

## PNP PRE-BIASED SMALL SIGNAL DUAL SURFACE MOUNT TRANSISTOR

## Features

- Epitaxial Planar Die Construction
- Complementary NPN Types Available (DDC)
- Built-In Biasing Resistors
- Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- Halogen and Antimony Free "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

Part Number	R1 (NOM)	R2 (NOM)
DDA124EU	22KΩ	22KΩ
DDA144EU	47KΩ	47KΩ
DDA114YU	10KΩ	47KΩ
DDA123JU	2.2KΩ	47KΩ
DDA114EU	10KΩ	10KΩ

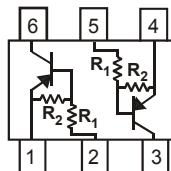
## Mechanical Data

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208<sup>(e3)</sup>
- Weight: 0.006 grams (approximate)

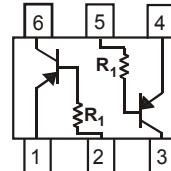
Part Number	R1 Only
DDA113TU	1KΩ
DDA143TU	4.7KΩ
DDA114TU	10KΩ



Top View



R1, R2



R1 Only

Device Schematic

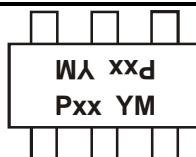
## Ordering Information (Notes 4 &amp; 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DDA124EU-7-F	AEC-Q101	P17	7	8	3,000
DDA124EUQ-7-F	Automotive	P17	7	8	3,000
DDA124EUQ-13-F	Automotive	P17	13	8	10,000
DDA144EU-7-F	AEC-Q101	P20	7	8	3,000
DDA144EUQ-7-F	Automotive	P20	7	8	3,000
DDA114YU-7-F	AEC-Q101	P14	7	8	3,000
DDA114YUQ-7-F	Automotive	P14	7	8	3,000
DDA123JU-7-F	AEC-Q101	P06	7	8	3,000
DDA114EU-7-F	AEC-Q101	P13	7	8	3,000
DDA114EUQ-7-F	Automotive	P13	7	8	3,000
DDA113TU-7-F	AEC-Q101	P01	7	8	3,000
DDA143TU-7-F	AEC-Q101	P07	7	8	3,000
DDA143TUQ-7-F	Automotive	P07	7	8	3,000
DDA143TUQ-13-F	Automotive	P07	13	8	10,000
DDA114TU-7-F	AEC-Q101	P12	7	8	3,000
DDA114TUQ-7-F	Automotive	P12	7	8	3,000
DDA114TUQ-13-F	Automotive	P12	13	8	10,000

## Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
- For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



Pxx = Product Type Marking Code (See Ordering Information)

YM = Date Code Marking

Y = Year (ex: T = 2006)

M = Month (ex: 9 = September)

### Date Code Key

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Code	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Code	1	2	3	4	5	6	7	8	9	O	N	D		

## Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Supply Voltage (1) to (6) and (4) to (3)	V <sub>CC</sub>	-50	V
Input Voltage (1) to (2) and (4) to (5)	V <sub>IN</sub>	+10 to -40 +10 to -40 +6 to -40 +5 to -12 +10 to -40 +5V max +5V max +5V max	V
Output Current	I <sub>O</sub>	-30 -30 -70 -100 -50 -100 -100 -100	mA
Output Current	I <sub>C(MAX)</sub>	-100	mA

## Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 6 & 7)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	R <sub>θJA</sub>	625	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 6. Mounted on FR4 PC Board with minimum recommended pad layout.  
 7. 150mW per element must not be exceeded.

Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic (DDA113TU & DDA143TU & DDA114TU only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-50	—	—	V	I <sub>C</sub> = -50µA
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	-50	—	—	V	I <sub>C</sub> = -1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-5	—	—	V	I <sub>E</sub> = -50µA
Collector Cutoff Current	I <sub>CBO</sub>	—	—	-0.5	µA	V <sub>CB</sub> = -50V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	-0.5	µA	V <sub>EB</sub> = -4V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	-0.3	V	I <sub>C</sub> /I <sub>B</sub> = -2.5mA / -0.25mA I <sub>C</sub> /I <sub>B</sub> = -1mA / -0.1mA I <sub>C</sub> /I <sub>B</sub> = -10mA / -1mA
DC Current Transfer Ratio	h <sub>FE</sub>	100 160	250 —	600 —	—	I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V
Input Resistor (R <sub>1</sub> ) Tolerance	ΔR <sub>1</sub>	-30	—	+30	%	—
Gain-Bandwidth Product (Note 7)	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = 5mA, f = 100MHz

