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Littelfuse, WX  
East 1# Zhen Fa 6 Road  
Shuo Fang Industrial Park  
Wuxi, Jiangsu 214142

## Product Qualification Report

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To: Those who may concern

From: Haipeng Xu, Senior Product Engineer, Littelfuse, Wuxi

Date: Feb 12<sup>th</sup>, 2020 – Rev.A

Subject: **Qualification Test Result for 2<sup>nd</sup> Plating Source Suyang of Surface Mounted Automotive/Hi-rel TVS in Wuxi Site LFPCN41342**

### **Purpose:**

This report is to inform the successful qualification test results of plating 2<sup>nd</sup> source Suyang associated with surface mounted automotive/Hi-rel TVS in Wuxi site.

### **Conclusion:**

According to the qualification result, Littelfuse concluded that Suyang is qualified as the 2<sup>nd</sup> plating source for surface mounted automotive/Hi-rel TVS in Wuxi site.

Best Regards,

Haipeng Xu

Senior Product Engineer  
Littelfuse Semiconductor

### 1. Qualification Test Vehicle

Part Number	Package Type	Product Type
TPSMB200CA	SMB	automotive
SMBJ16A-HRA	SMB	hi-rel
SMBJ30CA-001	SMB	hi-rel
TPSMD22A	SMC	automotive
TPSMC47CA	SMC	automotive
SMDJ7.5CA-HRA	SMC	hi-rel
SLD8S22A	SM-TO263	automotive

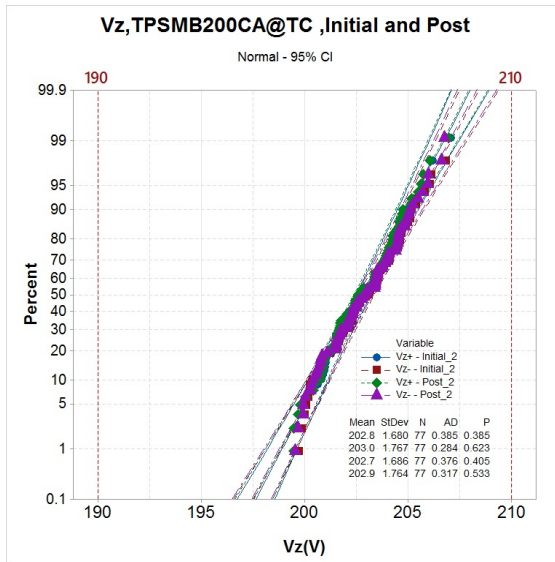
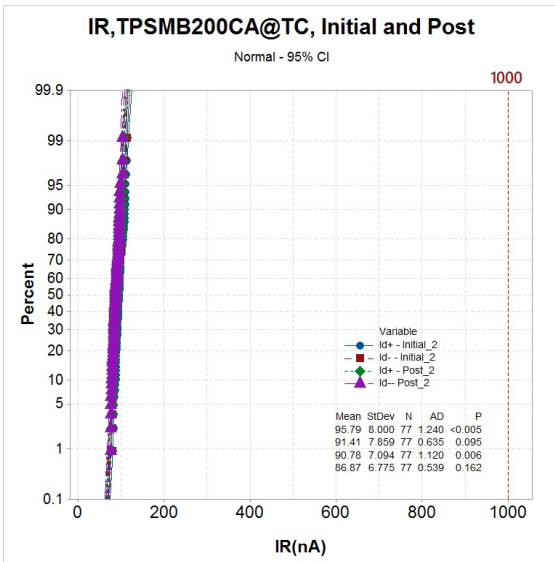
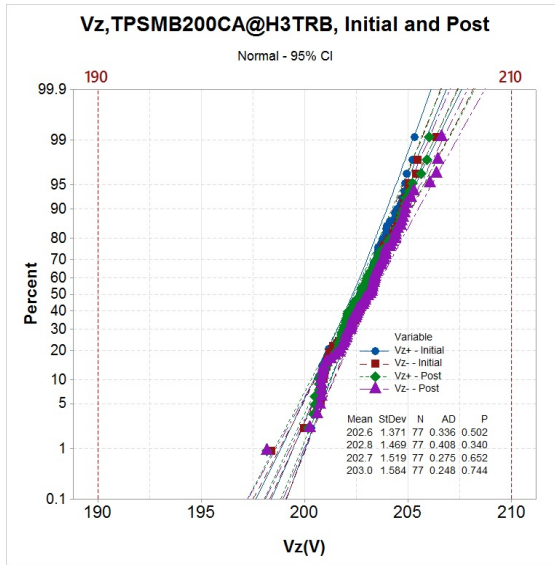
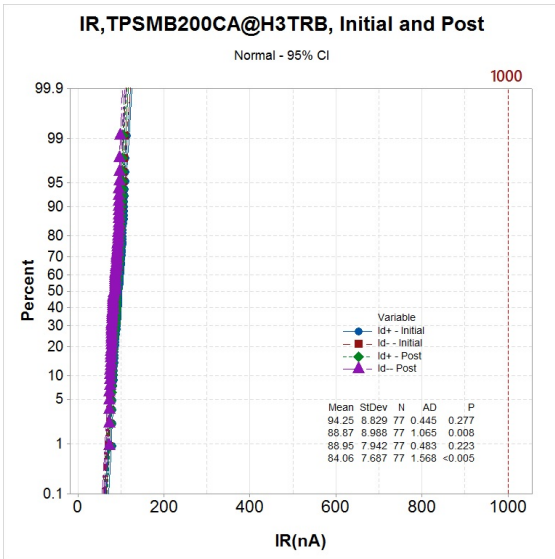
### 2. Qualification Test Items and Result Summary

