

PRODUCT/PROCESS CHANGE NOTICE (PCN)

PCN Number: **05-04**
 Date Issued: **January 28, 2005**
 Product(s) Affected: **PI5C3383 (all package types)**
 Manufacturing Location Affected: **CSMC-HJ –China PRC**
 Date Effective: **April 28, 2005 – standard 90 day waiting period (some customers may require additional time).**
Supplies of current product may be very limited.

Means of Distinguishing Changed Devices:
 Product Mark:
 Back Mark
 Date Code: **Wafer Fab ID letter code ***
 Other
 * **W - last letter of date code signifies CSMC-HJ**

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

Description and Purpose of Change:
Product is transferring from wafer fab subcontractor Chartered Semiconductor Manufacturing Singapore's (CSMS) Fab 1 (which closed operations in March 2004), to previously approved CSMC-HJ wafer fab in China. The device maintains the same design and will be manufactured at CSMC-HJ with essentially the same qualified CMOS 0.6-µm SPDM process type as used in CSMC Fab 1. The CSMS wafer fab equipment was sold to CSMC-HJ in 2004, and Pericom is using the same CSMS Fab 1 masks. See the CSMC-HJ website for more information about their operations: <http://www.csmc-hj.com.cn/csmc/english/index.asp>

Die Technology
 Wafer Fabrication
 Assembly Process
 Equipment
 Material
 Testing
 Manufacturing Site
 Data Sheet
 Other:

Reliability/Qualification Summary: **Electrical Characterization and Reliability Qualification reports are attached.**

Customer Acknowledgement of Receipt:

Customer: _____
 Name: _____
 Title: _____
 Date: _____
 E-Mail: _____
 Phone: _____
 Fax: _____
 Approval for shipments prior to PCN effective date
 Customer Comments (Optional): _____

Confidential/For Customer Use Only

Date: January 24, 2005

Subject: PI5C3383 Product Characterization Report – CSMC-HJ Wafer Fab

Introduction:

The PI5C3383 is a 5-Bit, 4-Port Bus Exchange Switch. This is a CSMS Fab-1 transfer to CSMC-HJ in China. The original characterization for the CSMS Fab 1 product and process was originally done in 1995. A review of the key parameters confirmed that there are essentially no parametric differences, since CSMC-HJ is using the same process equipment and masks that were used in CSMS Fab 1 (sold by CSMS to CSMC-HJ after the Fab 1 shutdown in March 2004). The die and wafer size is therefore the same as used in CSMS Fab 1.

Reference:

Process CSMC-HJ, CMOS, 0.6um, 5V, 1P2M
Array: BUSSU1
Lot #: EA48YF2.3A
Date Code: X0440OW
Package SOIC (S24)

Equipment:

HP power supply & DMM
HP4145B DC Analyzer
HP4285A LCR Meter
TDS7404 Oscilloscope with TEK P7240 Probes
HP8082A Signal Generator
Thermostream TP04300A

Tables:

Table 1: DC Characteristics
Table 2: Ron Measurements, all paths, 25C
Table 3: Capacitance, 25C
Table 4: AC Characteristics
Table 5: Dynamic ICC, Vcc=5.25V, 25C

Conclusion

Product meets all current spec requirements, and there is essentially no difference between the CSMS Fab 1 and CSMC-HJ versions.

Table 1. DC Characteristics

Symbol	Test Conditions	Vcc	-40°C	25°C	90°C	Min Spec	Max Spec	unit
VIH	Input High Voltage	4.75 V	1.305	1.285	1.260	2.0		V
VIH	Input High Voltage	5.00 V	1.335	1.325	1.295	2.0		V
VIH	Input High Voltage	5.25 V	1.370	1.360	1.335	2.0		V
VIL	Input Low Voltage	4.75 V	1.505	1.490	1.480		0.8	V
VIL	Input Low Voltage	5.00 V	1.550	1.535	1.530		0.8	V
VIL	Input Low Voltage	5.25 V	1.595	1.585	1.580		0.8	V
VH	Input Hysteresis	4.75 V	0.200	0.205	0.220	typ	0.15	V
VH	Input Hysteresis	5.00 V	0.215	0.210	0.235	typ	0.15	V
VH	Input Hysteresis	5.25 V	0.225	0.225	0.245	typ	0.15	V
Ron	Ion=48mA, Vin=0 V	4.75 V	4.03	4.79	5.99		7	Ω
Ron	Ion=15mA, Vin=2.4 V	4.75 V	7.07	8.73	11.3		15	Ω
IIL	Vin= 0 V	5.25 V	-15 p	15 p	-7 p		-1u	A
IHH	Vin= 5.25 V	5.25 V	28 p	38 p	1.7 n		1u	A
IOZL	Voz= 0 V	5.25 V	8 p	-10 p	-1.5 n		-1u	A
IOZH	Voz= 5.25V	5.25 V	-14 p	26 p	2.1 n		1u	A
VIK	I/O Pin, I=-18mA	4.75 V	-0.92	-0.85	-0.76	typ	-1.2	V
VIK	BX / BE Pin, I=-18mA	4.75 V	-0.88	-0.82	-0.74	typ	-1.2	V
ICCL	Vin=0 V	5.25 V	4 p	104 p	4 n		3	uA
ICCH	Vin=5.25V	5.25 V	74 p	67 p	4 n		3	uA
ΔICC	Vin=3.4V	5.25 V	832 u	772 u	732 u		2.5m	A

Table 2. Ron Measurement, all paths, Vcc=4.75V, 25C

Channel	Ion=+48mA Vin=0V	Ion=+15mA Vin=2.4V	unit
A0 – C0	4.58	8.40	Ω
B0 – D0	4.34	8.19	Ω
A0 – D0	4.56	8.33	Ω
B0 – C0	4.53	8.19	Ω
A1 – C1	4.33	8.06	Ω
B1 – D1	4.30	8.14	Ω
A1 – D1	4.51	8.19	Ω
B1 – C1	4.46	8.26	Ω
A2 – C2	4.52	8.40	Ω
B2 – D2	4.66	8.46	Ω
A2 – D2	4.65	8.47	Ω
B2 – C2	4.76	8.53	Ω
A3 – C3	4.57	8.46	Ω
B3 – D3	4.56	8.46	Ω
A3 – D3	4.77	8.59	Ω
B3 – C3	4.71	8.59	Ω
A4 – C4	4.57	8.46	Ω
B4 – D4	4.79	8.73	Ω
A4 – D4	4.78	8.59	Ω
B4 – C4	4.76	8.59	Ω

Table 3. Capacitance at 25 °C

Symbol	Description	Vcc	25 °C	Typical	Units
Cin	Bus Enable Input	5 V	4.8	6	pF
Cin	Bus Exchange Input	5 V	5.1	6	pF
Coff	C2 Cap, Switch Off	5 V	7.3	8	pF
Coff	A2 Cap, Switch Off	5 V	6.2	8	pF
Coff	D2 Cap, Switch Off	5 V	7.3	8	pF
Coff	B2 Cap, Switch Off	5 V	5.9	8	pF
Con	Switch On	5 V	13.7	14	pF

HP4285A LCR Meter

Table 4. AC Characteristics

Symbol	Vcc	Load	-40°C	25°C	90°C	Max Spec	Units
tsLH*	4.75 V	Load A	3.09	3.32	3.60	6.5	nS
tsHL*	4.75 V	Load A	2.98	3.21	3.41	6.5	nS
tpZH	4.75 V	Load A	3.10	3.34	3.63	6.5	nS
tpHZ	4.75 V	Load A	3.24	3.48	3.67	5.5	nS
tpZL	4.75 V	Load B	3.28	3.52	3.82	6.5	nS
tpLZ	4.75 V	Load B	3.38	3.42	3.51	5.5	nS

*Bus Exchange Time

Load A: 50pF//500Ω

Load B: 50pF//500Ω, 500Ω to 7V

Table 5. Dynamic Icc, Vcc=5.25V

Frequency	25C	Units
1MHZ	0.115	mA
5MHZ	0.574	mA
10MHZ	1.146	mA
20MHZ	2.287	mA
30MHZ	3.435	mA

Date: January 28, 2005

Subject: CSMC-HJ CMOS 0.6 μ m Wafer Fab Reliability Report

CSMC-HJ's (<http://www.csmc-hj.com.cn/csmc/english/index.asp>) CMOS, 5-volt, 0.6-micron process was recently verified for acceptability to Pericom's standard die level process qualification requirements. This facility has previously been qualified on their 0.8-micron CMOS process in 2004. This 0.6-micron process is a direct transfer of the equipment and Pericom masks from CSMS Fab 1 in Singapore.

A total of 130 units have thus far successfully completed 1000 hours of Dynamic High Temperature Operating Life (DHTOL) test at 150°C and 5.5 volts applied bias with no failures. The PI5C3383 product was used as the qualification vehicle, and therefore all products using this same process technology and design rules will meet Pericom's Wafer Fab Process Qualification requirements. This can include: PI5C3244, 3245, 3383, 3384, 3861, 32X2245, 32X383, 32X384, 34X245, and 34X2245, as well as other device types from other product families. It also passed High Temp Storage Life (HTSL), Unbiased HAST (UHAST), and Temperature Cycle (TMCL) testing as shown below.

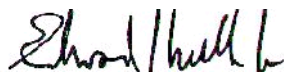
Based on 1000 hours of accelerated life test temperature and voltage operating conditions, the equivalent long-term life test FIT rate is currently 69.7, with a calculated MTBF of 130,000 hours. The life test will continue on to 3000 hours total, and the 2000-hour time point is now in process. The FIT calculation was made using the Arrhenius equation, with an Activation energy of 0.5 eV, an assumed system operating temperature of 55 °C, and a Confidence factor of 60%.

Pericom's Qualification Test results:

Rel Lot #	Device Type	Pkg. Type	Date Code	Stress Test	Stress Condition	Stress Duration	Sample Units	Results Pass/Fail
Q04013-1A	PI5C3383	S24	X0444OW	DHTOL	150°C, 5.5 v	168 hrs	130	130/0
Q04013-1A	PI5C3383	S24	X0444OW	DHTOL	150°C, 5.5 v	500 hrs	130	130/0
Q04013-1A	PI5C3383	S24	X0444OW	DHTOL	150°C, 5.5 v	1000 hrs	130	130/0
Q04013-1A	PI5C3383	S24	X0444OW	DHTOL	150°C, 5.5 v	2000 hrs	130	<i>In process</i>
Q04013-1A	PI5C3383	S24	X0444OW	DHTOL	150°C, 5.5 v	3000 hrs	130	<i>TBD</i>
Q04013-1B	PI5C3383	S24	X0444OW	HTSL	150°C	168 hrs	100	100/0
Q04013-1B	PI5C3383	S24	X0444OW	HTSL	150°C	500 hrs	100	100/0
Q04013-1B	PI5C3383	S24	X0444OW	HTSL	150°C	1000 hrs	100	100/0
Q04013-1C	PI5C3383	S24	X0444OW	UHAST	130°C	96 hrs	100	100/0
Q04013-1D	PI5C3383	S24	X0444OW	TMCL	-65, +150 °C	500 cycles	100	100/0

If there are any questions about this device qualification, please let me know.

Regards,



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