

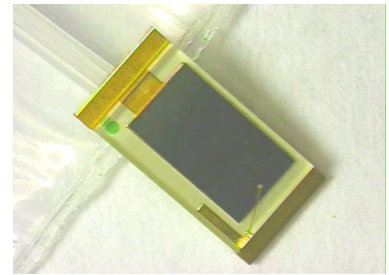
Surface Mount PhotoDiode

MSD-12431K

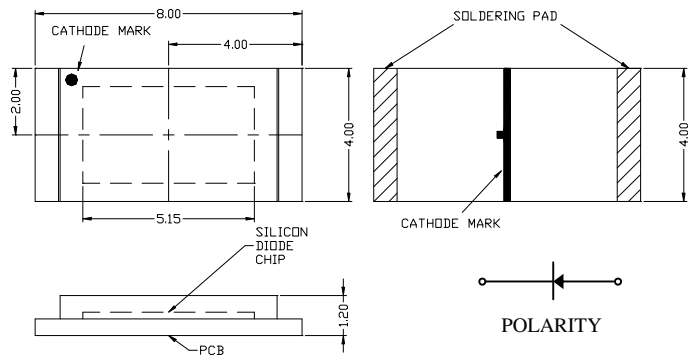
Description

The MSD-12431K is designed in an industry package for ease of handling and use.

The MSD-12431K is a P/N photodiode device, mounted in a top view Chip LED package.



Package Dimensions



NOTE:

1. All dimensions are in millimeter
2. Tolerance is ± 0.1 mm unless otherwise specified.

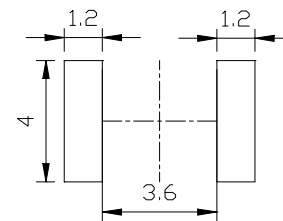
Features

- Large radiant sensitive area ($A=7.5\text{mm}^2$)
- Wide angle of half sensitivity $\theta = \pm 65^\circ$
- High photo sensitivity
- Fast response times
- Small junction capacitance
- Suitable for visible and near infrared radiation

Applications

High speed photo detector

Recommended Solder Patterns



Absolute Maximum Ratings

@ $T_A=25^\circ\text{C}$

Parameter	Test Conditions	Symbol	Value	Units
Reverse Voltage		V_R	30	V
Power Dissipation	$T_{amb} \leq 25^\circ\text{C}$	P_V	215	mW
Junction Temperature		T_j	100	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	-55 to + 100	$^\circ\text{C}$
Soldering Temperature	$t \leq 3$ s	T_{sd}	240	$^\circ\text{C}$
Thermal Resistance Junction / Ambient		R_{thJA}	350	K/W



Optical-Electrical Characteristics

Parameter	Test Conditions	Symbol	Min.	Typ .	Max.	Unit
Reverse Dark Current	$V_R=10V$ $E=0$	I_D	-	2	30	nA
Reverse Breakdown Voltage	$I_R=100mA$ $E=0$	$V_{(BR)}$	60	-	-	V
Diode Capacitance	$V_R=0V, f=1MHz, E=0$	C_D	-	-	135	pF
	$V_R=3V, f=1MHz, E=0$		-	35	-	
Open Circuit Voltage	$E_c=1 \text{ mW/cm}^2, l=950 \text{ nm}$	V_o	-	350	-	mV
Temp. Coefficient of V_o	$E_c=1 \text{ mW/cm}^2, l=950 \text{ nm}$	TK_{IK}	-	-2.6	-	mV/K
Short Circuit Current	$E_A=1klx, V_R=5V$	I_K	-	80	-	mA
	$E_c=1 \text{ mW/cm}^2, l=950 \text{ nm}$	I_K	-	55	-	
Temp. Coefficient of I_K	$E_c=1 \text{ mW/cm}^2, l=950 \text{ nm}$	TK_{V_o}	-	0.1	-	%/K
Reverse Light Current	$E_A=1klx, V_R=5V$	I_{ra}	-	85	-	mA
	$E_c=1 \text{ mW/cm}^2, l=950 \text{ nm}, V_R=5V$	I_{ra}	-	60	-	
Angle of Half Sensitivity		f	-	± 65	-	deg
Wavelength of Peak Sensitivity		l_p	-	900	-	nm
Range of Spectral Bandwidth		$l_{0.5}$	-	600...1050	-	nm
Noise Equivalent Power	$V_R=10V, l=950nm$	NEP	-	4×10^{-14}		W/ \sqrt{Hz}
Rise Time	$V_R=10V, R_L=1K\Omega, l=820nm$	t_r	-	120	-	ns
Fall Time	$V_R=10V, R_L=1K\Omega, l=820nm$	t_f	-	120	-	ns

