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Littelfuse, Inc.  
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July 1<sup>st</sup>, 2019

## **LFPCN #41288 - Littelfuse TVS 5.0SMDJ Process Upgrade**

To: Our Valued Customers

With continuous process and product quality improvement efforts, Littelfuse would like to notify you of that assembly process of 5.0SMDJ Series will be upgraded from manual assembly to more optimized auto die-bonded assembly to achieve quality and reliability improvement as well as productivity efficiency.

Please see the attached documentation for change details and affected part numbers.

All affected products have been fully qualified in accordance with established performance and reliability criteria. The attached pages summarize the qualification results. Full qualification data and/or samples will be available upon request.

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

**Form, fit, function, changes:** None  
**Part number changes:** None  
**Effective date:** Oct 1<sup>st</sup>, 2019 or sooner  
**Replacement products:** N/A  
**Last time buy:** N/A

This notification 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  
Assistant Product Manager  
Commercial TVS Products  
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## Product/Process Change Notice (PCN)

**PCN#:** LFPCN #41288    **Date:** July 1<sup>st</sup>, 2019

**Product Identification:**

5.0SMDJ Series

**Implementation Date for Change:**

Oct 1st, 2019

### Contact Information

**Name:** Jenny Chen

**Title:** Assistant Product Manager

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**Fax#:** N/A

**E-mail:** jchen7@littelfuse.com

### Category of Change:

- Assembly Process
- Data Sheet
- Technology
- Discontinuance/Obsolescence
- Equipment
- Manufacturing Site
- Raw Material
- Testing
- Fabrication Process
- Other: \_\_\_\_\_

### Description of Change:

Assembly process of 5.0SMDJ Series will be upgraded from manual assembly to more optimized auto die-bonded assembly to achieve quality and reliability improvement as well as productivity efficiency.

This change has been comprehensively evaluated and verified without fit or function impact.

All relevant details are included in the supplemental pages.

### Important Dates:

Qualification Samples Available: sample available upon request

Last Time Buy:

Final Qualification Data Available: July 1<sup>st</sup> 2019

Date of Final Product Shipment:

### Method of Distinguishing Changed Product

- Product Mark,
- Date Code, traceability data available upon request
- Other,

### Demonstrated or Anticipated Impact on Form, Fit, Function or Reliability:

N/A

### LF Qualification Plan/Results:

Littelfuse Qualification Report is Available

**Customer Acknowledgement of Receipt:** Littelfuse requests you acknowledge receipt of this PCN. In your acknowledgement, you can grant approval or request additional information. Littelfuse will assume the change is acceptable if no acknowledgement is received within 30 days of this notice. Lack of any additional response within 90 days of PCN issuance further constitutes acceptance of the change.

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 Wuxi, Jiangsu 214142

## Product Qualification Report

To: Those who may concern  
 From: Zihui Chen, Product Engineering, Littelfuse  
 Date: July 1<sup>st</sup>, 2019  
 Subject: **Qualification report for Littelfuse TVS 5.0SMDJ**

### Purpose:

This report is to inform the successful TVS 5.0SMDJ qualification test results

### 1. Qualification Types (Test Vehicle)

Product Package	Product Series	Representative Test Sample Part Numbers	Assembly Location
DO-214AB	TVS	5.0SMDJ16CA	Wuxi
		5.0SMDJ22A	
		5.0SMDJ58A	

### 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	5.0SMDJ16CA	207	99380	VBR, IR	100% meet published spec.
		5.0SMDJ22A	207	112886		
		5.0SMDJ58A	207	105032		
Surge out test	10*1000us Surge out Test	5.0SMDJ16CA	10	99380	+/- 1 hit, at rated IPP	100% passing at Rated IPP
		5.0SMDJ22A	10	112886		
		5.0SMDJ58A	10	105032		
Reliability Test	Pre-condition (PC)	5.0SMDJ16CA	120	99379	SMD qualification parts for TC, H3TRB	0 failure
		5.0SMDJ22A	120	112885		
		5.0SMDJ58A	120	105029		
	DC Blocking (HTRB)	5.0SMDJ16CA	77	99379	150°C, DC bias=100% of VR spec	0 failure at 1008hrs
		5.0SMDJ22A	77	112885		
		5.0SMDJ58A	77	105029		
	RSH	5.0SMDJ16CA	30	99379	260°C, 10second	0 failure after RSH
		5.0SMDJ22A	30	112885		
		5.0SMDJ58A	30	105029		

Reliability Test	Biased Temp & Humidity (H3TRB)	5.0SMDJ16CA	40	99379	85°C, 85%RH DC bias=100% of VR spec	0 failure at 1008hrs
		5.0SMDJ22A	40	112885		
		5.0SMDJ58A	40	105029		
	Autoclave	5.0SMDJ16CA	40	99379	TA=121°C, RH=100%,2atm	0 failure at 96hrs
		5.0SMDJ22A	40	112885		
		5.0SMDJ58A	40	105029		
	Temp Cycle	5.0SMDJ16CA	40	99379	-55°C&150°C (air to air)	0 failure at 1000cycle
		5.0SMDJ22A	40	112885		
		5.0SMDJ58A	40	105029		

### 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	13118051	0.08
55	0.00014	710876	1.4
85	0.00272	36797	27.2
100	0.00999	10008	99.9
125	0.07037	1421	703.3
150	0.39351	254	3935

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 DO-214AB 5.0SMDJ family parts have passed the reliability test at WTC Lab.