



8755 W. Higgins Road Suite 500
Chicago, Illinois USA 60631

May 07, 2018

RE: PCN Production Transfer for Acquired ON Semiconductor Automotive TVS Diodes SMB (DO-214AA) and SMF (SOD123)

To our valued customers,

On August 29, 2016, Littelfuse completed the acquisition of select ON Semiconductor product lines. The acquired product lines included TVS Diodes, Thyristors, and IGBT's for ignition applications as well as all relevant intellectual property.

It's our pleasure to announce that Littelfuse has successfully qualified the SMB (DO-214AA) and SMF (SOD123) automotive grade TVS Diode products (with part number starting with SZ or SC prefix), Qualification reports and part number lists are attached as appendices.

To ensure a smooth transition to serve our customers better, we ask that you contact your local Littelfuse sales teams with any specific questions or requests within 180 days or before November 06, 2018 at the latest.

Littelfuse will start to produce SMB (DO-214AA) and SMF (SOD123) automotive grade TVS Diode products (with part number starting with SZ or SC prefix) in our Wuxi, China manufacturing site starting November 07, 2018. During the production transition period we will ship from both the current ON Semiconductor Seremban site and the Littelfuse Wuxi China site. Littelfuse will provide customer specific cutover date codes based on each individual customer's approval process and the Littelfuse production conversion timeline.

For the customers who have already engaged with Littelfuse to receive validation samples and manage internal testing, Littelfuse will keep providing our support and service for customer qualifications until the final approvals is obtained.

Qualification Plan and Part Number List

Enclosed separately are the part numbers which are qualified in our Wuxi, China site, along with the qualification result.

Project Milestones

Date	Milestone
2/27/2017	SAP Go live: ordering/shipment of ON Semiconductor part numbers through Littelfuse – Finished
5/30/2017	Clean Rooms and Facility Hook Up completed by Littelfuse – Finished
10/31/2017	FAB & ASSY Equipment and Process Qualification completed by Littelfuse – Finished
5/07/2018	Internal Product Qualification Completed, Start Sampling and Initial Production from Littelfuse facilities SMB (DO-214AA) and SMF (SOD123) TVS products - Finished
11/07/2018	Initial Production from Littelfuse Wuxi site of SMB (DO-214AA) and SMF (SOD123) automotive grade TVS products and start the deliveries
12/31/2018	Last Order Date of ON Semiconductor part numbers from ON Semiconductor facilities for customers
6/30/2019	Automotive Customer Qualification Completed by Littelfuse
7/31/2019	Last Shipment Date of ON Semiconductor part numbers from ON Semiconductor facilities to customers
8/29/2019	Automotive TSA completed and Full Mass Production from Littelfuse Wuxi China



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Product Discontinuity

Littelfuse has obsoleted all commercial grade TVS Diodes (those PNs without the **SZ/SC** prefix) starting from December 31, 2017, and will obsolete SMA-FL (SZNS6A), and replace it with the TPSMA6L series starting December 31, 2018.

Production Support and Last Time Buy from ON Semiconductor Seremban site

ON Semiconductor will continue to manufacture and ship the automotive grade TVS Diodes (with part number starting with SZ or SC prefix) up to August 29, 2019 (or 3 years from acquisition date) to support those customers who require additional time to approve the Littelfuse made TVS Diodes. We ask that you communicate your approval requirements and timelines to your local Littelfuse sales representative as soon as possible if you have not done so already, and place your Last Time Buy orders before December 31, 2018 to ensure supply continuity.

All new SMB (DO-214AA) and SMF (SOD123) automotive grade TVS Diode sample orders and requests will be fulfilled from our Wuxi manufacturing site starting today (May 07, 2018)

Manufacturing Changes

Although we are working with the ON Semiconductor team to duplicate their processes to the greatest extent possible, there are still some changes we would like to draw your attention to below.

	Current	Change to
Raw Silicon	ON Semiconductor, 6 inches	Littelfuse , 5 inches
Wafer Fab	ON Semiconductor	Littelfuse (Wuxi, China)
Backend	ON Semiconductor (DO-214AA,SMB)	Littelfuse (Wuxi, China)
	ON Semiconductor (DO-214AB,SMC)	Littelfuse (Wuxi, China)
	ON Semiconductor (DO-214AC,SMA)	Littelfuse (Wuxi, China)
	ON Semiconductor (SOD-123)	Littelfuse (Wuxi, China)
	ON Semiconductor (SMA-FL)	Obsolete SZNS6A and replace it with Littelfuse TPSMA6L series



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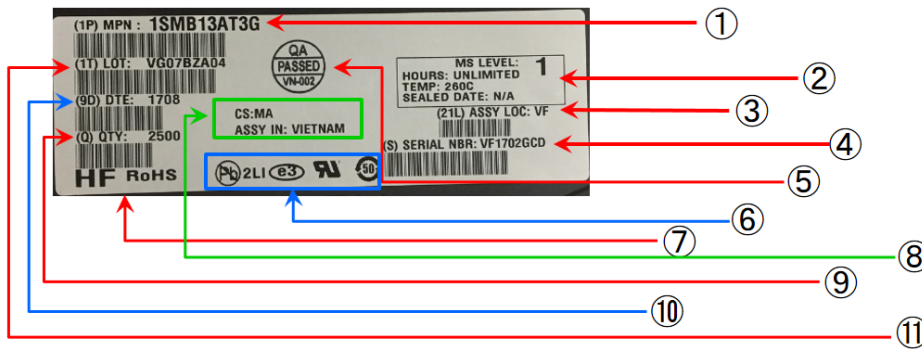
Meanwhile, Littelfuse will enhance the body marking and label specification for better traceability and service.

Device Marking Change: following production transfer into our Wuxi, China site.

Package	SMA	SMB	SMC	SMF (SOD123 - FL)
Existing (ON)				
Modified (LF)	 <small>XXXX = Device Code Y = Year M = Month A = Assembly Location WW = Lot Code</small>			 <small>XX = Device Code Y = Year M = Month A = Assembly Location WW = Lot Code</small>
Modification Items	1. Intergrat SMA, SMB and SMC using same marking diagram. 2. Use five digits trace code for better traceability. 3. Remove Pb-free dot. 4. Change polarity band quantity from three to one.			1. Change marking from one line to two lines. 2. Use five digits trace code for better traceability. 3. Remove Pb-free dot. 4. Change polarity band quantity from three to one.

Note: Polarity band is only for uni-directional components.

Current label format:

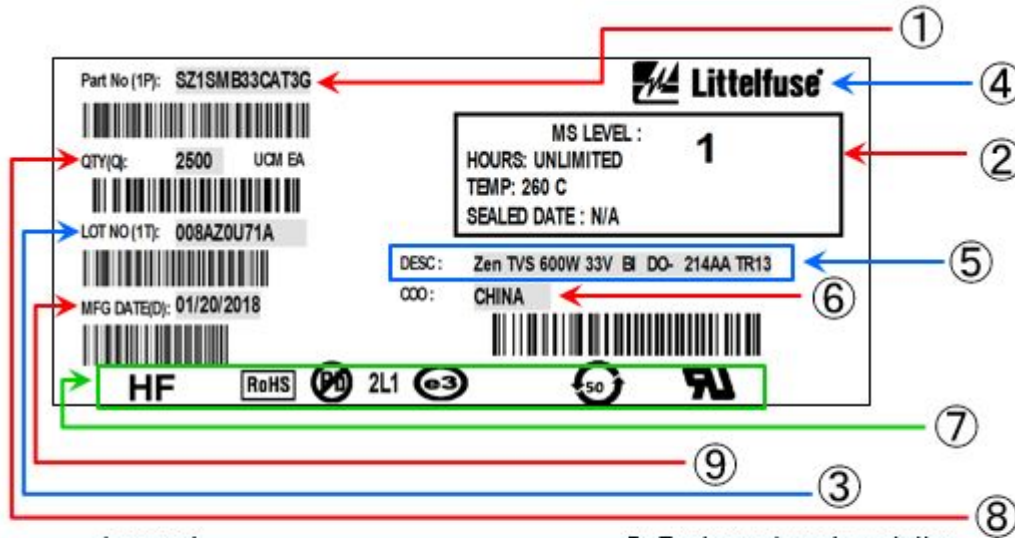


- Legend:
- 1. Part number
- 2. MSL Level
- 3. Assembly site
- 4. ON Serial Number
- 5. QA passed mark
- 6. Pb and UL symbol
- 7. RoHS Compliance and HF symbol
- 8. Assembly location
- 9. Quantity
- 10. Manufacturing date
- 11. Lot number



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New label format: following production transfer into our Wuxi, China site.



- 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

Both SMB (DO-214AA) and SMF (SOD123) qualification reports are included with this PCN letter reflecting the improvements above. The new datasheets will be on the Littelfuse website once all the customer approvals are obtained.

This PCN package is for your information and acknowledgement. If you require any specific data or product samples to certify this change, please contact Littelfuse as soon as possible.

If you have any further questions or concerns, please contact your Littelfuse local sales representative.

We value your business and look forward to assisting you whenever possible.

Best Regards,

Charlie Cai
Product Manager Automotive and Hi-Rel TVS

LFCN41298 Affected Parts List

Automotive TVS in SMB(DO214AA)

Material			
SZ1SMB100AT3G	SZ1SMB8.5AT3G	SZ1SMB10CAT3G	SZP6SMB47CAT3G
SZ1SMB10AT3G	SZ1SMB85AT3G	SZ1SMB11CAT3G	SZP6SMB51CAT3G
SZ1SMB110AT3G	SZ1SMB9.0AT3G	SZ1SMB12CAT3G	SZP6SMB56CAT3G
SZ1SMB11AT3G	SZ1SMB90AT3G	SZ1SMB13CAT3G	SZP6SMB62CAT3G
SZ1SMB120AT3G	SCP6SMB68AT3G	SZ1SMB14CAT3G	SZP6SMB68CAT3G
SZ1SMB12AT3G	SZP6SMB100AT3G	SZ1SMB15CAT3G	SZP6SMB82CAT3G
SZ1SMB130AT3G	SZP6SMB10AT3G	SZ1SMB16CAT3G	SZP6SMB47CAT3G
SZ1SMB13AT3G	SZP6SMB120AT3G	SZ1SMB17CAT3G	SZP6SMB51CAT3G
SZ1SMB14AT3G	SZP6SMB12AT3G	SZ1SMB18CAT3G	SZP6SMB56CAT3G
SZ1SMB150AT3G	SZP6SMB130AT3G	SZ1SMB20CAT3G	SZP6SMB62CAT3G
SZ1SMB15AT3G	SZP6SMB13AT3G	SZ1SMB22CAT3G	SZP6SMB68CAT3G
SZ1SMB160AT3G	SZP6SMB150AT3G	SZ1SMB24CAT3G	SZP6SMB82CAT3G
SZ1SMB16AT3G	SZP6SMB15AT3G	SZ1SMB26CAT3G	SZ2887AT3G
SZ1SMB170AT3G	SZP6SMB160AT3G	SZ1SMB28CAT3G	SZ2985AT3G
SZ1SMB17AT3G	SZP6SMB16AT3G	SZ1SMB30CAT3G	
SZ1SMB18AT3G	SZP6SMB180AT3G	SZ1SMB33CAT3G	
SZ1SMB20AT3G	SZP6SMB18AT3G	SZ1SMB36CAT3G	
SZ1SMB22AT3G	SZP6SMB200AT3G	SZ1SMB40CAT3G	
SZ1SMB24AT3G	SZP6SMB20AT3G	SZ1SMB43CAT3G	
SZ1SMB26AT3G	SZP6SMB22AT3G	SZ1SMB45CAT3G	
SZ1SMB28AT3G	SZP6SMB24AT3G	SZ1SMB48CAT3G	
SZ1SMB30AT3G	SZP6SMB27AT3G	SZ1SMB51CAT3G	
SZ1SMB33AT3G	SZP6SMB30AT3G	SZ1SMB54CAT3G	
SZ1SMB36AT3G	SZP6SMB30SAT3G	SZ1SMB58CAT3G	
SZ1SMB40AT3G	SZP6SMB33AT3G	SZ1SMB60CAT3G	
SZ1SMB43AT3G	SZP6SMB36AT3G	SZ1SMB64CAT3G	
SZ1SMB45AT3G	SZP6SMB39AT3G	SZ1SMB75CAT3G	
SZ1SMB48AT3G	SZP6SMB43AT3G	SZP6SMB11CAT3G	
SZ1SMB5.0AT3G	SZP6SMB47AT3G	SZP6SMB12CAT3G	
SZ1SMB51AT3G	SZP6SMB51AT3G	SZP6SMB15CAT3G	
SZ1SMB54AT3G	SZP6SMB56AT3G	SZP6SMB16CAT3G	
SZ1SMB58AT3G	SZP6SMB6.8AT3G	SZP6SMB18CAT3G	
SZ1SMB6.0AT3G	SZP6SMB62AT3G	SZP6SMB20CAT3G	
SZ1SMB6.5AT3G	SZP6SMB68AT3G	SZP6SMB22CAT3G	
SZ1SMB60AT3G	SZP6SMB7.5AT3G	SZP6SMB24CAT3G	
SZ1SMB64AT3G	SZP6SMB75AT3G	SZP6SMB27CAT3G	
SZ1SMB7.0AT3G	SZP6SMB8.2AT3G	SZP6SMB30CAT3G	
SZ1SMB7.5AT3G	SZP6SMB82AT3G	SZP6SMB33CAT3G	
SZ1SMB70AT3G	SZP6SMB9.1AT3G	SZP6SMB36CAT3G	
SZ1SMB75AT3G	SZP6SMB91AT3G	SZP6SMB39CAT3G	
SZ1SMB8.0AT3G	SC1SMB5.0AT3G	SZP6SMB43CAT3G	
SZ1SMB100AT3G	SZ1SMB8.5AT3G	SZ1SMB10CAT3G	
SZ1SMB10AT3G	SZ1SMB85AT3G	SZ1SMB11CAT3G	
SZ1SMB110AT3G	SZ1SMB9.0AT3G	SZ1SMB12CAT3G	
SZ1SMB11AT3G	SZ1SMB90AT3G	SZ1SMB13CAT3G	
SZ1SMB120AT3G	SCP6SMB68AT3G	SZ1SMB14CAT3G	
SZ1SMB12AT3G	SZP6SMB100AT3G	SZ1SMB15CAT3G	
SZ1SMB130AT3G	SZP6SMB10AT3G	SZ1SMB16CAT3G	
SZ1SMB13AT3G	SZP6SMB120AT3G	SZ1SMB17CAT3G	
SZ1SMB14AT3G	SZP6SMB12AT3G	SZ1SMB18CAT3G	
SZ1SMB150AT3G	SZP6SMB130AT3G	SZ1SMB20CAT3G	

SZ1SMB15AT3G	SZP6SMB13AT3G	SZ1SMB22CAT3G
SZ1SMB160AT3G	SZP6SMB150AT3G	SZ1SMB24CAT3G
SZ1SMB16AT3G	SZP6SMB15AT3G	SZ1SMB26CAT3G
SZ1SMB170AT3G	SZP6SMB160AT3G	SZ1SMB28CAT3G
SZ1SMB17AT3G	SZP6SMB16AT3G	SZ1SMB30CAT3G
SZ1SMB18AT3G	SZP6SMB180AT3G	SZ1SMB33CAT3G
SZ1SMB20AT3G	SZP6SMB18AT3G	SZ1SMB36CAT3G
SZ1SMB22AT3G	SZP6SMB200AT3G	SZ1SMB40CAT3G
SZ1SMB24AT3G	SZP6SMB20AT3G	SZ1SMB43CAT3G
SZ1SMB26AT3G	SZP6SMB22AT3G	SZ1SMB45CAT3G
SZ1SMB28AT3G	SZP6SMB24AT3G	SZ1SMB48CAT3G
SZ1SMB30AT3G	SZP6SMB27AT3G	SZ1SMB51CAT3G
SZ1SMB33AT3G	SZP6SMB30AT3G	SZ1SMB54CAT3G
SZ1SMB36AT3G	SZP6SMB30SAT3G	SZ1SMB58CAT3G
SZ1SMB40AT3G	SZP6SMB33AT3G	SZ1SMB60CAT3G
SZ1SMB43AT3G	SZP6SMB36AT3G	SZ1SMB64CAT3G
SZ1SMB45AT3G	SZP6SMB39AT3G	SZ1SMB75CAT3G
SZ1SMB48AT3G	SZP6SMB43AT3G	SZP6SMB11CAT3G
SZ1SMB5.0AT3G	SZP6SMB47AT3G	SZP6SMB12CAT3G
SZ1SMB51AT3G	SZP6SMB51AT3G	SZP6SMB15CAT3G
SZ1SMB54AT3G	SZP6SMB56AT3G	SZP6SMB16CAT3G
SZ1SMB58AT3G	SZP6SMB6.8AT3G	SZP6SMB18CAT3G
SZ1SMB6.0AT3G	SZP6SMB62AT3G	SZP6SMB20CAT3G
SZ1SMB6.5AT3G	SZP6SMB68AT3G	SZP6SMB22CAT3G
SZ1SMB60AT3G	SZP6SMB7.5AT3G	SZP6SMB24CAT3G
SZ1SMB64AT3G	SZP6SMB75AT3G	SZP6SMB27CAT3G
SZ1SMB7.0AT3G	SZP6SMB8.2AT3G	SZP6SMB30CAT3G
SZ1SMB7.5AT3G	SZP6SMB82AT3G	SZP6SMB33CAT3G
SZ1SMB70AT3G	SZP6SMB9.1AT3G	SZP6SMB36CAT3G
SZ1SMB75AT3G	SZP6SMB91AT3G	SZP6SMB39CAT3G
SZ1SMB8.0AT3G	SC1SMB5.0AT3G	SZP6SMB43CAT3G

Automotive TVS in SMF(SOD123)

Material

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

PCN Report

Prepared By : Haipeng Xu, Senior Product Engineer
Date : Apr. 30th, 2018
Products : Automotive TVS in SMB(DO214AA) package acquired from ON Semiconductor
Revision : A

1.0 Objective:

This report covers manufacturing site transfer activities of automotive TVS of SMB(DO214AA) package acquired from ON Semiconductor. Site transfer includes fab manufacturing, backend assembly, final test and packaging operations.

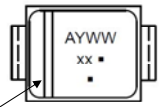
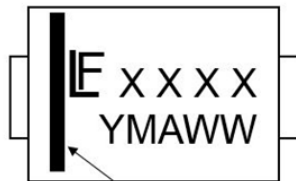
2.0 Affected Devices:

Automotive TVS components acquired from ON Semiconductor in package of SMB(DO214AA). Please see the attached Appendix I for a full list of affected part numbers.

3.0 Physical Differences/Changes:

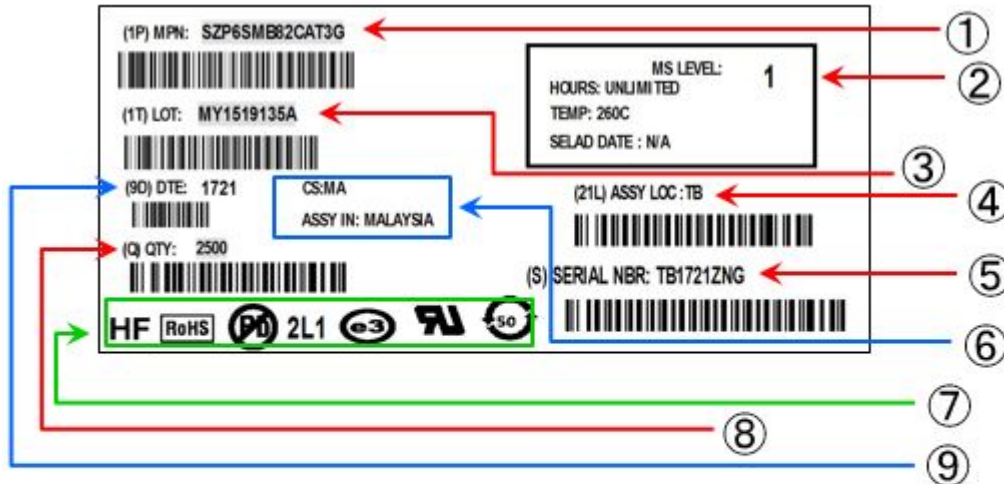
3.1 Marking diagram format change

Marking diagram has been changed to optimize the component traceability.

Package	ON Semi Marking [OLD]	Littelfuse Marking [NEW]	Modification Items
SMB (DO214AA)	 <p>POLARITY INDICATOR OPTIONAL AS NEEDED</p> <p> A = Assembly Location Y = Year WW = Work Week xx = Device Code (Refer to page 3) ▪ = Pb-Free Package (Note: Microdot may be in either location) </p>	 <p>POLARITY INDICATOR OPTIONAL AS NEEDED</p> <p> XXXX = Device Code(Max four digits) Y = Year M = Month A = Assembly Location WW = Lot Code </p>	<ol style="list-style-type: none"> 1.Add Littelfuse logo 2.Optimize trace code for better traceability 3.Remove Pb-free dot 4.Change polarity band quantity from three to one

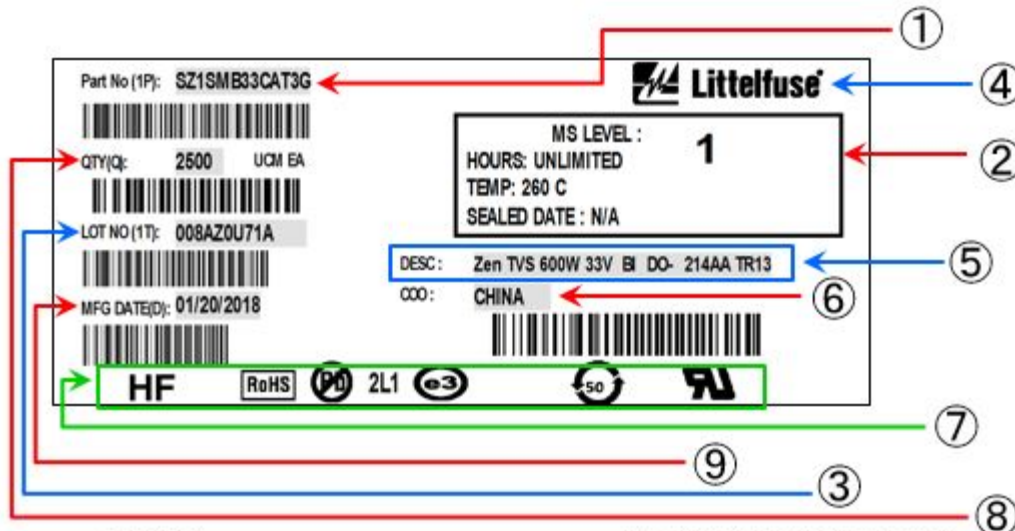
3.2 Label format change

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



Expertise Applied | Answers Delivered

4.0 Qualification Test Items and Result Summary:

Discrete Semiconductor Component Qualification Result						Rev.D	April 27, 2018	
General Specification: AEC-Q101 Rev D Supplier: Littelfuse, Inc Supplier Generic P/N: SZ1SMBxxAT3G, SZ1SMBxxCAT3G SZP6SMBxxAT3G, SZP6SMBxxCAT3G Supplier Internal P/N: SZ1SMBxxAT3G, SZ1SMBxxCAT3G SZP6SMBxxAT3G, SZP6SMBxxCAT3G Requested PPAP submission date: TBD Reason for qual: Manufacturing site change for TVS acquired from ON Semi								
Supplier Manufacturing Site: Wuxi, Jiangsu, China Package Type: SMB Family Type: Zener								
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	106385&106386&106387&106388&106395&106407	JA113	36	80	0/2880	Performed prior to UHAST, TC, IOL, H3TRB
3	External Visual	Per AEC-Q101		ML750-2071	all	all	0/all	
4	Parametric Verification	Electrical Characterization @ -65°C, 25°C & 150°C	106390&106391&106392&106393	Individual AEC user specification	10	30	0/300	
5	High Temperature Reverse Bias	Tj=150°C, 1,008hr, biased at VR	106385&106386&106387&106388	ML-STD-750-1 M1038 Method A	10	80	0/800	
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	106385&106386&106387&106388	JA104	10	80	0/800	
8	Unbiased Highly Accelerated Stress Test	96 hours at TA=130°C/85%RH.	106385&106386&106387&106388	JA118	10	80	0/800	
9	High Humidity High Temp. Reverse Bias	TA: 85°C, RH: 85%, 1000hr, Reverse biased at VR or max 100V	106385&106386&106387&106388	JA101	10	80	0/800	
10	Intermittent Operational Life	TA:25°C, ΔTj: 100°C, TON/OFF: 2 minutes, 15,000cycles	106395&106407	ML-STD-750 Method 1037	6	80	0/480	
11	ESD Characterization	HBM:16KV,MM:1.6KV,IEC61000-4-2:30KV	106385&106386&106387&106388&109733&109735&109736&109739	CDF-AEC Q101-001 & 002	10	90	0/900	HBM :3B IEC-61000-4-2 ≥ 30KV MM :M4
12	Destructive Physical Analysis	Per AEC-Q101		AEC-Q101-004	3	2	0/6	Samples from passed H3TRB and TC
13	Physical Dimension	Per JEDEC SOD123 package dimension		JB-100	3	30	0/90	Per Datasheet Spec
14	Terminal Strength	Per AEC-Q101	N/A	ML750-2006				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	106385&106386&106387&106388	JB-106-A	10	30	0/300	
21	Solderability	Per AEC-Q101	106385&106386&106387&106388	J-STD002	10	15	0/150	
22	Thermal Resistance	Per AEC-Q101	106416&106417	JESD-24-3, 24-4, 24-6 as appropriate	5	15	0/75	Per Datasheet Spec
23	Wire Bond Strength	Per AEC-Q101	N/A	ML750, 2037				wire bond only
24	Bond Shear		N/A					wire bond only
25	Die Shear	Per AEC-Q101	N/A	ML750, 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 Reliability	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	106390&106391&106392&106393	Individual AEC user specification	10	15	0/150	
31	Surge Life(10*1000us)	10*1000us waveform,50hits	106390&106391&106392&106393	Individual AEC user specification	10	10	0/300	
32	Surge Out(10*1000)	10*1000us waveform,25°C,85°C and 150°C	106390&106391&106392&106393&108971&108972&108973&108974	Individual AEC user specification	10	30	0/300	
33	High Temperature Storage Life	TA=150°C, 1008hours	106385&106386&106387&106388	JA103	10	80	0/800	
All samples passed all requested test items by AEC-Q101 Rev.D successfully.								



Expertise Applied | Answers Delivered

5.0 Recommendations & Conclusions:

Based on above qualification test results, Littelfuse judged that manufacturing site transfer activities of SMB(DO214AA) package have been completed and TVS components in SMB(DO214AA) package are successfully qualified by AEC-Q101 tests.

Littelfuse released new manufacturing site to production for automotive TVS of SMB(DO214AA) package.

6.0 Approvals:

Haipeng Xu
Senior Product Engineer
Littelfuse, Inc.

Sewall Wang
Product Engineering Manager
Littelfuse, Inc

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

SZ1SMB100AT3G	SZ1SMB8.5AT3G	SZ1SMB10CAT3G	SZP6SMB47CAT3G
SZ1SMB10AT3G	SZ1SMB85AT3G	SZ1SMB11CAT3G	SZP6SMB51CAT3G
SZ1SMB110AT3G	SZ1SMB9.0AT3G	SZ1SMB12CAT3G	SZP6SMB56CAT3G
SZ1SMB11AT3G	SZ1SMB90AT3G	SZ1SMB13CAT3G	SZP6SMB62CAT3G
SZ1SMB120AT3G	SCP6SMB68AT3G	SZ1SMB14CAT3G	SZP6SMB68CAT3G
SZ1SMB12AT3G	SZP6SMB100AT3G	SZ1SMB15CAT3G	SZP6SMB82CAT3G
SZ1SMB130AT3G	SZP6SMB10AT3G	SZ1SMB16CAT3G	
SZ1SMB13AT3G	SZP6SMB120AT3G	SZ1SMB17CAT3G	
SZ1SMB14AT3G	SZP6SMB12AT3G	SZ1SMB18CAT3G	
SZ1SMB150AT3G	SZP6SMB130AT3G	SZ1SMB20CAT3G	
SZ1SMB15AT3G	SZP6SMB13AT3G	SZ1SMB22CAT3G	
SZ1SMB160AT3G	SZP6SMB150AT3G	SZ1SMB24CAT3G	
SZ1SMB16AT3G	SZP6SMB15AT3G	SZ1SMB26CAT3G	
SZ1SMB170AT3G	SZP6SMB160AT3G	SZ1SMB28CAT3G	
SZ1SMB17AT3G	SZP6SMB16AT3G	SZ1SMB30CAT3G	
SZ1SMB18AT3G	SZP6SMB180AT3G	SZ1SMB33CAT3G	
SZ1SMB20AT3G	SZP6SMB18AT3G	SZ1SMB36CAT3G	
SZ1SMB22AT3G	SZP6SMB200AT3G	SZ1SMB40CAT3G	
SZ1SMB24AT3G	SZP6SMB20AT3G	SZ1SMB43CAT3G	
SZ1SMB26AT3G	SZP6SMB22AT3G	SZ1SMB45CAT3G	
SZ1SMB28AT3G	SZP6SMB24AT3G	SZ1SMB48CAT3G	
SZ1SMB30AT3G	SZP6SMB27AT3G	SZ1SMB51CAT3G	
SZ1SMB33AT3G	SZP6SMB30AT3G	SZ1SMB54CAT3G	
SZ1SMB36AT3G	SZP6SMB30SAT3G	SZ1SMB58CAT3G	
SZ1SMB40AT3G	SZP6SMB33AT3G	SZ1SMB60CAT3G	
SZ1SMB43AT3G	SZP6SMB36AT3G	SZ1SMB64CAT3G	
SZ1SMB45AT3G	SZP6SMB39AT3G	SZ1SMB75CAT3G	
SZ1SMB48AT3G	SZP6SMB43AT3G	SZP6SMB11CAT3G	
SZ1SMB5.0AT3G	SZP6SMB47AT3G	SZP6SMB12CAT3G	
SZ1SMB51AT3G	SZP6SMB51AT3G	SZP6SMB15CAT3G	
SZ1SMB54AT3G	SZP6SMB56AT3G	SZP6SMB16CAT3G	
SZ1SMB58AT3G	SZP6SMB6.8AT3G	SZP6SMB18CAT3G	
SZ1SMB6.0AT3G	SZP6SMB62AT3G	SZP6SMB20CAT3G	
SZ1SMB6.5AT3G	SZP6SMB68AT3G	SZP6SMB22CAT3G	
SZ1SMB60AT3G	SZP6SMB7.5AT3G	SZP6SMB24CAT3G	
SZ1SMB64AT3G	SZP6SMB75AT3G	SZP6SMB27CAT3G	
SZ1SMB7.0AT3G	SZP6SMB8.2AT3G	SZP6SMB30CAT3G	
SZ1SMB7.5AT3G	SZP6SMB82AT3G	SZP6SMB33CAT3G	
SZ1SMB70AT3G	SZP6SMB9.1AT3G	SZP6SMB36CAT3G	
SZ1SMB75AT3G	SZP6SMB91AT3G	SZP6SMB39CAT3G	
SZ1SMB8.0AT3G	SC1SMB5.0AT3G	SZP6SMB43CAT3G	

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



Expertise Applied | Answers Delivered

SZ1SMB100AT3G	SZ1SMB8.5AT3G	SZ1SMB10CAT3G	SZP6SMB47CAT3G
SZ1SMB10AT3G	SZ1SMB85AT3G	SZ1SMB11CAT3G	SZP6SMB51CAT3G
SZ1SMB110AT3G	SZ1SMB9.0AT3G	SZ1SMB12CAT3G	SZP6SMB56CAT3G
SZ1SMB11AT3G	SZ1SMB90AT3G	SZ1SMB13CAT3G	SZP6SMB62CAT3G
SZ1SMB120AT3G	SCP6SMB68AT3G	SZ1SMB14CAT3G	SZP6SMB68CAT3G
SZ1SMB12AT3G	SZP6SMB100AT3G	SZ1SMB15CAT3G	SZP6SMB82CAT3G
SZ1SMB130AT3G	SZP6SMB10AT3G	SZ1SMB16CAT3G	SZ2887AT3G
SZ1SMB13AT3G	SZP6SMB120AT3G	SZ1SMB17CAT3G	SZ2985AT3G
SZ1SMB14AT3G	SZP6SMB12AT3G	SZ1SMB18CAT3G	
SZ1SMB150AT3G	SZP6SMB130AT3G	SZ1SMB20CAT3G	
SZ1SMB15AT3G	SZP6SMB13AT3G	SZ1SMB22CAT3G	
SZ1SMB160AT3G	SZP6SMB150AT3G	SZ1SMB24CAT3G	
SZ1SMB16AT3G	SZP6SMB15AT3G	SZ1SMB26CAT3G	
SZ1SMB170AT3G	SZP6SMB160AT3G	SZ1SMB28CAT3G	
SZ1SMB17AT3G	SZP6SMB16AT3G	SZ1SMB30CAT3G	
SZ1SMB18AT3G	SZP6SMB180AT3G	SZ1SMB33CAT3G	
SZ1SMB20AT3G	SZP6SMB18AT3G	SZ1SMB36CAT3G	
SZ1SMB22AT3G	SZP6SMB200AT3G	SZ1SMB40CAT3G	
SZ1SMB24AT3G	SZP6SMB20AT3G	SZ1SMB43CAT3G	
SZ1SMB26AT3G	SZP6SMB22AT3G	SZ1SMB45CAT3G	
SZ1SMB28AT3G	SZP6SMB24AT3G	SZ1SMB48CAT3G	
SZ1SMB30AT3G	SZP6SMB27AT3G	SZ1SMB51CAT3G	
SZ1SMB33AT3G	SZP6SMB30AT3G	SZ1SMB54CAT3G	
SZ1SMB36AT3G	SZP6SMB30SAT3G	SZ1SMB58CAT3G	
SZ1SMB40AT3G	SZP6SMB33AT3G	SZ1SMB60CAT3G	
SZ1SMB43AT3G	SZP6SMB36AT3G	SZ1SMB64CAT3G	
SZ1SMB45AT3G	SZP6SMB39AT3G	SZ1SMB75CAT3G	
SZ1SMB48AT3G	SZP6SMB43AT3G	SZP6SMB11CAT3G	
SZ1SMB5.0AT3G	SZP6SMB47AT3G	SZP6SMB12CAT3G	
SZ1SMB51AT3G	SZP6SMB51AT3G	SZP6SMB15CAT3G	
SZ1SMB54AT3G	SZP6SMB56AT3G	SZP6SMB16CAT3G	
SZ1SMB58AT3G	SZP6SMB6.8AT3G	SZP6SMB18CAT3G	
SZ1SMB6.0AT3G	SZP6SMB62AT3G	SZP6SMB20CAT3G	
SZ1SMB6.5AT3G	SZP6SMB68AT3G	SZP6SMB22CAT3G	
SZ1SMB60AT3G	SZP6SMB7.5AT3G	SZP6SMB24CAT3G	
SZ1SMB64AT3G	SZP6SMB75AT3G	SZP6SMB27CAT3G	
SZ1SMB7.0AT3G	SZP6SMB8.2AT3G	SZP6SMB30CAT3G	
SZ1SMB7.5AT3G	SZP6SMB82AT3G	SZP6SMB33CAT3G	
SZ1SMB70AT3G	SZP6SMB9.1AT3G	SZP6SMB36CAT3G	
SZ1SMB75AT3G	SZP6SMB91AT3G	SZP6SMB39CAT3G	
SZ1SMB8.0AT3G	SC1SMB5.0AT3G	SZP6SMB43CAT3G	

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.

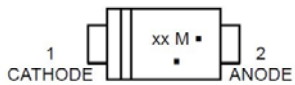

2.0 Affected Devices:

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:

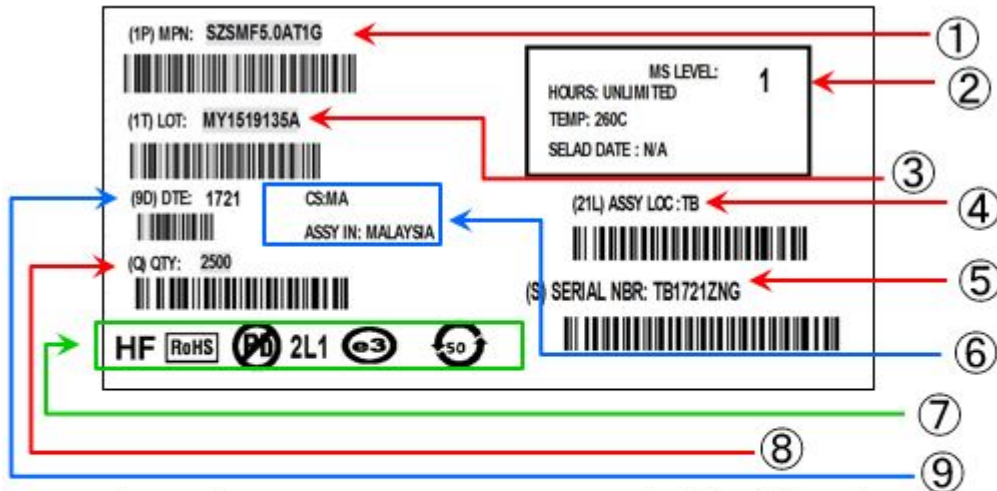
3.1 Marking diagram format change

Marking diagram has been changed to optimize the component traceability.

Package	ON Semi Marking [OLD]	Littelfuse Marking [NEW]	Modification Items
SMF (SOD123)	<p style="text-align: center;">MARKING DIAGRAM</p>  <p>xx = Device Code (Refer to page 3) M = Date Code ■ = Pb-Free Package</p>	 <p>XX = Device Code Y = Year M = Month A = Assembly Location WW = Lot Code</p>	<ol style="list-style-type: none"> 1. Optimize trace code for better traceability 2. Remove Pb-free dot 3. Change polarity band quantity from three to one

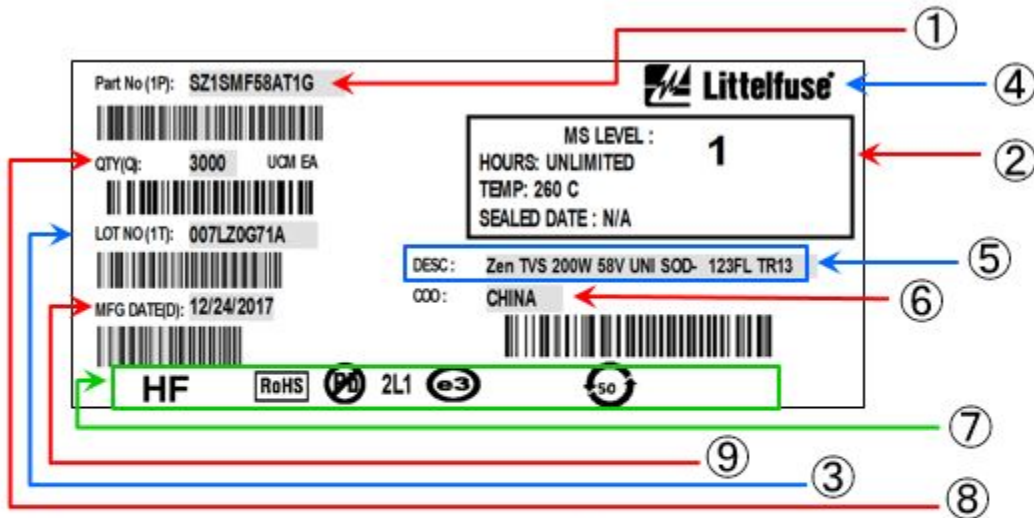
3.2 Label format change

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:



Expertise Applied | Answers Delivered

Discrete Semiconductor Component 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 Reason for qual: Manufacturing site change for TVS acquired from ON Semi								
			Supplier Manufacturing Site: Wuxi, Jiangsu, China Package Type: SMF (SOD123-FL) Family Type: Zener					
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		ML750-2071	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 Temperature Reverse Bias	Tj=150°C, 1,008hr, biased at VR	106412&106413	ML-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, ΔT:≥ 100°C, TON/OFF: 2 minutes, 15,000cycles	106408&108170&108171	ML-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 JEDEC SOD123 package dimension	108815&108816	JB-100	2	30	0/60	Per Datasheet Spec
14	Terminal Strength	Per AEC-Q101	N/A	ML750-2006				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	ML750, 2037				wire bond only
24	Bond Shear		N/A					wire bond only
25	Die Shear	Per AEC-Q101	N/A	ML750, 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 Reliability	Per AEC-Q101	N/A					For smart power parts only
29	Lead Free	Per AEC-Q101	N/A	AEC-Q005				
30	Capitance	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.



Expertise Applied | Answers Delivered

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

6.0 Approvals:

Haipeng Xu
Senior Product Engineer
Littelfuse, Inc.

Sewall Wang
Product Engineering Manager
Littelfuse,

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



Expertise Applied | Answers Delivered

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