

# PCN Report

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

## 1.0 Objective:

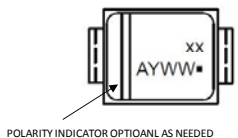
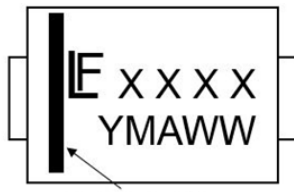
This report covers manufacturing size transfer activities of automotive TVS of SMA package acquired from ON Semiconductor. Site transfer includes fab manufacturing, backend assembly, final test and packaging operations.

## 2.0 Affected Devices:

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

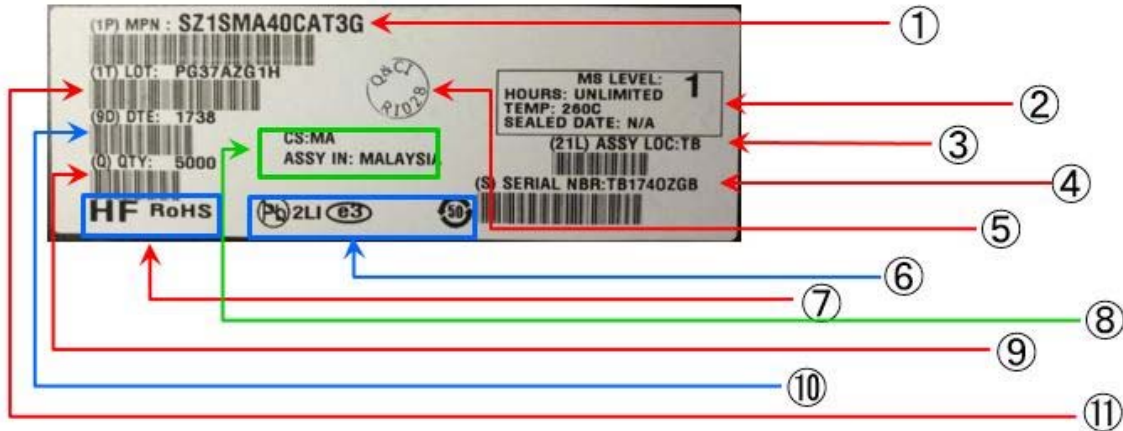
## 3.0 Physical Differences/Changes:

### 3.1 Marking diagram format change

Package	ON Semi Marking [OLD]	Littelfuse Marking [NEW]	Modification Items
SMA	 <p>           XX = Device Code            A = Assembly Location            Y = Year            WW = Work Week            ■ = Pb-Free Package         </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>

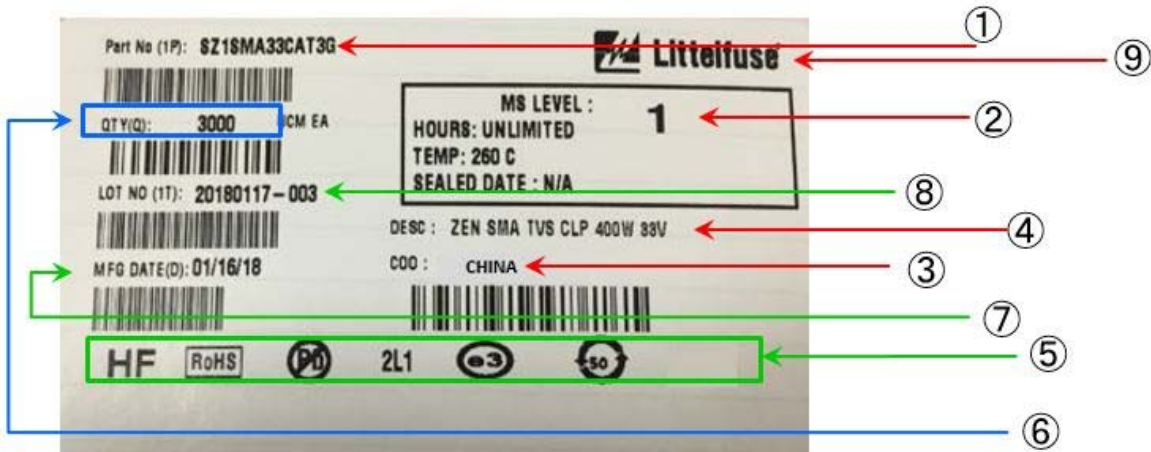
### 3.2 Label format change

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



- 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

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



- Legend:
- 1. Part number
- 2. MSL Level
- 3. Assembly site
- 4. Component description
- 5. Environmental symbol
- 6. Quantity
- 7. Manufacturing date
- 8. Lot number
- 9. Littelfuse Logo



