

Shenzhen Tiancheng Lighting Co., Ltd.

SPECIFICATIONS

Product Specifications

client's name		product name	TX1812Z5
Customer code		Product Specification	TC2020RGB-3CJH



client confirmation			
formulate	audit	approved	
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Version No: 1.0			



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• Description

TX1812Z5 is an intelligent external control LED light source that integrates control circuit and lighting circuit. Its appearance is the same as a 2020LED lamp bead, each

Each element is a pixel. The interior of the pixel includes an intelligent digital interface data latch signal shaping and amplifying drive circuit, a power supply voltage regulator circuit, and a

Equipped with constant current circuit, high-precision RC oscillator, and the output driver adopts patented PWM technology, which effectively ensures the high color consistency of the light in the pixel.

The data protocol adopts the communication method of unipolar return-to-zero code. After the pixel is powered on and reset, the DIN terminal accepts the data transmitted from the controller.

The 24bit data sent first is extracted by the first pixel, and then sent to the data latch inside the pixel, and the remaining data is processed by internal shaping

After the circuit is shaped and amplified, the output is forwarded to the next cascaded pixel through the DO port, and the signal is reduced by 24 bits each time a pixel is transmitted.

The pixel adopts automatic shaping and forwarding technology, so that the cascade number of the pixel is not limited by the signal transmission, but only limited by the signal transmission speed requirement.

LED has the advantages of low voltage drive, environmental protection and energy saving, high brightness, large scattering angle, good consistency, ultra-low power, ultra-long life and so on. will control

The circuit is integrated on the LED, the circuit becomes simpler, the volume is smaller, and the installation is easier.

• Applications (field)

γ LED full-color light-emitting character light string, LED full-color module, LED phantom soft and hard light bar, LED guardrail tube, LED appearance/scenario lighting.

γ LED point light source, LED pixel screen, LED special-shaped screen, various electronic products, electrical equipment marquee.

• Features

γ High-quality external control single-wire serial cascade constant current IC is integrated inside

the LED; γ The control circuit and chip are integrated in SMD 2020 components to form a complete external control pixel, with uniform color temperature effect and high consistency. γ Built-in data

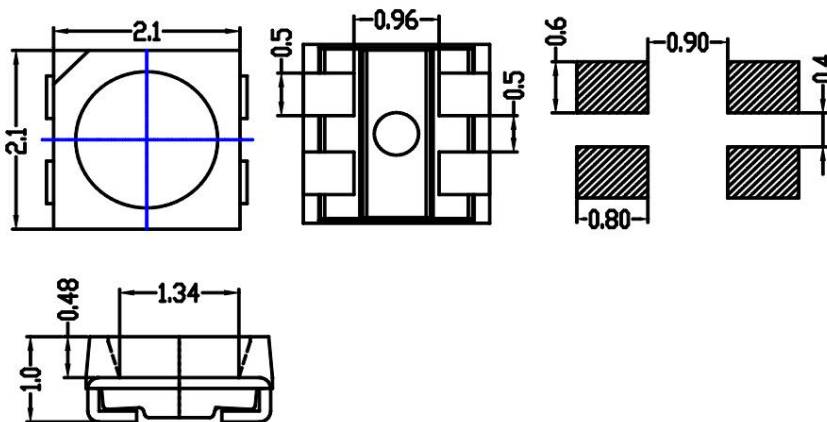
shaping circuit, any pixel receives the signal after waveform shaping and then outputs it to ensure that the line waveform distortion will not accumulate. γ Built-in power-on reset and power-down

reset circuit, no light when power on; γ Grayscale adjustment circuit (256-level grayscale adjustable), γ Red light drive special processing, more balanced color matching, γ Single-line data

transmission, infinite level link. γ Shaping and forwarding enhancement technology, the transmission distance between two points exceeds 10M. γ The data transmission frequency can reach

800Kbps, when the refresh rate is 30 frames/second, the number of cascades is not less than 1024 points.

