

ASMT-Ax03

1W Power LED Light Source

Datasheet



Description

The 1W Power LEDs are high performance energy efficient devices which can handle high driving current and high temperatures. The exposed pad design enables excellent heat transfer from the package to the motherboard.

The low profile package design is suitable for a wide variety of applications especially where height is a constraint and the package foot print is compatible with most high power LEDs available in the market today.

This package is compatible with reflow soldering process.

Features

- Available in Red, Red Orange and Amber
- Energy efficient
- Exposed metal slug for excellent heat transfer
- Compatible with reflow soldering process
- High current operation
- Long operation life
- Wide viewing angle at 140°
- Silicone encapsulation
- Non-ESD sensitive (threshold > 16kV)
- MSL 2A products

Applications

- Architectural lighting
- Channel backlighting
- Contour lighting
- Retail display lighting
- Decorative lighting
- Garden lighting

Package Dimensions

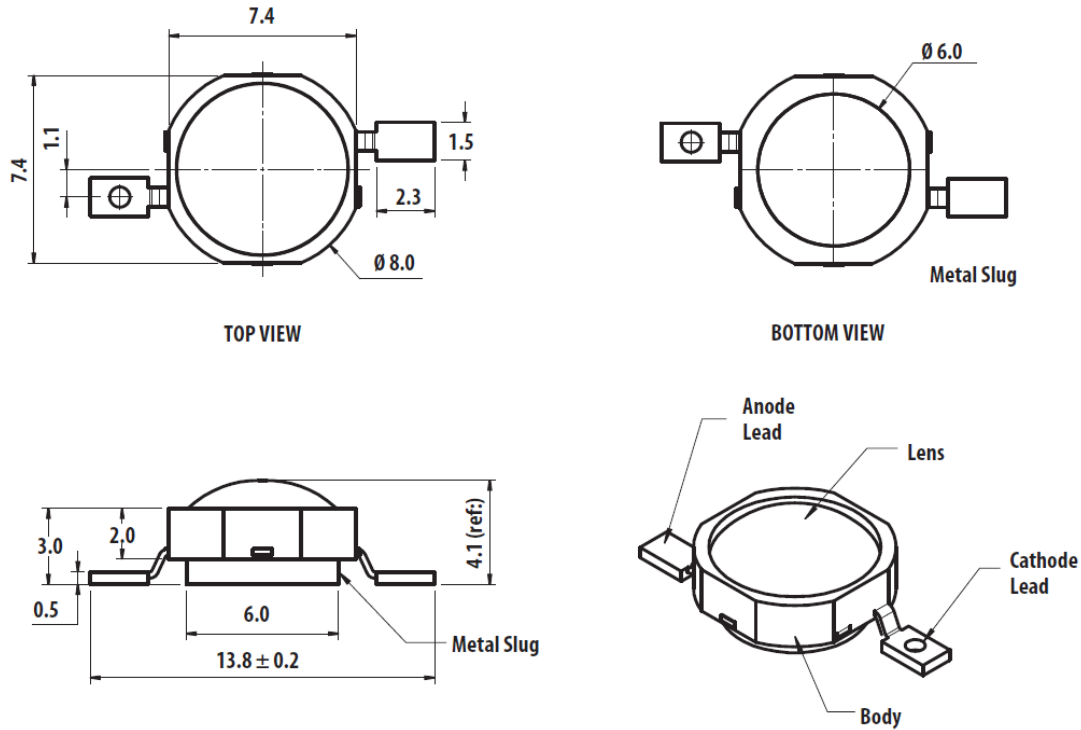
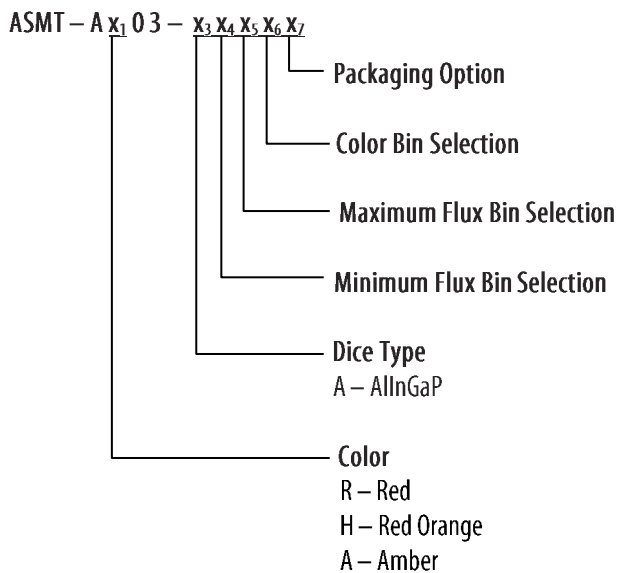


