

PROCESS CHANGE NOTIFICATION

PCN1502

Package Appearance Change

This is not a new PCN issuance.

PCN1502 Rev 1.2.0 is an update to the list of Ordering Part Numbers (OPNs) affected (Appendix 1).

Please see the [revision history table](#) (page 5) for more details.

Change Description

Altera® announces a change to the package appearance on select package types from the following families of products: APEX™, ACEX®, FLEX® 6K, FLEX® 8K, FLEX® 10K, MAX® 3000, MAX® 7000, MAX® II, MAX® V, Cyclone®, Cyclone® III and Cyclone® IV. Moving forward, the mold (assembly process) gate mark will appear on the lower corner of the package top-side, while the round mold ejector pin marks appearing in the corners of the package bottom-side will be of a smaller diameter on select packages. See complete details in Figure 1 and updated Package Drawings in Appendix 2.

There are no changes to device performance, functionality or thermal characteristics. The list of part numbers affected is available in Appendix 1.

Recommended Action:

Customers are encouraged to review the key milestones listed in the “Product Transition Dates” section and take the necessary action to approve this change at the earliest. Upon change implementation (see dates in Table 1), Altera may ship pre-conversion product or post-conversion product, based on inventory availability.

Reason for Change:

This minor change in form is a result of a lead-frame format improvement, combined with corresponding changes in the mold chase design. The assembly process specifications and controls remain unchanged.

Benefit of Change:

Altera is implementing this change to better support the long-term demand of the affected products. Customers will benefit from continued product supply.

Products Affected:

This change will apply to parts offered in TQFP-100 (14mm x 14mm), TQFP-144 (20mm x 20mm) and EQFP-144 (20mm x 20mm) packages. The list of part numbers currently open for order entry is available in Appendix 1.

Means to Identify Changed Product:

New material can be distinguished by the mold gate mark on the top-side of the package, as shown in Figure 1.

Figure 1:

Package Top-Side: New material features the mold gate mark on the top-side lower corner (Current material features the mold gate mark at the lead-frame side of the package corner, i.e., not visible from the top). See images below.



The mold gate mark is larger than the Pin 1 indentation mark. Updated Package Outline Drawings reflecting the new position of the mold gate mark are available in Appendix 2 of this notification.

Package Bottom-Side (Non-EPAD Packages): New material features round ejector pin marks of a smaller diameter at every corner (Current material features round ejector pin marks of a larger diameter). See images below.



Current

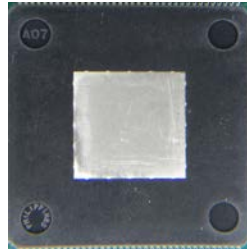


New

Package Bottom-Side (EPAD Packages): There is no change in the shape or diameter of the round ejector pin marks.



Current



New

Product Transition Dates:

Customers are requested to take note of the key dates shown in Table 1.

Table 1: Product Transition Dates

<i>Milestone</i>	<i>Date</i>
Qualification samples available to order	04/01/2015
Last date to acknowledge receipt of this notification*	04/30/2015
Last date to order qualification samples	06/15/2015
Last date to request additional information or clarification	06/30/2015
Change implementation date (i.e., date shipment of new product will commence)	11/30/2015

* Note, in accordance with JESD46D, this change is deemed acceptable if no response or acknowledgement is received within 30 days from the date of this notification.

Effective the change implementation date listed in Table 1, Altera will begin the shipment of changed product. Altera reserves the right to continue the shipment of pre-conversion product following the change implementation date. In other words, customers should expect to receive a

mix of pre-conversion and changed product interchangeably, following the change implementation date.

Samples:

Samples of changed product can be ordered starting the date specified in Table 1 via the following URL:

<https://www.samplecomponents.com/scripts/SampleCenter.dll?Alter>

Sample orders must be placed no later than the last date to order qualification samples, as shown in Table 1. Please note that samples may not be readily available or built ahead of time for all part numbers affected, and may be subject to factory published lead-times.

Qualification Data:

Qualification data has been collected to ensure that the changed product meets or exceeds Altera’s quality and reliability specifications. This data is summarized in Table 2.

