

Harvatek Surface Mount CHIP LEDs Data Sheet
T3A53RGB-12C610111U1930
(Preliminary)

Official Product	HT Part No.T3A53RGB-12C610111U1930		
Tentative Product	*****	*****	
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DISCLAIMER

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1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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Product Specifications

Item	Specification	Material	Quantity
Luminous Intensity	Red : 320-580 mcd Green : 815-1275 mcd Blue : 160-320 mcd @12mA; T _s = 25°C;Tolerance: ± 10%		
Wavelength	Red : 620-625 nm Green : 520-530 nm Blue : 460-470 nm @12mA; T _s = 25°C;Tolerance: ± 1 nm		
Vf	Red : 2.0-2.3 V Green : 2.6-2.8 V Blue : 2.7-3.0 V @12mA; T _s = 25°C ;Tolerance: ± 0.1 V		
Applied voltage	12mA		
Resin	Clear	Silicone	
Carrier tape	EIA 481-1A specs	Conductive black tape	1000
Reel	EIA 481-1A specs	Conductive black	
Label	HT standard	Paper	
Packing bag	250x230mm	Aluminum laminated bag/ no-zipper	One reel per bag
Carton	HT standard	Paper	Non-specified

Others:

Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of I_v, λ_D and Vf. Each reel has a label identifying its specification; the immediate box consists of a product label as well.

Note :This is shipped test conditions

※Remarks: This product should be operated in forward bias. If a reverse voltage is continuously applied to the product, such operation can cause migration resulting in LED damage.

ATTENTION: Electrostatic Discharge (ESD) protection

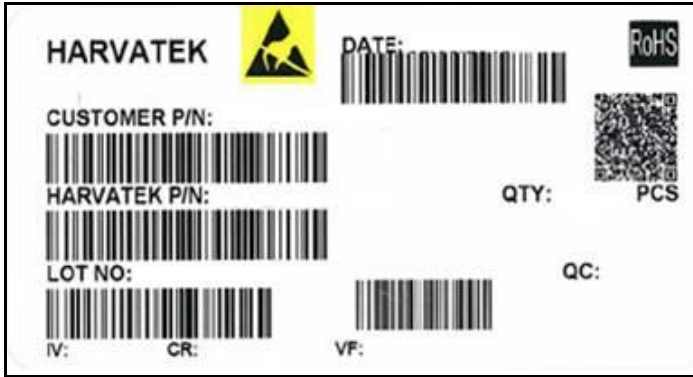


The symbol to the left denotes that ESD precaution is needed. ESD protection for GaP and AlGaAs based chips is necessary even though they are relatively safe in the presence of low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD precaution must be taken during design and assembly.

If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.

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Label Specifications



■ Harvatek P/N:

T 3A5 3 RGB- 12C- 61 01 11

Product	Package	Dice Q'ty	Color	Current	System	Series Number	Taping
LF	5.0(L)x5.4(W)x1.6(H) mm	3:Tri	RGB (Full Color)	12mA	00-ZZ	01-ZZ	1.Taping style 2. Q'ty

■ Lot No.:

