

# PCN Report

**Prepared By** : Haipeng Xu, Senior Product Engineer  
**Date** : Mar 16<sup>th</sup>, 2018  
**Products** : Automotive TVS in SMC package acquired from ON Semiconductor  
**Revision** : A

## 1.0 Objective:

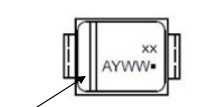

This report covers manufacturing size transfer activities of automotive TVS of SMC package acquired from ON Semiconductor. Site transfer includes fab manufacturing, backend assembly, final test and packaging operations.

## 2.0 Affected Devices:

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

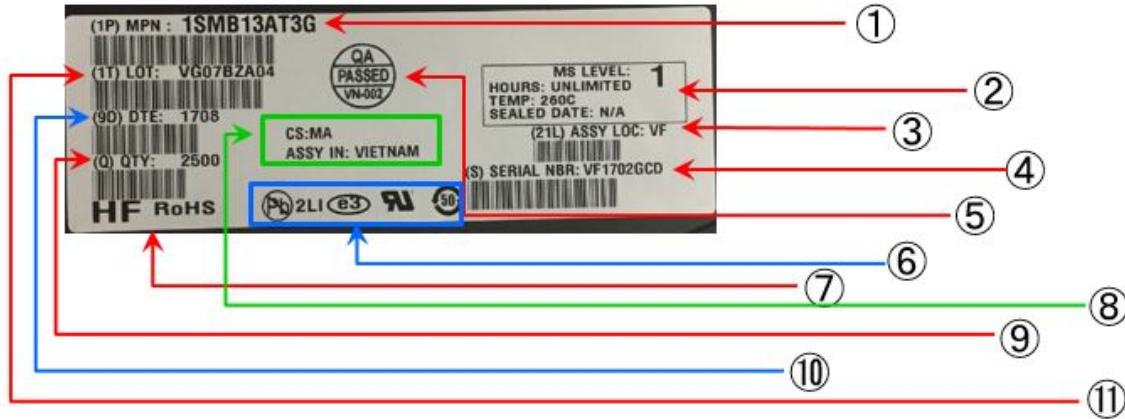
## 3.0 Physical Differences/Changes:

### 3.1 Marking diagram format change

Package	ON Semi Marking [OLD]	Littelfuse Marking [NEW]	Modification Items
SMC	<p style="text-align: center;"><b>MARKING DIAGRAM</b></p>  <p style="text-align: center;"><small>POLARITY INDICATOR OPTIOANL AS NEEDED</small></p> <p>           xx = Device Code (Refer to page 3)            A = Assembly Location            Y = Year            WW = Work Week            • = Pb-Free Package         </p>	 <p style="text-align: center;"><small>POLARITY INDICATOR OPTIONAL AS NEEDED</small></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"> <li>1.Add Littelfuse logo</li> <li>2.Optimize trace code for better traceability</li> <li>3.Remove Pb-free dot</li> <li>4.Change polarity band quantity from three to one</li> </ol>

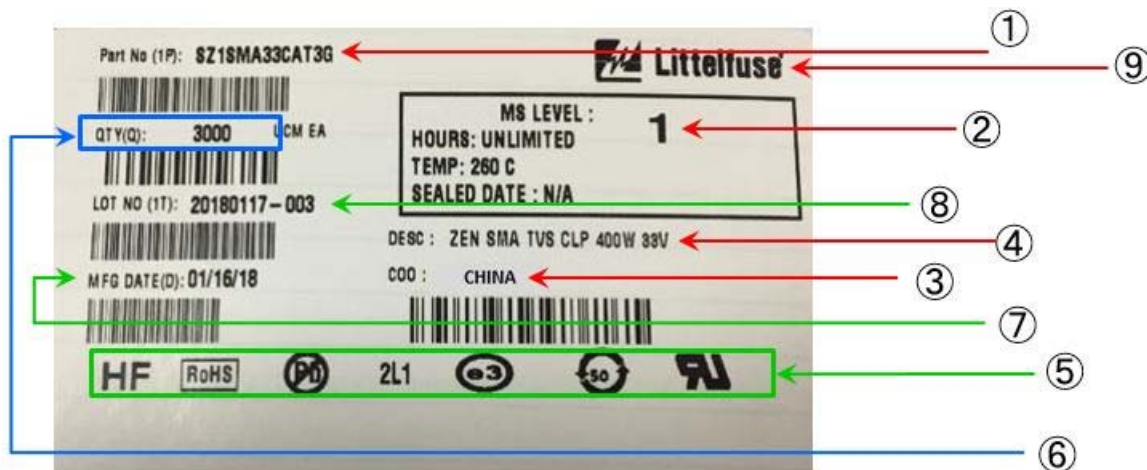
### 3.2 Label format change

#### a. ON Semiconductor's label [OLD]



- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>▪ Legend:</li> <li>▪ 1. Part number</li> <li>▪ 2. MSL Level</li> <li>▪ 3. Assembly site</li> <li>▪ 4. ON Serial Number</li> <li>▪ 5. QA passed mark</li> <li>▪ 6. Pb and UL symbol</li> </ul> | <ul style="list-style-type: none"> <li>▪ 7. RoHS Compliance and HF symbol</li> <li>▪ 8. Assembly location</li> <li>▪ 9. Quantity</li> <li>▪ 10. Manufacturing date</li> <li>▪ 11. Lot number</li> </ul> |
|--|---|

