Avago
TECHNOLOGIES

LED Solutions
High Brightness LEDs, Indicators and Displays

Your Imagination, Our Innovation
Sense · Illuminate · Connect

LED Solutions

High Brightness LEDs

LED Indicators and Displays

Avago Technologies is one of the largest producers of visible light-emitting diodes in the world.

Avago Technologies offers "one-stop shopping" with its wide array of LED (Light Emitting Diodes) Solutions. With our large manufacturing base and many years of experience from our HP and Agilent days, we are one of the largest producers of visible LEDs in the world and ships billions of products annually.

Avago employs the latest in material and process technology to produce superior LEDs. Our highly acclaimed AllnGaP (aluminium indium gallium phosphide) LED material offers high brightness and stable light output over thousands of hours with excellent mean-time-before-failure (MTBF). With our cutting edge LED technology, our solution also offers dazzling blue and green colors with InGaN (indium gallium nitride) material, and very cost-effective GaP (gallium phosphide) based technology, perfect for low to moderate light output. Avago's LEDs create brilliant lights with rich life-like colors for our customers' applications which are longer lasting and at a globally competitive price. They are suitable for almost any applications that customers need today with wide selection of viewing and package options.

Key products range from high brightness and high power LEDs, surface mount lamps, PLCC surface mount LEDs, to standard brightness through-hole lamps, chip LEDs, flash LEDs and various LED displays. These LED Solutions address a wide range of markets, including electronic sign and signal, automotive, solid-state lighting, consumer electronics, home and mobile appliances.

For virtually all established and emerging applications, Avago Technologies has the right LED Solutions to meet your design requirements.

High Brightness LEDs

High Brightness Through-hole Lamps

Description

Avago Technologies offers two types of technology based LEDs AlInGaP and InGaN which are suitable for high brightness needs. Through Hole LEDs are offered in 4 mm and 5 mm package.

These devices are casted using advance optical grade epoxy, which provides superior high temperature performance and excellent moisture resistance.

These High Brightness Through Hole LEDs are suitable for application in traffic management, solar powered variable message signs and commercial outdoor advertising video displays.

Features and Benefits

- Excellent product quality and reliability
- Wide range of products
- Competitive pricing
- Wide operating temperature range
- Low power consumption
  - High efficiency, low drive currents and low driving voltages required.
- Colors available for AlInGaP LED lamps:
  Red (626nm), Red Orange (615nm), Orange (605nm) and Amber (590nm)
- Colors available for InGaN LED lamps:
  Blue (470nm), Green (525nm).
- Packaging options
  - Bulk
  - Ammopack

Typical Applications

- Electronic Signs and Signals
  - Traffic Signal
  - Variable Message Sign
  - Pedestrian Signal
  - Work Zone Warning Lights
- Solar Powered Sign
- Commercial Outdoor Advertising
  - Full Color Sign
  - Mono Color Sign

High Brightness LEDs

High Brightness 5mm Round LED Lamp

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle (°)	Standoff (Yes/N0)	Luminous Intensity (mcd) @ 20 mA		Package Drawing
						Min.	Max.	
5 mm Round LED Lamps								
8º Viewing Angle								
HLMP-EG08-X1000		Red	626	8	No	7200	21000	A
HLMP-EG10-X1000		Red	626	8	Yes	7200	21000	B
HLMP-EH08-Y2000		Red-Orange	615	8	No	9300	27000	A
HLMP-EH10-Y2000		Red-Orange	615	8	Yes	9300	27000	B
HLMP-EJ08-X1000		Orange	605	8	No	7200	21000	A
HLMP-EJ10-X1000		Orange	605	8	Yes	7200	21000	B
HLMP-EL08-X1000		Amber	590	8	No	7200	21000	A
HLMP-EL10-X1000		Amber	590	8	Yes	7200	21000	B
5mm Round LED Lamps								
15º Viewing Angle								
HLMP-EG1G-Y10DD		Red	626	15	No	9300	21000	A
HLMP-EG1H-Y10DD		Red	626	15	Yes	9300	21000	B
HLMP-EG1A-Z10DD		Red	626	15	No	12000	21000	A
HLMP-EG1B-Z10DD		Red	626	15	Yes	12000	21000	B
HLMP-EH1A-Z10DD		Red-Orange	615	15	No	12000	21000	A
HLMP-EH1B-Z10DD		Red-Orange	615	15	Yes	12000	21000	B
HLMP-EL1G-Y10DD		Amber	590	15	No	9300	21000	A
HLMP-EL1H-Y10DD		Amber	590	15	Yes	9300	21000	B
HLMP-EL1A-Z1KDD		Amber	590	15	No	12000	21000	A
HLMP-EL1B-Z1KDD		Amber	590	15	Yes	12000	21000	B
HLMP-CB1G-WY0DD		Blue	470	15	No	5500	12000	C
HLMP-CB1H-WY0DD		Blue	470	15	Yes	5500	12000	D
HLMP-CB1A-XY0DD		Blue	470	15	No	7200	12000	C
HLMP-CB1A-XYBDD		Blue	470	15	No	7200	12000	C
HLMP-CB1A-XYCDD		Blue	470	15	No	7200	12000	C
HLMP-CB1B-XY0DD		Blue	470	15	Yes	7200	12000	D
HLMP-CB1B-XYBDD		Blue	470	15	Yes	7200	12000	D
HLMP-CB1B-XYCDD		Blue	470	15	Yes	7200.	12000	D
HLMP-CM1G-350DD		Green	525	15	No	27000	59000	C
HLMP-CM1H-350DD		Green	525	15	Yes	27000	59000	D
HLMP-CM1A-560DD		Green	525	15	No	45000	76000	C
HLMP-CM1B-560DD		Green	525	15	Yes	45000	76000	D
HLMP-CE13-24CDD		Cyan	505	15	No	21000	45000	A
HLMP-CE13-24QDD		Cyan	505	15	No	21000	45000	A
HLMP-CE14-24CDD		Cyan	505	15	Yes	21000	45000	B
HLMP-CE14-24QDD		Cyan	505	15	Yes	21000	45000	B

High Brightness LEDs

High Brightness 5mm Round LED Lamp

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle (°)	Standoff (Yes/N0)	Luminous Intensity (mcd) @ 20 mA		Package Drawing
						Min.	Max.	
23° Viewing Angle								
HLMP-EG2G-XZ0DD		Red	626	23	No	7200	16000	A
HLMP-EG2H-XZ0DD		Red	626	23	Yes	7200	16000	B
HLMP-EG2A-XY0DD		Red	626	23	No	7200	12000	A
HLMP-EG2B-XY0DD		Red	626	23	Yes	7200	12000	B
HLMP-EH2A-XY0DD		Red-Orange	615	23	No	7200	12000	A
HLMP-EH2B-XY0DD		Red-Orange	615	23	Yes	7200	12000	B
HLMP-EL2G-WY0DD		Amber	590	23	No	5500	12000	A
HLMP-EL2H-WY0DD		Amber	590	23	Yes	5500	12000	B
HLMP-EL2A-XYKDD		Amber	590	23	No	7200	12000	A
HLMP-EL2B-XYKDD		Amber	590	23	Yes	7200	12000	B
HLMP-CB2G-UW0DD		Blue	470	23	No	3200	7200	C
HLMP-CB2H-UW0DD		Blue	470	23	Yes	3200	7200	D
HLMP-CB2A-VW0DD		Blue	470	23	No	4200	7200	C
HLMP-CB2A-VWBDD		Blue	470	23	No	4200	7200	C
HLMP-CB2A-VWCDD		Blue	470	23	No	4200	7200	C
HLMP-CB2B-VW0DD		Blue	470	23	Yes	4200	7200	D
HLMP-CB2B-VWBDD		Blue	470	23	Yes	4200	7200	D
HLMP-CB2B-VWCDD		Blue	470	23	Yes	4200	7200	D
HLMP-CM2G-130DD		Green	525	23	No	16000	35000	C
HLMP-CM2H-130DD		Green	525	23	Yes	16000	35000	D
HLMP-CM2A-230DD		Green	525	23	No	21000	35000	C
HLMP-CM2B-230DD		Green	525	23	Yes	21000	35000	D
HLMP-CE22-Y1CDD		Cyan	505	23	No	9300	21000	A
HLMP-CE22-Y1QDD		Cyan	505	23	No	9300	21000	A
HLMP-CE25-Y1CDD		Cyan	505	23	Yes	9300	21000	B
HLMP-CE25-Y1QDD		Cyan	505	23	Yes	9300	21000	B

High Brightness LEDs

High Brightness 5mm Round LED Lamp

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle (°)	Standoff (Yes/N0)	Luminous Intensity (mcd) @ 20 mA		Package Drawing
						Min.	Max.	
30° Viewing Angle								
HLMP-EG3G-VX0DD		Red	626	30	No	4200	9300	A
HLMP-EG3H-VX0DD		Red	626	30	Yes	4200	9300	B
HLMP-EG3A-WX0DD		Red	626	30	No	5500	9300	A
HLMP-EG3B-WX0DD		Red	626	30	Yes	5500	9300	B
HLMP-EH3A-WX0DD		Red-Orange	615	30	No	5500	9300	A
HLMP-EH3B-WX0DD		Red-Orange	615	30	Yes	5500	9300	B
HLMP-EL3G-VX0DD		Amber	590	30	No	4200	9300	A
HLMP-EL3H-VX0DD		Amber	590	30	Yes	4200	9300	B
HLMP-EL3A-WXKDD		Amber	590	30	No	5500	9300	A
HLMP-EL3B-WXKDD		Amber	590	30	Yes	5500	9300	B
HLMP-CB3G-TV0DD		Blue	470	30	No	2500	5500	C
HLMP-CB3H-TV0DD		Blue	470	30	Yes	2500	5500	D
HLMP-CB3A-UV0DD		Blue	470	30	No	3200	5500	C
HLMP-CB3A-UVBDD		Blue	470	30	No	3200	5500	C
HLMP-CB3A-UVCDD		Blue	470	30	No	3200	5500	C
HLMP-CB3B-UV0DD		Blue	470	30	Yes	3200	5500	D
HLMP-CB3B-UVBDD		Blue	470	30	Yes	3200	5500	D
HLMP-CB3B-UVCDD		Blue	470	30	Yes	3200	5500	D
HLMP-CM3G-Y10DD		Green	525	30	No	9300	21000	C
HLMP-CM3H-Y10DD		Green	525	30	Yes	9300	21000	D
HLMP-CM3A-Z10DD		Green	525	30	No	12000	21000	C
HLMP-CM3A-Z1BDD		Green	525	30	No	12000	21000	C
HLMP-CM3A-Z1CDD		Green	525	30	No	12000	21000	C
HLMP-CM3B-Z10DD		Green	525	30	Yes	12000	21000	D
HLMP-CM3B-Z1BDD		Green	525	30	Yes	12000	21000	D
HLMP-CM3B-Z1CDD		Green	525	30	Yes	12000	21000	D
HLMP-CE34-XZCDD		Cyan	505	30	No	7200	16000	A
HLMP-CE34-XZQDD		Cyan	505	30	No	7200	16000	A
HLMP-CE35-XZCDD		Cyan	505	30	Yes	7200	16000	B
HLMP-CE35-XZQDD		Cyan	505	30	Yes	7200	16000	B

High Brightness LEDs

High Brightness Oval LED Lamp

Part Number		Color	Dominant Wavelength (nm)	Viewing Angle (°)	Standoff (Yes/N0)	Luminous Intensity (mcd) @ 20 mA		Lead Frame Orientation	Package Drawing	Remarks
						Min.	Max.			
4 mm Standard Oval LED Lamp										
50° x 100° Viewing Angle										
HLMP-LG65-WX0DD		Red	626	50x100	Yes	1380	1990	Parallel	E	For full color sign application
HLMP-LM65-Z30DD		Green	525	50x100	Yes	2400	5040	Parallel	E	
HLMP-LM65-23BDD		Green	525	50x100	Yes	3500	5040	Parallel	E	
HLMP-LB65-RU0DD		Blue	470	50x100	Yes	550	1150	Parallel	E	
HLMP-LB65-STBDD		Blue	470	50x100	Yes	660	960	Parallel	E	
HLMP-LH65-XY0DD		Red Orange	615	50x100	Yes	1660	2400	Parallel	E	For mono color sign application
HLMP-LL65-XYKDD		Amber	590	50x100	Yes	1660	2400	Parallel	E	
4mm Standard Oval LED Lamp										
40º x 100º Viewing Angle										
HLMP-LG75-XY0DD		Red	626	40x100	Yes	1660	2400	Parallel	E	For full color sign application
HLMP-LG73-XZ0DD		Red	626	40x100	Yes	1660	2900	Parallel	E	
HLMP-LM75-34CDD		Green	530	40x100	Yes	4200	6050	Parallel	E	For full color sign application
HLMP-LM73-35PDD		Green	530	40x100	Yes	4200	7260	Parallel	E	
HLMP-LB75-VWBDD		Blue	470	40x100	Yes	1150	1660	Parallel	E	For full color sign application
HLMP-LB72-UWPDD		Blue	470	40x100	Yes	960	1660	Parallel	E	
4 mm Super Oval LED Lamp										
60° x 120° Viewing Angle										
HLMP-SL20-MP0DD		Amber	590	60x120	Yes	520	1150	Perpendicular	F	For mono color sign application
HLMP-RL20-MP0DD		Amber	590	60x120	Yes	520	1150	Parallel	G	
5 mm Standard Oval LED Lamps										
40º x 100° Viewing Angle										
HLMP-HG64-WX0DD		Red	626	40x100	No	1380	1990	Parallel	H	For full color sign application
HLMP-HG65-WX0DD		Red	626	40x100	Yes	1380	1990	Parallel	I	
HLMP-HM64-34BDD		Green	525	40x100	No	4200	6050	Parallel	H	
HLMP-HM65-34BDD		Green	525	40x100	Yes	4200	6050	Parallel	I	
HLMP-HB64-STBDD		Blue	470	40x100	No	660	960	Parallel	H	
HLMP-HB65-STBDD		Blue	470	40x100	Yes	660	960	Parallel	I	
HLMP-HG74-XY0DD		Red	626	40x100	No	1660	2400	Parallel	H	
HLMP-HG75-XY0DD		Red	626	40x100	Yes	1660	2400	Parallel	I	
HLMP-HM74-34CDD		Green	530	40x100	No	4200	6050	Parallel	H	
HLMP-HM75-34CDD		Green	530	40x100	Yes	4200	6050	Parallel	I	
HLMP-HB74-UVCDD		Blue	470	40x100	No	960	1380	Parallel	H	
HLMP-HB75-UVCDD		Blue	470	40x100	Yes	960	1380	Parallel	I	
HLMP-HB75-VWCDD		Blue	470	40x100	Yes	1150	1660	Parallel	I	

High Brightness LEDs

High Brightness Oval LED Lamp

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle (°)	Standoff (Yes/N0)	Luminous Intensity (mcd) @ 20 mA		Lead Frame Orientation	Package Drawing	Remarks
						Min.	Max.			
HLMP-HH64-WX0DD		Red Orange	615	40x100	No	1380	1990	Parallel	H	For mono color sign application
HLMP-HH65-WX0DD		Red Orange	615	40x100	Yes	1380	1990	Parallel	I	
HLMP-HL64-XYKDD		Amber	590	40x100	No	1660	2400	Parallel	H	
HLMP-HL64-XYLDD		Amber	590	40x100	No	1660	2400	Parallel	H	
HLMP-HL65-XYKDD		Amber	590	40x100	No	1660	2400	Parallel	I	
HLMP-HL65-XYLDD		Amber	590	40x100	No	1660	2400	Parallel	I	
5 mm Mini Oval LED Lamps										
30º x 70° Viewing Angle										
HLMP-AG64-Z10DD		Red	626	30x70	No	2400	3500	Parallel	J	For full color sign application
HLMP-AG65-Z10DD		Red	626	30x70	Yes	2400	3500	Parallel	K	
HLMP-AM64-460DD		Green	525	30x70	No	5040	8710	Parallel	J	
HLMP-AM65-460DD		Green	525	30x70	Yes	5040	8710	Parallel	K	
HLMP-AG74-120DD		Red	626	30x70	No	2900	4200	Parallel	J	
HLMP-AG75-120DD		Red	626	30x70	Yes	2900	4200	Parallel	K	
HLMP-AM74-45CDD		Green	530	30x70	No	5040	7260	Parallel	J	
HLMP-AM75-45CDD		Green	530	30x70	Yes	5040	7260	Parallel	K	
HLMP-AB74-WXBDD		Blue	470	30x70	No	1380	1990	Parallel	J	
HLMP-AB75-WXBDD		Blue	470	30x70	Yes	1380	1990	Parallel	K	
HLMP-AH64-Z10DD		Red Orange	615	30x70	No	2400	3500	Parallel	J	For mono color sign application
HLMP-AH65-Z10DD		Red Orange	615	30x70	Yes	2400	3500	Parallel	K	
HLMP-AJ64-YZ0DD		Orange	605	30x70	No	1990	2400	Parallel	J	
HLMP-AJ65-YZ0DD		Orange	605	30x70	Yes	1990	2400	Parallel	K	
HLMP-AL64-23KDD		Amber	590	30x70	No	3500	5040	Parallel	J	
HLMP-AL65-23KDD		Amber	590	30x70	Yes	3500	5040	Parallel	K	

High Brightness LEDs

High Brightness Lamps

High Brightness LED Lamps 1.3:1 Intensity Bin Limits (mcd at 20mA)

Bin ID	Min.	Max.
D	65	85
E	85	110
F	110	140
G	140	180
H	180	240
J	240	310
K	310	400
L	400	520
M	520	680
N	680	880
P	880	1150
Q	1150	1500
R	1500	1900
S	1900	2500
T	2500	3200
U	3200	4200
V	4200	5500
W	5500	7200
X	7200	9300
Y	9300	12000
Z	12000	16000
1	16000	21000
2	21000	27000
3	27000	35000
4	35000	45000
5	45000	59000
6	59000	76000

Tolerance for each bin limit is ±15%

High Brightness LED Lamps 1.2:1 Intensity Bin Limits (mcd at 20mA)

Bin ID	Min.	Max.
P	380	460
Q	460	550
R	550	660
S	660	800
T	800	960
U	960	1150
V	1150	1380
W	1380	1660
X	1660	1990
Y	1990	2400
Z	2400	2900
1	2900	3500
2	3500	4200
3	4200	5040
4	5040	6050
5	6050	7260
6	7260	8710
7	8710	10460
8	10460	12560
9	12560	15100

Tolerance for each bin limit is ±15%

Color Bin Structure

Bin ID	Wavelength (nm) Min.	Max.	Remark
Red			
--	618.0	630.0	Type 1
--	620.0	630.0	Type 2
Red Orange [1]			
--	612.0	619.0	Type 1
--	612.0	621.7	Type 2
Orange [1]			
1	600.0	604.0	Type 1
2	604.0	608.0	
3	608.0	612.0	
2	599.5	604.5	Type 2
4	604.5	610.5	
Amber			
1	584.5	587.0	
2	587.0	589.5	
4	589.5	592.0	
6	592.0	594.5	
Green [1]			
1	520.0	524.0	Type 1
2	524.0	528.0	Type 1
3	528.0	532.0	Type 1
4	532.0	536.0	Type 1
5	536.0	540.0	Type 1
1	519.0	523.0	Type 2
2	523.0	527.0	Type 2
3	527.0	531.0	Type 2
4	531.0	535.0	Type 2
5	535.0	539.0	Type 2
Blue			
1	460.0	464.0	
2	464.0	468.0	
3	468.0	472.0	
4	472.0	476.0	
5	476.0	480.0	

Note 1: There are 2 types of color bin limits. Please refer to individual datasheet for details.
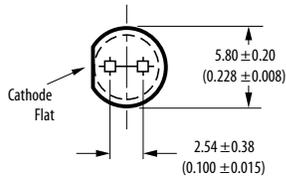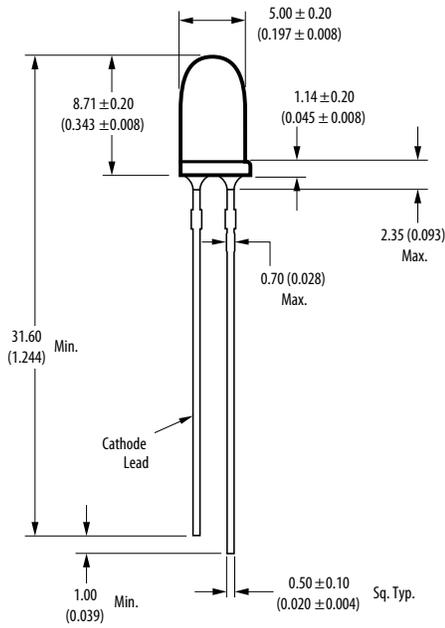
Tolerance for each bin limit is ±0.5nm

High Brightness LEDs

**High Brightness Lamps
Package Drawing**

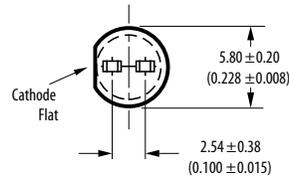**5 mm Round LED Lamp**

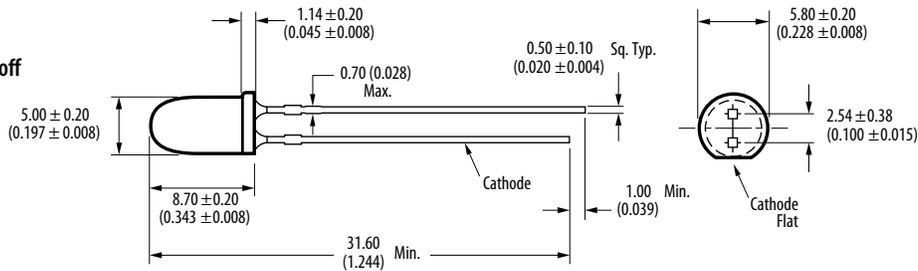**A: Non-standoff**

5.00 ± 0.20
(0.197 ± 0.008)

8.71 ± 0.20
(0.343 ± 0.008)

1.14 ± 0.20
(0.045 ± 0.008)

2.35 (0.093)
Max.

0.70 (0.028)
Max.

31.60
(1.244) Min.

Cathode
Lead

1.00
(0.039) Min.

0.50 ± 0.10
(0.020 ± 0.004) Sq. Typ.

5.80 ± 0.20
(0.228 ± 0.008)

Cathode
Flat

2.54 ± 0.38
(0.100 ± 0.015)

B: Standoff

5.00 ± 0.20
(0.197 ± 0.008)

8.71 ± 0.20
(0.343 ± 0.008)

d

1.14 ± 0.20
(0.045 ± 0.008)

1.50 ± 0.15
(0.059 ± 0.006)

0.70 (0.028)
Max.

31.60
(1.244) Min.

Cathode
Lead

1.00
(0.039) Min.

0.50 ± 0.10
(0.020 ± 0.004) Sq. Typ.

5.80 ± 0.20
(0.228 ± 0.008)

Cathode
Flat

2.54 ± 0.38
(0.100 ± 0.015)

Note:
Please refer to individual datasheet for dimension D.
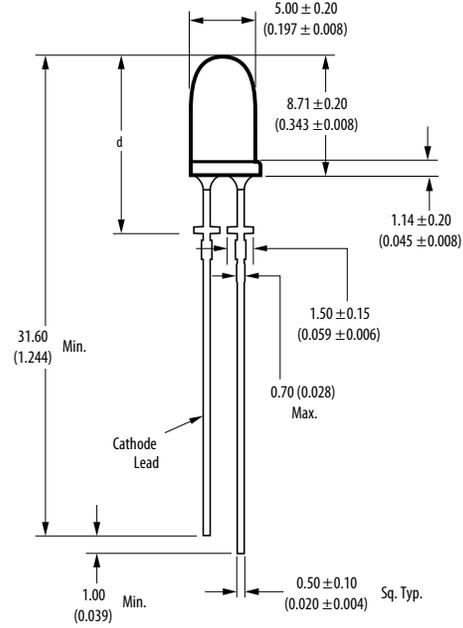
5 mm Round LED Lamp

C: Non-standoff

1.14 ± 0.20
(0.045 ± 0.008)

0.70 (0.028)
Max.

0.50 ± 0.10
(0.020 ± 0.004) Sq. Typ.

5.00 ± 0.20
(0.197 ± 0.008)

8.70 ± 0.20
(0.343 ± 0.008)

Cathode

1.00
(0.039) Min.

31.60
(1.244) Min.

5.80 ± 0.20
(0.228 ± 0.008)

2.54 ± 0.38
(0.100 ± 0.015)

Cathode
Flat

D: Standoff

1.00 ± 0.20
(0.039 ± 0.008)

1.30 ± 0.15
(0.051 ± 0.006)

0.70 (0.028)
Max.

0.50 ± 0.10
(0.020 ± 0.004) Sq. Typ.

5.00 ± 0.20
(0.197 ± 0.008)

8.70 ± 0.20
(0.343 ± 0.008)

D

Cathode

1.00
(0.039) Min.

31.60
(1.244) Min.

5.80 ± 0.20
(0.228 ± 0.008)

2.54 ± 0.38
(0.100 ± 0.015)

Cathode
Flat
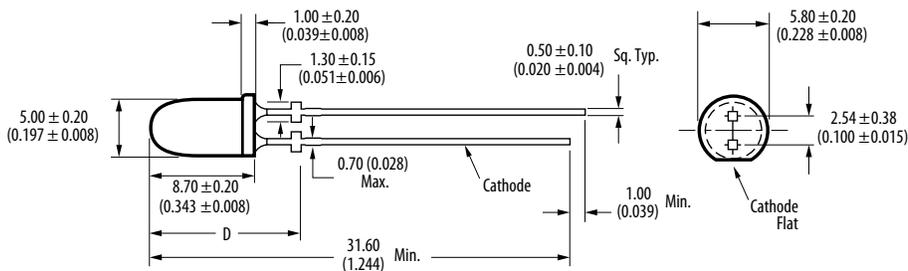
Note:
Please refer to individual datasheet for dimension D.

High Brightness LEDs

4 mm Standard Oval LED Lamp 50° x 100° Viewing Angle

E

21.0 Min.
(0.827)
Note: HLMP-LG73/LM73/LB72 is with 18.0/ 0.709 Min.

10.00 ±0.50
(0.394 ±0.020)

7.26 ±0.20
(0.286 ±0.008)

Ø 3.80 ±0.20
(0.1496 ±0.008)

1.25 ±0.20
(0.049 ±0.008)

Cathode
Lead

1.0 Min.
(0.039)

2.54 ±0.30
(0.100 ±0.012)

3.00 ±0.20
(0.118 ±0.008)

0.80 Max. Epoxy Meniscus
(0.031)
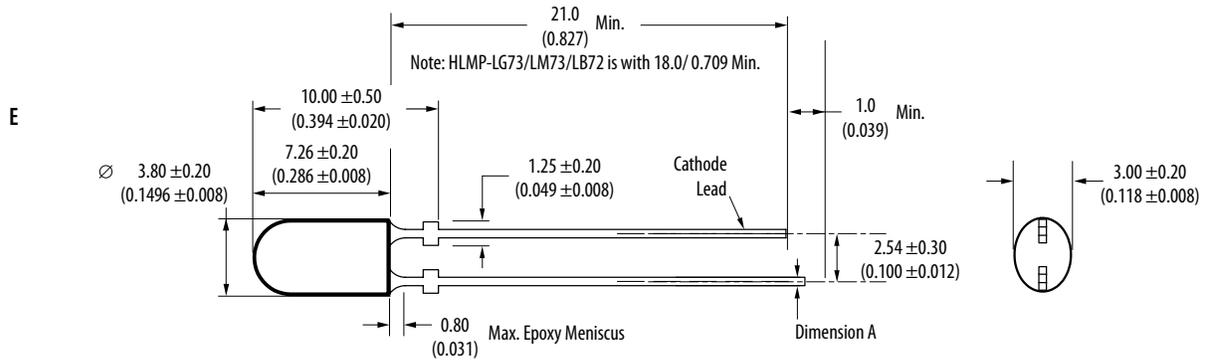
Dimension A

Note:
Please refer to individual datasheet for dimension A.

4 mm Super Oval LED Lamp 60° x 120° Viewing Angle

F

25.4 Min.
(1.00)

9.90 ±0.50
(0.390 ±0.020)

6.30 ±0.25
(0.248 ±0.010)

4.0 ±0.20
(0.157 ±0.010)

1.40 Typ.
(0.055)

Cathode
Lead

1.0 Min.
(0.039)

2.54 Nom.
(0.100)

1.20 Typ.
(0.047)

0.50 Typ.
(0.020)

4.00 ±0.25
(0.157 ±0.010)

G

25.4 Min.
(1.00)

9.90 ±0.25
(0.390 ±0.010)

6.20 ±0.25
(0.244 ±0.010)

3.90 ±0.25
(0.154 ±0.010)

1.40 Typ.
(0.055)

Cathode
Lead

1.0 Min.
(0.039)

2.54 Nom.
(0.100)

1.00 Typ.
(0.039)

0.50 Typ.
(0.020)

3.00 ±0.25
(0.118 ±0.010)
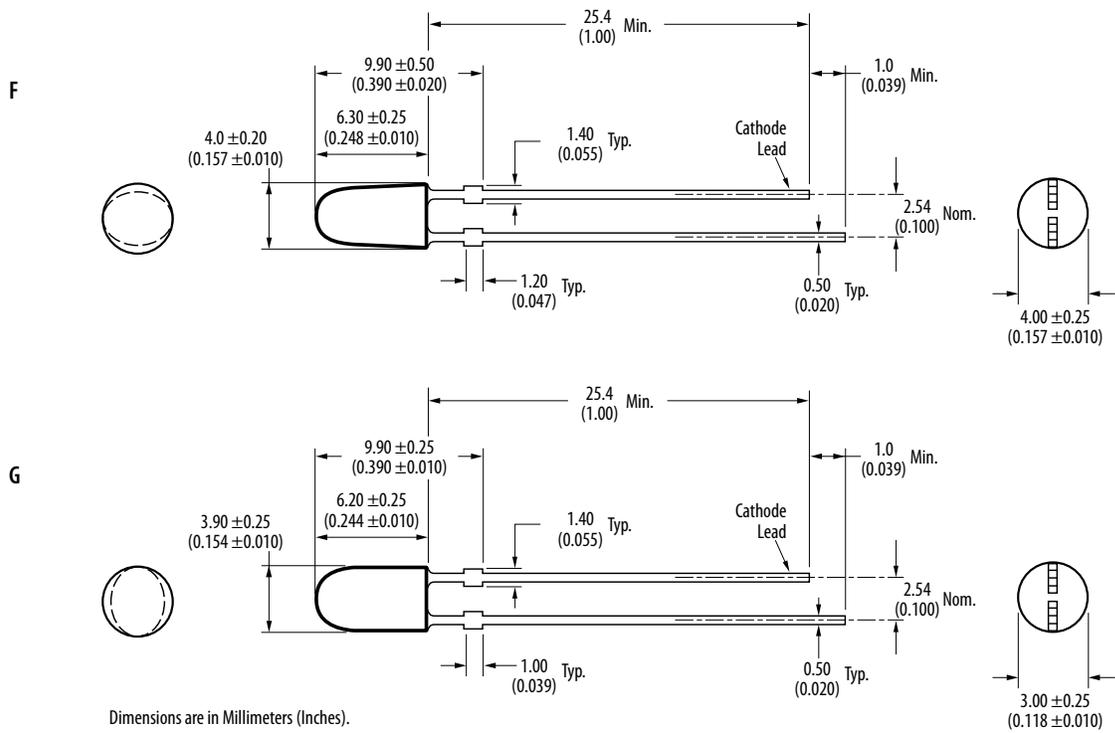
Dimensions are in Millimeters (Inches).

High Brightness LEDs

5 mm Standard Oval LED Lamp 40° x 100° Viewing Angle

H

5.20 ±0.20
(0.0205 ±0.008)

1.02
(0.040) Max.

0.50 ±0.10
(0.020 ±0.004) SQ.

3.80 ±0.20
(0.150 ±0.008)

0.70
(0.028) Max.

Cathode Lead

1.00
(0.039) Min.

2.54 ±0.30
(0.10 ±0.012)

7.00 ±0.20
(0.0276 ±0.008)

24.00
(0.945) Min.

I

10.80 ±0.50
(0.425 ±0.020)

Dimension A

5.20 ±0.20
(0.205 ±0.008)

1.02
(0.040) Max.

0.70
(0.028) Max.

0.50 ±0.10
(0.020 ±0.004) Sq.

3.80 ±0.20
(0.150 ±0.008)

Cathode Lead

1.00
(0.039) Min.

2.54 ±0.30
(0.10 ±0.012)

7.00 ±0.20
(0.276 ±0.008)

24.00
(0.945) Min.
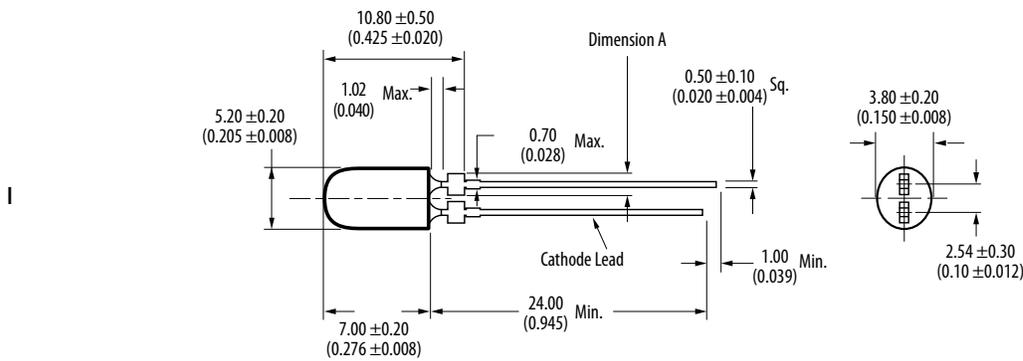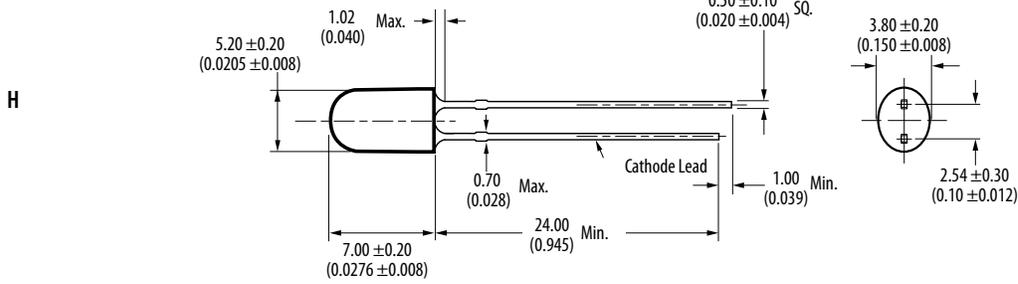
Note:
Please refer to individual datasheet for dimension A.

5mm Mini Oval LED Lamp 30° x 70° Viewing Angle

J

8.70 ±0.20
0.342 ±0.008

24.00
0.945 Min.

1.0
0.038 Min.

A

Cathode
Lead

B

0.80
0.032 Max. Epoxy Meniscus

2.50 ±0.10
0.020 ±0.004

2.54 ±0.3
0.100 ±0.012

K

11.70 ±0.20
0.4606 ±0.01

24.00
0.945 Min.

1.0
0.038 Min.

8.70 ±0.20
0.342 ±0.008

1.50 ± 0.15
0.0591 ± 0.006

Cathode
Lead

B

A

0.80
0.032 Max. Epoxy Meniscus

0.50 ±0.10
0.020 ±0.004

2.54 ±0.3
0.100 ±0.012
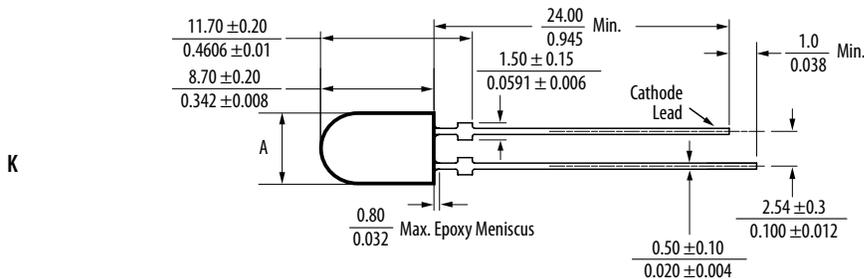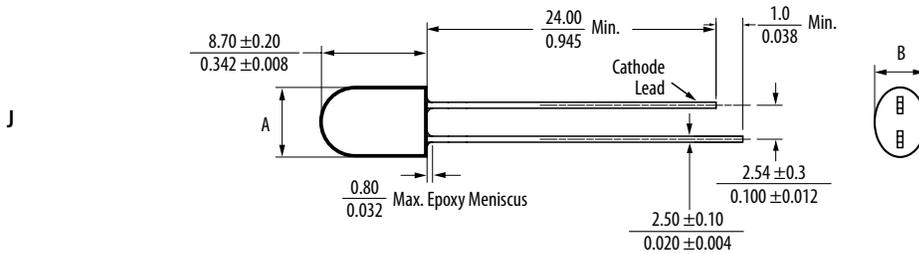
Note:
For all package drawings above, the dimension are in millimeters (inches).
Please refer to individual datasheet for Dimension A and B.

High Brightness LEDs

High Brightness SMT Lamps

Description

Avago Technologies offers industry's first Surface Mount High Brightness Round and Oval LED lamps for Electronic Sign Application. These SMT lamps are compatible with industrial reflow soldering processes and made with advanced optical grade epoxy to provide superior performance in outdoor application.

Features and Benefits

- Compact form factor with well defined spatial radiation pattern
- High Brightness AlInGaP and InGaN material available in Red, Amber, Green and Blue
- Moisture sensitivity level (MSL) 2A
- Compatible with industrial reflow soldering process
- Lens features: Tinted for SMT Round
  – Tinted and diffused for SMT Oval

Typical Applications

- Electronic Signs and signals
  – Traffic Signal
  – Variable Message Signs
  – Full Color Signs
  – Mono Color Signs

High Brightness SMT Round and Oval Lamps

Part Number	Color	Typ. Dominant Wavelength (nm)	Typ. Viewing Angle (°)	Lens Tinted	Lens Diffused	Luminous Intensity (mcd) @ 20 mA		Package Drawing
						Min.	Max.	
SMT Round Lamps								
30° Viewing Angle								
ALMD-EG3D-VX002	Red	626	30	Yes	No	4200	9300	A
ALMD-EL3D-VX002	Amber	590	30	Yes	No	4200	9300	
ALMD-CM3D-XZ002	Green	525	30	Yes	No	7200	16000	
ALMD-CB3D-SU002	Blue	470	30	Yes	No	1900	5500	
SMT Oval Lamps								
40 × 100° Viewing Angle								
ALMD-LG36-WZ002	Red	626	40 x 100	Yes	Yes	1380	2900	B
ALMD-LL36-WZ002	Amber	590	40 x 100	Yes	Yes	1380	2900	
ALMD-LM36-14002	Green	525	40 x 100	Yes	Yes	2900	6050	
ALMD-LB36-SV002	Blue	470	40 x 100	Yes	Yes	660	1380	

High Brightness LEDs

High Brightness SMT Round Lamps
1.3:1 Intensity Bin Limits (mcd at 20mA)

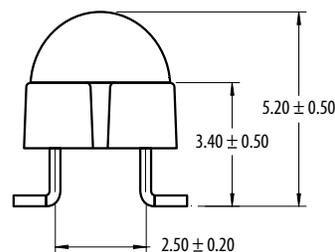| Bin ID	Min.	Max.
R	1500	1900
S	1900	2500
T	2500	3200
U	3200	4200
V	4200	5500
W	5500	7200
X	7200	9300
Y	9300	12000
Z	12000	16000

Tolerance of each bin limit is ± 15%

High Brightness SMT Oval Lamps
1.2:1 Intensity Bin Limits (mcd at 20mA)

Bin ID	Min.	Max.
R	550	660
S	660	800
T	800	960
U	960	1150
V	1150	1380
W	1380	1660
X	1660	1990
Y	1990	2400
Z	2400	2900
1	2900	3500
2	3500	4200
3	4200	5040
4	5040	6050

Tolerance of each bin limit is ± 15%

Color Bin Structure

Bin ID	Wavelength (nm)	
	Min.	Max.
Red		
Red	618.0	630.0

Tolerance for each bin limits is ± 0.05nm

Bin ID	Wavelength (nm)	
	Min.	Max.
Amber		
1	584.5	587.0
2	587.0	589.5
4	589.5	592.0
6	592.5	594.0

Tolerance for each bin limits is ± 0.05nm

Bin ID	Wavelength (nm)	
	Min.	Max.
Green		
1	519.0	523.0
2	523.0	527.0
3	527.0	531.0
4	531.0	535.0
5	535.0	539.0

Tolerance for each bin limits is ± 0.05nm

Bin ID	Wavelength (nm)	
	Min.	Max.
Blue		
1	460.0	464.0
2	464.0	468.0
3	468.0	472.0
4	472.0	476.0
5	476.0	480.0

Tolerance for each bin limits is ± 0.05nm

High Brightness SMT Lamps Package Drawing

Package Drawing A

4.20 ± 0.20
4.20 ± 0.20
4.75 ± 0.50

A - Anode
C - Cathode

Package Drawing B

4.20 ± 0.20
4.20 + 0.20
4.75 + 0.50

Orientation
(Anode Mark)

A - Anode
C - Cathode

6.50 ± 0.50
3.40 ± 0.50
2.50 ± 0.20

1.4 (4X)
C
A
1.0

5.20 ± 0.50
3.40 ± 0.50
2.50 ± 0.20

1.4 (4X)
1.0
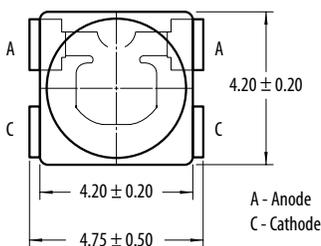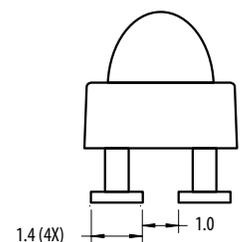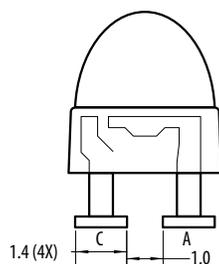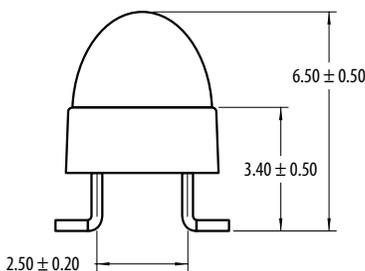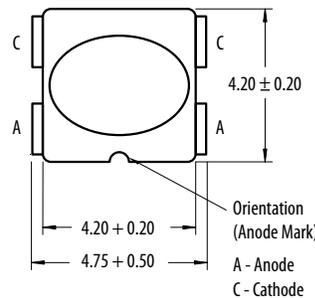
Notes:
1. All dimensions in millimeters (inches).
2. Tolerance is ± 0.20mm unless other specified.