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DDA124EU DDA144EU DDA114YU DDA123JU DDA114EU	V <sub>I(off)</sub>	-0.5 -0.5 -0.3 -0.5 -0.5	-1.1 -1.1 — — -1.1	—	V <sub>CC</sub> = -5V, I <sub>O</sub> = -100µA
	DDA124EU DDA144EU DDA114YU DDA123JU DDA114EU	V <sub>I(on)</sub>	—	-1.9 -1.9 — — -1.9	-3.0 -3.0 -1.4 -1.1 -3.0	
	DDA124EU DDA144EU DDA114YU DDA123JU DDA114EU	V <sub>O(on)</sub>	—	-0.1	-0.3	I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA I <sub>O</sub> /I <sub>I</sub> = -5mA / -0.25mA I <sub>O</sub> /I <sub>I</sub> = -5mA / -0.25mA I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA
	DDA124EU DDA144EU DDA114YU DDA123JU DDA114EU	I <sub>I</sub>	—	—	-0.36 -0.18 -0.88 -3.6 -0.88	
	DDA124EU DDA144EU DDA114YU DDA123JU DDA114EU	I <sub>O(off)</sub>	—	—	-0.5	
	DDA124EU DDA124EUQ DDA144EU DDA114YU DDA123JU DDA114EU	G <sub>I</sub>	56 60 68 68 80 30	—	—	V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA
Input Resistor (R <sub>1</sub> ) Tolerance	ΔR <sub>1</sub>	-30	—	+30	%	—
Resistance Ratio Tolerance	R <sub>2</sub> /R <sub>1</sub>	-20	—	+20	%	—
Gain-Bandwidth Product	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100MHz

