OVERVIEW

Ceramic 5050 high-power package with superior thermal conductivity.

Emission colors: RGBY – Red, Green, Blue, and Yellow in a single compact package.

Lens appearance: Water Clear

Wide viewing angle: 120° (2θ½) for excellent light spread and mixing efficiency.

SMT compatible: Suitable for all standard surface-mount assembly processes.

Reflow robust: Withstands infrared and vapor phase reflow soldering (peak temperature up to 260°C).

Automation ready: Fully compatible with high-speed pick-and-place equipment.

RoHS compliant: Complies with EU RoHS Directive 2011/65/EU (lead-free, mercury-free).

FEATURES:

The **5050 RGBY 10–12W series** integrates four high-brightness LED chips (Red, Green, Blue, Yellow) on a thermally efficient ceramic substrate. The unique **inter-reflector design** ensures clean color separation and optimal light coupling—ideal for applications requiring vibrant, tunable white tones or saturated primary colors. With each chip rated for **1200 mA drive current**, the module delivers total optical power equivalent to **10–12 watts**, making it well-suited for dynamic lighting, automotive interiors, and professional-grade color-mixing systems where reliability and chromatic precision are essential.

APPLICATIONS:

Medical devices: PCR instruments, diagnostic equipment

Industrial lighting: machine vision, inspection systems

UV curing (if applicable)

High-reliability indicators and signal lighting

ABSOLUTE MAXIMUM RATINGS

Table 1. Absolute maximum ratings for LEDs.

PARAMETER	RED Yellow	GREEN BLUE
Parameter PD (mW)	2800	3200
DC Forward Current [1, 2]	1000mA	1000mA
Peak Pulsed Forward Current [1, 3]	1400mA	1400mA
LED Junction Temperature [1] (DC & Pulse)	115°C	115°C
Reverse Voltage ($V_{reverse}$)	5	
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 1	
LED Storage Temperature	-40°C to 80°C	
Operating Temperature Range	Minus 40°C To plus 80°C	
Soldering Temperature	JEDEC 020c 260°C	
Allowable Reflow Cycles	3~5 Seconds	
ESD Sensitivity	2000V HBM	

Notes for Table 1:

1. Proper current derating must be applied to ensure that the junction temperature remains below the maximum allowable limit.
2. All optical and electrical characteristics are measured under pulsed conditions with a 0.01 ms pulse width and a 0.1 ms pulse period, unless otherwise specified.
3. Pulse test conditions: tp ≤ 10 ms, duty cycle ≤ 10%.
4. Soldering temperature refers to the peak temperature during reflow soldering.
5. For RGB devices, each color channel (R/G/B) is driven and measured independently under its respective test current.

Product Electrical Index & TYPICALWAVELENGTH

Table 2. Product performance of Queendom Commercial LEDs under specified test conditions (IF = 1200 mA, Tj = 25°C; continued).

Model	Rank Code	Color Type	Wavelength (nm)		Luminous Flux (lm)		Forward Voltage VF (V)		Test Current
Device Model	Rank	Typical λ (nm)	Min	Max	Min	Max	Min	Max	(mA)
HP5050RGBY8WI	HP2B4	Red	620	640	240	280	1.8	2.4	1200
		Green	520	530	560	720	2.6	3.2	1200
		Blue	460	470	200	240	2.6	3.2	1200
		Yellow	585	595	200	240	1.8	2.4	1200

Notes for Table2:

1. Dominant Wavelength (λd) The dominant wavelength is determined from the CIE chromaticity diagram and represents the single wavelength that defines the perceived color of the LED.
2. Measurement Tolerances：Luminous flux: ±7.5%，Forward voltage: ±0.15 V；Color Rendering Index (CRI): ±2 ， These tolerances apply to all standard production measurements.
3. Test Conditions ： All optical and electrical characteristics are measured under pulsed conditions with a 10 ms pulse width at the nominal drive current, unless otherwise specified.
4. Typical Values ： Typical pulsed test data are provided for reference only and do not constitute a guarantee of performance. Actual values may vary due to production tolerances and operating conditions.

OPTICAL CHARACTERISTICS

Table 3. Optical performance of Queendom Commercial LEDs under specified test conditions (IF = 1200 mA, Tj = 25°C; continued).