13

High Brightness LEDs

Surface Mount PLCC LEDs

Description

This surface-mount LED comes in PLCC standard package dimension. It has a substrate made up of a molded plastic reflector sitting on top of a bent lead frame. The die is attached within the reflector cavity and the cavity is encapsulated by an Avago Technologies proprietary epoxy or silicone material.

The PLCC SMT LED products with a viewing angle of 120° is ideal for instruments/switch/icon backlighting. With additional lens in 30° and 50° variants, these products are especially fitting to applications for traffic lights, CHMSL and displays. Its external reflector makes easy coupling with light pipe/light guide for an even-larger area backlighting. The package design coupled with careful selection of component materials allow these products to perform with high reliability in a larger temperature range -40°C to 100°C. The high reliability feature is crucial to Automotive Interior and Indoor ESS.

The surface-mount LED is designed to be compatible with industrial reflow soldering process.

Features and Benefits

- Industry Standard PLCC SMT package
  - No change in existing board layout, drop-in replacement for the existing PLCC SMT LEDs
- High brightness using AlInGaP and InGaN dice technologies
- Available in various colors
  - Red, Red Orange, Orange, Amber, Yellow Green, Emerald Green, Green, Blue and White
  - Bi-colors in various combinations
  - Tri-colors in Red, Green and Blue
- Available in viewing angle of 30°, 50° and 120°
  - Well-suited for backlighting applications
- High volume, high reliability
  - Cost-effective solution
- Black surface and black body options to enhance contrast for display application

Target Markets and Applications

- Interior automotive
  - Instrument panel backlighting
  - Central console backlighting
  - Cabin backlighting
- Exterior automotive
  - Turn signals
  - Side repeater lamps
  - CHMSLs (center high-mounted stop light)
  - Rear combination lamps
  - Puddle lights
- Electronic Signs and Signals
  - Interior full color sign
  - Variable message sign
- Office Automation, Electrical Appliances, Industrial Equipment
  - Front panel backlighting
  - Push button backlighting
  - Display backlighting

High Brightness LEDs

PLCC Surface Mount LEDs
PLCC-2

Part Number	Color		Typ. Dominant Wavelength λ_D (nm)	Viewing Angle $2\theta_{1/2}$ (°)	Min. I_V (mcd)	Max. I_V (mcd)	Typ. V_F (V)	Test Current (mA)
HSMS-A100-J00J1		Red	626	120	4.5	–	2.2	20
HSMH-A100-L00J1		Red	637	120	11.2	–	1.9	20
HSMC-A100-Q00J1		Red	626	120	71.5	–	1.9	20
HSMC-A101-S40J1		Red	626	120	180	450	1.9	20
HSMJ-A100-Q00J1		Red Orange	615	120	71.5	–	1.9	20
HSMJ-A101-S00J1		Red Orange	615	120	180	–	1.9	20
HSMD-A100-J00J1		Orange	602	120	4.4	–	2.2	20
HSML-A100-Q00J1		Orange	605	120	71.5	–	1.9	20
HSMY-A100-J00J1		Amber	585	120	4.5	–	2.2	20
HSMA-A100-Q00J1		Amber	590	120	71.5	–	1.9	20
HSMG-A100-J02J1		Yellow Green	569	120	4.5	–	2.2	20
HSME-A100-M02J1		Yellow Green	569	120	18	–	1.9	20
HSMG-A100-H01J1		Emerald Green	560	120	2.8	–	2.2	20
HSME-A100-L01J1		Emerald Green	560	120	11.2	–	1.9	20
HSMM-A100-U4PJ1		Green	525	120	450	1125	3.4	20
HSMM-A100-S00J1		Green	525	120	180	–	3.4	20

Notes:

1. The luminous intensity I_V, is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.

2. The dominant wavelength, λ_D, is derived from the CIE Chromaticity Diagram and represents the color of the device.

3. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the peak intensity.

PLCC-2 White

Part Number	Color		Chromaticity Coordinates		Viewing Angle	I_V @ 20 mA		V_F @ 20 mA
			x	y	$2\theta_{1/2}$ (°)	Min. (mcd)	Typ. (mcd)	Typ. (V)
HSMW-A100-U40J1		InGaN White	0.31	0.31	120	140	–	3.3

Notes:

1. The luminous intensity I_V, is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.

2. The chromaticity coordinates are derived from the CIE 1931 Chromaticity Diagram and represents the perceived color of the device.

3. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is ½ the peak intensity.

PLCC-2 White (ASMT-UWB1)

Part Number	Color	CCT (K)	Viewing Angle $2\theta_{1/2}$ (°)	Luminous Intensity (mcd)			Test Current (mA)
				Min	Typ	Max	
ASMT-UWB1-NX302	InGaN White	4500 ~ 8000	120	1800	2300	3550	20
ASMT-UWB1-NX312	InGaN White	2700 ~ 4000	120	1800	2300	3550	20
ASMT-UWB1-NX3A2	InGaN White	8000	120	1800	2300	3550	20
ASMT-UWB1-NX3B2	InGaN White	6500	120	1800	2300	3550	20
ASMT-UWB1-NX3C2	InGaN White	5700	120	1800	2300	3550	20
ASMT-UWB1-NX3D2	InGaN White	5000	120	1800	2300	3550	20
ASMT-UWB1-NX3E2	InGaN White	4500	120	1800	2300	3550	20
ASMT-UWB1-NX3F2	InGaN White	4000	120	1800	2300	3550	20
ASMT-UWB1-NX3G2	InGaN White	3500	120	1800	2300	3550	20
ASMT-UWB1-NX3H2	InGaN White	3000	120	1800	2300	3550	20
ASMT-UWB1-NX3J2	InGaN White	2700	120	1800	2300	3550	20

Tolerance ±12%

High Brightness LEDs

PLCC Surface Mount LEDs

Power PLCC-4

Part Number	Color		Typ. Dominant Wavelength λ_D [1] (nm)	Viewing Angle $2\theta_{1/2}$ [2] (°)	Min. I_V (mcd)	Max. I_V (mcd)	Typ. V_F (V)	Test Current (mA)
HSMC-A401-U80M1		Red	626	120	560	1400	2.2	50
HSMA-A401-U80M1		Amber	590	120	560	1400	2.2	50
HSMA-A401-V30M1		Amber	590	120	715	1400	2.2	50
HSML-A401-U40M1		Orange	605	120	450	1125	2.2	50
HSMJ-A401-U40M1		Red Orange	615	120	450	1125	2.2	50
HSME-A401-P4PM1		Emerald Green	567	120	45	112.5	2.2	50
HSMM-A400-U4QM2		Green	525	120	450	1125	3.8	30
HSMN-A400-S4QM2		Blue	470	120	180	450	3.8	30
HSMN-A400-S8PM2		Blue	470	120	224	560	3.8	30

Notes:
1. The dominant wavelength, λ_D, is derived from the CIE Chromaticity Diagram and represents the color of the device.
2. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the peak intensity.
3. The luminous intensity, I_V, is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.

Power PLCC-4 White

Part Number	Color	Chromaticity Coordinates		Viewing Angle $2\theta_{1/2}$ (°)	I_V @ 30 mA			VF @ 30 mA Typ. (V)
		x	y		Min. (mcd)	Typ. (mcd)	Max. (mcd)	
HSMW-A400-U00M2	InGaN White	0.31	0.31	120	450.00	700.00	-	3.8
ASMT-SWBM-NU803	InGaN White	0.318	0.318	120	560.00	1100.00	1400.00	3.5

Notes:
1. The luminous intensity I_V, is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.
2. I_V Tolerance $= \pm12\%$.
3. The chromaticity coordinates are derived from the CIE 1931 Chromaticity Diagram and represent the perceived color of the device.
4. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is ½ the peak intensity.

Power PLCC-4 with Lens

Part Number	Color		Dominant Wavelength λ_D [1] (nm)	Viewing Angle $2\theta_{1/2}$ (°)	Min. I_V (mcd)	Max. I_V (mcd)	Typ. V_F (V)	Test Current (mA)
HSMC-A431-Y80M1		AllnGaP Red	626	30	3550	9000	2.2	50
HSMC-A431-X90M1		AllnGaP Red	626	30	2240	7150	2.2	50
HSMC-A461-V00M1		AllnGaP Red	626	50	715	–	2.2	50
HSMJ-A430-W50M1		AllnGaP Red Orange	615	30	1125	3550	2.2	50
HSMJ-A431-X90M1		AllnGaP Red Orange	615	30	2240	7150	2.2	50
HSMJ-A461-W40M1		AllnGaP Red Orange	615	50	1125	2850	2.2	50
HSML-A431-X90M1		AllnGaP Orange	605	30	2240	7150	2.2	50
HSML-A461-W40M1		AllnGaP Orange	605	50	1125	2850	2.2	50
HSMA-A431-Y00M1		AllnGaP Amber	590	30	2850	–	2.2	50
HSMA-A431-Z50M1		AllnGaP Amber	590	30	4500	14000	2.2	50
HSMA-A461-X83M1		AllnGaP Amber	590	50	2240	5600	2.2	50
HSMM-A430-X90M2		InGaN Green	525	30	2240	4500	3.9	30
HSMN-A430-V50M2		InGaN Blue	470	30	715	1400	3.9	30

Notes:
1. The luminous intensity, I_V, is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.
2. I_V tolerance $\pm12\%$.
3. The dominant wavelength, λ_D, is derived from the CIE Chromaticity Diagram and represents the color of the device.
4. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is ½ the peak intensity.

High Brightness LEDs

PLCC Surface Mount LEDs

Bicolor PLCC-4

Part Number	Color		Min. I_V @ 20mA		Typ. I_V (mcd) @ 20mA
			Bin ID	mcd	
HSMF-A201-A00J1		GaP Red	K2	8	16
		GaP Yellow Green	L1	10	20
HSMF-A202-A00J1		GaP Red	K2	8	16
		GaP Yellow	K1	6.3	12
HSMF-A203-A00J1		GaP Red	K2	8	16
		GaP Emerald Green	J1	4	8
HSMF-A204-A00J1		GaP Orange	K2	8	16
		GaP Yellow Green	L1	10	20
HSMF-A205-A00J1		GaP Orange	K2	8	16
		GaP Emerald Green	J1	4	8
HSMF-A206-A00J1		GaP Yellow	K2	8	16
		GaP Yellow Green	L1	10	20
HSMF-A211-A00J1		AlGaAs Red	L2	12.5	25
		GaP Yellow Green	L1	10	20
HSMF-A212-A00J1		AlGaAs Red	L2	12.5	25
		GaP Yellow	K1	6.3	12
HSMF-A222-A00J1		AlInGaP Red	P1	40	80
		AlInGaP Amberi	P1	40	80
HSMF-A226-A00J1		AlInGaP Amber	P2	50	100
		AlInGaP Yellow Green	M2	20	60

Super 0.25W Power PLCC-4

Part Number	Color	CCT (K)	Viewing Angle (°)	Min Flux (lm)	Max Flux (lm)	Forward Voltage (Vf) If=80mA	Test Curent (mA)
ASMT-UWBG-NAC08	Cool White	4000 ~ 8000	120	18.1	35.2	3.4	80
ASMT-UWBG-NACA8	Cool White	8000	120	18.1	35.2	3.4	80
ASMT-UWBG-NACB8	Cool White	6500	120	18.1	35.2	3.4	80
ASMT-UWBG-NACC8	Cool White	5700	120	18.1	35.2	3.4	80
ASMT-UWBG-NACD8	Cool White	5000	120	18.1	35.2	3.4	80
ASMT-UWBG-NACE8	Cool White	4500	120	18.1	35.2	3.4	80
ASMT-UWBG-NACF8	Cool White	4000	120	18.1	35.2	3.4	80
ASMT-UWBH-NBD08	Cool White	4000 ~ 8000	120	23.5	39.8	3.4	80
ASMT-UWBH-NBDA8	Cool White	8000	120	23.5	39.8	3.4	80
ASMT-UWBH-NBDB8	Cool White	6500	120	23.5	39.8	3.4	80
ASMT-UWBH-NBDC8	Cool White	5700	120	23.5	39.8	3.4	80
ASMT-UWBH-NBDD8	Cool White	5000	120	23.5	39.8	3.4	80
ASMT-UWBH-NBDE8	Cool White	4500	120	23.5	39.8	3.4	80
ASMT-UWBH-NBDF8	Cool White	4000	120	23.5	39.8	3.4	80
ASMT-UYBG-NAC18	Warm White	2700 ~ 3500	120	18.1	35.2	3.4	80
ASMT-UYBG-NACG8	Warm White	3500	120	18.1	35.2	3.4	80
ASMT-UYBG-NACH8	Warm White	3000	120	18.1	35.2	3.4	80
ASMT-UYBG-NACJ8	Warm White	2700	120	18.1	35.2	3.4	80

High Brightness LEDs

Super 0.25W Power PLCC-4

Part Number	Color	CCT (K)	Viewing Angle (°)	Min Flux (lm)	Max Flux (lm)	Forward Voltage (Vf) If=80mA	Test Curent (mA)
ASMT-UYBH-NAC18	Warm White	2700 ~ 3500	120	18.1	35.2	3.2	80
ASMT-UYBH-NACG8	Warm White	3500	120	18.1	35.2	3.2	80
ASMT-UYBH-NACH8	Warm White	3000	120	18.1	35.2	3.2	80
ASMT-UYBH-NACJ8	Warm White	2700	120	18.1	35.2	3.2	80

Tolerance ±12%

Super 0.5W Power PLCC-4

Part Number	Color		Dominant Wavelength λ_D [1] (nm)	Viewing Angle $2\theta_{1/2}$ [2] (°)	Min. Flux (lm)	Max. Flux (lm)	Forward Voltage (V_F) I_F=150mA	Test Current (mA)
ASMT-QABD-AEF0E		Amber	593.1	120	11.5	25.5	2.5	150
ASMT-QHBD-AFH0E		Red Orange	616.1	120	11.5	25.5	2.5	150
ASMT-QRBD-AEF0E		Red	621.1	120	11.5	25.5	2.5	150
ASMT-QBB3-NBD0E		Blue	460	120	5.5	11.5	3.5	150
ASMT-QGBE-NFH0E		Green	522	120	15.0	33.0	3.6	150

Notes:
1. The dominant wavelength, λ_D, is derived from the CIE Chromaticity diagram and represents the color of the device.
2. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is ½ the peak intensity.
3. Φ_V is the total luminous flux output as measured with an integrating sphere at mono pulse conditions.
4. Tolerance = ±12%.

PLCC Surface Mount LEDs
Super 0.5W White Power PLCC-4

Part Number	Color		CCT (K)	Viewing Angle $2\theta_{1/2}$ [2] (°)	Min. Flux (lm)	Max. Flux (lm)	Forward Voltage (V_F) I_F=150mA	Test Current (mA)
ASMT-QWBF-NKL0E		Cool White	4500-1000	120	43	73	3.3	150
ASMT-QYBF-NJK0E		Warm White	2500-4800	120	33	56	3.3	150

Notes:
1. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is ½ the peak intensity.
2. ΦV is the total luminous flux output as measured with an integrating sphere at mono pulse conditions.
3. Tolerance = ±12%.

High Brightness LEDs

TheiaLED Super 0.5W White Power PLCC-4

| Part number	Color		CCT (K)	Viewing Angle (°)	Min Flux (lm)	Max Flux (lm)	Forward Voltage (V$_F$) I$_F$=150mA	Test Curent (mA)	CRI
ASMT-QWBG-NFH0E		Cool White	4000 ~ 8000	120	45.7	62	3.2	150	85
ASMT-QWBG-NFHAE		Cool White	8000	120	45.7	62	3.2	150	85
ASMT-QWBG-NFHBE		Cool White	6500	120	45.7	62	3.2	150	85
ASMT-QWBG-NFHCE		Cool White	5700	120	45.7	62	3.2	150	85
ASMT-QWBG-NFHDE		Cool White	5000	120	45.7	62	3.2	150	85
ASMT-QWBG-NFHEE		Cool White	4500	120	45.7	62	3.2	150	85
ASMT-QWBG-NFHFE		Cool White	4000	120	45.7	62	3.2	150	85
ASMT-QWBH-NGJ0E		Cool White	4000 ~ 8000	120	51.7	67.2	3.2	150	75
ASMT-QWBH-NGJAE		Cool White	8000	120	51.7	67.2	3.2	150	75
ASMT-QWBH-NGJBE		Cool White	6500	120	51.7	67.2	3.2	150	75
ASMT-QWBH-NGJCE		Cool White	5700	120	51.7	67.2	3.2	150	75
ASMT-QWBH-NGJDE		Cool White	5000	120	51.7	67.2	3.2	150	75
ASMT-QWBH-NGJEE		Cool White	4500	120	51.7	67.2	3.2	150	75
ASMT-QWBH-NGJFE		Cool White	4000	120	51.7	67.2	3.2	150	75
ASMT-QYBG-NEG1E		Warm White	2700 ~ 3500	120	39.8	56.8	3.2	150	85
ASMT-QYBG-NEGGE		Warm White	3500	120	39.8	56.8	3.2	150	85
ASMT-QYBG-NEGHE		Warm White	3000	120	39.8	56.8	3.2	150	85
ASMT-QYBG-NEGJE		Warm White	2700	120	39.8	56.8	3.2	150	85
ASMT-QYBH-NEG1E		Warm White	2700 ~ 3500	120	39.8	56.8	3.2	150	75
ASMT-QYBH-NEGGE		Warm White	3500	120	39.8	56.8	3.2	150	75
ASMT-QYBH-NEGHE		Warm White	3000	120	39.8	56.8	3.2	150	75
ASMT-QYBH-NEGJE		Warm White	2700	120	39.8	56.8	3.2	150	75

Tolerance ±12%

High Brightness LEDs

High Brightness Tricolor PLCC4 & PLCC6 tricolor

Part Number	Color		Package	Package Dimension	Viewing Angle (°)	Dominant Wavelength (nm)	Min Intensity (mcd) @ 20mA		Typ IV @ 20mA	Features
							Bin	mcd	mcd	
ASMB-BTE1-0B332		Red	PLCC-4	3.5x 2.8x 1.9	110	622	450	900	630	Black Body White Reflector
		Green				529	1125	2240	1500	
		Blue				469	285	560	350	
ASMB-MTB0-0A302		Red	PLCC-4	3.5x 2.8x 1.9	115	625	470	780	540	Black Surface
		Green				525	1380	2280	1600	
		Blue				470	270	450	350	
ASMB-MTB1-0A302		Red	PLCC-4	3.5x 2.8x 1.9	115	625	470	780	540	Black Surface
		Green				525	1380	2280	1600	
		Blue				470	270	450	350	
ASMT-YTB2-0BB02		Red	PLCC-6	3.4 x 2.8 x 1.8	120	626	U2	560	745	Black Surface
		Green				525	W1	1125	1600	
		Blue				470	T1	285	380	
ASMT-YTB7-0AA02		Red	PLCC-6	3.4 x 2.8 x 1.8	120	622	560	1125	650	Black Surface
		Green				530	1400	2850	1900	
		Blue				470	285	560	384	
ASMT-YTC2-0AA02		Red	PLCC-6	3.4 x 2.8 x 1.8t	120	626	T2	355	450	Black Body
		Green				525	U1	450	560	
		Blue				470	R2	140	180	
ASMT-YTC7-0AA02		Red	PLCC-6	3.4 x 2.8 x 1.8	110	622	224	450	330	Black Body
		Green				530	560	840	1125	
		Blue				470	112.5	224	160	
ASMT-YTD2-0BB02		Red	PLCC-6	3.4 x 2.8 x 1.8	120	626	U2	560	745	White Surface
		Green				525	W1	1125	1600	
		Blue				470	T1	285	380	
ASMT-YTD7-0AA02		Red	PLCC-6	3.4 x 2.8 x 1.8	120	622	560	1125	650	White Surface
		Green				530	1400	2850	1900	
		Blue				470	285	560	384	

High Brightness LEDs

PLCC-2 (ASMT-UWB1)

ASMT-UWB1-N X_2 X_3 X_4 2
— Color Bin
— Max Intensity Bin
— Min Intensity Bin
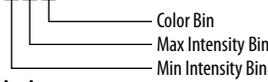
Color Bin Limits

Individual reel will contain parts from one sub bin only.

Sub Bin	Chromaticity Coordinates				
1A	x	0.2950	0.2920	0.2984	0.3009
	y	0.2970	0.3060	0.3133	0.3042
1B	x	0.2920	0.2895	0.2962	0.2984
	y	0.3060	0.3135	0.3220	0.3133
1C	x	0.2984	0.2962	0.3028	0.3048
	y	0.3133	0.3220	0.3304	0.3207
1D	x	0.2984	0.3048	0.3068	0.3009
	y	0.3207	0.3290	0.3186	0.3113
2A	x	0.3048	0.3130	0.3144	0.3068
	y	0.3207	0.3290	0.3186	0.3113
2B	x	0.3028	0.3115	0.3130	0.3048
	y	0.3304	0.3391	0.3290	0.3207
2C	x	0.3115	0.3205	0.3213	0.3130
	y	0.3391	0.3481	0.3373	0.3290
2D	x	0.3130	0.3213	0.3221	0.3144
	y	0.3290	0.3373	0.3261	0.3186
3A	x	0.3215	0.3290	0.3290	0.3222
	y	0.3350	0.3417	0.3300	0.3243
3B	x	0.3207	0.3290	0.3290	0.3215
	y	0.3462	0.3538	0.3417	0.3350
3C	x	0.3290	0.3376	0.3371	0.3290
	y	0.3538	0.3616	0.3490	0.3417
3D	x	0.3290	0.3371	0.3366	0.3290
	y	0.3417	0.3490	0.3369	0.3300
4A	x	0.3371	0.3451	0.3440	0.3366
	y	0.3490	0.3554	0.3427	0.3369
4B	x	0.3376	0.3463	0.3451	0.3371
	y	0.3616	0.3687	0.3554	0.3490
4C	x	0.3463	0.3551	0.3533	0.3451
	y	0.3687	0.3760	0.3620	0.3554
4D	x	0.3451	0.3533	0.3515	0.3440
	y	0.3554	0.3620	0.3487	0.3427
5A	x	0.3530	0.3615	0.3590	0.3512
	y	0.3597	0.3659	0.3521	0.3465
5B	x	0.3548	0.3641	0.3615	0.3530
	y	0.3736	0.3804	0.3659	0.3597
5C	x	0.3641	0.3736	0.3702	0.3615
	y	0.3804	0.3874	0.3722	0.3659
5D	x	0.3615	0.3702	0.3670	0.3590
	y	0.3659	0.3722	0.3578	0.3521

6A	x	0.3670	0.3702	0.3825	0.3783
	y	0.3578	0.3722	0.3798	0.3646
6B	x	0.3702	0.3736	0.3869	0.3825
	y	0.3722	0.3874	0.3958	0.3798
6C	x	0.3825	0.3869	0.4006	0.3950
	y	0.3798	0.3958	0.4044	0.3875
6D	x	0.3783	0.3825	0.3950	0.3898
	y	0.3646	0.3798	0.3875	0.3716
7A	x	0.3889	0.3941	0.4080	0.4017
	y	0.3690	0.3848	0.3916	0.3751
7B	x	0.3941	0.3996	0.4146	0.4080
	y	0.3848	0.4015	0.4089	0.3916
7C	x	0.4080	0.4146	0.4299	0.4221
	y	0.3916	0.4089	0.4165	0.3984
7D	x	0.4017	0.4080	0.4221	0.4147
	y	0.3751	0.3916	0.3984	0.3814
8A	x	0.4147	0.4221	0.4342	0.4259
	y	0.3814	0.3984	0.4028	0.3853
8B	x	0.4221	0.4299	0.4430	0.4342
	y	0.3984	0.4165	0.4212	0.4028
8C	x	0.4342	0.4430	0.4562	0.4465
	y	0.4028	0.4212	0.4260	0.4071
8D	x	0.4259	0.4342	0.4465	0.4373
	y	0.3853	0.4028	0.4071	0.3893
9A	x	0.4373	0.4465	0.4582	0.4483
	y	0.3893	0.4071	0.4099	0.3919
9B	x	0.4465	0.4562	0.4687	0.4582
	y	0.4071	0.4260	0.4289	0.4099
9C	x	0.4582	0.4687	0.4813	0.4700
	y	0.4099	0.4289	0.4319	0.4126
9D	x	0.4483	0.4582	0.4700	0.4593
	y	0.3919	0.4099	0.4126	0.3944

Intensity Bin Limits

Bin ID	Min. (mcd)	Max. (mcd)
X1	1800	2240
X2	2240	2850
Y1	2850	3550
Y2	3550	4500
Z1	4500	5600
Z2	5600	7150

Tolerance of each bin it = ± 12%

Intensity Bin Select (X_2X_3)

Individual reel will contain parts from one half bin only.

X_2	Minimum Iv Bin
X_3	Maximum Iv Bin
0	Full Distribution
3	3 half bins starting from $X_2$1
4	4 half bins starting from $X_2$1
5	5 half bins starting from $X_2$1
7	3 half bins starting from $X_2$2
8	4 half bins starting from $X_2$2
9	5 half bins starting from $X_2$2

Color Bin Limits

Individual reel will contain parts from one sub bin only.

Bin	Sub Bin
A	1A, 1B, 1C, 1D
B	2A, 2B, 2C, 2D
C	3A, 3B, 3C, 3D
D	4A, 4B, 4C, 4D
E	5A, 5B, 5C, 5D
F	6A, 6B, 6C, 6D
G	7A, 7B, 7C, 7D
H	8A, 8B, 8C, 8D
J	9A, 9B, 9C, 9D
K	1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D
L	2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D
M	3A, 3B, 3C, 3D, 4A, 4B, 4C, 4D
N	4A, 4B, 4C, 4D, 5A, 5B, 5C, 5D
P	5A, 5B, 5C, 5D, 6A, 6B, 6C, 6D
R	7A, 7B, 7C, 7D, 8A, 8B, 8C, 8D
S	8A, 8B, 8C, 8D, 9A, 9B, 9C, 9D
0	1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 5A, 5B, 5C, 5D
1	6A, 6B, 6C, 6D, 7A, 7B, 7C, 7D, 8A, 8B, 8C, 8D, 9A, 9B, 9C, 9D

Forward Voltage Bin

Bin	Min (V)	Max (V)
F05	2.80	3.00
F06	3.00	3.20
F07	3.20i	3.40
F08	3.40	3.60

Tolerance ± 0.1V
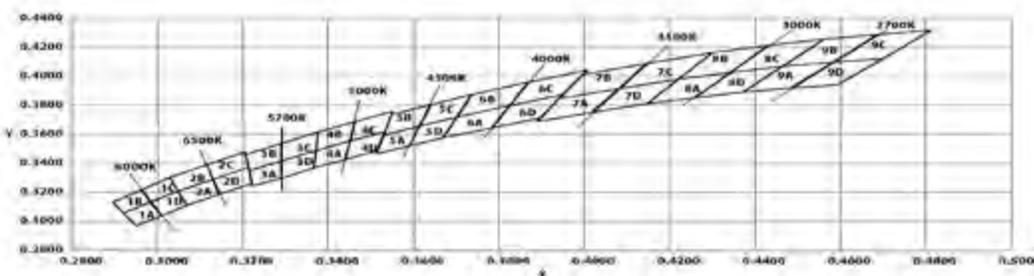
High Brightness LEDs

PLCC2, Power PLCC-4, Bicolor PLCC-4 and Tricolor PLCC-4

HSMx–Axxx–X_1-X_2-X_3-X_4-X_5

- Packaging option
- Color bin selection
- Intensity bin selection
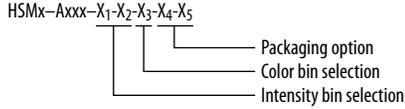
Intensity Bin Select (X_1X_2)

Individual reel will contain parts from 1 half bin only.
Single color (see data sheet for bicolor and tricolor).

X_1	Minimum Iv Bin
X_2	Number of half Bins
0	Full Distribution
2	2 half bins starting from $X_5$1
3	3 half bins starting from $X_5$1
4	4 half bins starting from $X_5$1
5	5 half bins starting from $X_5$1
6	2 half bins starting from $X_5$2
7	3 half bins starting from $X_5$2
8	4 half bins starting from $X_5$2
9	5 half bins starting from $X_5$2

Color Bin Selection (X_3)

Individual reel will contain parts from 1 full bin only.
Single color (see data sheet for bicolor and tricolor).

X_3	
0	Full Distribution
Z	A and B only
Y	B and C only
W	C and D only
V	D and E only
U	E and F only
T	F and G only
S	G and H only
Q	A, B and C only
P	B, C and D only
N	C, D and E only
M	D, E and F only
L	E, F and G only
K	F, G and H only
1	A, B, C and D only
2	E, F G and H only
3	B, C, D and E only
4	C, D, E and F only
5	A, B, C, D and E only
6	B, C, D, E and F only

Color Bin Limits for HSMW-Axxx

Bin ID	Limits (Chromaticity Coordinates)			
A	X	0.352	0.365	0.365	0.352
	Y	0.377	0.395	0.360	0.341
B	X	0.340	0.352	0.352	0.340
	Y	0.360	0.377	0.341	0.325
C	X	0.327	0.340	0.340	0.327
	Y	0.342	0.360	0.325	0.306
D	X	0.315	0.327	0.327	0.315
	Y	0.325	0.342	0.306	0.290
E	X	0.302	0.315	0.315	0.302
	Y	0.307	0.325	0.290	0.271
F	X	0.290	0.302	0.302	0.290
	Y	0.290	0.307	0.271	0.255

Tolerance of each bin limit = ± 0.02

Intensity Bin Limits

Bin ID	Intensity (mcd)	
	Min.	Max.
J1	4.50	5.60
J2	5.60	7.20
K1	7.20	9.00
K2	9.00	11.20
L1	11.20	14.00
L2	14.00	18.00
M1	18.00	22.40
M2	22.40	28.50
N1	28.50	35.50
N2	35.50	45.00
P1	45.00	56.00
P2	56.00	71.50
Q1	71.50	90.00
Q2	90.00	112.50
R1	112.50	140.00
R2	140.00	180.00
S1	180.00	224.00
S2	224.00	285.00
T1	285.00	355.00
T2	355.00	450.00
U1	450.00	560.00
U2	560.00	715.00
V1	715.00	900.00
V2	900.00	1125.00
W1	1125.00	1400.00
W2	1400.00	1800.00
X1	1800.00	2240.00
X2	2240.00	2850.00
Y1	2850.00	3550.00
Y2	3550.00	4500.00
Z1	4500.00	5600.00
Z2	5600.00	7150.00
11	7150.00	9000.00
12	9000.00	11250.00
21	11250.00	14000.00
22	14000.00	18000.00

Tolerance of each bin limit = ± 12%

Color Coordinates Chart for HSMW-Axxx
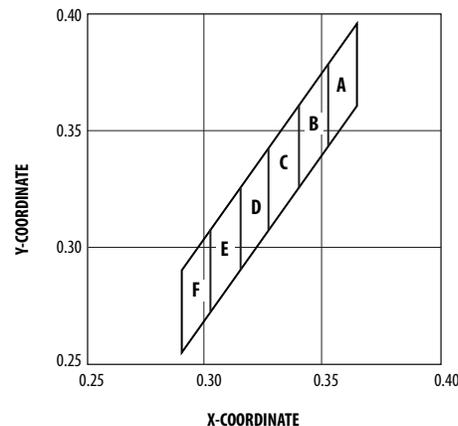
Color Bin Limits

Color/Bin	Wavelength (nm)	
	Min.	Max.
Blue		
A	460.0	465.0
B	465.0	470.0
C	470.0	475.0
D	475.0	480.0
Cyan		
A	490.0	495.0
B	495.0	500.0
C	500.0	505.0
D	505.0	510.0
Green		
A	515.0	520.0
B	520.0	525.0
C	525.0	530.0
D	530.0	535.0
Yellow Green/Emerald Green		
A	552.5	555.5
B	555.5	558.5
C	558.5	561.5
D	561.5	564.5
E	564.5	567.5
F	567.5	570.5
G	570.5	573.5
H	573.5	576.5
Amber		
A	582.0	584.5
B	584.5	587.0
C	587.0	589.5
D	589.5	592.0
E	592.0	594.5
F	594.5	597.0
Orange		
A	597.0	600.0
B	600.0	603.0
C	603.0	606.0
D	606.0	609.0
E	609.0	612.0
Red Orange		
A	611.0	616.0
B	616.0	620.0
Red		
Full Distribution	620i	635

Tolerance of each bin limit = ± 1nm

Tricolor/Power PLCC-4

1	Cathode (Color 1)
2	Common Anode
3	Cathode (Color 3)
4	Cathode (Color 2)

Bicolor PLCC-4

1	Cathode (Color 1)
2	Anode (Color 1)
3	Cathode (Color 2)
4	Anode (Color 2)

High Brightness LEDs
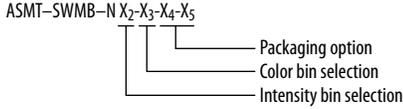
PLCC Surface Mount LEDs

ASMT–SWMB–N X$_2$-X$_3$-X$_4$-X$_5$
— Packaging option
— Color bin selection
— Intensity bin selection

Intensity Bin Selection (X$_2$X$_3$)

Individual reel will contain parts from one half bin only.

X$_2$	Minimum I$_V$ Bin
X$_3$	Number of half bins
0	Full Distribution
2	2 half bins starting from X$_2$1
3	3 half bins starting from X$_2$1
4	4 half bins starting from X$_2$1
5	5 half bins starting from X$_2$1
6	2 half bins starting from X$_2$2
7	3 half bins starting from X$_2$2
8	4 half bins starting from X$_2$2
9	5 half bins starting from X$_2$2

Intensity Bin Limits

Bin ID	Min. (mcd)	Max. (mcd)
N1	28.50	35.50
N2	35.50	45.00
P1	45.00	56.00
P2	56.00	71.50
Q1	71.50	90.00
Q2	90.00	112.50
R1	112.50	140.00
R2	140.00	180.00
S1	180.00	224.00
S2	224.00	285.00
T1	285.00	355.00
T2	355.00	450.00
U1	450.00	560.00
U2	560.00	715.00
V1	715.00	900.00
V2	900.00	1125.00
W1	1125.00	1400.00
W2	1400.00	1800.00

Tolerance of each bin limit = ± 12%

Long Life PLCC-4 ASMT-SWBM
Packaging Option (X$_4$X$_5$)

X$_4$X$_5$	Test Current	Package Type	Reel Size
M1	50 mA	Top Mount	7/13 Inch
M2	30 mA	Top Mount	7/13 Inch
J1	20 mA	Top Mount	7 Inch
J4	20 mA	Top Mount	13 Inch
H1	20 mA	Reverse Mount	7 Inch
H4	20 mA	Reverse Mount	13 Inch

Color Bin Selection (X$_4$)

Individual reel will contain parts from one full bin only.

X$_4$	Color Bin Selection
0	Full Distributon
A	1 and 2 only
B	2 and 3 only
C	3 and 4 only
D	4 and 5 only
E	5 and 6 only
F	6 and 7 only
G	1, 2 and 3 only
H	2, 3 and 4 only
J	3, 4 and 5 only
K	4, 5 and 6 only
L	5, 6 and 7 only
M	1, 2, 3 and 4 only
N	2, 3, 4 and 5 only
P	3, 4, 5 and 6 only
Q	4, 5, 6 and 7 only
R	1, 2, 3, 4 and 5 only
S	2, 3, 4, 5 and 6 only
T	3, 4, 5, 6, and 7 only
U	1, 2, 3, 4, 5 and 6 only
V	2, 3, 4, 5,6 and 7 only
Z	Special Color Bin

Packaging Option (X$_5$)

X$_5$	Test Current	Package Type	Reel Size
3	30 mA	Top Mount	7 inch

V$_F$ Bin Limits

Bin ID	Min.	Max.
S3	3.20	3.80
S4	3.80	4.35

Tolerance of each bin limit = ± 0.1V

Color Bin Limits

| Bin ID	Limits (Chromaticity Coordinates)				
1	x	0.296	0.291	0.310	0.313
	y	0.259	0.268	0.297	0.284
2	x	0.291	0.285	0.307	0.310
	y	0.268	0.279	0.312	0.297
3	x	0.313	0.310	0.330	0.330
	y	0.284	0.297	0.330	0.310
4	x	0.310	0.307	0.330	0.330
	y	0.297	0.312	0.347	0.330
5	x	0.330	0.330	0.338	0.352
	y	0.310	0.330	0.342	0.344
6	x	0.330	0.330	0.347	0.345
	y	0.330	0.347	0.371	0.352
7	x	0.352	0.338	0.364	0.360
	y	0.344	0.342	0.380	0.357
8	x	0.345	0.347	0.367	0.364
	y	0.352	0.371	0.401	0.380

Tolerance of each bin limit = ± 0.02

Color Coordinates Chart for ASMT-SWBM
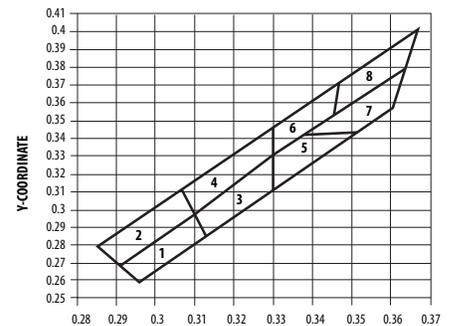
High Brightness LEDs

High Brightness Tricolor PLCC-4 and PLCC-6

ASMT−xTxx−0 X2-X3-X4-X5
— Packaging option
— Color bin selection
— Intensity bin selection
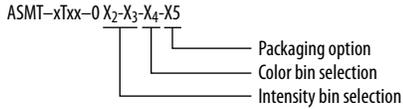
Intensity Bin Selection (X2X3)
For ASMT-QTB4

Individual reel will contain parts from one half bin only.

X2	Min Iv Bin (Minimum Intensity Bin)		
	Red	Green	Blue
0	0	0	0
A	U1	V2	S2

X3	Number of Half Bin from X2		
	Red	Green	Blue
0	0	0	0
A	4	4	4

Note: 0 represents no maximum bin limit.

For ASMT-QTC4

X2	Min Iv Bin (Minimum Intensity Bin)		
	Red	Green	Blue
0	0	0	0
E	T1	T2	R1

X3	Number of Half Bin from X2		
	Red	Green	Blue
0	0	0	0
A	4	4	4

For ASMT-YTB2/YTD2

Individual reel will contain parts from one half bin only.

X2	Min Iv Bin (Minimum Intensity Bin)		
	Red	Green	Blue
B	U2	W1	T1

X3	Number of Half Bin from X2		
	Red	Green	Blue
B	3	3	3

For ASMT-YTC2

Individual reel will contain parts from one half bin only.

X2	Min Iv Bin (Minimum Intensity Bin)		
	Red	Green	Blue
A	T2	U1	R2

X3	Number of Half Bin from X2		
	Red	Green	Blue
A	3	3	3

Color Bin Selection (X4)
for ASMT-QTB4/QTC4

Individual reel will contain parts from one full bin only.

X4	Color Bin Combinations		
	Red	Green	Blue
0	Full Distribution	A,B,C	A,B,C,D

Intensity Bin Limits

Bin ID	Min (mcd)	Max (mcd)
R1	112.5	140
R2	140	180
S1	180	224
S2	224	285
T1	285	355
T2	355	450
U1	450	560
U2	560	715
V1	715	900
V2	900	1125
W1	1125	1400
W2	1400	1800
X1	1800	2240

Tolerance of each bin limit = ± 12%

Color Bin Selection (X4)
for ASMT-YTB2/YTC2/YTD2

Individual reel will contain parts from one full bin only.

X4	Color Bin Combinations		
	Red	Green	Blue
0	Full Distribution	A, B, C	A, B, C, D, E

Packaging Option (X5)

Please refer to respective datasheet for related information.

