

Assembly Instructions

GENERAL

Vishay leaded IR receiver modules can be mounted in any position. The wire leads may be bent provided the bend is not less than 1.5 mm from the bottom of the plastic package. During bending, no forces should be transmitted from the leads to the package (e.g. by spreading the leads). If the device is to be mounted near heat generating components, the resultant increase in ambient temperature should not exceed the specified ratings.

SOLDERING INSTRUCTIONS

Protection against overheating is essential when a device is being soldered. It is recommended, where possible, that the length of the leads between the solder joint and the package be left as long as possible. The maximum permissible soldering temperature for plastic encapsulated devices is governed by the maximum permissible heat that may be applied to the encapsulant rather than by the maximum permissible junction temperature of the die.

The maximum temperatures and soldering times for iron and wave soldering are given in table 1.

TABLE 1 - MAXIMUM SOLDERING TEMPERATURES

	IRON SOLDERING			WAVE SOLDERING		
	IRON TEMPERATURE	DISTANCE OF THE SOLDERING POSITION FROM THE LOWER EDGE OF THE CASE	MAXIMUM ALLOWABLE SOLDERING TIME PER PIN	SOLDERING TEMPERATURE SEE TEMPERATURE TIME PROFILES	DISTANCE OF THE SOLDERING POSITION FROM THE LOWER EDGE OF THE CASE	MAXIMUM ALLOWABLE SOLDERING TIME
IR receiver for through hole assembly without holder	≤ 350 °C	≥ 2 mm	3 s	260 °C	≥ 1 mm	10 s
IR receiver for through hole assembly with plastic holder	≤ 350 °C	n.a.	3 s	260 °C	n.a.	5 s
IR receiver for through hole assembly with metal holder	≤ 350 °C	n.a.	3 s	260 °C	n.a.	10 s
IR receiver for SMD assembly	≤ 350 °C	n.a.	3 s			

SOLDERING METHODS

There are several commonly used methods to solder devices on-to the substrate. Some of them are listed in the following:

(a) Reflow Soldering

Reflow soldering uses contact-free heating and derives the energy for soldering the assembly either from convection heating or from direct infrared radiation.

The heating rate in an IR furnace depends on the absorption coefficients of the material surfaces and on the ratio of the components' masses to their irradiated surfaces.

The temperature of parts in an IR furnace cannot be determined in advance. Temperature measurements may be performed by measuring the temperature of a certain component while it is being transported through the furnace. The temperatures of small components tend to change more than that of the larger ones with which they are soldered together and may rise up to 280 °C.

The parameters which influence the internal temperature of the component are the following:

- Time in the oven and power of the oven
- Mass of the component
- Size of the component
- Size of the printed circuit board

- Absorption coefficient of the surfaces
- Layout density
- Optical spectrum of the radiation source
- Ratio of radiated to convected energy

A temperature-time profile of the reflow process, suitable only for SMD devices, is given in figure 2. Reflow soldering is not approved for leaded IR receivers.

Soldering Instructions

- Reflow soldering must be done according MSL4 within 72 h after opening the dry pack envelope while stored under a maximum temperature of 30 °C and a relative humidity of 60 %.
- Set the furnace temperatures for pre-heating and heating in accordance with the reflow temperature profile as shown in the diagram. Exercise extreme care to keep the maximum temperature below 260 °C. The temperature shown in the profile means the temperature at the device surface. Since there is a temperature difference between the component and the circuit board, it should be verified that the temperature of the device is accurately being measured.
- Handling after reflow should be done only after the work surface has been cooled off.

(b) Wave soldering

In wave soldering, one or more continuously replenished waves are generated in a bath of molten solder. The substrates to be soldered are moved in the opposite direction to that of the wave and across the wave's crest. A temperature-time profile of the entire process is given in figure 3. Wave soldering is applicable for leaded IR receiver but not for the SMD packages.

Note for parts mounted in plastic holders: the temperatures used for soldering exceed the melting temperature of plastic. A wave-soldering process not exceeding 5 s will therefore often deform the hooks used to attach the holder to the PCB, but will not affect the functionality of the holder.

