BROADCOM®

Data Sheet

ASMT-Jx3x

3W Mini Power LED Light Source

Description

The Broadcom® 3W Mini Power LED Light Source is a high-performance energy-efficient device that can handle high thermal and high driving current. An option with electrically isolated metal slug is also available.

The low-profile package design and ultra-small footprint are suitable for a wide variety of applications especially where space and height is a constraint.

The package is compatible with the reflow soldering process. To facilitate easy pick-and-place assembly, the LEDs are packed in EIA-compliant tape and reel.

CAUTION! Keep the LEDs in a moisture barrier bag when not in use because prolonged exposure to the environment might cause the silver-plated leads to tarnish, which might cause difficulties in soldering.

Features

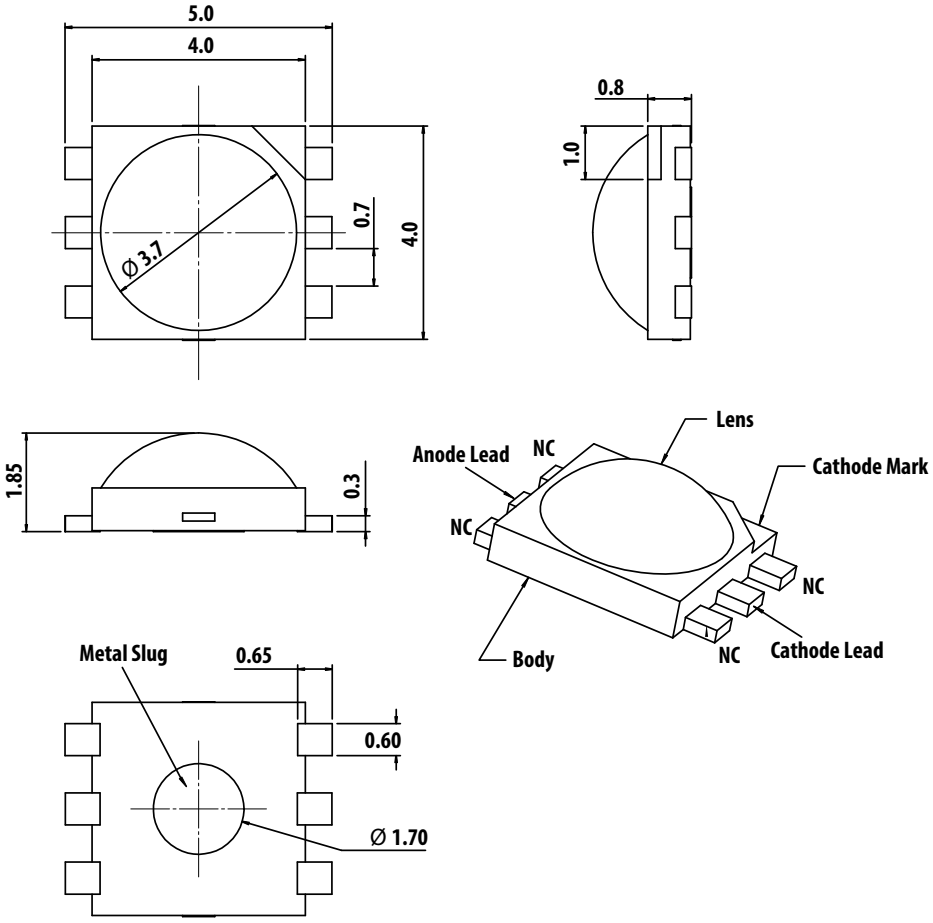
- Available in Red, Amber, Green, Blue, and Royal Blue
- Small footprint and low profile
- Symmetrical outline
- Energy efficient
- Direct heat transfer from metal slug to motherboard
- Compatible with reflow soldering process
- High current operation
- Long operation life
- Wide viewing angle
- Silicone encapsulation
- Non-ESD sensitive (threshold > 16 kV)
- MSL 1 products

Applications

- Sign backlight
- Safety, exit and emergency sign lightings
- Specialty lighting such as task lighting and reading lights
- Retail display
- Commercial lighting
- Accent or marker lightings, strip or step lightings
- Portable lightings, bicycle head lamp, torch lights.
- Decorative lighting
- Architectural lighting
- Pathway lighting
- Street lighting
- Pedestrian street lighting
- Tunnel lighting
- Horticulture

Package Dimensions

Figure 1: ASMT-Jx3x Package Outline Drawing



NOTE:

1. All dimensions are in millimeters.
2. The metal slug is connected to the anode for electrically nonisolated option.
3. Tolerance is ± 0.1 mm, unless otherwise specified.
4. Terminal finish: Ag plating.
5. Corresponding NC (No Connection) leads adjacent to anode and cathode leads can be electrically short.

Device Selection Guide (T_J = 25°C)

Part Number	Color	Luminous Flux (lm) / Radiometric Power (mW), Φ_V[a, b]			Test Current (mA)	Dice Technology	Electrically Isolated Metal Slug
		Min.	Typ.	Max.			
ASMT-JR30-AST01	Red	51.7	58.0	87.4	350	AlInGaP	No
ASMT-JA30-ARS01	Amber	39.8	48.0	67.2	350	AlInGaP	No
ASMT-JG31-NUW01	Green	87.4	110.0	129.5	350	InGaN	Yes
ASMT-JB31-NNP01	Blue	18.1	25.0	30.6	350	InGaN	Yes
ASMT-JL31-NRS01	Royal Blue	515 mW	600 mW	685.0 mW	350	InGaN	Yes

a. Φ_V is the total luminous flux/radiometric power output as measured with an integrating sphere at 25-ms mono pulse condition.

b. Flux tolerance is ±10%.

