

PRODUCT/PROCESS CHANGE NOTICE (PCN)

PCN Number: **04-07**

Date Issued: **April 8, 2004**

Product(s) Affected: **PI5C3257, PI5C33X257, and PI5V330**

Manufacturing Location Affected: **Hynix Semiconductor, Korea**

Date Effective: **July 8, 2004**

Means of Distinguishing Changed Devices:

- Product Mark:
 - Back Mark
 - Date Code: **Wafer Fab ID letter code ***
 - Other
- * G - last letter of date code signifies Hynix**

Contact: **Ed Mello**

Title: **Director, Quality Systems**

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

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

eMail: emello@pericom.com

Attachment: Yes; No

Samples: **Please check with your local Pericom Sales Representative for availability of certain device types within the family of products that will be manufactured at the Hynix wafer fab facility.**

Description and Purpose of Change:

To increase Pericom's manufacturing capacity for these products, we've added them to Hynix's standard CMOS 0.5 μm, 5 V 1P2M/1P3M process on their 200-mm wafer fab line. Generic Information on Hynix's basic 0.5 μm process is at:

http://www.hynix.com/eng/products/system_ic/sms/down/procs_5um_5VSTD.pdf

Hynix Semiconductor's facilities are certified to ISO-9000-2000 & ISO-14001, and are located in Gumi, Korea. Their website is at:

<http://www.hynix.com/eng/index.html>

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

Reliability/Qualification Summary: **Copy of representative Process Qualification and Electrical Characterization reports for the PI5C3257 device type are included in this document.**

Customer Acknowledgement of Receipt:

Customer: _____

Name: _____

Title: _____

Date: _____

E-Mail: _____

Phone: _____

Fax: _____

Approval for shipments prior to PCN effective date

Customer Comments (Optional): _____

Subject: PI5C3257 Characterization Comparison Report – Hynix and CSM Wafer Fabs

Introduction:

PI5C3257 is a Quad 2:1 Mux/Demux Bus Switch. The C16H array is from Hynix Wafer Fab, and is compared against previous data from die arrays of both CSM Fab-2 and the recently closed CSM Fab 1. The Hynix PI5C3257 is a major volume product and the data will represent other devices in the family using this same die array, differing only in metal mask and bonding options:
PI5C3125, PI5C3126, PI5C3253, PI5C33X257, PI5V330, PI5V331, PI5V332, and PI5L100.

Reference:

*Array: C16H-BS3257B
Process: Hynix 0.5um, 1P3M, 5V
Lot #: ENYD038.A
Date Code: Z0332OG
Package: SOIC (S16)*

*Array: C162-S3257-U01
Process: CSM 0.5um, 1P2M, 5V
Lot #: EZ19169.1A
Date Code: BZ0322OC
Package: SOIC (W16)*

Equipment:

HP power supply & DMM,
HP4145B DC Analyzer
BK810B Capacitance Meter
TDS8000 Oscilloscope
HP8110A Pulse Generator
Thermostream TP041000-A

Tables

Table 1: DC Characteristics
Table 2: Ron Measurements, all paths, 25°C
Table 3: AC Characteristics
Table 4: Capacitance, 25°C

Conclusion

Hynix product meets all datasheet requirements with good margin.

Table 1. DC characteristics

Parameter	Test Conditions	Vcc	Hynix			CSM Fab 2			CSM Fab 1		Specification		
			-10°C	25°C	90°C	-10°C	25°C	90°C	25°C	90°C	Min Spec	Max Spec	unit
VIH	Input High Voltage	4.75 V	1.205	1.195	1.185	1.235	1.235	1.235	1.295	1.285	2.0		V
VIH	Input High Voltage	5.00 V	1.240	1.230	1.220	1.270	1.270	1.270	1.325	1.330	2.0		V
VIH	Input High Voltage	5.25 V	1.270	1.260	1.255	1.310	1.310	1.310	1.365	1.375	2.0		V
VIL	Input Low Voltage	4.75 V	1.300	1.295	1.285	1.345	1.345	1.345	1.380	1.385		0.8	V
VIL	Input Low Voltage	5.00 V	1.335	1.330	1.320	1.380	1.380	1.380	1.425	1.435		0.8	V
VIL	Input Low Voltage	5.25 V	1.365	1.360	1.355	1.410	1.410	1.410	1.475	1.490		0.8	V
VH	Input Hysteresis	4.75 V	0.10	0.10	0.10	0.11	0.11	0.11	0.09	0.10	typ	0.15	V
VH	Input Hysteresis	5.00 V	0.10	0.10	0.10	0.11	0.11	0.11	0.10	0.11	typ	0.15	V
VH	Input Hysteresis	5.25 V	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.12	typ	0.15	V
Ron	I _{on} =-48mA, V _{in} =0 V	4.75 V	3.22	3.59	4.20	4.27	4.63	5.44	5.32	6.40		7	Ω
Ron	I _{on} =-15mA, V _{in} =2.4 V	4.75 V	4.93	5.54	6.60	6.50	7.04	8.57	8.47	10.7		15	Ω
IIL	V _{in} = 0 V	5.25 V	103p	-211p	-224p	-463p	499 p	-165p	-2.8n	-1.3n		-1u	A
IIH	V _{in} = 5.25 V	5.25 V	415p	363p	2.9n	-165p	-429p	853p	388p	1.0n		1u	A
IOZL	V _{oz} = 0 V	5.25 V	-419p	181p	-1.9n	-862p	-747p	-2.4 n	1.1n	2.4 n		-1u	A
IOZH	V _{oz} = 5.25V	5.25 V	408p	208p	3.2n	-814p	586 p	418 p	1.1n	1.0 n		1u	A
VIK	I _s =-18mA	4.5 V	-0.93	-0.88	-0.80	-0.90	-0.86	-0.78	-0.82	-0.71		-1.2	V
ICCL	V _{in} =0 V	5.25 V	201p	-134p	5.9n	267 p	786 p	1.1 n	400 p	1.72 n		3.0	uA
ICCH	V _{in} =5.25V	5.25 V	297p	794p	5.5n	302 p	299 p	2.8 n	215 p	1.40 n		3.0	uA
ΔICC	V _{in} =3.4V	5.25 V	591u	586u	576u	1.0 m	985 u	948 u	697u	686u		2.5m	A

Note: VIH/VIL Test Measurement Definition

- The Table 1 DC parametric data for VIH and VIL reflects the input switching threshold data for logic devices. When the measured value is compared to the VIH min or VIL max limits, the difference is the noise margin for that device’s input; it does not mean the device is out of spec. This is a standard methodology for doing this type of design parameter test.

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

Channel	Hynix		CSM Fab 2		CSM Fab 1		Specification Limit		Unit
	I _{in} =-48mA V _{in} =0V	I _{in} =-15mA V _{in} =2.4V	I _{in} =-48mA V _{in} =0V	I _{in} =-15mA V _{in} =2.4V	I _{in} =-48mA V _{in} =0V	I _{in} =-15mA V _{in} =2.4V	I _{in} =-48mA V _{in} =0V	I _{in} =-15mA V _{in} =2.4V	
IA0-YA	3.78	5.73	4.65	7.17	4.88	8.07	7	15	Ω
IA1-YA	3.47	5.40	4.46	6.90	4.78	7.94			Ω
IB0-YB	3.70	5.67	4.61	7.04	4.84	8.47			Ω
IB1-YB	3.40	5.40	4.54	7.04	4.74	8.00			Ω
IC0-YC	3.55	5.47	4.60	7.00	5.32	8.47			Ω
IC1-YC	3.43	5.33	4.57	7.10	5.11	8.27			Ω
ID0-YD	3.57	5.47	4.63	7.03	4.88	8.07			Ω
ID1-YD	3.47	5.40	4.51	6.90	4.78	7.94	▼	▼	Ω

Table 3. AC Characteristics

Symbol	Vcc	Load	Hvix			CSM Fab 2			CSM Fab 1		Max Spec	Units
			-10°C	25°C	90°C	-10°C	25°C	90°C	25°C	90°C		
tsyLH	4.75 V	Load A	2.33	2.43	2.65	2.26	2.33	2.52	2.52	2.79	5.2	nS
tsyLH	4.75 V	Load A	2.68	2.77	2.99	2.49	2.56	2.68	2.61	2.87	5.2	nS
tpZH	4.75 V	Load A	2.58	2.67	2.87	2.40	2.44	2.63	2.72	2.99	4.8	nS
tpHZ	4.75 V	Load A	2.44	2.49	2.66	2.73	2.75	2.97	3.78	3.78	5.0	nS
tpZL	4.75 V	Load B	2.86	2.97	3.18	2.58	2.65	2.83	2.87	3.13	4.8	nS
tpLZ	4.75 V	Load B	2.94	3.02	3.18	2.81	2.89	2.99	3.41	3.41	5.0	nS

Load A: 50pF//500Ω

Load B: 50pF//500Ω, 500Ω to 2Vcc

Table 4. Capacitance at 25C

Symbol	Description	Vcc	Hvix	CSM Fab 2	CSM Fab 1	typ	Units
Cin	Control Input	5.0 V	2.5	3.1	2.6	6	
Coff	Y Cap, Switch Off /E=H (disabled)	5.0 V	4.6	4.4	4.4	6	pF
Coff	A1/A0 Cap, Switch Off	5.0 V	3.4	2.8	2.9	6	pF
Con	A/Y Cap, Switch On	5.0 V	9.3	9.4	9.6	14	pF

Date: April 8, 2004

Subject: Hynix Process Qualification - PI5C3257 - CMOS, 0.5 μ m

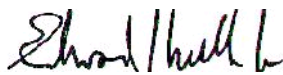
Pericom recently added several Bus Switch device types to the 0.5 μ m process we use at Hynix for the following device types: PI5C3125, PI5C3126, PI5C3253, PI5C3257, PI5C33X257, PI5V330, PI5V331, PI5V332, and PI5L100. The PI5C3257 was selected as the best representative Process Qualification vehicle since it is the highest volume product. The test results are shown below.

Rel Lot #	Device Type	Pkg. Type	Date Code	Stress Test	Sample Units	Stress Duration	Results Pass/Fail
Q03009-1A	PI5C3257S	S16	Z0332OG	DHTOL	130	168 hrs	130/0
Q03009-1A	PI5C3257S	S16	Z0332OG	DHTOL	130	500 hrs	130/0
Q03009-1A	PI5C3257S	S16	Z0332OG	DHTOL	130	1000 hrs	130/0
Q03009-1A	PI5C3257S	S16	Z0332OG	DHTOL	130	2000 hrs	130/0
Q03009-1A	PI5C3257S	S16	Z0332OG	DHTOL	130	3000 hrs	130/0
Q03009-1B	PI5C3257S	S16	Z0332OG	HTSL	100	168 hrs	100/0
Q03009-1B	PI5C3257S	S16	Z0332OG	HTSL	100	500 hrs	100/0
Q03009-1B	PI5C3257S	S16	Z0332OG	HTSL	100	1000 hrs	100/0
Q03009-2B	PI5C3257S	S16	Z0332OG	PTMCL	76	500 cyc	76/0
Q03009-2C	PI5C3257S	S16	Z0332OG	UHAST	76	168 hrs	76/0
N/A	PI5C3257S	S16	Z0332OG	ESD	5	>2000 v	Pass
N/A	PI5C3257S	S16	Z0332OG	Latch-up	5	>200 ma	Pass

These products use Hynix's 5 volt, CMOS, 0.5-micron, 1P2M process on 200-mm wafers. The long-term life test FIT rate is 33 for any devices using the same process and design rules, with an MTBF of 390,000 hours. The 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%.

If there are any questions about the qualification of this product, please let me know.

Regards,



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