

# LX2410A Soldering Technique

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## Purpose

This application note describes the two techniques used in LX2410A soldering process—SMT reflow soldering and localized solder reflow.

## SMT Reflow Soldering

The LX2410A can withstand a reflow peak temperature of 260 °C as specified in the IPC/JEDEC J-STD-020D standard. It is also a qualified moisture sensitivity level (MSL) 1 device according to the IPC/JEDEC J-STD-033C standard.

Reflow soldering is a process of temporarily attaching electrical components to their contact pads using a solder paste, and then subjecting the entire assembly to controlled heat, thereby melting the solder and permanently connecting the joint. To generate the required heat the assembly is passed through a convection or an infra red (IR) reflow oven. The goal of the reflow process is to melt the solder and heat the adjoining surfaces, without overheating and damaging the electrical components.

Microsemi recommends using solder profile based on the IPC/JEDEC J-STD-020D standard. SMT reflow soldering requires special fixtures for positioning the bus bar and the component while they pass through the reflow oven.

The following tables list the reflow profile specified in the IPC/JEDEC J-STD-020D standard.

**Table 1 • SnPb Eutectic Process—Classification Temperature (T<sub>c</sub>)**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5 mm	235 + 0/-5 °C	225 + 0/-5 °C
<sup>3</sup> 2.5 mm	225 + 0/-5 °C	225 + 0/-5 °C

**Table 2 • Pb-Free Process—Classification Temperature (T<sub>c</sub>)**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350 – 2000	Volume mm <sup>3</sup> >2000
<1.6 mm	260 + 0 °C <sup>1</sup>	260 + 0 °C <sup>1</sup>	260 + 0 °C <sup>1</sup>
1.6 mm – 2.5 mm	260 + 0 °C <sup>1</sup>	250 + 0 °C <sup>1</sup>	245 + 0 °C <sup>1</sup>
≥2.5 mm	250 + 0 °C <sup>1</sup>	245 + 0 °C <sup>1</sup>	245 + 0 °C <sup>1</sup>

## Notes:

- <sup>1</sup>Microsemi assures process compatibility up to and including the stated classification temperature at the rated MSL (this means peak reflow temperature +0 °C, for example, 260 °C + 0 °C).
- <sup>2</sup>At the discretion of the device manufacturer but not the board assembler/user, the maximum peak package body temperature ( $T_p$ ) can exceed the values specified in [Table 1](#) and [Table 2](#). The use of a higher  $T_p$  does not change the classification temperature ( $T_c$ ).
- <sup>3</sup>Package volume excludes external terminals (balls, bumps, lands, leads) and/or non-integral heat sinks.

**Table 3 • Classification Reflow Profile**

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
<b>Preheat and soak</b>		
Minimum temperature ( $T_{smin}$ )	100 °C	150 °C
Minimum temperature ( $T_{smax}$ )	150 °C	200 °C
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 seconds	60-120 seconds
Average ramp-up rate ( $T_{smax}$ to $T_p$ )	3 °C/second maximum	3 °C/second maximum
Liquidous temperature ( $T_L$ )	183 °C	217 °C
Time at liquidous temperature ( $t_L$ )	60-150 seconds	60-150 seconds
Peak package body temperature ( $T_p$ )	See classification temperature in <a href="#">Table 1</a> and <a href="#">Table 2</a>	See classification temperature in <a href="#">Table 1</a> and <a href="#">Table 2</a>
Time ( $t_p$ ) <sup>2</sup> within 5 °C of the specified classification temperature ( $T_c$ )	20 <sup>2</sup> seconds	30 <sup>2</sup> seconds
Average ramp-down rate ( $T_p$ to $T_{smax}$ )	6 °C/second maximum	6 °C/second maximum
Time 25 °C to peak temperature	6 minutes maximum	8 minutes maximum

## Notes:

- <sup>1</sup>Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.
- <sup>2</sup>Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.

The following figure shows the SMT reflow soldering profile.