Absolute Maximum Ratings

Parameter	AlInGaP	InGaN	Units
DC Forward Current[a]	700	700	mA
Peak Pulsing Current	1500	2400	mA
Power Dissipation	1820	2730	mW
LED Junction Temperature	125	135	°C
Operating Metal Slug Temperature Range at 350 mA	–40 to +115	–40 to +120	°C
Operating Metal Slug Temperature Range at 700 mA	–40 to +100	–40 to +105	°C
Storage Temperature Range	–40 to +120	–40 to + 120	°C
Reverse Voltage[b]	Not recommended		

a. Derate linearly based on Figure 10 for AlInGaP and Figure 21 for InGaN.

b. Not designed for reverse-bias operation.

Optical Characteristics at 350 mA (T_J = 25°C)

Part Number	Color	Peak Wavelength, λ_{PEAK} (nm)	Dominant Wavelength, λ_D[a] (nm)	Viewing Angle, $2\theta_{½}$[b] (°)	Luminous Efficiency (lm/W)
		Typ.	Typ.	Typ.	Typ.
ASMT-JR30-AST01	Red	635	625	165	79
ASMT-JA30-ARS01	Amber	598	590	165	65
ASMT-JG31-NUW01	Green	519	525	165	98
ASMT-JB31-NNP01	Blue	454	460	165	22
ASMT-JL31-NRS01	Royal Blue	450	455	165	Not applicable

a. The dominant wavelength, λ_D, is derived from the CIE Chromaticity Diagram and represents the color of the device

b. $\theta_{½}$ is the off-axis angle where the luminous intensity is half of the peak intensity.

Electrical Characteristic at 350 mA (T_J = 25°C)

Dice Type	Forward Voltage, V_F (V)			Thermal Resistance, $R\theta_{j\text{-}ms}$ (°C/W)[a]
	Min.	Typ.	Max.	Typ.
AlInGaP	1.7	2.1	2.3	9
InGaN	2.8	3.2	3.5	9

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

Optical and Electrical Characteristic at 700 mA (T_J = 25°C)

Part Number	Color	Luminous Flux (lm)/ Radiometric Power (mW), Φ_V	Forward Voltage, V_F (V)
		Typ.	Typ.
ASMT-JR30-AST01	Red	104.0	2.4
ASMT-JA30-ARS01	Amber	86.0	2.4
ASMT-JG31-NUW01	Green	176.0	3.3
ASMT-JB31-NNP01	Blue	43.0	3.6
ASMT-JL31-NRS01	Royal Blue	1020 mW	3.6

Part Numbering System

A S M T - J [x_1] **3** [x_2] **-** [x_3] [x_4] [x_5] [x_6] [x_7]

Code	Description	Option	
x_1	LED Chip Color	A	Amber
		B	Blue
		G	Green
		L	Royal Blue
		R	Red
x_2	Heat Sink	0	Electrically Non-Isolated
		1	Electrically Isolated
x_3	Dice Type	A	AlInGaP
		N	InGaN
x_4	Minimum Flux Bin Selection	Refer Flux Bin Limit Table	
x_5	Maximum Flux Bin Selection		
x_6	Color Bin Selection	Refer Color Bin Selection	
x_7	Packaging Option	0	Tube
		1	Tape and Reel

NOTE: For selection details, see Option Selection Details.

Option Selection Details

ASMT-J x_1 3 x_2 - x_3 x_4 x_5 x_6 x_7

x_4 - Minimum Flux Bin Selection
x_5 - Maximum Flux Bin Selection
x_6 - Color Bin Selection
x_7 - Packaging Option

Flux Bin Limit (x_4, x_5)

Color	Bin ID	Luminous Flux (lm)/ Radiometric Power (mW) at 350 mA	
		Min.	Max.
Blue	M	13.9	18.1
	N	18.1	23.5
	P	23.5	30.6
	Q	30.6	39.8
Other Colors	R	39.8	51.7
	S	51.7	67.2
	T	67.2	87.4
	U	87.4	99.6
	V	99.6	113.6
	W	113.6	129.5
Royal Blue	L	175.0	225.0
	M	225.0	275.0
	N	275.0	355.0
	P	355.0	435.0
	Q	435.0	515.0
	R	515.0	595.0
	S	595.0	685.0

Tolerance for each bin limit is ± 10%.

Color Bin Selection (x_6)

Individual reel contains parts from one color bin selection only.

Selection	Bin ID
0	Full Distribution
Z	A and B
Y	B and C
W	C and D
V	D and E
Q	A, B, and C
P	B, C, and D
N	C, D, and E
M	D, E, and F

Color Bin Limits

Color	Bin ID	Dominant Wavelength (nm) at 350 mA	
		Min.	Max.
Red	—	620.0	635.0
Amber	B	587.0	589.5
	C	589.5	592.0
	D	592.0	594.5
	E	594.5	597.0
Blue	A	455.0	460.0
	B	460.0	465.0
	C	465.0	470.0
	D	470.0	475.0
Green	A	515.0	520.0
	B	520.0	525.0
	C	525.0	530.0
	D	530.0	535.0

Tolerance: ± 1 nm.

