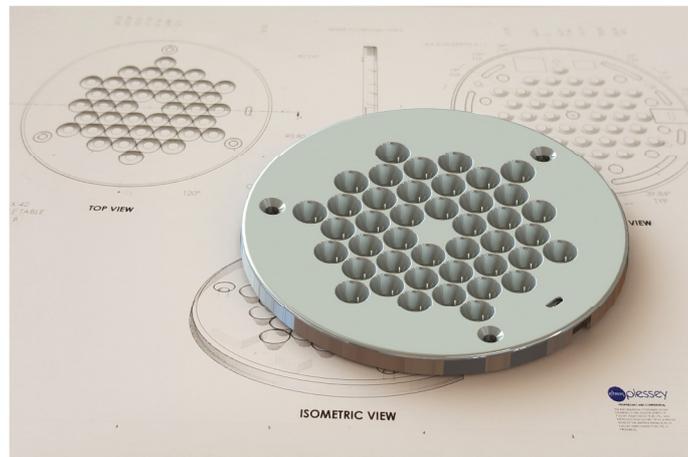


PLWS3000C2 Series Orion™ Beam Forming Module

Product Datasheet



Orion™ is the first standard product from the innovative Stellar™ family.

A complete LED lighting module, including optics, from a module thickness of just 5.6mm.

An exceptionally compact replacement for COB modules in directional lighting applications with improved thermal resistance.

Features

- 5.6mm depth
- 82mm diameter footprint
- 40g in weight
- Up to 10,000 CBCP
- Plessey Stellar™ optic technology
- 25 degree FWHM
- SELV
- RoHS compliant
- Range of standard colour temperatures
- Module includes optics

Applications

- Track lighting
- Retail lighting
- Architectural lighting
- Specialist lighting (Museum/Gallery)
- High intensity lighting
- Spot lights
- Directional lighting



Image 1.1: Comparison of a standard COB to Plessey Orion™ PLWS3000C2

Product Datasheet Description

Plessey's Orion™ PLWS3000C2 series LED array™ module enables new concepts in LED lighting design. The new addition to the Stellar™ family uses Plessey's optical beam forming technology to make a light module which is simple to integrate into your product whilst helping to solve many key challenges of existing COB type modules. The Orion™ provides an innovative approach to directional lighting applications opening new opportunities for creativity in industrial and architectural lighting design. The key is Plessey's innovative Stellar™ beam forming optics which with a module at only 5.6mm in thickness achieves a beam angle of 25° FWHM. With a thermal resistance of only 1°C/w, the Orion™ allows a significant reduction in the heat sink providing a reduction in the size and weight of the luminaire. This will have a significant benefit on luminaire packaging and logistics. In addition the superior thermal performance of this combination allows a different approach to luminaire form-factor.

The Orion™ removes common restraints found in a typical small COB, such as requiring a second optic that can be 100mm in depth and it being difficult to control colour over angle. Plessey's key combination of LED technology and innovative Stellar™ beam forming optics interact to help solve this challenge. By adding a driver and a lightweight heat sink consumers can experience a new quality of directional light.

One example of an innovative application of the Orion™ is Plessey's ability to re-create an LED version of the AR111, for a track spot, at less than 25mm in depth including LEDs, optics and a heatsink. Further information can be found in the Orion™ application notes.

The Orion™ is available from Plessey in a range of CCT and CRI as outlined in the product family.

Plessey Stellar™ part number system (Tc = 25°C)

Plessey^A White^B Technology^C Output^D Form Factor^E FWHM^F CRI^G CCT^H

Example: AA-B-C-DDDD-E-F-G-HHHH becomes: PL-W-S-3000-C-2-8-4000.

A: Plessey

B: Colour: White

C: Technology: Stellar

D: Rated Continuous output (lumens)

E: Form Factor: C=Circular L= Linear

F: Beam angle FWHM 0=10/ 1=15 / 2=25/ 5=50

G: CRI 8=80/ 7=70/ 9=90

H: CCT 3000/4000/5000

Ordering information table (Tc = 25°C) @700mA.

Variant	FWHM 2 $\Theta_{1/2}$	Description	CRI ^[1]	CCT	Output (lm)
PLWS3000C283000	25°	Warm White >80 CRI 3000K	>80	3000K	3000 ^[2]
PLWS3000C284000	25°	Neutral White >80 CRI 4000K	>80	4000K	3250 ^[2]
PLWS3000C285000	25°	Cool White >80 CRI 5000K	>80	5000K	3250 ^[2]

[1] CRI measurement tolerance ± 3

[2] Luminous flux range of $\pm 10\%$

Fixed module characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance	R_{thj-Tc}		1.0		K/W
Half-Intensity Angle	$2\Theta_{1/2}$	23	25	28	Deg.
Forward Voltage	V_F ^[3]	39.2	44	45.5	V
Forward Current	I_F		700 ^[4]	1350 ^[5]	mA
Operating temperature (Tc)	$^{\circ}Tc$	-40		70	$^{\circ}C$
Storage temperature	$^{\circ}Tstg$	-40		70	$^{\circ}C$

- [3] Measurement tolerance $\pm 0.1V$.
- [4] Suggested maximum for continuous use. Always observe Tc Max.
- [5] Electrical maximum unit if pulsed with sufficient cooling.