PRODUCT	COLOR	TYPICAL SPECTRAL HALF-WIDTH [1] (nm)	TYPICAL TEMPERATURE COEFFICIENT OF DOMINANT WAVELENGTH (nm/°C)	TYPICAL VIEWING ANGLE [2]	PART NUMBER
HP5050RGBY8WI	Red	6	+0.12 ~ +0.25	120°	8541401000HP2B4
	Green	5	+0.07 ~ +0.15		
	Blue	5	+0.05 ~ +0.10		
	Yellow	5	+0.10 ~ +0.20		

Notes for Table 3

1. Spectral half-width refers to the spectral bandwidth measured at 50% of the peak radiant intensity.
2. Viewing angle is defined as the off-axis angle at which the luminous intensity is 50% of the peak value.
3. For RGB devices, each color channel (R/G/B) is tested and characterized independently under its respective test conditions.

ELECTRICAL AND THERMAL CHARACTERISTICS

Table 4. Electrical and thermal performance of LEDs at rated current (Tj = 25°C).

PRODUCT	PEAK COLOR	FORWARD VOLTAGE [1] (Vf)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W)
		MINIMUM	TYPICAL	MAXIMUM		
HP5050RGBY8WI	Red	1.9	2.2	2.4	-1.7	2 ~ 6
	Green	2.8	3.0	3.2	−2.0	3 ~ 7
	Blue	2.8	3.0	3.2	−2.5	3 ~ 7
	Yellow	1.9	2.2	2.4	−1.8	2 ~ 6

Notes for Table 4

1. Forward voltage (Vf) is measured under pulsed conditions to minimize self-heating.
2. The temperature coefficient of forward voltage represents the typical change in Vf per °C at the rated test current.
3. Thermal resistance (junction-to-solder-pad) is derived from thermal characterization measurements and may vary with board design and thermal interface materials.
4. Each color channel (R/G/B) is tested and characterized independently.

CHARACTERISTIC CURVES

SPECTRAL POWER DISTRIBUTION CHARACTERISTIC

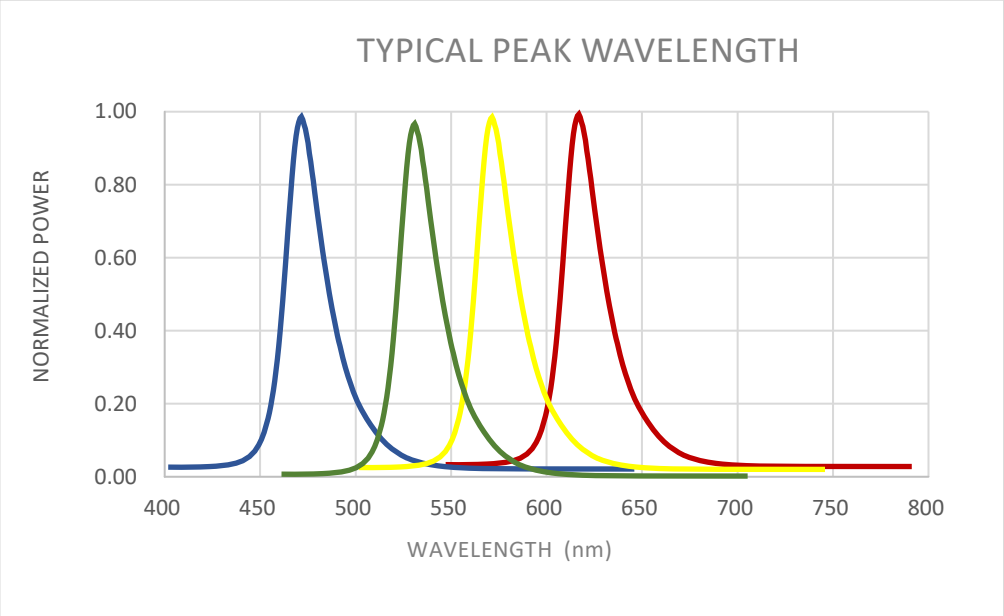


Figure 1. Typical normalized light output vs. junction temperature for at specified test current.Tj=25°C