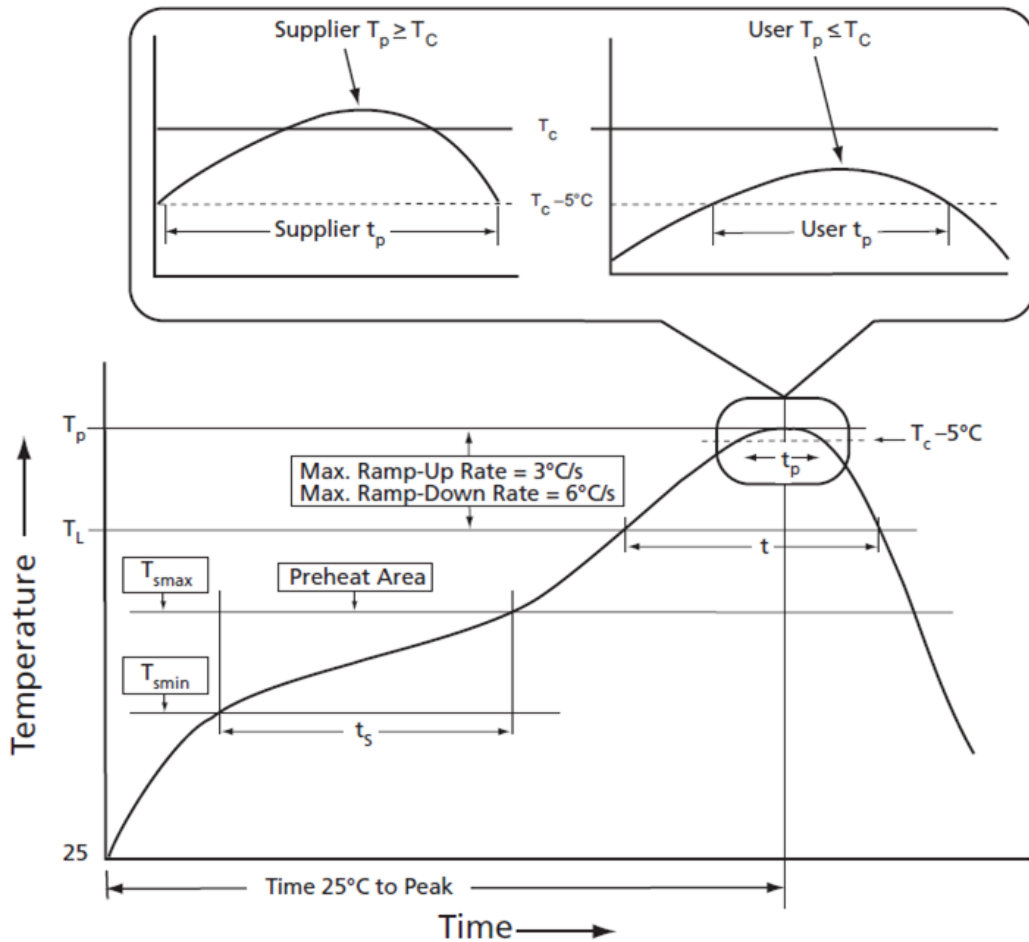


Figure 1 • Reflow Profile

## Localized Solder Reflow

The LX2410A can be connected to the bus bar using a soldering iron, hot air pencil, or hot bar by locally applying heat to the bus bar.

The tools required for localized solder reflow include a temperature-controlled soldering iron (or alternate localized controlled heating source), solder wire, and flux (Figure 2, Figure 3, and Figure 4 respectively).



**Figure 2 • Soldering Iron–Weller dec1001**



**Figure 3 • Kester Solder**



**Figure 4 • IFlux–TW Chemtronics CW8400**

The localized solder reflow technique is used in the LX2410A mechanical strength test, customer built solar panel, and so on.

The following steps describe how to perform the localized solder reflow technique:

1. Set the soldering iron temperature at 640 °F.
2. Apply flux to the LX2410A pad.
3. Use the soldering iron to reflow the solder at the end of the bus bar.
4. Set the pre-tinned bus bar ribbon (Figure 5) to overlap the LX2410 pad.

5. Apply the soldering iron to the bus bar at the point where it overlaps the LX2410A pad.
6. Remove the soldering iron immediately after reflow.

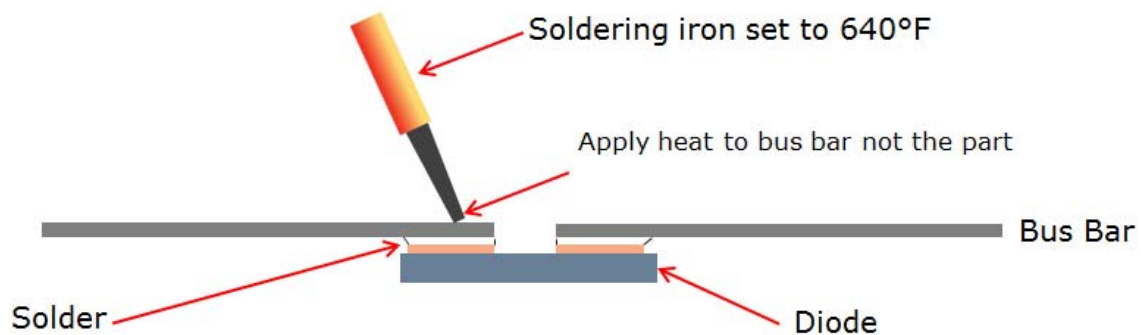
**Note:** Part temperature needs to be maintained below 290 °C.



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**Figure 5 • Pre-Tinned Bus Bar Ribbon**

The following figure shows the soldering process.



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**Figure 6 • Soldering the Bus Bar**

## Conclusion

The soldering techniques described above ensures foolproof and robust soldering of the LX2410A.

## List of Changes

The following table shows the important changes made in this document for each revision.

Revision	Changes	Page
Revision 1 (June 2016)	Initial release.	NA



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