Cyclone® III EP3C55 Device Pin-Out
PT-EP3C55-1.2

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Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
B1	VREFB1N0	VCCD_PLL3			F6	J9							
B1	VREFB1N0	GNDA3			F5	H9							
B1	VREFB1N0	VCCA3			G6	J8							
B1	VREFB1N0	IO	DIFFIO_L1p		G4	D3							Adj.
B1	VREFB1N0	IO	DIFFIO_L1n		G3	C2				DQ2L	DQ1L	DQ1L	Adj.
B1	VREFB1N0	IO	DIFFIO_L2p		B2	D2	DQ2L	DQ1L	DQ1L	DQ2L	DQ1L	DQ1L	Sep.
B1	VREFB1N0	IO	DIFFIO_L2n		B1	D1	DQ2L	DQ1L	DQ1L	DQ2L	DQ1L	DQ1L	Sep.
B1	VREFB1N0	IO	VREFB1N0		G5	H7							
B1	VREFB1N0	IO	DIFFIO_L3p	nRESET	E4	G6	DQ2L	DQ1L	DQ1L	DQ2L	DQ1L	DQ1L	Sep.
B1	VREFB1N0	IO	DIFFIO_L3n		E3	G5	DQ2L	DQ1L	DQ1L	DQ2L	DQ1L	DQ1L	Sep.
B1	VREFB1N0	IO	DIFFIO_L4p		C2	E3	DQS2L/CQ3L, CDPCLK0	DQS2L/CQ3L, CDPCLK0	DQS2L/CQ3L, CDPCLK0	DQS2L/CQ3L, CDPCLK0	DQS2L/CQ3L, CDPCLK0	DQS2L/CQ3L, CDPCLK0	Sep.
B1	VREFB1N0	IO	DIFFIO_L4n		C1	F3	DQ2L	DQ1L	DQ1L	DQ2L	DQ1L	DQ1L	Sep.
B1	VREFB1N0	IO	DIFFIO_L5p		D2	F5	DQ2L	DQ1L	DQ1L	DQ2L	DQ1L	DQ1L	Adj.
B1	VREFB1N0	IO	DIFFIO_L5n	DATA1, ASDO	D1	F4							Adj.
B1	VREFB1N0	IO			H7	H6							
B1	VREFB1N0	IO	DIFFIO_L6p		H6	G4	DQ2L	DQ1L	DQ1L	DQ2L	DQ1L	DQ1L	Adj.
B1	VREFB1N0	IO	DIFFIO_L6n		J6	G3	DQ2L	DQ1L	DQ1L				Adj.
B1	VREFB1N0	IO	DIFFIO_L7p		H4	H4							Sep.
B1	VREFB1N0	IO	DIFFIO_L7n		H3	H3							Sep.
B1	VREFB1N0	IO	DIFFIO_L8p	FLASH_nCE, nCSO	E2	E2							Adj.
B1	VREFB1N0	IO	DIFFIO_L8n		E1	E1		DQ1L	DQ1L		DQ1L	DQ1L	Adj.
B1	VREFB1N0	IO	DIFFIO_L9p		F2	F2	DM2L	DM1L0/BWS#1L0	DM1L0/BWS#1L0	DM2L	DM1L0/BWS#1L0	DM1L0/BWS#1L0	Sep.
B1	VREFB1N1	IO	DIFFIO_L9n		F1	F1	DQ0L	DQ1L	DQ1L	DQ0L	DQ1L	DQ1L	Sep.
B1	VREFB1N1	IO			J5	H5							
B1	VREFB1N1	IO	VREFB1N1		H5	L5							
B1	VREFB1N1	IO	DIFFIO_L10p			J4							Adj.
B1	VREFB1N1	IO	DIFFIO_L10n			J3				DQ0L	DQ1L	DQ1L	Adj.
B1	VREFB1N1	nSTATUS		nSTATUS	K6	M6							
B1	VREFB1N1	IO	DIFFIO_L11p		J7	G2				DQ0L	DQ1L	DQ1L	Adj.
B1	VREFB1N1	IO	DIFFIO_L11n		K7	G1							Adj.
B1	VREFB1N1	IO	DIFFIO_L12p		J4	K2	DQS0L/CQ1L, DPCLK0	DQS0L/CQ1L, DPCLK0	DQS0L/CQ1L, DPCLK0	DQS0L/CQ1L, DPCLK0	DQS0L/CQ1L, DPCLK0	DQS0L/CQ1L, DPCLK0	Sep.
B1	VREFB1N1	IO	DIFFIO_L12n			K1				DQ0L	DQ1L	DQ1L	Sep.
B1	VREFB1N1	IO	DIFFIO_L13p		H2	M5	DQ0L	DQ1L	DQ1L				Adj.
B1	VREFB1N1	IO	DIFFIO_L13n		H1	L1	DQ0L	DQ1L	DQ1L	DQ0L	DQ1L	DQ1L	Adj.
B1	VREFB1N1	IO	DIFFIO_L14p			M2							Adj.
B1	VREFB1N1	IO	DIFFIO_L14n		J3	M1				DQ0L	DQ1L	DQ1L	Adj.
B1	VREFB1N1	IO	DIFFIO_L15p		J2	P2	DQ0L	DQ1L	DQ1L				Sep.
B1	VREFB1N1	IO	DIFFIO_L15n		J1	P1	DQ0L	DQ1L	DQ1L	DQ0L	DQ1L	DQ1L	Sep.
B1	VREFB1N1	DCLK		DCLK	K2	P3							
B1	VREFB1N1	IO		DATA0	K1	N7							
B1	VREFB1N1	nCONFIG		nCONFIG	K5	P4							
B1	VREFB1N1	TDI		TDI	L5	P7							
B1	VREFB1N1	TCK		TCK	L2	P5							
B1	VREFB1N1	TMS		TMS	L1	P8							
B1	VREFB1N1	TDO		TDO	L4	P6							
B1	VREFB1N1	nCE		nCE	L3	R8							
B1	VREFB1N1	CLK0	DIFFCLK_0p		G2	J2							
B1	VREFB1N1	CLK1	DIFFCLK_0n		G1	J1							
B2	VREFB2N0	CLK2	DIFFCLK_1p		T2	Y2							
B2	VREFB2N0	CLK3	DIFFCLK_1n		T1	Y1							
B2	VREFB2N0	IO	DIFFIO_L16p		L6	R2	DQ0L	DQ1L	DQ1L	DQ0L	DQ1L	DQ1L	Sep.
B2	VREFB2N0	IO	DIFFIO_L16n		M6	R1	DQ0L	DQ1L	DQ1L		DQ1L	DQ1L	Sep.

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
B2	VREFB2N0	IO	DIFFIO_L17p		M2	U3	DQ0L	DQ1L	DQ1L	DM0L	DM1L1/BWS#1L1	DM1L1/BWS#1L1	Adj.
B2	VREFB2N0	IO	DIFFIO_L17n		M1	U4		DQ1L	DQ1L				Adj.
B2	VREFB2N0	IO	DIFFIO_L18p		M4	R3	DM0L	DM1L1/BWS#1L1	DM1L1/BWS#1L1	DQ1L	DQ3L	DQ1L	Sep.
B2	VREFB2N0	IO	DIFFIO_L18n		M3	R4	DQ1L	DQ3L	DQ1L	DQ1L	DQ3L	DQ1L	Sep.
B2	VREFB2N0	IO	DIFFIO_L19p		N2	T4	DQ1L	DQ3L	DQ1L	DQ1L	DQ3L	DQ1L	Adj.
B2	VREFB2N0	IO	DIFFIO_L19n		N1	T3	DQ1L	DQ3L	DQ1L				Adj.
B2	VREFB2N0	IO				R5				DQ1L	DQ3L	DQ1L	
B2	VREFB2N0	IO	VREFB2N0		M5	T7							
B2	VREFB2N0	IO	DIFFIO_L20p		P2	U2	DQ1L	DQ3L	DQ1L				Sep.
B2	VREFB2N0	IO	DIFFIO_L20n		P1	U1	DQ1L	DQ3L	DQ1L	DQ1L	DQ3L	DQ1L	Sep.
B2	VREFB2N0	IO	DIFFIO_L21p		R2	V4	DQ1L	DQ3L	DQ1L	DQ1L	DQ3L	DQ1L	Adj.
B2	VREFB2N0	IO	DIFFIO_L21n		R1	V3	DQ1L	DQ3L	DQ1L				Adj.
B2	VREFB2N0	IO	DIFFIO_L22p			V2				DQ1L	DQ3L	DQ1L	Sep.
B2	VREFB2N0	IO	DIFFIO_L22n		N5	V1	DQ1L	DQ3L	DQ1L	DQ1L	DQ3L	DQ1L	Sep.
B2	VREFB2N0	IO	DIFFIO_L23p		P4	AB2	DQS1L/CQ1L#, DPCLK1	DQS1L/CQ1L#, DPCLK1	DQS1L/CQ1L#, DPCLK1	DQS1L/CQ1L#, DPCLK1	DQS1L/CQ1L#, DPCLK1	DQS1L/CQ1L#, DPCLK1	Adj.
B2	VREFB2N0	IO	DIFFIO_L23n		P3	AB1	DQ1L	DQ3L	DQ1L				Adj.
B2	VREFB2N0	IO	DIFFIO_L24p		U2	W2	DM1L/BWS#1L	DM3L0/BWS#3L0	DM1L2/BWS#1L2	DQ1L	DQ3L	DQ1L	Sep.
B2	VREFB2N0	IO	DIFFIO_L24n		U1	W1	DQ3L	DQ3L	DQ1L	DM1L/BWS#1L	DM3L0/BWS#3L0	DM1L2/BWS#1L2	Sep.
B2	VREFB2N0	IO	DIFFIO_L25p		V2	U6	DQ3L	DQ3L	DQ1L	DQ3L	DQ3L	DQ1L	Adj.
B2	VREFB2N1	IO	DIFFIO_L25n		V1	U5	DQ3L	DQ3L	DQ1L				Adj.
B2	VREFB2N1	IO	DIFFIO_L26p		P5	Y4				DQ3L	DQ3L	DQ1L	Adj.
B2	VREFB2N1	IO	DIFFIO_L26n		N6	Y3	DQ3L	DQ3L	DQ1L				Adj.
B2	VREFB2N1	IO	DIFFIO_L27p		R4	AC2				DQ3L	DQ3L	DQ1L	Sep.
B2	VREFB2N1	IO	DIFFIO_L27n		R3	AC1				DQ3L	DQ3L	DQ1L	Sep.
B2	VREFB2N1	IO	DIFFIO_L28p		W2	AC3	DQ3L	DQ3L	DQ1L	DQ3L	DQ3L	DQ1L	Adj.
B2	VREFB2N1	IO	DIFFIO_L28n		W1	AD3	DQ3L	DQ3L	DQ1L				Adj.
B2	VREFB2N1	IO	DIFFIO_L29p		Y2	AD2	DQ3L	DQ3L	DQ1L	DQ3L	DQ3L	DQ1L	Adj.
B2	VREFB2N1	IO	DIFFIO_L29n		Y1	AD1	DQ3L	DQ3L	DQ1L				Adj.
B2	VREFB2N1	IO				AB3				DQ3L	DQ3L	DQ1L	
B2	VREFB2N1	IO	VREFB2N1		T3	T8							
B2	VREFB2N1	IO	DIFFIO_L30p		N7								Sep.
B2	VREFB2N1	IO	DIFFIO_L30n		P7								Sep.
B2	VREFB2N1	IO	DIFFIO_L31p		AA2	AA4				DQ3L	DQ3L	DQ1L	Adj.
B2	VREFB2N1	IO	DIFFIO_L31n		AA1	AA3	DQ3L	DQ3L	DQ1L				Adj.
B2	VREFB2N1	IO	RUP1		V4	U7							
B2	VREFB2N1	IO	RDN1		V3	U8							
B2	VREFB2N1	IO	DIFFIO_L32p		P6	AE2				DQ3L	DQ3L	DQ1L	Adj.
B2	VREFB2N1	IO	DIFFIO_L32n		R5	AB4							Adj.
B2	VREFB2N1	IO			T4	AE3	DQS3L/CQ3L#, CDPCLK1	DQS3L/CQ3L#, CDPCLK1	DQS3L/CQ3L#, CDPCLK1	DQS3L/CQ3L#, CDPCLK1	DQS3L/CQ3L#, CDPCLK1	DQS3L/CQ3L#, CDPCLK1	
B2	VREFB2N1	IO	DIFFIO_L33p		T5	AF2	DM3L/BWS#3L	DM3L1/BWS#3L1	DM1L3/BWS#1L3	DM3L/BWS#3L	DM3L1/BWS#3L1	DM1L3/BWS#1L3	Sep.
B2	VREFB2N1	IO	DIFFIO_L33n		R6	AE1							Sep.
B2	VREFB2N1	VCCA1			T6	Y8							
B2	VREFB2N1	GNDA1			U5	AA9							
B2	VREFB2N1	VCCD_PLL1			U6	Y9							
B3	VREFB3N1	IO	DIFFIO_B1p		V6	AD5							Res.
B3	VREFB3N1	IO	DIFFIO_B1n		V5	AE6	DM3B/BWS#3B	DM3B1/BWS#3B1	DM5B3/BWS#5B3	DM1B			Res.
B3	VREFB3N1	IO	DIFFIO_B2p		U7	AD4							Res.
B3	VREFB3N1	IO	DIFFIO_B2n		U8	AF4				DQ1B			Res.
B3	VREFB3N1	IO	DIFFIO_B3p		Y4	AE4							Res.
B3	VREFB3N1	IO	DIFFIO_B3n		Y3	AG3	DQ3B	DQ3B	DQ5B	DQ1B			Res.
B3	VREFB3N1	IO			Y6	AD7	DQS1B/CQ1B#, CDPCLK2	DQS1B/CQ1B#, CDPCLK2	DQS1B/CQ1B#, CDPCLK2	DQS1B/CQ1B#, CDPCLK2	DQS1B/CQ1B#, CDPCLK2	DQS1B/CQ1B#, CDPCLK2	