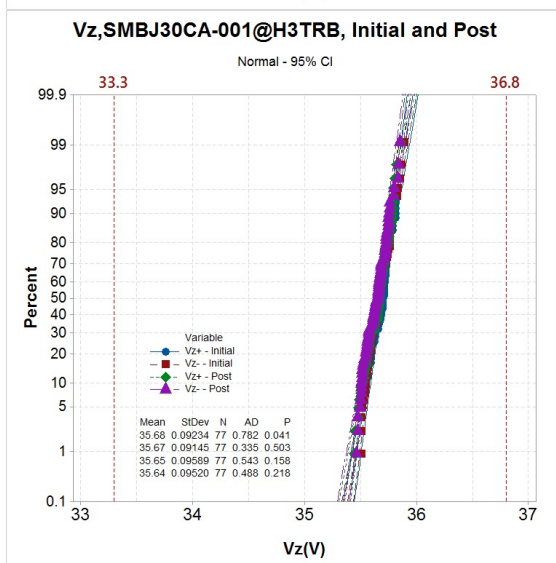
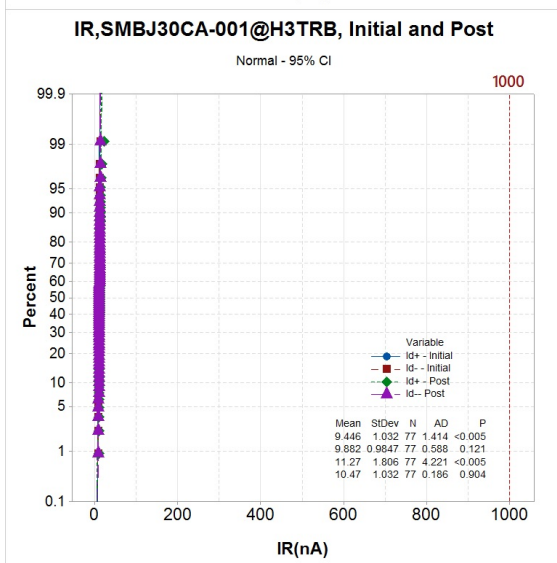
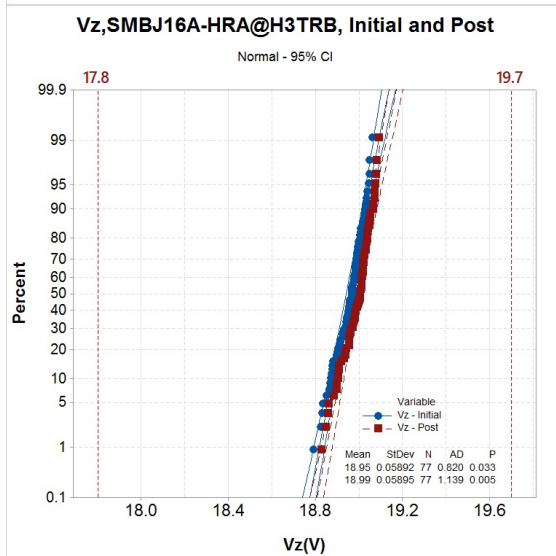
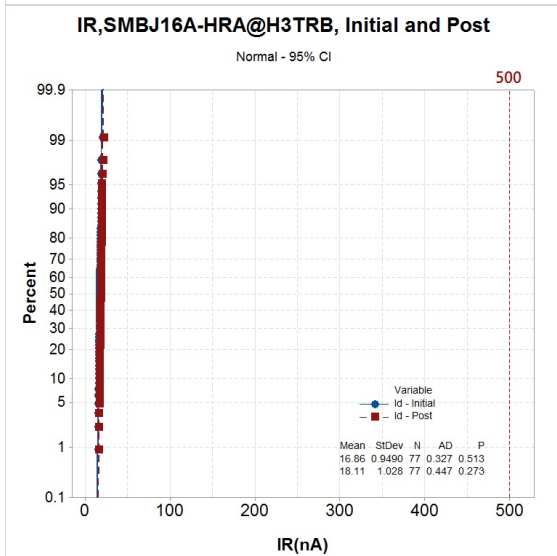
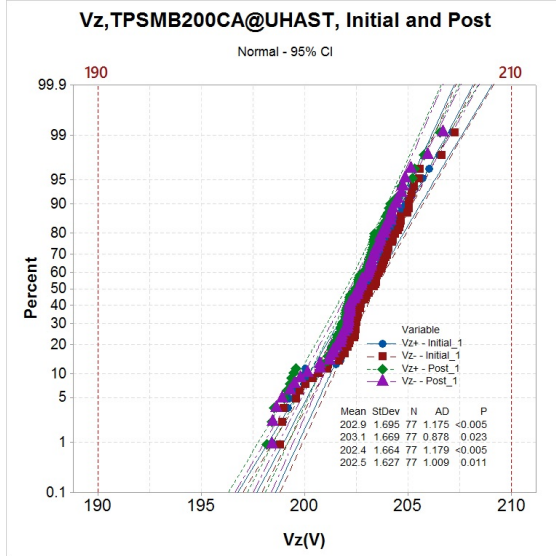
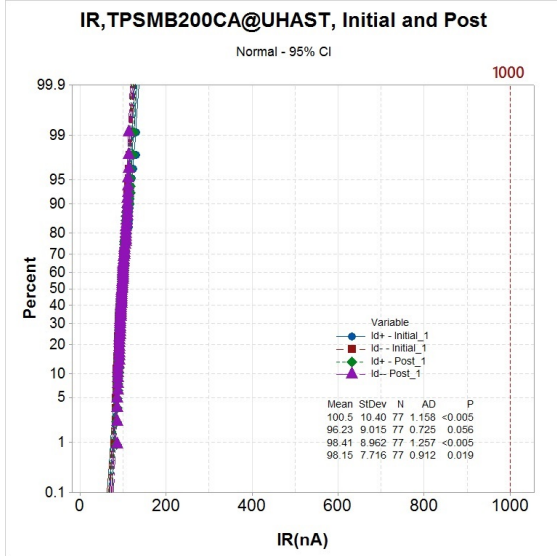
Reliability Test	Part Number	S. S	Test Condition	Test Ref #	Ref. Spec	Result Fail/Total
Pre-conditioning	TPSMB200CA	231	24hr 125°C bake, 168hrs 85°C/85% humidity storage, 3 times Reflow	127603	JESD22A-113	0/1155
	SMBJ16A-HRA	77		128412		
	SMBJ30CA-001	77		128846		
	TPSMD22A	231		130455		
	TPSMC47CA	154		127282		
	SMDJ7.5CA-HRA	154		128846		
	SLD8S22A	231		130160		
High Humidity High Temp. Reverse Bias (H3TRB)	TPSMB200CA	77	TA: 85°C, RH: 85%, 1000hr, Reverse biased at V <sub>R</sub> or max 100V	127603	JESD22A-101	0/539
	SMBJ16A-HRA	77		128412		
	SMBJ30CA-001	77		128846		
	TPSMD22A	77		130455		
	TPSMC47CA	77		127282		
	SMDJ7.5CA-HRA	77		128846		
	SLD8S22A	77		130160		
Unbiased Highly Accelerated Stress Test (UHAST)	TPSMB200CA	77	96 hours at TA=130°C/85%RH.	127603	JESD22A-118	0/385
	TPSMD22A	77		130455		
	TPSMC47CA	77		127282		
	SMDJ7.5CA-HRA	77		128846		
	SLD8S22A	77		130160		
Temperature Cycling (TC)	TPSMB200CA	77	TA: -55°C to +150°C, dwell time >15mins, 1,000 cycle)	127603	JESD22A-104	0/231
	TPSMD22A	77		130455		
	SLD8S22A	77		130160		
Solderability	TPSMB200CA	10	245°C ± 5°C, 5 ± 0.5s	TINPWW001-F3	J-STD002	0/70
	SMBJ16A-HRA	10				
	SMBJ30CA-001	10				
	TPSMD22A	10				
	TPSMC47CA	10				
	SMDJ7.5CA-HRA	10				
	SLD8S22A	10				

