



**SMD Multicolor LED (Visible LED) - NO: 8541401000HP2B1
SPECIFICATION FOR APPROVAL FOR APPROVAL**

HP5050RYBI8WI



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523800

Features:

- Ceramic 5050 package.
- Emission color: RYB+IR, Multicolor LEDs type.
- RYB visible light: red, yellow and blue combination,
- IR infrared light: wavelength range 730-1550nm (customizable band)
- Lens appearance: Water Clear
- Inter reflector
- Applicable to all SMT assembly methods.
- Compatible with infrared and vapor phase reflow soldering processes.
- Compatible with automatic placement equipment.
- The product itself will remain within RoHS compliant



Descriptions:

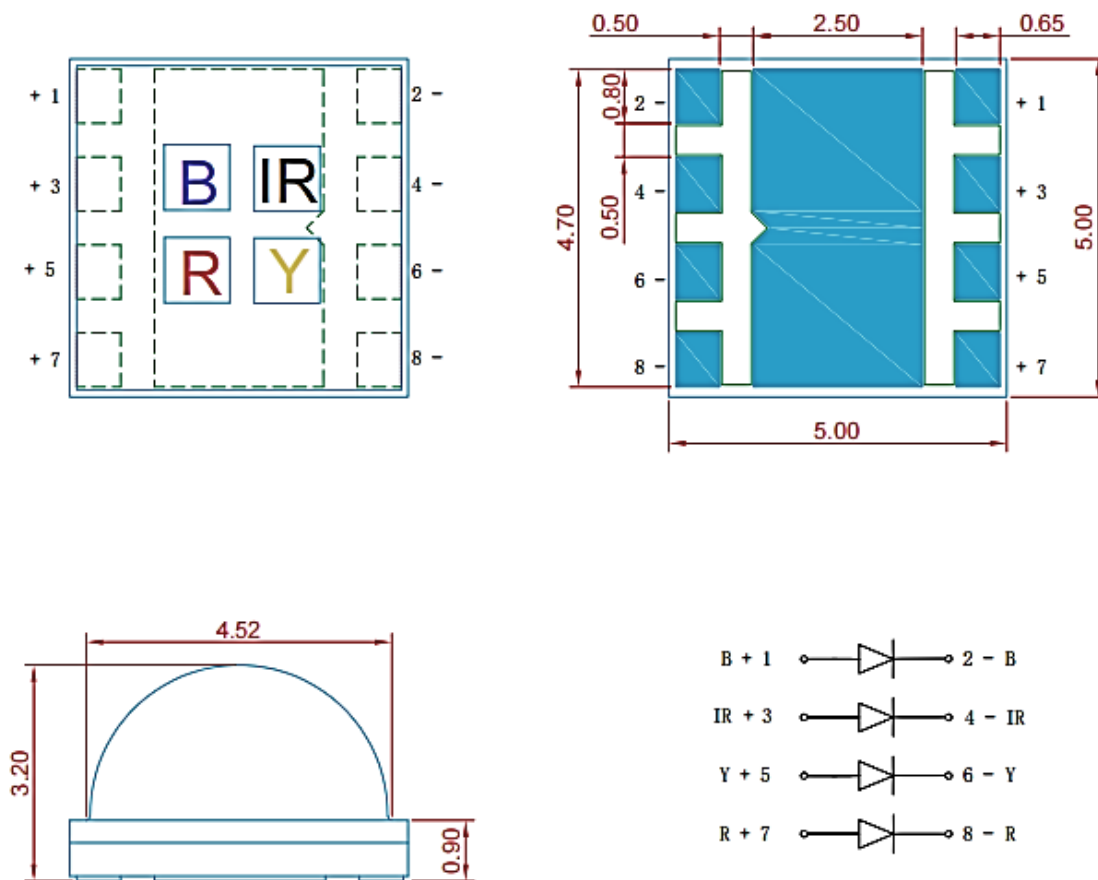
The 5050 series is Due to the package design, LED has wide viewing angle and optimized light coupling by inter reflector. This feature makes the Ceramic substrate improves heat dissipation efficiency ideal for light pipe application.

Applications:

- Automobile: dashboard, brake lights, turn signals.
- Status indicator: consumer electronics and industrial electronics
- Indoor/outdoor lighting
- Medical biology
- Beauty equipment

Package SIZE:

Picture 1



Notes:

- All dimensions are in millimeters (inches).
- Tolerance is ± 0.25 mm (.010") unless otherwise noted.
- Protruded resin under flange is 1.00mm (.039") max.

Performance Characteristics

Product Selection Guide

Table 1. Product performance of QUEENDOM RYBI at Tj=25°C. 1000mA

PRODUCT	RANK NO.	DOMINANT WAVELENGTH		INTENSITY [2] FLUX		FORWARD VOLTAGE	
		[1] (nm/K)		[2] (lm)/mw		[3] (VF/V)	
		MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
HP5050RYBI8WI	Red	635	645	150	280	1.8	2.4
	Yellow	585	595	130	200	1.8	2.4
	Blue	460	470	150	280	2.8	3.2
	infrared	830	850	410	670	1.5	2.40

Notes for Table 1:

1. Queendom leds maintains a tolerance of ±1nm on dominant wavelength measurements.
2. Queendom leds maintains a tolerance of ±10% on luminous intensity measurements.