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
B3	VREFB3N1	IO	PLL1_CLKOUTp		AA3	AE5							
B3	VREFB3N1	IO	PLL1_CLKOUTn		AB3	AF5							
B3	VREFB3N1	IO	DIFFIO_B4p		W6	AH3	DQ3B	DQ3B	DQ5B	DQ1B			Res.
B3	VREFB3N1	IO	DIFFIO_B4n		V7	AF3							Res.
B3	VREFB3N1	IO			AA4	AF6	DQ3B	DQ3B	DQ5B	DQ1B			
B3	VREFB3N1	IO	VREFB3N1		AB4	Y10							
B3	VREFB3N1	IO	DIFFIO_B5p		AA5	AG4	DQ3B	DQ3B	DQ5B				Res.
B3	VREFB3N1	IO	DIFFIO_B5n		AA6	AH4				DQ1B			Res.
B3	VREFB3N1	IO	DIFFIO_B6p		AB6	AD8				DQ1B			Res.
B3	VREFB3N1	IO	DIFFIO_B6n		AB5	AC7							Res.
B3	VREFB3N1	IO	DIFFIO_B7p		W7	AG6	DQ3B	DQ3B	DQ5B	DQ1B			Res.
B3	VREFB3N1	IO	DIFFIO_B7n		Y7	AH6	DQ3B	DQ3B	DQ5B	DQ1B			Res.
B3	VREFB3N1	IO	DIFFIO_B8p		U9	AB9	DQ3B	DQ3B	DQ5B	DM3B/BWS#3B	DM3B1/BWS#3B1	DM5B3/BWS#5B3	Res.
B3	VREFB3N1	IO	DIFFIO_B8n		V8	AB8	DQ3B	DQ3B	DQ5B				Res.
B3	VREFB3N1	IO			W8	AD10	DQ3B	DQ3B	DQ5B	DQ3B	DQ3B	DQ5B	
B3	VREFB3N1	IO	DIFFIO_B9p			AG7				DQ3B	DQ3B	DQ5B	Res.
B3	VREFB3N1	IO	DIFFIO_B9n			AH7				DQ3B	DQ3B	DQ5B	Res.
B3	VREFB3N1	IO	DIFFIO_B10p		AA7	AB7	DM5B/BWS#5B	DM3B0/BWS#3B0	DM5B2/BWS#5B2				Res.
B3	VREFB3N1	IO	DIFFIO_B10n		AB7	AC8	DQ5B	DQ3B	DQ5B	DQ3B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B11p		Y8	AA8	DQ5B	DQ3B	DQ5B				Res.
B3	VREFB3N0	IO	DIFFIO_B11n			AA10				DQ3B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B12p			AG8				DQ3B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B12n			AH8				DQ3B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B13p		T10	AE7							Res.
B3	VREFB3N0	IO	DIFFIO_B13n		T11	AF7				DQ3B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO				AF9				DQ3B	DQ3B	DQ5B	
B3	VREFB3N0	IO	DIFFIO_B14p			AE8							Res.
B3	VREFB3N0	IO	DIFFIO_B14n			AF8				DM5B/BWS#5B	DM3B0/BWS#3B0	DM5B2/BWS#5B2	Res.
B3	VREFB3N0	IO				AE9				DQ5B	DQ3B	DQ5B	
B3	VREFB3N0	IO	VREFB3N0		V9	AB11							
B3	VREFB3N0	IO	DIFFIO_B15p		V10	AE10	DQS3B/CQ3B#, DPCLK2	DQS3B/CQ3B#, DPCLK2	DQS3B/CQ3B#, DPCLK2	DQS3B/CQ3B#, DPCLK2	DQS3B/CQ3B#, DPCLK2	DQS3B/CQ3B#, DPCLK2	Res.
B3	VREFB3N0	IO	DIFFIO_B15n			AF10				DQ5B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B16p			AG10				DQ5B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B16n		U10	AH10	DQ5B	DQ3B	DQ5B				Res.
B3	VREFB3N0	IO	DIFFIO_B17p		AA8	AE12	DQ5B	DQ3B	DQ5B	DQ5B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B17n		AB8	AF12	DQ5B	DQ3B	DQ5B				Res.
B3	VREFB3N0	IO	DIFFIO_B18p		AA9	AE11	DQ5B	DQ3B	DQ5B	DQ5B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B18n		AB9	AF11	DQS5B/CQ5B#, DPCLK3	DQS5B/CQ5B#, DPCLK3	DQS5B/CQ5B#, DPCLK3	DQS5B/CQ5B#, DPCLK3	DQS5B/CQ5B#, DPCLK3	DQS5B/CQ5B#, DPCLK3	Res.
B3	VREFB3N0	IO	DIFFIO_B19p		U11	AG11				DQ5B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B19n		V11	AH11	DQ5B	DQ3B	DQ5B	DQ5B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B20p		W10	AE13	DQ5B	DQ3B	DQ5B	DQ5B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B20n		Y10	AB13	DQ5B	DQ3B	DQ5B				Res.
B3	VREFB3N0	IO	DIFFIO_B21p		AA10	AG12	DM4B	DM5B1/BWS#5B1	DM5B1/BWS#5B1	DQ5B	DQ3B	DQ5B	Res.
B3	VREFB3N0	IO	DIFFIO_B21n		AB10	AH12		DQ5B	DQ5B				Res.
B3	VREFB3N0	CLK15	DIFFCLK_6p		AA11	AG14							
B3	VREFB3N0	CLK14	DIFFCLK_6n		AB11	AH14							
B4	VREFB4N1	CLK13	DIFFCLK_7p		AA12	AG15							
B4	VREFB4N1	CLK12	DIFFCLK_7n		AB12	AH15							
B4	VREFB4N1	IO	DIFFIO_B22p			AC15				DM4B	DM5B1/BWS#5B1	DM5B1/BWS#5B1	Res.
B4	VREFB4N1	IO	DIFFIO_B22n			AD15							Res.
B4	VREFB4N1	IO	DIFFIO_B23p		AA13	AE15	DQ4B	DQ5B	DQ5B		DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	DIFFIO_B23n		AB13	AF15	DQ4B	DQ5B	DQ5B	DQ4B	DQ5B	DQ5B	Res.

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
B4	VREFB4N1	IO	DIFFIO_B24p			AG17				DQ4B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	DIFFIO_B24n			AH17				DQ4B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO				AF16				DQ4B	DQ5B	DQ5B	
B4	VREFB4N1	IO	DIFFIO_B25p		AA14	AA16	DQ4B	DQ5B	DQ5B				Res.
B4	VREFB4N1	IO	DIFFIO_B25n		AB14	AB16	DQ4B	DQ5B	DQ5B	DQ4B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	VREFB4N1		V12	AA15							
B4	VREFB4N1	IO				AE16							
B4	VREFB4N1	IO	DIFFIO_B26p		W13	AE17	DQ4B	DQ5B	DQ5B	DQ4B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	DIFFIO_B26n		Y13	AF17	DQS4B/CQ5B, DPCLK4	DQS4B/CQ5B, DPCLK4	DQS4B/CQ5B, DPCLK4	DQS4B/CQ5B, DPCLK4	DQS4B/CQ5B, DPCLK4	DQS4B/CQ5B, DPCLK4	Res.
B4	VREFB4N1	IO	DIFFIO_B27p		AA15	AG18	DQ4B	DQ5B	DQ5B	DQ4B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	DIFFIO_B27n		AB15	AH18	DQ4B	DQ5B	DQ5B	DQ4B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	DIFFIO_B28p		U12	AG19	DQ4B	DQ5B	DQ5B				Res.
B4	VREFB4N1	IO	DIFFIO_B28n			AH19				DM2B	DM5B0/BWS#5B0	DM5B0/BWS#5B0	Res.
B4	VREFB4N1	IO	DIFFIO_B29p		Y14	AC17							Res.
B4	VREFB4N1	IO	DIFFIO_B29n		Y15	AD17				DQ2B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	DIFFIO_B30p		AA16	AG21	DM2B	DM5B0/BWS#5B0	DM5B0/BWS#5B0	DQ2B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	DIFFIO_B30n		AB16	AH21	DQ2B	DQ5B	DQ5B	DQ2B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	DIFFIO_B31p		V13	AE18	DQS2B/CQ3B, DPCLK5	DQS2B/CQ3B, DPCLK5	DQS2B/CQ3B, DPCLK5	DQS2B/CQ3B, DPCLK5	DQS2B/CQ3B, DPCLK5	DQS2B/CQ3B, DPCLK5	Res.
B4	VREFB4N1	IO	DIFFIO_B31n		W14	AF18							Res.
B4	VREFB4N1	IO	DIFFIO_B32p		U13	AG22				DQ2B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	DIFFIO_B32n			AH22				DQ2B	DQ5B	DQ5B	Res.
B4	VREFB4N1	IO	DIFFIO_B33p		V14	AG23	DQ2B	DQ5B	DQ5B				Res.
B4	VREFB4N0	IO	DIFFIO_B33n		U14	AH23				DQ2B	DQ5B	DQ5B	Res.
B4	VREFB4N0	IO	DIFFIO_B34p		U15	AE19				DQ2B	DQ5B	DQ5B	Res.
B4	VREFB4N0	IO	DIFFIO_B34n		V15	AF19	DQ2B	DQ5B	DQ5B				Res.
B4	VREFB4N0	IO	DIFFIO_B35p		W15	AF24	DQ2B	DQ5B	DQ5B	DQ2B	DQ5B	DQ5B	Res.
B4	VREFB4N0	IO	DIFFIO_B35n			AF25				DM0B	DQ5B	DQ5B	Res.
B4	VREFB4N0	IO	DIFFIO_B36p		T14	AE20							Res.
B4	VREFB4N0	IO	DIFFIO_B36n		T15	AF20	DQ2B	DQ5B	DQ5B	DQ0B			Res.
B4	VREFB4N0	IO			AB18	AD18	DQ2B	DQ5B	DQ5B	DQ0B			
B4	VREFB4N0	IO	DIFFIO_B37p		AA17	AE21				DQ0B			Res.
B4	VREFB4N0	IO	DIFFIO_B37n		AB17	AF21							Res.
B4	VREFB4N0	IO	VREFB4N0		AA18	AC18							
B4	VREFB4N0	IO	RUP2		AA19	AA17							
B4	VREFB4N0	IO	RDN2		AB19	AB17							
B4	VREFB4N0	IO	DIFFIO_B38p		W17	AE25	DQ2B	DQ5B	DQ5B	DQ0B			Res.
B4	VREFB4N0	IO	DIFFIO_B38n		Y17	AF26	DQS0B/CQ1B, CDPCLK3	DQS0B/CQ1B, CDPCLK3	DQS0B/CQ1B, CDPCLK3	DQS0B/CQ1B, CDPCLK3	DQS0B/CQ1B, CDPCLK3	DQS0B/CQ1B, CDPCLK3	Res.
B4	VREFB4N0	IO	DIFFIO_B39p		AA20	AG25		DQ5B	DQ5B				Res.
B4	VREFB4N0	IO	DIFFIO_B39n		AB20	AH25	DQ2B	DQ5B	DQ5B	DQ0B			Res.
B4	VREFB4N0	IO			V16	AF22				DQ0B			
B4	VREFB4N0	IO	DIFFIO_B40p		U16	AE24				DQ0B			Res.
B4	VREFB4N0	IO	DIFFIO_B40n		U17	AD24							Res.
B4	VREFB4N0	IO	PLL4_CLKOUTp		T16	AE23							
B4	VREFB4N0	IO	PLL4_CLKOUTn		R16	AF23							
B4	VREFB4N0	IO	DIFFIO_B41p		R14	AG26				DQ0B			Res.
B4	VREFB4N0	IO	DIFFIO_B41n		R15	AH26							Res.
B5	VREFB5N1	VCCD_PLL4			V17	Y20							
B5	VREFB5N1	GNDA4			V18	AA20							
B5	VREFB5N1	VCCA4			U18	Y21							
B5	VREFB5N1	IO	DIFFIO_R36n		AA22	AC25							Adj.
B5	VREFB5N1	IO	DIFFIO_R36p		AA21	AC24	DM3R/BWS#3R	DM3R1/BWS#3R1	DM1R3/BWS#1R3				Adj.