Angular light distribution

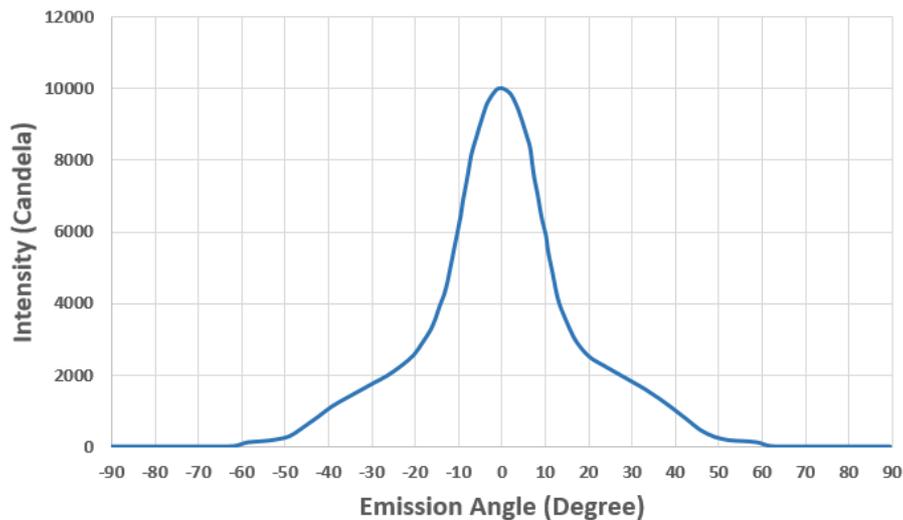


Figure 1: Light intensity versus emission angle ($I_F=700mA$)

Forward current characteristics

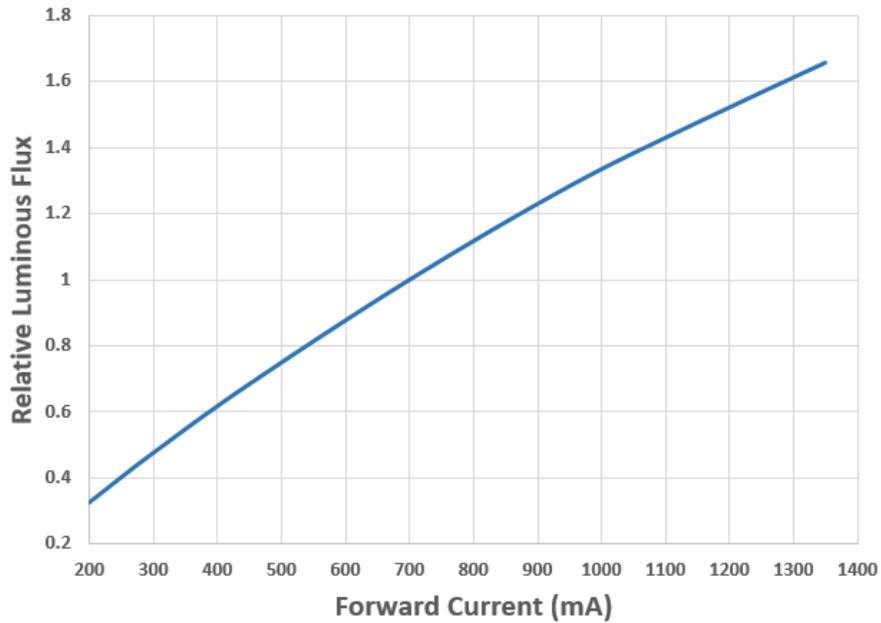


Figure 2: Relative luminous flux as function of forward current ($T_c=+25^\circ\text{C}$)

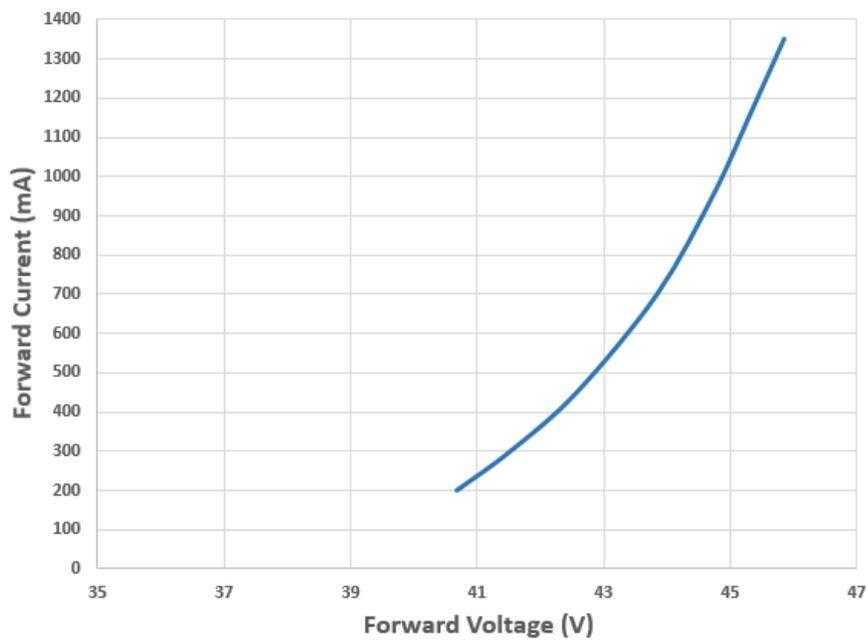


Figure 3: Forward current versus forward voltage ($T_c=+25^\circ\text{C}$)

Temperature characteristics

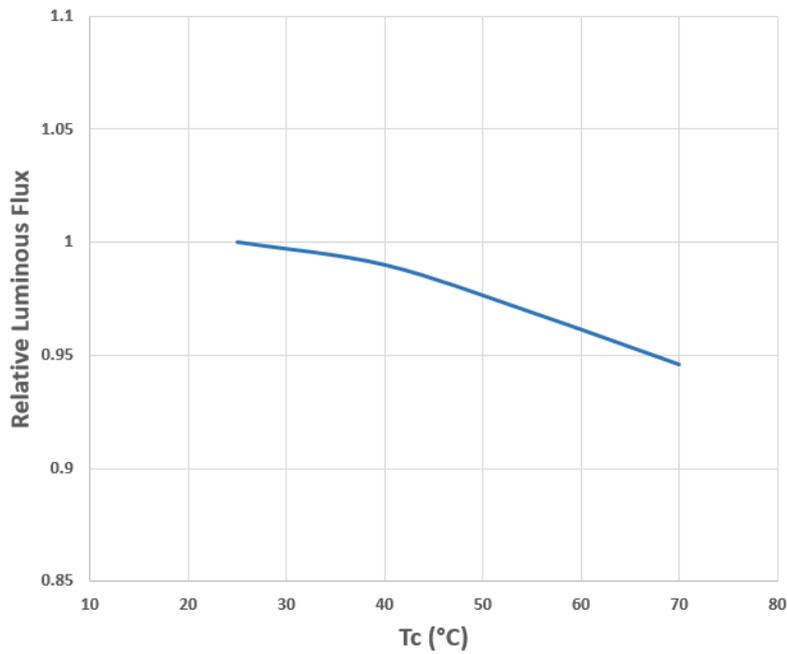


Figure 4: Relative luminous flux as function of temperature T_c ($I_F=700\text{mA}$)