Color	Bin ID	Peak Wavelength (nm) at 350 mA	
		Min.	Max.
Royal Blue	C	440.0	445.0
	D	445.0	450.0
	E	450.0	455.0
	F	455.0	460.0

Tolerance: ± 2 nm.

Packaging Option (x_7)

Selection	Option
1	Tape and Reel

Example

ASMT-JG31-NUW01

ASMT-JG31-Nxxxx	– Green, InGaN, Electrically Isolated Heat Sink
x_4 = U	– Minimum Flux Bin U
x_5 = W	– Maximum Flux Bin W
x_6 = 0	– Full Distribution
x_7 = 1	– Tape and Reel Option

AlInGaP

Figure 2: Relative Intensity vs. Wavelength for Red and Amber

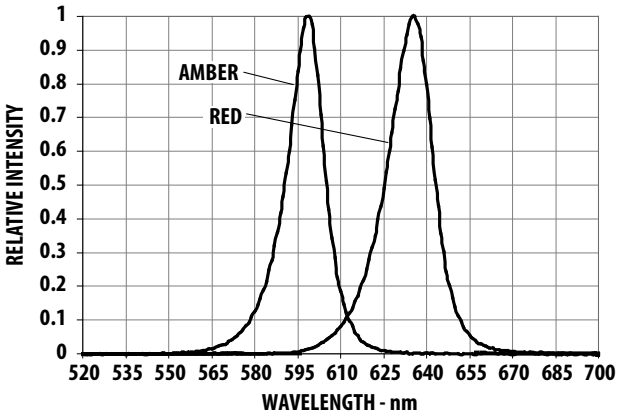


Figure 3: Relative Luminous Flux/Radiometric Power vs. Mono Pulse Current

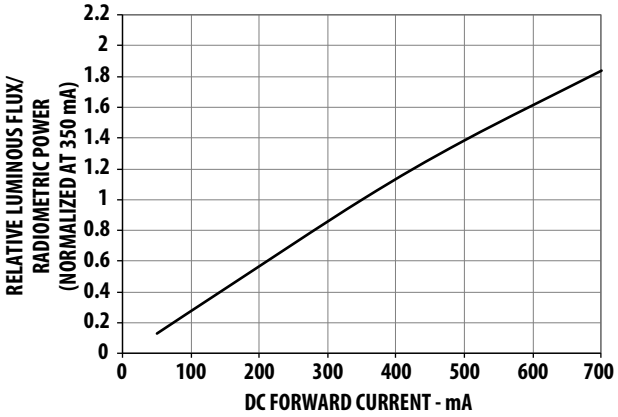


Figure 4: Forward Current vs. Forward Voltage

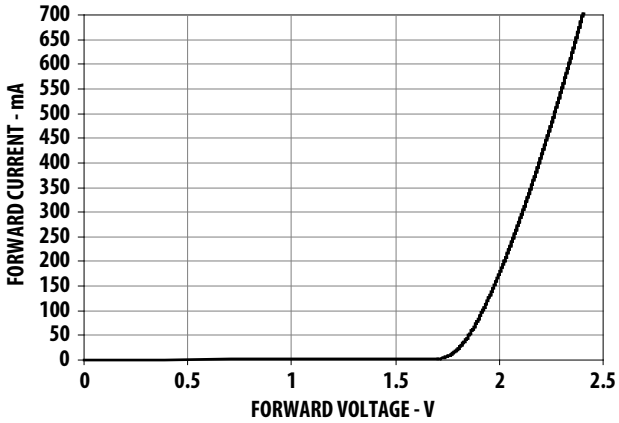


Figure 5: Radiation Pattern Red and Amber

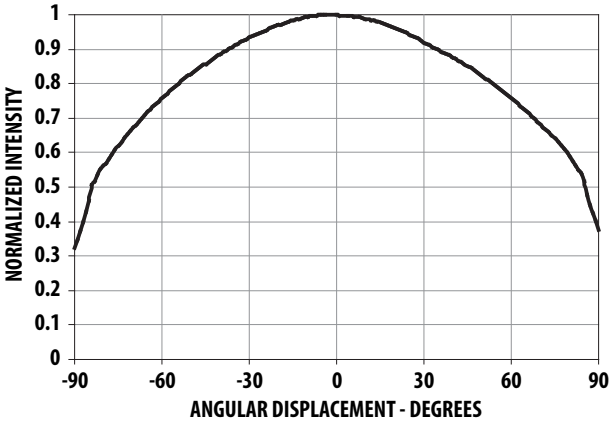


Figure 6: Maximum Pulse Current vs. Ambient Temperature. Derated based on T_A = 25°C, $R\theta_{J-A}$ = 30°C/W.

