



Welcome to [E-XFL.COM](https://www.e-xfl.com)

Understanding [Embedded - FPGAs \(Field Programmable Gate Array\)](#)

Embedded - FPGAs, or Field Programmable Gate Arrays, are advanced integrated circuits that offer unparalleled flexibility and performance for digital systems. Unlike traditional fixed-function logic devices, FPGAs can be programmed and reprogrammed to execute a wide array of logical operations, enabling customized functionality tailored to specific applications. This reprogrammability allows developers to iterate designs quickly and implement complex functions without the need for custom hardware.

Applications of Embedded - FPGAs

The versatility of Embedded - FPGAs makes them indispensable in numerous fields. In telecommunications.

Details

Product Status	Obsolete
Number of LABs/CLBs	-
Number of Logic Elements/Cells	-
Total RAM Bits	276480
Number of I/O	147
Number of Gates	1500000
Voltage - Supply	1.425V ~ 1.575V
Mounting Type	Surface Mount
Operating Temperature	-40°C ~ 100°C (TJ)
Package / Case	208-BFQFP
Supplier Device Package	208-PQFP (28x28)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/m1a3pe1500-pq208i

Guidelines

Toggle Rate Definition

A toggle rate defines the frequency of a net or logic element relative to a clock. It is a percentage. If the toggle rate of a net is 100%, this means that this net switches at half the clock frequency. Below are some examples:

- The average toggle rate of a shift register is 100% as all flip-flop outputs toggle at half of the clock frequency.
- The average toggle rate of an 8-bit counter is 25%:
 - Bit 0 (LSB) = 100%
 - Bit 1 = 50%
 - Bit 2 = 25%
 - ...
 - Bit 7 (MSB) = 0.78125%
 - Average toggle rate = $(100\% + 50\% + 25\% + 12.5\% + \dots + 0.78125\%) / 8$

Enable Rate Definition

Output enable rate is the average percentage of time during which tristate outputs are enabled. When nontristate output buffers are used, the enable rate should be 100%.

Table 2-11 • Toggle Rate Guidelines Recommended for Power Calculation

Component	Definition	Guideline
α_1	Toggle rate of VersaTile outputs	10%
α_2	I/O buffer toggle rate	10%

Table 2-12 • Enable Rate Guidelines Recommended for Power Calculation

Component	Definition	Guideline
β_1	I/O output buffer enable rate	100%
β_2	RAM enable rate for read operations	12.5%
β_3	RAM enable rate for write operations	12.5%

SSTL2 Class II

Stub-Speed Terminated Logic for 2.5 V memory bus standard (JESD8-9). ProASIC3E devices support Class II. This provides a differential amplifier input buffer and a push-pull output buffer.

Table 2-69 • Minimum and Maximum DC Input and Output Levels

SSTL2 Class II	VIL		VIH		VOL	VOH	IOL	IOH	IOSL	IOSH	IIL	IIH
Drive Strength	Min. V	Max. V	Min. V	Max. V	Max. V	Min. V	mA	mA	Max. mA ¹	Max. mA ¹	μA ²	μA ²
18 mA	−0.3	VREF − 0.2	VREF + 0.2	3.6	0.35	VCCI − 0.43	18	18	124	169	10	10

Notes:

1. Currents are measured at high temperature (100°C junction temperature) and maximum voltage.
2. Currents are measured at 85°C junction temperature.

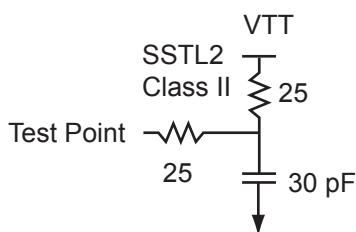


Figure 2-19 • AC Loading

Table 2-70 • AC Waveforms, Measuring Points, and Capacitive Loads

Input Low (V)	Input High (V)	Measuring Point* (V)	VREF (typ.) (V)	VTT (typ.) (V)	C _{LOAD} (pF)
VREF − 0.2	VREF + 0.2	1.25	1.25	1.25	30

Note: *Measuring point = V_{trip}. See Table 2-15 on page 2-18 for a complete table of trip points.

Timing Characteristics

Table 2-71 • SSTL 2 Class II

Commercial-Case Conditions: T_J = 70°C, Worst-Case VCC = 1.425 V, Worst-Case VCCI = 2.3 V, VREF = 1.25 V

Speed Grade	t _{DOUT}	t _{DP}	t _{DIN}	t _{PY}	t _{EOUT}	t _{ZL}	t _{ZH}	t _{LZ}	t _{HZ}	t _{ZLS}	t _{ZHS}	Units
Std.	0.66	0.66	2.17	0.04	1.33	0.43	2.21	1.77			4.44	ns
−1	0.56	0.56	1.84	0.04	1.14	0.36	1.88	1.51			3.78	ns
−2	0.49	0.49	1.62	0.03	1.00	0.32	1.65	1.32			3.32	ns

Note: For specific junction temperature and voltage supply levels, refer to Table 2-6 on page 2-5 for derating values.

Table 2-84 • Parameter Definition and Measuring Nodes

Parameter Name	Parameter Definition	Measuring Nodes (from, to)*
t_{OCLKQ}	Clock-to-Q of the Output Data Register	H, DOUT
t_{OSUD}	Data Setup Time for the Output Data Register	F, H
t_{OHD}	Data Hold Time for the Output Data Register	F, H
t_{OSUE}	Enable Setup Time for the Output Data Register	G, H
t_{OHE}	Enable Hold Time for the Output Data Register	G, H
t_{OPRE2Q}	Asynchronous Preset-to-Q of the Output Data Register	L, DOUT
$t_{OREMPRE}$	Asynchronous Preset Removal Time for the Output Data Register	L, H
$t_{ORECPRE}$	Asynchronous Preset Recovery Time for the Output Data Register	L, H
t_{OECLKQ}	Clock-to-Q of the Output Enable Register	H, EOUT
t_{OESUD}	Data Setup Time for the Output Enable Register	J, H
t_{OEHD}	Data Hold Time for the Output Enable Register	J, H
t_{OESUE}	Enable Setup Time for the Output Enable Register	K, H
t_{OEHE}	Enable Hold Time for the Output Enable Register	K, H
$t_{OEPRE2Q}$	Asynchronous Preset-to-Q of the Output Enable Register	I, EOUT
$t_{OEREMPRE}$	Asynchronous Preset Removal Time for the Output Enable Register	I, H
$t_{OERECPRE}$	Asynchronous Preset Recovery Time for the Output Enable Register	I, H
t_{ICLKQ}	Clock-to-Q of the Input Data Register	A, E
t_{ISUD}	Data Setup Time for the Input Data Register	C, A
t_{IHD}	Data Hold Time for the Input Data Register	C, A
t_{ISUE}	Enable Setup Time for the Input Data Register	B, A
t_{IHE}	Enable Hold Time for the Input Data Register	B, A
t_{IPRE2Q}	Asynchronous Preset-to-Q of the Input Data Register	D, E
$t_{IREMPRE}$	Asynchronous Preset Removal Time for the Input Data Register	D, A
$t_{IRECPRE}$	Asynchronous Preset Recovery Time for the Input Data Register	D, A

Note: *See Figure 2-25 on page 2-53 for more information.

Global Resource Characteristics

A3PE600 Clock Tree Topology

Clock delays are device-specific. Figure 2-38 is an example of a global tree used for clock routing. The global tree presented in Figure 2-38 is driven by a CCC located on the west side of the A3PE600 device. It is used to drive all D-flip-flops in the device.

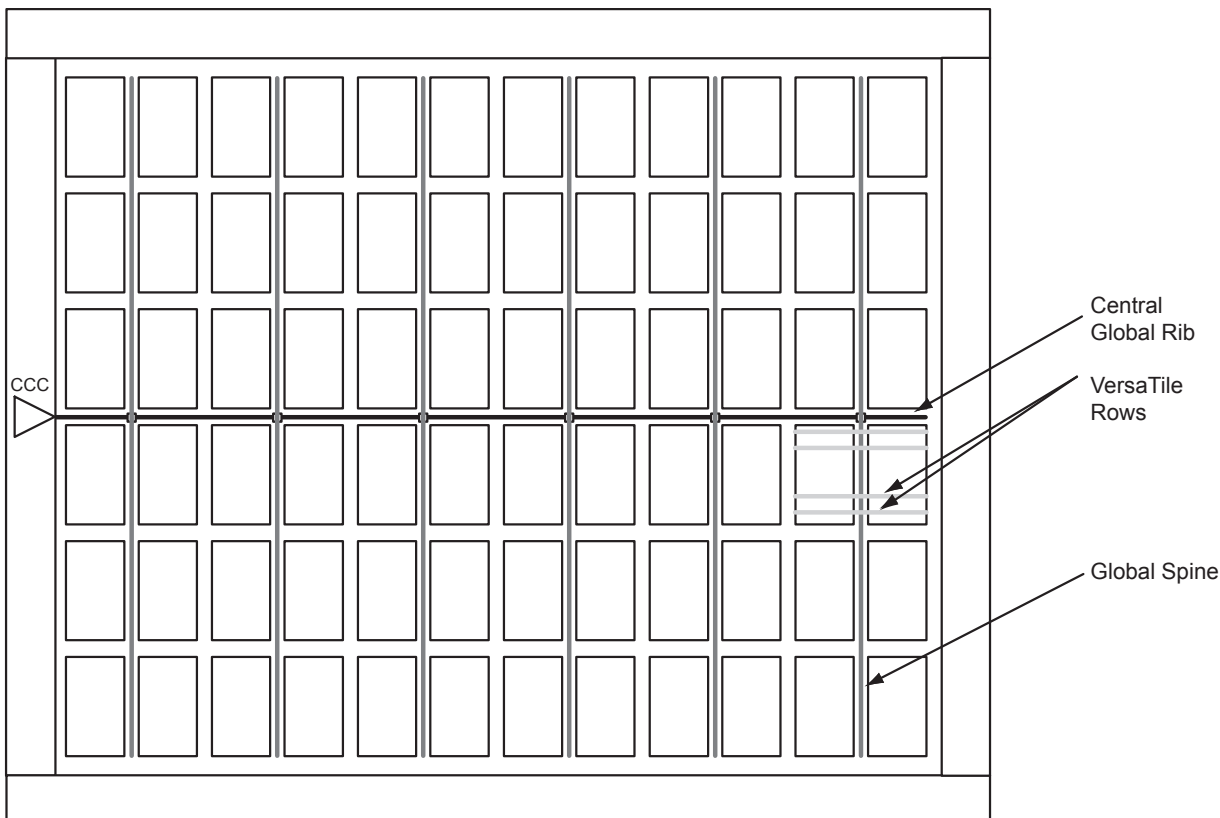


Figure 2-38 • Example of Global Tree Use in an A3PE600 Device for Clock Routing

Global Tree Timing Characteristics

Global clock delays include the central rib delay, the spine delay, and the row delay. Delays do not include I/O input buffer clock delays, as these are I/O standard-dependent, and the clock may be driven and conditioned internally by the CCC module. For more details on clock conditioning capabilities, refer to the "Clock Conditioning Circuits" section on page 2-70. Table 2-95 on page 2-69, Table 2-96 on page 2-69, and Table 2-97 on page 2-69 present minimum and maximum global clock delays within the device. Minimum and maximum delays are measured with minimum and maximum loading.

Timing Characteristics

Table 2-95 • A3PE600 Global Resource
Commercial-Case Conditions: $T_J = 70^\circ\text{C}$, $V_{CC} = 1.425\text{ V}$

Parameter	Description	-2		-1		Std.		Units
		Min. ¹	Max. ²	Min. ¹	Max. ²	Min. ¹	Max. ²	
t_{RCKL}	Input Low Delay for Global Clock	0.83	1.04	0.94	1.18	1.11	1.39	ns
t_{RCKH}	Input High Delay for Global Clock	0.81	1.06	0.93	1.21	1.09	1.42	ns
$t_{RCKMPWH}$	Minimum Pulse Width High for Global Clock	0.75		0.85		1.00		ns
$t_{RCKMPWL}$	Minimum Pulse Width Low for Global Clock	0.85		0.96		1.13		ns
t_{RCKSW}	Maximum Skew for Global Clock		0.25		0.28		0.33	ns

Notes:

1. Value reflects minimum load. The delay is measured from the CCC output to the clock pin of a sequential element, located in a lightly loaded row (single element is connected to the global net).
2. Value reflects maximum load. The delay is measured on the clock pin of the farthest sequential element, located in a fully loaded row (all available flip-flops are connected to the global net in the row).
3. For specific junction temperature and voltage supply levels, refer to [Table 2-6 on page 2-5](#) for derating values.

Table 2-96 • A3PE1500 Global Resource
Commercial-Case Conditions: $T_J = 70^\circ\text{C}$, $V_{CC} = 1.425\text{ V}$

Parameter	Description	-2		-1		Std.		Units
		Min. ¹	Max. ²	Min. ¹	Max. ²	Min. ¹	Max. ²	
t_{RCKL}	Input Low Delay for Global Clock	1.07	1.29	1.22	1.47	1.43	1.72	ns
t_{RCKH}	Input High Delay for Global Clock	1.06	1.32	1.21	1.50	1.42	1.76	ns
$t_{RCKMPWH}$	Minimum Pulse Width High for Global Clock	0.75		0.85		1.00		ns
$t_{RCKMPWL}$	Minimum Pulse Width Low for Global Clock	0.85		0.96		1.13		ns
t_{RCKSW}	Maximum Skew for Global Clock		0.26		0.29		0.34	ns

Notes:

1. Value reflects minimum load. The delay is measured from the CCC output to the clock pin of a sequential element, located in a lightly loaded row (single element is connected to the global net).
2. Value reflects maximum load. The delay is measured on the clock pin of the farthest sequential element, located in a fully loaded row (all available flip-flops are connected to the global net in the row).
3. For specific junction temperature and voltage supply levels, refer to [Table 2-6 on page 2-5](#) for derating values.

Table 2-97 • A3PE3000 Global Resource
Commercial-Case Conditions: $T_J = 70^\circ\text{C}$, $V_{CC} = 1.425\text{ V}$

Parameter	Description	-2		-1		Std.		Units
		Min. ¹	Max. ²	Min. ¹	Max. ²	Min. ¹	Max. ²	
t_{RCKL}	Input Low Delay for Global Clock	1.41	1.62	1.60	1.85	1.88	2.17	ns
t_{RCKH}	Input High Delay for Global Clock	1.40	1.66	1.59	1.89	1.87	2.22	ns
$t_{RCKMPWH}$	Minimum Pulse Width High for Global Clock	0.75		0.85		1.00		ns
$t_{RCKMPWL}$	Minimum Pulse Width Low for Global Clock	0.85		0.96		1.13		ns
t_{RCKSW}	Maximum Skew for Global Clock		0.26		0.29		0.35	ns

Notes:

1. Value reflects minimum load. The delay is measured from the CCC output to the clock pin of a sequential element, located in a lightly loaded row (single element is connected to the global net).
2. Value reflects maximum load. The delay is measured on the clock pin of the farthest sequential element, located in a fully loaded row (all available flip-flops are connected to the global net in the row).
3. For specific junction temperature and voltage supply levels, refer to [Table 2-6 on page 2-5](#) for derating values.