Color Bin Limits for ASMT-YTB2/YTC2/YTD2

Red	Min (nm)	Max (nm)
Full Distribution	618	628

Green	Min (nm)	Max (nm)
A	525	531
B	528	534
C	531	537

Blue	Min (nm)	Max (nm)
A	465	469
B	467	471
C	469	473
D	471	475
E	470	475

Tolerance of each bin limit = ± 1 nm

High Brightness LEDs

Super 0.5W Power PLCC-4
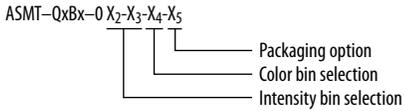
ASMT–QxBx–0 X$_2$-X$_3$-X$_4$-X$_5$

— Packaging option
— Color bin selection
— Intensity bin selection

Flux Bin Selection (X$_2$X$_3$)

Individual reel will contain parts from one bin only

X$_2$	Min Flux Bin
X$_3$	Max Flux Bin

Flux Bin Limits

Bin ID	Min. (lm)	Max. (lm)
0	3.40	4.30
A	4.30	5.50
B	5.50	7.00
C	7.00	9.00
D	9.00	11.50
E	11.50	15.00
F	15.00	19.50
G	19.50	25.50
H	25.50	33.00
J	33.00	43.00
K	43.00	56.00
L	56.00	73.00

Tolerance of each bin limit = ± 12%

V$_F$ Binning for AlInGaP Devices (ASMT-QAxx/QHxx/QRxx)

Bin ID	Min.	Max.
2D	2.35	2.50
2E	2.50	2.65
2F	2.65	2.80
2G	2.80	2.95
2H	2.95	3.10
2J	3.10	3.25
2K	3.25	3.40
2L	3.40	3.55
2M	3.55	3.70
2N	3.70	3.85

Tolerance of each bin limit = ± 0.1V

Color Bin Selection (X$_4$)

Individual reel will contain parts from one full bin only.

X$_4$	
0	Full Distribution
A	1 and 2 only
B	2 and 3 only
C	3 and 4 only
D	4 and 5 only
E	5 and 6 only
G	1, 2 and 3 only
H	2, 3 and 4 only
J	3, 4 and 5 only
K	4, 5 and 6 only
M	1, 2, 3 and 4 only
N	2, 3, 4 and 5 only
P	3, 4, 5 and 6 only
R	1, 2, 3, 4 and 5 only
S	2, 3, 4, 5 and 6 only
Z	Special Color Bin

V$_F$ Bin Limits for InGaN Devices (ASMT-QBxx/QGxx)

Bin ID	Min.	Max.
S5	3.20	3.50
S6	3.50	3.80
S7	3.80	4.10

Tolerance of each bin limit = ± 0.1V

Color Bin Limits

Color/Bin	Wavelength (nm)	
	Min.	Max.
Blue		
1	460.0	465.0
2	465.0	470.0
8	450.0	455.0
9	455.0	460.0
Green		
1	515.0	520.0
2	520.0	525.0
3	525.0	530.0
4	530.0	535.0
Amber		
2	583.0	586.0
3	586.0	589.0
4	589.0	592.0
5	592.0	595.0
6	595.0	598.0
Red Orange		
1	611.0	616.0
2	616.0	620.0
3	620.0	625.0
Red		
Full Distribution	620.0	635.0

Tolerance of each bin limit = ±1nm

Packaging Option (X$_5$)

X$_5$	Test Current)	Package Type	Reel Size
E	150 mA	Top Mount	7 inch

High Brightness LEDs

Super 0.5W White Power PLCC-4

ASMT–QxBx–0 X₂-X₃-X₄-X₅

- Packaging option
- Color bin selection
- Flux bin selection

Flux Bin Selection (X₂X₃)

Individual reel will contain parts from one bin only

X₂	Min Flux Bin
X₃	Min Flux Bin

Flux Bin Limits

Bin ID	Min. (lm)	Max. (lm)
0	3.40	4.30
A	4.30	5.50
B	5.50	7.00
C	7.00	9.00
D	9.00	11.50
E	11.50	15.00
F	15.00	19.50
G	19.50	25.50
H	25.50	33.00
J	33.00	43.00
K	43.00	56.00
L	56.00	73.00

Tolerance of each bin limit = ± 12%

Color Bin Selection (X₄) for ASMT-QWBx

Individual reel will contain parts from one sub bin only.

X₄	
0	Full Distribution
A	5K and 5L only
B	6K and 6L only
C	7K and 7L only
D	8K and 8L only
E	5K and 6K only
F	5L and 6L only
G	6K and 7K only
H	6L and 7L onlyi
J	7K and 8K only
K	7L and 8L only
L	5K, 5L, 6K and 6L only
M	6K, 6L, 7K and 7L only
N	7K, 7L, 8K and 8L only
Z	Special binning

Color Bin Limits for ASMT-QWBx

Bin ID	Sub Bin ID	Limits (Chromaticity Coordinates)				
5K	5Ka	x	0.296	0.304	0.302	0.294
		y	0.259	0.270	0.276	0.264
	5Kb	x	0.294	0.302	0.300	0.291
		y	0.264	0.276	0.281	0.268
	5Kc	x	0.304	0.313	0.312	0.302
		y	0.270	0.284	0.291	0.276
	5Kd	x	0.302	0.312	0.310	0.300
		y	0.276	0.291	0.297	0.281
5L	5La	x	0.291	0.300	0.298	0.288
		y	0.268	0.281	0.288	0.274
	5Lb	x	0.288	0.298	0.295	0.285
		y	0.274	0.288	0.294	0.279
	5Lc	x	0.300	0.310	0.309	0.298
		y	0.281	0.297	0.305	0.288
	5Ld	x	0.298	0.309	0.307	0.295
		y	0.288	0.305	0.312	0.294
6K	6Ka	x	0.313	0.322	0.321	0.312
		y	0.284	0.297	0.305	0.291
	6Kb	x	0.312	0.321	0.320	0.310
		y	0.291	0.305	0.314	0.297
	6Kc	x	0.322	0.330	0.330	0.321
		y	0.297	0.310	0.320	0.305
	6Kd	x	0.321	0.330	0.330	0.320
		y	0.305	0.320	0.330	0.314

Tolerance of each bin limit = ± 0.02

Color Bin Limits cont.

Bin ID	Sub Bin ID	Limits (Chromaticity Coordinates)				
6L	6La	x	0.310	0.320	0.319	0.309
		y	0.297	0.314	0.322	0.305
	6Lb	x	0.309	0.319	0.318	0.307
		y	0.305	0.322	0.329	0.312
	6Lc	x	0.320	0.330	0.330	0.319
		y	0.314	0.330	0.339	0.322
	6Ld	x	0.319	0.330	0.330	0.318
		y	0.322	0.339	0.347	0.329
7K	7Ka	x	0.330	0.336	0.337	0.330
		y	0.310	0.320	0.330	0.320
	7Kb	x	0.330	0.337	0.337	0.330
		y	0.320	0.330	0.341	0.330
	7Kc	x	0.336	0.343	0.344	0.337
		y	0.320	0.331	0.341	0.330
	7Kd	x	0.337	0.344	0.345	0.337
		y	0.330	0.341	0.352	0.341
7L	7La	x	0.330	0.337	0.337	0.330
		y	0.330	0.341	0.349	0.339
	7Lb	x	0.330	0.337	0.338	0.330
		y	0.339	0.349	0.358	0.347
	7Lc	x	0.337	0.345	0.346	0.337
		y	0.341	0.352	0.362	0.349
	7Ld	x	0.337	0.346	0.347	0.338
		y	0.349	0.362	0.371	0.358
8K	8Ka	x	0.343	0.351	0.352	0.344
		y	0.331	0.343	0.354	0.341
	8Kb	x	0.344	0.352	0.354	0.345
		y	0.341	0.354	0.364	0.352
	8Kc	x	0.351	0.360	0.362	0.352
		y	0.343	0.357	0.369	0.354
	8Kd	x	0.352	0.362	0.364	0.354
		y	0.354	0.369	0.380	0.364
8L	8La	x	0.345	0.354	0.355	0.346
		y	0.352	0.364	0.375	0.362
	8Lb	x	0.346	0.355	0.356	0.347
		y	0.362	0.375	0.385	0.371
	8Lc	x	0.354	0.364	0.366	0.355
		y	0.364	0.380	0.391	0.375
	8Ld	x	0.355	0.366	0.367	0.356
		y	0.375	0.391	0.401	0.385

Tolerance of each bin limit = ± 0.02

High Brightness LEDs

Color Coordinates Chart for ASMT-QWBx

(Chart: Y-COORDINATE vs X-coordinate; bins 5Ka–5Ld, 6Ka–6Ld, 7Ka–7Ld, 8Ka–8Ld; labels 5000K–4500K, 5600K–5000K, 7000K–5600K, 10000K–7000K)

Color Coordinates Chart for ASMT-QYBx

(Chart: Y-COORDINATE vs X-coordinate; bins H3–H5, J3–J5, K3–K5, L3–L5, M3–M5, N3–N5, P3–P5, Q3–Q5, R3–R5; labels 2800K–2500K, 3150K–2800K, 3650K–3150K, 4800K–3650K)
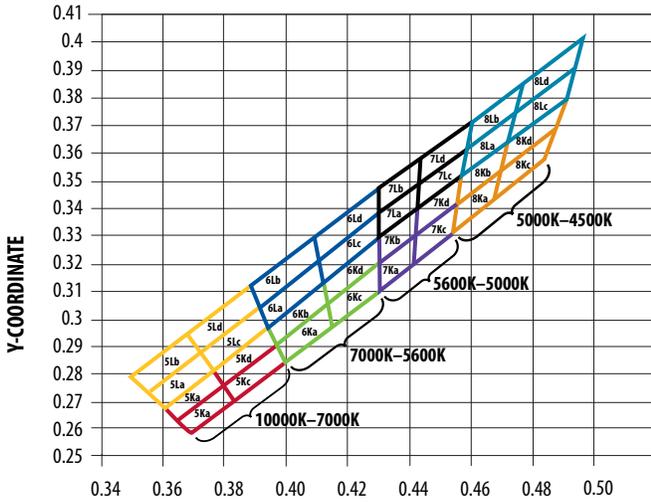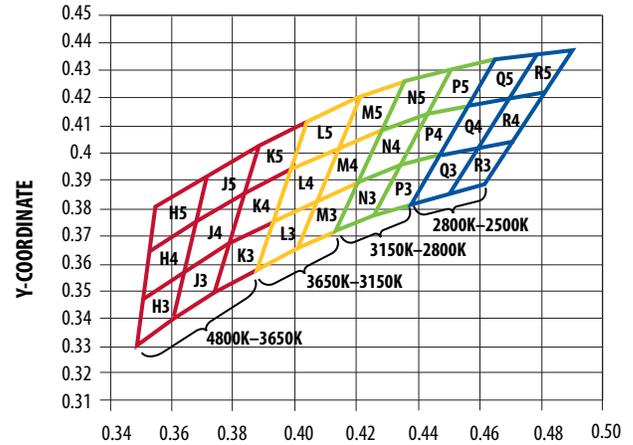
Color Bin Selection (X₄) for ASMT-QYBx

Individual reel will contain parts from one sub bin only.

X_4	
0	Full Distribution
A	H, J and K only
B	H, J, K, L and M only
C	L and M only
D	L, M, N and P only
E	N and P only
F	N, P, Q and R only
G	Q and R only
Z	Special Color Bin

Color Bin Limits for ASMT-QYBx

Bin ID	Sub Bin ID		Limits (Chromaticity Coordinates)			
H	H3	x	0.348	0.360	0.364	0.350
		y	0.332	0.341	0.358	0.348
	H4	x	0.350	0.364	0.367	0.352
		y	0.348	0.358	0.376	0.365
	H5	x	0.352	0.367	0.371	0.354
		y	0.365	0.376	0.392	0.381
J	J3	x	0.360	0.373	0.378	0.364
		y	0.341	0.350	0.368	0.358
	J4	x	0.364	0.378	0.383	0.367
		y	0.358	0.368	0.386	0.376
	J5	x	0.367	0.383	0.388	0.371
		y	0.376	0.386	0.403	0.392
K	K3	x	0.373	0.387	0.393	0.378
		y	0.350	0.358	0.376	0.368
	K4	x	0.378	0.393	0.399	0.383
		y	0.368	0.376	0.395	0.386
	K5	x	0.383	0.399	0.405	0.388
		y	0.386	0.395	0.412	0.403

Color Bin Limits for ASMT-QYBx

Bin ID	Sub Bin ID		Limits (Chromaticity Coordinates)			
L	L3	x	0.387	0.400	0.407	0.393
		y	0.358	0.366	0.384	0.376
	L4	x	0.393	0.407	0.414	0.399
		y	0.376	0.384	0.402	0.395
	L5	x	0.399	0.414	0.421	0.405
		y	0.395	0.402	0.420	0.412
M	M3	x	0.400	0.413	0.421	0.407
		y	0.366	0.372	0.390	0.384
	M4	x	0.407	0.421	0.429	0.414
		y	0.384	0.390	0.409	0.402
	M5	x	0.414	0.429	0.436	0.421
		y	0.402	0.409	0.426	0.420
N	N3	x	0.413	0.425	0.434	0.421
		y	0.372	0.378	0.396	0.390
	N4	x	0.421	0.434	0.443	0.429
		y	0.390	0.396	0.414	0.409
	N5	x	0.429	0.443	0.451	0.436
		y	0.409	0.414	0.430	0.426
P	P3	x	0.425	0.438	0.447	0.434
		y	0.378	0.382	0.400	0.396
	P4	x	0.434	0.447	0.456	0.443
		y	0.396	0.400	0.417	0.414
	P5	x	0.443	0.456	0.465	0.451
		y	0.414	0.417	0.434	0.430
Q	Q3	x	0.438	0.450	0.460	0.447
		y	0.382	0.386	0.403	0.400
	Q4	x	0.447	0.460	0.470	0.456
		y	0.400	0.403	0.420	0.417
	Q5	x	0.456	0.470	0.479	0.465
		y	0.417	0.420	0.436	0.434

Color Bin Limits for ASMT-QYBx

Bin ID	Sub Bin ID		Limits (Chromaticity Coordinates)			
R	R3	x	0.450	0.462	0.472	0.460
		y	0.386	0.389	0.405	0.403
	R4	x	0.460	0.472	0.482	0.470
		y	0.403	0.405	0.422	0.420
	R5	x	0.470	0.482	0.491	0.479
		y	0.420	0.422	0.437	0.436

Tolerance of each bin limit = ± 0.02

Packaging Option (X₅)

X_5	Test Current	Package Type	Reel Size
E	150 mA	Top Mount	7 inch

High Brightness LEDs

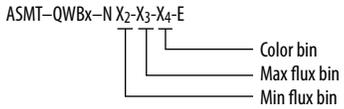**Super 0.25W and 0.5W Power PLCC4 Cool White and Warm White Luminous Flux Bin and Color Bin (ASMT-UWBx/UYBx/QWBx/QYBx)**
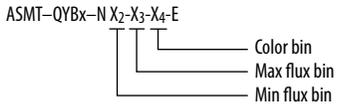
Super 0.25W Power PLCC4 Cool White

ASMT–UWBx–N X$_2$-X$_3$-X$_4$-8

    Color bin
    Max flux bin
    Min flux bin

Super 0.25W Power PLCC4 Warm White

ASMT–UYBx–N X$_2$-X$_3$-X$_4$-8
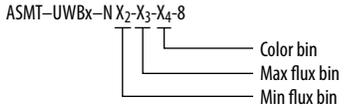
    Color bin
    Max flux bin
    Min flux bin
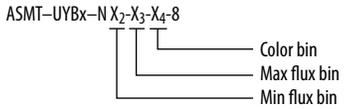
Super 0.5W Power PLCC4 Cool White (ASMT-QWBx)

ASMT–QWBx–N X$_2$-X$_3$-X$_4$-E

    Color bin
    Max flux bin
    Min flux bin

Super 0.5W Power PLCC4 Warm White (ASMT-QYBx)

ASMT–QYBx–N X$_2$-X$_3$-X$_4$-E

    Color bin
    Max flux bin
    Min flux bin

Color Bin (X$_4$)

Individual reel will contain parts from one sub bin only.

Sub Bin	Chromaticity Coordinates			
		0.2950	0.2920	0.2984	0.3009
1A	x	0.2950	0.2920	0.2984	0.3009
	y	0.2970	0.3060	0.3133	0.3042
1B	x	0.2920	0.2895	0.2962	0.2984
	y	0.3060	0.3135	0.3220	0.3133
1C	x	0.2984	0.2962	0.3028	0.3048
	y	0.3133	0.3220	0.3304	0.3207
1D	x	0.2984	0.3048	0.3068	0.3009
	y	0.3133	0.3207	0.3113	0.3042
2A	x	0.3048	0.3130	0.3144	0.3068
	y	0.3207	0.3290	0.3186	0.3113
2B	x	0.3028	0.3115	0.3130	0.3048
	y	0.3304	0.3391	0.3290	0.3207
2C	x	0.3115	0.3205	0.3213	0.3130
	y	0.3391	0.3481	0.3373	0.3290
2D	x	0.3130	0.3213	0.3221	0.3144
	y	0.3290	0.3373	0.3261	0.3186
3A	x	0.3215	0.3290	0.3290	0.3222
	y	0.3350	0.3417	0.3300	0.3243
3B	x	0.3207	0.3290	0.3290	0.3215
	y	0.3462	0.3538	0.3417	0.3350
3C	x	0.3290	0.3376	0.3371	0.3290
	y	0.3538	0.3616	0.3490	0.3417
3D	x	0.3290	0.3371	0.3366	0.3290
	y	0.3417	0.3490	0.3369	0.3300
4A	x	0.3371	0.3451	0.3440	0.3366
	y	0.3490	0.3554	0.3427	0.3369
4B	x	0.3376	0.3463	0.3451	0.3371
	y	0.3616	0.3687	0.3554	0.3490
4C	x	0.3463	0.3551	0.3533	0.3451
	y	0.3687	0.3760	0.3620	0.3554
4D	x	0.3451	0.3533	0.3515	0.3440
	y	0.3554	0.3620	0.3487	0.3427
5A	x	0.3530	0.3615	0.3590	0.3512

	y	0.3597	0.3659	0.3521	0.3465
5B	x	0.3548	0.3641	0.3615	0.3530
	y	0.3736	0.3804	0.3659	0.3597
5C	x	0.3641	0.3736	0.3702	0.3615
	y	0.3804	0.3874	0.3722	0.3659
5D	x	0.3615	0.3702	0.3670	0.3590
	y	0.3659	0.3722	0.3578	0.3521
6A	x	0.3670	0.3702	0.3825	0.3783
	y	0.3578	0.3722	0.3798	0.3646
6B	x	0.3702	0.3736	0.3869	0.3825
	y	0.3722	0.3874	0.3958	0.3798
6C	x	0.3825	0.3869	0.4006	0.3950
	y	0.3798	0.3958	0.4044	0.3875
6D	x	0.3783	0.3825	0.3950	0.3898
	y	0.3646	0.3798	0.3875	0.3716
7A	x	0.3889	0.3941	0.4080	0.4017
	y	0.3690	0.3848	0.3916	0.3751
7B	x	0.3941	0.3996	0.4146	0.4080
	y	0.3848	0.4015	0.4089	0.3916
7C	x	0.4080	0.4146	0.4299	0.4221
	y	0.3916	0.4089	0.4165	0.3984
7D	x	0.4017	0.4080	0.4221	0.4147
	y	0.3751	0.3916	0.3984	0.3814
8A	x	0.4147	0.4221	0.4342	0.4259
	y	0.3814	0.3984	0.4028	0.3853
8B	x	0.4221	0.4299	0.4430	0.4342
	y	0.3984	0.4165	0.4212	0.4028

Flux Bin Selection (X$_2$X$_3$)

Individual reel will contain parts from one bin only

X$_2$	Min Flux Bin
X$_3$	Min Flux Bin

Flux Bin Limits

Bin ID	Min. (lm)	Max. (lm)
A	18.1	23.5
B	23.5	30.6
C	30.6	35.2
D	35.2	39.8
E	39.8	45.7
F	45.7	51.7
G	51.7	56.8
H	56.8	62
J	62	67.2
K	67.2	73.9

Tolerance of each bin limit = ± 12%.

Color Bin (X$_4$)

Individual reel will contain parts from one sub bin only.

X$_4$	
Bin	Sub Bin
A	1A, 1B, 1C, 1D
B	2A, 2B, 2C, 2D
C	3A, 3B, 3C, 3D
D	4A, 4B, 4C, 4D
E	5A, 5B, 5C, 5D
F	6A, 6B, 6C, 6D
G	7A, 7B, 7C, 7D
H	8A, 8B, 8C, 8D
J	9A, 9B, 9C, 9D
K	1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D
L	2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D
M	3A, 3B, 3C, 3D, 4A, 4B, 4C, 4D
N	4A, 4B, 4C, 4D, 5A, 5B, 5C, 5D
P	5A, 5B, 5C, 5D, 6A, 6B, 6C, 6D
R	7A, 7B, 7C, 7D, 8A, 8B, 8C, 8D
S	8A, 8B, 8C, 8D, 9A, 9B, 9C, 9D
0	1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 5A, 5B, 5C, 5D, 6A, 6B, 6C, 6D
1	7A, 7B, 7C, 7D, 8A, 8B, 8C, 8D, 9A, 9B, 9C, 9D

8C	x	0.4342	0.4430	0.4562	0.4465
	y	0.4028	0.4212	0.4260	0.4071
8D	x	0.4259	0.4342	0.4465	0.4373
	y	0.3853	0.4028	0.4071	0.3893
9A	x	0.4373	0.4465	0.4582	0.4483
	y	0.3893	0.4071	0.4099	0.3919
9B	x	0.4465	0.4562	0.4687	0.4582
	y	0.4071	0.4260	0.4289	0.4099
9C	x	0.4582	0.4687	0.4813	0.4700
	y	0.4099	0.4289	0.4319	0.4126
9D	x	0.4483	0.4582	0.4700	0.4593
	y	0.3919	0.4099	0.4126	0.3944

Forward Voltage Bin

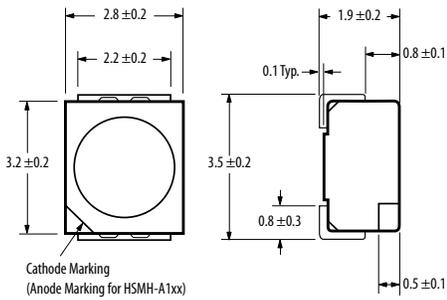| Bin	Min (V)	Max (V)
F05	2.80	3.00
F06	3.00	3.20
F07	3.20	3.40
F08	3.40	3.60

Tolerance ± 0.1V
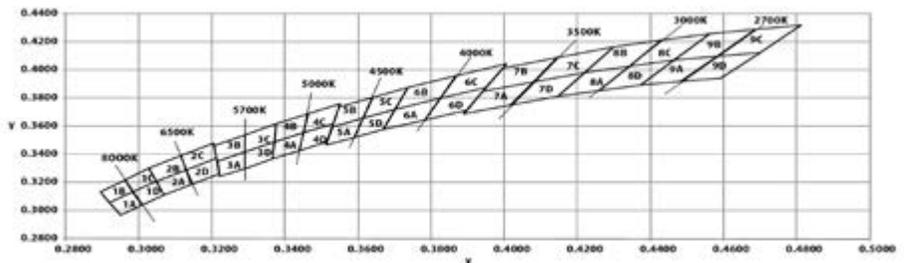
High Brightness LEDs

Package Dimensions

PLCC-2 Top Mount

2.8 ±0.2
2.2 ±0.2
3.2 ±0.2
0.1 Typ.
1.9 ±0.2
0.8 ±0.1
3.5 ±0.2
0.8 ±0.3
0.5 ±0.1

Cathode Marking
(Anode Marking for HSMH-A1xx)

PLCC-2 Reverse Mount

2.8 ±0.2
2.2 ±0.2
3.2 ±0.2
1.9 ±0.2
5.2 ±0.
0.1 TYP.
0.5 ±0.1

Cathode Marking
(Anode Marking for HSMH-A1xx)

Power PLCC-4 with Lens

2.8 ±0.2
2.2 ±0.2
+ve   -ve
3.2 ±0.2
-ve   -ve
0.7 ±0.1

Package Marking

3.87 Max.
0.1 Typ.
0.8 ±0.1
3.5 ±0.2
0.8 ±0.3
0.5 ±0.1
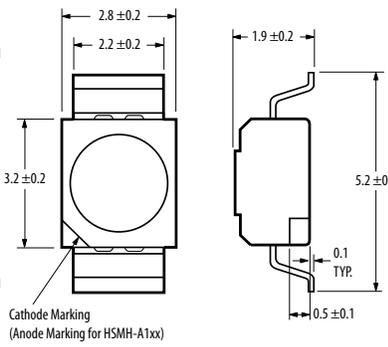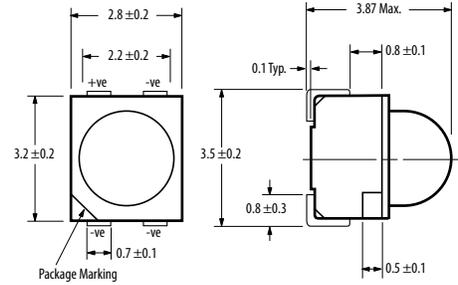
BiColor/TriColor PLCC4/Power PLCC-4
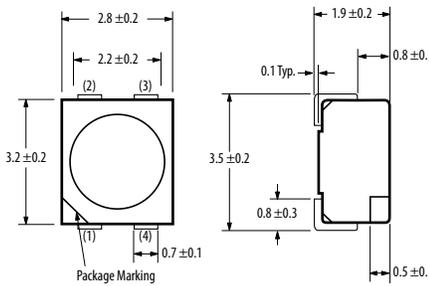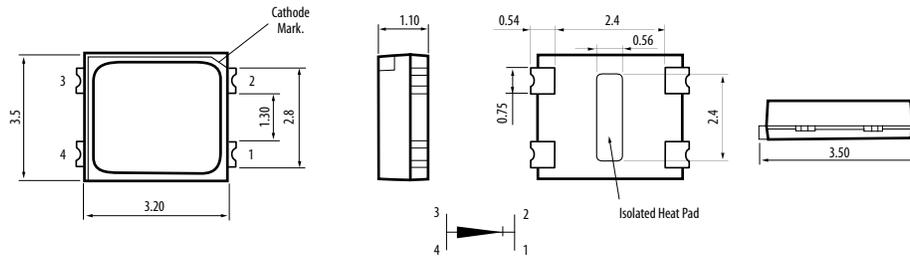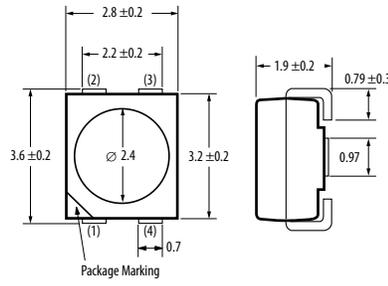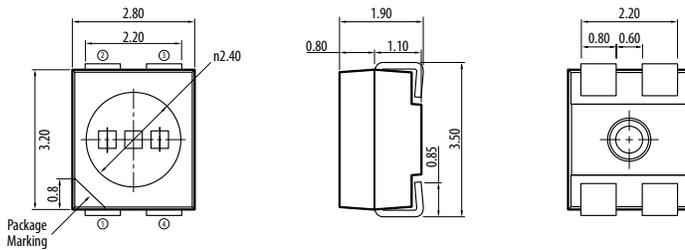
2.8 ±0.2
2.2 ±0.2
(2)   (3)
3.2 ±0.2
(1)   (4)
0.7 ±0.1

Package Marking

1.9 ±0.2
0.1 Typ.
0.8 ±0.
3.5 ±0.2
0.8 ±0.3
0.5 ±0.

Super 0.5W Power PLCC-4

2.8 ±0.2
2.2 ±0.2
(2)   (3)
3.6 ±0.2   ∅ 2.4   3.2 ±0.2
(1)   (4)
0.7

Package Marking

1.9 ±0.2
0.79 ±0.3
0.97

Cathode Mark.
3.5
3
4
1.30   2.8
2
1
3.20

1.10

0.54   2.4
0.56
0.75
2.4
3.50

Isolated Heat Pad

3   2
4   1

High Brightness Tricolor PLCC-4

2.80
2.20
②   ③
n2.40
3.20
0.8
①   ④

Package Marking

1.90
0.80   1.10
3.50
0.85

2.20
0.80   0.60

High Brightness Tricolor PLCC-6 ASMT-YTB2/YTC2/YTD2/YTB7/YTC7/YTD7

③   ②   ①   Pin 1
2.30   3.00   3.40
④   ⑤   ⑥
2.30
2.80

0.50
0.20
0.90
1.80

4 ▶ 3 Red
5 ▶ 2 Green
6 ▶ 1 Blue
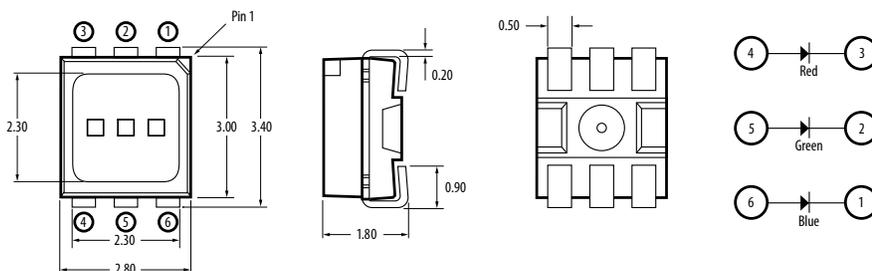
Note:
Diagram represents the overall package dimension for ASMT-YTB2/YTC2/YTD2/YTB7/YTC7/YTD7. ASMTYTC2/YTC7 is black body, while ASMT-YTD2/YTD7 is white surface.

Surface Mount PLCC LEDs

29

High Brightness LEDs

Mini PLCC-2 Surface Mount LEDs

Description

Avago Technologies' ASMT-TxBM-Nxxxx Mini PLCC-2 SMT LEDs are designed specifically for use in Automotive Interior applications. They have a wide viewing angle of 110 degree making them ideally suited for instrument cluster panel, push button, HVAC and ambient decorative lighting applications in automotive interiors.

The LEDs are packed in EIA-compliant tape and reel to facilitate easy pick and place assembly. Every reel will be shipped in single intensity and color bin, to provide close uniformity.

Features and Benefits

- Industry standard Mini PLCC-2
- High reliability LED package
- High brightness using InGaN dice technologies
- High optical efficiency
- Wide viewing angle at 110°
- Available is 8mm carrier tape on 7-inch reel
- Stable and consistent performance with minimum degradation
- JEDEC MSL 2

Target Markets Applications

- Interior automotive
- Instrument panel backlighting
- Central console backlighting
- Navigation and audio system backlighting
- Push button backlighting
- Ambient illumination
- Car puddle lighting

1W High Power LEDs

Part Number	Color		Color Temperature	Intensity Bin (Luminous Intensity @ 20mA)	Luminous Intensity @ 20mA (typ)	Max.Current	Viewing Angle	Packaging
ASMT-TWBM-NT902		Cool White	4500 - 8000K	T2 (355 - 450 mcd) U1 (450 - 560 mcd) U2 (560 - 715 mcd) V1 (715 - 900 mcd) V2 (900 - 1125 mcd)	650	20mA	120°	Reel
ASMT-TBBM-NP902		Blue	Not Applicable	P2 (56 - 71.5 mcd) Q1 (71.5 - 90 mcd) Q2 (90 - 112.5 mcd) R1 (112.5 - 140 mcd) R2 (140 - 180 mcd)	100	20mA	120°	Reel
ASMT-TGBM-NT502		Green	Not Applicable	T1 (285 - 355 mcd) T2 (3555 - 450 mcd) U1 (450 - 560 mcd) U2 (560 - 715 mcd) V1 (715 - 900 mcd)	480	20mA	120°	Reel

Notes
1. θ1/2 is the off-axis angle where the luminous intensity is ½ the peak intensity.
2. ΦV is the total luminous flux output as measured with an integrating sphere at mono pulse conditions.
3. Tolerance = ±12%.

High Brightness LEDs

ASMT–T X₁BM-N X₂-X₃-X₄-X₅

$\text{ASMT–T } X_1\text{BM-N } X_2\text{-}X_3\text{-}X_4\text{-}X_5$

- Packaging option
- Color bin selection
- Intensity bin selection
- Color
  - B – Blue
  - G – Green
  - W – White
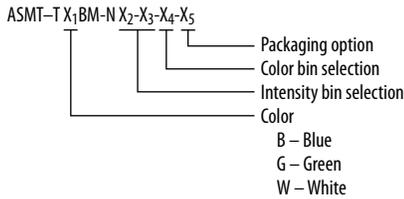
Part Numbering System

Device Color (X_1)

B	Blue
G	Green

Intensity Bin Select (X_2X_3)

Individual reel will contain parts from one half bin only

X_2	Min IV Bin
X_3	Number of half bins
0	Full Distribution
2	2 half bins starting from X21
3	3 half bins starting from X21
4	4 half bins starting from X21
5	5 half bins starting from X21
6	2 half bins starting from X22
7	3 half bins starting from X22
8	4 half bins starting from X22
9	5 half bins starting from X22

Intensity Bin Limits

Bin ID	Min (mcd)	Max (mcd)
P1	45.0	56.0
P2	56.0	71.5
Q1	71.5	90.0
Q2	90.0	112.5
R1	112.5	140.0
R2	140.0	180.0
S1	180.0	224.0
S2	224.0	285.0
T1	285.0	355.0
T2	355.0	450.0
U1	450.0	560.0
U2	560.0	715.0
V1	715.0	900.0
V2	900.0	1125.0

Tolerance of each bin limit = ± 12%

Color Bin Select (X_4)

Individual reel will contain parts from one half bin only

X_4	
0	Full Distribution
A	1 and 2 only
B	2 and 3 only
C	3 and 4 only
G	1, 2 and 3 only
H	2, 3 and 4 only
Z	Special binning

Color Bin Limits

Blue	Min. (nm)	Max. (nm)
1	460.0	465.0
2	465.0	470.0
3	470.0	475.0
4	475.0	480.0

Green	Min. (nm)	Max. (nm)
1	515.0	520.0
2	520.0	525.0
3	525.0	530.0
4	530.0	535.0

Tolerance of each bin limit = ± 1%

Packaging Option (X_5)

Option	Test Current	Package Type	Reel Size
2	20mA	Top Mount	7 inch

Device Color (X_1)

W	White

Intensity Bin Select (X_2X_3)

Individual reel will contain parts from one half bin only

X_2	Min IV Bin
X_3	Number of half bins
0	Full Distribution
2	2 half bins starting from X21
3	3 half bins starting from X21
4	4 half bins starting from X21
5	5 half bins starting from X21
6	2 half bins starting from X22
7	3 half bins starting from X22
8	4 half bins starting from X22
9	5 half bins starting from X22

Intensity Bin Limits

Bin ID	Min (mcd)	Max (mcd)
T1	285.0	355.0
T2	355.0	450.0
U1	450.0	560.0
U2	560.0	715.0
V1	715.0	900.0
V2	900.0	1125.0
W1	1125.0	1400.00
W2	1400.00	1800.00

Bin ID	Min (mcd)	Max (mcd)
X1	1800.00	2240.00
X2	2240.00	2850.00

Tolerance of each bin limit = ± 12%

Color Bin Select (X_4)

Individual reel will contain parts from one half bin only

X_4	
0	Full Distribution
A	5K and 5L only
B	6K and 6L only
C	7K and 7L only
D	8K and 8L only
E	5K and 6K only
F	5L and 6L only
G	6K and 7K only
H	6L and 7L only
J	7K and 8K only
K	7L and 8L only
L	5K, 5L, 6K and 6L only
M	6K, 6L, 7K and 7L only
N	7K, 7L, 8K and 8L only
Z	Special binning

Color Bin Limits

Blue	Min. (nm)	Max. (nm)
1	460.0	465.0
2	465.0	470.0
3	470.0	475.0
4	475.0	480.0

Green	Min. (nm)	Max. (nm)
1	515.0	520.0
2	520.0	525.0
3	525.0	530.0
4	530.0	535.0

Tolerance of each bin limit = ± 1%

Packaging Option (X_5)

Option	Test Current	Package Type	Reel Size
2	20mA	Top Mount	7 inch

High Brightness LEDs

Color Bin (X₄)

Individual reel will contain parts from one sub bin only.

Bin ID	Sub Bin ID					Limits (Chromaticity Coordinates)
5K	5Ka	x	0.296	0.304	0.302	0.294
		y	0.259	0.270	0.276	0.264
	5Kb	x	0.294	0.302	0.300	0.291
		y	0.264	0.276	0.281	0.268
	5Kc	x	0.304	0.313	0.312	0.302
		y	0.270	0.284	0.291	0.276
	5Kd	x	0.302	0.312	0.310	0.300
		y	0.276	0.291	0.297	0.281
5L	5La	x	0.291	0.300	0.298	0.288
		y	0.268	0.281	0.288	0.274
	5Lb	x	0.288	0.298	0.295	0.285
		y	0.274	0.288	0.294	0.279
	5Lc	x	0.300	0.310	0.309	0.298
		y	0.281	0.297	0.305	0.288
	5Ld	x	0.298	0.309	0.307	0.295
		y	0.288	0.305	0.312	0.294
6K	6Ka	x	0.313	0.322	0.321	0.312
		y	0.284	0.297	0.305	0.291
	6Kb	x	0.312	0.321	0.320	0.310
		y	0.291	0.305	0.314	0.297
	6Kc	x	0.322	0.330	0.330	0.321
		y	0.297	0.310	0.320	0.305
	6Kd	x	0.321	0.330	0.330	0.320
		y	0.305	0.320	0.330	0.314
6L	6La	x	0.310	0.320	0.319	0.309
		y	0.297	0.314	0.322	0.305
	6Lb	x	0.309	0.319	0.318	0.307
		y	0.305	0.322	0.329	0.312
	6Lc	x	0.320	0.330	0.330	0.319
		y	0.314	0.330	0.339	0.322
	6Ld	x	0.319	0.330	0.330	0.318
		y	0.322	0.339	0.347	0.329

Bin ID	Sub Bin ID					Limits (Chromaticity Coordinates)
7K	7Ka	x	0.330	0.336	0.337	0.330
		y	0.310	0.320	0.330	0.320
	7Kb	x	0.330	0.337	0.337	0.330
		y	0.320	0.330	0.341	0.330
	7Kc	x	0.336	0.343	0.344	0.337
		y	0.320	0.331	0.341	0.330
	7Kd	x	0.337	0.344	0.345	0.337
		y	0.330	0.341	0.352	0.341
7L	7La	x	0.330	0.337	0.337	0.330
		y	0.330	0.341	0.349	0.339
	7Lb	x	0.330	0.337	0.338	0.330
		y	0.339	0.349	0.358	0.347
	7Lc	x	0.337	0.345	0.346	0.337
		y	0.341	0.352	0.362	0.349
	7Ld	x	0.337	0.346	0.347	0.338
		y	0.349	0.362	0.371	0.358
8K	8Ka	x	0.343	0.351	0.352	0.344
		y	0.331	0.343	0.354	0.341
	8Kb	x	0.344	0.352	0.354	0.345
		y	0.341	0.354	0.364	0.352
	8Kc	x	0.351	0.360	0.362	0.352
		y	0.343	0.357	0.369	0.354
	8Kd	x	0.352	0.362	0.364	0.354
		y	0.354	0.369	0.380	0.364
8L	8La	x	0.345	0.354	0.355	0.346
		y	0.352	0.364	0.375	0.362
	8Lb	x	0.346	0.355	0.356	0.347
		y	0.362	0.375	0.385	0.371
	8Lc	x	0.354	0.364	0.366	0.355
		y	0.364	0.380	0.391	0.375
	8Ld	x	0.355	0.366	0.367	0.356
		y	0.375	0.391	0.401	0.385

Tolerance of each bin limit = ±0.02

Color Coordinates Chart

Package Dimensions

Cathode Marking
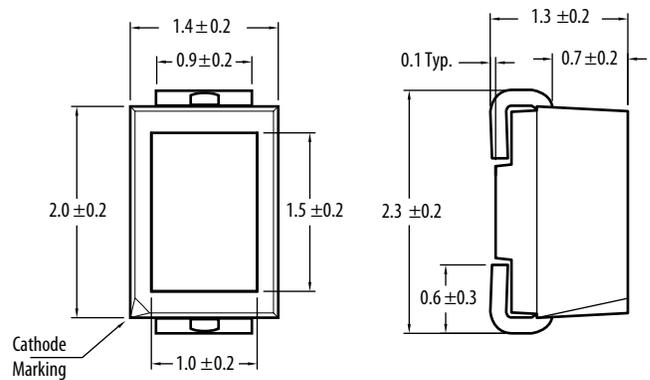
Notes:
1. All dimensions in millimeters.
2. Terminal Finish: Ag plating.
3. Encapsulation material: Silicone resin.

High Brightness LEDs

Envisium™ Power PLCC-4 Surface Mount LEDs

Description

Envisium™ is the premier class of mid-Power LEDs using TS AlInGaP chip technology. Envisium™ LEDs offer unparalleled performance, engineering and design flexibility.

Envisium™ Power PLCC-4 SMT LEDs, available in red, red-orange and amber, fill the need for mid-power illumination capabilities between Avago Technologies' conventional PLCC-4 products, and the Super 0.5W Power PLCC-4. The Power PLCC-4 package can be driven at high current due to its superior design, and is able to dissipate the heat more efficiently than conventional PLCC-2 SMT LEDs. It also offers much higher quality and reliability and superior mechanical characteristics to reduce tombstoning, prevent delamination and improve pick-and-place assembly.

The reliability and performance characteristics of these mid-power LEDs, such as their –40°C to +100°C operating temperature range, make them uniquely suitable for use in harsh conditions such as automotive applications, and in electronic signs and signals. To facilitate easy pick and place assembly, the LEDs are packed in EIA-compliant tape and reel. Every reel is shipped in single intensity and color bin (except for red) to provide close uniformity.

These LEDs are compatible with both IR solder reflow and through-the-wave (TTW) soldering processes.

