Surface Mount PhotoDiode MSD-12H31B-D-O

Description

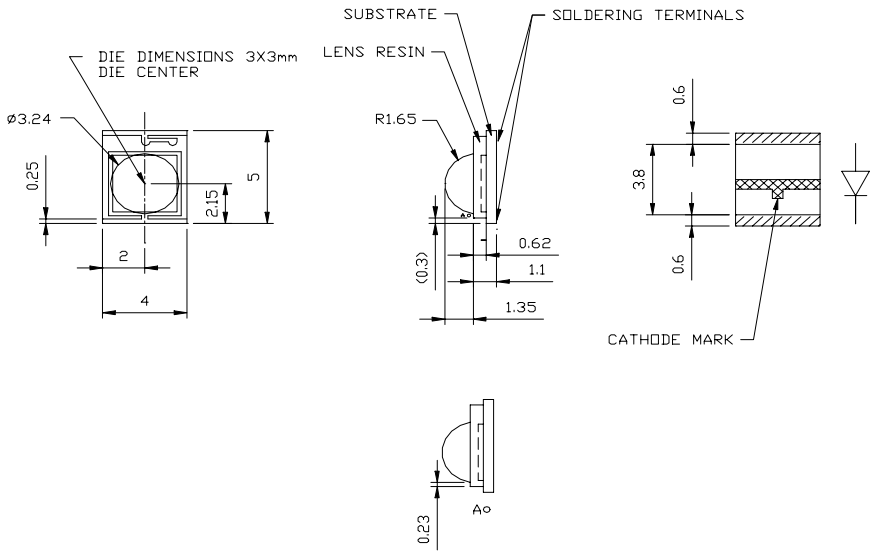
The MSD-12H31B-D-O is designed in an industry package for ease of handling and use.

The MSD-12H31B-D-O is a PIN photodiode device, mounted in a top view ChipLED package.

The device is matched in near infrared spectrum due to it's PIN structure and IR filter plastic package.

Package Dimensions

Unit: mm



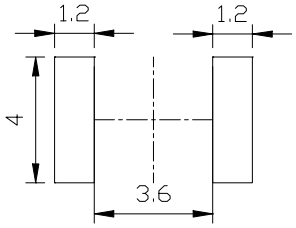
NOTE:
1. All dimensions are in millimeter (inches)
2. Tolerance is ± 0.1mm (.004") unless otherwise specified.

Features

- Large radiant sensitive area (A=7.2mm^2)
- Wide angle of half sensitivity φ = ± 65^o
- High photo sensitivity
- Fast response time
- Small junction capacitance
- Suitable for infrared radiation
- Plactic package with IR filter (λ = 870 to 920nm)
- Pb-free device
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

*Note:Pb-Free(RoHS): Unity's terms Pb-Free mean seiconductor products that are compatible with current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, Unity Pb-Free products are suitable for use in specified Pb-free processes.

Recommended Solder



Applications

High speed photo detector

Absolute Maximum Ratings

Parameter	Test Coditions	Symbol	Value	Units
Reverse Voltage		V_R	30	V
Power Dissipation	Tamb ≦ 25^{o}C	P_V	215	mW
Junction Temperature		T_j	100	^{o}C
Storage Temperature Range		T_{stg}	-40 to + 100	^{o}C
Operating Temperature Range		T_{otg}	-40 to + 100	^{o}C
Soldering Temperature	t≦5s	T_{sd}	260	^{o}C