Figure 1: ASMT-Ax03 package outline drawing

Notes:

1. All dimensions in millimeters.
2. Metal slug is connected to anode for electrically non-isolated option.
3. Tolerance is ± 0.1 mm unless otherwise specified.
4. Terminal finish: Ag plating.

Part Numbering System



Note:

1. Please refer to Page 6 for selection details.

Device Selection Guide ($T_j = 25\text{ }^\circ\text{C}$)

Part Number	Color	Luminous Flux (lm), Φ_v ^[1,2]			Test Current (mA)	Dice Technology	Electrically Isolated Metal Slug
		Min.	Typ.	Max.			
ASMT-AR03-AST00	Red	51.7	65.0	87.4	350	AllnGaP	No
ASMT-AH03-AST00	Red Orange	51.7	65.0	87.4	350	AllnGaP	No
ASMT-AH03-ATU00		67.2	75.0	99.6	350	AllnGaP	No
ASMT-AA03-AST00	Amber	51.7	65.0	87.4	350	AllnGaP	No

Notes:

- Φ_v is the total luminous flux output as measured with an integrating sphere at 25ms mono pulse condition.
- Flux tolerance is $\pm 10\%$

Absolute Maximum Ratings

Parameter	1W AllnGaP	Units
DC Forward Current ^[1]	500	mA
Peak Pulsing Current ^[2]	1000	
Power Dissipation	1230	mW
LED Junction Temperature	125	$^\circ\text{C}$
Operating Metal Slug Temperature Range at 350 mA	-40 to +115	$^\circ\text{C}$
Storage Temperature Range	-40 to +120	$^\circ\text{C}$
Soldering Temperature	Refer to Figure. 14	
Reverse Voltage ^[3]	Not Recommended	

Note:

- Derate linearly based on Figure 8.
- Pulse condition duty factor =10%, Frequency =1kHz
- Not designed for reversed bias operation.

Optical Characteristics at 350 mA ($T_j = 25\text{ }^\circ\text{C}$)

Part Number	Color	Peak Wavelength, λ_{PEAK} (nm)	Dominant Wavelength, λ_D ^[1] (nm)	Viewing Angle, $2\theta_{1/2}$ ^[2] ($^\circ$)	Luminous Efficiency (lm/W)
		Typ.	Typ.	Typ.	Typ.
ASMT-AR03-AST00	Red	635	625	140	88
ASMT-AH03-AST00	Red Orange	625	615	140	88
ASMT-AH03-ATU00		625	615	140	102
ASMT-AA03-AST00	Amber	598	590	140	88

Notes:

- The dominant wavelength, λ_D , is derived from the CIE Chromaticity Diagram and represents the color of the device.
- $\theta_{1/2}$ is the off-axis angle where the luminous intensity is $1/2$ the peak intensity.

Electrical Characteristic at 350 mA ($T_j = 25\text{ }^\circ\text{C}$)

Dice Type	Forward Voltage, V_F (Volts) at $I_F = 350\text{mA}$			Thermal Resistance, $R_{\theta_{j-ms}}$ ($^\circ\text{C/W}$) ^[1]
	Min.	Typ	Max.	Typ.
AllnGaP	1.7	2.1	2.3	10

Note:

- $R_{\theta_{j-ms}}$ is Thermal Resistance from LED junction to metal slug.

