



Expertise Applied | Answers Delivered

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Suite 500
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www.littelfuse.com

Nov 28, 2023

Re: LFPCN41495 - Littelfuse SOD-123FL Package TPSMF4Lxx Auto TVS 1st assembly & test source transfer to new location and 2nd assembly & test source approval

To Our Valued Customers,

At present, there is only one existing assembly & test site (1st source) of SOD-123FL Package TPSMF4Lxx Series Auto TVS products. Due to government land use planning impact and to optimize manufacturing layout, Littelfuse will transfer this existing assembly & test site from current location to new location.

Meanwhile, to implement Business Continuous Plan (BCP), Littelfuse will approve 2nd assembly & test site in China for SOD-123FL Package TPSMF4Lxx Series.

Existing location of the 1st source assembly & test site will be no longer in any TPSMF4Lxx production till end of Mar, 2024.

There will be no change to the form, fit, function, quality, or reliability of the products.

All affected products have been fully qualified in accordance with established performance and reliability criteria. Please refer to the attached affected parts list and the attached documentation for qualification result and change details.

Form, fit, function changes: None

Effective date: Aug 31th, 2024

Last time buy: Jan 30th, 2024 for TPSMF4Lxx product from 1st source existing location. Orders which are received before last time buy are NCNR.

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

Best Regards,

Victoria You
Assistant Product Manager
Automotive TVS

PCN Report

Prepared By : Tianhua Wang-Product Engineer,
 Ada Du-Sr. OSAT Engineer,
Date : 11/8/2023
Device : SOD-123FL Package Product
Revision : 1

1.0 Objective:

The purpose of this project is to transfer 1st source assembly & test site to new location and qualify 2nd Source assembly & test location for SOD-123FL Package.
 Succeeding pages summarize the physical, electrical and reliability test performed in qualification lots.

	Before	After	
OSAT	1 st Source	1 st Source	2 nd Source
Site	Will transfer to new location	New location	
Address	Suzhou, China	Suzhou, China	Wuhu, China

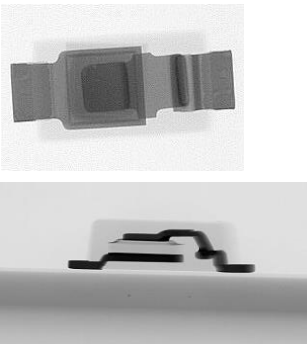
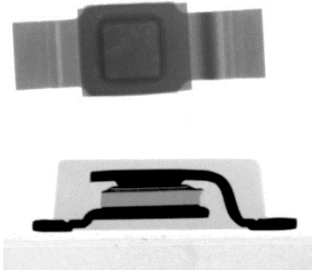
2.0 Applicable Devices:

Package	Part Numbers
SOD123-FL	TPSMF4L

3.0 Assembly, Process & Material Differences/Changes:

3.1 Assembly and Process Changes

- Existing 1st Source will be transferred from current location to new location. No Process changes.
- New adding 2nd Source

Product	1 st Source	2 nd Source
TVS		

3.1 Material Changes

- Existing 1st Source will be transferred from current location to new location. No material and supplier changes.
- New adding 2nd Source

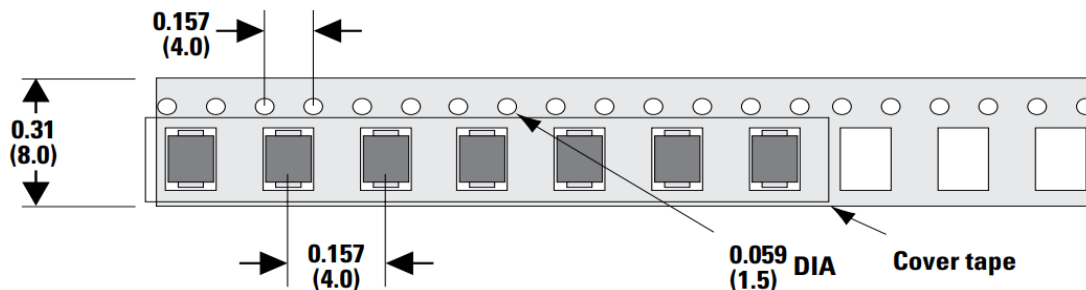
4.0 Packing Method

4.1 Packing Material

- Existing 1st Source will be transferred from current location to new location. No Packing changes.
- New adding 2nd Source

