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**UPDATE NOTIFICATION**  
**Generic Copy**

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**07-SEP-2001**

**SUBJECT:** ON Semiconductor Update Notification 11747

**TITLE:** Update Notification To PCN#10396 (Additional Assy/Test Site For Zener/Rectifier SMA Devices)

**EFFECTIVE DATE:** 10-Sep-2001

**AFFECTED CHANGE CATEGORY:** ON Semiconductor Assembly Site

**AFFECTED PRODUCT DIVISION:** Bipolar Discretes Products Division

**ADDITIONAL RELIABILITY DATA:** Available

Contact your local ON Semiconductor Sales Office  
or Paul Lem <FFBFBM@onsemi.com>

**SAMPLES:** Contact your local ON Semiconductor Sales Office  
or Paul Lem <FFBFBM@onsemi.com>

**FOR ANY QUESTIONS CONCERNING THIS NOTIFICATION:**

Contact Sales Office or PAUL LEM <FFBFBM@onsemi.com>)

**DISCLAIMER:**

Initial Product/Process Change Notification (IPCN) - First Notification distributed to customers. Distributed at least 120 days from the effective date of the change.

Final Product/Process Change Notification (FPCN) - Final Notification completing the notification process. Distributed at least 60 days from the effective date 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:**

On 27Nov2000, ON Semiconductor issued a PCN #10396 informing our customers about the qualification of an additional assembly/test site for Zener and Rectifier SMA devices. The additional assembly/test site was ON Semiconductor's manufacturing facility in Seremban, Malaysia. Current manufacturing location was a subcontracted site in Taiwan.



**Update Notification 11747**

We have encountered that a number of devices were omitted or not included from that notification due to error. This Update Notification includes those devices that were not identified on the initial notification. ON Semiconductor has identified the root cause of the error and addressing corrective actions. An 8-Discipline (8D) Corrective Action can be available on request. We apologize for this inconvenience.

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**ORIGINAL PCN #10396**

In order to meet increasing customer demand for ON Semiconductor SMA devices, our Seremban, Malaysia manufacturing facility is being qualified as a second assembly site. The current SMA devices are assembled by our Taiwanese subcontractor. Both sites are qualified and meet all ON Semiconductor quality standards. Each site utilizes its own qualified piece parts suppliers. This site qualification will increase ON Semiconductor capacity and capability to provide quality SMA package products.

ON Semiconductor's Seremban, Malaysia manufacturing facility has been producing quality products for over 10 years. The Seremban, Malaysia facility is certified to QS-9000, ISO-9001 and ISO-14000 standards. There will be no changes in device functionality. SMA devices produced in Seremban, Malaysia will continue to meet device parameters specified in the Databooks and continue to meet or exceed ON Semiconductor reliability standards.

For samples contact

Schottky Rectifiers  
Randy Keadle 602-244-5315 <Randy.keadle@onsemi.com>  
Zeners Kyle Bunch 602-244-5814 <Kyle.bunch@onsemi.com>

**QUALIFICATION PLAN:**

<u>TEST</u>	<u>CONDITIONS</u>	<u>EXCEPTIONS</u>
H3TRB	Ta=85 deg. C, RH= 85%, 1008 hours	
ESD	JEDEC Standard Human Body Model JEDEC Standard Machine Model	
HTRB	Ta=150 deg.C, 1008 hrs.	
IOL	Ta=25 deg.C, delta Tj =>100 deg.C, 2 minutes on/off, 15000 cycles	
Temp Cycle	Air to Air, -65 to 150 deg.C 1000 cycles, Tdwell>10 min	
Autoclave	Ta=121 deg.C, RH= 100%, P = 15psig, 96 hours	

**QUALIFICATION VEHICLE JUSTIFICATION:**

<u>FAMILY</u>	<u>QUALIFICATION DEVICE</u>	<u>REASON CHOSEN</u>
SMA Zener Voltage Regulators	1SMA5913BT3	Lowest Voltage Zeners
SMA TVS Uni direction	1SMA75AT3	Highest voltage TVS
SMA TVS Bi direction	SZ2841T3	Largest Die TVS
SMA Schottky rectifier	MBRA140T3	Highest voltage device



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**CHANGED PART IDENTIFICATION:**

Current products from our Taiwan subcontracted facility have a notch in the plastic body to indicate the cathode lead. The Seremban products will have a laser-marked band to indicate the cathode lead. Bidirectional TVS devices will not have a polarity indicator. Device markings will include assembly site location code. Seremban assembled devices are marked with an "R".

**RELIABILITY DATA SUMMARY:****MBRA140T3**

TEST DESCRIPTION	LOT 1	LOT 2	LOT 3	CONTROL
H3TRB 1000 hours	0/84	0/84	0/84	0/84
ESD Human Body Model Machine Model	Class 3 Class C	Class 3 Class C	Class 3 Class C	Class 3 Class 3
HTRB 1000 hours	0/84	0/84	0/84	0/84
IOL 5000 cycles	0/84	0/84	0/84	0/84
Temp Cycle 1000 cycles	0/84	0/84	0/84	0/84
Autoclave 96 hrs.	0/84	0/84	0/84	0/84

**1SMA5913BT3**

TEST DESCRIPTION	Lot 1	Lot 2	Lot 3	Control
H3TRB 1000 hours	0/84	0/84	0/84	0/84
ESD Human Body Model Machine Model	Class 3 Class C	Class 3 Class C	Class 3 Class C	Class 3 Class C
HTRB 1000 hours	0/84	0/84	0/84	0/84
IOL 5000 cycles	0/84	0/84	0/84	0/84
Temp Cycle 1000 cycles	0/84	0/84	0/84	0/84
Autoclave 96 hours	0/84	0/84	0/84	0/84

Reliability reports and characterization data for SZ2841T3 and 1SMA75AT3 will be available by WW50.



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## ELECTRICAL CHARACTERIZATION SUMMARY:

## MBRA140T3

TEMP.	(-55 Deg.C)				(25 Deg.C)			
	CONTROL	ENG 1	ENG 2	ENG 3	CONTROL	ENG 1	ENG 2	ENG 3
Vf (Volts) @If = 1.0A								
Min	4.72E-01	4.79E-01	4.79E-01	4.73E-01	4.23E-01	4.32E-01	4.33E-01	4.20E-01
Max	4.81E-01	4.84E-01	4.84E-01	4.84E-01	4.38E-01	4.43E-01	4.42E-01	4.42E-01
Mean	4.78E-01	4.81E-01	4.81E-01	4.81E-01	4.33E-01	4.37E-01	4.36E-01	4.35E-01
Std Dev	2.23E-03	1.38E-03	1.08E-03	2.26E-03	4.03E-03	3.12E-03	2.42E-03	4.68E-03
Limit	-	-	-	-	5.50E-01	5.50E-01	5.50E-01	5.50E-01
Cpk	-	-	-	-	9.67E+00	1.20E+01	1.57E+01	8.17E+00
Vf (Volts) @If = 2.0A								
Min	5.40E-01	5.50E-01	5.50E-01	5.38E-01	5.36E-01	5.51E-01	5.52E-01	5.27E-01
Max	5.56E-01	5.61E-01	5.59E-01	5.61E-01	5.66E-01	5.73E-01	5.72E-01	5.73E-01
Mean	5.50E-01	5.54E-01	5.54E-01	5.53E-01	5.56E-01	5.61E-01	5.60E-01	5.59E-01
Std Dev	4.21E-03	3.10E-03	2.46E-03	4.73E-03	8.33E-03	6.49E-03	5.20E-03	9.56E-03
Limit	-	-	-	-	7.10E-01	7.10E-01	7.10E-01	7.10E-01
Cpk	-	-	-	-	6.16E+00	7.65E+00	9.63E+00	5.27E+00
Ir (Amps) @ Vr = 20V								
Min	3.83E-09	3.12E-09	3.35E-09	3.08E-09	1.25E-05	1.25E-05	1.40E-05	1.38E-05
Max	1.54E-06	5.46E-07	1.89E-06	3.60E-08	1.73E-05	1.42E-05	1.68E-05	1.70E-05
Mean	6.08E-08	2.39E-08	6.67E-08	5.10E-09	1.55E-05	1.33E-05	1.46E-05	1.50E-05
Std Dev	2.79E-07	9.92E-08	3.44E-07	5.87E-09	8.26E-07	5.06E-07	5.51E-07	7.46E-07
Limit	-	-	-	-	1.00E-04	1.00E-04	1.00E-04	1.00E-04
Cpk	-	-	-	-	3.41E+01	5.72E+01	5.17E+01	3.80E+01
Ir (Amps) @ Vr = 40V								
Min	3.13E-08	2.57E-08	2.71E-08	2.64E-08	4.25E-05	3.46E-05	3.85E-05	3.88E-05
Max	1.32E-04	5.86E-06	5.90E-05	3.77E-07	9.49E-05	4.52E-05	8.38E-05	5.85E-05
Mean	5.54E-06	2.38E-07	2.00E-06	6.17E-08	4.83E-05	3.84E-05	4.33E-05	4.39E-05
Std Dev	2.42E-05	1.06E-06	1.08E-05	8.21E-08	9.73E-06	2.94E-06	7.95E-06	5.21E-06
Limit	-	-	-	-	5.00E-04	5.00E-04	5.00E-04	5.00E-04
Cpk	-	-	-	-	1.55E+01	5.23E+01	1.92E+01	2.92E+01

## MBRA140T3

TEMP.	(100 Deg.C)				(125 Deg.C)			
	CONTROL	ENG 1	ENG 2	ENG 3	CONTROL	ENG 1	ENG 2	ENG 3
Vf (Volts) @If = 1.0A								
Min	3.91E-01	4.04E-01	4.05E-01	3.85E-01	3.84E-01	3.98E-01	3.99E-01	3.76E-01
Max	4.16E-01	4.23E-01	4.21E-01	4.22E-01	4.12E-01	4.19E-01	4.17E-01	4.18E-01
Mean	4.08E-01	4.13E-01	4.11E-01	4.11E-01	4.03E-01	4.07E-01	4.06E-01	4.05E-01
Std Dev	6.86E-03	5.52E-03	4.32E-03	7.96E-03	7.72E-03	6.08E-03	4.79E-03	8.89E-03
Limit	5.05E-01	5.05E-01	5.05E-01	5.05E-01	-	-	-	-
Cpk	4.70E+00	5.57E+00	7.22E+00	3.96E+00	-	-	-	-
Vf (Volts) @If = 2.0A								
Min	5.55E-01	5.70E-01	5.71E-01	5.42E-01	5.46E-01	5.55E-01	5.56E-01	5.36E-01
Max	5.90E-01	5.95E-01	5.91E-01	5.95E-01	5.73E-01	5.75E-01	5.71E-01	5.76E-01
Mean	5.79E-01	5.81E-01	5.79E-01	5.78E-01	5.64E-01	5.63E-01	5.62E-01	5.63E-01
Std Dev	9.70E-03	6.95E-03	5.55E-03	1.06E-02	7.22E-03	5.19E-03	4.12E-03	7.64E-03
Limit	7.40E-01	7.40E-01	7.40E-01	7.40E-01	-	-	-	-
Cpk	5.55E+00	7.64E+00	9.67E+00	5.07E+00	-	-	-	-
Ir (Amps) @ Vr = 20V								
Min	2.03E-03	1.95E-03	1.93E-03	1.79E-03	7.34E-03	7.15E-03	7.00E-03	6.93E-03
Max	2.54E-03	2.34E-03	2.25E-03	2.38E-03	9.01E-03	8.39E-03	8.14E-03	8.58E-03



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## ELECTRICAL CHARACTERIZATION SUMMARY CONTINUED:

Mean	2.26E-03	2.10E-03	2.10E-03	2.02E-03	8.40E-03	7.64E-03	7.62E-03	7.53E-03
Std	1.39E-04	9.92E-05	8.85E-05	1.37E-04	3.36E-04	2.96E-04	3.12E-04	3.73E-04
Dev								
Limit	-	-	-	-	-	-	-	-
Cpk	-	-	-	-	-	-	-	-

	Ir (Amps) @ Vr = 40V							
Min	4.49E-03	4.06E-03	4.11E-03	3.71E-03	1.65E-02	1.42E-02	1.40E-02	1.36E-02
Max	5.87E-03	5.24E-03	5.20E-03	5.87E-03	2.00E-02	1.77E-02	1.77E-02	1.99E-02
Mean	5.01E-03	4.51E-03	4.54E-03	4.43E-03	1.76E-02	1.55E-02	1.55E-02	1.55E-02
Std	3.54E-04	3.03E-04	2.82E-04	4.48E-04	9.17E-04	9.23E-04	9.25E-04	1.36E-03
Dev								
Limit	1.00E-02	1.00E-02	1.00E-02	1.00E-02	-	-	-	-
Cpk	4.69E+00	6.03E+00	6.44E+00	4.15E+00	-	-	-	-

## 1SMA5913BT3

Temp.	(25 Deg.C)				(- 55 Deg.C)			
LOTS	CONTROL	ENG 1	ENG 2	ENG 3	CONTROL	ENG 1	ENG 2	ENG 3

VZ (V) @ IT = 113.6mA								
Min	3.260	3.250	3.230	3.240	3.430	3.430	3.410	3.420
Max	3.390	3.450	3.420	3.370	3.560	3.530	3.590	3.550
Mean	3.320	3.310	3.310	3.310	3.500	3.480	3.490	3.490
Std.Dev	0.040	0.040	0.040	0.030	0.040	0.020	0.040	0.030
Min Limit	3.140	3.140	3.140	3.140	--	--	--	--
Max Limit	3.470	3.470	3.470	3.470	--	--	--	--
Cpk	1.230	1.340	1.400	1.660	--	--	--	--

VF (V) @ IF = 200mA								
Min	0.820	0.730	0.810	0.810	0.910	0.910	0.910	0.910
Max	0.820	0.820	0.820	0.820	0.920	0.920	0.920	0.920
Mean	0.820	0.810	0.810	0.810	0.920	0.910	0.910	0.910
Std. Dev	0.000	0.020	0.000	0.000	0.000	0.000	0.010	0.000
Min Limit	--	--	--	--	--	--	--	--
Max Limit	1.500	1.500	1.500	1.500	--	--	--	--
Cpk	268.350	12.120	51.180	54.300	--	--	--	--

IR (uA) @ VR = 1.0V								
Min	10.200	10.500	10.100	10.200	7.070	7.370	6.560	7.370
Max	16.500	16.300	18.400	17.400	11.800	11.800	12.300	12.300
Mean	13.100	14.400	13.700	13.700	9.030	9.640	9.460	9.380
Std. Dev	2.010	1.540	2.010	1.820	1.410	0.940	1.290	1.320
Min Limit	--	--	--	--	--	--	--	--
Max Limit	50.000	50.000	50.000	50.000	--	--	--	--
Cpk	6.124	7.685	6.013	6.640	--	--	--	--

ZZT (Ohms) @ IZT = 113.6mA								
Min	3.380	3.390	3.380	3.380	3.330	3.320	3.300	3.380
Max	3.730	5.140	3.740	3.740	3.740	3.720	3.720	3.730
Mean	3.550	3.590	3.560	3.580	3.580	3.570	3.590	3.570
Std. Dev	0.130	0.320	0.130	0.120	0.100	0.100	0.110	0.100
Min Limit	--	--	--	--	--	--	--	--
Max Limit	10.000	10.000	10.000	10.000	--	--	--	--
Cpk	16.980	6.681	16.940	17.860	--	--	--	--

ZZK (Ohms) @ IZK = 1.0mA								
Min	232.000	232.000	232.000	231.000	245.000	242.000	244.000	246.000
Max	241.000	240.000	251.000	241.000	262.000	261.000	260.000	260.000
Mean	235.770	235.430	236.370	236.100	251.800	251.900	251.670	252.470
Std. Dev	2.460	2.190	3.460	2.370	3.630	5.130	4.590	3.750
Min Limit	--	--	--	--	--	--	--	--
Max Limit	500.000	500.000	500.000	500.000	--	--	--	--
Cpk	35.820	40.230	25.410	37.140	--	--	--	--



## Update Notification 11747

ELECTRICAL CHARACTERIZATION SUMMARY CONTINUED:  
1SMA5913BT3

TEMP.	(150 Deg.C)			
LOTS	CONTROL	ENG 1	ENG 2	ENG 3
VZ (V) @ IT = 113.6mA				
Min	3.000	3.000	2.980	2.980
Max	3.130	3.100	3.170	3.120
Mean	3.060	3.050	3.050	3.060
Std. Dev	0.040	0.020	0.040	0.030
Min Limit	--	--	--	--
Max Limit	--	--	--	--
Cpk	--	--	--	--
VF (V) @ IF = 200mA				
Min	0.640	0.630	0.630	0.630
Max	0.640	0.640	0.640	0.640
Mean	0.640	0.640	0.640	0.640
Std. Dev	0.000	0.000	0.000	0.000
Min Limit	--	--	--	--
Max Limit	--	--	--	--
Cpk	--	--	--	--
IR (uA) @ VR = 1.0V				
Min	18.700	20.600	16.400	19.500
Max	30.200	29.200	33.800	33.000
Mean	24.500	26.300	25.700	25.700
Std. Dev	3.160	2.810	3.630	3.570
Min Limit	--	--	--	--
Max Limit	--	--	--	--
Cpk	--	--	--	--
ZZT (Ohms) @ IZT = 113.6mA				
Min	3.260	3.250	3.260	3.270
Max	3.600	3.570	3.590	3.600
Mean	3.390	3.390	3.390	3.420
Std. Dev	0.110	0.110	0.110	0.090
Min Limit	--	--	--	--
Max Limit	--	--	--	--
Cpk	--	--	--	--
ZZK (Ohms) @ IZK = 1.0mA				
Min	212.000	212.000	211.000	221.000
Max	222.000	223.000	223.000	222.000
Mean	216.200	216.997	216.900	217.830
Std. Dev	2.370	2.460	3.040	2.850
Min Limit	--	--	--	--
Max Limit	--	--	--	--
Cpk	--	--	--	--

**Update Notification 11747****RELATED NOTIFICATIONS:**

ADDITION OF SEREMBAN ASSY. SITE FOR RECTIFIER AND ZENER SMA PKG.

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

1SMA10AT3, 1SMA10CAT3, 1SMA11AT3, 1SMA11CAT3, 1SMA12AT3, 1SMA12CAT3,  
1SMA13AT3, 1SMA13CAT3, 1SMA14CAT3, 1SMA15AT3, 1SMA15CAT3, 1SMA16AT3,  
1SMA16CAT3, 1SMA17AT3, 1SMA17CAT3, 1SMA18AT3, 1SMA18CAT3, 1SMA20AT3,  
1SMA20CAT3, 1SMA22AT3, 1SMA22CAT3, 1SMA24AT3, 1SMA24CAT3, 1SMA26AT3,  
1SMA26CAT3, 1SMA28AT3, 1SMA28CAT3, 1SMA30AT3, 1SMA30CAT3, 1SMA33AT3,  
1SMA33CAT3, 1SMA36AT3, 1SMA36CAT3, 1SMA40AT3, 1SMA40CAT3, 1SMA43AT3,  
1SMA43CAT3, 1SMA45AT3, 1SMA45CAT3, 1SMA48AT3, 1SMA48CAT3, 1SMA51AT3  
1SMA51CAT3, 1SMA54AT3, 1SMA54CAT3, 1SMA58AT3, 1SMA58CAT3, 1SMA5913BT3,  
1SMA5914BT3, 1SMA5915BT3, 1SMA5916BT3, 1SMA5917BT3, 1SMA5918BT3,  
1SMA5919BT3, 1SMA5920BT3, 1SMA5921BT3, 1SMA5922BT3, 1SMA5923BT3,  
1SMA5924BT3, 1SMA5925BT3, 1SMA5926BT3, 1SMA5927BT3, 1SMA5928BT3,  
1SMA5929BT3, 1SMA5930BT3, 1SMA5931BT3, 1SMA5932BT3, 1SMA5933BT3,  
1SMA5934BT3, 1SMA5935BT3, 1SMA5936BT3, 1SMA5937BT3, 1SMA5938BT3,  
1SMA5939BT3, 1SMA5940BT3, 1SMA5941BT3, 1SMA5942BT3, 1SMA5943BT3,  
1SMA5944BT3, 1SMA5945BT3, 1SMA60AT3, 1SMA60CAT3, 1SMA64AT3, 1SMA64CAT3,  
1SMA70AT3, 1SMA70CAT3, 1SMA75AT3, 1SMA75CAT3, 1SMA78CAT3,  
MBRA130LT3, MBRA140T3