SGS-THOMSON MICROELECTRONICS

APPLICATION NOTE

SURFACE MOUNT DEVICE (SMD) PACKAGING AND SOLDERING METHOD

P. Rault

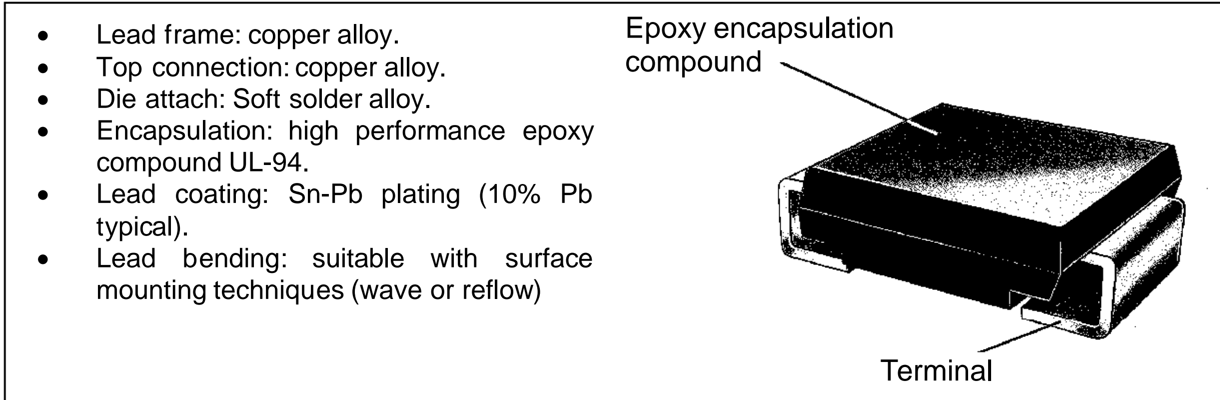
PACKAGING :

These devices are delivered in standard embossed 12 & 16 mm tapes and reels (E.I.A. 481A standards).

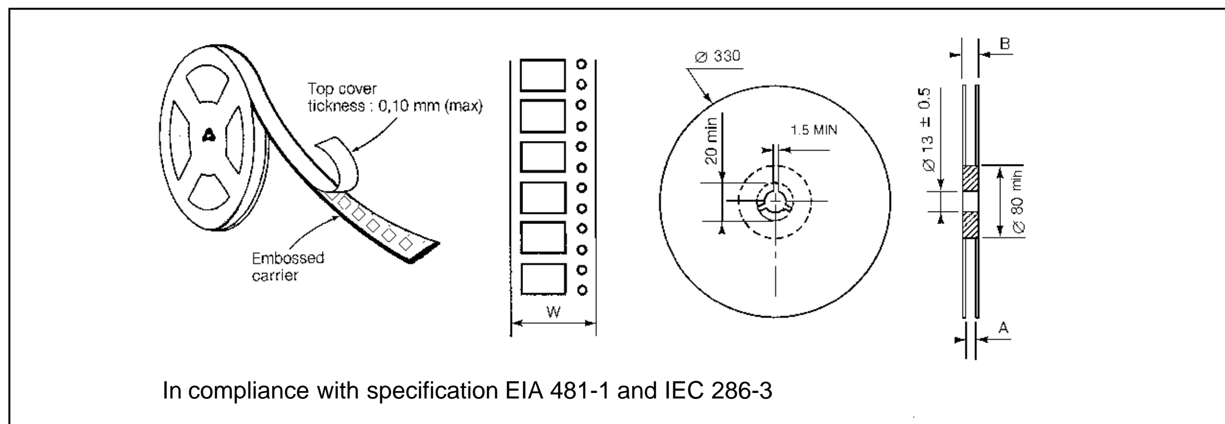
This packaging minimizes handling and is fully compatible with state-of-the-art assembly technology for hybrid circuits and printed circuit boards.

The diodes are pre-orientated and the tape can be used directly on automatic pick and place equipment.

Picking up is easy thanks to the rectangular parallelepiped shape. In particular, a vacuum chuck is very efficient due to the flatness of the upper side of the components, thus avoiding air leakage.