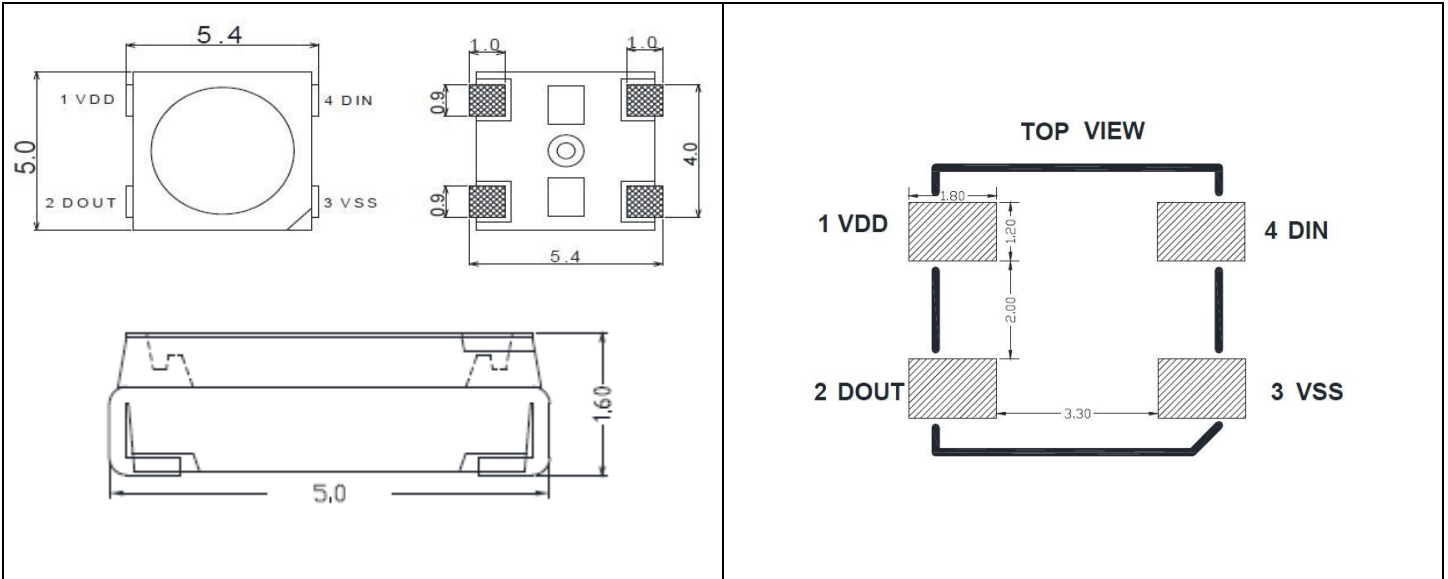
1	2	3	4	5	6	7	8	9	10
E	1	A	1	A	2	2	L	1	2
Code 1 2		Code 3	Code 4	Code 5	Code 6	Code 7	Code 8	Code 9	Code 10
		Mfg. Year	Mfg. Month	Mfg. Date	Consecutive number		Special code		
Internal Tracing Code		2020-L 2021-M 2022-P 2023-Q ... 2026-T 2027-V ... 2030-Y 2031-Z ...	1:Jan. 2:Feb. ... A:Oct. B:Nov. C:Dec.	1:A 2:B 3:C ... 26:Z 27:7 28:8 29:9 30:3 31:4	01-ZZ		000-ZZZ		

Package Outline Dimension and Recommended Soldering Pattern for Reflow Soldering

(Unit:mm Tolerance: +/-0.1)

Outline Dim.	Soldering Pattern
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Soldering terminals may shift in the Wd direction.

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Electrical characteristics

(Max., TA=25°C, VSS=0V)

Parameter	Symbol	Range	Unit
Power supply voltage	VDD	+3.7~+5.5	V
Logic input voltage	V _{IN}	-0.5~VDD+0.5	V
Reverse Voltage	VR	12	V
Working temperature	Topt	-40~+85	°C
Storage temperature	Tstg	-40~+85	°C
ESD pressure(DM)	V _{ESD}	200	V
ESD pressure(HBM)	V _{ESD}	2K	V

(TA=-20~+70°C, VDD=4.5~5.5V, VSS=0V)

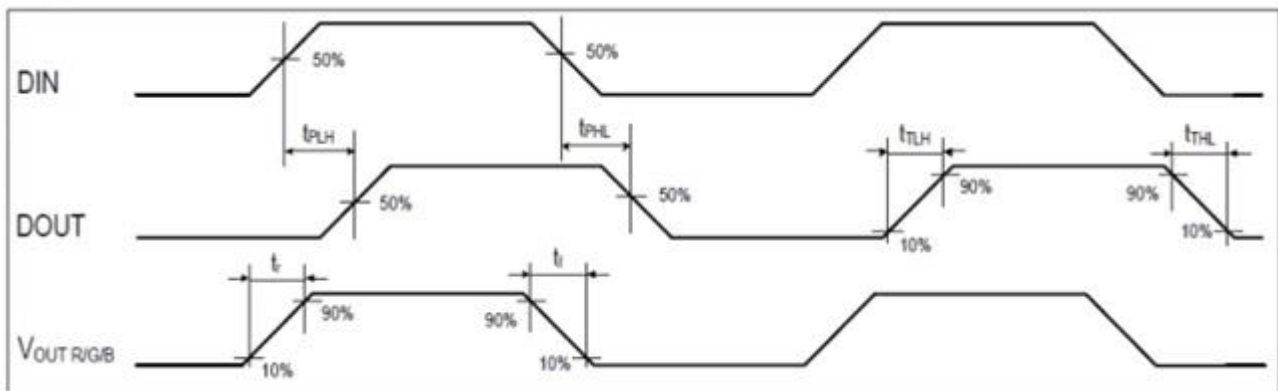
Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
The chip supply voltage	VDD	-	5.2	-	V	-
The signal input flip threshold	V _{IH}	0.7*VDD	-	-	V	VDD=5.0V
	V _{IL}	-	-	0.3*VDD	V	
The frequency of PWM	FPWM	-	1.0	-	KHZ	-
Static power consumption	IDD	-	0.5	-	mA	-

