MAGIC LED
PLB114050 Series
Advanced Datasheet

Description

Plessey MAGIC PLB114050 PLCC-2 SMT LEDs are designed for ambient decorative lighting. The light is emitted close to a Lambertian distribution and hence this SMT package is naturally suitable for backlighting instrument cluster panel 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

- Industry standard 3020 footprint
- High reliability PLCC packaging
- 120 degree wide viewing angle
- GaN-on-Si die technology

Applications

- Decoration Lighting
- Instrument panel backlighting
- Illumination symbols
- Navigation backlighting

Variant	Dominant Wavelength (nm)	
	Min.	Max.
PLB114050-M	450	460
PLB114050-P	460	470
PLB114050-T	470	480

Absolute Maximum Ratings

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

Parameter	Symbol	Minimum	Maximum	Unit
DC Forward Current	I_F	-	90	mA
Peak Pulse Forward Current[1]	I_{FP}	-	90	mA
Reverse Voltage	V_R	-	5	V
Storage Temperature	T_{stg}	-40	+100	°C
Junction Temperature	T_j	-	+120	°C

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

Electro-optical Characteristics

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

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	I_F = 60mA	2.8	3.2	3.4	V
Reverse Current	I_R	V_R = 5V	-	-	10	µA
Dominant wavelength	λ_d	I_F = 60mA	450		460	nm
			460		470	
			470		480	
Thermal Resistance	R_{thj-sp}		-	30	-	K/W
Half-Intensity Angle	$2\Theta_{1/2}$	I_F = 60mA	-	120	-	Deg.

Recommended Operating Conditions

In typical applications, for optimum LED performance

Parameter	Symbol	Minimum	Maximum	Unit
Operating Ambient Temperature	T_{opr}	-40	+85	°C

Ordering Information

name	Order code	Colour range	Luminous intensity range
PLB114050-M	PLB114050M000	M1, M2, M3 & M4	2B, 3B & 4B
PLB114050-P	PLB114050P000	T1, T2	3B, 4B & 5B
PLB114050-T	PLB114050T000	T3, T4	3B, 4B & 5B

[1] Tolerance ±10%

Intensity Bin Groups

I_F = 60mA, T_{amb} = +25ºC, unless otherwise stated

Variant	Group	Luminous Intensity Iv [1] (mcd)		Typ. Luminous Flux Φv (lm)	Radiant Power Range (mW)	
		Min.	Max.		Min.	Max.
PLB114050-M	2B	300	380	1.10	38	42
	3B	380	480	1.35	42	46
	4B	480	600	1.65	46	52
PLB114050-P & PLB114050-T	3B	380	480	1.35	-	-
	4B	480	600	1.65	-	-
	5B	600	850	2.30	-	-

[1] Tolerance ±11%

Forward Voltage Bin Groups

I_F = 60mA, T_{amb} = +25ºC, unless otherwise stated

Group	V_F [1] (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

[1] Tolerance ±0.05V

Dominant Wavelength Bin Groups

I_F = 60mA, T_{amb} = +25ºC, unless otherwise stated

Group	λ_d [1](nm)	
	Min.	Max.
M1	450	452.5
M2	452.5	455
M3	455	457.5
M4	457.5	460
T1	460	465
T2	465	470
T3	470	475
T4	475	480