Optical Characteristics

Table 2. Optical characteristics for QUEENDOM RYBI at Tj=25°C. 1000mA

PRODUCT	COLOR	TYPICAL SPECTRAL HALF-WIDTH [1] (nm)	TYPICAL TEMPERATURE COEFFICIENT OF DOMINANT WAVELENGTH (nm/°C)	TYPICAL VIEWING ANGLE [2]	PART NUMBER
HP5050RYBI8WI	Red	6	0.04	120°	8541401000HP2B1
	Yellow	5	0.04	120°	
	Blue	5	0.04	120°	

Table 3. Optical characteristics for QUEENDOM RYBI at Tj=25°C. 1000mA

PRODUCT	COLOR	TYPICAL SPECTRAL HALF-WIDTH [1] (K)	TYPICAL TEMPERATURE COEFFICIENT OF DOMINANT WAVELENGTH (nm/°C)	TYPICAL VIEWING ANGLE [2]	PART NUMBER
HP5050RYBI8WI	850	30	-0.5 nm/°C--2 nm/°C	120°	8541401000HP2B1
	880	29	-0.5 nm/°C--2 nm/°C	120°	
	940	36	-0.5 nm/°C--2 nm/°C	120°	

Notes for Table 2:

1. Spectral half-width is the spectral bandwidth at 50% of the peak intensity.
2. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is ½ of the peak value.

Electrical and Thermal Characteristics

 Table 4. Electrical and thermal characteristics for QUEENDOM RYBI at T_j=25°C. 1000mA

COLOR	PART NUMBER	FORWARD VOLTAGE [1] (V _f)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W)
		MINIMUM	TYPICAL	MAXIMUM		
Red	HP5050RYBI8WI	1.8	2.0	2.4	-2.0mV/°C--2.5mV/°C	6-12°C/W
Yellow		1.8	2.0	2.4	-2.0mV/°C--2.5mV/°C	3-8°C/W
Blue		2.80	3.00	3.20	-2.6 mV/°C--2.5mV/°C	5-15°C/W
infrared		1.6	2.0	2.4	-2.0mV/°C--2.5mV/°C	5-15°C/W

 Table 5. Electrical and thermal characteristics for QUEENDOM RYBI at T_j=25°C. 1000mA

Absolute Maximum Ratings

Table 4. Absolute maximum ratings for QUEENDOM RYBI

PARAMETER	BLUE	RED Yellow infrared
DC Forward Current ^[1, 2]	1000mA	1000mA
Peak Pulsed Forward Current ^[1, 3]	1200mA	1200mA
LED Junction Temperature ^[1] (DC & Pulse)	115°C	115°C
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 2	
LED Storage Temperature	-40°C to 80°C	
Soldering Temperature	JEDEC 020c 250°C	
Allowable Reflow Cycles	3	
Reverse Voltage (V _{reverse})	QUEENDOM LEDs are not designed to be driven in reverse bias	

Notes for Table 4:

- Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
- Single-color light.
- At 0.01ms pulse on time test with a pulse period of 0.1ms.

Spectral Power Distribution Characteristics

Typical Electrical / Optical Characteristics Curves (25°C Ambient Temperature Unless Otherwise Noted)

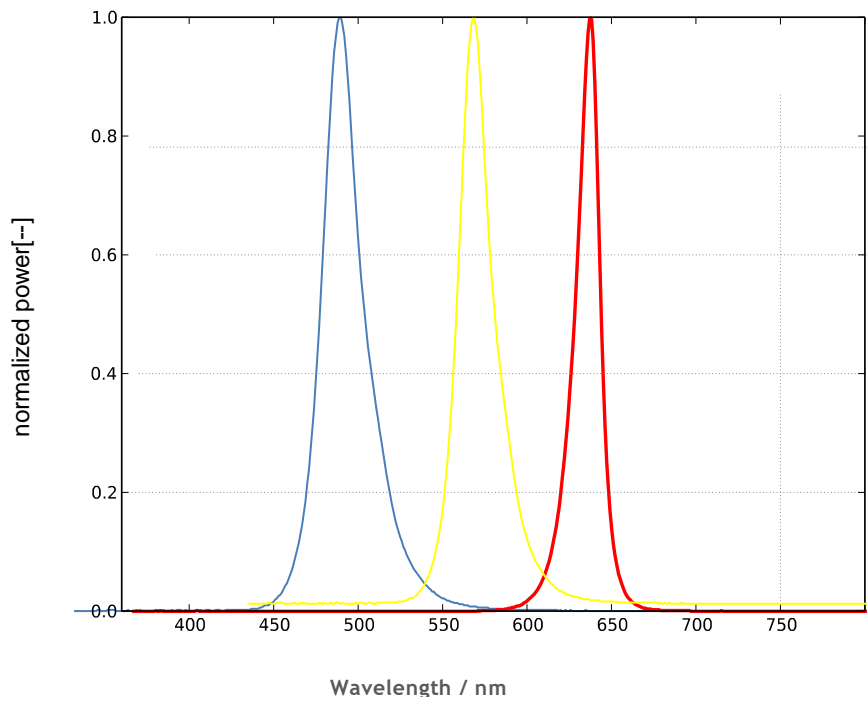


Figure 1. Typical normalized power vs. wavelength for Queendom 5050 T_j=25°C.