Optical-Electrical Characteristics

Parameter	Test Conditions	Symbol	Min.	Typ .	Max.	Unit
Reverse Breakdown Voltage	I_R=100μA E=0	$V_{(BR)}$	30	-	-	V
Reverse Dark Current	V_R=10V E=0	I_D	-	2	15	nA
Open Circuit Voltage	E_e=1 mW/cm^2, λ=870 nm	V_o	-	350	-	mV
Short Circuit Current	E_e=1 mW/cm^2, λ=870 nm	I_{SC}	-	55	-	μA
Reverse Light Current	E_e=1 mW/cm^2, λ=870 nm,V_R=5V	I_L	-	60	-	μA
Diode Capacitance	V_R=0V,f=1MHz,E=0	CD		80		pF
	V_R=3V,f=1MHz,E=0	CD		25	40	pF
Angle of Half Sensitivity		ϕ	-	±65	-	deg
Wavelength of Peak Sensitivity		λ_p	-	910	-	nm
Range of Spectral Bandwidth		$\lambda_{0.5}$	-	745 to 1045	-	nm
Rise Time	V_R=10V, R_L=1KΩ, λ=870nm	t_r	-	25	-	ns
Fall Time	V_R=10V, R_L=1KΩ, λ=870nm	t_f	-	25	-	ns

*Note:The wavelength of peak sensitivity is 910nm, sensitvity(850nm~920nm)/sensitivity(910nm)=97%

