

Date: Jan. 4, 2005

Subject: PI6C2410 CSM Fab1 and Fab2 Comparison Report

Reference:

CSM Fab2

Base Array: C241

Process: 0.5um 1P2M 3.3V CMOS

Date Code: B0441OC

Lot #: EA34366.3A

Package: L24

CSM Fab1

Base Array: CLKZDLY

Process: 0.5um/0.6um 3.3V CMOS

Date Code: 0203AOC

Lot #: EW87943.3

Package: L24

Equipment:

TEK TDS694C with P6249 probe & ASA M1

HP8082A Pulse Generator

Rohde & Schwarz SMY01 Signal Generator

HP8116A Function Generator

TEK DG2040 Data Generator

HP4145B

HP Power Supply

BK815 Capacitance Meter

Summary Results:

Table 1. PI6C2410 DC Characteristics at 25C.

Parameter	Test Condition	CSM Fab2 Data	CSM Fab1 Data
Vol	Iol = 12mA, Vcc = 3.0V	0.230V	0.203V
Voh	Ioh = -12mA, Vcc = 3.0V	2.760V	2.741V
Ioz (OUTx)	IOZL @ Vout = 0V, Vcc = 3.6V IOZH @ Vout = 3.6V, Vcc = 3.6V Pulldown resistance @ Vout = 0V	1.105nA 107.8uA 12.8Kohms	-55.67nA 112.0uA 11.8Kohms
Ioff (CLKIN, OEx, HF#, DIVx, FBIN)	Ioff @ Vin = 3.6V, Vcc = 0V Ioff @ Vin = 5.5V, Vcc = 0V	> 10mA > 10mA	> 10mA > 10mA
Iin (CLKIN, FBIN)	IIL @ Vin = 0V, Vcc = 3.6V IIH @ Vin = 3.6V, Vcc = 3.6V IIH @ Vin = 5.5V, Vcc = 3.6V (not 5V tolerant)	-48pA 210pA > 10mA	-8pA 20pA > 10mA
Iin (OEx, HF#, DIVx)	IIL @ Vin = 0V, Vcc = 3.6V IIH @ Vin = 3.6V, Vcc = 3.6V IIH @ Vin = 5.5V, Vcc = 3.6V (not 5V tolerant) Pullup resistance @ Vin = 3.6V	-6.204uA -3.559nA > 10mA 203Kohms	-6.122uA 9.145nA > 10mA 196Kohms
Cin (CLKIN)	Vcc = 3.3V, Vin = 0V, L24 package	5.8pF	5.5pF

Equipment used: HP4145B, HP Power Supply, BK815 Capacitance Meter

Table 2. PI6C2410 output DC Iol and Ioh, Vcc = 3.0V, 25C.

Vol / Voh V	CSM Fab2 Iol, mA	CSM Fab1 Iol, mA	CSM Fab2 Ioh, mA	CSM Fab1 Ioh, mA
0	0	0	-69.18	-61.78
0.5	24.89	28.02	-66.44	-59.56
1.0	43.25	48.43	-62.43	-56.45
1.5	53.59	59.21	-55.22	-50.43
2.0	57.65	62.66	-42.59	-39.21
2.5	58.71	63.33	-23.90	-22.11
3.0	58.94	63.40	0	0

Equipment used : HP4145B

Table 3. PI6C2410 min input freq, all outputs switching, Vcc=AVcc, 25C.

HF#	DIV1	DIV0	CSM Fab2 Min Input Freq., MHz Vcc=3.0V	CSM Fab2 Min Input Freq., MHz Vcc=3.3V	CSM Fab2 Min Input Freq., MHz Vcc=3.6V	CSM Fab1 Min Input Freq., MHz Vcc=3.0V	CSM Fab1 Min Input Freq., MHz Vcc=3.3V	CSM Fab1 Min Input Freq., MHz Vcc=3.6V
1	1	1	1.4	1.45	1.5	1.20	1.30	1.45

Equipment used: HP Power Supply, TEK DG2040 Data Gen., TEK TDS694C Scope with P6249 probes

Table 4. PI6C2410 max input freq, all outputs switching, Vcc=AVcc, 25C.