Note: 7. Transistor - For Reference Only

Typical Curves – DDA123JU (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

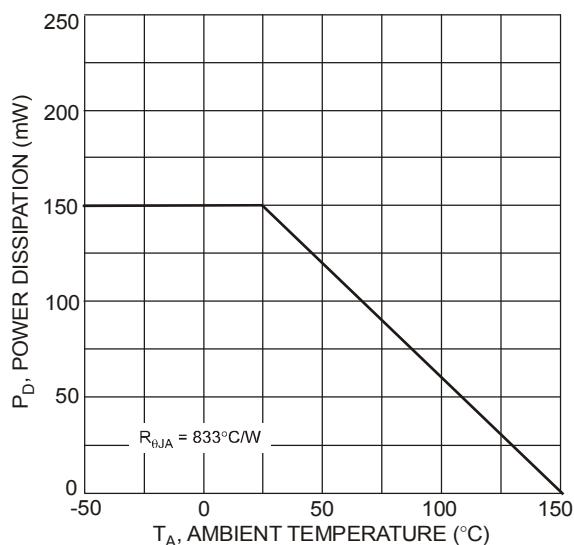


Fig. 1 Power Dissipation vs. Ambient Temperature

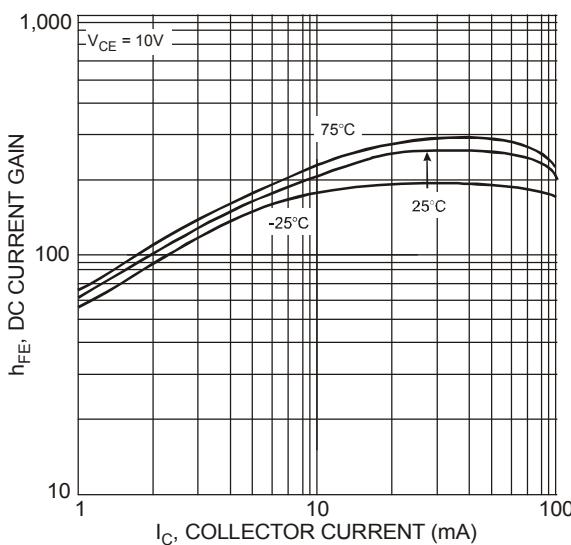


Fig. 2 Typical DC Current Gain vs. Collector Current

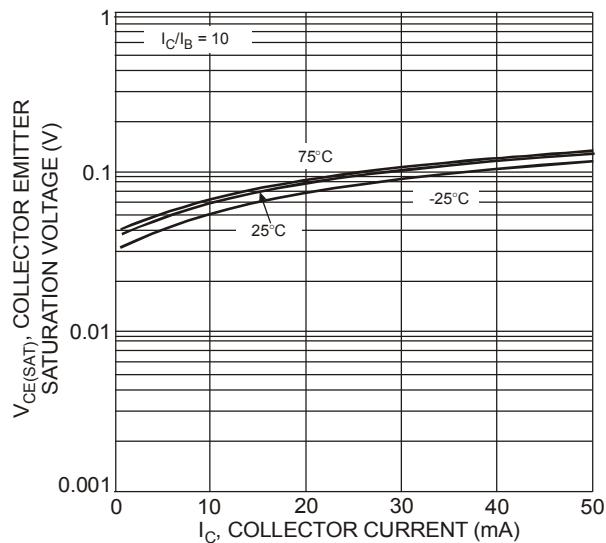


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

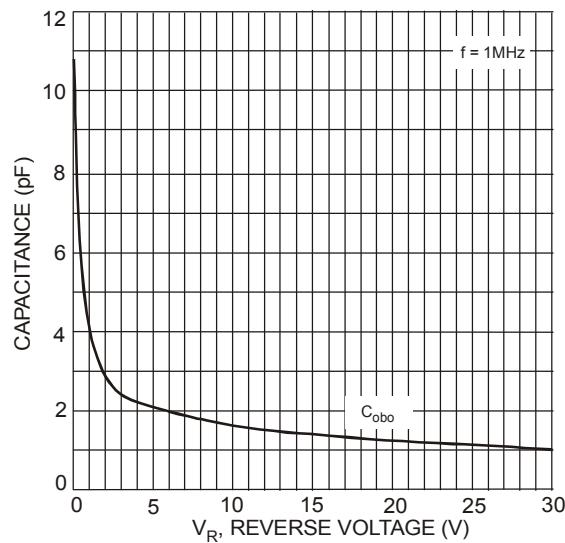


Fig. 4 Typical Capacitance Characteristics

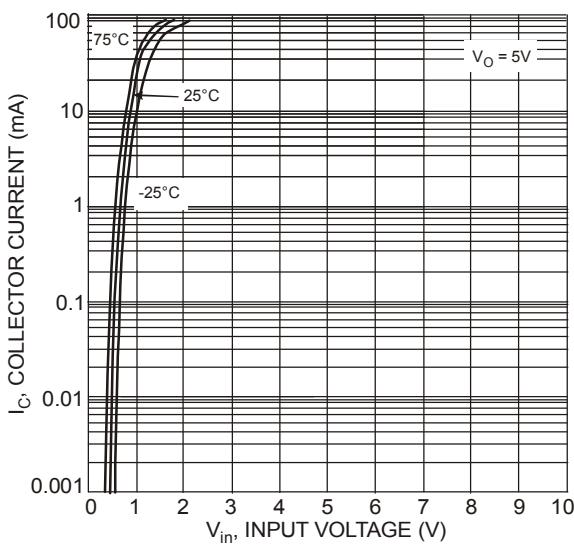


Fig. 5 Collector Current vs. Input Voltage

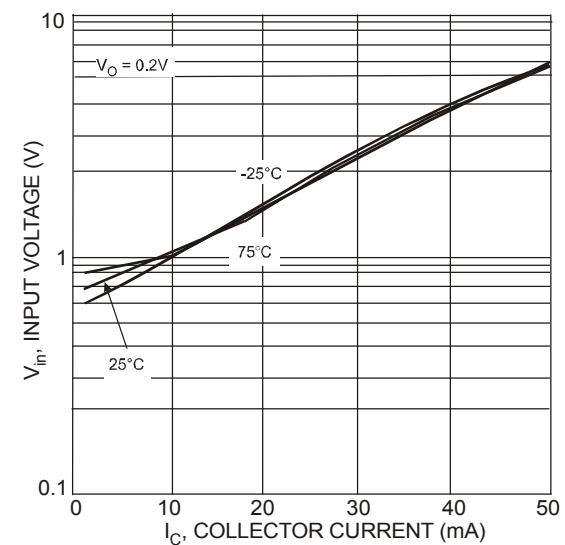