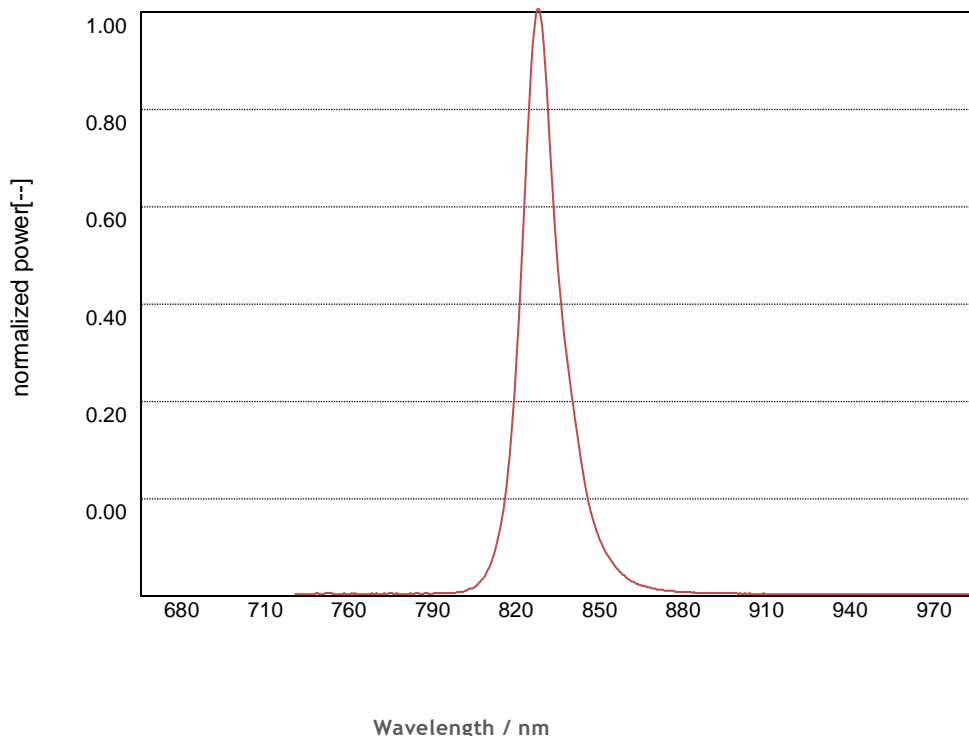


Figure 2. Typical normalized power vs. wavelength for Queendom 5050 T_j=25°C.

Light Output Characteristics

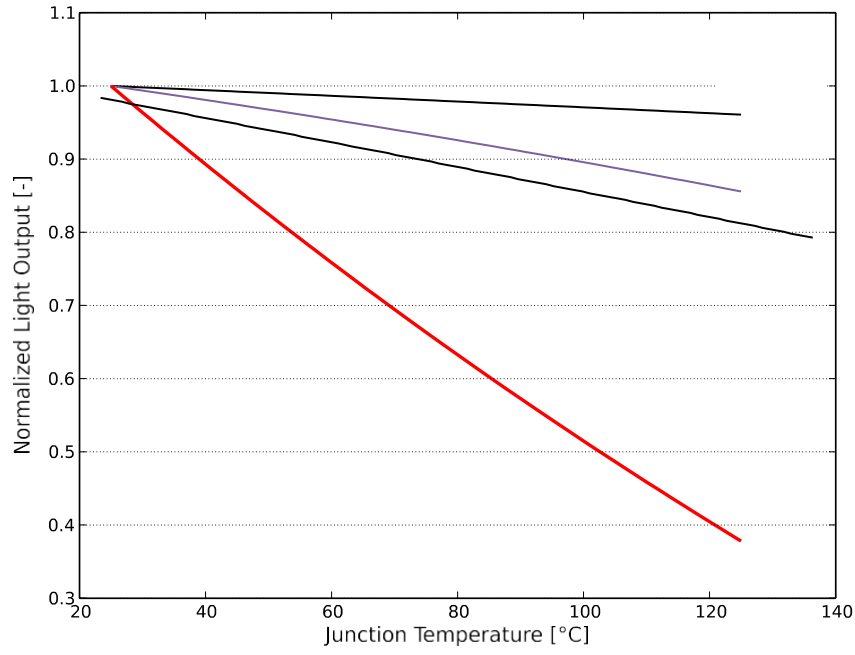


Figure 3. Typical normalized light output vs. junction temperature for Queendom 5050 $T_j=25^{\circ}\text{C}$.