Recommended Soldering Conditions

1.Reflow Soldering

- (1) The Fig. 1 temperature profile shall be at the surface of LED resin.
- (2) Ideally, the reflow process should be performed only once.

If second reflow process is to be performed, intervals between the first and second process should be as short as possible to prevent absorption of moisture to resin of LED. Cooling process to normal temperature shall be required between first and second reflow process.

- (3) Temperature fluctuation to LED at pre-heat process shall be minimized. (Less than 6°C)

2.Dip Soldering

- (1) Preheat temperature for soldering: 120 - 150°C, for 60 - 120 seconds.
- (2) Soldering temperature: Temperature of soldering pot shall be 260 MAX for less than 5 seconds.
- (3) Dip soldering process should ideally be performed no more than 2 times and these processes shall be performed in a row.
- (4) Cooling process to normal temperature shall be required between first and second soldering process.

3.Pb-free Reflow Soldering

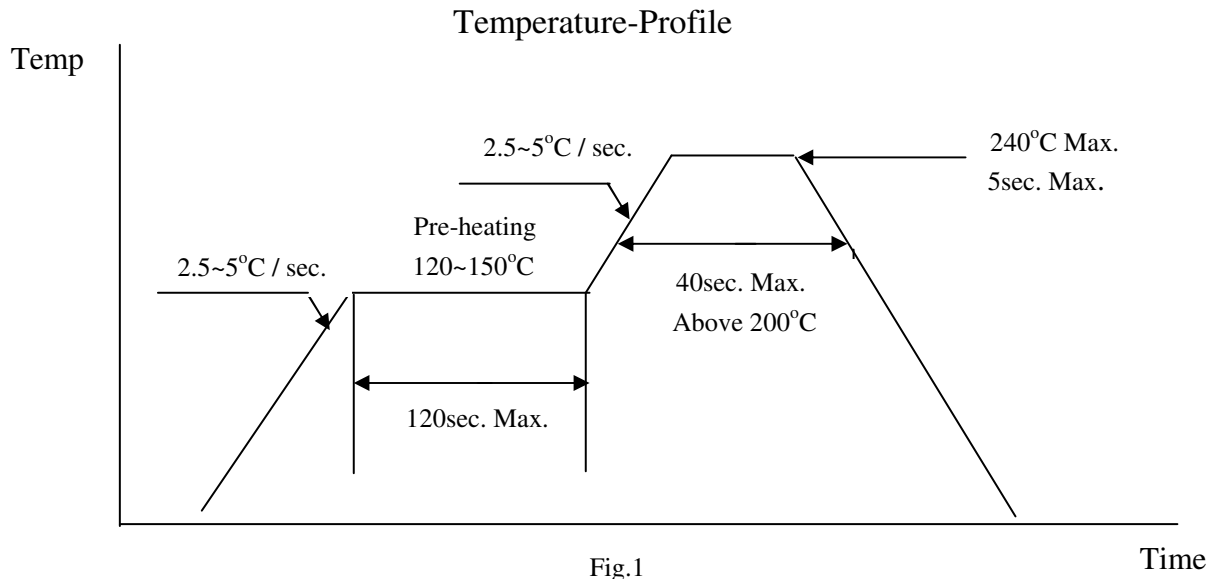
- (1) The Fig. 2 temperature profile shall be at the surface of LED resin.
- (2) Preheat temperature for soldering: 180 - 200°C , 120 seconds MAX.
- (3) Soldering temperature: Temperature of soldering pot 260 MAX for less than 5 seconds.