[1] Tolerance ±1nm

Relative Spectral Emission

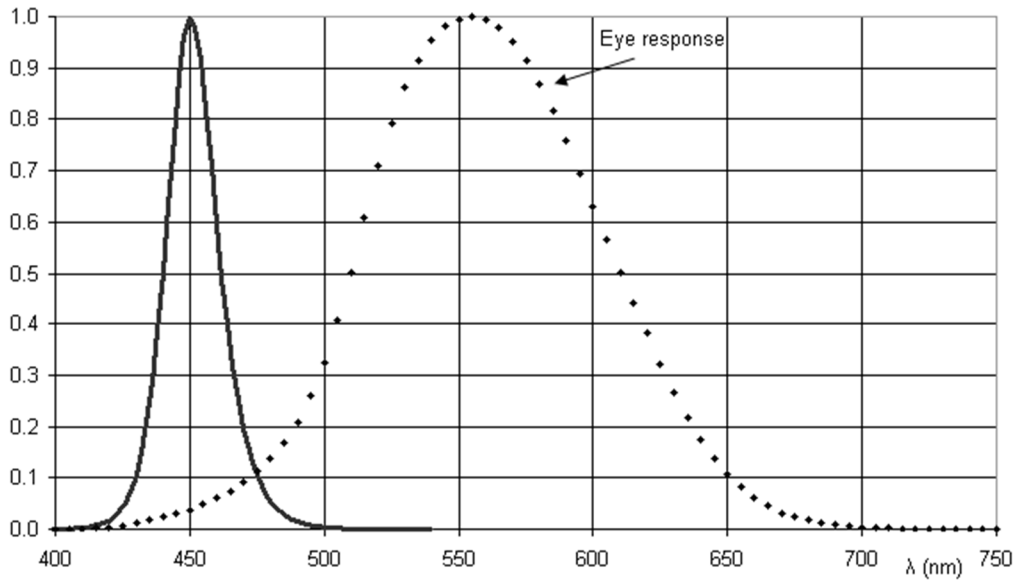


Figure 1. Normalised spectral power distribution

Note: The spectrum data is taken from a random sample (for reference only)