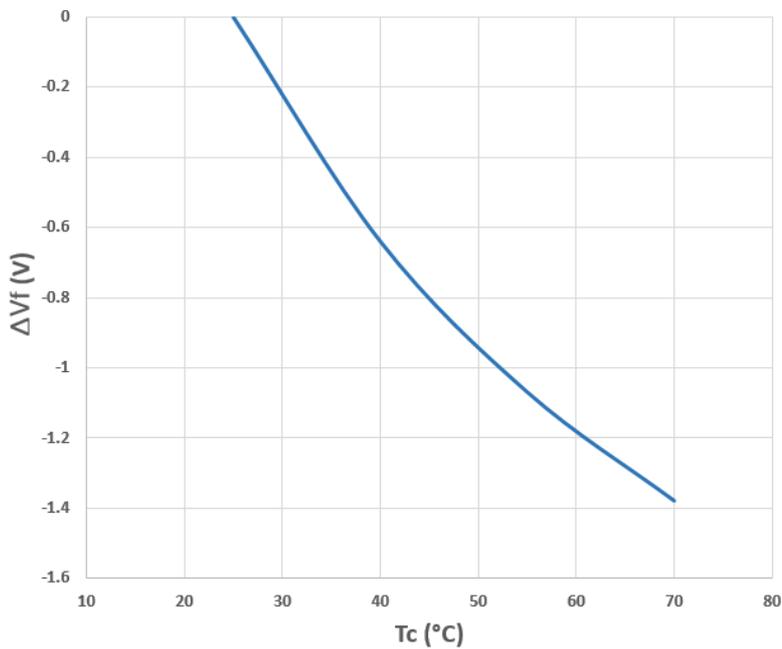


Figure 5: Variation in forward voltage as function of temperature T_c ($I_F=700\text{mA}$)

Colour chromaticity – warm white 3000K ($I_F=450mA$)

