



# MAGIC LED

## PLW11A090 Series

### Advanced Product Information



#### Description

Plessey MAGIC PLW11A090 SMT LEDs are designed for ambient decorative lighting and automotive interior applications. The light is emitted close to a Lambertian distribution and hence this SMT package is naturally suitable for backlighting panels and symbols. The LEDs are packed in reels containing 2000 pieces; every reel will be shipped in single intensity and colour bin, to provide close uniformity.

#### Features

- 5630 footprint
- High reliability PLCC packaging
- Diffused pale yellow resin
- 120 degree wide viewing angle
- GaN-on-Si die technology

#### Applications

- Decoration Lighting
- Instrument panel backlighting
- Illumination symbols
- General lighting
- Signage lighting

Variant	Colour	CCT	
		Min.	Max.
PLW11A090-WW	Warm White	2870K	3220K
PLW11A090-NW	Neutral White	3710K	4260K
PLW11A090-CW	Cool White	5310K	6020K

## Absolute Maximum Ratings

T<sub>amb</sub> = +25°C unless otherwise stated

Parameter	Symbol	Minimum	Maximum	Unit
DC Forward Current	I <sub>F</sub>	-	150	mA
Peak Pulse Forward Current <sup>[1]</sup>	I <sub>FP</sub>	-	180	mA
Reverse Voltage	V <sub>R</sub>	-	5	V
Storage Temperature	T <sub>stg</sub>	-40	+100	°C
Junction Temperature	T <sub>j</sub>	-	+120	°C

[1] Pulse width ≤10ms, duty cycle ≤10%

## Electro-optical Characteristics

T<sub>amb</sub> = +25°C unless otherwise stated

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 100mA	2.8	3.2	3.4	V
Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5V	-	-	10	μA
Correlated Colour Tempertaure	CCT	I <sub>F</sub> = 100mA	2870		3220	K
			3710		4260	
			5310		6020	
Colour Rendering Index	CRI	I <sub>F</sub> = 100mA	70		80	%
Thermal Resistance	R <sub>thj-sp</sub>		-	tbd	-	K/W
Half-Intensity Angle	2Θ <sub>1/2</sub>	I <sub>F</sub> = 100mA	-	120	-	deg

## Recommended Operating Conditions

In typical applications, for optimum LED performance

Parameter	Symbol	Minimum	Maximum	Unit
Operating Ambient Temperature	T <sub>opr</sub>	-40	+85	°C

## Intensity Bin Groups

$I_F = 100\text{mA}$ ,  $T_{\text{amb}} = +25^\circ\text{C}$ , unless otherwise stated

Group	Luminous flux <sup>[1]</sup> (lm)	
	Min.	Max.
1A	13.2	16.6
2A	16.6	20.7

<sup>[1]</sup> Tolerance  $\pm 10\%$

## Forward Voltage Bin Groups

$I_F = 100\text{mA}$ ,  $T_{\text{amb}} = +25^\circ\text{C}$ , unless otherwise stated

Group	$V_F$ <sup>[1]</sup> (V)	
	Min.	Max.
V1	2.8	2.9
V2	2.9	3.0
V3	3.0	3.1
V4	3.1	3.2
V5	3.2	3.3
V6	3.3	3.4