• Package Dimensions

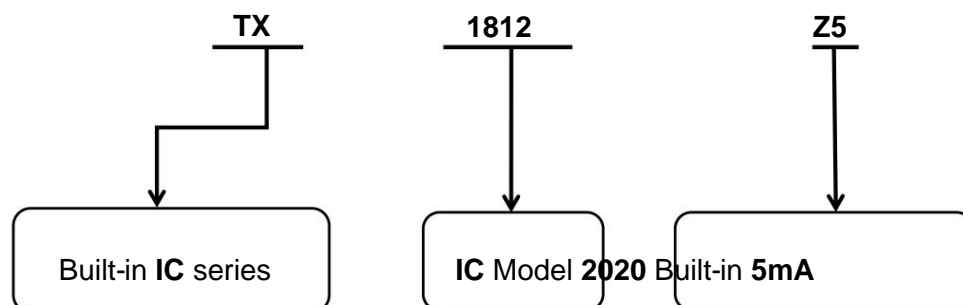


Note:

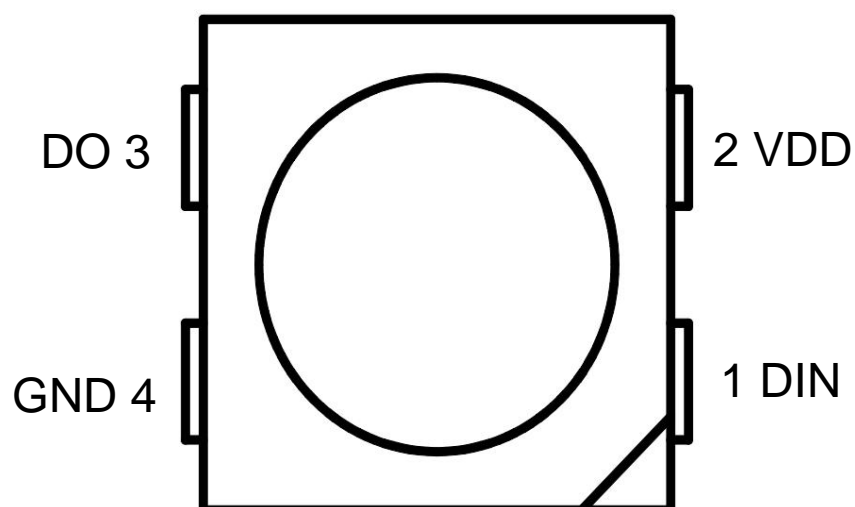
1. All dimensions are in millimeters 2. Unless otherwise

specified, the tolerances of all dimensions are $\pm 0.2\text{mm}$ 3. Package size: 2.1X 2.1 X 1.0mm

• Product naming principle



• Pin figure



• Pin function (pin diagram)

serial number	symbol	pin name	Function description
1	FROM	data input	Control data signal input
2	VDD	power supply	Power supply pins
3	DO	data output	Control data signal output
4	GND	land	Signal ground and power ground

Electro-optical characteristics at Ta=25°C

Item Symbol (I symbol)			Mix (minimum)	Type (average)	Max (maximum)	Unit (unit)	Conditions (Test Conditions)
Reverse current (reverse current)	IR		5	μA	VR = 5V
Dominant wavelength (dominant wavelength)	λd	G	525		530	nm	IF=5mA
		R	627.5		632.5		
		B	467.5		472.5		
Luminous intensity (light intensity)	IV	G	400		600	mcd	IF=5mA
		R	100		200		
		B	100		200		

