

PLW13D004 Series 1005

Low Power LED

Product Datasheet



Description

Plessey MAGIC PLW13D004 ultra-thin SMT white LEDs are designed for symbol backlight applications. The light is emitted in wide emission angles and hence this SMT package is suitable for indicators in mobile devices. The LEDs are packed in reels containing 4000 pieces; each individual reel will be shipped in single intensity and colour bin, to provide close uniformity.

Features

- Ultra-thin 1005 footprint
- Moisture sensitivity level 2a
- Diffused pale yellow resin
- 130 degree wide viewing angle
- GaN-on-Si die technology

Applications

- Decoration Lighting
- Instrument panel backlighting
- Illumination symbols
- Miniature dot-matrix displays
- Wearable devices

Ordering Information

Name	Order Code	Chromaticity	Min. Iv mcd	Forward Voltage Range
PLW13D004	PLW13D004000	C1, C2, D1	112.5	2.55 -3.25

Absolute Maximum Ratings

T_{amb} = +25°C unless otherwise stated

Parameter	Symbol	Min.	Max.	Unit
DC Forward Current	I_F	-	10	mA
Peak Pulse Forward Current ^[1]	I_{FP}	-	60	mA
Power Dissipation	P_D		36	mW
Storage Temperature	T_{stg}	-40	+100	°C
Junction Temperature	T_j		+85	°C

^[1] Pulse width ≤0.1ms, duty cycle ≤10%

Electro-optical Characteristics

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

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage ^[1]	V_F	$I_F = 5\text{mA}$	2.55	2.85	3.25	V
Reverse Current	I_R	$V_R = 5\text{V}$	-	-	100	μA
Luminous Intensity ^[2]	I_v	$I_F = 5\text{mA}$	-	170	-	mcd
Thermal Resistance	R_{thj-sp}	$I_F = 5\text{mA}$	-	265	-	°C/W
Half-Intensity Angle	$2\Theta_{1/2}$	$I_F = 5\text{mA}$	-	130	-	deg

[1] Forward Voltage, V_F , tolerance is ±0.05V

[2] Luminous Intensity, I_v , tolerance is ±10%

Recommended Operating Conditions

In typical applications, for optimum LED performance

Parameter	Symbol	Min.	Max.	Unit
Operating Ambient Temperature	T_{opr}	-40	+85	°C

Luminous Intensity Bin Groups

$I_F = 5\text{mA}$, $T_{amb} = +25^\circ\text{C}$, unless otherwise stated

Group	Luminous Intensity ^[1] (mcd)	
	Min.	Max.
R	112.5	180.0
S	180.0	285.0
T1	285.0	320.0

[1] Tolerance $\pm 10\%$

Forward Voltage Bin Groups

$I_F = 5\text{mA}$, $T_{amb} = +25^\circ\text{C}$, unless otherwise stated

Group	Forward Voltage ^[1] (V)	
	Min.	Max.
G2T	2.55	2.65
G3T	2.65	2.75
G4T	2.75	2.85
H1T	2.85	2.95
H2T	2.95	3.05
H3T	3.05	3.15
H4T	3.15	3.25

[1] Tolerance $\pm 0.05\text{V}$

Chromaticity Binning - 25°C, (tolerance ± 0.007)

