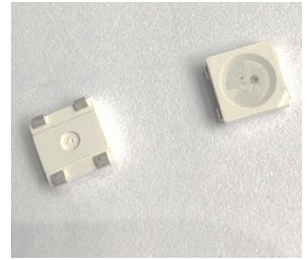


Features:

PLCC 5054 package.
Emission color: Multicolor LEDs type.
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.
Available on tape and reel (8mm Tape).
The product itself will remain within RoHS compliant
Compliance with EU REACH.within RoHS



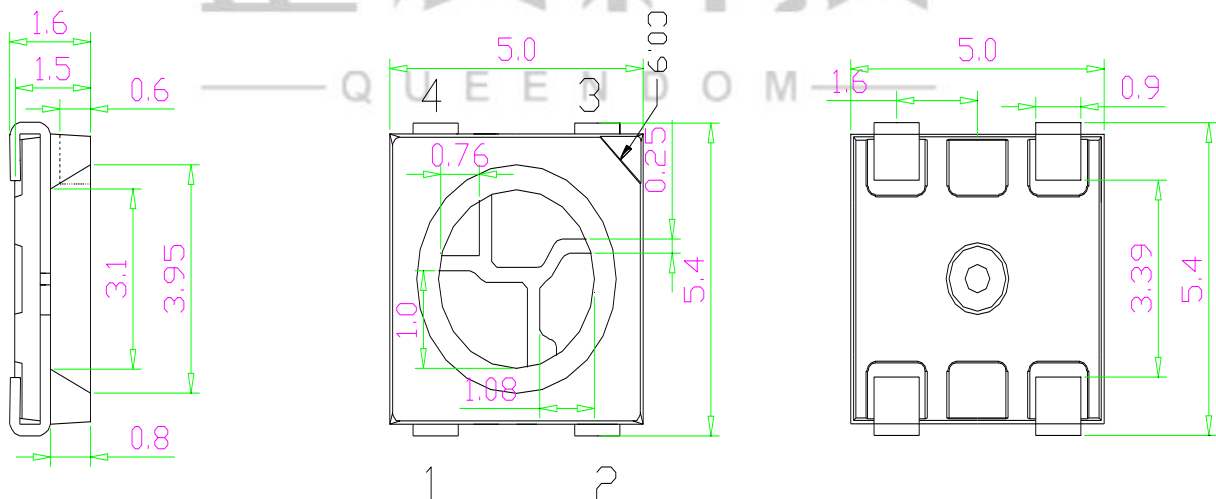
Descriptions:

The 5054 series is Due to the package design, LED has wide viewing angle and optimized light coupling by inter reflector. This feature makes the SMTTOP LED ideal for light pipe application. The low current requirement makes this device ideal for portable, equipment or any other application where power

Applications:

Automobile: dashboard, brake lights, turn signals.
Status indicator: consumer electronics and industrial electronics
Indoor/outdoor lighting
Industrial equipment.
Consumer Electronics.
Biomedical optics, instrument and equipment testing

Package SIZE: Picture 1



Notes:

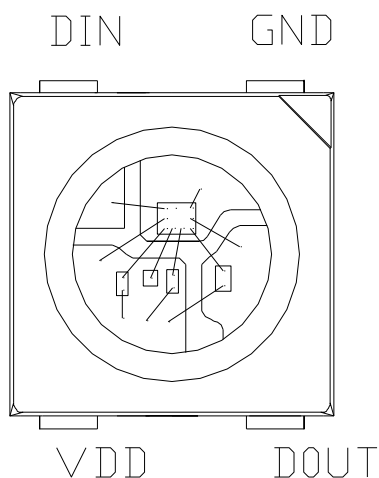
All dimensions are in millimeters (inches).

Tolerance is ± 0.25 mm (.010") unless otherwise noted.

Protruded resin under flange is 1.00mm (.039") max.

Process line

Picture 2



PIN polarity description

Table 1. Product performance of QUEENDOM RGB at Tj=25°C.

NO.	Pin identification	Explain the definition
1	GND	信号接地和电源接地
2	DIN	显示数据输入
3	VDD	芯片供电极&信号
4	DOUT	控制数据信号输出

Table 2

Table 2. Product performance of QUEENDOM LED at Tj=25°C.

参数 Parameter	符号 Symbol	范围 Range	单位 Units
逻辑电源电压 Logic supply voltage	Vdd	-0.4 - 14	V
输出端口耐压 output port voltage withstand	Vout	18	V
逻辑输入电压 Logic input voltage	Vi	-0.5 ~ Vdd+ 0.5	V
工作温度 Operating Temperature Range	Topt	-40~ + 85	°C
储存温度 Operating Temperature Range	Tstg	-55 ~ + 150	°C
湿气敏感等级 Moisture sensitive level	MSL	5 a	-

Switching Characteristics

Table 3. Product performance Switching characteristics of QUEENDOM LED at Tj=25°C.

参数 Parameter	符号 Symbol	最小 Min.	典型 Typ.	最大 Max.	单位 Units	测试条件 Conditions
振荡频率 Oscillation frequency	FOSC1	-	500	-	KHz	Vdd =5V
	FOSC2	-	10	-	MHz	Vdd =5V
传输延迟时间 Transmission Delay Time	Tflz	-	-	300	ns	CI= 15 pF, DIN → DOUT, RI = 10 kΩ
下降时间 Descent time	Tthz	-	-	120	μs	CI = 300 pF, OUTR / OUTG / OUTB
数据传输率 Data transfer rate	Fd	800	-	-	Kbps	占空比 50 % 50% duty cycle
输入电容 Input capacitance	Ci	-	-	15	pF	-

Electrical parameters

Table 4. Product performance Electrical parameters of QUEENDOM LED at Tj=25°C.