Table 2: Summary of Qualification Data

Qualification Test	Standard	Readout	Results # of Failures / Total Samples Tested
High Temp Bake @ 150°C	JESD22-A103	1000 hrs	0/233
Unbiased HAST (130°C / 85%RH)	JESD22-A110B	96 hrs	0/234
Biased HAST (130°C /85%RH)	JESD22-A110B	96 hrs	0/152
Temperature Cycle “B” (-55°C to 125°C)	JESD22-A104D	700 cyc	0/234
Temperature Humidity Bias (85°C /85%RH)	JESD22-A101B	1000 hrs	0/79

Contact

For more information, please contact Altera Technical Support by submitting a Service Request at Altera's mySupport website.

Customer Notifications Subscription

Customers that have subscribed to Altera's customer notification mailing list will receive updates automatically via email. If you would like to receive customer notifications by e-mail, please subscribe to our customer notification mailing list at:

<https://www.altera.com/subscriptions/email/signup/eml-index.jsp>

In accordance with JESD46D, this change is deemed acceptable to the customer if no acknowledgement is received within 30 days from this notification.

Revision History

Date	Rev	Description
03/18/2015	1.0.0	Initial Release
05/15/2015	1.1.0	Updated "Means to Identify Changed Product", Table 1: Product Transition Dates, and Appendix 1: Affected Ordering Part Numbers
02/01/2016	1.2.0	Updated Appendix 1 : Affected Ordering Part Numbers to remove the following: 5M160ZT100A5N 5M570ZT100A5N EP3C10E144A7N EP3C5E144A7N EP4CE10E22A7N EP4CE22E22A7N EP4CE6E22A7N EPM1270T144A5N EPM240T100A5N EPM570T100A5N EPM570T144A5N EPM7128AETA100-10N

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Appendix 1: Affected Ordering Part Numbers

MAX 3000	MAX 7000	MAX 7000 (Contd.)	MAX 7000 (Contd.)
EPM3064ATC100-10	EPM7064AETC100-10	EPM7128AETC144-10N	EPM7160STC100-6
EPM3064ATC100-10N	EPM7064AETC100-10N	EPM7128AETC144-5	EPM7160STC100-6N
EPM3064ATC100-10NA	EPM7064AETC100-4	EPM7128AETC144-5N	EPM7160STC100-7
EPM3064ATC100-4	EPM7064AETC100-4N	EPM7128AETC144-7	EPM7160STC100-7N
EPM3064ATC100-4N	EPM7064AETC100-7	EPM7128AETC144-7N	EPM7160STI100-10
EPM3064ATC100-7	EPM7064AETC100-7N	EPM7128AETI100-7	EPM7160STI100-10N
EPM3064ATC100-7N	EPM7064AETI100-7	EPM7128AETI100-7GA	EPM7256AETC100-10
EPM3064ATI100-10	EPM7064AETI100-7AA	EPM7128AETI100-7N	EPM7256AETC100-10N
EPM3064ATI100-10N	EPM7064AETI100-7N	EPM7128AETI144-7	EPM7256AETC100-5
EPM3128ATC100-10	EPM7064BTC100-3	EPM7128AETI144-7N	EPM7256AETC100-5N
EPM3128ATC100-10N	EPM7064BTC100-3N	EPM7128BTC100-10	EPM7256AETC100-7
EPM3128ATC100-5	EPM7064BTC100-5	EPM7128BTC100-4	EPM7256AETC100-7N
EPM3128ATC100-5N	EPM7064BTC100-5N	EPM7128BTC100-4N	EPM7256AETC144-10
EPM3128ATC100-7	EPM7064BTC100-7	EPM7128BTC100-7	EPM7256AETC144-10N
EPM3128ATC100-7N	EPM7064STC100-10	EPM7128BTC100-7N	EPM7256AETC144-5
EPM3128ATC144-10	EPM7064STC100-10F	EPM7128BTC144-10	EPM7256AETC144-5N
EPM3128ATC144-10N	EPM7064STC100-10FN	EPM7128BTC144-10N	EPM7256AETC144-7
EPM3128ATC144-5	EPM7064STC100-10N	EPM7128BTC144-4	EPM7256AETC144-7N
EPM3128ATC144-5N	EPM7064STC100-5	EPM7128BTC144-7	EPM7256AETI100-7
EPM3128ATC144-7	EPM7064STC100-5N	EPM7128STC100-10	EPM7256AETI100-7N
EPM3128ATC144-7N	EPM7064STC100-6	EPM7128STC100-10F	EPM7256AETI144-7
EPM3128ATI100-10	EPM7064STC100-7	EPM7128STC100-10N	EPM7256AETI144-7AA
EPM3128ATI100-10N	EPM7064STC100-7N	EPM7128STC100-15	EPM7256AETI144-7N
EPM3128ATI144-10	EPM7064STI100-7	EPM7128STC100-15N	EPM7256BTC100-10
EPM3128ATI144-10AA	EPM7064STI100-7N	EPM7128STC100-6	EPM7256BTC100-10N
EPM3128ATI144-10N		EPM7128STC100-6N	EPM7256BTC100-5
EPM3256ATC144-10	EPM7128AETA144-10N	EPM7128STC100-7	EPM7256BTC100-5N
EPM3256ATC144-10AA	EPM7128AETC100-10	EPM7128STC100-7F	EPM7256BTC100-7
EPM3256ATC144-10N	EPM7128AETC100-10N	EPM7128STC100-7N	EPM7256BTC100-7N
EPM3256ATC144-7	EPM7128AETC100-5	EPM7128STI100-10	EPM7256BTC144-10
EPM3256ATC144-7N	EPM7128AETC100-5N	EPM7128STI100-10N	EPM7256BTC144-10N
EPM3256ATI144-10	EPM7128AETC100-7	EPM7128STI100-10NG	EPM7256BTC144-5
EPM3256ATI144-10N	EPM7128AETC100-7N	EPM7160STC100-10	EPM7256BTC144-5N
	EPM7128AETC144-10	EPM7160STC100-10N	EPM7256BTC144-7

