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Littelfuse, Inc.
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May 17th, 2018

Littelfuse TVS STD DO-214AB Package Capacity Expansion Notification Letter

To: Our Valued Customers

In order to support growing demand, Littelfuse SBU (Semiconductor Business Unit) completed TVS STD DO-214AB package capacity expansion qualification. With this new capacity expansion line released, there will have more capacity to support growing demand of TVS STD DO-214AB package.

This DO-214AB package backend new line for capacity expansion is installed in Littelfuse Semiconductor Wuxi China, and is planned to have production since June 2018. As rolling change, please expect to receive products manufactured by either current line or new capacity expansion automation line.

The affected part numbers as attached excel file, have been fully qualified in accordance with established performance and reliability criteria. The next few pages summarize the qualification results for your reference please.

There are no changes on FIT, form, function and reliability of the finished product.

Form, fit, function, reliability changes: None

Part number changes: None

Effective date: June 2018 or sooner

Replacement products: N/A

Last time buy: N/A

This communication letter is for your information and acknowledgement. If you have any other questions or concerns, please contact your local sales team or product team below for further assistance.

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

Sincerely,

Jenny Chen
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Commercial TVS Products
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Jchen7@littelfuse.com

Littelfuse Semiconductor (Wuxi) Co., Ltd
 3# Zhen Fa 6 Road, Wuxi, JiangSu, China, 214142

Product Qualification Report

From: Zhihui Chen, Product Engineering, Littelfuse

Date: Apr 27th, 2018

Subject: **Qualification report for Littelfuse TVS STD DO-214AB capacity expansion project**

Backend capacity expansion Line Picture

Automation Assembly Process Flow



Purpose:

This report is to inform the successful TVS STD DO-214AB capacity expansion qualification test results.

1. Qualification Types (Test Vehicle)

Product Package	Product Series	Representative Test Sample Part Numbers	Assembly Location
DO-214AB	TVS	1.5SMC6.8A	Wuxi
		1.5SMC300CA	
		SMDJ6.0CA	
		1.5SMC170A	

2. Qualification Test Items and Result Summary

Test Category	Description	Sample P/N	Sample Qty	Littelfuse test Ref#	Contents/Conditions	Result Summary	
Parametric	Electrical Parameters	1.5SMC6.8A	207	106592	VBR, IR	100% meet published spec.	
		1.5SMC300CA	207	106592			
		1.5SMC170A	207	106592			
		SMDJ6.0CA	207	106592			
Surge out test	10*1000us Surge out Test	1.5SMC6.8A	10	106592	+/- 1 hit, at rated IPP	100% passing at Rated IPP	
		1.5SMC300CA	10	106592			
		1.5SMC170A	10	106592			
		SMDJ6.0CA	10	106592			
Reliability Test	Pre-condition (PC)	1.5SMC6.8A	80	106590	SMD qualification parts for TC,H3TRB	0 failure	
		1.5SMC300CA	80	106593			
		1.5SMC170A	80	106595			
		SMDJ6.0CA	80	106601			
	DC Blocking (HTRB)	DC Blocking (HTRB)	1.5SMC6.8A	77	106590	150°C, DC bias=100% of VR spec	0 failure at 1008hrs
			1.5SMC300CA	77	106593		
			1.5SMC170A	77	106595		
			SMDJ6.0CA	77	106601		
	RSH	RSH	1.5SMC6.8A	30	106590	260°C,10second	0 failure after RSH
			1.5SMC300CA	30	106593		
			1.5SMC170A	30	106595		
			SMDJ6.0CA	30	106601		
	Biased Temp & Humidity (H3TRB)	Biased Temp & Humidity (H3TRB)	1.5SMC6.8A	40	106590	85°C, 85%RH DC bias=100% of VR spec	0 failure at 1008hrs
			1.5SMC300CA	40	106593		
			1.5SMC170A	40	106595		
			SMDJ6.0CA	40	106601		
	Autoclave	Autoclave	1.5SMC6.8A	40	106590	TA=121°C , RH=100%,2atm	0 failure at 96hrs
			1.5SMC300CA	40	106593		
			1.5SMC170A	40	106595		
			SMDJ6.0CA	40	106601		
Temp Cycle	Temp Cycle	1.5SMC6.8A	40	106590	-55°C&150°C (air to air)	0 failure at 1008hrs	
		1.5SMC300CA	40	106593			
		1.5SMC170A	40	106595			
		SMDJ6.0CA	40	106601			