参数 Parameter	符号 Symbol	最小 Min.	典型 Typ.	最大 Max.	单位 Units	测试条件 Conditions
低电平输出电流 Low level output current	Iout	9	12	14.4	mA	R, G, B
低电平输出电流 Low level output current	I _{do}	10	-	-	mA	Vo = 0.4V, Dout
输入电流/Input Current	Ii	-	-	±1	μA	
输出管脚电流/Output Pin current	I _{sink}		12		mA	
高电平输入电压/High level input voltage	Vih	0.7	-	0.9	V	Vdd DIN, SET
低电平输入电压/Low level input voltage	Vil	-0	-0.1	0.3	V	Vdd DIN, SET
滞后电压/Lag Voltage	Vh	-	0.35	-	V	DIN, SET
电流偏移量 (通道间) Current offset (between channels)	dIout		±1.5	±3.0	%	Vds=1V, Iout=12mA
电流偏移量 (芯片间) Current offset (between chips)	dIout		±3.0	±5.0	%	Vds=1V, Iout=12mA
电流偏移量 VS-Vds/Current offset VS-Vds	%dVds		±0.1	±0.5	%/V	1V<Vds<3V
电流偏移量 VS-Vdd/Current offset VS-Vdd	%dVds		±1.0	±2.0	%/V	4.5V<Vdd<5.5V
动态电流损耗/Dynamic current loss (No load)	IDDdyn				1	mA
消耗功率/Consumed power	PD				250	mW
热阻值/Thermal resistance	Rth(j-a)		80		190	°C/W

Absolute Maximum Ratings

Table 1. Absolute maximum ratings for Queendom LEDs.

PARAMETER	MAXIMUM PERFORMANCE & RED	GREEN & BLUE
Parameter PD (mW)	200 mW	200 mW
DC Forward Current [1, 2]	20mA	20mA
Peak Pulsed Forward Current [1, 3]	30mA	40mA
LED Junction Temperature [1] (DC & Pulse)	115°C	
Reverse Voltage (Vreverse)	5	
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 2	
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:

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.

Performance Characteristics & Product Selection Guide

Product Electrical Index & TYPICALWAVELENGTH

Table 2. Product performance of Queendom Commercial LEDs at specified test conditions, Continued., $T_j=25^{\circ}\text{C}$.

PRODUCT	RANK NO.	DOMINANT WAVELENGTH [1] (nm)		INTENSITY [2] FLUX (lm)		FORWARD VOLTAGE	
		[1] (nm)		[2] (MCD)		[3] (VF/V)	
		MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
S5050RGB4IC	Red	620	630	200	450	1.8	2.4
	Green	520	525	900	1500	2.8	3.2
	Blue	460	470	210	540	2.8	3.2

Notes for Table 1:

- Queendom leds maintains a tolerance of $\pm 1\text{nm}$ on dominant wavelength measurements.
- Queendom leds maintains a tolerance of $\pm 10\%$ on luminous intensity measurements.

Optical Characteristics

Table 3 Optical characteristics for QUEENDOM RBW at $T_j=25^{\circ}\text{C}$, 20mA

PRODUCT	COLOR	TYPICAL SPECTRAL HALF-WIDTH [1] (nm)	TYPICAL TEMPERATURE COEFFICIENT OF DOMINANT WAVELENGTH (nm/ $^{\circ}\text{C}$)	TYPICAL VIEWING ANGLE [2]	PART NUMBER
S5050RGB4IC	Red	6	0.04	120 $^{\circ}$	8541401000SML29
	Green	5	0.04	120 $^{\circ}$	
	Blue	5	0.04	120 $^{\circ}$	

Notes for Table 2:

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

Electrical and Thermal Characteristics

Table 4. Electrical and thermal characteristics for QUEENDOM RGBW at 20mA, $T_j=25^{\circ}\text{C}$.

COLOR	PART NUMBER	FORWARD VOLTAGE [1] (Vf)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/ $^{\circ}\text{C}$)	TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD ($^{\circ}\text{C}/\text{W}$)
		MINIMUM	TYPICAL	MAXIMUM		
Red	8541401000SML23	1.8	2	2.4	-1.6	110
Green		2.8	3	3.2	-2.4	150
Blue		2.8	3	3.2	-2.6	130

- Ratio between temperature difference (junction « case) and electrical input power .
- Ratio between temperature difference (junction « case) and dissipated heat, i.e. emitted light taken into account
- Measured between 25°C and 85°C .
- Typical performance represents the average long term performance and may not be reflected in individual batches