Features and Benefits

- Industry Standard PLCC-4 (plastic leaded chip carrier) form factor
- High reliability Power PLCC-4 package
- High brightness with optimum flux performance using TS AlInGaP dice technologies
- Available in red, red orange and amber colors
- High optical efficiency
- Higher ambient temperature at the same current possible compared to PLCC-2
- Super wide 120-degree viewing angle
- Well-suited for backlighting applications
- Supplied in EIA-standard 8 mm carrier tape on 7 inch reel
- Compatible with both IR and TTW soldering processes

Applications

- Interior automotive
  - Instrument panel backlighting
  - Central console backlighting
  - Navigation and audio system lighting
  - Push button backlighting
- Exterior automotive
  - Turn signals
  - Side repeater lamps
  - CHMSLs (center high-mounted stop light)
  - Rear combination lamps
  - Puddle lights
- Electronic signs and signals
  - Channel lettering
  - Contour lighting
  - Indoor variable message signs
- Office automation, home appliances, industrial equipment
  - Front panel backlighting
  - Push button backlighting
  - Display backlighting

High Brightness LEDs

Envisium 0.25W Power PLCC-4 Surface Mount LED

Part Number	Color	Typ. Dominant Wavelength λD (nm)1	Typ. Viewing Angle 2θ½ (°)2	Intensity Bin	Min. IV (mcd)	Max. IV (mcd)	Total Flux ΦV (mlm)4,5 Typ.	Typ. VF (V)	Test Current (mA)
ASMC-PRB9-TV005	AllnGaP Red	630.0	120	V1	630.00	1000.00	2600.00	2.8	50
		630.0	120	V2	790.00	1260.00	3300.00	2.8	50
		630.0	120	W1	1000.00	1600.00	–	2.8	50
ASMC-PHB9-TW005	AllnGaP Red Orange	617.0	120	W1	1000.00	1600.00	4300.00	2.8	50
		617.0	120	W2	1200.00	2020.00	5000.00	2.8	50
		617.0	120	X1	1580.00	2500.00	–	2.8	50
ASMC-PAB9-TV005	AllnGaP Amber	592.0	120	V1	630.00	1000.00	3000.00	2.8	50
		592.0	120	V2	790.00	1260.00	3800.00	2.8	50
		592.0	120	W1	1000.00	1600.00	–	2.8	50

Notes:

1. The dominant wavelength, λ_D, is derived from the CIE Chromaticity Diagram and represents the color of the device.

2. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the peak intensity.

3. The luminous intensity, I_V, is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.

4. Φ is the total luminous flux output as measured with an integrating sphere at mono pulse conditions.

High Brightness LEDs

Envisium 0.25W Power PLCC-4

ASMC—PxB9—T X_2-X_3-X_4-X_5

              — Packaging option
             — Color bin selection
             — Intensity bin selection
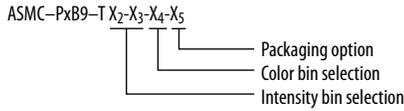
Color Bin Selection (X_4)

An individual reel will contain parts from one bin only

X_4	
0	Full Distribution
A	1 and 2 only
B	2 and 3 only
C	3 and 4 only
D	4 and 5 only
E	5 and 6 only
G	1, 2 and 3 only
H	2, 3 and 4 only
J	3, 4 and 5 only
K	4, 5 and 6 only
M	1, 2, 3 and 4 only
N	2, 3, 4 and 5 only
P	3, 4, 5 and 6 only
R	1, 2, 3, 4 and 5 only
S	2, 3, 4, 5 and 6 only

Intensity Bin Selection (X_2X_3)

X_2	Min. I_V Bin
X_3	**Number of half bins**
0	Full Distribution
2	2 half bins starting from $X_2$1
3	3 half bins starting from $X_2$1
4	4 half bins starting from $X_2$1
5	5 half bins starting from $X_2$1
6	2 half bins starting from $X_2$2
7	3 half bins starting from $X_2$2
8	4 half bins starting from $X_2$2
9	5 half bins starting from $X_2$2

Color Bin Limits

Amber/ Yellow	Min. (nm)	Max. (nm)
1	582.0	584.5
2	584.5	587.0
3	587.0	589.5
4	589.5	592.0
5	592.0	594.5
6	594.5	597.0

Red Orange	Min. (nm)	Max. (nm)
1	611.0	616.0
2	616.0	620.0

Red	Min. (nm)	Max. (nm)
Full Distribution		

Tolerance of each bin limit = ±1 nm

Packaging Option (X_5)

X_5	Test Current	Package Type	Reel Size
5	50 mA	Top Mount	7 inch

Intensity Bin Limits

Bin ID	Min. (mcd)	Max. (mcd)
V1	715.00	900.00
V2	900.00	1125.00
W1	1125.00	1400.00
W2	1400.00	1800.00
X1	1800.00	2240.00
X2	2240.00	2850.00

Tolerance of each bin limit = ± 12%

High Brightness LEDs

Package Dimensions

Envisium 0.25W Power PLCC-4
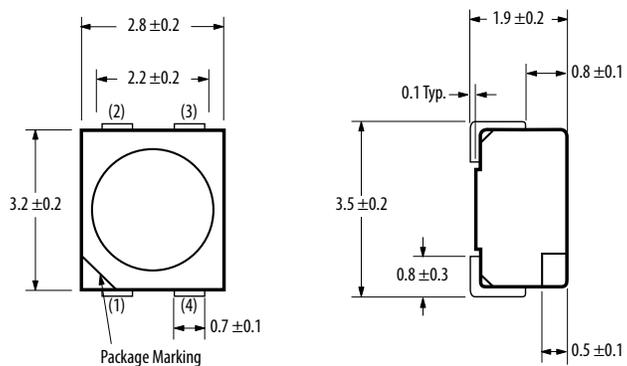
Note:
All dimensions in millimeters.

Envisium Power PLCC-4	
1	Cathode
2	Anode
3	Cathode
4	Cathode

High Power LEDs

Description

Avago High Power and Mini High Power LED is a high performance, energy efficient device which can handle high thermal and high driving current. The White High Power LED is available in a wide range of color. For white color, the color temperature ranges from 2700K to 10000K.

The low profile package design and ultra small footprint is suitable for a wide variety of applications especially where space and height is a constraint.

The package is compatible with reflow soldering process. It is packed in EIA-compliant tape and reel option.

Features and Benefits

- Available in full range of colors: Red, Red Orange, Amber, Green, Blue, Royal Blue, Cyan, Cool White, Neutral White and Warm White
- Energy efficient
- Compatible with reflow soldering process
- High current operation
- Long operation life
- Wide viewing angle
- Silicone encapsulation
- Non-ESD sensitive (threshold > 16kV)

Typical Applications

- Sign backlight
- Safety, exit and emergency sign lightings
- Specialty lighting such as task lighting and reading lights
- Retail display
- Commercial lighting
- Accent or marker lightings, strip or step lightings
- Portable lightings, bicycle head lamp, torch lights.
- Decorative lighting
- Architectural lighting
- Street lighting
- Tunnel lighting
- Contour lighting
- Traffic signal

High Brightness LEDs

1W High Power LEDs

Part Number	Color		Color Temperature (K)/ Wavelength (nm)	Flux Bin (Luminous Flux/Radiometric Power @ 350mA)	Luminous Flux (lm) @ 350mA (typ)	Luminous Flux (lm) @ 700mA (typ)	Max. Current	Viewing Angle	Electrically Isolated Metal Slug	Packaging
ASMT-AW00-NUV00		Cool White	4500 - 10,000K (1)	U(87.4-99.6lm) ; V(99.6-113.6lm)	90lm	-	350mA	140	Yes	Tube[2]
ASMT-AW00-NUWK1		Cool White	5650 - 7000K	U(87.4-99.6lm); V(99.6-113.6lm); W(113.6-129.5lm)	95lm	-	350mA	140	Yes	Tube and Reel[2]
ASMT-AN00-NUV01		Neutral White	3500 - 4500K	U(87.4-99.6lm) ; V(99.6-113.6lm)	90lm	-	350mA	140	Yes	Tube and Reel[2]
ASMT-AN00-NUVJ1		Neutral White	3500 - 4100K	U(87.4-99.6lm) ; V(99.6-113.6lm)	90lm	-	350mA	140	Yes	Tube and Reel[2]
ASMT-AY00-NTU00		Warm White	2700 - 3500K[1]	T(67.2-87.4lm); U(87.4-99.6lm)	80lm	-	350mA	140	Yes	Tube[2]
ASMT-AY00-NTV00		Warm White	2700 - 3500K[1]	T(67.2-87.4lm); U(87.4-99.6lm); V(99.6-113.6lm)	85lm	-	350mA	140	Yes	Tube[2]
ASMT-AL00-NNP00		Royal Blue	440-460nm[3,4]	N(275-355mW); P(355-435mW)	350mW	–	350mA	140	Yes	Tube[2]
ASMT-AB00-NMP00		Blue	460-480nm[3]	M(13.9-18.1lm); N(18.1-23.5lm); P(23.5-30.6lm)	18lm	–	350mA	140	Yes	Tube[2]
ASMT-AC00-NST00		Cyan	490-520nm[3]	S(51.7-67.2lm); T(67.2-87.4lm)	58lm	–	350mA	140	Yes	Tube[2]
ASMT-AC00-NSU00		Cyan	490-520nm[3]	S(51.7-67.2lm); T(67.2-87.4lm) U(87.4-99.6lm)	75lm	–	350mA	140	Yes	Tube[2]
ASMT-AG00-NST00		Green	515-535nm[3]	S(51.7-67.2lm); T(67.2-87.4lm)	65lm	–	350mA	140	Yes	Tube[2]
ASMT-AA00-ARS00		Amber	587-597nm[3]	R(39.8-51.7lm); S(51.7-67.2lm)	50lm	–	350mA	140	No	Tube[2]
ASMT-AH00-ARS00		Red-Orange	610-620nm	R(39.8-51.7lm); S(51.7-67.2lm)	50lm	–	350mA	140	No	Tube[2]
ASMT-AR00-ARS00		Red	620-635nm	R(39.8-51.7lm); S(51.7-67.2lm)	50lm	–	350mA	140	No	Tube[2]
ASMT-AR00-AST00		Red	620-635nm	S(51.7-67.2lm); T(67.2-87.4lm)	65lm	–	350mA	140	No	Tube[2]

Notes
1. Narrow Color Temperature selections are available on request.
2. All above listed LEDs are also avaialble in Reel packing.
3. Narrow color bin selections for blue, green, amber, royal-blue, and cyan are available on request.
4. For royal-blue, the wavelength shown in the above table is peak wavelength.

3W High Power LEDs

Part Number	Color		Color Temperature (K)/ Wavelength (nm)	Flux Bin (Luminous Flux/Radiometric Power @ 350mA)	Luminous Flux (lm) @ 350mA (typ)	Luminous Flux (lm) @ 700mA (typ)	Max. Current	Viewing Angle	Electrically Isolated Metal Slug	Packaging
ASMT-AW31-NVW00		Cool White	4500-10000K	V(99.6-113.6lm); W(113.6-129.5lm)	115	196	700mA	140	Yes	Tube[2]
ASMT-AN31-NVW00		Neutral White	3500-4500K	V(99.6-113.6lm); W(113.6-129.5lm)	115	196	700mA	140	Yes	Tube[2]
ASMT-AY31-NTU00		Warm White	2,700 - 3,500K[1]	T(67.2-87.4lm); U(87.4-99.6lm)	80lm	140lm	700mA	140	Yes	Tube[2]
ASMT-AB31-NNP00		Blue	455-475nm	N(18.1-23.5lm); P(23.5-30.6lm)	23	39	700mA	140	Yes	Tube[2]
ASMT-AL31-NPQ00		Royal Blue	440-460nm[3,4]	P(355-435lm); Q(435-515lm)	460mW	782mW	700mA	140	Yes	Tube[2]
ASMT-AG31-NTU00		Green	515-535nm[3]	T(67.2-87.4lm); U(87.4-99.6lm)	78lm	125lm	700mA	140	Yes	Tube[2]
ASMT-AA30-ARS00		Amber	587-597nm[3]	R(39.8-51.7lm); S(51.7-67.2lm)	50lm	94lm	700mA	140	No	Tube[2]
ASMT-AH30-ARS00		Red-Orange	610-620nm	R(39.8-51.7lm); S(51.7-67.2lm)	50lm	94lm	700mA	140	No	Tube[2]
ASMT-AR30-ARS00		Red	620-635nm	R(39.8-51.7lm); S(51.7-67.2lm)	50lm	94lm	700mA	140	No	Tube[2]
ASMT-AR30-AST00		Red	620-635nm	S(51.7-67.2lm); T(67.2-87.4lm)	60lm	112lm	700mA	140	Yes	Tube[2]

Notes
1. Narrow Color Temperature selections are available on request.
2. All above listed LEDs are also avaialble in Reel packing.
3. Narrow color bin selections for blue, green, amber and royal-blue are available on request.
4. For royal-blue, the wavelength shown in the above table is peak wavelength.

High Brightness LEDs

1W Mini High Power LEDs

Part Number	Color		Color Temperature (K)/ Wavelength (nm)	Flux Bin (Luminous Flux/Radiometric Power @ 350mA)	Luminous Flux (lm) @ 350mA (typ)	Luminous Flux (lm) @ 700mA (typ)	Max. Current	Viewing Angle	Electrically Isolated Metal Slug	Packaging
ASMT-JW11-NUW01		Cool White	4500 - 10,000K[1]	U(87.4-99.6lm) ; V(99.6-113.6lm); W(113.6-129.5lm)	106lm	-	350mA	140	Yes	Tape & Reel
ASMT-JN11-NUW01		Neutral White	3500 - 4500K[1]	U(87.4-99.6lm) ; V(99.6-113.6lm); W(113.6-129.5lm)	106lm	-	350mA	140	Yes	Tape & Reel
ASMT-JY11-NTV01		Warm White	2700 - 3500K[1]	T(67.2-87.4lm); U(87.4-99.6lm);V(99.6-113.6lm)	87lm	-	350mA	140	Yes	Tape & Reel
ASMT-JL11-NMP01		Royal Blue	440-460nm[2,3]	M(225-275mW); N(275-355mW); P(355-435mW)	350mW	–	350mA	165	Yes	Tape & Reel
ASMT-JL11-NNQ01		Royal Blue	440-460nm[2,3]	N(275-355mW); P(355-435mW); Q(435-515mW)	355mW	-	350mA	165	Yes	Tape & Reel
ASMT-JB11-NMP01		Blue	455-475nm[2]	M(13.9-18.1lm); N(18.1-23.5lm); P(23.5-30.6lm)	18lm	–	350mA	165	Yes	Tape & Reel
ASMT-JB11-NNQ01		Blue	455-475nm[2]	N(275-355mW); P(355-435mW); Q(435-515mW)	24lm	-	350mA	165	Yes	Tape & Reel
ASMT-JC11-NST01		Cyan	490-520nm[2]	S(51.7-67.2lm); T(67.2-87.4lm)	58lm	–	350mA	165	Yes	Tape & Reel
ASMT-JG11-NST01		Green	515-535nm[2]	S(51.7-67.2lm); T(67.2-87.4lm)	70lm	–	350mA	165	Yes	Tape & Reel
ASMT-JA10-ARS01		Amber	587-597nm[2]	R(39.8-51.7lm); S(51.7-67.2lm)	48lm	–	350mA	165	No	Tape & Reel
ASMT-JH10-ARS01		Red-Orange	610-620nm	R(39.8-51.7lm); S(51.7-67.2lm)	48lm	–	350mA	165	No	Tape & Reel
ASMT-JR10-AST01		Red	620-635nm	S(51.7-67.2lm); T(67.2-87.4lm)	60lm	-	350mA	165	Yes	Tape & Reel

Notes

1. Narrow Color Temperature selections are available on request.

2. Narrow color bin selections for blue, green, amber, royal-blue, and cyan are available on request.

3. For royal-blue, the wavelength shown in the above table is peak wavelength.

High Brightness LEDs

3W Mini High Power LEDs

Part Number	Color		Color Tempera-ture (K)/ Wavelength (nm)	Flux Bin (Luminous Flux/Radiometric Power @ 350mA)	Luminous Flux (lm) @ 350mA (typ)	Luminous Flux (lm) @ 700mA (typ)	Max. Current	Viewing Angle	Electrically Isolated Metal Slug	Packaging
ASMT-JW32-NVW01		Cool White	4500-10000K	V(99.6-113.6lm); W(113.6-129.5lm)	110	187	700mA	140	Yes	Tape & Reel
ASMT-JW32-NWX01		Cool White	4500-10000K	W(113.6-129.5lm); X(129.5-147.7lm)	125	213	700mA	140	Yes	Tape & Reel
ASMT-JW32-NWXH1		Cool White	4500-5650K	W(113.6-129.5lm); X(129.5-147.7lm)	125	213	700mA	140	Yes	Tape & Reel
ASMT-JW32-NWXJ1		Cool White	5000-6300K	W(113.6-129.5lm); X(129.5-147.7lm)	125	213	700mA	140	Yes	Tape & Reel
ASMT-JW32-NWXK1		Cool White	5650-7000K	W(113.6-129.5lm); X(129.5-147.7lm)	125	213	700mA	140	Yes	Tape & Reel
ASMT-JN32-NVW01		Neutral White	3500-4500K	V(99.6-113.6lm); W(113.6-129.5lm)	110	187	700mA	140	Yes	Tape & Reel
ASMT-JN32-NWX01		Neutral White	3500-4500K	W(113.6-129.5lm); X(129.5-147.7lm)	125	213	700mA	140	Yes	Tape & Reel
ASMT-JN32-NWXG1		Neutral White	3500-4100K	W(113.6-129.5lm); X(129.5-147.7lm)	125	213	700mA	140	Yes	Tape & Reel
ASMT-JN32-NWXH1		Neutral White	3800-4500K	W(113.6-129.5lm); X(129.5-147.7lm)	125	213	700mA	140	Yes	Tape & Reel
ASMT-JY32-NUW01		Warm White	2700-3500K	U(87.4-99.6lm) ; V(99.6-113.6lm); W(113.6-129.5lm)	105	179	700mA	140	Yes	Tape & Reel
ASMT-JY32-NUWH1		Warm White	2700-3050K	U(87.4-99.6lm) ; V(99.6-113.6lm); W(113.6-129.5lm)	105	179	700mA	140	Yes	Tape & Reel
ASMT-JY32-NUWJ1		Warm White	2850-3250K	U(87.4-99.6lm) ; V(99.6-113.6lm); W(113.6-129.5lm)	105	179	700mA	140	Yes	Tape & Reel
ASMT-JY32-NUWK1		Warm White	3050-3500K	U(87.4-99.6lm) ; V(99.6-113.6lm); W(113.6-129.5lm)	105	179	700mA	140	Yes	Tape & Reel
ASMT-JL31-NPR01		Royal Blue	440-460nm[3]	P(355-435lm); Q(435-515lm); R(515-595mW)	450mW	765mW	700mA	165	Yes	Tape & Reel
ASMT-JG31-NTU01		Green	515-535nm[2]	T(67.2-87.4lm); U(87.4-99.6lm)	78lm	125lm	700mA	165	Yes	Tape & Reel
ASMT-JA30-ARS01		Amber	587-597nm[2]	R(39.8-51.7lm); S(51.7-67.2lm)	48lm	86lm	700mA	165	No	Tape & Reel
ASMT-JH30-ARS01		Red-Orange	610-620nm	R(39.8-51.7lm); S(51.7-67.2lm)	48lm	86lm	700mA	165	No	Tape & Reel
ASMT-JR30-AST01		Red	620-635nm	S(51.7-67.2lm); T(67.2-87.4lm)	58lm	104lm	700mA	165	Yes	Tape & Reel
ASMT-JD30-ALN01		Deep Red	650-670nm[3]	L(175-225mW); N(275-355mW)	240mW	480mW	700mA	165	Yes	Tape & Reel

Notes
1. Narrow Color Temperature selections are available on request.
2. Narrow color bin selections for blue, green, amber and royal-blue are available on request.
3. For royal-blue and deep red, the wavelength shown in the above table is peak wavelength.
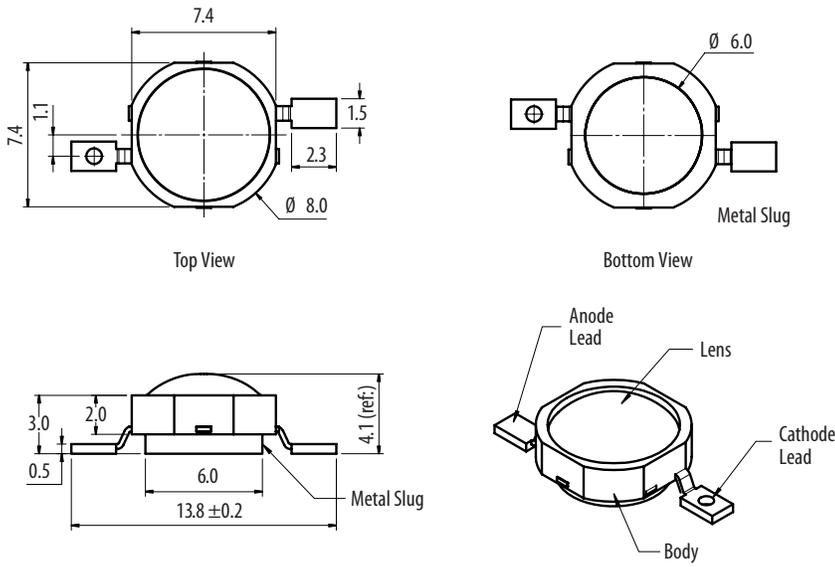
High CRI 3W Mini High Power LEDs

Part Number	Color		Color Tempera-ture (K)/ Wavelength (nm)	Flux Bin (Luminous Flux/Radiometric Power @ 350mA)	Luminous Flux (lm) @ 350mA (typ)	Luminous Flux (lm) @ 700mA (typ)	Max. Current	Viewing Angle	Electrically Isolated Metal Slug	Packaging
ASMT-JW33-NUV01		Cool White	4500-10000K	U(87.4-99.6lm); V(99.6-113.6lm)	100	178	700mA	140	Yes	Tape & Reel
ASMT-JN33-NUV01		Neutral White	3500-4500K	U(87.4-99.6lm); V(99.6-113.6lm)	100	178	700mA	140	Yes	Tape & Reel
ASMT-JY33-NRS01		Warm White	2700-3500K	R(39.8-51.7lm); S(51.7-67.2)	60	107	700mA	140	Yes	Tape & Reel

Notes
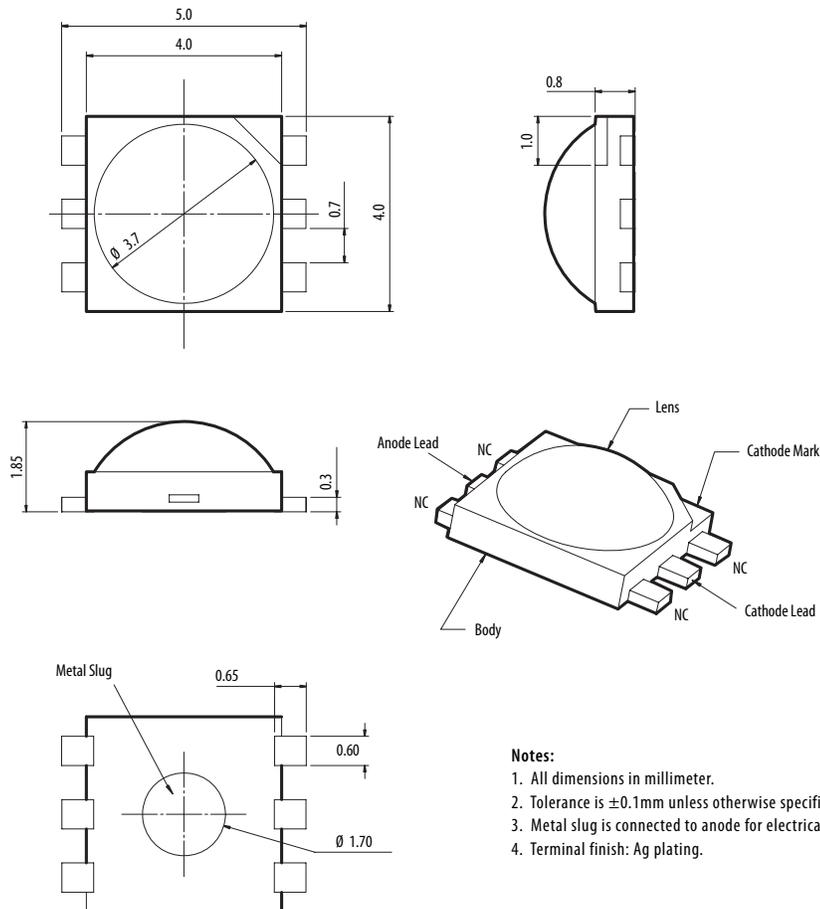1. Narrow Color Temperature selections are available on request.

High Brightness LEDs

1W & 3W High Power LED

Top View

7.4
7.4
1.1
1.5
2.3
Ø 8.0

Bottom View

Ø 6.0
Metal Slug

3.0
2.0
0.5
6.0
13.8 ±0.2
4.1 (ref.)
Metal Slug

Anode Lead
Lens
Cathode Lead
Body

Notes:
1. All dimensions in millimeter.
2. Tolerance is ±0.1mm unless otherwise specified.
3. Metal slug is connected to anode for electrically non-isolated package.
4. Terminal finish: Ag plating.

1W & 3W Mini High Power LED

5.0
4.0
4.0
0.7
Ø 3.7

0.8
1.0

1.85
0.3

Lens
Anode Lead
NC
NC
Cathode Mark
NC
Cathode Lead
NC
Body

Metal Slug
0.65
0.60
Ø 1.70

Notes:
1. All dimensions in millimeter.
2. Tolerance is ±0.1mm unless otherwise specified.
3. Metal slug is connected to anode for electrically non-isolated package.
4. Terminal finish: Ag plating.

High Power LEDs

Moonstone™ High Power LEDs

Description

High Power LED is a high-performance, energy-efficient device that can handle high-thermal and high-driving current. The exposed pad design has excellent heat transfer from the package to the motherboard. The low-profile package design is suitable for a wide variety of applications, especially where height is a constraint. The package is compatible with the SMT reflow soldering process. This will give more freedom and flexibility to the light source designer.

Features and Benefits

- Available in White, Blue, Green, Red and Amber color
- Energy efficient
- Exposed pad for excellent heat transfer
- Suitable for SMT process
- High-current operation
- Long operation life
- Wide viewing angle
- Silicone encapsulation
- Available in emitter and module

Typical Applications

- Portable (flashlight, bicycle headlight)
- Reading light
- Architectural lighting
- Garden lighting
- Decorative lighting
- Street lighting
- Retail lighting
- Contour lighting
- Sign backlighting

Specifications

- InGaN: 3.2V (typ) at 350 mA
  3.6 V (typ) at 700 mA
- AlInGaP: 2.1 V (typ) at 350 mA
- Viewing angle of 120° and 110°

High Brightness LEDs

1W Moonstone™ High Power LEDs

Part Number	Color		Color Temperature (K)/Wavelength (nm)	Flux Bin (Luminous Flux/Radiometric Power @ 350mA)	Luminous Flux (lm) @ 350mA (typ)	Luminous Flux (lm) @ 500mA (typ)	Max. Current	Viewing Angle	Electrically Isolated Metal Slug	Packaging
ASMT-MW06-NMN00		Cool White	4,000 - 10,000K	M(95-110lm); N (110-125lm)	105	144	500mA	110	Yes	Tube
ASMT-MWB6-NMN00		Cool White	4,000 - 10,000K	M(95-110lm); N (110-125lm)	100	137	500mA	110	Yes	Tube
ASMT-MW04-NMN00		Cool White	4,000 - 10,000K	M (95-110lm); N (110-125lm)	105	–	350mA	110	Yes	Tube[2]
ASMT-MWB4-NLM00		Cool White	4,000 - 10,000K	M (95-110lm); N (110-125lm)	95	–	350mA	110	Yes	Tube[2]
ASMT-MY06-NMN00		Warm White	2,600K-4,000K	M (95-110lm); N (110-125lm)	100	137	500mA	110	Yes	Tube[2]
ASMT-MYB6-NMN00		Warm White	2,600K-4,000K	M (95-110lm); N (110-125lm);	98	134	500mA	110	Yes	Tube[2]
ASMT-MY04-NLM00		Warm White	2,600K-4,000K	L (73-95lm); M (95-110lm)	100	–	350mA	110	Yes	Tube[2]
ASMT-MYB4-NLM00		Warm White	2,600K-4,000K	L (73-95lm); M (95-110lm)	90	–	350mA	110	Yes	Tube[2]
ASMT-MB00-NDF00		Blue	455-475nm[3]	D(11.5-15lm); E(15-19.5lm); F(19.5-25.5lm)	15	–	350mA	120	Yes	Tube[2]
ASMT-MG00-NJK00		Green	515-535nm[3]	J(43-56lm); K(56-73lm)	60	–	350mA	120	Yes	Tube[2]
ASMT-MA00-AGH00		Amber	582-594.5nm[3]	G(25.5-33lm); H(33-43lm)	35	–	350mA	120	No	Tube[2]
ASMT-MR00-AGH00		Red	620-635nm	G(25.5-33lm); H(33-43lm)	35	–	350mA	120	No	Tube[2]
ASMT-MR00-AHJ00		Red	620-635nm	H(33-43lm); J(43-56lm)	40	–	350mA	120	No	Tube[2]

Notes
1. Narrow Color Temperature selections are available on request.
2. All above listed LEDs are also avaialble in Reel packing.
3. Narrow color bin selections for blue, green and amber are available on request.

High Brightness LEDs

3W Moonstone™ High Power LEDs

Part Number	Color		Color Temperature (K)/ Wavelength (nm)	Flux Bin (Luminous Flux/Radiometric Power @ 350mA)	Luminous Flux (lm) @ 350mA (typ)	Luminous Flux (lm) @ 700mA (typ)	Max. Current	Viewing Angle	Electrically Isolated Metal Slug	Packaging
ASMT-MW22-NNP00		Cool White	4000-10000K	N(110-125lm); P(125-140lm)	120	205	700mA	110	Yes	Tube
ASMT-MWE2-NNP00		Cool White	4000-10000K	N(110-125lm); P(125-140lm)	115	196	700mA	110	Yes	Tube

Notes
1. Narrow Color Temperature selections are available on request.
2. All above listed LEDs are also avaialble in Reel packing.

3W RGB Tri-Color Moonstone™ High Power LED

Part Number	Color		Color Temperature (K)/ Wavelength (nm)	Flux Bin (Luminous Flux/Radiometric Power @ 350mA)	Luminous Flux (lm) @ 700mA (typ)	Max. Current	Viewing Angle	Electrically Isolated Metal Slug	Packaging
ASMT-MT00-00001		Red	620-635nm	H(33-43lm); J(43-56lm)	40	350mA	120	No	Tape and Reel
		Green	515 - 535nm[1]	J(43-56lm); K(56-73lm); L(73-95lm)	55	350mA	120	Yes	
		Blue	455 - 475nm[1]	D(11.5-15lm); E(15-19.5lm); F(19.5-25.5lm)	13	350mA	120	Yes	

Notes
1. Narrow Color Temperature selections are available on request.

Package Dimensions
Moonstone LED Emitters
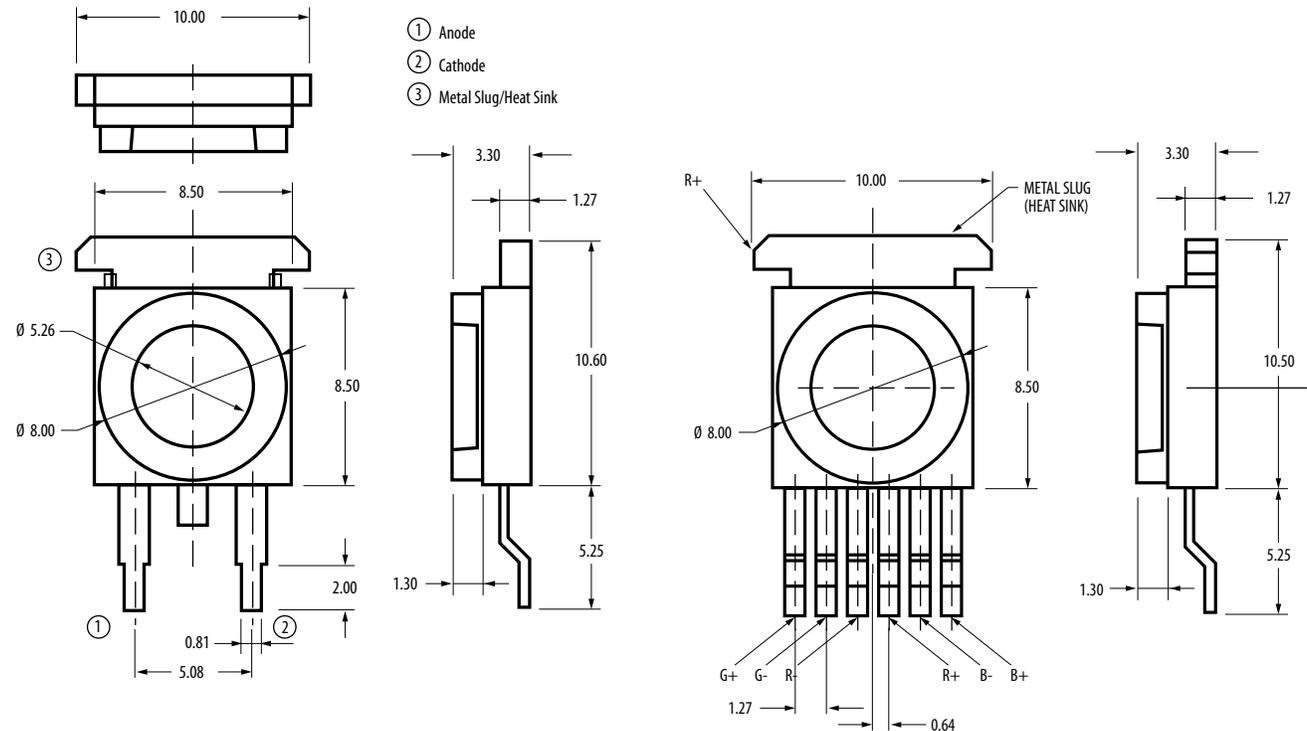
① Anode
② Cathode
③ Metal Slug/Heat Sink

Notes:
1. All Dimensions in millimeters.
2. Tolerance is ±0.1 mm unless otherwise specified.
3. Metal slug is connected to anode for electrically non-isolated option.

Notes:
1. All dimensions in millimeters.
2. Tolerance is ±0.1 mm unless otherwise specified.
3. Metal slug is connected to the anode of Red.

LED Indicators and Displays

Standard Through-hole Lamps

Description

Avago Technologies offers four types of technology-based LEDs. GaP and AlGaAs based technologies are suitable for low to moderate light output requirements. AlInGaP and InGaN product offering are suitable for high brightness needs. Through-hole LEDs are offered in a variety of packages such as 3 mm, 5 mm, rectangular, bicolor, integrated resistors in standard and low current options.

These devices are molded from advanced optical grade epoxy, which provide superior high temperature performance and excellent moisture resistance.

Through-hole LEDs are suitable for all applications requiring backlighting and status indication. Consumer electronics and automotive interiors use LEDs to add value to their products. Low power consumption, high reliability and a broad range of colors and packages are just a few reasons why.

Features and Benefits

- Excellent product quality and reliability
- Wide range of products
- Competitive pricing
- Wide operating temperature range
  - With minor electrical/optical changes
- Lower power consumption
  - High efficiency, low drive currents and low driving voltages required
- Thin, light weight and robust packaging
  - Excellent performance even under vibration and mechanical shock
- Different material technologies available in standard GaP LED lamps
  - Choice of colors (560 nm – 626 nm): Green, Yellow, Amber, Orange and Red
- Red color using AlGaAs technology.
- Five colors available with high luminous intensity in AlInGaP LED lamps
  - Amber (590 nm), Red (626 nm), Deep Red (635 nm), Orange (605 nm) and Red-Orange (615 nm)
- Two colors available with high luminous intensity in InGaN LED lamps
  - Blue (470 nm) and Green (527 nm)
- Several packaging options
  - Different sizes with aclear or diffused lens, several lead configurations and different spatial radiation patterns available in bulk, ammo-pack, right angle housing and tape and reel

Typical Applications

- Consumer
  - Ovens, washers, etc.
  - Audio, hi-fi and electrical appliances
  - Gaming and vending machines
  - Electronic toys and games
- Industrial
  - Sensors
  - Instruments
  - Measurement equipment
- Automotive and Other
  - Automotive interior
  - Exercise equipment
  - Medical equipment
  - Front panel industrial equipment

LED Indicators and Displays

Standard Through-hole LED Lamps

Part Number	Color	Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
					Min. (mcd)	Typ. (mcd)		
3 mm (T1) LED Lamps — Standard Current								
HLMP-1301-G0002	GaP Red	626	60°	Tinted, Diffused	8.6	11	1.9	10
HLMP-1321	GaP Red	626	45°	Tinted, Non-diffused	8.6	30	1.9	10
HLMP-1340	GaP Red	626	45°	Micro-tinted, Non-diffused	35.2	55	1.9	20
HLMP-1401-E0000	GaP Yellow	585	60°	Tinted, Diffused	5.7	-	2	10
HLMP-1440	GaP Yellow	585	45°	Micro-tinted, Non-diffused	23.5	45	2.1	20
HLMP-1503	GaP Green	569	60°	Tinted, Diffused	4.2	8.5	2.1	10
HLMP-1521	GaP Green	569	45°	Tinted, Non-diffused	6.7	22	2.1	10
HLMP-1540	GaP Green	569	45°	Untinted, Non-diffused	27.3	45	2.2	20
HLMP-K101	AlGaAs Red	637	60°	Tinted, Diffused	22	45	1.8	20
HLMP-K105	AlGaAs Red	637	45°	Untinted, Non-diffused	35.2	65	1.8	20
HLMP-K640	GaP Green	560	45°	Untinted, Non-diffused	4.2	21	2.2	20
HLMP-Y601-J0000	AlInGaP Red	627	45	Untinted, Non-diffused	240	680	2.2	20
HLMP-Y651-G0000	AlInGaP Deep Red	638	45	Untinted, Non-diffused	140	300	2.2	20
HLMP-Y701-G0000	AlInGaP Amber	592	45	Untinted, Non-diffused	140	400	2.2	20
HLMP-Y802-F0000	AlInGaP Green	572	45	Tinted, Non-diffused	110	240	2.4	20
HLMP-Y901-J0000	AlInGaP Yellow Orange	605	45	Untinted, Non-diffused	240	680	2	20
HLMP-Y951-K0000	AlInGaP Red Orange	615	45	Untinted, Non-diffused	310	680	2	20
HLMP-KA45-E0000	InGaN Blue	464	50	Untinted, Non-diffused	85	480	3.5	20
3 mm (T1) LED Lamps — Autoinsertable								
HLMP-NG05	AlInGaP Red	626	45°	Micro-tinted, Non-diffused	90.2	435	1.90	20
HLMP-NG07	AlInGaP Red	626	60°	Micro-tinted, Non-diffused	90.2	435	1.90	20
HLMP-NL06	AlInGaP Amber	590	60°	Micro-tinted, Non-diffused	96.2	450	2.02	20
HLMP-NS30-J0000	InGaN Blue	470	30°	Untinted, Non-diffused	240	550	3.6	20
HLMP-NM31-R0000	InGaN Green	529	30°	Untinted, Non-diffused	1500	2800	3.3	20
3 mm (T1) 5V, 12V Integrated Resistor LED Lamps								
HLMP-1621[1]	GaP Yellow	585	60°	Tinted, Diffused	2.2	8	8	–
HLMP-1640-B00A2[2]	GaP Green	569	60°	Tinted, Diffused	1.6	8	8	–

Notes: 1. Operating Voltage = 12 V.   2. Operating Voltage = 5V.