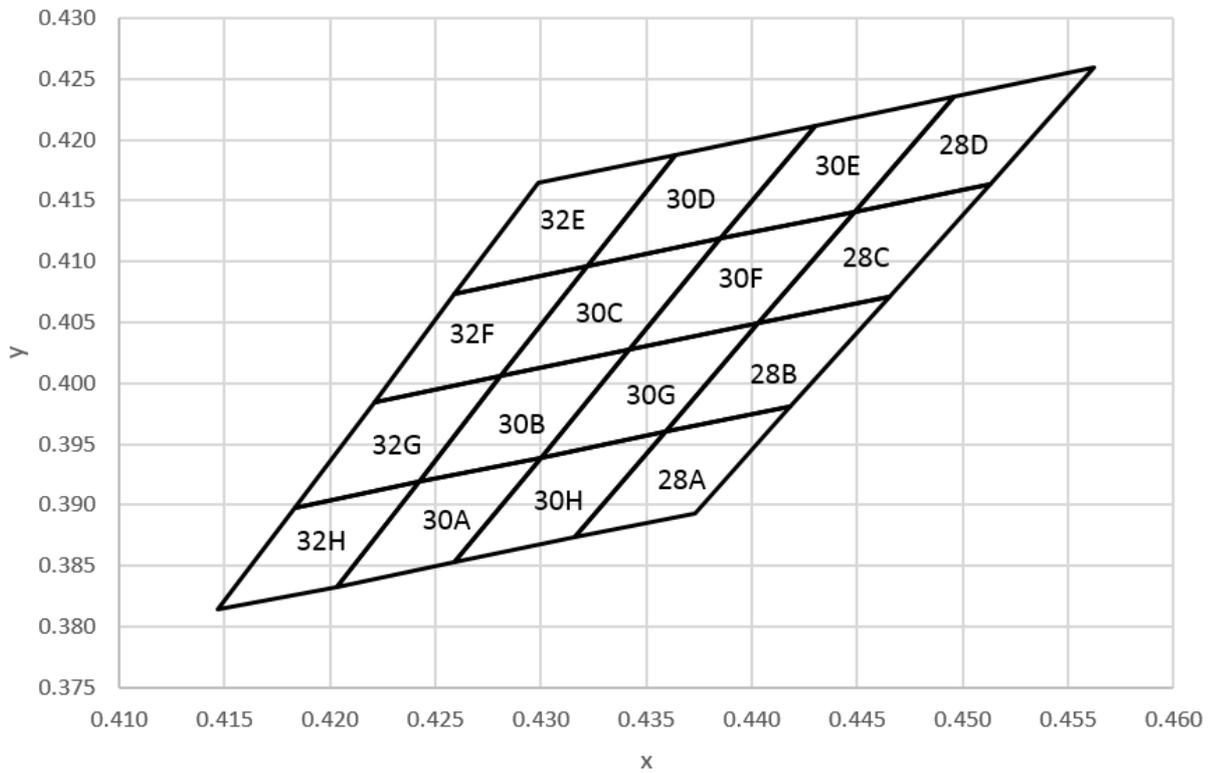


Figure 6: Colour coordinates region 3000K

32E		32F		32G		32H	
x	y	x	y	x	y	x	y
0.4259	0.4073	0.4221	0.3984	0.4183	0.3898	0.4147	0.3814
0.4299	0.4165	0.4259	0.4073	0.4221	0.3984	0.4183	0.3898
0.4364	0.4188	0.4322	0.4096	0.4281	0.4006	0.4242	0.3919
0.4322	0.4096	0.4281	0.4006	0.4242	0.3919	0.4203	0.3833
30A		30B		30C		30D	
x	y	x	y	x	y	x	y
0.4203	0.3833	0.4242	0.3919	0.4281	0.4006	0.4322	0.4096
0.4242	0.3919	0.4281	0.4006	0.4322	0.4096	0.4364	0.4188
0.4300	0.3939	0.4342	0.4028	0.4385	0.4119	0.4430	0.4212
0.4259	0.3853	0.4300	0.3939	0.4342	0.4028	0.4385	0.4119
30E		30F		30G		30H	
x	y	x	y	x	y	x	y
0.4385	0.4119	0.4342	0.4028	0.4300	0.3939	0.4259	0.3853
0.4430	0.4212	0.4385	0.4119	0.4342	0.4028	0.4300	0.3939
0.4496	0.4236	0.4449	0.4141	0.4403	0.4049	0.4359	0.3960
0.4449	0.4141	0.4403	0.4049	0.4359	0.3960	0.4316	0.3873
28A		28B		28C		28D	
x	y	x	y	x	y	x	y
0.4316	0.3873	0.4359	0.3960	0.4403	0.4049	0.4449	0.4141
0.4359	0.3960	0.4403	0.4049	0.4449	0.4141	0.4496	0.4236
0.4418	0.3981	0.4465	0.4071	0.4513	0.4164	0.4562	0.4260
0.4373	0.3893	0.4418	0.3981	0.4465	0.4071	0.4513	0.4164

Table 1: Colour coordinates bin boundaries 3000K

Note: Chromaticity measurement tolerances are maintained to ± 0.005

Colour chromaticity – neutral white 4000K ($I_F=450\text{mA}$)

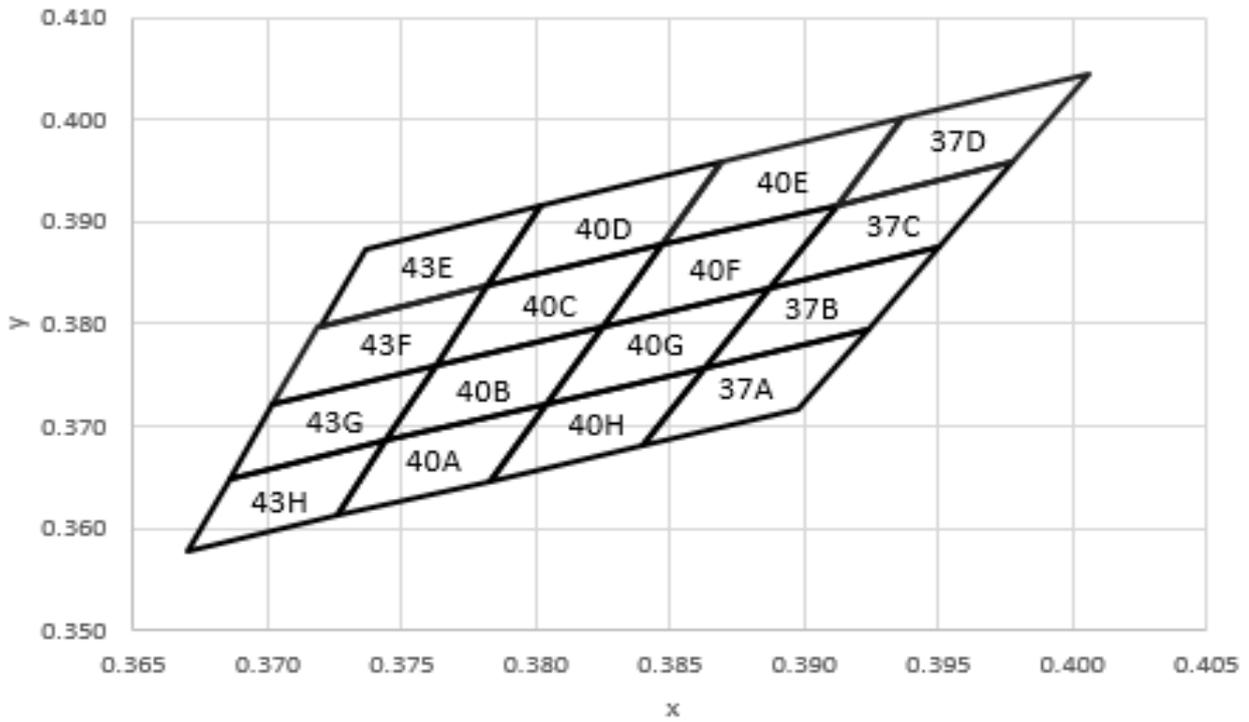


Figure 7: Colour coordinates region 4000K

43E		43F		43G		43H	
x	y	x	y	x	y	x	y
0.3719	0.3797	0.3702	0.3722	0.3686	0.3649	0.367	0.3578
0.3736	0.3874	0.3719	0.3797	0.3702	0.3722	0.3686	0.3649
0.3802	0.3916	0.3782	0.3837	0.3763	0.376	0.3744	0.3685
0.3782	0.3837	0.3763	0.376	0.3744	0.3685	0.3726	0.3612
40A		40B		40C		40D	
x	y	x	y	x	y	x	y
0.3726	0.3612	0.3744	0.3685	0.3763	0.376	0.3782	0.3837
0.3744	0.3685	0.3763	0.376	0.3782	0.3837	0.3802	0.3916
0.3804	0.3721	0.3825	0.3798	0.3847	0.3877	0.3869	0.3958
0.3783	0.3646	0.3804	0.3721	0.3825	0.3798	0.3847	0.3877
40E		40F		40G		40H	
x	y	x	y	x	y	x	y
0.3847	0.3877	0.3825	0.3798	0.3804	0.3721	0.3783	0.3646
0.3869	0.3958	0.3847	0.3877	0.3825	0.3798	0.3804	0.3721
0.3937	0.4001	0.3912	0.3917	0.3887	0.3836	0.3863	0.3758
0.3912	0.3917	0.3887	0.3836	0.3863	0.3758	0.384	0.3681
37A		37B		37C		37D	
x	y	x	y	x	y	x	y
0.384	0.3681	0.3863	0.3758	0.3887	0.3836	0.3912	0.3917
0.3863	0.3758	0.3887	0.3836	0.3912	0.3917	0.3937	0.4001
0.3924	0.3794	0.395	0.3875	0.3978	0.3958	0.4006	0.4044
0.3898	0.3716	0.3924	0.3794	0.395	0.3875	0.3978	0.3958