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Switching characteristics

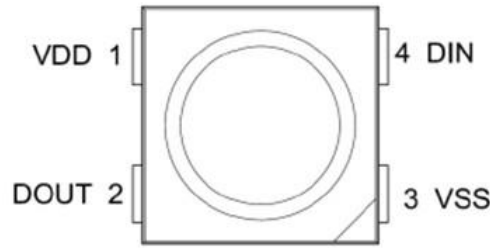
(TA=25°C)

Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
The speed of data transmission	fDIN	---	800	---	KHZ	The duty ratio of 67% (data 1)
DOUT transmission delay	TPLH	---	67	---	ns	The earth load capacitance of the dout port is 30pf, and the signal transmission
	TPHL	---	82	---	ns	
Out R/B conversion time	Tr	---	22	---	ns	IOUT R / B= 12mA, out R / B port connected with 200 Ω resistor to VDD in series, load
	Tf	---	75	---	ns	
Out G conversion time	Tr	---	18	---	ns	IOUT g = 12mA, out g port is connected with 200 Ω resistor to VDD in series, and the load capacitance to
	Tf	---	110	---	ns	



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■ Application circuit



No.	Symbol	Pin	Function
1	VDD	Power	Power
2	DOUT	Data Output	Control Data Signal Output
3	VSS	Ground	Ground
4	DIN	Data Input	Control Data Signal Input

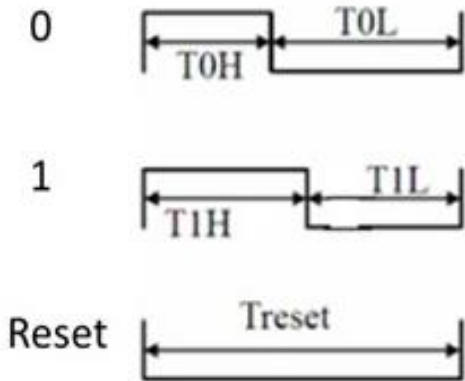
■ Cascading data structure

(TH+TL=1.25us±600ns)

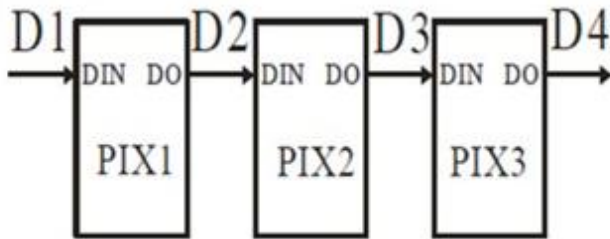
Symbol		Min	Typ.	Max	Units
T	T cycle	1.2		-	μs
T0H	0, High	0.2	0.3	0.4	μs
T0L	0, Low	0.8			ns
T1H	1, High	0.6	0.67	1.0	μs
T1L	1, Low	0.2	--	--	μs
Reset	Reset, Low	>80	--	--	μs

