Technical notes on using Analog Devices DSPs, processors and development tools
Visit our Web resources http://www.analog.com/ee-notes and http://www.analog.com/processors or e-mail processor.support@analog.com or processor.tools.support@analog.com for technical support.

Land Pattern Compatibility Between 28x28 MQFP and LQFP Packages

Contributed by Gregg Ciszewski *Rev 1 – March 13, 2007*

Introduction

Analog Devices offers many of its processor products, such as the ADSP-21369 and ADSP-21371 SHARC® processors, in a 28x28 mm metric quad flat pack (MQFP) package. To enhance thermal performance, some parts are offered in a 28x28 mm low-profile quad flat pack (LQFP_EP) package. The MQFP and LQFP_EP have different footprints. This EE-Note describes a land pattern design that accommodates both packages.

Problem Description

The lead width (b) and pitch (e) dimensions are identical between the MQFP and LQFP_EP packages. However, the MQFP package footprint is 2.6 mm (1.3 mm on a side), with a foot length (L) of 0.6 mm. In contrast, the LQFP_EP package footprint is 2.0 mm (1.0 mm on a side), with the same foot length. The land pattern design must accommodate for the differences in lead length, as shown in Table 1.

Dim.	MQFP	LQFP_EP	Definition
A	4.1(max)	1.6(max)	Overall Height
A2	3.4	1.4	Package Thickness
L	0.6	0.6	Foot Length
L1	1.3	1.0	Lead Length
E	30.6	30.0	Lead Tip to Tip
E1	28.0	28.0	Package Width
c	0.08	0.08	Foot Coplanarity
e	0.5	0.5	Lead Pitch
b	0.22	0.22	Lead Width

Table 1. Dimensions (in mm) of MQFP and LQFP_EP packages

Figure 1 illustrates the dimensions described in Table 1.

