

SURFACE MOUNTED GLASS DIODE HANDLING PRECAUTIONS

1. HANDLING PRECAUTIONS
2. HANDLING PRECAUTIONS FOR SOLDERING
3. RECOMMENDED SAFE TEMPERATURE RANGE FOR SOLDERING

Diodes

1. Handling precautions

● Absolute maximum ratings

Semiconductor has its own absolute maximum ratings. This is prescribed in JIS7032 as that absolute maximum ratings is the limited value which must not be exceeded even a moment. If it is exceeded even a moment, semiconductor is fallen into degradation or destroyed. In other case, after supplying excess value to semiconductor, Its life become shorter even if it can work well right after. So keep the system design which do not exceed any ratings.

● Derating

Reliability of semiconductor device is heavily influenced to the electrical, Mechanical and enviromental stress. Therefore, design for reliability will be made according to the purpose of application and derating against the maximum rating will be defined by selecting each stress depending on required reliability. Following table shows the standard recommended generally with the reference to the reliability test results of each device manufacturers.

Example of derating design standard

Derating factor		Diode	Note
Temp.	T/J	Below 110°C (Tj=Below 60°C)	For high reliability
	T/A of diode	– (Ta=0 to 45°C)	For high reliability
	Others	Consumption power, T/A heat radiation $T_j = P \times \theta_{ja} + T_a$	
Humidity	Relative temp.	40 to 80% RH	
	Others	In case of existing the dew due to sudden temp. change, implement corting PCB.	
Voltage	Voltage	Max. rating \times below 0.8 (Max. rating \times below 0.5)	
	Over voltage	Inplement protection for overload including ESD.	
Current	Average current	$I_o \times$ below 0.5 ($I_o \times$ below 0.25)	For high reliability
	Forward current	I_f (peak) \times below 0.8	
Power	Average power	$P \times 0.5$ (Especially in zener diode)	
Pulse	ASO	Not exceed absolute Max. ratings on each individual catalog	
	Surge	below I_f (Surge)	

● Mounting on PCB.

In case of SMD components, minimize the bending of board also. Especially, Being stress will directly influence the SMD components. Furthermore, Screw fastener or board breaking near the SMD components is also prohibited.

● Others

- (1) As for components lay-out on PCB, Do not put diode near high voltage resistors etc which may generate heat to diode, Nor in high density board. When design the PCB, Implement protection to diode from electrical damage like surge, ESD and so on.
- (2) Do not storage diodes in the following places:
 - High temp. or High humidity.
 - From which corrosive gas exposed.
 - From which mechanical stress or vibration is supplied.
 - Possibly having electrostatic.
- (3) When transporting diode, keep supplying vibration as little as possibly or grass body of diode may be broken and diode die may be destroyed with electrostatics.
- (4) Please avoid a condition that the diode is wet with dew. Especially, some bias loaded into the glass sealed diode covered with dew, there is possibility that air-tight condition in the diode is deteriorated.
We recomend that the diode be used under the condition of RH=20 to 80%.

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Diodes

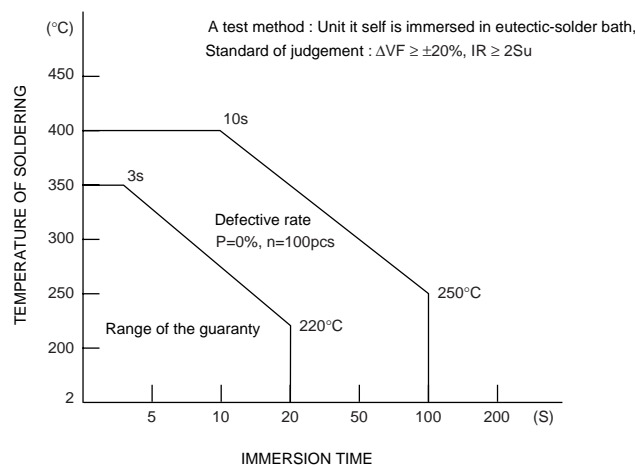
- (5) In case of using the coating resin for the PCB, pay attention to the mechanical stress from the resin hardening or the thermal expansion, shrinkage at temperature changes. There is a possibility of unexpected mechanical stress in case that the resin has the high coefficient of thermal expansion or hardness.

2. Handling precautions for soldering

- (1) Do not use a strong acidity nor alkaline flux, or it might corrode the diode terminations and have bad influence on diode's electrical characteristics. Implement soldering after fully dry flux.
- (2) In case of supplying high temperature to a diode body suddenly for example dip soldering, supply pre-heating to diode body and then minimizes temperature change at operation.
- (3) In case of surface mounted diode, PCB condition after soldering have much influence on diode reliability, because surface mounted diode is put on PCB directly. Do not use PCB with is bended or twisted.
- (4) In case of using the PCB which has low coefficient of thermal expansion like ceramic materials, there is a possibility that the tensile stress will remain after mounting the diode on PCB. Please pay attention to the stress to prevent the failure of the diode.
- (5) For flux washing after soldering, use a washing solvent for semiconductor.
- (6) Do not be stuck flux liquid to glass body of diode, or glass body might have high temperature graduation ration, and then have crack or brekage because some area have high temperature from solder bath (soldering iron) at soldering and the other area have low temperature from flux vaporate cooling. In case of being stuck flux liquid, implement soldering after fully dry flux vapor with below 80°C degree condition.
- (7) Use the solder iron which has no leakage at the top of iron and have earth operation because leakage might cause damage by overload to diode.

3. Handling precaution for soldering

- (1) Soldering proof temperature range is until 260°C degree for 10 sec. (Full soldering), and 350°C degree for 10 sec. (solder iron) with more than 1mm distance. But this is the worst condition which be allowed to our leadless diode. So from the reliability point of view, we recommend lower and shorter soldering condition as much as it can be.



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