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#### 4.0 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: SZ1SMAxxAT3G and SZ1SMAxxCAT3G Supplier Internal P/N: SZ1SMAxxAT3G and SZ1SMAxxCAT3G 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: SMA 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	105536&105538&105552 &105553&105806	JA113	27	80	0/2160	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	105539&105540&105807	Individual AEC user specification	7	30	0/210	
5	High Temperature Reverse Bias	Tj=150°C, 1,008hr, biased at VR	105536&105538&105806	MIL-STD-750-1 M1038 Method A	7	80	0/560	
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	105536&105538&105806	JA104	7	80	0/560	
8	Unbiased Highly Accelerated Stress Test	96 hours at TA=130°C/85%RH	105536&105538&105806	JA118	7	80	0/560	
9	High Humidity High Temp. Reverse Bias	TA: 85°C, RH: 85%, 1000hr, Reverse biased at VR or max 100V	105536&105538&105806	JA101	7	80	0/560	
10	Intermittent Operational Life	TA:25°C, ΔTj: 100°C, TON/OFF: 2 minutes, 15,000cycles	105552&105553	MIL-STD-750 Method 1037	6	80	0/480	
11	ESD Characterization	HBM:16KV,MM:1.6KV,IEC61000-4-2: 30KV	105536&105538&105806	CDF-AEC Q101-001 & 002	7	90	0/630	HBM :3B IEC-61000-4-2 ≥ 30KV MM : M4
12	Destructive Physical Analysis	Per AEC-Q101	108906&109059&109060	AEC-Q101-004	3	2	0/6	Samples from passed H3TRB and TC
13	Physical Dimension	Per JEDEC SOD123 package dimension	105539&105540&105807	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	105536&105538&105806	JB-106-A	7	30	0/210	
21	Solderability	245°C, 10 secs	105536&105538&105806	J-STD002	7	15	0/105	
22	Thermal Resistance	Typical Thermal Resistance Junction to Lead	105554	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	105539&105540&105807	Individual AEC user specification	7	15	0/105	
31	Surge Life(10*1000us)	10*1000us waveform,50hits	105539&105540&105807	Individual AEC user specification	7	10	0/70	
32	Surge Out(10*1000)	10*1000us waveform,25°C,85°C and 150°C	105539&105540&105807	Individual AEC user specification	7	30	0/210	each temp 10Pcs
33	High Temperature Storage Life	TA=150°C, 1008hours	105536&105538&105806	JA103	7	80	0/560	
All samples passed all requested test items by AEC-Q101 Rev.D successfully.								

#### 5.0 Recommendations & Conclusions:



Expertise Applied | Answers Delivered

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

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

**6.0 Approvals:**

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

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



Expertise Applied | Answers Delivered

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

SC1SMA12AT3G	SZ1SMA10CAT3G
SZ1SMA10AT3G	SZ1SMA12CAT3G
SZ1SMA11AT3G	SZ1SMA13CAT3G
SZ1SMA12AT3G	SZ1SMA15CAT3G
SZ1SMA13AT3G	SZ1SMA16CAT3G
SZ1SMA14AT3G	SZ1SMA18CAT3G
SZ1SMA15AT3G	SZ1SMA20CAT3G
SZ1SMA16AT3G	SZ1SMA24CAT3G
SZ1SMA17AT3G	SZ1SMA26CAT3G
SZ1SMA18AT3G	SZ1SMA28CAT3G
SZ1SMA20AT3G	SZ1SMA30CAT3G
SZ1SMA22AT3G	SZ1SMA33CAT3G
SZ1SMA24AT3G	SZ1SMA36CAT3G
SZ1SMA26AT3G	SZ1SMA40CAT3G
SZ1SMA28AT3G	SZ1SMA48CAT3G
SZ1SMA30AT3G	SZ1SMA58CAT3G
SZ1SMA33AT3G	SZ1SMA60CAT3G
SZ1SMA36AT3G	SZ1SMA70CAT3G
SZ1SMA40AT3G	SZ1SMA78CAT3G
SZ1SMA43AT3G	
SZ1SMA45AT3G	
SZ1SMA48AT3G	
SZ1SMA5.0AT3G	
SZ1SMA54AT3G	
SZ1SMA58AT3G	
SZ1SMA6.0AT3G	
SZ1SMA6.5AT3G	
SZ1SMA70AT3G	
SZ1SMA8.0AT3G	
SZ1SMA8.5AT3G	
SZ1SMA9.0AT3G	