#### b. Littelfuse's label [NEW]

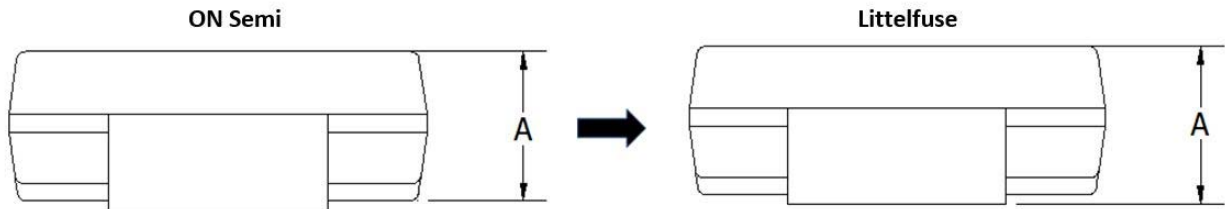


- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>▪ Legend:</li> <li>▪ 1. Part number</li> <li>▪ 2. MSL Level</li> <li>▪ 3. Assembly site</li> <li>▪ 4. Component description</li> <li>▪ 5. Environmental symbol</li> </ul> | <ul style="list-style-type: none"> <li>▪ 6. Quantity</li> <li>▪ 7. Manufacturing date</li> <li>▪ 8. Lot number</li> <li>▪ 9. Littelfuse Logo</li> </ul> |
|--|---|

#### 4.0 Dimension specification changes:

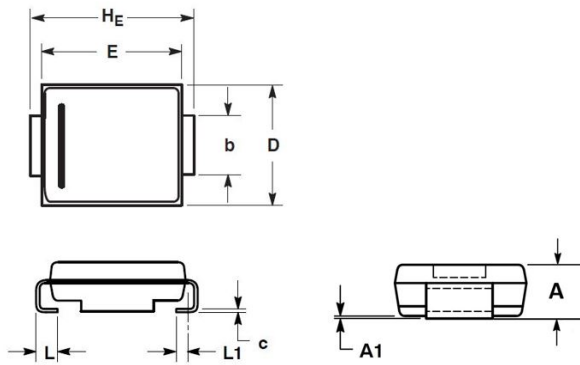
Slight changes have been proceeded for outline dimensions A, A1 and b and all new specifications are within JEDEC specifications.

4.1 Dimension A is changed from body height to total height to keep with JESDC standard.



4.2 DO214AB outline

--- Dimensions A, A1 and b are changed, other dimension specifications are no difference.



DIM	ON Semi(old)			Littelfuse(new)		
	MILLIMETERS			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
<b>A</b>	1.90	2.13	2.41	2.00	2.22	2.41
<b>A1</b>	0.05	0.10	0.15	0.05	0.10	0.20
<b>b</b>	2.92	3.00	3.07	2.92	3.00	3.18
<b>c</b>	0.15	0.23	0.30	0.15	0.23	0.30
<b>D</b>	5.59	5.84	6.10	5.59	5.84	6.10
<b>E</b>	6.60	6.86	7.11	6.60	6.86	7.11
<b>HE</b>	7.75	7.94	8.13	7.75	7.94	8.13
<b>L</b>	0.76	1.02	1.27	0.76	1.02	1.27
<b>L1</b>	0.51 REF			0.51 REF		



