AC341
Application Note
CCGA to CLGA Adapter Socket

Microsemi

Power Matters.™

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1 Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

1.1 Revision 3.0

In revision 3.0 of this document, a recommendation to use a torque limit screwdriver was added. For more information, see CG to LG Adapter Socket Assembly Procedure, page 3.

1.2 Revision 2.0

The following is a summary of the changes in revision 2.0 of this document.

- The figure title for Figure 1, page 2 (SAR 41789) was updated.
- "Support" section was updated.

1.3 Revision 1.0

The following is a summary of the changes in revision 1.0 of this document.

- In the "Introduction" section, the phrase "with error detection and correction (EDAC) protected" [static RAM] was deleted and replaced with "embedded."
- The following figures were replaced:
    - Figure 1, page 2
    - Figure 2, page 3
    - Figure 5, page 4
    - Figure 9, page 7

2   CCGA to CLGA Adapter

RTAX™-S/SL is a designed-for-space, metal-to-metal antifuse FPGA family by Microsemi. It is a derivative of the Axcelerator® family with up to two million system gates. RTAX-S/SL FPGAs provide designers with nearly 500K ASIC gates and embedded static RAM.

Microsemi offers RTAX-S/SL devices in two package types: ceramic column grid array (CCGA or CG) and ceramic quad flat pack (CQFP or CQ). Microsemi has developed CQ to LG and CG to LG adapter sockets for designers to prototype RTAX-S/SL devices in both CCGA and CQFP packages. These adapter sockets use the ceramic land grid array (LGA) package as a prototyping vehicle.

This document provides information about assembling the CG to LG adapter socket.

2.1   CG to LG Adapter Socket

The CG to LG adapter socket has an LG configuration on the top and a CG configuration on the bottom. The adapter socket enables customers to use an LG package during prototyping, and then switch to an equivalent CG package for production. The following table lists the top and bottom ordering part numbers.

Table 1 •   **Adapter Socket Part Numbers**

Adapter Socket	Ordering Part Numbers	Prototyped and Prototype Device
CG1272 to LG1272	SK-RT4K-KITTOP SK-RT4K-CG1272-KITBTM	For prototyping RTAX4000S/SL-CG1272 using RTAX4000S/SL-LG1272 package

The following figure shows the CG1272 to LG1272 adapter socket parts.

- The kit top (SK-RT4K-KITTOP) contains an interposer (3), a socket lid (4), and eight screws (5).
- The kit bottom (SK-RT4K-CG1272-KITBTM) contains a ceramic adapter (1)—a unique adapter for RTAX4000S/SL, socket housing (2), and eight screws (5).

Figure 1 •   **CG1272 to LG1272 Adapter Socket Parts**
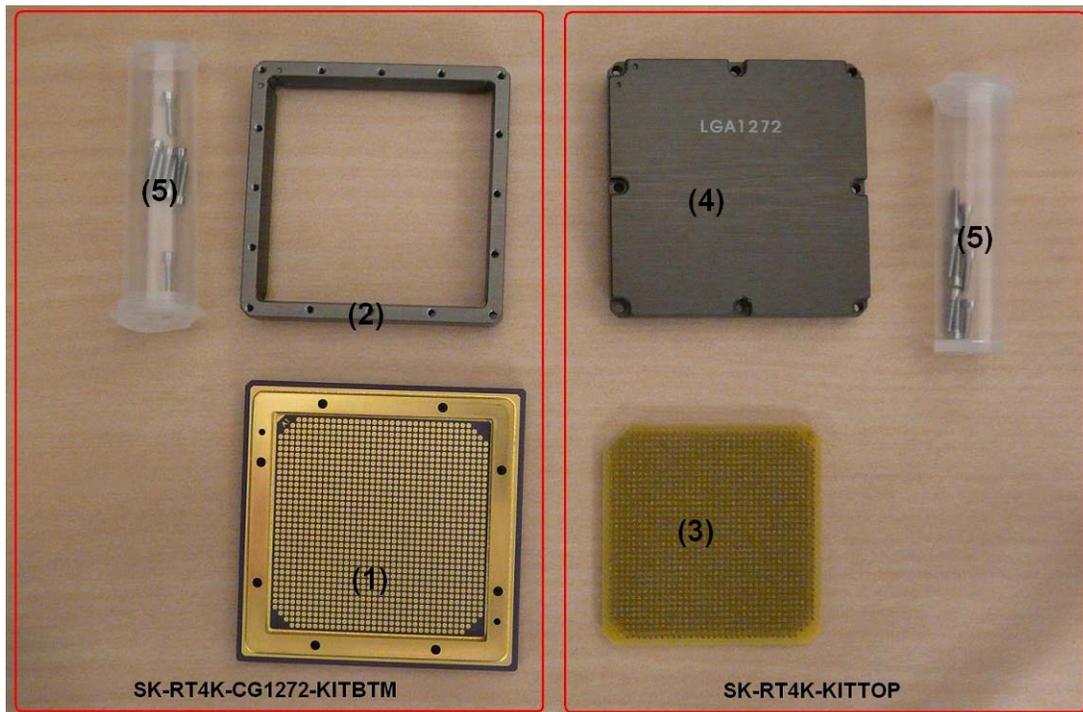
The following figure shows the top view, bottom view, and orientation of the RTAX4000S/SL CG1272 to LG1272 adapter.