<sup>[1]</sup> Tolerance  $\pm 0.05\text{V}$

### Relative Spectral Emission (Typical)

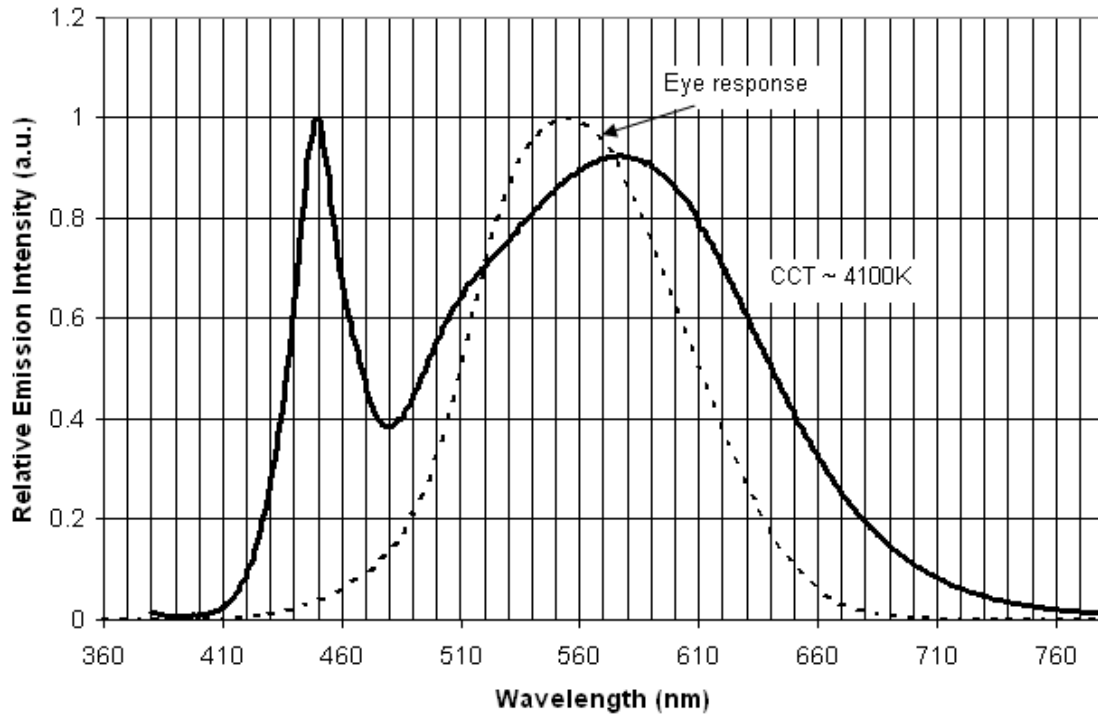


Figure 1. Normalised spectral power distribution (Neutral white)

### Angular Light Distribution

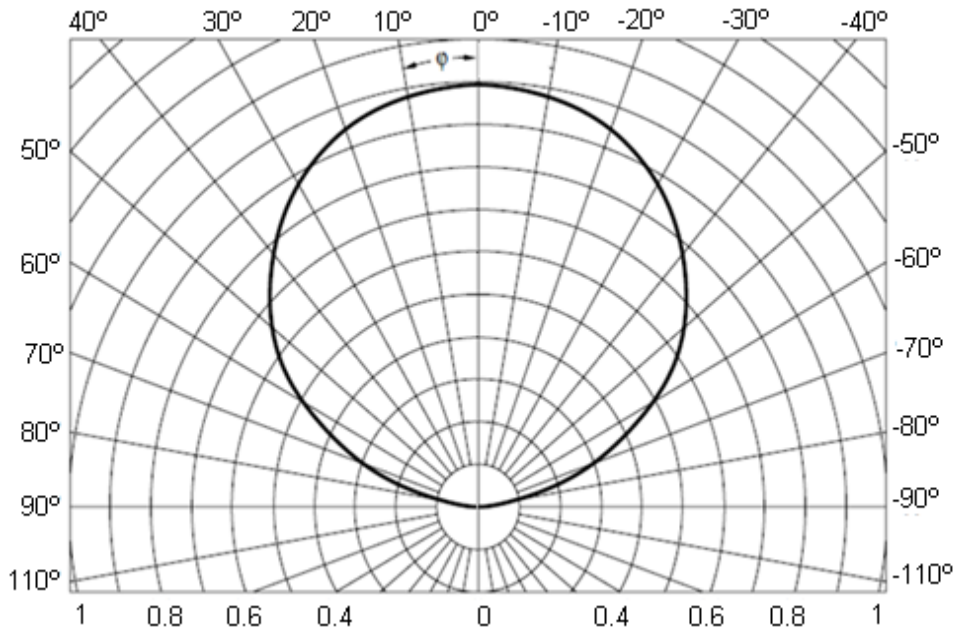


Figure 2. Angular distribution pattern of emitted light

## Colour Chromaticity – Warm White

Warm White 2870-3220 K

3SW		3NE		3NW		3SE	
x	y	x	y	x	y	x	y
0.4345	0.4033	0.4562	0.4260	0.4431	0.4213	0.4468	0.4077
0.4223	0.3990	0.4431	0.4213	0.4299	0.4165	0.4345	0.4033
0.4147	0.3814	0.4345	0.4033	0.4223	0.3990	0.4260	0.3854
0.4260	0.3854	0.4468	0.4077	0.4345	0.4033	0.4373	0.3893