特性曲线 Characteristic Curves

光谱功率分布特性 Spectral Power Distribution Characteristic

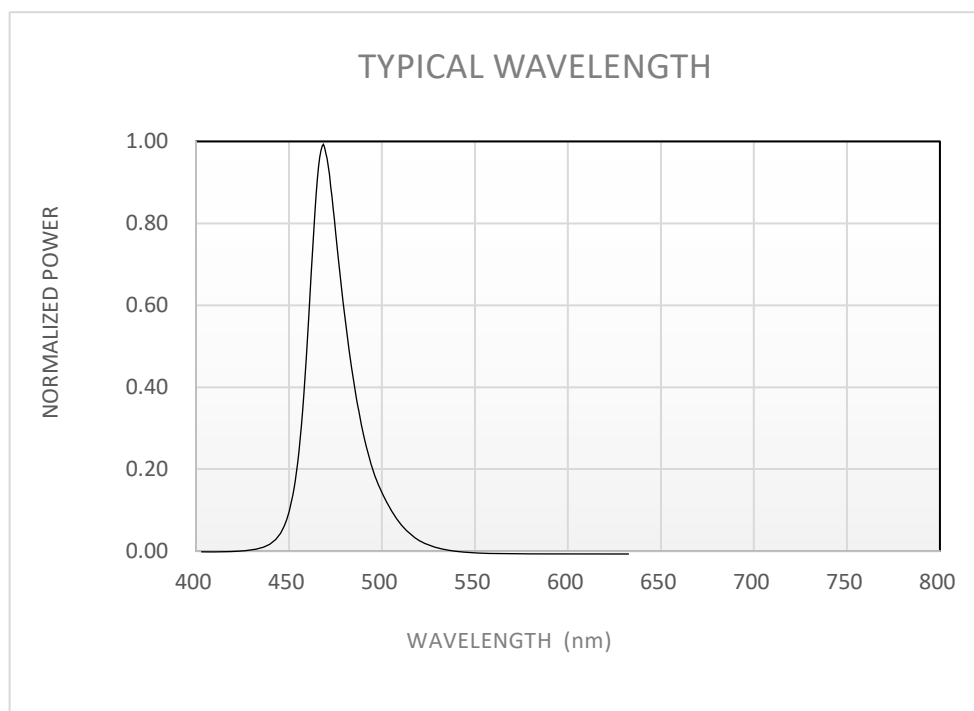


Figure 1A. Typical normalized light output vs.TYPICAL WAVELENGTH for Led uva at specified test current.IF=20ma TJ=25°C

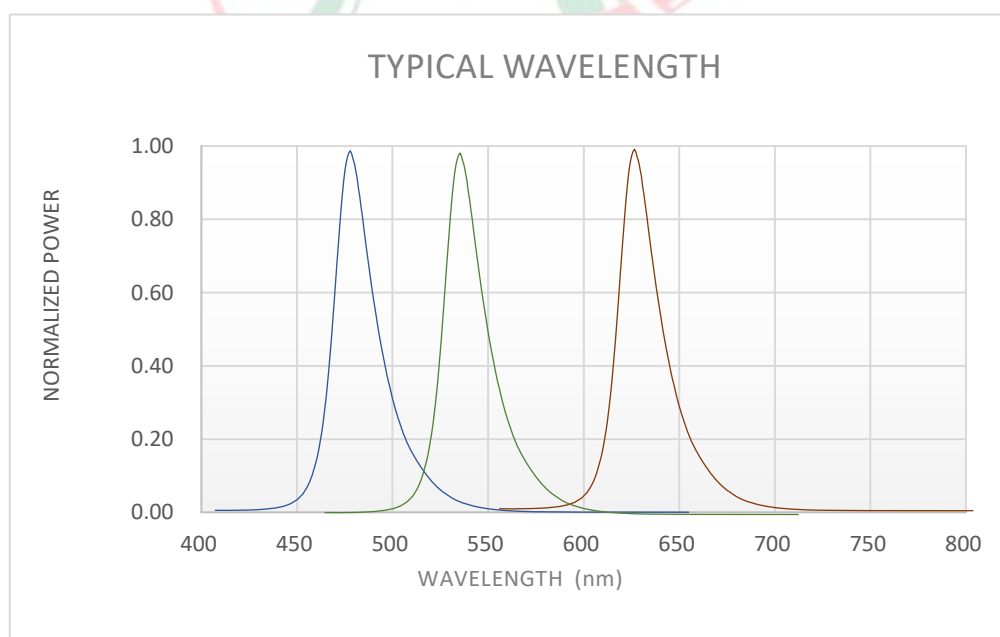


Figure 1B . Typical normalized light output vs.TYPICAL WAVELENGTH for Led uva at specified test current.IF=20ma TJ=25°C

Light Output Characteristics

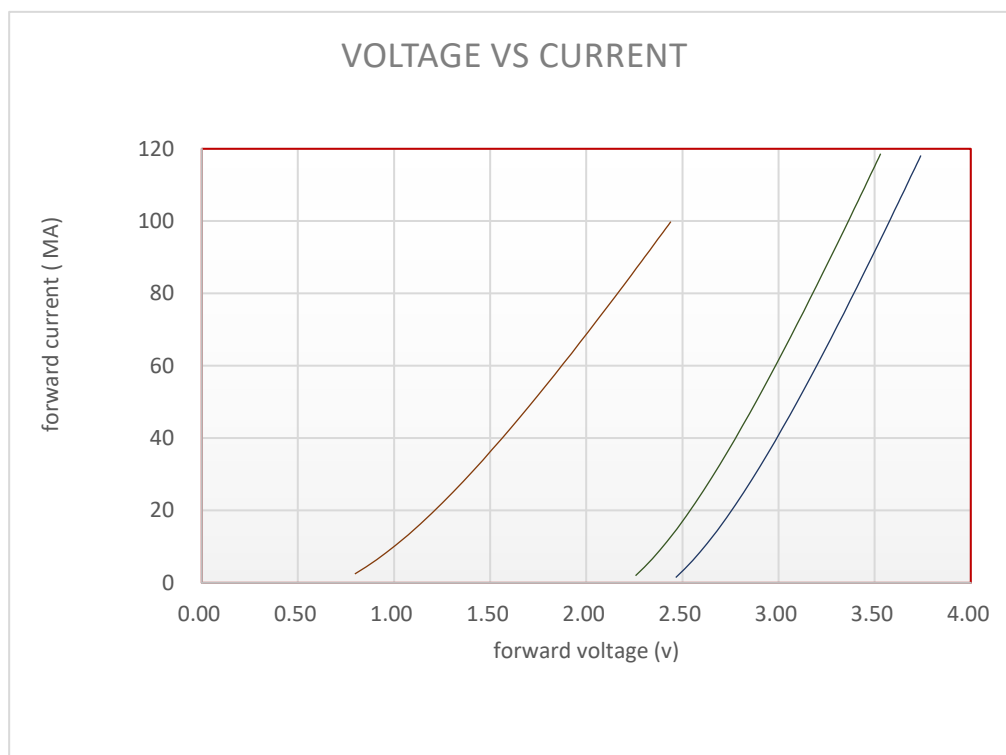


Figure 2. Typical forward current vs. forward voltage for R Tj=25°C.