Part Number	Color	Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
5 mm (T1 3/4) LED Lamps — Standard Current								
HLMP-3301	GaP Red	626	60°	Tinted, Diffused	5.4	7	1.9	10
HLMP-3401	GaP Yellow	585	60°	Tinted, Diffused	5.7	8	2	10
HLMP-3507	GaP Green	569	60°	Tinted, Diffused	4.2	5.2	2.1	10
HLMP-3950	GaP Green	569	24°	Micro-tinted, Non-diffused	111.7	265	2.2	20
HLMP-C008-U0000	AlInGaP Red	626	8°	Untinted, Non-diffused	2900	6000	1.9	20
HLMP-C025-P0000	AlInGaP Red	626	25°	Untinted, Non-diffused	500	1000	1.9	20
HLMP-C208-S0000	AlInGaP Amber	590	8°	Untinted, Non-diffused	2600	3000	1.9	20
HLMP-C225-00000	AlInGaP Amber	590	25°	Untinted, Non-diffused	450	800	1.9	20
HLMP-C608-R0000	AlInGaP Red	635	8°	Untinted, Non-diffused	1000	2000	1.9	20
HLMP-C625-P0000	AlInGaP Red	635	25°	Untinted, Non-diffused	500	700	1.9	20
HLMP-DB25-B0000	GaN Blue	462	25°	Untinted, Non-diffused	40	100	4	20
HLMP-DM25-J0000	InGaN Green	527	25°	Untinted, Non-diffused	240	970	3.8	20
HLMP-DS25-F0000	InGaN Blue	470	25°	Untinted, Non-diffused	110	260	3.6	20
5 mm (T1 3/4) LED Lamps — Low Current								
HLMP-4700	GaP Red	626	50°	Tinted, Diffused	1.3	2.3	1.7	2
HLMP-4719	GaP Yellow	585	50°	Tinted, Diffused	0.9	2.1	1.8	2
HLMP-4740	GaP Green	569	50°	Tinted, Diffused	1	2.3	1.9	2
HLMP-D150	AlGaAs Red	637	65°	Tinted, Diffused	1.3	3	1.6	1

LED Indicators and Displays

Standard Through-hole Lamps

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
						Min. (mcd)	Typ. (mcd)		
2 mm x 5 mm Rectangular LED Lamps									
HLMP-S201		GaP Red	626	110°	Tinted, Diffused	3.4	7.5	1.9	20
HLMP-S301		GaP Yellow	585	110°	Tinted, Diffused	2.2	4	2.1	20
HLMP-S501		GaP Green	569	110°	Tinted, Diffused	4.2	8	2.2	20
2mm x 5mm Bicolor Rectangular LED Lamps									
HLMP-0800		GaP Green	570	100°	Untinted, Diffused	2.6	–	2.2	20
		GaP Red	626	100°	Untinted, Diffused	2.1	–	1.9	20
HLMP-0805		GaP Green	570	100°	Untinted, Diffused	2.6	–	2.2	20
		GaP Yellow	585	100°	Untinted, Diffused	1.4	–	2.1	20
5 mm (T1 3/4) LED Lamps — Bicolor									
HLMP-4000		GaP Green	570	65°	Untinted, Diffused	4.2	–	2.2	10
		GaP Red	626	65°	Untinted, Diffused	2.1	–	1.9	10
HLMP-4015		Gap Green	570	65°	Untinted, Non-Diffused	20	–	2.2	20
		GaP Yellow	585	65°	Untinted, Non-Diffused	20	–	2.6	20

Intensity Bin Limits

Bin ID	Intensity (mcd)	
Red / Orange	Min.	Max.
A	0.6	0.9
B	0.9	1.5
C	1.5	2.4
D	2.4	3.8
E	3.8	6.1
F	6.1	9.7
G	9.7	15.5
H	15.5	24.8
I	24.8	39.6
J	39.6	63.4
K	63.4	101.5
L	101.5	162.4
M	162.4	234.6
N	234.6	340.0
O	340	540
P	540	850
Q	850	1200
R	1200	1700
S	1700	2400
T	2400	3400
U	3400	4900
V	4900	7100
W	7100	10200
X	10200	14800
Y	14800	21400
Z	21400	30900

Tolerance: ±18%

Bin ID	Intensity (mcd)	
Yellow / Amber	Min.	Max.
A	1.0	1.6
B	1.6	2.5
C	2.5	4.0
D	4.0	6.5
E	6.5	10.3
F	10.3	16.6
G	16.6	26.5
H	26.5	42.3
I	42.3	67.7
J	67.7	108.2
K	108.2	173.2
L	173.2	250.0
M	250	360
N	360	510
O	510	800
P	800	1250
Q	1250	1800
R	1800	2900
S	2900	4700
T	4700	7200
U	7200	11700
V	11700	18000
W	18000	27000

Tolerance: ±18%

Bin ID	Intensity (mcd)	
Green / Emerald Green *	Min.	Max.
A	1.1	1.8
B	1.8	2.9
C	2.9	4.7
D	4.7	7.6
E	7.6	12.0
F	12.0	19.1
G	19.1	30.7
H	30.7	49.1
I	49.1	78.5
J	78.5	125.7
K	125.7	201.1
L	201.1	289.0
M	289	417
N	417	680
O	680	1100
P	1100	1800
Q	1800	2700
R	2700	4300
S	4300	6800
T	6800	10800
U	10800	16000
V	16000	25000
W	25000	40000

* Except InGaN Green

Tolerance: ±18%

Bin ID	Intensity (mcd)	
InGaN Green / Blue	Min.	Max.
A	30	40
B	40	50
C	50	65
D	65	85
E	85	110
F	110	140
G	140	180
H	180	240
J	240	310
K	310	400
L	400	520
M	520	680
N	680	880
P	880	1150
Q	1150	1500
R	1500	1900
S	1900	2500
T	2500	3200
U	3200	4200
V	4200	5500
W	5500	7200
X	7200	9300
Y	9300	12000

Tolerance: ±15%

LED Indicators and Displays

Color Bin Limits

Bin ID		Intensity (mcd)	
Orange ▧		**Min.**	**Max.**
2		599.0	602.5
3		601.5	605.0
4		603.8	608.2
5		606.8	611.2
Yellow ▧			
1		582.0	584.5
3		584.5	587.0
2		587.0	589.5
4		589.5	592.0
5		592.0	593.0
Amber ▧			
3		584.5	587.0
2		587.0	589.5
4		589.5	592.0
6		592.0	594.5
7		594.5	597.0
Emerald Green ▧			
1		582.0	584.5
3		584.5	587.0
2		587.0	589.5
4		589.5	592.0
5		592.0	593.0

Tolerance: ±0.5nm

Bin ID		Intensity (mcd)	
Green (except InGaN Green ▧		**Min.**	**Max.**
6		561.5	564.5
5		564.5	567.5
4		567.5	570.5
3		570.5	573.5
2		573.5	576.5
Yellow ▧			
1		520.0	524.0
3		524.0	528.0
2		528.0	532.0
4		532.0	536.0
5		536.0	540.0
Blue ▧			
1		460.0	464.0
2		464.0	468.0
3		468.0	472.0
4		472.0	476.0
5		476.0	480.0

Tolerance: ±0.5nm

LED Indicators and Displays

3 mm (T1) LED Lamps – Autoinsertable Package

Seating Plane

5.9 ±0.5 (0.23 ±0.02)

3.5 ±0.3 (0.14 ±0.01)

23.0 (0.91)

1.0 ±0.5 (0.04 ±0.02)

0.65 (0.03) Max.

4.4 ±0.3 (0.17 ±0.01)

3.1 ±0.2 (0.12 ±0.01)

2.5 ±0.3 (0.10 ±0.01)

0.4 ±0.2 (0.01 ±0.01)

0.45 ±0.10 (0.02 ±0.007)

2.0 (0.08) Ref.

Cathode Marks

0.4 ±0.2 (0.02 ±0.01)

0.4 +0.1 / 0 (0.2 +0.00 / -0.00)

3.4 ±0.2 (0.13 ±0.01)
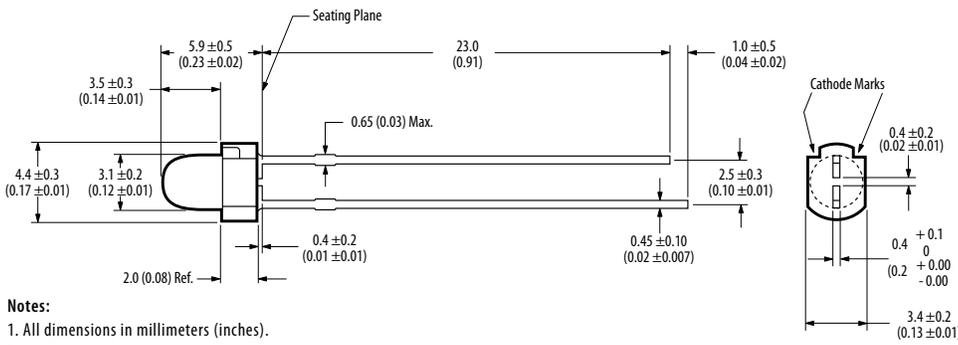
Notes:
1. All dimensions in millimeters (inches).
2. Leads are mild steel. Solder coated.
3. Epoxy Meniscus of 0.8 mm (0.03 in.) maximum may extend to the leads.
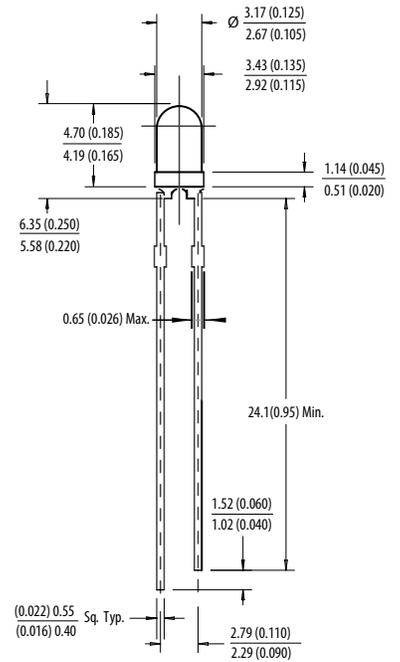
3 mm (T1) AlInGaP LED Lamps Package

5.2 / 0.205

4.1 ± 0.2 / 0.161 ± 0.008

1.0 (Max.) / 0.04

24.0 (Min.) / 0.945

1.0 (Min.) / 0.04

Cathode

3.8 / 0.15

3.5 / 0.138

3.1 ± 0.2 / 0.122 ± 0.008

2.54 / 0.1

0.45 x 0.4 Typ. (0.018 x 0.016)
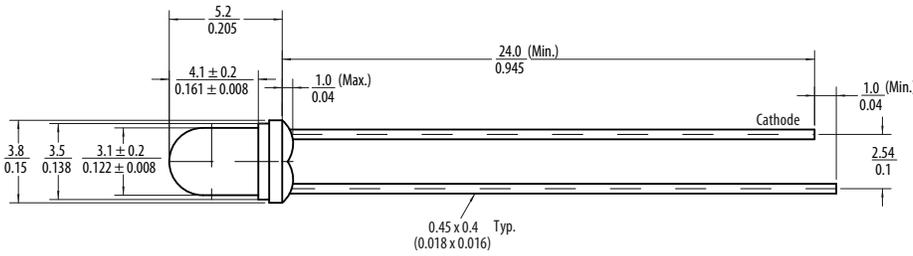
Notes:
1. All dimensions in millimeters (inches).
2. Tolerance is ±0.25mm (.010) unless otherwise stated.
3. Lead spacing is measured where the leads emerge from the package.

3 mm (T1) LED Lamps Package

Ø 3.17 (0.125) / 2.67 (0.105)

3.43 (0.135) / 2.92 (0.115)

4.70 (0.185) / 4.19 (0.165)

1.14 (0.045) / 0.51 (0.020)

6.35 (0.250) / 5.58 (0.220)

0.65 (0.026) Max.

24.1 (0.95) Min.

1.52 (0.060) / 1.02 (0.040)

(0.022) 0.55 / (0.016) 0.40 Sq. Typ.

2.79 (0.110) / 2.29 (0.090)

5 mm (T1 3/4) LED Lamps Package

5.08 (0.200) / 4.57 (0.180)

9.19 (0.362) / 8.43 (0.332)

0.65 (0.026) MAX.

0.89 (0.035) / 0.64 (0.025)

25.40 (1.00) MIN.

CATHODE LEAD (NOTE 1)

1.27 (0.050) NOM.

0.46 (0.018) SQUARE NOM.

6.10 (0.240) / 5.59 (0.220)

2.54 (0.100) NOM.

5 mm (T1-3/4) LED Lamps - Bicolor

5.08 (0.200) / 4.57 (0.180)

9.19 (0.362) / 8.43 (0.332)

0.89 (0.035) / 0.64 (0.025)

25.40 (1.00) Min.

1.27 (0.050) Nom.

Common Cathode

0.508 (0.020) Sq. Typ.

1.27 (0.050) Nom.

2.54 (0.100) Nom.

Green Anode

Flat Indicates Anode

Red or Yellow Anode (Short Lead)

Common Cathode

6.10 (0.240) / 5.59 (0.220)
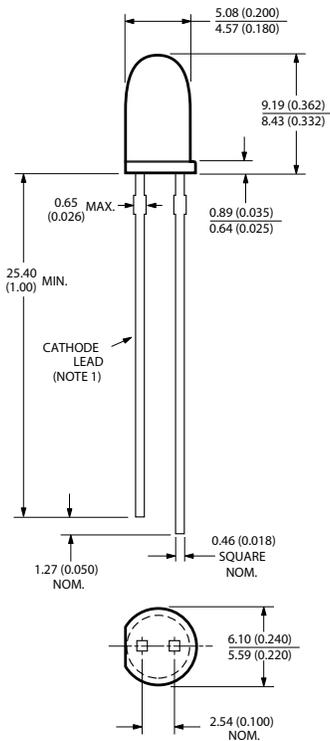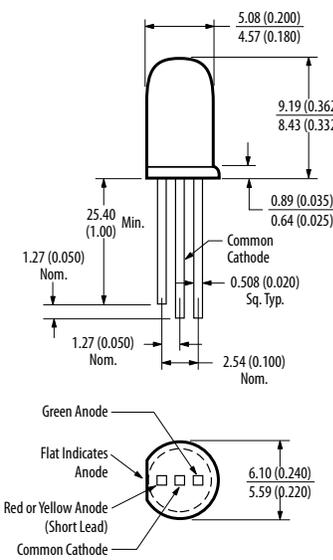
2 x 5 mm Rectangular LED Lamps Package

5.46 (0.215) / 4.95 (0.195)

5.18 (0.204) / 4.93 (0.194)

25.40 (1.00) Min.

8.00 (0.315) / 7.37 (0.290)

1.27 (0.050) Nominal

49
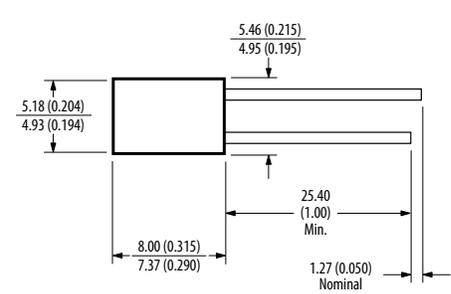
Subminiature Lamps

Description

Avago Technologies' Subminiature Lamps are designed for modern printed circuit (PC) boards, replacing through-hole mounted components for many traditional functions with smaller components, sized for closer placement.

Subminiature Lamp components are available in several lead configurations and can be used for top mount, reverse mount, and through-hole applications. The lead configurations are 'Gull Wing'–011 option, 'Yoke Bend'–021 option and 'Z Bend'–031 option. A variety of packages are available, such as flat top, dome and rectangular in standard or low current options.

Besides this, PCB based subminiature lamps are available as well. These lamps come in un-tinted, non-diffused package to cater for various product themes and ease handling applications. The small size, narrow footprint and high brightness make these LEDs excellent for backlighting, status indication and panel illumination applications.

Features and Benefits

- Excellent product quality
- Wide range of product offering
- Competitive pricing
- Can be used with surface mount or through-hole applications
- High reliability
  - No replacement for life of equipment
- Wide operating temperature range
  - Minor electrical/optical changes
- Lower power consumption
  - High efficiency, low drive currents required, low driving voltages
- Thin, light-weight and robust packaging
  - Excellent performance even under vibration and mechanical shock
- Different thin material technologies available
  - Several colors available in GaP
  - Choice of colors (560 – 626 nm): Green, Yellow, Amber, Orange, Red and Deep Red
- Three colors available in AlnGaP
  - Amber (590 nm), Red (626 nm) and Orange (605 nm)
- Two colors available in InGaN
  - Blue (472 nm), Green (526 nm)
- Several lead configuration options
  - Gull-wing, Yoke-bend and Z-bend
- Several Packaging options
  - Different sizes and spatial radiation patterns available in bulk, right angle housing, and tape and reel

Typical Applications

- Industrial and Communication
  - Front panel and symbol indicator
  - Keypad and push button backlighting
- Consumer
  - CD player, hi-fi audio and electrical appliances
  - Keypad and push button backlighting
- Automotive
  - Dashboard panel and symbol backlighting
  - Car radio indicators

LED Indicators and Displays

Domed Subminiature Lamps

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
						Min. (mcd)	Typ. (mcd)		
HLMP-Q106-R00xx		TS AlGaAs Red	644	15°	Untinted, Non-diffused	100	400	1.9	20
HLMA-QG00-S00xx		AlInGaP Red	626	15°	Untinted, Non-diffused	160	500	1.9	20
HLMT-QG00-T00xx		AlInGaP Red	622	15°	Untinted, Non-diffused	250	1000	2	20
HLMP-6300-F00xx		GaP Red	626	90°	Tinted, Diffused	1	10	1.8	10
HLMA-QH00-S00xx		AlInGaP Red-Orange	615	15°	Untinted, Non-diffused	160	500	1.9	20
HLMT-QH00-T00xx		AlInGaP Red-Orange	615	15°	Untinted, Non-diffused	250	500	2	20
HLMT-QH00-XY0xx		AlInGaP Red-Orange	615	15°	Untinted, Non-diffused	1600	3300	2	20
HLMA-QJ00-S00xx		AlInGaP Orange	605	15°	Untinted, Non-diffused	160	500	1.9	20
HLMA-QL00-S00xx		AlInGaP Amber	590	15°	Untinted, Non-diffused	160	500	1.9	20
HLMT-QL00-Txxxx		AlInGaP Amber	590	15°	Untinted, Non-diffused	250	–	2	20
HLMP-6400-F00xx		GaP Yellow	585	90°	Tinted, Diffused	1	9	2	10
HLMP-6500-F00xx		GaP Green	569	90°	Tinted, Diffused	1	7	2.1	10
HLMP-6505-L00xx		GaP Green	569	28°	Untinted, Non-diffused	10	40	2.1	10
HLMP-QB00-S00xx		InGaN Blue	468	20°	Untinted, Non-diffused	–	160	290	3.7
HLMP-QM00-S00xx		InGaN Green	525	20°	Untinted, Non-diffused	–	160	690	3.7
Domed Subminiature Lamps — Low Current									
HLMP-Q150-F00xx		AlGaAs Red	637	90°	Tinted, Diffused	1	1.8	1.8	1.6
HLMP-7000-D00xx		GaP Red	626	90°	Tinted, Diffused	0.4	1	1.4	1.8
HLMP-7019-D00xx		GaP Yellow	585	90°	Tinted, Diffused	0.4	0.6	1.6	2
HLMP-7040-D00xx		GaP Green	569	90°	Tinted, Diffused	0.4	0.6	1.4	2.1

Domed Subminiature Lamps — Resistor

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
						Min. (mcd)	Typ. (mcd)		
HLMP-6600-G00xx		GaP Red	626	90°	Tinted, Diffused	1.6	5	9.6	5
HLMP-6620-F00xx		GaP Red	626	90°	Tinted, Diffused	1	2	3.5	5
HLMP-6720-F00xx		GaP Yellow	585	90°	Tinted, Diffused	0.9	2	3.5	5
HLMP-6800-G00xx		GaP Green	569	90°	Tinted, Diffused	1.6	5	9.6	5
HLMP-6820-F00xx		GaP Green	569	90°	Tinted, Diffused	1	2	3.5	5
Flat Top Subminiature Lamps									
HLMP-P105-L00xx		AlGaAs Red	637	125°	Untinted, Non-diffused	10	30	1.8	20
HLMA-PG00-N00xx		AlInGaP Red	626	125°	Untinted, Non-diffused	25	75	1.9	20
HLMT-PG00-P00xx		AlInGaP Red	622	125°	Untinted, Non-diffused	40	150	2	20
HLMP-P205-F00xx		GaP Red	626	125°	Untinted, Non-diffused	1	8	1.8	10
HLMA-PH00-N00xx		AlInGaP Red-Orange	615	125°	Untinted, Non-diffused	25	75	1.9	20
HLMT-PH00-P00xx		AlInGaP Red Orange	615	125°	Untinted, Non-diffused	40	120	2	20
HLMA-PJ00-N00xx		AlInGaP Orange	605	125°	Untinted, Non-diffused	25	75	2	20
HLMA-PL00-N00xx		AlInGaP Amber	590	125°	Untinted, Non-diffused	25	75	1.9	20
HLMT-PL00-P0Wxx		AlInGaP Amber	590	125°	Untinted, Non-diffused	40	150	2.4	20
HLMP-P505-G00xx		GaP Green	569	125°	Untinted, Non-diffused	1.6	6.5	2.1	10
HLMP-P605-F00xx		GaP Emerald Green	560	125°	Untinted, Non-diffused	1	1.5	2.2	10
HLMP-PB00-N00xx		InGaN Blue	468	90°	Untinted, Non-diffused	25	60	3.7	20
HLMP-PM00-N00xx		InGaN Green	528	90°	Untinted, Non-diffused	25	200	3.7	20
PCB Based Subminiature Lamps									
ASMT-BA20-AS000		AlInGaP Amber	590	15°	Untinted, Non-diffused	180	750	2.0	20
ASMT-BG20-AS000		AlInGaP Green	569	15°	Untinted, Non-diffused	180	650	2.0	20
ASMT-BR20-AS000		AlInGaP Red	626	15°	Untinted, Non-diffused	180	650	2.0	20
ASMT-BB20-NS000		InGaN Blue	468	15°	Untinted, Non-diffused	180	650	3.2	20

Note: "xx" at the end of the part number refers to the mechanical option number. Refer to table on the next page.

LED Indicators and Displays

Subminiature Lamps are also available in the following options:

Mechanical Option Number	Description
10	Right Angle
11	Tape and Reel, 1500 lamps per reel
12	Gull Wing, Bulk Packaging
21	Yoke Lead, Tape and Reel, 1500 lamps per reel
22	Yoke Lead, Bulk Packaging
31	Z-Bend, Tape and Reel, 1500 lamps per reel
32	Z-Bend, Bulk Packaging

Intensity Bin Limits

Bin ID	Intensity (mcd)	
	Min.	Max.
A	0.10	0.20
B	0.16	0.32
C	0.25	0.50
D	0.40	0.80
E	0.63	1.25
F	1.0	2.0
G	1.6	3.2
H	2.5	5.0
J	4.0	8.0
K	6.3	12.5
L	10	20
M	16	32
N	25	50
P	40	80.0
Q	63	125
R	100	200
S	160	320
T	250	500
U	400	800
V	630	1250
W	1000	2000
X	1600	3200
Y	2500	5000

Tolerance: ±18%

Color Bin Limits

Bin ID	Intensity (mcd)	
Red Orange	Min.	Max.
1	617.5	625.0
2	621.0	628.5
3	624.5	632.0
Orange		
1	596.5	600.0
2	599.0	602.5
3	601.5	604.0
4	603.8	608.2
5	606.8	611.2
6	609.8	614.2
7	612.8	617.2
8	615.8	620.2
Yellow		
1	581.5	585.0
3	584.0	587.5
2	586.5	590.0
4	589.0	592.5
5	591.5	593.5
6	591.5	595.0
7	594.0	597.5
Green (except InGaN Green)		
4	567	571
3	570	574
2	573	577
Emerald Green		
9	552.0	556.0
8	555.0	559.0
7	558.0	562.0
6	561.0	565.0

Bin ID	Intensity (mcd)	
InGaN Green	Min.	Max.
0	Full distribution	
1	520.0	530.0
2	530.0	540.0
3	520.0	525.5
4	525.0	530.0
5	530.0	535.0
6	535.0	540.0
InGaN Blue		
0	Full distribution	
1	460.0	464.0
2	464.0	468.0
3	468.0	472.0
4	472.0	476.0
5	476.0	480.0
6	480.0	484.0

Tolerance = ±1nm

LED Indicators and Displays

Surface Mount Subminiature LED Lamps Package Dimensions

Flat Top Subminiature Lamps

Option 011, 012

Notes:
1. All dimensions in millimeters (inches).
2. Protruding support tab is connected to Cathode Lead.

Domed Subminiature Lamps

Option 010

Option 031, 032

Option 021, 022

PCB Based Subminiature Lamps

Surface Mount ChipLEDs

Description

For applications that require small size, high efficiency and low power consumption, Avago Technologies offers an extensive range of high quality ChipLEDs to meet demands for virtually any surface mount lighting requirement.

Avago Technologies' ChipLEDs are available in standard and high-brightness colors, using Avago Technologies' proven AlGaAs, AlInGaP and InGaN processes to give you the broadest range of colors from a single supplier.

Avago's ChipLEDs use the industry standard footprint, with top-mount, reverse-mount and right-angle-mount packaging options. They also have the lowest profile in the industry and are positioned to support high volume, cost-effective solutions.

ChipLED products are used in a variety of applications including LCD and push button backlighting for cellular phones, white goods and appliances, industrial measurement and control systems, and for symbol lighting and status indication in computer peripherals and consumer goods.

Low power consumption, small size and easy assembly make the ChipLED ideal for backlighting handsets as well as backlighting industrial displays.

Features and Benefits

- Small size
  - Saves PC board space
- Wide viewing angle
  - Well-suited for backlighting applications
- Intensity and color bin uniformity
  - Can be closely mounted without any intensity variations
- Available in multiple colors
  - Amber, Red, AlGaAs Red, Green, Orange, Yellow, InGaN Blue, InGaN Green, bicolor and tricolor combinations
- Variety of packages and mounting options
  - Top, reverse and right angle auto mountable
- Industry standard footprint
  - No change in existing board layout
- High volume, high reliability
  - Cost-effective solution

Typical Applications

- Telecommunications
  - Keypad and LCD backlighting for mobile phones, pagers and cordless phones
- Industrial
  - Status and symbol indicator
  - Keypad and LCD backlighting
- Consumer
  - White goods and appliances
- Computer Peripherals
  - Status indicator
- Indoor Full/Mono color sign
- Automotive interior

LED Indicators and Displays

Surface Mount ChipLEDs

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
						Min. (mcd)	Typ. (mcd)		
Top Mount 1206 Industrial Footprint with 1.1 mm Height (C150)									
3.2 x 1.6 x 1.1 mm (L x W x H)									
HSMH-C150		AS AlGaAs Red	639	170°	Diffused	7.2	17	1.8	20
HSMD-C150		GaP Orange	604	170°	Diffused	2.8	8	2.2	20
HSMG-C150		GaP Green	572	170°	Diffused	4.5	15	2.2	20
HSMS-C150		GaP Red	626	170°	Diffused	2.8	10	2.1	20
HSMY-C150		GaP Yellow	586	170°	Diffused	2.8	8	2.1	20
HSMQ-C150		InGaN Green	527	140°	Diffused	45	145	3.4	20
HSMR-C150		InGaN Blue	473	140°	Diffused	18	55	3.4	20
HSME-C150		AS AlInGaP Green	572	170°	Diffused	18	50	2.1	20

Quantity: 3,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
Top Mount 0805 Industrial Footprint with 0.8 mm Height (C170)									
2.0 x 1.25 x 0.8 mm (L x W x H)									
HSMH-C170		AS AlGaAs Red	639	170°	Diffused	7.2	17	1.8	20
HSMD-C170		GaP Orange	604	170°	Diffused	2.8	8	2.2	20
HSMG-C170		GaP Green	572	170°	Diffused	4.5	15	2.2	20
HSMS-C170		GaP Red	626	170°	Diffused	2.8	10	2.1	20
HSMY-C170		GaP Yellow	586	170°	Diffused	2.8	8	2.1	20
HSMA-C170		AS AlInGaP Amber	592	170°	Diffused	28.5	90	1.9	20
HSMC-C170		AS AlInGaP Red	626	170°	Diffused	28.5	90	1.9	20
HSML-C170		AS AlInGaP Orange	605	170°	Diffused	28.5	90	1.9	20
HSMZ-C170		AS AlInGaP Red	631	170°	Diffused	45	165	2.2	20
HSMM-C170		InGaN Green	525	170°	Diffused	45	120	3.3	20
HSMN-C170		InGaN Blue	470	170°	Diffused	11.2	35	3.3	20
HSMQ-C170		InGaN Green	527	140°	Diffused	45	145	3.4	20
HSMR-C170		InGaN Blue	473	140°	Diffused	18	55	3.4	20
HSME-C170		AS AlInGaP Green	572	170°	Diffused	18	50	2.1	20

Quantity: 4,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
Top Mount 0603 Industrial Footprint with 0.8 mm Height (C190)									
1.6 x 0.8 x 0.8 mm (L x W x H)									
HSMH-C190		AS AlGaAs Red	639	170°	Diffused	7.2	17	1.8	20
HSMD-C190		GaP Orange	604	170°	Diffused	2.8	8	2.2	20
HSMG-C190		GaP Green	572	170°	Diffused	4.5	5	2.2	20
HSMS-C190		GaP Red	626	170°	Diffused	2.8	10	2.1	20
HSMY-C190		GaP Yellow	586	170°	Diffused	2.8	8	2.1	20
HSMA-C190		AS AlInGaP Amber	592	170°	Diffused	28.5	90	1.9	20
HSMC-C190		AS AlInGaP Red	626	170°	Diffused	28.5	90	1.9	20
HSML-C190		AS AlInGaP Orange	605	170°	Diffused	28.5	90	1.9	20
HSMZ-C190		AS AlInGaP Red	631	170°	Diffused	45	165	2.2	20
HSMM-C190		InGaN Green	525	170°	Diffused	45	120	3.3	20
HSMN-C190		InGaN Blue	470	170°	Diffused	11.2	35	3.3	20
HSMQ-C190		InGaN Green	527	140°	Diffused	45	145	3.4	20
HSMR-C190		InGaN Blue	473	140°	Diffused	18	55	3.4	20
HSME-C190		AS AlInGaP Green	572	170°	Diffused	18	50	2.1	20

Quantity: 4,000 per 7 inch reel

LED Indicators and Displays

Surface Mount ChipLEDs

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
						Min. (mcd)	Typ. (mcd)		
Top Mount 0603 Industrial Footprint with 0.6 mm Height (C191)									
1.6 x 0.8 x 0.6 mm (L x W x H)									
HSMH-C191		AS AlGaAs Red	639	170°	Diffused	7.2	17	1.8	20
HSMD-C191		GaP Orange	604	170°	Diffused	2.8	8	2.2	20
HSMG-C191		GaP Green	572	170°	Diffused	4.5	5	2.2	20
HSMS-C191		GaP Red	626	170°	Diffused	2.8	10	2.1	20
HSMY-C191		GaP Yellow	586	170°	Diffused	2.8	8	2.1	20
HSMA-C191		AS AlInGaP Amber	592	170°	Diffused	28.5	90	1.9	20i
HSMC-C191		AS AlInGaP Red	626	170°	Diffused	28.5	90	1.9	20
HSML-C191		AS AlInGaP Orange	605	170°	Diffused	28.5	90	1.9	20
HSMN-C191		InGaN Blue	470	170°	Diffused	11.2	35	3.3	20
HSMQ-C191		InGaN Green	527	140°	Diffused	45	145	3.4	20
HSMR-C191		InGaN Blue	473	140°	Diffused	18	55	3.4	20
HSME-C191		AS AlInGaP Green	572	170°	Diffused	18	50	2.1	20

Quantity: 4,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
Top Mount 0805 Industrial Footprint with 0.4 mm Height (C177)									
2.0 x 1.25 x 0.4 mm (L x W x H)									
HSMD-C177		GaP Orange	604	130°	Diffused	2.8	8	2.2	20
HSMG-C177		GaP Green	572	130°	Diffused	4.5	5	2.2	20
HSMS-C177		GaP Red	626	130°	Diffused	2.8	10	2.1	20
HSMA-C177		AS AlInGaP Amber	592	130°	Diffused	28.5	90	1.9	20
HSMC-C177		AS AlInGaP Red	626	130°	Diffused	28.5	90	1.9	20
HSML-C177		AS AlInGaP Orange	605	130°	Diffused	28.5	90	1.9	20
HSME-C177		AS AlInGaP Green	572	130°	Diffused	18	50	2.1	20

Quantity: 4,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
Top Mount 0603 Industrial Footprint with 0.4 mm Height (C197)									
1.6 x 0.8 x 0.4 mm (L x W x H)									
HSMD-C197		GaP Orange	604	130°	Diffused	2.8	8	2.2	20
HSMG-C197		GaP Green	572	130°	Diffused	4.5	5	2.2	20
HSMS-C197		GaP Red	626	130°	Diffused	2.8	10	2.1	20
HSMY-C197		GaP Yellow	586	130°	Diffused	2.8	8	2.1	20
HSMA-C197		AS AlInGaP Amber	592	130°	Diffused	28.5	90	1.9	20
HSMC-C197		AS AlInGaP Red	626	130°	Diffused	28.5	90	1.9	20
HSML-C197		AS AlInGaP Orange	605	130°	Diffused	28.5	90	1.9	20
HSME-C197		AS AlInGaP Green	572	130°	Diffused	18	50	2.1	20

Quantity: 4,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
Top Mount 0402 Industrial Footprint with 0.4 mm Height (C280)									
1.0 x 0.5 x 0.4 mm (L x W x H)									
HSMA-C280		AS AlInGaP Amber	592	130°	Diffused	28.5	90	1.9	20
HSMC-C280		AS AlInGaP Red	626	130°	Diffused	28.5	90	1.9	20
HSMG-C280		GaP Green	572	130°	Diffused	4.5	15	2.2	20
HSMS-C280		GaP Red	626	130°	Diffused	2.8	10	2.1	20
HSMY-C280		GaP Yellow	586	130°	Diffused	2.8	8	2.1	20

Quantity: 4,000 per 7 inch reel

LED Indicators and Displays

Surface Mount ChipLEDs

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
						Min. (mcd)	Typ. (mcd)		
Top Mount 0603 Industrial Footprint with 0.35 mm Height (C130)									
1.6 x 0.8 x 0.35 mm (L x W x H)									
HSMA-C130		AlInGaP Amber	592	110°	Diffused	28.5	87	2	20
HSMC-C130		AlInGaP Red	626	110°	Diffused	28.5	131	1.9	20
HSME-C130		AlInGaP Green	572	110°	Diffused	18	54	1.9	20
HSML-C130		AlInGaP Orange	605	110°	Diffused	28.5	139	1.9	20
HSMR-C130		InGaN Blue	473	145°	Diffused	18	55	3.4	20

Quantity: 4,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
Right Angle 1 mm Height (C110)									
3.2 x 1.5 x 1.0 mm (L x W x H)									
HSMH-C110		AS AlGaAs Red	639	130°	Non-diffused	7.2	17	1.8	20
HSMD-C110		GaP Orange	604	130°	Non-diffused	2.8	8	2.2	20
HSMG-C110		GaP Green	572	130°	Non-diffused	4.5	15	2.2	20
HSMS-C110		GaP Red	626	130°	Non-diffused	2.8	10	2.1	20
HSMY-C110		GaP Yellow	586	130°	Non-diffused	2.8	8	2.1	20
HSMA-C110		AS AlInGaP Amber	592	130°	Non-diffused	28.5	95	1.9	20
HSMC-C110		AS AlInGaP Red	626	130°	Non-diffused	28.5	95	1.9	20
HSML-C110		AS AlInGaP Orange	605	130°	Non-diffused	28.5	95	1.9	20
HSMZ-C110		AS AlInGaP Red	631	130°	Non-diffused	45	170	2.2	20
HSMM-C110		InGaN Green	525	130°	Non-diffused	45	126	3.3	20
HSMN-C110		InGaN Blue	470	130°	Non-diffused	11.2	39	3.3	20
HSMQ-C110		InGaN Green	527	130°	Non-diffused	45	150	3.4	20
HSMR-C110		InGaN Blue	473	130°	Non-diffused	18	60	3.4	20
HSME-C110		AS AlInGaP Green	572	130°	Non-diffused	18	52	2.1	20

Quantity: 3,000 per 7 inch reel

LED Indicators and Displays

Surface Mount ChipLEDs

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
						Min. (mcd)	Typ. (mcd)		
Right Angle 0.6 mm Height (C120)									
1.6 x 1.0 x 0.6 mm (L x W x H)									
HSMH-C120		AS AlGaAs	639	155°	Non-diffused	7.2	17	1.8	20
HSMD-C120		GaP Orange	604	155°	Non-diffused	2.8	8	2.2	20
HSMG-C120		GaP Green	572	155°	Non-diffused	4.5	15	2.2	20
HSMA-C120		AS AlInGaP Amber	592	155°	Non-diffused	28.5	90	1.9	20
HSMC-C120		AS AlInGaP Red	626	155°	Non-diffused	28.5	90	1.9	20
HSML-C120		AS AlInGaP Orange	605	155°	Non-diffused	28.5	90	1.9	20
HSMM-C120		InGaN Green	525	155°	Non-diffused	45	120	3.4	20
HSMN-C120		InGaN Blue	470	155°	Non-diffused	11.2	30	3.4	20
HSMQ-C120		InGaN Green	527	155°	Non-diffused	45	145	3.4	20
HSMR-C120		InGaN Blue	473	155°	Non-diffused	18	55	3.4	20
HSME-C120		AS AlInGaP Green	572	155°	Non-diffused	18	52	2.1	20

Quantity: 4,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Min. (mcd)	Typ. (mcd)	Vf Typ. (V)	Test Current (mA)
Right Angle 0.4 mm Height (Cx00)									
1.6 x 1.0 x 0.4 mm (L x W x H)									
ASMT-CA00		AlInGaP Amber	592	150°	Non-diffused	28.5	90	1.9	20
ASMT-CB00		InGaN Blue	473	150°	Non-diffused	7.2	18	2.85	5
ASMT-CW00		InGaN White	Chromaticity Coordinates Bin A1-D2	170°	Diffused	18	35	2.85	5

Quantity: 4,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Min. (mcd)	Typ. (mcd)	Vf Typ. (V)	Test Current (mA)
Reverse Mount (C265)									
3.4 x 1.25 x 1.1 mm (L x W x H)									
HSMA-C265		AS AlInGaP Amber	592	150°	Non-diffused	28.5	75	1.9	20
HSMC-C265		AS AlInGaP Red	626	150°	Non-diffused	28.5	75	1.9	20
HSME-C265		AS AlInGaP Green	572	170°	Non-diffused	18	50	2.1	20
HSML-C265		AS AlInGaP Orange	605	150°	Non-diffused	28.5	75	1.9	20
HSMG-C265		GaP Green	572	170°	Non-diffused	4.5	15	2.2	20
HSMH-C265		AS AlGaAs Red	639	170°	Non-diffused	7.2	17	1.8	20

Quantity: 3,000 per 7 inch reel

LED Indicators and Displays

Surface Mount ChipLEDs

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
						Min. (mcd)	Typ. (mcd)		
Bicolor Top Mount 1210 Industrial Footprint (C15x)									
3.2 x 2.7 x 1.1 mm (L x W x H)									
HSMF-C153		GaP Yellow	586	170°	Diffused	2.8	8	2.1	20
		GaP Red	626	170°	Diffused	2.8	10	2.1	20
HSMF-C155		GaP Green	572	170°	Diffused	4.5	15	2.2	20
		GaP Red	626	170°	Diffused	2.8	10	2.1	20
HSMF-C156		GaP Green	572	170°	Diffused	4.5	15	2.2	20
		GaP Yellow	586	170°	Diffused	2.8	8	2.1	20
HSMF-C157		GaP Green	572	170°	Diffused	4.5	15	2.2	20
		GaP Orange	604	170°	Diffused	2.8	8	2.2	20
HSMF-C158		AlInGaP Green	572	170°	Diffused	28.5	45	2.1	20
		AlInGaP Amber	626	170°	Diffused	28.5	55	1.9	20

Quantity: 3,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
Bicolor Top Mount 0603 Industrial Footprint (C16x)									
1.6 x 0.8 x 0.5 mm (L x W x H)									
HSMF-C162		AlInGaP Amber	592	120°	Diffused	28.5	90	1.9	20
		AlInGaP Red	626	120°	Diffused	28.5	90	1.9	20
HSMF-C163		InGaN Green	525	120°	Diffused	18	45	3.4	10
		AlInGaP Red	626	120°	Diffused	11.2	35	1.8	10
HSMF-C164		InGaN Blue	470	120°	Diffused	2.8	10	3.4	10
		AlInGaP Red	626	120°	Diffused	11.2	35	1.8	10
HSMF-C165		GaP Green	572	120°	Diffused	4.5	15	2.2	20
		GaP Red	626	120°	Diffused	2.8	10	2.1	20
HSMF-C166		GaP Green	572	120°	Diffused	4.5	15	2.2	20
		GaP Yellow	586	120°	Diffused	2.8	8	2.1	20
HSMF-C167		GaP Green	572	120°	Diffused	4.5	15	2.2	20
		GaP Orange	604	120°	Diffused	2.8	8	2.2	20
HSMF-C169		InGaN Blue	470	120°	Diffused	2.8	10	3.4	10
		AlInGaP Amber	592	120°	Diffused	11.2	35	1.8	10

Quantity: 3,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
Tricolor Top Mount 1210 Industrial Footprint (C118)									
3.2 x 2.7 x 1.1 mm (L x W x H)									
HSMF-C118		GaP Green	525	130°	Diffused	45	120	3.5	20
		AlInGaP Red	626	135°	Diffused	28.5	90	1.9	20
		InGaN Blue	470	125°	Diffused	11.2	40	3.5	20

Quantity: 3,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
Tricolor Right Angle with 1.0 mm Height (C11x)									
2.5 x 1.0 x 1.0 mm (L x W x H)									
HSMF-C113		AlInGaP Red	626	120°	Diffused	28.5	80	1.9	20
		AlInGaP Green	572	125°	Diffused	18	50	2	20
		InGan Blue	470	125°	Diffused	28.5	60	3.4	20
HSMF-C115		AlInGaP Red	626	120°	Diffused	28.5	80	1.9	20
		InGan Green	525	125°	Diffused	71.5	170	3.4	20
		InGan Blue	470	125°	Diffused	28.5	60	3.4	20

Quantity: 3,000 per 7 inch reel

LED Indicators and Displays

Surface Mount ChipLEDs

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
						Min. (mcd)	Typ. (mcd)		
Tricolor Top Mount with 0.35mm Height (C114)									
1.6 x 1.5 x 0.35 mm (L x W x H)									
HSMF-C114		AlInGaP Red	626	140°	Diffused	28.5	85	1.9	20
		InGan Green	525	145°	Diffused	45	180	3.4	20
		InGan Blue	470	145°	Diffused	28.5	70	3.4	20

Quantity: 4,000 per 7 inch reel

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity		Vf Typ. (V)	Test Current (mA)
Leadframe-based (ASMT-Rx45)									
1.6 x 0.8 x 0.45 mm (L x W x H)									
ASMT-RR45		AlInGaP Red	622	145°	Diffused	50	120	2	20
ASMT-RF45		AlInGaP Yellow Green	573	145°	Diffused	30	60	2	20
ASMT-RA45		AlInGaP Amber	591	145°	Diffused	40	90	2	20

Standard Intensity Bin Limits

Bin ID	Intensity (mcd)	
	Min.	Max.
A	0.11	0.18
B	0.18	0.29
C	0.29	0.45
D	0.45	0.72
E	0.72	1.10
F	1.10	1.80
G	1.80	2.80
H	2.80	4.50
J	4.50	7.20
K	7.20	11.20
L	11.20	18.00
M	18.00	28.50
N	28.50	45.00
P	45.00	71.50
Q	71.50	112.50
R	112.50	180.00
S	180.00	285.00
T	285.00	450.00
U	450.00	715.00
V	715.00	1125.00
W	1125.00	1800.00
X	1800.00	2850.00
Y	2850.00	4500.00

Tolerance: ±15%

Color Bin Limits

Package	Color Bin	Wavelength (nm)	
		Min.	Max.
GaN/InGaN Blue	A	460.0	465.0
	B	465.0	470.0
	C	470.0	475.0
	D	475.0	480.0
InGaN Green	A	515.0	520.0
	B	520.0	525.0
	C	525.0	530.0
	D	530.0	535.0
Orange	A	597.0	600.0
	B	600.0	603.0
	C	603.0	606.0
	D	606.0	609.0
	E	609.0	612.0
	F	612.0	615.0
Red	Full Distribution		
AlGaAs Red	Full Distribution		

Tolerance: ± 1.0 nm

Package	Color Bin	Wavelength (nm)	
		Min.	Max.
Green	A	561.5	564.5
	B	564.5	567.5
	C	567.5	570.5
	D	570.5	573.5
	E	573.5	576.5
Yellow	A	582.0	584.5
	B	584.5	587.0
	C	587.0	589.5
	D	589.5	592.0
	E	592.0	594.5
	F	594.5	597.0
Amber	A	582.0	584.5
	B	584.5	587.0
	C	587.0	589.5
	D	589.5	592.0
	E	592.0	594.5
	F	594.5	597.0

Tolerance: ± 1.0 nm

LED Indicators and Displays

Surface Mount ChipLEDs

Package Dimensions

Clear Epoxy

PC Board

1.5 (0.059)

0.5 (0.020)

1.6 (0.063)

3.2 (0.126)

HSMx-C110

Clear Epoxy

PC Board

1.2 (0.047)

1.0 (0.039)

0.5 (0.020)

HSMx-C120/ASMT-Cx00

LED Die

Cathode Mark (Anode Mark for HSMX-Cxxx)

1.6 (0.063)

0.8 (0.031)

3.2 (0.126)

HSMx-C150

LED Die

Cathode Mark (Anode Mark for HSMX-Cxxx)

1.25 (0.049)

0.62 (0.024)

2.0 (0.079)

HSMx-C170

LED Die

Cathode Mark (Anode Mark for HSMX-Cxxx)

1.25 (0.049)

0.62 (0.025)

2.00 (0.079)

HSMx-C177

LED Die

Cathode Mark (Anode Mark for HSMX-Cxxx)

0.8 (0.031)

0.4 (0.016)

1.6 (0.063)

HSMx-C190/C191/C130

Cathode Mark

LED Die

0.40 (0.016)

0.80 (0.031)

1.60 (0.063)

HSMx-C197

3.4 (0.134)

LED Die

Cathode Mark (Anode Mark for HSMX-Cxxx)

1.25 (0.049)

Green Solder Mask

HSMx-C265

LED Die

Cathode Mark

0.5 (0.02)

0.25 (0.01)

1.0 (0.04)

HSMx-C280

LED Die

Cathode Mark

① ②
③ ④

1.4 (0.055)

2.7 (0.106)

3.2 (0.126)

HSMF-C15x

LED Dies

Cathode Line

① ③
② ④

0.8 (0.031)

1.6 (0.063)

HSMF-C16x

LED Die

③ ②
④ ①

1.5 (0.059)

2.7 (0.106)

3.2 (0.126)

Common Anode

HSMF-C118

② ③
① ④

Anode Mark

1.5 (0.059)

1.6 (0.063)

LED Die

HSMF-C114

R 0.50

2.1 (0.082)

1.0 (0.039)

1.0 (0.039)

0.5 (0.020)

2.5 (0.098)

HSMF-C113/C115

0.8

LED Die

0.6

1.6

0.45

Lead Frame

1.1

Resin

Cathode Side

0.4

ASMT-RX45

Notes:
1. All dimensions in millimeters (inches).
2. Tolerance is ±0.1mm (±0.004 in.) unless otherwise specified.