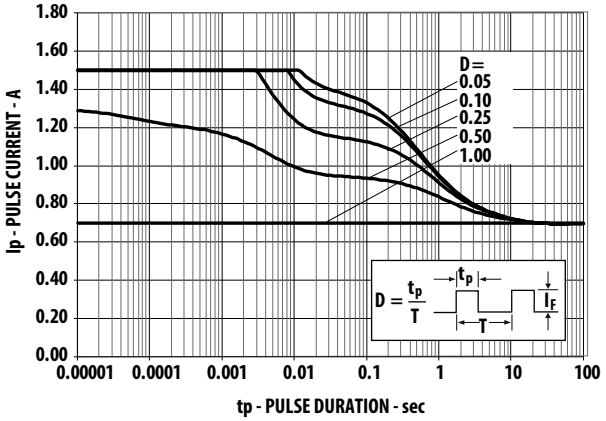


Figure 7: Maximum Pulse Current vs. Ambient Temperature. Derated based on T_A = 85°C, $R\theta_{J-A}$ = 30 °C/W.

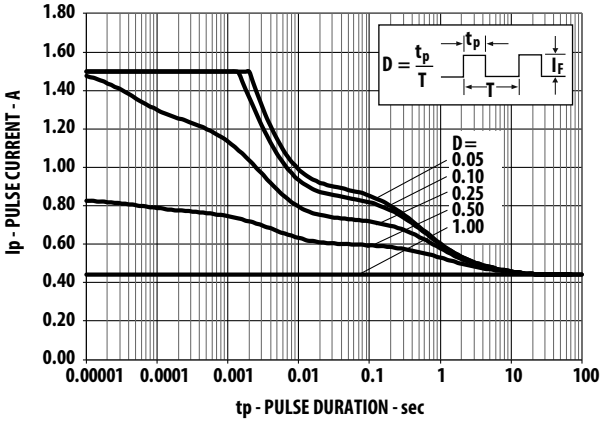


Figure 8: Relative Light Output vs. Junction Temperature

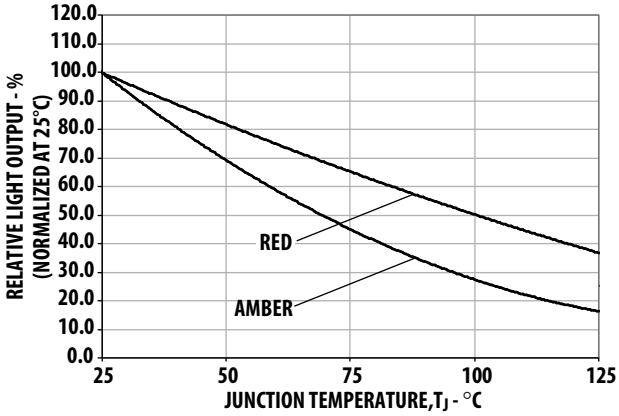


Figure 9: Forward Voltage Shift vs. Junction Temperature

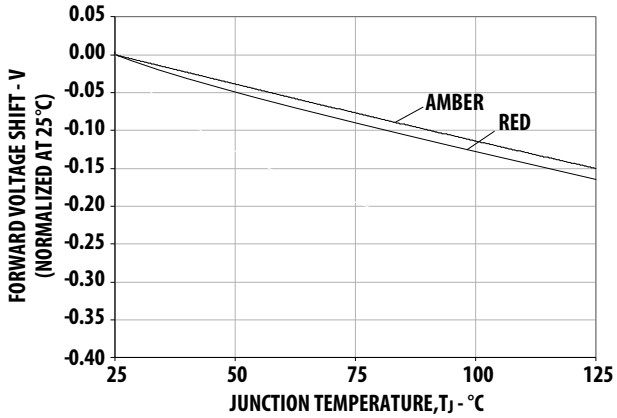


Figure 10: Maximum Forward Current vs. Ambient Temperature. Derated based on T_{JMAX} = 125°C, $R\theta_{J-A}$ = 20°C/W, 25°C/W, and 30°C/W.

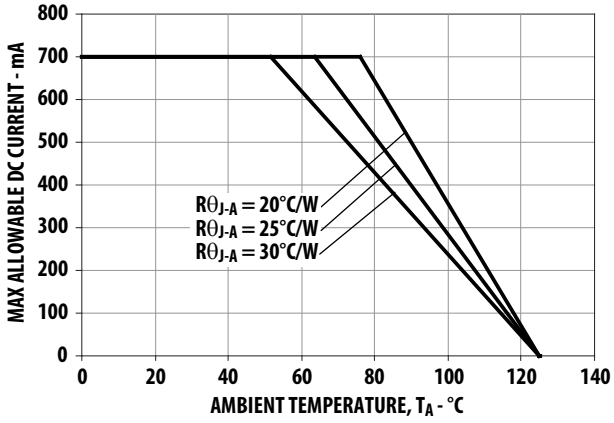
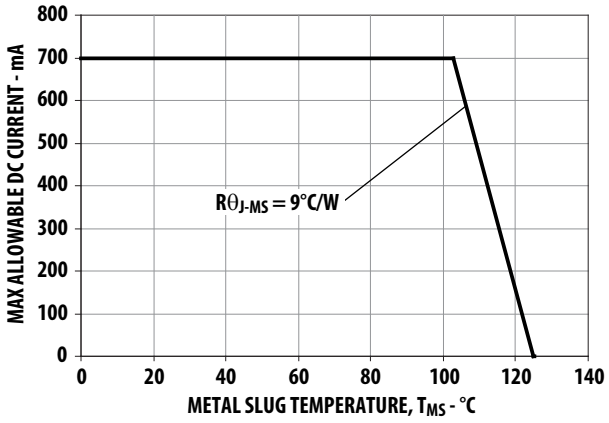


Figure 11: Maximum Forward Current vs. Ambient Temperature. Derated based on T_{JMAX} = 125°C, $R\theta_{J-MS}$ = 9°C/W.