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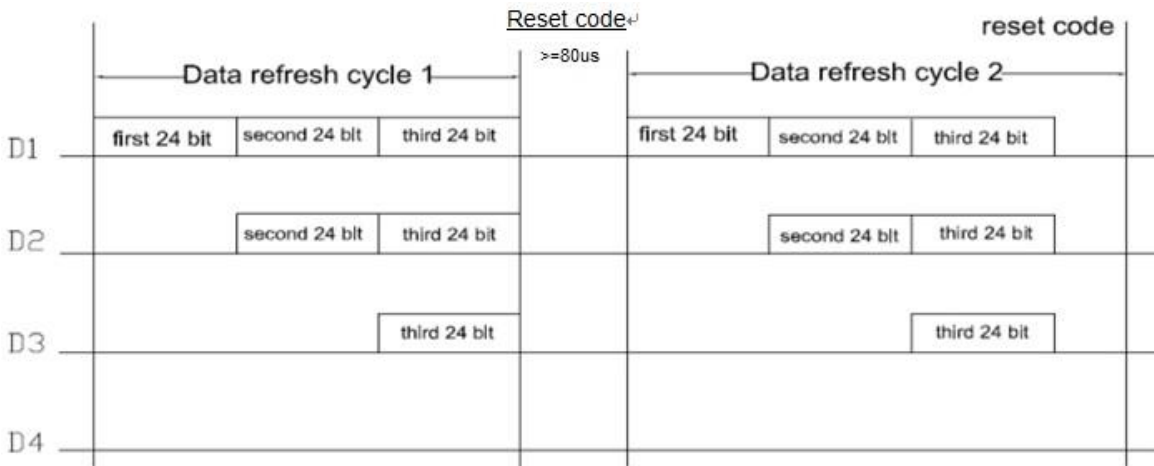
■ Timing waveform(Ta=25°C)



■ Connection method



■ Data transmission method(Ta=25°C)



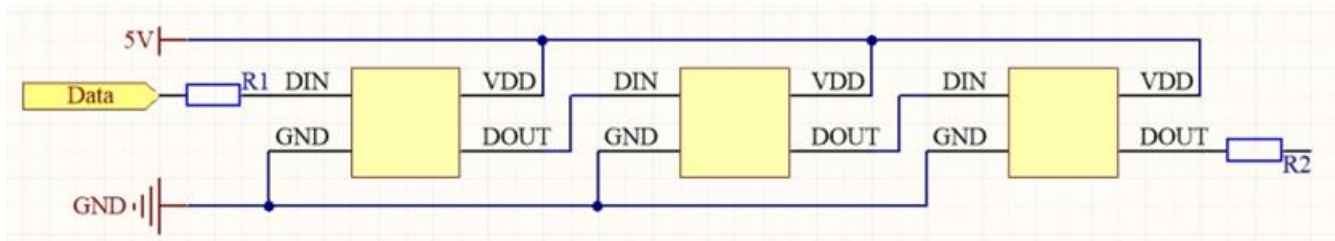
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■ 24 bit Data Structure

G7	G6	G5	G4	G3	G2	G1	G0	R7	R6	R5	R4
R3	R2	R1	R0	B7	B6	B5	B4	B3	B2	B1	B0

Note: High order first, send data in the order of GRB (G7 → G6 →..... →B0)

■ Typical Application Circuit



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Precaution for Use

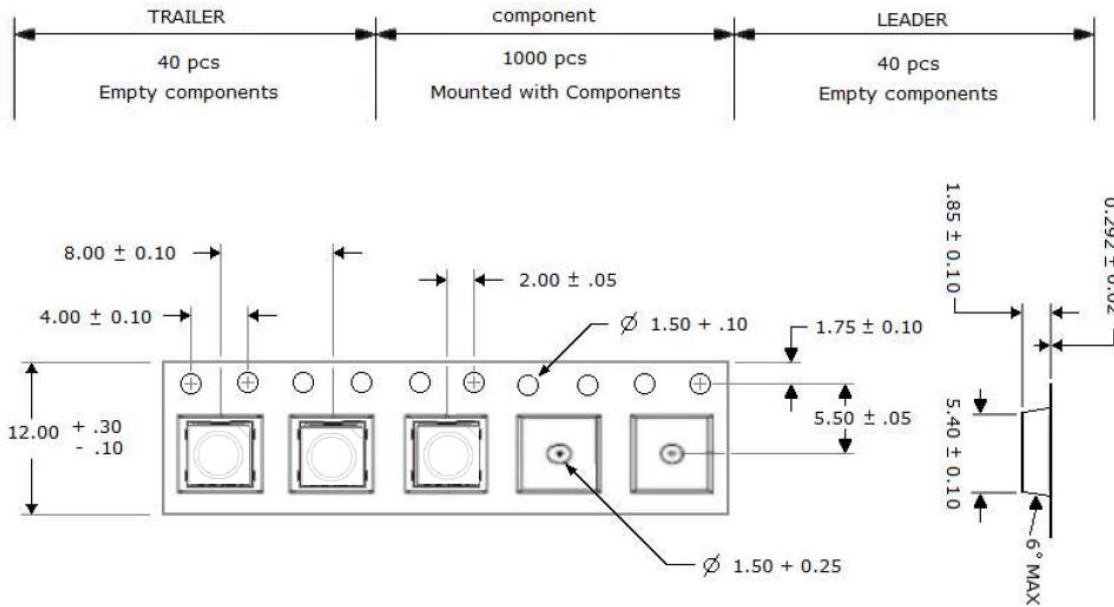
1. The chips should not be used directly in any type of fluid such as water, oil, organic solvent, etc.
2. When the LEDs are illuminating, the maximum ambient temperature should be first considered before operation.
3. LEDs must be stored in a clean environment. A sealed container with a nitrogen atmosphere is necessary if the storage period is over 3 months after shipping.
4. The LEDs must be used within 48 hrs after unpacked. Unused products must be repacked in an anti-electrostatic package, folded to close any opening and then stored in a dry and cool space.
5. The appearance and specifications of the products may be modified for improvement without further notice.
6. The LEDs are sensitive to the static electricity and surge. It is strongly recommended to use a grounded wrist band and anti-electrostatic glove when handling the LEDs. If a voltage over the absolute maximum rating is applied to LEDs, it will damage LEDs. Damaged LEDs will show some abnormal characteristics such as remarkable increase of leak current, lower turn-on voltage and getting unlit at low current.