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
B5	VREFB5N1	IO				AB24				DM3R/BWS#3R	DM3R1/BWS#3R1	DM1R3/BWS#1R3	
B5	VREFB5N1	IO	RUP3		T17	AA22							
B5	VREFB5N1	IO	RDN3		T18	AB23							
B5	VREFB5N1	IO			W20	AF27	DQS3R/CQ3R#, CDPCLK4	DQS3R/CQ3R#, CDPCLK4	DQS3R/CQ3R#, CDPCLK4	DQS3R/CQ3R#, CDPCLK4	DQS3R/CQ3R#, CDPCLK4	DQS3R/CQ3R#, CDPCLK4	
B5	VREFB5N1	IO	VREFB5N1		W19	AA24							
B5	VREFB5N1	IO	DIFFIO_R35n		Y22	AD26	DQ3R	DQ3R	DQ1R	DQ3R	DQ3R	DQ1R	Adj.
B5	VREFB5N1	IO	DIFFIO_R35p		Y21	AC26							Adj.
B5	VREFB5N1	IO	DIFFIO_R34n		U20	AE28	DQ3R	DQ3R	DQ1R	DQ3R	DQ3R	DQ1R	Adj.
B5	VREFB5N1	IO	DIFFIO_R34p		U19	AE27							Adj.
B5	VREFB5N1	IO	DIFFIO_R33n			AD28				DQ3R	DQ3R	DQ1R	Sep.
B5	VREFB5N1	IO	DIFFIO_R33p			AD27				DQ3R	DQ3R	DQ1R	Sep.
B5	VREFB5N1	IO	DIFFIO_R32n		W22	Y24	DQ3R	DQ3R	DQ1R	DQ3R	DQ3R	DQ1R	Adj.
B5	VREFB5N1	IO	DIFFIO_R32p		W21	Y23	DQ3R	DQ3R	DQ1R				Adj.
B5	VREFB5N1	IO	DIFFIO_R31n		T20	AC28				DQ3R	DQ3R	DQ1R	Sep.
B5	VREFB5N1	IO	DIFFIO_R31p		T19	AC27				DQ3R	DQ3R	DQ1R	Sep.
B5	VREFB5N1	IO	DIFFIO_R30n		R17	AB26				DQ3R	DQ3R	DQ1R	Adj.
B5	VREFB5N1	IO	DIFFIO_R30p		P17	AB25							Adj.
B5	VREFB5N1	IO	DIFFIO_R29n		V22	AA26	DQ3R	DQ3R	DQ1R	DQ3R	DQ3R	DQ1R	Adj.
B5	VREFB5N1	IO	DIFFIO_R29p		V21	AA25	DQ3R	DQ3R	DQ1R				Adj.
B5	VREFB5N1	IO	DIFFIO_R28n		R20	AB28	DQ3R	DQ3R	DQ1R	DM1R/BWS#1R	DM3R0/BWS#3R0	DM1R2/BWS#1R2	Sep.
B5	VREFB5N0	IO	DIFFIO_R28p			AB27				DQ1R	DQ3R	DQ1R	Sep.
B5	VREFB5N0	IO	DIFFIO_R27n		U22	Y26	DQ3R	DQ3R	DQ1R	DQ1R	DQ3R	DQ1R	Adj.
B5	VREFB5N0	IO	DIFFIO_R27p		U21	Y25	DQ3R	DQ3R	DQ1R				Adj.
B5	VREFB5N0	IO	DIFFIO_R26n		R18	W26				DQ1R	DQ3R	DQ1R	Adj.
B5	VREFB5N0	IO	DIFFIO_R26p		R19	W25	DM1R/BWS#1R	DM3R0/BWS#3R0	DM1R2/BWS#1R2				Adj.
B5	VREFB5N0	IO	DIFFIO_R25n			W27				DQ1R	DQ3R	DQ1R	Sep.
B5	VREFB5N0	IO	DIFFIO_R25p		N16	W28				DQ1R	DQ3R	DQ1R	Sep.
B5	VREFB5N0	IO	DIFFIO_R24n		R22	V28	DQ1R	DQ3R	DQ1R	DQ1R	DQ3R	DQ1R	Adj.
B5	VREFB5N0	IO	DIFFIO_R24p		R21	V27	DQ1R	DQ3R	DQ1R				Adj.
B5	VREFB5N0	IO	VREFB5N0		P20	U23							
B5	VREFB5N0	IO	DIFFIO_R23n		P22	V26	DQ1R	DQ3R	DQ1R				Adj.
B5	VREFB5N0	IO	DIFFIO_R23p		P21	V25	DQ1R	DQ3R	DQ1R	DQ1R	DQ3R	DQ1R	Adj.
B5	VREFB5N0	IO	DIFFIO_R22n		N20	U26	DQ1R	DQ3R	DQ1R				Adj.
B5	VREFB5N0	IO	DIFFIO_R22p		N19	U25							Adj.
B5	VREFB5N0	IO	DIFFIO_R21n		N17	U28				DQ1R	DQ3R	DQ1R	Sep.
B5	VREFB5N0	IO	DIFFIO_R21p		N18	T25	DQS1R/CQ1R#, DPCLK6	DQS1R/CQ1R#, DPCLK6	DQS1R/CQ1R#, DPCLK6	DQS1R/CQ1R#, DPCLK6	DQS1R/CQ1R#, DPCLK6	DQS1R/CQ1R#, DPCLK6	Sep.
B5	VREFB5N0	IO	DIFFIO_R20n	DEV_OE	N22	T22							Adj.
B5	VREFB5N0	IO	DIFFIO_R20p	DEV_CLRn	N21	T21							Adj.
B5	VREFB5N0	IO	DIFFIO_R19n		M22	R26	DQ1R	DQ3R	DQ1R	DQ1R	DQ3R	DQ1R	Adj.
B5	VREFB5N0	IO	DIFFIO_R19p		M21	R25	DQ1R	DQ3R	DQ1R				Adj.
B5	VREFB5N0	IO	DIFFIO_R18n		M20	R28	DQ1R	DQ3R	DQ1R	DM0R	DM1R1/BWS#1R1	DM1R1/BWS#1R1	Sep.
B5	VREFB5N0	IO	DIFFIO_R18p		M19	R27	DQ1R	DQ3R	DQ1R		DQ1R	DQ1R	Sep.
B5	VREFB5N0	IO			M16	U27							
B5	VREFB5N0	CLK7	DIFFCLK_3n		T22	Y28							
B5	VREFB5N0	CLK6	DIFFCLK_3p		T21	Y27							
B6	VREFB6N1	CLK5	DIFFCLK_2n		G22	J28							
B6	VREFB6N1	CLK4	DIFFCLK_2p		G21	J27							
B6	VREFB6N1	CONF_DONE		CONF_DONE	M18	P24							
B6	VREFB6N1	MSEL0		MSEL0	M17	N22							
B6	VREFB6N1	MSEL1		MSEL1	L18	P23							
B6	VREFB6N1	MSEL2		MSEL2	L17	M22							
B6	VREFB6N1	MSEL3		MSEL3	K20	P22							

