

NMOP-10165

LED SMD

Features:

1. Meet RoHS.
2. Full Color SMD Chip LED With IC Control.
3. Top view Package in 12.0mm carrier tape on 7" diameter reel.
4. Each RGB chip is 8 bit control, total of 16M color can be displayed.

Descriptions:

The NMOP-10165 SMD has wide viewing angle and optimized light coupling by inter reflector, The low current requirement makes this device ideal for portable equipment or any other application where power is at a premium.

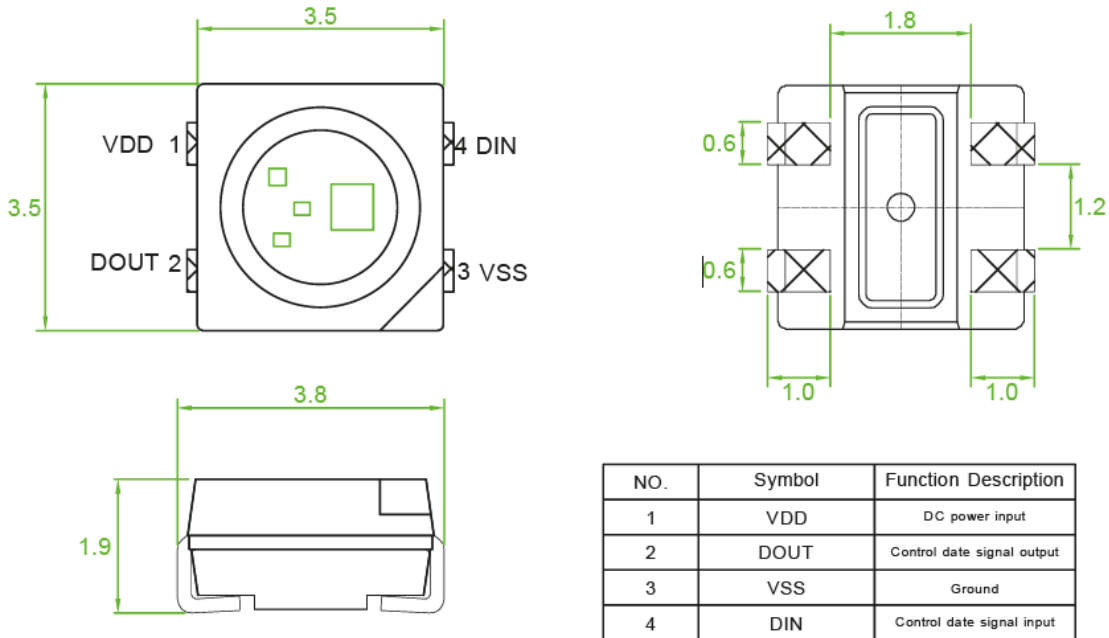
Applications:

1. Consumer product, Home appliances, Telecommunication, light bar.
2. Toy lights, Christmas lights, Decorative lights.

Device Selection Guide

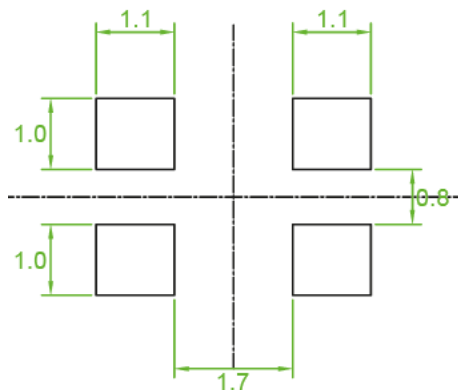
Part No	Material	Color	
		Emitted	Lens
NMOP-10165	AlGaInP	Red	Water Clear
	InGaN	Blue	
	InGaN	Green	

Package Dimensions



Note : 1. All dimension are in millimeter tolerance is $\pm 0.2\text{mm}$ unless otherwise noted.
 2. Specifications are subject to change without notice.

Recommended Soldering Pad Dimensions



Note : The tolerances unless mentioned is $\pm 0.1\text{mm}$, Angle ± 0.5 . Unit=mm.

Absolute Maximum Ratings

(Ta=25°C)

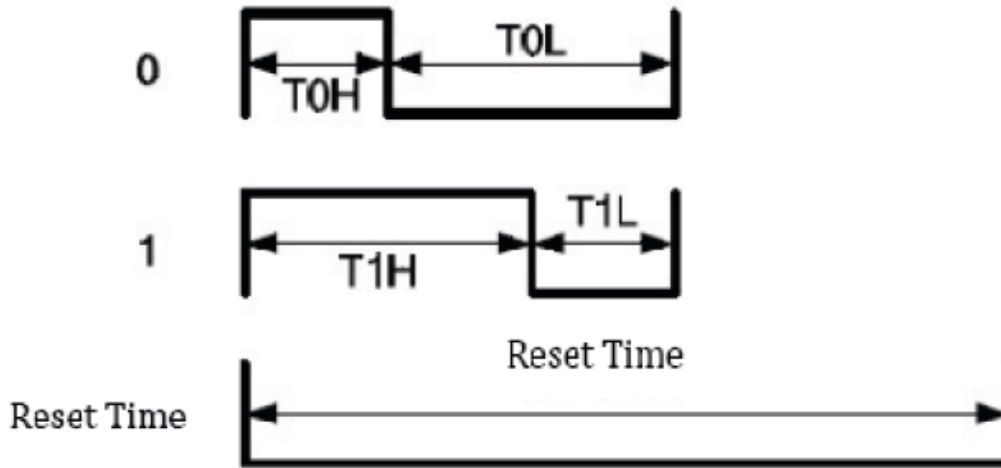
Parameter	Symbol	Ratings	UNIT
Supply Voltage	VDD	-0 ~ +6.0	V
LED Output Current	I _{OUT}	20	mA
Operating Temperature	T _{opr}	-40 ~ +85	°C
Storage Temperature	T _{stg}	-40 ~ +100	°C

Typical Electrical & Optical Characteristics

(Ta=25° C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Supply Voltage	VDD	3.3	5	5.5	V	
Each R/G/B Current	IOL		12		mA	VDD=5V
Input High Voltage	VIH	2.7		VDD	V	DI,
Input Low Voltage	VIL	0		1.0	V	DI,
Output High Voltage	VOH	4.5				IOH=4mA
Output Low Voltage	VOL			0.4 VDD	V	IOL=4mA
Operation Current	IDD			2	mA	B, G,R no load
Pull Down Resistance	R _{PD}		500K		Ω	Din, Dout (VDD=5V)

Timing Wave Form



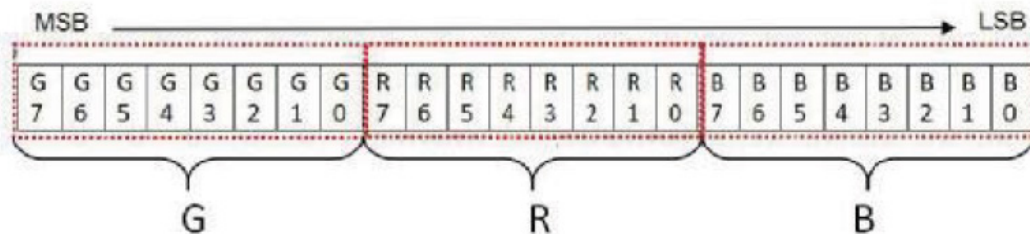
High Speed mode

Item	Description	min	Typical	Allowance	unit
T0H	0 code, High-level time		0.3	±0.15	us
T0L	0 code, Low-level time		0.9	±0.15	us
T1H	1 code, High-level time		0.9	±0.15	us
T1L	1 code, Low-level time		0.3	±0.15	us
Trst	Reset code, Low-level time	250			us

Control Commands for multiple strips connected parallelly

NMOP-10165 supports the scenarios of controlling multiple strips with parallel connection (up to 15 strips). With appropriate commands, each of the strips can be identified and assigned a unique strip dynamic ID (by set dynamic ID command). After the commands is completed, MCU host can individually control and send the display data to each strip with the help of "Clean ID" □ "Check ID" □ "specify ID" commands.

Single Data in 24bit for RGB



Advance Function Mode

This product has a Advance Function mode that supports the MCU to start with a specific command setting. Advance Function Mode includes the following function

1. Feedback the cascaded number of LEDs and maximum sink current of R/G/B channel
2. Current Gain control:32 level(5bits) to adjust maximum sink current of R/G/B channel
3. Programmable PWM refresh rate (1.25kHz/2.5kHz/5kHz/10kHz)

Electrical Optical Characteristics

(Ta=25° C)

Items	Symbol	Min.	Typ.	Max.	Unit	Condition
Luminous Intensity	Iv	1120	---	2750	mcd	VDD = 5V
Dominant Wavelength	λD	R	---	622	---	
		G	---	522	---	
		B	---	466	---	
Viewing Angle	2θ1/2	---	120	---	deg	

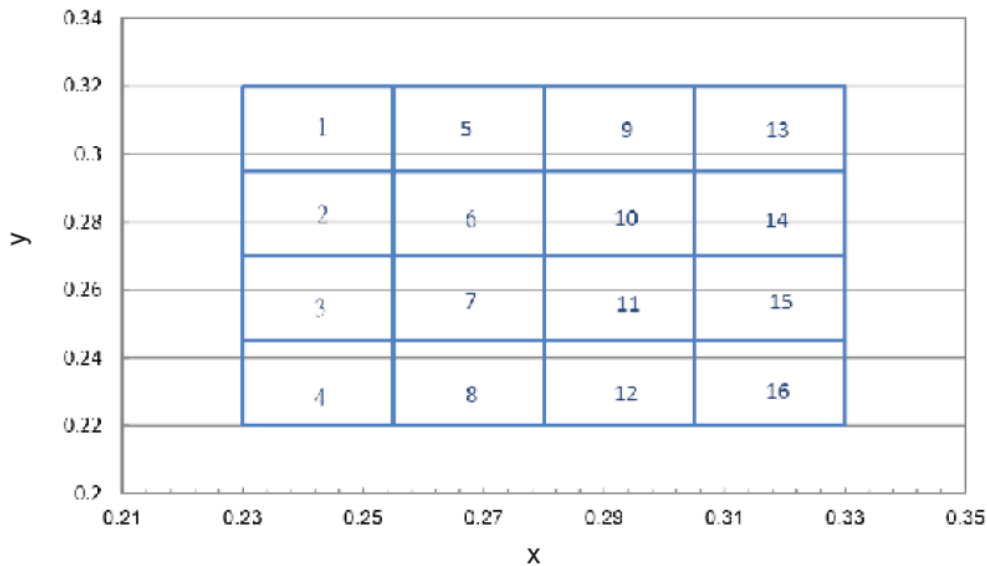
Note:

- 1.The luminous intensity data did not including ±15% testing tolerance.
- 2.The dominant wavelength data did not including ±1nm testing tolerance

Luminous Intensity Classification

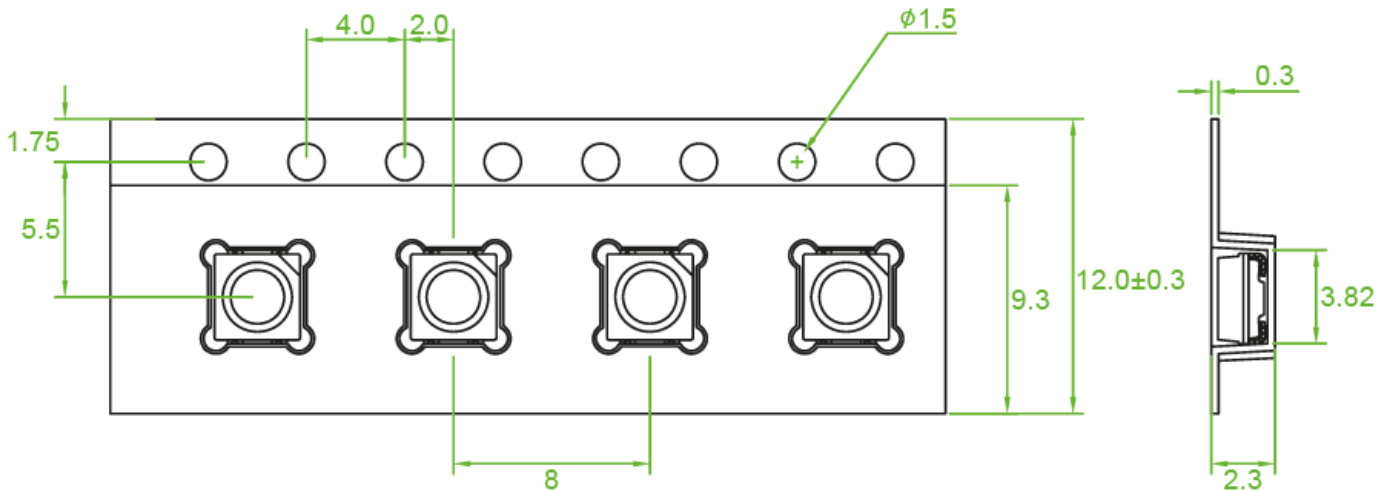
BIN CODE	Iv (mcd)	
	Min.	Max.
F1	1120	1400
F2	1400	1750
F3	1750	2200
F4	2200	2750

Chromaticity Coordinates Specifications For Bin Grading



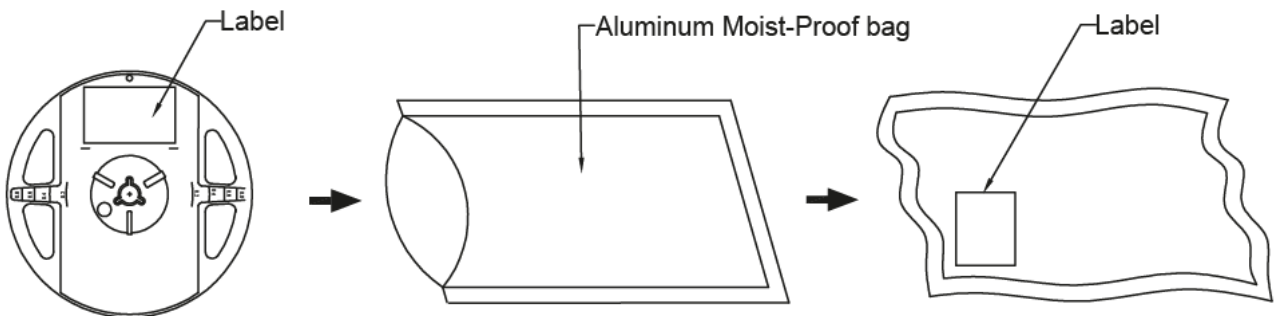
Color Coordinates								
CODE CODE	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
1	0.230	0.295	0.230	0.320	0.255	0.320	0.255	0.295
2	0.230	0.270	0.230	0.295	0.255	0.295	0.255	0.270
3	0.230	0.245	0.230	0.270	0.255	0.270	0.255	0.245
4	0.230	0.220	0.230	0.245	0.255	0.245	0.255	0.220
5	0.255	0.295	0.255	0.320	0.280	0.320	0.280	0.295
6	0.255	0.270	0.255	0.295	0.280	0.295	0.280	0.270
7	0.255	0.245	0.255	0.270	0.280	0.270	0.280	0.245
8	0.255	0.220	0.255	0.245	0.280	0.245	0.280	0.220
9	0.280	0.295	0.280	0.320	0.305	0.320	0.305	0.295
10	0.280	0.270	0.280	0.295	0.305	0.295	0.305	0.270
11	0.280	0.245	0.280	0.270	0.305	0.270	0.305	0.245
12	0.280	0.220	0.280	0.245	0.305	0.245	0.305	0.220
13	0.305	0.295	0.305	0.320	0.330	0.320	0.3300	0.295
14	0.305	0.270	0.305	0.295	0.330	0.295	0.3300	0.270
15	0.305	0.245	0.305	0.270	0.330	0.270	0.3300	0.245
16	0.305	0.220	0.305	0.245	0.330	0.245	0.3300	0.220

Carrier Type Dimensions



Note : The tolerances unless mentioned is ± 0.1 mm, Angle ± 0.5 . Unit=mm.

Packing Specification



Part No.	Description	Quantity/Reel
NMOP-1016%	12.0mm tape, 7" reel	500 PCS

NMOP-10165

Label Explanation



N Neumüller
Elektronik GmbH
www.neumueller.com

Typ / Part No. _____

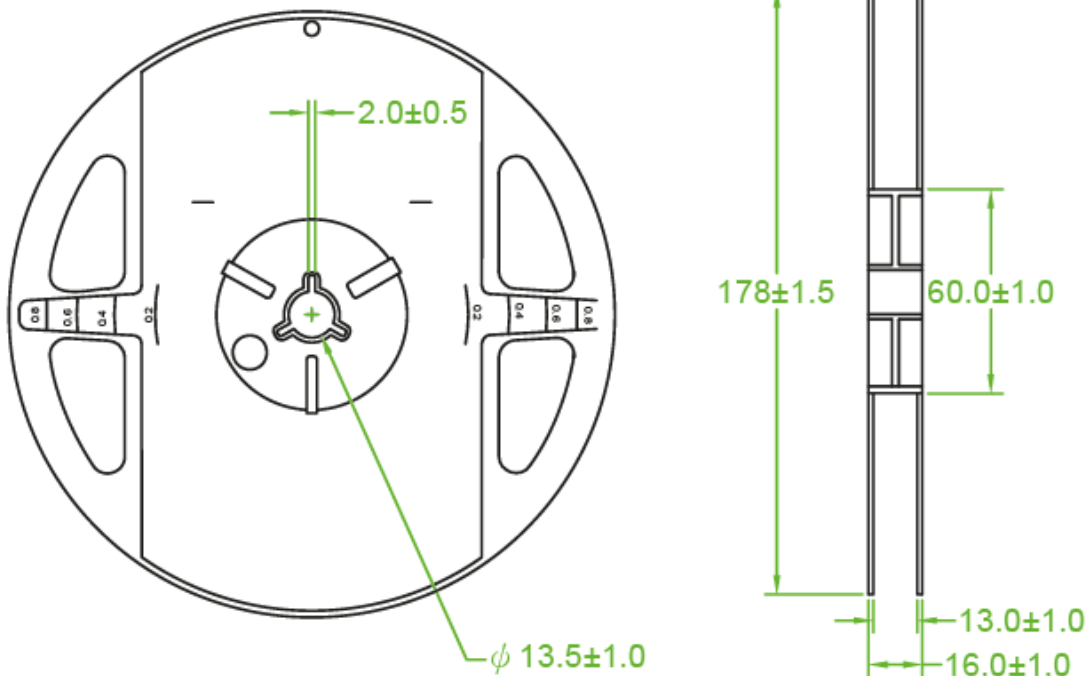
Date Code / Rank _____

Menge / Quantity _____

Kunde / Customer _____

BIN : Luminous Intensity

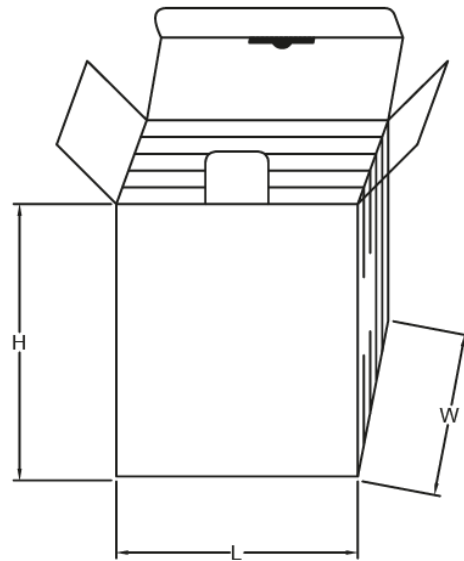
Reel Dimensions



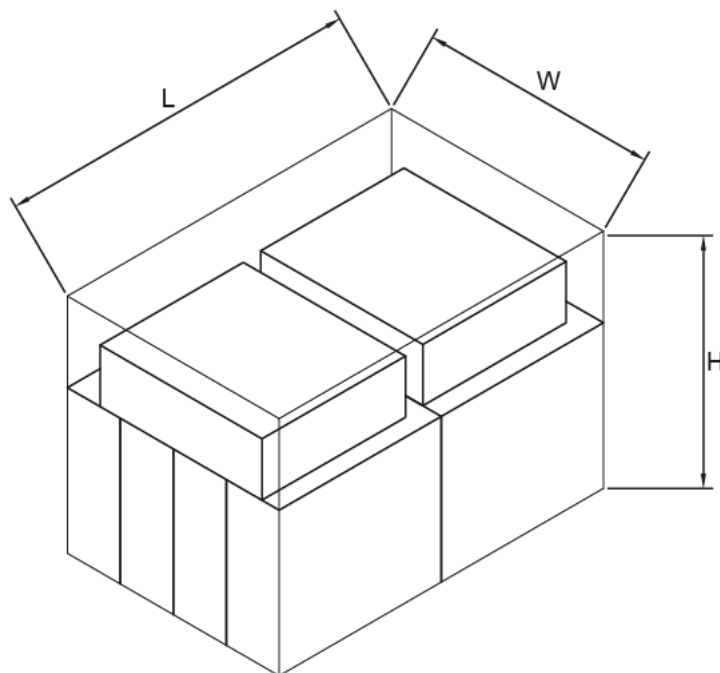
NMOP-10165

Box Explanation

1. 4 BAG / INNER BOX
2. INNER BOX SIZE : L X W X H 23cm X 8.5cm x 26cm



3. 10 INNER BOXES / CARTON
4. CARTON SIZE : L X W X H 58cm X 34cm x 35cm

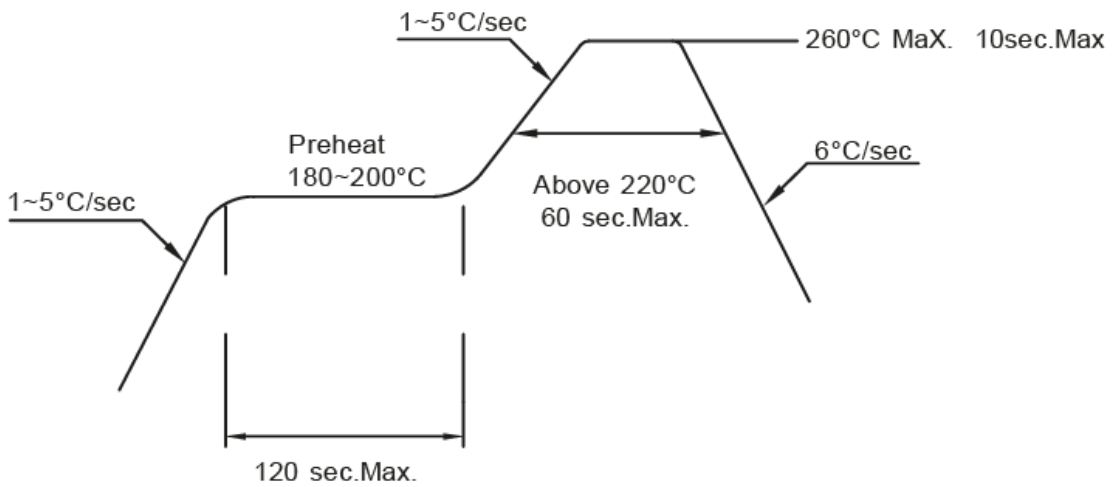


Recommended Soldering Conditions

1. Hand solder

Basic spec is $\leq 280^{\circ}\text{C}$ 3 sec. one time only

2. PB-Free Reflow Solder



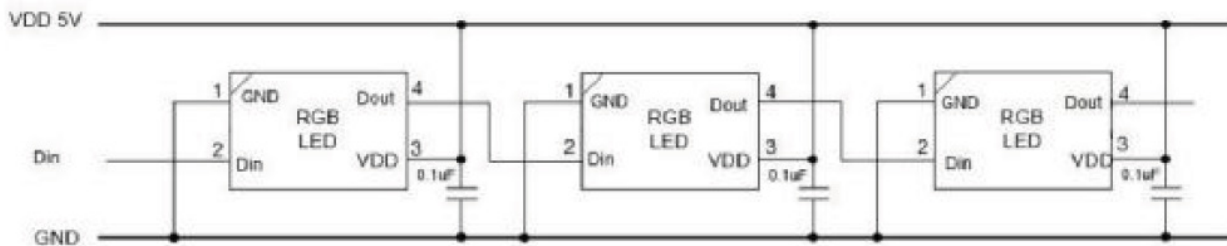
- Note:
1. Reflow soldering should not be done more than two times.
 2. When soldering, do not put stress on the LEDs during heating.
 3. After soldering, do not warp the circuit board.

Precautions For Use:

Storage time:

1. Calculated shelf life before opening is 12 months at $< 30^{\circ}\text{C}$ and $< 90\%$ relative humidity (RH)
2. After bag is opened, devices which will be subjected to reflow soldering or other high temperature processes must be
 - a) Assembled within 72 hours in an environment of $\leq 30^{\circ}\text{C} / 60\%$ RH, or
 - b) Stored at ambient of 10% RH or less
3. Devices are required baking before assembly if:
 - a) Humidity Indicator Card reads $>10\%$ (for level 2a -5a) or $>60\%$ (for level 2) at ambient temperature $23\pm 5^{\circ}\text{C}$
 - b) 2.a) or 2.b) doesn't meet
4. If baking is required, devices should be baked for >24 hours at $60\pm 5^{\circ}\text{C} / 5\%$ RH. Performing baking only once, and using the baked devices within 8 hours..

Recommendes route



Cleaning

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED.

ESD(Electrostatic Discharge):

Static Electricity or power surge will damage the LED. Use of a conductive wrist band or anti-electrosatic glove is recommended when handing these LED. All devices, equipment and machinery must be properly grounded.

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 use the picking up nozzle, the pressure on the silicone resin should be proper.



1. Handle the component along the side surface by using forceps or appropriate tools; do not directly touch or Handle the silicone lens surface, it may damage the internal circuitry.

2. 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. A pliable material is suggested for the nozzle tip to avoid scratching of damaging the LED surface during pickup. The dimensions of the component must be accurately programmed in the pick-and-place machine to insure precise pickup and avoid damage during production.