AlInGaP

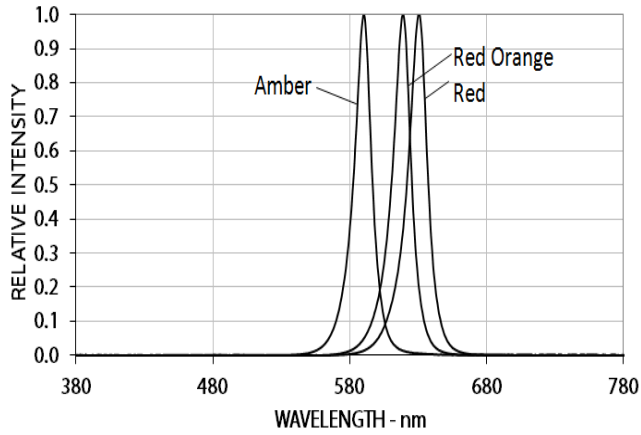


Figure 2. Relative Intensity vs. Wavelength for Red, Red Orange and Amber.

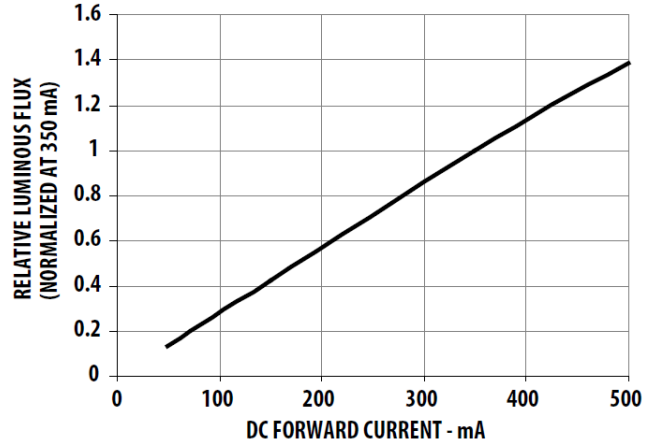


Figure 3. Relative Luminous Flux vs. Mono Pulse Current.

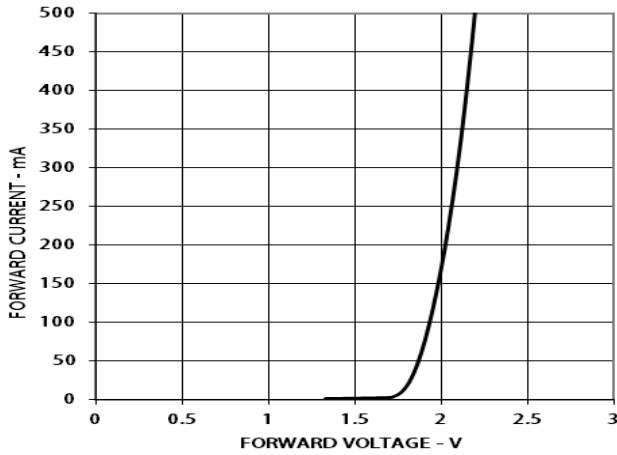


Figure 4. Forward Current vs. Forward Voltage.

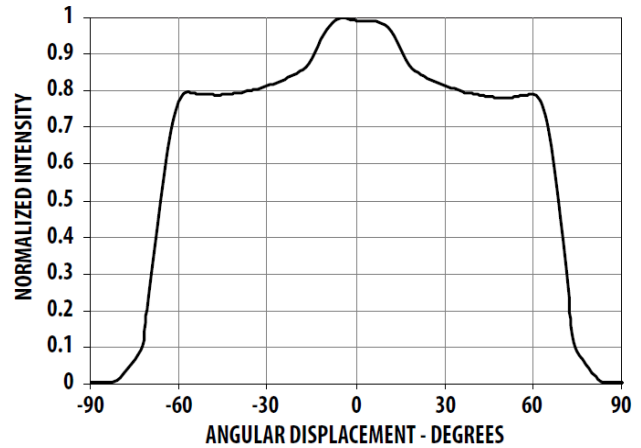


Figure 5. Radiation Pattern.