Expertise Applied | Answers Delivered

**5.0 Qualification Test Items and Result Summary:**

Discrete Semiconductor Component Qualification Result							Rev.A	March 15, 2018
General Specification: AEC-Q101 Rev D Supplier: Littelfuse, Inc Supplier Generic P/N: SZ1SMCxxAT3G and SZ1.5SMCxxAT3G Supplier Internal P/N: SZ1SMCxxAT3G and SZ1.5SMCxxAT3G 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: SMC			
					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		Datasheet spec	all	all	0/all	Before and after all test
2	Pre-conditioning	24hrs 125°C bake, 168hrs 85°C/85% humidity storage, 3 times Reflow	105555&105557	JA113	12	80	0/960	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	105556	Individual AEC user specification	3	30	0/90	
5	High Temperature Reverse Bias	Tj=150°C, 1,008hr, biased at VR	105555	MIL-STD-750-1 M1038 Method A	3	80	0/240	
6	High Temperature Gate Bias	Per AEC-Q101	N/A	JA108				
7	Temperature Cycling	TA: -65°C to +150°C, dwell time >15mins.	105555	JA104	3	80	0/240	
8	Unbiased Highly Accelerated Stress Test	96 hours at TA=130°C/85%RH.	105555	JA118	3	80	0/240	
9	High Humidity High Temp. Reverse Bias	TA: 85°C, RH: 85%, 1000hr, Reverse biased at VR or max 100V	105555	JA101	3	80	0/240	
10	Intermittent Operational Life	TA:25°C, ΔTjz 100°C, TON/OFF: 2 minutes, 15,000cycles	105557	MIL-STD-750 Method 1037	3	80	0/240	
11	ESD Characterization	HBM:16KV,MM:1.6KV,IEC61000-4-2: 30KV	105555	CDF-AEC Q101-001 & 002	3	90	0/270	HBM :3B IEC-61000-4-2 ≥ 30KV MM: M4
12	Destructive Physical Analysis	Per AEC-Q101	107929&109062&109063	AEC-Q101-004	3	2	0/6	Samples from passed H3TRB and TC
13	Physical Dimension	Per JEDEC SOD123 package dimension	105556	JB-100	3	30	0/90	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	260°C, 10 secs	105555	JB-106-A	3	30	0/90	
21	Solderability	245°C, 10 secs	105555	J-STD002	3	15	0/45	
22	Thermal Resistance	Typical Thermal Resistance Junction to Lead	105558	JESD-24-3, 24-4, 24-6 as appropriate	3	15	0/45	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 Reliability	Per AEC-Q101	N/A					For smart power parts only
29	Lead Free	Per AEC-Q101	N/A	AEC-Q005				Will provide separate whisker report once
30	Capacitance	Bias=1V,2V,5V, 10V,50%VR, 100%VR, 1MHz,Tj = 25°C	105556	Individual AEC user specification	3	15	0/45	
31	Surge Life(10*1000us)	10*1000us waveform,50hits	105556	Individual AEC user specification	3	10	0/30	
32	Surge Out(10*1000)	10*1000us waveform,25°C,85°C and 150°C	105556	Individual AEC user specification	3	30	0/90	each temp 10Pcs
32	High Temperature Storage Life	TA=150°C, 1008hours	105555	JA103	3	80	0/240	
<b>All samples passed all requested test items by AEC-Q101 Rev.D successfully.</b>								



Expertise Applied | Answers Delivered

**6.0 Recommendations & Conclusions:**

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

Littelfuse released new manufacturing site to production for automotive TVS of SMC package .

**7.0 Approvals:**

**Haipeng Xu**  
**Senior Product Engineer**  
**Littelfuse, Inc.**

**Sewall Wang**  
**Product Engineering Manager**  
**Littelfuse, Inc**

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



Expertise Applied | Answers Delivered

SZ1SMC10AT3G	SC1.5SMC62AT3G
SZ1SMC12AT3G	SZ1.5SMC10AT3G
SZ1SMC13AT3G	SZ1.5SMC12AT3G
SZ1SMC14AT3G	SZ1.5SMC13AT3G
SZ1SMC15AT3G	SZ1.5SMC15AT3G
SZ1SMC16AT3G	SZ1.5SMC16AT3G
SZ1SMC17AT3G	SZ1.5SMC18AT3G
SZ1SMC18AT3G	SZ1.5SMC20AT3G
SZ1SMC20AT3G	SZ1.5SMC22AT3G
SZ1SMC22AT3G	SZ1.5SMC24AT3G
SZ1SMC24AT3G	SZ1.5SMC27AT3G
SZ1SMC26AT3G	SZ1.5SMC30AT3G
SZ1SMC28AT3G	SZ1.5SMC33AT3G
SZ1SMC30AT3G	SZ1.5SMC36AT3G
SZ1SMC33AT3G	SZ1.5SMC39AT3G
SZ1SMC36AT3G	SZ1.5SMC43AT3G
SZ1SMC40AT3G	SZ1.5SMC47AT3G
SZ1SMC43AT3G	SZ1.5SMC51AT3G
SZ1SMC48AT3G	SZ1.5SMC56AT3G
SZ1SMC5.0AT3G	SZ1.5SMC6.8AT3G
SZ1SMC51AT3G	SZ1.5SMC62AT3G
SZ1SMC54AT3G	SZ1.5SMC68AT3G
SZ1SMC58AT3G	SZ1.5SMC7.5AT3G
SZ1SMC6.0AT3G	SZ1.5SMC75AT3G
SZ1SMC6.5AT3G	SZ1.5SMC82AT3G
SZ1SMC60AT3G	SZ1.5SMC91AT3G
SZ1SMC64AT3G	
SZ1SMC7.5AT3G	
SZ1SMC70AT3G	
SZ1SMC75AT3G	
SZ1SMC78AT3G	
SZ1SMC8.0AT3G	
SZ1SMC9.0AT3G	