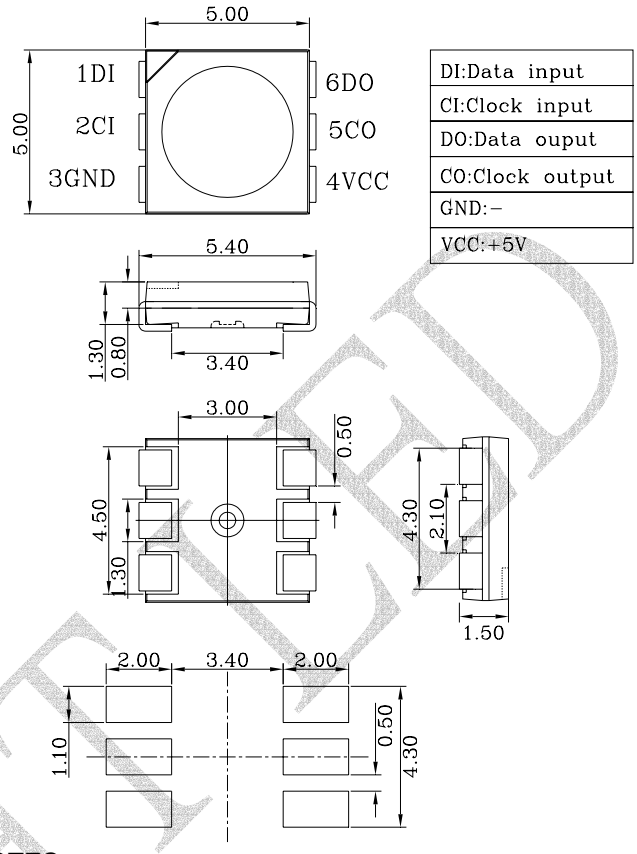
● Features:

1. Emitted Color: Red, Green, Blue,
2. Lens Appearance: Water Clear.
3. 5.4x5.0x1.5mm standard package.
4. Refresh rate : 400 cycle
5. Applied Voltage : 5V
6. Power consumption : 0.2W (max : 1W)
7. Suitable for all SMT assembly methods.
8. Compatible with infrared and vapor phase reflow solder process.
9. Compatible with automatic placement equipment.
10. This product doesn't contain restriction Substance, comply ROHS standard.
11. Synchronous of two-lane.
12. 8Bit(256 level)Color set.
13. 5Bit(32 level)brightness adjustment.
14. 20mA Content current output.
15. High contrast.
16. Choose positive output or negative output RGB tri-color LED output.
17. With self-detection signal Built-in support for continuous oscillation PWM output can be maintained static screen.

●Package Dimensions:



NOTES:
1.All dimensions are in millimeters (inches).
2.Tolerance is ±0.10mm (0.004") unless otherwise specified.
3.Specifications are subject to change without notice.

● Applications:

1. Large LED Display.
2. Soft Light Bar.
3. Full Color Display.

● Absolute Maximum Ratings(Ta=25℃)

Parameter	Symbol	Range	Unit
Supply voltage		-0.3V~6.0V	V
Input Voltage		VSS-0.3 ~VDD+0.3	V
Operating Temperature	Topt	-40℃~70℃	-
Storage Temperature	Tstg	-40℃~105℃	-
Soldering Temperature	Tsol	See Page 8	-

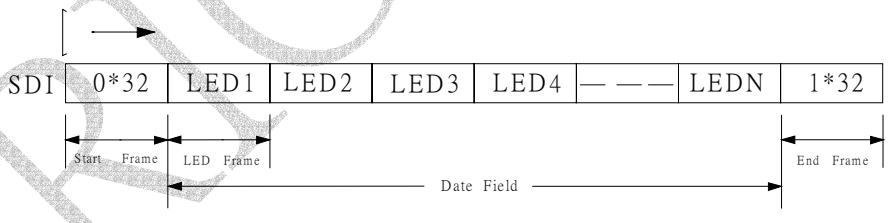
● Electrical and optical characteristics(Ta=25℃)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	VDD			5.0	5.5	V
Input High Voltage	VIH		0.7VDD		VDD+0.03	V
Input Low Voltage	VH		Vss-0.03		0.3VDD	V
Sink Current Voltage	LOL	@VDD=5V,VOL>1V	22.5	24.5	26.5	mA
Pull High	RIN	@VDD=5V		570		KΩ
Regulator Voltage (VREG)	VREG	@VDD>5V	4.4	4.5	4.7	V
Oscillator Frequency	FOSC		800		1200	KHz
Luminous Intensity	IV (R)			900		mcd
	IV (G)			1600		mcd
	IV (B)			400		mcd
Dominant Wavelength	WLD(R)			625		nm
	WLD(G)			525		nm
	WLD(B)			465		nm