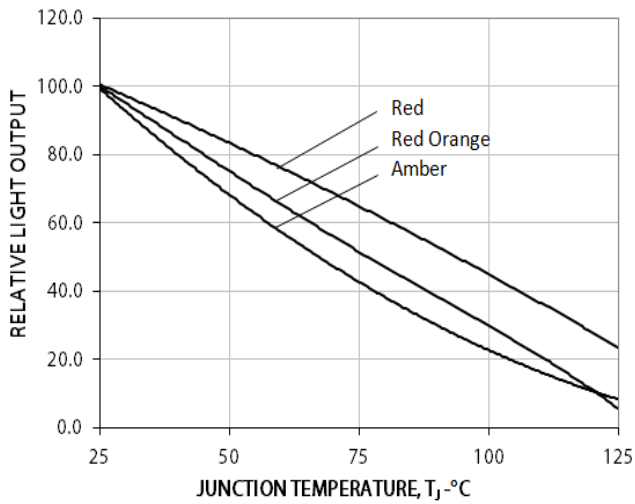


Figure 6. Relative Light Output vs. Junction Temperature.

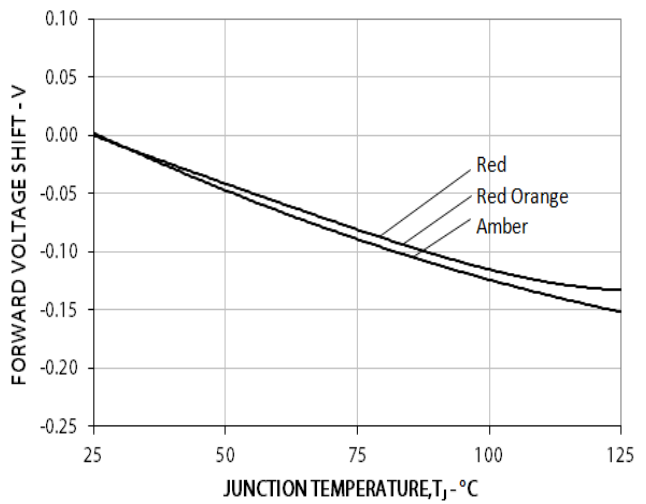


Figure 7. Forward Voltage Shift vs. Junction Temperature.

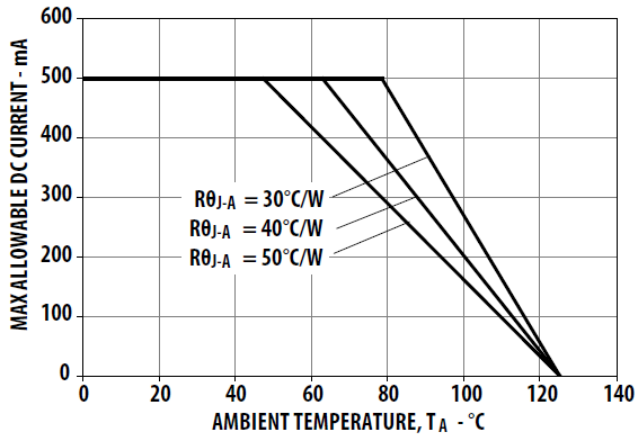


Figure 8. Maximum Forward Current vs. Ambient Temperature. Derated based on $T_{JMAX} = 125^{\circ}\text{C}$, $R_{\theta J-A} = 30^{\circ}\text{C/W}$, 40°C/W and 50°C/W .

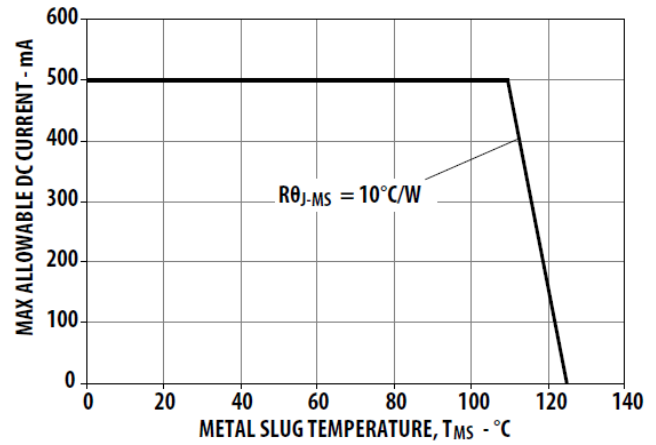


Figure 9. Maximum Forward Current vs. Metal Slug Temperature. Derated based on $T_{JMAX} = 125^{\circ}\text{C}$, $R_{\theta J-MS} = 10^{\circ}\text{C/W}$.