Surface Mount ChipLEDs

61

Auto Focus Auxiliary Flash LED

Description

Avago Technologies offer Auto Focus Auxiliary Flash LEDs in the standard, low profile and miniature package. These are surface mount dome lamps that use an untinted, non-diffused lens to provide a high luminous intensity within a narrow radiation pattern.

These narrow angle SMT lamp packages are designed for applications which require long distance illumination and narrow beam pattern such as auxiliary flash for auto-focus function in digital still camera. The miniature and low profile package are also suitable for applications that have constrains in design area. These devices are compatible with Pb-free reflow soldering process.

The standard Auto Focus Auxiliary Flash LEDs are available in 530nm Green and 605nm Orange. The miniature package is available in 605nm Orange.

Features and Benefits

• Smooth, Consistent Narrow Radiation Pattern
• Viewing angle optimized for auto focus function
• > 3m illumination distance
• Low profile package: 12o viewing angle for Orange; 14o viewing angle for Green
• Miniature package: 18° View Angle
• Standard package: Small footprint with 4.8L x 4.8W x 5.33H mm
• Low profile package: 3.6L x 3.2W x 3.4H mm package dimension
• Good Intensity Output
• Compatible with 2x Solder Reflow
• Clear, Non-diffused Epoxy
• Allows easy assembly and PCB space saving.
• Compatible with reflow soldering
• IEC/EN 60825-1 Eye Safety Class 1
• RoHS compliant

Application

• Digital Still Camera

LED Indicators and Displays

Standard Auto Focus Auxiliary Flash LED

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity			Vf Typ. (V)	Test Current (mA)	Device Height
						Min. (cd)	Typ. (cd)	Max. Iv (cd)			
ASMT-FJ60-AFJ00		AlInGaP Orange	605	10°	Clear	–	29	–	2.1	20	4.35mm
ASMT-FJ10-ADH00		AlInGaP Orange	605	8°	Clear	9	22	–	2	20	5.33mm
ASMT-FG10-NFJ00		InGaN Green	530	6°	Clear	18	40	56	3.3	20	5.33mm
ASMT-FJ70-AFJ00		AlInGaP Orange	605	12º	Clear	15	25	56	2.1	20	3.40mm
ASMT-FG70-NFJ00		InGaN Green	525	14º	Clear	15	22	56	3.3	20	3.40mm

Miniature Auto Focus Auxiliary Flash LED

Part Number	Color		Dominant Wavelength (nm)	Viewing Angle	Lens	Intensity			Vf Typ. (V)	Test Current (mA)
						Min. (mcd)	Typ. (mcd)	Max. Iv (cd)		
ASMT-FJ30-AB000		AlInGaP Orange	605	18°	Clear	5.5	9	–	2	20

Iv Bin Category

Bin ID	Intensity (cd)	
	Min.	Max.
B	5.5	7.0
C	7.0	9.0
D	9.0	11.5
E	11.5	15.0
F	15.0	19.5
F+ **	18.0	19.5
G	19.5	25.5
H	25.5	33.0
I	33.0	43.0
J	43.0	56.0

Iv Tolerance = ±15%

** For ASMT-FG10-NFJ00 only

Color Bin Category

Bin ID	Wavelength (nm)	
	Min.	Max.
Orange (ASMT-FJ10-xxxxx)		
A	600	604
B	604	608
C	608	612
Orange (ASMT-FJ30-xxxxx)		
1	597	600
2	600	603
3	603	606
4v	606	609
5	609	612
Green		
A	515	520
B	520	525
C	525	530
D	530	535

Tolerance = ±1nm

LED Indicators and Displays

Standard Auto Focus Auxiliary Flash LED with 4.35mm Height Package Dimensions

5.20
4.80
4.80
1.27
0.51
① ② ③ — 1, 2, 4
④ ⑤ ⑥
∅ 3.48

PIN 1, 2, 4 – Anode
PIN 3, 5, 6 – Cathode

4.35
2.84
0.15
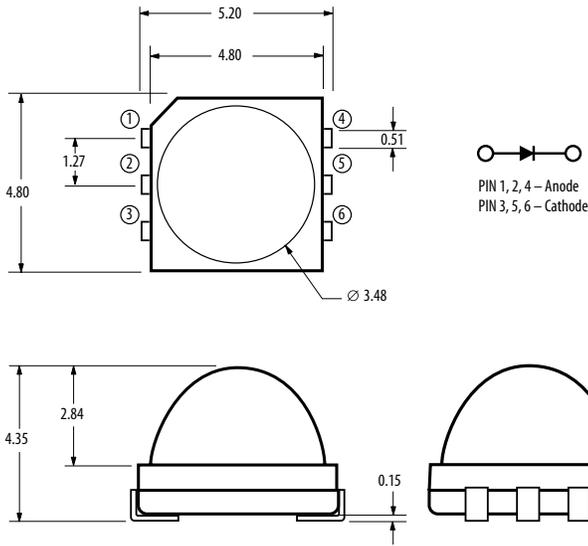
Notes:
1. All dimensions in millimeters.
2. Tolerance is ±0.1mm unless otherwise specified.

Miniature Auto Focus Auxiliary Flash LED Package Dimensions

1.80
2.40
∅ 1.80
0.55
3.20
Soldering Terminal
LED Diode
Anode Mask
0.55

P.C. Board
Molding Body (Lens)
2.20
0.50

2.40
0.55
1.00

Polarity
+
−

Notes:
1. All dimensions in millimeters.
2. Tolerance is ±0.1mm unless otherwise specified.
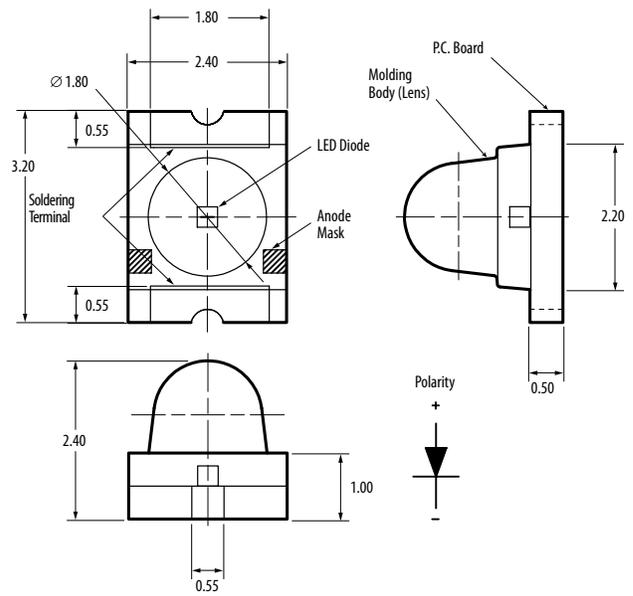
Standard Auto Focus Auxiliary Flash LED with 5.33 Height Package Dimensions
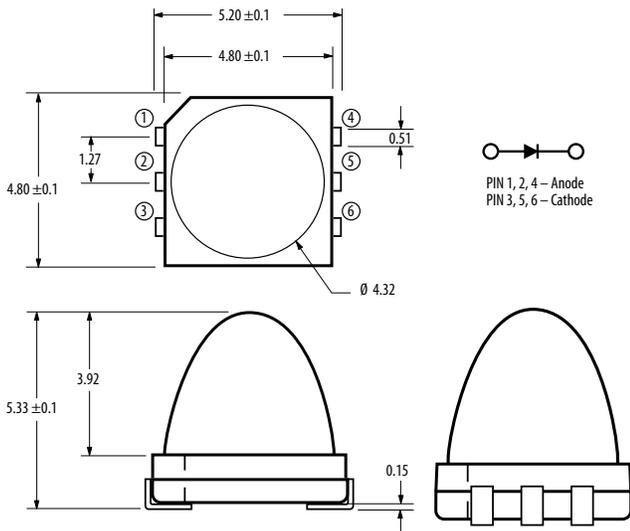
5.20 ±0.1
4.80 ±0.1
4.80 ±0.1
1.27
0.51
① ② ③
④ ⑤ ⑥
Ø 4.32

PIN 1, 2, 4 – Anode
PIN 3, 5, 6 – Cathode

5.33 ±0.1
3.92
0.15

Notes:
1. All dimensions in millimeters.
2. Tolerance is ±0.1mm unless otherwise specified.

3.60
3.20
Dice
Ø 2.84

3.40
2.39

Green Cathode Mark
Anode
Cathode
3.00
0.80
1.80
0.80

Cathode ——————— Anode

Notes:
1. All dimensions in millimeters.
2. Tolerance is ±0.1mm unless otherwise specified.

LED Indicators and Displays
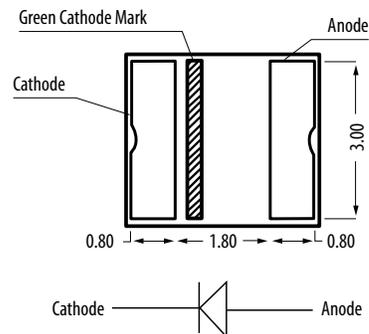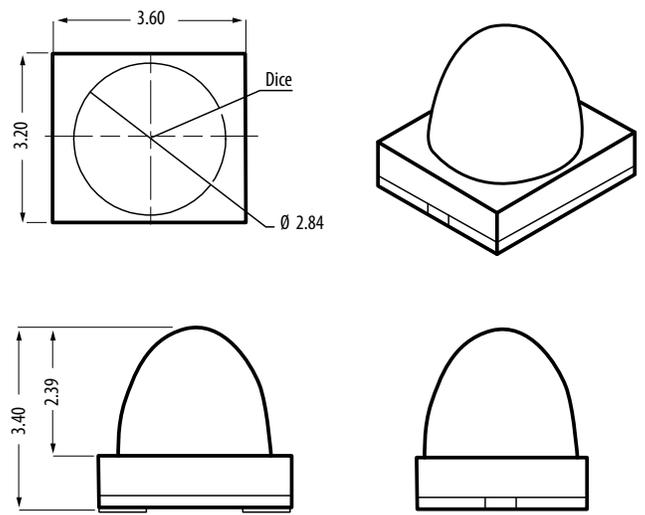
Seven-Segment Displays

Description

Avago Technologies offers a full range of seven-segment displays from low cost, standard brightness displays to high ambient light displays that produce up to 78 mcd per segment. Dual and single digit displays are available in assorted character heights and colors. They are divided into two platforms to address different market requirements in both industrial and consumer markets. Displays for industrial markets are designed for high-reliability applications and feature extremely durable packaging for high temperature environments. Consumer applications are designed for cost-sensitive, general-purpose display applications.
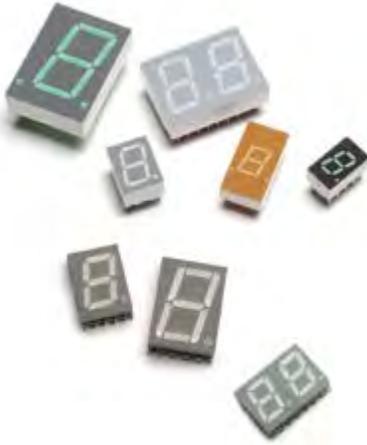
Product Features and Benefits

- Semiconductor (LED) light source
  - Cost-effective solutions
  - Flexibility for designers
  - Light weight
- Lower power consumption
  - Electrical power savings
  - Low heat generation
  - Low current devices available
- Mechanically rugged
  - No wire filaments
  - No moving parts
  - Not sensitive to mechanical shock and vibration
- Essentially monochromatic light
  - No color filter required
  - Maximum use of visible light
- Easy for the eye to discern against distracting backgrounds in sunlight and adverse weather conditions
  - High light output
  - Industry standard size and pinout
  - Categorized for luminous intensity (yellow and green categorized for color)

Industrial Applications: High Performance Seven-segment Display Package

Industrial grade products provide high peak current, automated IV/color bining and the availability of intensity and color selection. Ideal for high reliability applications such as temperature controllers, this package is extremely durable in high temperature environments with better heat dissipation through a mild steel leadframe.

Key benefits for the leadframe platform
- Heat dissipation from the package is faster than other PCB display products
- Brightness (Iv) degradation reduced over time
- Lead stability and consistency
- Solder coated leads result in better solderability
- Typical epoxy Tg is 140°C resulting in improved temperature cycling reliability

Consumer Applications:
Standard Seven-segment Display Package

Designed for the cost-competitive general purpose commercial LED display applications, this package is built with a PCB substrate using ultrasonic stitch-to-stitch bonding with aluminum wire.

Key benefits for the PCB platform
- Competitive prices

- Avago Technologies quality, reliability and technical support
- Typical epoxy Tg is 100–120°C, suitable for applications that do not experience extreme temperatures and temperature cycling

Avago Technologies is committed to support the market by offering display performance and features that are specific to the designer's application requirements.

Typical Industrial Applications
HighPerformance Seven-segment Displays:
- Temperature controllers
- Test and measurement instrumentation
- Power converters
- Home appliance displays
- Automotive and avionic instrumentation
- Fuel pump displays
- Digital panel meters

Typical Consumer Applications
Standard Seven-segment Displays:
- Cable set-top boxes
- Electronics displays
- Gaming machines
- Point of sale terminals
- Answering machines
- Exercise equipment

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

Part Number	Face Color	Pin Configuration	Intensity (μcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	2 Intensity Bin Selection
			Min.	Typ.				
7.6 mm (0.3") Micro Bright Displays (right decimal point)								
GaP Red 626 nm								
HDSP-7501	Grey	Common Anode	360	980	5	2	20	C,D
HDSP-A211	Black	Common Anode	360	980	5	2	20	
HDSP-7503	Grey	Common Cathode	360	980	5	2	20	C,D
HDSP-A213	Black	Common Cathode	360	980	5	2	20	C,D
GaP Orange 600 nm								
HDSP-A401	Grey	Common Anode	354	720	5	2	20	
HDSP-A403	Grey	Common Cathode	354	720	5	2	20	
HDSP-A413	Black	Common Cathode	354	720	5	2	20	
GaP Yellow 586 nm								
HDSP-7401	Grey	Common Anode	225	480	5	2.2	20	D,E
HDSP-7403	Grey	Common Cathode	225	480	5	2.2	20	D,E
High Performance Green 571 nm								
HDSP-7801	Grey	Common Anode	860	3000	10	2.1	10	J,K
HDSP-A511	Black	Common Anode	860	3000	10	2.1	10	J,K
HDSP-7803	Grey	Common Cathode	860	3000	10	2.1	10	
HDSP-A513	Black	Common Cathode	860	3000	10	2.1	10	
GaP AlGaAs Red 637 nm								
HDSP-A151	Grey	Common Anode	690	1400	20	1.8	20	
HDSP-A153	Grey	Common Cathode	690	1400	20	1.8	20	
7.6 mm (0.3") Micro Bright Low Current Displays (right decimal point)								
GaP AlGaAs Red 637 nm								
HDSP-A101	Grey	Common Anode	315	600	1	1.6	1	F,G
HDSP-A103	Grey	Common Cathode	315	600	1	1.6	1	F,G
HDSP-A113	Black	Common Cathode	315	600	1	1.6	1	
GaP Red 626 nm								
HDSP-7511	Grey	Common Anode	160	270	2	1.6	2	C,D
HDSP-7513	Grey	Common Cathode	160	270	2	1.6	2	C,D
GaP Yellow 585 nm								
HDSP-A801	Grey	Common Anode	250	420	4	1.7	4	
HDSP-A803	Grey	Common Cathode	250	420	4	1.7	4	
GaP Green 571 nm								
HDSP-A901	Grey	Common Anode	250	475	4	1.9	4	
HDSP-A903	Grey	Common Cathode	250	475	4	1.9	4	

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

Part Number	Face Color	Pin Configuration	Intensity (µcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)
			Min.	Typ.			
7.6 mm (0.3") Micro Bright Overflow Displays (right decimal point)							
GaP Red 626 nm							
HDSP-7507	Grey	Common Anode	360	980	5	2	20
HDSP-7508	Grey	Common Cathode	360	980	5	2	20
HDSP-7517	Grey	Common Anode	160	270	2	1.6	2
GaP Green 571 nm							
HDSP-7807	Grey	Common Anode	860	3000	10	2.1	10
HDSP-7808	Grey	Common Cathode	860	3000	10	2.1	10

Part Number	Face Color	Pin Configuration	Intensity (µcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)
			Min.	Typ.			
AlGaAs Red 637 nm (right hand decimal)							
HDSP-A107	Grey	Common Anode	135	600	1	1.6	1
HDSP-A108	Grey	Common Cathode	135	600	1	1.6	1
HDSP-A113	Black	Common Cathod	315	600	1	1.6	1
GaP Yellow 586 nm							
HDSP-A807	Grey	Common Anode	250	420	4	1.7	4
GaP Green 571 nm							
HDSP-A907	Grey	Common Anode	250	475	5	1.9	4
HDSP-A908	Grey	Common Cathode	250	475	5	1.9	4

Part Number	Face Color	Pin Configuration	Intensity		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	2 Intensity Bin Selection	Decimal Point
			Min.	Typ.					
7.6 mm (0.3") Single Digit Displays									
GaP Red 626 nm									
5082-7610	Red	Common Anode	340	800	5	2.1	20	C,D	Left
5082-7611	Red	Common Anode	340	800	5	2.1	20		Right
5082-7613	Red	Common Cathode	340	800	5	2.1	20	C,D	Right
GaP Yellow 586 nm									
5082-7620	Yellow	Common Anode	205	620	5	2.2	20		Left
5082-7621	Yellow	Common Anode	205	620	5	2.2	20		Right
5082-7623	Yellow	Common Cathode	205	620	5	2.2	20		Right
GaP Green 571 nm									
HDSP-3600	Green	Common Anode	860	2700	10	2.1	10		Left
HDSP-3601	Green	Common Anode	860	2700	10	2.1	10		Right
HDSP-3603	Green	Common Cathode	860	2700	10	2.1	10		Right

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

Part Number	Face Color	Pin Configuration	Intensity (μcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	2 Intensity Bin Selection
			Min.	Typ.				
8 mm (0.31") Micro Bright Displays (right decimal point)								
AlGaAs Red 637 nm								
HDSP-U101	Grey	Common Anode	315	600	1	1.8	20	
HDSP-U111	Black	Common Anode	315	600	1	1.8	20	
HDSP-U103	Grey	Common Cathode	315	600	1	1.8	20	
HDSP-U113	Black	Common Cathode	315	600	1	1.8	20	F,G
GaP Red 626 nm								
HDSP-U201	Grey	Common Anode	360	980	5	2	20	
HDSP-U211	Black	Common Anode	360	980	5	2	20	C,D
HDSP-U203	Grey	Common Cathode	360	980	5	2	20	C,D
HDSP-U213	Black	Common Cathode	360	980	5	2	20	C,D
GaP Orange 600 nm								
HDSP-U401	**Grey**	**Common Anode**	**360**	**980**	**5**	**2**	**20**	
HDSP-U411	**Black**	**Common Anode**	**360**	**980**	**5**	**2**	**20**	
HDSP-U403	**Grey**	**Common Cathode**	**360**	**980**	**5**	**2**	**20**	
HDSP-U413	**Black**	**Common Cathode**	**360**	**980**	**5**	**2**	**20**	
GaP Yellow 586 nm								
HDSP-U301	**Grey**	**Common Anode**	**225**	**480**	**5**	**2.2**	**20**	
HDSP-U311	**Black**	**Common Anode**	**225**	**480**	**5**	**2.2**	**20**	
HDSP-U303	**Grey**	**Common Cathode**	**225**	**480**	**5**	**2.2**	**20**	
HDSP-U313	**Black**	**Common Cathode**	**225**	**480**	**5**	**2.2**	**20**	
GaP Green 571 nm								
HDSP-U501	**Grey**	**Common Anode**	**860**	**3000**	**10**	**2.1**	**10**	
HDSP-U511	**Black**	**Common Anode**	**860**	**3000**	**10**	**2.1**	**10**	**K,L**
HDSP-U503	Grey	Common Cathode	860	3000	10	2.1	10	K,L
HDSP-U513	Black	Common Cathode	860	3000	10	2.1	10	K,L

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

Part Number	Face Color	Pin Configuration	Intensity (µcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	2 Intensity Bin Selection
			Min.	Typ.				
10 mm (0.4") Single Digit Displays (right decimal point)								
AlGaAs Red 637 nm								
HDSP-F111	Black	Common Anode	330	650	1	1.6	1	
HDSP-F101	Grey	Common Anode	330	650	1	1.6	1	E,F
HDSP-F113	Black	Common Cathode	330	650	1	1.6	1	
HDSP-F103	Grey	Common Cathode	330	650	1	1.8	1	E,F
HDSP-F151	Grey	Common Anode	7500	15000	20	1.8	20	
HDSP-F153	Grey	Common Cathode	7500	15000	20	1.8	20	
HDSP-F161	Black	Common Anode	7500	15000	20	1.8	20	
GaP Red 626 nm								
HDSP-F211	Black	Common Anode	420	1200	5	2	20	D,E
HDSP-F201	Grey	Common Anode	420	1200	5	2	20	D,E
HDSP-F213	Black	Common Cathode	420	1200	5	2	20	D,E
HDSP-F203	Grey	Common Cathode	420	1200	5	2	20	D,E
GaP Orange 603 nm								
HDSP-F401	Grey	Common Anode	420	1200	5	2	20	
HDSP-F413	Black	Common Cathode	420	1200	5	2	20	
HDSP-F403	Grey	Common Cathode	420	1200	5	2	20	
GaP Yellow 586 nm								
HDSP-F301	Grey	Common Anode	290	800	5	2.2	20	D,E
HDSP-F303	Grey	Common Cathode	290	800	5	2.2	20	D,E
GaP Green 571 nm								
HDSP-F511	Black	Common Anode	1030	3500	10	2.1	10	I,J
HDSP-F501	Grey	Common Anode	1030	3500	10	2.1	10	J,K
HDSP-F513	Black	Common Cathode	1030	3500	10	2.1	10	I,J
HDSP-F503	Grey	Common Cathode	1030	3500	10	2.1	10	J,K
10 mm (0.4") Overflow Displays (right decimal point)								
AlGaAs Red 637 nm								
HDSP-F107	Grey	Common Anode	330	650	1	1.6	1	
HDSP-F108	Grey	Common Cathode	330	650	1	1.6	1	
HDSP-F157	Grey	Common Anode	7500	15000	20	1.8	20	
HDSP-F158	Grey	Common Cathode	7500	15000	20	1.8	20	
GaP Red 626 nm								
HDSP-F207	Grey	Common Anode	420	1200	5	2	20	
HDSP-F208	Grey	Common Cathode	420	1200	5	2	20	

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

Part Number	Face Color	Pin Configuration	Intensity		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	Decimal Point
			Min.	Typ.				
10 mm (0.4") Slim Font Single Digit Displays								
AlGaAs Red 637 nm								
HDSP-315H	Grey	Common Anode	180	650	1	1.8	1	Right
HDSP-316H	Grey	Common Cathode	180	650	1	1.8	1	Right
GaP Red 626 nm								
HDSP-315E	Grey	Common Anode	450	2600	10	1.9	10	Right
HDSP-316E	Grey	Common Cathode	450	2600	10	1.9	10	Right
GaP Red 626 nm — Low Current								
HDSP-315L	Grey	Common Anode	180	370	2	2.1	2	Right
HDSP-316L	Grey	Common Cathode	180	370	2	2.1	2	Right
GaP Yellow 586 nm								
HDSP-315Y	Grey	Common Anode	450	1800	10	2	10	Right
HDSP-316Y	Grey	Common Cathode	450	1800	10	2	10	Right
GaP Green 571 nm								
HDSP-315G	Grey	Common Anode	450	5000	10	2.1	10	Right
HDSP-316G	Grey	Common Cathode	450	5000	10	2.1	10	Right

Part Number	Face Color	Pin Configuration	Intensity		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	2 Intensity Bin Selection	Decimal Point
			Min.	Typ.					
10 mm (0.4") Slim Font Single Digit Displays									
GaP Red 626 nm — Low Current									
5082-7656	Red	–	340	1115	5	2.1	20		Right
GaP Yellow 586 nm									
5082-7666	Yellow	–	290	835	5	2.2	20		Right
GaP Green 571 nm									
HDSP-4606	Grey	–	1030	4000	10	2.1	10	I,J	Right

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

Part Number	Face Color	Pin Configuration	Intensity		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	2 Intensity Bin Selection	Decimal Point
			Min.	Typ.					
10.9 mm (0.43") Single Digit Displays									
AlGaAs Red 637 nm									
HDSP-E101	Grey	Common Anode	390	650	1	1.6	1	E,F	Right
HDSP-E103	Grey	Common Cathode	390	650	1	1.6	1		Right
HDSP-E151	Grey	Common Anode	8500	15000	20	1.8	20		Right
HDSP-E153	Grey	Common Cathode	8500	15000	20	1.8	20		Right
GaP Red 626 nm									
5082-7650	Red	Common Anode	340	1115	5	2.1	20	D,E	Left
5082-7651	Red	Common Anode	340	1115	5	2.1	20	D,E	Right
5082-7653	Red	Common Cathode	340	1115	5	2.1	20	D,E	Right
GaP Red 626 nm — Low Current									
HDSP-3351	Red	Common Anode	200	300	2	1.6	2		Right
HDSP-3353	Red	Common Cathode	200	300	2	1.6	2		Right
GaP Yellow 586 nm									
5082-7661	Yellow	Common Anode	290	835	5	2.2	20		Right
5082-7663	Yellow	Common Cathode	290	835	5	2.2	20		Right
GaP Green 571 nm									
HDSP-4600	Grey	Common Anode	1030	4000	10	2.1	10		Left
HDSP-4601	Grey	Common Anode	1030	4000	10	2.1	10		Right
HDSP-4603	Grey	Common Cathode	1030	4000	10	2.1	10	I,J	Right
10.9mm (0.43") Overflow Displays									
HDSP-3356	Red	Universal	200	300	2	1.6	2		Right

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

Part Number	Face Color	Pin Configuration	Intensity (µcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	2 Intensity Bin Selection
			Min.	Typ.				
14.2 mm (0.56") Single Digit Displays (right decimal point)								
AlGaAs Red 637 nm								
HDSP-H111	Black	Common Anode	400	700	1	1.6	1	D,E
HDSP-H101	Grey	Common Anode	400	700	1	1.6	1	D,E
HDSP-H113	Black	Common Cathode	400	700	1	1.6	1	
HDSP-H103	Grey	Common Cathode	400	700	1	1.6	1	D,E
HDSP-H151	Grey	Common Anode	9100	16000	20	1.8	20	
HDSP-H153	Grey	Common Cathode	9100	16000	20	1.8	20	
GaP Red 626 nm								
HDSP-H211	Black	Common Anode	900	2800	10	2	20	G,H
HDSP-5501	Grey	Common Anode	900	2800	10	2.1	20	G,H
HDSP-H213	Black	Common Cathode	900	2800	10	2	20	G,H
HDSP-5503	Grey	Common Cathode	900	2800	10	2.1	20	G,H
GaP Red 626 nm — Low Current								
HDSP-5551	Grey	Common Anode	270	370	2	1.6	2	
HDSP-5553	Grey	Common Cathode	270	370	2	1.6	2	B,C
GaP Orange 600 nm								
HDSP-H413	Black	Common Cathode	1190	2000	10	2	20	
GaP Yellow 586 nm								
HDSP-5701	Grey	Common Anode	600	1800	10	2.1	20	F,G
HDSP-5703	Grey	Common Cathode	600	1800	10	2.1	20	F,G
GaP Green 571 nm								
HDSP-H511	Black	Common Anode	900	2500	10	2.1	10	G,H
HDSP-5601	Grey	Common Anode	900	2500	10	2.1	10	G,H
HDSP-H513	Black	Common Cathode	900	2500	10	2.1	10	G,H
HDSP-5603	Grey	Common Cathode	900	2500	10	2.1	10	G,H
14.2 mm (0.56") Overflow Displays (right decimal point)								
AlGaAs Red 637 nm								
HDSP-H107	Grey	Common Anode	400	700	1	1.6	1	
HDSP-H108	Grey	Common Cathode	400	700	1	1.6	1	
HDSP-H157	Grey	Common Anode	9100	16000	20	1.8	20	
HDSP-H158	Grey	Common Cathode	9100	16000	20	1.8	20	
GaP Red 626 nm								
HDSP-5507	Grey	Common Anode	900	2800	10	2.1	20	G,H
HDSP-5508	Grey	Common Cathode	900	2800	10	2.1	20	G,H
GaP Red 626 nm — Low Current								
HDSP-5557	Grey	Common Anode	270	370	2	1.6	2	
HDSP-5558	Grey	Common Cathode	270	370	2	1.6	2	
GaP Green 571 nm								
HDSP-5607	Grey	Common Anode	900	2500	10	2.1	10	
HDSP-5608	Grey	Common Cathode	900	2500	10	2.1	10	

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

Part Number	Face Color	Pin Configuration	Intensity (μcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	2 Intensity Bin Selection
			Min.	Typ.				
14.2 mm (0.56") Dual Digit Displays (right decimal point)								
AlGaAs Red 637 nm								
HDSP-K121	Grey	Common Anode	400	700	1	1.6	1	
HDSP-K123	Grey	Common Cathode	400	700	1	1.6	1	
AlGaAs Red 637 nm – Low Current								
HDSP-K111	Black	Common Anode	400	700	1	1.6	1	
HDSP-K113	Black	Common Cathode	400	700	1	1.6	1	
GaP Red 626 nm								
HDSP-5521	Grey	Common Anode	900	2800	10	2.1	20	
HDSP-5523	Grey	Common Cathode	900	2800	10	2.1	20	
HDSP-K211	Black	Common Anode	900	2800	10	2.0	20	
HDSP-K213	Black	Common Anode	900	2800	10	2.0	20	
GaP Yellow 586 nm								
HDSP-5721	Grey	Common Anode	600	1800	10	2.1	10	
HDSP-5723	Grey	Common Cathode	600	1800	10	2.1	10	
GaP Green 571 nm								
HDSP-5621	Grey	Common Anode	900	2500	10	2.1	10	
HDSP-5623	Grey	Common Cathode	900	2500	10	2.1	10	
HDSP-K511	Black	Common Anode	900	2500	10	2.1	10	
HDSP-K513	Black	Common Cathode	900	2500	10	2.1	10	

Part Number	Face Color	Pin Configuration	Intensity		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	2 Intensity Bin Selection	Decimal Point
			Min.	Typ.					
20 mm (0.8") Single Digit Displays									
AlGaAs Red 637 nm									
HDSP-N101	Grey	Common Anode	270	590	1	1.6	1		Right
HDSP-N103	Grey	Common Cathode	270	590	1	1.6	1		Right
HDSP-N105	Grey	Common Cathode	270	590	1	1.6	1		Left
HDSP-N150	Grey	Common Anode	6000	14000	20	1.8	20		Left
HDSP-N151	Grey	Common Anode	6000	14000	20	1.8	20		Right
HDSP-N153	Grey	Common Cathode	6000	14000	20	1.8	20		Right
GaP Red 626 nm									
HDSP-3900	Grey	Common Anode	3350	48000	20	2.6	100		Left
HDSP-3901	Grey	Common Anode	3350	7000 Peak (1/5 df)		2.6	100	E,F	Right
HDSP-3903	Grey	Common Cathode	3350	7000		2.6	100	E,F	Right
HDSP-3905	Grey	Common Cathode	3350	7000		2.6	100		Left
GaP Yellow 586 nm									
HDSP-4201	Grey	Common Anode	2200	7000		2.6	100		Right
HDSP-4203	Grey	Common Cathode	2200	7000		2.6	100		Right
GaP Green 571 nm									
HDSP-8601	Grey	Common Anode	680	1500	10	2.1	10	E,F	Right
HDSP-8603	Grey	Common Cathode	680	1500	10	2.1	10	E,F	Right

LED Indicators and Displays

Through-hole Seven-Segment Displays—PCB Platform

Part Number	Face Color	Pin Configuration	Intensity (μcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	Decimal Point
			Min.	Typ.				
7.62 mm (0.3") Single Digit Display								
GaP Red 620 nm ▭								
HDSP-333E	Grey	Common Cathode	800	1800	10	2.05	20	Right
GaP Green 573 nm ▭								
HDSP-333G	Grey	Common Cathode	800	2000	10	2.25	20	Right
AlGaAs Red 643 nm ▭								
HDSP-333A	Grey	Common Cathode	2001	4200	10	1.85	20	Right
9.1mm (0.36")Single Digit Display								
AlGaAs Red 643nm ▭								
HDSP-C3A1	Grey	Common Anode	–	7500	10	1.85	20	Right
HDSP-C3A3	Grey	Common Cathode	–	7500	10	1.85	20	Right
GaAsP Red 626nm ▭								
HDSP-C3E1	Grey	Common Anode	–	1100	10	2.0	20	Right
HDSP-C3E3	Grey	Common Cathode	–	1100	10	2.0	20	Right
GaAsP Orange ▭								
HDSP-C3L1	Grey	Common Anode	–	900	10	2.15	20	Right
HDSP-C3L3	Grey	Common Cathode	–	900	10	2.15	20	Right
GaAsP Yellow ▭								
HDSP-C3Y1	Grey	Common Anode	–	750	10	2.15	20	Right
HDSP-C3Y3	Grey	Common Cathode	–	750	10	2.15	20	Right
GaP Green ▭								
HDSP-C3G1	Grey	Common Anode	-	1900	10	2.25	20	Right
HDSP-C3G3	Grey	Common Cathode	-	1900	10	2.25	20	Right
10 mm (0.4") Slim Font Single Digit Display								
GaP Red 625 nm ▭								
HDSP-301E	Grey	Common Anode	1100	1100	10	1.90	20	Right
HDSP-303E	Grey	Common Cathode	1100	1100	10	1.90	20	Right
GaP Green 573 nm ▭								
HDSP-301G	Grey	Common Anode	1800	2800	10	2.25	20	Right
HDSP-303G	Grey	Common Cathode	1800	2800	10	2.25	20	Right
AlGaAs Red 643 nm ▭								
HDSP-301A	Grey	Common Anode	280	450	1	1.80	20	Right
HDSP-303A	Grey	Common Cathode	280	450	1	1.80	20	Right
GaP Yellow 590 nm ▭								
HDSP-301Y	Grey	Common Anode	1100	1800	10	2.15	20	Right
HDSP-303Y	Grey	Common Cathode	1100	1800	10	2.15	20	Right

LED Indicators and Displays

Through-hole Seven-Segment Displays—PCB Platform

Part Number	Face Color	Pin Configuration	Intensity (µcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	Decimal Point
			Min.	Typ.				
10.16 mm (0.4") Single Digit Display								
GaP Red 620 nm								
HDSP-311E	Grey	Common Anode	1250	3200	10	2.05	20	Right
HDSP-313E	Grey	Common Cathode	1250	3200	10	2.05	20	Right
GaP Green 573 nm								
HDSP-311G	Grey	Common Anode	1250	3200	10	2.25	20	Right
HDSP-313G	Grey	Common Cathode	1250	3200	10	2.25	20	Right
AlGaAs Red 643 nm								
HDSP-311A	Grey	Common Anode	3200	7500	10	1.85	20	Right
HDSP-313A	Grey	Common Cathode	3200	7500	10	1.85	20	Right
GaP Yellow 590 nm								
HDSP-311Y	Grey	Common Anode	800	1500	10	2.15	20	Right
HDSP-313Y	Grey	Common Cathode	800	1500	10	2.15	20	Right
10.16 mm (0.4") Dual Digit Display								
GaP Red 620 nm								
HDSP-G01E	Grey	Common Anode	1250	2600	10	2.05	20	–
HDSP-G03E	Grey	Common Cathode	1250	2600	10	2.05	20	–
GaP Green 573 nm								
HDSP-G01G	Grey	Common Anode	1250	3200	10	2.25	20	–
HDSP-G03G	Grey	Common Cathode	1250	3200	10	2.25	20	–
AlGaAs Red 643nm								
HDSP-G01A	Grey	Common Anode	3200	6500	10	1.85	20	–
HDSP-G03A	Grey	Common Cathode	3200	6500	10	1.85	20	–
GaP Yellow 590 nm								
HDSP-G01Y	Grey	Common Anode	800	1500	10	2.15	20	–
HDSP-G03Y	Grey	Common Cathode	800	1500	10	2.15	20	–

