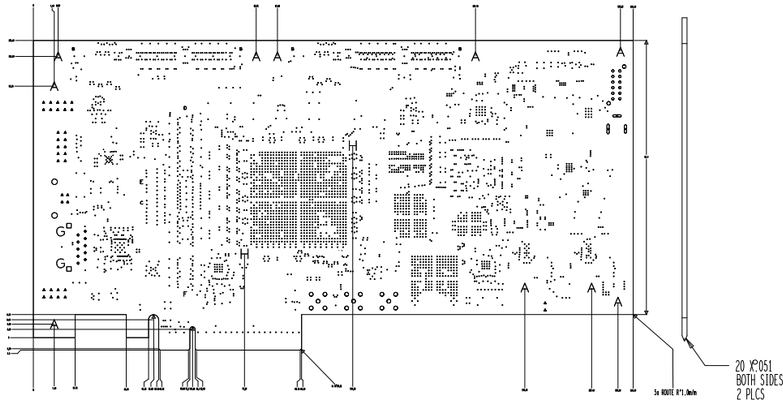
DWG NO. 140-0320801-C1 REV C

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

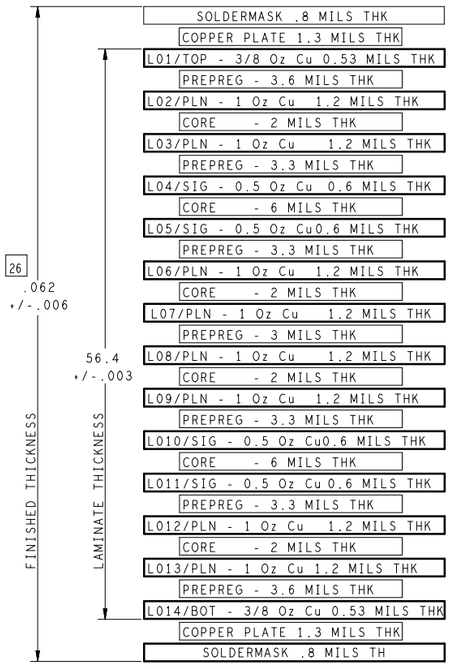
NOTES UNLESS OTHERWISE SPECIFIED:

1. PCB VENDOR MUST NOTIFY RESPONSIBLE ALTERA CONTACT OF ANY DISCREPANCIES FOUND BETWEEN FABRICATION DATA AND FABRICATION DRAWING NOTES.
2. THIS DRAWING IS VIEWED FROM THE PRIMARY OR TOP SIDE OF THE PCB.
3. FABRICATION OF THIS PCB SHOULD BE IN COMFORMANCE WITH THE SPECIFICATION (IPC-6011 CLASS 2).
4. FABRICATION OF THIS PCB TO BE ACCEPTABLE TO IPC-A-600 CLASS 2.
5. ALL DIMENSIONAL LIMITS APPLY AFTER PLATING OR PROCESSING.
6. BASE MATERIAL :HIGH Tg (ISOLA 370HR).MIN Tg OF 170 DEGREES C. (RoHS Compliant)
7. FLAME CLASS : UL 94V-0 & MUST MEET REQUIREMENTS OF UL796.
8. MANUFACTURER MUST BE UL RECOGNIZED TO PRODUCE THIS PRODUCT SUCH THAT IT MEETS 170 DEGREES CELSIUS MAXIMUM OPERATING TEMPERATURE (MOT).
9. THE FOLLOWING MUST BE MARKED OR ETCHED ON SECONDARY SIDE OF PCB IN AREA SHOWN:
   a. DATE CODE.
   b. UL RECOGNIZED VENDOR ID. UL TYPE DESIGNATION AND / OR MARKING WHICH REFLECT THE SPECIFIED FLAME CLASS AND MAXIMUM OPERATING TEMPERATURE RATINGS.
10. HOLE/SLOT PLATING = 0.001 MIN AVERAGE / 0.0008 ABSOLUTE MIN. PLATING. HOLE/SLOT DIAMETERS ARE SPECIFIED AFTER PLATING (SEE HOLE CHART).
11. PLUG ALL VIAS WITH NON-CONDUCTIVE MATERIAL.
12. AFTER REVIEWING FABRICATION DATA, PCB VENDOR MUST DISCUSS WHETHER COPPER THIEVING IS NECESSARY WITH THE RESPONSIBLE ALTERA PCB CONTACT. WHEN DETERMINED NECESSARY. A SPACING IF 100 MILS FROM ANY OTHER COPPER FEATURE ON THE BOARD MUST BE MAINTAINED.
13. SMEAR REMOVAL SHALL NOT ETCHBACK GREATER THAN 0.001.
14. FINISHED CONDUCTOR WIDTH NOT TO BE REDUCED MORE THAN 20% OF MINIMUM WIDTH FROM ARTWORK SUPPLIED. FINISHED CONDUCTOR SPACING NOT TO BE REDUCED MORE THAN 20% OF MINIMUM SPACING FROM ARTWORK SUPPLIED.
15. SOLDER MASK IS LIQUID PHOTO IMAGEABLE AND IN ACCORDANCE WITH IPC-SM-840C CLASS T. FINISH MUST BE GREEN AND GLOSSY. REGISTERATION TO BE WITHIN +/- 0.003 OF ITS RESPECTIVE OUTER CIRCUIT LAYERS. VENDOR MAY ADJUST SOLDERMASK WHEREVER SOLDMASK PADS ARE THE SAME SIZE(1:1) TO PROVIDE UP TO .003 MAXIUM CLEARANCE FROM MASK TO PAD PROVIED NO ADJACENT COPPER EXPOSED. NO " VIA TENTING/PLUGGING IS ALLOWED WITHOUT PRIOR CONSENT OF ALTERA.
16. PCB VENDOR TO ENSURE ALL UNCONNECTED (NON-FUNCTIONAL) INTERNAL SIGNAL LAYER PADS AND VIAS ARE REMOVED.
17. INTERAL ANNULAR RIGN 0.001 MINIMUM. EXTERNAL ANNULAR RING 0.002 MINIMUM. BOTH ARE MEASURED AT LINE TO PAD ENTRY. TEAR DROPPING OF TRACE TO PAD JUNCTION IS PERMITTED PROVIDED MINIMUM METAL-TO-METAL ARTWORK SPACINGS ARE NOT COMPROMISED.
18. FINISHED ON BOTH SIDES WITH 150 MICRO INCHES MINIMUM ELECTROLESS NICKEL (Ni) FOLLOWED BY 3-8 MICRO INCHES IMMERSION GOLD (Au).
19. REMOVE ALL SHARP EDGES AND BURRS 0.003" MAXIUM.
20. SILKSCREEN USING WHITE NONCONDUCTIVE INK. NO INK TO APPEAR ON EXPOSED COPPER SUCH AS PLATED THROUGH HOLE PADS AND SURFACE MOUNT LANDS. INK ON SOLDER MASK COVERED PADS IS PERMISSIBLE. CLIPPING OF SILKSCREEN 0.008 MAX FROM PADS IS PERMITTED.
21. BOW & TWIST SHALL BE DETERMINED BY PHYSICAL MEASUREMENT AND PERCENTAGE CALCULATION IN ACCORDANCE WITH PC-TM-650, METHOD 2.4.22. BOW AND TWIST MAY NOT EXCEED .07%.
22. 100% CONTINUITY AND ISOLATION ELECTRICAL TESTING PER CURRENT IPC TEST METHODS REQUIRED FOR EVERY PCB. FINAL PCB TEST DATA MUST BE CROSS-REFERENCED TO IPC-D-356 FILE, NEUTRAL FILE OR NETLIST PROVIDED.
23. PCB VENDOR TO PROVIDE ONE TEST COUPON AND ONE CROSS SECTION PER LOT WITH.
24. PCB VENDOR TO PROVIDE 2 SOLDER SAMPLES WITH FIRST SHIPMENT. NO SCRATCHES OR MARKINGS ON SURFACE.
25. DETAILS NOT SPECIFIED ARE AT MANUFACTURER'S OPTION. HOWEVER FINAL APPROVAL MUST BE OBTAINED FROM ALTERA.
26. CONTROLLED IMPEDANCE TRACES ARE AS FOLLOW.
    a) TOLERANCE (ALL LINES) +/- 10%
    b) SINGLE ENDED TRACES (6 MIL - LAYER 1 & 14) TO BE 50 OHMS.
    c) SINGLE ENDED TRACES (4.75 MIL - ALL INNER LAYERS) TO BE 50 OHMS.
    d) EDGE COUPLED TRACES (4.25 MIL WIDE/ 10 MIL CENTERS - LAYER 1 & 14) TO BE 100 OHMS.
    e) EDGE COUPLED TRACES (4.75 MIL WIDE/ 19.75 MIL CENTERS - LAYER 4, 5 & 10) TO BE 100 OHMS.
    f) EDGE COUPLED TRACES (4 MIL WIDE/ 10 MIL CENTERS - ALL INNER LAYERS) TO BE 100 OHMS.
27. CONTACT FINGERS SHALL BE GOLD PLATED 30 MICRO INCHES OVER 200 MICRO INCHES NICKEL. EDGES AT CONTACT FINGERS ARE TO BE BEVELED BOTH SIDES 20° X .051".
28. PCB VENDOR TO ENSURE ALL VIAS ARE COMPLETELY FREE OF SOLDERMASK ON BOTTOM SIDE OF PCB.
29. ALL PLATING BARS FOR THE EDGE CONNECTOR FINGERS (REQUIRED DURING THE PCB MANUFACTURING PROCESS) MUST BE REMOVED.



PRIMARY SIDE SHOWN

DRILL CHART: TOP to BOTTOM				
ALL UNITS ARE IN MILS				
FIGURE	SIZE	TOLERANCE	PLATED	QTY
·	8.0	+0.0/-0.0	PLATED	29
·	10.0	+0.0/-0.0	PLATED	2209
·	10.0	+0.0/-0.0	PLATED	1553
·	10.0	+3.0/-3.0	PLATED	34
◦	32.0	+0.0/-0.0	PLATED	12
◦	35.0	+0.0/-0.0	PLATED	10
◦	37.0	+0.0/-0.0	PLATED	34
◦	50.0	+0.0/-0.0	PLATED	2
◦	53.0	+0.0/-0.0	PLATED	15
□	63.0	+0.0/-0.0	PLATED	2
○	79.0	+0.0/-0.0	PLATED	2
A	126.0	+0.0/-0.0	PLATED	10
B	39.37	+0.0/-0.0	NON-PLATED	4
C	42.126	+0.0/-0.0	NON-PLATED	1
D	43.31	+0.0/-0.0	NON-PLATED	1
E	55.118	+0.0/-0.0	NON-PLATED	1
F	62.99	+0.0/-0.0	NON-PLATED	1
G	128.0	+0.0/-0.0	NON-PLATED	2
H	138.0	+0.0/-0.0	NON-PLATED	2
⊂⊃	120.0x31.0	+0.0/-0.0	PLATED	1
⊟	120.0x31.0	+0.0/-0.0	PLATED	1
⊟	138.0x31.0	+3.0/-3.0	PLATED	1



DETAIL A
SCALE: NONE
(CROSS SECTION)

			MATL 6	DWN Alen Lee 07/31/09	ALTERA (c) 2009 Altera Corporation 9330 SCRANTON RD., #400 SAN DIEGO, CA 92121
				CHKR	
-	XX-XXX-XXXX		SPEC 3	DSGN ENGR	TITLE PCB FABRICATION
DASH	NEXT ASSY	USED ON	FNSH 15 18 20	RELEASE	Arria II GX FPGA Developmemt Board
APPLICATION					
THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES IN ACCORDANCE WITH ANSI Y14.5. DRILL TOLERANCES ARE PER 10387		TOLERANCES: DEC .X ± / DEC .XX ±.01 / DEC .XXX .005 / DEC .XXXX .002 / FRACTIONS ± 1/8 / ANGLES ± 1°	CONTRACT NO. XXXXXXXX	SIZE D | CAGE CODE N/A | DWG NO. 140-0320801-C1 | REV C
					SCALE: 1/1 SHEET 1 OF 1

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