Figure 2 • **CG1272 to LG1272 Ceramic Adapter Top View, Bottom View and Orientation**
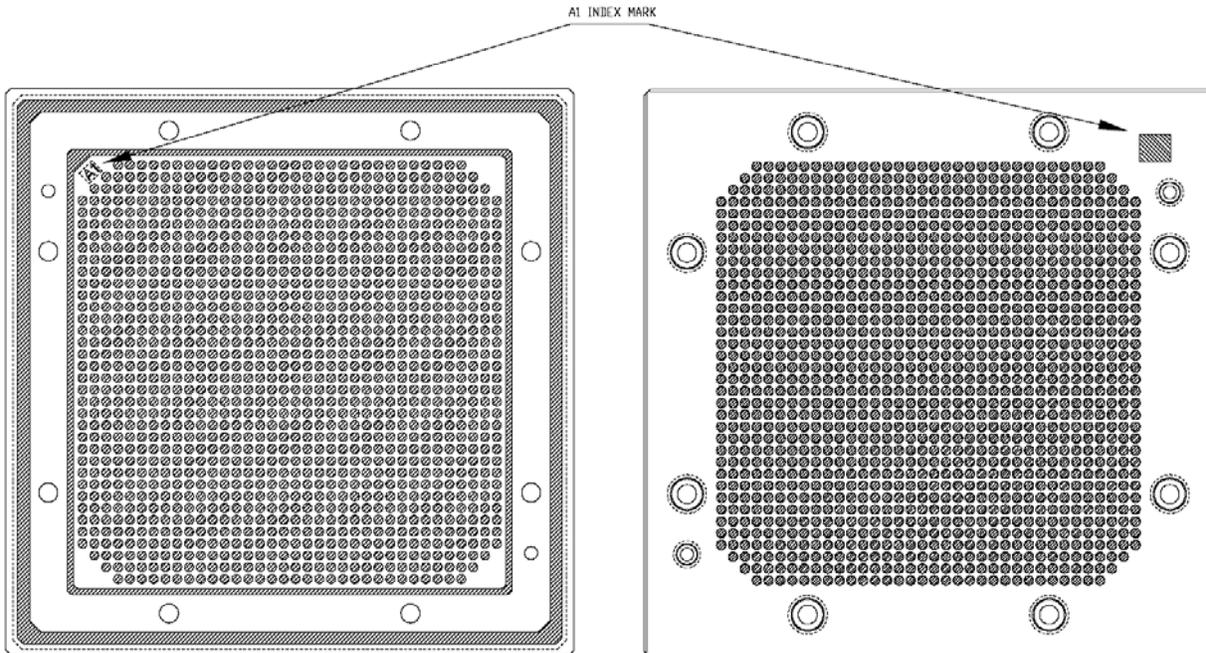
2.2 CG to LG Adapter Socket Assembly Procedure