For 870nm light source application, sensitivity(870nm)/sensitivity(910nm)=98%

Typical Optical-Electrical Characteristic Curves

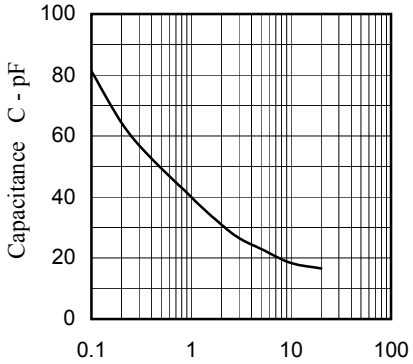


FIG.1 CAPACITANCE VS. REVERSE VOLTAGE
F=1MH$_Z$, Ee=0mW/cm^2

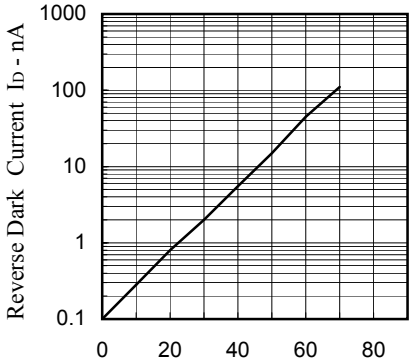


FIG.2 REVERSE DARK CURRENT
VS. AMBIENT TEMPERATURE
V_R=10V, Ee=0 mw/cm^2

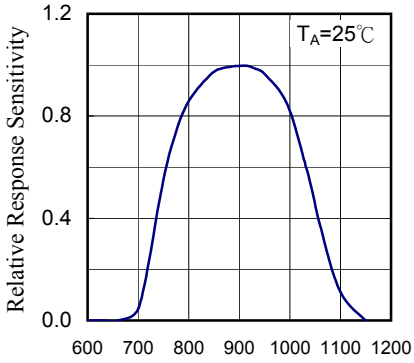


FIG.3 RELATIVE SPECTRAL SENSITIVITY
VS. WAVELENGTH

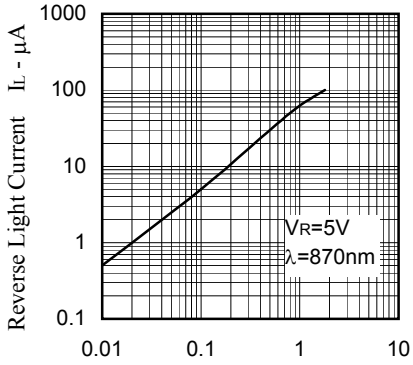


FIG.4 REVERSE LIGHT CURRENT
VS. IRRADIANCE

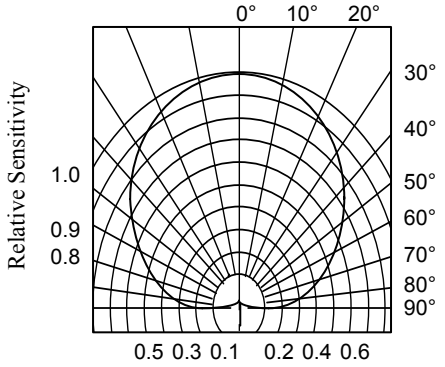


FIG .5 SENSITIVITY DIAGRAM

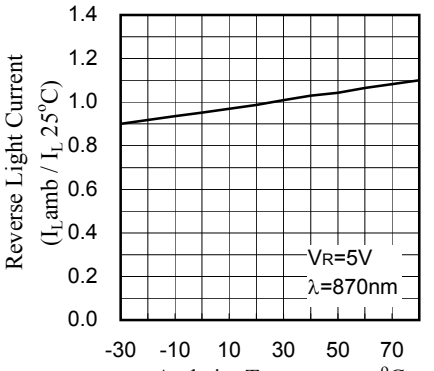


FIG.6 REVERSE LIGHT CURRENT
VS. AMBIENT

Typical Optical-Electrical Characteristic Curves

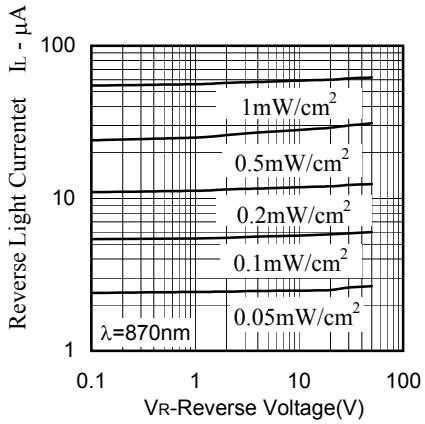


FIG.7 REVERSE LIGHT CURRENT
VS. REVERSE VOLTAGE

Recommended Soldering Conditions

1.Reflow Soldering

(1).The Fig. 1 temperature profile shall be at the surface of LED resin.

(2).Number of reflow process shall be less than 2 times.
If second reflow process would be performed, intervals between first and second process shall be as short as possible to prevent absorption of moisture to resin of LED Cooling process to nomal temp, shall be required between first and second reflow process

(3).Temp,fluctuation to LED at pre-heat process shall be minimized.(Less than 6^{o}C)

2.Dip Soldering

(1).Preheat temp,for soldering:120-150^{o}C, 60-120sec

(2).Soldering temp:Temp of soldering pot 260 MAX.less than 5sec

(3).Number of dip soldering process shall be less than 2 times and these process shall be performed in a row.

(4).Cooling process to normal temp, shall be required between first and second soldering process.

3.Pb-free Reflow Soldering

(1).The Fig.2 temperature profile shall be at the surface of LED resin.

(2).Preheat temp,for soldering:180~200^{o}C ,120sec MAX.

(3).Soldering temp:Temp of soldering pot 260 MAX,less than 5 sec.

4.Other Caution

(1).Manual soldering should be less than 280^{o}C within 3 sec.

(2).Heat or UV(or both)curing resin shall used for preliminary fixing.
Curing condition or temp:150^{o}C MAX.less than 120sec

(3).Any mechanical force or any excess vibration shall not be accepted to apply during cooling process to normal temp,after soldering

(4).If manual soldering would be performed to repair LED by tweezers, mechanical force to resin should not be given.

RECOMMENDED SOLDERING CONDITION

Reflow Soldering.