Packing	1 st Source	2 nd Source
Tape	Hot seal carrier tape Details dimension refer to 4.2	Hot seal carrier tape Details dimension refer to 4.2
Reel	White Plastic Reel, 7 inches Details dimension refer to 4.3	White Plastic Reel, 7 inches Details dimension refer to 4.3
Pizza Box	188mm*180mm*20mm, 7 inches(1 reel)	199mm*182mm*21mm, 7 inches(1 reel)
Label	Size:70mmx40mm Font is Arial, Font size is 12 and 5 Bar code is code 128, height is 4.6mm	Size:70mmx40mm Font is Arial, Font size is 9 and 5 Bar code is code 128(B), height is 4.6mm

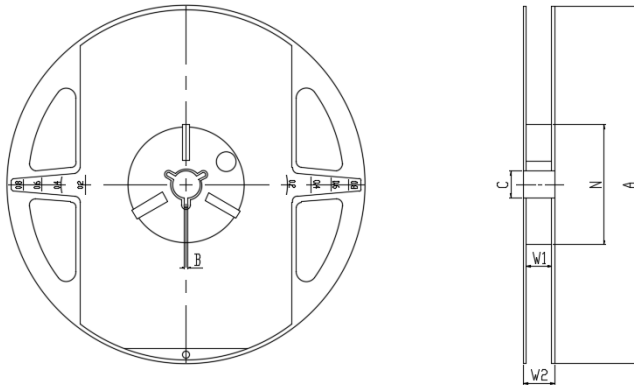
4.2 Tape Dimension



Source	Tape Dimension				Changed?
	W	D0	P0	P1	
1 st Source(new location)	8.00+0.3 -0.1	1.50+0.1	4.00±0.10	4.00±0.10	No
2 nd Source	8.00±0.15	1.55±0.15	4.00±0.15	4.00±0.15	

Internal Remark: Bold Dimension which shows on datasheet has no changes. No need update datasheet

4.3 Reel Dimension



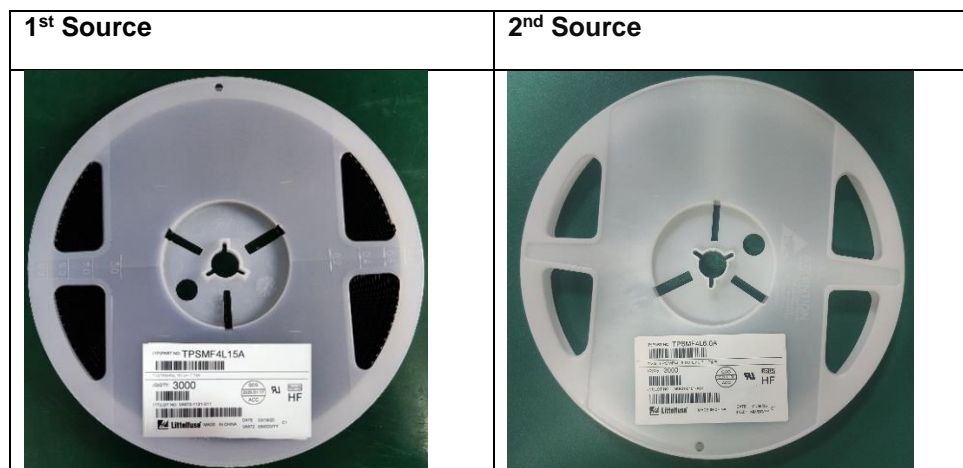
4.3.1 7inch Reel Dimension:

Source	Reel Dimension(mm)				
	A	N	W1	W2	C
1 st Source	178±1	60±0.1	9±0.3	11±1.0	13±0.2
2 nd Source	178±1	60.5±0.5	9.2±0.5	11±0.5	13±0.5

Internal Remark: Bold Dimension which shows on datasheet has no changes. No need update datasheet

Reel

- Existing 1st Source will be transferred from current location to new location. No reel changes.
- New adding 2nd Source



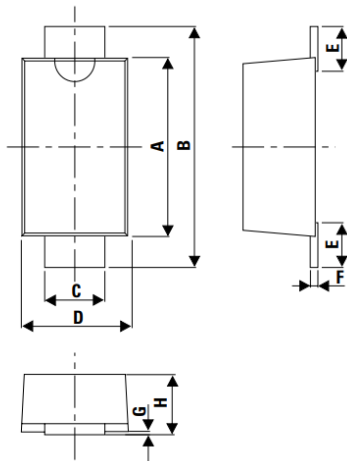
4.4 Label on Reel and Pizza Box



- Existing 1st Source will be transferred from current location to new location. No Label changes.
- New adding 2nd Source