LIGHT OUTPUT CHARACTERISTICS

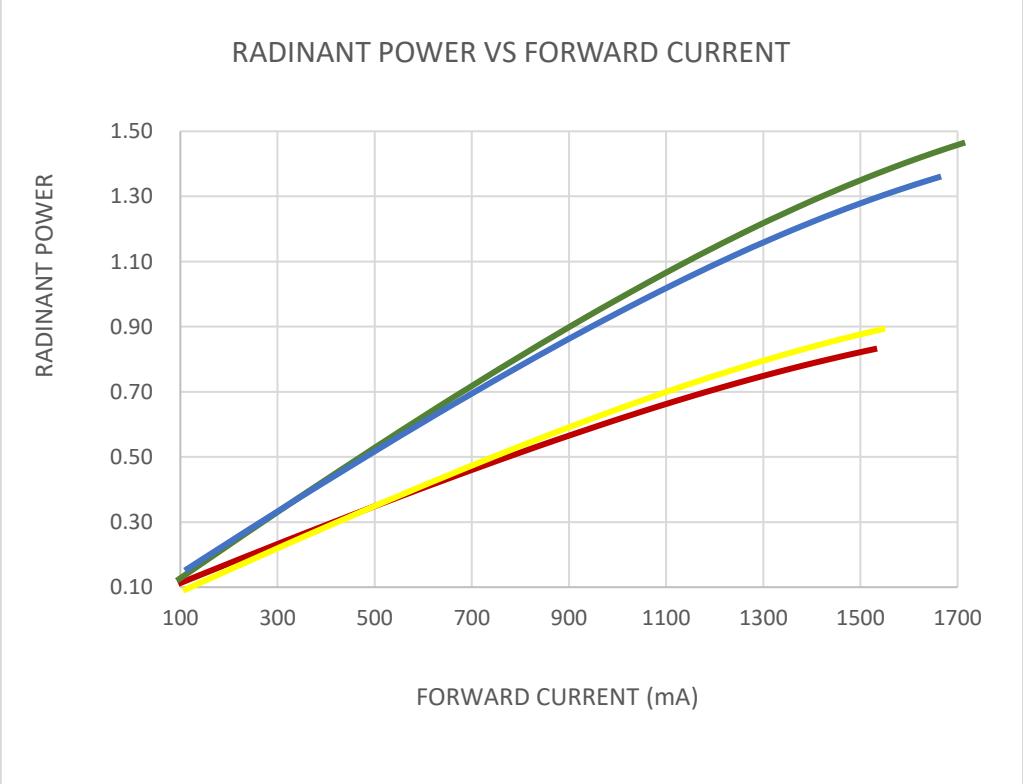


Figure 2 Typical normalized radiant power vs. junction temperature for at Tj=25ºC.