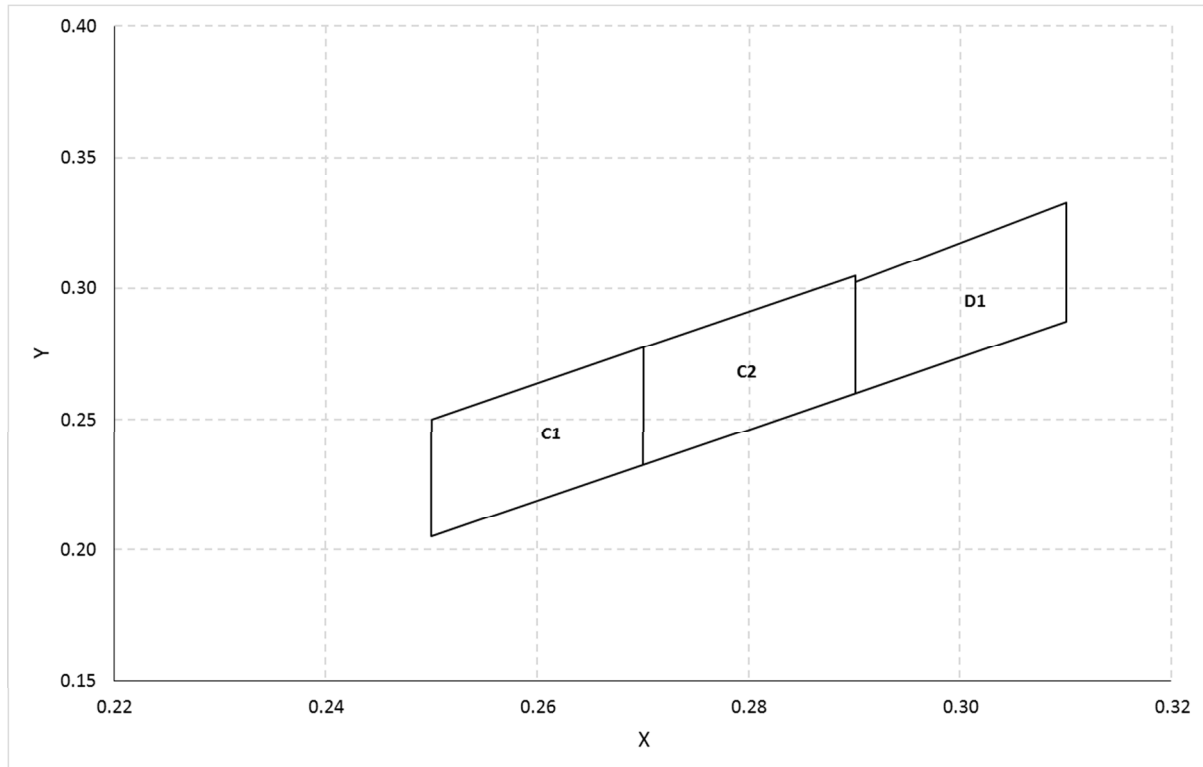


Figure 1 : Chromaticity Chart

C1		C2		D1	
X	Y	X	Y	X	Y
0.2500	0.2050	0.2700	0.2325	0.2900	0.2600
0.2500	0.2500	0.2700	0.2775	0.2900	0.3025
0.2700	0.2775	0.2900	0.3050	0.3100	0.3325
0.2700	0.2325	0.2900	0.2600	0.3100	0.2875