Angular Light Distribution

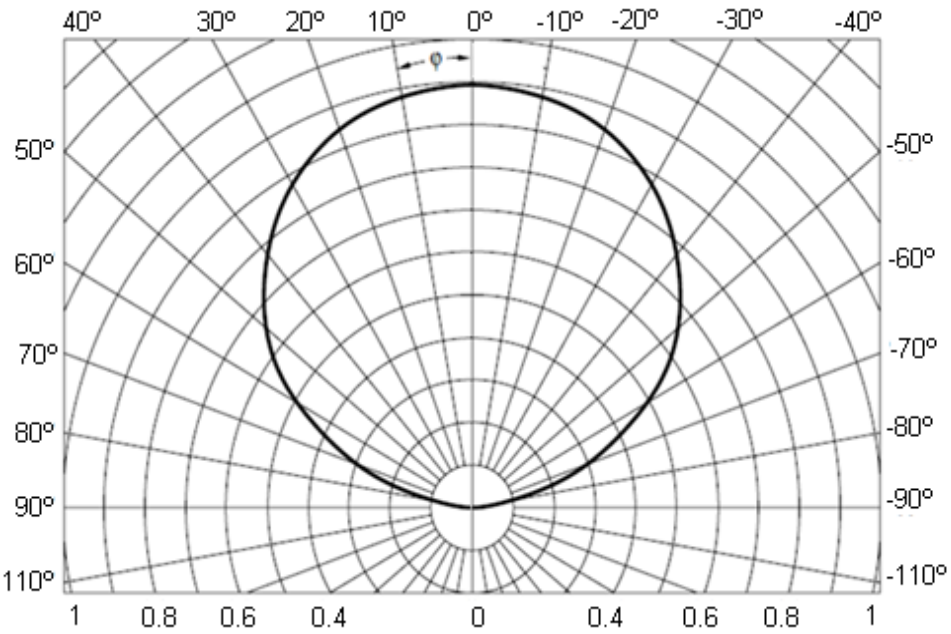


Figure 2. Angular distribution pattern of emitted light

Forward Current Characteristics

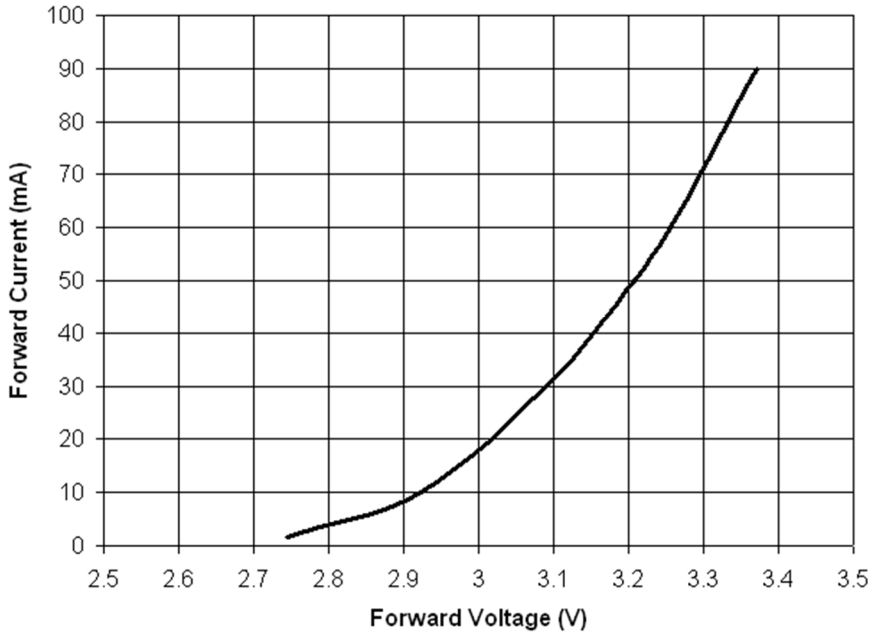


Figure 3. Typical forward voltage versus forward current

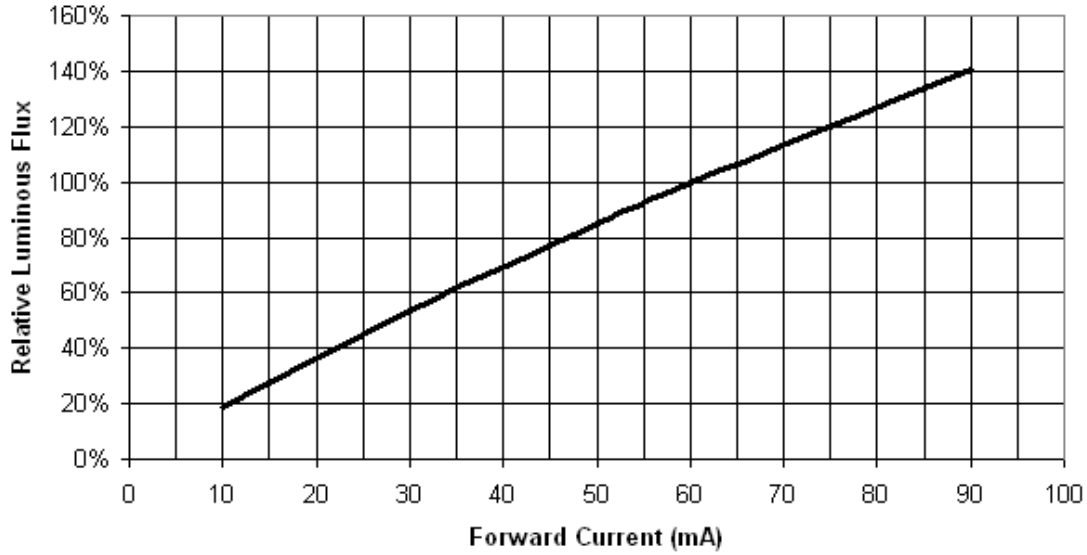