Table 2: Colour coordinates bin boundaries 4000K ($I_F=450mA$)

Note: Chromaticity measurement tolerances are maintained to ± 0.005

Colour chromaticity – cool white 5000K ($I_F=450mA$)

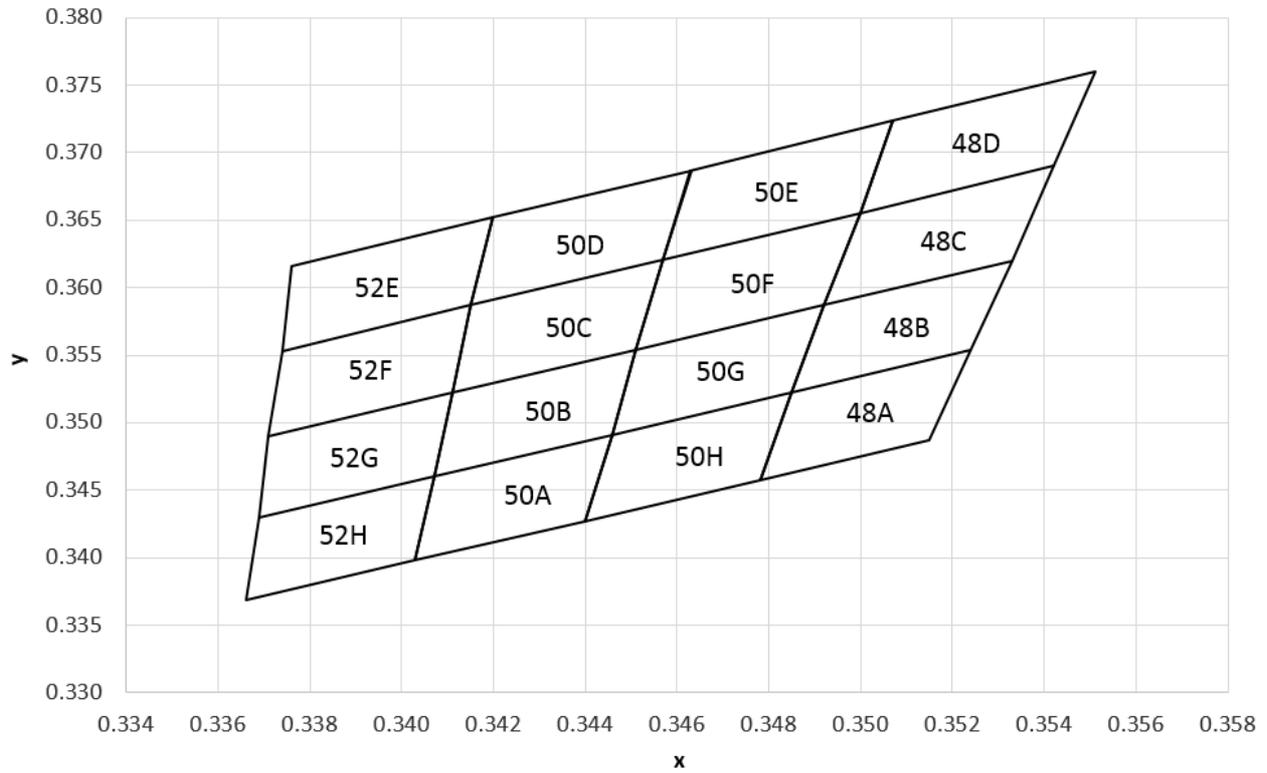


Figure 8: Colour coordinates region 5000K

52E		52F		52G		52H	
x	y	x	y	x	y	x	y
0.3374	0.3553	0.3371	0.3490	0.3369	0.3430	0.3366	0.3369
0.3376	0.3616	0.3374	0.3553	0.3371	0.3490	0.3369	0.3430
0.3420	0.3652	0.3415	0.3587	0.3411	0.3522	0.3407	0.3460
0.3415	0.3587	0.3411	0.3522	0.3407	0.3460	0.3403	0.3398
50A		50B		50C		50D	
x	y	x	y	x	y	x	y
0.3403	0.3398	0.3407	0.3460	0.3411	0.3522	0.3415	0.3587
0.3407	0.3460	0.3411	0.3522	0.3415	0.3587	0.3420	0.3652
0.3446	0.3491	0.3451	0.3554	0.3457	0.3621	0.3463	0.3687
0.3440	0.3427	0.3446	0.3491	0.3451	0.3554	0.3457	0.3621
50E		50F		50G		50H	
x	y	x	y	x	y	x	y
0.3457	0.3621	0.3451	0.3554	0.3446	0.3491	0.3440	0.3427
0.3463	0.3687	0.3457	0.3621	0.3451	0.3554	0.3446	0.3491
0.3507	0.3724	0.3500	0.3655	0.3492	0.3587	0.3485	0.3522
0.3500	0.3655	0.3492	0.3587	0.3485	0.3522	0.3478	0.3457
48A		48B		48C		48D	
x	y	x	y	x	y	x	y
0.3478	0.3457	0.3485	0.3522	0.3492	0.3587	0.3500	0.3655
0.3485	0.3522	0.3492	0.3587	0.3500	0.3655	0.3507	0.3724
0.3524	0.3554	0.3533	0.3620	0.3542	0.3690	0.3551	0.3760
0.3515	0.3487	0.3524	0.3554	0.3533	0.3620	0.3542	0.3690