The socket housing and the ceramic adapter, along with eight screws are required for SK-RT4K-CG1272-KITBTM assembly, and the socket lid, socket interposer, and eight remaining screws are required for SK-RT4K-KITTOP assembly.
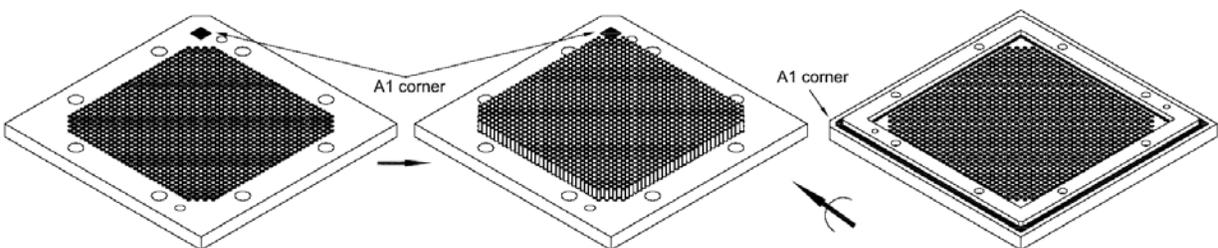
The following steps describe how to assemble the CG to LG adapter socket.

2.2.1 Step 1

Solder the column attachment to the ceramic adapter.

Note: Do not reflow the adapter to the circuit board until the housing has been attached.
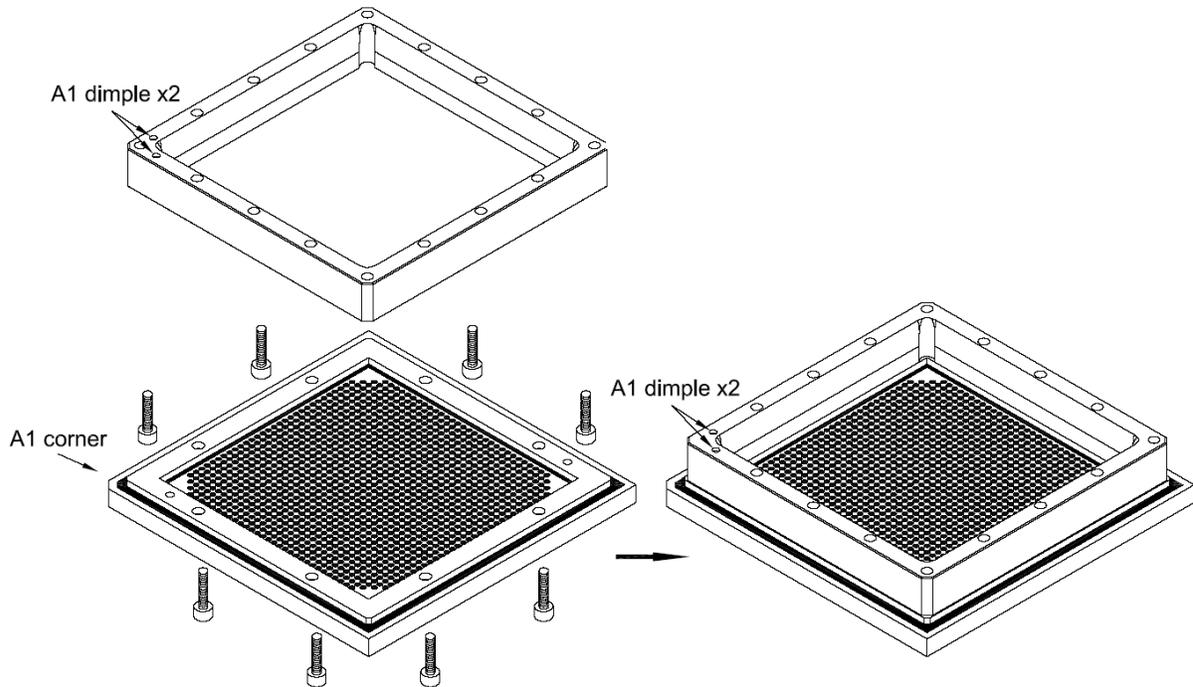
Figure 3 • **Soldering Column Attachment to CG1272 to LG1272 Adapter**

2.2.2   Step 2

Assemble the socket housing onto the adapter using eight of the screws provided in the kit. It is recommended to use a torque limit screwdriver with the setting 1.3 to 2.0 lb-in.

