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**FINAL PRODUCT/PROCESS CHANGE NOTIFICATION**  
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**09-OCT-2003**

**SUBJECT: ON Semiconductor Final Product/Process Change Notification #12908**

**TITLE: Die Technology Conversion for Small Signal MOSFET Products**

**EFFECTIVE DATE: 15-Dec-2003**

**AFFECTED CHANGE CATEGORY: Design Change**

**AFFECTED PRODUCT DIVISION: MOS Power Products Div**

**ADDITIONAL RELIABILITY DATA:** Available  
Contact your local ON Semiconductor Sales Representative  
or Keith Stapley <RXNN90@onsemi.com>

**SAMPLES:** Contact your local ON Semiconductor Sales Representative  
or Bob Forness <RYGY40@onsemi.com>

**FOR ANY QUESTIONS CONCERNING THIS NOTIFICATION:**  
Contact Sales Representative or Bob Forness <RYGY40@onsemi.com>

**NOTIFICATION TYPE:**

Final Product/Process Change Notification (FPCN)

Final change notification sent to customers. FPCNs are issued at least 60 days prior to implementation of the change.

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.

**DESCRIPTION AND PURPOSE:**

This is a final notification announcing ON Semiconductor is changing the die technology used to source the following list of devices. This is the Final PCN to Initial PCN 12908 issued on 07-May-2003 that outlined this change. The new die technology is sourced from the same wafer fab that is supplying the current die for these devices, Phenitec Semiconductor Corp. located in Okayama Japan. The electrical performance now matches closely to the industry standard device performance for these parts, with no change to the datasheet parameters.



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**QUALIFICATION PLAN:**

High Humidity High Temp Reverse Bias: Testing 85DegC, Relative Humidity= 85%, Vgs=0V, Vds=80% Vdss rating, Duration= 1008Hrs, 3 Lots, 80pcs/Lot

High Temperature Reverse Bias: Ta=150DegC, Vgs=0V, Vds=80%Vdss rating, Duration=1008Hrs, 3 Lots, 80pcs/Lot

High Temperature Gate Bias: Ta=150DegC, Vgs= 100%Vgss rating, Vds=0V, Duration=1008Hrs, 3 Lots, 80pcs/Lot

Intermittent Operating Life: Ton= Toff= 2 minutes, delta Tj= 100DegC, Duration= 15000Cy, 3Lots,80pcs/Lot

Temperature Cycling: Temperature extremes= +150DegC/-65DegC, Dwell time= 15 minutes, Duration = 1000Cy, 3 Lots, 80pcs/Lot

**RELIABILITY DATA SUMMARY:**

Reliability Qualification Testing was performed and completed with no qualification related anomalies being observed. Three qualification lots were tested from the technology qualification vehicle, NTD4302. A summary of the test results and status is below:

<b>Test</b>	<b>Conditions</b>	<b>Results</b>
High Hum-Temp, Rev Bias (H3TRB-PC)	Ta=85C, RH=85%, Vds=48V, 1008Hrs	0/240
High Temp Reverse Bias (HTRB)	Ta=150C, Vds=48V, 1008Hrs	0/240
High Temp Gate Bias (HTGB)	Ta=150C, Vgs=20V, 1008Hrs	0/239
Intermittent Op Life (IOL-PC)	2min on/off, Delta Tj=100C, 15000cyc	0/239
Temperature Cycle (TC-PC)	+150C to -65C, 1000cycles	0/240

**ELECTRICAL CHARACTERISTIC SUMMARY:**

**2N7002LT1 Data**

Parameter	Test Condition	Control		Qual Lot 1	
		Mean	StDev	Mean	StDev
Igss (nA)	Vgs=20V	62.10	6.060	8.06	1.970
Idss (nA)	Vds=60V	25.60	19.800	4.84	2.770
Bvdss (V)	Id=10uA	87.2	3.49	72.8	2.36
Vth (V)	Id=250uA	1.94	0.045	2.01	0.020
Rdson1 (Ohms)	Id=500mA, Vgs=10V	1.92	0.046	0.82	0.015
Rdson2 (Ohms)	Id=50mA, Vgs=5V	2.24	0.045	1.10	0.015
Idon (A)	Vds=2V, Vgs=10V	0.94	0.020	1.91	0.038
Vsd (V)	Isd=11.5mA	0.67	0.002	0.67	0.001
Gfs (mhos)	Vds=2V, Id=200mA	0.35	0.009	0.41	0.002
		Qual Lot 2		Qual Lot 3	
		Mean	StDev	Mean	StDev
		7.66	0.902	9.03	1.210
		10.20	9.390	10.10	2.180
		74.8	0.89	72.5	0.65
		1.97	0.020	2.00	0.025
		0.82	0.009	0.78	0.007
		1.10	0.010	1.07	0.009
		1.91	0.023	2.00	0.019
		0.66	0.001	0.66	0.002
		0.40	0.002	0.41	0.002



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**BSS138LT1**

Parameter	Test Condition	Control		Qual Lot 1	
		Mean	StDev	Mean	StDev
Igss (nA)	Vgs=20V	3.71	2.365	7.03	0.979
Idss (nA)	Vds=50V	11.10	5.304	5.26	2.670
Bvdss (V)	Id=250uA	90.8	0.96	73.1	0.66
Vth (V)	Id=1mA	0.93	0.024	1.05	0.030
Rdson1 (Ohms)	Id=200mA, Vgs=2.75V	2.32	0.053	1.11	0.015
Rdson2 (Ohms)	Id=200mA, Vgs=5V	1.99	0.050	0.83	0.010
Gfs (mhos)	Vds=2V, Id=200mA	0.55	0.077	0.54	0.117

  

		Qual Lot 2		Qual Lot 3	
		Mean	StDev	Mean	StDev
		5.39	2.452	7.28	1.152
		3.85	1.171	9.77	9.063
		75.6	0.79	72.6	1.95
		1.13	0.021	1.09	0.030
		1.19	0.011	1.12	0.009
		0.89	0.008	0.82	0.008
		0.52	0.105	0.52	0.040

**MMBF170LT1**

Parameter	Test Condition	Control		Qual Lot 1	
		Mean	StDev	Mean	StDev
Igss (nA)	Vgs=15V	9.48	1.897	5.80	1.730
Idss (nA)	Vds=60V	3.08	1.936	3.61	3.506
Bvdss (V)	Id=100uA	89.9	3.57	74.2	1.64
Vth (V)	Id=1mA	2.30	0.050	2.37	0.031
Rdson (Ohms)	Id=200mA, Vgs=10V	1.98	0.054	0.83	0.020
Idoff (uA)	Vds=25V	0.28	0.016	0.22	0.001

  

		Qual Lot 2		Qual Lot 3	
		Mean	StDev	Mean	StDev
		5.82	2.090	3.01	1.139
		7.28	3.596	6.82	8.170
		73.5	3.38	70.9	2.16
		2.40	0.041	2.33	0.058
		0.84	0.021	0.78	0.019
		0.23	0.002	0.28	0.003

**CHANGED PART IDENTIFICATION:**

All Products with Date Code 0350 and after could be affected.

**AFFECTED DEVICE LIST (WITHOUT SPECIALS):**

**PART**

2N7002LT1, 2N7002LT3, 2N7008, 2N7008RLRA, 2N7008RLRE,  
 BS170, BS170RL1, BS170RLRA, BS170RLRM, BS170RLRP,  
 BS170ZL1, BSS138LT1, BSS138LT3, MMBF170LT1, MMBF170LT3,  
 SBVS138LT1