Chromaticity co-ordinate tolerance for each bin is  $\pm 0.01$

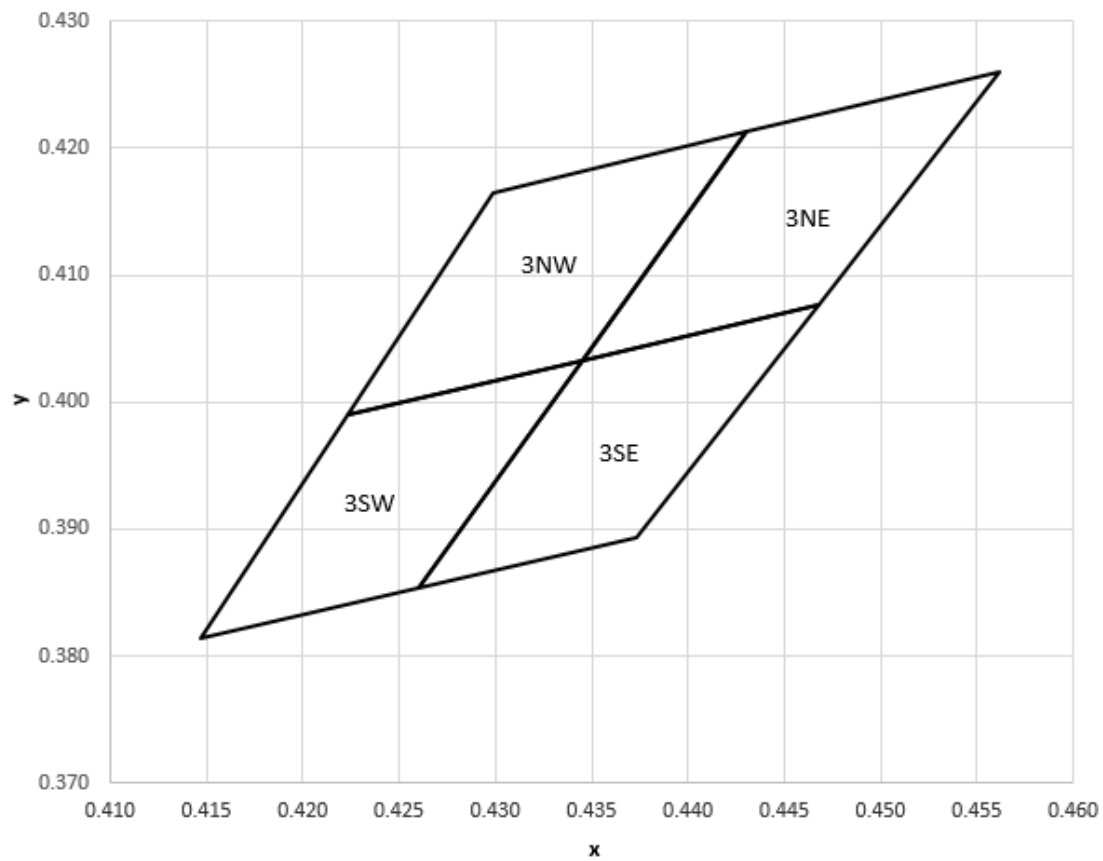


Figure 3A. CIE1931 chromaticity diagram (ANSI standard C78.377-2008)

### Colour Chromaticity – Neutral White

Neutral White 3710-4260 K

4SW		4NE		4NW		4SE	
x	y	x	y	x	y	x	y
0.3828	0.3803	0.4006	0.4044	0.3871	0.3959	0.3952	0.3880
0.3703	0.3726	0.3871	0.3959	0.3736	0.3874	0.3828	0.3803
0.3670	0.3578	0.3828	0.3803	0.3703	0.3726	0.3784	0.3647
0.3784	0.3647	0.3952	0.3880	0.3828	0.3803	0.3898	0.3716

