



IBM PowerPC® 750FX RISC Microprocessor

**Datasheet Supplement for Reduced-Lead
Parts, DD2.3**

Preliminary

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Overview

The IBM PowerPC® 750FX RISC Microprocessor is an implementation of the IBM PowerPC family of reduced instruction set computer (RISC) microprocessors. This document is specific to a set of part numbers for the PowerPC 750FX RISC Microprocessor. All information in this supplement supersedes that in the *PowerPC 750FX RISC Microprocessor Datasheet* for the part numbers listed below. All other information in the *PowerPC 750FX RISC Microprocessor Datasheet* remains unchanged, and applies to the reduced-lead parts unless noted herein.

This document describes the reduced-lead package for the 750FX, as indicated by the 'R' in the Package code field of the part number; refer to Section 1.4 of the *Datasheet* for the part number legend. The reduced-lead package includes changing the soldering process for both the capacitors on the substrate and the BGA balls to lead-free solder. All *Datasheet* specifications that apply to the standard part numbers also apply to the reduced-lead part numbers, except as specifically noted herein.

Table 1. 750FX Reduced-Lead Part Numbers

Reduced-lead part number	Internal p/n	Frequency	Correlates to Standard p/n	Internal p/n
IBM25PPC750FX-GR0133T	70P8945	600MHz	IBM25PPC750FX-GB0133T	70P4675
IBM25PPC750FX-GR0533T	70P8946	700MHz	IBM25PPC750FX-GB0533T	70P4674
IBM25PPC750FX-GR1033T	70P8947	733MHz	IBM25PPC750FX-GB1033T	70P4673
IBM25PPC750FX-GR2533T	10R6938	800MHz	IBM25PPC750FX-GB2533T	70P4672
IBM25PPC750FX-GR0132T	70P8838	600MHz	IBM25PPC750FX-GB0132T	70P4671
IBM25PPC750FX-GR0532T	70P8839	700MHz	IBM25PPC750FX-GB0532T	70P4670
IBM25PPC750FX-GR1032T	70P8840	733MHz	IBM25PPC750FX-GB1032T	70P4669
IBM25PPC750FX-GR2532T	10R6072	800MHz	IBM25PPC750FX-GB2532T	70P4668

Reduced-Lead Parametrics

The power dissipation values, electrical data, and timing data do not change from the published *Datasheet* specification. For more information about device specifications, refer to the *PowerPC 750FX RISC Microprocessor Datasheet*.

Table 2. Comparison of Leaded to Reduced-Lead Parametrics

1mm pitch package	MSL	Solder Ball Composition	Solder Ball Diameter	Substrate I/O Pad Diameter	Solder Mask Opening Diameter	Solder Screen Diameter	Card Pad Diameter
Leaded	1	Sn10%-Pb90%	31.5	31.5 (0.80mm)	31.5	26.5 mil opening in 7.5 mil thick stencil, 2500-4600 cubic mils	27.5
Reduced-lead	3	Sn95.5%-Ag3.8%-Cu0.7%	25	27.55 (0.70mm)	28	23 mil opening in 4 mil thick stencil, 1400-2000 cubic mils	24

Note: All diameters are in mils.

The European Union RoHS legislation prohibits lead, but exempts high melting point solder alloys with >85%Pb. The IBM C4 alloy of 97Pb3Sn for the die qualifies for this exemption. Since the 750FX reduced-lead package qualification includes changing the soldering process for both the capacitor joining on the top of the substrate and the BGA balls on the bottom of the substrate to lead-free solder, this package is RoHS compliant.

Mechanical Specifications

The reduced-lead 292-CBGA package uses the same signal pinout as the leaded package. Refer to the *Datasheet* for the signal list, and to *Figure 0-1 Mechanical Dimensions and Bottom Surface Nomenclature of the Reduced-Lead CBGA Package* for the updated package dimensions. While this package maintains the same 21x21mm outline as the leaded package, the solder balls on the bottom are slightly smaller for the reduced-lead version, which will decrease the overall height when assembled onto a board. Heatsink solutions should be modified accordingly.