4.Other Cautions

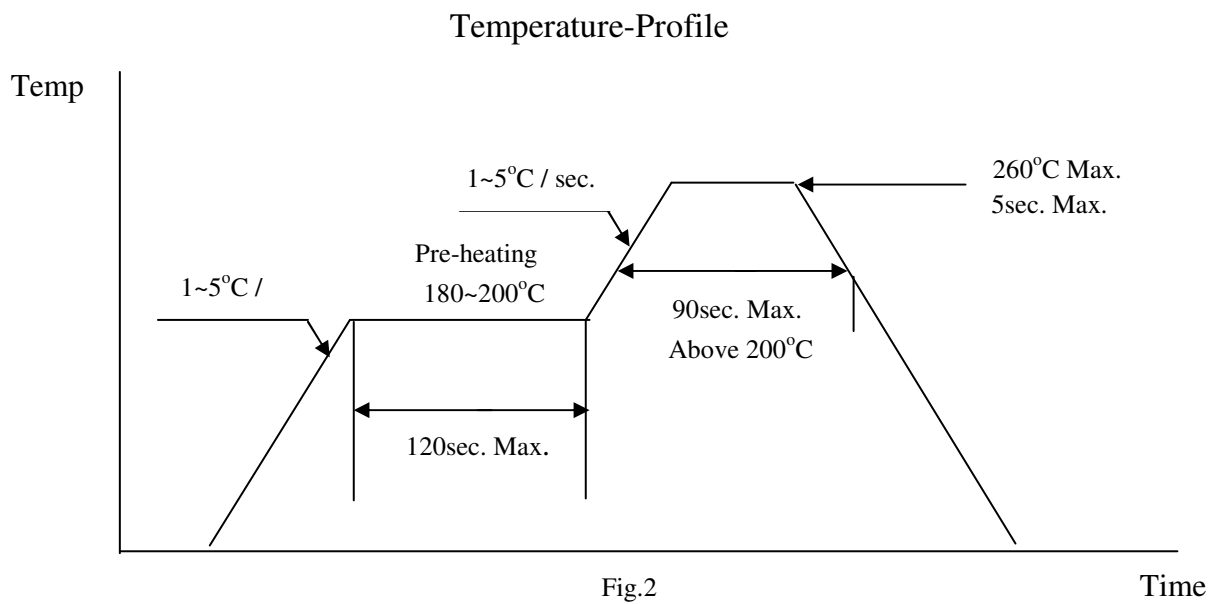
- (1) Manual soldering should be less than 280°C within 3 sec.
- (2) Heat or UV (or both) curing resin shall used for preliminary fixing.
Curing condition and temperature: 150°C MAX for less than 120 seconds.
- (3) Any mechanical force or any excess vibration shall be avoided during cooling process to normal temperature after soldering
- (4) If manual soldering is to be performed to repair LED by tweezers, mechanical force to resin should not be given.