Chromaticity co-ordinate tolerance for each bin is  $\pm 0.01$

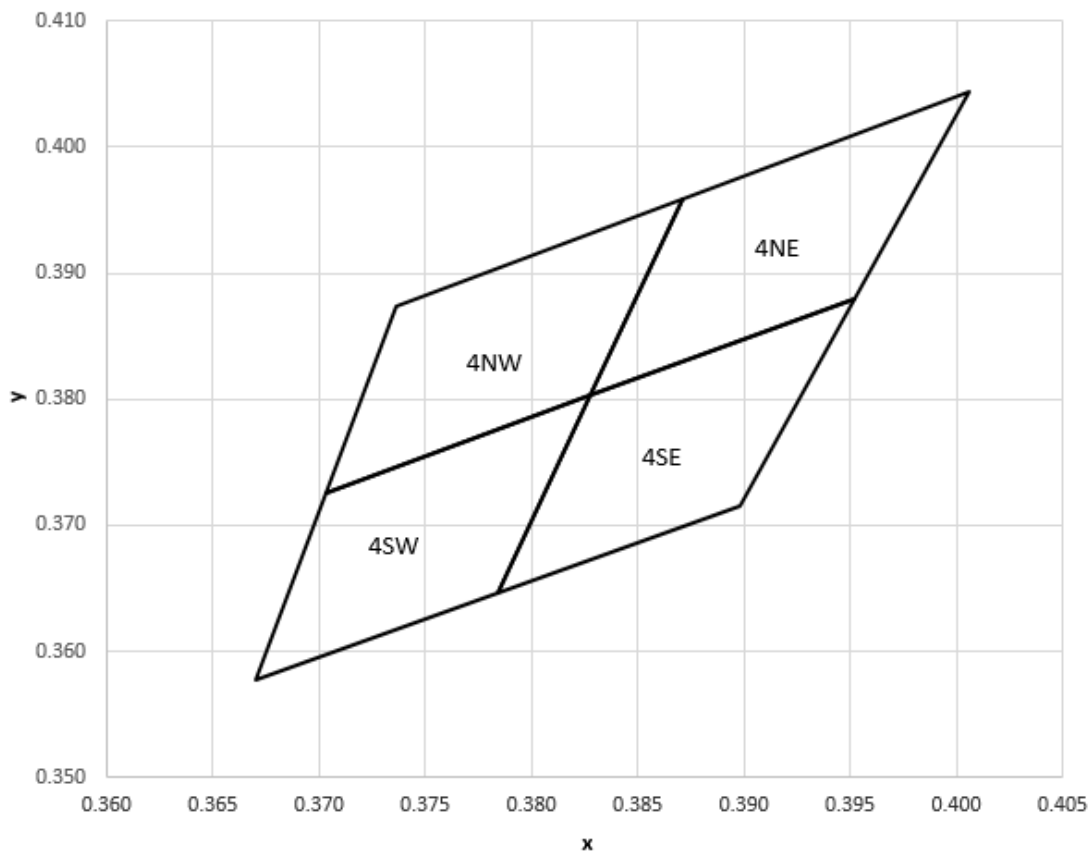


Figure 3B. CIE1931 chromaticity diagram (ANSI standard C78.377-2008)

### Colour Chromaticity – Cool White

Cool White 5310-6020 K

5SW		5NE		5NW		5SE	
x	y	x	y	x	y	x	y
0.3293	0.3422	0.3376	0.3616	0.3292	0.3539	0.3371	0.3493
0.3215	0.3353	0.3292	0.3539	0.3207	0.3462	0.3293	0.3422
0.3222	0.3243	0.3293	0.3422	0.3215	0.3353	0.3294	0.3306
0.3294	0.3306	0.3371	0.3493	0.3293	0.3422	0.3366	0.3369