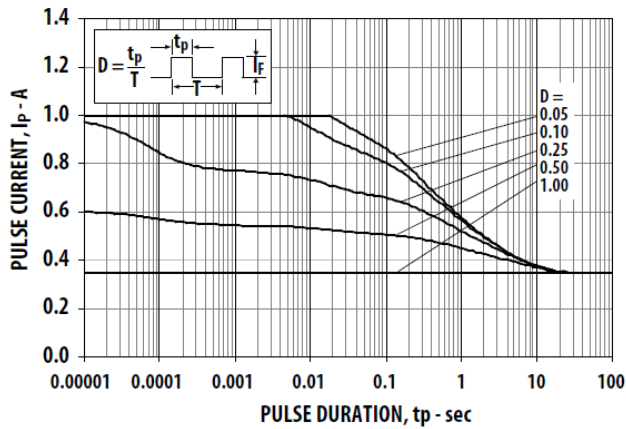


Figure 10: Maximum peak pulse current at $T_A = 25^{\circ}\text{C}$, $R_{\theta J-A} = 50^{\circ}\text{C/W}$.

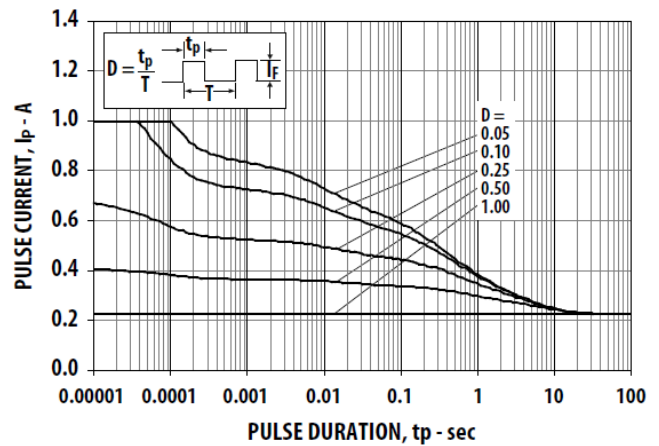


Figure 11: Maximum peak pulse current at $T_A = 85^{\circ}\text{C}$, $R_{\theta J-A} = 50^{\circ}\text{C/W}$.