Figure 4. Relative luminous flux versus forward current

Temperature Characteristics

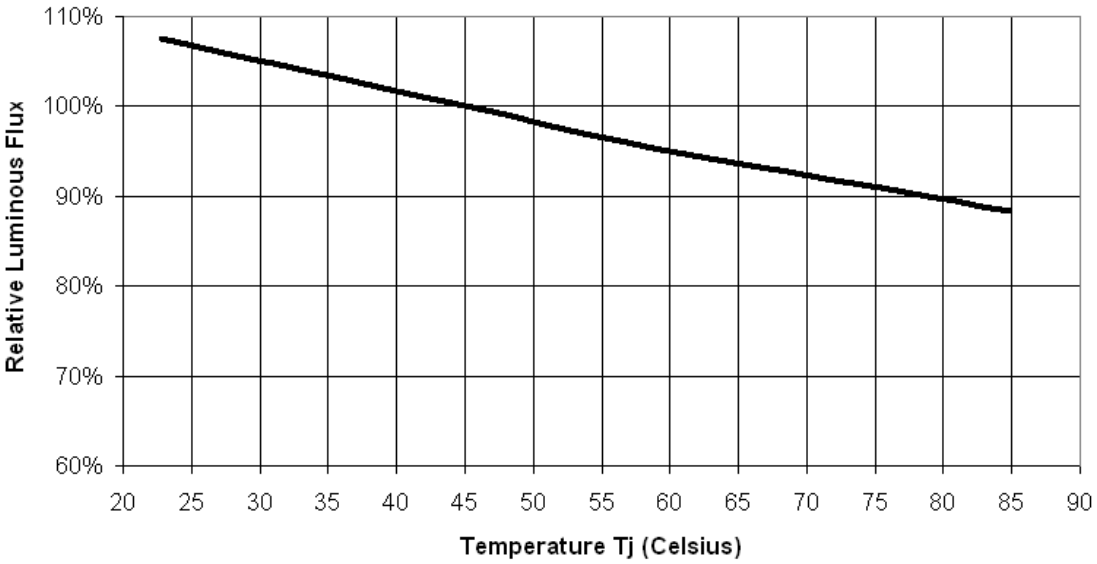


Figure 5. Relative luminous flux versus junction temperature

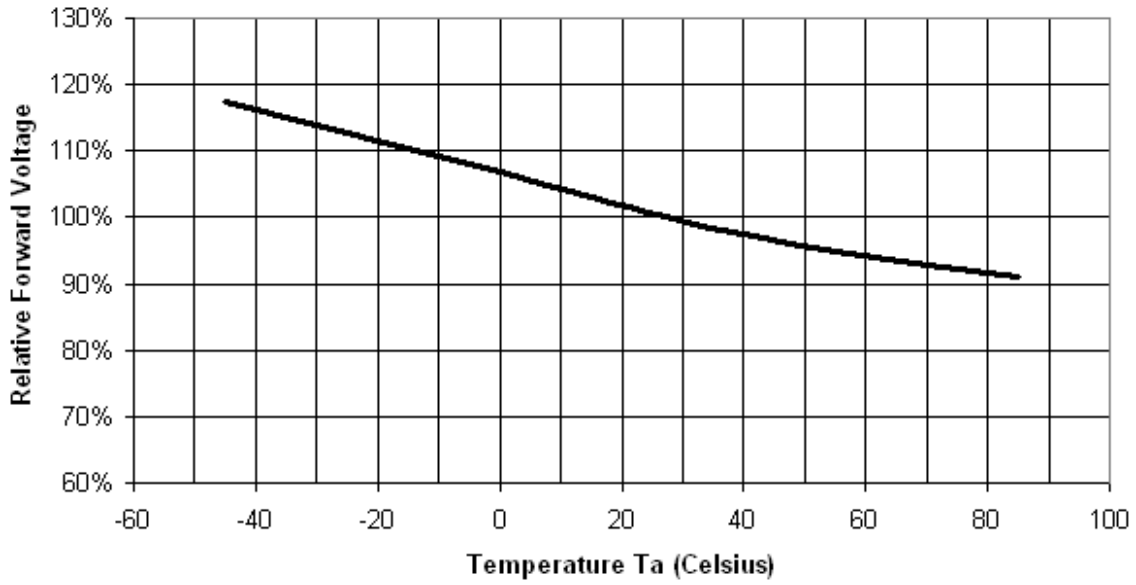


Figure 6. Relative forward voltage versus ambient temperature