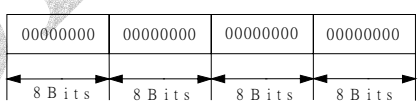
● Function description

（1）cascading data structure

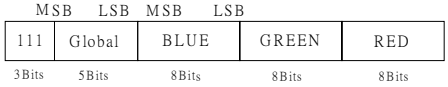
Tabdem N-LED



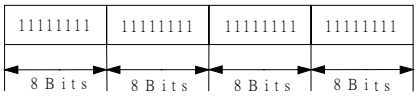
Start Frame 32 Bits



LED Frame 32 Bits



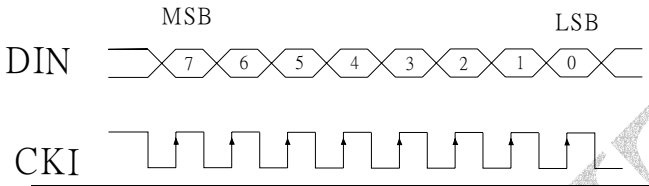
LED Frame 32 Bits



Global bit：5-bit（32level）brightness setting，while controlling R,G,B Three-color constant current output value，if set the Global bit for the 10000（16/31）is the output current is half again the original PWM settings

DATA MSB←→LSB	Driving Current
00000	0/31
00001	1/31
00010	2/31
…	
11110	30/31
11111	31/31（max）

PWM input and output signals Relations



DATA MSB-----	Duty Cycle
00000000	0/256(min)
00000001	1/256
00000010	2/256
…	
111111101	253/256
111111110	254/256
111111111	255/256(max)

（2) The number of pixels per second sent to CKI frequency(FCKI)minus the Start Frame bit divided by the number 40 the number of LED Frame bit 32,if CKI frequency (FCKI) to 512KHz,the pixel number (512000-40)/32=15998,if the 50 second update Views can be connected in series LED number 15998/50=319.To increase the number of cascaded IC CKI frequency to be increased

（3) POLAR to empty, R,G,B for the negative output ;POLAR access VSS,R,G,B is positive output,

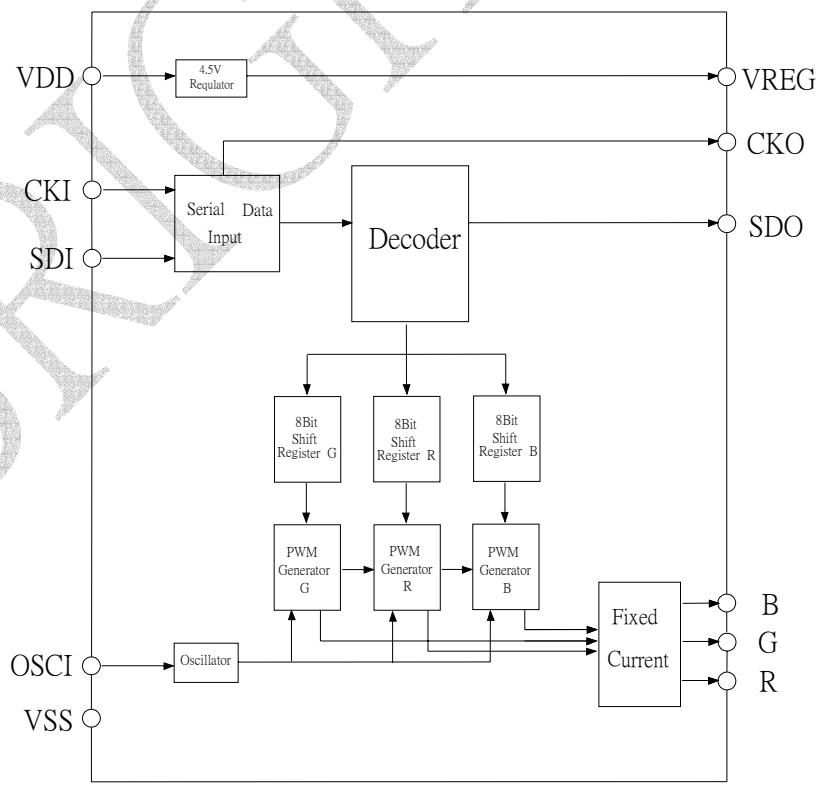
（4) VEN：Self-detection
Data Field to the middle of 3bit were B,G,R in the MSB of the opposite phase, otherwise regarded as invalid data VEN close to empty when the self-detection：when VEN VSS then activated self-detection.

