

Expertise Applied Answers Delivered

8755 W. Higgins Road Suite 500 Chicago, IL 60631 www.littelfuse.com

Jun 6, 2022

Re: LFPCN41444 - Littelfuse Additional Assembly Site Approval for DO221AC TPSMA6L AUTO TVS

To Our Valued Customers,

In order to support fast-growing demand and secure continuity of supply for our customers, Littelfuse will approve additional assembly site in China for DO221AC Package TPSMA6L Series, AUTO TVS.

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 7, 2022 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

11 Littelfuse					
Expertise Applied Answers Delivered	Expertise Applied Answers Delivered				
800 E. Northwest Highway Des Plaines, IL 60016					
Product/F	Process Change Notice (PCN)				
PCN#: Date: 6th Jun, 2022	Contact Information				
Product Identification:	Name: Victoria You				
DO221AC Package TPSMA6L Series, AUTO TVS.	Title: Assistant Production Manager				
Implementation Date for Change:	Phone # : +86 510 85277701 ext. 7710				
7th Jul, 2022	Fax#: NA				
	E-mail : VYou@Littelfuse.com				
Category of Change: Des	scription of Change:				
Assembly Process	rder to support fast-growing demand and secure continuity of supply for our				
Data Sheet cust	omers, Littelfuse will approve additional assembly site in China for				
DO2	21AC Package TPSMA6L Series, AUTO TVS.				
Discontinuance/Obsolescence					
Equipment					
Manufacturing Site					
Raw Material					
Testing					
Fabrication Process					
□ Other:					
Important Dates:					
Qualification Samples Available:	Upon request Last Time Buy:				
\square Final Qualification Data Available:	Upon request				
Date of Final Product Shipment:					
Method of Distinguishing Changed Produc	t				
Product Mark,					
Date Code,					
Other, Littelfuse internal work order documentation					
Demonstrated or Anticipated Impac	t on Form, Fit, Function or Reliability:				
N/A					
LF Qualification Plan/Results:					
Yes					
Customer Acknowledgement of Rec	ceipt: Littelfuse requests you acknowledge receipt of this PCN. In your acknowledgement,				
you can grant approval or request additional information. days of this notice. Lack of any additional response withi	Littelfuse will assume the change is acceptable if no acknowledgement is received within 30 n 90 days of PCN issuance further constitutes acceptance of the change.				



PCN Report

Prepared By	: Yaling Fan- Outsourcing Assembly and Test Manager,
Date	: 3/4/2021
Device	: DO-221AC Package TPSMA6L Series Product
Revision	:1

1.0 Objective:

The purpose of this project is to qualify an alternate location for DO-221AC Package TPSMA6L Series Product as 2nd source.

Succeeding pages summarize the physical, electrical and reliability test performed in qualification lots.

2.0 Applicable Devices:

Package	Part Numbers
DO-221AC	TPSMA6LxxxA

3.0 Assembly, Process & Material Differences/Changes:

3.1 Assembly and Process Changes

Process	1 st Source	2 nd Source
1	Wafer Sawing (None Tape)	Wafer Mounting &Sawing (Blue Tape)
2	Soldering	Soldering (Die&Clip Bond)
3	Molding	Flux Cleaning
4	PMC	Molding
5	Trim/Forming	PMC
6	IR reflow	Trim
7	Barrel Plating	IR reflow
8	Test	Rack Plating
9	OQC	Forming
10		Temperature Cycling (TPSMA6L)
11		Test
12		OQC

3.2 Material Changes

Motorial	1st Sour	се	2nd Sou	Changed 2	
Material Material Name		Supplier	Material Name	Supplier	Changeur
Die	Silicon Wafer	Littelfuse	Silicon Wafer	Littelfuse	No
Leadframe & Clip	C194	Jihlong	C19210	ECE	Yes
Die Attach Material	Pb92.5/Sn5/Ag2.5	Zhejiang Huangyan Xingqian	Pb92.5/Sn5/Ag2.5	Alpha/Indium	Yes
Molding Compound	E120G Changchun Pound E120G Plastics		EK1700GH	Eternal Electronic Materials	Yes
Plating	Matte Tin	Jihlong	Matte Tin	Yunnan Tin	Yes