1 st Source	2 nd Source
<p>(P)PART NO: TPSMF4L15A</p> <p>TVS TPSMF4L 15V Uni. 7" T&R</p> <p>(Q)QTY: 3000</p> <p>(1T)LOT NO: 0A672-1121-011</p> <p>Littelfuse MADE IN CHINA DATE: 02/19/20 C1 0A672 MM/DD/YY</p> <p>QCG 2020.01.17 ACC RoHS HF</p>	<p>(P)PART NO: TPSMF4L6.0A</p> <p>TVS TPSMF4L 6.0V Uni. 7" T&R</p> <p>(Q)Qty: 3000</p> <p>(1T)LOT NO: 3K801-0101-A01</p> <p>Littelfuse MADE IN CHINA DATE: 11/08/23 C1 3K801 MM/DD/YY</p> <p>QCG 2023.11.08 ACC RoHS HF</p>

5.0 Physical Differences/Changes:



Dimensions	TPSMF4L				Changed?
	Before		After		
	Min	Max	Min	Max	
A	2.9	3.1	2.9	3.1	No
B	3.5	3.9	3.5	3.9	No
C	0.85	1.05	0.85	1.05	No
D	1.7	2	1.7	2	No
E	0.43	0.83	0.43	0.83	No
F	0.1	0.25	0.1	0.25	No
G	0	0.1	0	0.1	No
H	0.9	1.08	0.9	1.08	No

6.0 Reliability Test Results Summary:



1st Source

Discrete Semiconductor Component Qualification Result									
General Specification:	AEC-Q101 Rev E			Report Date:	November 8, 2023				
Supplier:	Littelfuse Semiconductor (Wuxi) Co., Ltd.			Supplier Manufacturing Site:	East 3#, ZhenFa 6 Road, Shuo Fang Industrial Park, Wuxi, JiangSu China				
User Generic P/N:	TPSMF4L7.0A, TPSMF4L15A, TPSMF4L28A			Package Type:	SOD123-FL				
Supplier Internal P/N:	TPSMF4L7.0A, TPSMF4L15A, TPSMF4L28A			Product Type:	Automotive TVS				
				Laboratory Name:	Wuxi Technical Center				
				Qualification Reporter:	Tianhua Wang, Product Engineer				