Chromaticity co-ordinate tolerance for each bin is  $\pm 0.01$

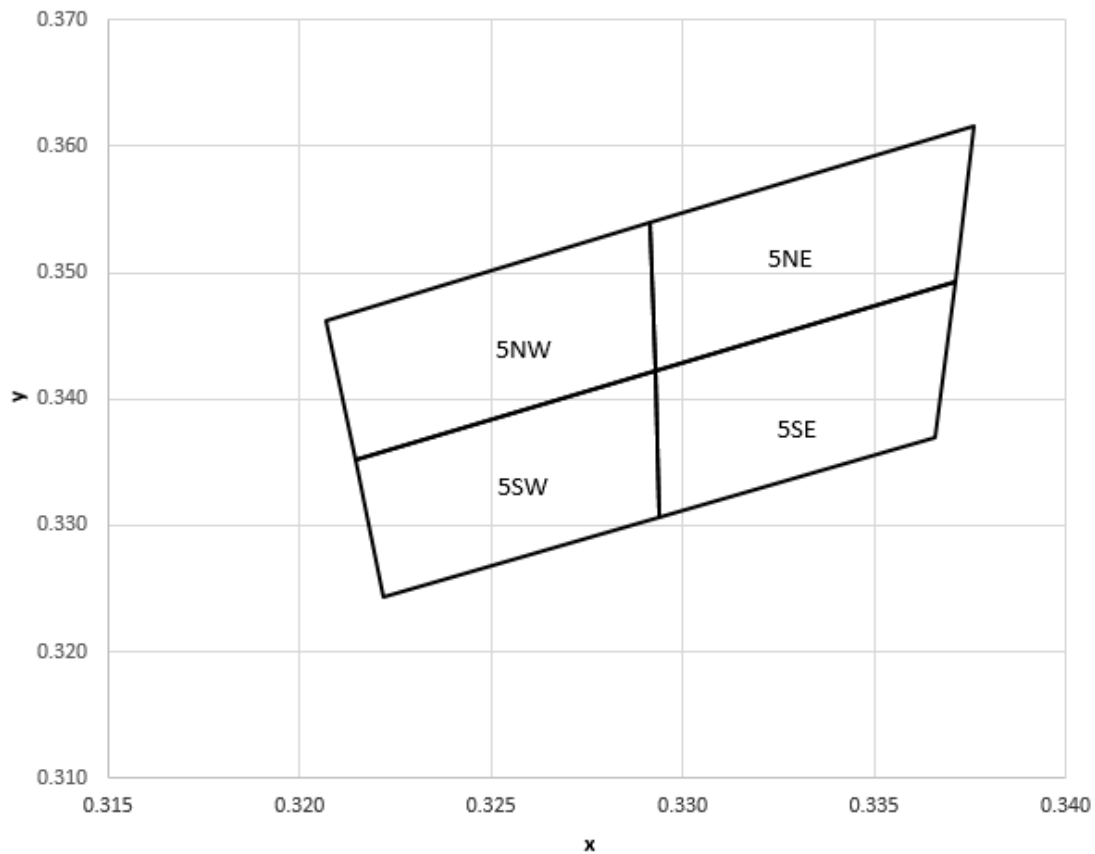


Figure 3C. CIE1931 chromaticity diagram (ANSI standard C78.377-2008)