InGaN

Figure 12: Relative Intensity vs. Wavelength for Royal Blue, Blue, and Green

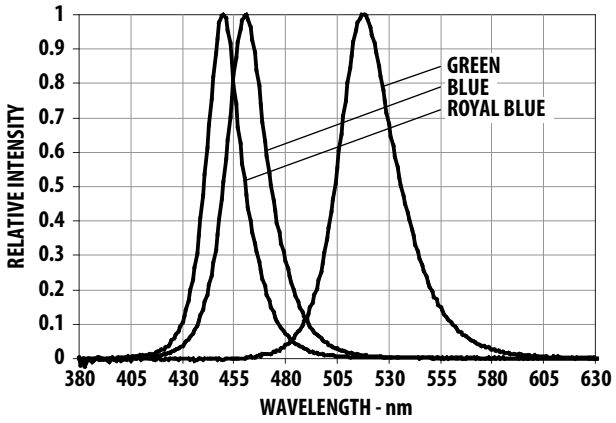


Figure 13: Relative Luminous Flux vs. Mono Pulse Current

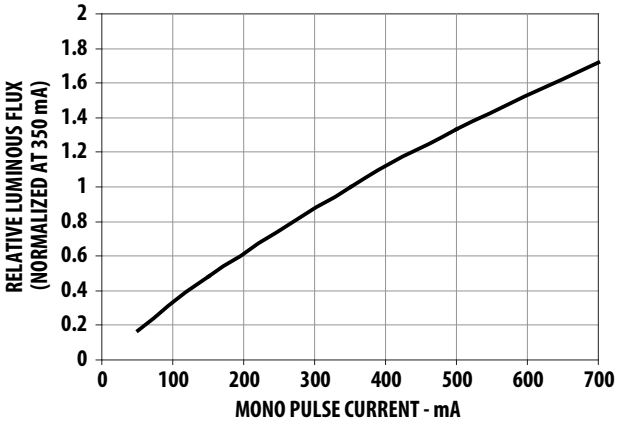


Figure 14: Forward Current vs. Forward Voltage for Royal Blue and Blue

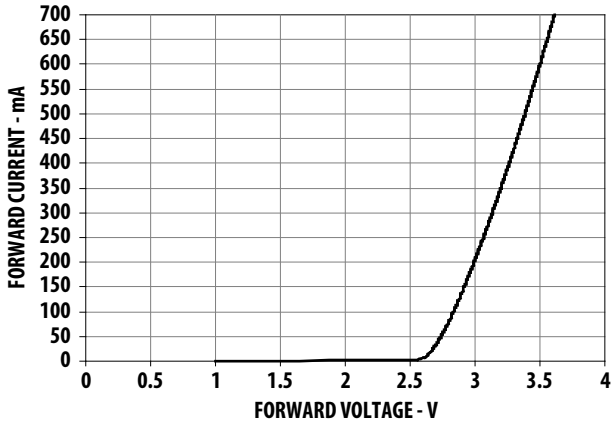


Figure 15: Forward Current vs. Forward Voltage for Green

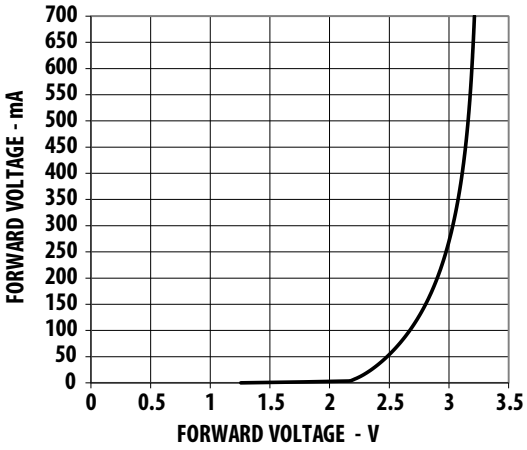


Figure 16: Radiation Pattern for Royal Blue, Blue, and Green

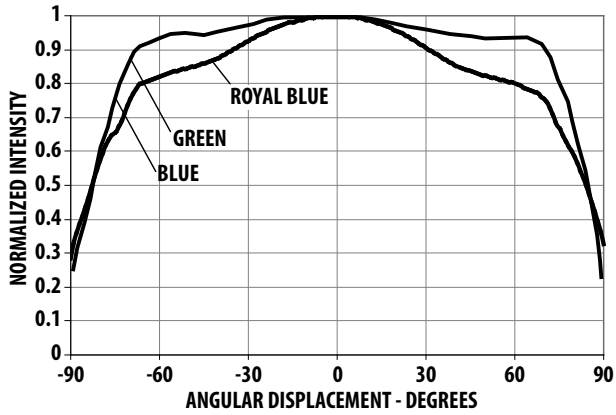


Figure 17: Maximum Pulse Current vs. Ambient Temperature. Derated based on T_A = 25°C, $R\theta_{J-A}$ = 30°C/W