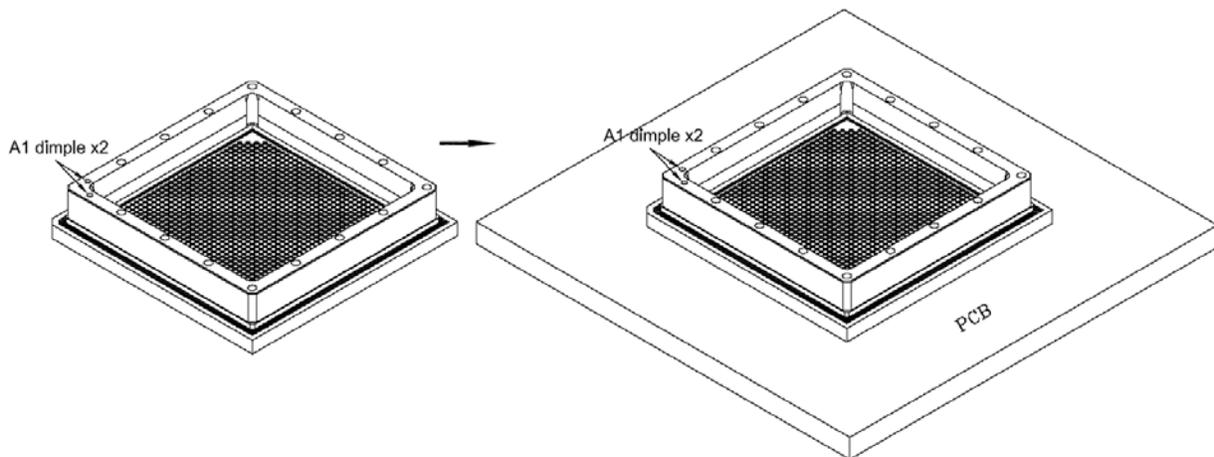*Figure 4* •   **Assembling Socket Housing to CG1272 to LG1272 Adapter**

2.2.3   Step 3

Reflow the adapter (with socket housing mounted on it) to the printed circuit board (PCB).

Note: Reflow profiles depend upon the size of the board and other components, so it is recommended to perform reflow process optimization for better results.
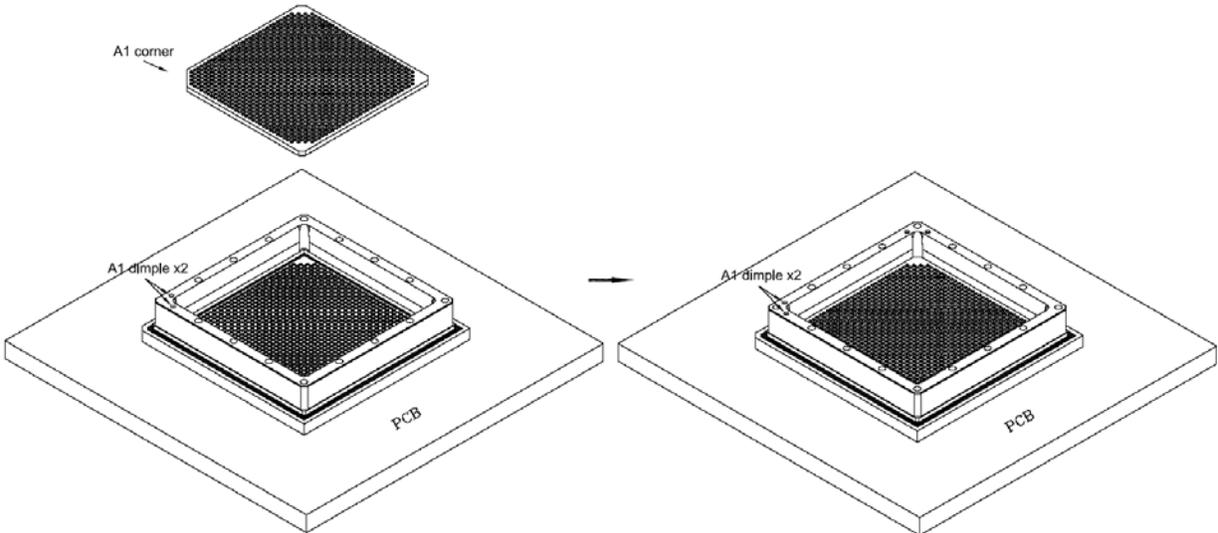
Figure 5 •   **Reflowing Adapter to PCB**