RECOMMENDED SOLDERING CONDITION

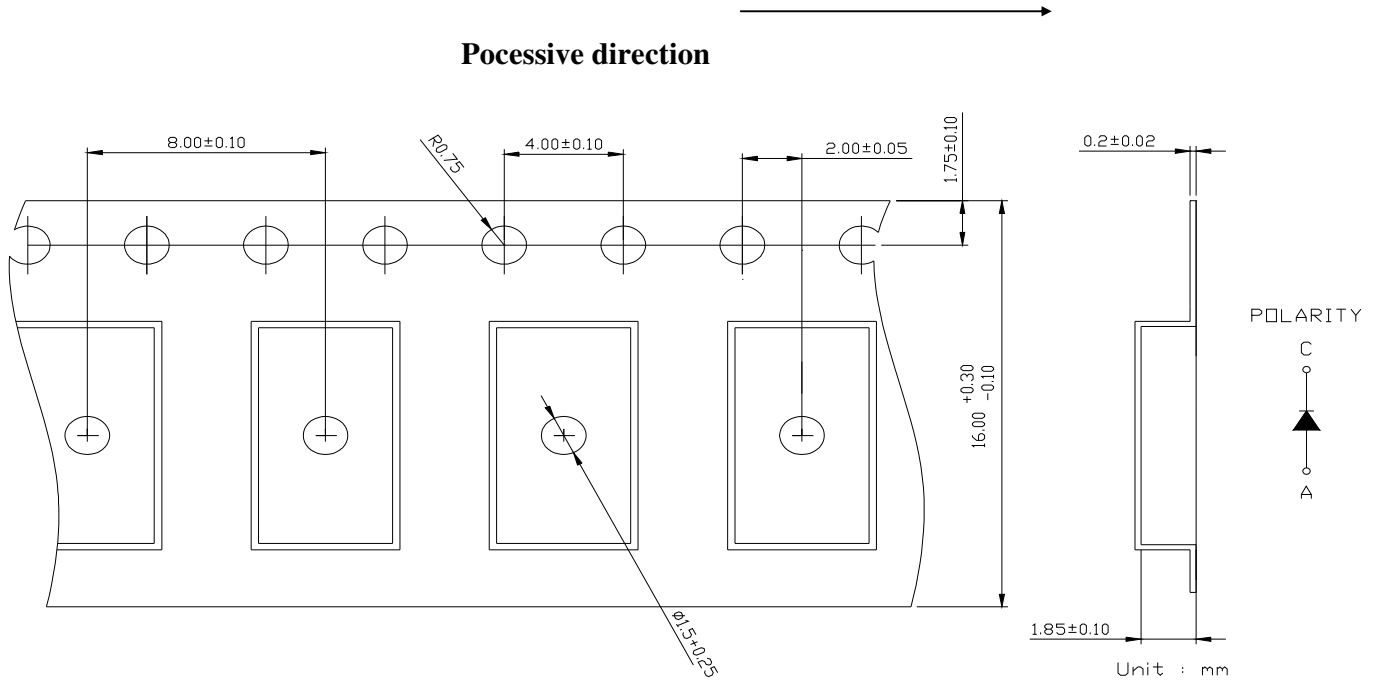
Reflow Soldering.



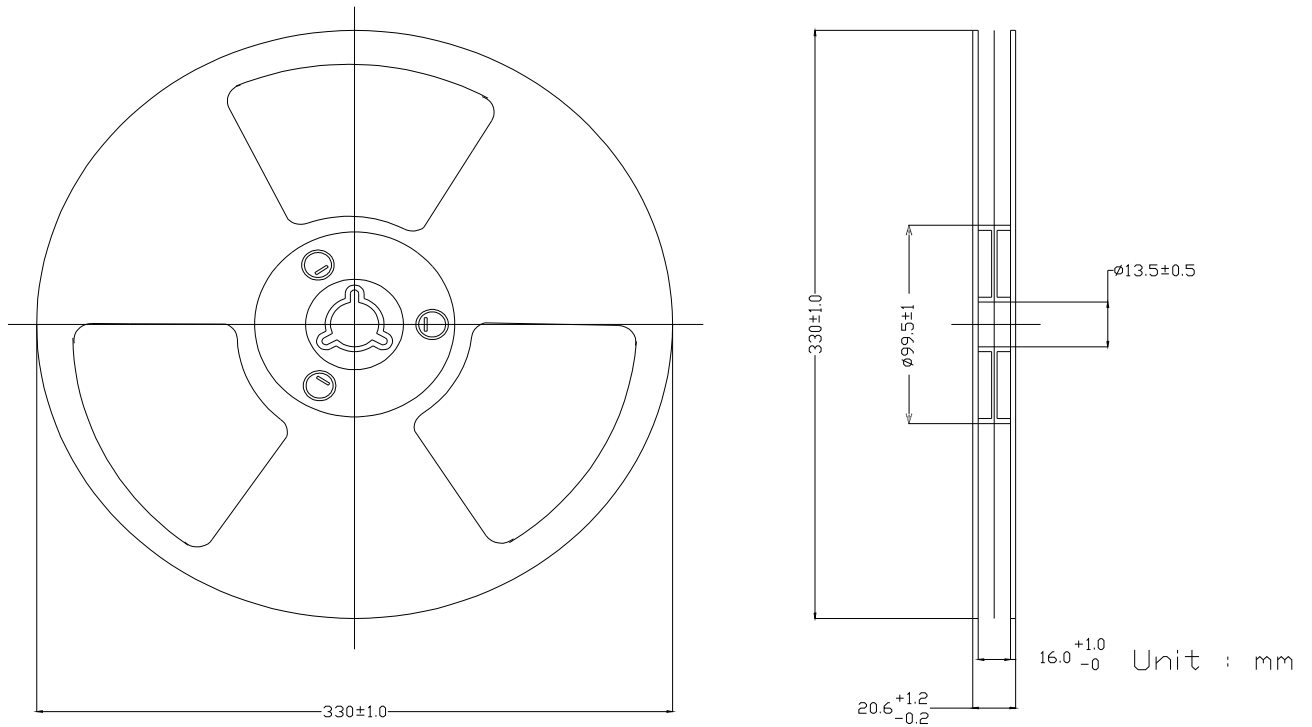
Pb-free reflow Soldering.