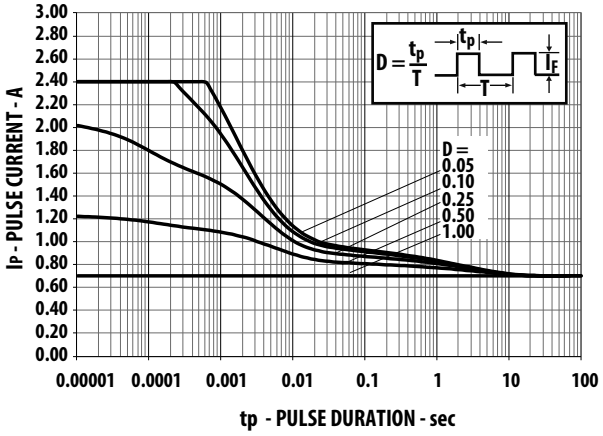


Figure 18: Maximum Pulse Current vs. Ambient Temperature. Derated based on T_A = 85°C, $R\theta_{J-A}$ = 30°C/W

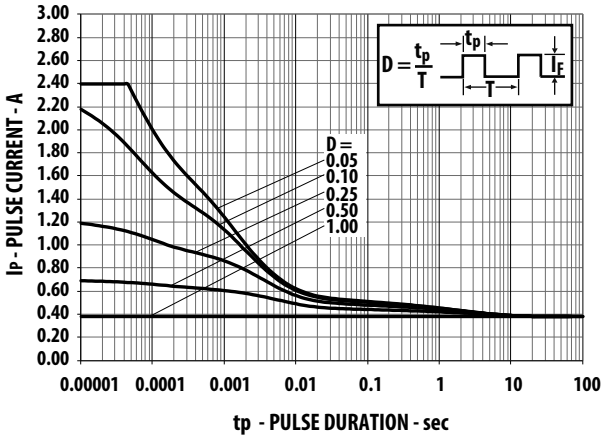


Figure 19: Relative Light Output vs. Junction Temperature

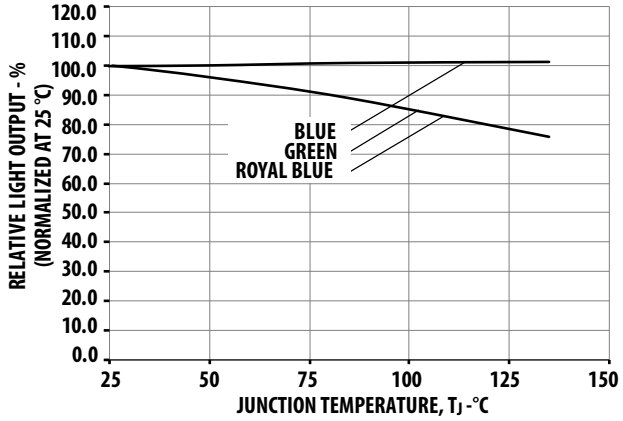


Figure 20: Forward Voltage Shift vs. Junction Temperature

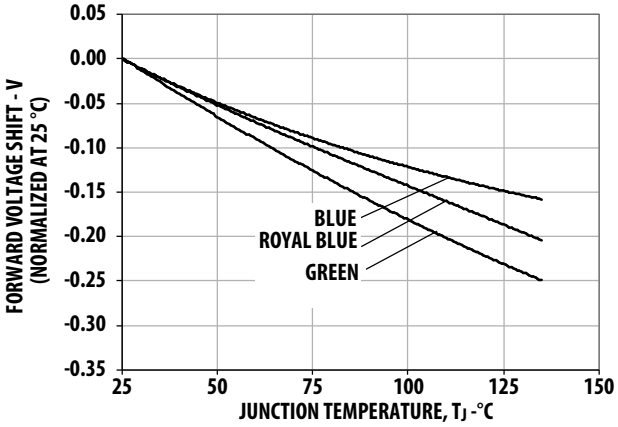


Figure 21: Maximum Forward Current vs. Ambient Temperature. Derated based on T_{JMAX} = 135°C, $R\theta_{J-A}$ = 20°C/W, 25°C/W and 30°C/W

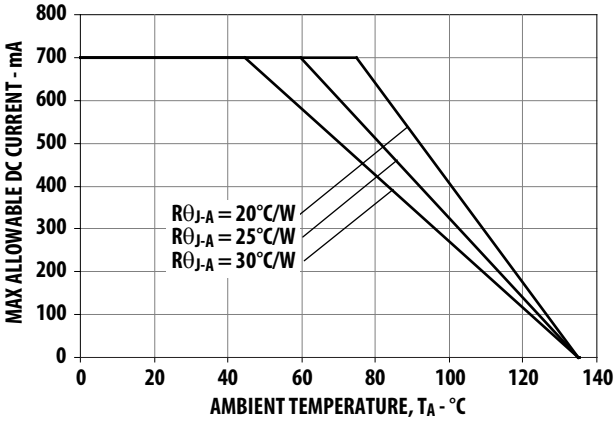


Figure 22: Maximum Forward Current vs. Metal Slug Temperature. Derated based on T_{JMAX} = 135°C, $R\theta_{J-MS}$ = 9°C/W