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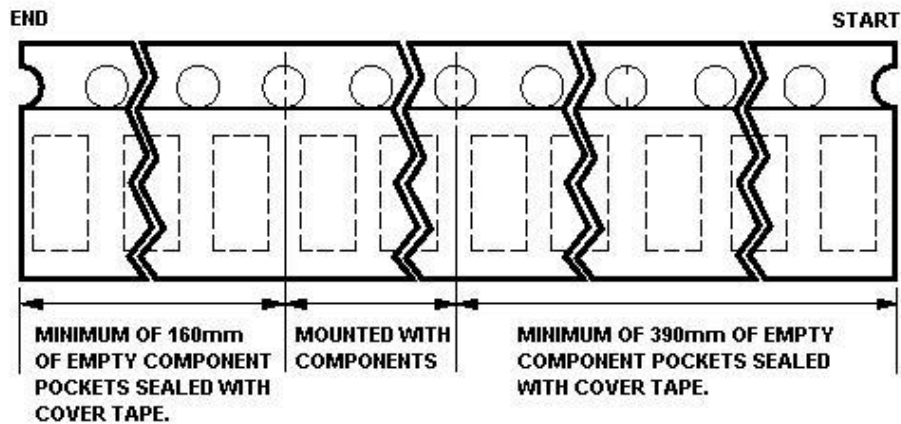
Packaging Tape Dimension

REEL PACKAGE:

Pull Direction: 

