



PCN Report

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Date : 11/1/2021
Device : DO-214AA/AC Package Product
Revision : 1

1.0 Objective:

The purpose of this project is to qualify an additional assembly/test location of SMBJ, P6SMB Series housed in DO-214AA(SMB) package and SMAJ, P4SMA Series housed in DO-214AC(SMA) package. Succeeding pages summarize the electrical and reliability test performed in qualification lots.

2.0 Applicable Devices:

Package	Part Numbers
DO-214AA	SMBJ5.0A/CA~8.5A/CA, SMBJ9.0A/CA~85A/CA, SMBJ90A/CA~250A/CA
	P6SMB6.8A/CA~9.1A/CA, P6SMB10A/CA~91A/CA, P6SMB100A/CA~300A/CA
DO-214AC	SMAJ9.0A/CA~43A/CA, SMAJ45A~85A
	P4SMA10A/CA~47A/CA, P4SMA51A~91A

3.0 Reliability Test Results Summary:

DO-214AA SMBJ/P6SMB				
Test Items	Condition	S/S per PN	Results	ETR #
Pre-conditioning	24hrs 125°C bake/ 168hrs 85%rh, 85°C soak/3 times 260°C peak temp. reflow	120	0/120	ETR158908 ETR158910 ETR160710 ETR161882
High Temperature, DC Blocking(HTRB)	At 150°C for 1008hrs, bias rated VR	77	0/77	
Temperature Cycle(TC)	-55°C&150°C, 1000 cycles, 15 minutes dwell	40	0/40	
High Temperature & Humidity with Bias(H3TRB)	85°C, 85%RH for 1008hrs bias rated VR	40	0/40	
UHAST Unbiased Highly Accelerated Stress Test (UHAST)	Ta = 130°C, 85%RH, 2ATM Duration = 96 Hours	40	0/40	
Resistance to Solder Heat(RSH)	260°C, 10 seconds	30	0/30	
Moisture Sensitivity Level(MSL)	Per Jedec J-STD-020D Level 1	22	0/22	
Solderability	ANSI-J-STD-002	22	0/22	

DO-214AC SMAJ/P4SMA				
Test Items	Condition	S/S per PN	Results	ETR #
Pre-conditioning	24hrs 125°C bake/ 168hrs 85%rh, 85°C soak/3 times 260°C peak temp. reflow	120	0/360	ETR158919 ETR160712
High Temperature, DC Blocking(HTRB)	At 150°C for 1008hrs, bias rated VR	77	0/240	
Temperature Cycle(TC)	-55°C&150°C, 1000 cycles, 15 minutes dwell	40	0/120	
High Temperature & Humidity with Bias(H3TRB)	85°C, 85%RH for 1008hrs bias rated VR	40	0/120	
UHAST Unbiased Highly Accelerated Stress Test (UHAST)	Ta = 130°C, 85%RH, 2ATM Duration = 96 Hours	40	0/120	
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	
Solderability	ANSI-J-STD-002	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 SMBJ5.0A, SMBJ5.0CA, SMBJ85CA, P6SMB200A, P6SMB300CA, SMAJ24A, SMAJ33A, SMAJ40CA.

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

Temp °C	% FR/khrs	MTBF (K)	FITS
30	0.00001	17490735	0.06
55	0.00011	947835	1.1
85	0.00204	49062	20.4
100	0.00749	13344	74.9
125	0.05278	1895	527.8
150	0.29514	339	2951.4

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.

4.0 Electrical Characteristic Summary:

There is no change in electrical characteristics. Characterization data is available upon request.

5.0 Packing Method

5.1 Packing Material

Packing	Current site	New additional site
Tape	Hot seal carrier tape	Hot seal carrier tape
Reel	Dark Blue Plastic Reel, 13 inches	Blue Plastic Reel, 13 inches
Pizza Box	345mm*336.5mm*21mm	
Label	Size: 70mmx38mm	Size: 70mmx40mm
Outside Box	350mm*350mm*50mm (1 to 2 Pizza Box) 350mm*350mm*100mm (3 to 4 Pizza Box) 350mm*350mm*195mm (5 to 8 Pizza Box) 350mm*350mm*345mm (9 to 14 Pizza Box)	