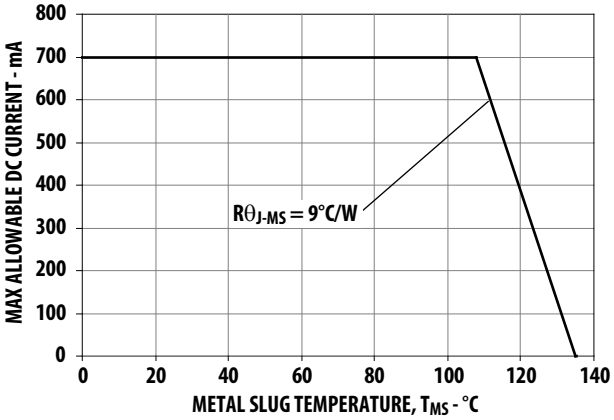


Figure 23: Recommended Soldering Land Pattern

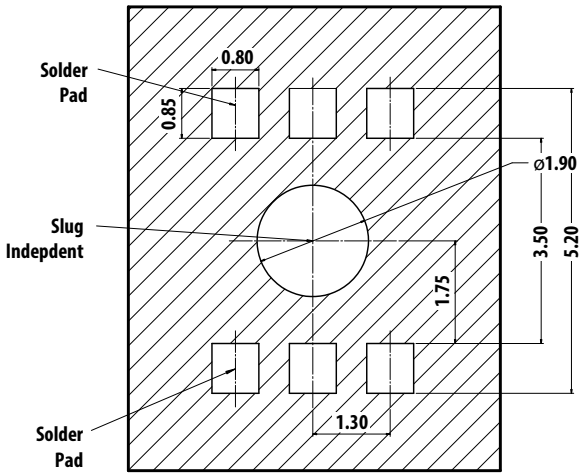


Figure 24: Recommended Pick-and-Place Nozzle Tip. Inner diameter = 3.2 mm.

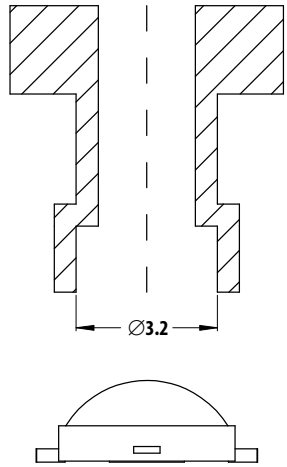
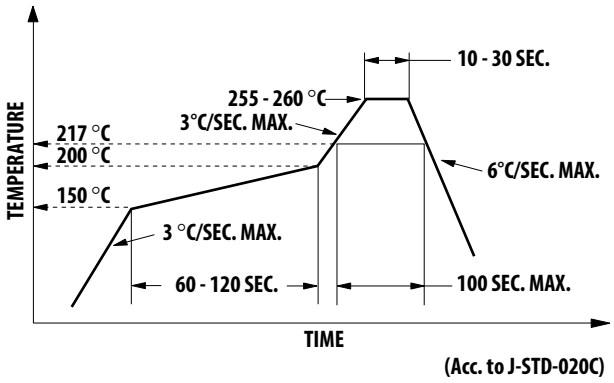


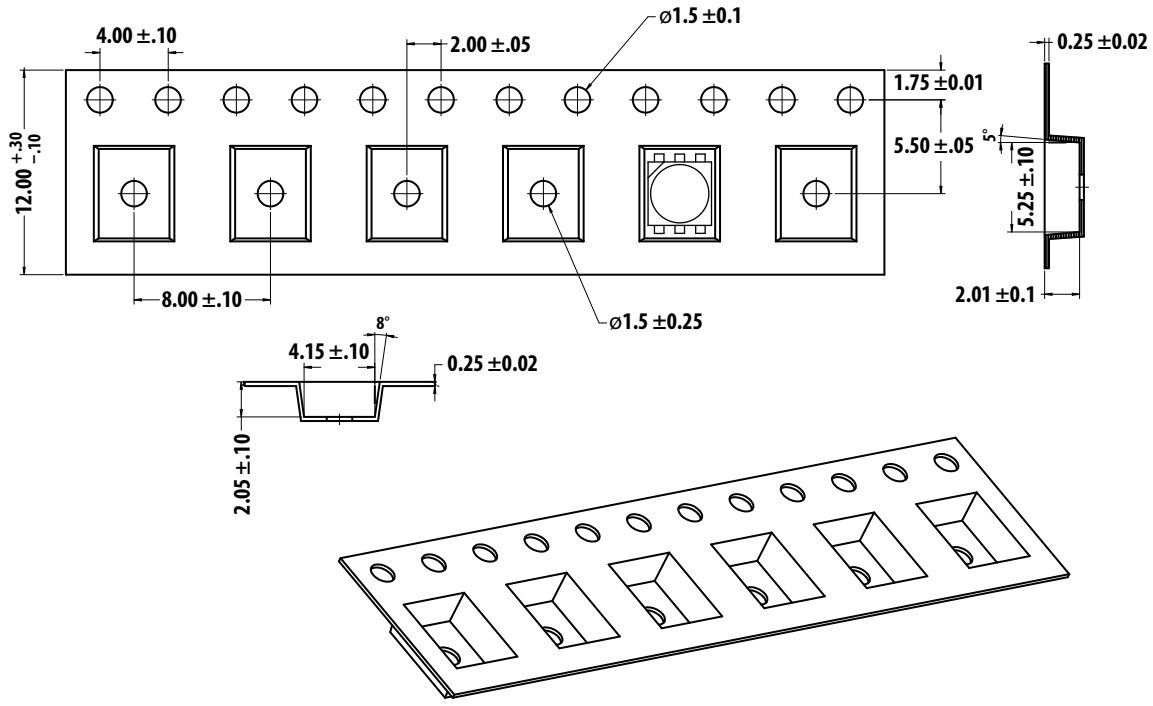
Figure 25: Recommended Reflow Soldering Profile