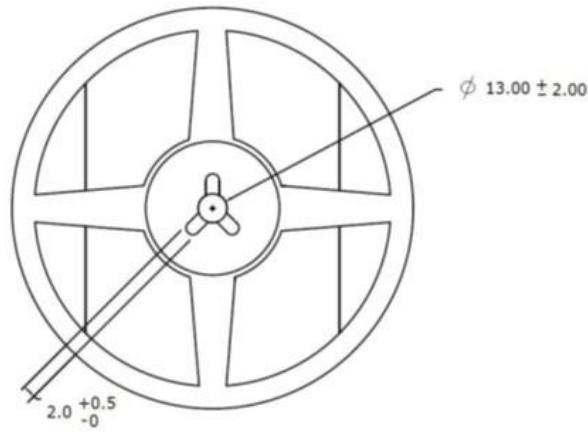


Unit : mm



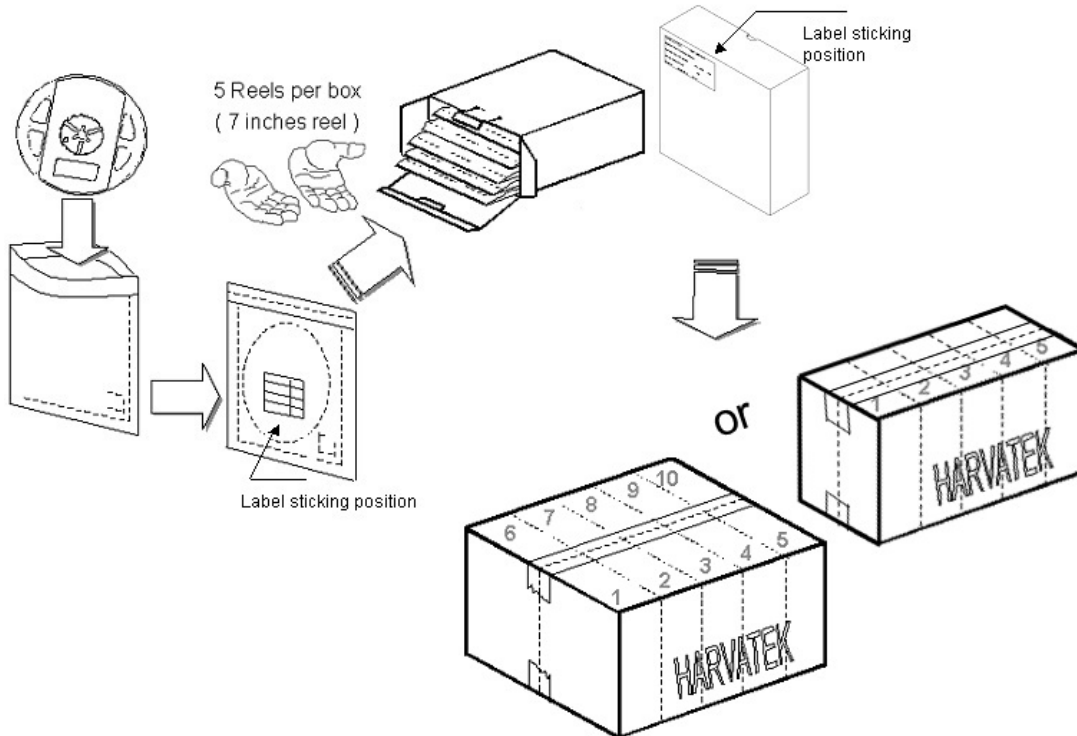
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Reel Dimension



Unit : mm

Packing



5 or 10 boxes per carton is available depending on shipment quantity.

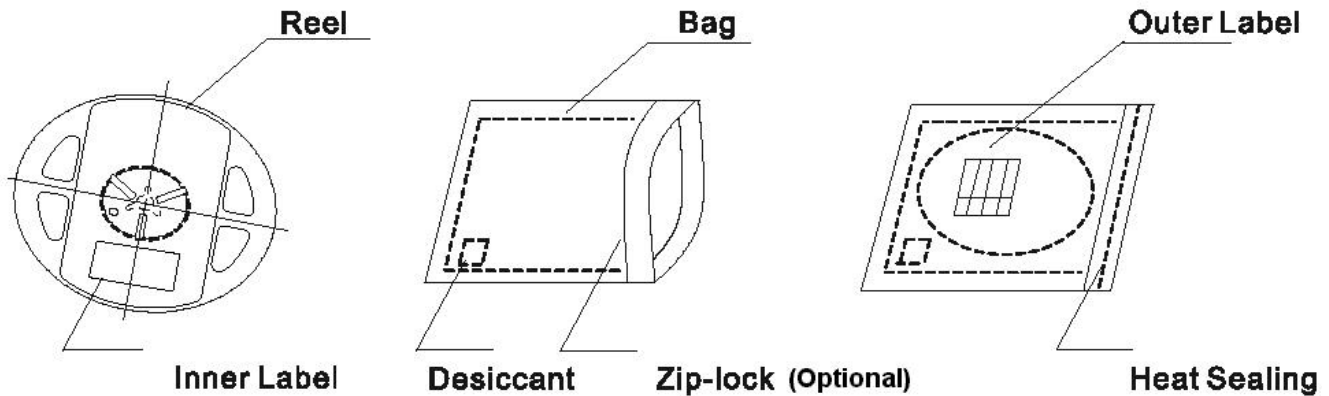
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Dry Pack

All SMD optical devices are **MOISTURE SENSITIVE**. Avoid exposure to moisture at all times during transportation or storage. Every reel is packaged in a moisture protected anti-static bag. Each bag is properly sealed prior to shipment.

Upon request, a humidity indicator will be included in the moisture protected anti-static bag prior to shipment.