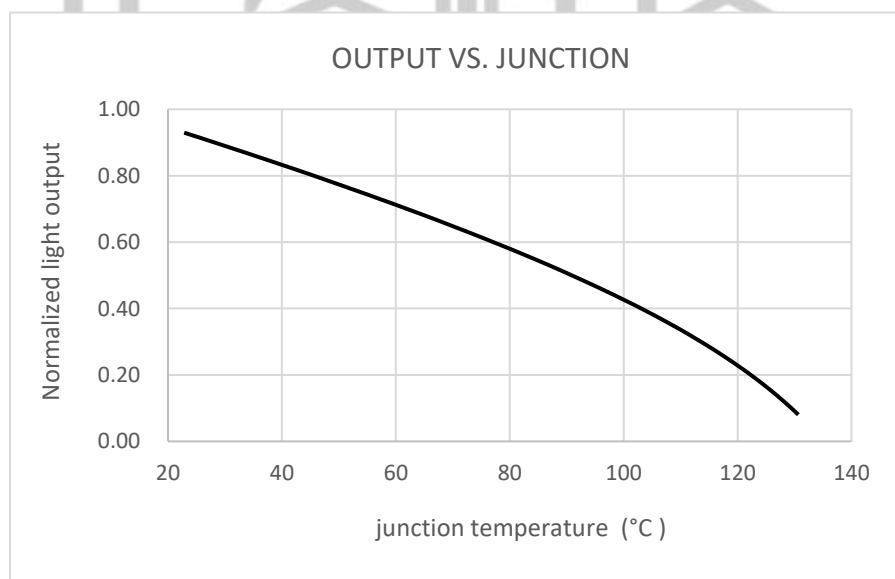


Figure 3. Typical normalized light output vs. junction temperature for at test current.

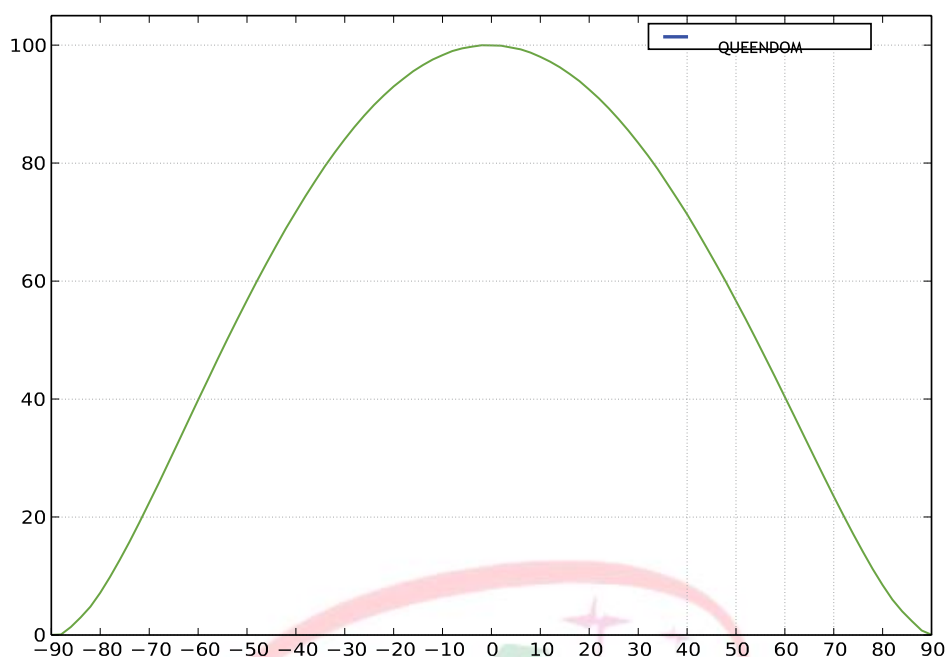


Figure 4. Typical radiation pattern for Queendom LED, $T_j=25^\circ\text{C}$.

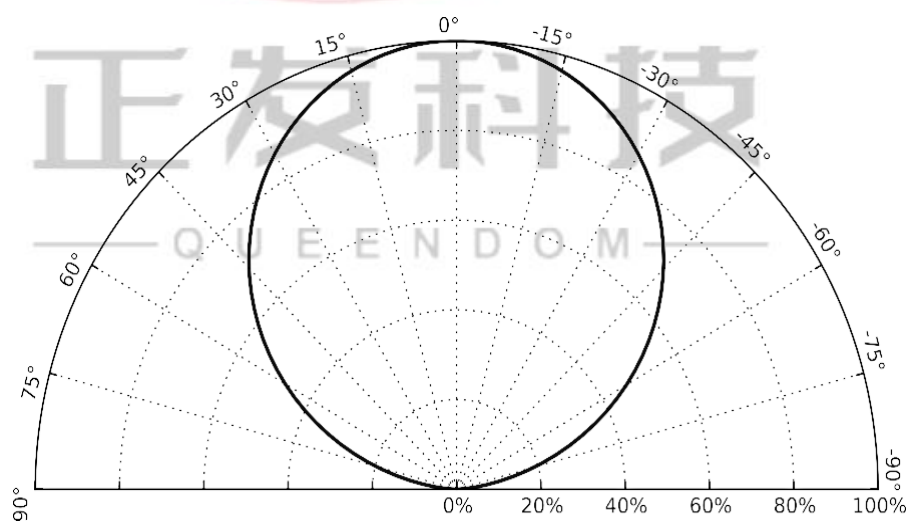


Figure 5. Typical polar radiation pattern for all at test current, $T_j=25^\circ\text{C}$.