Derating Curve

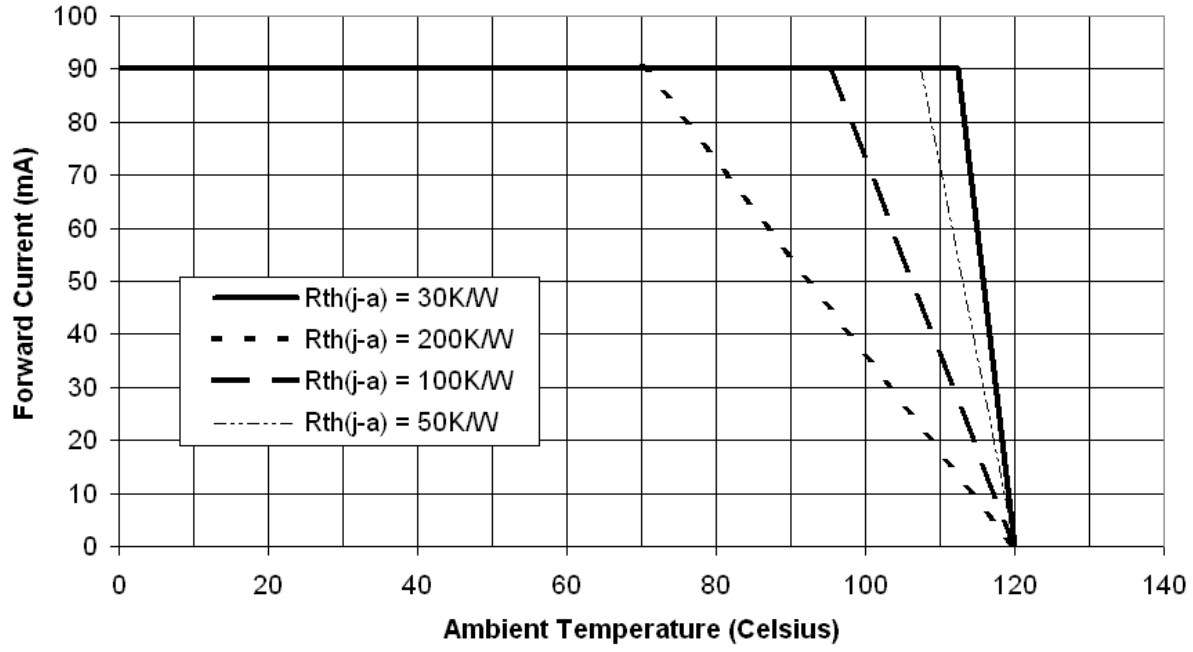


Figure 7. Maximum forward current versus ambient temperature for varying heat sinks

Package Outline Dimensions

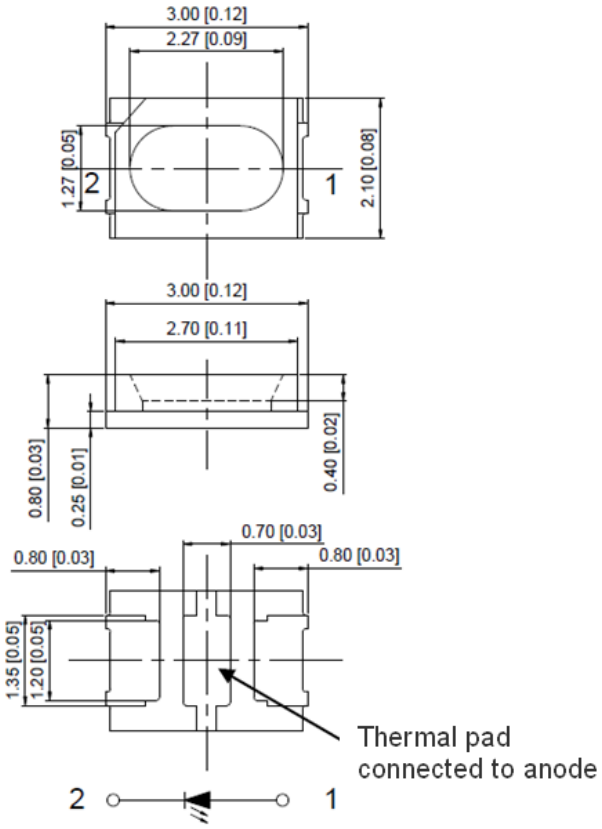


Figure 8. Mechanical drawings of the 3020 package

Notes:

1. All dimensions are in mm [inches]
2. All dimensions are to a tolerance of ±0.15mm (±0.006 inches)

Recommended Solder Pad

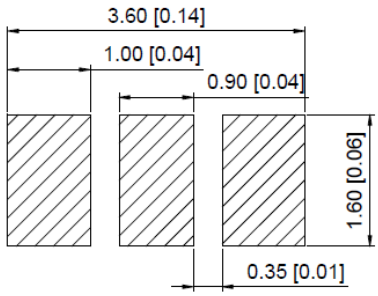


Figure 9. Diagram of soldering pad in mm [inches]

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

Reflow Soldering Profile

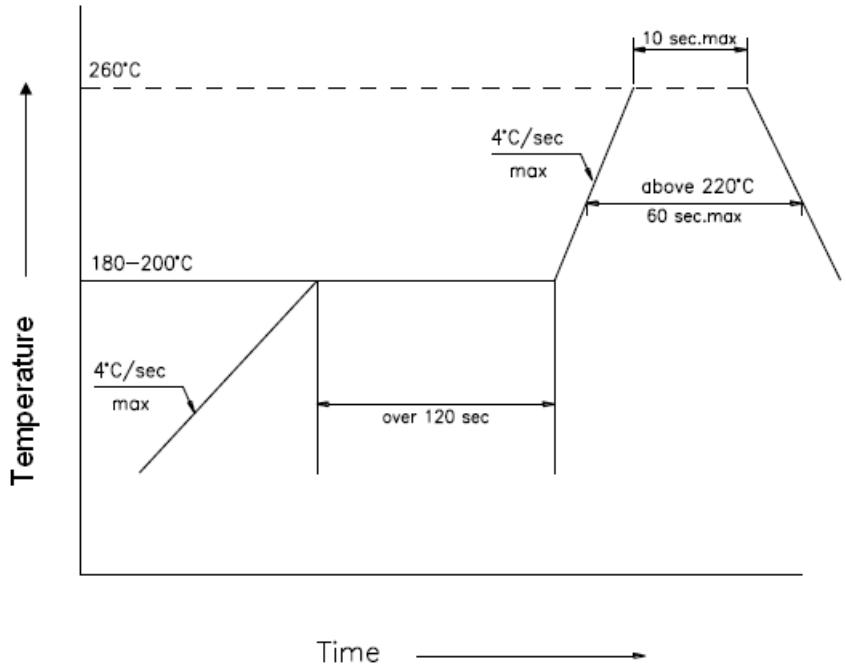


Figure 10. Reflow soldering profile

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

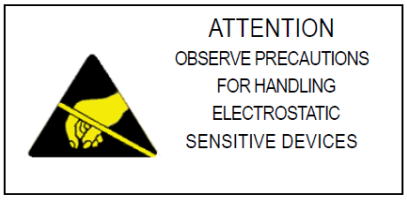
Soldering iron

1. When hand soldering, the temperature of the iron must be ≤+300ºC 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	≤+30ºC / 60% RH	≥24 hours	+125ºC ±5ºC

