

**ON Semiconductor**  
Formerly a Division of Motorola



Subject: ON Semiconductor PRODUCT/PROCESS CHANGE NOTIFICATION 10047

TITLE: ULTRAFAST RECTIFIERS QUALIFICATION OF GUADALAJARA, MEXICO  
WAFER FAB.

EFFECTIVE DATE: 28-NOV-99

AFFECTED CHANGE CATEGORIES  
On Semi Fabrication Site

AFFECTED PRODUCT DIVISIONS  
MOS POWER PRODUCTS

ADDITIONAL RELIABILITY DATA: Available  
Contact your local ON Semiconductor Sales Office.

Ref: R12559

SAMPLES: Contact Below  
Contact your local ON Semiconductor Sales Office.

Ref: R42065@email.sps.mot.com

For any questions concerning this notification:  
REFERENCE: CHRIS HOLLY                      PHONE: 602-244-4961

DISCLAIMER:

ON SEMICONDUCTOR WILL CONSIDER THIS CHANGE APPROVED UNLESS SPECIFIC  
CONDITIONS OF ACCEPTANCE ARE PROVIDED IN WRITING WITHIN 30 DAYS OF  
RECEIPT OF THIS NOTICE. TO DO SO, CONTACT YOUR LOCAL ON  
SEMICONDUCTOR SALES OFFICE.

GPCN FORMAT: CUSTOMER

DO NOT REPLY TO THIS MESSAGE.

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PRODUCT/PROCESS CHANGE NOTIFICATION

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ISSUE DATE: 29-Sep-1999

NOTIFICATION #:10047

EFFECTIVE DATE: 28-Nov-1999

ISSUING DIVISION:PHX-PPD

DESCRIPTION AND PURPOSE

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In order to provide additional capacity to service our customers' increasing demand of our Ultrafast Rectifier product, On Semiconductor has qualified a new wafer fab in our Guadalajara, Mexico facility. The new Guadalajara facility's wafer-processing technology is the same as the current Phoenix facility. A major capacity benefit of the Guadalajara facility is it's production of 6-inch wafers, instead of the 4-inch wafers currently produced in the Phoenix fab. There will be no change in electrical performance with product from the new wafer-processing facility. The Guadalajara Rectifier fab is part of Motorola/ON Semiconductor's previously-announced manufacturing restructuring program, which will dramatically increase ON's Rectifier manufacturing capacity. In order to expedite this additional capacity to service our customers, we will start shipping product from the new fab after 60 days from the PCN release date.

QUALIFICATION PLAN

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See Rel Data

RELIABILITY DATA SUMMARY

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500hrs (interim) reports will be available for all qualification vehicles after Oct. 11th. Full 1000hrs reports will be available for all qualification vehicles after Nov. 8th.

Interim Reliability Results:

MUR1620CTR, VR Rating=200V, Package=TO-220AB

Test	Conditions	Interval	size	Rejects
HTRB	Tj=175, VR=160V	500 Hrs	3 x 80	0
H3TRB	Ta=85, RH=85%, VR=100V	500 Hrs	3 x 80	0
IOL	Ta=25, Tj=125, Ton/off=3.5	500 Hrs	3 x 80	0
Autoclave	Ta=121, P=15 PSIG, RH=100%	96 Hrs	3 x 80	0
Temp Cycle	-55 to 175, Td >15 min	500 Cyc	3 x 80	0

MURS160T3, VR Rating=600V, Package=SMB

Test	Conditions	Interval	size	Rejects
Autoclave	Ta=121, P=15 PSIG, RH=100%	192 Hrs	3 x 77	0
Temp Cycle	-55 to 150, Td >15 min	500 Cyc	3 x 77	0

MUR3060PT, VR Rating=600V, Package=TO-218AC

Test	Conditions	Interval	size	Rejects
HTRB	Tj=175, VR=480V	500 Hrs	3 x 80	0
H3TRB	Ta=85, RH=85%, VR=100V	500 Hrs	3 x 80	0
IOL	Ta=25, Tj=125, Ton/off=5.0	500 Hrs	3 x 80	0
Autoclave	Ta=121, P=15 PSIG, RH=100%	96 Hrs	3 x 80	0
Temp Cycle	-55 to 150, Td >15 min	500 Cyc	3 x 80	0

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MUR4100E, VR Rating=1000V, Package=3A Axial

Test	Conditions	Interval	size	Rejects
HTRB	Tj=175, VR=800V	500 Hrs	3 x 80	0
H3TRB	Ta=85, RH=85%, VR=100V	500 Hrs	3 x 80	0
IOL	Ta=25, Tj=125, Ton/off=2.0	500 Hrs	3 x 80	0
Autoclave	Ta=121, P=15 PSIG, RH=100%	96 Hrs	3 x 80	0
Temp Cycle	-55 to 150, Td >15 min	500 Cyc	3 x 80	0

MUR10150E, VR Rating=1500V, Package=TO-220

Test	Conditions	Interval	size	Rejects
HTRB	Tj=125, VR=1200V	168 Hrs	3 x 80	0
H3TRB	Ta=85, RH=85%, VR=100V	168 Hrs	3 x 80	0
IOL	Ta=25, Tj=125, Ton/off=3.5	168 Hrs	3 x 80	0
Autoclave	Ta=121, P=15 PSIG, RH=100%	96 Hrs	3 x 80	0
Temp Cycle	-55 to 125, Td >15 min	100 Cyc	3 x 80	0

ELECTRICAL CHARACTERISTIC SUMMARY

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MUR1620CTR, VR Rating=200V, Package=TO-220AB

Forward Voltage (volts) @ If=8A at 25 degrees C.

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch)		
		Lot 1	Lot 2	Lot 3
Max Limit	1.2	1.2	1.2	1.2
Min	0.919	0.576	0.928	0.907
Max	0.944	0.942	1.136	0.944
Mean	0.937	0.934	0.936	0.938
Std Dev	0.004	0.029	0.017	0.004
Cpk	23.5	3.10	5.26	21.1

Reverse Leakage (nA) @ Vr=200V

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch)		
		Lot 1	Lot 2	Lot 3
Max Limit	5000	5000	5000	5000
Min	55.1	25.3	32.6	32.3
Max	112	60.2	61.9	61.1
Mean	76.8	43.5	48.7	49.3
Std Dev	9.87	5.30	5.43	5.13
Cpk	166	311	304	321

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MURS160T3, VR Rating=600V, Package=SMB

Forward Voltage (volts) @ If=1A at 25 degrees C.

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch) Lot 1	Lot 2	Lot 3
Max Limit	1.25	1.25	1.25	1.25
Min	1.048	1.040	1.062	1.049
Max	1.165	1.141	1.111	1.181
Mean	1.085	1.072	1.087	1.086
Std Dev	0.026	0.026	0.014	0.035
Cpk	2.10	2.28	3.94	1.55

Reverse Leakage (nA) @ Vr=600V at 25 degrees C.

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch) Lot 1	Lot 2	Lot 3
Max Limit	5000	5000	5000	5000
Min	33.0	32.3	25.9	37.8
Max	606	644	456	1128
Mean	152	159	131	220
Std Dev	152	163	102	214
Cpk	10.6	9.91	15.9	7.44

Reverse Leakage (uA) @ Vr=600V at 175 degrees C

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch) Lot 1	Lot 2	Lot 3
Max Limit	150	150	150	150
Min	22.3	21.8	19.2	19.9
Max	39.1	37.3	53.1	41.4
Mean	30.6	28.7	33.7	28.8
Std Dev	3.95	3.45	9.18	5.12
Cpk *	10.1	11.7	4.22	7.89

\* Note: Max limit used in calculating Cpk is for 150 degrees C data, actual Cpk are higher.

Reverse Recovery Time trr (ns) @ If=1A, di/dt=50A/us at 25 degrees C.

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch) Lot 1	Lot 2	Lot 3
Max Limit	75	75	75	75
Min	43.2	44.3	41.1	40.3
Max	47.5	49.6	47.6	46.7
Mean	45.0	46.6	45.0	43.9
Std Dev	1.51	1.66	2.33	2.17
Cpk	6.63	5.69	4.29	4.79

Semiconductor Technology Grp

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MUR3060PT, VR Rating=600V, Package=TO-218AC

Froward Voltage (volts) @ If=15A at 25 degrees C.

	Control Group Test	Group (Guadalajara 6 inch)		
	(Phoenix Z/R 4 inch)	Lot 1	Lot 2	Lot 3
Max Limit	1.5	1.5	1.5	1.5
Min	1.183	1.138	1.168	1.152
Max	1.242	1.230	1.236	1.215
Mean	1.213	1.182	1.196	1.186
Std Dev	0.020	0.025	0.019	0.022
Cpk	4.72	4.17	5.43	4.68

Froward Voltage (volts) @ If=15A at 150 degrees C

	Control Group Test	Group (Guadalajara 6 inch)		
	(Phoenix Z/R 4 inch)	Lot 1	Lot 2	Lot 3
Max Limit	1.2	1.2	1.2	1.2
Min	0.944	0.922	0.939	0.929
Max	0.981	0.971	0.975	0.967
Mean	0.963	0.945	0.953	0.951
Std Dev	0.012	0.014	0.010	0.013
Cpk	6.48	6.14	8.19	6.50

Reverse Leakage (uA) @ Vr=600V

	Control Group Test	Group (Guadalajara 6 inch)		
	(Phoenix Z/R 4 inch)	Lot 1	Lot 2	Lot 3
Max Limit	10	10	10	10
Min	0.299	0.808	0.402	0.462
Max	2.25	6.86	4.80	3.67
Mean	1.08	2.54	1.83	1.53
Std Dev	0.502	1.659	1.055	0.743
Cpk	5.93	1.50	2.58	3.80

Reverse Leakage (uA) @ Vr=600V at 175 degrees C.

	Control Group Test	Group (Guadalajara 6 inch)		
	(Phoenix Z/R 4 inch)	Lot 1	Lot 2	Lot 3
Max Limit	1000	1000	1000	1000
Min	199	122	128	121
Max	311	205	316	190
Mean	259	158	170	150
Std Dev	31.2	21.2	39.2	15.6
Cpk *	7.91	13.2	7.05	18.2

\* Note: Max limit used in calculating Cpk is for 150 degrees C data, actual Cpk's are higher.

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Reverse Recovery Time  $t_{rr}$  (ns) @  $I_f=1A$ ,  $di/dt=50A/us$

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch)		
		Lot 1	Lot 2	Lot 3
Max Limit	60	60	60	60
Min	41.3	43.2	41.1	41.7
Max	42.9	46.3	45.5	44.9
Mean	42.1	45.0	42.9	43.1
Std Dev	0.518	0.969	1.18	0.993
Cpk	11.5	5.16	4.86	5.67

Surge Ifsm (A) applied at rated load conditions, half wave, single phase, 60Hz

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch)		
		Lot 1	Lot 2	Lot 3
Max Limit	150	150	150	150
Min	263	252	275	267
Max	282	286	288	285
Mean	270	270	281	274
Std Dev	6.47	11.4	4.01	5.79
Cpk	6.21	3.51	10.9	7.1

MUR4100E, VR Rating=1000V, Package=3A Axial

Forward Voltage (volts) @  $I_f=3A$  at 25 degrees C.

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch)		
		Lot 1	Lot 2	Lot 3
Max Limit	1.75	1.75	1.75	1.75
Min	1.202	1.135	1.151	1.133
Max	1.517	1.392	1.354	1.398
Mean	1.342	1.227	1.274	1.240
Std Dev	0.074	0.056	0.046	0.062
Cpk	1.83	3.09	3.42	2.73

Forward Voltage (volts) @  $I_f=4A$

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch)		
		Lot 1	Lot 2	Lot 3
Max Limit	1.85	1.85	1.85	1.85
Min	1.248	1.177	1.196	1.176
Max	1.587	1.453	1.414	1.460
Mean	1.398	1.275	1.326	1.290
Std Dev	0.079	0.061	0.050	0.067
Cpk	1.90	3.17	3.47	2.79

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Reverse Leakage (nA) @ Vr=1000V

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch)		
		Lot 1	Lot 2	Lot 3
Max Limit	25,000	25,000	25,000	25,000
Min	0.8	274	303	313
Max	4800	6880	7390	3520
Mean	755	920	1079	621
Std Dev	725	1137	1546	671
Cpk	11.1	7.06	5.15	12.1

MUR10150E, VR Rating=1500V, Package=TO-220

Forward Voltage (volts) @ If=6.5A at 25 degrees C.

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch)		
		Lot 1	Lot 2	Lot 3
Max Limit	2.4	2.4	2.4	2.4
Min	1.634	1.410	1.422	1.507
Max	2.066	2.078	1.790	1.954
Mean	1.819	1.610	1.604	1.744
Std Dev	0.071	0.145	0.085	0.102
Cpk	2.73	1.81	3.12	2.14

Reverse Leakage (uA) @ Vr=1500V at 25 degrees C.

	Control Group Test (Phoenix Z/R 4 inch)	Group (Guadalajara 6 inch)		
		Lot 1	Lot 2	Lot 3
Max Limit	100	100	100	100
Min	1.03	1.32	0.774	1.48
Max	19.5	53	36.9	37.3
Mean	2.15	7.49	4.61	7.70
Std Dev	2.84	8.80	7.22	8.20
Cpk	11.5	3.51	4.40	3.75

CHANGED PART IDENTIFICATION

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Customers may receive product from wafers processed at either the Guadalajara or Phoenix facility starting with datecode 9948.

FILE FORMAT: ASCII TEXT

FONT - Courier  
SIZE - 12 Point  
LINE - 70 characters/line  
PAGE - 55 lines/page  
PAGEBREAK CHARACTER - ^L (Control L)

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AFFECTED DEVICE LIST (WITHOUT SPECIALS)

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BYV32-200 , BYW29-100 , BYW29-200 , BYW51-200  
BYW80-100 , BYW80-200 , MR10120E , MSR860  
MSRB860-001 , MSRD620CT , MSRD620CTT4 , MSRP10040  
MUR10120E , MUR10150E , MUR105 , MUR105RL  
MUR110 , MUR1100E , MUR1100ERL , MUR110RL  
MUR115 , MUR115RL , MUR120 , MUR120RL  
MUR130 , MUR130RL , MUR140 , MUR140RL  
MUR150 , MUR1510 , MUR1515 , MUR1520  
MUR1540 , MUR1550 , MUR1560 , MUR160  
MUR160RL , MUR1610CT , MUR1610CTR , MUR1615CT  
MUR1620CT , MUR1620CTR , MUR1640CT , MUR1650CT  
MUR1660CT , MUR180E , MUR180ERL , MUR190E  
MUR3020PT , MUR3020WT , MUR3040 , MUR3040PT  
MUR3060PT , MUR3060WT , MUR3080 , MUR405  
MUR410 , MUR4100E , MUR4100ERL , MUR410RL  
MUR415 , MUR415RL , MUR420 , MUR420RL  
MUR460 , MUR460RL , MUR480E , MUR480ERL  
MUR490E , MUR5150E , MUR6040 , MUR620CT  
MUR805 , MUR810 , MUR8100E , MUR815  
MUR820 , MUR840 , MUR860 , MUR880E  
MURB1620CT , MURB1620CTT4 , MURB1660CT , MURB1660CTT4  
MURC115WP , MURC120WP , MURC1510WP , MURC1520WP  
MURC1560WP , MURC160WP , MURC3020DWP , MURC3040DWP  
MURC3040WP , MURC3060DWP , MURC820WP , MURC860WP  
MURD305RL , MURD310T4 , MURD315T4 , MURD320T4  
MURD610CTT4 , MURD615CTT4 , MURD620CT , MURD620CT1  
MURD620CTT4 , MURF1620CT , MURF1660CT , MURF820  
MURH8100E , MURH840CT , MURH860CT , MURHB840CT  
MURHB840CTT4 , MURHB860CT , MURHB860CTT4 , MURHC860CTWP  
MURHF860CT , MURP10020 , MURP10040 , MURP10060  
MURP20020CT , MURP20040CT , MURS105T3 , MURS110T3  
MURS115T3 , MURS120T3 , MURS130T3 , MURS140T3  
MURS150T3 , MURS160T3 , MURS320T3 , MURS340T3  
MURS360T3 , SUR309-12WT , SURB1620CT , SURB1620CTT4  
SURB1660CT , SURB1660CTT4 , SURHB840CT , SURHB840CTT4  
SURHB860CT , SURHB860CTT4 , TURC160PF