Case	Quantity per reel	Film width	Reel dimensions A	Reel dimensions B
SMA	5000	12	12.4 +2.0 -0.0	18.4 max
SOD 6 / SMB	2500	12	12.4 ± 2	18.4 ± 2
SOD 15	2500	16	16.4 ± 2	22.4 ± 2



In compliance with specification EIA 481-1 and IEC 286-3

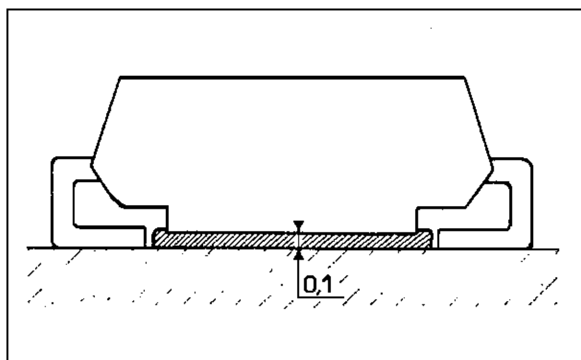
Note : Polarized devices have cathode lead oriented towards the perforated side of the film

SOLDERING METHODS :

SMD devices are suitable for mounting on various substrates (thick or thin films) and printed circuit boards.
They are compatible with current soldering techniques.

1) WAVE SOLDERING :

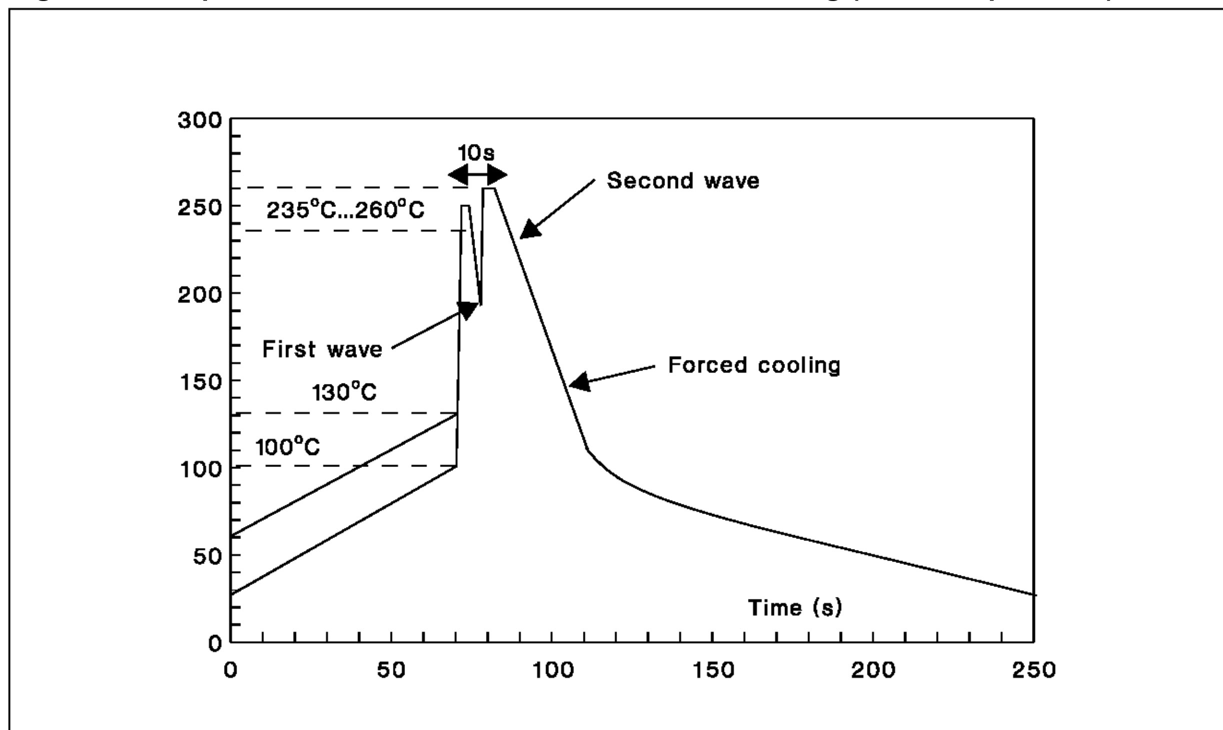
This method is employed when surface mount components are used with conventional through-hole components on the same board. The through-hole mounting components are inserted from the top, and the SMD are attached to the under-side, using a suitable adhesive.
The lower part of the package allows a controlled thickness of the glue and ensures efficient adhesion.
The height (2.6 mm) provides a very low ”screen effect”.