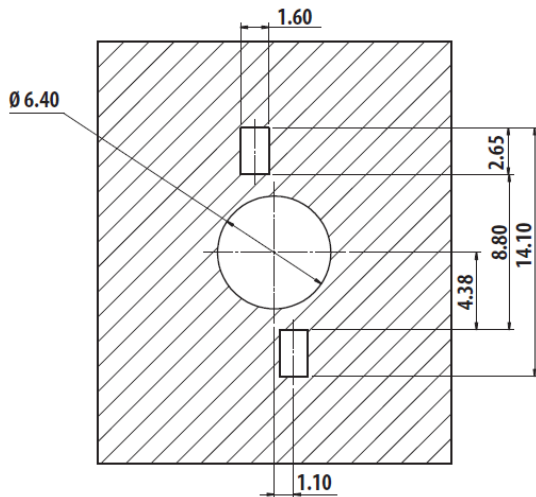


Figure 12. Recommended soldering land pattern

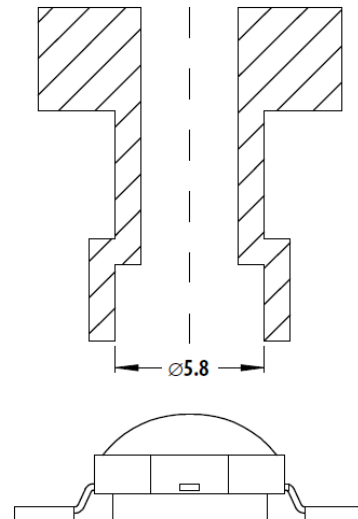


Figure 13. Recommended pick and place nozzle tip. Inner diameter = 5.8 mm

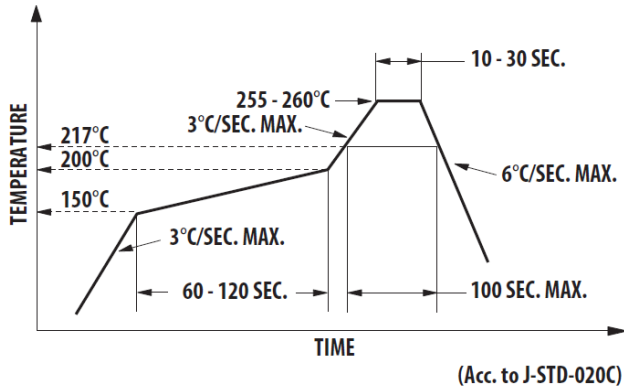


Figure 14. Recommended Reflow Soldering Profile

Note:

For detail information on reflow soldering of Avago surface mount LEDs, do refer to Avago Application Note AN1060 Surface Mounting SMT LED Indicator Components.

Option Selection Details

ASMT-A x₁ 0 3 – x₂ x₃ x₄ x₅ x₆

x₃ – Minimum Flux Bin Selection

x₄ – Maximum Flux Bin Selection

x₅ – Color Bin Selection

x₆ – Packaging Option

Color Bin Selection [x₅]

Individual reel will contain parts from one full bin only.

Other Colors

0	Full Distribution
Y	B and C
W	C and D
V	D and E
P	B, C and D
N	C, D and E

Packaging Option [x₆]

Selection	Option
0	Tube
1	Tape and Reel

Flux Bin Limit [x₃, x₄]

Color	Bin ID	Luminous Flux (lm) at 350 mA	
		Min.	Max.
Other	S	51.7	67.2
Colors	T	67.2	87.4
	U	87.4	99.6

Tolerance for each bin limits is ±10 %

Color Bin Limit

Color	Bin ID	Dominant Wavelength(nm) at 350 mA	
		Min.	Max.
Red	-	620.0	635.0
Red Orange	-	610.0	620.0
Amber	B	587.0	589.5
	C	589.5	592.0
	D	592.0	594.5
	E	594.5	597.0

