Littelfuse
Expertise Applied | Answers Delivered

8755 W. Higgins Road
Suite 500
Chicago, IL 60631

www.littelfuse.com

Apr 17, 2023

Re: LFPCN41478 - Littelfuse Alternative Solder Wafer Source Approval for TPSMA6Lxx DO221AC AUTO TVS

To Our Valued Customers,

Due to supplier's solder wafer end of life and to secure continuity of supply for our customers, Littelfuse will notify you a newly approved solder wafer supplier of TPSMA6Lxx DO221AC AUTO TVS.

Material	Before		After	
	Material Name	Supplier	Material Name	Supplier
Solder Wafer	Pb92.5Sn5.0Ag2.5	Zhejiang Huangyan Xinqian	Pb92.5Sn5.0Ag2.5	Langfang Bondtron

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
Part number changes: None
Effective date: Jul 18, 2023
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 value your business and look forward to assisting you whenever possible.

Best Regards,

Victoria You
Assistant Product Manager
Automotive TVS
Tel: +86 510 85277701 ext. 7710
VYou@Littelfuse.com

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800 E. Northwest Highway Des Plaines, IL 60016

Product/Process Change Notice (PCN)

PCN#: Date: 17th Apr, 2023

Product Identification:

TPSMA6Lxx DO221AC AUTO TVS

Implementation Date for Change:

18th Jul, 2023

Contact Information

Name: Victoria You

Title: Assistant Production Manager

Phone # : +86 510 85277701 ext. 7710

Fax# : NA

E-mail : VYou@Littelfuse.com

Category of Change:

- ☐ Assembly Process
- ☐ Data Sheet
- ☐ Technology
- ☐ Discontinuance/Obsolescence
- ☐ Equipment
- ☐ Manufacturing Site
- ☒ Raw Material
- ☐ Testing
- ☐ Fabrication Process
- ☐ Other: _____

Description of Change:

Due to supplier's solder wafer end of life and to secure continuity of supply for our customers, Littelfuse will notify you a newly approved solder wafer supplier of TPSMA6Lxx DO221AC AUTO TVS.

Important Dates:

☒ Qualification Samples Available: Upon request

☐ Last Time Buy:

☒ Final Qualification Data Available: Upon request

☐ 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:

Yes

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.

PCN Report

Prepared By : Ada Du- Sr. OSAT Engineer,
Tianhua Wang-Product Engineer
Date : 4/4/2023
Device : DO-221AC Package Product
Revision : 1

1.0 Objective:

The purpose of this project is to qualify an additional solder wafer supplier for DO-221AC Package TPSMA6L Series Product.
Succeeding pages summarize the physical, electrical and reliability test performed in qualification lots.

2.0 Applicable Devices:

Package	Part Numbers	Die Size	Structure
DO-221AC	TPSMA6L	70mil	Single

3.0 Assembly, Process & Material Differences/Changes:

3.1 Assembly and Process Changes

There are no changes in the assembly and process method.

3.2 Material Changes

There are no significant changes of material.

Material	1st Source		2nd Source	
	Material Name	Supplier	Material Name	Supplier
Solder Wafer	Pb92.5Sn5.0Ag2.5	Zhejiang Huangyan Xinqian	Pb92.5Sn5.0Ag2.5	Langfang Bondtron

4.0 Packing Method

There will be no changes in the packing method.

5.0 Physical Differences/Changes:

There will be no changes.

6.0 Reliability Test Results Summary:

DO-221AC				
Test Items	**Condition**	**S/S per PN**	**Results**	**ETR #**
Pre-conditioning	24hrs 125℃ bake/ 168hrs 85%rh, 85℃ soak/3 times 260 ℃ peak temp. reflow	231	0/693	ETR181243 ETR181244
High Temperature, DC Blocking(HTRB)	At 150℃ for 1008hrs, bias rated VR	77	0/231	
Temperature Cycle(TC)	-55℃&150℃, 1000 cycles, 15 minutes dwell	77	0/231	
High Temperature & Humidity with Bias(H3TRB)	85℃, 85%RH for 1008hrs bias rated VR	77	0/231	
UHAST Unbiased Highly Accelerated Stress Test (UHAST)	Ta = 130°C, 85%RH, 2ATM Duration = 96 Hours	77	0/231	
Resistance to Solder Heat(RSH)	260°C,10 seconds	30	0/90	
Moisture Sensitivity Level(MSL)	Per Jedec J-STD-020D Level 1	22	0/66	

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 **TPSMA6L18A, TPSMA6L26A, TPSMA6L36A**.