5.2 Reel

Current site

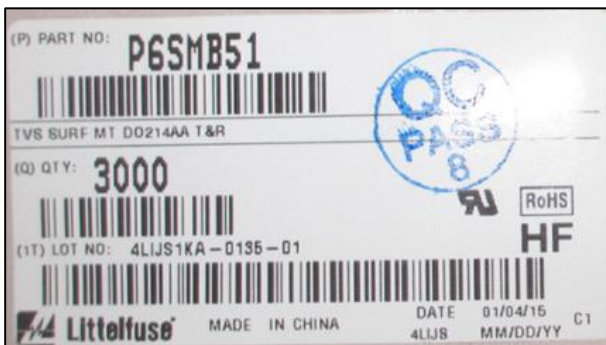


New additional site

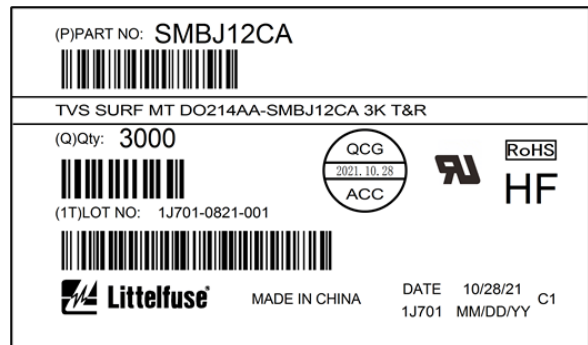


5.3 Label

Current site



New additional site



6 Changed Part Identification:

There is no Part used in affected products.



7 Recommendations & Conclusions:

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

8 Approvals:

Yaling Fan
OSAT Operation Manager
Littelfuse, Wuxi

Peter Liu
Asia OSAT Product Engineering Manager
Littelfuse, Wuxi



Appendix I –Affected part number list

Package	Standard Part Numbers
DO-214AA	SMBJ5.0A
DO-214AA	SMBJ5.0CA
DO-214AA	SMBJ6.0A
DO-214AA	SMBJ6.0CA
DO-214AA	SMBJ6.5A
DO-214AA	SMBJ6.5CA
DO-214AA	SMBJ7.0A
DO-214AA	SMBJ7.0CA
DO-214AA	SMBJ7.5A
DO-214AA	SMBJ7.5CA
DO-214AA	SMBJ8.0A
DO-214AA	SMBJ8.0CA
DO-214AA	SMBJ8.5A
DO-214AA	SMBJ8.5CA
DO-214AA	SMBJ9.0A
DO-214AA	SMBJ9.0CA
DO-214AA	SMBJ10A
DO-214AA	SMBJ10CA
DO-214AA	SMBJ11A
DO-214AA	SMBJ11CA
DO-214AA	SMBJ12A
DO-214AA	SMBJ12CA
DO-214AA	SMBJ13A
DO-214AA	SMBJ13CA
DO-214AA	SMBJ14A
DO-214AA	SMBJ14CA
DO-214AA	SMBJ15A
DO-214AA	SMBJ15CA
DO-214AA	SMBJ16A
DO-214AA	SMBJ16CA
DO-214AA	SMBJ17A
DO-214AA	SMBJ17CA
DO-214AA	SMBJ18A
DO-214AA	SMBJ18CA
DO-214AA	SMBJ20A
DO-214AA	SMBJ20CA
DO-214AA	SMBJ22A
DO-214AA	SMBJ22CA
DO-214AA	SMBJ24A
DO-214AA	SMBJ24CA
DO-214AA	SMBJ26A
DO-214AA	SMBJ26CA
DO-214AA	SMBJ28A
DO-214AA	SMBJ28CA
DO-214AA	SMBJ30A
DO-214AA	SMBJ30CA
DO-214AA	SMBJ33A
DO-214AA	SMBJ33CA
DO-214AA	SMBJ36A
DO-214AA	SMBJ36CA