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
B6	VREFB6N1	IO	DIFFIO_R17n	INIT_DONE	L22	P26							Sep.
B6	VREFB6N1	IO	DIFFIO_R17p	CRC_ERROR	L21	P25							Sep.
B6	VREFB6N1	IO	VREFB6N1		K19	N21							
B6	VREFB6N1	IO	DIFFIO_R16n	nCEO	K22	P28							Sep.
B6	VREFB6N1	IO	DIFFIO_R16p	CLKUSR	K21	P27							Sep.
B6	VREFB6N1	IO	DIFFIO_R15n		J22	N26	DQS0R/CQ1R, DPCLK7	DQS0R/CQ1R, DPCLK7	DQS0R/CQ1R, DPCLK7	DQS0R/CQ1R, DPCLK7	DQS0R/CQ1R, DPCLK7	DQS0R/CQ1R, DPCLK7	Adj.
B6	VREFB6N1	IO	DIFFIO_R15p		J21	N25	DM0R	DM1R1/BWS#1R1	DM1R1/BWS#1R1				Adj.
B6	VREFB6N1	IO	DIFFIO_R14n		H22	M28	DQ0R	DQ1R	DQ1R	DQ0R	DQ1R	DQ1R	Sep.
B6	VREFB6N1	IO	DIFFIO_R14p		H21	M27	DQ0R	DQ1R	DQ1R	DQ0R	DQ1R	DQ1R	Sep.
B6	VREFB6N1	IO	DIFFIO_R13n		K17	M26				DQ0R	DQ1R	DQ1R	Adj.
B6	VREFB6N1	IO	DIFFIO_R13p		K18	M25	DQ0R	DQ1R	DQ1R				Adj.
B6	VREFB6N1	IO	DIFFIO_R12n		J18	L28				DQ0R	DQ1R	DQ1R	Sep.
B6	VREFB6N1	IO	DIFFIO_R12p			L27				DQ0R	DQ1R	DQ1R	Sep.
B6	VREFB6N1	IO	DIFFIO_R11n		F22	L24	DQ0R	DQ1R	DQ1R	DQ0R	DQ1R	DQ1R	Adj.
B6	VREFB6N1	IO	DIFFIO_R11p		F21	L23	DQ0R	DQ1R	DQ1R				Adj.
B6	VREFB6N1	IO	DIFFIO_R10n		J20	K28				DQ0R	DQ1R	DQ1R	Sep.
B6	VREFB6N1	IO	DIFFIO_R10p		J19	K27				DQ0R	DQ1R	DQ1R	Sep.
B6	VREFB6N0	IO			J17	L26				DM2R	DM1R0/BWS#1R0	DM1R0/BWS#1R0	
B6	VREFB6N0	IO	DIFFIO_R9n		H20	J26	DQ0R	DQ1R	DQ1R				Adj.
B6	VREFB6N0	IO	DIFFIO_R9p		H19	J25	DQ0R	DQ1R	DQ1R		DQ1R	DQ1R	Adj.
B6	VREFB6N0	IO	DIFFIO_R8n	nWE	E22	G28	DQ0R	DQ1R	DQ1R	DQ2R	DQ1R	DQ1R	Sep.
B6	VREFB6N0	IO	DIFFIO_R8p	nOE	E21	G27		DQ1R	DQ1R	DQ2R	DQ1R	DQ1R	Sep.
B6	VREFB6N0	IO	VREFB6N0		H18	M21							
B6	VREFB6N0	IO			H16	L25							
B6	VREFB6N0	IO	DIFFIO_R7n		D22	K26	DM2R	DM1R0/BWS#1R0	DM1R0/BWS#1R0	DQ2R	DQ1R	DQ1R	Adj.
B6	VREFB6N0	IO	DIFFIO_R7p		D21	K25		DQ1R	DQ1R				Adj.
B6	VREFB6N0	IO	DIFFIO_R6n	nAVD	F20	F28	DQ2R	DQ1R	DQ1R	DQ2R	DQ1R	DQ1R	Adj.
B6	VREFB6N0	IO	DIFFIO_R6p		F19	F27	DQ2R	DQ1R	DQ1R				Adj.
B6	VREFB6N0	IO	DIFFIO_R5n	PADD23	G18	E28	DQ2R	DQ1R	DQ1R	DQ2R	DQ1R	DQ1R	Sep.
B6	VREFB6N0	IO	DIFFIO_R5p		H17	E27				DQ2R	DQ1R	DQ1R	Sep.
B6	VREFB6N0	IO	DIFFIO_R4n		C22	H26	DQ2R	DQ1R	DQ1R				Adj.
B6	VREFB6N0	IO	DIFFIO_R4p		C21	F26	DQ2R	DQ1R	DQ1R	DQ2R	DQ1R	DQ1R	Adj.
B6	VREFB6N0	IO	DIFFIO_R3n	PADD22	B22	D28	DQ2R	DQ1R	DQ1R				Adj.
B6	VREFB6N0	IO	DIFFIO_R3p	PADD21	B21	D27	DQ2R	DQ1R	DQ1R	DQ2R	DQ1R	DQ1R	Adj.
B6	VREFB6N0	IO	DIFFIO_R2n	PADD20	C20	C27	DQS2R/CQ3R, CDPCLK5	DQS2R/CQ3R, CDPCLK5	DQS2R/CQ3R, CDPCLK5	DQS2R/CQ3R, CDPCLK5	DQS2R/CQ3R, CDPCLK5	DQS2R/CQ3R, CDPCLK5	Sep.
B6	VREFB6N0	IO	DIFFIO_R2p		D20	D26							Sep.
B6	VREFB6N0	IO	DIFFIO_R1n		F17	H24	DQ2R	DQ1R	DQ1R				Adj.
B6	VREFB6N0	IO	DIFFIO_R1p		G17	J22							Adj.
B6	VREFB6N0	VCCA2			F18	J21							
B6	VREFB6N0	GNDA2			E18	H20							
B6	VREFB6N0	VCCD_PLL2			E17	J20							
B7	VREFB7N0	IO	DIFFIO_T42n		F16	C26							Res.
B7	VREFB7N0	IO	DIFFIO_T42p		E16	B26	DQ2T	DQ5T	DQ5T	DQ0T			Res.
B7	VREFB7N0	IO	DIFFIO_T41n		F15	D22	DQ2T	DQ5T	DQ5T	DQ0T			Res.
B7	VREFB7N0	IO	DIFFIO_T41p		G16	E22				DQ0T			Res.
B7	VREFB7N0	IO	DIFFIO_T40n		G15	A26				DQ0T			Res.
B7	VREFB7N0	IO	DIFFIO_T40p		F14	A25	DQS0T/CQ1T, CDPCLK6	DQS0T/CQ1T, CDPCLK6	DQS0T/CQ1T, CDPCLK6	DQS0T/CQ1T, CDPCLK6	DQS0T/CQ1T, CDPCLK6	DQS0T/CQ1T, CDPCLK6	Res.
B7	VREFB7N0	IO				B25				DQ0T			
B7	VREFB7N0	IO	DIFFIO_T39n		C18	E21							Res.
B7	VREFB7N0	IO	DIFFIO_T39p		D18	F21				DQ0T			Res.
B7	VREFB7N0	IO	VREFB7N0		D17	F22							

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
B7	VREFB7N0	IO	DIFFIO_T38n			D25							Res.
B7	VREFB7N0	IO	DIFFIO_T38p			C25				DQ0T			Res.
B7	VREFB7N0	IO	DIFFIO_T37n		C19	A23	DQ2T	DQ5T	DQ5T	DQ0T			Res.
B7	VREFB7N0	IO	DIFFIO_T37p		D19	B23	DQ2T	DQ5T	DQ5T	DM0T			Res.
B7	VREFB7N0	IO	PLL2_CLKOUTn		A20	C23							
B7	VREFB7N0	IO	PLL2_CLKOUTp		B20	D23							
B7	VREFB7N0	IO	DIFFIO_T36n			C24				DQ2T	DQ5T	DQ5T	Res.
B7	VREFB7N0	IO	DIFFIO_T36p			D24							Res.
B7	VREFB7N0	IO	DIFFIO_T35n			C22				DQ2T	DQ5T	DQ5T	Res.
B7	VREFB7N0	IO	DIFFIO_T35p		C17	D21	DQ2T	DQ5T	DQ5T	DQ2T	DQ5T	DQ5T	Res.
B7	VREFB7N0	IO	RUP4		B19	F19							
B7	VREFB7N0	IO	RDN4		A19	E19							
B7	VREFB7N0	IO				C21				DQ2T	DQ5T	DQ5T	
B7	VREFB7N0	IO	DIFFIO_T34n		A18	A22	DQ2T	DQ5T	DQ5T	DQ2T	DQ5T	DQ5T	Res.
B7	VREFB7N0	IO	DIFFIO_T34p	PADD0	B18	B22							Res.
B7	VREFB7N0	IO	DIFFIO_T33n		D15	A21				DQ2T	DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T33p		E15	B21	DQ2T	DQ5T	DQ5T	DQ2T	DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T32n		G14	E18				DQ2T	DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T32p		G13	F18							Res.
B7	VREFB7N1	IO	DIFFIO_T31n	PADD1	A17	C18	DQ2T	DQ5T	DQ5T		DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T31p	PADD2	B17	D18		DQ5T	DQ5T				Res.
B7	VREFB7N1	IO	DIFFIO_T30n		A16	C20	DM2T	DM5T0/BWS#5T0	DM5T0/BWS#5T0	DM2T	DM5T0/BWS#5T0	DM5T0/BWS#5T0	Res.
B7	VREFB7N1	IO	DIFFIO_T30p		B16	D20	DQ4T	DQ5T	DQ5T	DQ4T	DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T29n			C19				DQ4T	DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T29p			D19							Res.
B7	VREFB7N1	IO	VREFB7N1		C15	G17							
B7	VREFB7N1	IO	DIFFIO_T28n	PADD3	E14	C17	DQ4T	DQ5T	DQ5T	DQ4T	DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T28p	PADD4	F13	D17	DQS2T/CQ3T, DPCLK8	DQS2T/CQ3T, DPCLK8	DQS2T/CQ3T, DPCLK8	DQS2T/CQ3T, DPCLK8	DQS2T/CQ3T, DPCLK8	DQS2T/CQ3T, DPCLK8	Res.
B7	VREFB7N1	IO	DIFFIO_T27n	PADD5	A15	A19	DQ4T	DQ5T	DQ5T	DQ4T	DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T27p	PADD6	B15	B19	DQ4T	DQ5T	DQ5T	DQ4T	DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T26n	PADD7	C13	A18							Res.
B7	VREFB7N1	IO	DIFFIO_T26p	PADD8	D13	B18	DQ4T	DQ5T	DQ5T	DQ4T	DQ5T	DQ5T	Res.
B7	VREFB7N1	IO				E17				DQ4T	DQ5T	DQ5T	
B7	VREFB7N1	IO			E13	G15							
B7	VREFB7N1	IO	DIFFIO_T25n	PADD9	A14	C16	DQ4T	DQ5T	DQ5T	DQ4T	DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T25p	PADD10	B14	D16	DQ4T	DQ5T	DQ5T				Res.
B7	VREFB7N1	IO	DIFFIO_T24n	PADD11	A13	A17	DQ4T	DQ5T	DQ5T		DQ5T	DQ5T	Res.
B7	VREFB7N1	IO	DIFFIO_T24p	PADD12	B13	B17	DQS4T/CQ5T, DPCLK9	DQS4T/CQ5T, DPCLK9	DQS4T/CQ5T, DPCLK9	DQS4T/CQ5T, DPCLK9	DQS4T/CQ5T, DPCLK9	DQS4T/CQ5T, DPCLK9	Res.
B7	VREFB7N1	IO			E12	E15		DQ5T	DQ5T	DM4T	DM5T1/BWS#5T1	DM5T1/BWS#5T1	
B7	VREFB7N1	IO	DIFFIO_T23n	PADD13	E11	C15							Res.
B7	VREFB7N1	IO	DIFFIO_T23p	PADD14	F11	D15	DM4T	DM5T1/BWS#5T1	DM5T1/BWS#5T1	DQ5T	DQ3T	DQ5T	Res.
B7	VREFB7N1	CLK8	DIFFCLK_5n		A12	A15							
B7	VREFB7N1	CLK9	DIFFCLK_5p		B12	B15							
B8	VREFB8N0	CLK10	DIFFCLK_4n		A11	A14							
B8	VREFB8N0	CLK11	DIFFCLK_4p		B11	B14							
B8	VREFB8N0	IO	DIFFIO_T22n		D10	C13	DQ5T	DQ3T	DQ5T	DQ5T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T22p		E10	D13				DQ5T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T21n		A10	C14	DQ5T	DQ3T	DQ5T	DQ5T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T21p	PADD15	B10	D14							Res.
B8	VREFB8N0	IO	DIFFIO_T20n	PADD16	A9	C12	DQ5T	DQ3T	DQ5T	DQ5T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T20p	PADD17	B9	D12	DQS5T/CQ5T#, DPCLK10	DQS5T/CQ5T#, DPCLK10	DQS5T/CQ5T#, DPCLK10	DQS5T/CQ5T#, DPCLK10	DQS5T/CQ5T#, DPCLK10	DQS5T/CQ5T#, DPCLK10	Res.