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

Temp ℃	% 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 **M**ean-**T**ime-**B**etween-**F**ailure (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.

DO-221AC					
Test Items		**Condition**	**S/S**	**Results**	**ETR #**
Parametric		V_{BR}, I_R	30	0/30	ETR181246 ETR181247
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 1.1IPP	30	0/30	
Surge Life test	10X1000us	1 hit,30 hits, 1.0IPP	30	0/30	

Detail Surge Test Summary:

Part No.	Package	ETR#	Surge out 10X1000us	Surge Life 10X1000us
TPSMA6L18A	DO-221AC	181246	1.2IPP	0/10
TPSMA6L26A	DO-221AC	181246	1.1IPP	0/10
TPSMA6L36A	DO-221AC	181247	1.2IPP	0/10

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 solder wafer supplier is qualified and certified for production of above listed Littelfuse products.

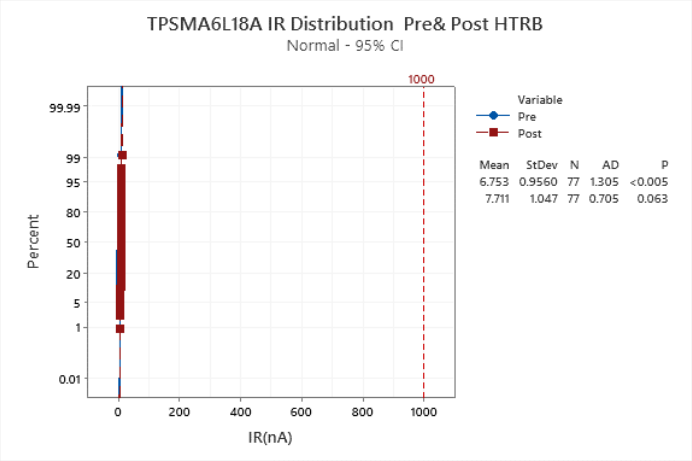
10.0 Approvals:

Yaling Fan
OSAT Operation Manager
Littelfuse, Wuxi

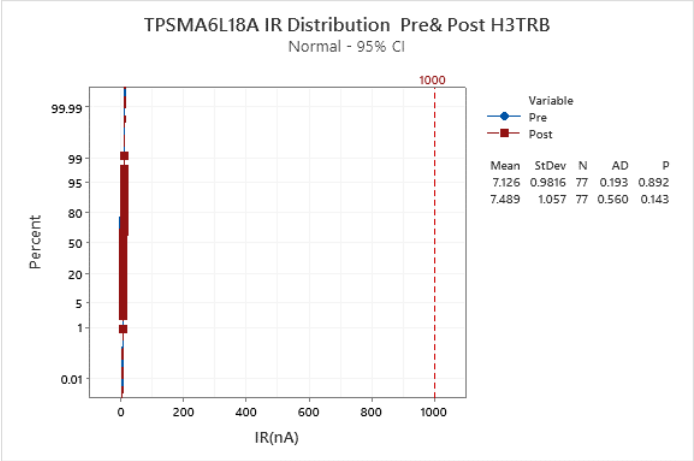
Peter Liu
Asia OSAT Product Engineering Manager
Littelfuse, Wuxi

11.0 Appendix A – Pre & Post Test Electrical Performance Distribution

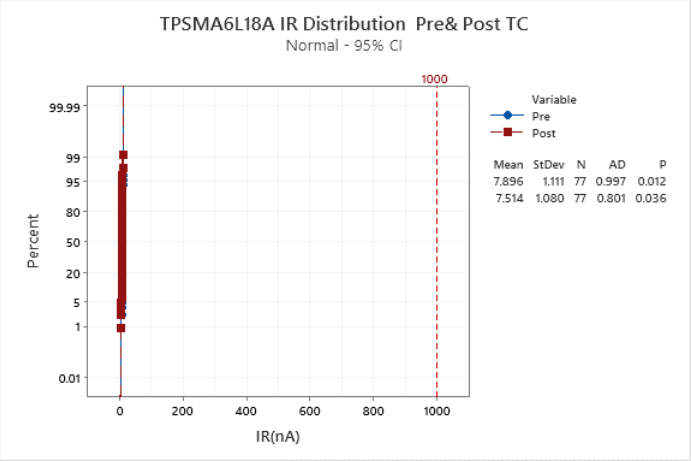
TPSMA6L18A Ir Distribution Pre & Post HTRB