Light Output Characteristics

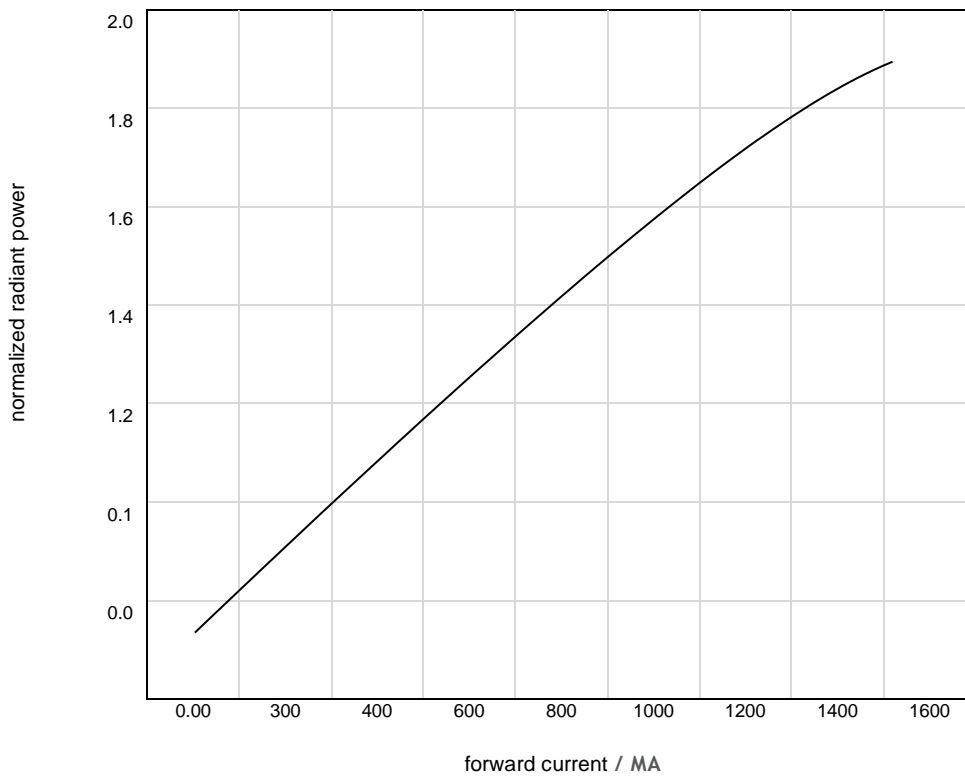


Figure 4. Typical normalized radiant power vs. forward current for Queendom led at $T_j=25^{\circ}\text{C}$

Forward Current Characteristics

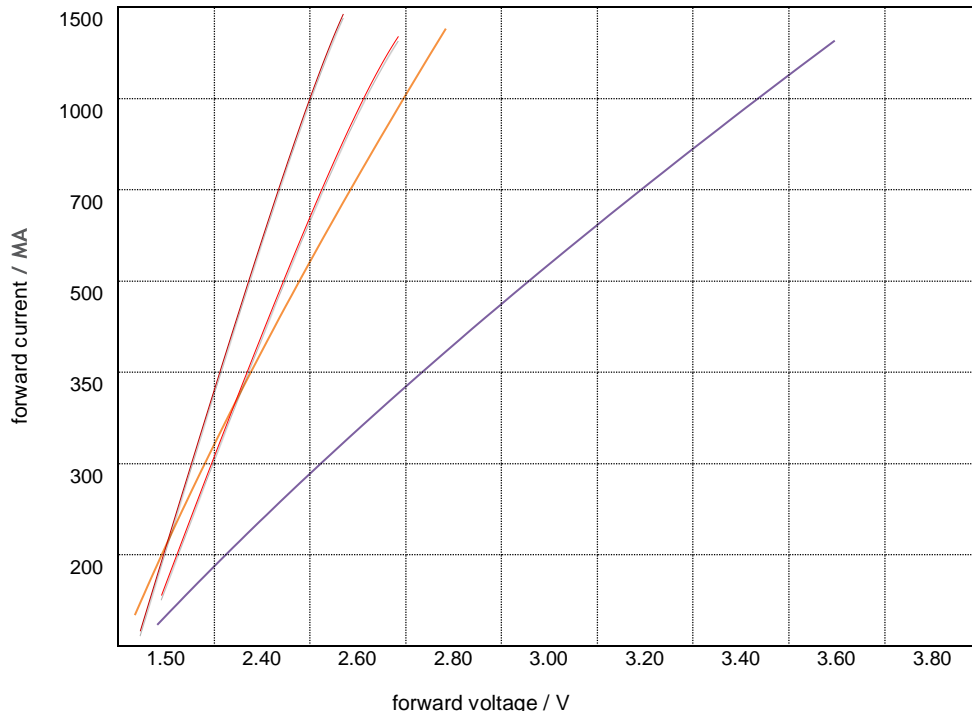


Figure 5. Typical forward current vs. forward voltage for queendom LED at 1000ma Tj=25°C