Appendix 1: Affected Ordering Part Numbers (Continued)

MAX 7000 (Contd.)	MAX II	MAX II (Contd.)	MAX II (Contd.)
EPM7256BTC144-7N	EPM1270GT144C3	EPM240T100C4	EPM570GT144C5
EPM7256BTI100-7N	EPM1270GT144C3N	EPM240T100C4N	EPM570GT144C5N
MPF8282ATC100AC	EPM1270GT144C4	EPM240T100C4NGA	EPM570GT144C5TT
MPM7128STC100AB	EPM1270GT144C4N	EPM240T100C4TT	EPM570GT144I5
MPM7128STC100AC	EPM1270GT144C5	EPM240T100C5	EPM570GT144I5N
MPM7128TC100AA	EPM1270GT144C5N	EPM240T100C5AA	
	EPM1270GT144I5	EPM240T100C5N	EPM570T100C3
	EPM1270GT144I5N	EPM240T100C5NAA	EPM570T100C3N
		EPM240T100C5NAC	EPM570T100C4
	EPM1270T144C3	EPM240T100C5NAD	EPM570T100C4N
	EPM1270T144C3N	EPM240T100C5NAH	EPM570T100C5
	EPM1270T144C3RR	EPM240T100C5NGA	EPM570T100C5N
	EPM1270T144C4	EPM240T100C5NRR	EPM570T100C5NAA
	EPM1270T144C4N	EPM240T100C5RR	EPM570T100C5NRR
	EPM1270T144C5	EPM240T100C5TT	EPM570T100C5RR
	EPM1270T144C5N	EPM240T100I5	EPM570T100C5TT
	EPM1270T144C5NAA	EPM240T100I5N	EPM570T100I5
	EPM1270T144C5NGB	EPM240T100I5NAB	EPM570T100I5N
	EPM1270T144C5RR	EPM240T100I5NAJ	EPM570T100I5RR
	EPM1270T144I5	EPM240T100I5NGA	EPM570T100I5TT
	EPM1270T144I5N	EPM240T100I5NRR	
	EPM240GT100C3	EPM240T100I5RR	EPM570T144C3
	EPM240GT100C3N	EPM240T100I5TT	EPM570T144C3N
	EPM240GT100C3TT	EPM570GT100C3	EPM570T144C3NRR
	EPM240GT100C4	EPM570GT100C3N	EPM570T144C3RR
	EPM240GT100C4N	EPM570GT100C4	EPM570T144C3TT
	EPM240GT100C4TT	EPM570GT100C4N	EPM570T144C4
	EPM240GT100C5	EPM570GT100C5	EPM570T144C4N
	EPM240GT100C5N	EPM570GT100C5N	EPM570T144C5
	EPM240GT100C5TT	EPM570GT100C5RR	EPM570T144C5N
	EPM240GT100I5	EPM570GT100C5TT	EPM570T144C5NGA
	EPM240GT100I5N	EPM570GT100I5	EPM570T144C5NRR
	EPM240GT100I5NRR	EPM570GT100I5N	EPM570T144C5RR
	EPM240GT100I5RR	EPM570GT100I5NRR	EPM570T144C5TT
		EPM570GT100I5RR	EPM570T144I5
	EPM240T100C3	EPM570GT144C3	EPM570T144I5N
	EPM240T100C3N	EPM570GT144C3N	EPM570T144I5TT
	EPM240T100C3RR	EPM570GT144C4	
	EPM240T100C3TT	EPM570GT144C4N	