Relative Spectral Emission

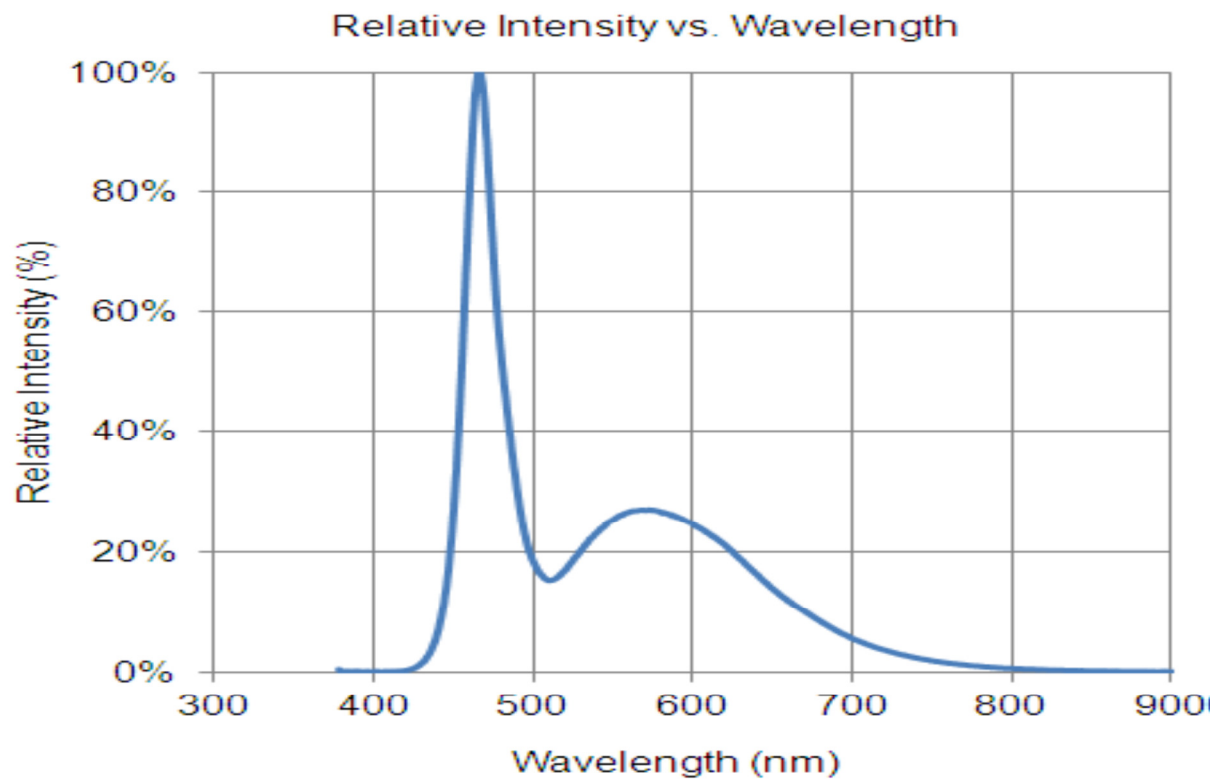
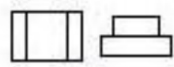
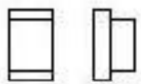
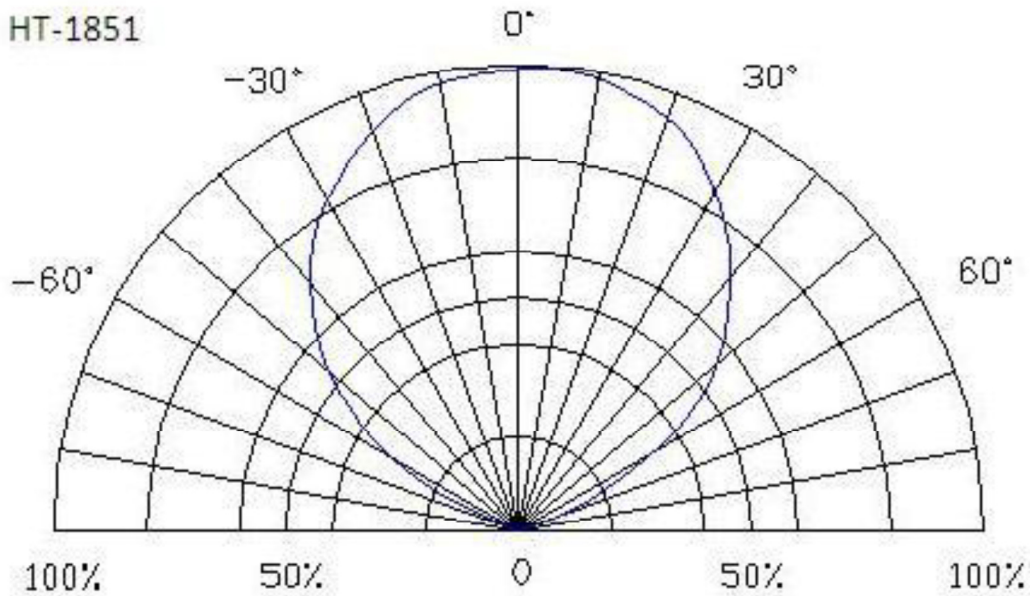