Test #	Test Description	Test Conditions	Standard/Method	Littelfuse Test Ref#	# Lots	# Sample per lot	# Tested	# Failed	Remarks
1	Pre & Post Stress Parameter Test	Electrical parameter test (I_A & V_{RRM}) at 25°C	Datasheet spec	All	All	All	All	0	Test before and after all test
2	Pre-conditioning	24hrs 125°C bake, 168hrs 85°C & 85%RH temperature humidity, 3 times reflow of peak temperature 260°C	JESD22-A-113	TR23-06-001936 TR23-06-001938	3	261	783	0	Performed prior to H3TRB, TC, UHAST, HAST, IOL, RSH
3	External Visual	Inspect part construction, marking and workmanship. Pass by OQC inspection in assembly house.	JESD22-B-101	All	All	All	All	0	
4	Parametric Verification	Electrical parameter test at different Temp.	Individual AEC user specification	TR23-06-001936 TR23-06-001938	3	25	75	0	
5	High Temperature Reverse Bias	$T_A = T_J$, 1008hrs, DC biased at V_R	MIL-STD-750-1 M1038 Method A	TR23-06-001936 TR23-06-001938	3	77	231	0	
5a	AC Blocking Voltage	Not applicable, for Thyristors only	MIL-STD-750-1 M1040 condition A	NA	NA	NA	NA	NA	
5b	Steady State Operational	Not applicable, for Voltage Regulators	MIL-STD-750-1 M1038 condition B	NA	NA	NA	NA	NA	
6	High Temperature Gate Bias	Not applicable, for MOS & IGBT parts only	JESD22-A-108	NA	NA	NA	NA	NA	
7	Temperature Cycling	T_A : -55°C to 150°C, 1000 cycles	JESD22-A-104	TR23-06-001936 TR23-06-001938	3	77	231	0	
7a	Temperature Cycling Hot Test	Not applicable, for MOSFET parts	JESD22-A-104	NA	NA	NA	NA	NA	
7a alt	TC Delamination Test	Not applicable, for MOSFET parts	JESD22 A-104 J-STD-035	NA	NA	NA	NA	NA	
8	Unbiased Highly Accelerated Stress Test	96 hours at $T_A = 130^\circ\text{C}$ & 85%RH	JESD22-A-118	TR23-06-001936 TR23-06-001938	3	77	231	0	
8 alt	Autoclave	96 hours at $T_A = 121^\circ\text{C}$ & 100%RH, 2 atm	JESD22-A-102	NA	NA	NA	NA	NA	UHAST as replace
9	High Humidity High Temp Reverse Bias	$T_A = 85^\circ\text{C}$, 85%RH, 1008hrs, DC biased at V_R not exceed 100V	JESD22-A-101	TR23-06-001936 TR23-06-001938	3	77	231	0	
9 alt	Highly Accelerated Stress Test	96 hours at $T_A = 130^\circ\text{C}$ & 85%RH, biased at 80% rated voltage, not exceed 42V	JESD22-A-110	NA	NA	NA	NA	NA	Already test H3TRB, can cover HAST
10	Intermittent Operational Life	$T_A = 25^\circ\text{C}$, $\Delta T_J \geq 100^\circ\text{C}$, TON/OFF = 2 minutes, 15000cycles	MIL-STD-750 Method 1037	NA	NA	NA	NA	NA	
10 alt	Power Temperature Cycling	Not required for TVS parts	JESD22-A-105	NA	NA	NA	NA	NA	
11	High Temperature Storage Life	$T_A = T_{STG}$, 1008hours	JESD22-A-103	NA	NA	NA	NA	NA	
12	ESD HBM Characterization	16KV HBM discharge, met Class 3B requirement	AEC Q101-001	TR23-06-001936 TR23-06-001938	3	30	90	0	
13	ESD CDM Characterization	2KV CDM discharge, met Class 3B requirement	AEC Q101-005	NA	NA	NA	NA	NA	
14	ESD IEC Characterization	30KV IEC61000-4-2 contact discharge	IEC61000-4-2	NA	NA	NA	NA	NA	
15	Destructive Physical Analysis	Destructive Physical Analysis, no obvious defect	AEC Q101-004 Section 4	TR23-09-003901 TR23-09-003903	1	2	2	0	Random samples from passed H3TRB and TC
16	Physical Dimension	Per package dimension specification Pass by OQC inspection in assembly house	JESD22-B-100	NA	1	30	30	0	
17	Terminal Strength	Not applicable, required for leaded parts only	MIL-STD-750-2 Method 2036	NA	NA	NA	NA	NA	
18	Resistance to Solvents	Not required for laser etched parts or parts with no marking	JESD22-B-107	NA	NA	NA	NA	NA	
19	Constant Acceleration	Not applicable, required for hermetic packaged parts only	MIL-STD-750 Method 2006	NA	NA	NA	NA	NA	
20	Vibration Variable Frequency	Not applicable, required for hermetic packaged parts only	JESD22-B-103	NA	NA	NA	NA	NA	
21	Mechanical Shock	Not applicable, required for hermetic packaged parts only	JESD22-B-104	NA	NA	NA	NA	NA	
22	Hermeticity	Not applicable, required for hermetic packaged parts only	JESD22-A-109	NA	NA	NA	NA	NA	
23	Resistance to Solder Heat	260°C, 10secs	JESD22-A-111	TR23-06-001936 TR23-06-001938	3	30	90	0	
24	Solderability	245°C \pm 5°C, 5 \pm 0.5s	J-STD-002	TR23-06-001936 TR23-06-001938	3	10	30	0	
25	Thermal Resistance	Typical Thermal Resistance Junction to Lead Per datasheet spec	JESD-24-3, 24-4, 24-6 as appropriate	TR23-10-004678	1	10	10	0	Only test for uni-directional product
26	Wire Bond Strength	Not applicable, only required for wire bond	MIL-STD-750 Method 2037	NA	NA	NA	NA	NA	
27	Bond Shear	Not applicable, only required for wire bond	JESD22-B116	NA	NA	NA	NA	NA	
28	Die Shear	Not applicable, only required for wire bond	MIL-STD-750 Method 2017	NA	NA	NA	NA	NA	
29	Unclamped Inductive Switching	Not applicable, only required for power MOS & IGBT	AEC-Q101-004 Section 2	NA	NA	NA	NA	NA	
30	Dielectric Integrity	Not applicable, only required for power MOS & IGBT	AEC-Q101-004 Section 3	NA	NA	NA	NA	NA	
31	Short Circuit Reliability Characterization	Not applicable, only required for smart power parts	AEC-Q101-006	NA	NA	NA	NA	NA	
32	Lead Free	Not applicable, not whisker terminal	AEC-Q005	NA	NA	NA	NA	NA	Solderability, Resistance to solder heat and whisker test all use Pb-free solder paste
33	V_f Test	V_f @ different IF, 25°C	Datasheet spec	TR23-06-001957 TR23-06-001958	3	10	30	0	Only test for uni-direction production
34	Capacitance	Bias voltage = 1V, 2V, 5V, 10V, 50% V_R , 100% V_R , 1MHz, $T_J = 25^\circ\text{C}$	Individual AEC user specification	TR23-06-001957 TR23-06-001958	3	10	30	0	
35	10x1000us Surge Life	10x1000us waveform, 25°C, 30hits	Individual AEC user specification	TR23-06-001957 TR23-06-001958	3	10	30	0	
36	10x1000us Surge Out	10x1000us waveform, 25°C	Individual AEC user specification	TR23-06-001957 TR23-06-001958	3	10	30	0	

