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PCN Report

Prepared By : Haipeng Xu, Senior Product Engineer
Date : Apr. 30th, 2018
Products : Automotive TVS in SMF(SOD123) package acquired from ON Semiconductor
Revision : A

1.0 Objective:

This report covers manufacturing site transfer activities of automotive TVS of SMF(SOD123) package acquired from ON Semiconductor. Site transfer includes fab manufacturing, backend assembly, final test and packaging operations.

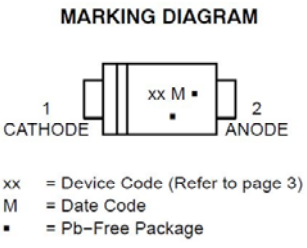
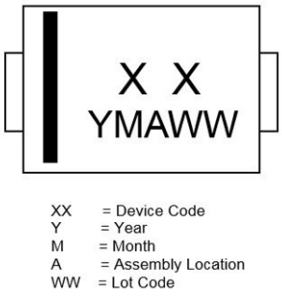
2.0 Affected Devices:

Automotive TVS components acquired from ON Semiconductor in package of SMF(SOD123).
Please see attached Appendix I for a full list of affected part numbers.

3.0 Physical Differences/Changes:

3.1 Marking diagram format change

Marking diagram has been changed to optimize the component traceability.

Package	ON Semi Marking [OLD]	Littelfuse Marking [NEW]	Modification Items
SMF (SOD123)			1.Optimize trace code for better traceability 2.Remove Pb-free dot 3.Change polarity band quanity from three to one

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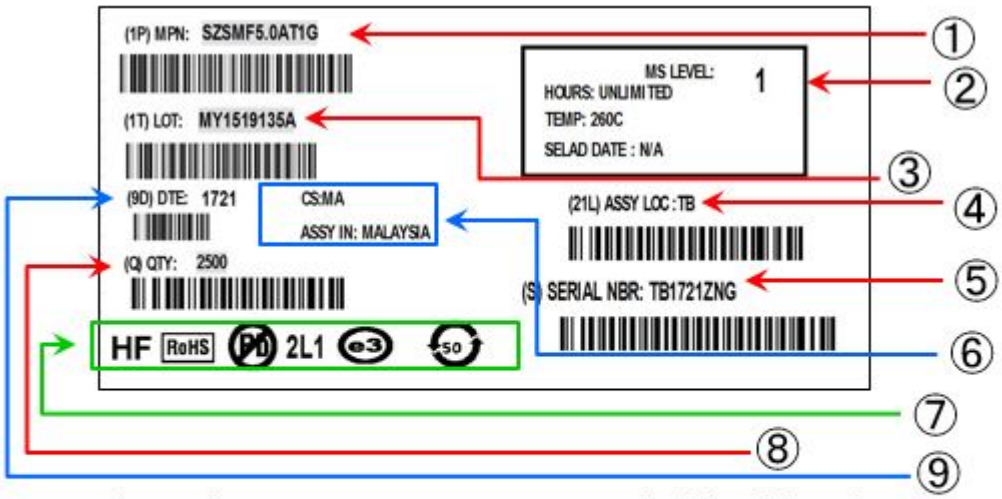
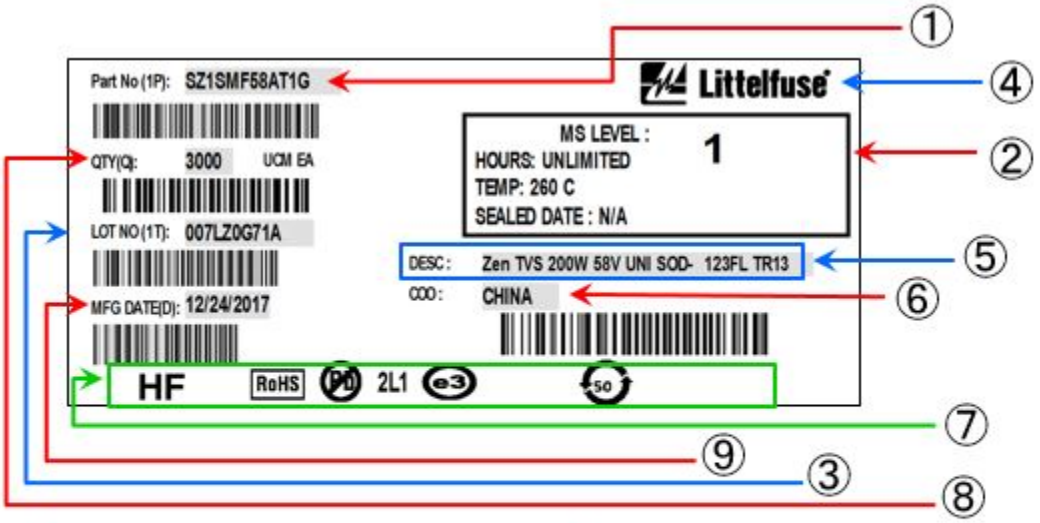
3.2 Label format change

a. ON Semiconductor's label [OLD]



- Legend:
- 1. Part number
- 2. MSL Level
- 3. Lot number
- 4. Assembly location
- 5. ON serial number
- 6. Assembly site
- 7. Compliance logo
- 8. Quantity
- 9. Manufacturing date

b. Littelfuse's label [NEW]



- Legend:
- 1. Part number
- 2. MSL level
- 3. Lot number
- 4. Littelfuse logo
- 5. Part number description
- 6. Assembly site
- 7. Compliance logo
- 8. Quantity
- 9. Manufacturing date

4.0 Qualification Test Items and Result Summary:

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Discrete Semiconductor Componet Qualification Result Rev.D April 27, 2018

General Specification: AEC-Q101 Rev D
Supplier: Littelfuse. Inc
Supplier Generic P/N: SZSMFxxAT1G
Supplier Internal P/N: SZSMFxxAT1G
Requested PPAP submission date: N/A
Supplier Manufacturing Site: Wuxi, Jiangsu, China
Package Type: SMF (SOD123-FL)
Family Type: Zener
Reason for qual: Manufaturing site change for TVS aquired from ON Semi

Item #	Test	Test Conditions	Littelfuse Test Ref#	Ref. Spec	# Lots	S.S.	Result Fail/Total	Remarks
1	Pre- and Post-Stress Electrical Test	Electrical Characterization @ 25°C	All	Datasheet spec	all	all	0/all	Before and after all test
2	Pre-conditioning	24hr 125°C bake, 168hrs 85°C/85% humidity storage, 3 times Reflow	106412&106413&106408& 108170&108171	JA113	21	80	0/1680	Performed prior to UHAST, TC, IOL, H3TRB
3	External Visual	Per AEC-Q101		MIL750-2071	all	all	0/all	
4	Parametric Verification	Electrical Characterization @ -65°C, 25°C & 150°C	108815&108816	Individual AEC user specification	6	30	0/180	
5	High Temperatrue Reverse Bias	Tj=150°C, 1,008hr, biased at VR	106412&106413	MIL-STD-750-1 M1038 Method A	6	80	0/480	
6	High Temperature Gate Bias	Per AEC-Q101	N/A	JA108				
7	Temperature Cycling	TA: -65°C to +150°C , dwell time >15mins, 1,000 cycle	106412&106413	JA104	6	80	0/480	
8	Unbiased Highly Accelerated Stress Test	96 hours at TA=130°C/85%RH.	106412&106413	JA118	6	80	0/480	
9	High Humidity High Temp. Reverse Bias	TA: 85°C, RH: 85%, 1000hr, Reverse biased at VR or max 100V	106412&106413	JA101	6	80	0/480	
10	Intermittent Operational Life	TA:25°C, ΔTJ≥ 100°C, TON/OFF: 2 minutes, 15,000cycles	106408&108170&108171	MIL-STD-750 Method 1037	3	80	0/240	
11	ESD Characterization	HBM:16KV,MM:1.6KV,IEC61000-4-2:30KV	106412&106413&109740& 109741	CDF-AEC Q101-001 & 002	6	90	0/540	HBM :3B IEC−61000−4−2 ≥ 30KV MM :M4
12	Destructive Physical Analysis	Per AEC-Q101	109058&109064&109065	AEC-Q101-004	3	2	0/6	Samples from passed H3TRB and TC
13	Physical Dimension	Per JEDECSOD123 package dimension	108815&108816	JB-100	2	30	0/60	Per Datasheet Spec
14	Terminal Strength	Per AEC-Q101	N/A	MIL750-2006				Evaluate lead integrity of leaded parts only
15	Resistance to Solvents	per AEC - Q101	N/A	JB-107				Laser marked
16	Constant Acceleration		N/A					Not hermetic packaged devices
17	Vibration Variable Frequency		N/A					Not hermetic packaged devices
18	Mechanical Shock		N/A					Not hermetic packaged devices
19	Hermeticity		N/A					Not hermetic packaged devices
20	Resistance to Solder Heat	Per AEC-Q101	106412&106413	JB-106-A	6	30	0/180	
21	Solderability	Per AEC-Q101	106412&106413	J-STD002	6	15	0/90	
22	Thermal Resistance	Per AEC-Q101	106414&106415	JESD-24-3, 24-4, 24-6 as appropriate	5	10	0/50	Per Datasheet Spec
23	Wire Bond Strength	Per AEC-Q101	N/A	MIL750, 2037				wire bond only
24	Bond Shear		N/A					wire bond only
25	Die Shear	Per AEC-Q101	N/A	MIL750, 2017				wire bond only
26	Unclamped Inductive Switching	Per AEC-Q101	N/A	CDF-AECQ101-004 Section 2				Power MOS & internally clamped IGBT only
27	Dielectric Integrity	Per AEC-Q101	N/A	CDF-AECQ101-004 Section 2				Power MOS & IGBT only
28	Short Circuit Reliablity	Per AEC-Q101	N/A					For smart power parts only
29	Lead Free	Per AEC-Q101	N/A	AEC-Q005				
30	Capcitance	Bias=1V,2V,5V, 10V,50%VR, 100%VR, 1MHZ,TJ = 25°C	106409&106410	Individual AEC user specification	6	15	0/90	
31	Surge Life(10*1000us)	10*1000us waveform,50hits	106409&106410	Individual AEC user specification	6	10	0/60	
32	Surge Out(10*1000)	10*1000us waveform,25°C,85°C and 150°C	106409&106410	Individual AEC user specification	6	30	0/180	
33	High Temperature Storage Life	TA=150°C, 1008hours	106412&106413	JA103	6	80	0/480	

All sampels passed all requested items by AEC-Q101 Rev.D successfully.

5.0 Recommendations & Conclusions:

Based on above qualification test results, Littelfuse judged that manufacturing site transfer activities of SMF(SOD123) package have been completed and TVS components in SMF(SOD123) package are successfully qualified by AEC-Q101 tests.

Littelfuse released new manufacturing site to production for automotive TVS of SMF(SOD123) package.

6.0 Approvals:

Haipeng Xu	**Sewall Wang**
Senior Product Engineer	**Product Engineering Manager**
Littelfuse, Inc.	**Littelfuse,**

7.0 Appendix I – List of part numbers affected by this PCN report

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SZSMF10AT1G
SZSMF11AT1G
SZSMF12AT1G
SZSMF13AT1G
SZSMF14AT1G
SZSMF15AT1G
SZSMF18AT1G
SZSMF20AT1G
SZSMF22AT1G
SZSMF24AT1G
SZSMF26AT1G
SZSMF28AT1G
SZSMF30AT1G
SZSMF33AT1G
SZSMF36AT1G
SZSMF48AT1G
SZSMF5.0AT1G
SZSMF58AT1G
SZSMF6.0AT1G
SZSMF6.5AT1G
SZSMF7.0AT1G
SZSMF7.5AT1G
SZSMF8.0AT1G
SZSMF9.0AT1G