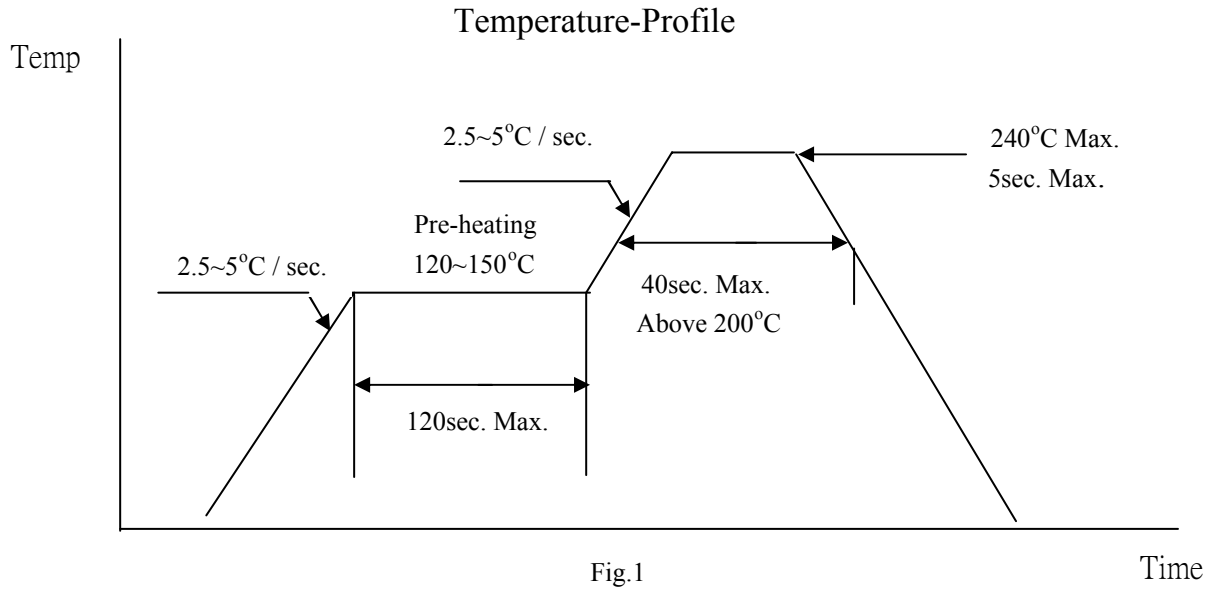


Fig.1

Pb-free reflow Soldering.