Table 3: Colour coordinates bin boundaries 5000K

Note: Chromaticity measurement tolerances are maintained to ± 0.005

Colour shift characteristics

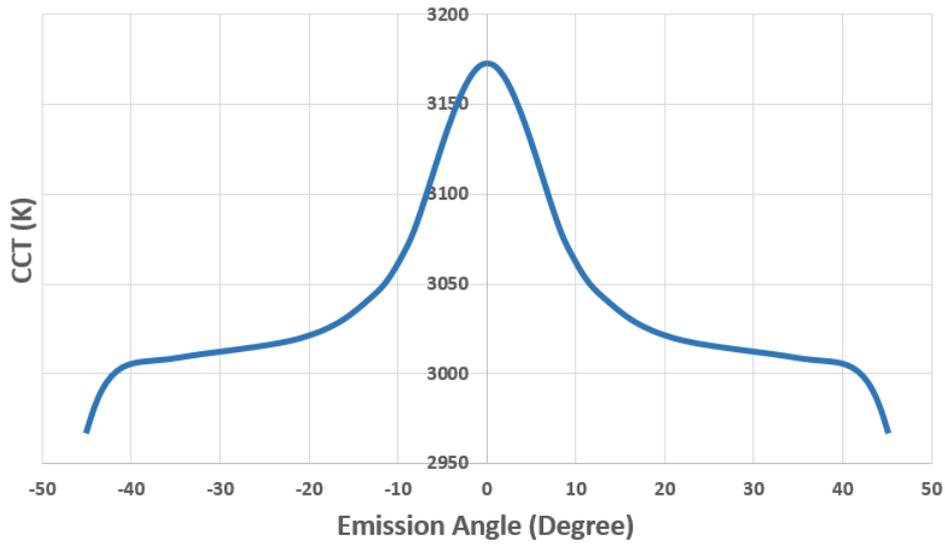


Figure 9: CCT vs viewing angle ($I_f=700mA$)

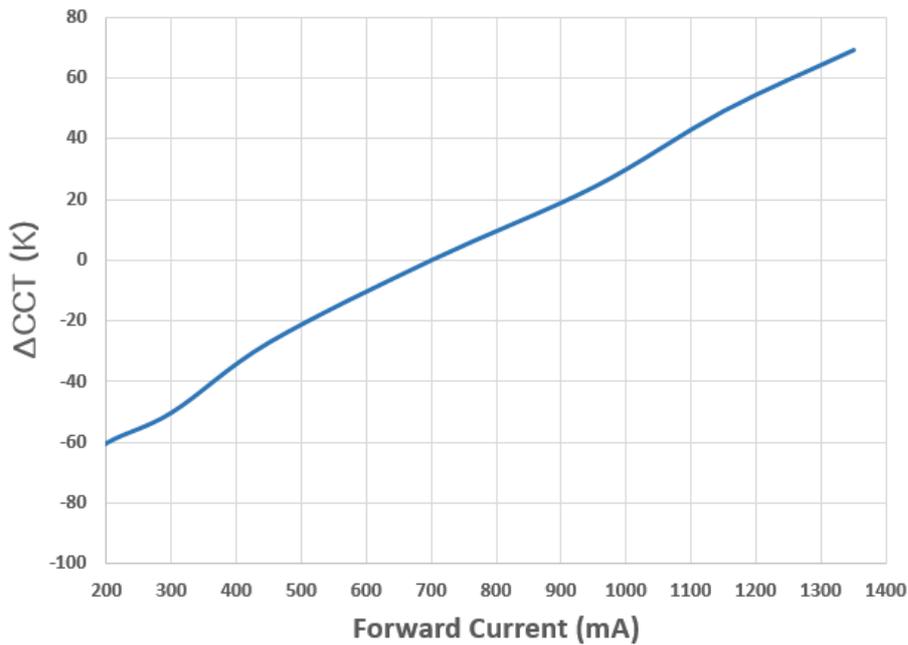


Figure 10. Variation in CCT as function of forward current ($T_c=+25^\circ C$)

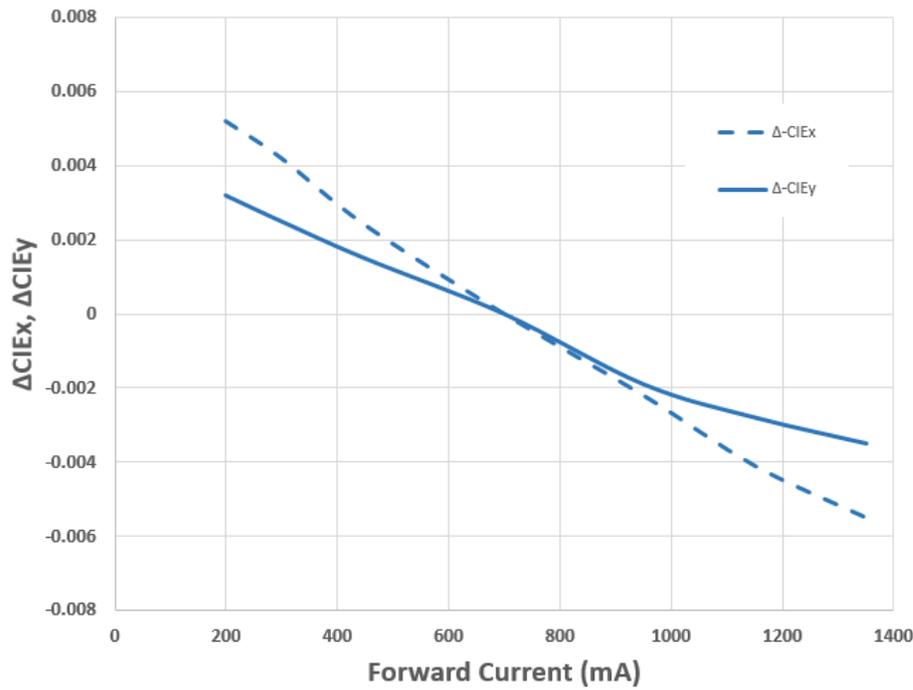


Figure 11. Colour shift as function of forward current ($T_c=+25^\circ\text{C}$)