- The assembly should be pre-heated to about 100°C to minimize the thermal shock.
- The maximum solder temperature is 260°C and the exposure time should not exceed 10 seconds.
- A dual wave process gives the best results.

Recommendations :

Figure 1: Temperature -Time-Profile Double-Wave Soldering (Lead temperature)



Note : According to CECC Standard Method SMD 50301188 - Oct 89

2) REFLOW SOLDERING :

The epoxy resin specially designed for the molding of these components is suitable for all reflow soldering techniques used today :

- vapour phase
- infrared tunnel
- pulse-heat
- etc...

According to these methods, components are first positioned on the substrate and kept in place thanks to the adhesive properties of the solder paste applied to the soldering areas (footprints).

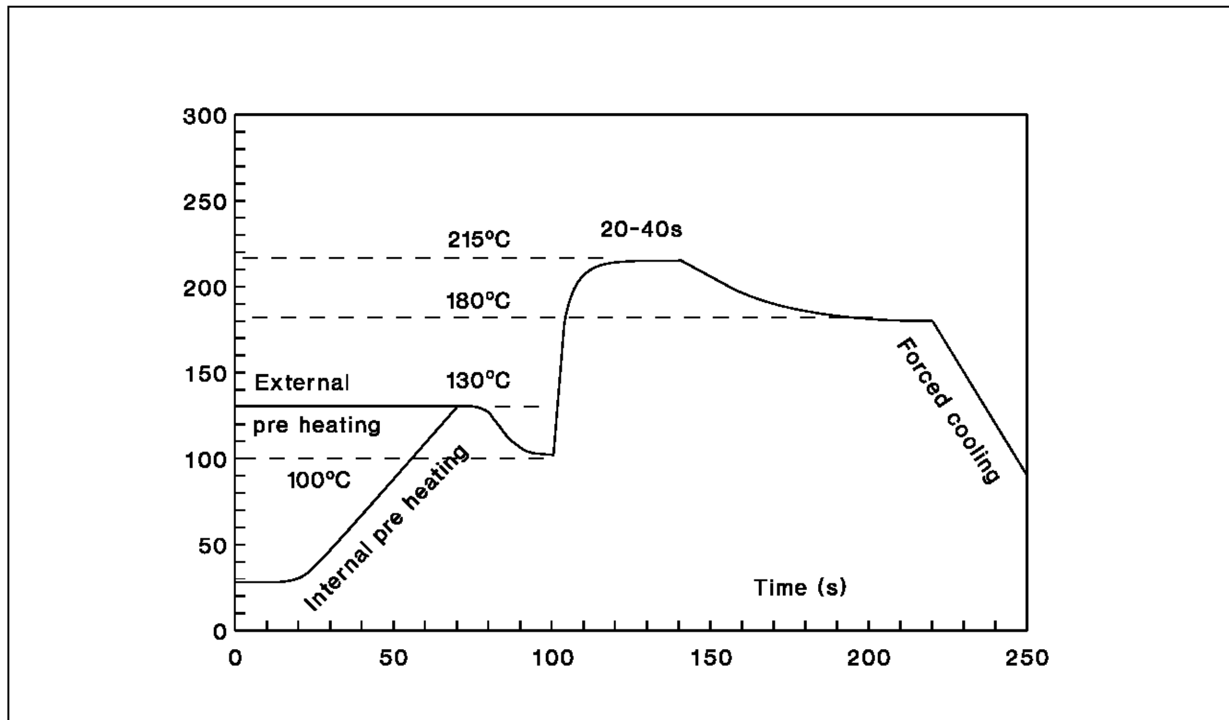
The wide surfaces of contact of SMD packages ensure a good stability of the assembly before reflowing process.

Recommendations :

The soldering temperature changes according to the method used. Pre-heating up to 100°C is required. The temperature during reflow should be limited in order to keep the plastic body of the device below 260°C. At this temperature, exposure time should be less than 10 seconds.

The vapour phase reflow soldering method provides the best control of the temperature and gives the most uniform results.

Figure 2 : In Line System with Preheating - Temp.-Time-Profile Vapour-Phase-Soldering (Lead Temperature)



Note : According to CECC Standard Method SMD 50301188 - Oct 89

3) PROTOTYPES :

In the laboratory, for low volume, reflow soldering using heat-plate can be implemented. The immersion method is also a possibility.

When the complete circuit board is immersed in a solder bath, the temperature should not exceed 260°C and the soldering cycle should not exceed 10 seconds. A forced cooling is then recommended.

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