2.2.4   Step 4

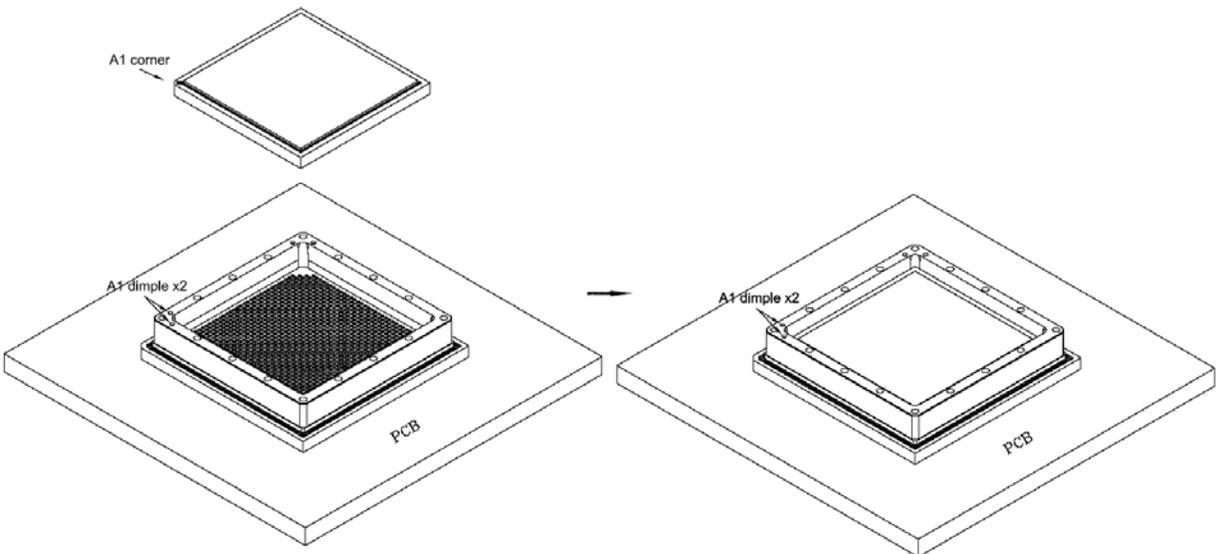Place the socket interposer into the adapter.

Figure 6 •   **Placing Socket Interposer into Adapter Assembly**

2.2.5   Step 5

Place the LG1272 package into the adapter.