Figure 2: Relative Emission Intensity versus Wavelength

Angular Light Distribution



HT-1851



HT-1851

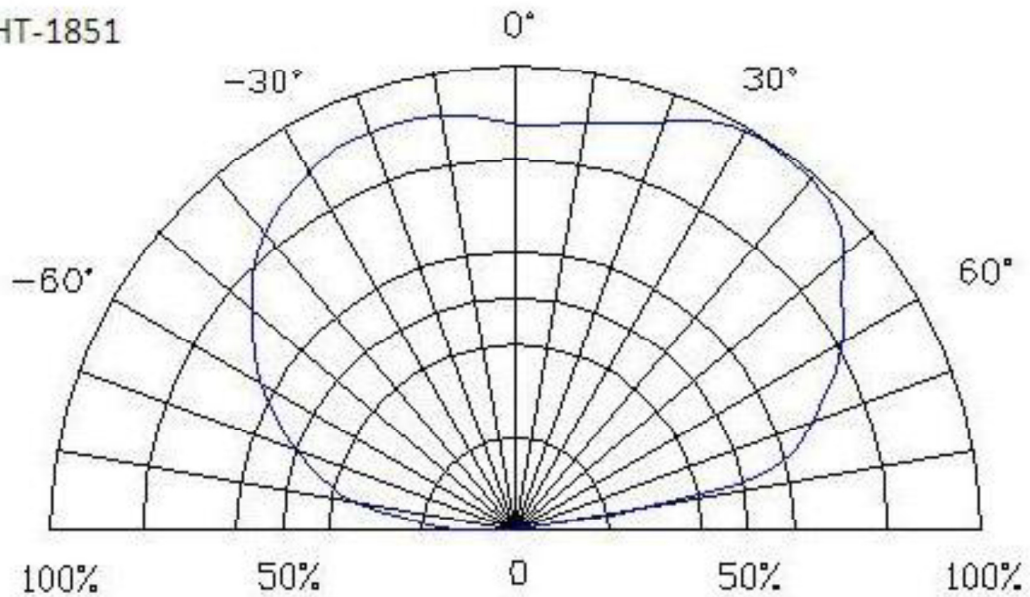


Figure 3: Angular distribution patterns of emitted light

Forward Current Characteristics

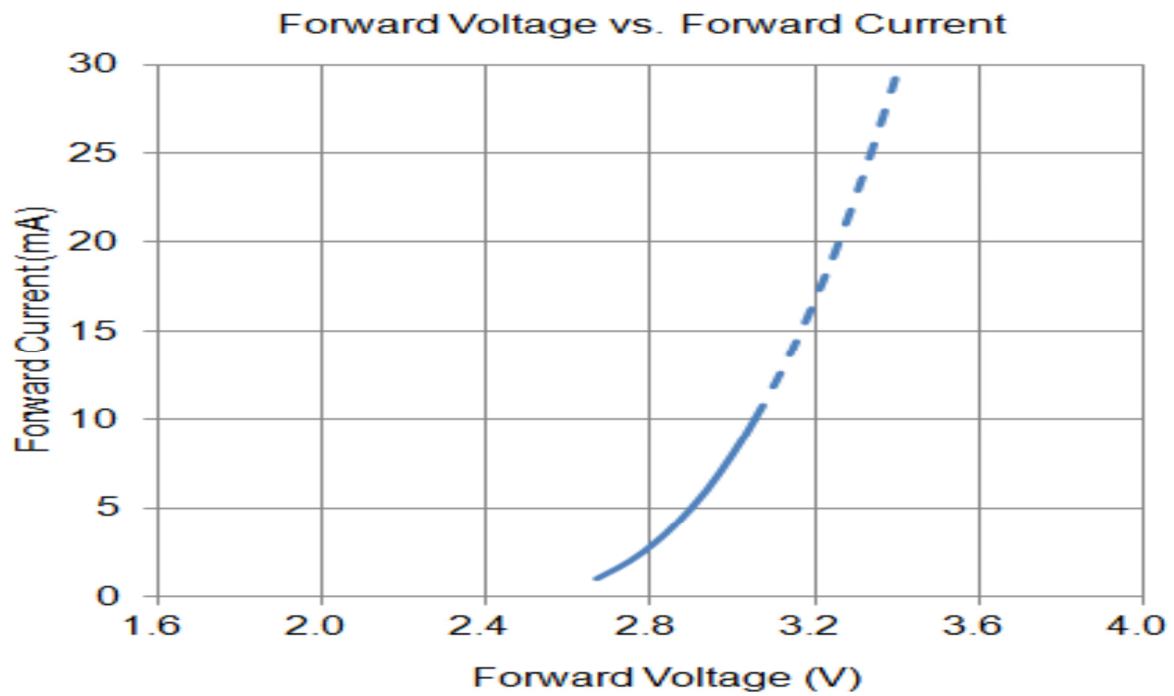


Figure 4: Typical forward current versus forward voltage ($T_a=+25^\circ\text{C}$)