TYPICAL APPLICATION

3528 内封 IC 灯采用单线通讯方式，采用归零码的方式发送信号。芯片在上电复位以后，接收 DIN 端打来的数据，接收够 24bit 后，DO 端口开始转发数据，供下一个芯片提供输入数据。

在转发之前，DO 口一直拉低。此时灯珠将不接收新的数据，内置 RGB 芯片根据接收到的 24bit 数据后产生的不同占空比信号，展现不同亮度。

如果 DIN 端输入信号为 RESET 信号，芯片将接收到的数据送显示，芯片将在该信号结束后重新接收新的数据，在接收完开始的 24bit 数据后，通过 DO 口转发数据，灯珠在没有接收到 RESET 码前，RGB 亮度保持不变，当接收到 100us 以上低电平 RESET 码后，灯珠内部 RGB 芯片将根据刚才接收到的 24bit 数据后产生的不同占空比信号，展现不同亮度。

The 3528 internally sealed IC lamp uses a single-line communication method and uses a return-to-zero code to send signals. After the chip is powered on and reset, it receives data from the DIN end. After receiving 24 bits, the DO port starts to forward data for the next chip to provide input data.

Before forwarding, the DO port is always pulled low. At this time, the lamp bead will not receive new data, and the built-in RGB chip will show different brightness according to the different duty cycle signals generated after receiving the 24-bit data.

If the input signal at the DIN end is a RESET signal, the chip will send the received data to the display, and the chip will receive new data again after the signal ends. After receiving the initial 24-bit data, the data is forwarded through the DO port. Before the lamp bead receives the RESET code, the RGB brightness remains unchanged. After receiving a low-level RESET code of more than 100us, the RGB chip inside the lamp bead will show different brightness according to the different duty cycle signals generated after the 24-bit data just received.

Figure 1 :Chip cascading method:

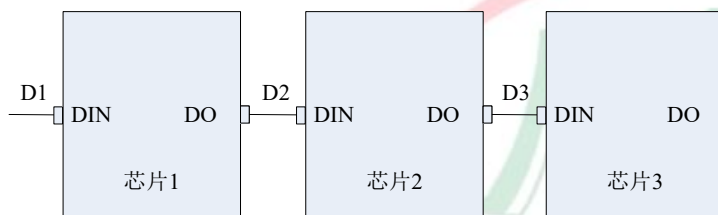


Figure 2 :



Note: Where D1 is the data sent by the MCU, D2, D3, and D4 are the data automatically transferred by the cascading circuit.

Figure 3 Reference design

24 bit data structure:

G	G	G	G	G	G	G	G	R	R	R	R	R	R	R	R	B	B	B	B	B	B	B	B
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

Note: Higher-level starts, sending data in GRB order.

Figure 4 Sequential wave map:

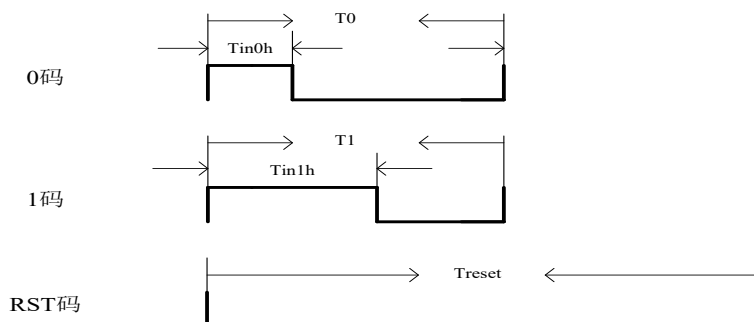


Figure 5.Signal Transmission Definition:

参数 Parameter	符号 Symbol	最小值 MIN.	典型值 Typ.	最大值 Max.	单位 Units
输入 0 码高电平时间 Enter a 0-yard high-level time	Tin0h	0.20	0.28	0.35	us
输入 1 码高电平时间 Enter 1 yard high level time	Tin1h	0.65	0.9	1.0	us
输入 0 码低电平时间 Enter the zero yard low level time	T0L	1.55	1.72	30	us
输入 1 码低电平时间 Enter 1 yard low level time	T1L	1.10	1.10	30	us
0 码/1 码周期 Zero-yard-per-yard period	T0/T1	1.75	-	35	us
RESET 码低电平时间 Reset Code Low level time	Treset	100	150	-	us

Figure 6.Recommended Controller Timing

名称 Name	描述 Description	典型值 Typ.	建议设定值 Recommended setting
T0H	0 码, 高电平时间/Zero yards, high-level time	0.28us	0.28us
T1H	1 码, 高电平时间/One Yard, high-level time	0.9 us	0.9 us
T0L	0 码, 低电平时间/Zero yards, low-level time	>1.72μs	1.72μs
T1L	1 码, 低电平时间/One Yard, low level time	>1.1us	1.1μs
T	“0” 码或 “1” 码周期/Zero or one yard period	>2.0us	--
Treset	Reset 码, 低电平时间/Reset Code, low-level time	>100us	150 us