The packaging sequence is as follows:



Baking

Baking before soldering is recommended when the package has been unsealed for 48 hrs.

The conditions are as followings:

1. $60\pm 3^{\circ}\text{C} \times (12\sim 24\text{hrs})$ and $<5\%RH$, taped reel type.
2. $100\pm 3^{\circ}\text{C} \times (45\text{min}\sim 1\text{hr})$, bulk type.
3. $130\pm 3^{\circ}\text{C} \times (15\text{min}\sim 30\text{min})$, bulk type.

Precautions

1. Avoid exposure to moisture at all times during transportation or storage.
2. Anti-Static precaution must be taken when handling GaN, InGaN, and AlInGaP products.
3. It is suggested to connect the unit with a current limiting resistor of the proper size. Avoid applying a reverse voltage beyond the specified limit.
4. Avoid operation beyond the limits as specified by the absolute maximum ratings.
5. Avoid direct contact with the surface through which the LED emits light.
6. If possible, assemble the unit in a clean room or dust-free environment.

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Handling of Silicone Resin LEDs

Handling Indications

During processing, mechanical stress on the surface should be minimized as much as possible.

Sharp objects of all types should not be used to pierce the sealing compound.



Figure 1

In general, LEDs should only be handled from the side. By the way, this also applies to LEDs without a silicone sealant, since the surface can also become scratched.

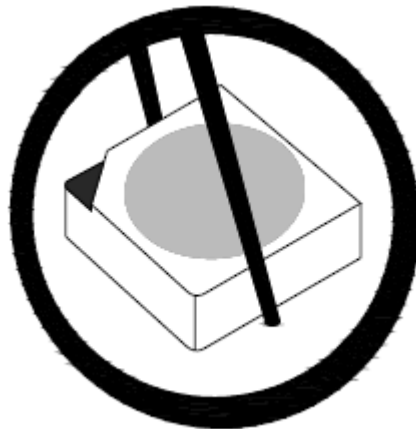


Figure 2

When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevented.

This is assured by choosing a pick and place nozzle which is large than LEDs reflector area.

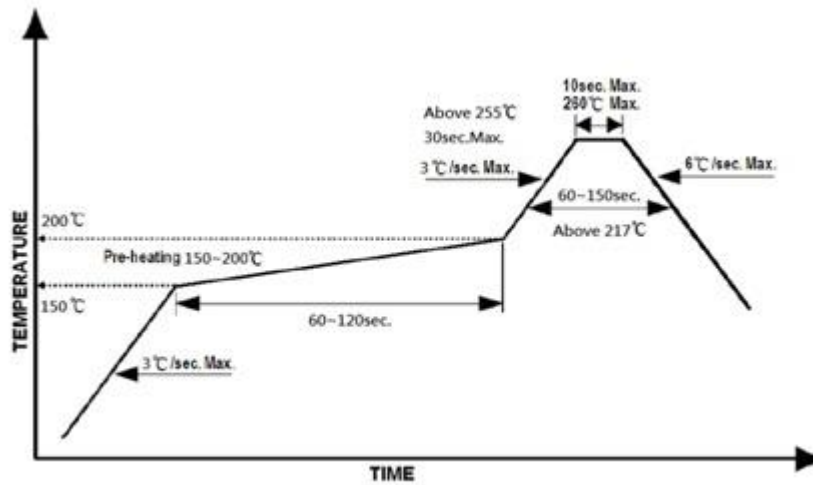
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Reflow Soldering

Recommend soldering paste specifications:

1. Operating temp.: Above 217 °C ,60~150 sec.
2. Peak temp.:260 °CMax.,10sec Max.
3. Reflow soldering should not be done more than two times.
4. Never attempt next process until the component is cooled down to room temperature after reflow.
5. The recommended reflow soldering profile (measured on the surface of the LED terminal) is as following:

Lead-free Solder Profile



Reworking

- Rework should be completed within 5 seconds under 260 °C.
- The iron tip must not come in contact with the copper foil.
- Twin-head type is preferred.

Cleaning

Following are cleaning procedures after soldering:

- An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.
- Temperature x Time should be 50°C x 30sec. or <30°C x 3min
- Ultrasonic cleaning: < 15W/ bath; bath volume ≤ 1liter
- Curing: 100 °C max, <3min

Cautions of Pick and Place

- Avoid stress on the resin at elevated temperature.

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