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# PRODUCT/PROCESS CHANGE NOTICE (PCN)

PCN Number: **05-05**  
 Date Issued: **February 11, 2005**  
 Product(s) Affected: **PI6C2404A-1**  
 Manufacturing Location Affected: **Moving this CSMS Fab 1 product to already approved CSMS Fab 2.**  
 Date Effective: **May 11, 2005**  
*(Remaining Fab 1 inventory is very limited. Immediate review by affected customers is requested).*

Means of Distinguishing Changed Devices:  
 Product Mark:  
 Back Mark  
 Date Code: **Added letter code \***  
 Other  
 \* Product will have a letter "B" as the first character of the date code to signify CSMS Fab 2. All product samples should be identified this way.

Contact: **Ed Mello**  
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Attachment:  Yes;  No  
**No significant product features changed. Pericom Product and Design Engineering Characterization data confirmed Fab 2 devices should have no critical performance differences from Fab 1 products.**  
 Samples: **Request from Sales.**

Description and Purpose of Change:  
**Product is transferring from approved wafer fab subcontractor Chartered Semiconductor Manufacturing Singapore's (CSMS) Fab 1, to the already approved Fab 2 facility. The devices use the same design and process type, and will be manufactured in Fab 2 with essentially the same qualified CMOS 0.5-µm SPDM process type as used in Fab 1. CSMS closed the older 150-mm wafer Fab 1 facility at the end of March 2004. Fab 2 will manufacture these Pericom products using 200-mm wafers. See CSMS website for more information:**  
<http://www.charteredsemi.com/media/corp/2003n/20030213.asp>

Die Technology  
 Wafer Fabrication  
 Assembly Process  
 Equipment  
 Material  
 Testing  
 Manufacturing Site  
 Data Sheet  
 Other: **CSMS Fab 1 closure, porting to Fab 2**

Reliability/Qualification Summary: *Generic data using same process and design rules:* [http://www.pericom.com/pdf/gen/rel\\_CSM2.pdf](http://www.pericom.com/pdf/gen/rel_CSM2.pdf)

Customer Acknowledgement of Receipt:

Customer: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

E-Mail: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Approval for shipments prior to effective date

Customer Comments (Optional): \_\_\_\_\_

Date: Dec. 22, 2004

Subject: PI6C2404A-1 – CSM-S Fab1to Fab2 Comparison Report

**Reference:**

CSM-S Fab2:

Device array: CDF2  
 Process: 0.5um SPDM 3.3V CMOS  
 Date Code: B0442ZC  
 Lot #: EA31344.2A  
 Package: W8

CSM-S Fab1:

Device array: CD89  
 Process: 0.5um SPDM 3.3V CMOS  
 Date Code: 0443ZC  
 WO/LT#: 268463 from finished goods box stock  
 Package: W8

**Equipment:**

TEK TDS694C with P6249 probe & ASA M1  
 HP8082A Pulse Generator  
 HP8116A Function Generator  
 R & S Signal Generator SMY01  
 HP4145B  
 HP TIA  
 HP Power Supply

**Summary:**

The new Fab 2 die array closely matches the Fab 1 product and meets spec requirements

**Comparison Test Results:**

**Table 1. PI6C2404A-1 - DC Characteristics at 25C.**

Parameter	Test Condition	Vdd V	CSM Fab2 Data	CSM Fab1 Data
Vol	Iol = 8mA	3.0	0.206V	0.206V
Voh	Ioh = -8mA	3.0	2.775V	2.768V
Ioff (CLKIN)	Vin = 3.6V Vin = 5.5V (5V tolerant)	0	41pA 59pA	8pA 34pA
Iil (CLKIN)	Vin = 0V Pull-down resistance measured at 0V	3.6	-5.125nA 19.7Kohms	-2.434uA 15.2Kohms
Iih (CLKIN)	Vin = 3.6V Vin = 5.5V (5V tolerant)	3.6	69.52uA 69.95uA	82.66uA 82.94uA
Ioff (FB_IN)	Vin = 3.6V Vin = 5.5V	0	> 10mA > 10mA	> 10mA > 10mA
Iin (FB_IN)	Vin = 0V Vin = 3.6V Vin = 5.5V (not 5V tolerant)	3.6	-1.258nA 65pA > 10mA	-640pA 23pA > 10mA
Static Idd	outputs open, CLKIN=0 outputs open, CLKIN=1	3.6	2.917mA 3.938mA	4.210mA 3.167mA

Equipment used: HP4145B, HP Power Supply.

**Table 2. PI6C2404A-1 DC Iol and Ioh at Vdd = 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	-48.23	-42.79
0.5	18.38	18.34	-46.16	-41.30
1.0	31.60	31.64	-43.35	-39.25
1.5	38.72	38.66	-38.50	-35.43
2.0	41.32	40.95	-29.93	-27.99
2.5	42.00	41.44	-16.92	-16.10
3.0	42.18	41.54	0	0

Equipment used: HP4145B.