Absolute maximum ratings at Ta=25°C

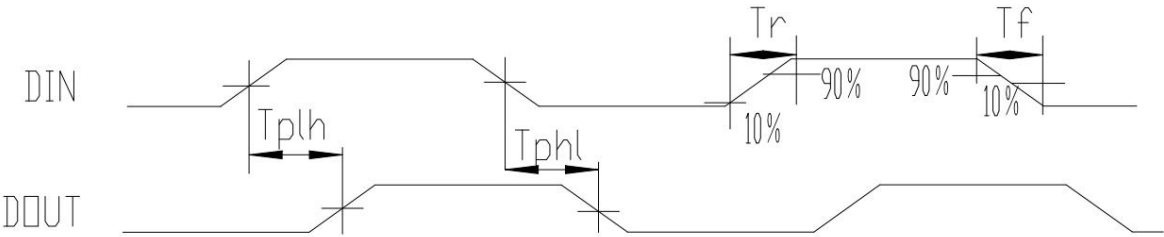
parameter	symbol	scope	unit
Logic Supply Voltage	VDD	3.0~7.5	V
R/G/B output port current	Iol1	5	mA
Operating temperature	Topt	-40~85	°C
Storage temperature	Tstg	-40~120	°C

Electric Spec

parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
voltage	VDD		3.5	5.0	5.5	V
OUT output current	Iout			5		mA
High level input voltage Vin			0.7VDD			V
Low-level input voltage Vil					0.3VDD	V
PWM frequency	FPWM			4		KHZ
Static power	IDD			0.3		mA

dynamic parameter

Parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
data rate	END		800	1100	KHZ	
Transmission delay time T_{pL}				500	ns	DIN-DO



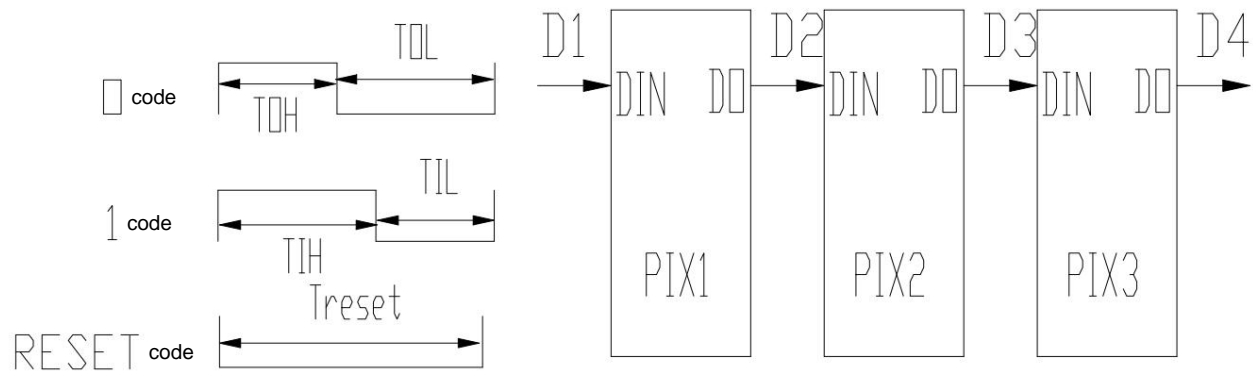
The data transmission time

parameter name	Parameter Symbol	Test Condition	Min	Typ	Max	Unit
Input 0 code corresponds to high level time	T_{in0h}	VDD=5.0V	245	295	345	ns
Input 1 code corresponding to high level time	T_{in1h}	VDD=5.0V	545	595	645	ns
Output 0 code corresponding to low level time	T_{do0h}	VDD=5.0V	545	595	645	ns
Output 1 code corresponds to low level time	T_{do1h}	VDD=5.0V	245	295	345	ns
RST code low time	Trieste		80			us

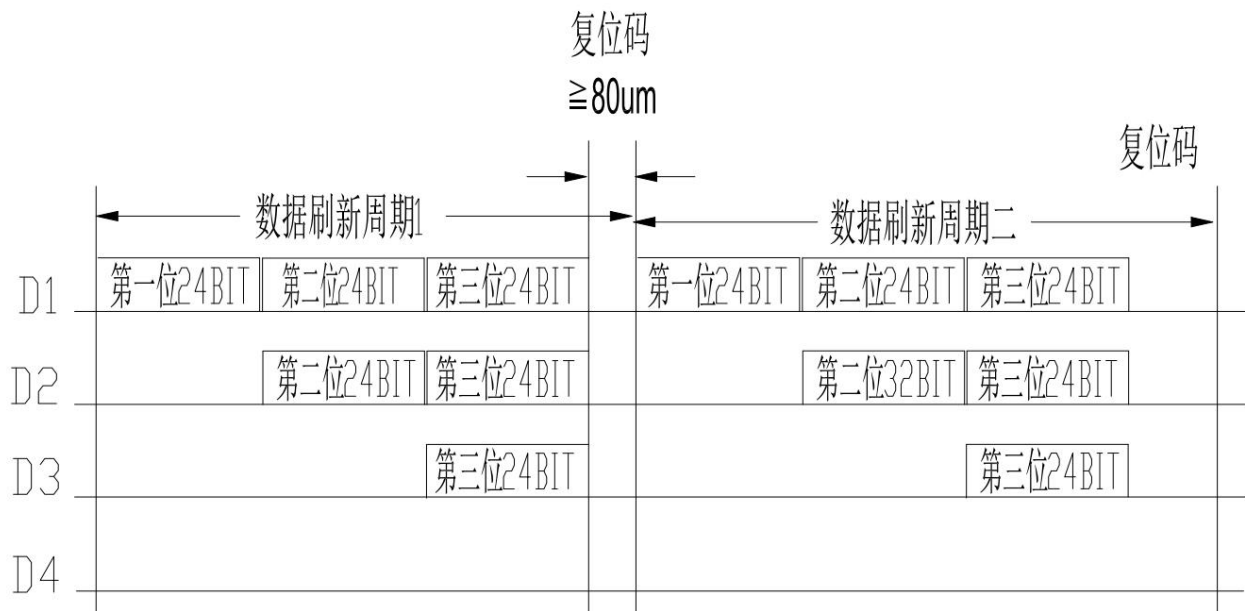
Temporal waveform figure

Input pattern:

Connection method:

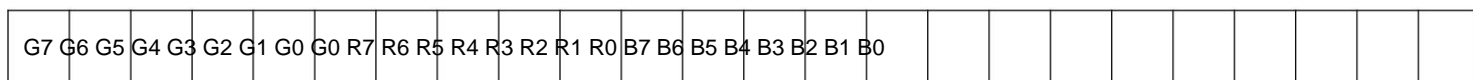


• mode of data transmission



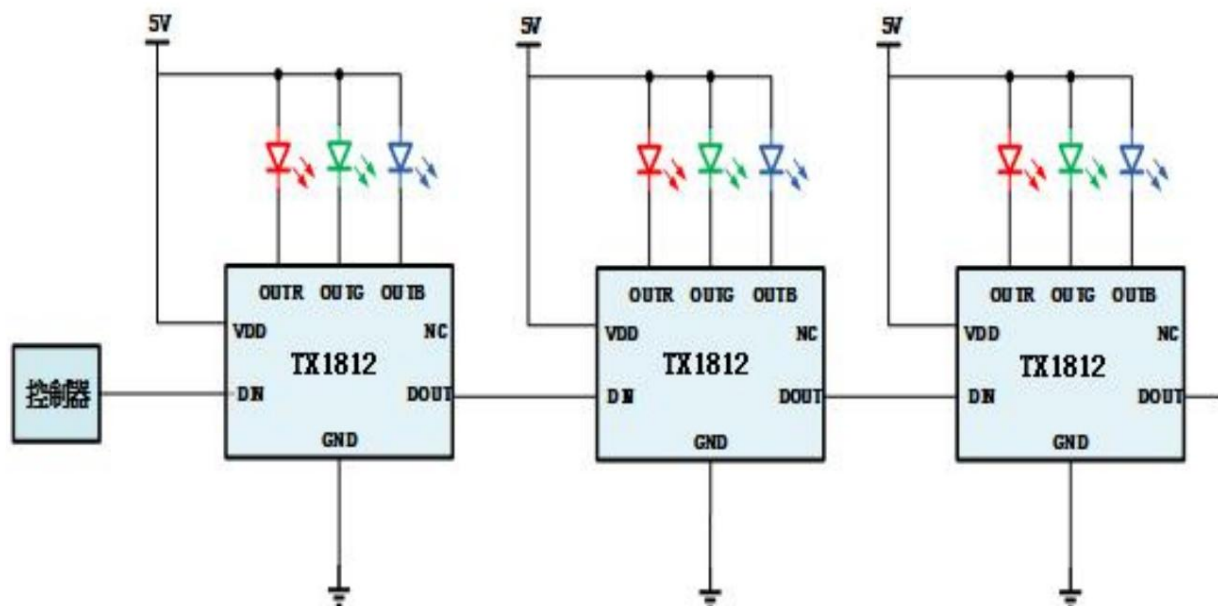
注：其中D1为MCU端发送的数据，D2、D3、D4为级联电路自动整形转发的数据

• mode of data transmission



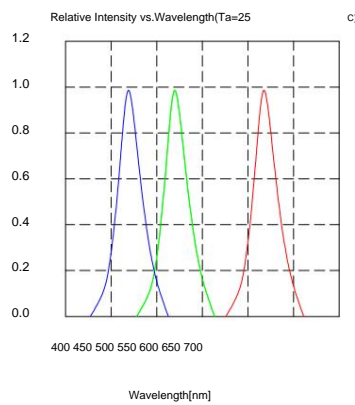
Note: High-order first, send data in the order of GRB (G7yG6...B0)

• Typical application circuit

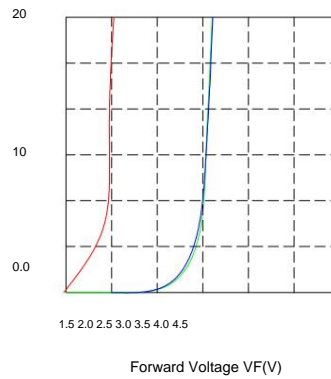


• Typical optical characteristics curves

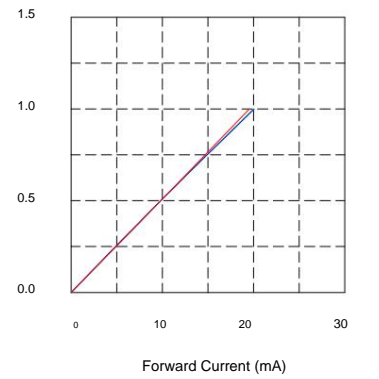
Spectral Distribution



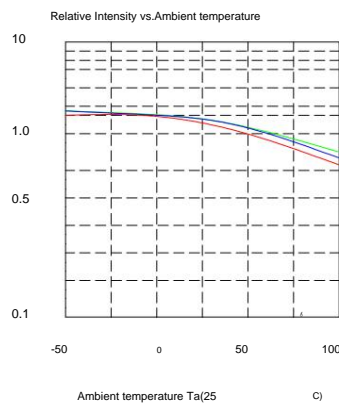
Forward current vs. Forward Voltage (Ta=25) C)



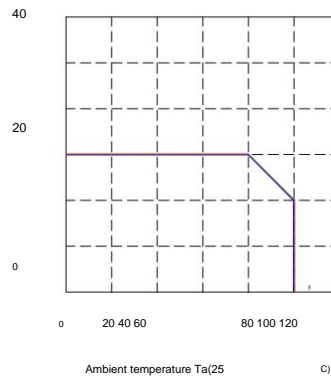
Relative Intensity vs. Forward Current (Ta=25) C)



Detrating



Ambient temperature vs. Maximum Forward Current C)



Forward Current vs. Chromating (Ta=25) C)

