

Memorandum

To: Our Valued Customers

From: Steve Brower

Date: 3/30/2007

Re: Lead-free/RoHS policy

Background

On January 27, 2003, the European Union passed the "Restriction on Use of Hazardous Substances in Electrical and Electronic Equipment," or "RoHS" directive 2002/95/EC, which has an implementation date of July 1, 2006. Member states were required ensure that by July 1, 2006, new electrical and electronic equipment placed on the market, contain less than the maximum allowed levels of the following restricted hazardous substances:

Hazardous Substance	Maximum limit % by weight
Hg – Mercury	0.1%
Cd – Cadmium	0.01%
Cr6 – Hexavalent Chromium	0.1%
PBB – Polybrominated Biphenyls	0.1%
PBDE – Polybrominated Diphenylethers	0.1%
Pb - Lead	0.1%

Materials Selection

In compliance with the RoHS European directives to eliminate lead in the electronics industry, Holt Integrated Circuits has adopted the use of 100% matte tin (Sn) plating for its RoHS compliant plastic packages. Package molding compounds have been upgraded so that the product is fully RoHS compliant and able to withstand the higher soldering temperatures of lead-free solder alloys. Product qualification has validated that the products can withstand peak solder temperature rating per JEDEC J-STD-020C Table 5-2 and Figure 5-1.

JEDEC J-STD-020C Table 5-2 Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-Up Rate (T _{Smax} to T _p)	3 °C/second max.	3° C/second max.
Preheat – Temperature Min (T _{Smin}) – Temperature Max (T _{Smax}) – Time (t _{Smin} to t _{Smax})	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-180 seconds
Time maintained above: – Temperature (T _L) – Time (t _L)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak/Classification Temperature (T _p)	See Table 4.1	See Table 4.2
Time within 5 °C of actual Peak Temperature (t _p)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6 °C/second max.	6 °C/second max.
Time 25 °C to Peak Temperature	6 minutes max.	8 minutes max.

Note 1: All temperatures refer to topside of the package, measured on the package body surface.

JEDEC J-STD-020C Figure 5-1 Classification Reflow Profile

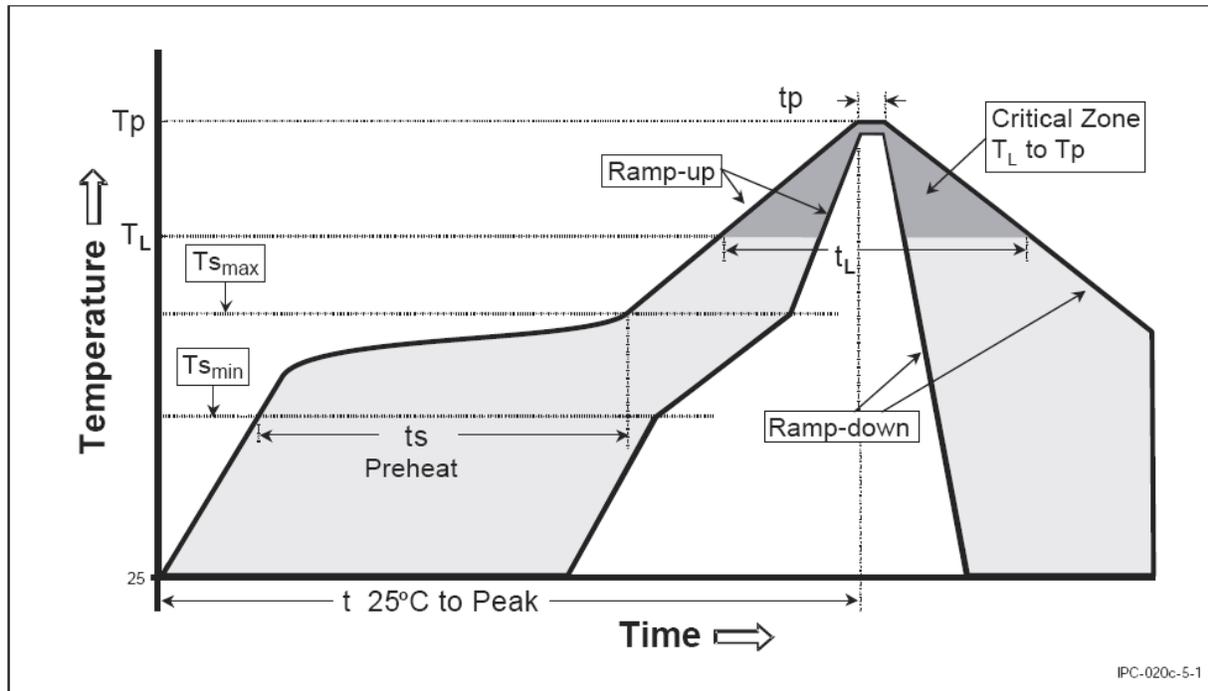


Figure 5-1 Classification Reflow Profile

Holt selected matte tin to provide forward and backward compatibility with both the current industry-standard SnPb-based soldering processes and higher-temperature Pb-free processes. Industry testing has shown that matte tin is backward compatible to standard 215°C to 225°C tin/lead (SnPb) reflow processes and compatible with up to 260°C Pb-free reflow processes.

Tin Whisker Mitigation

Because of the lead-free movement and the European RoHS directive, many component manufacturers are moving from tin-lead (SnPb) to pure tin (Sn) lead finishes. Pure tin and high-tin content alloys are subject to tin whisker formation and growth. Tin whiskers are spontaneous filamentous or needlelike growths from the tin surface and are believed to be a result of stress relief in the tin layer. Holt's assembly subcontractors employ the following industry approved mitigation practices to mitigate the formation and growth of tin whiskers:

- Use of 100% matte tin.
 - Matte tin has a larger grain size (1µm-5µm) than bright tin (0.5µm-0.8µm)
- Use of a thicker matte tin plating
 - Plating thickness of 8µm minimum is recommended
- Use of an annealing process immediately after matte tin plating

Holt is aware of and will continue to monitor ongoing studies in tin whisker development and mitigation strategies. Additional information on tin whiskers can be found at the International Electronics Manufacturing Initiative website (www.nemi.org).



Product Offerings

To meet our customer's desire to meet these Directives, Holt is proud to offer RoHS compliant Lead-Free products. Holt's RoHS compliant ICs are in full compliance with the EU Directives for Restriction of Hazardous Substances (RoHS). Our lead-free products are easily identifiable. Products compliant to the RoHS Directive 2002/95/EC are identified by an "F" contained in the part number marked of the device.

For example:

HI-8586PSI is non-RoHS SnPb plated

HI-8586PSIF is RoHS compliant lead-free plated with 100% matte tin

Holt will continue to support the original line of tin/lead plated products. We recognize that many customers still require Tin/Lead products that are not RoHS compliant. These products are still available from Holt. We will not phase these products out. The part numbers will remain as they are. There will be no change to the formula for those products. They will continue to be the same high quality products we have always delivered.

A handwritten signature in black ink that reads "Steve A. Brower".

Steve Brower
Director of Manufacturing
Holt Integrated Circuits, Inc.

Disclaimer

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