LIGHT OUTPUT CHARACTERISTICS

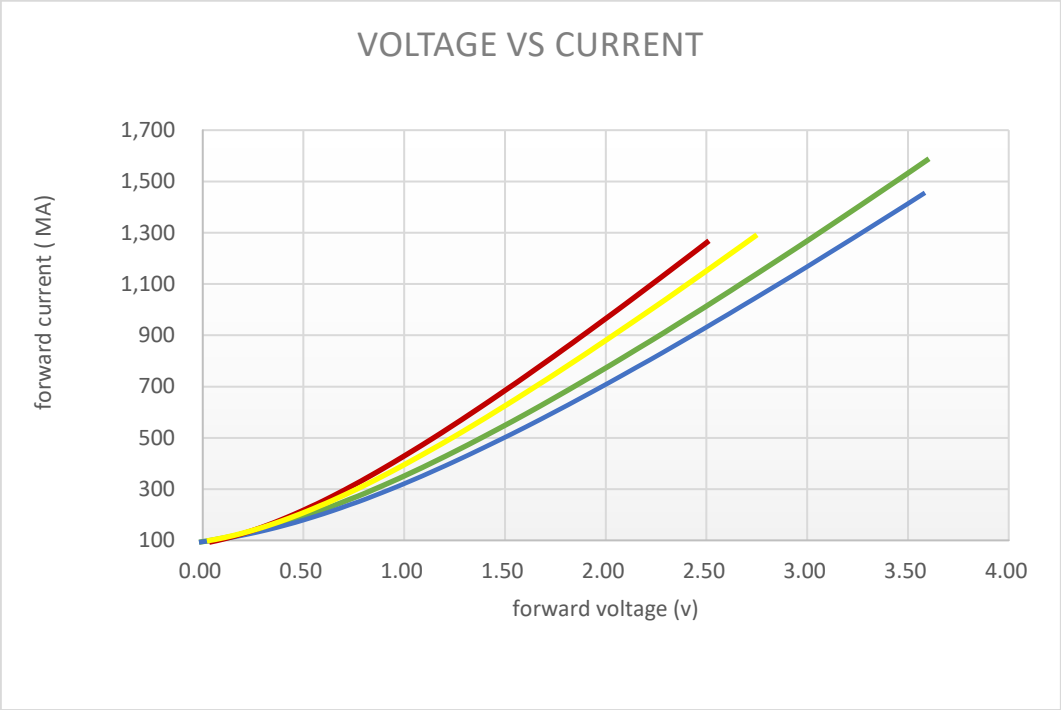


Figure 3. Typical forward current vs. forward voltage for at Tj=25°C.