NOTE: For detailed information on reflow soldering of Broadcom surface mount LEDs, refer to Broadcom Application Note AN-1060, *Surface Mounting SMT LED Indicator Components*.

Tape and Reel – Option 1

Figure 26: Carrier Tape Dimensions



NOTE:

1. Empty component pockets are sealed with top cover tape.
2. 250 or 500 pieces per reel.
3. Drawing is not to scale.
4. All dimensions are in millimeters.

Figure 27: Reel Dimensions

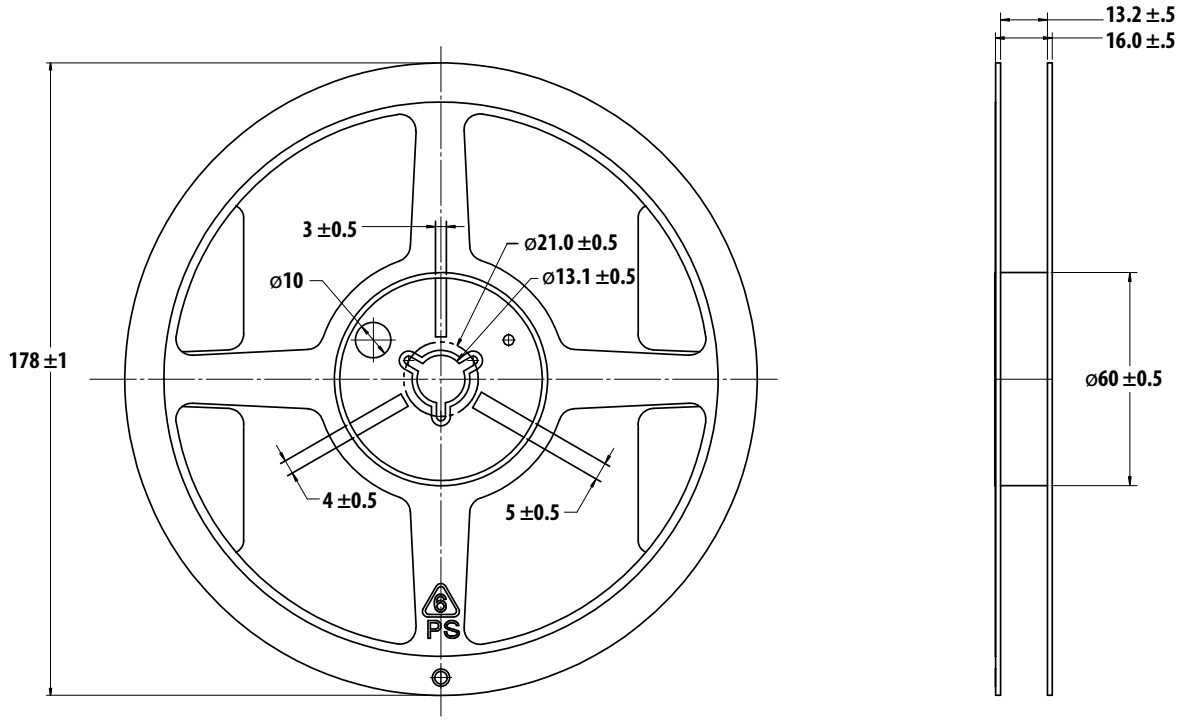
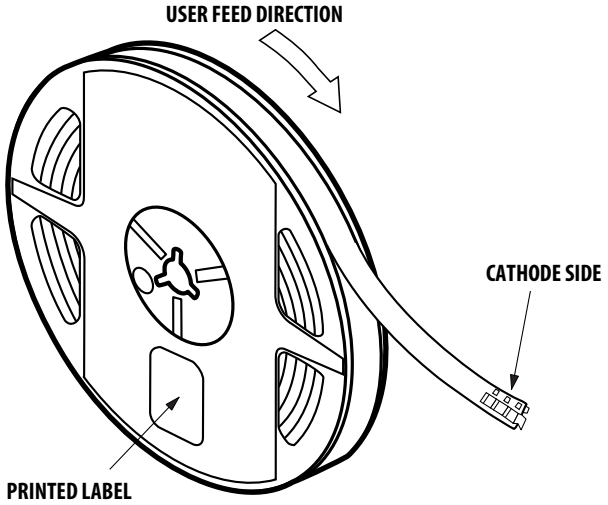


Figure 28: Reeling Orientation



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