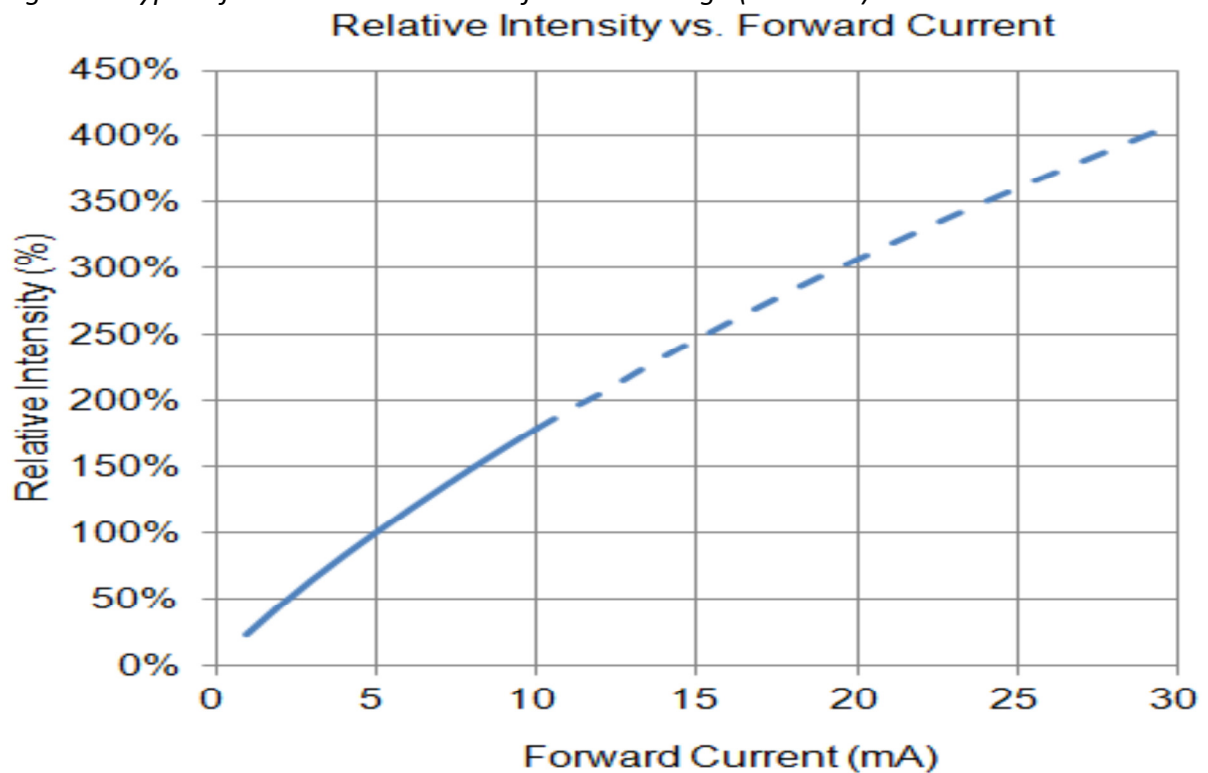


Figure 5: Relative luminous intensity versus forward current ($T_a=+25^\circ\text{C}$)

Derating

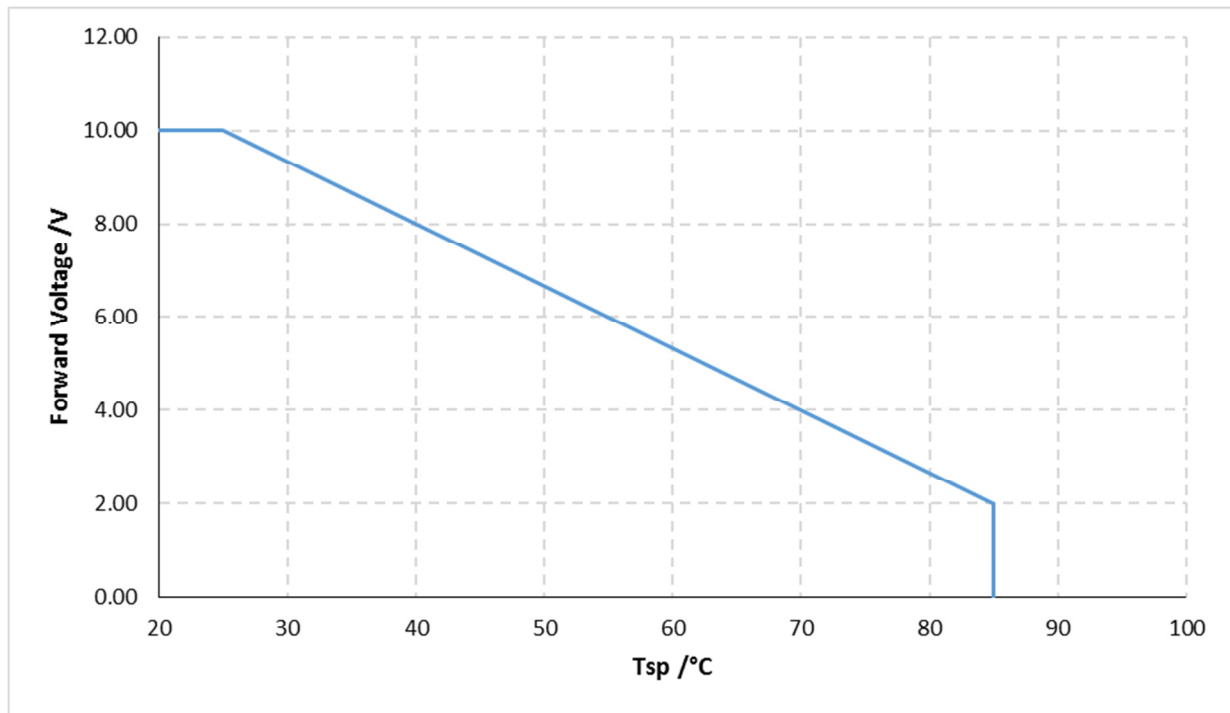
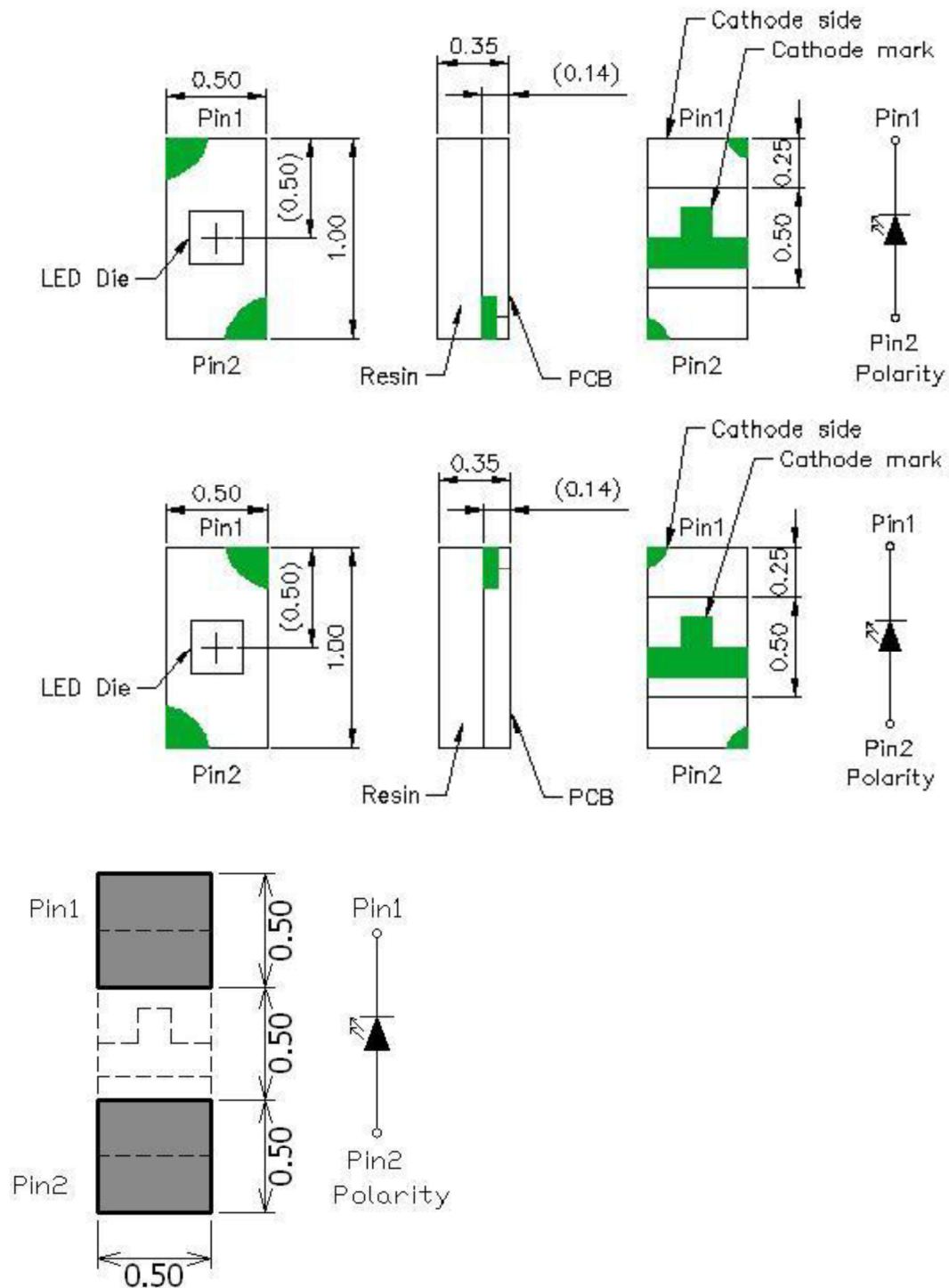