Tolerance: ± 1nm

Example

ASMT-AA03-AST00

ASMT-AA03-Axxxx – Amber, AllnGaP

x₄ = S – Minimum Flux Bin S

x₅ = T – Maximum Flux Bin T

x₆ = 0 – Full Distribution

x₇ = 0 – Tube

Packing tube – Option 0

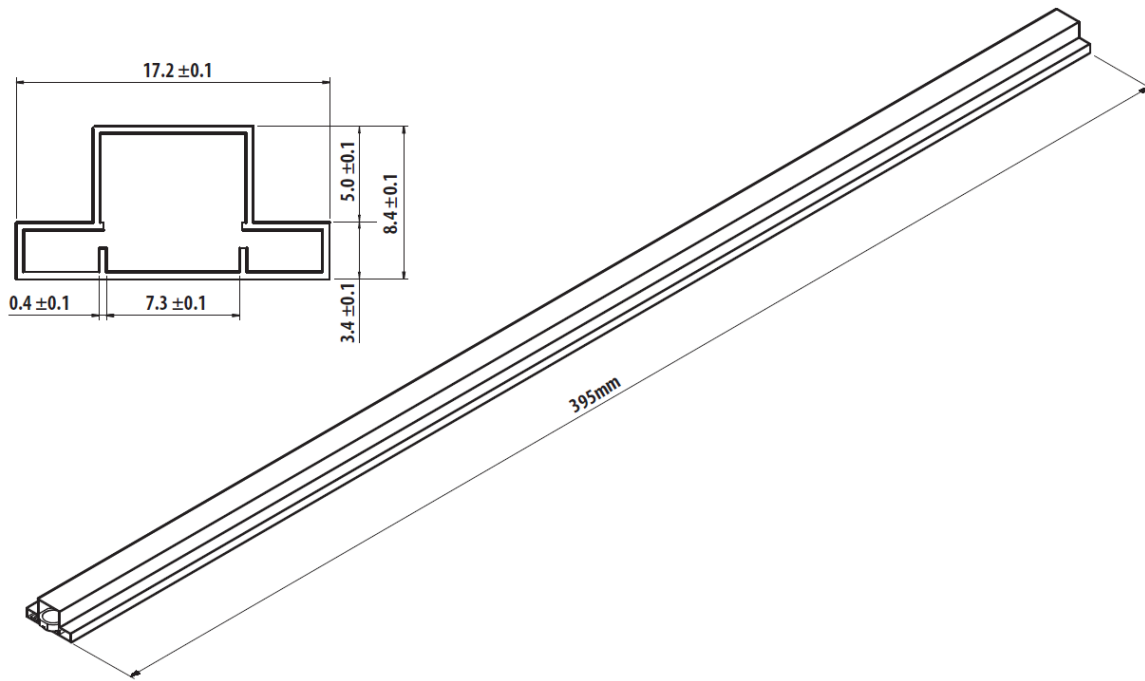


Figure 15: Packing tube dimensions.

Tape and reel – Option 1

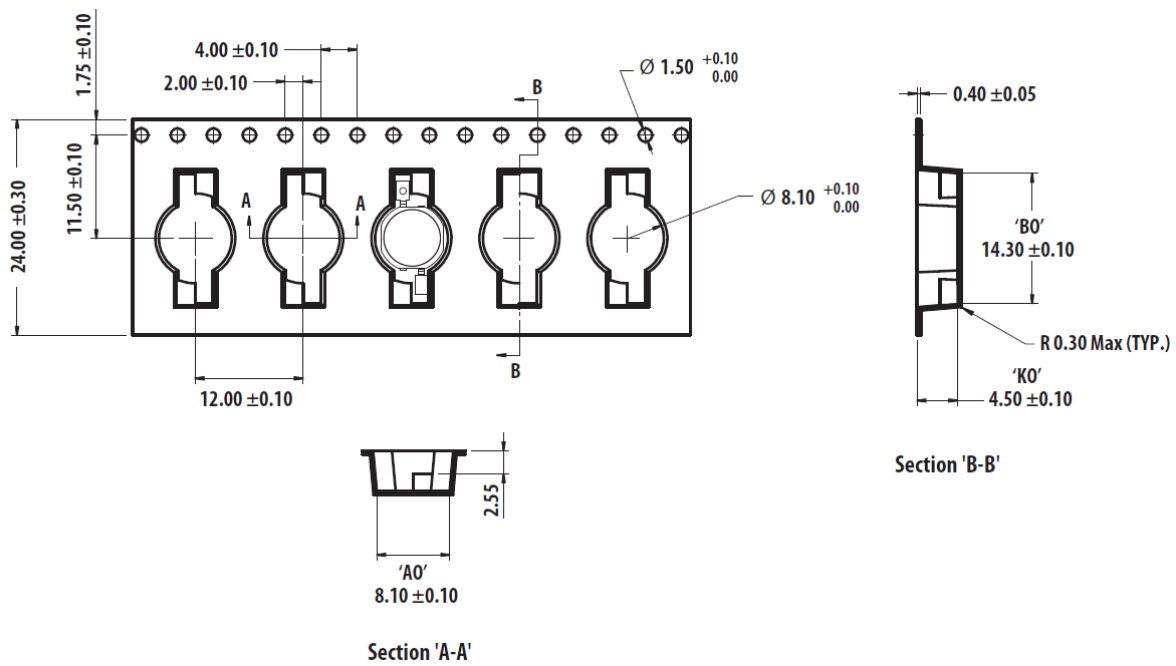


Figure 16. Carrier tape dimensions.