**Table 3. PI6C2404A-1 Min Vdd for PLL to lock at different frequencies, 25C, 15pF & 30pF at all 4 outputs, OUTB2 connected to FB IN.**

CLKIN Freq. MHz	CSM Fab2 Min Vdd, V for PLL to lock 15pF load	CSM Fab2 Min Vdd, V for PLL to lock 30pF load	CSM Fab1 Min Vdd, V for PLL to lock 15pF load	CSM Fab1 Min Vdd, V for PLL to lock 30pF load
33.3	1.86	1.86	2.23	2.23
66.6	1.98	1.98	2.39	2.39
133.3	2.16	2.16	2.51	2.54

Equipment used: HP8082A Pulse gen., HP Power Supply, TEK TDS694C Scope & P6249 probes.

Note: Part may have large phase errors/jitters and small output swings at these low Vdd conditions, but outputs still track input.

**Table 4a. PI6C2404A-1 Min CLKIN Input Frequencies at 25C, 15pF & 30pF all 4 outputs, OUTB2 connected to FB IN.**

Vdd V	CSM Fab2 Min Input Freq., MHz for PLL to lock 15pF load	CSM Fab2 Min Input Freq., MHz for PLL to lock 30pF load	CSM Fab1 Min Input Freq., MHz for PLL to lock 15pF load	CSM Fab1 Min Input Freq., MHz for PLL to lock 30pF load
3.0	1.7	1.7	3.3	3.3
3.3	1.8	1.8	3.6	3.6
3.6	1.9	1.9	3.9	3.9

Equipment used: HP8082A Pulse gen., HP Power Supply, TEK TDS694C Scope & P6249 probes.

Note: Part may have large phase errors and jitters at these min freq conditions, but the outputs still track input.

**Table 4b. PI6C2404A-1 Max CLKIN Input Frequencies at 25C, 15pF & 30pF at all 4 outputs, OUTB2 connected to FB IN.**

Vdd V	CSM Fab2 Max Input Freq., MHz for PLL to lock 15pF load	CSM Fab2 Max Input Freq., MHz for PLL to lock 30pF load	CSM Fab1 Max Input Freq., MHz for PLL to lock 15pF load	CSM Fab1 Max Input Freq., MHz for PLL to lock 30pF load
3.0	224	170	219	190
3.3	199	175	232	199
3.6	206	180	233	208

Equipment used: HP8082A Pulse gen., HP Power Supply, TEK TDS694C Scope & P6249 probes.

Note: Part may have large phase errors and jitters at these max freq conditions, but the outputs still track input.

**Table 5a. CSM Fab2 PI6C2404A-1 output rise and fall times, and duty cycle measured at the OUTA2 pin without trace, 25C, 15pF & 30pF load at all 4 outputs, OUTB2 connected to FB IN.**

CLKIN Freq. MHz	Vdd V	CSM Fab2 trise, ns 0.8V to 2.0V 15pF load	CSM Fab2 trise, ns 0.8V to 2.0V 30pF load	CSM Fab2 tfall, ns 2.0V to 0.8V 15pF load	CSM Fab2 tfall, ns 2.0V to 0.8V 30pF load	CSM Fab2 Duty Cycle, % at Vdd/2 15pF load	CSM Fab2 Duty Cycle, % at Vdd/2 30pF load
33.3	3.0	1.130	1.460	0.978	1.428	51.26	51.31
	3.3	0.979	1.257	0.853	1.259	51.28	51.39
	3.6	0.861	1.109	0.761	1.144	51.34	51.44
66.67	3.0	1.114	1.477	0.998	1.429	52.93	52.98
	3.3	0.954	1.270	0.848	1.258	52.92	52.78
	3.6	0.839	1.124	0.770	1.156	52.99	52.84
100	3.0	1.200	1.583	1.005	1.501	54.42	54.94
	3.3	1.055	1.351	0.881	1.321	54.03	54.95
	3.6	0.945	1.185	0.786	1.191	54.08	55.25
133.33	3.0	1.147	1.771	1.054	1.591	57.68	59.85
	3.3	0.965	1.565	0.926	1.418	57.86	60.40
	3.6	0.823	1.355	0.837	1.305	58.20	60.34

Equipment used: HP8082A Pulse gen., HP Power Supply, TEK TDS694C Scope & P6249 probes.

\* Note: Vol > 0.8V, rise and fall times cannot be measured between 0.8V and 2.0V.

**Table 5b. CSM Fab1 PI6C2404A-1 output rise and fall times, and duty cycle measured at the OUTA2 pin without trace, 25C, 15pF & 30pF load at all 4 outputs, OUTB2 connected to FB IN.**

CLKIN Freq. MHz	Vdd V	CSM Fab1 trise, ns 0.8V to 2.0V 15pF load	CSM Fab1 trise, ns 0.8V to 2.0V 30pF load	CSM Fab1 tfall, ns 2.0V to 0.8V 15pF load	CSM Fab1 tfall, ns 2.0V to 0.8V 30pF load	CSM Fab1 Duty Cycle, % at Vdd/2 15pF load	CSM Fab1 Duty Cycle, % at Vdd/2 30pF load
33.3	3.0	1.290	1.705	1.170	1.567	50.46	50.55
	3.3	1.073	1.484	0.997	1.328	50.53	50.54
	3.6	0.875	1.307	0.869	1.170	50.62	50.57
66.67	3.0	1.324	1.728	1.243	1.596	50.46	51.03
	3.3	1.137	1.512	1.053	1.358	50.62	51.21
	3.6	0.958	1.361	0.917	1.205	50.82	51.46
100	3.0	1.364	1.814	1.163	1.573	53.60	54.12
	3.3	1.076	1.537	0.985	1.378	54.48	54.86
	3.6	0.843	1.323	0.870	1.225	55.00	55.42
133.33	3.0	1.160	1.834	1.140	1.561	56.19	58.93
	3.3	0.886	1.598	0.991	1.348	56.59	60.47
	3.6	0.688	1.410	0.870	1.220	56.90	60.97

Equipment used: HP8082A Pulse gen., HP Power Supply, TEK TDS694C Scope & P6249 probes.

**Table 6a. CSM Fab2 PI6C2404A-1 max cycle-to-cycle Jitters measured at OUTA2 rising edge at Vdd/2, 25C, SSC off and on with 50KHz triangular modulation and +/-0.5% freq spread, 15pF & 30pF at all 4 outputs, OUTB2 connected to FB\_IN.**

<b>CLKIN Freq. MHz</b>	<b>Vdd V</b>	<b>CSM Fab2 Max Cycle-to-cycle Jitter, ps SSC Off, 15pF load</b>	<b>CSM Fab2 Max Cycle-to-cycle Jitter, ps SSC Off, 30pF load</b>	<b>CSM Fab2 Max Cycle-to-cycle Jitter, ps SSC On, 15pF load</b>	<b>CSM Fab2 Max Cycle-to-cycle Jitter, ps SSC On, 30pF load</b>
33.33	3.0	128	127	120	123
	3.3	126	136	128	135
	3.6	129	127	114	132
66.67	3.0	94	121	106	115
	3.3	98	94	95	111
	3.6	101	102	91	109
100	3.0	85	113	102	104
	3.3	88	95	95	100
	3.6	88	114	91	105
133.33	3.0	104	103	113	113
	3.3	114	118	100	121
	3.6	90	102	101	104

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

**Table 6b. CSM Fab1 PI6C2404A-1 max cycle-to-cycle Jitters measured at OUTA2 rising edge at Vdd/2, 25C, SSC off and on with 50KHz triangular modulation and +/-0.5% freq spread, 15pF & 30pF at all 4 outputs, OUTB2 connected to FB\_IN.**

<b>CLKIN Freq. MHz</b>	<b>Vdd V</b>	<b>CSM Fab1 Max Cycle-to-cycle Jitter, ps SSC Off, 15pF load</b>	<b>CSM Fab1 Max Cycle-to-cycle Jitter, ps SSC Off, 30pF load</b>	<b>CSM Fab1 Max Cycle-to-cycle Jitter, ps SSC On, 15pF load</b>	<b>CSM Fab1 Max Cycle-to-cycle Jitter, ps SSC On, 30pF load</b>
33.33	3.0	103	113	98	119
	3.3	106	118	100	114
	3.6	117	123	114	138
66.67	3.0	86	108	86	100
	3.3	93	98	85	101
	3.6	96	102	91	101
100	3.0	100	127	92	129
	3.3	112	110	108	114
	3.6	106	120	112	106
133.33	3.0	112	123	115	121
	3.3	75	110	80	120
	3.6	87	122	76	109

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

**Table 7a. CSM Fab2 PI6C2404A-1 - Mean & Peak-to-peak Delays measured from CLKIN rising edge at Vdd/2 to FB\_IN rising edge at Vdd/2, SSC off and SSC on with 50KHz triangular modulation and +/-0.5% freq spread, 15pF & 30pF load at all 4 outputs, 25C, OUTB2 connected to FB IN.**

CLKIN Freq. MHz	Vdd V	CSM Fab2 SSC Off 15pF load Mean Delay ps	CSM Fab2 SSC Off 30pF load Mean Delay ps	CSM Fab2 SSC On 15pF load Mean Delay ps	CSM Fab2 SSC On 30pF load Mean Delay ps	CSM Fab2 SSC Off 15pF load Peak-to-peak Delay ps	CSM Fab2 SSC Off 30pF load Peak-to-peak Delay ps	CSM Fab2 SSC On 15pF load Peak-to-peak Delay ps	CSM Fab2 SSC On 30pF load Peak-to-peak Delay ps
33.33	3.0	-99	-133	-94	-136	335	332	498	445
	3.3	-90	-103	-93	-108	333	329	423	426
	3.6	-89	-73	-87	-73	356	379	414	444
66.67	3.0	-114	-150	-114	-137	200	199	271	337
	3.3	-108	-120	-106	-117	193	191	274	320
	3.6	-111	-91	-113	-84	212	227	242	273
100	3.0	-120	-146	-117	-141	148	158	254	297
	3.3	-101	-116	-101	-109	147	158	245	269
	3.6	-88	-94	-89	-89	155	165	251	235
133.33	3.0	-200	-263	-213	-255	148	147	265	272
	3.3	-183	-245	-176	-238	119	111	236	233
	3.6	-162	-222	-166	-218	119	109	208	214

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

**Table 7b. CSM Fab1 PI6C2404A-1 - Static & Peak-to-peak Phase Errors measured from CLKIN rising edge at Vdd/2 to FB\_IN rising edge at Vdd/2, SSC off and SSC on with 50KHz triangular modulation and +/-0.5% freq spread, 15pF & 30pF load at all 4 outputs, 25C, OUTB2 connected to FB IN.**

CLKIN Freq. MHz	Vdd V	CSM Fab1 SSC Off 15pF load Mean Delay ps	CSM Fab1 SSC Off 30pF load Mean Delay ps	CSM Fab1 SSC On 15pF load Mean Delay ps	CSM Fab1 SSC On 30pF load Mean Delay ps	CSM Fab1 SSC Off 15pF load Peak-to-peak Delay ps	CSM Fab1 SSC Off 30pF load Peak-to-peak Delay ps	CSM Fab1 SSC On 15pF load Peak-to-peak Delay ps	CSM Fab1 SSC On 30pF load Peak-to-peak Delay ps
33.33	3.0	-11	-117	-21	-121	453	517	524	558
	3.3	-82	-55	-78	-61	582	628	512	598
	3.6	-55	-5	-56	-5	703	860	783	916
66.67	3.0	-32	-145	-23	-139	265	282	337	324
	3.3	-53	-97	-48	-97	316	321	354	385
	3.6	-73	-51	-68	-52	273	339	344	445
100	3.0	-286	-14	-286	-5	198	173	294	268
	3.3	-218	+61	-214	+63	130	186	251	262
	3.6	-139	-45	-136	-65	150	206	224	249
133.33	3.0	-79	-142	-80	-132	107	115	268	266
	3.3	-27	-71	-40	-75	112	125	237	237
	3.6	+19	-37	+9	-44	140	112	215	210

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

**Table 8a. CSM Fab2 PI6C2404A-1 output-to-output skews measured at Vdd/2 of rising edges, 25C, 15pF & 30pF load at all 4 outputs, OUTB2 connected to FB IN.**

CLKIN Freq. MHz	Vdd V	Output Load pF	CSM Fab2 OUTA1 & OUTA2 Output-to-output skew ps	CSM Fab2 OUTB1 & OUTB2 Output-to-output skew ps	CSM Fab2 OUTA1/2 & OUTB1/2 Output-to-output skew ps
66.6	3.0	30	36	174	174
	3.3		28	162	162
	3.6		24	156	156
133.3	3.0	15	54	128	132
	3.3		50	130	142
	3.6		48	142	152

Equipment used: HP8082A Pulse gen., HP Power Supply, TEK TDS694C Scope & P6249 probes.

**Table 8b. CSM Fab1 PI6C2404A-1 output-to-output skews measured at Vdd/2 of rising edges, 25C, 15pF & 30pF load at all 4 outputs, OUTB2 connected to FB IN.**

CLKIN Freq. MHz	Vdd V	Output Load pF	CSM Fab1 OUTA1 & OUTA2 Output-to-output skew ps	CSM Fab1 OUTB1 & OUTB2 Output-to-output skew ps	CSM Fab1 OUTA1/2 & OUTB1/2 Output-to-output skew ps
66.6	3.0	30	28	256	256
	3.3		25	236	236
	3.6		18	230	230
133.3	3.0	15	20	96	96
	3.3		25	98	98
	3.6		28	100	100

Equipment used: HP8082A Pulse gen., HP Power Supply, TEK TDS694C Scope & P6249 probes.