LED Indicators and Displays

Through-hole Seven-Segment Displays—PCB Platform

Part Number	Face Color	Pin Configuration	Intensity (µcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	Decimal Point
			Min.	Typ.				
0.56" Slim Font Single Digit Display								
GaP Red 625 nm								
HDSP-561E	Grey	Common Anode	1100	1800	10	1.90	20	Right
HDSP-563E	Grey	Common Cathode	1100	1800	10	1.90	20	Right
GaP Green 573 nm								
HDSP-561G	Grey	Common Anode	1800	2800	10	2.25	20	Right
HDSP-563G	Grey	Common Cathode	1800	2800	10	2.25	20	Right
AlGaAs Red 643 nm								
HDSP-561A	Grey	Common Anode	280	450	1	2.1	20	Right
HDSP-563A	Grey	Common Cathode	280	450	1	2.1	20	Right
GaP Yellow 590 nm								
HDSP-561Y	Grey	Common Anode	1800	2800	10	1.80	20	Right
HDSP-563Y	Grey	Common Cathode	1800	2800	10	1.80	20	Right
13.1mm (0.52")Single Digit Display								
AlGaAs Red 643nm								
HDSP-C5A1	Grey	Common Anode	–	16000	10	1.85	20	Right
HDSP-C5A3	Grey	Common Cathode	–	16000	10	1.85	20	Right
GaAsP Red 626nm								
HDSP-C5E1	Grey	Common Anode	–	4000	10	2.0	20	Right
HDSP-C5E3	Grey	Common Cathode	–	4000	10	2.0	20	Right
GaAsP Orange								
HDSP-C5L1	Grey	Common Anode	–	4000	10	2.15	20	Right
HDSP-C5L3	Grey	Common Cathode	–	4000	10	2.15	20	Right
GaAsP Yellow								
HDSP-C5Y1	Grey	Common Anode	–	3000	10	2.15	20	Right
HDSP-C5Y3	Grey	Common Cathode	–	3000	10	2.15	20	Right
GaP Green								
HDSP-C5G1	Grey	Common Anode	–	6000	10	2.25	20	Right
HDSP-C5G3	Grey	Common Cathode	–	6000	10	2.25	20	Right

LED Indicators and Displays

Through-hole Seven-Segment Displays—PCB Platform

Part Number	Face Color	Pin Configuration	Intensity (µcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	Decimal Point
			Min.	Typ.				
14.22 mm (0.56") Single Digit Display								
GaP Red 620 nm								
HDSP-511E	Grey	Common Anode	2001	4100	10	2.05	20	Right
HDSP-513E	Grey	Common Cathode	2001	4100	10	2.05	20	Right
GaP Green 573 nm								
HDSP-511G	Grey	Common Anode	2001	4100	10	2.25	20	Right
HDSP-513G	Grey	Common Cathode	2001	4100	10	2.25	20	Right
AlGaAs Red 643 nm								
HDSP-511A	Grey	Common Anode	3201	6500	10	1.85	20	Right
HDSP-513A	Grey	Common Cathode	3201	6500	10	1.85	20	Right
GaP Yellow 590 nm								
HDSP-511Y	Grey	Common Anode	1251	2600	10	2.15	20	Right
HDSP-513Y	Grey	Common Cathode	1251	2600	10	2.15	20	Right
14.2 mm (0.56") Dual Digit Displays								
GaP Yellow 587 nm								
HDSP-521Y	Grey	Common Anode	1520	2300	10	2.1	20	Right
HDSP-523Y	Grey	Common Cathode	1520	2300	10	2.1	20	Right
GaP Red 626 nm								
HDSP-521E	Grey	Common Anode	2280	4000	10	2.1	20	Right
HDSP-523E	Grey	Common Cathode	2280	4000	10	2.1	20	Right
GaP Green 571 nm								
HDSP-521G	Grey	Common Anode	2280	3500	10	2.1	10	Right
HDSP-523G	Grey	Common Cathode	2280	3500	10	2.1	10	Right
AlGaAs Red 643 nm								
HDSP-521A	Grey	Common Anode	–	6500	10	1.85	20	Right
HDSP-523A	Grey	Common Cathode	–	6500	10	1.85	20	Right

LED Indicators and Displays

Through-hole Seven-Segment Displays—PCB Platform

Part Number	Face Color	Pin Configuration	Intensity (μcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	Decimal Point
			Min.	Typ.				
20 mm (0.8") Single Digit Display								
GaP Red 626 nm								
HDSP-815E	Grey	Common Anode	2300	4800	20	2.1	20	Right
HDSP-816E	Grey	Common Cathode	2300	4800	20	2.1	20	Right
GaP Green 571 nm								
HDSP-815G	Grey	Common Anode	1500	3300	20	2.1	20	Right
HDSP-816G	Grey	Common Cathode	1500	3300	20	2.1	20	Right
20mm (0.8")Single Digit Display								
AlGaAs Red 643nm								
HDSP-C8A1	Grey	Common Anode	–	18200	10	1.85	20	Right
HDSP-C8A3	Grey	Common Cathode	–	18200	10	1.85	20	Right
GaAsP Red 626nm								
HDSP-C8E1	Grey	Common Anode	–	4800	10	2.0	20	Right
HDSP-C8E3	Grey	Common Cathode	–	4800	10	2.0	20	Right
GaAsP Orange								
HDSP-C8L1	Grey	Common Anode	–	4500	10	2.15	20	Right
HDSP-C8L3	Grey	Common Cathode	–	4500	10	2.15	20	Right
GaAsP Yellow								
HDSP-C8Y1	Grey	Common Anode	–	3800	10	2.15	20	Right
HDSP-C8Y3	Grey	Common Cathode	–	3800	10	2.15	20	Right
GaP Green								
HDSP-C8G1	Grey	Common Anode	–	5000	10	2.25	20	Right
HDSP-C8G3	Grey	Common Cathode	–	5000	10	2.25	20	Right

LED Indicators and Displays

Through-hole Seven-Segment Displays—PCB Platform

Part Number	Face Color	Pin Configuration	Intensity (µcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	Decimal Point
			Min.	Typ.				
25.4mm (1.0")Single Digit Display								
AlGaAs Red 643nm								
HDSP-C1A1	Grey	Common Anode	–	42000	10	3.7	20	Right
HDSP-C1A3	Grey	Common Cathode	–	42000	10	3.7	20	Right
GaAsP Red 626nm								
HDSP-C1E1	Grey	Common Anode	–	12000	10	4.0	20	Right
HDSP-C1E3	Grey	Common Cathode	–	12000	10	4.0	20	Right
GaAsP Orange								
HDSP-C1L1	Grey	Common Anode	–	12100	10	4.3	20	Right
HDSP-C1L3	Grey	Common Cathode	–	12100	10	4.3	20	Right
GaAsP Yellow								
HDSP-C1Y1	Grey	Common Anode	–	6900	10	4.3	20	Right
HDSP-C1Y3	Grey	Common Cathode	–	6900	10	4.3	20	Right
GaP Green								
HDSP-C1G1	Grey	Common Anode	–	16000	10	4.5	20	Right
HDSP-C1G3	Grey	Common Cathode	–	16000	10	4.5	20	Right
56.80mm (2.3") Single Digit Display								
AlGaAs Red 643nm								
HDSP-C2A1	Grey	Common Anode	–	78000	10	7.4	20	Right
HDSP-C2A3	Grey	Common Cathode	–	78000	10	7.4	20	Right
GaAsP Red 626nm								
HDSP-C2E1	Grey	Common Anode	–	20000	10	8.0	20	Right
HDSP-C2E3	Grey	Common Cathode	–	20000	10	8.0	20	Right
GaAsP Orange								
HDSP-C2L1	Grey	Common Anode	–	20000	10	8.6	20	Right
HDSP-C2L3	Grey	Common Cathode	–	20000	10	8.6	20	Right
GaAsP Yellow								
HDSP-C2Y1	Grey	Common Anode	–	12000	10	8.6	20	Right
HDSP-C2Y3	Grey	Common Cathode	–	12000	10	8.6	20	Right
GaP Green								
HDSP-C2G1	Grey	Common Anode	–	28000	10	9.0	20	Right
HDSP-C2G3	Grey	Common Cathode	–	28000	10	9.0	20	Right

LED Indicators and Displays

Surface Mount Seven-Segment Displays—PCB Platform

Part Number	Face Color	Pin Configuration	Intensity (mcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	Decimal Point
			Min.	Typ.				
7.0mm (0.28") Single Digit SMT Display								
AlInGaP Red 624 nm								
HDSM-281C	Grey	Common Anode	3.4	7.5	10	2	20	Upper and Lower
HDSM-283C	Grey	Common Cathode	3.4	7.5	10	2	20	Upper and Lower
AlInGaP Green 571 nm								
HDSM-281H	Grey	Common Anode	3.4	6	10	2.1	20	Upper and Lower
HDSM-283H	Grey	Common Cathode	3.4	6	10	2.1	20	Upper and Lower
AlInGaP Yellow 589 nm								
HDSM-281F	Grey	Common Anode	3.4	8	10	2.1	20	Upper and Lower
HDSM-283F	Grey	Common Cathode	3.4	8	10	2.1	20	Upper and Lower
AlInGaP Orange 605 nm								
HDSM-281L	Grey	Common Anode	3.4	8.5	10	2.1	20	Upper and Lower
HDSM-283L	Grey	Common Cathode	3.4	8.5	10	2.1	20	Upper and Lower
InGaN Blue 470nm								
HDSM-281B	Grey	Common Anode	3.4	6	10	3.3	20	Upper and Lower
HDSM-283B	Grey	Common Cathode	3.4	6	10	3.3	20	Upper and Lower
7.0 mm (0.28") Dual Digit SMT Display								
AlInGaP Red 624 nm								
HDSM-291C	Grey	Common Anode	3.4	7.5	10	2	20	Upper and Lower
HDSM-293C	Grey	Common Cathode	3.4	7.5	10	2	20	Upper and Lower
AlInGaP Green 571 nm								
HDSM-291H	Grey	Common Anode	3.4	6	10	2.1	20	Upper and Lower
HDSM-293H	Grey	Common Cathode	3.4	6	10	2.1	20	Upper and Lower
AlInGaP Yellow 589 nm								
HDSM-291F	Grey	Common Anode	3.4	8	10	2.1	20	Upper and Lower
HDSM-293F	Grey	Common Cathode	3.4	8	10	2.1	20	Upper and Lower
AlInGaP Orange 605 nm								
HDSM-291L	Grey	Common Anode	3.4	8.5	10	2.1	20	Upper and Lower
HDSM-293L	Grey	Common Cathode	3.4	8.5	10	2.1	20	Upper and Lower
InGaN Blue 470nm								
HDSM-291B	Grey	Common Anode	3.4	6	10	3.3	20	Upper and Lower
HDSM-293B	Grey	Common Cathode	3.4	6	10	3.3	20	Upper and Lower

LED Indicators and Displays

Surface Mount Seven-Segment Displays—PCB Platform

Part Number	Face Color	Pin Configuration	Intensity (mcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	Decimal Point
			Min.	Typ.				
10 mm (0.39") Single Digit SMT Display								
AlInGaP Red 624 nm								
HDSM-431C	Grey	Common Anode	8.6	14.3	10	2	20	Right
HDSM-433C	Grey	Common Cathode	8.6	14.3	10	2	20	Right
AlInGaP Green 571 nm								
HDSM-431H	Grey	Common Anode	5.4	9	10	2.1	20	Right
HDSM-433H	Grey	Common Cathode	5.4	9	10	2.1	20	Right
AlInGaP Yellow 589 nm								
HDSM-431F	Grey	Common Anode	8.6	15	10	2.1	20	Right
HDSM-433F	Grey	Common Cathode	8.6	15	10	2.1	20	Right
AlInGaP Orange 605 nm								
HDSM-431L	Grey	Common Anode	8.6	16	10	2.1	20	Right
HDSM-433L	Grey	Common Cathode	8.6	16	10	2.1	20	Right
InGaN Blue 470nm								
HDSM-431B	Grey	Common Anode	5.4	11.2	10	3.3	20	Right
HDSM-433B	Grey	Common Cathode	5.4	11.2	10	3.3	20	Right
InGaN White								
HDSM-431W	Grey	Common Anode	24	40	5	2.95	5	Right
HDSM-433W	Grey	Common Cathode	24	40	5	2.95	5	Right
10 mm (0.39") Dual Digit SMT Display								
AlInGaP Red 624 nm								
HDSM-441C	Grey	Common Anode	8.6	14.3	10	2	20	Right
HDSM-443C	Grey	Common Cathode	8.6	14.3	10	2	20	Right
AlInGaP Green 571 nm								
HDSM-441H	Grey	Common Anode	5.4	9	10	2.1	20	Right
HDSM-443H	Grey	Common Cathode	5.4	9	10	2.1	20	Right
AlInGaP Yellow 589 nm								
HDSM-441F	Grey	Common Anode	8.6	15	10	2.1	20	Right
HDSM-443F	Grey	Common Cathode	8.6	15	10	2.1	20	Right
AlInGaP Orange 605 nm								
HDSM-441L	Grey	Common Anode	8.6	16	10	2.1	20	Right
HDSM-443L	Grey	Common Cathode	8.6	16	10	2.1	20	Right
InGaN Blue 470nm								
HDSM-441B	Grey	Common Anode	5.4	11.2	10	3.3	20	Right
HDSM-443B	Grey	Common Cathode	5.4	11.2	10	3.3	20	Right
InGaN White								
HDSM-441W	Grey	Common Anode	24	40	5	2.95	5	Right
HDSM-443W	Grey	Common Cathode	24	40	5	2.95	5	Right

LED Indicators and Displays

Surface Mount Seven-Segment Displays—PCB Platform

Part Number	Face Color	Pin Configuration	Intensity (mcd)		Iv Test Current (mA)	Vf Typ. (V)	Vf Test Current (mA)	Decimal Point
			Min.	Typ.				
14.22 mm (0.56") Single Digit SMT Display								
AlInGaP Red 624 nm								
HDSM-531C	Grey	Common Anode	8.6	16	10	2	20	Right
HDSM-533C	Grey	Common Cathode	8.6	16	10	2	20	Right
AlInGaP Green 571 nm								
HDSM-531H	Grey	Common Anode	5.4	10.5	10	2.1	20	Right
HDSM-533H	Grey	Common Cathode	5.4	10.5	10	2.1	20	Right
AlInGaP Yellow 589 nm								
HDSM-531F	Grey	Common Anode	8.6	20	10	2.1	20	Right
HDSM-533F	Grey	Common Cathode	8.6	20	10	2.1	20	Right
AlInGaP Orange 605 nm								
HDSM-531L	Grey	Common Anode	8.6	19.5	10	2.1	20	Right
HDSM-533L	Grey	Common Cathode	8.6	19.5	10	2.1	20	Right
InGaN Blue 470nm								
HDSM-531B	Grey	Common Anode	5.4	13.5	10	3.3	20	Right
HDSM-533B	Grey	Common Cathode	5.4	13.5	10	3.3	20	Right
InGaN White								
HDSM-531W	Grey	Common Anode	28	44	5	2.95	5	Right
HDSM-533W	Grey	Common Cathode	28	44	5	2.95	5	Right
14.22mm (0.56") Dual Digit SMT Display								
AlInGaP Red 624 nm								
HDSM-541C	Grey	Common Anode	8.6	16	10	2	20	Right
HDSM-543C	Grey	Common Cathode	8.6	16	10	2	20	Right
AlInGaP Green 571 nm								
HDSM-541H	Grey	Common Anode	5.4	10.5	10	2.1	20	Right
HDSM-543H	Grey	Common Cathode	5.4	10.5	10	2.1	20	Right
AlInGaP Yellow 589 nm								
HDSM-541F	Grey	Common Anode	8.6	20	10	2.1	20	Right
HDSM-543F	Grey	Common Cathode	8.6	20	10	2.1	20	Right
AlInGaP Orange 605 nm								
HDSM-541L	Grey	Common Anode	8.6	19.5	10	2.1	20	Right
HDSM-543L	Grey	Common Cathode	8.6	19.5	10	2.1	20	Right
InGaN Blue 470nm								
HDSM-541B	Grey	Common Anode	5.4	13.5	10	3.3	20	Right
HDSM-543B	Grey	Common Cathode	5.4	13.5	10	3.3	20	Right
InGaN White								
HDSM-541W	Grey	Common Anode	28	44	5	2.95	5	Right
HDSM-543W	Grey	Common Cathode	28	44	5	2.95	5	Right

LED Indicators and Displays

Through-hole Seven-Segment Displays—PCB Platform
Luminous Intensity Categories (Typ.)

7.62 mm (0.3") Single Digit

Bin ID	lv in mcd	
	Min.	Max.
GaP Red HDSP-33xE		
G	0.801	1.250
H	1.251	2.000
I	2.001	3.200
GaP Green HDSP-33xG		
G	0.801	1.250
H	1.251	2.000
I	2.001	3.200
AlGaAs Red HDSP-33xA		
I	2.001	3.200
J	3.201	5.050
K	5.051	8.000

10.16 mm (0.4") Single Digit

Bin ID	lv in mcd	
	Min.	Max.
GaP Red HDSP-31xE		
H	1.251	2.000
I	2.001	3.200
J	3.201	5.050
GaP Green HDSP-31xG		
H	1.251	2.000
I	2.001	3.200
J	3.201	5.050
AlGaAs Red HDSP-31xA		
J	3.201	5.050
K	5.051	8.000
L	8.001	12.650
GaP Yellow HDSP-31xY		
G	0.801	1.250
H	1.251	2.000
I	2.001	3.200

13 mm (0.56") Slim Font Single Digit

Bin ID	lv in mcd	
	Min.	Max.
GaP Red HDSP-56xE		
I	1.100	2.200
K	1.800	3.600
GaP Green HDSP-56xG		
K	1.800	3.600
L	2.800	5.600
AlGaAs Red HDSP-56xA		
F	0.280	0.560
G	0.450	0.900
GaP Yellow HDSP-56xY		
I	1.100	2.200
K	1.800	3.600

10 mm (0.4") Slim Font Single Digit

Bin ID	lv in mcd	
	Min.	Max.
GaP Red HDSP-30xE		
I	1.100	2.200
K	1.800	3.600
GaP Green HDSP-30xG		
K	1.800	3.600
L	2.800	5.600
AlGaAs Red HDSP-30xA		
F	0.280	0.560
G	0.450	0.900
GaP Yellow HDSP-30xY		
I	1.100	2.200
K	1.800	3.600

10.16 mm (0.4"D) Dual Digit

Bin ID	lv in mcd	
	Min.	Max.
GaP Red HDSP-G0xE		
H	1.251	2.000
I	2.001	3.200
J	3.201	5.050
GaP Green HDSP-G0xG		
H	1.251	2.000
I	2.001	3.200
J	3.201	5.050
AlGaAs Red HDSP-G0xA		
J	3.201	5.050
K	5.051	8.000
L	8.001	12.650
GaP Yellow HDSP-G0xY		
G	0.801	1.250
H	1.251	2.000
I	2.001	3.200

LED Indicators and Displays

Through-hole Seven-Segment Displays—PCB Platform

14.22 mm (0.56") Single Digit

Bin ID	Customer Iv in mcd	
	Min.	Max.
GaP Red HDSP-51xE		
I	2.001	3.200
J	3.201	5.050
K	5.051	8.000
GaP Green HDSP-51xG		
I	2.001	3.200
J	3.201	5.050
K	5.051	8.000
AlGaAs Red HDSP-51xA		
J	3.201	5.050
K	5.051	8.000
L	8.001	12.650
GaP Yellow HDSP-51xY		
H	1.251	2.000
I	2.001	3.200
J	3.201	5.050

0.56" Dual Digit

Bin ID	Customer Iv in mcd	
	Min.	Max.
GaP Red HDSP-52xE		
G	2.28	3.42
H	3.42	5.13
I	5.13	7.69
GaP Yellow HDSP-52xY		
F	1.52	2.28
G	2.28	3.42
H	3.42	5.13
GaP Green HDSP-52xG		
G	2.28	3.42
H	3.42	5.13
AlGaAs Red HDSP-52xA		
J	3.201	5.050
K	5.051	8.000
L	8.001	12.650

0.8" Single Digit

Bin ID	Customer Iv in mcd	
	Min.	Max.
GaP Red HDSP-81xE		
N	4.78	8.34
P	6.82	11.86
Q	9.7	16.61
GaP Green HDSP-81xG		
P	6.82	11.86
Q	9.7	16.61
R	13.6	23.74

LED Indicators and Displays

Surface Mount Seven-Segment Displays

10mm (0.28") Single Digit SMT Display

Bin ID	Iv in mcd	
	Min.	Max.
AlInGaP Green HDSM-281H HDSM-283H		
L	3.401	5.400
M	5.401	8.600
AlInGaP Red/Orange/Yellow HDSM-281C/281L/281F HDSM-283C/283L/283F		
L	3.401	5.400
M	5.401	8.600
N	8.601	13.700
InGaN Blue HDSM-281B HDSM-283B		
L	3.401	5.400
M	5.401	8.600
N	8.601	13.700

10mm (0.28") Dual Digit SMT Display

Bin ID	Iv in mcd	
	Min.	Max.
AlInGaP Green HDSM-291H HDSM-293H		
L	3.401	5.400
M	5.401	8.600
GAlInGaP Red/Orange/Yellow HDSM-291C/291L/291F HDSM-293C/293L/293F		
L	3.401	5.400
M	5.401	8.600
N	8.601	13.700
InGaN Blue HDSM-291B HDSM-293B		
L	3.401	5.400
M	5.401	8.600
N	8.601	13.700

10mm (0.39") Single Digit SMT Display

Bin ID	Iv in mcd	
	Min.	Max.
AlInGaP Green HDSM-431H HDSM-433H		
M	5.401	8.600
N	8.601	13.700
P	13.701	21.800
AlInGaP Red/Yellow HDSM-431C/431F HDSM-433C/433F		
N	8.601	13.700
P	13.701	21.800
Q	21.801	34.700
AlInGaP Orange HDSM-431L HDSM-433L		
N	8.601	13.700
P	13.701	21.800
Q	21.801	34.700
R	34.701	55.200
InGaN Blue HDSM-431B HDSM-433B		
M	5.401	8.600
N	8.601	13.700
P	13.701	21.800

LED Indicators and Displays

Surface Mount Seven-Segment Displays
Luminous Intensity Categories (Typ.)

10mm (0.39") Dual Digit

Bin ID	Customer lv in mcd	
	Min.	Max.
AlInGaP Green HDSM-441H HDSM-443H		
M	5.401	8.600
N	8.601	13.700
P	13.701	21.800
AlInGaP Red/Yellow HHDSM-441C/441F HDSM-443C/443F		
N	8.601	13.700
P	13.701	21.800
Q	21.801	34.700
AlInGaP Orange HDSM-441L HDSM-443L		
N	8.601	13.700
P	13.701	21.800
Q	21.801	34.700
R	34.701	55.200
InGaN Blue HDSM-441B HDSM-443B		
M	5.401	8.600
N	8.601	13.700
P	13.701	21.800

14.22mm (0.56") Single Digit

Bin ID	Customer lv in mcd	
	Min.	Max.
AlInGaP GreeN HDSM-531H HDSM-533H		
M	5.401	8.600
N	8.601	13.700
AlInGaP Red HDSM-531C HDSM-533C		
N	8.601	13.700
P	13.701	21.800
AlInGaP Orange/Yellow HDSM-531L/531F HDSM-533L/533F		
N	8.601	13.700
P	13.701	21.800
Q	21.801	34.700
InGaN Blue HDSM-531B HDSM-533B		
M	5.401	8.600
N	8.601	13.700
P	13.701	21.800
Q	21.801	34.700

14.22mm (0.56") Dual Digit

Bin ID	Customer lv in mcd	
	Min.	Max.
AlInGaP Green HDSM-541H HDSM-543H		
M	5.401	8.600
N	8.601	13.700
AlInGaP Red HDSM-541C HDSM-543C		
N	8.601	13.700
P	13.701	21.800
AlInGaP Orange/Yellow HHDSM-541L/541F HDSM-543L/543F		
N	8.601	13.700
P	13.701	21.800
Q	21.801	34.700
InGaN Blue HDSM-541B HDSM-543B		
M	5.401	8.600
N	8.601	13.700
P	13.701	21.800
Q	21.801	34.700

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

7.6 mm (0.3") Micro Bright Displays Package Dimension

Part Number		
HDSP-	A151	A211
	7501	A213
	A401	A511
	A411	A513
	7401	
	7801	
	A153	
	7503	
	A403	
	A413	
	7403	
	7803	
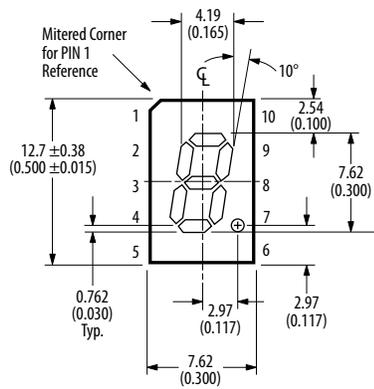
7.6 mm (0.3") Micro Bright Overflow Displays (Right Decimal Point) Package Dimension

Part Number	
HDSP-	7507
	A407
	7407
	7807
	7508
	A408
	7408
	7808
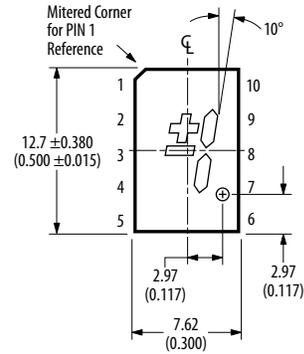
7.6 mm (0.3") Micro Bright Low Current Displays (Right Decimal Point) Package Dimension

Part Number		
HDSP-	A101	A111
	7511	A113
	A801	
	A901	
	A103	
	7513	
	A803	
	A903	
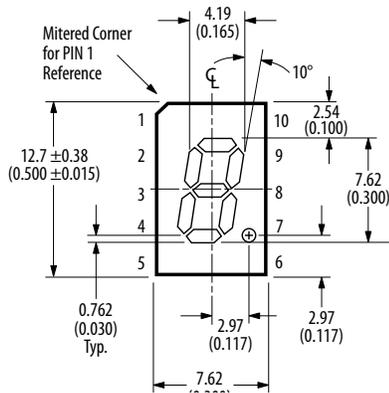
7.6 mm (0.3") Single Digit Displays Package Dimension

Part Number	
5082-	7610
	7611
	7613
	7620
	7621
	7623
	3600
	3601
	3603

Note:
1. Dimensions in millimeters (inches).

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

8 mm (0.31") Micro Bright Displays
Package Dimension

Part Number	
HDSP-	Uxxx

10 mm (0.4") Single Digit Displays
(Right Decimal Point) Package Dimension

Part Number	
HDSP-	F111	F113
	F211	F213
	F511	F513
	F101	F103
	F201	F203
	F401	F403
	F411	F413
	F301	F303
	F501	F503
	F511	F513

10 mm (0.4") Overflow Displays (Right Decimal Point) Package Dimension

Part Number	
HDSP-	F107	F108
	F207	F208
	F407	F408
	F307	F308
	F507	F508

Note:
1. Dimensions in millimeters (inches).

10.9 mm (0.43") Single Digit Displays (Right Decimal Point) Package Dimension

Part Number	
HDSP-	E101	E103
	3351	3353
5082-	7651	7653
	7661	7663
	4601	4603

Part Number	
5802-	7650
	7660
	4600

10.9 mm (0.43") Overflow Displays Package Dimension

Part Number	
HDSP-	4606	
5082-	7656	7666

Part Number	
HDSP-	3356

Note:
1. Dimensions in millimeters (inches).

88

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

**14.2 mm (0.56") Single Digit Displays
(Right Decimal Point) Package Dimension**

Part Number		
HDSP-	H111	H211
	H411	H511
	H113	H213
	H413	H513
	H101	H103
	H401	H403
	5551	5553
	5501	5503
	5701	5703
	5601	5603
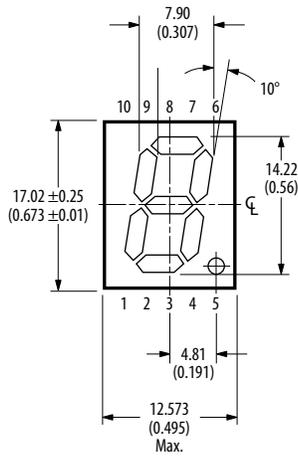
**14.2 mm (0.56") Overflow Displays
(Right Decimal Point) Package Dimension**

Part Number		
HDSP-	H107	H108
	H407	H408
	5557	5558
	5507	5508
	5707	5708
	5607	5608

Note:
1. Dimensions in millimeters (inches).
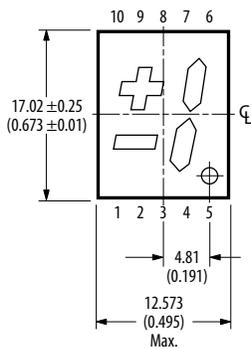
**14.22 mm (0.56") Single Digit Displays
Package Dimension**

Part Number		
HDSP-	51xE	51xG
	51xA	51xY
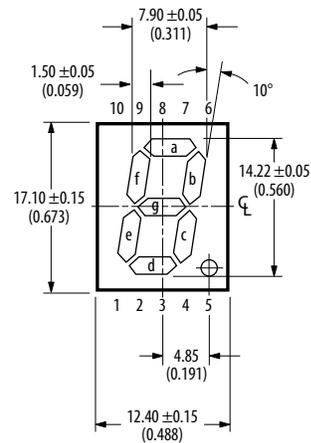
89

LED Indicators and Displays

Through-hole Seven-Segment Displays—Leadframe Platform

20 mm (0.8") Single Digit Displays Package Dimension

Part Number		
HDSP-	3901	3903
	4201	4203
	8601	8603
	N101	N103
	N401	N403
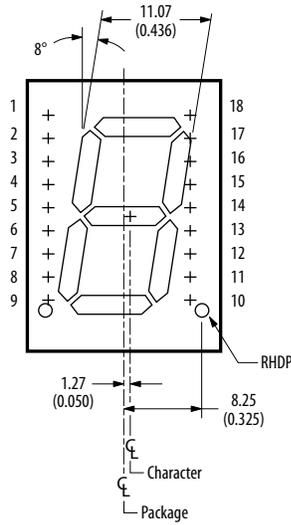
Part Number		
HDSP-		N105
	3900	3905
	4200	4205
	8600	8605
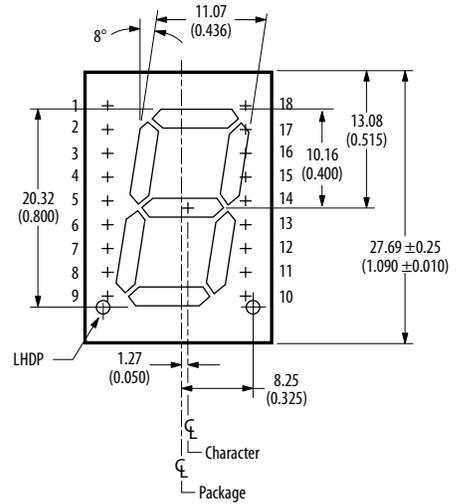
Through-hole Seven Segment Displays—PCB Platform

7.62 mm (0.3") Single Digit Displays Package Dimension

Part Number	
5802-	333E
	333G
	333A
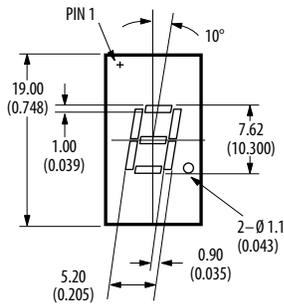
10 mm (0.4") Slim Font Single Digit Displays (Right Decimal Point) Package Dimension

Part Number		
HDSP-	315E	316E
	315L	316L
	315Y	316Y
	315G	316G
	30xE	30xG
	30xA	30xY
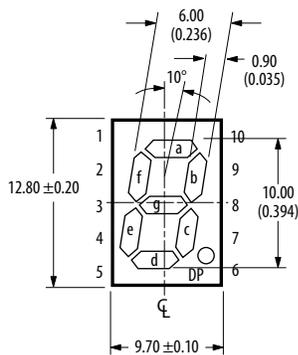
10.16 mm (0.4") Dual Digit Displays Package Dimension

Part Number		
HDSP-	G0xE	G0xG
	G0xA	G0xY
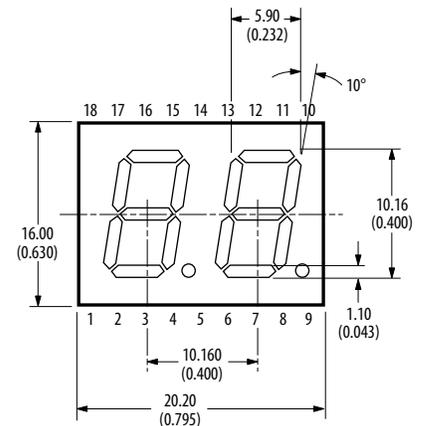
Note:
1. Dimensions in millimeters (inches).

LED Indicators and Displays

Through-hole Seven Segment Displays—PCB Platform

9.1mm (0.36") Single Digit Displays Package Dimension

Part Number	
HDSP-	C3A1
	C3A3
	C3E1
	C3E3
	C3L1
	C3L3
	C3Y1
	C3Y3
	C3G1
	C3G3
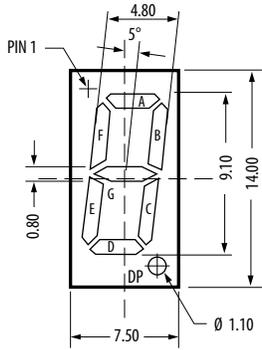
10.16 mm (0.4") Single Digit Displays Package Dimension

Part Number	
HDSP-	311E
	311G
	311A
	311Y
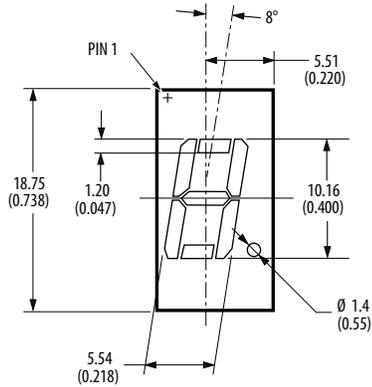
Part Number	
HDSP-	313E
	313G
	313A
	313Y
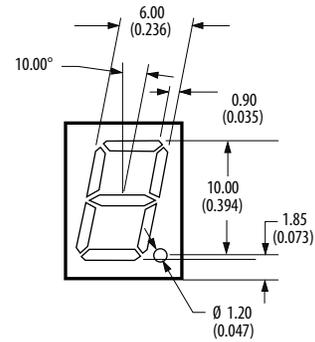
13.1mm (0.52") Single Digit Displays Package Dimension

Part Number	
HDSP-	C5A1
	C5A3
	C5E1
	C5E3
	C5L1
	C3L3
	C3Y1
	C3Y3
	C3G1
	C3G3
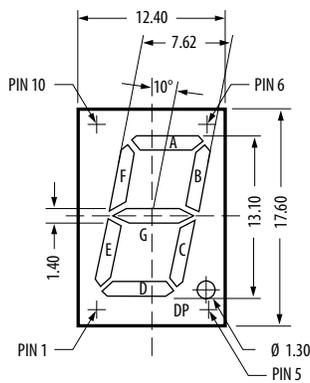
Note:
1. Dimensions in millimeters (inches).

LED Indicators and Displays

Through-hole Seven Segment Displays—PCB Platform

14.2 mm (0.56") Dual Digit Displays
Package Dimension

Part Number		
HDSP-	52xA	52xE
	52xG	52xY
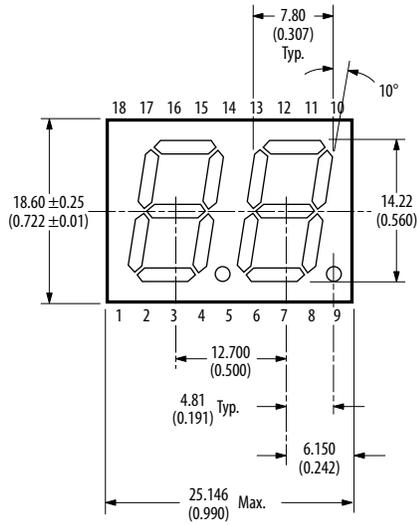
20 mm (0.8") Single Digit Displays Package Dimension

Part Number	
HDSP-	81xE	81xG
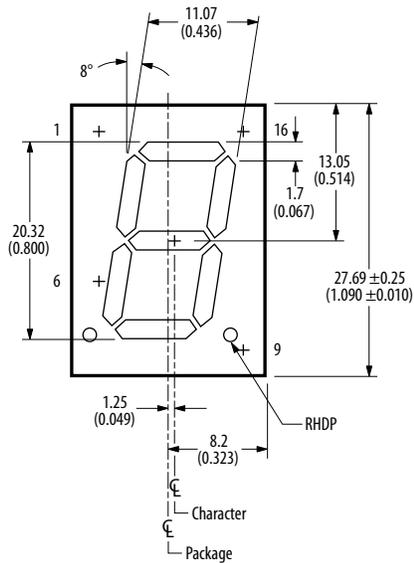
Part Number	
HDSP-	C8A1
	C8A3
	C8E1
	C8E3
	C8L1
	C8L3
	C8Y1
	C8Y3
	C8G1
	C8G3
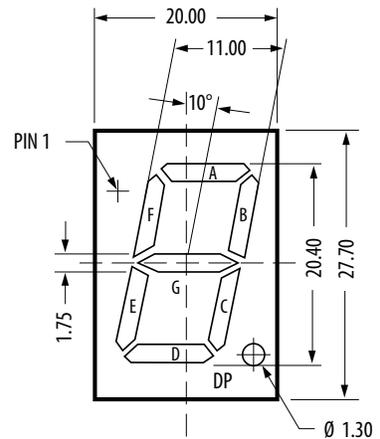
Note:
1. Dimensions in millimeters (inches).

LED Indicators and Displays

Through-hole Seven Segment Displays—PCB Platform

25.4mm (1.0") Single Digit Displays Package Dimension

Part Number	
HDSP-	C1A1
	C1A3
	C1E1
	C1E3
	C1L1
	C1L3
	C1Y1
	C1Y3
	C1G1
	C1G3
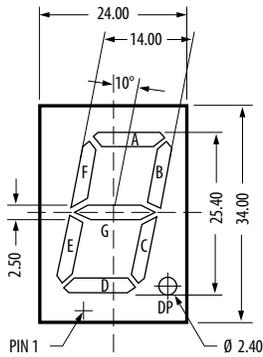
56.80mm (2.3") Single Digit Displays Package Dimension

Part Number	
HDSP-	C2A1
	C2A3
	C2E1
	C2E3
	C2L1
	C2L3
	C2Y1
	C2Y3
	C2G1
	C2G3
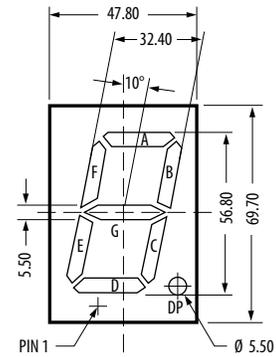
Surface Mount Seven Segment Displays —PCB Platform

7.0mm (0.28") Single Digit SMT Display Package Dimension

Part Number	
HDSM-	281C
	281B
	283B
	283C
	281H
	283H
	281F
	283F
	281L
	283L
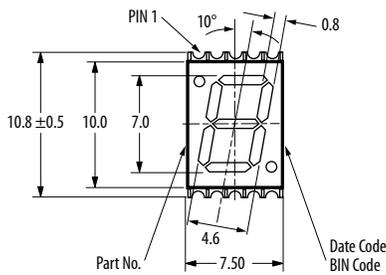
10.0mm (0.39") Dual Digit SMT Display Package Dimension

Part Number	
HDSM-	441C
	441B
	443B
	441W
	443W
	443C
	441H
	443H
	441F
	443F
	441L
	443L
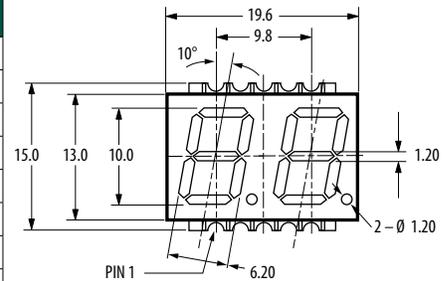
7.0mm (0.28") Dual Digit SMT Display Package Dimension

Part Number	
HDSM-	291C
	291B
	293B
	293C
	291H
	293H
	291F
	293F
	291L
	293L

Note:
1. Dimensions in millimeters (inches).
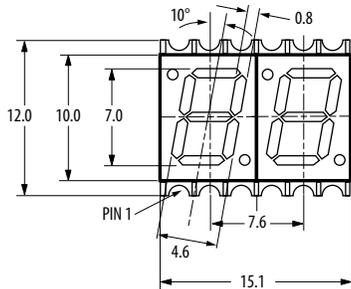
10mm (0.39") Single Digit SMT Display Package Dimension

Part Number	
HDSM	431C
	431B
	433B
	431W
	433W
	433C
	431H
	433H
	431F
	433F
	431L
	433L
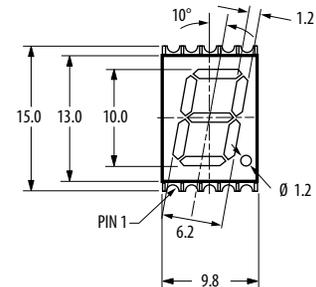
LED Indicators and Displays

Surface Mount Seven Segment Displays —PCB Platform

14.22mm (0.56") Single Digit SMT Display Package Dimension

Part Number	
HDSM	531C
	531B
	533B
	531W
	533W
	533C
	531H
	533H
	531F
	533F
	531L
	533L
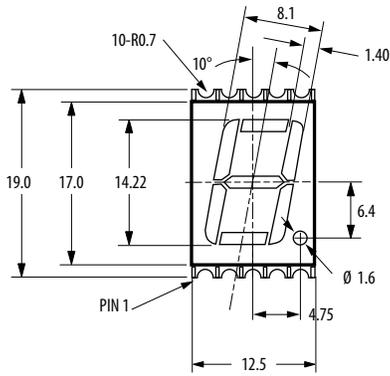
14.22mm (0.56") Dual Digit SMT Display Package Dimension

Part Number	
HDSM-	541C
	541B
	543B
	541W
	543W
	543C
	541H
	543H
	541F
	543F
	541L
	543L

Note:
1. Dimensions in millimeters (inches).
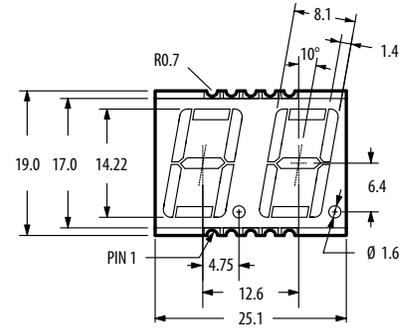
LED Indicators and Displays

Light Bars and Bar Graph Arrays
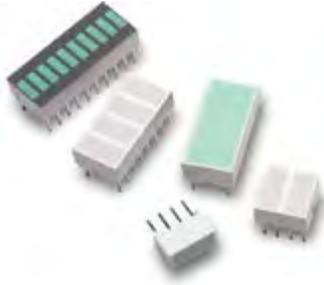
Description — Light Bars

Light Bars are Avago Technologies' innovative solution to fixed message annunciaton. They are used as annunciators that serve three customer functions: status indication, backlighting fixed messages and analog level indications (arrays). The Light Bars provide exceptional brightness at very low drive current for those applications where portability and battery backup are vital. These rectangular light sources are configured in single-in-line and dual-in-line packages that contain either single or segmented light emitting areas. They are also X-Y stackable.

