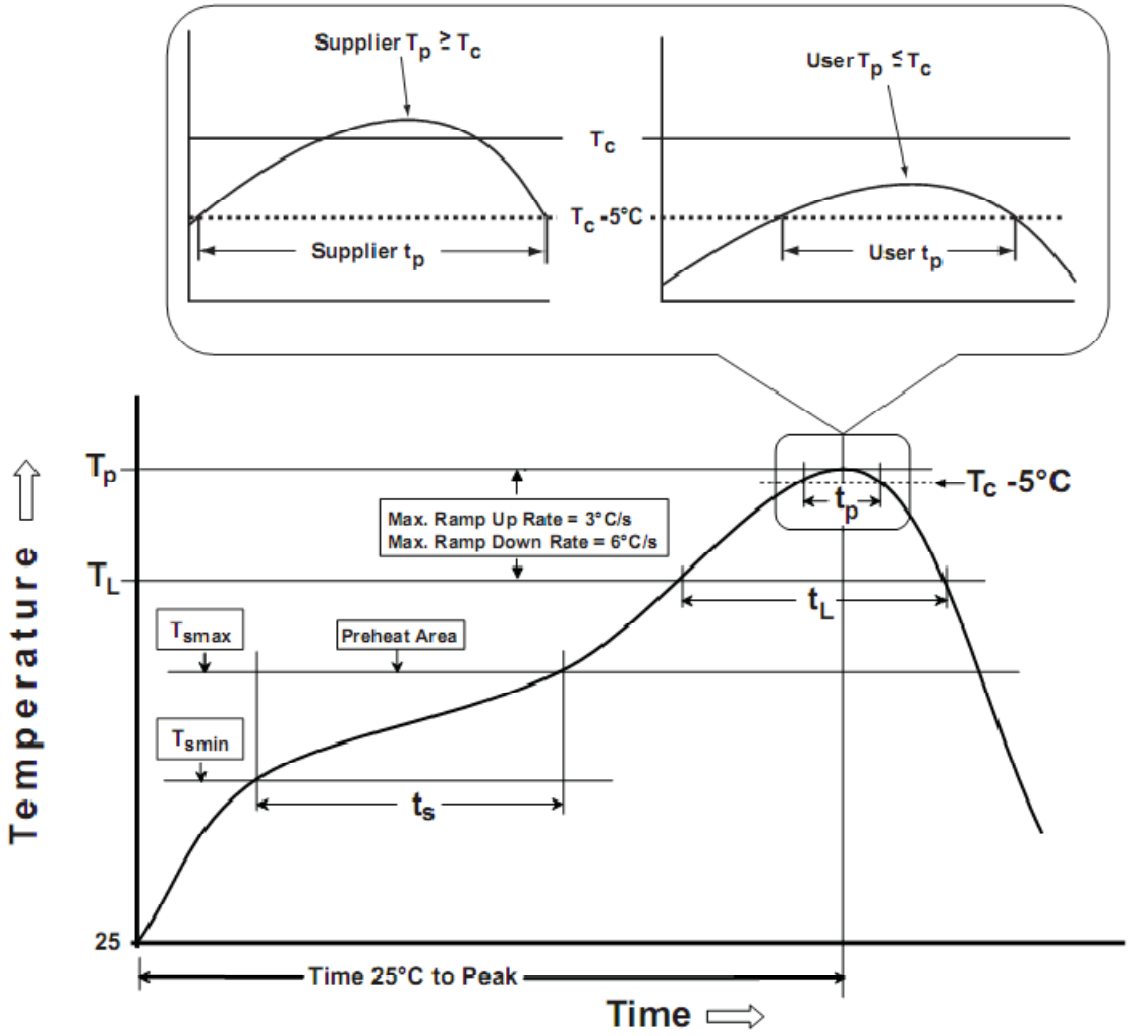
DH SEMICONDUCTOR RECOMMENDED SOLDERING PROCESS FOR SURFACE MOUNTED AND PTH COMPONENTS