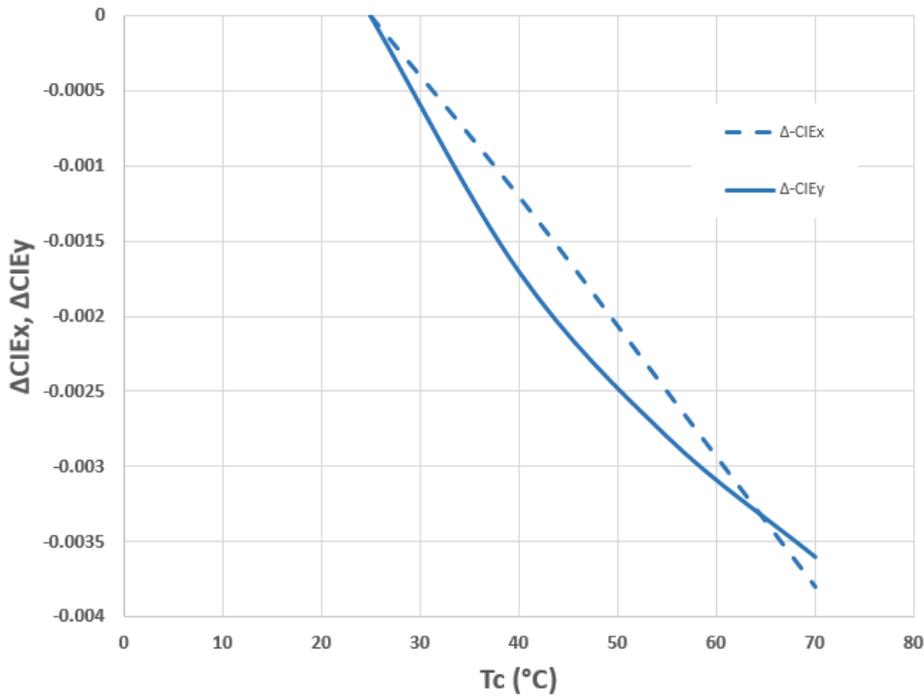


Figure 12. Colour shift as function of temperature ($I_f=700\text{mA}$)