Conclusion:	All samples passed all requested test items by AEC-Q101 Rev.E successfully.
Footnotes 1:	Tests are conducted without a bias condition unless otherwise stated.
Footnotes 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.
Footnotes 3:	Tests are conducted on

**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 **TPSMF4L7.0A, TPSMF4L15A, TPSMF4L28A**.

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

Temp °C	% FR/khrs	MTBF (K)	FITS
30	0.0000076	13163061.53	0.08
55	0.00023856	419175.11	2.39
85	0.00171509	58306.01	17.15
100	0.00998019	10019.85	99.80
125	0.07033148	1421.84	703.31
150	0.39351454	254.12	3935.15

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.

2nd source

Discrete Semiconductor Component Qualification Result									
General Specification:	AEC-Q101 Rev E			Report Date:	November 8, 2023				
Supplier:	Littelfuse Semiconductor (Wuxi) Co., Ltd.			Supplier Manufacturing Site:	East 3#, ZhenFa 6 Road, Shuo Fang Industrial Park, Wuxi, JiangSu China				
User Generic P/N:	TPSMF4L5.0A~TPSMF4L85A			Package Type:	SOD123-FL				
Supplier Internal P/N:	TPSMF4L5.0A~TPSMF4L85A			Product Type:	Automotive TVS				
				Laboratory Name:	Wuxi Technical Center				
				Qualification Reporter:	Tianhua Wang, Product Engineer				