Radiation Pattern Characteristics

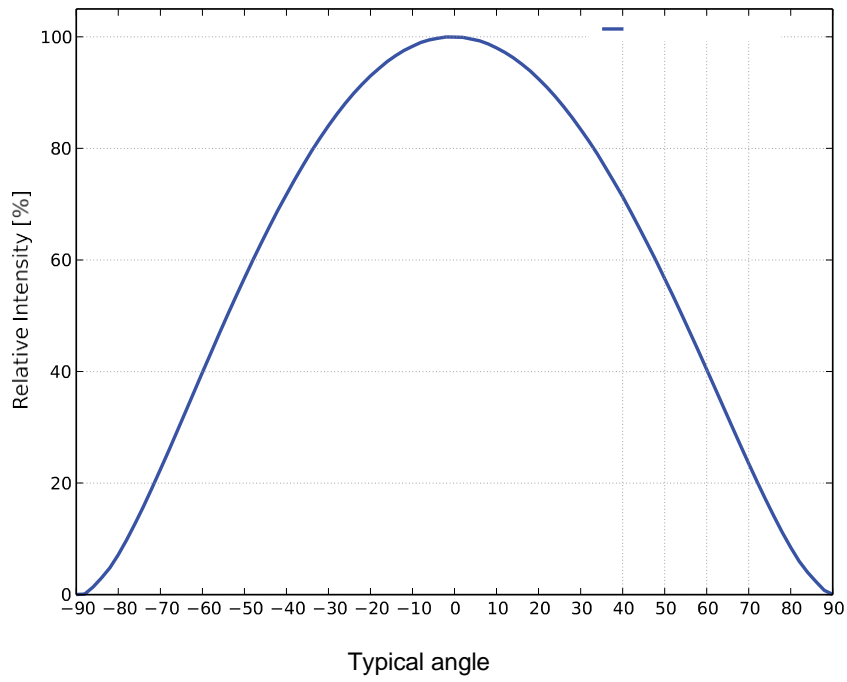


Figure 6. Typical radiation pattern for Queendom 5050 at 1000ma Tj=25°C

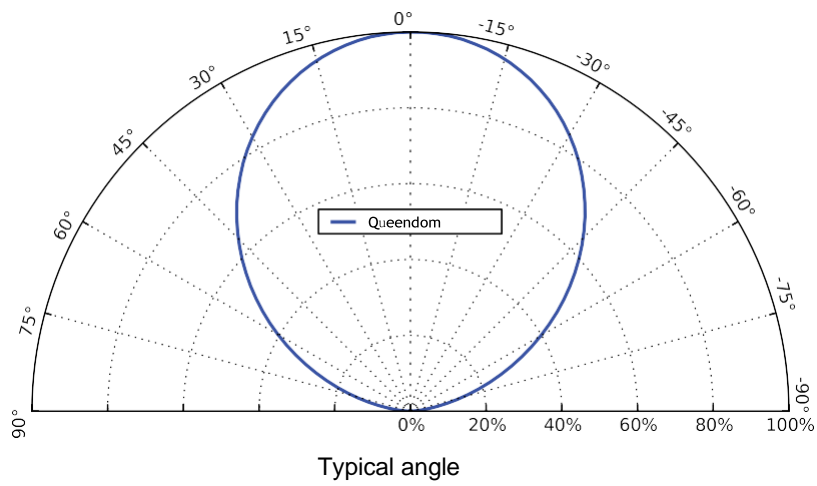


Figure 7. Typical polar radiation pattern for Queendom 5050 Tj=25°C.

Decoding Product Bin Labeling

In the manufacturing of semiconductor products, there are variations in performance around the average values given in the technical datasheet. For this reason, Queendom leds bins LED components for luminous flux, intensity, radiometric power, color point, peak wavelength, dominant wavelength and forward voltage.

RANK NOMINAL CCT & COLOR COORDINATES

Dominant Wavelength Bins

RANK Table 1. Dominant wavelength bins & Product performance of Queendom Commercial LEDs at specified test conditions.

PRODUCT	COLOR	BIN	DOMINANT WAVELENGTH [1] (nm)		RANK WAVELENGTH [2] (nm)	
			MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
SMD LEDs	Blue	B3	440	450	2.5	5
		B4	450	460	2.5	5
		B5	460	470	2.5	5
		B6	470	480	2.5	5
		B7	480	490	2.5	5
		B8	490	500	2.5	5
	Green	G0	500	505	2.5	5
		G0	505	510	2.5	5
		G1	510	520	2.5	5
		G2	520	530	2.5	5
	Green	G3	530	540	2.5	5
		G4	540	550	2.5	5
		G5	550	560	2.5	5
	Yellow	G6	560	570	2.5	5
		G1	555	560	2.5	5
	Yellow	G2	560	565	2.5	5
		Y1	570	580	2.5	5
		Y2	580	590	2.5	5
	Orange	Y3	590	600	2.5	5
		A0	600	610	2.5	5
		R1	610	620	2.5	5
		R2	620	630	2.5	5
	Red	R3	630	640	2.5	5
		R4	640	650	2.5	5
R5		650	660	2.5	5	
R6		660	670	2.5	5	
R7		670	680	2.5	5	
R8		680	690	2.5	5	

Notes for Table 1:

1. Queendom maintains a tolerance of $\pm 1\text{nm}$ on dominant wavelength measurements

Table 1. Peak Emission Wavelength Rank Combination

PEAK WAVELENGTH NM	RANK NO.	TYPICAL WAVELENGTH [1] (nm)		RANK WAVELENGTH [2] (nm)		TYPICAL Radiant Intensity HALF-WIDTH [3](mW/sr)
		MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	
680	I1	680	690	5	10	10
	I2	690	700	5	10	10
730	I3	700	710	5	10	10
	I4	710	720	5	10	10
	I5	720	730	5	10	10
	I6	730	740	5	10	10
	I7	740	750	5	10	10
750	I8	750	760	5	10	10
	I9	760	770	5	10	10
780	IA	770	780	5	10	10
	IB	780	790	5	10	10
	IC	790	800	5	10	10
	ID	800	810	5	10	10
	IE	810	820	5	10	10
850	IF	820	830	5	10	10
	IG	830	840	5	10	10
	IH	840	850	5	10	10
	II	850	860	5	10	10
	IJ	860	870	5	10	10
880	IK	870	880	5	10	10
	IL	880	890	5	10	10
	IM	890	900	5	10	10
	IN	900	910	5	10	10
940	IO	910	920	5	10	10
	IP	920	930	5	10	10
	IQ	930	940	5	10	10
	IR	940	950	5	10	10
	IS	950	960	5	10	10
970	IT	960	970	5	10	10
	IU	970	980	5	10	10

Notes:

1. The tolerance of luminous intensity (Iv) is $\pm 15\%$.
2. The tolerance of dominant wavelength is $\pm 1\text{nm}$.
3. This specification is preliminary.
4. This specification is a standard specification of our factory, can make in accordance with customer's special requirement.