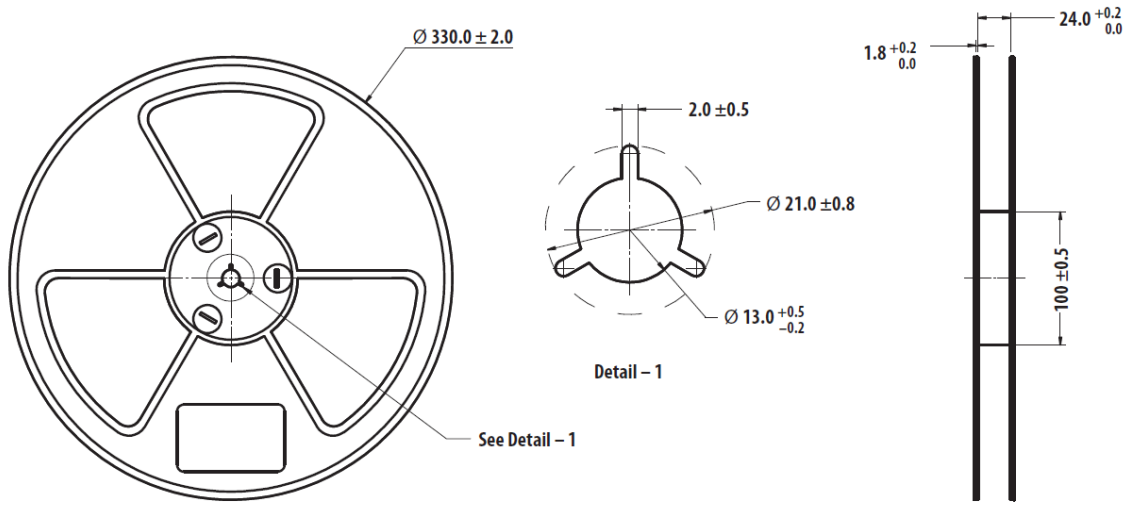


Figure 17. Reel dimensions.

Handling Precaution

The encapsulation material of the product is made of silicone for better reliability of the product. As silicone is a soft material, please do not press on the silicone or poke a sharp object onto the silicone. These might damage the product and cause premature failure. During assembly or handling, the unit should be held on the body only. Please refer to Avago Application Note AN 5288 for detail information.

Moisture Sensitivity

This product is qualified as Moisture Sensitive Level 2a per Jedec J-STD-020. Precautions when handling this moisture sensitive product is important to ensure the reliability of the product. Do refer to Avago Application Note AN5305 Handling of Moisture Sensitive Surface Mount Devices for details.

A. Storage before use

- Unopen moisture barrier bag (MBB) can be stored at $40^{\circ}\text{C}/90\%\text{RH}$ for 12 months. If the actual shelf life has exceeded 12 months and the humidity indicator card (HIC) indicates that baking is not required, then it is safe to reflow the LEDs per the original MSL rating.
- It is not recommended to open the MBB prior to assembly (e.g. for IQC).

B. Control after opening the MBB

- The humidity indicator card (HIC) shall be read immediately upon opening of MBB.
- The LEDs must be kept at $30^{\circ}\text{C}/60\%\text{RH}$ at all time and all high temperature related process including soldering, curing or rework need to be completed within 672 hours.

C. Control for unfinished reel

- For any unused LEDs, they need to be stored in sealed MBB with desiccant or desiccator at $5\%\text{RH}$.

D. Control of assembled boards

- If the PCB soldered with the LEDs is to be subjected to other high temperature processes, the PCB need to be stored in sealed MBB with desiccant or desiccator at $5\%\text{RH}$ to ensure no LEDs have exceeded their floor life of 672 hours.

E. Baking is required if:

- HIC "10%" indicator is NOT Brown and "5%" indicator is Azure.
- The LEDs are exposed to condition of $30^{\circ}\text{C}/60\%\text{RH}$ at any time.
- The LED floor life exceeded 672hrs.

Recommended baking condition: $60\pm 5^{\circ}\text{C}$ for 20hrs.

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