（5）CSEL to empty when the CKO and CKI RP: CSEL connected with VSS when the CKO compared with CKI

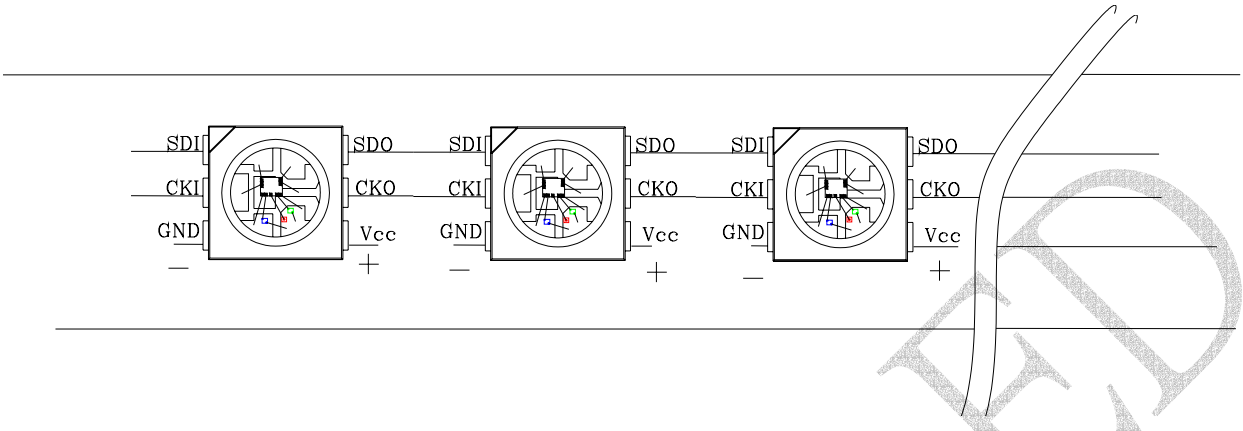
●Pin Description

NO	PIN NAME	I/O	FUNCTION
1	VDD	P	Power is terminal
2	VREG	O	4.5V regulator output
3	CKO	O	Series with the output clock signal
4	SDO	O	Series whit the output data
5	VEN	I	Self-test function selection
6	CSEL	I	Invert the clock signal cascade
7	POLAR	I	Positive and negative output options
8	OSCI	I	Oscillator input
9	SDI	I	Series whit the input data
10	CKI	I	Series whit the input clock signal
11	REXT	I	Constant current source to adjust side
12	VSS	P	Power supply negative terminal
13	G	O	Green LED output
14	R	O	Red LED output
15	B	O	Blue LED output

