PERICOM®
Enabling Serial Connectivity
Pericom Semiconductor Corporation
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TO: All Pericom Customers

DATE: October 1, 2008

SUBJECT: Pericom Plastic IC Package MSL (Moisture Sensitivity Level and Soldering Profile Information

Pericom's Integrated Circuit (IC) products are enclosed in plastic encapsulated or plastic covered substrate, Surface Mount Technology (SMT) packages. They have been evaluated by Moisture Sensitivity Testing (MST) and Moisture Resistance Testing (MRT), and depending on package size found to be in compliance with the applicable MSL Level requirements of the latest revisions to industry standard specifications: IPC/JEDEC J-STD-020D and JESD22-A113, for both Sn/Pb and Pb-free terminations.

Unless otherwise designated on the packaging MSL label, Pericom's Small Outline (SO) QSOP, BQSOP, SOIC (SOP), SSOP, MSOP, TSSOP, SOT-23, SC-70, and CSP type packages meet MSL 1, and therefore do not require bake or dry pack prior to shipment. Depending on package thickness and volume as indicated in the attached tables, they are capable of withstanding 3 cycles of IR / Convection / Forced Air (N_2) reflow profiled to a recommended maximum peak temperature of 220 or 235°C for packages using Sn/Pb plating; and 245, 250 or 260°C for Pb-free.

Pericom products that are not shipped in dry-pack containers will not need storage in a specially controlled temperature and humidity environment prior to use. The floor life is unlimited up to 30°C and 85% RH. No board mount/reflow package damage should occur with product when utilizing industry standard SMT Reflow Solder profile methods and temperatures (including ramp rates and dwell times).

Unless otherwise designated on the packaging MSL label, Pericom's BGA (PBGA, LFBGA, TFBGA), QFP (LQFP, TQFP) and PLCC type packages currently require bake and/or dry pack prior to shipment as they are rated at either MSL 2 or 3. DFN and QFN leadless package types may be rated MSL 1, 2, or 3 based on terminal count and package size. Depending on package thickness and volume as indicated in the attached tables, they are capable of withstanding 3 cycles of IR / Convection / Forced Air (N_2) reflow profiled to a recommended maximum peak temperature of 220 or 235 for packages using Sn/Pb plating; and 245, 250 or 260°C for Pb-free.

All Pericom packages using 100% matte Sn as terminal solder coatings also receive post-plating anneal bake at 150C for 1 hour to prevent Tin Whisker growth. Subcontractor tests per JESD22-A121 and NEMI Tin Whisker Acceptance Test Requirements (Class 2) confirmed no whisker growth in excess of a 40μm limit.

Pericom ensures maximum protection against moisture penetration because our plastic encapsulated/covered substrate packages are designed using the most appropriate epoxy and leadframe/substrate materials applicable to the type of package being assembled. Pericom's IC chips also use a silicon nitride (SN_2) topside passivation to help reduce the possibility of moisture corrosion to the device metallization.

If there are any questions or more information needed on this issue, please contact me at your convenience.

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SOLDER REFLOW PROFILE RECOMMENDATIONS

Reflow Profiles based on J-Std-020

Table 5-2 Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat/Soak Temperature Min (T_{smin}) Temperature Max (T_{smax}) Time (t_s) from (T_{smin} to T_{smax})	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-120 seconds
Ramp-up rate (T_L to T_p)	3 °C/second max.	3 °C/second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body temperature (T_p)	For users T_p must not exceed the Classification temp in Table 4-1. For suppliers T_p must equal or exceed the Classification temp in Table 4-1.	For users T_p must not exceed the Classification temp in Table 4-2. For suppliers T_p must equal or exceed the Classification temp in Table 4-2.
Time (t_p)* within 5 °C of the specified classification temperature (T_c), see Figure 5-1.	20* seconds	30* seconds
Ramp-down rate (T_p to T_L)	6 °C/second max.	6 °C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.
* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.		

Note 1: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow (e.g., live-bug). If parts are reflowed in other than the normal live-bug assembly reflow orientation (i.e., dead-bug), T_p **shall** be within ± 2 °C of the live-bug T_p and still meet the T_c requirements, otherwise, the profile **shall** be adjusted to achieve the latter. To accurately measure actual peak package body temperatures refer to JEP140 for recommended thermocouple use.

Note 2: Reflow profiles in this document are for classification/preconditioning and are not meant to specify board assembly profiles. Actual board assembly profiles should be developed based on specific process needs and board designs and should not exceed the parameters in Table 5-2.
For example, if T_c is 260 °C and time t_p is 30 seconds, this means the following for the supplier and the user.
For a supplier: The peak temperature must be at least 260 °C. The time above 255 °C must be at least 30 seconds.
For a user: The peak temperature must not exceed 260 °C. The time above 255 °C must not exceed 30 seconds.

Note 3: All components in the test load **shall** meet the classification profile requirements.

Note 4: SMD packages classified to a given moisture sensitivity level by using Procedures or Criteria defined within any previous version of J-STD-020, JESD22-A112 (rescinded), IPC-SM-786 (rescinded) do not need to be reclassified to the current revision unless a change in classification level or a higher peak classification temperature is desired.

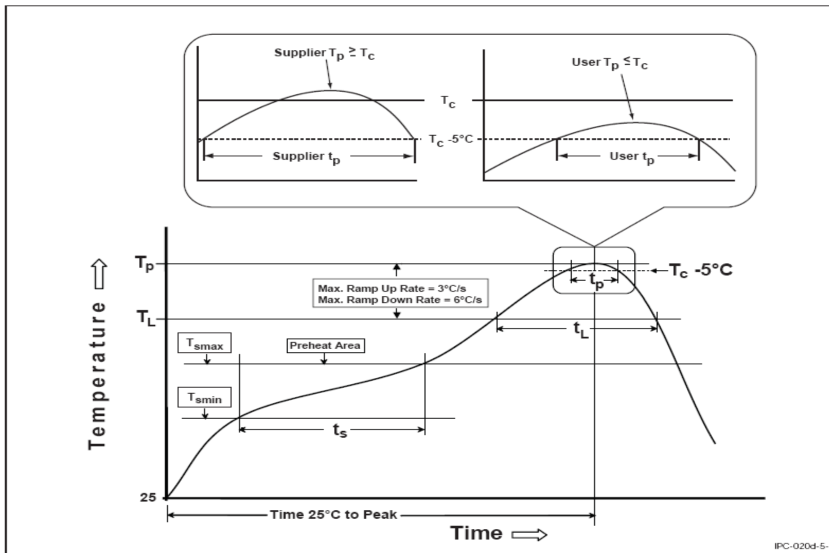

Figure 5-1 Classification Profile (Not to scale)

Table 4.1 Sn/Pb Eutectic Process – Package Tc Peak Reflow Temperatures

Package Thickness	Volume mm³ <350	Volume mm³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 4.2 Pb-free Process – Package Tc Peak Reflow Temperatures

Package Thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Note 1: At Pericom's discretion, the maximum peak package body temperature (Tp) can exceed the values specified in Tables 4-1 or 4-2. The use of a higher Tp does not change the classification temperature (Tc).

Note 2: Package volume excludes external terminals (balls, bumps, lands, leads) and/or nonintegral heat sinks.

Note 3: The maximum component temperature reached during reflow depends on package thickness and voume.

Recommended Manual Soldering Conditions:

- ► **Peak Temperature (at terminals): 350 C**
- ► **Soldering Duration: 3 seconds**

Recommended Product Storage Conditions

- ► **Ambient Temperature: less than 30 °C**
- ► **Ambient Humidity: less than 85 %**