Package	Standard Part Numbers
DO-214AA	P6SMB6.8A
DO-214AA	P6SMB6.8CA
DO-214AA	P6SMB7.5A
DO-214AA	P6SMB7.5CA
DO-214AA	P6SMB8.2A
DO-214AA	P6SMB8.2CA
DO-214AA	P6SMB9.1A
DO-214AA	P6SMB9.1CA
DO-214AA	P6SMB10A
DO-214AA	P6SMB10CA
DO-214AA	P6SMB11A
DO-214AA	P6SMB11CA
DO-214AA	P6SMB12A
DO-214AA	P6SMB12CA
DO-214AA	P6SMB13A
DO-214AA	P6SMB13CA
DO-214AA	P6SMB15A
DO-214AA	P6SMB15CA
DO-214AA	P6SMB16A
DO-214AA	P6SMB16CA
DO-214AA	P6SMB18A
DO-214AA	P6SMB18CA
DO-214AA	P6SMB20A
DO-214AA	P6SMB20CA
DO-214AA	P6SMB22A
DO-214AA	P6SMB22CA
DO-214AA	P6SMB24A
DO-214AA	P6SMB24CA
DO-214AA	P6SMB27A
DO-214AA	P6SMB27CA
DO-214AA	P6SMB30A
DO-214AA	P6SMB30CA
DO-214AA	P6SMB33A
DO-214AA	P6SMB33CA
DO-214AA	P6SMB36A
DO-214AA	P6SMB36CA
DO-214AA	P6SMB39A
DO-214AA	P6SMB39CA
DO-214AA	P6SMB43A
DO-214AA	P6SMB43CA
DO-214AA	P6SMB47A
DO-214AA	P6SMB47CA
DO-214AA	P6SMB51A
DO-214AA	P6SMB51CA
DO-214AA	P6SMB56A
DO-214AA	P6SMB56CA
DO-214AA	P6SMB58CA
DO-214AA	P6SMB58A
DO-214AA	P6SMB62A
DO-214AA	P6SMB62CA



DO-214AA	SMBJ40A
DO-214AA	SMBJ40CA
DO-214AA	SMBJ43A
DO-214AA	SMBJ43CA
DO-214AA	SMBJ45A
DO-214AA	SMBJ45CA
DO-214AA	SMBJ48A
DO-214AA	SMBJ48CA
DO-214AA	SMBJ51A
DO-214AA	SMBJ51CA
DO-214AA	SMBJ54A
DO-214AA	SMBJ54CA
DO-214AA	SMBJ58A
DO-214AA	SMBJ58CA
DO-214AA	SMBJ60A
DO-214AA	SMBJ60CA
DO-214AA	SMBJ64A
DO-214AA	SMBJ64CA
DO-214AA	SMBJ70A
DO-214AA	SMBJ70CA
DO-214AA	SMBJ75A
DO-214AA	SMBJ75CA
DO-214AA	SMBJ78A
DO-214AA	SMBJ78CA
DO-214AA	SMBJ85A
DO-214AA	SMBJ85CA
DO-214AA	SMBJ90A
DO-214AA	SMBJ90CA
DO-214AA	SMBJ100A
DO-214AA	SMBJ100CA
DO-214AA	SMBJ110A
DO-214AA	SMBJ110CA
DO-214AA	SMBJ120A
DO-214AA	SMBJ120CA
DO-214AA	SMBJ130A
DO-214AA	SMBJ130CA
DO-214AA	SMBJ150A
DO-214AA	SMBJ150CA
DO-214AA	SMBJ160A
DO-214AA	SMBJ160CA
DO-214AA	SMBJ170A
DO-214AA	SMBJ170CA
DO-214AA	SMBJ180A
DO-214AA	SMBJ180CA
DO-214AA	SMBJ188A
DO-214AA	SMBJ188CA
DO-214AA	SMBJ200A
DO-214AA	SMBJ200CA
DO-214AA	SMBJ220A
DO-214AA	SMBJ220CA
DO-214AA	SMBJ250A
DO-214AA	SMBJ250CA

DO-214AA	P6SMB68A
DO-214AA	P6SMB68CA
DO-214AA	P6SMB75A
DO-214AA	P6SMB75CA
DO-214AA	P6SMB82A
DO-214AA	P6SMB82CA
DO-214AA	P6SMB91A
DO-214AA	P6SMB91CA
DO-214AA	P6SMB100A
DO-214AA	P6SMB100CA
DO-214AA	P6SMB110A
DO-214AA	P6SMB110CA
DO-214AA	P6SMB120A
DO-214AA	P6SMB120CA
DO-214AA	P6SMB130A
DO-214AA	P6SMB130CA
DO-214AA	P6SMB150A
DO-214AA	P6SMB150CA
DO-214AA	P6SMB160A
DO-214AA	P6SMB160CA
DO-214AA	P6SMB170A
DO-214AA	P6SMB170CA
DO-214AA	P6SMB180A
DO-214AA	P6SMB180CA
DO-214AA	P6SMB200A
DO-214AA	P6SMB200CA
DO-214AA	P6SMB220A
DO-214AA	P6SMB220CA
DO-214AA	P6SMB250A
DO-214AA	P6SMB250CA
DO-214AA	P6SMB300A
DO-214AA	P6SMB300CA