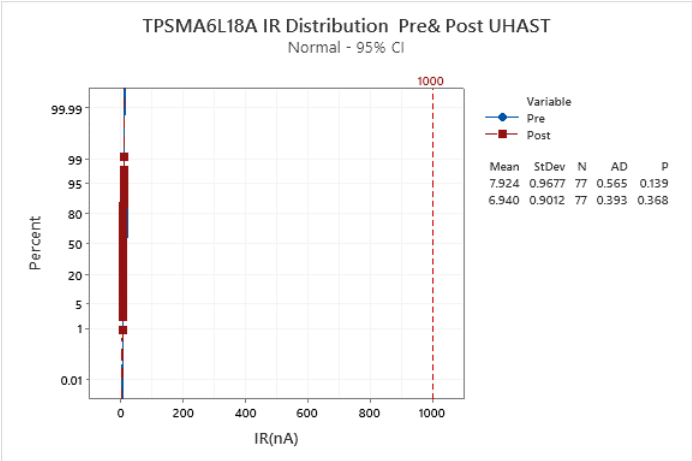
TPSMA6L18A Ir Distribution Pre & Post H3TRB



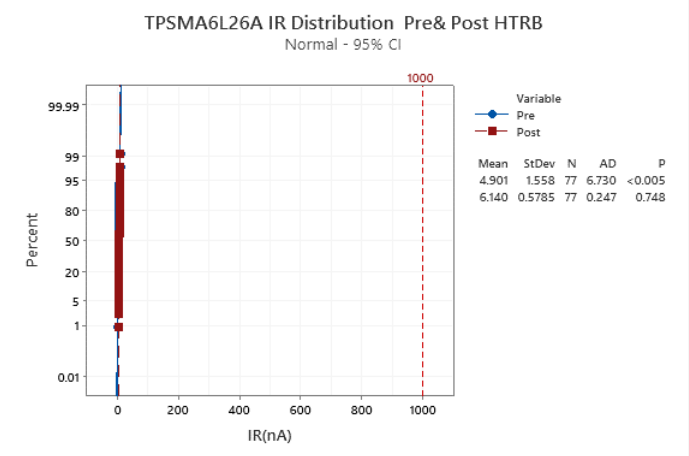
TPSMA6L18A Ir Distribution Pre & Post TC



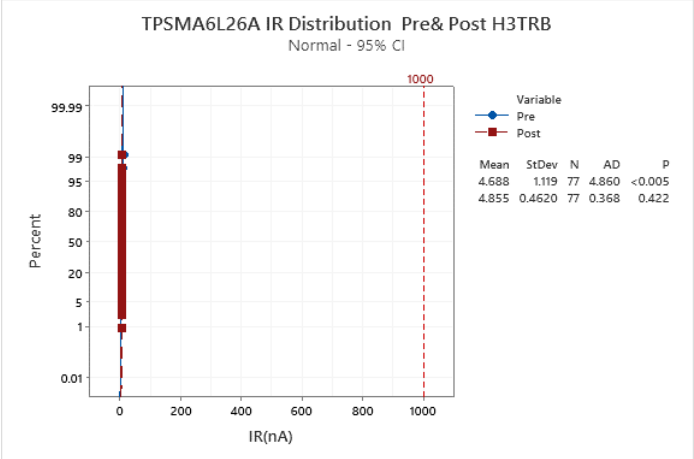
TPSMA6L18A Ir Distribution Pre & Post UHAST