LUMINOUS FLUX BINS

Table 2. Luminous flux bin definitions for QUEENDOM LED Line at Tj=25°C.

BIN	QUEENDOM FLUX [1] (lm)		RANK FLUX [2] (lm)		TYPICAL FLUX HALF WIDTH
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	[3] (lm)
LI	22	24	2	4	4
LJ	24	26	2	4	4
LK	26	28	2	4	4
LL	28	30	2	4	4
LM	30	32	2	4	4
LN	32	34	2	4	4
LO	34	36	2	4	4
LP	36	38	2	4	4
LQ	38	40	2	4	4
LR	45	50	3	5	5
LS	55	60	3	5	5
LT	65	70	3	5	5
LU	75	80	3	5	5
LV	85	90	3	5	5
LW	95	100	3	5	5
LX	110	120	5	10	10
LY	130	140	5	10	10
LZ	150	160	5	10	10
H1	170	180	5	10	10
H2	190	200	5	10	10

TABLE Forward Voltage BINS

Table 3. Electrical and thermal characteristics for Queendom at specified test current, Tj=25°C

NUMBER	FORWARD VOLTAGE [1] (Vf)			RANK WAVELENGTH [2] (Vf)		TYPICAL VOLTAGE HALF WIDTH
	MINIMUM	TYPICAL	MAXIMUM	MINIMUM	MAXIMUM	[3] (Vf)
V5	2.6	2.8	3	0.1	0.2	0.2
V6	3	3.2	3.4	0.1	0.2	0.2
V7	3.4	3.6	3.8	0.1	0.2	0.2
V8	3.8	4	4.2	0.1	0.2	0.2
V9	4.2	4.4	4.6	0.1	0.2	0.2
VA	4.6	4.8	5	0.1	0.2	0.2
VB	5	5.2	5.4	0.1	0.2	0.2
VC	5.4	5.6	5.8	0.1	0.2	0.2
VD	5.8	6				

TABLE TYPICAL POWER BINS

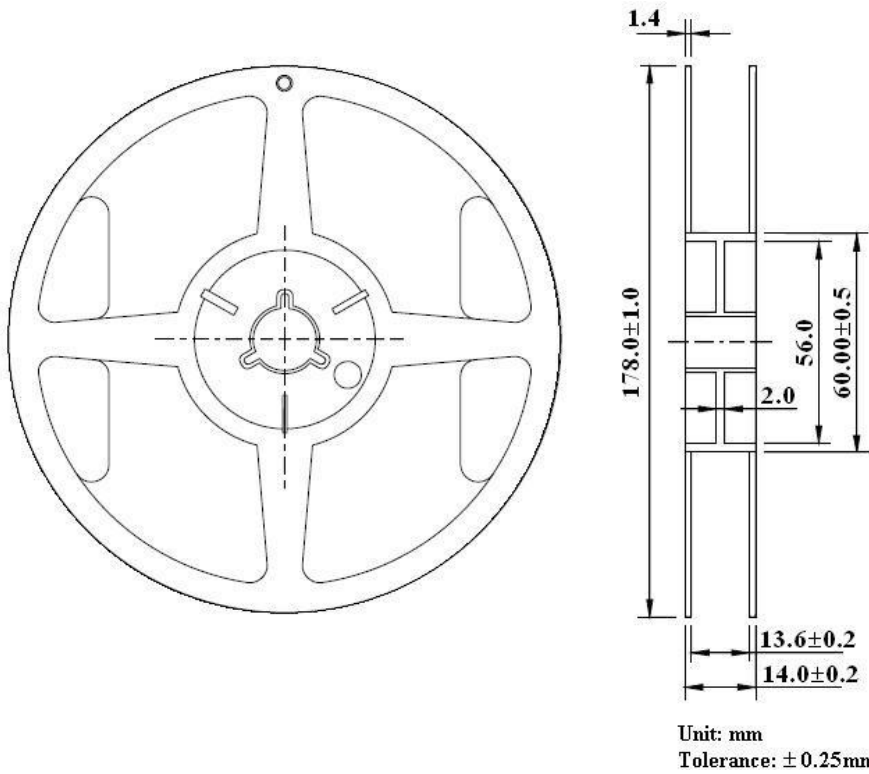
 Table 4. Electrical and thermal characteristics for Queendom at specified test current, T_j=25°C