Test #	Test Description	Test Conditions	Standard/Method	Littelfuse Test Ref#	# Lots	# Sample per lot	# Tested	# Failed	Remarks
1	Pre & Post Stress Parameter Test	Electrical parameter test (I_R & V_{RRM}) at 25°C	Datasheet spec	All	All	All	All	0	Test before and after all test
2	Pre-conditioning	24hrs 125°C bake, 168hrs 85°C & 85%RH temperature humidity, 3 times reflow of peak temperature 260°C	JESD22-A-113	TR23-08-003497	3	261	783	0	Performed prior to H3TRB, TC, UHAST, HAST, IOL, RSH
3	External Visual	Inspect part construction, marking and workmanship. Pass by OQC inspection in assembly house.	JESD22-B-101	All	All	All	All	0	
4	Parametric Verification	Electrical parameter test at different Temp.	Individual AEC user specification	TR23-08-003497	3	25	75	0	
5	High Temperature Reverse Bias	$T_A = T_J$, 1008hrs, DC biased at V_R	MIL-STD-750-1 M1038 Method A	TR23-08-003497	3	77	231	0	
5a	AC Blocking Voltage	Not applicable, for Thyristors only	MIL-STD-750-1 M1040 condition A	NA	NA	NA	NA	NA	
5b	Steady State Operational	Not applicable, for Voltage Regulators	MIL-STD-750-1 M1038 condition B	NA	NA	NA	NA	NA	
6	High Temperature Gate Bias	Not applicable, for MOS & IGBT parts only	JESD22-A-108	NA	NA	NA	NA	NA	
7	Temperature Cycling	T_A : -55°C to 150°C, 1000 cycles	JESD22-A-104	TR23-08-003497	3	77	231	0	
7a	Temperature Cycling Hot Test	Not applicable, for MOSFET parts	JESD22-A-104	NA	NA	NA	NA	NA	
7a alt	TC Delamination Test	Not applicable, for MOSFET parts	JESD22 A-104 J-STD-035	NA	NA	NA	NA	NA	
8	Unbiased Highly Accelerated Stress Test	96 hours at $T_A = 130^\circ\text{C}$ & 85%RH	JESD22-A-118	TR23-08-003497	3	77	231	0	
8 alt	Autoclave	96 hours at $T_A = 121^\circ\text{C}$ & 100%RH, 2 atm	JESD22-A-102	NA	NA	NA	NA	NA	UHAST as replace
9	High Humidity High Temp Reverse Bias	$T_A = 85^\circ\text{C}$, 85%RH, 1008hours, DC biased at V_R not exceed 100V	JESD22-A-101	TR23-08-003497	3	77	231	0	
9 alt	Highly Accelerated Stress Test	96 hours at $T_A = 130^\circ\text{C}$ & 85%RH, biased at 80% rated voltage, not exceed 42V	JESD22-A-110	NA	NA	NA	NA	NA	Already test H3TRB, can cover HAST
10	Intermittent Operational Life	$T_A = 25^\circ\text{C}$, $\Delta T_J \gg 100^\circ\text{C}$, TON/OFF = 2 minutes, 15000cycles	MIL-STD-750 Method 1037	NA	NA	NA	NA	NA	
10 alt	Power Temperature Cycling	Not required for TVS parts	JESD22-A-105	NA	NA	NA	NA	NA	
11	High Temperature Storage Life	$T_A = T_{S10}$, 1008hours	JESD22-A-103	TR23-08-003497	3	77	231	0	
12	ESD HBM Characterization	16KV HBM discharge, met Class 3B requirement	AEC Q101-001	TR23-08-003497	3	30	90	0	
13	ESD CDM Characterization	2KV CDM discharge, met Class 3B requirement	AEC Q101-005	NA	NA	NA	NA	NA	
14	ESD IEC Characterization	30KV IEC61000-4-2 contact discharge	IEC61000-4-2	NA	NA	NA	NA	NA	
15	Destructive Physical Analysis	Destructive Physical Analysis, no obvious defect	AEC Q101-004 Section 4	TR23-11-004880 TR23-11-004881	1	2	2	0	Random samples from passed H3TRB and TC
16	Physical Dimension	Per package dimension specification Pass by OQC inspection in assembly house	JESD22-B-100	NA	1	30	30	0	
17	Terminal Strength	Not applicable, required for leaded parts only	MIL-STD-750-2 Method 2036	NA	NA	NA	NA	NA	
18	Resistance to Solvents	Not required for laser etched parts or parts with no marking	JESD22-B-107	NA	NA	NA	NA	NA	
19	Constant Acceleration	Not applicable, required for hermetic packaged parts only	MIL-STD-750 Method 2006	NA	NA	NA	NA	NA	
20	Vibration Variable Frequency	Not applicable, required for hermetic packaged parts only	JESD22-B-103	NA	NA	NA	NA	NA	
21	Mechanical Shock	Not applicable, required for hermetic packaged parts only	JESD22-B-104	NA	NA	NA	NA	NA	
22	Hermeticity	Not applicable, required for hermetic packaged parts only	JESD22-A-109	NA	NA	NA	NA	NA	
23	Resistance to Solder Heat	260°C, 10secs	JESD22-A-111	TR23-08-003497	3	30	90	0	
24	Solderability	245°C \pm 5°C, 5 \pm 0.5s	J-STD-002	TR23-08-003497	3	10	30	0	
25	Thermal Resistance	Typical Thermal Resistance Junction to Lead Per datasheet spec	JESD-24-3, 24-4, 24-6 as appropriate	TR23-09-004151	1	10	10	0	Only test for uni-directional product
26	Wire Bond Strength	Not applicable, only required for wire bond	MIL-STD-750 Method 2037	NA	NA	NA	NA	NA	
27	Bond Shear	Not applicable, only required for wire bond	JESD22-B116	NA	NA	NA	NA	NA	
28	Die Shear	Not applicable, only required for wire bond	MIL-STD-750 Method 2017	NA	NA	NA	NA	NA	
29	Unclamped Inductive Switching	Not applicable, only required for power MOS & IGBT	AEC-Q101-004 Section 2	NA	NA	NA	NA	NA	
30	Dielectric Integrity	Not applicable, only required for power MOS & IGBT	AEC-Q101-004 Section 3	NA	NA	NA	NA	NA	
31	Short Circuit Reliability Characterization	Not applicable, only required for smart power parts	AEC-Q101-006	NA	NA	NA	NA	NA	
32	Lead Free	Not applicable, not whisker terminal	AEC-Q005	NA	NA	NA	NA	NA	Solderability, Resistance to solder heat and whisker test all use Pb-free solder paste
33	V_f Test	V_f @ different IF, 25°C	Datasheet spec	TR23-08-003501	3	10	30	0	Only test for uni-direction production
34	Capacitance	Bias voltage = 1V, 2V, 5V, 10V, 50% V_R , 100% V_R , 1MHz, $T_J = 25^\circ\text{C}$	Individual AEC user specification	TR23-08-003501	3	10	30	0	
35	10x1000us Surge Life	10x1000us waveform, 25°C, 30hits	Individual AEC user specification	TR23-08-003501	3	10	30	0	
36	10x1000us Surge Out	10x1000us waveform, 25°C	Individual AEC user specification	TR23-08-003501	3	10	30	0	