4.0 Packing Method

4.1 Packing Material

Packing	1st Source	2nd Source
Tana	Hot seal carrier tape	Hold seal carrier tape
Tape	Details dimension refer to 4.2	Details dimension refer to 4.2
Pool	White Plastic Reel,7 inches	White Plastic Reel, 7 inches
Reel	Details dimension refer to 4.3	Details dimension refer to 4.3
Dizzo Box	185mm*185mm*20mm	200mm*186mm*21mm
PIZZA DOX	(TPSMA6L 1 Reel/Pizza Box)	(1 Reel/Pizza Box)
	Size:100mmx40mm	Size: 70mmx40mm
Label	Font is Arial, font size is 7.5	Font is Arial, Font size is 12
	Bar code is code 128, height is 4mm	Bar code is code 39, height is 4.06mm
		350mm*350mm*50mm (1 to 2 Pizza Box)
Outside	405mm*210mm*380mm	350mm*350mm*100mm (3 to 4 Pizza Box)
Box	(TPSMA6L 34 Pizza Box)	350mm*350mm*195mm (5 to 18 Pizza Box)
		350mm*350mm*345mm (19 to 34 Pizza Box)

Remark: There are few minor differences (Bold Parts) between two sources.

4.2 Tape Dimension







4.3 Reel Dimension



Case	Source		Reel	Dimension(mm)	
Туре	Source	Reel Dia.	Arbor Hole Dia.	Reel Inner Height	Reel Total Height
DO-221AC	1 st Source	178±0.5	13.3±0.5	12.5±0.5	15.5±0.5
DO-221AC	2 nd Source	178±1.0	13.3±0.2	12.4+2.0-0.4	15.2±1.0





Remark: Reel dimension has little difference between two sources as above.

Remark: Reel color is similar between two sources as above.

4.4 Label on Reel and Pizza Box



Remark: Besides differences of label listed in packing material, QC signet is printed on the label at 2nd Source.



5.0 Physical Differences/Changes:



		1 st Source					2 nd Source				
	Inc	hes		Millime	ters Inches		Millimeters			Changed?	
DIM	MIN	МАХ	ΜΙΝ	МАХ	Actual AVE	MIN	MAX	ΜΙΝ	МАХ	Actual AVE	onangeu
Α	0.156	0.181	3.950	4.600	4.32	0.16	0.17	4.100	4.300	4.16	No
В	0.189	0.220	4.800	5.600	5.34	0.19	0.21	4.800	5.200	5.00	No
С	0.049	0.069	1.250	1.750	1.37	0.05	0.06	1.250	1.450	1.36	No
D	0.088	0.116	2.250	2.950	2.65	0.10	0.11	2.600	2.800	2.70	No
Е	0.030	0.059	0.750	1.500	1.06	0.03	0.04	0.750	1.100	0.85	No
F	0.005	0.010	0.125	0.250	0.15	0.00	0.01	0.125	0.250	0.15	No
G	0.035	0.043	0.900	1.100	1.05	0.04	0.04	0.920	1.080	1.05	No
н	0.123	3 typ.	3.12	typ.		0.12	3 typ.	3.12	typ.		No
I	0.047	7 typ.	1.20	typ.		0.04	7 typ.	1.20	typ.		No
J	0.060) typ.	1.52	typ.		0.06	0 typ.	1.52	typ.		No