Package	Standard Part Numbers
DO-214AC	SMAJ9.0A
DO-214AC	SMAJ9.0CA
DO-214AC	SMAJ10A
DO-214AC	SMAJ10CA
DO-214AC	SMAJ11A
DO-214AC	SMAJ11CA
DO-214AC	SMAJ12A
DO-214AC	SMAJ12CA
DO-214AC	SMAJ13A
DO-214AC	SMAJ13CA
DO-214AC	SMAJ14A
DO-214AC	SMAJ14CA
DO-214AC	SMAJ15A
DO-214AC	SMAJ15CA
DO-214AC	SMAJ16A
DO-214AC	SMAJ16CA
DO-214AC	SMAJ17A
DO-214AC	SMAJ17CA
DO-214AC	SMAJ18A
DO-214AC	SMAJ18CA
DO-214AC	SMAJ20A
DO-214AC	SMAJ20CA
DO-214AC	SMAJ22A
DO-214AC	SMAJ22CA
DO-214AC	SMAJ24A
DO-214AC	SMAJ24CA
DO-214AC	SMAJ26A
DO-214AC	SMAJ26CA
DO-214AC	SMAJ28A
DO-214AC	SMAJ28CA
DO-214AC	SMAJ30A
DO-214AC	SMAJ30CA
DO-214AC	SMAJ33A
DO-214AC	SMAJ33CA
DO-214AC	SMAJ36A
DO-214AC	SMAJ36CA
DO-214AC	SMAJ40A
DO-214AC	SMAJ40CA
DO-214AC	SMAJ43A
DO-214AC	SMAJ43CA
DO-214AC	SMAJ45A
DO-214AC	SMAJ48A
DO-214AC	SMAJ51A
DO-214AC	SMAJ54A
DO-214AC	SMAJ58A
DO-214AC	SMAJ60A
DO-214AC	SMAJ64A
DO-214AC	SMAJ70A
DO-214AC	SMAJ75A
DO-214AC	SMAJ78A
DO-214AC	SMAJ85A

Package	Standard Part Numbers
DO-214AC	P4SMA10A
DO-214AC	P4SMA10CA
DO-214AC	P4SMA11A
DO-214AC	P4SMA11CA
DO-214AC	P4SMA12A
DO-214AC	P4SMA12CA
DO-214AC	P4SMA13A
DO-214AC	P4SMA13CA
DO-214AC	P4SMA15A
DO-214AC	P4SMA15CA
DO-214AC	P4SMA16A
DO-214AC	P4SMA16CA
DO-214AC	P4SMA18A
DO-214AC	P4SMA18CA
DO-214AC	P4SMA20A
DO-214AC	P4SMA20CA
DO-214AC	P4SMA22A
DO-214AC	P4SMA22CA
DO-214AC	P4SMA24A
DO-214AC	P4SMA24CA
DO-214AC	P4SMA27A
DO-214AC	P4SMA27CA
DO-214AC	P4SMA30A
DO-214AC	P4SMA30CA
DO-214AC	P4SMA33A
DO-214AC	P4SMA33CA
DO-214AC	P4SMA36A
DO-214AC	P4SMA36CA
DO-214AC	P4SMA39A
DO-214AC	P4SMA39CA
DO-214AC	P4SMA43A
DO-214AC	P4SMA43CA
DO-214AC	P4SMA47A
DO-214AC	P4SMA47CA
DO-214AC	P4SMA51A
DO-214AC	P4SMA56A
DO-214AC	P4SMA62A
DO-214AC	P4SMA68A
DO-214AC	P4SMA75A
DO-214AC	P4SMA82A
DO-214AC	P4SMA91A