

Soldering Process Notes

TABLE 3 - CLASSIFICATION REFLOW PROFILE

PROFILE FEATURE	Sn-Pb EUTECTIC ASSEMBLY	LEAD (Pb)-FREE ASSEMBLY
Average ramp-up rate (Ts max. to TP)	3 °C/s maximum	3 °C/s maximum
Preheat		
- Temperature minimum (Ts min.)	100 °C	150 °C
- Temperature maximum (Ts max.)	150 °C	200 °C
- Time (min. to max.) (ts)	60 s to 120 s	60 s to 180 s
Time maintained above:		
- Temperature (T _L)	183 °C	217 °C
- Time (t _L)	60 s to 150 s	60 s to 150 s
Peak temperature	See table 1	See table 2
Time within 5 °C to actual peak temperature (tp)	10 s to 30 s	20 s to 40 s
Ramp-down rate	6 °C/s maximum	6 °C/s maximum
Time 25 °C to peak temperature	6 min maximum	8 min maximum

Note

- All temperatures refer to top side of the package, measured on the package body surface.

HAND SOLDERING (THROUGH HOLE ONLY)

Protection against overheating is essential when a device is being soldered. It is recommended, therefore, that connection terminals are left as long as possible, are soldered at the tip only, and that any heat generated is quickly conducted away. The time during which the specified maximum permissible device junction temperature is exceeded during the soldering operation should be as short as possible, (i.e., for silicon, 260 °C + 5 °C - 0 °C for 10 s maximum). Excessive force on the body or leads should be avoided during or just after soldering. Do not correct the position of an already soldered device by pushing, pulling or twisting the body. Prevent fast cooling after soldering. The maximum Iron soldering temperatures are shown in table 4.

TABLE 4 - IRON SOLDERING

IRON TEMPERATURE	SOLDERING DISTANCE FORM THE CASE	MAXIMUM ALLOWABLE SOLDERING TIME
265 °C	1.5 mm to 5 mm	5s
265 °C	> 5 mm	10s

HAND SOLDERING (SURFACE MOUNT ONLY)

The maximum temperature of 260 °C over a period 10 s must not be exceeded during soldering. No aggressive fluxes may be used. A soldering iron should be used only in exceptional cases (repairs, etc.). A temperature regulated miniature soldering iron must be used, and care should be taken to avoid touching the component with the tip of the soldering iron. By preheating your PCB assembly with an air bath you can achieve far lower reflow temperatures than you can without it.

Example: The same solder joint that requires a 370 °C (700 °F) soldering iron can be made at only 226 °C (420 °F) if the assembly is first briefly preheated for just seconds with an air bath. That is a temperature difference of 144 °C (280 °F)