RANK NO.	TYPICAL POWER RANK (W) [1]		RANK POWER [2] (W)		TYPICAL POWER HALF WIDTH
	min	max	MINIMUM	MAXIMUM	[3] (W)
WE	1	3	1	3	3
WF	3	6	1	3	3
WG	6	9	1	3	3
WH	9	12	1	3	3
WI	12	15	1	3	3
WJ	15	18	1	3	3
WK	18	21	1	3	3
WL	21	24	1	3	3
WM	24	27	1	3	3
WN	27	30	2	3	3
WO	30	34	2	4	4
WP	34	38	2	4	4
WQ	38	42	2	4	4

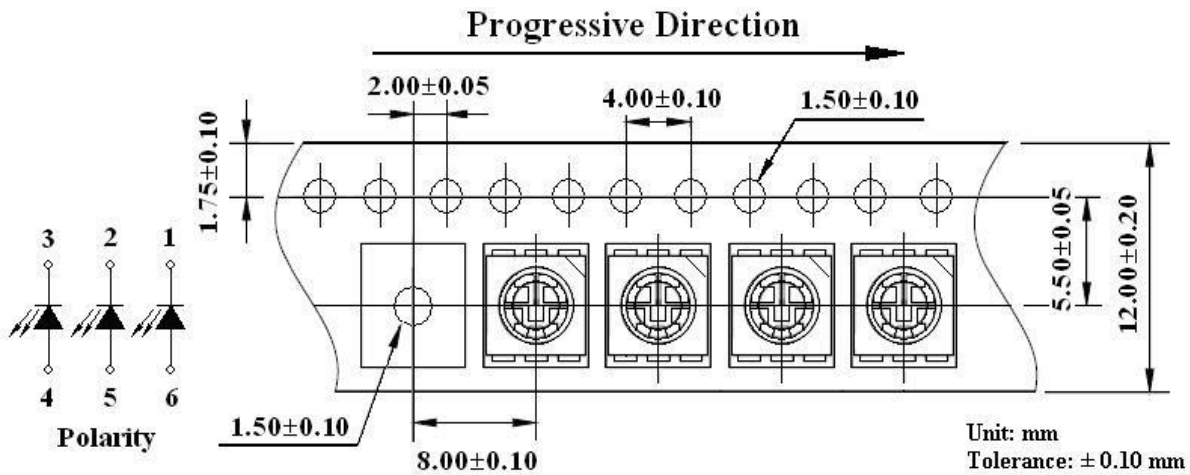
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Packaging Information

Reel Dimensions:

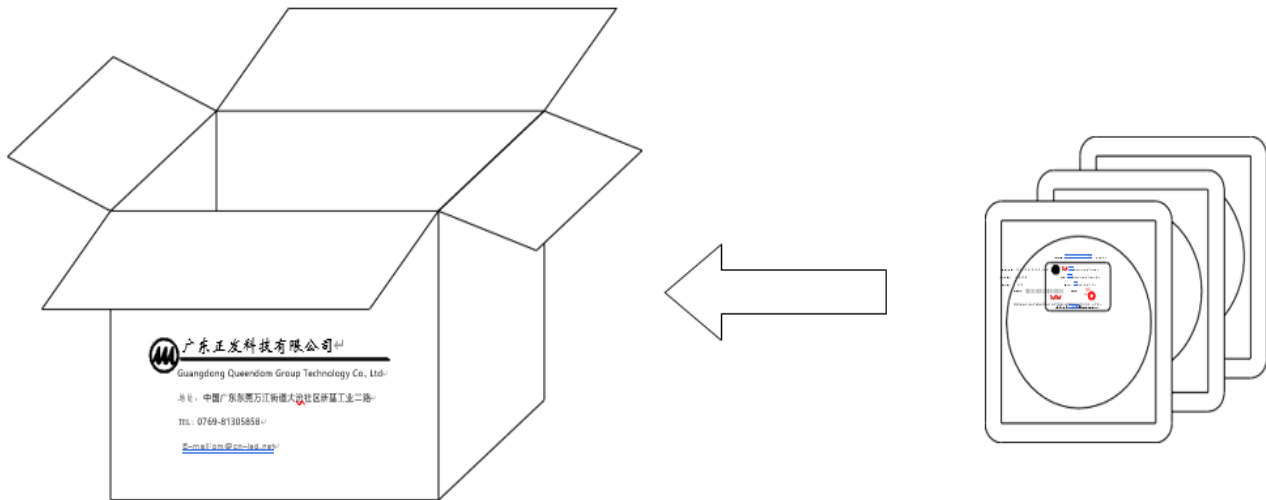


Carrier Tape Dimensions:



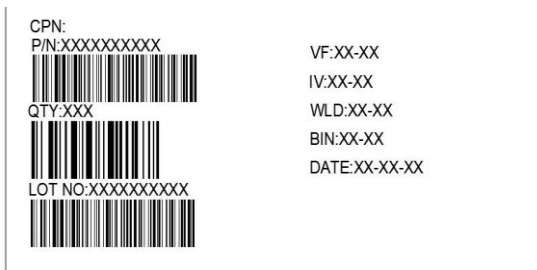
Loaded quantity 3000 pcs per reel.