### Package Outline Dimensions

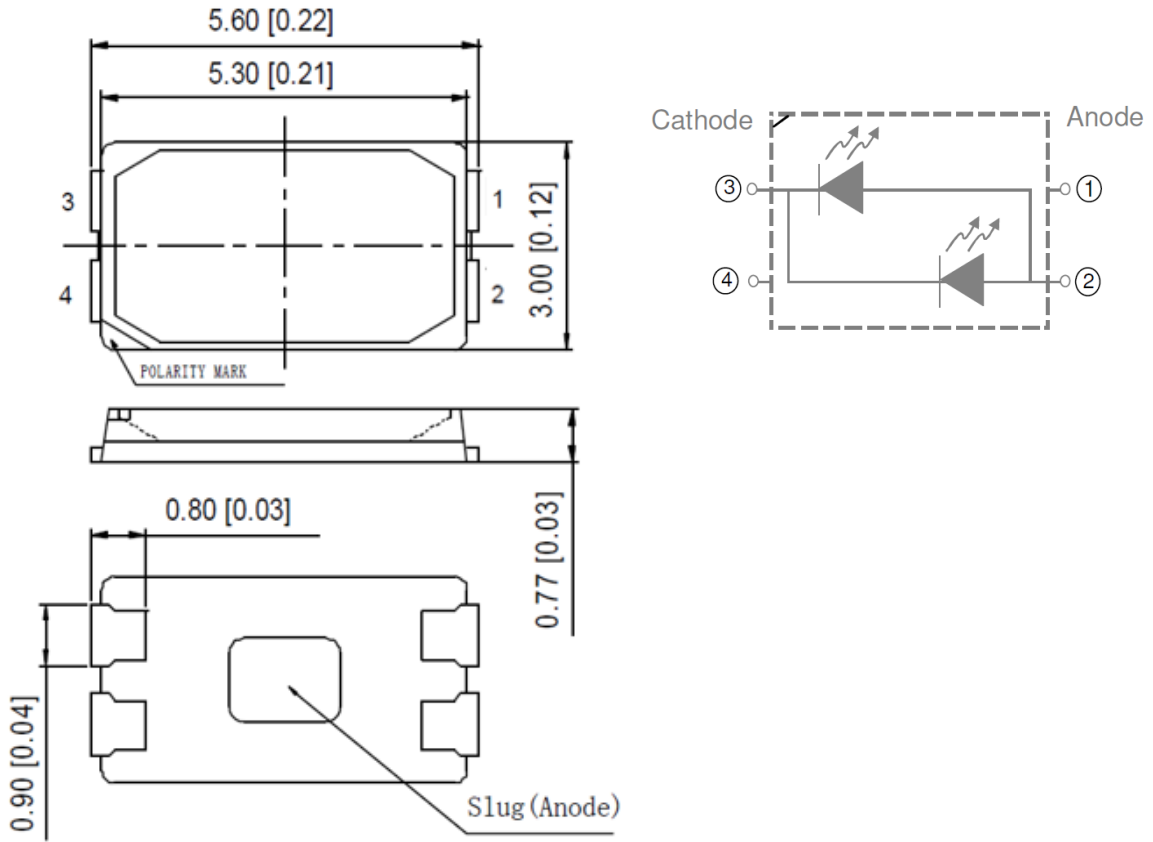


Figure 4. Mechanical drawings of the 5630 package, with unit in millimeter [in inches]

### Recommended Solder Pad

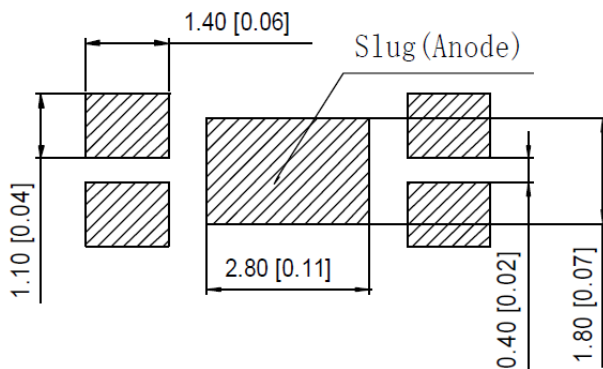


Figure 5. Diagram of soldering pad (unit in mm)

