



Expertise Applied | Answers Delivered

Littelfuse, Inc.
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Jun 21st, 2021

RE: LFPCN 41393 – TVS STD SMF3.3 and SMF4.0 approval of wafer foundry location & wafer size change for productivity improvement

To: Our Valued Customers

Littelfuse would like to notify you of changing wafer foundry location and corresponding wafer size from 5-inch to 6-inch of TVS STD products listed below for productivity improvement. There will be no change to the fit, form, function, quality or reliability of the products.

All affected products have been fully qualified in accordance with established performance and reliability criteria. Please see the attached documentation for qualification results, change details and affected part numbers. Full qualification data and samples will be available upon request.

Affected Part Numbers		
SMF3.3	SMF3.3-A	SMF4.0

Form, fit, function changes: None
Part number changes: None
Effective date: Jan 1st, 2022 and rolling change
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 Marketing Manager
Commercial TVS Products
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PCN Report

Prepared By : Shirley Zhao-Foundry Operation Manager
Wilson Wu-Outsourced Product Engineer
Date : 6/17/2021
Device : SOD123-FL Package SMF3.3 SMF4.0
Revision : A

1.0 Objective:

The purpose of this project is to qualify an alternate foundry location and corresponding wafer size change from 5-inch to 6-inch for TVS STD products listed below. Succeeding pages summarize the physical, electrical and reliability test performed in qualification lots.

2.0 Applicable Devices:

Affected Part Numbers		
SMF3.3	SMF3.3-A	SMF4.0

3.0 Assembly, Process & Material Differences/Changes:

3.1 Assembly and Process Changes

	Current	Alternate
Foundry Location	150 Kinoko-cho, Ibara-shi, Okayama, Japan	6833 Kinoko-cho, Ibara-shi, Okayama, Japan
Wafer Size	5-inch	6-inch
Top Metallization	TiNiAg/TiAg	TiAg

There are no other significant changes in the assembly and process method.

3.2 Material Changes

No change of BOM

4.0 Packing Method

There will be no changes in the packing method.

5.0 Physical Differences/Changes:

There is no change in mechanical specification or package outline dimension (POD).



6.0 Reliability Test Results Summary:

Test Items	Condition	S/S	Results	ETR #
Pre-conditioning	JESD22-A113	240	0/240	ETR152832
DC Blocking(HTRB)	Bias = rated VR, Ta = 150°C or 125°C Duration = 1008 Hours	154	0/154	
Temperature Cycle	Ta = -55°C to +150°C Duration = 1000 Cycles	80	0/80	
Temperature/Humidity	Ta = 85°C, 85% RH Duration = 1008 Hours	80	0/80	
Unbiased Highly Accelerated Stress Test	Ta = 130°C, 85%RH, 2ATM Duration = 96 Hours	80	0/80	
Resistance to Solder Heat	260°C, 10 sec M-2031	60	0/60	
Moisture Sensitivity Level(MSL)	Per Jedec J-STD-020D Level 1	44	0/44	

Remark:

1. Tests are conducted without a bias condition unless otherwise stated.
2. Reliability data from product tests that is representative of similar products having structural similarity, commonality of production processes and product technology will be generically applied to those products.
3. Tests are conducted on **SMF3.3 and SMF4.0**.

Estimate of Failure Rate, MTBF, FITS for a Given Operation Temperature

Temp °C	% FR/khrs	MTBF (K)	FITS
30	0.00002279	4387687.18	0.23
60	0.00071569	139725.04	7.16
80	0.00514527	19435.34	51.45
100	0.02994058	3339.95	299.41
125	0.21099443	473.95	2109.94
150	1.18054361	84.71	11805.44

4. 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.

7.0 Electrical Characteristic Summary:

There is no change in electrical characteristics.

Test Items	Condition	S/S	Results	ETR #
Parametric	V_{BR} , I_R	20	0/20	ETR152837
VF	Datasheet condition	20	0/20	
Surge Out test	1 hit, at 25°C from rated IPP, 0.1 IPP step	20	0/20	
Surge Life test	1 hit, 30 hits, 1.0IPP	20	0/20	



8.0 Changed Part Identification:

There is no Part used in affected products.

9.0 Recommendations & Conclusions:

Based on the test results, it is determined that the alternative foundry location is qualified and certified for production of all Littelfuse SMF3.3 and SMF4.0 products.

10.0 Approvals:

Shirley Zhao
Foundry Operation Manager
Littelfuse, Shanghai

Peter Liu
Asia OSAT Product Engineering Manager
Littelfuse, Wuxi