Figure 7 •   **Placing LG1272 Package into Adapter Assembly**

2.2.6 Step 6

Place the socket lid on the socket housing, and tighten it using the remaining eight screws. It is recommended to use a torque limit screwdriver with the setting 1.3 to 2.0 lb-in.
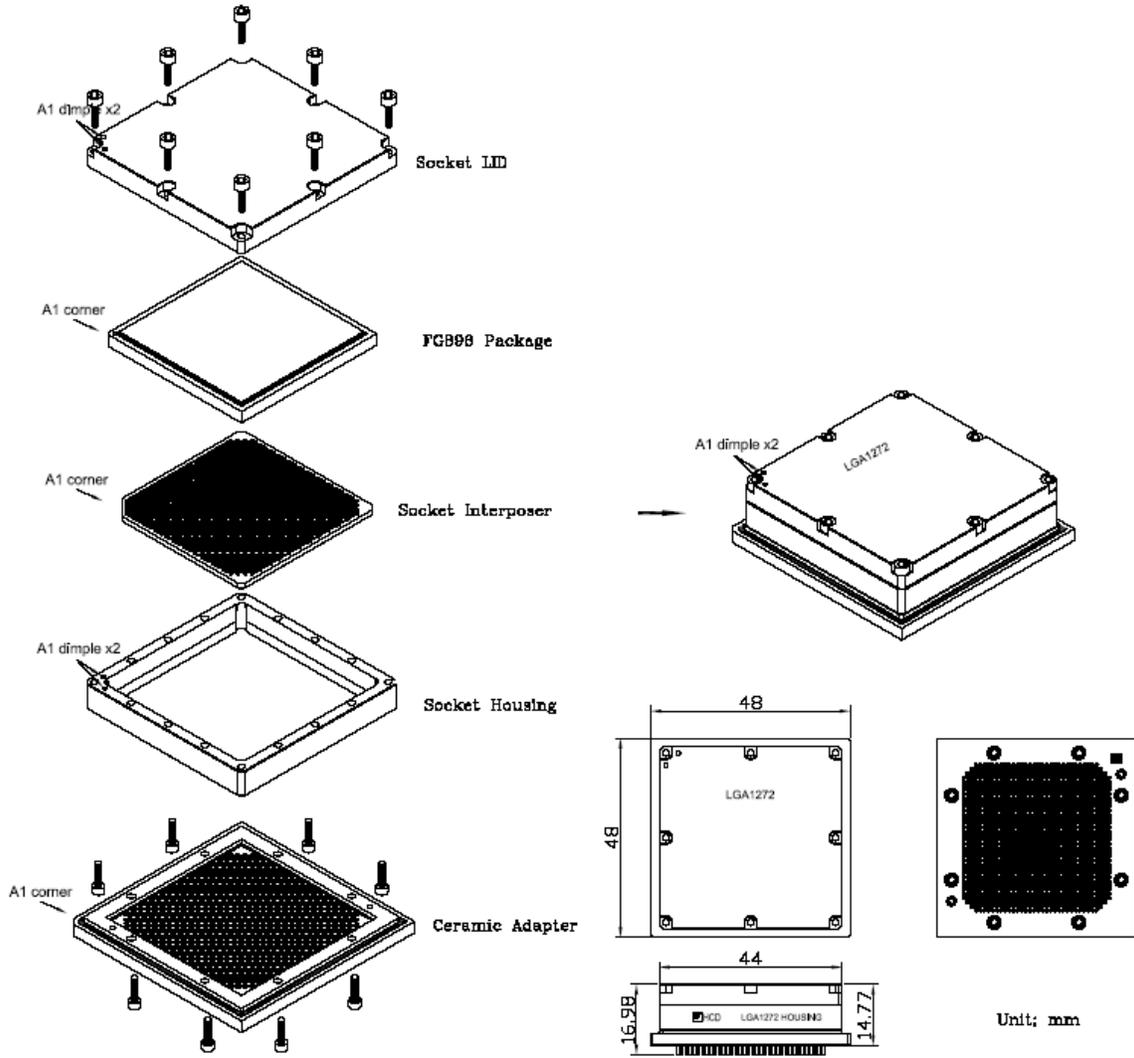
Figure 8 • **Placing and Tightening Socket Lid Using Eight Screws and Optional Alignment Pins**
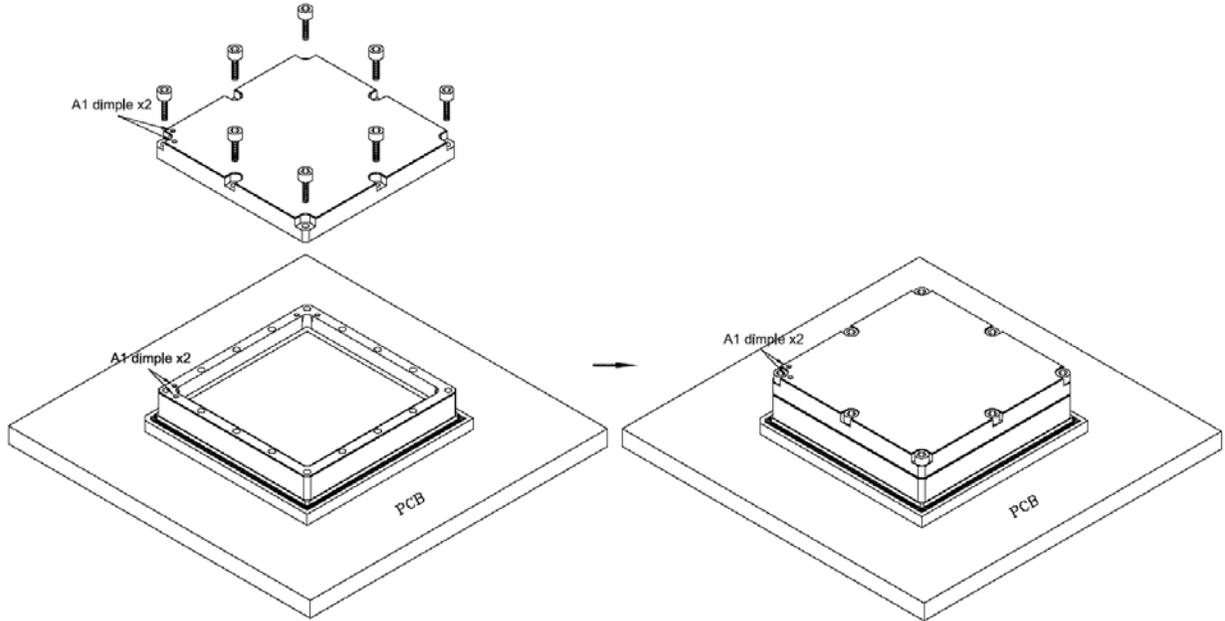
2.3 CG1272 to LG1272 Adapter Socket Outline