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
B8	VREFB8N0	IO	DIFFIO_T19n			A12				DQ5T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T19p			B12							Res.
B8	VREFB8N0	IO	VREFB8N0		C10	G14							
B8	VREFB8N0	IO	DIFFIO_T18n		G11	F14							Res.
B8	VREFB8N0	IO	DIFFIO_T18p			E14				DQ5T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T17n	DATA2	A8	A11	DQ5T	DQ3T	DQ5T	DQ5T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T17p	DATA3	B8	B11	DQ5T	DQ3T	DQ5T	DQ5T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T16n	PADD18	A7	A10	DQ5T	DQ3T	DQ5T				Res.
B8	VREFB8N0	IO	DIFFIO_T16p	DATA4	B7	B10	DQ5T	DQ3T	DQ5T	DM5T/BWS#5T	DM3T0/BWS#3T0	DM5T2/BWS#5T2	Res.
B8	VREFB8N0	IO	DIFFIO_T15n	PADD19	A6	G13	DQ5T	DQ3T	DQ5T				Res.
B8	VREFB8N0	IO	DIFFIO_T15p	DATA15	B6	H13	DQ5T	DQ3T	DQ5T	DQ3T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T14n		E9	C10				DQ3T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T14p			D10				DQ3T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T13n	DATA14	C8	E12	DQS3T/CQ3T#, DPCLK11	DQS3T/CQ3T#, DPCLK11	DQS3T/CQ3T#, DPCLK11	DQS3T/CQ3T#, DPCLK11	DQS3T/CQ3T#, DPCLK11	DQS3T/CQ3T#, DPCLK11	Res.
B8	VREFB8N0	IO	DIFFIO_T13p	DATA13	C7	F12	DM5T/BWS#5T	DM3T0/BWS#3T0	DM5T2/BWS#5T2				Res.
B8	VREFB8N0	IO	DIFFIO_T12n		D8	E11				DQ3T	DQ3T	DQ5T	Res.
B8	VREFB8N0	IO	DIFFIO_T12p		E8	F11							Res.
B8	VREFB8N0	IO	DIFFIO_T11n			A7				DQ3T	DQ3T	DQ5T	Res.
B8	VREFB8N1	IO	DIFFIO_T11p	DATA5	A5	B7	DQ3T	DQ3T	DQ5T	DQ3T	DQ3T	DQ5T	Res.
B8	VREFB8N1	IO	VREFB8N1		B5	G12							
B8	VREFB8N1	IO	DIFFIO_T10n		G10	A6							Res.
B8	VREFB8N1	IO	DIFFIO_T10p	DATA6	F10	B6	DQ3T	DQ3T	DQ5T	DQ3T	DQ3T	DQ5T	Res.
B8	VREFB8N1	IO	DIFFIO_T9n	DATA7	C6	C11	DQ3T	DQ3T	DQ5T	DQ3T	DQ3T	DQ5T	Res.
B8	VREFB8N1	IO	DIFFIO_T9p		D7	D11							Res.
B8	VREFB8N1	IO	DIFFIO_T8n		A4	C9	DQ3T	DQ3T	DQ5T	DQ3T	DQ3T	DQ5T	Res.
B8	VREFB8N1	IO	DIFFIO_T8p	DATA8	B4	D9	DQ3T	DQ3T	DQ5T				Res.
B8	VREFB8N1	IO	DIFFIO_T7n	DATA9	F8	A8	DQ3T	DQ3T	DQ5T	DM3T/BWS#3T	DM3T1/BWS#3T1	DM5T3/BWS#5T3	Res.
B8	VREFB8N1	IO	DIFFIO_T7p		G8	B8							Res.
B8	VREFB8N1	IO	DIFFIO_T6n			C8				DQ1T			Res.
B8	VREFB8N1	IO	DIFFIO_T6p			D8				DQ1T			Res.
B8	VREFB8N1	IO	DIFFIO_T5n	DATA10	A3	C7	DQ3T	DQ3T	DQ5T	DQ1T			Res.
B8	VREFB8N1	IO	DIFFIO_T5p	DATA11	B3	D7	DQ3T	DQ3T	DQ5T				Res.
B8	VREFB8N1	IO	DIFFIO_T4n		D6	D6				DQ1T			Res.
B8	VREFB8N1	IO	DIFFIO_T4p		E7	G9							Res.
B8	VREFB8N1	IO	DIFFIO_T3n		C3	A4	DQ3T	DQ3T	DQ5T	DQ1T			Res.
B8	VREFB8N1	IO	DIFFIO_T3p	DATA12	C4	B4	DQS1T/CQ1T#, CDPCLK7	DQS1T/CQ1T#, CDPCLK7	DQS1T/CQ1T#, CDPCLK7	DQS1T/CQ1T#, CDPCLK7	DQS1T/CQ1T#, CDPCLK7	DQS1T/CQ1T#, CDPCLK7	Res.
B8	VREFB8N1	IO	DIFFIO_T2n		F7	B3	DM3T/BWS#3T	DM3T1/BWS#3T1	DM5T3/BWS#5T3				Res.
B8	VREFB8N1	IO	DIFFIO_T2p		G7	A3				DQ1T			Res.
B8	VREFB8N1	IO			F9	C6				DQ1T			
B8	VREFB8N1	IO	PLL3_CLKOUTn		E6	C5							
B8	VREFB8N1	IO	PLL3_CLKOUTp		E5	D5							
B8	VREFB8N1	IO	DIFFIO_T1n		G9	C4				DQ1T			Res.
B8	VREFB8N1	IO	DIFFIO_T1p			D4				DM1T			Res.
B8	VREFB8N1	IO				E4							
		VCCINT			J11	K9							
		VCCINT			J12	K11							
		VCCINT			L14	K13							
		VCCINT			M14	K15							
		VCCINT			P11	K17							
		VCCINT			P12	K19							
		VCCINT			L9	L10							
		VCCINT			M9	L12							

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
		VCCINT			J13	L14							
		VCCINT			J14	L16							
		VCCINT			K14	L18							
		VCCINT			J10	L20							
		VCCINT			K9	M9							
		VCCINT			N9	M11							
		VCCINT			P9	M13							
		VCCINT			P10	M15							
		VCCINT			P13	M17							
		VCCINT			P14	M19							
		VCCINT			N14	N10							
		VCCINT			J16	N12							
		VCCINT			K15	N14							
		VCCINT			L16	N16							
		VCCINT			M15	N18							
		VCCINT			R12	N20							
		VCCINT			R10	P9							
		VCCINT			R8	P11							
		VCCINT			H9	P13							
		VCCINT			G12	P15							
		VCCINT			J8	P17							
		VCCINT			M8	P19							
		VCCINT			T7	R10							
		VCCINT			T9	R12							
		VCCINT			T13	R14							
		VCCINT			P15	R16							
		VCCINT			H15	R18							
		VCCINT			H11	R20							
		VCCINT			K8	T9							
		VCCINT			L7	T11							
		VCCINT				T13							
		VCCINT				T15							
		VCCINT				T17							
		VCCINT				T19							
		VCCINT				U10							
		VCCINT				U12							
		VCCINT				U14							
		VCCINT				U16							
		VCCINT				U18							
		VCCINT				U20							
		VCCINT				V9							
		VCCINT				V11							
		VCCINT				V13							
		VCCINT				V15							
		VCCINT				V17							
		VCCINT				V19							
		VCCINT				W10							
		VCCINT				W12							
		VCCINT				W14							
		VCCINT				W16							
		VCCINT				W18							
		VCCINT				W20							
		VCCIO1			D4	B1							

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
		VCCIO1			F4	H1							
		VCCIO1			K4	K5							
		VCCIO1				N1							
		VCCIO1				N5							
		VCCIO2			N4	AA1							
		VCCIO2			U4	AG1							
		VCCIO2			W4	T1							
		VCCIO2				T5							
		VCCIO2				W5							
		VCCIO3			AB2	AA11							
		VCCIO3			W5	AD6							
		VCCIO3			W9	AD9							
		VCCIO3			W11	AD13							
		VCCIO3				AH2							
		VCCIO3				AH5							
		VCCIO3				AH9							
		VCCIO3				AH13							
		VCCIO4			AB21	AA18							
		VCCIO4			W12	AD16							
		VCCIO4			W16	AD20							
		VCCIO4			W18	AD23							
		VCCIO4				AH16							
		VCCIO4				AH20							
		VCCIO4				AH24							
		VCCIO4				AH27							
		VCCIO5			P18	AA28							
		VCCIO5			V19	AG28							
		VCCIO5			Y19	T24							
		VCCIO5				T28							
		VCCIO5				W24							
		VCCIO6			E19	B28							
		VCCIO6			G19	H28							
		VCCIO6			L19	K24							
		VCCIO6				N24							
		VCCIO6				N28							
		VCCIO7			A21	A16							
		VCCIO7			D12	A20							
		VCCIO7			D14	A24							
		VCCIO7			D16	A27							
		VCCIO7				E16							
		VCCIO7				E20							
		VCCIO7				E23							
		VCCIO7				H18							
		VCCIO8			A2	A2							
		VCCIO8			D5	A5							
		VCCIO8			D9	A9							
		VCCIO8			D11	A13							
		VCCIO8				E6							
		VCCIO8				E9							
		VCCIO8				E13							
		VCCIO8				H11							
		GND			L10	K10							
		GND			L11	K12							

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
		GND			M10	K14							
		GND			M11	K16							
		GND			L12	K18							
		GND			L13	K20							
		GND			M12	L9							
		GND			M13	L11							
		GND			N11	L13							
		GND			K11	L15							
		GND			N12	L17							
		GND			K12	L19							
		GND			K13	M10							
		GND			N13	M12							
		GND			N10	M14							
		GND			K10	M16							
		GND			J9	M18							
		GND			F12	M20							
		GND			H12	N9							
		GND			H13	N11							
		GND			J15	N13							
		GND			K16	N15							
		GND			L15	N17							
		GND			N15	N19							
		GND			R13	P10							
		GND			R11	P12							
		GND			R9	P14							
		GND			P8	P16							
		GND			H14	P18							
		GND			H10	P20							
		GND			H8	R9							
		GND			N8	R11							
		GND			R7	R13							
		GND			T8	R15							
		GND			T12	R17							
		GND			P16	R19							
		GND			L8	T10							
		GND			M7	T12							
		GND				T14							
		GND				T16							
		GND				T18							
		GND				T20							
		GND				U9							
		GND				U11							
		GND				U13							
		GND				U15							
		GND				U17							
		GND				U19							
		GND				V10							
		GND				V12							
		GND				V14							
		GND				V16							
		GND				V18							
		GND				V20							
		GND				W9							

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
		GND				W11							
		GND				W13							
		GND				W15							
		GND				W17							
		GND				W19							
		GND			A1	AA2							
		GND			C5	AA27							
		GND			C9	AC6							
		GND			C11	AC9							
		GND			C12	AC13							
		GND			C14	AC16							
		GND			C16	AC20							
		GND			A22	AC23							
		GND			E20	AF1							
		GND			G20	AF28							
		GND			L20	AG2							
		GND			P19	AG5							
		GND			V20	AG9							
		GND			Y20	AG13							
		GND			AB22	AG16							
		GND			Y18	AG20							
		GND			Y16	AG24							
		GND			Y12	AG27							
		GND			Y11	B2							
		GND			Y9	B5							
		GND			Y5	B9							
		GND			AB1	B13							
		GND			N3	B16							
		GND			U3	B20							
		GND			W3	B24							
		GND			D3	B27							
		GND			F3	C1							
		GND			K3	C28							
		GND				F6							
		GND				F9							
		GND				F13							
		GND				F16							
		GND				F20							
		GND				F23							
		GND				H2							
		GND				H27							
		GND				J11							
		GND				J18							
		GND				K6							
		GND				K23							
		GND				N2							
		GND				N6							
		GND				N23							
		GND				N27							
		GND				T2							
		GND				T6							
		GND				T23							
		GND				T27							