Package outline drawing

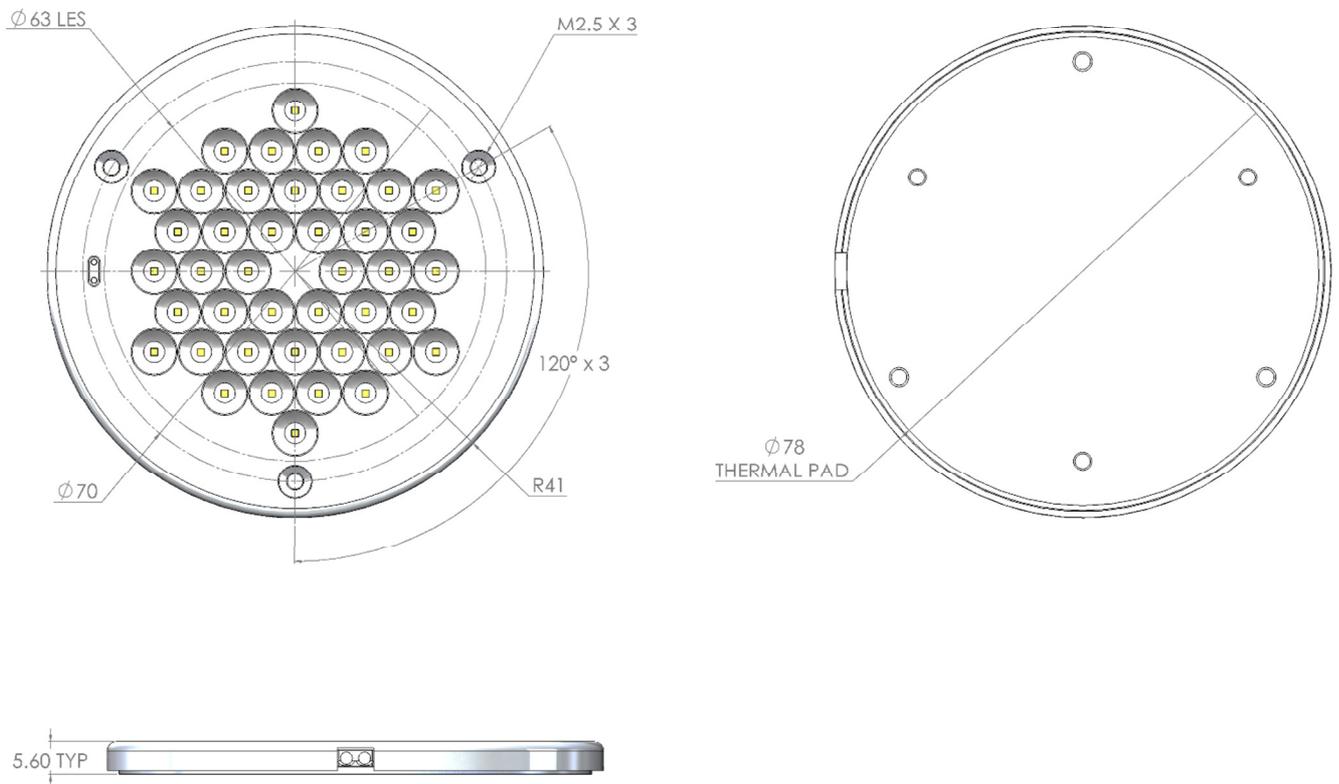


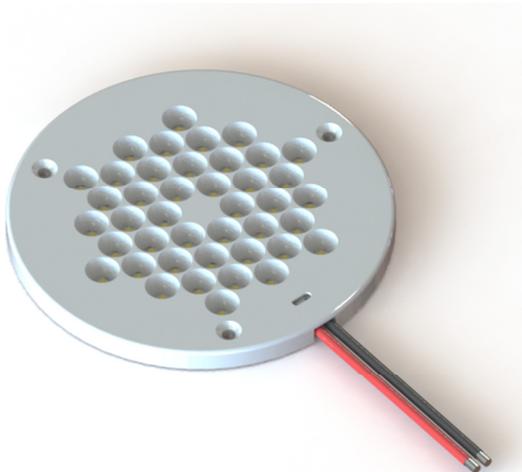
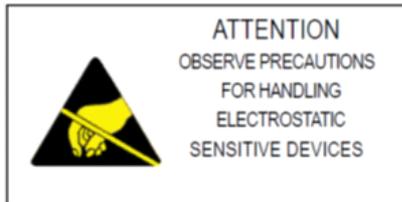
Figure 13: Package outline drawing and schematic

Handling instructions

The Orion™ must not be operated in reverse bias. A protection diode is included for ESD protection and will conduct in the reverse direction.

Precautions are required to prevent reverse bias in applications and during handling. The ESD protection for the Orion™ is 8 kV.

Do not expose the module to liquids such as adhesives or thermal paste. No thermal paste should be used as a TIM between the module and the heatsink. Do not remove the product barcode.



Connector

Wires are not included in the Orion module. This is a poke-in style connector with a slot in the top of the module to facilitate release/removal of wires if necessary.

Connection technology	Wire
Conductor Size	Solid 0.14 – 0.34mm
AWG	26-22 "sol"

Measuring Case Temperature

The case temperature should be lower than 70°C while the LED module is operating. Case temperature (T_c) is the temperature at the center point on the module plate as seen below. T_c should be measured with a thermocouple. No thermal paste should be used as a TIM between the module and the heatsink.

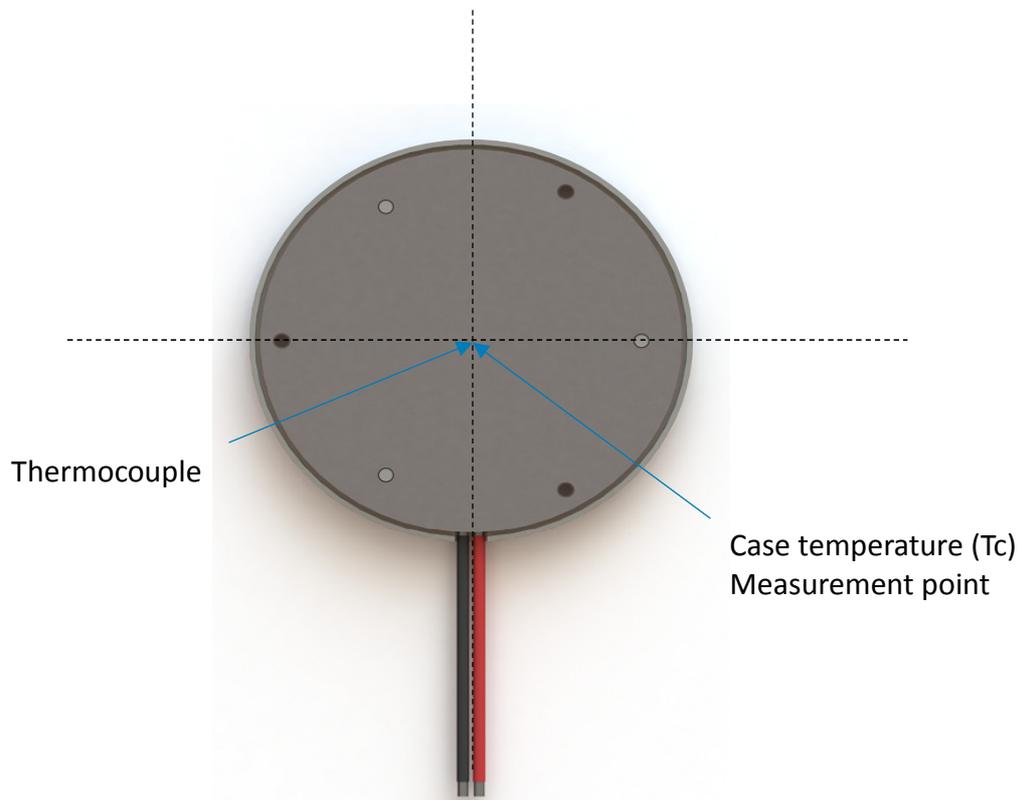


Figure 14: Measuring the T_c on the Orion™ module.

Packaging and shipping information

Due to its slim line size and reduced thermal resistance, customers and consumers will see a vast reduction in packaging, shipping costs and storage space.

The minimum order quantity for the PLWS3000C2 is 432 units.

Plessey

Plessey is a leading expert in the manufacturing of semiconductor products used in sensing, measurement and controls applications, and is now at the forefront of the Solid State Lighting revolution. Its MaGIC™ (Manufactured on GaN – on – Si I/C) LED technology has won numerous awards for its innovation and ability to cut the cost of LED lighting by using standard silicon manufacturing techniques. By using its understanding of electronics and expertise in micro- electronic product design and manufacture, Plessey is radically enhancing the human experience with micro-electronics solutions such that people achieve more than they thought possible.

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Contact

Customer Enquiries/Sales

+44 1752 693000 | sales@plesseysemi.com www.plesseysemi.com

Plessey Semiconductors Ltd | Plymouth
Tamerton Road, Roborough
Plymouth, Devon
PL6 7BQ
United Kingdom

P: +44 1752 693000

F: +44 1752 693700

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