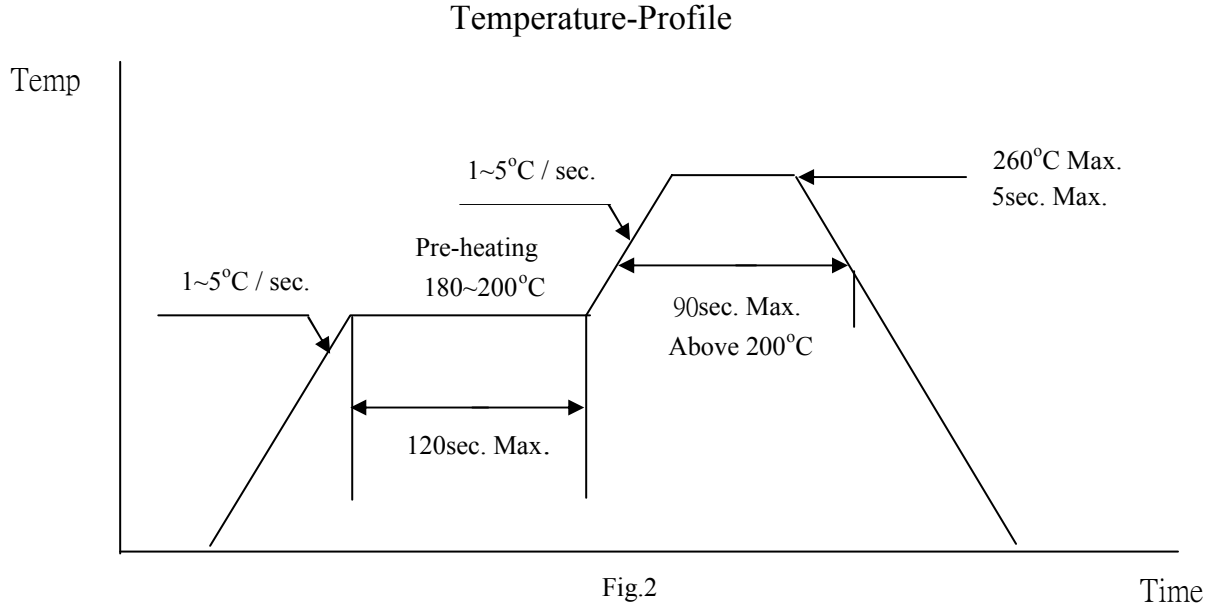
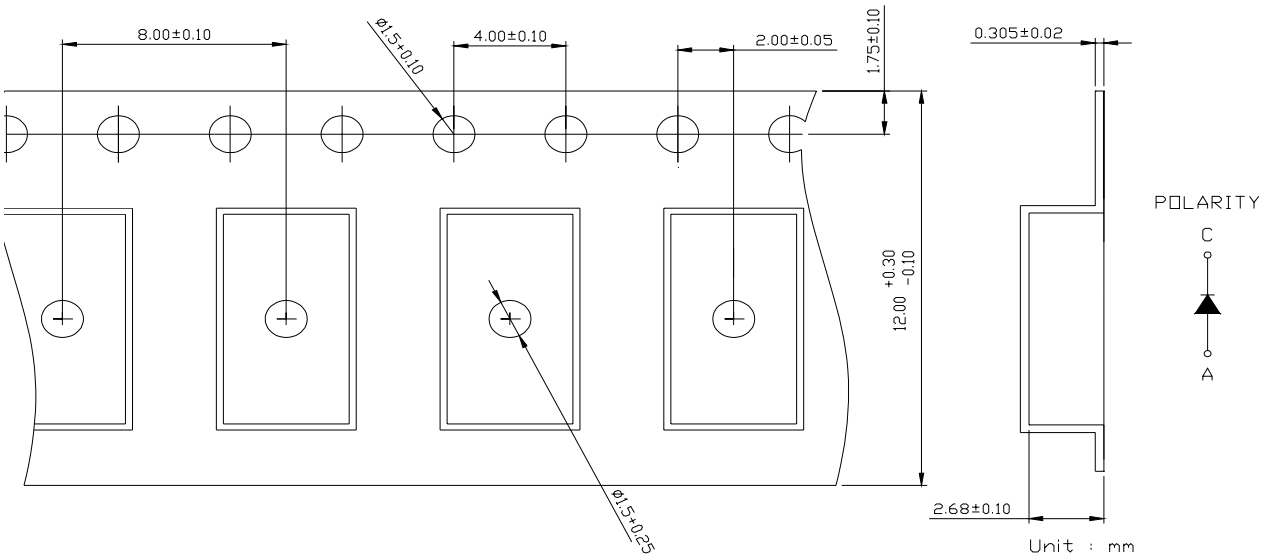