Fig. 6 Input Voltage vs. Collector Current

Typical Curves – DDA114TU (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

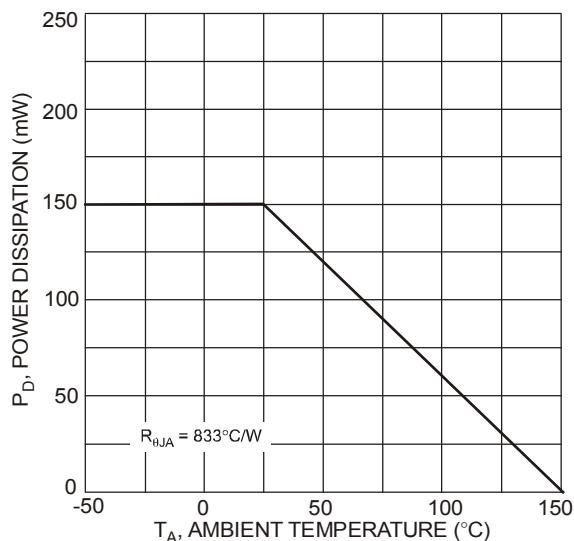


Fig. 1 Power Dissipation vs. Ambient Temperature

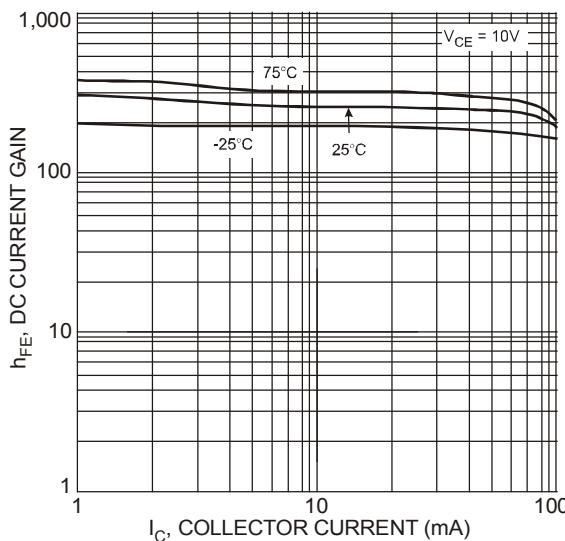


Fig. 2 Typical DC Current Gain vs. Collector Current

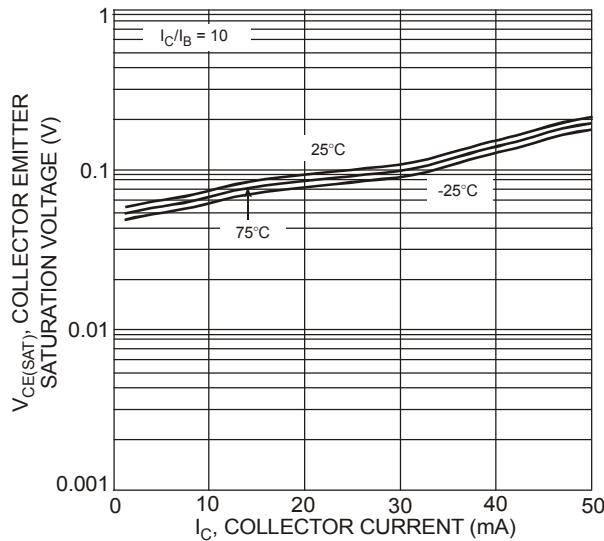


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

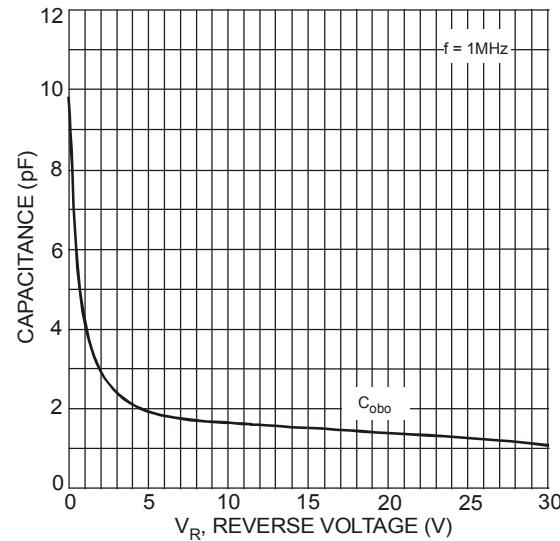


Fig. 4 Typical Capacitance Characteristics

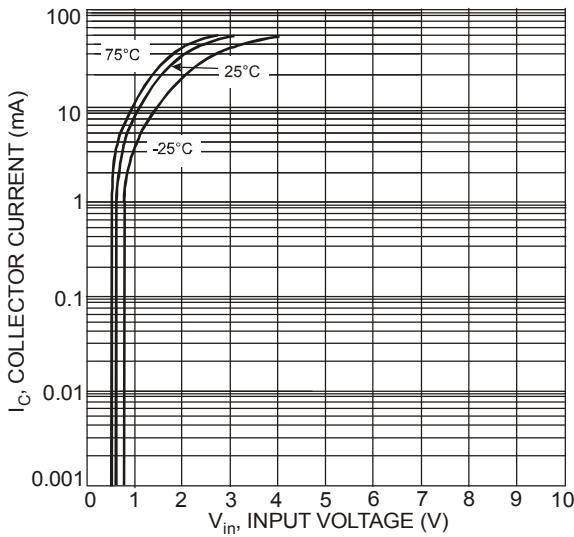


Fig. 5 Collector Current vs. Input Voltage

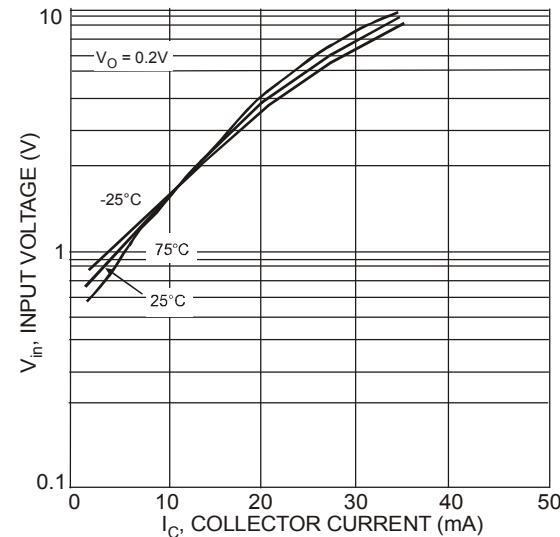
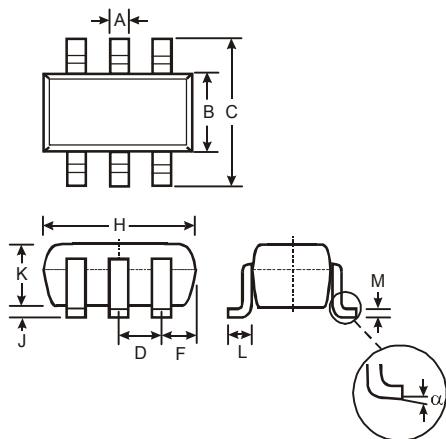


Fig. 6 Input Voltage vs. Collector Current

## Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

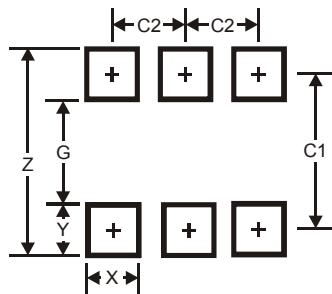


SOT363			
Dim	Min	Max	Typ
<b>A</b>	0.10	0.30	0.25
<b>B</b>	1.15	1.35	1.30
<b>C</b>	2.00	2.20	2.10
<b>D</b>	0.65 Typ		
<b>F</b>	0.40	0.45	0.425
<b>H</b>	1.80	2.20	2.15
<b>J</b>	0	0.10	0.05
<b>K</b>	0.90	1.00	1.00
<b>L</b>	0.25	0.40	0.30
<b>M</b>	0.10	0.22	0.11
$\alpha$	0°	8°	-

All Dimensions in mm

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
<b>Z</b>	2.5
<b>G</b>	1.3
<b>X</b>	0.42
<b>Y</b>	0.6
<b>C1</b>	1.9
<b>C2</b>	0.65

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