Tape Dimensions

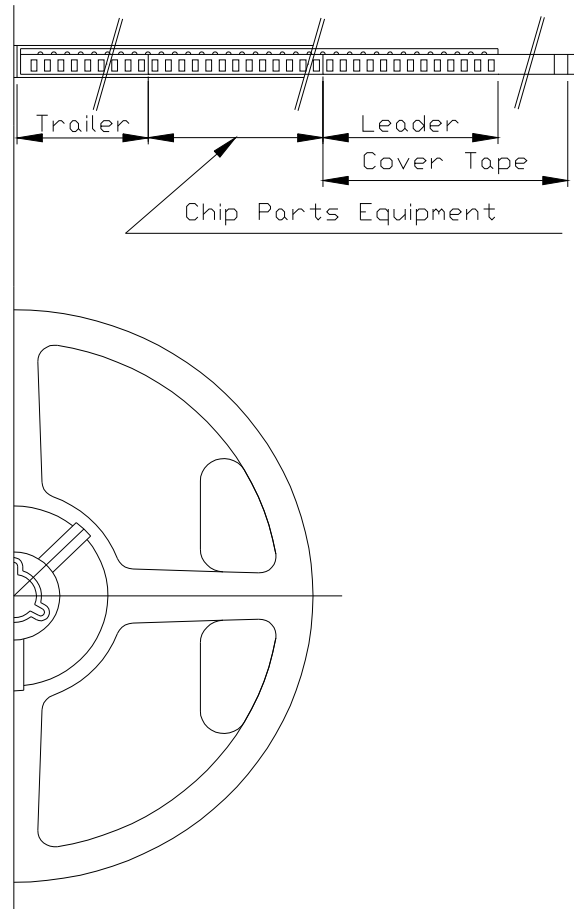


REEL Dimensions



Reel Packing

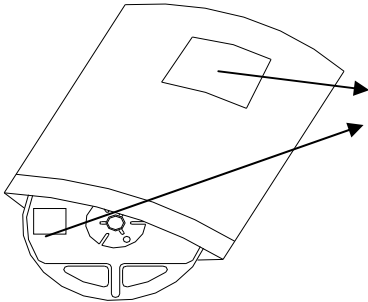
Direction of take out →



Items		Specifications	Remarks
Leader	Cover Tape	Cover tape shall be longer than 200 mm without carrier tape	The end of the tape shall be adhered to tape
	Carrier Tape	There will be more than 10 empties	The orientation of tape is as shown
Trailer		There will be more than 15 empties	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 unopened

Temperature: 5 to 30°C;

Humidity: 70% RH, max.;

Storage time: 6 months max.

STORAGE PRECAUTIONS: After opening the laminate bag, the lamps should be stored in the follow conditions:

Temperature: 5 to 30°C;

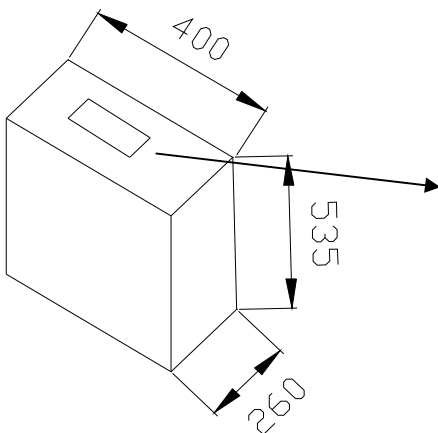
Humidity: 70% RH, max.;

Storage time: 72 hrs max.

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

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 the 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.