RADIATION PATTERN CHARACTERISTICS

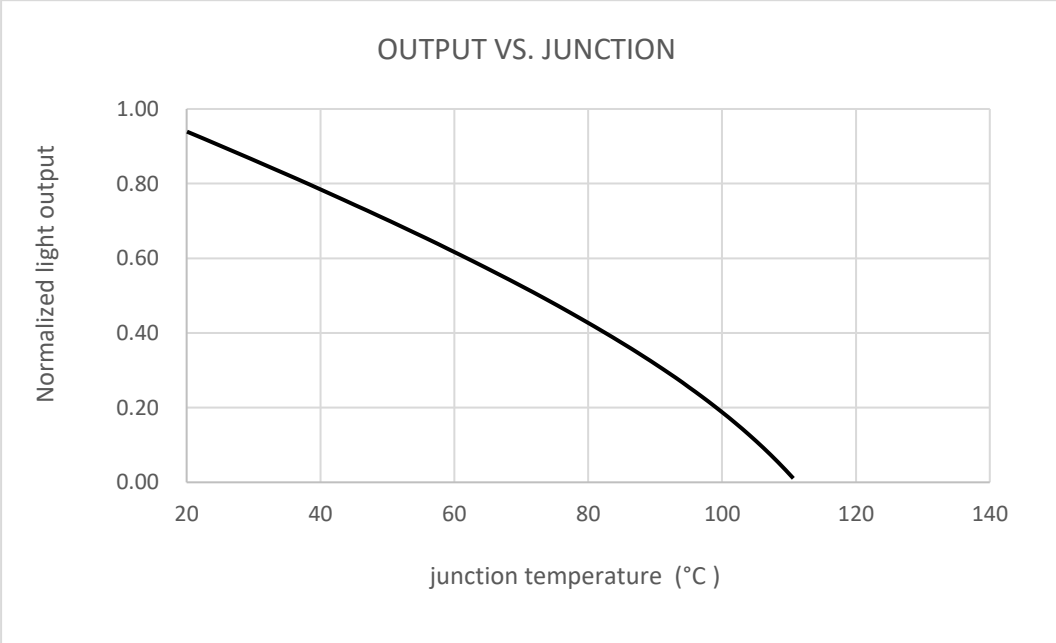
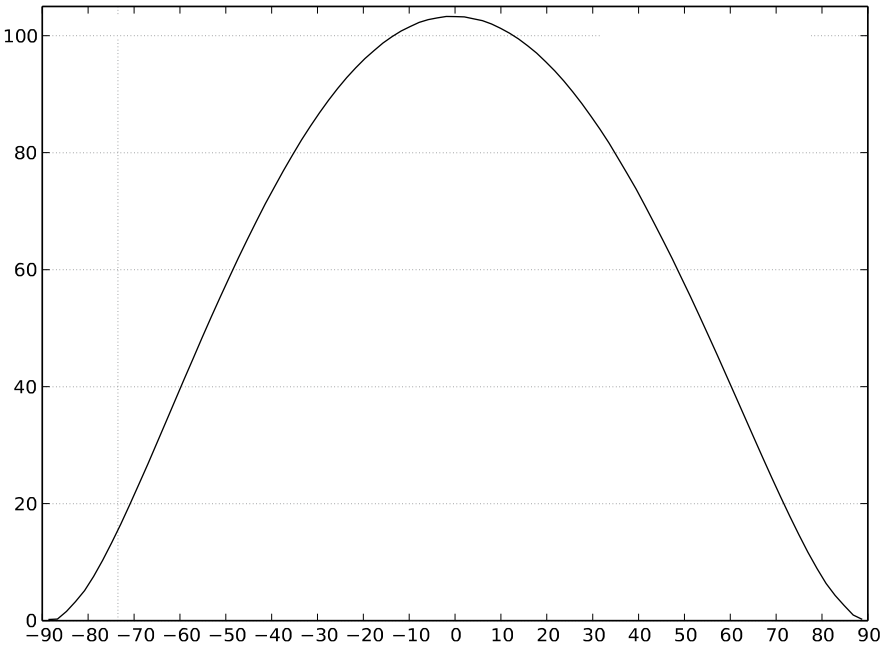