Packaging cartons



Information

- With Stopper



Without Stopper

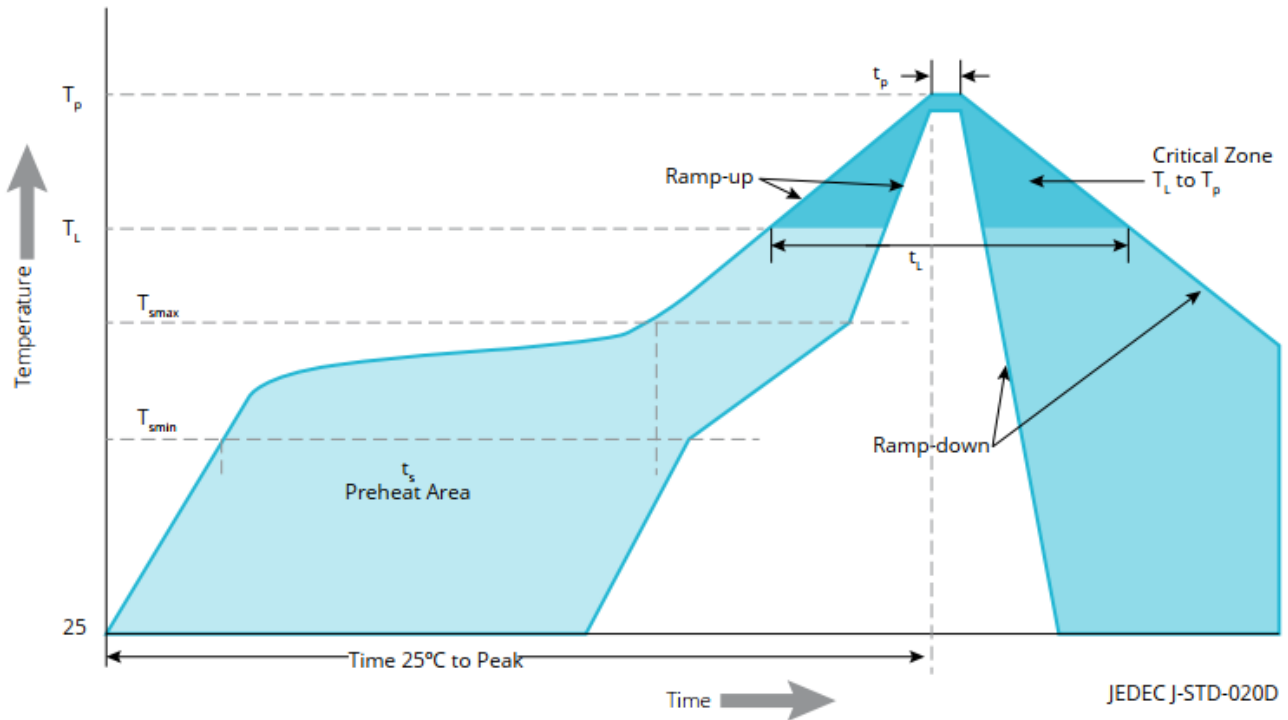
CPN:Customer's Product Number
 P/N:Product Number
 QTY:Packing Quantity
 LOT NO:Lot Number
 VF:Forward Voltage Rank
 IV:Luminous Intensity Rank
 WLD:Dom. Wavelength Rank
 BIN:BIN Code
 DATE:Date Of Dispatch

Packing Quantity

1. 1000 PCS/1 Bag,
- 2.10 Inner Cartons/1 Outside Carton

CAUTIONS

Reflow Soldering Guidelines



Visualization of the acceptable reflow temperature profile as specified

Reflow profile characteristics for Queendom smd.

PROFILE FEATURE	LEAD-FREE ASSEMBLY
Preheat Minimum Temperature (T_{smin})	150°C
Preheat Maximum Temperature (T_{smax})	200°C
Preheat Time (t_{smin} to t_{smax})	60 to 120 seconds
Ramp-Up Rate (T_L to T_p)	4°C / second maximum
Liquidous Temperature (T_L)	217°C
Time Maintained Above Temperature T_L (t_L)	60 to 150
seconds Peak / Classification Temperature (T_p)	250°C
Time Within 5°C of Actual Peak Temperature (t_p)	20 to 40 seconds
Ramp-Down Rate (T_p to T_L)	6°C / second maximum maximum
Time 25°C to Peak Temperature	8 minutes maximum

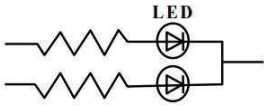
JEDEC Moisture Sensitivity

LEVEL	FLOOR LIFE		SOAK REQUIREMENTS STANDARD	
	TIME	CONDITIONS	TIME	CONDITIONS
5a	24 hours	≤30°C / 60% RH	48 Hours +2/ -0	30°C / 60% RH

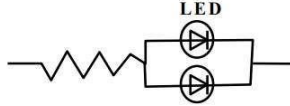
Drive Method

An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.

Circuit model A



Circuit model B



Recommended circuit

The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.

ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED. Suggestions to prevent ESD damage:

Use a conductive wrist band or anti-electrostatic glove when handling these LEDs.

All devices, equipment, and machinery must be properly grounded.

Work tables, storage racks, etc. should be properly grounded.

Use ion blower to neutralize the static charge which might have built up on surface of the LEDs plastic lens as a result of friction between LEDs during storage and handing.

Others

The information included in this document reflects representative usage scenarios and is intended for technical reference only.

The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.

When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, Queendom will not be responsible for any subsequent issues.

The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications). Consult Queendom's Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health, such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices.