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Understanding [Embedded - CPLDs \(Complex Programmable Logic Devices\)](#)

Embedded - CPLDs, or Complex Programmable Logic Devices, are highly versatile digital logic devices used in electronic systems. These programmable components are designed to perform complex logical operations and can be customized for specific applications. Unlike fixed-function ICs, CPLDs offer the flexibility to reprogram their configuration, making them an ideal choice for various embedded systems. They consist of a set of logic gates and programmable interconnects, allowing designers to implement complex logic circuits without needing custom hardware.

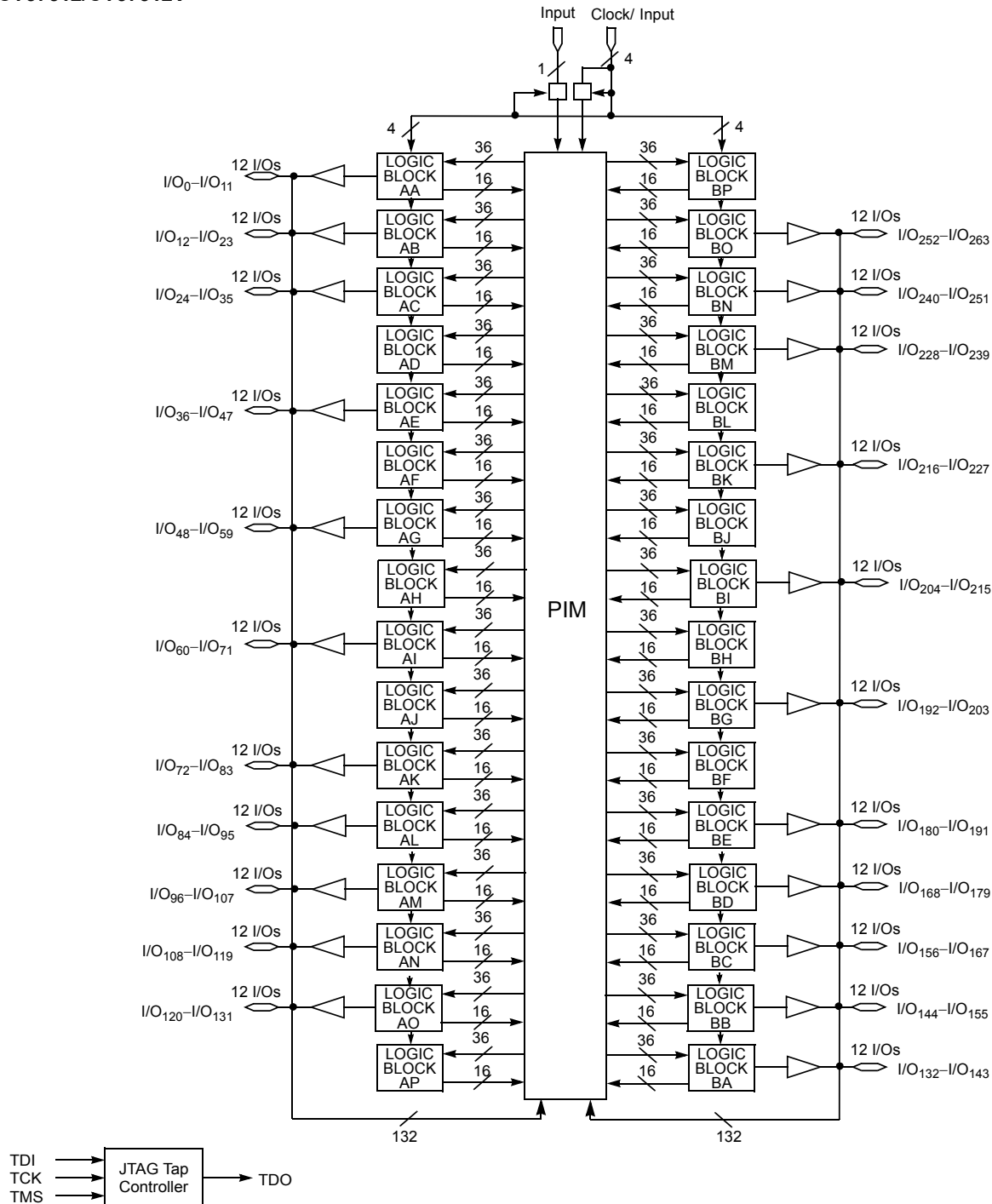
Applications of Embedded - CPLDs

Details

Product Status	Obsolete
Programmable Type	In-System Reprogrammable™ (ISR™) CMOS
Delay Time tpd(1) Max	10 ns
Voltage Supply - Internal	4.75V ~ 5.25V
Number of Logic Elements/Blocks	-
Number of Macrocells	192
Number of Gates	-
Number of I/O	125
Operating Temperature	0°C ~ 70°C (TA)
Mounting Type	Surface Mount
Package / Case	160-LQFP
Supplier Device Package	160-TQFP (24x24)
Purchase URL	https://www.e-xfl.com/product-detail/infineon-technologies/cy37192p160-125axc

Logic Block Diagrams (continued)

CY37512/CY37512V



Inductance^[5]

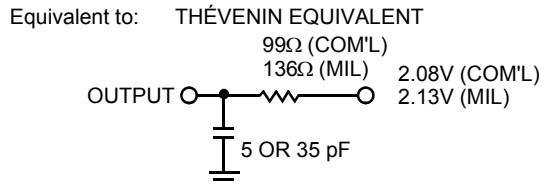
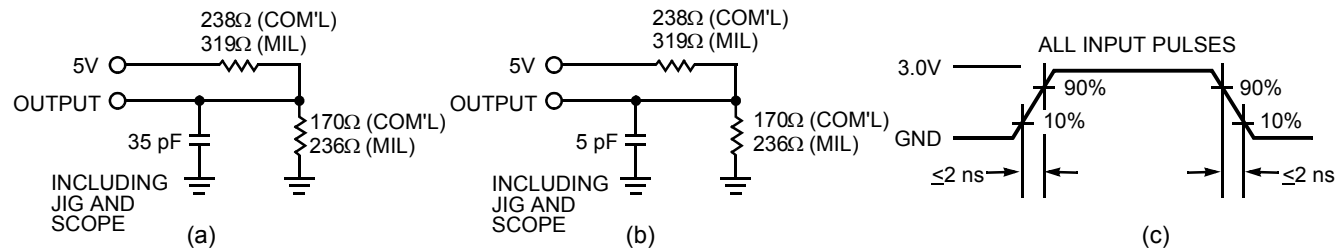
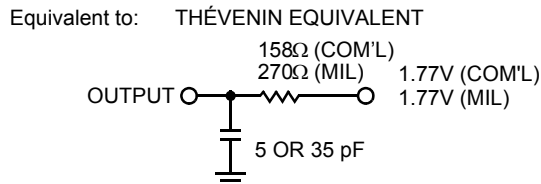
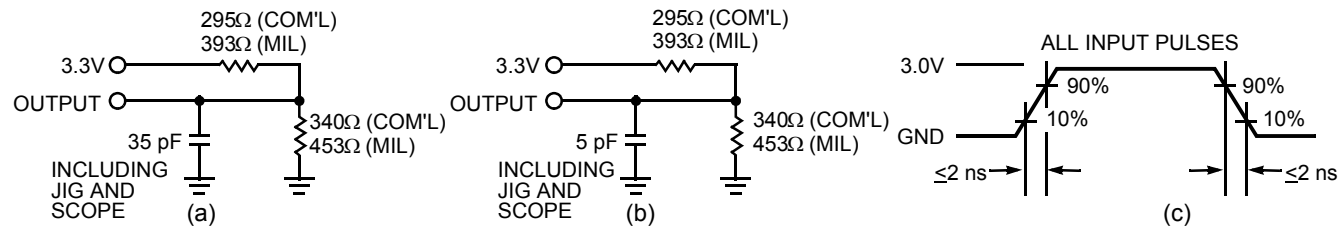
Parameter	Description	Test Conditions	44-Lead TQFP	44-Lead PLCC	44-Lead CLCC	84-Lead PLCC	84-Lead CLCC	100-Lead TQFP	160-Lead TQFP	208-Lead PQFP	Unit
L	Maximum Pin Inductance	$V_{IN} = 3.3V$ at $f = 1\text{ MHz}$	2	5	2	8	5	8	9	11	nH

Capacitance^[5]

Parameter	Description	Test Conditions	Max.	Unit
$C_{I/O}$	Input/Output Capacitance	$V_{IN} = 3.3V$ at $f = 1\text{ MHz}$ at $T_A = 25^\circ C$	8	pF
C_{CLK}	Clock Signal Capacitance	$V_{IN} = 3.3V$ at $f = 1\text{ MHz}$ at $T_A = 25^\circ C$	12	pF
C_{DP}	Dual Functional Pins ^[9]	$V_{IN} = 3.3V$ at $f = 1\text{ MHz}$ at $T_A = 25^\circ C$	16	pF

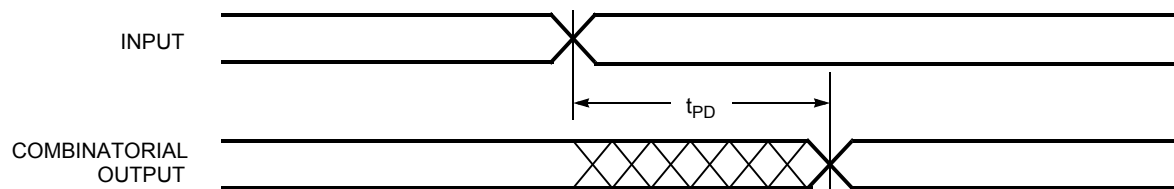
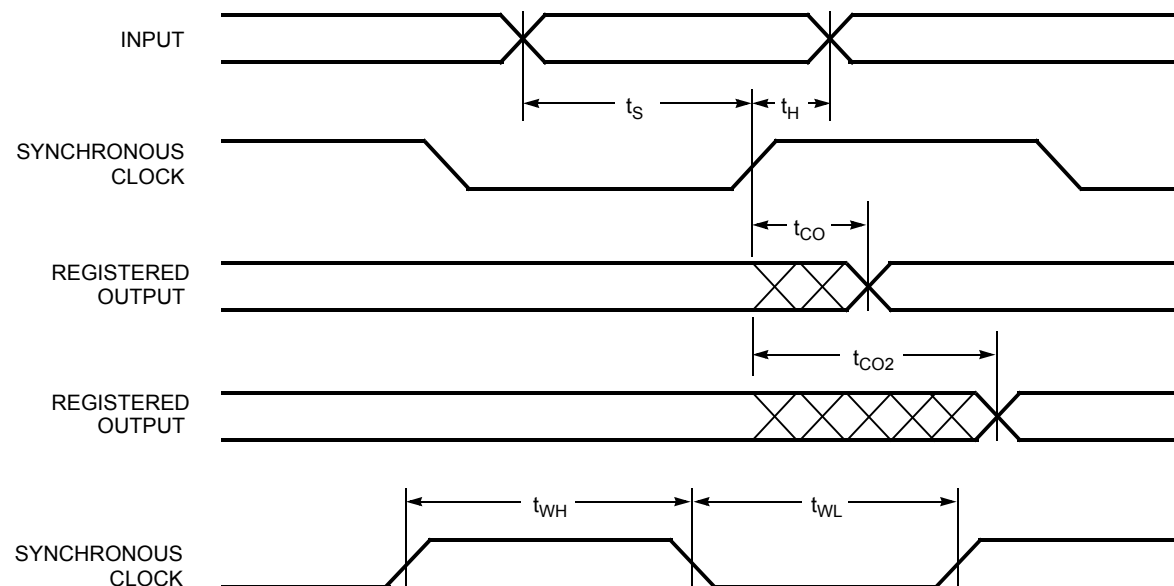
Endurance Characteristics^[5]

Parameter	Description	Test Conditions	Min.	Typ.	Unit
N	Minimum Reprogramming Cycles	Normal Programming Conditions ^[2]	1,000	10,000	Cycles

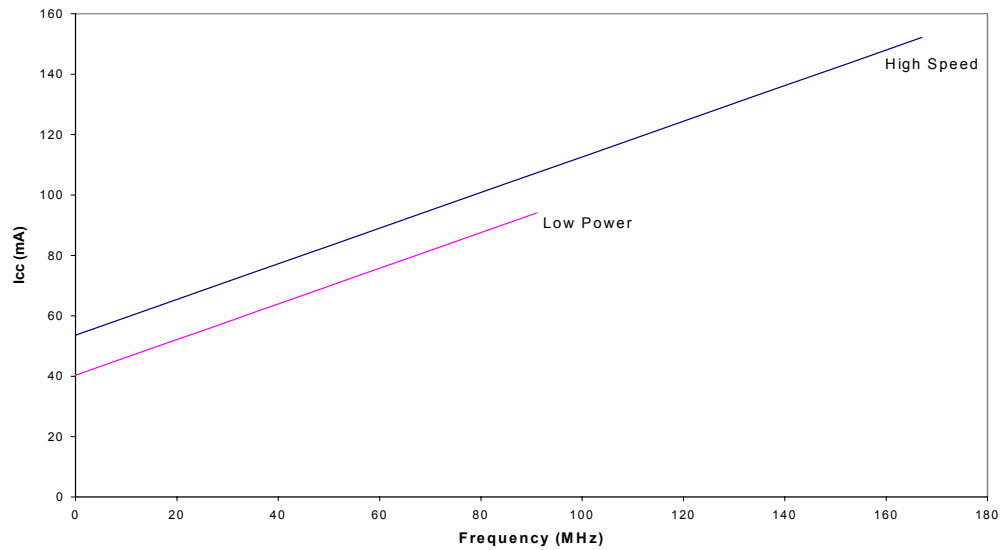
AC Characteristics
5.0V AC Test Loads and Waveforms

3.3V AC Test Loads and Waveforms


Switching Characteristics Over the Operating Range (continued)^[12]

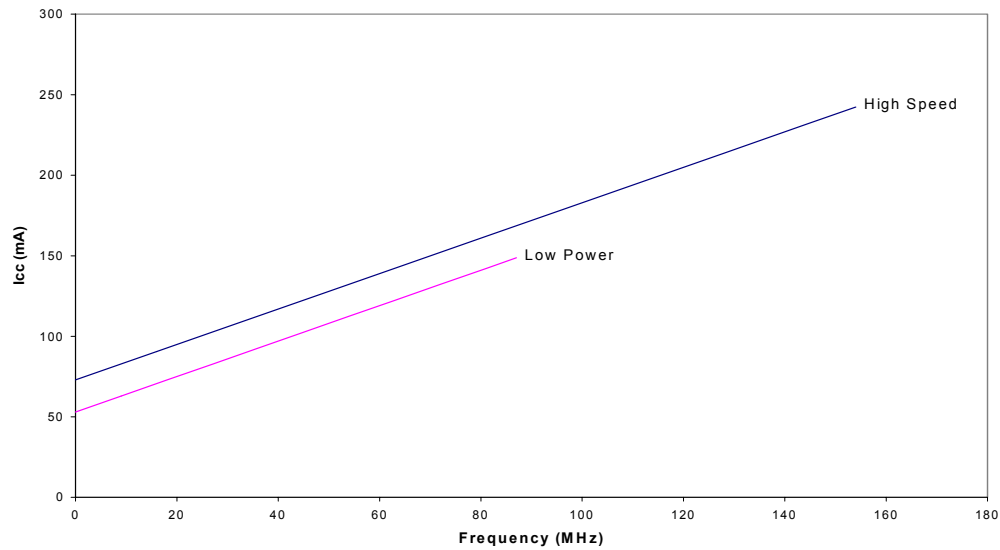
Parameter	200 MHz		167 MHz		154 MHz		143 MHz		125 MHz		100 MHz		83 MHz		66 MHz		Unit
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
$t_{RO}^{[13, 14, 15]}$		12		13		13		14		15		18		21		26	ns
t_{PW}	8		8		8		8		10		12		15		20		ns
$t_{PR}^{[13]}$	10		10		10		10		12		14		17		22		ns
$t_{PO}^{[13, 14, 15]}$		12		13		13		14		15		18		21		26	ns
User Option Parameters																	
t_{LP}		2.5		2.5		2.5		2.5		2.5		2.5		2.5		2.5	ns
t_{SLEW}		3		3		3		3		3		3		3		3	ns
$t_{3.3IO}^{[19]}$		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3	ns
JTAG Timing Parameters																	
$t_{S\ JTAG}$	0		0		0		0		0		0		0		0		ns
$t_{H\ JTAG}$	20		20		20		20		20		20		20		20		ns
$t_{CO\ JTAG}$		20		20		20		20		20		20		20		20	ns
f_{JTAG}		20		20		20		20		20		20		20		20	MHz

Switching Waveforms
Combinatorial Output

Registered Output with Synchronous Clocking

Note:

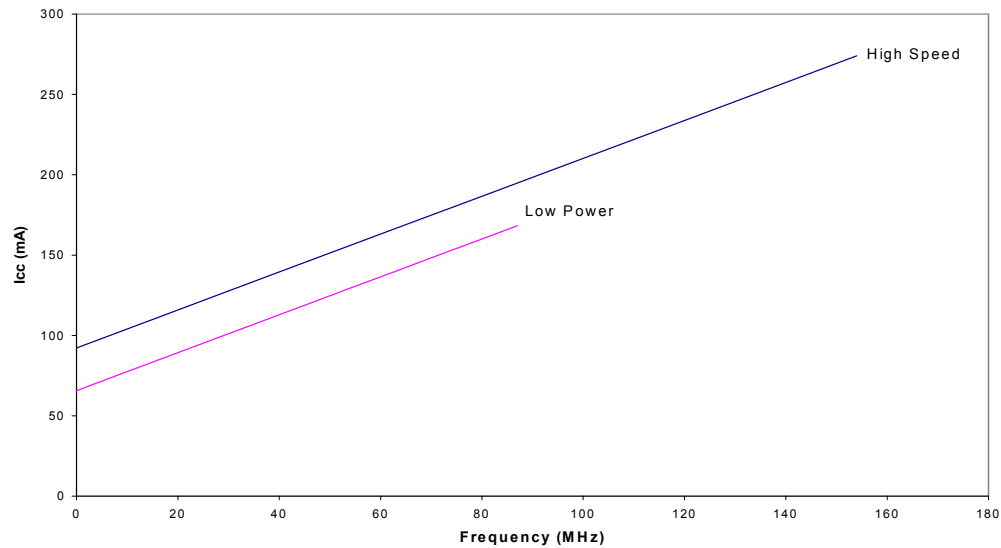
19. Only applicable to the 5V devices.

Typical 5.0V Power Consumption (continued)
CY37128


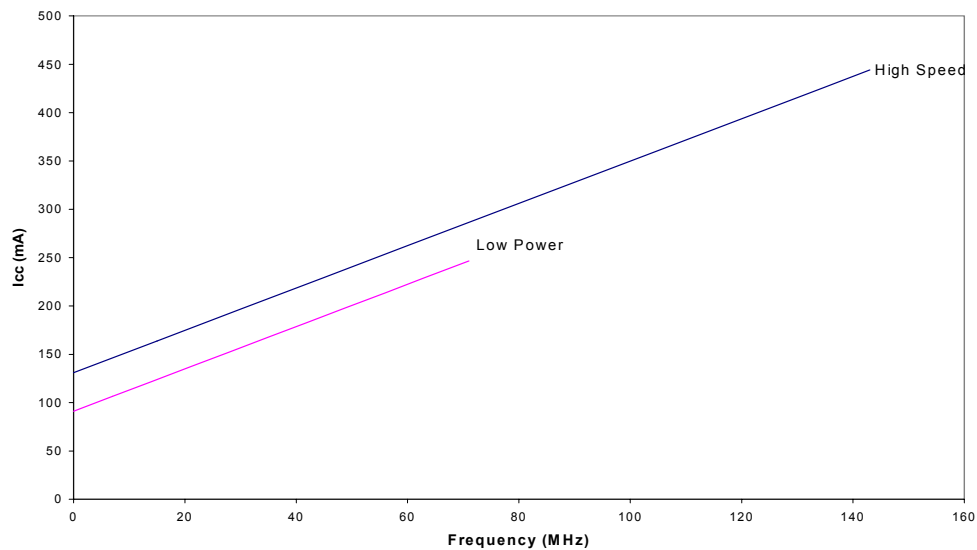
The typical pattern is a 16-bit up counter, per logic block, with outputs disabled.
 $V_{CC} = 5.0V$, $T_A = \text{Room Temperature}$

CY37192


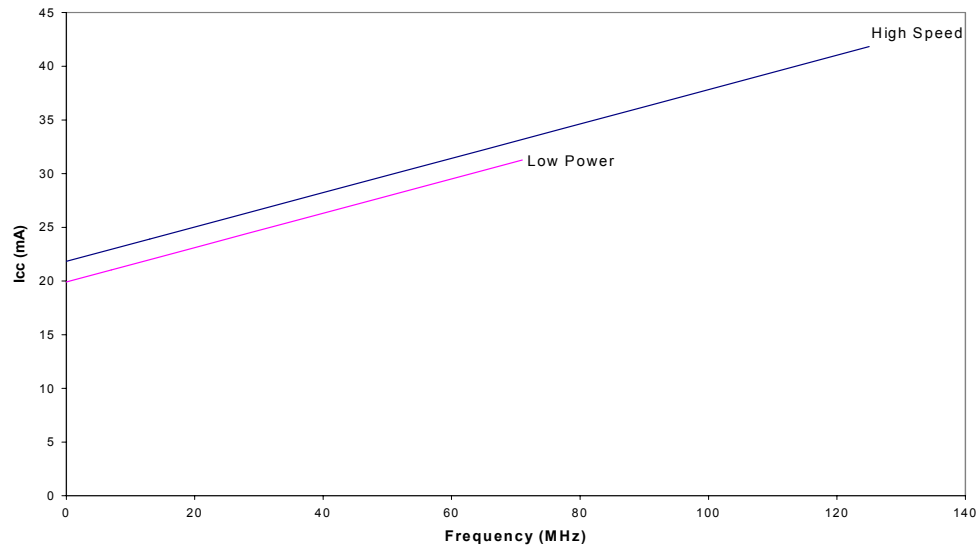
The typical pattern is a 16-bit up counter, per logic block, with outputs disabled.
 $V_{CC} = 5.0V$, $T_A = \text{Room Temperature}$

Typical 5.0V Power Consumption (continued)
CY37256


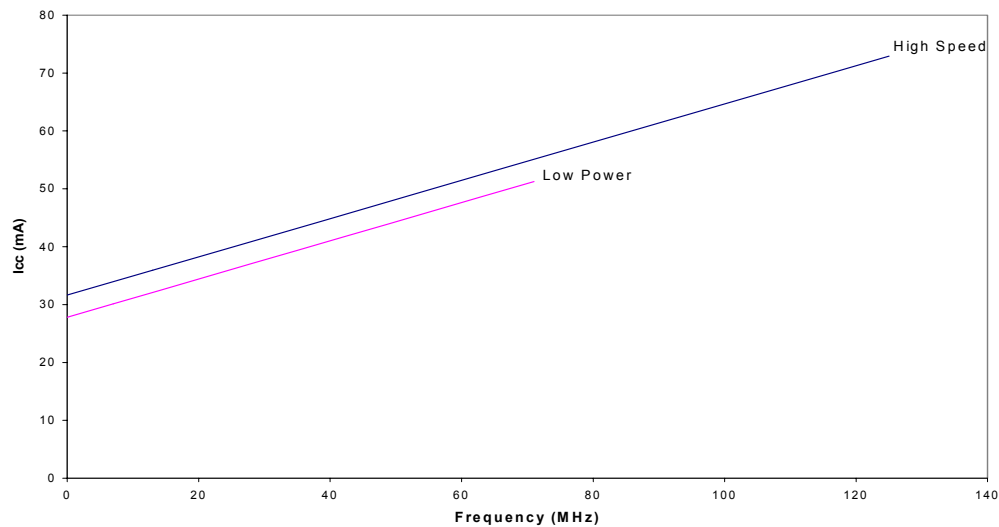
The typical pattern is a 16-bit up counter, per logic block, with outputs disabled.
 $V_{CC} = 5.0V$, $T_A = \text{Room Temperature}$

CY37384


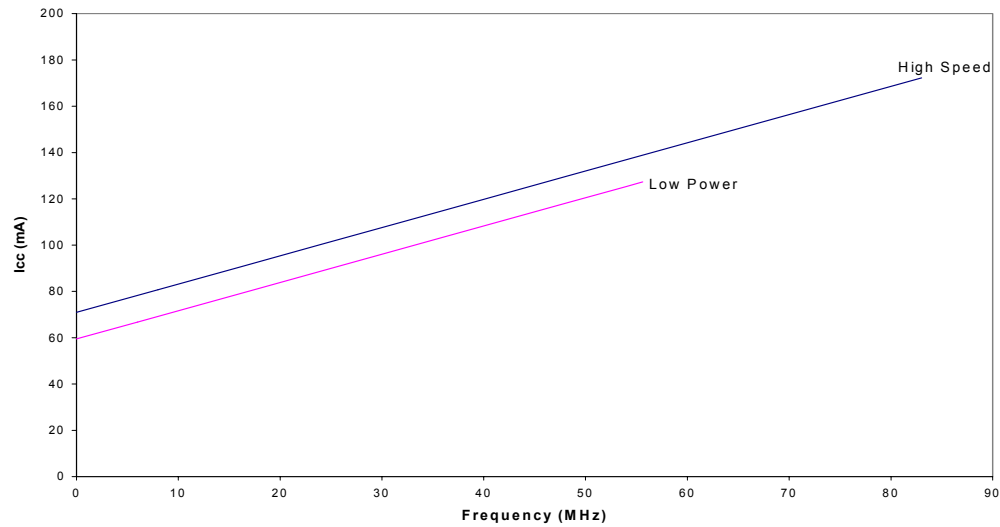
The typical pattern is a 16-bit up counter, per logic block, with outputs disabled.
 $V_{CC} = 5.0V$, $T_A = \text{Room Temperature}$

Typical 3.3V Power Consumption (continued)
CY37064V


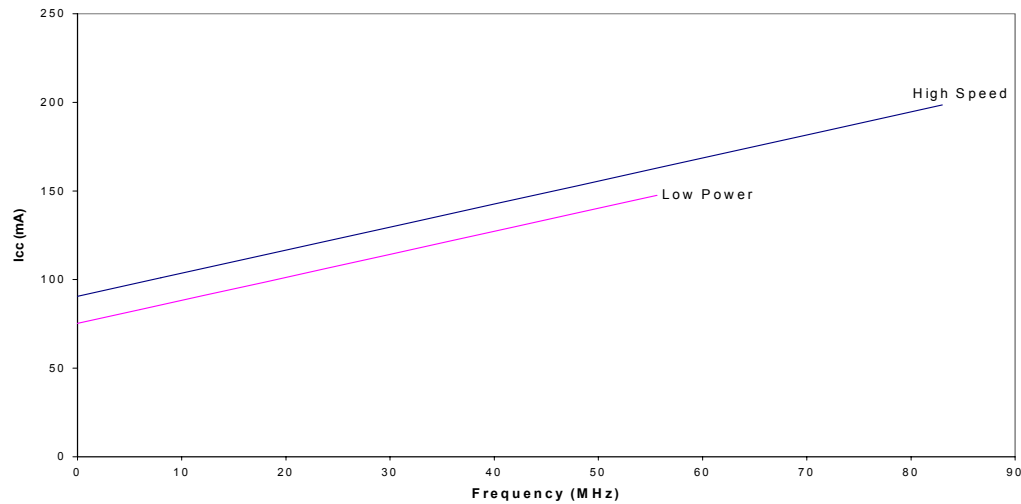
The typical pattern is a 16-bit up counter, per logic block, with outputs disabled.
 $V_{CC} = 3.3V$, $T_A = \text{Room Temperature}$

CY37128V


The typical pattern is a 16-bit up counter, per logic block, with outputs disabled.
 $V_{CC} = 3.3V$, $T_A = \text{Room Temperature}$

Typical 3.3V Power Consumption (continued)
CY37384V


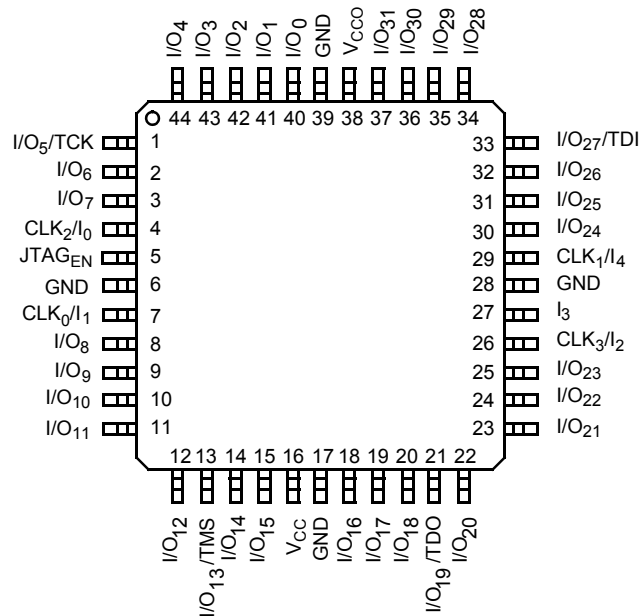
The typical pattern is a 16-bit up counter, per logic block, with outputs disabled.
 $V_{CC} = 3.3V$, $T_A = \text{Room Temperature}$

CY37512V


The typical pattern is a 16-bit up counter, per logic block, with outputs disabled.
 $V_{CC} = 3.3V$, $T_A = \text{Room Temperature}$

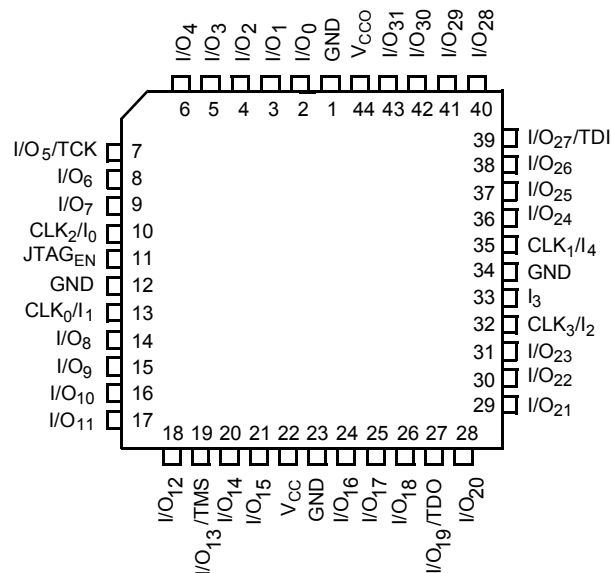
44-pin TQFP (A44)

Top View



44-pin PLCC (J67) / CLCC (Y67)

Top View

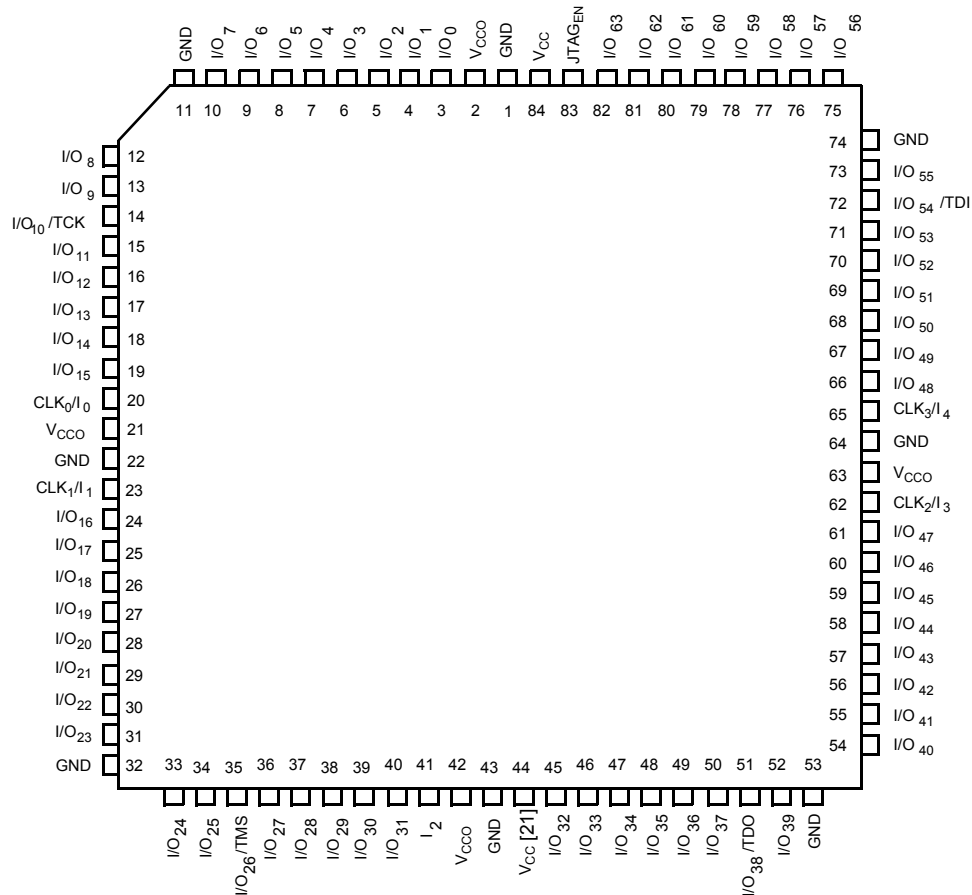


Pin Configurations^[20] (continued)
48-ball Fine-Pitch BGA (BA50)
Top View

	1	2	3	4	5	6	7	8
A	I/O ₅ TCK	V _{CC}	I/O ₃	I/O ₁	I/O ₃₁	I/O ₃₀	V _{CC}	I/O ₂₇ TDI
B	V _{CC}	I/O ₄	I/O ₂	I/O ₀	I/O ₂₉	I/O ₂₈	I/O ₂₆	CLK ₁ /I ₄
C	CLK ₂ /I ₀	I/O ₇	I/O ₆	GND	GND	I/O ₂₅	I/O ₂₄	I ₃
D	JTAG _{EN}	I/O ₈	I/O ₉	GND	GND	I/O ₂₂	I/O ₂₃	CLK ₃ /I ₂
E	CLK ₀ /I ₁	I/O ₁₂	I/O ₁₁	I/O ₁₀	I/O ₁₆	I/O ₂₀	I/O ₂₁	V _{CC}
F	I/O ₁₃ TMS	V _{CC}	I/O ₁₄	I/O ₁₅	I/O ₁₇	I/O ₁₈	V _{CC}	I/O ₁₉ TDO

Note:

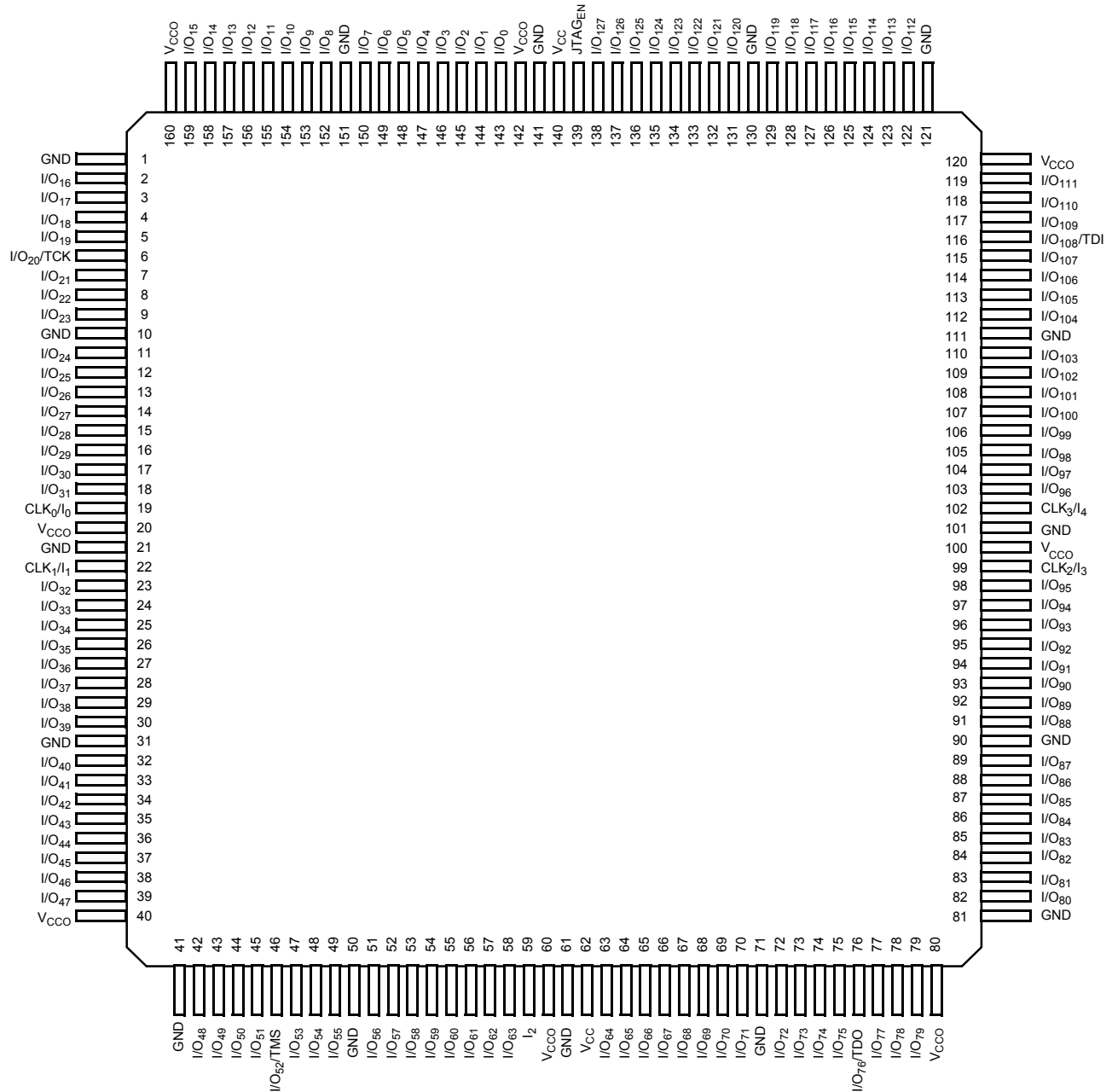
20. For 3.3V versions (Ultra37000V), V_{CCO} = V_{CC}.

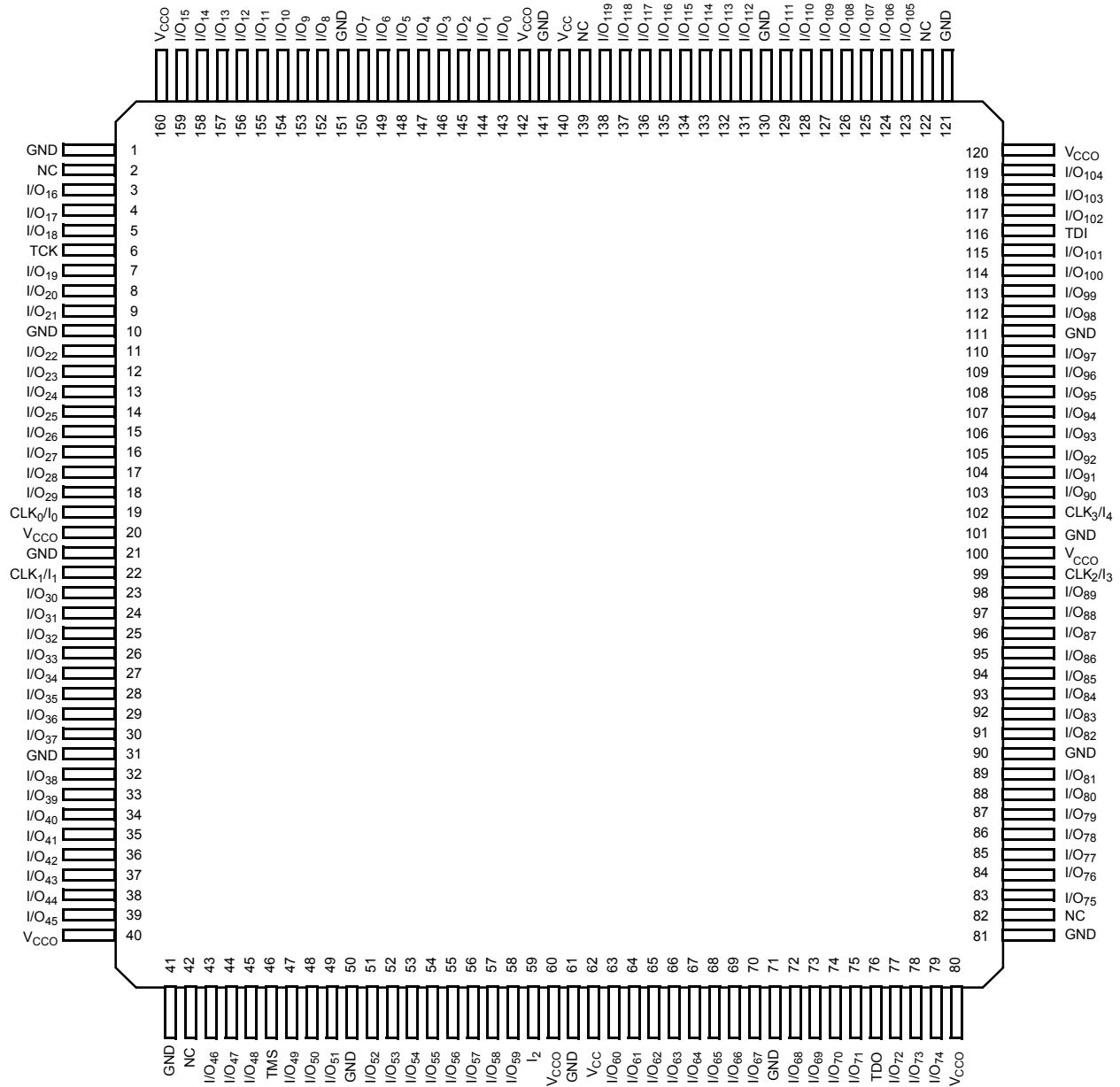
84-lead PLCC (J83) / CLCC (Y84)
Top View

Note:

21. This pin is a N/C, but Cypress recommends that you connect it to V_{CC} to ensure future compatibility.

Pin Configurations^[20] (continued)

160-Lead TQFP (A160) / CQFP (U162)
for CY37128(V) and CY37256(V)
Top View



Pin Configurations^[20] (continued)
**160-Lead TQFP (A160) for CY37192(V)
Top View**


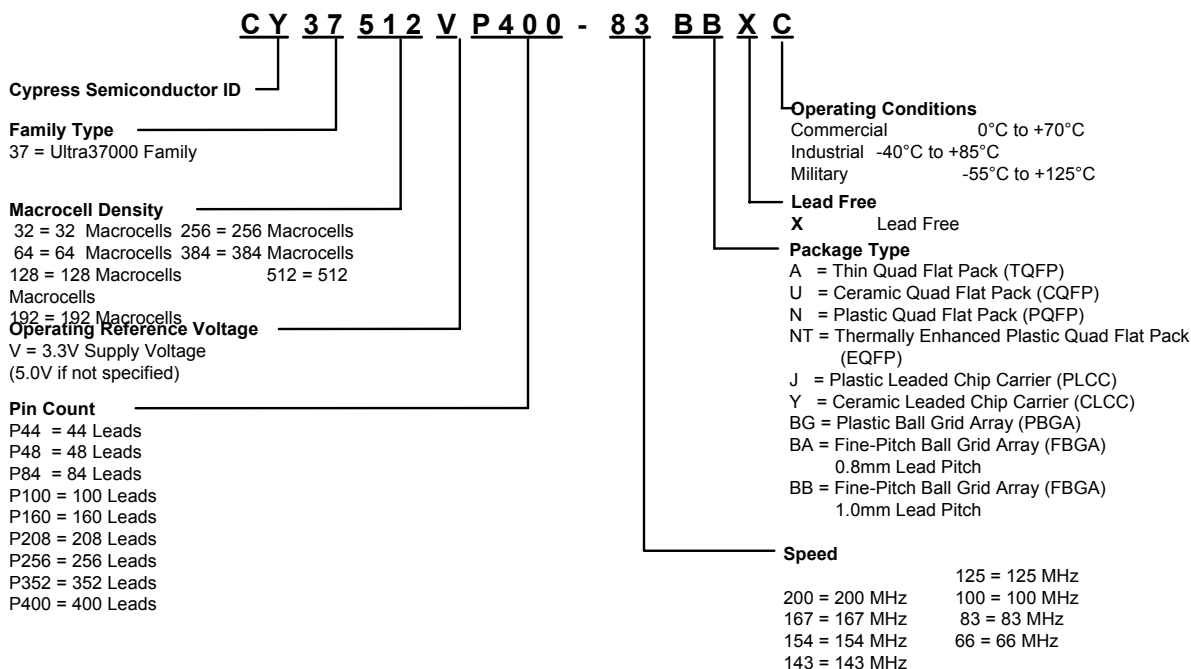
Pin Configurations^[20] (continued)
**292-Ball PBGA (BG292)
Top View**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	GND	I/O ₂₁	NC	I/O ₁₆	I/O ₁₂	I/O ₉	I/O ₇	I/O ₄	I/O ₀	I/O ₁₉₀	I/O ₁₈₉	I/O ₁₈₆	I/O ₁₈₂	NC	I/O ₁₇₈	I/O ₁₇₅	NC	NC	I/O ₁₆₉	I/O ₁₆₈	A
B	I/O ₂₃	I/O ₂₀	I/O ₁₉	I/O ₁₈	I/O ₁₅	I/O ₁₁	I/O ₈	I/O ₅	I/O ₁	I/O ₁₉₁	I/O ₁₈₇	I/O ₁₈₅	I/O ₁₈₁	NC	NC	I/O ₁₇₄	I/O ₁₇₁	I/O ₁₇₀	NC	I/O ₁₆₆	B
C	NC	NC	I/O ₂₂	NC	I/O ₁₇	I/O ₁₄	I/O ₁₀	I/O ₆	I/O ₂	NC	I/O ₁₈₈	I/O ₁₈₄	I/O ₁₈₀	I/O ₁₇₉	I/O ₁₇₆	I/O ₁₇₃	I/O ₁₇₂	I/O ₁₆₇	I/O ₁₆₅	I/O ₁₆₂	C
D	I/O ₂₄	NC	NC	GND	NC	V _{CC0}	I/O ₁₃	GND	I/O ₃	NC	V _{CC}	I/O ₁₈₃	GND	I/O ₁₇₇	V _{CC0}	NC	GND	I/O ₁₆₄	TDI	I/O ₁₆₀	D
E	I/O ₂₇	I/O ₂₆	I/O ₂₅	NC													I/O ₁₆₃	I/O ₁₆₁	I/O ₁₅₉	I/O ₁₅₆	E
F	I/O ₃₀	TCK	I/O ₂₈	V _{CC0}													V _{CC0}	I/O ₁₅₈	NC	I/O ₁₅₄	F
G	I/O ₃₃	I/O ₃₂	I/O ₃₁	I/O ₂₉													I/O ₁₅₇	I/O ₁₅₅	I/O ₁₅₃	I/O ₁₅₂	G
H	I/O ₃₅	NC	I/O ₃₄	GND	GND												GND	I/O ₁₅₁	I/O ₁₅₀	I/O ₁₄₉	H
J	I/O ₃₉	I/O ₃₈	I/O ₃₇	I/O ₃₆	GND												I/O ₁₄₈	I/O ₁₄₇	I/O ₁₄₆	I/O ₁₄₅	J
K	I/O ₄₂	I/O ₄₀	I/O ₄₁	V _{CC}	GND												I/O ₁₄₄	CLK ₃ /I ₄	NC	NC	K
L	I/O ₄₃	I/O ₄₄	I/O ₄₅	I/O ₄₆	GND												V _{CC}	CLK ₂ /I ₃	I/O ₁₄₃	NC	L
M	I/O ₄₇	CLK ₀ /I ₀	CLK ₁ /I ₁	I/O ₄₈	GND												I/O ₁₃₉	I/O ₁₄₀	I/O ₁₄₁	I/O ₁₄₂	M
N	I/O ₄₉	I/O ₅₀	I/O ₅₁	GND	GND												GND	I/O ₁₃₆	I/O ₁₃₇	I/O ₁₃₈	N
P	I/O ₅₂	I/O ₅₃	I/O ₅₅	I/O ₅₈													I/O ₁₃₁	I/O ₁₃₃	I/O ₁₃₄	I/O ₁₃₅	P
R	I/O ₅₄	I/O ₅₆	I/O ₅₉	V _{CC0}													V _{CC0}	I/O ₁₃₀	NC	I/O ₁₃₂	R
T	I/O ₅₇	I/O ₆₀	I/O ₆₂	I/O ₆₅													I/O ₁₂₄	I/O ₁₂₇	I/O ₁₂₈	I/O ₁₂₉	T
U	I/O ₆₁	I/O ₆₃	I/O ₆₆	GND	I/O ₇₆	V _{CC0}	I/O ₈₂	GND	I/O ₉₁	V _{CC}	I/O ₉₈	I/O ₁₀₂	GND	I/O ₁₁₂	V _{CC0}	NC	GND	I/O ₁₂₃	I/O ₁₂₂	I/O ₁₂₆	U
V	I/O ₆₄	I/O ₆₇	I/O ₆₉	I/O ₇₅	I/O ₇₈	I/O ₈₁	I/O ₈₅	I/O ₈₈	I/O ₉₂	I ₂	I/O ₉₇	I/O ₁₀₁	I/O ₁₀₅	I/O ₁₀₉	I/O ₁₁₃	TD0	I/O ₁₁₄	I/O ₁₁₇	I/O ₁₂₁	I/O ₁₂₅	V
W	I/O ₆₈	I/O ₇₀	I/O ₇₂	I/O ₇₄	I/O ₇₉	I/O ₈₃	I/O ₈₆	I/O ₈₉	I/O ₉₃	I/O ₉₅	I/O ₉₆	I/O ₁₀₀	I/O ₁₀₄	I/O ₁₀₇	I/O ₁₁₀	NC	NC	I/O ₁₁₅	I/O ₁₁₈	I/O ₁₂₀	W
Y	I/O ₇₁	I/O ₇₃	I/O ₇₇	TMS	I/O ₈₀	I/O ₈₄	I/O ₈₇	I/O ₉₀	I/O ₉₄	NC	NC	I/O ₉₉	I/O ₁₀₃	I/O ₁₀₆	I/O ₁₀₈	I/O ₁₁₁	NC	NC	I/O ₁₁₆	I/O ₁₁₉	Y
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

Pin Configurations^[20] (continued)
256-Ball Fine-Pitch BGA (BB256)
Top View

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	GND	GND	I/O ₂₆	I/O ₂₄	I/O ₂₀	V _{CC}	I/O ₁₁	GND	GND	I/O ₁₈₆	V _{CC}	I/O ₁₇₇	I/O ₁₇₂	I/O ₁₆₇	GND	GND
B	GND	I/O ₂₇	I/O ₂₅	I/O ₂₃	I/O ₁₉	I/O ₁₅	I/O ₁₀	GND	GND	I/O ₁₈₅	I/O ₁₈₁	I/O ₁₇₆	I/O ₁₇₁	I/O ₁₆₆	I/O ₁₆₅	GND
C	I/O ₂₉	I/O ₂₈	NC	I/O ₂₂	I/O ₁₈	I/O ₁₄	I/O ₉	I/O ₄	I/O ₁₉₁	I/O ₁₈₄	I/O ₁₈₀	I/O ₁₇₅	I/O ₁₇₀	NC	I/O ₁₆₃	I/O ₁₆₄
D	I/O ₃₂	I/O ₃₁	I/O ₃₀	NC	I/O ₁₇	I/O ₁₃	I/O ₈	I/O ₃	I/O ₁₉₀	I/O ₁₈₃	I/O ₁₇₉	I/O ₁₇₄	I/O ₁₆₉	I/O ₁₆₀	I/O ₁₆₁	I/O ₁₆₂
E	I/O ₃₅	I/O ₃₄	I/O ₃₃	I/O ₂₁	I/O ₁₆	I/O ₁₂	I/O ₇	I/O ₂	I/O ₁₈₉	V _{CC}	I/O ₁₇₈	I/O ₁₇₃	I/O ₁₆₈	I/O ₁₅₇	I/O ₁₅₈	I/O ₁₅₉
F	V _{CC}	I/O ₃₈	I/O ₃₇	I/O ₃₆	TCK	V _{CC}	I/O ₆	I/O ₁	I/O ₁₈₈	I/O ₁₈₂	V _{CC}	TDI	I/O ₁₅₄	I/O ₁₅₅	I/O ₁₅₆	V _{CC}
G	I/O ₄₃	I/O ₄₂	I/O ₄₁	I/O ₄₀	V _{CC}	I/O ₃₉	I/O ₅	I/O ₀	I/O ₁₈₇	I/O ₁₄₈	I/O ₁₄₉	CLK ₃ /I ₄	I/O ₁₅₀	I/O ₁₅₁	I/O ₁₅₂	I/O ₁₅₃
H	GND	GND	I/O ₄₇	I/O ₄₆	CLK ₀ /I ₀	I/O ₄₅	I/O ₄₄	GND	GND	I/O ₁₄₄	I/O ₁₄₅	CLK ₂ /I ₃	I/O ₁₄₆	I/O ₁₄₇	GND	GND
J	GND	GND	I/O ₅₁	I/O ₅₀	NC	I/O ₄₉	I/O ₄₈	GND	GND	I/O ₁₄₀	I/O ₁₄₁	I ₂	I/O ₁₄₂	I/O ₁₄₃	GND	GND
K	I/O ₅₇	I/O ₅₆	I/O ₅₅	I/O ₅₄	CLK ₁ /I ₁	I/O ₅₃	I/O ₅₂	I/O ₉₁	I/O ₉₆	I/O ₁₀₁	I/O ₁₃₅	V _{CC}	I/O ₁₃₆	I/O ₁₃₇	I/O ₁₃₈	I/O ₁₃₉
L	V _{CC}	I/O ₆₀	I/O ₅₉	I/O ₅₈	TMS	V _{CC}	I/O ₈₆	I/O ₉₂	I/O ₉₇	I/O ₁₀₂	V _{CC}	TDO	I/O ₁₃₂	I/O ₁₃₃	I/O ₁₃₄	V _{CC}
M	I/O ₆₃	I/O ₆₂	I/O ₆₁	I/O ₇₂	I/O ₇₇	I/O ₈₂	V _{CC}	I/O ₉₃	I/O ₉₈	I/O ₁₀₃	I/O ₁₀₈	I/O ₁₁₂	I/O ₁₁₇	I/O ₁₂₉	I/O ₁₃₀	I/O ₁₃₁
N	I/O ₆₆	I/O ₆₅	I/O ₆₄	I/O ₇₃	I/O ₇₈	I/O ₈₃	I/O ₈₇	I/O ₉₄	I/O ₉₉	I/O ₁₀₄	I/O ₁₀₉	I/O ₁₁₃	NC	I/O ₁₂₆	I/O ₁₂₇	I/O ₁₂₈
P	I/O ₆₈	I/O ₆₇	NC	I/O ₇₄	I/O ₇₉	I/O ₈₄	I/O ₈₈	I/O ₉₅	I/O ₁₀₀	I/O ₁₀₅	I/O ₁₁₀	I/O ₁₁₄	I/O ₁₁₈	NC	I/O ₁₂₄	I/O ₁₂₅
R	GND	I/O ₆₉	I/O ₇₀	I/O ₇₅	I/O ₈₀	I/O ₈₅	I/O ₈₉	GND	GND	I/O ₁₀₆	I/O ₁₁₁	I/O ₁₁₅	I/O ₁₁₉	I/O ₁₂₁	I/O ₁₂₃	GND
T	GND	GND	I/O ₇₁	I/O ₇₆	I/O ₈₁	V _{CC}	I/O ₉₀	GND	GND	I/O ₁₀₇	V _{CC}	I/O ₁₁₆	I/O ₁₂₀	I/O ₁₂₂	GND	GND

Ordering Information



5.0V Ordering Information

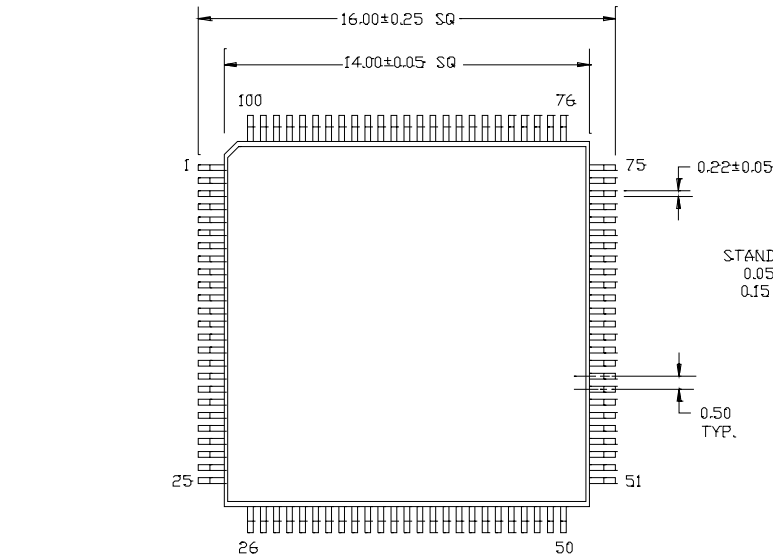
Macrocells	Speed (MHz)	Ordering Code	Package Name	Package Type	Operating Range
32	200	CY37032P44-200AC	A44	44-Lead Thin Quad Flat Pack	Commercial
		CY37032P44-200AXC	A44	44-Lead Lead Free Thin Quad Flat Pack	
		CY37032P44-200JC	J67	44-Lead Plastic Leaded Chip Carrier	
		CY37032P44-200JXC	J67	44-Lead Lead Free Plastic Leaded Chip Carrier	
	154	CY37032P44-154AC	A44	44-Lead Thin Quad Flat Pack	Commercial
		CY37032P44-154JC	J67	44-Lead Plastic Leaded Chip Carrier	
		CY37032P44-154AI	A44	44-Lead Thin Quad Flat Pack	Industrial
		CY37032P44-154AXI	A44	44-Lead Lead Free Thin Quad Flat Pack	
		CY37032P44-154JI	J67	44-Lead Plastic Leaded Chip Carrier	
		CY37032P44-154JXI	J67	44-Lead Lead Free Plastic Leaded Chip Carrier	
	125	CY37032P44-125AC	A44	44-Lead Thin Quad Flat Pack	Commercial
		CY37032P44-125AXC	A44	44-Lead Lead Free Thin Quad Flat Pack	
		CY37032P44-125JC	J67	44-Lead Plastic Leaded Chip Carrier	
		CY37032P44-125JXC	J67	44-Lead Lead Free Plastic Leaded Chip Carrier	
		CY37032P44-125AI	A44	44-Lead Thin Quad Flat Pack	Industrial
		CY37032P44-125JI	J67	44-Lead Plastic Leaded Chip Carrier	
64	200	CY37064P44-200AC	A44	44-Lead Thin Quad Flat Pack	Commercial
		CY37064P44-200AXC	A44	44-Lead Lead Free Thin Quad Flat Pack	
		CY37064P44-200JC	J67	44-Lead Plastic Leaded Chip Carrier	
		CY37064P44-200JXC	J67	44-Lead Lead Free Plastic Leaded Chip Carrier	
		CY37064P84-200JC	J83	84-Lead Plastic Leaded Chip Carrier	
		CY37064P100-200AC	A100	100-Lead Thin Quad Flat Pack	
		CY37064P100-200AXC	A100	100-Lead Lead Free Thin Quad Flat Pack	

5.0V Ordering Information (continued)

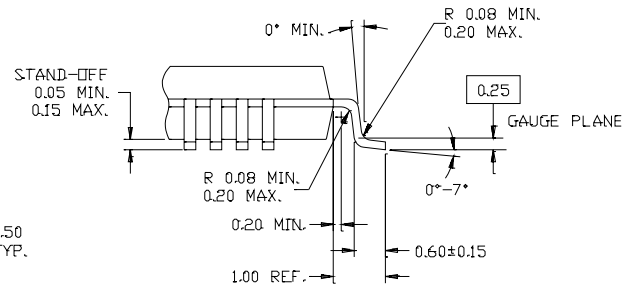
Macrocells	Speed (MHz)	Ordering Code	Package Name	Package Type	Operating Range
128	167	CY37128P84-167JC	J83	84-Lead Plastic Leaded Chip Carrier	Commercial
		CY37128P84-167JXC	J83	84-Lead Lead Free Plastic Leaded Chip Carrier	
		CY37128P100-167AC	A100	100-Lead Thin Quad Flat Pack	
		CY37128P100-167AXC	A100	100-Lead Lead Free Thin Quad Flat Pack	
		CY37128P160-167AC	A160	160-Lead Thin Quad Flat Pack	
		CY37128P160-167AXC	A160	160-Lead Lead Free Thin Quad Flat Pack	
	125	CY37128P84-125JC	J83	84-Lead Plastic Leaded Chip Carrier	Commercial
		CY37128P84-125JXC	J83	84-Lead Lead Free Plastic Leaded Chip Carrier	
		CY37128P100-125AC	A100	100-Lead Thin Quad Flat Pack	
		CY37128P100-125AXC	A100	100-Lead Lead Free Thin Quad Flat Pack	
		CY37128P160-125AC	A160	160-Lead Thin Quad Flat Pack	
		CY37128P160-125AXC	A160	160-Lead Lead Free Thin Quad Flat Pack	
		CY37128P84-125JI	J83	84-Lead Plastic Leaded Chip Carrier	Industrial
		CY37128P84-125JXI	J83	84-Lead Lead Free Plastic Leaded Chip Carrier	
		CY37128P100-125AI	A100	100-Lead Thin Quad Flat Pack	
		CY37128P100-125AXI	A100	100-Lead Lead Free Thin Quad Flat Pack	
		CY37128P160-125AI	A160	160-Lead Thin Quad Flat Pack	
		CY37128P160-125AXI	A160	160-Lead Lead Free Thin Quad Flat Pack	
		5962-9952102QYA	Y84	84-Lead Ceramic Leaded Chip Carrier	Military
	100	CY37128P84-100JC	J83	84-Lead Plastic Leaded Chip Carrier	Commercial
		CY37128P84-100JXC	J83	84-Lead Lead Free Plastic Leaded Chip Carrier	
		CY37128P100-100AC	A100	100-Lead Thin Quad Flat Pack	
		CY37128P100-100AXC	A100	100-Lead Lead Free Thin Quad Flat Pack	
		CY37128P160-100AC	A160	160-Lead Thin Quad Flat Pack	
		CY37128P160-100AXC	A160	160-Lead Lead Free Thin Quad Flat Pack	
		CY37128P84-100JI	J83	84-Lead Plastic Leaded Chip Carrier	Industrial
		CY37128P100-100AI	A100	100-Lead Thin Quad Flat Pack	
		CY37128P100-100AXI	A100	100-Lead Lead Free Thin Quad Flat Pack	
		CY37128P160-100AI	A160	160-Lead Thin Quad Flat Pack	
		5962-9952101QYA	Y84	84-Lead Ceramic Leaded Chip Carrier	Military
192	154	CY37192P160-154AC	A160	160-Lead Thin Quad Flat Pack	Commercial
		CY37192P160-154AXC	A160	160-Lead Lead Free Thin Quad Flat Pack	
	125	CY37192P160-125AC	A160	160-Lead Thin Quad Flat Pack	Commercial
		CY37192P160-125AXC	A160	160-Lead Lead Free Thin Quad Flat Pack	
		CY37192P160-125AI	A160	160-Lead Thin Quad Flat Pack	Industrial
		CY37192P160-125AXI	A160	160-Lead Lead Free Thin Quad Flat Pack	
	83	CY37192P160-83AC	A160	160-Lead Thin Quad Flat Pack	Commercial
		CY37192P160-83AXC	A160	160-Lead Lead Free Thin Quad Flat Pack	
		CY37192P160-83AI	A160	160-Lead Thin Quad Flat Pack	Industrial
		CY37192P160-83AXI	A160	160-Lead Lead Free Thin Quad Flat Pack	

Package Diagrams (continued)

100-Lead Lead (Pb)-Free Thin Plastic Quad Flat Pack (TQFP) A100



DIMENSIONS ARE IN MILLIMETERS.

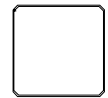


DETAIL A

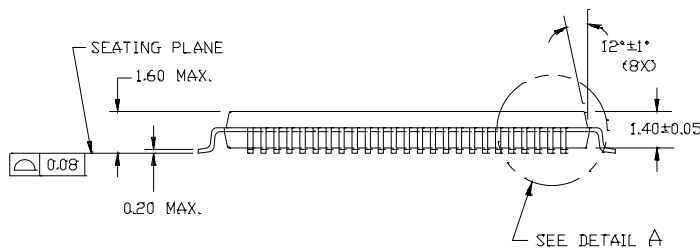
NOTE: PKG. CAN HAVE



OR

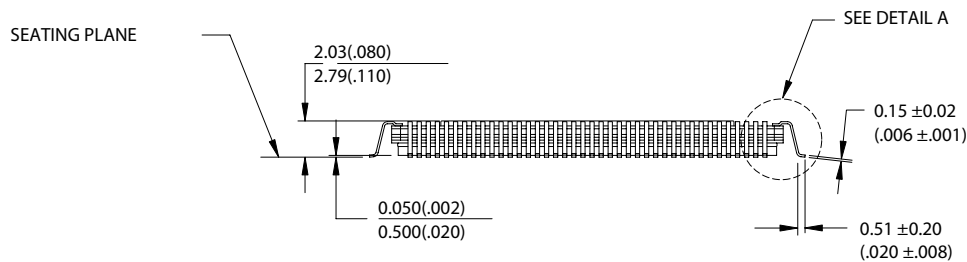
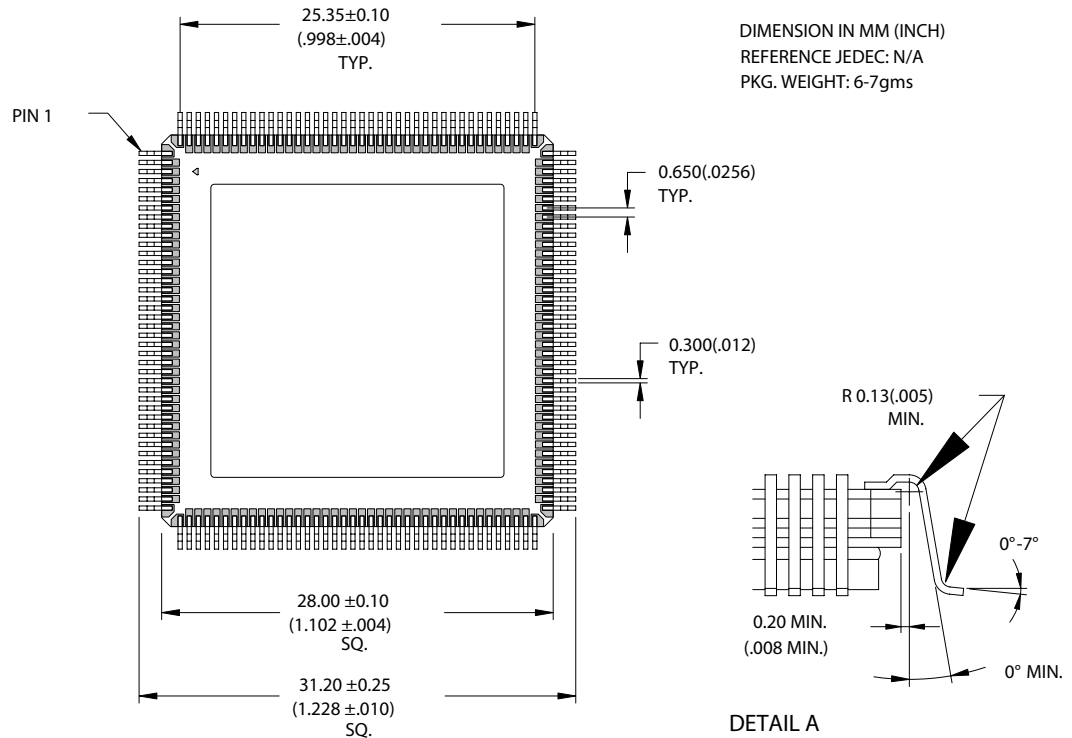


51-85048-*B



Package Diagrams (continued)

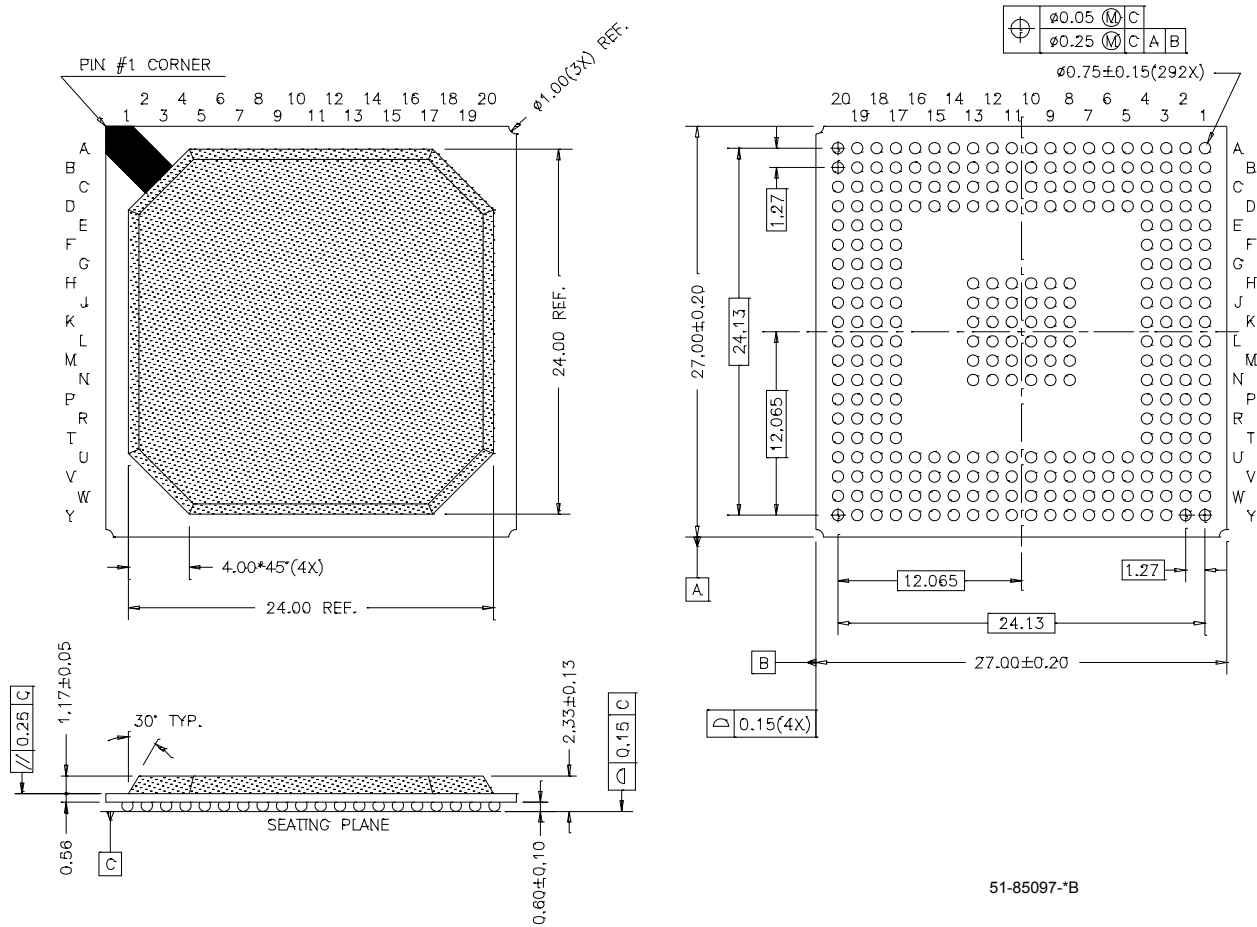
160-Lead Ceramic Quad Flatpack (Cavity Up) U162



51-80106-*A

Package Diagrams (continued)

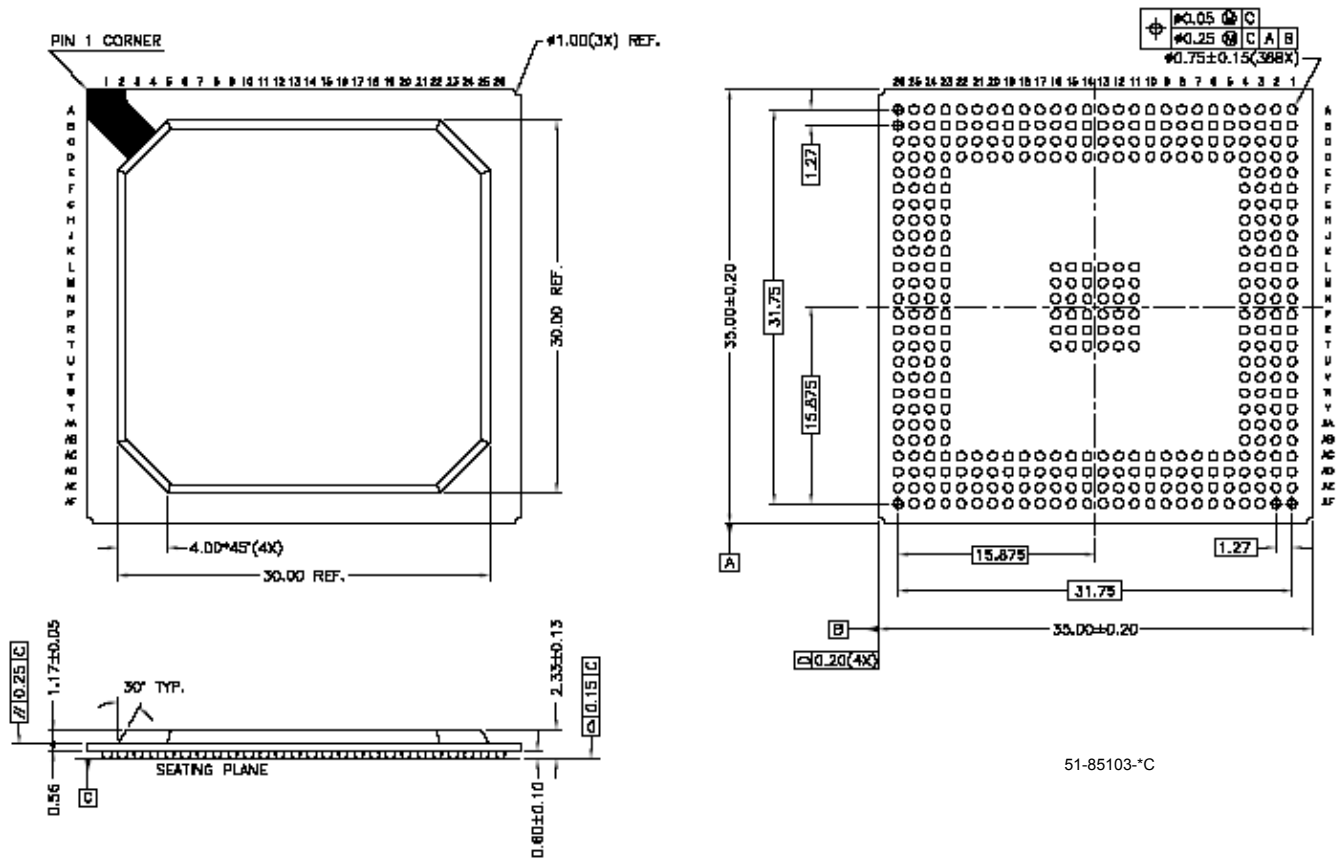
292-Ball Plastic Ball Grid Array PBGA (27 x 27 x 2.33 mm) BG292



51-85097-*B

Package Diagrams (continued)

388-Ball Plastic Ball Grid Array PBGA (35 x 35 x 2.33 mm) BG388



51-85103-°C

Document History Page

Document Title: Ultra37000 CPLD Family 5V, 3.3V, ISR™ High-Performance CPLDs Document Number: 38-03007				
REV.	ECN NO.	Issue Date	Orig. of Change	Description of Change
**	106272	04/18/01	SZV	Change from Spec number: 38-00475 to 38-03007
*A	124942	03/21/03	OOR	Updated 3.3V V _{CC} requirements for –144 speeds Added an Addendum
*B	126262	05/09/03	TEH	Changed pinout for CY37128V BB100 package
*C	128125	07/16/03	HOM	Obsoleted following 3.3V PLCC packaged devices: CY37032VP44-143JC CY37032VP44-100JC CY37032VP44-100JI CY37064VP44-143JC CY37064VP84-143JC CY37064VP44-100JC CY37064VP84-100JC CY37064VP44-100JI CY37064VP84-100JI CY37128VP84-125JC CY37128VP84-83JC CY37128VP84-83JI
*D	282709	See ECN	YDT	Changed package diagrams and labels for consistency Added Lead (Pb)-free logo on first page, as well as a note in Features Added Lead (Pb)-free package diagram labels Added Lead-free Parts to Ordering Information CY37032P44-200AXC, CY37032P44-200JXC, CY37032P44-154AXI, CY37032P44-154JXI, CY37032P44-125AXC, CY37032P44-125JXC, CY37064P44-200AXC, CY37064P44-200JXC, CY37064P100-200AXC, CY37064P44-154AXI, CY37064P44-154JXI, CY37064P44-125AXC, CY37064P44-125JXC, CY37064P100-125AXC, CY37064P44-125AXI, CY37064P100-125AXI, CY37128P84-167JXC, CY37128P100-167AXC, CY37128P160-167AXC, CY37128P84-125JXC, CY37128P100-125AXC, CY37128P160-125AXC, CY37128P84-125JXI, CY37128P100-125AXI, CY37128P160-125AXI, CY37128P84-100JXC, CY37128P100-100AXC, CY37128P160-100AXC, CY37128P100-100AXI, CY37192P160-154AXC, CY37192P160-125AXC, CY37192P160-125AXI, CY37192P160-83AXC, CY37192P160-83AXI, CY37256P160-154AXC, CY37256P160-125AXC, CY37256P160-125AXI, CY37256P160-83AXC, CY37256P160-83AXI, CY37032VP44-143AXC, CY37032VP44-100AXC, CY37032VP44-100AXI, CY37032VP44-100JXI, CY37064VP44-143AXC, CY37064VP100-143AXC, CY37064VP44-100AXC, CY37064VP100-100AXC, CY37064VP44-100AXI, CY37064VP100-100AXI, CY37128VP100-125AXC, CY37128VP160-125AXC, CY37128VP160-125AXI, CY37128VP100-83AXC, CY37128VP160-83AXC, CY37128VP100-83AXI, CY37128VP160-83AXI, CY37192VP160-100AXC, CY37192VP160-66AXC, CY37256VP160-100AXC, CY37256VP160-100AXI, CY37256VP160-66AXC
*E	321635	See ECN	PCX	Added Package Diagram BG292 Updated all PBGA package type information (BG292 & BG388)