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
		GND				W6							
		GND				W23							
		GND				Y11							
		GND				Y18							
		NC				AA5							
		NC				AA6							
		NC				AA7							
		NC				AA12							
		NC				AA13							
		NC				AA14							
		NC				AA19							
		NC				AA21							
		NC				AA23							
		NC				AB5							
		NC				AB6							
		NC				AB10							
		NC				AB12							
		NC				AB14							
		NC				AB15							
		NC				AB18							
		NC				AB19							
		NC				AB20							
		NC				AB21							
		NC				AB22							
		NC				AC4							
		NC				AC5							
		NC				AC10							
		NC				AC11							
		NC				AC12							
		NC				AC14							
		NC				AC19							
		NC				AC21							
		NC				AC22							
		NC				AD11							
		NC				AD12							
		NC				AD14							
		NC				AD19							
		NC				AD21							
		NC				AD22							
		NC				AD25							
		NC				AE14							
		NC				AE22							
		NC				AE26							
		NC				AF13							
		NC				AF14							
		NC				C3							
		NC				E5							
		NC				E7							
		NC				E8							
		NC				E10							
		NC				E24							
		NC				E25							
		NC				E26							

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
		NC				F7							
		NC				F8							
		NC				F10							
		NC				F15							
		NC				F17							
		NC				F24							
		NC				F25							
		NC				G7							
		NC				G8							
		NC				G10							
		NC				G11							
		NC				G16							
		NC				G18							
		NC				G19							
		NC				G20							
		NC				G21							
		NC				G22							
		NC				G23							
		NC				G24							
		NC				G25							
		NC				G26							
		NC				H8							
		NC				H10							
		NC				H12							
		NC				H14							
		NC				H15							
		NC				H16							
		NC				H17							
		NC				H19							
		NC				H21							
		NC				H22							
		NC				H23							
		NC				L22							
		NC				H25							
		NC				J5							
		NC				J6							
		NC				J7							
		NC				J10							
		NC				J12							
		NC				J13							
		NC				J14							
		NC				J15							
		NC				J16							
		NC				J17							
		NC				J19							
		NC				J23							
		NC				J24							
		NC				K3							
		NC				K4							
		NC				K7							
		NC				K8							
		NC				K21							
		NC				K22							

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)
		NC				L2							
		NC				L3							
		NC				L4							
		NC				L6							
		NC				L7							
		NC				L8							
		NC				L21							
		NC				M3							
		NC				M4							
		NC				M7							
		NC				M8							
		NC				M23							
		NC				M24							
		NC				N3							
		NC				N4							
		NC				N8							
		NC				P21							
		NC				R6							
		NC				R7							
		NC				R21							
		NC				R22							
		NC				R23							
		NC				R24							
		NC				T26							
		NC				U21							
		NC				U22							
		NC				U24							
		NC				V5							
		NC				V6							
		NC				V7							
		NC				V8							
		NC				V21							
		NC				V22							
		NC				V23							
		NC				V24							
		NC				W3							
		NC				W4							
		NC				W7							
		NC				W8							
		NC				W21							
		NC				W22							
		NC				Y5							
		NC				Y6							
		NC				Y7							
		NC				Y12							
		NC				Y13							
		NC				Y14							
		NC				Y15							
		NC				Y16							
		NC				Y17							
		NC				Y19							
		NC				Y22							

Bank Number	VREFB Group	Pin Name / Function	Optional Function(s)	Configuration Function	F484/ U484	F780	DQS for X8/X9 in F484/U484	DQS for X16/X18 in F484/U484	DQS for X32/X36 in F484/U484	DQS for X8/X9 in F780	DQS for X16/X18 in F780	DQS for X32/X36 in F780	PKG Note (3),(4),(5)

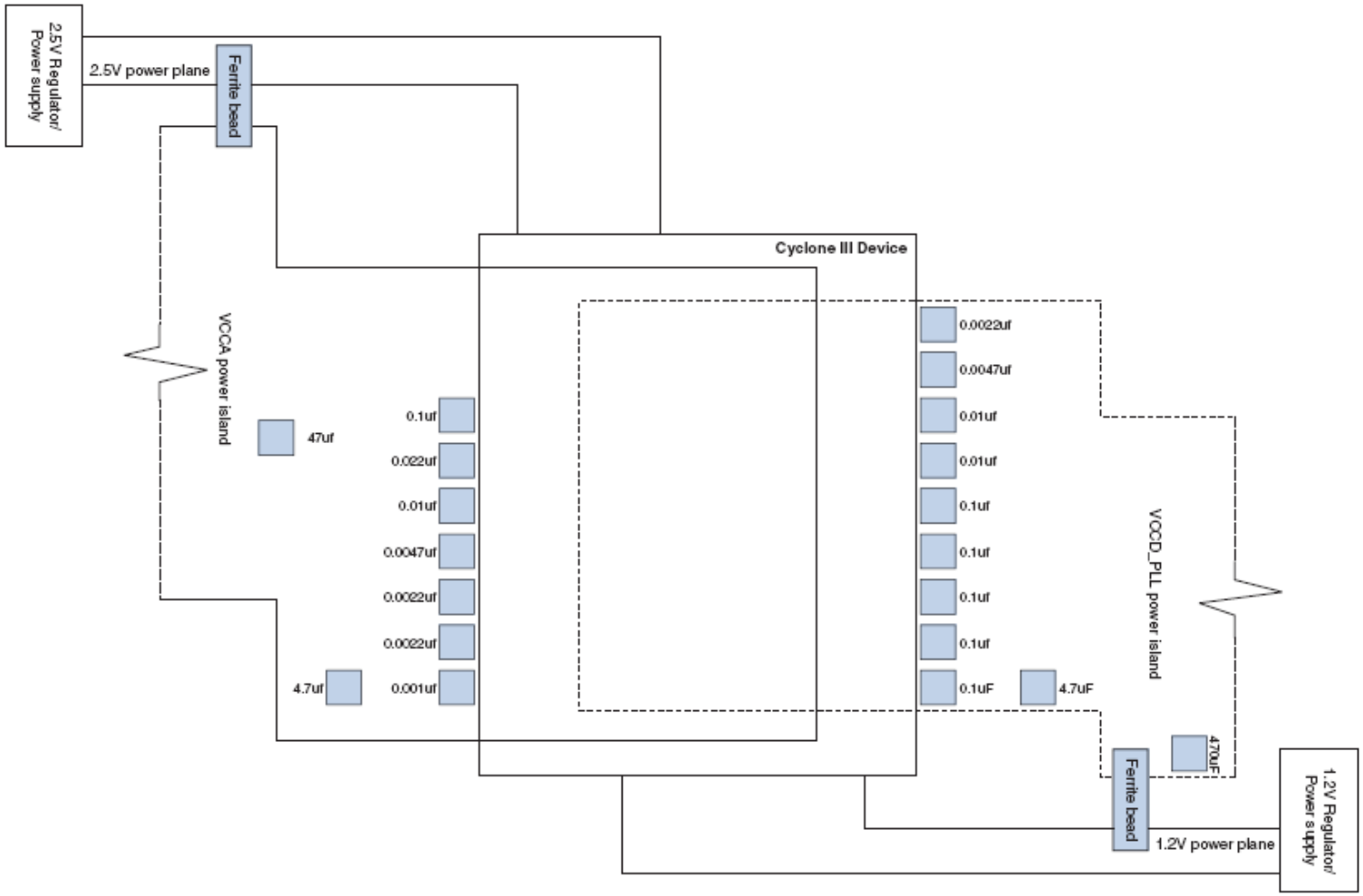
Notes:
(1) If the p pin or n pin is not available for the package, the particular differential pair is not supported.
(2) DQS pins that do not have the associated DQ pins are not supported.
(3) "Adj." in PKG NOTE denotes the dedicated differential output drivers with p and n pins located adjacent to each other.
(4) "Sep." in PKG NOTE denotes the dedicated differential output drivers with p and n pins not located adjacent to each other.
(5) "Res." in PKG NOTE denotes differential output drivers that require external resistor network.