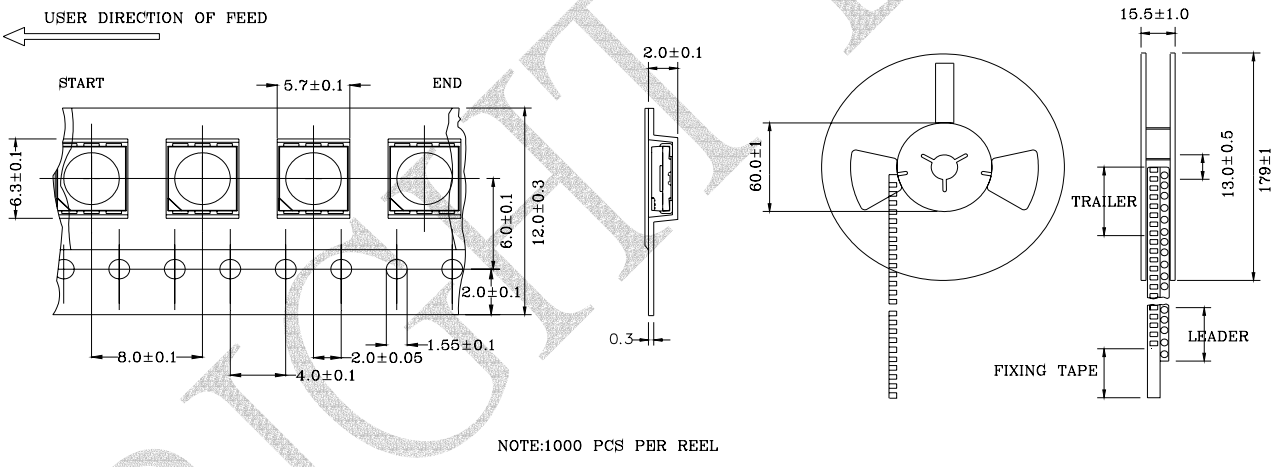
●Block Diagram



● Application Circuit

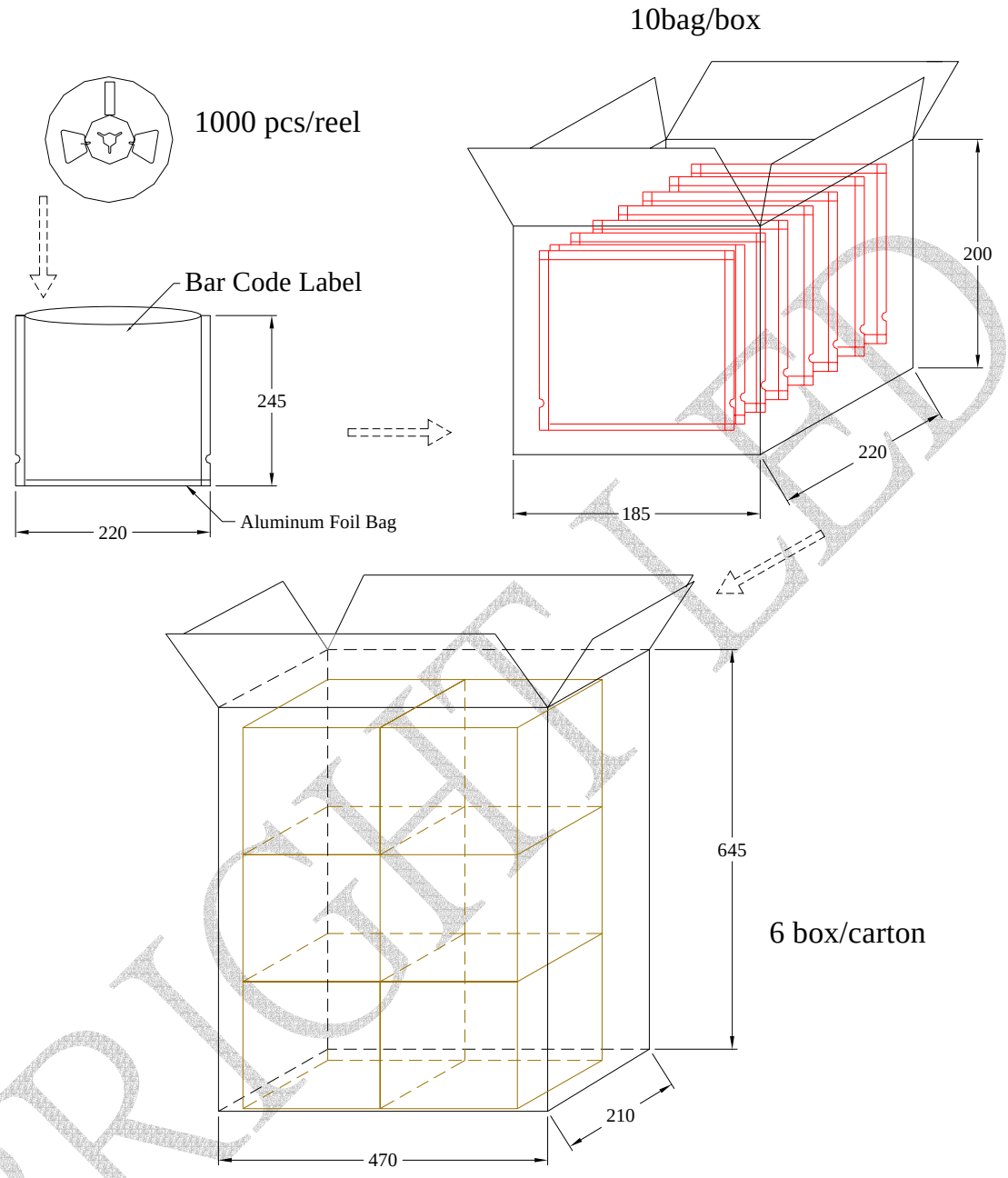


● Tapping and packaging specifications(Units: mm)