Figure 6: Power derating curve, continuous current versus T_{solder} point

Package Outline Dimensions & Soldering Pattern



All dimensions in mm

Figure 7: Mechanical drawings of the 1050 package & Solder Pads

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

Reflow Soldering Profile

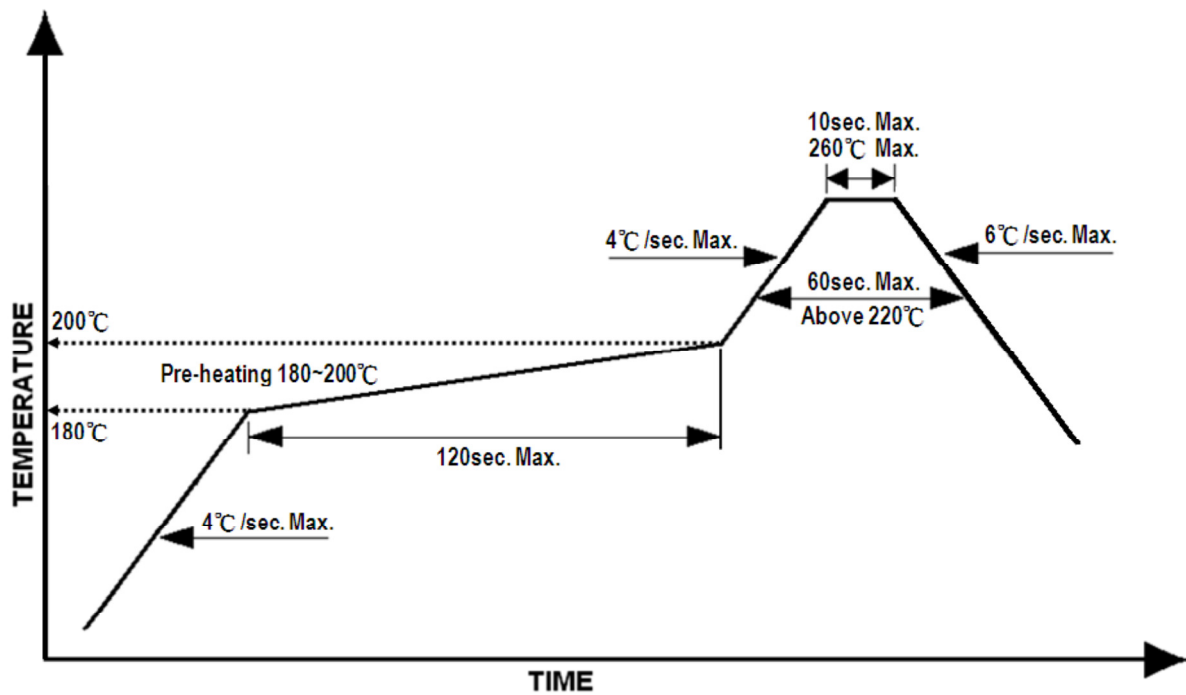


Figure 8: Reflow soldering profile

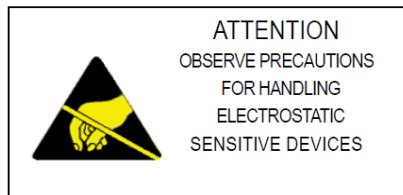
Reflow profile summary:

- Reflow soldering should not be done more than twice.
- Do not solder/reflow the same LED over two times.
- Reflow soldering:
 - Pre-heat 200°C max , 180 sec. max.
 - Peak 260°C max , 10 sec. max.

Handling Instructions

Plessey LEDs are not designed to operate with reverse bias.

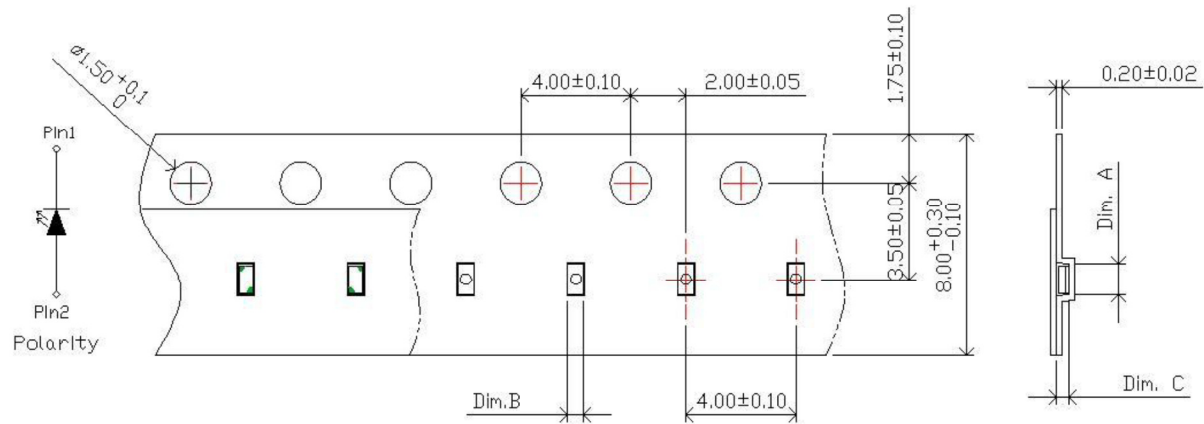
Precautions are required to prevent reverse bias in applications and during handling.