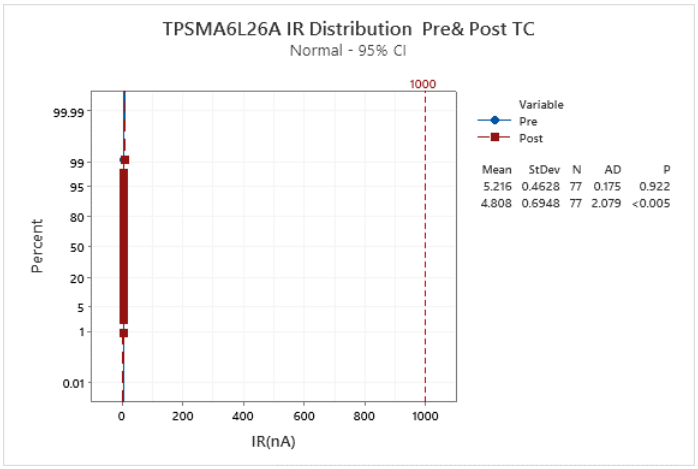
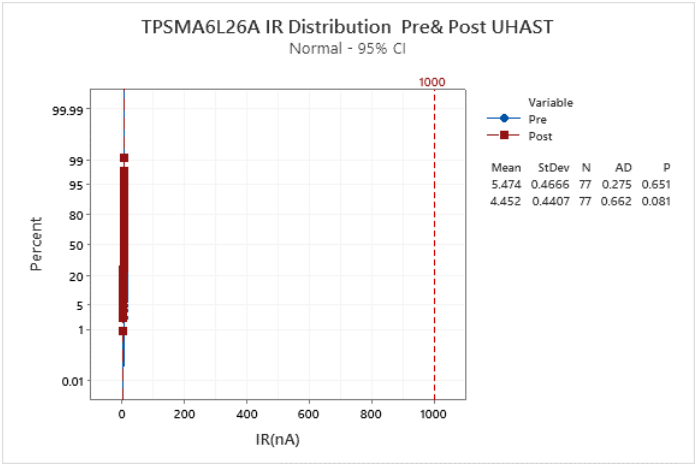
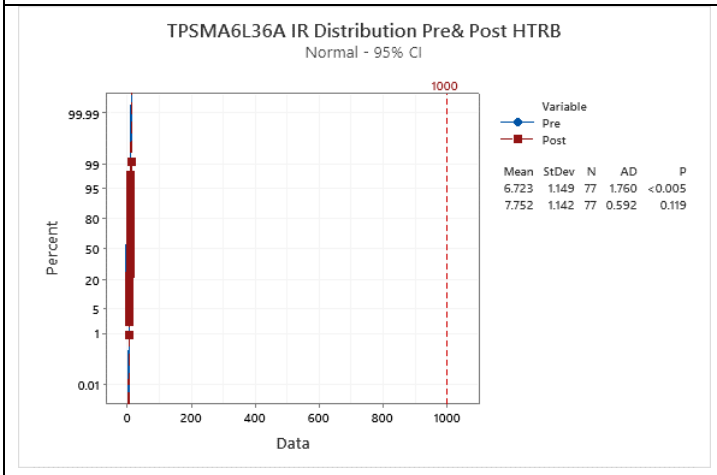
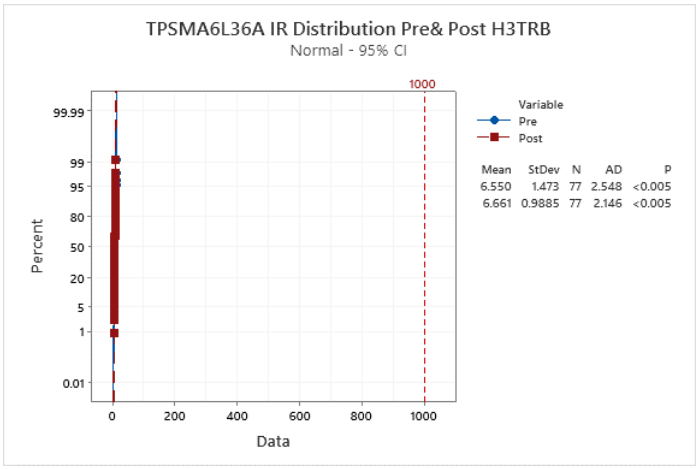
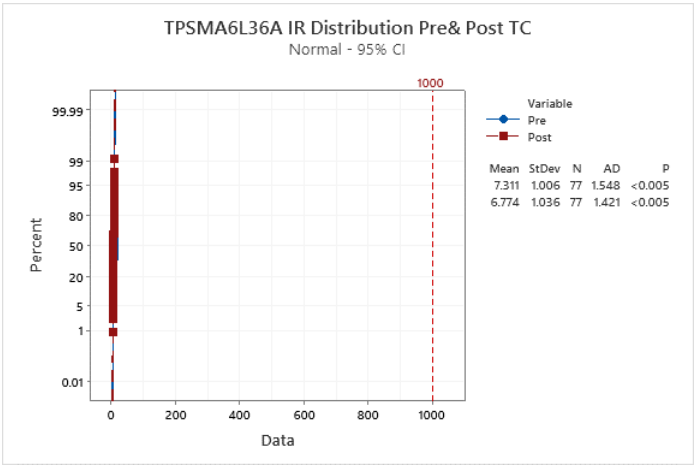
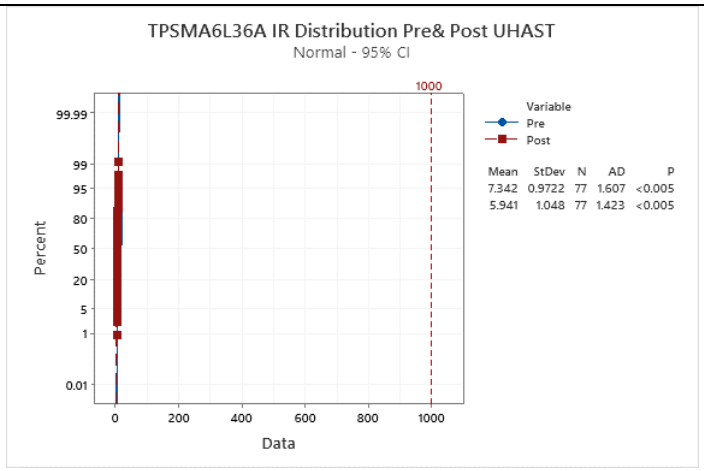