3. MTBF Calculation

Estimate of Failure Rate, MTBF, FITS for a Given Operation Temperature (**See note**)

Temp °C	% FR/khrs	MTBF (K)	FITS
30	0.00001	17490735	0.06
55	0.00011	947835	1.1
85	0.00204	49062	20.4
100	0.00749	13344	74.9
125	0.05278	1895	527.8
150	0.29514	339	2951.4

Note: The **Mean-Time-Between-Failure** (MTBF) in hours and the percent failure rate per 1000 hours (%FR/khr) are computed at a 60% confidence level using the chi square method and the Arrhenius derating model for various junction operating temperatures. For the calculations, a value of 1 eV was used for the activation energy.

4. Conclusion

According to the above qualification test results, Littelfuse concluded that TVS STD DO-214AB package capacity expansion project has been fully qualified and released to production.

AFFECTED MPN

SMCJ5.0
SMCJ5.0A
SMCJ5.0C
SMCJ5.0CA
SMCJ6.0
SMCJ6.0A
SMCJ6.0C
SMCJ6.0CA
SMCJ6.5
SMCJ6.5A
SMCJ6.5C
SMCJ6.5CA
SMCJ7.0
SMCJ7.0A
SMCJ7.0C
SMCJ7.0CA
SMCJ7.5
SMCJ7.5A
SMCJ7.5C
SMCJ7.5CA
SMCJ8.0
SMCJ8.0A
SMCJ8.0C
SMCJ8.0CA
SMCJ8.5
SMCJ8.5A
SMCJ8.5C
SMCJ8.5CA
SMCJ9.0
SMCJ9.0A
SMCJ9.0C
SMCJ9.0CA
SMCJ10
SMCJ10A
SMCJ10C
SMCJ10CA
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SMCJ11A
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SMCJ12A
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SMCJ13C
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SMCJ24CA
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SMCJ64
SMCJ64A
SMCJ64C
SMCJ64CA
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SMCJ70C
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SMCJ75A

SMCJ75C
SMCJ75CA
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SMCJ78C
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SMCJ85C
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SMCJ220CA
SMCJ250
SMCJ250A
SMCJ250C
SMCJ250CA
SMCJ36A-54T7
SMCJ36CA-54T7
SMCJ12CA-N
SMCJ36CA-N
SMCJ64CA-N
SMCJ78CA-N
SMCJ10A-GR-GT3
SMCJ10CA-GT3
SMCJ10CA-SA-GT3
SMCJ11CA-SA-GT3
SMCJ18CA-GT3
SMCJ18CA-SA-GT3
SMCJ24CA-GR-GT3
SMCJ26CA-SA-GT3
SMCJ40CA-SA-GT3
SMCJ43CA-SA-GT3
SMCJ5.0A-GT3
SMCJ5.0A-SA-GT3
SMCJ150CA-SA-GT3
SMCJ170CA-SA-GT3
SMCJ10A-GR-GT3R
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SMCJ10CA-SA-GT3R
SMCJ11CA-SA-GT3R
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SMCJ24CA-GR-GT3R
SMCJ26CA-SA-GT3R
SMCJ40CA-SA-GT3R
SMCJ43CA-SA-GT3R
SMCJ5.0A-GT3R
SMCJ5.0A-SA-GT3R
SMCJ6.0CA-23-TR71
SMCJ6.5A-23-TR71
SMCJ6.5CA-23-TR71
SMCJ7.0A-23-TR71

SMCJ7.0CA-23-TR71
SMCJ7.0CA-23-RG71
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SMCJ13A-23-TR71
SMCJ17CA-23-TR71
SMCJ17CA-23-RG71
SMCJ18A-23-RG71
SMCJ18A-23-TR71
SMCJ18CA-23-TR71
SMCJ20CA-23-TR71
SMCJ24A-23-TR71
SMCJ24CA-23-TR71
SMCJ30A-23-TR71
SMCJ40CA-23-TR71
SMCJ48A-23-TR71
SMCJ51CA-23-TR71
SMCJ54A-23-TR71
SMCJ60CA-23-RG71
SMCJ75CA-23-TR71
SMCJ85CA-23-TR71
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SMCJ64A-T7
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SMCJ24CAS-GR-GT7
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SMCJ64AS-GT7
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1.5SMC7.5C
1.5SMC7.5CA
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1.5SMC8.2A
1.5SMC8.2C
1.5SMC8.2CA
1.5SMC9.1
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1.5SMC9.1C
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1.5SMC10C
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1.5SMC11C
1.5SMC11CA