Moisture Sensitivity

MSL	Floor Life		Soak Requirements	
	Time	Conditions	Time	Conditions
2a	4 weeks	$\leq +30^{\circ}\text{C}/60\%\text{RH}$	≥ 12 hours	$+60 \pm 5^{\circ}\text{C}/5\%\text{RH}$

Packing Information



Dim. A	Dim. B	Dim. C	Q'ty/Reel
1.15 ± 0.03	0.58 ± 0.03	0.45 ± 0.03	4K

Unit: mm

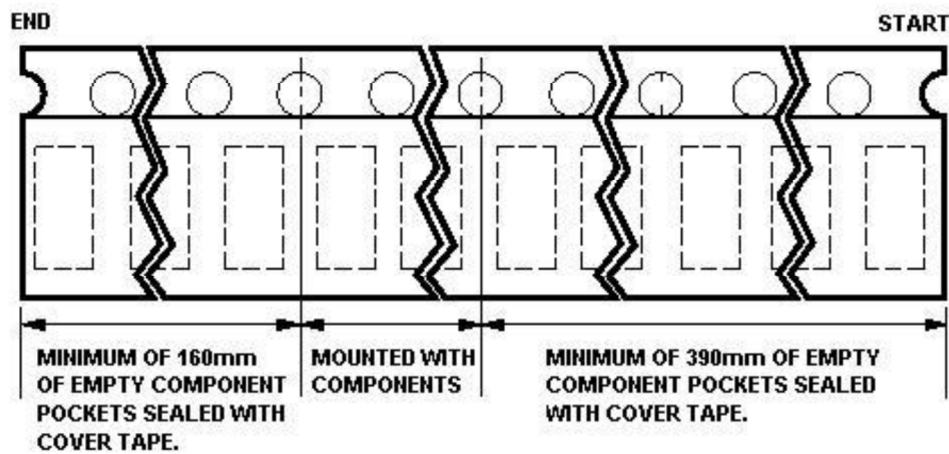


Figure 9: Tape specification (units in mm)

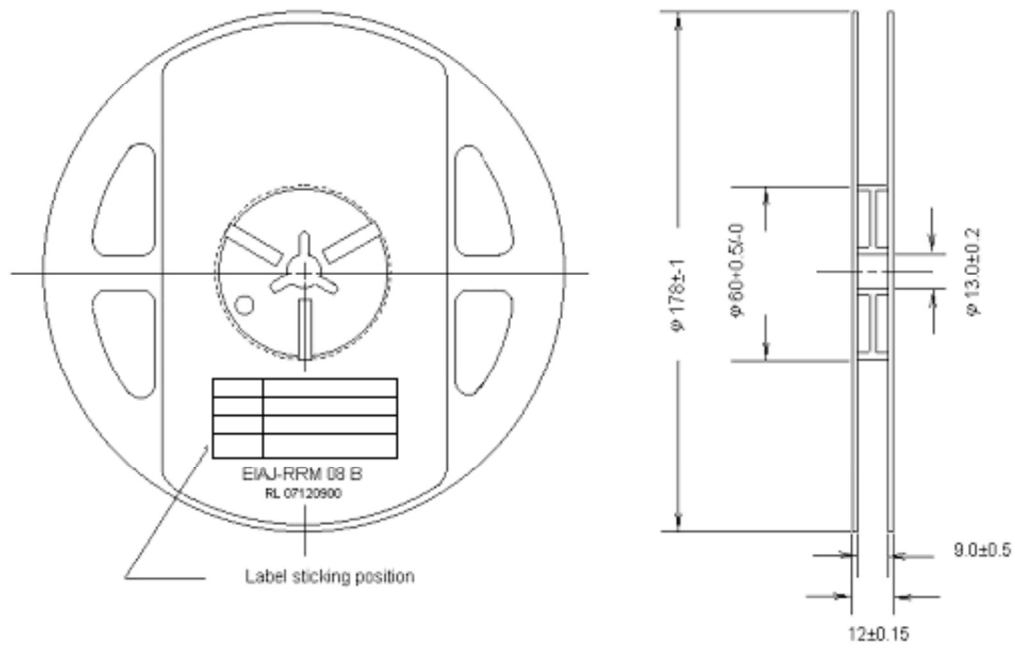


Figure 10: Reel specification (units in mm)

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