Features & Benefits

- Large, bright, uniform light emitting surface
- Yellow and green categorized for dominant wavelength
- Low heat dissipation
- Choices of colors — Red, Green, Yellow
- Various package sizes are X-Y stackable
- Industry standard SIP and DIP packages

Typical Applications

- Business machines
  - Point of sale bar code scanner
  - Electronic typewriters
  - Fax machines
  - Electronic scales
  - Postal meters
- Instrumentation
  - Process control system
  - Medical equipment
  - Machine control systems
  - Meters and status indicators
- Telecommunications
  - PBX systems
  - Modems
  - Central switching systems
  - Diagnostic equipment
  - Short wave radios
- Transportation
  - Automotive dashboards
  - Truck and bus controls
  - Airport passenger metal detectors
  - Ticket vending machines
- Consumer
  - Appliance front panel
  - Hi-Fi/stereo equipment
  - Alarm system

Description — 10-Element Bar Graph Arrays

Avago Technologies' 10-Element Bar Graph Arrays serve a market need for analog level indication. LED reliability, light emitting viewability make them suitable in place of mechanical meters. They are designed to display information in easily recognizable bar graph form. The packages are end stackable and are therefore capable of displaying long strings of information. The bar graph arrays are precision matched for both intensity and wavelength, saving you the time and trouble of matching individual parts. The prealigned bar graph elements locked in a single package eliminates the task of matching and aligning individual LEDs during manufacturing, along with the risk of visually substandard front panels resulting from misaligned indicators. Each device offers easy-to-handle packages that are compatible with standard DIP sockets.

Features & Benefits

- Exclusive package interlock
  - Facilitate end stacking alignment
- Large segment size
  - Wide viewing angle
- Available in Red, Green, Yellow and multicolor
- Wide variety of applications
- Categorized and packaged for luminous intensity
  - Greater uniformity of light output
- Matched LEDs for uniform appearance

Typical Applications

- Instrumentation
  - Meters
  - Channel indicators
  - Status indicators
- Process control
  - Level indicators
- Appliances
  - Status of indication
  - Mode of operation
- Transportation
  - Tachometers
  - Fuel gauges
- Consumer products
  - VU meters (stereos)
  - Radio channel scanners
  - Burglar alarms

LED Indicators and Displays

Light Bars

Shape	Size/# Light Emitting	Part Number	Color		Chip (nm) Typ.	Vf (V) Typ.	Vf (V) at If = mA	Iv at If = mA	Iv Min. (mcd)	Iv Typ. (mcd)	2 Intensity Bin Selection
0.4SIP	0.35" x 0.15" 1 area	HLCP-A100		AlGaAs Red	637	1.8	20	3	3	7.5	B, C
0.4SIP	0.35" x 0.15" 1 area	HLMP-2300		GaP Red	626	2	20	20	6	23	E, F
0.4SIP	0.35" x 0.15" 1 area	HLMP-2400		GaP Yellow	585	2.1	20	20	6	20	E, F
0.4SIP	0.35" x 0.15" 1 area	HLMP-2500		GaP Green	572	2.2	20	20	5	25	F, G
0.8SIP	0.75" x 0.15" 1 area	HLCP-B100		AlGaAs Red	637	1.8	20	3	6	15	B, C
0.8SIP	0.75" x 0.15" 1 area	HLMP-2350		GaP Red	626	2	20	20	13	45	E, F
0.8SIP	0.75" x 0.15" 1 area	HLMP-2450		GaP Yellow	585	2.1	20	20	13	38	E, F
0.8SIP	0.75" x 0.15" 1 area	HLMP-2550		GaP Green	572	2.2	20	20	11	50	F, G
0.4DIP	0.35" x 0.35" 1 area	HLCP-C100		AlGaAs Red	637	1.8	20	3	6	15	–
0.4DIP	0.35" x 0.35" 1 area	HLMP-2655		GaP Red	626	2	20	20	13	45	E, F
0.4DIP	0.35" x 0.35" 1 area	HLMP-2755		GaP Yellow	585	2.1	20	20	13	38	E, F
0.4DIP	0.35" x 0.35" 1 area	HLMP-2855		GaP Green	572	2.2	20	20	11	50	F, G
0.4DIP	0.35" x 0.15" 2 areas	HLCP-D100		AlGaAs Red	637	1.8	20	3	3	7.5	B, C
0.4DIP	0.35" x 0.15" 2 areas	HLMP-2600		GaP Red	626	2	20	20	6	23	E, F
0.4DIP	0.35" x 0.15" 2 areas	HLMP-2700		GaP Yellow	585	2.1	20	20	6	20	E, F
0.4DIP	0.35" x 0.15" 2 areas	HLMP-2800		GaP Green	572	2.1	20	20	5	25	–
0.8DIP	0.35" x 0.15" 4 areas	HLCP-E100		AlGaAs Red	637	1.8	20	3	3	7.5	B, C
0.8DIP	0.35" x 0.15" 4 areas	HLMP-2620		GaP Red	626	2	20	20	6	23	E, F
0.8DIP	0.35" x 0.15" 4 areas	HLMP-2720		GaP Yellow	585	2.1	20	20	6	20	E, F
0.8DIP	0.35" x 0.15" 4 areas	HLMP-2820		GaP Green	572	2.2	20	20	5	25	F, G
0.8DIP	0.15" x 0.75" 2 areas	HLCP-F100		AlGaAs Red	637	1.8	20	3	6	15	–
0.8DIP	0.15" x 0.75" 2 areas	HLMP-2635		GaP Red	626	2	20	20	13	45	–
0.8DIP	0.15" x 0.75" 2 areas	HLMP-2735		GaP Yellow	585	2.1	20	20	13	38	–
0.8DIP	0.15" x 0.75" 2 areas	HLMP-2835		GaP Green	572	2.2	20	20	11	50	–
0.8DIP	0.35" x 0.35" 2 areas	HLCP-G100		AlGaAs Red	637	1.8	20	3	6	15	–
0.8DIP	0.35" x 0.35" 2 areas	HLMP-2670		GaP Red	626	2	20	20	13	45	–
0.8DIP	0.35" x 0.35" 2 areas	HLMP-2770		GaP Yellow	585	2.1	20	20	13	38	–
0.8DIP	0.35" x 0.35" 2 areas	HLMP-2870		GaP Green	572	2.2	20	20	11	50	F, G
0.8DIP	0.35" x 0.75" 1 areas	HLCP-H100		AlGaAs Red	637	1.8	20	3	12	30	B, C
0.8DIP	0.35" x 0.75" 1 areas	HLMP-2685		GaP Red	626	2	20	20	22	80	–
0.8DIP	0.35" x 0.75" 1 areas	HLMP-2785		GaP Yellow	585	2.1	20	20	26	70	E, F
0.8DIP	0.35" x 0.75" 1 areas	HLMP-2885		GaP Green	572	2.2	20	20	22	100	F, G

LED Indicators and Displays

Bicolor Light Bars

Shape	Size/# Light Emitting	Part Number	Color		Chip (nm) Typ.	Vf (V) Typ.	Vf (V) at If = mA	Iv at If = mA	Iv Min. (mcd)	Iv Typ. (mcd)	2 Intensity Bin Selection
0.4DIP	0.35" x 0.35" 1 area	HLMP-2950		GaP Red	626	2	20	20	13	45	–
				GaP Yellow	585	2.1	20	20	13	38	–
0.4DIP	0.35" x 0.35" 1 area	HLMP-2965		GaP Red	626	2	20	20	19	45	–
				GaP Green	572	2.2	20	20	25	50	–

Bar Graph Arrays

10 Element		HLCP-J100		AlGaAs Red	637	1.6	1	1	600	1000	–
		HDSP-4830		GaP Red	626	2.1	20	10	900	3500	G, H
		HDSP-4840		GaP Yellow	585	2.2	20	10	600	1900	F, G
		HDSP-4850		GaP Green	572	2.1	10	10	600	1900	H, I
Multicolor LA		HDSP-4832		GaP Red	626	2.1	20	10	600	3500	–
				GaP Yellow	585	2.2	20	10	600	1900	–
				GaP Green	572	2.1	10	10	600	1900	–
		HDSP-4836		GaP Red	626	2.1	20	10	600	3500	–
				GaP Yellow	585	2.2	20	10	600	1900	–
				GaP Green	572	2.1	10	10	600	1900	–
				GaP Yellow	585	2.2	20	10	600	1900	–
				GaP Red	626	2.1	20	10	600	3500	–

Luminous Intensity Categories

LED Light Bars

Bin ID	Customer Iv in mcd	
	Min.	Max.
AlGaAs Red HLCP-A100 / D100 / E100 GaP Red HLMP-2300 / 2600 / 2620		
B	4.5	8.2
C	6.8	12.1
D	10.1	18.5
E	15.3	27.8
F	22.8	45.5
AlGaAs Red HLCP-B100 / C100 / F100 / G100 GaP Red HLMP-2350 / 2635 / 2655 / 2670		
B	9.0	16.0
C	13.1	24.0
D	19.7	36.1
E	29.6	54.2
F	44.9	88.8
AlGaAs Red HLCP-H100 GaP Red HLMP-2685		
B	18.0	27.1
C	22.0	40.8
D	33.3	61.1
E	50.0	91.8
F	75.1	150.0

Bin ID	Customer Iv in mcd	
	Min.	Max.
GaP Yellow HLMP-2400 / 2700 / 2720		
E	13.8	25.3
F	20.7	41.4
HLMP-2450 / 2735 / 2755 / 2770		
E	27.0	50.0
F	40.5	81.0
HLMP-2785		
E	54.0	99.0
F	81.0	162.0
GaP Green HLMP-2500 / 2800 / 2820		
F	18.9	37.8
G	30.6	61.2
HLMP-2550 / 2835 / 2855 / 2870		
F	38.1	76.2
G	61.6	123.2
HLMP-2885		
F	75.1	150.3
G	121.1	242.2

Bicolor Light Bars

Bin ID	Customer Iv in mcd	
	Min.	Max.
HLMP-2950/GaP Red		
D	17.00	31.00
E	25.40	46.50
F	38.10	76.20
GaP Yellow		
D	18.00	33.00
E	27.00	50.00
F	40.50	81.00
HLMP-2965/GaP Red		
F	44.90	88.80
G	71.90	143.80
GaP Green		
F	38.10	76.20
G	61.60	123.20

Bar Graph Arrays

Bin ID	Customer Iv in mcd	
	Min.	Max.
AlGaAs Red / HLCP-J100 GaP Red/GaP Yellow/GaP Green HDSP-4830 / 4840 / 4850		
D	0.61	1.11
E	0.91	1.67
F	1.37	2.51
G	2.05	3.76
H	3.08	5.64
I	4.62	8.64

LED Indicators and Displays

LED Light Bar and Bar Graph Array Package Dimension Drawings
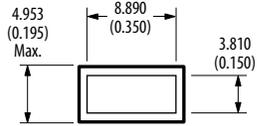
HLCP-A100
HLMP-2300/2400/2500
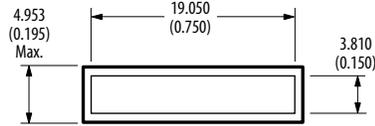
HLCP-B100
HLMP-2x50
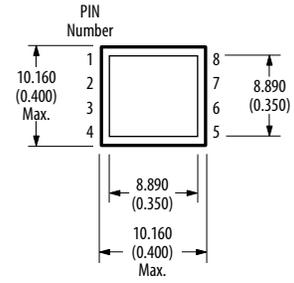
HLCP-C100
HLMP-2x55
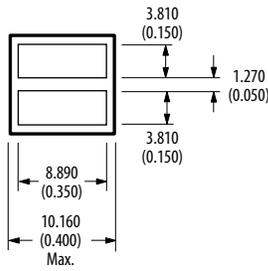
HLCP-D100
HLMP-2600/2700/2800
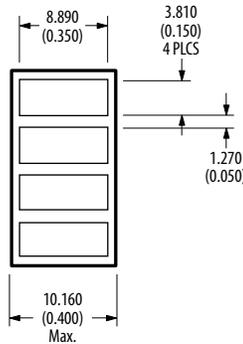
HLCP-E100
HLMP-2x20
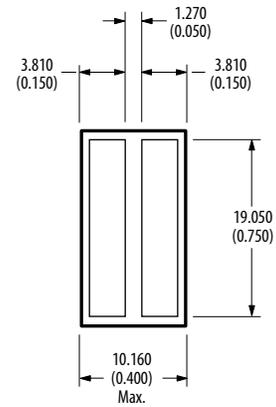
HLCP-F100
HLMP-2x35
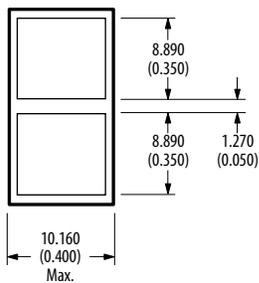
HLCP-G100
HLMP-2x70
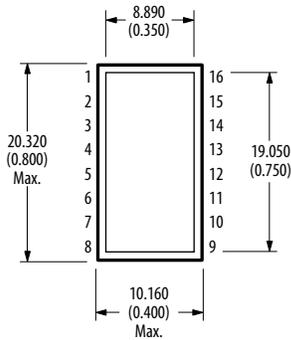
HLCP-H100
HLMP-2x85

HLCP-J100
HDSP-48x0
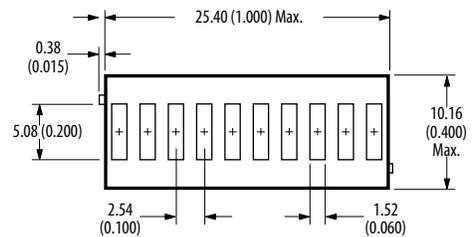
Note:
1. Dimensions in millimeters (inches).

LED Indicators and Displays

Smart Displays

Description

Avago Technologies offers high quality Smart Displays to meet a wide range of applications and requirements. The Smart Displays are available in both serial and parallel interface and have an ASIC driver that greatly simplifies design efforts. The Smart Displays are LED technology-based and are extremely reliable with a long life expectancy. They are resistant to extreme weather conditions, and to mechanical vibration and shock, making them suitable for industrial applications where maintenance resources are scarce. They are also suitable for the consumer market where the need for aesthetics and product differentiation provides a competitive advantage to our customers' end products. Avago Technologies' Smart Display products are positioned to support high volume and cost-effective solutions.

Features and Benefits

- Robust design for high reliability, longer life and hot and cold temperature operating capability
  - Ideally suited for outdoor, industrial and automotive applications
- Alphanumeric characters and custom icons for messaging
  - Useful for conveying operating modes, status, warning and error codes
- Ability to flash or blink
  - Catch user's attention
- ASIC LED driver
  - Simplified design interfacing reduces design cycle time
- Emissive display with brightness control
  - Ability to modify brightness for subdued light environment and total darkness
- Aesthetically pleasing
  - Distinctive display allows product differentiation

Typical Applications

- Industrial Equipment
  - Industrial ovens, reliability test equipment, analytical instruments, process control equipment, test and measuring instruments, temperature controllers, programmable logic controllers, security systems
- Networking
  - Telecommunication equipment, answering machines, telephones, base stations, PBX modems, network cards
- Outdoor Signs
  - Petrol pump meters
- Consumer
  - Audio/video equipment, audio mixers, set top boxes, amplifiers, musical instruments, gaming machines, currency/coin counters, security systems
- Consumer "White Goods"
  - Displays for washing machine digital panels, cookers, freezers and dishwashers
- Medical Equipment
  - Hospital monitoring systems
- Transportation
  - Displays, radar detectors, avionics displays
- Computers and Peripherals
  - CPU speed indicator, printer front panels, fax machines, copy machines, power supply equipment, cash registers

LED Indicators and Displays

Plastic Package, Serial Interface, 5 x 7 Dot Matrix Display with Custom Font Programmable

Part Number	Character	Color		Interface	Character Height (mm)	Intensity, Typ. (µcd)	Supply, Typ. (mA)
HCMS-2901	4		Yellow	Serial	3.7	64	132
HCMS-2902	4		Red	Serial	3.7	64	132
HCMS-2903	4		Green	Serial	3.7	114	132
HCMS-2904	4		Orange	Serial	3.7	64	132
HCMS-2905	4		AlGaAs Red	Serial	3.7	230	145
HCMS-2911	8		Yellow	Serial	3.7	64	264
HCMS-2912	8		Red	Serial	3.7	64	264
HCMS-2913	8		Green	Serial	3.7	114	264
HCMS-2914	8		Orange	Serial	3.7	64	264
HCMS-2915	8		AlGaAs Red	Serial	3.7	230	290
HCMS-2819	8		Blue	Serial	3.7	170	264
HCMS-2921	16		Yellow	Serial	3.7	64	528
HCMS-2922	16		Red	Serial	3.7	64	528
HCMS-2923	16		Green	Serial	3.7	114	528
HCMS-2924	16		Orange	Serial	3.7	64	528
HCMS-2925	16		AlGaAs Red	Serial	3.7	230	580
HCMS-2961	4		Yellow	Serial	4.6	64	132
HCMS-2962	4		Red	Serial	4.6	64	132
HCMS-2963	4		Green	Serial	4.6	114	132
HCMS-2964	4		Orange	Serial	4.6	64	132
HCMS-2965	4		AlGaAs Red	Serial	4.6	230	145
HCMS-2971	8		Yellow	Serial	4.6	64	264
HCMS-2972	8		Red	Serial	4.6	64	264
HCMS-2973	8		Green	Serial	4.6	114	264
HCMS-2974	8		Orange	Serial	4.6	64	264
HCMS-2975	8		AlGaAs Red	Serial	4.6	230	290
HCMS-3901	4		Yellow	Serial	3.7	148	132
HCMS-3902	4		Red	Serial	3.7	64	132
HCMS-3903	4		Green	Serial	3.7	252	132
HCMS-3904	4		Orange	Serial	3.7	64	132
HCMS-3906	4		Red	Serial	3.7	1150	132
HCMS-3907	4		Green	Serial	3.7	500	132
HCMS-3911	8		Yellow	Serial	3.7	148	264
HCMS-3912	8		Red	Serial	3.7	64	264
HCMS-3913	8		Green	Serial	3.7	252	264
HCMS-3914	8		Orange	Serial	3.7	64	264
HCMS-3916	8		Red	Serial	3.7	1150	264
HCMS-3917	8		Green	Serial	3.7	500	264
HCMS-3961	4		Yellow	Serial	4.6	148	132
HCMS-3962	4		Red	Serial	4.6	64	132
HCMS-3963	4		Green	Serial	4.6	252	132
HCMS-3964	4		Orange	Serial	4.6	64	132
HCMS-3966	4		Red	Serial	4.6	1150	132
HCMS-3967	4		Green	Serial	4.6	500	132
HCMS-3971	8		Yellow	Serial	4.6	148	264
HCMS-3972	8		Red	Serial	4.6	64	264
HCMS-3973	8		Green	Serial	4.6	252	264
HCMS-3974	8		Orange	Serial	4.6	64	264
HCMS-3976	8		Red	Serial	4.6	1150	264
HCMS-3977	8		Green	Serial	4.6	500	264

Notes:
Typical values at $T^A = 25°C$.
Luminous intensity for one pixel at $V^{LED} = 5.0$ V, 50% peak pixel current, 100% pulse width.
Supply current at $V^{LED} = 5.0$V, 100% peak pixel current, 100% pulse width, 20 pixels per digit at all digit locations.

100

LED Indicators and Displays

Plastic Package, Serial Interface, 5 x 7 Dot Matrix Display with Custom Font Programmable

Part Number	Character	Color		Interface	Character Height (mm)	Intensity, Typ. (μcd)	Supply, Typ. (mA)
HDLY-1414	4		Yellow	Parallel	3.6	3.7	110
HDLO-1414	4		Red	Parallel	3.6	3.5	110
HDLG-1414	4		Green	Parallel	3.6	5.6	110
HDLA-1414	4		Orange	Parallel	3.6	3.5	110
HDLU-1414	4		AlGaAs Red	Parallel	3.6	3.1	34
HDLS-1414	4		AlGaAs Red	Parallel	3.6	12.7	125
HDLY-2416	4		Yellow	Parallel	5.1	3.7	110
HDLO-2416	4		Red	Parallel	5.1	3.5	110
HDLG-2416	4		Green	Parallel	5.1	5.6	110
HDLA-2416	4		Orange	Parallel	5.1	3.5	110
HDLU-2416	4		AlGaAs Red	Parallel	5.1	3.1	34
HDLS-2416	4		AlGaAs Red	Parallel	5.1	12.7	125
HDLY-3416	4		Yellow	Parallel	6.9	3.7	110
HDLO-3416	4		Red	Parallel	6.9	3.5	110
HDLG-3416	4		Green	Parallel	6.9	5.6	110
HDLA-3416	4		Orange	Parallel	6.9	3.5	110

Plastic Package, Parallel Interface, 8 Character, 5 x 7 Dot Matrix Display with 128 Character ASCII Decoder

Part Number	Character	Color		Interface	Character Height (mm)	Intensity, Typ. (μcd)	Supply, Typ. (mA)
HDSP-2530	8		Orange	Parallel	4.6	7.5	300
HDSP-2531	8		Yellow	Parallel	4.6	7.	300
HDSP-2532	8		Red	Parallel	4.6	7.5	300
HDSP-2533	8		Green	Parallel	4.6	7.5	300
HDSP-2534	8		AlGaAs Red	Parallel	4.6	15	330
HDSP-2110	8		Orange	Parallel	4.8	7.5	300
HDSP-2111	8		Yellow	Parallel	4.8	7.5	300
HDSP-2112	8		Red	Parallel	4.8	7.5	300
HDSP-2113	8		Green	Parallel	4.8	7.5	300
HDSP-2107	8		AlGaAs Red	Parallel	4.8	15	330
HDSP-2500	8		Orange	Parallel	7.0	7.5	300
HDSP-2501	8		Yellow	Parallel	7.0	7.5	300
HDSP-2502	8		Red	Parallel	7.0	7.5	300
HDSP-2503	8		Green	Parallel	7.0	7.5	300
HDSP-2504	8		AlGaAs Red	Parallel	7.0	1.5	330

Notes:
Typical values at $V_{DD} = 5.0V$, $T_A = 25°C$.
Luminous intensity at 100% full brightness, character average with "#" (20 pixels) displayed.
Supply current at 100% brightness, with all character locations displaying "#" (20 pixels).

Smart Displays

LED Indicators and Displays

Glass/Ceramic Package, Parallel Interface, 8 Character, 5 x 7 Dot Matrix with 128 Character ASCII Decoder

Part Number	Character	Color		Interface	Character Height (mm)	Intensity, Typ. (µcd)	Supply, Typ. (mA)
HDSP-2131	8		Yellow	Parallel	4.8	7.5	300
HDSP-2132	8		Red	Parallel	4.8	7.5	300
HDSP-2133	8		Green	Parallel	4.8	7.5	300
HDSP-2179	8		Orange	Parallel	4.8	7.5	300

Notes:
Typical values at $V_{DD} = 5.0V$, $T_A = 25°C$.
Luminous intensity at 100% full brightness, character average with "#" (20 pixels) displayed.
Supply current at 100% brightness, with all character locations displaying "#" (20 pixels).

Glass/Ceramic Package, 4 x 7 Hexadecimal Display with Built-in BCD Decoder/Driver

Part Number	Description/ Decimal Point	Color		Operation Temperature (°C)	Character Height (mm)	Luminous Intensity Typ. (µcd)	Supply Current Typ. (mA)
HDSP-0760	Numeric, RHDP		HER	-55 to 85	7.4	140	78
HDSP-0761	Numeric, LHDP		HER	-55 to 85	7.4	140	78
HDSP-0762	Hexadecimal		HER	-55 to 85	7.4	140	78
HDSP-0770	Numeric, RHDP		HER	-55 to 85	7.4	620	120
HDSP-0771	Numeric, LHDP		HER	-55 to 85	7.4	620	120
HDSP-0772	Hexadecimal		HER	-55 to 85	7.4	620	120
HDSP-0781	Numeric, RHDP		HER	-55 to 100	7.4	140	78
HDSP-0782	Numeric, LHDPi		HER	-55 to 100	7.4	140	78
HDSP-0784	Hexadecimal		HER	-55 to 100	7.4	140	78
HDSP-0791	Numeric, RHDP		HER	-55 to 100	7.4	620	120
HDSP-0792	Numeric, LHDP		HER	-55 to 100	7.4	620	120
HDSP-0794	Hexadecimal		HER	-55 to 100	7.4	620	120
HDSP-0860	Numeric, RHDP		Yellow	-55 to 85	7.4	490	120
HDSP-0861	Numeric, LHDP		Yellow	-55 to 85	7.4	490	120
HDSP-0862	Hexadecimal		Yellow	-55 to 85	7.4	490	120
HDSP-0881	Numeric, RHDP		Yellow	-55 to 100	7.4	490	120
HDSP-0884	Hexadecimal		Yellow	-55 to 100	7.4	490	120
HDSP-0960	Numeric, RHDP		Green	-55 to 85	7.4	1100	120
HDSP-0961	Numeric, LHDP		Green	-55 to 85	7.4	1100	120
HDSP-0962	Hexadecimal		Green	-55 to 85	7.4	1100	120
HDSP-0981	Numeric, RHDP		Green	-55 to 100	7.4	1100	120
HDSP-0984	Hexadecimal		Green	-55 to 100	7.4	1100	120

Notes:
Typical values at $V_{DD} = 5.0V$, $T_A = 25°C$.
Luminous intensity per LED (Digit Average).
Supply current with "5" or "B" character displayed.

Glass/Ceramic Package Over Range ± with Built-in BCD Decoder/Driver

Part Number	Description/ Decimal Point	Color		Operation Temperature (°C)	Character Height (mm)	Luminous Intensity Typ. (µcd)	Supply Current Typ. (mA)
HDSP-0763	Overange ± 1		HER	-55 to 85	7.4	140	11.2
HDSP-0863	Overange ± 1		Yellow	-55 to 85	7.4	490	32
HDSP-0963	Overange ± 1		Green	-55 to 85	7.4	1100	32
HDPS-0783	Overage ± 1		HER	-55 to 100	7.4	140	11.2
HDPS-0883	Overage ± 1		Yellow	-55 to 100	7.4	490	32
HPDS-0983	Overage ± 1		Green	-55 to 100	7.4	1100	32

Notes:
Typical values at $V_{DD} = 5.0V$, $T_A = 25°C$.
Luminous intensity per LED (Digit Average).

Glass/Ceramic Package, Serial Interface, 4 character, 5 x 7 Dot Matrix with 128 Character ASCII Decoder

Part Number	Character	COLOR		Interface	Character Height (mm)	Intensity, Typ. (µcd)	Supply, Typ. (mA)
HCMS-2351	4		Yellow	Serial	4.9	3400	6.2
HCMS-2353	4		Green	Serial	4.9	3000	6.2

Notes:
Typical values at $V_{DD} = 5.0V$, $T_A = 25°C$.
Luminous intensity (peak) per LED (Digit Average).

LED Indicators and Displays

LED Dot Matrix Smart Displays Package Dimension Drawings
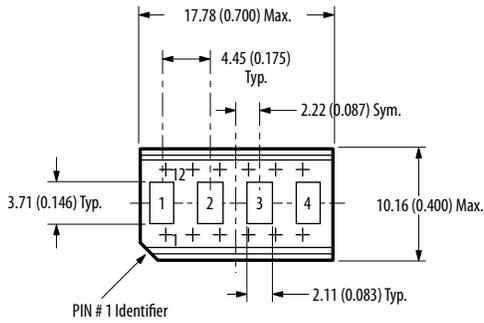
HCMS-290x/HCMS-390x
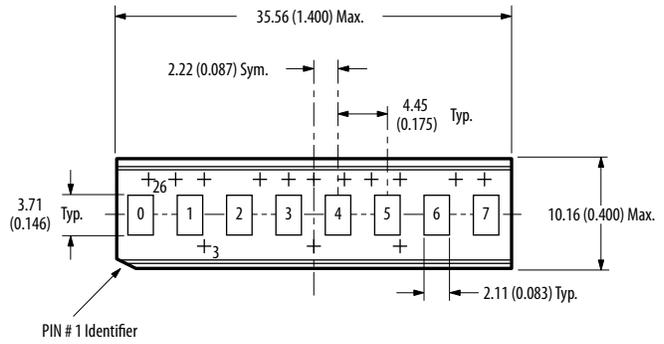
HCMS-291x/HCMS-391x
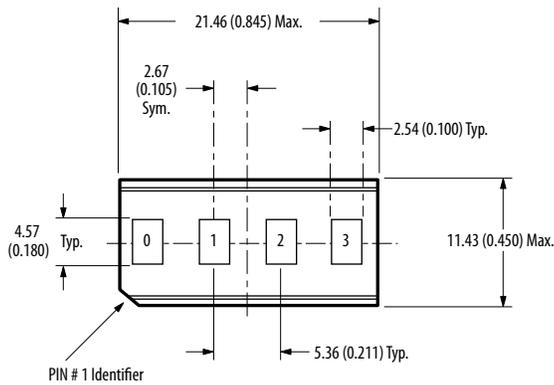
HCMS-296x/HCMS-396x
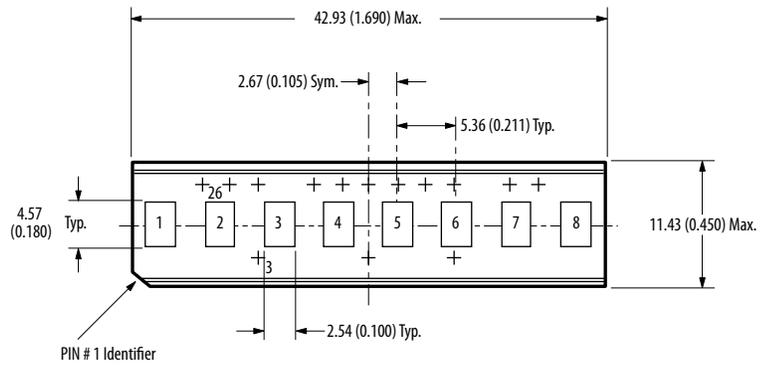
HCMS-297x/HCMS-397x
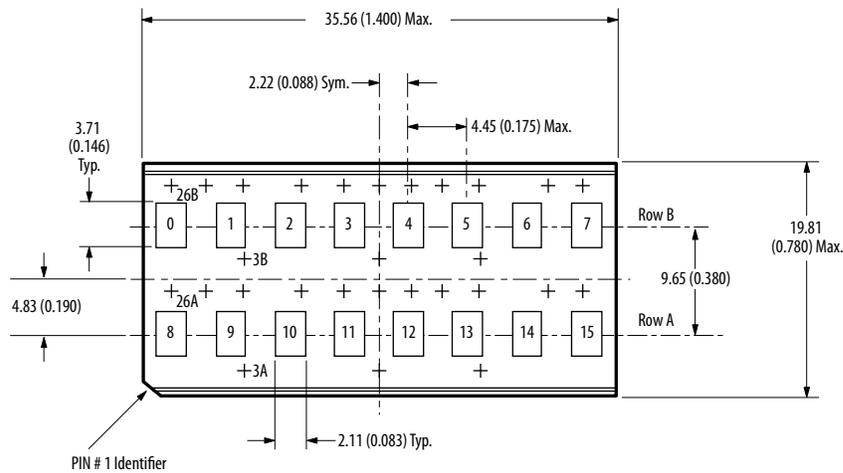
HCMS-292x

Note:
1. Dimensions in millimeters (inches).

LED Indicators and Displays

LED Dot Matrix Smart Displays Package Dimension Drawings
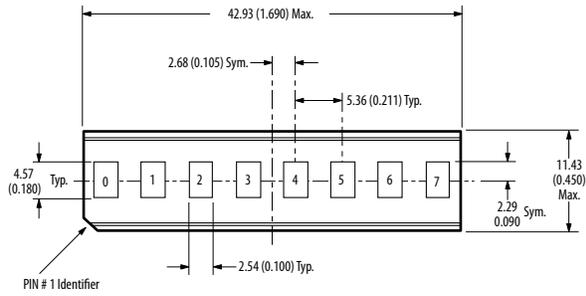
HDSP-253x
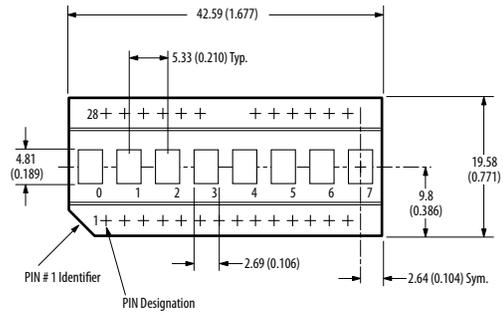
HDSP-2107, -211x
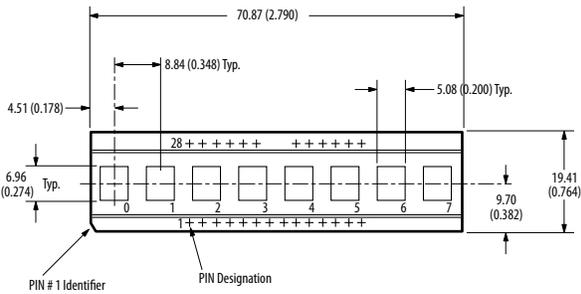
HDSP-250x
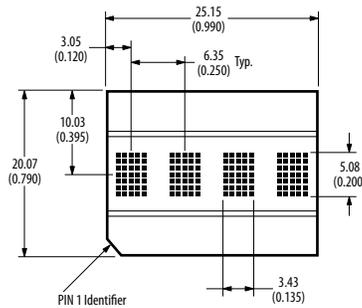
HDLx-2416
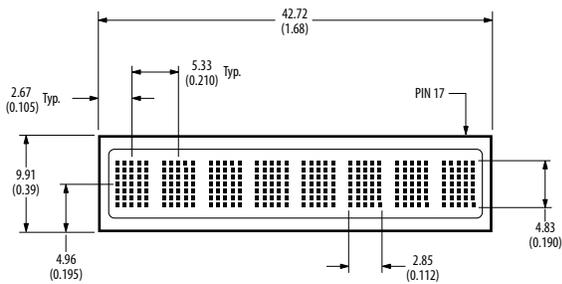
HDSP-213x, -2179
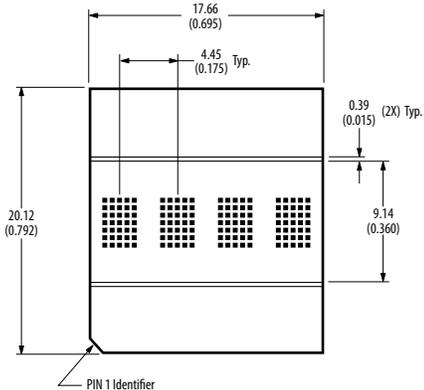
HDLx-1414
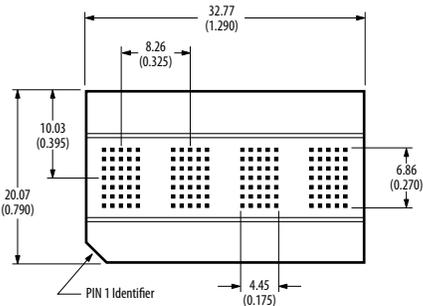
HDLx-3416
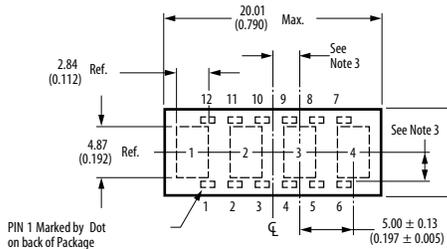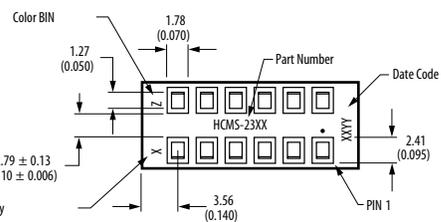
HDLx-3416

LED Indicators and Displays

LED Dot Matrix Smart Displays Package Dimension Drawings

HDSP-0x81, HDSP-0791
HDSP-0x60, HDSP-0770
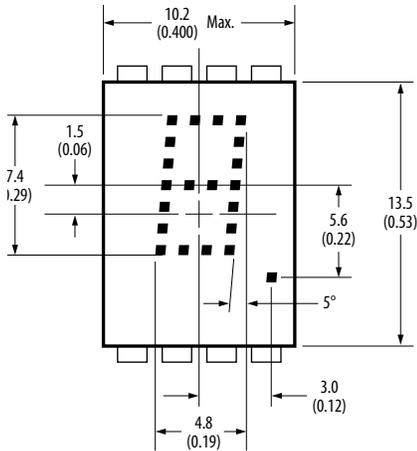
HDSP-0x82, HDPS-0792
HDSP-0x61, HDPS-0771
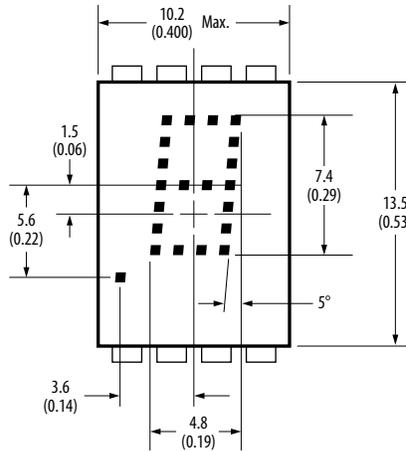
HDSP-0x84, HDSP-0794
HDSP-0x63
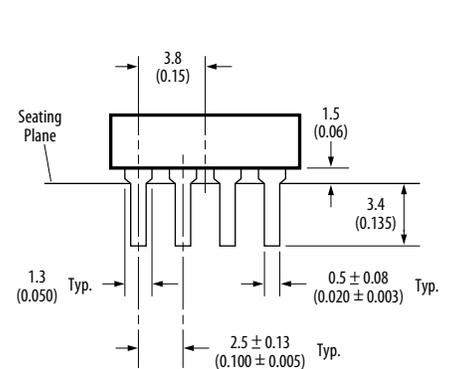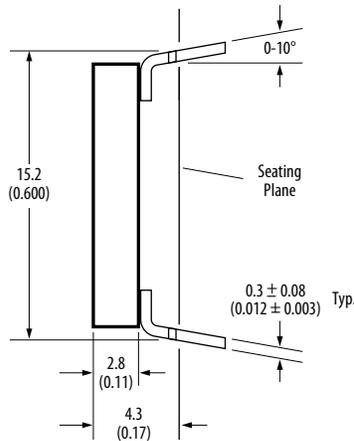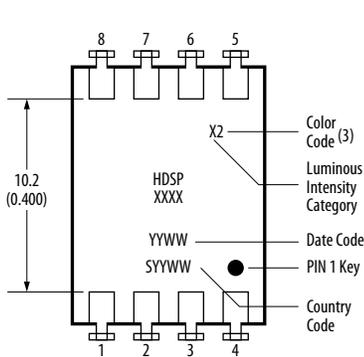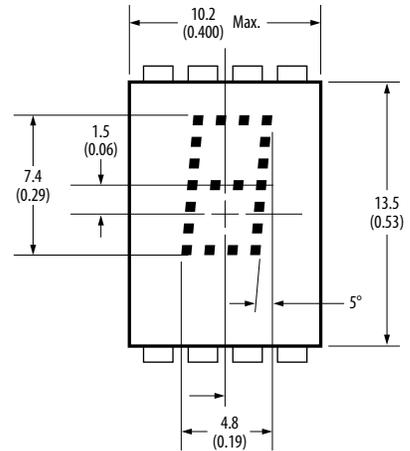
HDSP-0x83
HDSP-0x62, 0772
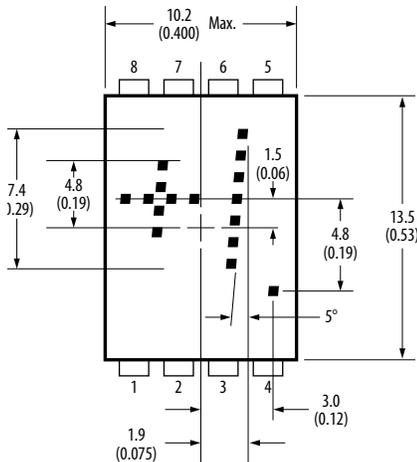
Notes:
1. Dimensions in millimeters (inches).
2. Digit ceter line is ±0.38MM (±0.015 inch) from package center line.
3. Unless otherwise specified, the tolerance on all dimensions is ±0.38MM (±0.015 inch).

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Avago Technologies]():
[ASMT-FJ70-AFJ00]() [ASMT-FG70-NFJ00]()