HF#	DIV1	DIV0	CSM Fab2 Max Input Freq., MHz Vcc=3.0V	CSM Fab2 Max Input Freq., MHz Vcc=3.3V	CSM Fab2 Max Input Freq., MHz Vcc=3.6V	CSM Fab1 Max Input Freq., MHz Vcc=3.0V	CSM Fab1 Max Input Freq., MHz Vcc=3.3V	CSM Fab1 Max Input Freq., MHz Vcc=3.6V
0	0	0	238	284	326	140	170	200

Equipment used: HP Power Supply, TEK DG2040 Data Gen., TEK TDS694C Scope with P6249 probes

Note: Jitters and phase errors may be large at these min & max freq conditions, but outputs track input.

Table 5. PI6C2410 Dynamic Supply Currents at 25C, Vcc=AVcc=3.6V, 15pF at all outputs.

CSM Fab	HF#	DIV1	DIV0	Input Freq. MHz	OUTx Freq. MHz	Vcc Pins (#2,10,15,22) Icc, mA	AVcc Pin (#23) Icc, mA	Total Icc, mA
Fab2	0	0	0	66.6	133.3	60	10	70
Fab1	0	0	0	66.6	133.3	62	9	71
Fab2	1	0	0	33.3	133.3	59	10	69
Fab1	1	0	0	33.3	133.3	61	9	70

Equipment used: HP Power Supply, HP8082A Pulse Gen., TEK TDS694C Scope with P6249 probes

Table 6. PI6C2410 output Rise and Fall Times measured between 0.8V & 2.0V, Duty Cycle measured at 1.4V of OUT2, all outputs switching with 15pF load, Vcc=AVcc=OEx, 25C.

Output Freq. MHz	Vcc V	CSM Fab2 Rise Time ns	CSM Fab2 Fall Time ns	CSM Fab2 Duty Cycle %	CSM Fab1 Rise Time ns	CSM Fab1 Fall Time ns	CSM Fab1 Duty Cycle %
66.6	3.0	0.730	0.775	54.21	0.653	0.552	50.67
	3.3	0.599	0.648	54.77	0.536	0.470	51.54
	3.6	0.480	0.558	55.44	0.485	0.423	52.04
133.3	3.0	0.725	0.787	55.95	0.651	0.556	51.53
	3.3	0.612	0.680	58.84	0.560	0.479	53.16
	3.6	0.500	0.570	60.05	0.514	0.428	54.52

Equipment used: HP Power Supply, HP8082A Pulse Gen., TEK TDS694C Scope with P6249 probes

Table 7a. PI6C2410 Phase Error measured from CLKIN rising edge at Vcc/2 to FBIN/FBOUT rising edge at Vcc/2, all outputs switching with 15pF load, SSC off, Vcc=AVcc=OEx, 25C.

HF#	DIV1	DIV0	Input Freq. MHz	Output Freq. MHz	Vcc V	CSM Fab2 Static Phase Error, ps	CSM Fab2 Dynamic Phase Error, ps	CSM Fab1 Static Phase Error, ps	CSM Fab1 Dynamic Phase Error, ps
0	1	1	66.6	33.3	3.0	-78	322	+27	162
					3.3	-54	302	+14	161
					3.6	-28	322	+3	173
0	1	0	66.6	66.6	3.0	-107	179	+8	93
					3.3	-64	180	-15	101
					3.6	-37	191	-22	91
0	0	1	66.6	100	3.0	-80	134	+8	85
					3.3	-50	125	+4	89
					3.6	-34	121	+20	75
0	0	0	66.6	133.3	3.0	-111	182	+11	103
					3.3	-71	189	-16	99
					3.6	-44	172	-20	103
1	1	1	33.3	33.3	3.0	+20	339	+140	165
					3.3	+34	361	+121	146
					3.6	+50	388	+103	158
1	1	0	33.3	66.6	3.0	+15	180	+108	109
					3.3	+26	172	+111	112
					3.6	+45	193	+93	101
1	0	1	33.3	100	3.0	+28	144	+141	89
					3.3	+26	126	+141	75
					3.6	+44	124	+108	75
1	0	0	33.3	133.3	3.0	+14	166	+113	104
					3.3	+19	168	+114	102
					3.6	+39	195	+98	102

Equipment used: HP Power Supply, HP8082A Pulse Gen., TEK TDS694C Scope with P6249 probes and M1

Table 7b. PI6C2410 Phase Error measured from CLKIN rising edge at Vcc/2 to FBIN/FBOOUT rising edge at Vcc/2, all outputs switching with 15pF load, SSC on with 50KHz triangular modulation & +/- 0.5% freq spread, Vcc=AVcc=OEx, 25C.