Appendix 1: Affected Ordering Part Numbers (Continued)

MAX V	Cyclone	Cyclone III	Cyclone IV
5M1270ZT144A5N	EP1C3T100A8N		
5M1270ZT144C4N	EP1C3T100C6	EP3C10E144C7	EP4CE10E22A7NGA
5M1270ZT144C5N	EP1C3T100C6N	EP3C10E144C7N	EP4CE10E22C6
5M1270ZT144I5	EP1C3T100C7	EP3C10E144C8	EP4CE10E22C6N
5M1270ZT144I5N	EP1C3T100C7N	EP3C10E144C8N	EP4CE10E22C7
	EP1C3T100C8	EP3C10E144I7	EP4CE10E22C7N
5M160ZT100C4N	EP1C3T100C8N	EP3C10E144I7N	EP4CE10E22C8
5M160ZT100C5N	EP1C3T100I7	EP3C16E144A7N	EP4CE10E22C8L
5M160ZT100C5NGB	EP1C3T100I7N	EP3C16E144C7	EP4CE10E22C8LN
5M160ZT100I5N	EP1C3T144A8N	EP3C16E144C7N	EP4CE10E22C8N
5M240ZT100A5N	EP1C3T144C6	EP3C16E144C8	EP4CE10E22C8NGA
5M240ZT100C4N	EP1C3T144C6N	EP3C16E144C8N	EP4CE10E22C9L
5M240ZT100C5N	EP1C3T144C7	EP3C16E144I7	EP4CE10E22C9LN
5M240ZT100C5NGA	EP1C3T144C7N	EP3C16E144I7N	EP4CE10E22I7
5M240ZT100I5N	EP1C3T144C8	EP3C25E144A7N	EP4CE10E22I7N
5M240ZT144C4N	EP1C3T144C8GA	EP3C25E144C7	EP4CE10E22I8L
5M240ZT144C5N	EP1C3T144C8N	EP3C25E144C7N	EP4CE10E22I8LN
5M240ZT144C5NGA	EP1C3T144C8NGA	EP3C25E144C8	EP4CE15E22C6
5M240ZT144I5N	EP1C3T144I7	EP3C25E144C8N	EP4CE15E22C6N
	EP1C3T144I7N	EP3C25E144C8NAA	EP4CE15E22C7
5M570ZT100C4N	EP1C6T144C6	EP3C25E144I7	EP4CE15E22C7N
5M570ZT100C5N	EP1C6T144C6N	EP3C25E144I7N	EP4CE15E22C8
5M570ZT100I5N	EP1C6T144C7		EP4CE15E22C8L
5M570ZT144C4N	EP1C6T144C7N	EP3C5E144A7NGA	EP4CE15E22C8LN
5M570ZT144C5N	EP1C6T144C8	EP3C5E144C7	EP4CE15E22C8N
5M570ZT144C5NGA	EP1C6T144C8AA	EP3C5E144C7N	EP4CE15E22C9L
5M570ZT144I5N	EP1C6T144C8N	EP3C5E144C8	EP4CE15E22C9LN
5M80ZT100A5N	EP1C6T144I7	EP3C5E144C8N	EP4CE15E22I7
5M80ZT100C4N	EP1C6T144I7N	EP3C5E144I7	EP4CE15E22I7N
5M80ZT100C5N		EP3C5E144I7N	EP4CE15E22I8L
5M80ZT100I5N			EP4CE15E22I8LN
			EP4CE22E22C6

Appendix 1: Affected Ordering Part Numbers (Continued)