Note: Increased PCB Cu area will reduce the  $T_j$  and increase reliability



## Reflow Soldering Profile

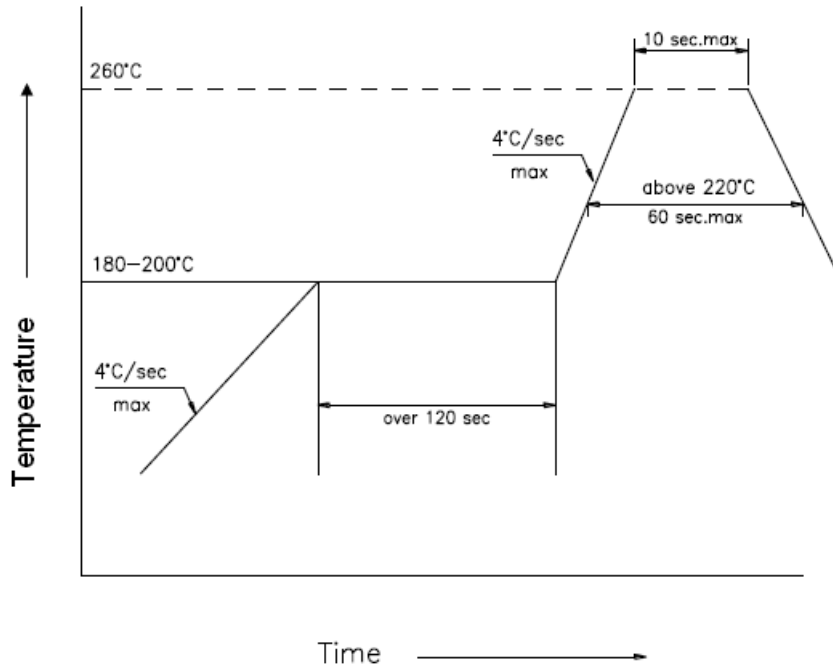


Figure 6. Reflow soldering profile

1. Reflow soldering should not be done more than twice
2. When soldering, do not put stress on the LEDs during heating

### Soldering iron

1. When hand soldering, the temperature of the iron must be  $\leq +300^{\circ}\text{C}$  for 3 seconds
2. Hand soldering should be performed only once.

## Handling Instructions

Plessey LEDs are not designed to operate with reverse bias.

Precautions are required to prevent reverse bias in applications and during handling.



## Moisture Sensitivity

JEDEC Level	Floor life		Bake	
	Time	Conditions	Time	Conditions
4	72 hours	$\leq +30^{\circ}\text{C} / 60\% \text{ RH}$	$\geq 24$ hours	$+125^{\circ}\text{C} \pm 5^{\circ}\text{C}$

## Packing Information

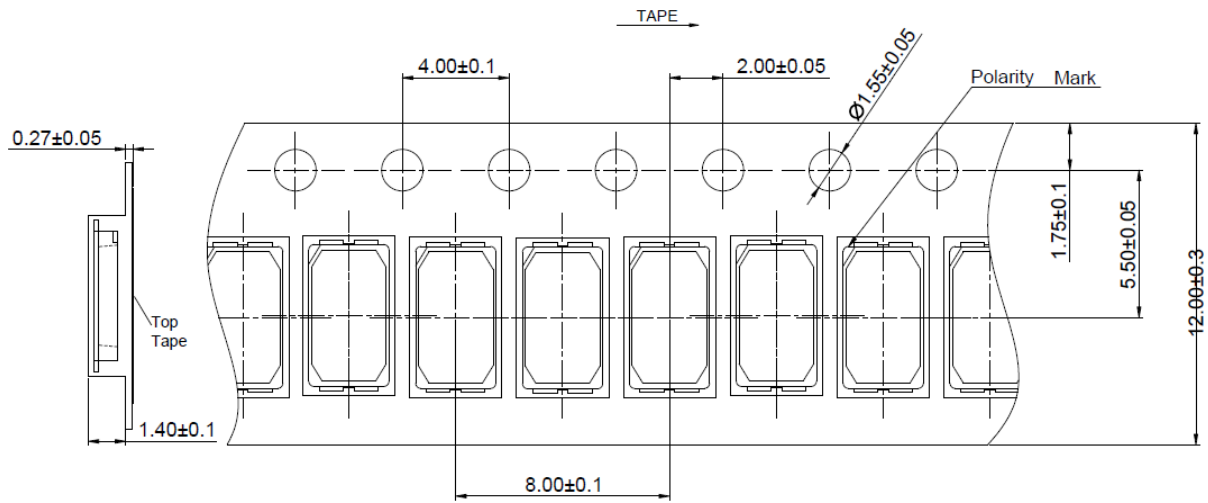


Figure 7. Embossed taping specifications (unit in mm)