The following figure shows the CG1272 to LG1272 adapter socket outline.

Figure 9 • **CG1272 to LG1272 Adapter Socket Outline (unit: mm)**

2.4 Reflow Profile

Since reflow profile depends upon the size of the board and other components, end users must perform additional fine tuning from the general profile shown in the following figure.

Figure 10 • **Sample Temperature Profile for I/R or Convection Reflow**
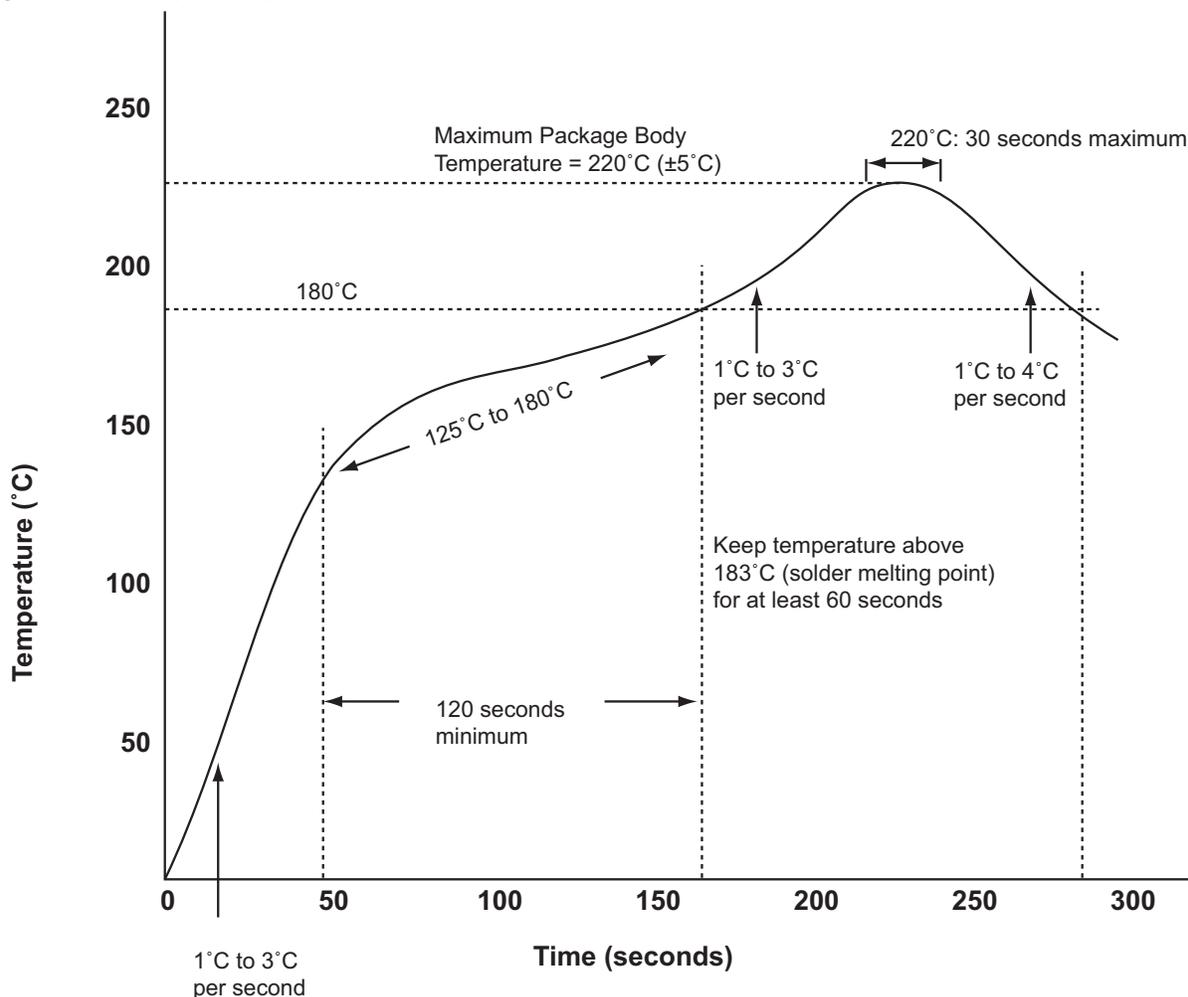
Note: This temperature profile guideline is for reference only.

2.5 CCGA to LG1272 Adapter Pin Mapping List

In the CG1272 to LG1272 adapter, each LG pad is routed to the corresponding CG pad. For example, LG1272 A1 is connected to CG1272 A1; LG1272 A2 is connected to CG1272 A2; and so on.

Table 2 • **CCGA to LG1272 Adapter Pin Mapping List**

Adapter Socket	Ordering Part Number	Prototyped and Prototype Device	Document Number
CG1272 to LG1272	SK-RT4K-KITTOP and SK-RT4K-CG1272-KITBTM	For prototyping RTAX4000S/SL-CG1272 using RTAX4000S/SL-LG1272 package	N/A

2.6 Prototyped Product, Adapter, and PCB Design Matrix

Designing PCBs for specific products requires an understanding of which adapter socket works for specific products. Each adapter socket is routed differently based on the Axcelerator device (or radiation-tolerant equivalent derivative) being prototyped, and the commercial Axcelerator FG package used for prototyping. The following table lists the device-PCB combinations that work.

Table 3 • **Prototyped Device PCB Design Matrix**

Prototyped Product	Adapter Part Number	Prototyping Vehicle	PCB Design
RTAX4000S/SL-CG1272	SK-RT4K-KITTOP and SK-RT4K-CG1272-KITBTM	RTAX4000S/SL-LG1272	RTAX4000S/SL-CG1272