Cyclone IV (Contd.)	APEX	FLEX 6K	FLEX 6K (Contd.)
EP4CE22E22C6N	EP20K100TC144-1	EPF6010ATC100-1	EPF6024ATC144-1N
EP4CE22E22C7	EP20K100TC144-1N	EPF6010ATC100-1N	EPF6024ATC144-2
EP4CE22E22C7N	EP20K100TC144-1X	EPF6010ATC100-2	EPF6024ATC144-2N
EP4CE22E22C8	EP20K100TC144-3	EPF6010ATC100-2N	EPF6024ATC144-3
EP4CE22E22C8L	EP20K100TC144-3N	EPF6010ATC100-3	EPF6024ATC144-3N
EP4CE22E22C8LN	EP20K160ETC144-1	EPF6010ATC100-3N	
EP4CE22E22C8N	EP20K160ETC144-1X	EPF6010ATC144-1	
EP4CE22E22C8NGA	EP20K160ETC144-2	EPF6010ATC144-2	FLEX 8K
EP4CE22E22C9L	EP20K160ETC144-2N	EPF6010ATC144-3	EPF8282ATC100-2
EP4CE22E22C9LN	EP20K160ETC144-2X	EPF6010ATC144-3N	EPF8282ATC100-2N
EP4CE22E22I7	EP20K160ETC144-3	EPF6010ATI100-2	EPF8282ATC100-3
EP4CE22E22I7N	EP20K160ETC144-3N	EPF6010ATI100-2N	EPF8282ATC100-3N
EP4CE22E22I8L		EPF6016ATC100-1	EPF8282ATC100-4
EP4CE22E22I8LN		EPF6016ATC100-2	EPF8282ATC100-4N
		EPF6016ATC100-2N	EPF8282ATI100-3
EP4CE6E22C6		EPF6016ATC100-3	EPF8282ATI100-3N
EP4CE6E22C6N		EPF6016ATC100-3N	EPF8282ATI100-3NGZ
EP4CE6E22C7		EPF6016ATC144-1	EPF8452ATC100-3
EP4CE6E22C7N		EPF6016ATC144-1N	EPF8452ATC100-3N
EP4CE6E22C8		EPF6016ATC144-2	EPF8452ATC100-4
EP4CE6E22C8L		EPF6016ATC144-2N	EPF8452ATC100-4N
EP4CE6E22C8LN		EPF6016ATC144-3	EPF8820ATC144-2
EP4CE6E22C8N		EPF6016ATC144-3N	EPF8820ATC144-2N
EP4CE6E22C9L		EPF6016ATI100-2	EPF8820ATC144-3
EP4CE6E22C9LN		EPF6016ATI100-2N	EPF8820ATC144-4
EP4CE6E22I7		EPF6016ATI144-3	EPF8820ATC144-4N
EP4CE6E22I7N		EPF6016ATI144-3N	
EP4CE6E22I8L		EPF6016TC144-2	
EP4CE6E22I8LN		EPF6016TC144-2N	
		EPF6016TC144-3	
		EPF6016TC144-3N	
		EPF6016TI144-2	
		EPF6016TI144-2N	
		EPF6016TI144-3	
		EPF6016TI144-3N	
		EPF6024ATC144-1	

Appendix 1: Affected Ordering Part Numbers (Continued)

FLEX 10K

EPF10K10ATC100-1
EPF10K10ATC100-2
EPF10K10ATC100-3
EPF10K10ATC100-3N
EPF10K10ATC144-1
EPF10K10ATC144-1N
EPF10K10ATC144-2
EPF10K10ATC144-2N
EPF10K10ATC144-3
EPF10K10ATC144-3N
EPF10K10ATI144-3
EPF10K10ATI144-3N
EPF10K30ATC144-1
EPF10K30ATC144-1N
EPF10K30ATC144-2
EPF10K30ATC144-2N
EPF10K30ATC144-3
EPF10K30ATC144-3N
EPF10K30ATI144-3
EPF10K30ATI144-3N
EPF10K30ETC144-1
EPF10K30ETC144-1N
EPF10K30ETC144-1X
EPF10K30ETC144-2
EPF10K30ETC144-2N
EPF10K30ETC144-2X
EPF10K30ETC144-3
EPF10K30ETI144-2
EPF10K50ETC144-1
EPF10K50ETC144-2

FLEX 10K (Contd.)

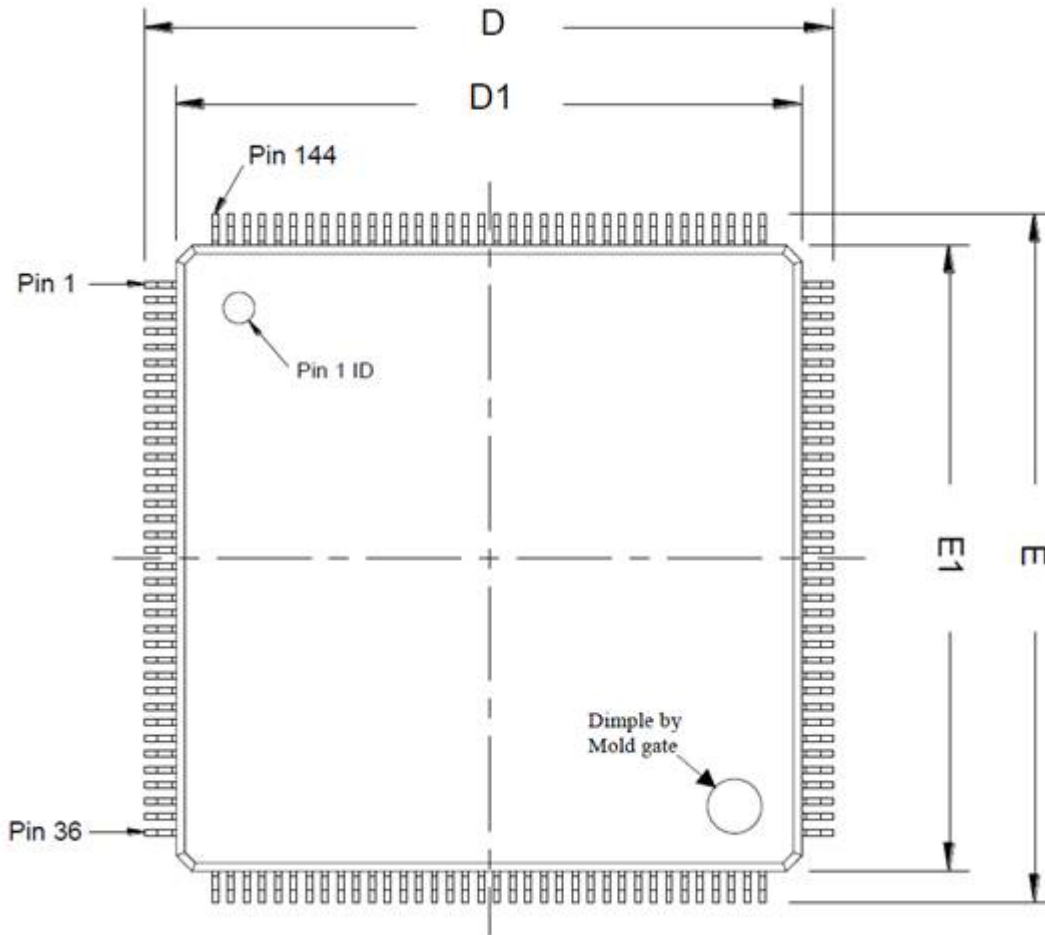
EPF10K50ETC144-3
EPF10K50ETC144-3N
EPF10K50ETI144-2
EPF10K50ETI144-2N
EPF10K50STC144-1
EPF10K50STC144-1X
EPF10K50STC144-2
EPF10K50STC144-2X
EPF10K50STC144-3

ACEX

EP1K10TC100-1
EP1K10TC100-1N
EP1K10TC100-2
EP1K10TC100-2N
EP1K10TC100-2NGZ
EP1K10TC100-3
EP1K10TC100-3N
EP1K10TI100-2
EP1K10TI100-2N
EP1K30TC144-1
EP1K30TC144-1N
EP1K30TC144-2
EP1K30TC144-2N
EP1K30TC144-3
EP1K30TC144-3N
EP1K30TI144-2
EP1K30TI144-2N
EP1K30TI144-2NGA
EP1K50TC144-1
EP1K50TC144-1N
EP1K50TC144-2
EP1K50TC144-2N
EP1K50TC144-3
EP1K50TC144-3N
EP1K50TI144-2
EP1K50TI144-2N

Appendix 2: Updated Package Outline Drawing

TQFP/EQFP-144 - Top View



Appendix 2: Updated Package Outline Drawing (Continued)

TQFP-100 - Top View