6.0 Reliability Test Results Summary:

Test Items	Condition	S/S	Results	ETR #
Pre-conditioning	JESD22-A113 1089 0/1089			
High Temperature, DC Blocking(HTRB)	Bias = VR,Ta = 150°C Duration = 1008 Hours 462 0/462			
Temperature Cycle(TC)	Ta = -55°C to +150°C Duration = 1000 Cycles 15 minutes dwell	363	0/363	
High Temperature & Humidity with Bias(H3TRB)	Ta = 85°C, 85% RH Bias=VR Duration = 1008 Hours	363	0/363	ETR150877
UHAST Unbiased Highly Accelerated Stress Test (UHAST)	Ta = 130°C, 85%RH, 2ATM Duration = 96 Hours	363	0/363	ETR152255 ETR150873
Resistance to Solder Heat(RSH)	260°C,10 seconds	90	0/90	
Moisture Sensitivity Level(MSL)	Per Jedec J-STD-020D Level 1	132	0/132	
Solderability	ANSI-J-STD-002	66	0/66	
DPA	Random sample of devices that have successfully completed H3TRB or HAST, and TC.	4	0/4	

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 **TPSMA6L5.0A**, **TPSMA6L28A** and **TPSMA6L85A** to cover TPSMA6L series products.

Temp °C	% FR/khrs	MTBF (K)	FITS
30	0.00000760	13163061.53	0.08
60	0.00023856	419175.11	2.39
80	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

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

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. Characterization data is available upon request.

Test Items	Condition	S/S	Results	ETR #
Parametric	V _{BR} , I _R	100	0/100	ETR150886
VF	Datasheet condition	100	0/100	ETR150887
Surge Out test	1 hit, at 25°C from rated IPP, 0.1 IPP step	100	0/100	ETR150971
Surge Life test	1 hit,30 hits, 1.0IPP	100	0/100	ETR150972 ETR150973 ETR150975

8.0 Changed Part Identification:

There is no Part used in affected products.

9.0 <u>Recommendations & Conclusions:</u>

Based on the test results, it is determined that the alternative backend location is qualified and certified for production of above listed Littelfuse products.

10.0 <u>Approvals:</u>

<u>Yaling Fan</u> Outsourcing Assembly and Test Manager Littelfuse, Wuxi <u>Peter Liu</u> Asia OSAT Product Engineering Manager Littelfuse, Wuxi

Package	Part Number
DO221AC	TPSMA6L10A
DO221AC	TPSMA6L11A
DO221AC	TPSMA6L12A
DO221AC	TPSMA6L13A
DO221AC	TPSMA6L14A
DO221AC	TPSMA6L15A
DO221AC	TPSMA6L16A
DO221AC	TPSMA6L17A
DO221AC	TPSMA6L18A
DO221AC	TPSMA6L20A
DO221AC	TPSMA6L22A
DO221AC	TPSMA6L24A
DO221AC	TPSMA6L26A
DO221AC	TPSMA6L26A-CL
DO221AC	TPSMA6L28A
DO221AC	TPSMA6L30A
DO221AC	TPSMA6L31A
DO221AC	TPSMA6L33A
DO221AC	TPSMA6L36A
DO221AC	TPSMA6L40A
DO221AC	TPSMA6L43A
DO221AC	TPSMA6L45A
DO221AC	TPSMA6L48A
DO221AC	TPSMA6L5.0A
DO221AC	TPSMA6L51A
DO221AC	TPSMA6L54A
DO221AC	TPSMA6L58A
DO221AC	TPSMA6L6.0A
DO221AC	TPSMA6L6.5A
DO221AC	TPSMA6L60A
DO221AC	TPSMA6L64A
DO221AC	TPSMA6L7.0A
DO221AC	TPSMA6L7.5A
DO221AC	TPSMA6L70A
DO221AC	TPSMA6L75A
DO221AC	TPSMA6L78A
DO221AC	TPSMA6L8.0A
DO221AC	TPSMA6L8.5A
DO221AC	TPSMA6L85A
DO221AC	TPSMA6L9.0A