NOTE:1000 PCS PER REEL

●Package Method: (unit : mm)



● Reliability Test

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS-C-7021 :B-1	I_F=20mA Ta=Under room temperature Test time=1,000hrs	0/20
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS-C-7021 :B-11	Ta=+65℃±5℃ RH=90%-95% Test time=240hrs	0/20
	High Temperature Storage	MIL-STD-883:1008 JIS-C-7021 :B-10	High Ta=+85℃±5℃ Test time=1,000hrs	0/20
	Low Temperature Storage	JIS-C-7021 :B-12	Low Ta=-35℃±5℃ Test time=1,000hrs	0/20
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS-C-7021 :A-4	-35℃ ~ +25℃ ~ +85℃ ~ +25℃ 60min 20min 60min 20min Test Time=5cycle	0/20
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	-35℃±5℃ ~+85℃±5℃ 20min 20min Test Time=10cycle	0/20
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS-C-7021 :A-1	Preheating： 140℃-160℃,within 2 minutes. Operation heating： 260℃(Max.), within 10seconds. (Max.)	0/20

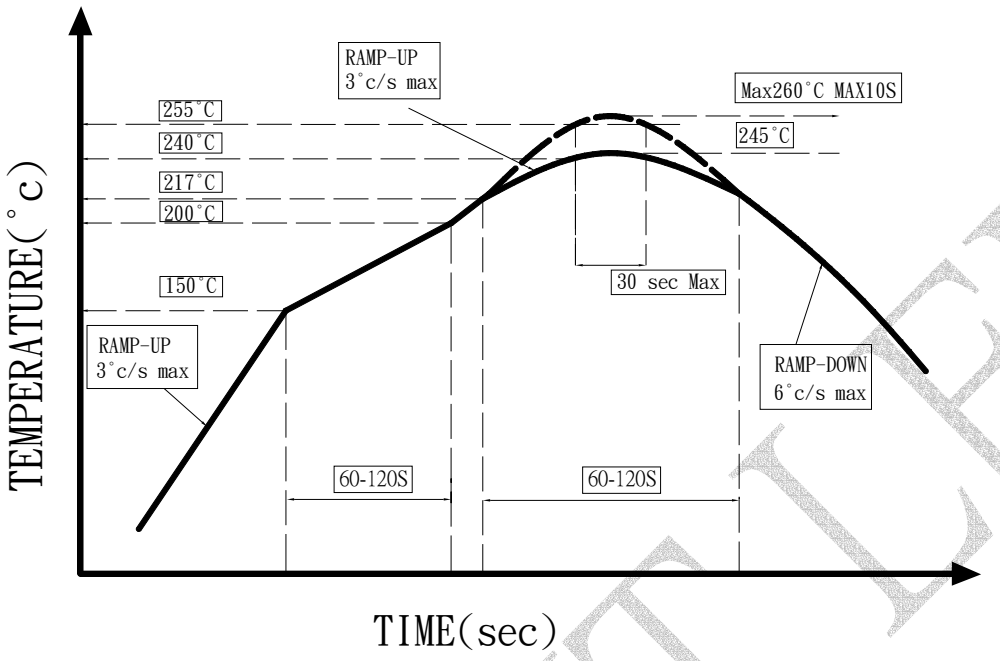
● **Judgment criteria of failure for the reliability**

Measuring items	Symbol	Measuring conditions	Judgment criteria for failure
Luminous intensity	Iv (mcd)	I_F=20mA	Below S^1X0.5

Note: 1. U means the upper limit of specified characteristics. S means initial value.

2. After each test, remove test pieces, wait for 2 hours and test pieces have returned to ambient temperature, then take next measurement.