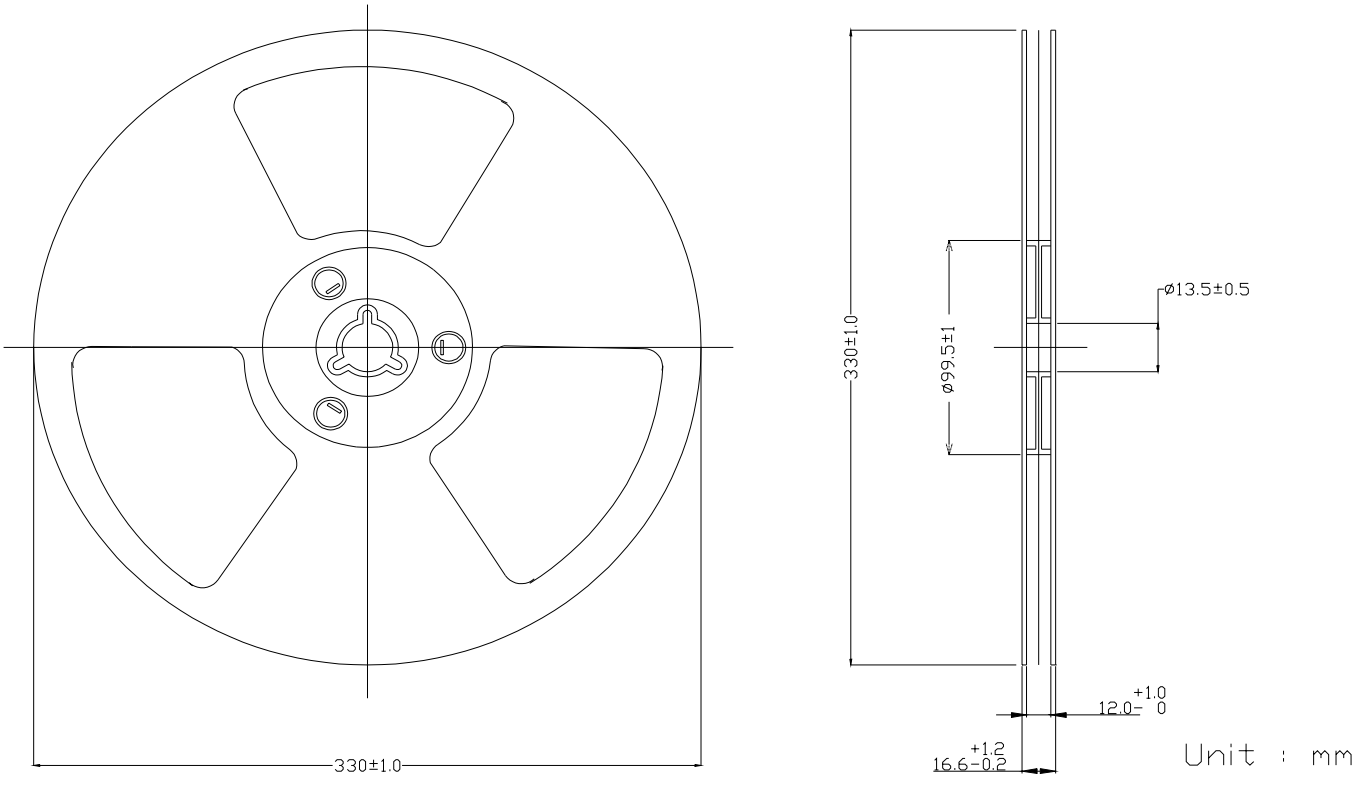
Fig.2

Tape Dimensions

Pocessive direction

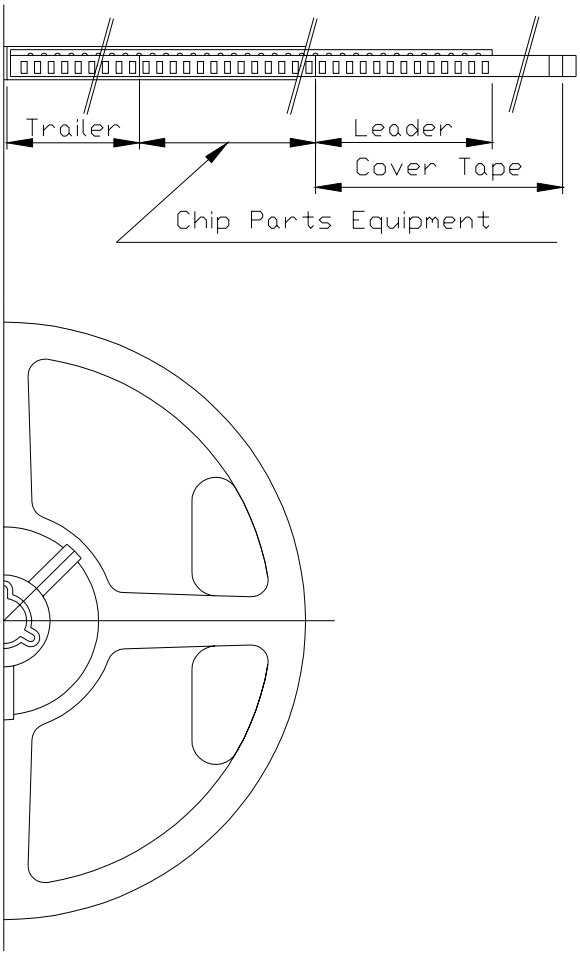


REEL Dimensions



Reel Packing

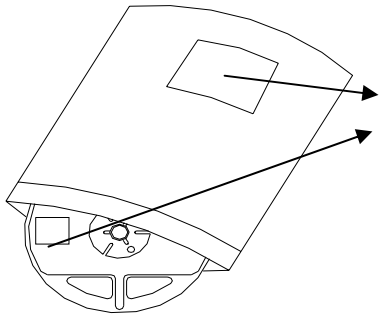
Direction of take out



Items		Specifications	Remarks
Leader	Carrier Tape	There will be more than 390 mm	The orientation of tape is as shown
Trailer		There will be more than 160 mm	The end of the tape is inserted into a slit of the hub
	Empty Pockets	There will be a maximum of 3 empty component pockets	The maximum connecting pockets in the middle of carrier-tape