(c) Soldering iron

The process of hand soldering with an iron cannot be carried out in a repeatable and controlled way.

This process should not be considered for use in applications where reliability is important. There is no SMD classification for this process.

Manual Soldering for SMD

- Use a soldering iron of 25 W or less. Adjust the temperature of the soldering iron below 350 °C.
- Finish soldering within 3 s.
- Handle products only after the temperature has cooled off.

WARNING

Opto devices are sensitive to damage due to moisture release if they are subjected to infrared reflow or a similar soldering process (e.g. wave soldering) without being properly dried.

Dry box storage is recommended as soon as the aluminum shipping bag has been opened to prevent moisture absorption by the device. The following conditions should be observed if dry boxes are not available:

- Storage temperature 10 °C to 30 °C
- Storage humidity at 60 % RH maximum

If the devices are stored for more than 72 h under these conditions, the moisture content will then be too high for reliable reflow soldering. The devices can be reconditioned to recover to an acceptable moisture content by drying under the following conditions:

192 h at 40 °C + 5 °C/- 0 °C and < 5 % RH (dry air/nitrogen) or
 96 h at 60 °C ± 5 °C and < 5 % RH for all device containers.
 An EIA JEDEC Standard JESD22-A112 level 4 label is included on all dry packs.

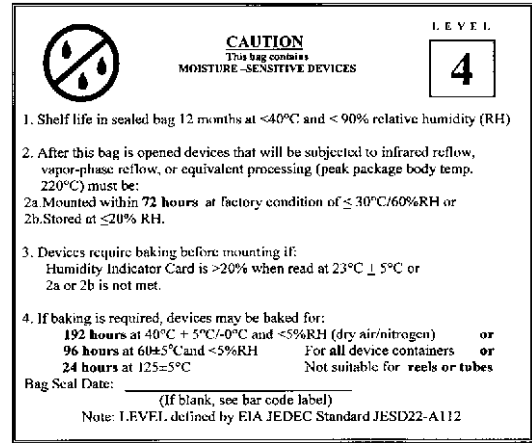


Fig. 1 - Example of JESD22-A112 Level 4 Label

Temperature-Time Profiles

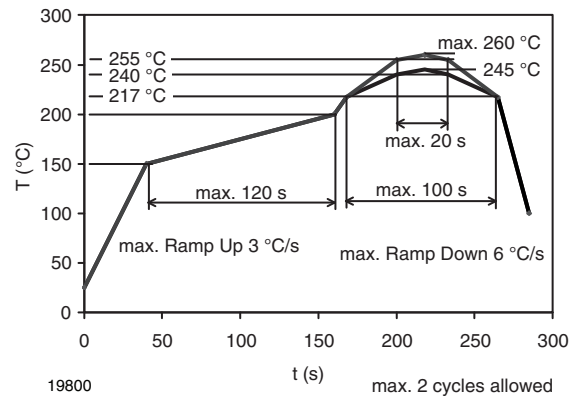


Fig. 2 - Infrared reflow soldering of opto devices (SMD package only)

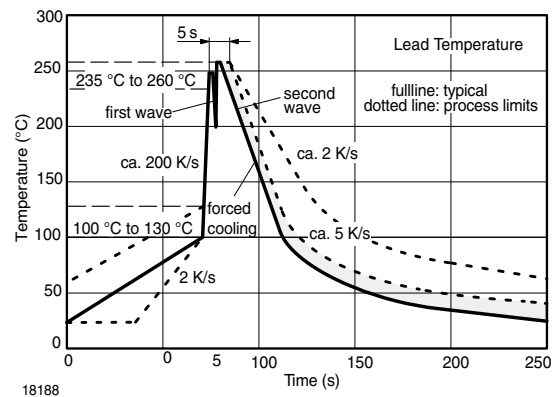


Fig. 3 - Wave soldering of opto devices (leaded IR receiver package only)