Embedded SRAM and FIFO Characteristics

SRAM

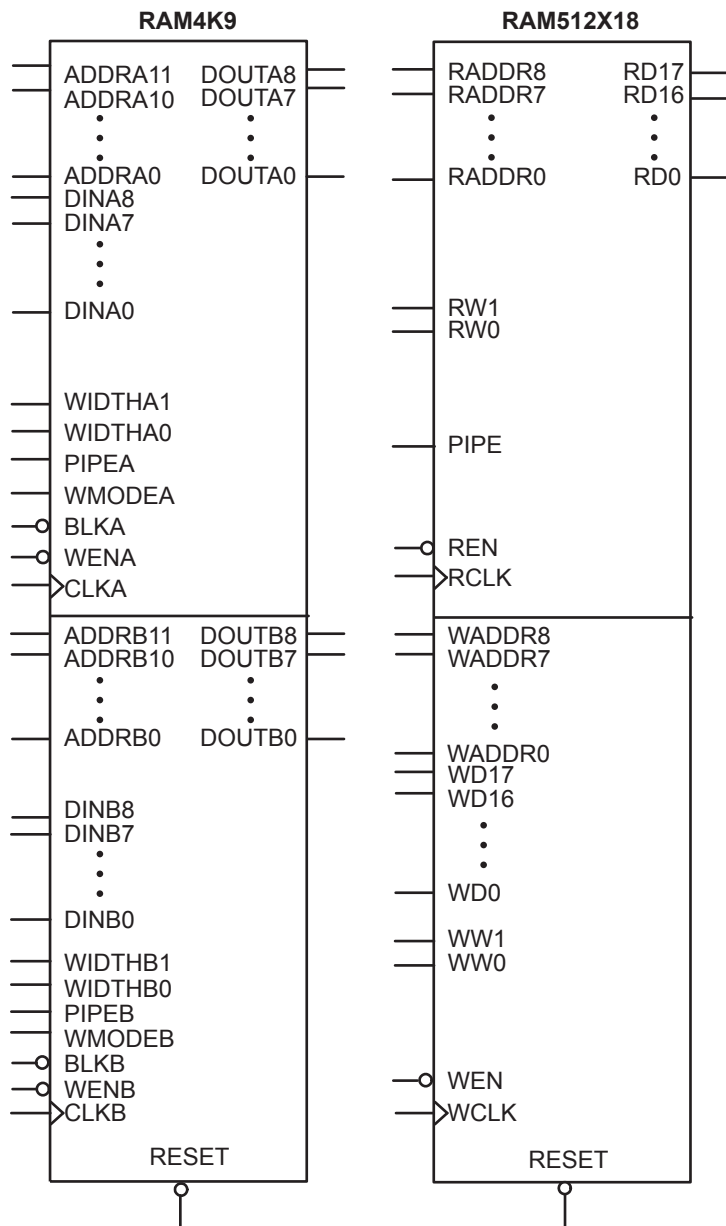


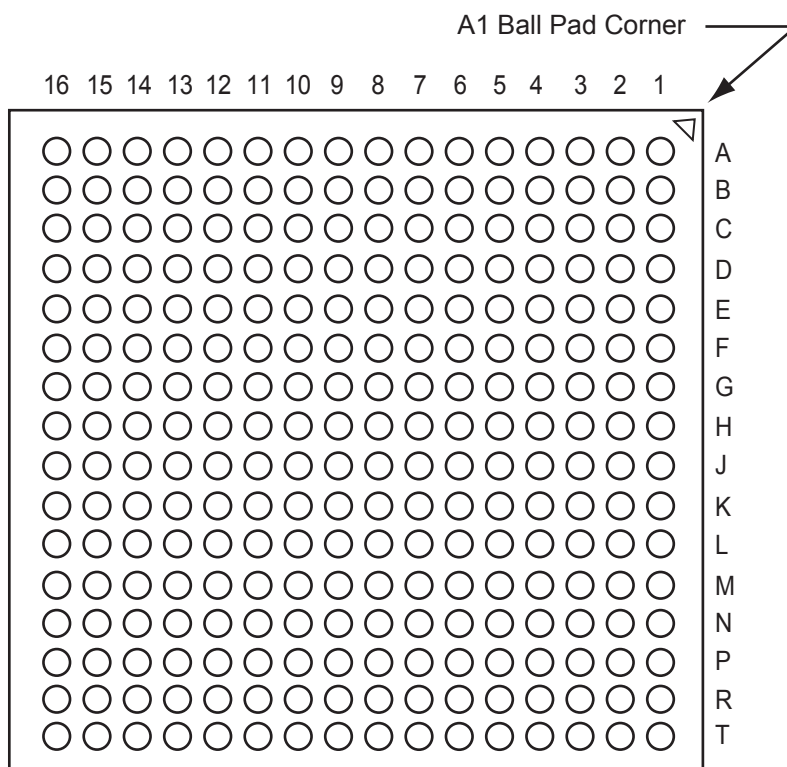
Figure 2-40 • RAM Models

PQ208	
Pin Number	A3PE3000 Function
1	GND
2	GNDQ
3	VMV7
4	GAB2/IO308PSB7V4
5	GAA2/IO309PDB7V4
6	IO309NDB7V4
7	GAC2/IO307PDB7V4
8	IO307NDB7V4
9	IO303PDB7V3
10	IO303NDB7V3
11	IO299PDB7V3
12	IO299NDB7V3
13	IO295PDB7V2
14	IO295NDB7V2
15	IO291PSB7V2
16	VCC
17	GND
18	VCCIB7
19	IO285PDB7V1
20	IO285NDB7V1
21	IO279PSB7V0
22	GFC1/IO275PSB7V0
23	GFB1/IO274PDB7V0
24	GFB0/IO274NDB7V0
25	VCOMPLF
26	GFA0/IO273NPB6V4
27	VCCPLF
28	GFA1/IO273PPB6V4
29	GND
30	GFA2/IO272PDB6V4
31	IO272NDB6V4
32	GFB2/IO271PPB6V4
33	GFC2/IO270PPB6V4
34	IO271NPB6V4
35	IO270NPB6V4
36	VCC
37	IO252PDB6V2
38	IO252NDB6V2
39	IO248PSB6V1

PQ208	
Pin Number	A3PE3000 Function
40	VCCIB6
41	GND
42	IO244PDB6V1
43	IO244NDB6V1
44	GEC1/IO236PDB6V0
45	GEC0/IO236NDB6V0
46	GEB1/IO235PPB6V0
47	GEA1/IO234PPB6V0
48	GEB0/IO235NPB6V0
49	GEA0/IO234NPB6V0
50	VMV6
51	GNDQ
52	GND
53	VMV5
54	GNDQ
55	IO233NDB5V4
56	GEA2/IO233PDB5V4
57	IO232NDB5V4
58	GEB2/IO232PDB5V4
59	IO231NDB5V4
60	GEC2/IO231PDB5V4
61	IO230PSB5V4
62	VCCIB5
63	IO218NDB5V3
64	IO218PDB5V3
65	GND
66	IO214PSB5V2
67	IO212NDB5V2
68	IO212PDB5V2
69	IO208NDB5V1
70	IO208PDB5V1
71	VCC
72	VCCIB5
73	IO202NDB5V1
74	IO202PDB5V1
75	IO198NDB5V0
76	IO198PDB5V0
77	IO197NDB5V0
78	IO197PDB5V0

PQ208	
Pin Number	A3PE3000 Function
79	IO194NDB5V0
80	IO194PDB5V0
81	GND
82	IO184NDB4V3
83	IO184PDB4V3
84	IO180NDB4V3
85	IO180PDB4V3
86	IO176NDB4V2
87	IO176PDB4V2
88	VCC
89	VCCIB4
90	IO170NDB4V2
91	IO170PDB4V2
92	IO166NDB4V1
93	IO166PDB4V1
94	IO156NDB4V0
95	GDC2/IO156PDB4V0
96	IO154NPB4V0
97	GND
98	GDB2/IO155PSB4V0
99	GDA2/IO154PPB4V0
100	GNDQ
101	TCK
102	TDI
103	TMS
104	VMV4
105	GND
106	VPUMP
107	GNDQ
108	TDO
109	TRST
110	VJTAG
111	VMV3
112	GDA0/IO153NPB3V4
113	GDB0/IO152NPB3V4
114	GDA1/IO153PPB3V4
115	GDB1/IO152PPB3V4
116	GDC0/IO151NDB3V4
117	GDC1/IO151PDB3V4

FG256



Note: This is the bottom view of the package.

Note

For Package Manufacturing and Environmental information, visit the Resource Center at <http://www.microsemi.com/products/fpga-soc/solutions>.

FG256	
Pin Number	A3PE600 Function
G13	GCC1/IO50PPB2V1
G14	IO44NDB2V1
G15	IO44PDB2V1
G16	IO49NSB2V1
H1	GFB0/IO119NPB7V0
H2	GFA0/IO118NDB6V1
H3	GFB1/IO119PPB7V0
H4	VCOMPLF
H5	GFC0/IO120NPB7V0
H6	VCC
H7	GND
H8	GND
H9	GND
H10	GND
H11	VCC
H12	GCC0/IO50NPB2V1
H13	GCB1/IO51PPB2V1
H14	GCA0/IO52NPB3V0
H15	VCOMPLC
H16	GCB0/IO51NPB2V1
J1	GFA2/IO117PSB6V1
J2	GFA1/IO118PDB6V1
J3	VCCPLF
J4	IO116NDB6V1
J5	GFB2/IO116PDB6V1
J6	VCC
J7	GND
J8	GND
J9	GND
J10	GND
J11	VCC
J12	GCB2/IO54PPB3V0
J13	GCA1/IO52PPB3V0
J14	GCC2/IO55PPB3V0
J15	VCCPLC
J16	GCA2/IO53PSB3V0

FG256	
Pin Number	A3PE600 Function
K1	GFC2/IO115PSB6V1
K2	IO113PPB6V1
K3	IO112PDB6V1
K4	IO112NDB6V1
K5	VCCIB6
K6	VCC
K7	GND
K8	GND
K9	GND
K10	GND
K11	VCC
K12	VCCIB3
K13	IO54NPB3V0
K14	IO57NPB3V0
K15	IO55NPB3V0
K16	IO57PPB3V0
L1	IO113NPB6V1
L2	IO109PPB6V0
L3	IO108PDB6V0
L4	IO108NDB6V0
L5	VCCIB6
L6	GND
L7	VCC
L8	VCC
L9	VCC
L10	VCC
L11	GND
L12	VCCIB3
L13	GDB0/IO66NPB3V1
L14	IO60NDB3V1
L15	IO60PDB3V1
L16	IO61PDB3V1
M1	IO109NPB6V0
M2	IO106NDB6V0
M3	IO106PDB6V0
M4	GEC0/IO104NPB6V0

FG256	
Pin Number	A3PE600 Function
M5	VMV5
M6	VCCIB5
M7	VCCIB5
M8	IO84NDB5V0
M9	IO84PDB5V0
M10	VCCIB4
M11	VCCIB4
M12	VMV3
M13	VCCPLD
M14	GDB1/IO66PPB3V1
M15	GDC1/IO65PDB3V1
M16	IO61NDB3V1
N1	IO105PDB6V0
N2	IO105NDB6V0
N3	GEC1/IO104PPB6V0
N4	VCOMPLE
N5	GNDQ
N6	GEA2/IO101PPB5V2
N7	IO92NDB5V1
N8	IO90NDB5V1
N9	IO82NDB5V0
N10	IO74NDB4V1
N11	IO74PDB4V1
N12	GNDQ
N13	VCOMPLD
N14	VJTAG
N15	GDC0/IO65NDB3V1
N16	GDA1/IO67PDB3V1
P1	GEB1/IO103PDB6V0
P2	GEB0/IO103NDB6V0
P3	VMV6
P4	VCCPLE
P5	IO101NPB5V2
P6	IO95PPB5V1
P7	IO92PDB5V1
P8	IO90PDB5V1

FG324	
Pin Number	A3PE3000 FBGA
G1	GND
G2	IO287PDB7V1
G3	IO287NDB7V1
G4	IO283PPB7V1
G5	VCCIB7
G6	IO279PDB7V0
G7	IO291NPB7V2
G8	VCC
G9	IO26NDB0V3
G10	IO34NDB0V4
G11	VCC
G12	IO94NPB2V1
G13	IO98PDB2V2
G14	VCCIB2
G15	GCC0/IO112NPB2V3
G16	IO104PDB2V2
G17	IO104NDB2V2
G18	GND
H1	IO267PDB6V4
H2	VCCIB7
H3	IO283NPB7V1
H4	GFB1/IO274PPB7V0
H5	GND
H6	IO279NDB7V0
H7	VCC
H8	VCC
H9	GND
H10	GND
H11	VCC
H12	VCC
H13	IO98NDB2V2
H14	GND
H15	GCB1/IO113PDB2V3
H16	GCC1/IO112PPB2V3
H17	VCCIB2
H18	IO108PDB2V3

FG324	
Pin Number	A3PE3000 FBGA
J1	IO267NDB6V4
J2	GFA0/IO273NDB6V4
J3	VCOMPLF
J4	GFA2/IO272PDB6V4
J5	GFB0/IO274NPB7V0
J6	GFC0/IO275NDB7V0
J7	GFC1/IO275PDB7V0
J8	GND
J9	GND
J10	GND
J11	GND
J12	GCA2/IO115PDB3V0
J13	GCA1/IO114PDB3V0
J14	GCA0/IO114NDB3V0
J15	GCB0/IO113NDB2V3
J16	VCOMPLC
J17	IO120NPB3V0
J18	IO108NDB2V3
K1	IO263PDB6V3
K2	GFA1/IO273PDB6V4
K3	VCCPLF
K4	IO272NDB6V4
K5	GFC2/IO270PPB6V4
K6	GFB2/IO271PDB6V4
K7	IO271NDB6V4
K8	GND
K9	GND
K10	GND
K11	GND
K12	IO115NDB3V0
K13	GCB2/IO116PDB3V0
K14	IO116NDB3V0
K15	GCC2/IO117PDB3V0
K16	VCCPLC
K17	IO124NPB3V1
K18	IO120PPB3V0

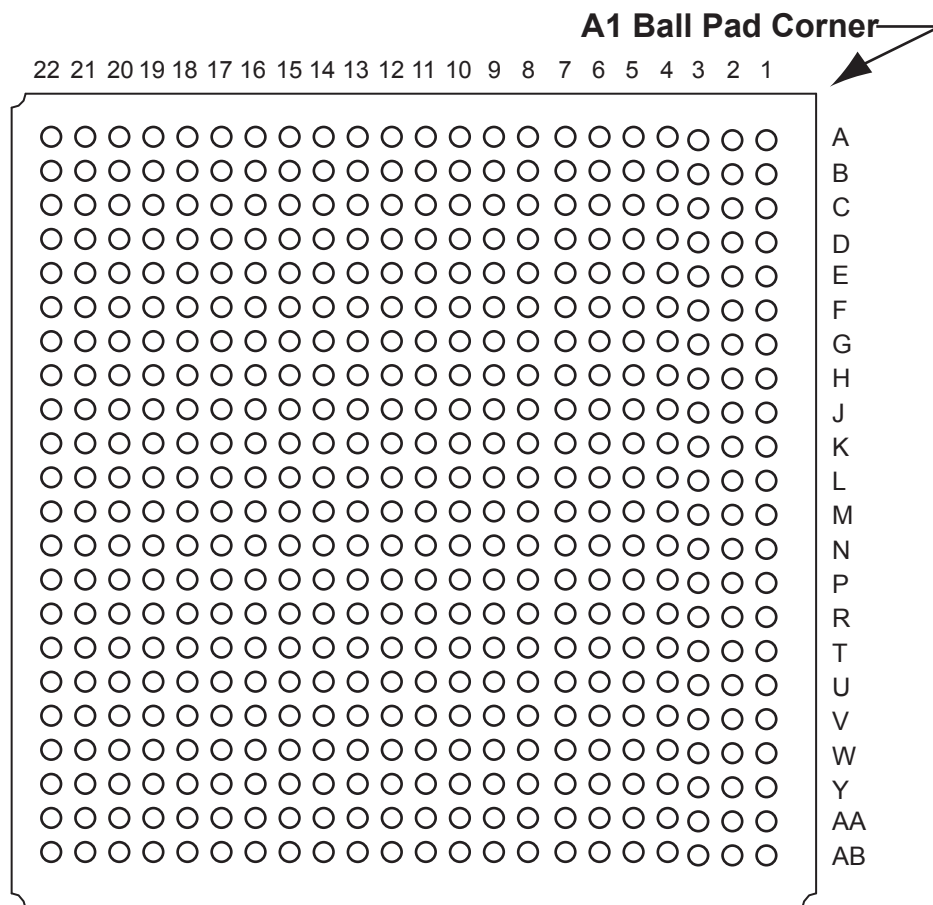
FG324	
Pin Number	A3PE3000 FBGA
L1	IO263NDB6V3
L2	VCCIB6
L3	IO259PDB6V3
L4	IO259NDB6V3
L5	GND
L6	IO270NPB6V4
L7	VCC
L8	VCC
L9	GND
L10	GND
L11	VCC
L12	VCC
L13	IO132PDB3V2
L14	GND
L15	IO117NDB3V0
L16	IO128NPB3V1
L17	VCCIB3
L18	IO124PPB3V1
M1	GND
M2	IO255PDB6V2
M3	IO255NDB6V2
M4	IO251PPB6V2
M5	VCCIB6
M6	GEB0/IO235NDB6V0
M7	GEB1/IO235PDB6V0
M8	VCC
M9	IO192PPB4V4
M10	IO154NPB4V0
M11	VCC
M12	GDA0/IO153NPB3V4
M13	IO132NDB3V2
M14	VCCIB3
M15	IO134NDB3V2
M16	IO134PDB3V2
M17	IO128PPB3V1
M18	GND

FG324	
Pin Number	A3PE3000 FBGA
N1	IO247NDB6V1
N2	IO247PDB6V1
N3	IO251NPB6V2
N4	GEC0/IO236NDB6V0
N5	VCOMPLE
N6	IO212NDB5V2
N7	IO212PDB5V2
N8	IO192NPB4V4
N9	IO174PDB4V2
N10	IO170PDB4V2
N11	GDA2/IO154PPB4V0
N12	GDB2/IO155PPB4V0
N13	GDA1/IO153PPB3V4
N14	VCOMPLD
N15	GDB0/IO152NDB3V4
N16	GDB1/IO152PDB3V4
N17	IO138NDB3V3
N18	IO138PDB3V3
P1	IO245PDB6V1
P2	GNDQ
P3	VMV6
P4	GEC1/IO236PDB6V0
P5	VCCPLE
P6	IO214PDB5V2
P7	VCCIB5
P8	GND
P9	IO174NDB4V2
P10	IO170NDB4V2
P11	GND
P12	VCCIB4
P13	IO155NPB4V0
P14	VCCPLD
P15	VJTAG
P16	GDC0/IO151NDB3V4
P17	GDC1/IO151PDB3V4
P18	IO142PDB3V3

FG324	
Pin Number	A3PE3000 FBGA
R1	IO245NDB6V1
R2	VCCIB6
R3	GEA1/IO234PPB6V0
R4	IO232NDB5V4
R5	GEB2/IO232PDB5V4
R6	IO214NDB5V2
R7	IO202PDB5V1
R8	IO194PDB5V0
R9	IO186PDB4V4
R10	IO178PDB4V3
R11	IO168NSB4V1
R12	IO164PDB4V1
R13	GDC2/IO156PDB4V0
R14	TCK
R15	VPUMP
R16	TRST
R17	VCCIB3
R18	IO142NDB3V3
T1	IO241PDB6V0
T2	GEA0/IO234NPB6V0
T3	IO233NPB5V4
T4	IO231NPB5V4
T5	VMV5
T6	IO208NDB5V1
T7	IO202NDB5V1
T8	IO194NDB5V0
T9	IO186NDB4V4
T10	IO178NDB4V3
T11	IO166NPB4V1
T12	IO164NDB4V1
T13	IO156NDB4V0
T14	VMV4
T15	TDI
T16	GNDQ
T17	TDO
T18	IO146PDB3V4

FG324	
Pin Number	A3PE3000 FBGA
U1	IO241NDB6V0
U2	GEA2/IO233PPB5V4
U3	GEC2/IO231PPB5V4
U4	VCCIB5
U5	GNDQ
U6	IO208PDB5V1
U7	IO198PPB5V0
U8	VCCIB5
U9	IO182NPB4V3
U10	IO180NPB4V3
U11	VCCIB4
U12	IO166PPB4V1
U13	IO162PDB4V1
U14	GNDQ
U15	VCCIB4
U16	TMS
U17	VMV3
U18	IO146NDB3V4
V1	GND
V2	IO218NDB5V3
V3	IO218PDB5V3
V4	IO206NDB5V1
V5	IO206PDB5V1
V6	IO198NPB5V0
V7	GND
V8	IO190NDB4V4
V9	IO190PDB4V4
V10	IO182PPB4V3
V11	IO180PPB4V3
V12	GND
V13	IO162NDB4V1
V14	IO160NDB4V0
V15	IO160PDB4V0
V16	IO158NDB4V0
V17	IO158PDB4V0
V18	GND

FG484



Note: This is the bottom view of the package.

Note

For Package Manufacturing and Environmental information, visit the Resource Center at <http://www.microsemi.com/products/fpga-soc/solutions>.

FG484	
Pin Number	A3PE1500 Function
A1	GND
A2	GND
A3	VCCIB0
A4	IO05NDB0V0
A5	IO05PDB0V0
A6	IO11NDB0V1
A7	IO11PDB0V1
A8	IO15PDB0V1
A9	IO17PDB0V2
A10	IO27NDB0V3
A11	IO27PDB0V3
A12	IO32PDB1V0
A13	IO43PDB1V1
A14	IO47NDB1V1
A15	IO47PDB1V1
A16	IO51NDB1V2
A17	IO51PDB1V2
A18	IO54NDB1V3
A19	NC
A20	VCCIB1
A21	GND
A22	GND
AA1	GND
AA2	VCCIB6
AA3	NC
AA4	IO161PDB5V3
AA5	IO155NDB5V2
AA6	IO155PDB5V2
AA7	IO154NDB5V2
AA8	IO154PDB5V2
AA9	IO143PDB5V1
AA10	IO143NDB5V1
AA11	IO131PPB4V2
AA12	IO129NDB4V2
AA13	IO129PDB4V2
AA14	NC

FG484	
Pin Number	A3PE1500 Function
AA15	NC
AA16	IO117NDB4V0
AA17	IO117PDB4V0
AA18	IO115NDB4V0
AA19	IO115PDB4V0
AA20	NC
AA21	VCCIB3
AA22	GND
AB1	GND
AB2	GND
AB3	VCCIB5
AB4	IO159NDB5V3
AB5	IO159PDB5V3
AB6	IO149NDB5V1
AB7	IO149PDB5V1
AB8	IO138NDB5V0
AB9	IO138PDB5V0
AB10	NC
AB11	NC
AB12	IO127NDB4V2
AB13	IO127PDB4V2
AB14	IO125NDB4V1
AB15	IO125PDB4V1
AB16	IO122NDB4V1
AB17	IO122PDB4V1
AB18	NC
AB19	NC
AB20	VCCIB4
AB21	GND
AB22	GND
B1	GND
B2	VCCIB7
B3	NC
B4	IO03NDB0V0
B5	IO03PDB0V0
B6	IO10NDB0V1

FG484	
Pin Number	A3PE1500 Function
B7	IO10PDB0V1
B8	IO15NDB0V1
B9	IO17NDB0V2
B10	IO20PDB0V2
B11	IO29PDB0V3
B12	IO32NDB1V0
B13	IO43NDB1V1
B14	NC
B15	NC
B16	IO53NDB1V2
B17	IO53PDB1V2
B18	IO54PDB1V3
B19	NC
B20	NC
B21	VCCIB2
B22	GND
C1	VCCIB7
C2	NC
C3	NC
C4	NC
C5	GND
C6	IO07NDB0V0
C7	IO07PDB0V0
C8	VCC
C9	VCC
C10	IO20NDB0V2
C11	IO29NDB0V3
C12	NC
C13	NC
C14	VCC
C15	VCC
C16	NC
C17	NC
C18	GND
C19	NC
C20	NC

FG484	
Pin Number	A3PE1500 Function
C21	NC
C22	VCCIB2
D1	NC
D2	NC
D3	NC
D4	GND
D5	GAA0/IO00NDB0V0
D6	GAA1/IO00PDB0V0
D7	GAB0/IO01NDB0V0
D8	IO09PDB0V1
D9	IO13PDB0V1
D10	IO21PDB0V2
D11	IO31NDB0V3
D12	IO37NDB1V0
D13	IO37PDB1V0
D14	IO49NDB1V2
D15	IO49PDB1V2
D16	GBB1/IO56PDB1V3
D17	GBA0/IO57NDB1V3
D18	GBA1/IO57PDB1V3
D19	GND
D20	NC
D21	IO69PDB2V1
D22	NC
E1	NC
E2	IO218PPB7V3
E3	GND
E4	GAB2/IO220PDB7V3
E5	GAA2/IO221PDB7V3
E6	GNDQ
E7	GAB1/IO01PDB0V0
E8	IO09NDB0V1
E9	IO13NDB0V1
E10	IO21NDB0V2
E11	IO31PDB0V3
E12	IO35NDB1V0

FG484	
Pin Number	A3PE1500 Function
E13	IO41NDB1V1
E14	IO41PDB1V1
E15	GBC1/IO55PDB1V3
E16	GBB0/IO56NDB1V3
E17	GNDQ
E18	GBA2/IO58PDB2V0
E19	IO63NDB2V0
E20	GND
E21	IO69NDB2V1
E22	NC
F1	IO218NPB7V3
F2	IO216NDB7V3
F3	IO216PDB7V3
F4	IO220NDB7V3
F5	IO221NDB7V3
F6	VMV7
F7	VCCPLA
F8	GAC0/IO02NDB0V0
F9	GAC1/IO02PDB0V0
F10	IO23NDB0V2
F11	IO23PDB0V2
F12	IO35PDB1V0
F13	IO39NDB1V0
F14	IO45PDB1V1
F15	GBC0/IO55NDB1V3
F16	VCCPLB
F17	VMV2
F18	IO58NDB2V0
F19	IO63PDB2V0
F20	NC
F21	NC
F22	NC
G1	IO211NDB7V2
G2	IO211PDB7V2
G3	NC
G4	IO214PDB7V3

FG484	
Pin Number	A3PE1500 Function
G5	IO217PDB7V3
G6	GAC2/IO219PDB7V3
G7	VCOMPLA
G8	GNDQ
G9	IO19NDB0V2
G10	IO19PDB0V2
G11	IO25PDB0V3
G12	IO33PDB1V0
G13	IO39PDB1V0
G14	IO45NDB1V1
G15	GNDQ
G16	VCOMPLB
G17	GBB2/IO59PDB2V0
G18	IO62PDB2V0
G19	IO62NDB2V0
G20	IO71PDB2V2
G21	IO71NDB2V2
G22	NC
H1	IO209PSB7V2
H2	NC
H3	VCC
H4	IO214NDB7V3
H5	IO217NDB7V3
H6	IO219NDB7V3
H7	IO215PDB7V3
H8	VMV0
H9	VCCIB0
H10	VCCIB0
H11	IO25NDB0V3
H12	IO33NDB1V0
H13	VCCIB1
H14	VCCIB1
H15	VMV1
H16	GBC2/IO60PDB2V0
H17	IO59NDB2V0
H18	IO67NDB2V1

FG484	
Pin Number	A3PE1500 Function
N17	IO91NPB3V0
N18	IO90NPB3V0
N19	IO91PPB3V0
N20	GNDQ
N21	IO93NDB3V0
N22	IO95PDB3V1
P1	NC
P2	IO183PDB6V2
P3	IO187NPB6V2
P4	IO184NPB6V2
P5	IO176PPB6V1
P6	IO182PDB6V1
P7	IO182NDB6V1
P8	VCCIB6
P9	GND
P10	VCC
P11	VCC
P12	VCC
P13	VCC
P14	GND
P15	VCCIB3
P16	GDB0/IO109NPB3V2
P17	IO97NDB3V1
P18	IO97PDB3V1
P19	IO99PDB3V1
P20	VMV3
P21	IO98PDB3V1
P22	IO95NDB3V1
R1	NC
R2	IO177PDB6V1
R3	VCC
R4	IO176NPB6V1
R5	IO174NDB6V0
R6	IO174PDB6V0
R7	GEC0/IO169NPB6V0
R8	VMV5

FG484	
Pin Number	A3PE1500 Function
R9	VCCIB5
R10	VCCIB5
R11	IO135NDB5V0
R12	IO135PDB5V0
R13	VCCIB4
R14	VCCIB4
R15	VMV3
R16	VCCPLD
R17	GDB1/IO109PPB3V2
R18	GDC1/IO108PDB3V2
R19	IO99NDB3V1
R20	VCC
R21	IO98NDB3V1
R22	IO101PDB3V1
T1	NC
T2	IO177NDB6V1
T3	NC
T4	IO171PDB6V0
T5	IO171NDB6V0
T6	GEC1/IO169PPB6V0
T7	VCOMPLE
T8	GNDQ
T9	GEA2/IO166PPB5V3
T10	IO145NDB5V1
T11	IO141NDB5V0
T12	IO139NDB5V0
T13	IO119NDB4V1
T14	IO119PDB4V1
T15	GNDQ
T16	VCOMPLD
T17	VJTAG
T18	GDC0/IO108NDB3V2
T19	GDA1/IO110PDB3V2
T20	NC
T21	IO103PDB3V2
T22	IO101NDB3V1

FG484	
Pin Number	A3PE1500 Function
U1	IO175PPB6V1
U2	IO173PDB6V0
U3	IO173NDB6V0
U4	GEB1/IO168PDB6V0
U5	GEB0/IO168NDB6V0
U6	VMV6
U7	VCCPLE
U8	IO166NPB5V3
U9	IO157PPB5V2
U10	IO145PDB5V1
U11	IO141PDB5V0
U12	IO139PDB5V0
U13	IO121NDB4V1
U14	IO121PDB4V1
U15	VMV4
U16	TCK
U17	VPUMP
U18	TRST
U19	GDA0/IO110NDB3V2
U20	NC
U21	IO103NDB3V2
U22	IO105PDB3V2
V1	NC
V2	IO175NPB6V1
V3	GND
V4	GEA1/IO167PDB6V0
V5	GEA0/IO167NDB6V0
V6	GNDQ
V7	GEC2/IO164PDB5V3
V8	IO157NPB5V2
V9	IO151NDB5V2
V10	IO151PDB5V2
V11	IO137NDB5V0
V12	IO137PDB5V0
V13	IO123NDB4V1
V14	IO123PDB4V1

FG484		FG484		FG484	
Pin Number	A3PE3000 Function	Pin Number	A3PE3000 Function	Pin Number	A3PE3000 Function
N17	IO132NPB3V2	R9	VCCIB5	U1	IO240PPB6V0
N18	IO117NPB3V0	R10	VCCIB5	U2	IO238PDB6V0
N19	IO132PPB3V2	R11	IO196NDB5V0	U3	IO238NDB6V0
N20	GNDQ	R12	IO196PDB5V0	U4	GEB1/IO235PDB6V0
N21	IO126NDB3V1	R13	VCCIB4	U5	GEB0/IO235NDB6V0
N22	IO128PDB3V1	R14	VCCIB4	U6	VMV6
P1	IO247PDB6V1	R15	VMV3	U7	VCCPLE
P2	IO253PDB6V2	R16	VCCPLD	U8	IO233NPB5V4
P3	IO270NPB6V4	R17	GDB1/IO152PPB3V4	U9	IO222PPB5V3
P4	IO261NPB6V3	R18	GDC1/IO151PDB3V4	U10	IO206PDB5V1
P5	IO249PPB6V1	R19	IO138NDB3V3	U11	IO202PDB5V1
P6	IO259PDB6V3	R20	VCC	U12	IO194PDB5V0
P7	IO259NDB6V3	R21	IO130NDB3V2	U13	IO176NDB4V2
P8	VCCIB6	R22	IO134PDB3V2	U14	IO176PDB4V2
P9	GND	T1	IO243PPB6V1	U15	VMV4
P10	VCC	T2	IO245NDB6V1	U16	TCK
P11	VCC	T3	IO243NPB6V1	U17	VPUMP
P12	VCC	T4	IO241PDB6V0	U18	TRST
P13	VCC	T5	IO241NDB6V0	U19	GDA0/IO153NDB3V4
P14	GND	T6	GEC1/IO236PPB6V0	U20	IO144NDB3V3
P15	VCCIB3	T7	VCOMPLE	U21	IO140NDB3V3
P16	GDB0/IO152NPB3V4	T8	GNDQ	U22	IO142PDB3V3
P17	IO136NDB3V2	T9	GEA2/IO233PPB5V4	V1	IO239PDB6V0
P18	IO136PDB3V2	T10	IO206NDB5V1	V2	IO240NPB6V0
P19	IO138PDB3V3	T11	IO202NDB5V1	V3	GND
P20	VMV3	T12	IO194NDB5V0	V4	GEA1/IO234PDB6V0
P21	IO130PDB3V2	T13	IO186NDB4V4	V5	GEA0/IO234NDB6V0
P22	IO128NDB3V1	T14	IO186PDB4V4	V6	GNDQ
R1	IO247NDB6V1	T15	GNDQ	V7	GEC2/IO231PDB5V4
R2	IO245PDB6V1	T16	VCOMPLD	V8	IO222NPB5V3
R3	VCC	T17	VJTAG	V9	IO204NDB5V1
R4	IO249NPB6V1	T18	GDC0/IO151NDB3V4	V10	IO204PDB5V1
R5	IO251NDB6V2	T19	GDA1/IO153PDB3V4	V11	IO195NDB5V0
R6	IO251PDB6V2	T20	IO144PDB3V3	V12	IO195PDB5V0
R7	GEC0/IO236NPB6V0	T21	IO140PDB3V3	V13	IO178NDB4V3
R8	VMV5	T22	IO134NDB3V2	V14	IO178PDB4V3

FG484		FG484	
Pin Number	A3PE3000 Function	Pin Number	A3PE3000 Function
V15	IO155NDB4V0	Y7	IO220PDB5V3
V16	GDB2/IO155PDB4V0	Y8	VCC
V17	TDI	Y9	VCC
V18	GNDQ	Y10	IO200PDB5V0
V19	TDO	Y11	IO192PDB4V4
V20	GND	Y12	IO188NPB4V4
V21	IO146PDB3V4	Y13	IO187PSB4V4
V22	IO142NDB3V3	Y14	VCC
W1	IO239NDB6V0	Y15	VCC
W2	IO237PDB6V0	Y16	IO164NDB4V1
W3	IO230PSB5V4	Y17	IO164PDB4V1
W4	GND	Y18	GND
W5	IO232NDB5V4	Y19	IO158PPB4V0
W6	GEB2/IO232PDB5V4	Y20	IO150PDB3V4
W7	IO231NDB5V4	Y21	IO148NPB3V4
W8	IO214NDB5V2	Y22	VCCIB3
W9	IO214PDB5V2		
W10	IO200NDB5V0		
W11	IO192NDB4V4		
W12	IO184NDB4V3		
W13	IO184PDB4V3		
W14	IO156NDB4V0		
W15	GDC2/IO156PDB4V0		
W16	IO154NDB4V0		
W17	GDA2/IO154PDB4V0		
W18	TMS		
W19	GND		
W20	IO150NDB3V4		
W21	IO146NDB3V4		
W22	IO148PPB3V4		
Y1	VCCIB6		
Y2	IO237NDB6V0		
Y3	IO228NDB5V4		
Y4	IO224NDB5V3		
Y5	GND		
Y6	IO220NDB5V3		