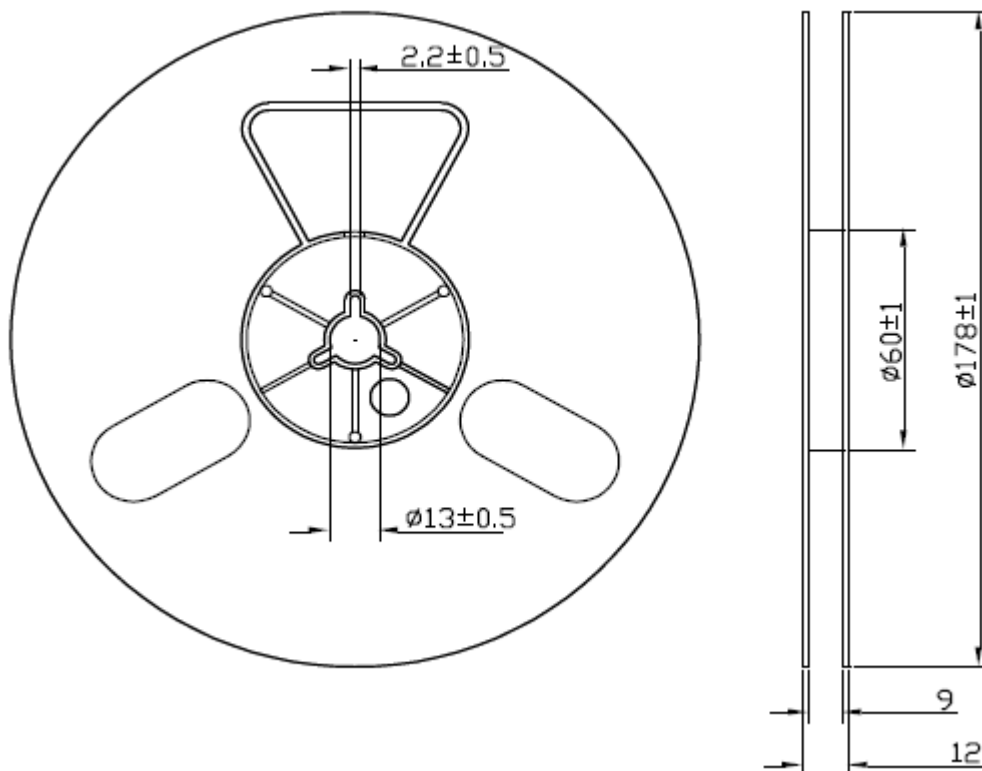


Figure 8. Reel specification (unit in mm)

## Legal Notice

Product information provided by Plessey Semiconductors Limited (“Plessey”) in this document is believed to be correct and accurate. Plessey reserves the right to change/correct the specifications and other data or information relating to products without notice but Plessey accepts no liability for errors that may appear in this document, howsoever occurring, or liability arising from the use or application of any information or data provided herein. Neither the supply of such information, nor the purchase or use of products conveys any licence or permission under patent, copyright, trademark or other intellectual property right of Plessey or third parties.

Products sold by Plessey are subject to its standard Terms and Conditions of Sale that are available on request. No warranty is given that products do not infringe the intellectual property rights of third parties, and furthermore, the use of products in certain ways or in combination with Plessey, or non-Plessey furnished equipments/components may infringe intellectual property rights of Plessey.

The purpose of this document is to provide information only and it may not be used, applied or reproduced (in whole or in part) for any purpose nor be taken as a representation relating to the products in question. No warranty or guarantee express or implied is made concerning the capability, performance or suitability of any product, and information concerning possible applications or methods of use is provided for guidance only and not as a recommendation. The user is solely responsible for determining the performance and suitability of the product in any application and checking that any specification or data it seeks to rely on has not been superseded.

Products are intended for normal commercial applications. For applications requiring unusual environmental requirements, extended temperature range, or high reliability capability (e.g. military, or medical applications), special processing/testing/conditions of sale may be available on application to Plessey.

## Contact

Customer Support

+41752 693000 | [support@plesseysemi.com](mailto:support@plesseysemi.com)

[www.plesseysemi.com](http://www.plesseysemi.com)

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

Plessey Semiconductors Ltd | Swindon  
Design & Technology Centre, Delta  
500, Delta Business Park, Swindon  
SN5 7XE United Kingdom

P: +44 1752 693000  
F: +44 1752 693200

P: +44 1793 518000  
F: +44 1793 518030