PERICOM Semiconductor Corporation
3545 North First St. • San Jose, CA 95134 • USA

PRODUCT/PROCESS CHANGE NOTICE (PCN)

PCN Number: **07-02C**

Date Issued: **August 8, 2007**

Product(s) Affected: **PI90LV048A, PI90LV047, PI90LV9637**

Manufacturing Location Affected: **TSMC Fab 7 and 10**

Date Effective: **November 8, 2007 – standard 90 day waiting period (except for customer contractually agreed upon longer timeframe).**

Means of Distinguishing Changed Devices:

- ☐ Product Mark:
- ☐ Back Mark
- ☒ Date Code: ***B letter code as first character**
- ☐ Other

Contact: **Ed Mello**

Title: **Director, Quality Systems**

Phone: (**408) 435-0800, Ext. 207**

Fax: **(408) 321-0324**

E-Mail: emello@pericom.com

Attachment: ☒ Yes; ☐ No

Characterization data confirmed TSMC-Fab 10 devices have no critical performance differences from TSMC Fab 7 production. See attached Characterization Comparison Data starting on page 3 of PDF copy.

Samples: **Request from Pericom Sales.**

Description and Purpose of Change:

These products have been transferred from wafer fab vendor Taiwan Semiconductor Manufacturing Corp. (TSMC) Fab 7 (which closed operations during Q1, 2006), to their Fab 10 facility near Shanghai, China. The devices are being manufactured from the same die array, and retain the same die size and CMOS, 0.35-µm, process as used in TSMC Fab 7. Key TSMC wafer fab manufacturing equipment was transferred to Fab 10, and Pericom is using the same mask sets. See the TSMC- website for more information about their China Fab 10 operation:

http://www.tsmc.com/download/english/a05_literature/enliterature/html-newsletter/Dec2004/ManufacturingExcellence/index.html

- ☐ Die Technology
- ☒ Wafer Fabrication
- ☐ Assembly Process
- ☐ Equipment
- ☐ Material
- ☐ Testing
- ☒ Manufacturing Site
- ☐ Data Sheet
- ☒ Other: Class 2 change

Reliability/Qualification Summary: **Process Qual report on a generically equivalent product is on page 2 of the PDF copy.**

Customer Acknowledgement of Receipt:

Customer: _____

Name: _____

Title: _____

Date: _____

E-Mail: _____

Phone: _____

Fax: _____

☐ Approval for shipments prior to PCN effective date

Customer Comments (Optional): _____

PERICOM Semiconductor Corporation
www.pericom.com

Date: December 7, 2006

Subject: ***TSMC Wafer Fab 10 - 0.35 µm CMOS (1P4M) Process Qualification Report - Update***

Pericom's PI7C8150B PCI Bridge device type manufactured at TSMC's Fab 10 facility has successfully completed Qualification testing thus far with no failures. This device and others in the PCI Bridge family of products are now being manufactured at our wafer fabrication subcontract supplier, TSMC (http://www.tsmc.com/english/default.htm) in their Fab 10 facility near Shanghai, China. This is because they closed their Fab 7 facility in Taiwan earlier this year and moved the key process manufacturing equipment to Fab 10 (see PCN 06-04 on the Pericom website). The product still uses the same 0.35-µm CMOS, 3.3-volt, Single Poly, Quad Metal (1P4M) process and the same wafer masks. Therefore, this device type and others in the product family that use this process now meet Pericom's initial Fab Process Qualification requirements. The current results are indicated in the table below.

The equivalent DHTOL FIT rate for 1000 hours is currently at 146.5 for devices using the same process and design rules, with an MTBF of 6,825,938 hours. The FIT calculation uses the Arrhenius equation, with an Activation energy of 0.5 eV, an assumed system operating temperature of 55 °C, and a Confidence Level factor of 60%.

Pericom's Qualification Test results to date:

Rel Lot #	Device Type	Pkg. Type	Date Code	Stress Test	Sample Units	Test Conditions (Per JEDEC Standards)	Stress/ Duration	Results Pass/Fail
QDT06002-1	PI7C8150B	NA-256	B0610BT	DHTOL	112	+125 °C, 3.6 V	1000 hrs	112/0
QDT06002-2			B0633BT		112	+125 °C, 3.6 V	1000 hrs	112/0
QDT06002-3			B0641BT		112	+125 °C, 3.6 V	1000 hrs	In process
QDT06002-1			B0610BT	Temp Cycle	25	-65 to +150°C,	500 cycles	25/0
QDT06002-2			B0633BT		25	-65 to +150°C	500 cycles	25/0
QDT06002-3			B0641BT		25	-65 to +150°C	500 cycles	25/0
QDT06002-1			B0610BT	HAST	15	85%RH, 130°C	96 hours	15/0
QDT06002-2			B0633BT		15	85%RH, 130°C	96 hours	15/0
QDT06002-3			B0641BT		15	85%RH, 130°C	96 hours	15/0
QDT06002-1			B0610BT	Autoclave	15	100% RH, 121°C, 15 PSI	96 hours	15/0
QDT06002-2			B0633BT		15	100% RH, 121°C, 15 PSI	96 hours	15/0
QDT06002-3			B0641BT		15	100% RH, 121°C, 15 PSI	96 hours	15/0
N/A			B0610BT	Latch-up	6	EIA/JESD78	>±200mA	6/0
N/A			B0610BT	ESD-HBM	5	JESD22-A114-B	>2000V	5/0
N/A			B0610BT	ESD-MM	5	JESD22-A115-A	>200V	5/0

Generically equivalent Pericom products that use the same array, design rules and process technology can also be considered qualified by this product. This will also include: **PI7C8150A, 7C8150A-33, 7C8150B-33, 7C8150D, 7C8152A and 7C8152B**

If there are any questions about this qualification report, please contact me as indicated below.

Regards,

Edward J. Mello, Jr.
Director, Quality Systems
Phone: (408) 435-0800, Ext. 207
FAX: (408) 321-0324
E-Mail: emello@pericom.com

Confidential/For Customer Use Only

Date: July 31, 2007

Subject: PI90LV048A Characterization Comparison Report

Introduction
This device characterization comparison report is for a 3-Volt LVDS Quad Flow-Through Differential Line Receiver. It shows the comparison of TSMC's Fab 7 facility (which was closed last year) with their Fab10 facility, using the same process type and mask sets. This data also applies to the PI90LV047A (Quad Flow-through Driver) and PI90LV9637 (Dual LVDS Receiver) devices from the same LVDS product family, differing only by die metal mask options. The key parameters of the Pericom datasheet are compared side by side for each wafer fab.

Reference:
Device Name: PI90LV048ALE
Package: 16-pin TSSOP (L)

Wafer Fab: TSMC Fab 7
Process: CMOS, 0.35-micron, 3.3v, SPTM
Date Code: A50142AOT
Lot number: ER60901.1E

Wafer Fab: TSMC, Fab 10
Process: CMOS, 0.35-micron, 3.3v, SPTM
Date Code: B0728OT
Lot number: EH92447.1B

Equipment:
HP power supply & DMM,
Agilent 81130A 400/660 MHz Pulse -/Pattern Generator
TDS8000 Digital Oscilloscope
HP4156B DC Analyzer
HP4285 LCR Meter
Thermostream TP04300-A

Tables:
Table 1: Differential Receiver Characteristics
Table 2: VOH/IOH Distribution
Table 3: VOL/IOL Distribution
Table 4: Device DC Characteristics
Table 5: AC Characteristics

Table 1: LV048A Differential Receiver Characteristics

Para-meter	Test Conditions	Vcc	Pin	-40°C		25°C		90°C		Min Spec	Max Spec	Unit
				Fab 7	Fab 10	Fab 7	Fab 10	Fab 7	Fab 10			
VOH	V_{ID}=+200mV, I_{OH}=-400uA	3.0V	Rout	2.99	2.99	2.99	2.98	2.98	2.98	2.7		V
VOH	Inputs terminated, I_{OH}=-400uA	3.0V	Rout	2.99	2.99	2.98	2.98	2.98	2.98	2.7		V
VOH	Inputs Shorted, I_{OH}=-400uA	3.0V	Rout	2.99	2.99	2.98	2.98	2.98	2.98	2.7		V
VOL	V_{ID}=-200mV, I_{OL}=2mA	3.0V	Rout	0.04	0.043	0.05	0.048	0.05	0.055		0.25	V
I_{OS}	Vout =0V	3.6V	Rout	-74.5	-73.59	-68.62	-67.94	-63.14	-63.53	-15	-100	mA
I_{OZ}	Vout =0V	3.6V	Rout	-10.4n	2.36n	227.4p	-25p	-2.43n	-3.7n	-10	+10	uA
I_{OZ}	Vout =Vcc	3.6V	Rout	7.4n	10.4n	857.7p	161p	20.25n	15.6n	-10	+10	uA
V_{TH}	Input Threshold High	3.0V	RI+/RI-			50*	50*				+100	mV
V_{TH}	Input Threshold High	3.3V	RI+/RI-			50*	50*				+100	mV
V_{TH}	Input Threshold High	3.6V	RI+/RI-			50*	50*				+100	mV
V_{TL}	Input Threshold Low	3.0V	RI+/RI-			-50*	-50*			-100		mV
V_{TL}	Input Threshold Low	3.3V	RI+/RI-			-50*	-50*			-100		mV
V_{TL}	Input Threshold Low	3.6V	RI+/RI-			-50*	-50*			-100		mV
I_{IN}	Vin =0V	3.6V	RI-	-446n	-423n	-383n	-349n	-319n	-294n	-10u	+10u	A
I_{IN}	Vin =2.8V	3.6V	RI-	-370n	-318n	-317n	-280n	-258n	-257n	-10u	+10u	A
I_{IN}	Vin =0V	0 V	RI-	-1.04n	401p	-460p	-4.52n	-369p	-1.58n	-10u	+10u	A
I_{IN}	Vin =2.8V	0 V	RI-	6.856u	6.95u	5.27u	5.50u	4.09u	4.54n	-10u	+10u	A
I_{IN}	Vin =3.6V	0 V	RI-	9.229u	9.42u	7.09u	7.45u	5.45u	6.10u	-20u	+20u	A

- Pulse Generator minimum, device could still be switching with less than 50mV threshold.

Table 2: VOH/IOH Distribution at 25C

VOH	IOH (Vcc=3.0V)		IOH (Vcc=3.3V),		IOH (Vcc=3.6V)		Unit
	Fab 7	Fab 10	Fab 7	Fab 10	Fab 7	Fab 10	
0 V	-50.40 m	-49.91m	-59.43 m	-58.06m	-68.54 m	-67.15m	A
0.5 V	-48.65 m	-48.06m	-57.56 m	-56.01m	-66.54 m	-64.79m	A
1.0 V	-45.60 m	-45.09m	-54.40 m	-52.93m	-63.30 m	-61.59m	A
1.5 V	-39.61 m	-39.31m	-48.55 m	-47.36m	-57.60 m	-56.14m	A
2.0 V	-29.71 m	-29.63m	-39.14 m	-38.32m	-48.65 m	-4759m	A
2.5 V	-16.18 m	-16.18m	-26.25 m	-25.76m	-36.38 m	-35.72m	A
3.0 V	76.70uA	266.22u	-10.45 m	-10.15m	-21.16 m	-20.77m	A
3.3 V	--------		84.74u	324.75u	-10.87 m	-10.60m	A
3.5 V	--------		--------		-3.625 m	-3.388m	A
3.6 V	--------		--------		92.01u	308.21u	A

Table 3: VOL/IOL Distribution at 25C

VOL	IOL (Vcc=3.0V)		IOL (Vcc=3.3V),		IOL (Vcc=3.6V)		Unit
	Fab 7	Fab 10	Fab 7	Fab 10	Fab 7	Fab 10	
0 V	-67.35 u	-99.62u	-72.70 u	-117.91u	-79.97 u	-121.09u	A
0.5 V	19.31 m	20.17m	20.04 m	21.01m	20.59 m	21.70m	A
1.0 V	34.22 m	35.13m	36.30 m	37.46m	37.90 m	39.37m	A
1.5 V	42.76 m	43.00m	46.79 m	47.33m	50.04 m	50.98m	A
2.0 V	45.56 m	45.49m	51.03 m	51.31m	56.02 m	56.57m	A
2.5 V	46.47 m	46.07m	52.76 m	52.33m	58.72 m	58.32m	A
3.0 V	46.78 m	46.24m	53.21 m	52.55m	59.46 m	58.67m	A
3.3 V	--------		53.31 m	52.58m	59.59 m	58.68m	A
3.5 V	--------		--------		59.63 m	58.64m	A
3.6 V	--------		--------		59.63 m	58.63m	A

Table 4a: LV048A Device Characteristics

Para-meter	Test Conditions	Vcc	Pin	-40°C		25°C		90°C		Min Spec	Max Spec	Unit
				Fab 7	Fab 10	Fab 7	Fab 10	Fab 7	Fab 10			
IIH	Vin=Vcc	3.6V	EN	5.14u	1.94n	4.01u	371p	3.21u	13.7n	-20u	20u	A
IIL	Vin=Gnd	3.6V	EN	-1.01n	-948p	-1.76n	-43.6p	-12.3n	-706p	-20u	20u	A
IIH	Vin=Vcc	3.6V	/EN	5.07u	16.2n	3.96u	256p	3.12u	16.07n	-20u	20u	A
IIL	Vin=Gnd	3.6V	/EN	-1.29n	-1.14n	-1.58n	-1.50p	-9.13n	1.42n	-20u	20u	A
V_{CL}	I_{CLAMP}= -18mA	3.0V	EN	-0.896	-0.882	-0.802	-0.797	-0.702	-0.717	-1.5		V
V_{CL}	I_{CLAMP}= -18mA	3.0V	/EN	-0.898	-0.880	-0.792	-0.796	-0.699	-0.714	-1.5		V
ICC[1]	No Load Receiver Enabled	3.6V	Vcc	963.2u	912u	869.6u	214u	798.0u	746u		15m	A
ICC[2]	No Load Receiver Enabled	3.6V	Vcc	10.54	9.755	9.917	9.072	9.155	8.449		15	mA
ICC[3]	No Load Receiver Enabled	3.6V	Vcc	11.74	10.122	11.07	9.613	10.38	9.141		15	mA
ICC[4]	No Load Receiver Enabled	3.6V	Vcc	3.380	3.131	3.126	2.888	2.885	2.691		15	mA
ICC[5]	No Load Receiver Enabled	3.6V	Vcc	3.698	3202	3.456	3.025	3.208	2.854		15	mA
ICCZ	No Load Receiver Disabled	3.6V	Vcc	644.9u	577.8u	609.9u	546.6u	584.3u	520.8u		5.0m	A
C_{IN}	Input Capacitance	3.3V	Rin			7.0	7.1				5 (typ)	pF

Notes:

1. EN=Vcc, Inputs Open
2. EN=Vcc, Rin+ =Gnd, Rin- =Vcc (all four Rin pairs)
3. EN=Vcc, Rin+ =Vcc, Rin- =Gnd (all four Rin pairs)
4. EN=Vcc, Rin+ =Gnd, Rin- =Vcc (only one Rin pairs)
5. EN=Vcc, Rin+ =Vcc, Rin- =Gnd (only one Rin pairs)

Table 4b: LV048A Device Characteristics

Para-meter	Test Conditions	Vcc	Pin	-40°C		25°C		90°C		Min Spec	Max Spec	Unit
				Fab 7	Fab 10	Fab 7	Fab 10	Fab 7	Fab 10			
VIH	Min. Input High Voltage	3.0V	EN	1.280	1.280	1.295	1.295	1.310	1.320	2.0	3.0	V
VIH	Min. Input High Voltage	3.3V	EN	1.415	1.410	1.435	1.425	1.450	1.445	2.0	3.3	V
VIH	Min. Input High Voltage	3.6V	EN	1.545	1.540	1.565	1.560	1.585	1.580	2.0	3.6	V
VIL	Min. Input Low Voltage	3.0V	EN	1.330	1.345	1.345	1.360	1.355	1.370	Gnd	0.8	V
VIL	Min. Input Low Voltage	3.3V	EN	1.460	1.480	1.480	1.495	1.495	1.510	Gnd	0.8	V
VIL	Min. Input Low Voltage	3.6V	EN	1.595	1.610	1.615	1.630	1.630	1.645	Gnd	0.8	V
VIH	Min. Input High Voltage	3.0V	/EN	1.285	1.305	1.300	1.300	1.315	1.315	2.0	3.0	V
VIH	Min. Input High Voltage	3.3V	/EN	1.410	1.445	1.430	1.430	1.450	1.445	2.0	3.3	V
VIH	Min. Input High Voltage	3.6V	/EN	1.545	1.580	1.565	1.565	1.595	1.580	2.0	3.6	V
VIL	Min. Input Low Voltage	3.0V	/EN	1.330	1.355	1.340	1.365	1.360	1.375	Gnd	0.8	V
VIL	Min. Input Low Voltage	3.3V	/EN	1.465	1.510	1.480	1.500	1.495	1.510	Gnd	0.8	V
VIL	Min. Input Low Voltage	3.6V	/EN	1.600	1.645	1.620	1.635	1.635	1.645	Gnd	0.8	V

Table 5: LV048A AC Characteristics, Vcc=3.0V, 25C, (Fab7 data are copied from old char. Report back in).

Para-meter	Condition	Pin	Vcc	Fab 7	Fab 10	Min	Max	Unit
tpHL	VID=200mV; CL=15pF	Rout 1	3.0 V	2.12	2.12	1.2	3.2	ns
tpLH	VID=200mV; CL=15pF	Rout 1	3.0 V	2.20	2.16	1.2	3.2	ns
tr	VID=200mV; CL=15pF	Rout 1	3.0 V	0.781	0.932		1.0	ns
tf	VID=200mV; CL=15pF	Rout 1	3.0 V	0.738	0.888		1.0	ns