REFLOW PROFILE



CLASSIFICATION REFLOW PROFILE		
PROFILE FEATURE	**Sn - Pb EUTECTIC ASSEMBLY**	**LEAD (Pb)-FREE ASSEMBLY**
Average ramp-up rate (T_L to T_P)	3 °C/s maximum	3 °C/s maximum
Preheat - Temperature minimum ($T_{S(min.)}$) - Temperature maximum ($T_{S(max.)}$) - Time ($T_{S(min.)}$ to $T_{S(max.)}$) (t_S)	 100 °C 150 °C 60 s to 120 s	 150 °C 200 °C 60 s to 120 s
Time maintained above - Temperature minimum (T_L) - Time (T_L)	 183 °C 60 s to 150 s	 217 °C 60 s to 150 s
Peak temperature	(Table 1)	(Table 2)
Time within 5 °C of actual peak temperature (t_P)*	20* s	30* s
Ramp-down rate	6 °C/s maximum	6 °C/s maximum
Time 25 °C to peak temperature	6 min maximum	8 min maximum
*Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.		

Note: All temperatures refer to topside of the package, measured on package body surface

TABLE 1 - Sn-Pb EUTECTIC PROCESS
PACKAGE PEAK REFLOW TRMPERATURES

PACKAGE THICKNESS	VOLUME mm^3 <350	VOLUME mm^3 ≧350
< 2.5mm	235 +0/-5℃	220 +0/-5℃
≧2.5mm	220 +0/-5℃	220 +0/-5℃

TABLE 2 - LEAD (Pb)-FREE PROCESS
PACKAGE CLASSIFICATION REFLOW TEMPERATURE

PACKAGE THICKNESS	VOLUME mm^3 <350	VOLUME mm^3 350 - 2000	VOLUME mm^3 > 2000
< 1.6mm	260 +0 ℃*	260 +0 ℃*	260 +0 ℃*
< 1.6mm - 2.5mm	260 +0 ℃*	250 +0 ℃*	245 +0 ℃*
≧2.5mm	250 +0 ℃*	245 +0 ℃*	245 +0 ℃*

* Tolerance: The device manufacturer/supplier shall assure process compatibility up to and including the stated classification temperature at the rated MSL level

WAVE SOLDERING

Fig.1 – Lead (Pb) –free Wave Soldering Profile

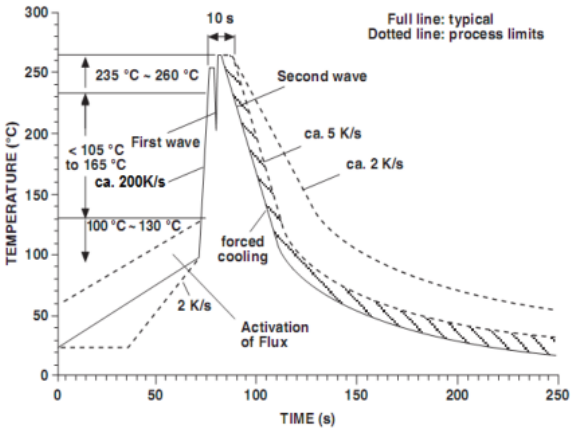
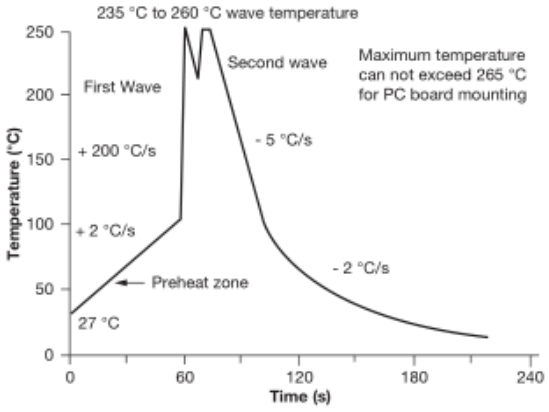


Fig.2 – Sn-Pb Wave Soldering Profile



Notes:

1. Package volume excludes external terminals (balls, bumps, lands, leads) and/or non-integral heat sinks.
2. The maximum component temperature reached during reflow depends on package thickness and volume. The use of convection reflow processes reduces the thermal gradients between packages. However, thermal gradients due to differences in thermal mass of SMD packages may still exist.
3. This document should serve as recommendation only. Other parameters may also affect soldering, so these profiles do not guarantee absolute success.
4. Soldering profile should be determined by the manufacturer of the solder paste, providing there is no contradiction with the recommendations in this document.
5. Reflow profile reference to J-STD-020
   Wave soldering reference to CECC00802