Conclusion:	All samples passed all requested test items by AEC-Q101 Rev.E successfully.
Footnotes 1:	Tests are conducted without a bias condition unless otherwise stated.
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Footnotes 3:	Tests are conducted on TPSMF4L6.0A, TPSMF4L8.5A, TPSMF4L28A



Remark:

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3. Tests are conducted on **TPSMF4L6.0A, TPSMF4L8.5A, TPSMF4L28A.**

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

Temp °C	% FR/khrs	MTBF (K)	FITS
30	0.0000076	13163061.53	0.08
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125	0.07033148	1421.84	703.31
150	0.39351454	254.12	3935.15

5. 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. Characterization data is available upon request.

1st Source

Test Items		Condition	S/S	Results	ETR #
Parametric		V _{BR} , I _R	30	0/30	TR23-06-001957 TR23-06-001958
VF		Datasheet condition	30	0/30	
Surge Out test	10X1000us	1 hit, at 25°C from 1.0IPP, add 0.1 IPP one step, pass 1.2IPP	30	0/30	
	8X20us	1 hit, at 25°C from 1.0IPP, add 0.1 IPP one step, pass 1.2IPP	30	0/30	
Surge Life test	10X1000us	1 hit,30 hits, 1.0IPP	30	0/30	
	8X20us	1 hit,30 hits, 5.0IPP	30	0/30	

Detail Surge Test Summary:

Part No.	Package	ETR#	Surge out 10X1000us	Surge Life 10X1000us
TPSMF7.0A	SOD-123FL	TR23-06-001957	1.3IPP	0/10
TPSMF15A	SOD-123FL	TR23-06-001958	1.2IPP	0/10
TPSMF28A	SOD-123FL	TR23-06-001958	1.2IPP	0/10

2nd source

Test Items		Condition	S/S	Results	ETR #
Parametric		V_{BR} , I_R	30	0/30	TR23-08-003501
VF		Datasheet condition	30	0/30	
Surge Out test	10X1000us	1 hit, at 25°C from 1.0IPP, add 0.1 IPP one step, pass 1.2IPP	30	0/30	
	8X20us	1 hit, at 25°C from 1.0IPP, add 0.1 IPP one step, pass 1.2IPP	30	0/30	
Surge Life test	10X1000us	1 hit, 30 hits, 1.0IPP	30	0/30	
	8X20us	1 hit, 30 hits, 5.0IPP	30	0/30	

Detail Surge Test Summary:

Part No.	Package	ETR#	Surge out 10X1000us	Surge Life 10X1000us
TPSMF4L6.0A	SOD-123FL	TR23-08-003501	1.3IPP	0/10
TPSMF4L8.5A	SOD-123FL	TR23-08-003501	1.5IPP	0/10
TPSMF4L28A	SOD-123FL	TR23-08-003501	1.4IPP	0/10

8.0 Changed Part Identification:

N/A.

9.0 Recommendations & Conclusions:

Based on the test results, it is determined that 1st Source new location & 2nd Source locations is qualified and certified for SOD123-FL,TPSMF4Lxx Littelfuse AUTO TVS.

10.0 Approvals:

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