TPSMA6L26A Ir Distribution Pre & Post HTRB



TPSMA6L26A Ir Distribution Pre & Post H3TRB



TPSMA6L26A Ir Distribution Pre & Post TC	TPSMA6L26A Ir Distribution Pre & Post UHAST
	
TPSMA6L36A Ir Distribution Pre & Post HTRB	**TPSMA6L36A Ir Distribution Pre & Post H3TRB**
	
TPSMA6L36A Ir Distribution Pre & Post TC	**TPSMA6L36A Ir Distribution Pre & Post UHAST**
	

Package	Part Numbers
DO-221AC	TPSMA6L5.0A
DO-221AC	TPSMA6L6.0A
DO-221AC	TPSMA6L6.5A
DO-221AC	TPSMA6L7.0A
DO-221AC	TPSMA6L7.5A
DO-221AC	TPSMA6L8.0A
DO-221AC	TPSMA6L8.5A
DO-221AC	TPSMA6L9.0A
DO-221AC	TPSMA6L10A
DO-221AC	TPSMA6L11A
DO-221AC	TPSMA6L12A
DO-221AC	TPSMA6L12A-LG
DO-221AC	TPSMA6L13A
DO-221AC	TPSMA6L13A-LG
DO-221AC	TPSMA6L14A
DO-221AC	TPSMA6L15A
DO-221AC	TPSMA6L16A
DO-221AC	TPSMA6L17A
DO-221AC	TPSMA6L18A
DO-221AC	TPSMA6L20A
DO-221AC	TPSMA6L22A
DO-221AC	TPSMA6L24A
DO-221AC	TPSMA6L24A-LG
DO-221AC	TPSMA6L26A
DO-221AC	TPSMA6L26A-CL
DO-221AC	TPSMA6L26A-LG
DO-221AC	TPSMA6L28A
DO-221AC	TPSMA6L30A
DO-221AC	TPSMA6L31A
DO-221AC	TPSMA6L33A
DO-221AC	TPSMA6L36A
DO-221AC	TPSMA6L40A
DO-221AC	TPSMA6L43A
DO-221AC	TPSMA6L45A
DO-221AC	TPSMA6L48A
DO-221AC	TPSMA6L51A
DO-221AC	TPSMA6L54A
DO-221AC	TPSMA6L58A
DO-221AC	TPSMA6L60A
DO-221AC	TPSMA6L64A
DO-221AC	TPSMA6L70A
DO-221AC	TPSMA6L75A
DO-221AC	TPSMA6L78A
DO-221AC	TPSMA6L85A