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SMDJ12C

SMDJ12CA
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SMDJ13A
SMDJ13C
SMDJ13CA
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SMDJ14A
SMDJ14C
SMDJ14CA
SMDJ15
SMDJ15A
SMDJ15C
SMDJ15CA
SMDJ15CA-G
SMDJ16
SMDJ16A
SMDJ16C
SMDJ16CA
SMDJ17
SMDJ17A
SMDJ17C
SMDJ17CA
SMDJ18
SMDJ18A
SMDJ18C
SMDJ18CA
SMDJ20
SMDJ20A
SMDJ20C
SMDJ20CA
SMDJ20CA-ZG
SMDJ22
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SMDJ22C
SMDJ22CA
SMDJ24
SMDJ24A
SMDJ24C
SMDJ24CA
SMDJ26
SMDJ26A
SMDJ26C
SMDJ26CA
SMDJ28
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SMDJ28C
SMDJ28CA

SMDJ30
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SMDJ45C
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SMDJ48A
SMDJ48C
SMDJ48CA
SMDJ51
SMDJ51A
SMDJ51C
SMDJ51CA
SMDJ54
SMDJ54A
SMDJ54C
SMDJ54CA
SMDJ58
SMDJ58A
SMDJ58C
SMDJ58CA
SMDJ60C
SMDJ60CA
SMDJ60
SMDJ60A
SMDJ64C
SMDJ64CA
SMDJ64

SMDJ64A
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SMDJ70A
SMDJ70C
SMDJ70CA
SMDJ70CA-N
SMDJ75
SMDJ75A
SMDJ75C
SMDJ75CA
SMDJ78C
SMDJ78CA
SMDJ78
SMDJ78A
SMDJ85
SMDJ85A
SMDJ85C
SMDJ85CA
SMDJ90
SMDJ90A
SMDJ90C
SMDJ90CA
SMDJ100
SMDJ100A
SMDJ100C
SMDJ100CA
SMDJ110
SMDJ110A
SMDJ110C
SMDJ110CA
SMDJ120
SMDJ120A
SMDJ120C
SMDJ120CA
SMDJ130
SMDJ130A
SMDJ130C
SMDJ130CA
SMDJ150
SMDJ150A
SMDJ160
SMDJ160A
SMDJ170
SMDJ170A
SMDJ5.0A-T7
SMDJ5.0CA-T7
SMDJ6.0A-T7

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SMDJ16A-T7
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SMDJ17A-T7
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SMDJ18A-T7
SMDJ18CA-T7
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SMDJ36CA-T7

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SMDJ54CA-T7
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SMDJ60A-T7
SMDJ64CA-T7
SMDJ64A-T7
SMDJ70A-T7
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SMDJ75A-T7
SMDJ75CA-T7
SMDJ78CA-T7
SMDJ78A-T7
SMDJ85A-T7
SMDJ85CA-T7
SMDJ90A-T7
SMDJ90CA-T7
SMDJ100A-T7
SMDJ100CA-T7
SMDJ110A-T7
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SMDJ160A-T7
SMDJ170A-T7
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3.0SMCJ15CA-GT3
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3.0SMCJ28CA-GR-GT3
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3.0SMCJ28CAS-GRGT7
3.0SMCJ30A-GT3
3.0SMCJ33A-GT3
3.0SMCJ33CA-GT3
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3.0SMCJ36CA-GT3
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3.0SMCJ43A-SA-GT3
3.0SMCJ43A-SA-GT7
3.0SMCJ43CA-SA-GT3
3.0SMCJ43CA-SA-GT7
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3.0SMCJ48A-SA-GT3
3.0SMCJ48CA-GR-GT3
3.0SMCJ48CA-SA-GT3
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3.0SMCJ5.0CA-GRGT3
3.0SMCJ60CA-GT3
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3.0SMCJ6.5A-GT3
3.0SMCJ70A-SA-GT3
3.0SMCJ70CA-SA-GT3

3.0SMCJ7.0CA-GT3
3.0SMCJ7.0CA-SAGT3
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3.0SMCJ75CA-GT3
3.0SMCJ78A-GT3
3.0SMCJ8.5CA-GRGT3
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