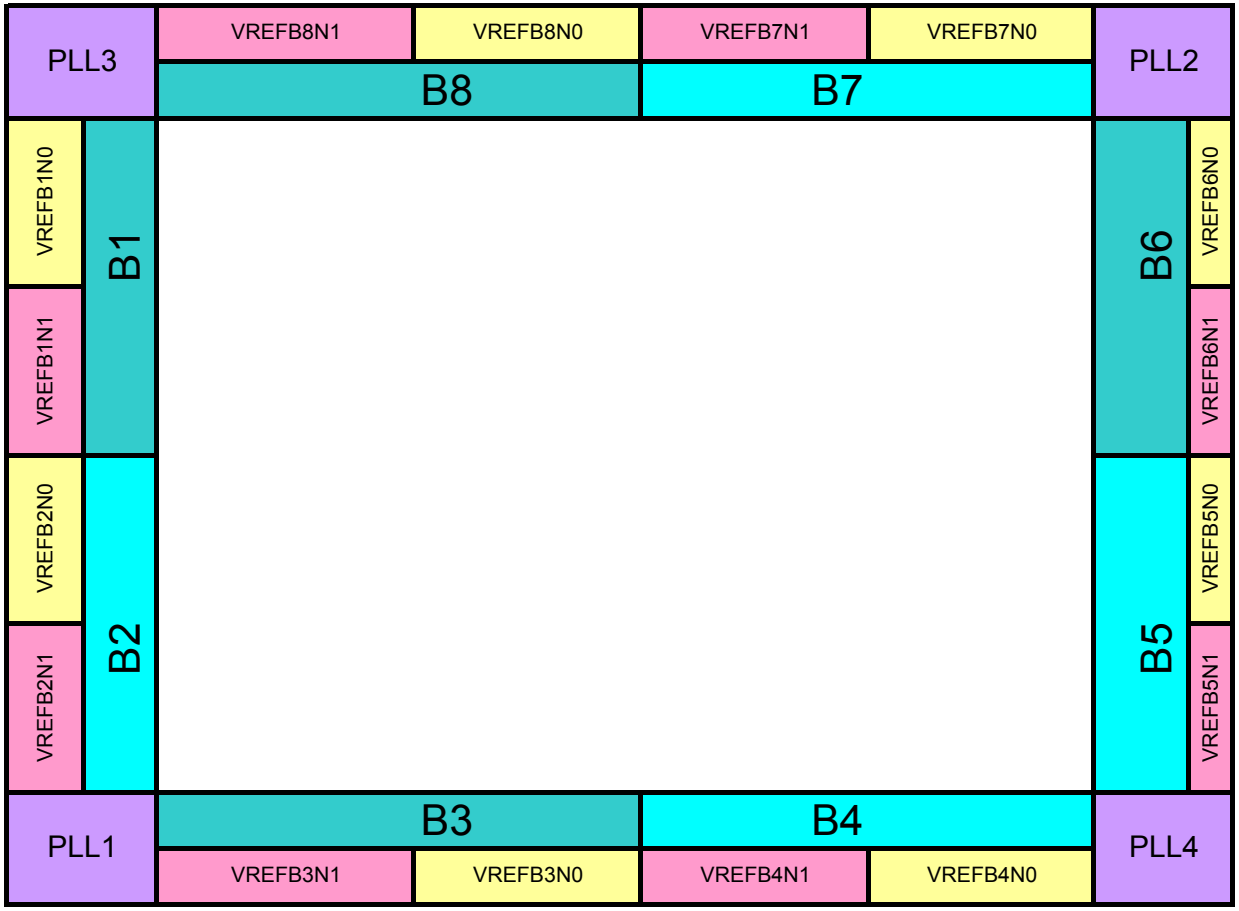
Pin Name	Pin Type (1st, 2nd, and 3rd Function)	Pin Description	Connection Guidelines
Altera provides these guidelines only as recommendations. It is the responsibility of the designer to apply simulation results to the design to verify proper device functionality.			
		Supply and Reference Pins	
VCCINT	Power	These are internal logic array voltage supply pins.	All VCCINT pins must be connected to 1.2V supply. Decoupling depends on the design decoupling requirements of the specific board. See *Note (8)* .
VCCIO[1..8]	Power	These are I/O supply voltage pins for banks 1 through 8. Each bank can support a different voltage level. VCCIO supplies power to the input and output buffers for all I/O standards. VCCIO powers up the JTAG pins (TCK, TMS, TDI and TDO) and the following configuration pins: nCONFIG, DCLK, DATA[15..0], nCE, nCEO, nWE, nRESET, nOE, FLASH_nCE, nCSO and CLKUSR.	Decoupling depends on the design decoupling requirements of the specific board.See *Note (8)* .
GND	Ground	Device ground pins. All GND pins should be connected to the board GND plane.	All GND pins should be connected to the board GND plane.
VREFB[1..8]N[0..2] *(Note 2)*	I/O	Input reference voltage for each I/O bank. If a bank uses a voltage-referenced I/O standard, then these pins are used as the voltage-referenced pins for the bank. If voltage-referenced I/O standards are not used in the bank, the VREF pins are available as user I/O pins.	If VREF pins are not used, the designer should connect them to either the VCCIO in the bank in which the pin resides or GND. Decoupling depends on the design decoupling requirements of the specific board. See *Note (8)* .
VCCA[1..4] *(Note 3)*	Power	Supply (analog) voltage for PLLs[1..4] and other analog circuits in the device.	The designer must connect these pins to 2.5V, even if the PLL is not used. These pins must be powered up and powered down at the same time. Connect VCCA[1..4] pins together. VCCA supply to the chip should be isolated. See *Note(9)* for details. See *Note(10)* for recommended decoupling.
VCCD_PLL[1..4] *(Note 3)*	Power	Supply (digital) voltage for PLLs[1..4].	The designer must connect these pins to 1.2V, even if the PLL is not used.Connect VCCD_PLL[1..4] pins together. VCCD_PLL supply to the chip should be isolated. See *Note(9)* for details. See *Note (11)* for recommended decoupling.
RUP[1..4]	I/O, Input	Reference pins for on-chip termination (OCT) block in I/O banks 2, 4, 5 and 7. The external precision resistor Rup must be connected to the designated RUP pin within the same bank. If not required, this pin is a regular I/O pin.	When the device does not use this dedicated input for the external precision resistor or as an I/O, the pin can be connected to VCCIO of the bank in which the RUP pin resides or GND.
RDN[1..4]	I/O, Input	Reference pins for on-chip termination (OCT) block in I/O banks 2, 4, 5 and 7. The external precision resistor Rdn must be connected to the designated RDN pin within the same bank. If not required, this pin is a regular I/O pin.	When the device does not use this dedicated input for the external precision resistor or as an I/O, it is recommended that the pin be connected to GND.
GNDA[1..4] *(Note 3)*	Ground	Ground for PLL[1..4]. You can connect these pins to GND plane on the board.	The designer should connect these pins to an isolated analog ground plane on the board.
NC	No Connect	Do not drive signals into these pins.	Do not connect these pins to any signal.
		Dedicated Configuration/JTAG Pins	
DCLK	Input (PS, FPP) Output (AS, AP)	Dedicated configuration clock pin. In PS and PP configuration modes, DCLK is used to clock configuration data from an external source into the Cyclone III device. In AS and AP modes, DCLK is an output from the Cyclone III device that provides timing for the configuration interface.	DCLK should not be left floating. In JTAG configuration and schemes that use an external host, designer should drive it high or low, whichever is more convenient on the board. In AS and AP mode, the DCLK has an internal pull-up resistor (typically 25-kΩ) that is always active.
DATA0	Input (PS, FPP, AS) Bidirectional open drain (AP)	Dedicated configuration data input pin. In serial configuration modes, bit-wide configuration data is received through this pin. In AS mode, DATA0 has an internal pull-up resistor that is always active. After AS configuration, DATA0 is a dedicated input pin with optional user control. After PS or PP configuration, DATA0 is available as a user I/O pin and the state of this pin depends on the Dual-Purpose Pin settings. After AP configuration, DATA0 is a dedicated bidirectional pin with optional user control.	If you are using a serial configuration device in AS configuration mode, you must connect a 25-Ω series resistor at the near end of the serial configuration device for the DATA[0]. If DATA[0] is not used, it should be driven high or low, whichever is more convenient on the board.
MSEL[3..0]	Input	Configuration input pins that set the Cyclone III device configuration scheme. These pins must be hardwired to VCCA or GND. Some of the smaller devices or package options do not support the AP flash programming and do not have the MSEL[3] pin.	These pins are internally connected to 5-kΩ resistor to GND. Do not leave these pins floating. When these pins are unused connect them to GND. Depending on the configuration scheme used, these pins should be tied to VCCA or GND. Refer to Chapter 10 of Cyclone III Handbook: Configuring Cyclone III Devices. If only JTAG configuration is used, then connect these pins to GND.
nCE	Input	Dedicated active-low chip enable. When nCE is low, the device is enabled. When nCE is high, the device is disabled.	In multi-device configuration, nCE of the first device is tied low while its nCEO pin drives the nCE of the next device in the chain. In single device configuration and JTAG programming, nCE is tied low.
nCONFIG	Input	Dedicated configuration control input. Pulling this pin low during user mode causes the FPGA to lose its configuration data, enter a reset state, and tri-state all I/O pins. Returning this pin to a logic high level will initiate reconfiguration.The input buffer on this pin supports hysteresis using Schmitt trigger circuitry.	If you are using PS configuration scheme with a download cable, connect this pin through a 10-kΩ resistor to VCCA. For other configuration schemes, if this pin is not used, this pin must be connected directly or through a 10-kΩ resistor to VCCIO.
CONF_DONE	Bidirectional (open-drain)	This is a dedicated configuration status pin. As a status output, the CONF_DONE pin drives low before and during configuration. Once all configuration data is received without error and the initialization cycle starts, CONF_DONE is released. As a status input, CONF_DONE goes high after all data is received. Then the device initializes and enters user mode.	This pin is not available as a user I/O pin. CONF_DONE should be pulled high by an external 10-kΩ pull-up resistor.
nSTATUS	Bidirectional (open-drain)	This is a dedicated configuration status pin. The FPGA drives nSTATUS low immediately after power-up and releases it after POR time. As a status output, the nSTATUS is pulled low if an error occurs during configuration. As a status input, the device enters an error state when nSTATUS is driven low by an external source during configuration or initialization.	This pin is not available as a user I/O pin. nSTATUS should be pulled high by an external 10-kΩ pull-up resistor.
TCK	Input	Dedicated JTAG input pin. The JTAG circuitry can be disabled by connecting TCK to GND.	Connect this pin to a 1-kΩ resistor to GND.
TMS	Input	Dedicated JTAG input pin. The JTAG circuitry can be disabled by connecting TMS to VCC.	When interfacing with 2.5V/3.0V/3.3V configuration voltage standards, connect this pin through a 1-kOhm resistor to VCCA. Otherwise, connect this pin through a 1-kΩ resistor to VCCIO. See *Note (4)* .
TDI	Input	Dedicated JTAG input pin. The JTAG circuitry can be disabled by connecting TDI to VCC.	When interfacing with 2.5V/3.0V/3.3V configuration voltage standards, connect this pin through a 1-kOhm resistor to VCCA. Otherwise, connect this pin through a 1-kOhm resistor to VCCIO. See *Note (4)* .
TDO	Output	Dedicated JTAG output pin.	The JTAG circuitry can be disabled by leaving TDO unconnected.
		Clock and PLL Pins	
CLK[0,2,4,6,9,11,13,15], DIFFCLK_[0..7]p *(Note 5)*	Clock, Input	Dedicated global clock input pins that can also be used for the positive terminal inputs for differential global clock input or user input pins.	Connect unused pins to GND. See *Note (12)* .
CLK[1,3,5,7,8,10,12,14], DIFFCLK_[0..7]n *(Note 5)*	Clock, Input	Dedicated global clock input pins that can also be used for the negative terminal inputs for differential global clock input or user input pins.	Connect unused pins to GND. See *Note (12)* .
PLL[1..4]_CLKOUT[p,n] *(Note 3)*	I/O, Output	I/O pins that be used as two single-ended clock output pins or one differential clock output pair.These pins can only use the differential I/O standard if it is being fed by a PLL output.	Connect unused pins to GND. See *Note (12)* .