●**IR-Reflow**



1、Avoid any external stress applied to the resin while the LEDs are at high temperature, especially during soldering.

2、Avoid rapid cooling or any excess vibration during temperature ramp-down process

3、Although the soldering condition is recommended above,
soldering at the lowest possible temperature is feasible for the LEDs

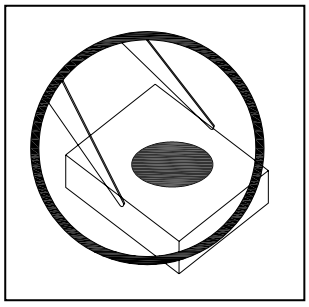
●IRON Soldering

350℃ Within 3 sec, one time only.

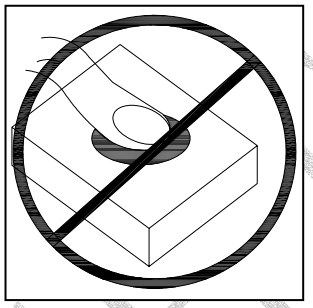
Handling Precautions

Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible.
Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force.
As a result, special handling precautions need to be observed during assembly using silicone encapsulated LED products. Failure to comply might lead to damage and premature failure of the LED.

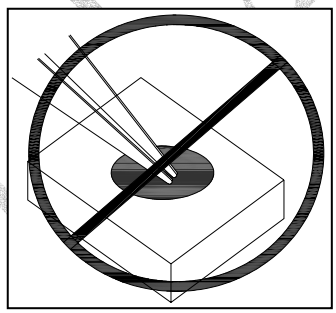
1. Handle the component along the side surfaces by using forceps or appropriate tools.(pic.1)
2. Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry. (pic.2,pic.3)
3. Do not stack together assembled PCBs, containing exposed LEDs. Impact may scratch the silicone lens or damage the internal circuitry. (pic.4)
4. The outer diameter of the SMD pickup nozzle should not exceed the size of the LED to prevent air leaks. The inner diameter of the nozzle should be as large as possible. (pic.5)
5. A pliable material is suggested for the nozzle tip to avoid scratching or damaging the LED surface during pickup. (pic.5)
6. The dimensions of the component must be accurately programmed in the pick-and-place machine to insure precise pickup and avoid damage during production. (pic.5)



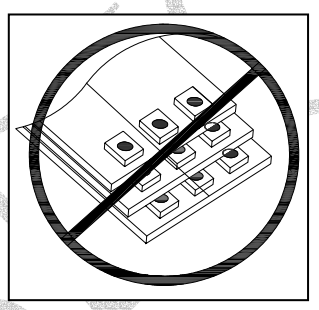
Pic.1



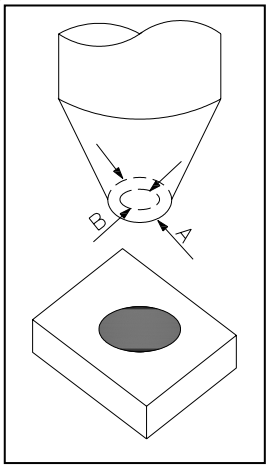
Pic.2



Pic.3



Pic.4



Pic.5

Notes for designing:

Care must be taken to provide the current limiting resistor in the circuit so as to drive the LEDs within the rated figures. Also, caution should be taken not to overload LEDs with instantaneous voltage at the turning ON and OFF of the circuit.

When using the pulse drive care must be taken to keep the average current within the rated figures. Also, the circuit should be designed so as be subjected to reverse voltage when turning off the LEDs.

Storage:

In order to avoid the absorption of moisture, it is recommended to solder LEDs as soon as possible after unpacking the sealed envelope.

If the envelope is still packed, to store it in the environment as following:
(1) Temperature : 5℃-30℃(41℉)Humidity : RH 60% Max.
(2) After this bag is opened, devices that will be applied to infrared reflow, vapor-phase reflow, or equivalent soldering process must be:
a. Completed within 24 hours.
b. Stored at less than 20% RH.
(3) Devices require baking before mounting, if:
2a or 2b is not met.
(4) If baking is required, devices must be baked under below conditions:
48 hours at 60℃±5℃.

Package and Label of Products:

(1) Package: Products are packed in one bag of 1000 pcs (one taping reel) and a label is attached to each bag.
(2) Label: