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Understanding <u>Embedded - FPGAs (Field</u> <u>Programmable Gate Array)</u>

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	147456
Number of I/O	154
Number of Gates	1000000
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/m7a3p1000-pq208i

Email: info@E-XFL.COM

Address: Room A, 16/F, Full Win Commercial Centre, 573 Nathan Road, Mongkok, Hong Kong

DDR Module Specifications

Input DDR Module



Figure 2-20 • Input DDR Timing Model

Table 2-101 •	Parameter	Definitions
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Parameter Name	Parameter Defini tion	Measuring Nodes (from, to)	
t _{DDRICLKQ1}	Clock-to-Out Out_QR	B, D	
t _{DDRICLKQ2}	Clock-to-Out Out_QF B, E		
t _{DDRISUD}	Data Setup Time of DDR input	А, В	
t _{DDRIHD}	Data Hold Time of DDR input	А, В	
t _{DDRICLR2Q1}	Clear-to-Out Out_QR	C, D	
t _{DDRICLR2Q2}	Clear-to-Out Out_QF	C, E	
t _{DDRIREMCLR}	Clear Removal	С, В	
t _{DDRIRECCLR}	Clear Recovery	С, В	







Figure 2-34 • RAM Write, Output as Write Data (WMO DE = 1). Applicable to RAM4K9 Only.

Parameter	Description	-2	-1	Std.	Units
t _{ENS}	REN, WEN Setup Time	3.75	4.27	5.02	ns
t _{ENH}	REN, WEN Hold Time	0.00	0.00	0.00	ns
t _{BKS}	BLK Setup Time	0.19	0.22	0.26	ns
t _{BKH}	BLK Hold Time	0.00	0.00	0.00	ns
t _{DS}	Input Data (WD) Setup Time	0.18	0.21	0.25	ns
t _{DH}	Input Data (WD) Hold Time	0.00	0.00	0.00	ns
t _{CKQ1}	Clock High to New Data Valid on RD (flow-through)	2.17	2.47	2.90	ns
t _{CKQ2}	Clock High to New Data Valid on RD (pipelined)	0.94	1.07	1.26	ns
t _{RCKEF}	RCLK High to Empty Flag Valid	1.72	1.96	2.30	ns
t _{WCKFF}	WCLK High to Full Flag Valid	1.63	1.86	2.18	ns
t _{CKAF}	Clock High to Almost Empty/Full Flag Valid	6.19	7.05	8.29	ns
t _{RSTFG}	RESET Low to Empty/Full Flag Valid	1.69	1.93	2.27	ns
t _{RSTAF}	RESET Low to Almost Empty/Full Flag Valid	6.13	6.98	8.20	ns
t _{RSTBQ}	RESET Low to Data Out Low on RD (flow-through)	0.92	1.05	1.23	ns
	RESET Low to Data Out Low on RD (pipelined)	0.92	1.05	1.23	ns
t _{REMRSTB}	RESET Removal	0.29	0.33	0.38	ns
t _{RECRSTB}	RESET Recovery	1.50	1.71	2.01	ns
t _{MPWRSTB}	RESET Minimum Pulse Width	0.21	0.24	0.29	ns
t _{CYC}	Clock Cycle Time	3.23	3.68	4.32	ns
F _{MAX}	Maximum Frequency for FIFO	310	272	231	MHz

Table 2-120 • A3P250 FIFO 512x8 Worst Commercial-Case Conditions: T ____ = 70°C, VCC = 1.425 V



TQ144				
Pin Number	A3P125 Function			
109	GBA1/IO40RSB0			
110	GBA0/IO39RSB0			
111	GBB1/IO38RSB0			
112	GBB0/IO37RSB0			
113	GBC1/IO36RSB0			
114	GBC0/IO35RSB0			
115	IO34RSB0			
116	IO33RSB0			
117	VCCIB0			
118	GND			
119	VCC			
120	IO29RSB0			
121	IO28RSB0			
122	IO27RSB0			
123	IO25RSB0			
124	IO23RSB0			
125	IO21RSB0			
126	IO19RSB0			
127	IO17RSB0			
128	IO16RSB0			
129	IO14RSB0			
130	IO12RSB0			
131	IO10RSB0			
132	IO08RSB0			
133	IO06RSB0			
134	VCCIB0			
135	GND			
136	VCC			
137	GAC1/IO05RSB0			
138	GAC0/IO04RSB0			
139	GAB1/IO03RSB0			
140	GAB0/IO02RSB0			
141	GAA1/IO01RSB0			
142	GAA0/IO00RSB0			
143	GNDQ			
144	VMV0			



Package Pin Assignments

FG256		FG256		FG256		
Pin Number	A3P250 Function	Pin Number	A3P250 Function	Pin Number	A3P250 Function	
G13	GCC1/IO48PPB1	K1	GFC2/IO105PDB3	M5	VMV3	
G14	IO47NPB1	K2	IO107NPB3	M6	VCCIB2	
G15	IO54PDB1	K3	IO104PPB3	M7	VCCIB2	
G16	IO54NDB1	K4	NC	M8	NC	
H1	GFB0/IO109NPB3	K5	VCCIB3	M9	IO74RSB2	
H2	GFA0/IO108NDB3	K6	VCC	M10	VCCIB2	
H3	GFB1/IO109PPB3	K7	GND	M11	VCCIB2	
H4	VCOMPLF	K8	GND	M12	VMV2	
H5	GFC0/IO110NPB3	K9	GND	M13	NC	
H6	VCC	K10	GND	M14	GDB1/IO59UPB1	
H7	GND	K11	VCC	M15	GDC1/IO58UDB1	
H8	GND	K12	VCCIB1	M16	IO56NDB1	
H9	GND	K13	IO52NPB1	N1	IO103NDB3	
H10	GND	K14	IO55RSB1	N2	IO101PPB3	
H11	VCC	K15	IO53NPB1	N3	GEC1/IO100PPB3	
H12	GCC0/IO48NPB1	K16	IO51NDB1	N4	NC	
H13	GCB1/IO49PPB1	L1	IO105NDB3	N5	GNDQ	
H14	GCA0/IO50NPB1	L2	IO104NPB3	N6	GEA2/IO97RSB2	
H15	NC	L3	NC	N7	IO86RSB2	
H16	GCB0/IO49NPB1	L4	IO102RSB3	N8	IO82RSB2	
J1	GFA2/IO107PPB3	L5	VCCIB3	N9	IO75RSB2	
J2	GFA1/IO108PDB3	L6	GND	N10	IO69RSB2	
J3	VCCPLF	L7	VCC	N11	IO64RSB2	
J4	IO106NDB3	L8	VCC	N12	GNDQ	
J5	GFB2/IO106PDB3	L9	VCC	N13	NC	
J6	VCC	L10	VCC	N14	VJTAG	
J7	GND	L11	GND	N15	GDC0/IO58VDB1	
J8	GND	L12	VCCIB1	N16	GDA1/IO60UDB1	
J9	GND	L13	GDB0/IO59VPB1	P1	GEB1/IO99PDB3	
J10	GND	L14	IO57VDB1	P2	GEB0/IO99NDB3	
J11	VCC	L15	IO57UDB1	P3	NC	
J12	GCB2/IO52PPB1	L16	IO56PDB1	P4	NC	
J13	GCA1/IO50PPB1	M1	IO103PDB3	P5	IO92RSB2	
J14	GCC2/IO53PPB1	M2	NC	P6	IO89RSB2	
J15	NC	M3	IO101NPB3	P7	IO85RSB2	
J16	GCA2/IO51PDB1	M4	GEC0/IO100NPB3	P8	IO81RSB2	



EC 256		EC 256		EC256		
FG256		FG256		FG256		
Pin Number	A3P400 Function	Pin Number	A3P400 Function	Pin Number	A3P400 Function	
G13	GCC1/IO67PPB1	K1	GFC2/IO142PDB3	M5	VMV3	
G14	IO64NPB1	K2	IO144NPB3	M6	VCCIB2	
G15	IO73PDB1	K3	IO141PPB3	M7	VCCIB2	
G16	IO73NDB1	K4	IO120RSB2	M8	IO108RSB2	
H1	GFB0/IO146NPB3	K5	VCCIB3	M9	IO101RSB2	
H2	GFA0/IO145NDB3	K6	VCC	M10	VCCIB2	
H3	GFB1/IO146PPB3	K7	GND	M11	VCCIB2	
H4	VCOMPLF	K8	GND	M12	VMV2	
H5	GFC0/IO147NPB3	K9	GND	M13	IO83RSB2	
H6	VCC	K10	GND	M14	GDB1/IO78UPB1	
H7	GND	K11	VCC	M15	GDC1/IO77UDB1	
H8	GND	K12	VCCIB1	M16	IO75NDB1	
H9	GND	K13	IO71NPB1	N1	IO140NDB3	
H10	GND	K14	IO74RSB1	N2	IO138PPB3	
H11	VCC	K15	IO72NPB1	N3	GEC1/IO137PPB3	
H12	GCC0/IO67NPB1	K16	IO70NDB1	N4	IO131RSB2	
H13	GCB1/IO68PPB1	L1	IO142NDB3	N5	GNDQ	
H14	GCA0/IO69NPB1	L2	IO141NPB3	N6	GEA2/IO134RSB2	
H15	NC	L3	IO125RSB2	N7	IO117RSB2	
H16	GCB0/IO68NPB1	L4	IO139RSB3	N8	IO111RSB2	
J1	GFA2/IO144PPB3	L5	VCCIB3	N9	IO99RSB2	
J2	GFA1/IO145PDB3	L6	GND	N10	IO94RSB2	
J3	VCCPLF	L7	VCC	N11	IO87RSB2	
J4	IO143NDB3	L8	VCC	N12	GNDQ	
J5	GFB2/IO143PDB3	L9	VCC	N13	IO93RSB2	
J6	VCC	L10	VCC	N14	VJTAG	
J7	GND	L11	GND	N15	GDC0/IO77VDB1	
J8	GND	L12	VCCIB1	N16	GDA1/IO79UDB1	
J9	GND	L13	GDB0/IO78VPB1	P1	GEB1/IO136PDB3	
J10	GND	L14	IO76VDB1	P2	GEB0/IO136NDB3	
J11	VCC	L15	IO76UDB1	P3	VMV2	
J12	GCB2/IO71PPB1	L16	IO75PDB1	P4	IO129RSB2	
J13	GCA1/IO69PPB1	M1	IO140PDB3	P5	IO128RSB2	
J14	GCC2/IO72PPB1	M2	IO130RSB2	P6	IO122RSB2	
J15	NC	M3	IO138NPB3	P7	IO115RSB2	
J16	GCA2/IO70PDB1	M4	GEC0/IO137NPB3	P8	IO110RSB2	
l		L		L	L	



Package Pin Assignments

FG256				
Pin Number	A3P1000 Function			
R5	IO168RSB2			
R6	IO163RSB2			
R7	IO157RSB2			
R8	IO149RSB2			
R9	IO143RSB2			
R10	IO138RSB2			
R11	IO131RSB2			
R12	IO125RSB2			
R13	GDB2/IO115RSB2			
R14	TDI			
R15	GNDQ			
R16	TDO			
T1	GND			
T2	IO183RSB2			
Т3	GEB2/IO186RSB2			
T4	IO172RSB2			
T5	IO170RSB2			
Т6	IO164RSB2			
T7	IO158RSB2			
T8	IO153RSB2			
Т9	IO142RSB2			
T10	IO135RSB2			
T11	IO130RSB2			
T12	GDC2/IO116RSB2			
T13	IO120RSB2			
T14	GDA2/IO114RSB2			
T15	TMS			
T16	GND			



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

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