Pin Name	Pin Type (1st, 2nd, and 3rd Function)	Pin Description	Connection Guidelines
		Optional/Dual-Purpose Configuration Pins	
nCEO	I/O, Output	Output that drives low when device configuration is complete.	During multi-device configuration, this pin feeds a subsequent device's nCE pin and must be pulled high to VCCIO by an external 10-kΩ pull-up resistor. During single device configuration and for the last device in multi-device configuration, this pin can be left floating or used as a user I/O after configuration.
FLASH_nCE, nCSO	I/O, Output	This pin functions as FLASH_nCE in AP mode, and nCSO in AS mode. This pin has an internal pull-up resistor that is always active. nCSO: Output control signal from the Cyclone III device to the serial configuration device in AS mode that enables the configuration device. FLASH_nCE: Output control signal from the Cyclone III device to the parallel flash in AP mode that enables the flash.	When not programming the device in AS mode, nCSO is not used. Similarly, FLASH_nCE is not used when not programming the device in AP mode. If the pin is not used as an I/O then it is recommended to leave the pin unconnected.
DATA1, ASDO	Input (FPP) Output (AS) Bidirectional open-drain (AP)	This pin functions as DATA1 in PS, FPP, and AP modes, and as ASDO in AS mode. DATA1: Data input in non-AS mode. Byte-wide or word-wide configuration data is presented to the target device on DATA[7..0] or DATA[15..0] respectively. In PS configuration scheme, DATA1 functions as user I/O pin during configuration, which means it is tri-stated. After FPP configuration, DATA1 is available as a user I/O pin and the state of this pin depends on the Dual-Purpose Pin settings. After AP configuration, DATA1 is a dedicated bidirectional pin with optional user control. ASDO: Control signal from the Cyclone III device to the serial configuration device in AS mode used to read out configuration data. In AS mode, this ASDO pin has an internal pull-up resistor that is always active. After AS configuration, this pin is a dedicated output pin with optional user control.	When not programming the device in AS or AP mode, this pin is available as a user I/O pin. If the pin is not used as an I/O then it is recommended to leave the pin unconnected.
DATA[7..2]	Input (FPP) Bidirectional open-drain (AP)	Data inputs. Byte-wide or word-wide configuration data is presented to the target device on DATA[7..0] or DATA[15..0] respectively. In AS or PS configuration scheme, they function as user I/O pins during configuration, which means they are tri-stated. After FPP configuration, DATA[7..2] are available as user I/O pins and the state of these pins depends on the Dual-Purpose Pin settings. After AP configuration, DATA[7..2] are dedicated bidirectional pins with optional user control.	When not programming the device in AP mode, these pins are available as user I/O pins. If these pins are not used as I/Os, then it is recommended to leave these pins unconnected.
DATA[15..8]	Bidirectional open-drain (AP)	Data inputs. Btye-wide or word-wide configuration data is presented to the target device on DATA[15..0]. In PS, FPP, or AS configuration scheme, they function as user I/O pins during configuration, which means they are tri-stated. After AP configuration, DATA[15..8] are dedicated bidirectional pins with optional user control.	When not programming the device in AP mode, these pins are available as user I/O pins. If these pins are not used as I/Os, then it is recommended to leave these pins unconnected.
PADD[23..0]	I/O, Output (AP)	24-bit address bus from the Cyclone III device to the parallel flash in AP mode.	When not programming the device in AP mode, these pins are available as user I/O pins. If these pins are not used as I/Os, then it is recommended to leave these pins unconnected.
nRESET	I/O, Output (AP)	Active-low reset output. Driving the nRESET pin low resets the parallel flash.	When not programming the device in AP mode, nRESET is not used and is available as a user I/O pin. If the pin is not used as an I/O then it is recommended to leave the pin unconnected.
nAVD	I/O, Output (AP)	Active-low address valid output. Driving the nAVD pin low during read or write operation indicates to the parallel flash that valid address is present on the PADD[23..0] address bus.	When not programming the device in AP mode, nRESET is not used and is available as a user I/O pin. If the pin is not used as an I/O then it is recommended to leave the pin unconnected.
nOE	I/O, Output (AP)	Active-low output enable to the parallel flash. Driving the nOE pin low during read operation enables the parallel flash outputs (DATA[15..0] and RDY).	When not programming the device in AP mode, nOE is not used and is available as a user I/O pin. If the pin is not used as an I/O then it is recommended to leave the pin unconnected.
nWE	I/O, Output (AP)	Active-low write enable to the parallel flash. Driving the nWE pin low during write operation indicates to the parallel flash that data on the DATA[15..0] bus is valid.	When not programming the device in AP mode, nWE is not used and is available as a user I/O pin. If the pin is not used as an I/O then it is recommended to leave the pin unconnected.
CRC_ERROR	I/O, Output	Active-high signal that indicates that the error-detection circuit has detected errors in the configuration SRAM bits. This pin is optional and is used when the CRC error-detection circuit is enabled.This pin can be set in Quartus® II software to support open-drain output.	If open drain feature is used, connect this pin to VCCIO of Bank 1 through a 10-kOhm resistor.When the output for CRC_ERROR is not used and this pin is not used as an I/O then it is recommended to leave the pin unconnected.
DEV_CLRn	I/O (when option off), Input (when option on)	Optional chip-wide reset pin that allows you to override all clears on all device registers. When this pin is driven low, all registers are cleared; when this pin is driven high, all registers behave as programmed. The DEV_CLRn pin does not affect JTAG boundary-scan or programming operations. This pin is enabled by turning on the Enable device-wide reset (DEV_CLRn) option in the Quartus II software.	When the input DEV_CLRn is not used and this pin is not used as an I/O then it is recommended to tie this pin to VCCIO or GND
DEV_OE	I/O (when option off), Input (when option on)	Optional pin that allows you to override all tri-states on the device. When this pin is driven low, all I/O pins are tri-stated; when this pin is driven high, all I/O pins behave as defined in the design. This pin is enabled by turning on the Enable device-wide output enable (DEV_OE) option in the Quartus II software.	When the input DEV_OE is not used and this pin is not used as an I/O then it is recommended to tie this pin to VCCIO or GND.
INIT_DONE	I/O, Output (open-drain)	This is a dual-purpose status pin and can be used as an I/O pin when not enabled as INIT_DONE. When enabled, a transition from low to high at the pin indicates when the device has entered user mode. If the INIT_DONE output is enabled, the INIT_DONE pin cannot be used as a user I/O pin after configuration. This pin is enabled by turning on the Enable INIT_DONE output option in the Quartus II software.	Connect this pin to a 10-kΩ resistor to VCCIO.

Pin Name	Pin Type (1st, 2nd, and 3rd Function)	Pin Description	Connection Guidelines
CLKUSR	I/O, Input	Optional user-supplied clock input. Synchronizes the initialization of one or more devices. If this pin is not enabled for use as a user-supplied configuration clock, it can be used as a user I/O pin. This pin is enabled by turning on the Enable user-supplied start-up clock (CLKUSR) option in the Quartus II software.	If the CLKUSR pin is not used as a configuration clock input and the pin is not used as an I/O then it is recommended to connect this pin to GND.
Dual-Purpose Differential and External Memory Interface Pins			
DIFFIO_[L,R,T,B][0..61][n,p] *(Note 6)*	I/O, TX/RX channel	Dual-purpose differential transmitter/receiver channels. These channels can be used for transmitting/receiving LVDS-compatible signals. Pins with a "p" suffix carry the positive signal for the differential channel. Pins with an "n" suffix carry the negative signal for the differential channel. If not used for differential signaling, these pins are available as user I/O pins.	When these I/O pins are not used they can be tied to the VCCIO of the bank they reside in or GND. See *Note (12)*.
DQS[0..5][L,R,T,B]/CQ[1,3,5][L,R,T,B][#],DPCLK[0..11] *(Note 7)*	I/O, DQS/CQ, DPCLK	Dual-purpose DPCLK/DQS pins can connect to the global clock network for high fan-out control signals such as clocks, asynchronous clears, presets, and clock enables. It can also be used as optional data strobe signal for use in external memory interfacing. These pins drive to dedicated DQS phase-shift circuitry, which allows for the fine tuning of the phase shift for input clocks or strobes to properly align clock edges needed to capture data.	When these I/O pins are not used they can be tied to the VCCIO of the bank they reside in or GND. See *Note (12)*.
DQS[0..5][L,R,T,B]/CQ[1,3,5][L,R,T,B][#],CDPCLK[0..7] *(Note 7)*	I/O, DQS/CQ, CDPCLK	Dual-purpose CDPCLK/DQS pins can connect to the global clock network for high fan-out control signals such as clocks, asynchronous clears, presets, and clock enables. Only one of the two CDPCLK in each corner can feed the clock control block at a time. The other pin can be used as general-purpose I/O pin. The CDPCLK signals incur more delay to the clock block control because they are multiplexed before being driven into the clock block control. It can also be used as optional data strobe signal for use in external memory interfacing. These pins drive to dedicated DQS phase-shift circuitry, which allows for the fine tuning of the phase shift for input clocks or strobes to properly align clock edges needed to capture data.	When these I/O pins are not used they can be tied to the VCCIO of the bank they reside in or GND. See *Note (12)*.
DQ[0..5][L,R,T,B] *(Note 7)*	I/O, DQ	Optional data signal for use in external memory interfaces.	When these I/O pins are not used they can be tied to the VCCIO of the bank they reside in or GND. See *Note (12)*.
DM[0..5][L,R,B,T][0..1]/BWS#[0..5][L,R,T,B]	I/O, DM/BWS#	The data mask pins are only required when writing to DDR SDRAM and DDR2 SDRAM devices. QDRII SRAM devices use the BWS signal to select the byte to be written into memory. A low signal on the DM/BWS# pin indicates that the write is valid. Driving the DM/BWS# pin high results in the memory masking the DQ signals.	When these I/O pins are not used they can be tied to the VCCIO of the bank they reside in or GND. See *Note (12)*.

Notes:
(1) This pin connection guideline is created based on the largest Cyclone III device (EP3C120F780).
(2) EP3C5 and EP3C10 only have VREFB[1..8]N0.
(3) EP3C5 and EP3C10 only have PLL(1 & 2). EP3C16 and other larger densities have PLL (1,2,3 & 4).
(4) You must follow specific requirements when interfacing Cyclone III devices with 2.5V/3.0V/3.3V configuration voltage standards. All I/O inputs must maintain a maximum AC voltage of 4.1V. Refer to Configuration and JTAG Pin I/O Requirements of Chapter 10 in Cyclone III Handbook: Configuring Cyclone III Devices.
(5) The number of dedicated global clocks for each device density is different. EP3C5 and EP3C10 support four dedicated clock pins on the left and right sides of the device, that can drive a total of 10 global clock networks. EP3C16 and other larger densities support four dedicated clock pins on each side of the device that can drive a total of 20 global clock networks.
(6) The differential TX/RX channels for each device density and package is different. Please refer to the Cyclone III Handbook Chapter 8: High-Speed Differential Interfaces in Cyclone III Devices.
(7) For details on the DQ and DQS bus modes support in different device densities, refer to the Cyclone III Handbook Chapter 9: External Memory Interfaces in Cyclone III Devices.
(8) Capacitance values for the power supply should be selected after consideration of the amount of power they need to supply over the frequency of operation of the particular circuit being decoupled. A target impedance for the power plane should be calculated based on current draw and voltage drop requirements of the device/supply. The power plane should then be decoupled using the appropriate number of capacitors. On-board capacitors do not decouple higher than 100 MHz due to “Equivalent Series Inductance” of the mounting of the packages. Proper board design techniques such as interplane capacitance with low inductance should be considered for higher frequency decoupling.
(9) Use a power island for VCCA and VCCD_PLL. PLL power supply may originate from another plane on the board but must be isolated using a ferrite bead or other equivalent methods. If using a ferrite bead, choose an 0402 package with low DC resistance, higher current rating than the maximum steady state current for the supply it is connected to (VCCA or VCCD_PLL) and high impedance at 100MHz.
(10) Decouple VCCA power island with a parallel combination of 1x47uF, 1x4.7uF, 1x0.1uF, 1x0.022uF, 1x0.01uF, 1x0.0047uF, 2x0.022uF, 1x0.001uF. Use 0402 package for 0.1uF and smaller capacitors for lower mounting inductance. Place 0.1uF and smaller capacitors as close to the device as possible. On-board capacitors do not decouple higher than 100 MHz due to “Equivalent Series Inductance” of the mounting of the packages. Proper board design techniques such as interplane capacitance with low inductance should be considered for higher frequency decoupling. To minimize impact on jitter, a 20mV ripple voltage was used in the analysis for VCCA decoupling. Refer to the figure on "VCCA&VCCD Decoupling" worksheet for decoupling capacitor placement guidelines. The figure on "VCCA&VCCD Decoupling" worksheet depicts symbolic representation of decoupling scheme and not the exact layout.
(11) Decouple VCCD_PLL power island with a parallel combination of 1x470uF(low ESR Tantalum), 1x4.7uF, 5x0.1uF, 2x0.01uF, 1x0.0047uF, 1x0.0022uF. Use 0402 package for 0.1uF and smaller capacitors for lower mounting inductance. Place 0.1uF and smaller capacitors as close to the device as possible. On-board capacitors do not decouple higher than 100 MHz due to “Equivalent Series Inductance” of the mounting of the packages. Proper board design techniques such as interplane capacitance with low inductance should be considered for higher frequency decoupling. To minimize impact on jitter, a 20mV ripple voltage was used in the analysis for VCCD_PLL decoupling.Refer to the figure on "VCCA&VCCD Decoupling" worksheet for decoupling capacitor placement guidelines. The figure on "VCCA&VCCD Decoupling" worksheet depicts symbolic representation of decoupling scheme and not the exact layout.
(12) The unused pins must be connected as specified in the Quartus II software settings. The default Quartus II setting for unused pins is 'As inputs tri-stated with weak pull-up resistors'. To change the setting, go to 'Assignments', then 'Device'. Click on 'Device & Pin options' dialog box and go to 'Unused Pins' tab. You may choose the desired setting from the 'Reserve all unused pins' drop down list.





Notes:

1. This is a top view of the silicon die.
2. This is only a pictorial representation to provide an idea of placement on the device.
   Refer to the pin list and the Quartus® II software for exact locations.

Pin Information for the Cyclone® III EP3C55 Device
Version 1.2

Version Number	Date	Changes Made
1.0	6/22/2007	Initial release.
1.1	1/4/2008	Updated Note(1) in Pin List.
1.2	5/23/2008	Updated pin function for CRC_ERROR pin.
		Updated DQ/DQS support for UBGA package.
		Updated pin function for PLL[1..4]_CLKOUT[p,n] pin.
		Remove RDY from pin list and pin definitions.
		Incorporated pin connection guideline into Pin Definitions worksheet.
		Incorporated VCCA and VCCD Decoupling recommendations.