Figure 7. Constant-current curve

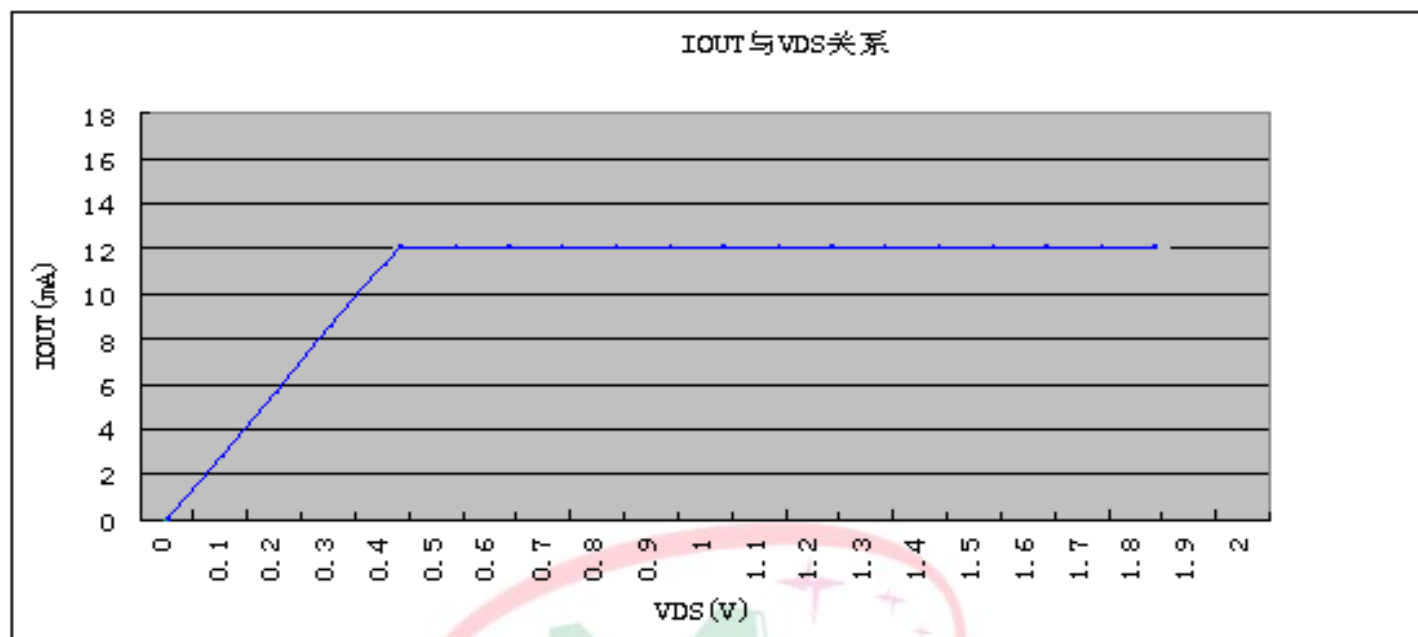
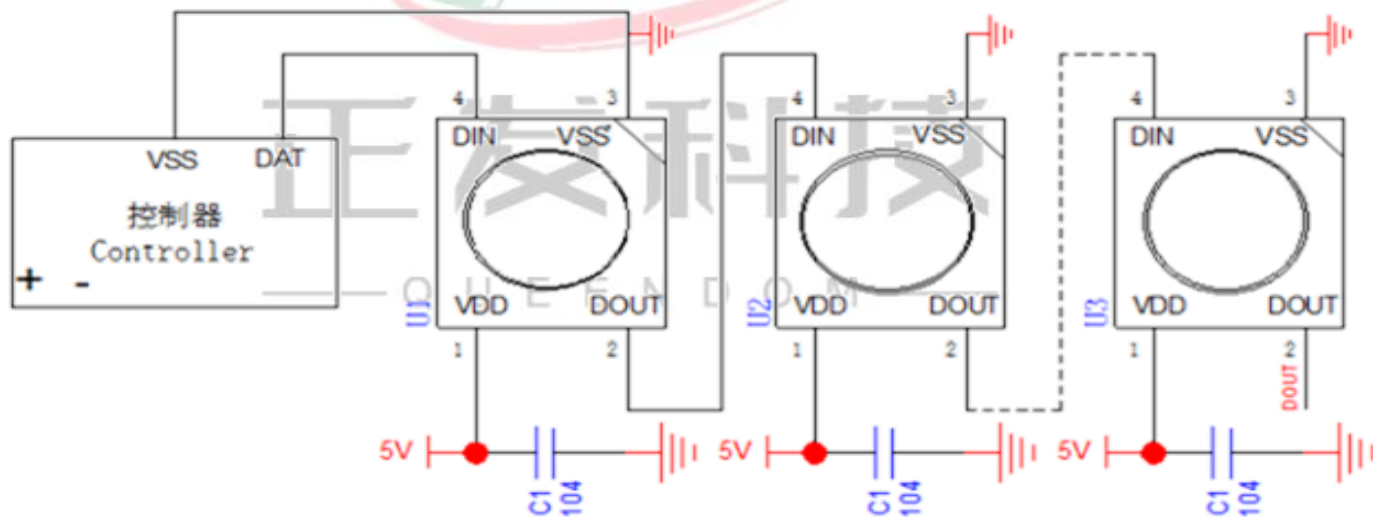


Figure 8 Application Route Diagram

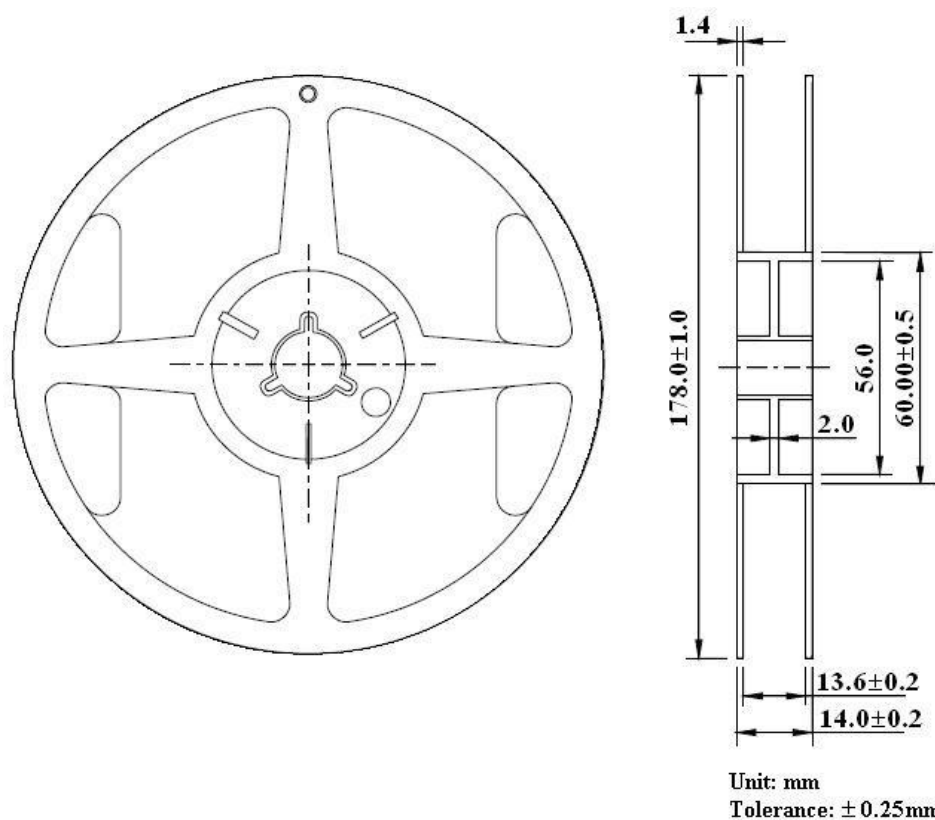
Power supply voltage 5V(as shown)



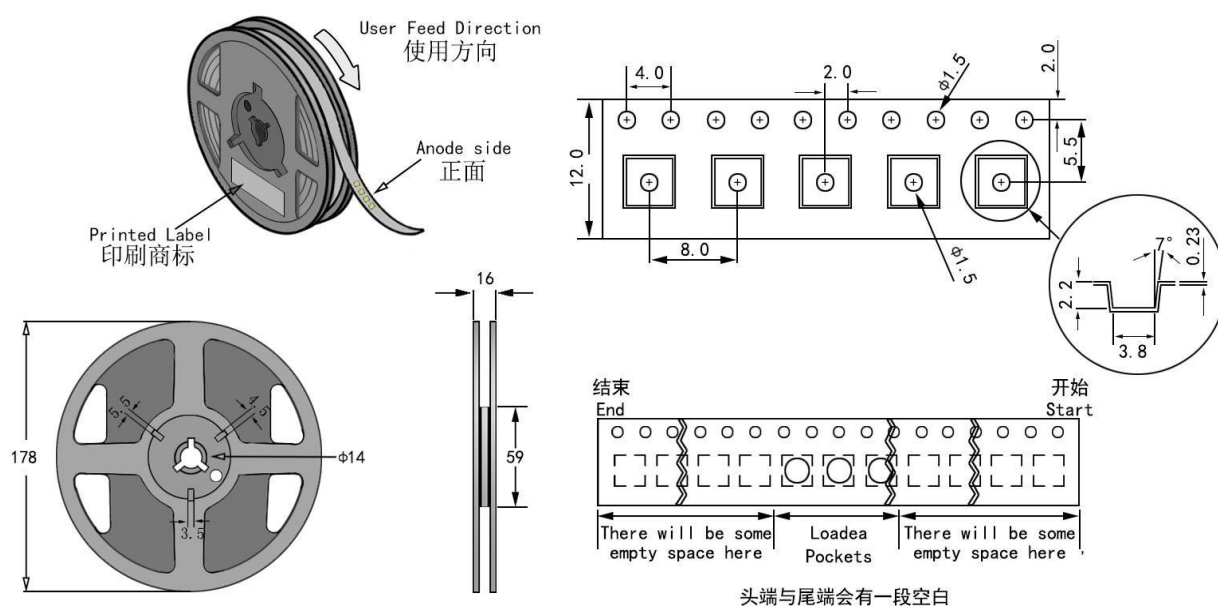
In the application of the product, there are big differences in the number of the cascade of the driving lights, the configuration of the controller parameters and the quality of the driving power, we are not committed to meeting all the application requirements of our customers.

Packaging Information

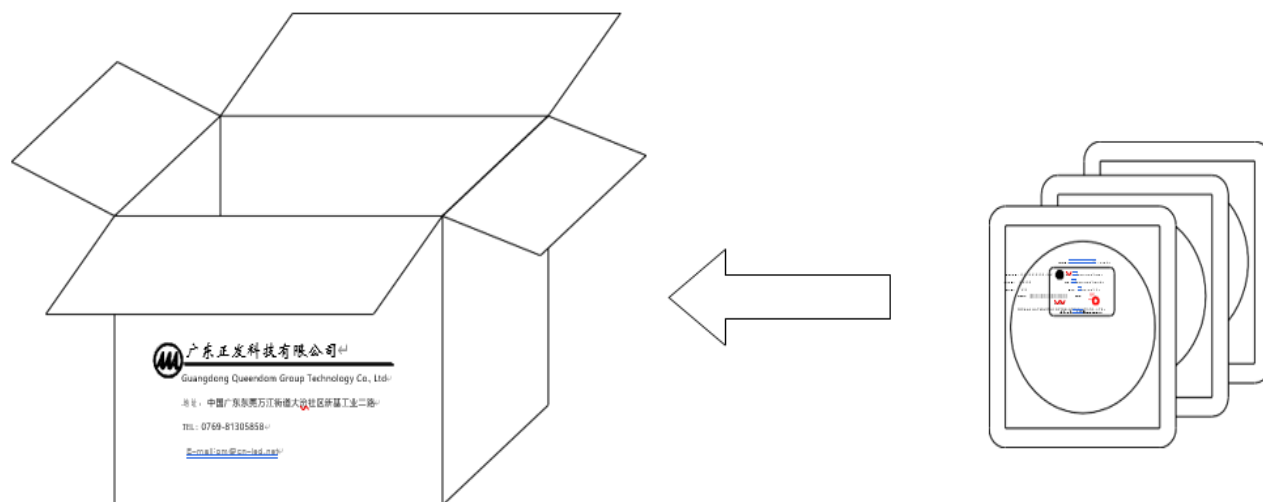
Reel Dimensions:



Carrier Tape Dimensions:



Packaging cartons



Information

- With Stopper



Without Stopper

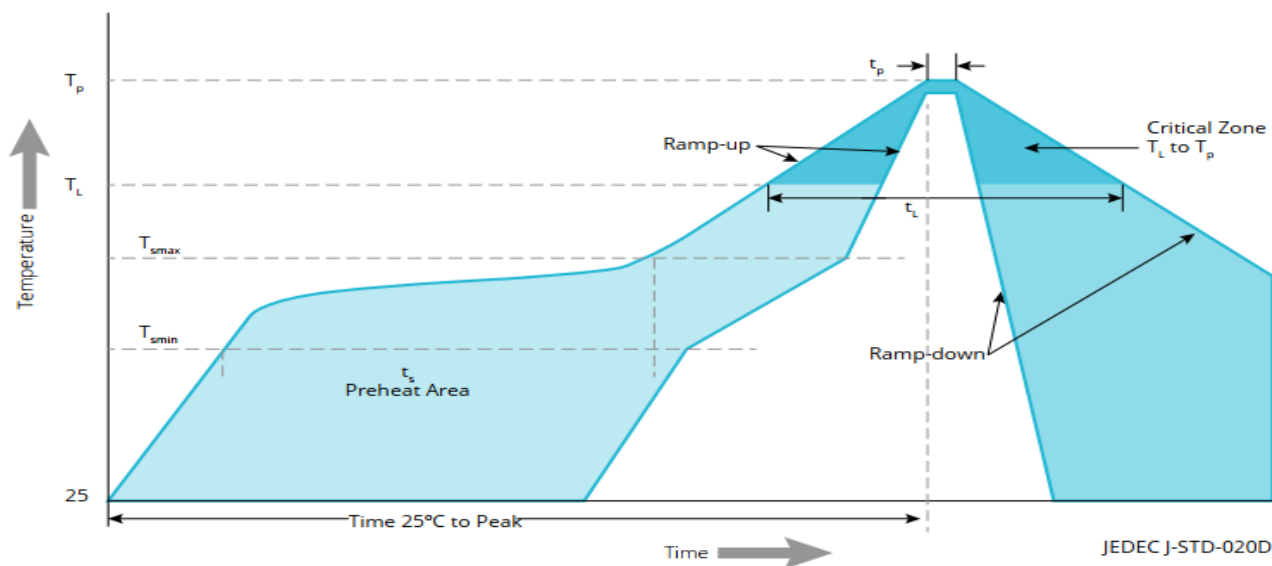
CPN:Customer's Product Number
P/N:Product Number
QTY:Packing Quantity
LOT NO:Lot Number
VF:Forward Voltage Rank
IV:Luminous Intensity Rank
WLD:Dom. Wavelength Rank
BIN:BIN Code
DATE: Date Of Dispatch

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
Reheat Minimum Temperature (T _{sm})	150°C
Preheat Maximum Temperature (T _{smx})	200°C
Preheat Time (t _{sm} to t _{smx})	60 to 120 seconds
Ramp-Up Rate (T _L to T _p)	3°C / second maximum
Liquidus Temperature (T _L)	217°C
Time Maintained Above Temperature T _L (t _L)	60 to 150 seconds
Peak / Classification Temperature (T _p)	260°C
Time Within 5°C of Actual Temperature (t _p)	20 to 40 seconds
Ramp-Down Rate (T _p to T _L)	6°C / second maximum
Time 25°C to P	8 minutes maximum

JEDEC Moisture Sensitivity

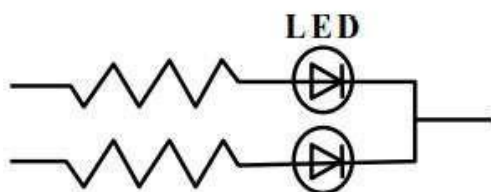
Moisture sensitivity levels for LEDs Line

level	Floor life		soak requirements standard	
	time	conditions	time	conditions
1	Unlimited	≤30°C / 85% RH	168 Hours +5 / -0	85°C / 85% RH

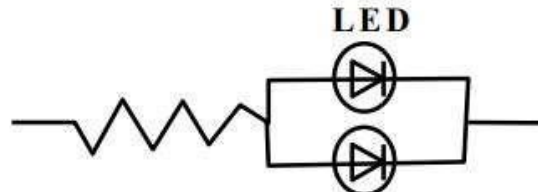
Drive Method

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 handling.

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.