FG896		FG896		FG896	
Pin Number	A3PE3000 Function	Pin Number	A3PE3000 Function	Pin Number	A3PE3000 Function
A2	GND	AA9	GEB1/IO235PPB6V0	AB15	IO198PDB5V0
A3	GND	AA10	VCC	AB16	IO192NDB4V4
A4	IO14NPB0V1	AA11	IO226PPB5V4	AB17	IO192PDB4V4
A5	GND	AA12	VCCIB5	AB18	IO178NDB4V3
A6	IO07NPB0V0	AA13	VCCIB5	AB19	IO178PDB4V3
A7	GND	AA14	VCCIB5	AB20	IO174NDB4V2
A8	IO09NDB0V1	AA15	VCCIB5	AB21	IO162NPB4V1
A9	IO17NDB0V2	AA16	VCCIB4	AB22	VCC
A10	IO17PDB0V2	AA17	VCCIB4	AB23	VCCPLD
A11	IO21NDB0V2	AA18	VCCIB4	AB24	VCCIB3
A12	IO21PDB0V2	AA19	VCCIB4	AB25	IO150PDB3V4
A13	IO33NDB0V4	AA20	IO174PDB4V2	AB26	IO148PDB3V4
A14	IO33PDB0V4	AA21	VCC	AB27	IO147NDB3V4
A15	IO35NDB0V4	AA22	IO142NPB3V3	AB28	IO145PDB3V3
A16	IO35PDB0V4	AA23	IO144NDB3V3	AB29	IO143PDB3V3
A17	IO41NDB1V0	AA24	IO144PDB3V3	AB30	IO137PDB3V2
A18	IO43NDB1V0	AA25	IO146NDB3V4	AC1	IO254PDB6V2
A19	IO43PDB1V0	AA26	IO146PDB3V4	AC2	IO254NDB6V2
A20	IO45NDB1V0	AA27	IO147PDB3V4	AC3	IO240PDB6V0
A21	IO45PDB1V0	AA28	IO139NDB3V3	AC4	GEC1/IO236PDB6V0
A22	IO57NDB1V2	AA29	IO139PDB3V3	AC5	IO237PDB6V0
A23	IO57PDB1V2	AA30	IO133NDB3V2	AC6	IO237NDB6V0
A24	GND	AB1	IO256NDB6V2	AC7	VCOMPLE
A25	IO69PPB1V3	AB2	IO244PDB6V1	AC8	GND
A26	GND	AB3	IO244NDB6V1	AC9	IO226NPB5V4
A27	GBC1/IO79PPB1V4	AB4	IO241PDB6V0	AC10	IO222NDB5V3
A28	GND	AB5	IO241NDB6V0	AC11	IO216NPB5V2
A29	GND	AB6	IO243NPB6V1	AC12	IO210NPB5V2
AA1	IO256PDB6V2	AB7	VCCIB6	AC13	IO204NDB5V1
AA2	IO248PDB6V1	AB8	VCCPLE	AC14	IO204PDB5V1
AA3	IO248NDB6V1	AB9	VCC	AC15	IO194NDB5V0
AA4	IO246NDB6V1	AB10	IO222PDB5V3	AC16	IO188NDB4V4
AA5	GEA1/IO234PDB6V0	AB11	IO218PPB5V3	AC17	IO188PDB4V4
AA6	GEA0/IO234NDB6V0	AB12	IO206NDB5V1	AC18	IO182PPB4V3
AA7	IO243PPB6V1	AB13	IO206PDB5V1	AC19	IO170NPB4V2
AA8	IO245NDB6V1	AB14	IO198NDB5V0	AC20	IO164NDB4V1

FG896		FG896		FG896	
Pin Number	A3PE3000 Function	Pin Number	A3PE3000 Function	Pin Number	A3PE3000 Function
T11	VCC	U17	GND	V23	IO128NDB3V1
T12	GND	U18	GND	V24	IO132PDB3V2
T13	GND	U19	GND	V25	IO130PPB3V2
T14	GND	U20	VCC	V26	IO126NDB3V1
T15	GND	U21	VCCIB3	V27	IO129NDB3V1
T16	GND	U22	IO120PDB3V0	V28	IO127NDB3V1
T17	GND	U23	IO128PDB3V1	V29	IO125NDB3V1
T18	GND	U24	IO124PDB3V1	V30	IO123PDB3V1
T19	GND	U25	IO124NDB3V1	W1	IO266NDB6V4
T20	VCC	U26	IO126PDB3V1	W2	IO262NDB6V3
T21	VCCIB3	U27	IO129PDB3V1	W3	IO260NDB6V3
T22	IO109NPB2V3	U28	IO127PDB3V1	W4	IO252NDB6V2
T23	IO116NDB3V0	U29	IO125PDB3V1	W5	IO251NDB6V2
T24	IO118NDB3V0	U30	IO121NDB3V0	W6	IO251PDB6V2
T25	IO122NPB3V1	V1	IO268NDB6V4	W7	IO255NDB6V2
T26	GCA1/IO114PPB3V0	V2	IO262PDB6V3	W8	IO249PPB6V1
T27	GCB0/IO113NPB2V3	V3	IO260PDB6V3	W9	IO253PDB6V2
T28	GCA2/IO115PPB3V0	V4	IO252PDB6V2	W10	VCCIB6
T29	VCCPLC	V5	IO257NPB6V2	W11	VCC
T30	IO121PDB3V0	V6	IO261NPB6V3	W12	GND
U1	IO268PDB6V4	V7	IO255PDB6V2	W13	GND
U2	IO264NDB6V3	V8	IO259PDB6V3	W14	GND
U3	IO264PDB6V3	V9	IO259NDB6V3	W15	GND
U4	IO258PDB6V3	V10	VCCIB6	W16	GND
U5	IO258NDB6V3	V11	VCC	W17	GND
U6	IO257PPB6V2	V12	GND	W18	GND
U7	IO261PPB6V3	V13	GND	W19	GND
U8	IO265NDB6V3	V14	GND	W20	VCC
U9	IO263NDB6V3	V15	GND	W21	VCCIB3
U10	VCCIB6	V16	GND	W22	IO134PDB3V2
U11	VCC	V17	GND	W23	IO138PDB3V3
U12	GND	V18	GND	W24	IO132NDB3V2
U13	GND	V19	GND	W25	IO136NPB3V2
U14	GND	V20	VCC	W26	IO130NPB3V2
U15	GND	V21	VCCIB3	W27	IO141PDB3V3
U16	GND	V22	IO120NDB3V0	W28	IO135PDB3V2



Microsemi Corporate Headquarters
One Enterprise, Aliso Viejo,
CA 92656 USA

Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Sales: +1 (949) 380-6136
Fax: +1 (949) 215-4996

E-mail: sales.support@microsemi.com

© 2015 Microsemi Corporation. All rights reserved. Microsemi and the Microsemi logo are trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.

Microsemi Corporation (MSCC) offers a comprehensive portfolio of semiconductor and system solutions for communications, defense & security, aerospace and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, Calif., and has approximately 3,600 employees globally. Learn more at www.microsemi.com.

Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice.