ON Semiconductor

FINAL PRODUCT/PROCESS CHANGE NOTIFICATION
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13-APR-2004

SUBJECT: ON Semiconductor Final Product/Process Change Notification #13428

TITLE: Phase 2 Qualification of Schottky Rectifier Wafer Production in LiON Microelectronics, LLC

EFFECTIVE DATE: 13-Jun-2004

AFFECTED CHANGE CATEGORY:
Subcontractor Fab Site
Subcontractor Test Site

AFFECTED PRODUCT DIVISION: Discretes Products

ADDITIONAL RELIABILITY DATA: Available
Contact your local ON Semiconductor Sales Office or Laura Rivers <S20636@onsemi.com>

SAMPLES: Contact your local ON Semiconductor Sales Office
or Dianne Von Borstel <RPDR20@onsemi.com>

FOR ANY QUESTIONS CONCERNING THIS NOTIFICATION:
Contact Sales Office or Louis Tsai <FFNT6M@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:
In order to provide additional capacity to service our customers' increasing demand for our Schottky Rectifier products, ON Semiconductor is qualifying a new wafer fabrication facility, LiON Microelectronics, located in Hangzhou,China.

LiON Microelectronics will be using an ON Semiconductor supplied equipment set with the same process technology flow as the current wafer fab. Qualifications and ramp up of LiON Microelectronics is being managed by ON Semiconductor personnel.

There will be no change in electrical performance with products from the new wafer fab.

This is the final PCN for Phase 2 of two phases of the initial PCN #13211.

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RELIABILITY DATA SUMMARY:

Six different qualification vehicles have been carefully selected to address all critical variables and interactions of wafer design features, process considerations, mechanical construction, and electrical characteristics.

ON Part Number	Rated Voltage	Package
MBR2545CT	45V	TO-220
MBR20200CT	200V	TO-220
MBR1100	100V	DO-41
MBR0530T1	30V	SOD-123
MBRS130LT3	30V	SMB
MBRP400100CTL	100V	TO-218

Results for three of these qualification vehicles are presented in this PCN, and they are MBR0530T1, MBRS130LT3, and MBRP400100CTL. Results for qualification vehicles MBR2545CT, MBR20200CT, and MBR1100 were already presented in the Phase 1 PCN which was released on 03/03/2004 (FPCN #13326).

Reliability Results for Devices MBR0530T1, MBRS130LT3:

Test	Conditions	Interval	Sample Size 3 Lots (each device) 77pcs/lot
A/clave	Ta=121C, P=15psig, RH=100%	96 hrs	0/231
H3TRB	85C/85%RH, Bias 80% rated voltage	1008 hrs	0/231
HTB	Ta=Device specific.	1008 hrs	0/231
HTRB	Ta=Device specific, Bias 80% rated voltage	1008 hrs	0/231
IOL	Ta=25C, delta Tjmax 100C, 2min on/off	1008 hrs (15K cycles)	0/231
Temp Cycle	Ta=-65 to +150C	1000 cyc	0/231
RSH	Ta=260C, 10 sec dip	Readout	0/90
MSL1	24 hr bake @125deg C + 168 hr 85/85 + 3 IR @ 260 deg C + 1x Flux immersion + Alcohol + DI rinse + Visual	Readout	0/231

Reliability Results for MBRP400100CTL:

Test	Conditions	Interval	Sample Size 3 Lots (each device) 77pcs/lot
H3TRB	85C/85%RH, Bias 80% rated voltage	504 hrs	0/231
HTRB	Ta=Device specific, Bias 80% rated voltage	504 hrs	0/231
IOL	Ta=25C, delta Tjmax 100C, 3.5 min on/off	504 hrs (4286 cycles)	0/231

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ELECTRICAL CHARACTERISTIC SUMMARY:
Electrical characterization has been completed on the designated qualification devices. These devices are representative of the entire family and will qualify the process. Datasheet specifications and electrical performance of the devices will remain unchanged.

Device: MBR0530T1 DC Test Results

Lot	Temp	Ir @ 15V	Ir @ 30V	Vr @ 130uA	Vf @ 0.1A	Vf @ 0.5A
Existing	25	MIN 2.18E-06	7.02E-06	44.70	0.3261	0.4016
Fab		MAX 3.45E-06	1.20E-05	45.63	0.3302	0.4059
		MEDIAN 2.36E-06	7.74E-06	45.31	0.3289	0.4042
		AVERAGE 2.46E-06	7.97E-06	45.28	0.3286	0.4040
		STDEV 2.62E-07	9.74E-07	0.21	0.0009	0.0009
		USL 2.00E-05	1.30E-04		0.375	0.430
		LSL		30		
		CPK 22.32	41.77	24.17	16.52	9.32
New Fab	25	MIN 1.48E-06	5.74E-06	43.64	0.3334	0.4045
Group 1		MAX 1.68E-06	1.08E-05	45.03	0.3354	0.4068
		MEDIAN 1.54E-06	6.02E-06	44.71	0.3349	0.4059
		AVERAGE 1.55E-06	6.31E-06	44.58	0.3347	0.4059
		STDEV 5.13E-08	9.22E-07	0.36	0.0005	0.0006
		USL 2.00E-05	1.30E-04		0.375	0.430
		LSL		30		
		CPK 119.83	44.72	13.51	27.39	13.33
New Fab	25	MIN 1.91E-06	6.74E-06	43.19	0.3290	0.4016
Group 2		MAX 2.18E-06	7.95E-06	46.00	0.3310	0.4048
		MEDIAN 2.00E-06	7.21E-06	45.33	0.3305	0.4037
		AVERAGE 2.02E-06	7.26E-06	45.24	0.3302	0.4036
		STDEV 8.76E-08	3.58E-07	0.57	0.0007	0.0007
		USL 2.00E-05	1.30E-04		0.375	0.430
		LSL		30		
		CPK 68.43	114.34	8.92	22.57	11.90
New Fab	25	MIN 2.29E-06	8.42E-06	40.28	0.3270	0.3994
Group 3		MAX 3.94E-06	9.24E-05	46.09	0.3294	0.4034
		MEDIAN 2.40E-06	9.26E-06	44.44	0.3285	0.4015
		AVERAGE 2.50E-06	1.32E-05	44.13	0.3284	0.4015
		STDEV 3.49E-07	1.58E-05	1.17	0.0006	0.0009
		USL 2.00E-05	1.30E-04		0.375	0.430
		LSL		30		
		CPK 16.73	2.47	4.04	26.26	10.42

Device: MBRS130LT3 (1N5817) DC Test Results

Lot	Temp	Ir @ 30V	Vr @ 1mA	Vf @ 0.1A	Vf @ 1A	Vf @ 3A
Existing	25	MIN 3.48E-05	46.75	0.2650	0.3664	0.4851
Fab		MAX 5.08E-05	48.38	0.2664	0.3757	0.5140
		MEDIAN 3.64E-05	48.08	0.2658	0.3727	0.5039
		AVERAGE 3.71E-05	48.00	0.2657	0.3726	0.5042
		STDEV 2.90E-06	0.37	0.0004	0.0017	0.0052
		USL 1.00E-03		0.32	0.45	0.75
		LSL	30			
		CPK 110.80	16.37	47.40	14.87	15.69

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Lot	Temp	Ir @ 30V	Vr @ 1mA	Vf @ 0.1A	Vf @ 1A	Vf @ 3A
New Fab 25	MIN	4.76E-05	43.38	0.2592	0.3553	0.4600
Group 1	MAX	6.51E-05	44.67	0.2660	0.3617	0.4689
	MEDIAN	5.75E-05	44.43	0.2613	0.3577	0.4650
	AVERAGE	5.80E-05	44.38	0.2613	0.3579	0.4650
	STDEV	4.07E-06	0.25	0.0014	0.0014	0.0025
	USL	1.00E-03		0.32	0.45	0.75
	LSL		30			
	CPK	77.21	19.55	14.20	22.68	38.28
New Fab 25	MIN	4.83E-05	42.19	0.2589	0.3565	0.4630
Group 2	MAX	6.42E-05	46.04	0.2630	0.3619	0.4757
	MEDIAN	5.15E-05	45.35	0.2617	0.3599	0.4712
	AVERAGE	5.25E-05	45.30	0.2615	0.3598	0.4710
	STDEV	3.67E-06	0.68	0.0011	0.0012	0.0025
	USL	1.00E-03		0.32	0.45	0.75
	LSL		30			
	CPK	86.15	7.55	17.84	25.37	37.04
New Fab 25	MIN	4.97E-05	40.53	0.2583	0.3542	0.4595
Group 3	MAX	6.38E-05	46.14	0.2656	0.3600	0.4694
	MEDIAN	5.48E-05	45.50	0.2605	0.3580	0.4663
	AVERAGE	5.48E-05	45.31	0.2608	0.3577	0.4659
	STDEV	2.97E-06	0.96	0.0013	0.0012	0.0024
	USL	1.00E-03		0.32	0.45	0.75
	LSL	30				
	CPK	106.01	5.34	14.74	25.69	39.15

Device: MBRP400100CTL DC Test Results

Lot	Temp		Ir @ 100V	Vr @ 6mA	Vf @ 200A
Existing	25	MIN	8.75E-07	108.30	0.7519
Fab		MAX	1.11E-05	130.30	0.7749
		MEDIAN	1.75E-06	127.30	0.7662
		AVERAGE	2.13E-06	125.27	0.7660
		STDEV	1.86E-06	5.31	0.0060
		USL	6.00E-03		0.83
		LSL		100	
		CPK	1072.02	1.59	3.57
New Fab 25		MIN	1.02E-06	121.30	0.7455
Group 1		MAX	2.84E-06	129.90	0.7585
		MEDIAN	1.86E-06	127.70	0.7512
		AVERAGE	1.89E-06	127.49	0.7517
		STDEV	5.08E-07	1.63	0.0036
		USL	6.00E-03		0.83
		LSL		100	
		CPK	3938.02	5.62	7.34
New Fab 25		MIN	1.41E-06	115.40	0.7435
Group 2		MAX	5.15E-06	126.80	0.7547
		MEDIAN	1.93E-06	121.30	0.7479
		AVERAGE	2.01E-06	121.28	0.7481
		STDEV	6.39E-07	2.88	0.0030
		USL	6.00E-03		0.83
		LSL		100	
		CPK	3130.61	2.47	9.19

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Lot	Temp	Ir @ 100V	Vr @ 6mA	Vf @ 200A
New Fab 25	MIN	1.74E-06	120.00	0.7359
Group 3	MAX	1.68E-05	124.40	0.7527
	MEDIAN	2.13E-06	122.50	0.7459
	AVERAGE	3.13E-06	122.58	0.7461
	STDEV	3.41E-06	0.91	0.0040
	USL	6.00E-03		0.83
	LSL		100	
	CPK	587.02	8.31	7.07

Full characterization reports are available upon request.

CHANGED PART IDENTIFICATION:
Products with date code 0424 (June 14, 2004) and forward may be from the new wafer fab.

AFFECTED DEVICE LIST (WITHOUT SPECIALS):

PART
1C5822WP
1N5817
1N5817RL
1N5818
1N5818RL
1N5819
1N5819RL
1N5819RLG
1N5820
1N5820RL
1N5821
1N5821RL
1N5822
1N5822RL
80SQ045N
80SQ045NRL
MBR0520LT1
MBR0520LT1G
MBR0520LT3
MBR0520LT3G
MBR0530T1
MBR0530T1G
MBR0530T3
MBR0530T3G
MBR120ESFT1
MBR120ESFT3
MBR120LSFT1
MBR120LSFT3
MBR120VLSFT1
MBR120VLSFT3
MBR130LSFT1
MBR130T1
MBR130T1G
MBR130T3
MBR140SFT1
MBR140SFT3

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MBR2515L
MBR2535CTL
MBR4015CTL
MBR4015LWT
MBR835
MBR835RL
MBR840
MBR840RL
MBR845
MBR845RL
MBRA120ET3
MBRA120LT3
MBRA130LT3
MBRA130LT3G
MBRA140T3
MBRA140T3G
MBRA160T3
MBRA210ET3
MBRA210LT3
MBRA340T3
MBRB2515L
MBRB2515LG
MBRB2515LT4
MBRB2535CTL
MBRB2535CTLT4
MBRB3030CTL
MBRC2535CTLWP
MBRC835L
MBRC835LWP
MBRD1035CTL
MBRD1035CTLT4
MBRD1035CTLT4G
MBRD835L
MBRD835LG
MBRD835LT4
MBRD835LT4G
MBRM110ET1
MBRM110ET3
MBRM110LT1
MBRM110LT3
MBRM120ET1
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MBRM140T3
MBRM140T3G
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MBRP20060CT

MBRP30045CT
MBRP30060CT
MBRP400100CTL
MBRP40030CTL
MBRS120T3
MBRS120T3G
MBRS130LT3
MBRS130LT3G
MBRS130T3
MBRS130T3G
MBRS140T3
MBRS140T3G
MBRS1540T3
MBRS1540T3G
MBRS2040LT3
MBRS2040LT3G
MBRS230LT3
MBRS240LT3
MBRS240LT3G
MBRS260T3
MBRS260T3G
MBRS2H40LT3
MBRS320T3
MBRS330T3
MBRS330T3G
MBRS340T3
MBRS340T3G
MBRS3H20T3
MBRS3H30T3
MBRS3H40T3
MBRS410ET3
MBRS410LT3
MBRS540T3
MBRS540T3G
NRVBA130LT3
NRVBA140T3
NRVBM140T1
NRVBM140T3
NRVBS240LT3
SBR80520LT1
SBR80520LT3
SBRB2515LT4
SBRC175-1645WP
SBRD81035CTLT4
SBRD835LT4
SBRD8835LT4
SBRS5652T3
SBRS5654T3G
SBRS8120T3
SBRS8130LT3
SBRS8130T3
SBRS8140T3
SBRS8320T3
SBRS8330T3
SBRS8340T3
SBRS8340T3G

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SRB5084T3
SRB5084T3G
SS22T3
SS24T3
SS26T3