Assembly Considerations

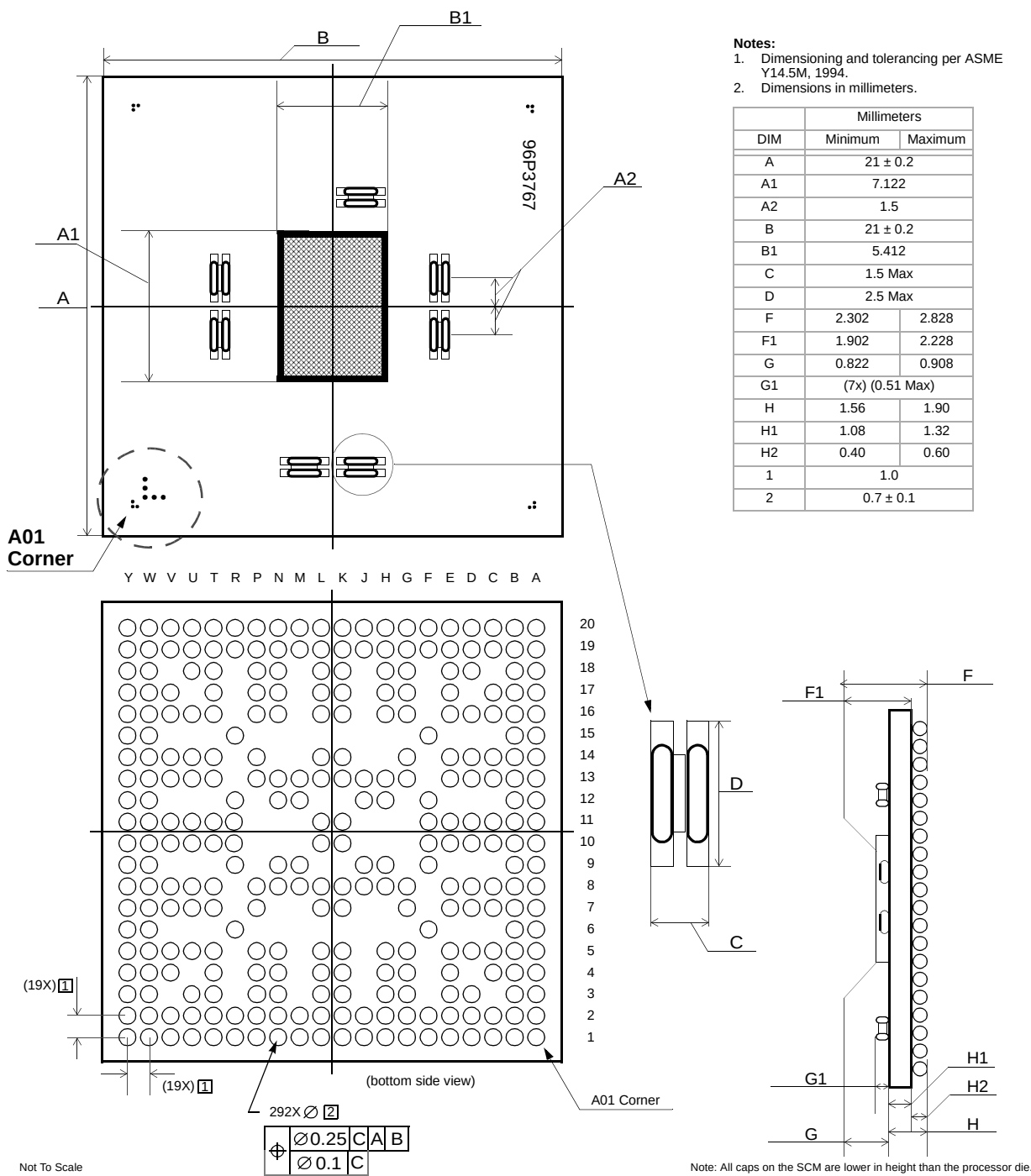
The package is being qualified to be compatible with a 260C lead free card assembly reflow profile. Refer to the NEMI Consortium, www.nemi.org, for industry-standard assembly and rework information.

The coplanarity specification for the reduced-lead CBGA, like other single melt BGA packages, is 0.20 mm (8 mil).

The qualification testing included a lead-free water soluble solder paste with type 3 mesh size (-325/+500). The solder alloy is 95.5% Sn/4.0% Ag/0.5% Cu with a 90% metal loading. The paste viscosity range is 600 to 800 Kcps. The thickness of the stencil is 4 mils and the aperture size is 23 mil diameter. The target solder paste volume range is between 1500 to 2000 cubic mils. Achieving the correct paste volume is necessary for eliminating solder shorts and producing high reliability solder joints. The actual solder paste volume from the qualification build ranged from 1750 to 2000 cubic mils.

Another change is the JEDEC Moisture Sensitivity Level, which is MSL 3 for the reduced-lead package. Storage and assembly protocols should be modified accordingly.

Figure 1. Mechanical Dimensions and Bottom Surface Nomenclature of the Reduced-Lead CBGA Package



Note: Use A01 corner designation for correct placement. Use the five plated dots that form a right angle (└) to locate the A01 corner as shown in figure 0-1.

Revision Log

Date	Description
May 6, 2004	Version 0.1 Initial preliminary version of document.
June 15, 2004	Version 0.2 Updated to add details from qual report.
August 9, 2004	Version 1.0 Minor corrections and updates to text. Declassified to Preliminary status, non-confidential.
October 11, 2004	Version 1.1 Corrected figure and table numbers. Changed dimensions in Figure 1. Mechanical Dimensions and Bottom Surface Nomenclature of the Reduced-Lead CBGA Package.