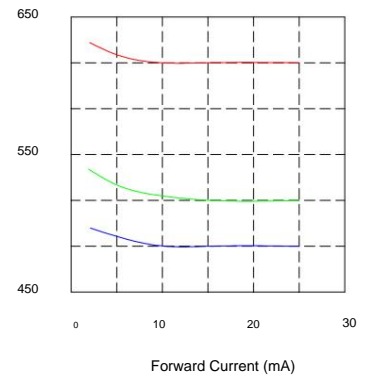
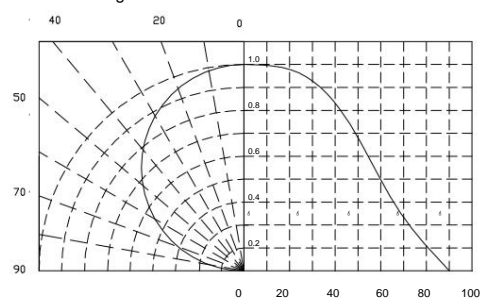
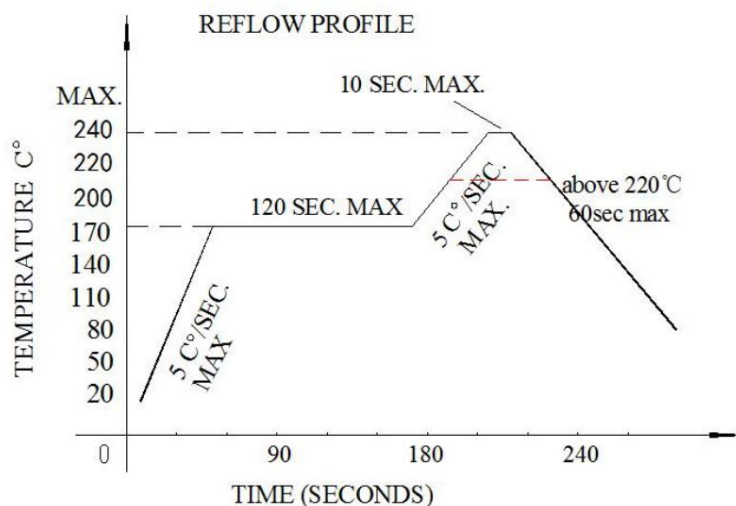


Diagram characteristics of radiation



• Reflow profile (welding instructions)

• SMD Reflow Soldering Instructions



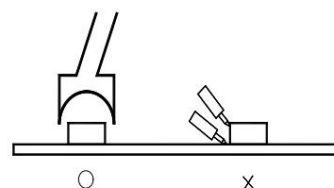
1. Reflow soldering should not be done more than two times
2. When soldering , do not put stress on the LEDs during heating

• Soldering iron

When hand soldering, keep the temperature of the iron under 300°C, and at that temperature keep the time under 3 sec. When hand soldering, the temperature of the soldering iron should be controlled below 300°C, and the time should not exceed 3 seconds. 2. The hand soldering should be done only a time

• Rework

1. Customer must finish rework within 5 sec under 240°C
2. The head of iron can not touch the LEDs
The soldering iron cannot touch the LED lamp beads
3. Twin-head type is preferred.



• CAUTIONS

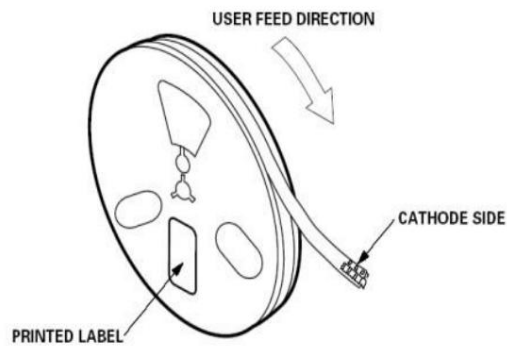
The encapsulated material of the LEDs is silicone. Therefore the LEDs have a soft surface on the top of package. The pressure to the top surface will be influence to the reliability of the LEDs. Precautions should be taken to avoid the strong pressure on the encapsulated part. So when using the picking up nozzle, the pressure on the silicone resin should be proper. The encapsulated LED is silicone material. The LED has a soft surface package top. Pressure on the top surface can affect LED reliability. Precautions should be taken to avoid excessive stress on the package. Therefore, when choosing a nozzle, it should be suitable for the pressure of the silicone resin.