HF#	DIV1	DIV0	Input Freq. MHz	Output Freq. MHz	Vcc V	CSM Fab2 Static Phase Error, ps	CSM Fab2 Dynamic Phase Error, ps	CSM Fab1 Static Phase Error, ps	CSM Fab1 Dynamic Phase Error, ps
0	1	1	66.6	33.3	3.0	-91	437	+27	309
					3.3	-61	532	+20	291
					3.6	-18	435	+6	253
0	1	0	66.6	66.6	3.0	-117	318	+13	237
					3.3	-58	308	-13	203
					3.6	-34	288	-19	194
0	0	1	66.6	100	3.0	-81	309	+15	224
					3.3	-46	255	+11	197
					3.6	-21	228	+22	193
0	0	0	66.6	133.3	3.0	-96	336	+16	244
					3.3	-69	303	-13	209
					3.6	-42	297	-18	211
1	1	1	33.3	33.3	3.0	+30	446	+145	296
					3.3	+37	487	+119	292
					3.6	+46	442	+103	268
1	1	0	33.3	66.6	3.0	+13	331	+102	250
					3.3	+27	197	+113	226
					3.6	+35	278	+92	215
1	0	1	33.3	100	3.0	+34	279	+146	254
					3.3	+26	239	+141	218
					3.6	+46	231	+107	191
1	0	0	33.3	133.3	3.0	+17	324	+108	251
					3.3	+24	276	+111	250
					3.6	+42	282	+91	221

Equipment used: HP Power Supply, HP8082A Pulse Gen., HP8116A Function Gen., R&S SMY01 Signal Gen., TEK TDS694C Scope with P6249 probes and M1

Table 8. PI6C2410 Cycle-to-cycle Jitters measured at OUT2 rising edge at Vcc/2, SSC off and on with 50KHz triangular modulation & +/- 0.5% freq spread, all outputs switching with 15pF load, Vcc=AVcc=OEx, 25C.

HF#	DIV1	DIV0	Input Freq. MHz	Output Freq. MHz	Vcc V	CSM Fab2 Max Cycle-to-cycle jitter, ps no SSC	CSM Fab1 Max Cycle-to-cycle jitter, ps no SSC	CSM Fab2 Max Cycle-to-cycle jitter, ps SSC on	CSM Fab1 Max Cycle-to-cycle jitter, ps SSC on
0	1	1	66.6	33.3	3.0	86	72	87	88
					3.3	75	64	78	88
					3.6	82	70	93	83
0	1	0	66.6	66.6	3.0	67	51	68	56
					3.3	66	47	58	51
					3.6	51	55	49	55
0	0	1	66.6	100	3.0	122	73	131	76
					3.3	90	130	90	133
					3.6	81	112	85	118
0	0	0	66.6	133.3	3.0	90	87	93	85
					3.3	73	79	75	80
					3.6	92	79	92	89
1	1	1	33.3	33.3	3.0	91	68	84	70
					3.3	91	60	92	77
					3.6	88	86	83	91
1	1	0	33.3	66.6	3.0	67	55	66	56
					3.3	62	50	58	62
					3.6	50	49	48	54
1	0	1	33.3	100	3.0	97	147	96	153
					3.3	83	127	88	131
					3.6	72	86	74	81
1	0	0	33.3	133.3	3.0	78	117	80	132
					3.3	109	107	115	110
					3.6	94	104	93	110

Equipment used: HP Power Supply, HP8082A Pulse Gen., HP8116A Function Gen., R&S SMY01 Signal Gen., TEK TDS694C Scope with P6249 probes and M1

Table 9. PI6C2410 output-to-output skews, tsk(o), measured at 1.4V of OUTx rising edges, 25C, 33.3MHz at CLKIN, all outputs switching with 15pF load, Vcc=AVcc=OEx, 25C.

Vcc V	CSM Fab2 tsk(o), ps OUTx at 33.3MHz	CSM Fab2 tsk(o), ps OUTx at 66.6MHz	CSM Fab1 tsk(o), ps OUTx at 33.3MHz	CSM Fab1 tsk(o), ps OUTx at 66.6MHz
3.0	33	25	66	56
3.3	43	34	62	54
3.6	48	50	54	50

Equipment used: HP Power Supply, HP8082A Pulse Gen., TEK TDS694C Scope with P6249 probes