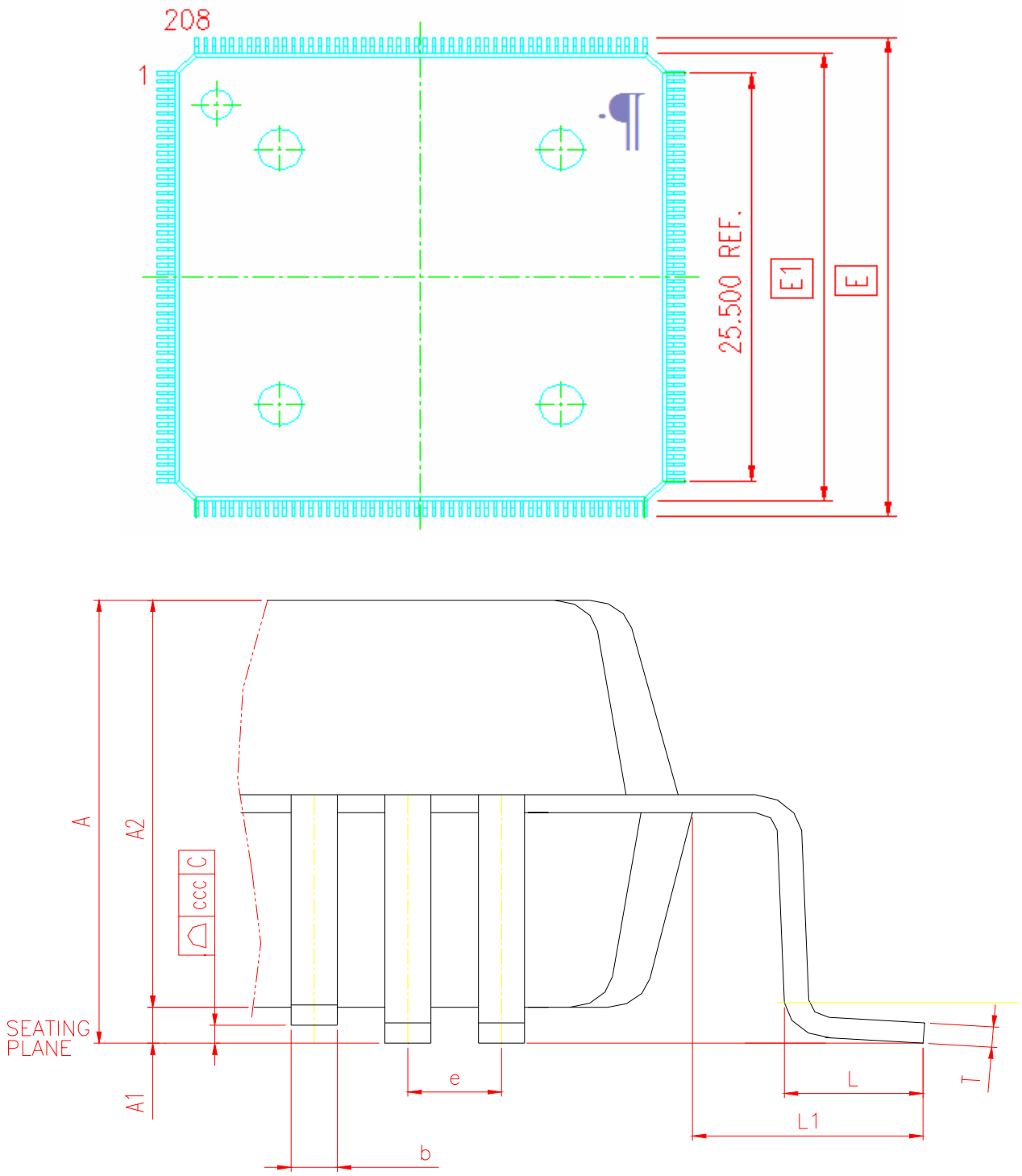

Figure 1. Dimensions of MQFP and LQFP_EP packages

If the PCB land pattern is designed per IPC-7351, the center of the land pattern of the MQFP package is offset in the positive x-direction relative to the LQFP_EP land pattern, as shown in Figure 2. To accommodate both footprints, the land pattern of the MQFP package must be extended 0.25 mm in the negative x-direction, as indicated by the green land pattern.

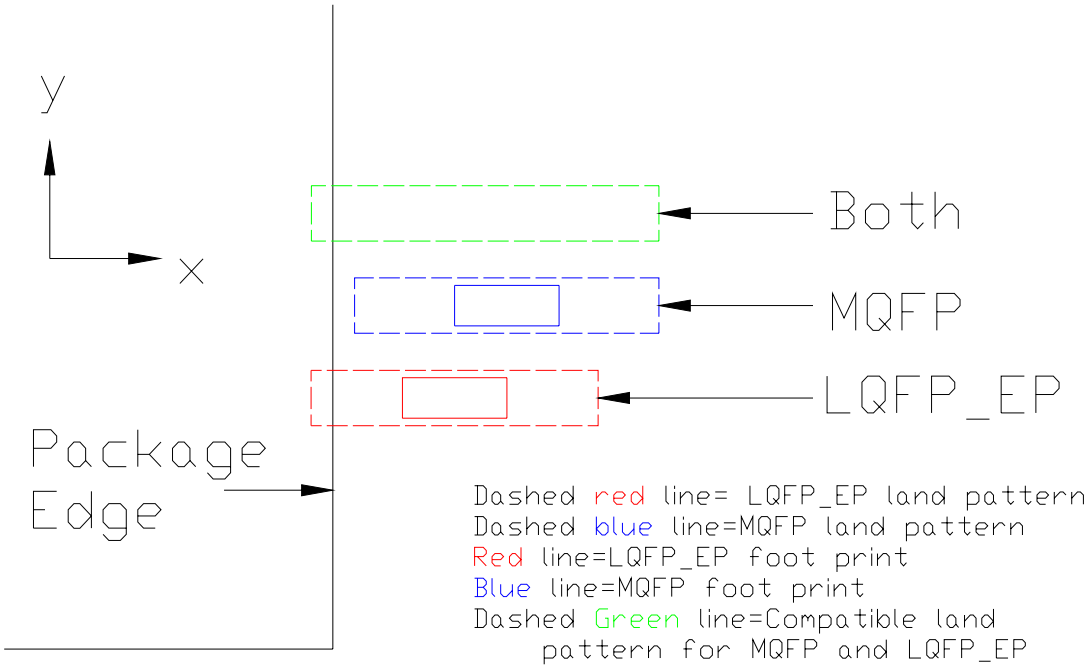

Figure 2. Land patterns

Conclusion

This EE-Note shows an example of a land pattern design that accommodates both packages; it is not a recommendation for the actual land pattern design. It is up to the end user to determine the correct land pattern dimensions for a particular application. The guidelines and equations for land pattern design can be found in detail using the "IPC-7351" section of *Generic Requirements for Surface Mount Design and Land Pattern Standard*[1].

References

[1] *Generic Requirements for Surface Mount Design and Land Pattern Standard.* IPC-7351, February 2005.

Document History

Revision	Description
Rev 1 – March 13, 2007 *by Gregg Ciszewski*	Initial release.