• Reliability

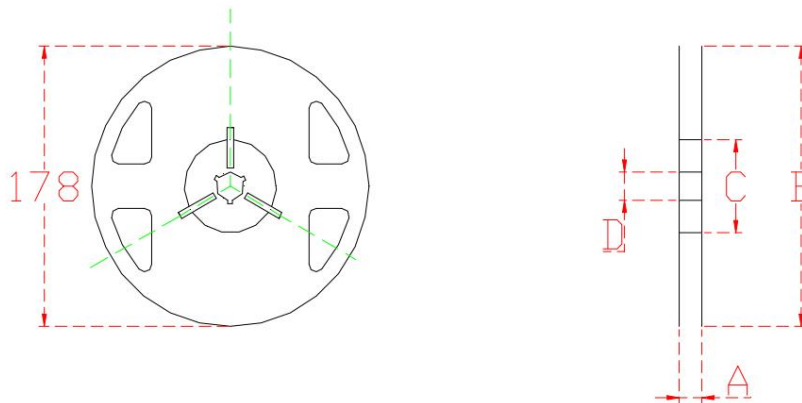
TEST ITEMS AND RESULTS

Test Item (Test items)	Ref.Standard (Guideline)	Test Conditions (Test Conditions)	Note (Remark)	Conclusion (in conclusion)
Reflow Soldering (reflow soldering)	JESD22-B106	Tsld=240 \pm 10sec	3 times	0/22
Temperature Cycle (temperature cycle)	JESD22-A104	-20 \pm 30min \pm 15min 120 \pm 30min	200 cycle	0/100
Thermal Shock (Thermal shock)	JESD22-A106	-40 \pm 15min \pm 15sec 125 \pm 15min	200 cycle	0/100
High Temperature Storage (high temperature storage)	JESD22-A103	Ta = 100 \pm	1000 hrs	0/100
Low Temperature Storage (low temperature storage)	JESD22-A119	Ta = -40 \pm	1000 hrs	0/100
Power temperature Cycling (Light up high and low temperature cycle)	JESD22-A105	On5min-40 \pm 15min \pm \pm \pm \pm <15min Off5min100 \pm 15min	200 cycle	0/100
Life Test (Aging test)	JESD22-A108	Ta = 25 \pm IF=5mA	1000 hrs	0/100
High Humidity Heat Life Test (High temperature and humidity)	JESD22-A101	60 \pm RH=90% IF=5mA	1000 hrs	0/100

• Packaging Specifications • Feeding Direction

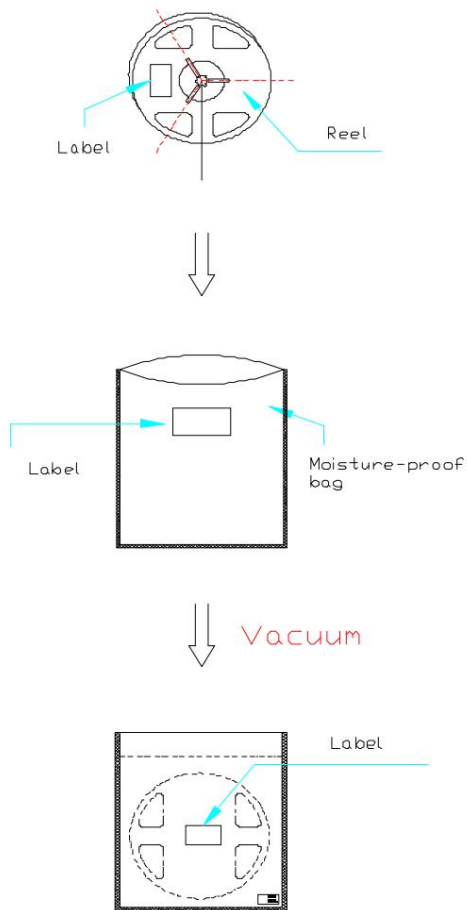


• Dimensions of Reel (Unit: mm)



A	8.0±0.1mm
B	178±1mm
C	60±1mm
D	13.0±0.5mm

1. Packing Icon



2. Label Icon