Figure 4. Typical normalized light output vs. junction temperature for at test current.

TYPICAL RADIATION PATTERN



Notes for Figure :

1. Typical viewing angle is 120°.

2. The viewing angle is defi ned as the off axis angle from the centerline where luminous intensity (Iv) is ½ of the peak value.

TYPICAL RADIATION PATTERN

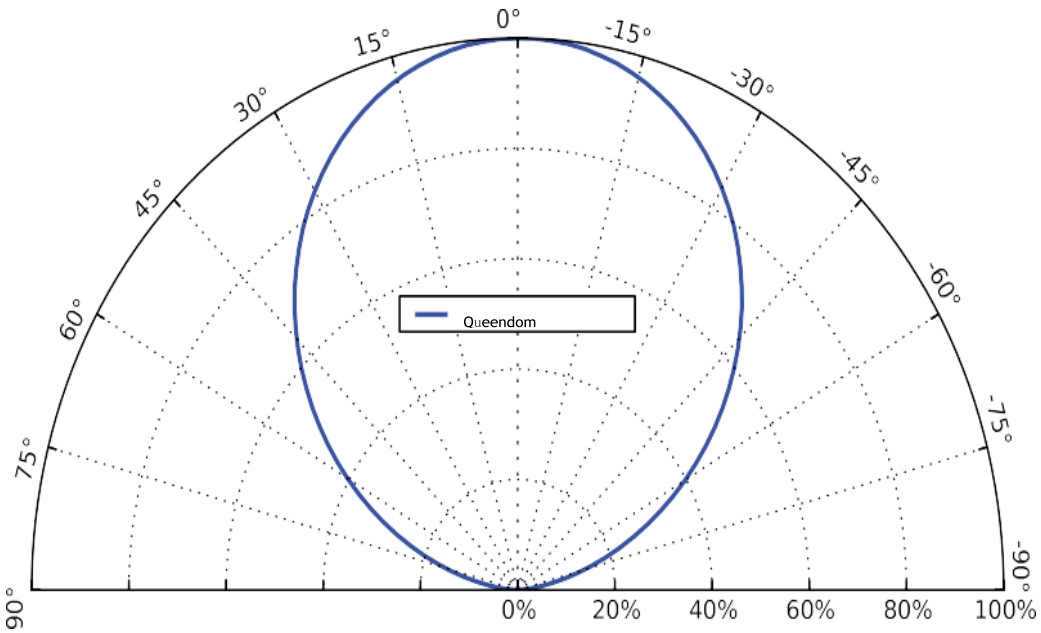
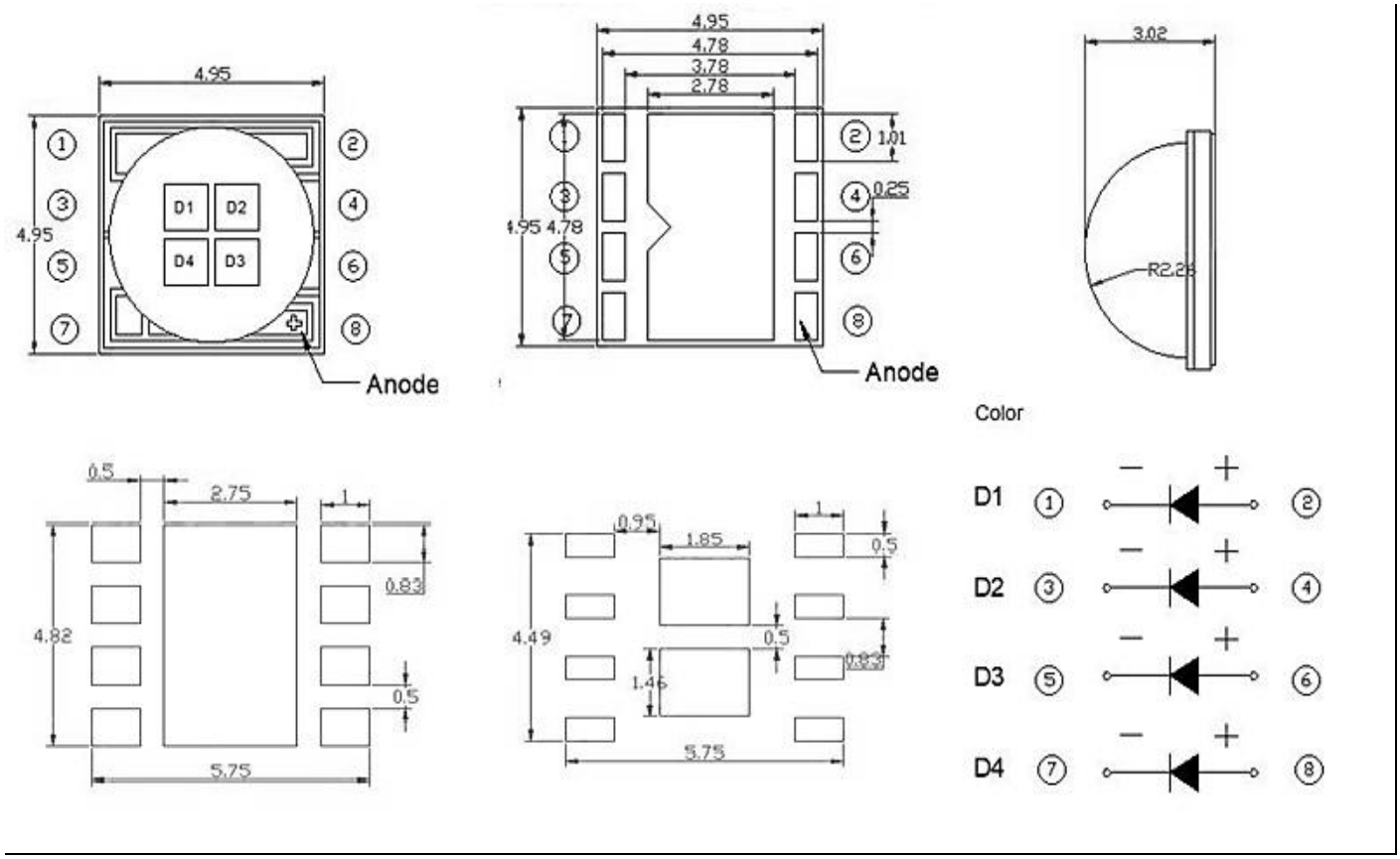


Figure 5. TYPICAL POLAR RADIATION PATTERN AT 20MA, TSP=25°C

DIMENSIONAL DRAWING:



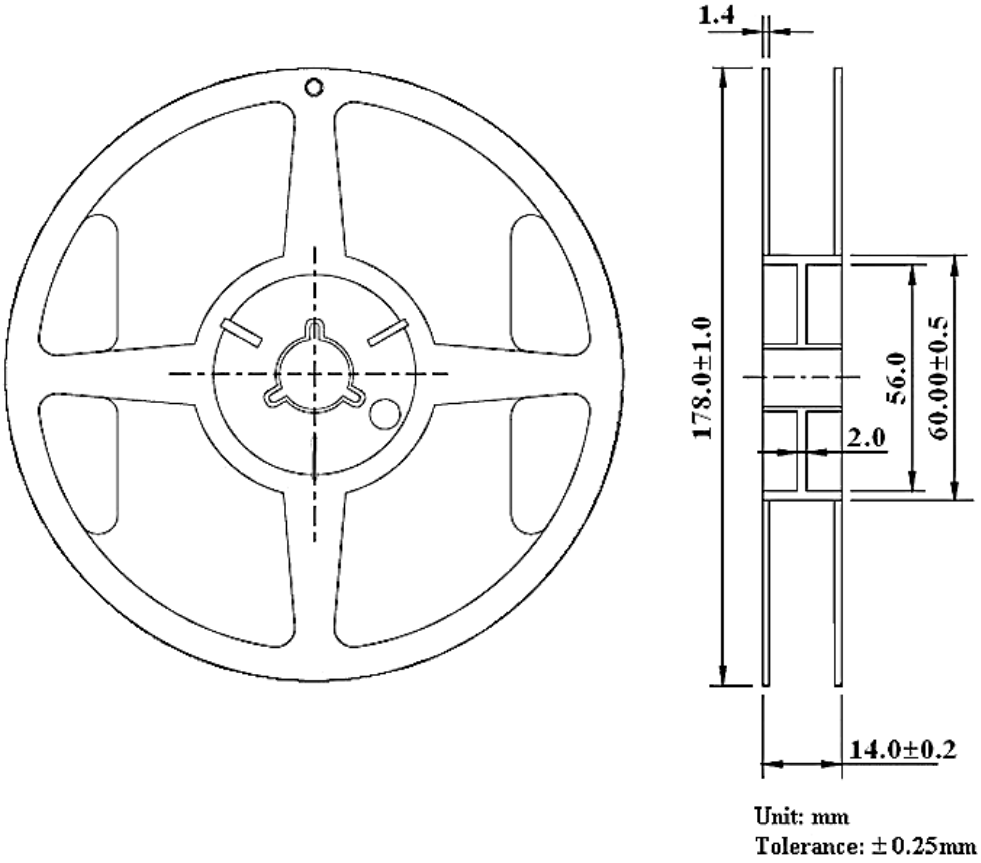
Notes for Figure :

1. Drawings are not to scale.
2. Drawing dimensions are in millimeters.
3. Unless otherwise specifi ed, tolerances are ± 0.10mm.

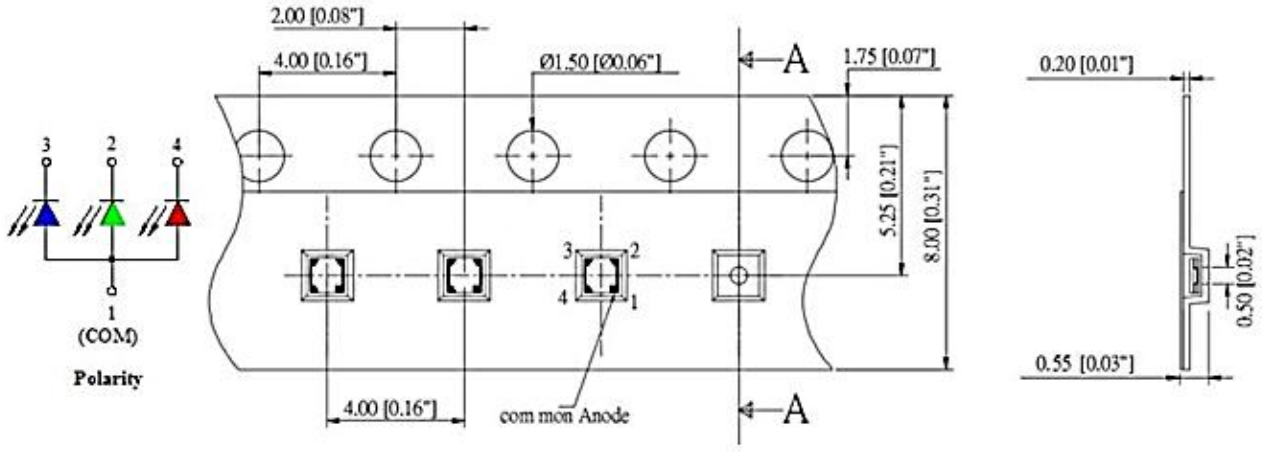
RECOMMENDED SOLDER PAD

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for ultra sonic cleaning

REEL DIMENSIONS:



CARRIER TAPE DIMENSIONS:



Carrier Tape Dimensions: Loaded quantity 1000PCS per reel.