Packing Information

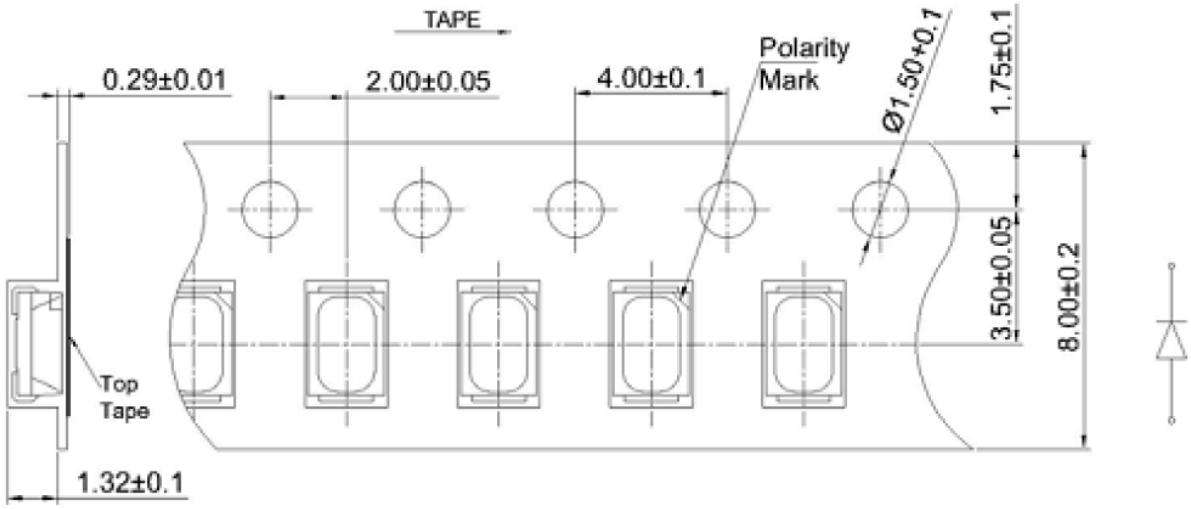


Figure 11. Embossed taping specifications (unit in mm)

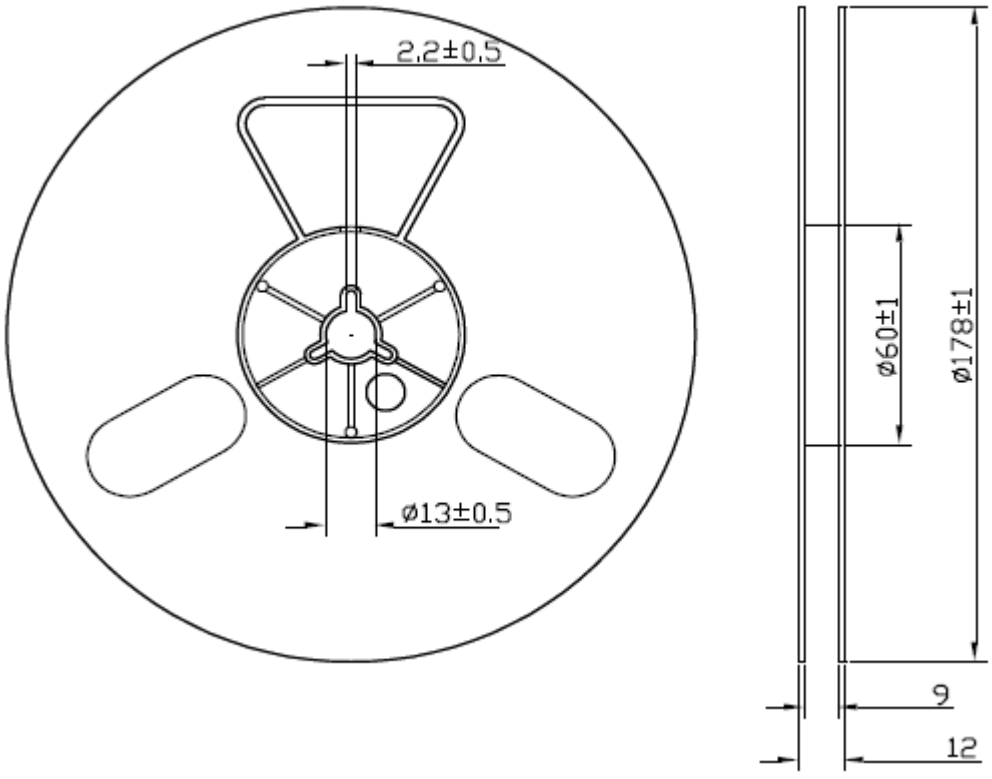


Figure 12. Reel specification (unit in mm)

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