Packaging

Loaded quantity per reel : 2000 pcs /reel



Product lable:

CUSTOMER:
CUSTOMER P/N:
DEVICE TYPE:
BIN:
LOT NO:
Q'TY:
DATE:

STORAGE PERIOD: Damp-proof bag un-opened

Temperature: 5 to 30°C;
Humidity: 70%RH, max. ;
Storage time: 6 month max.

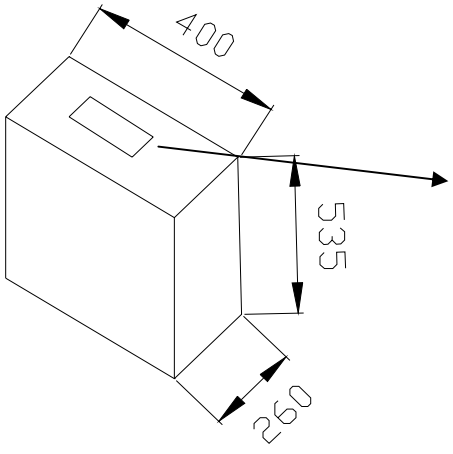
STORAGE PRECAUTIONS: After open the laminate bag the lamps should be storage in the follow condition

Temperature: 5 to 30°C;
Humidity: 70%RH, max. ;
Storage time: 72hrs max.

BAKING CONDITION: If baking is necessary, we recommended the baking condition is

60+/- 5°C 10 hours

Packing Box



Loaded quantity per box : Max 20,000 pcs / Per box

Product lable:

CUSTOMER:
CUSTOMER P/N:
DEVICE TYPE:
BIN:
LOT NO:
Q'TY:
DATE:

SURFACE MOUNT MOISTURE SENSITIVITY SPECIFICATIONS

1. Controlling Moisture

Unity Opto Technology, in its design of packing materials and packing methods, takes into consideration the susceptibility of some Unity packages to moisture induced damage. The risk of this damage is caused when the LED lens plastic encapsulation material is exposed to increases or decreases in the Relative Humidity of the surrounding environment.

Such damage may include delamination between the die and the LED lens plastic encapsulation material, which may result in open connections due to broken wire bonds. Moisture in the package having reached a critical level will fracture the package in order to escape when exposed to peak temperature conditions, typical in soldering process.

Therefore, the control of moisture levels in the LED package is critical to reduce the risk of moisture-induced failures. Please follow JEDEC-STD-033A standards for handling moisture sensitive devices.

2. Packaging SMD devices:

Unity packages all SMD devices into dry pack bags (moisture barrier bags).

Unity includes a desiccant pouch in each bag. Testing confirms that the desiccant pouch greatly reduces the presence of moisture by maintaining the environment in the bag, thus protecting the devices during shipment and storage.

3. Handling Dry Packed Parts

Upon receipt, the bags should be inspected for damage to ensure that the bag's integrity has been maintained. Inspection should verify that there are no holes, gouges, tears, or punctures of any kind that may expose the contents of the bag.

To open the bag, simply cut across the top of the bag as close to the original seal as possible being careful not to damage the contents. Once open the desired quantity of units should be removed and the bag resealed. If the bag is left open longer than 2 hours, the desiccant pouch should be replaced with a dry desiccant and the bag should be sealed immediately to avoid moisture damage.

Ozone Depleting Substances Policy Statement

It is the policy of **Unity Opto** to

1. Meet all present and future national and international statutory requirements.
2. Continuously improve the performance of our products, processes, operating systems and distribution regarding their impact on the safety and health of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances(ODSs).

Unity Opto is able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA

3. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively

Unity can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design without notice.