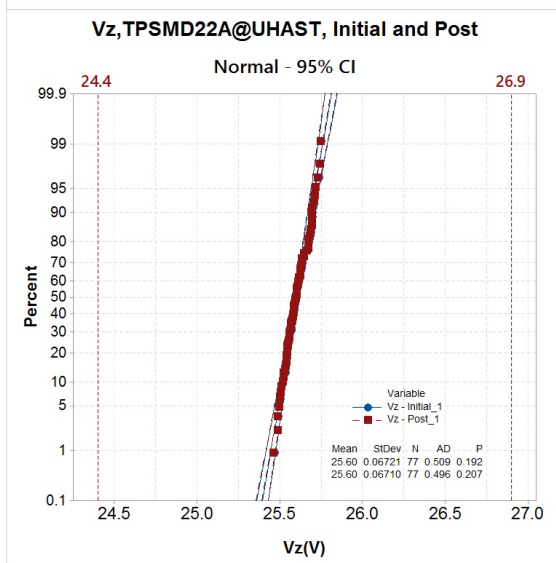
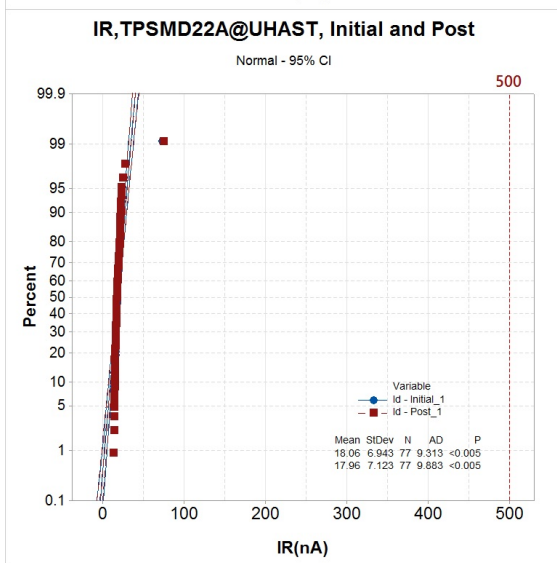
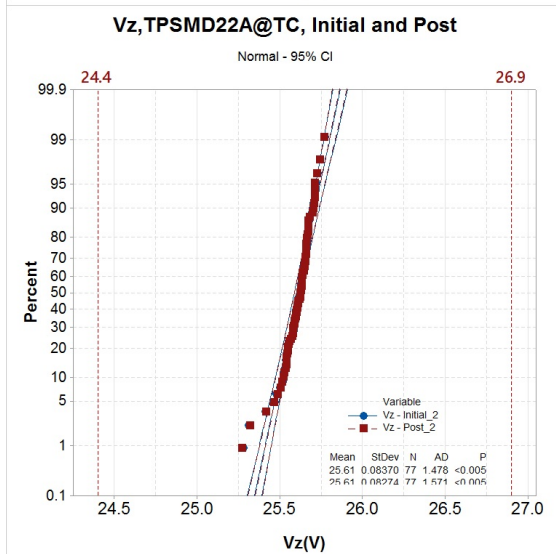
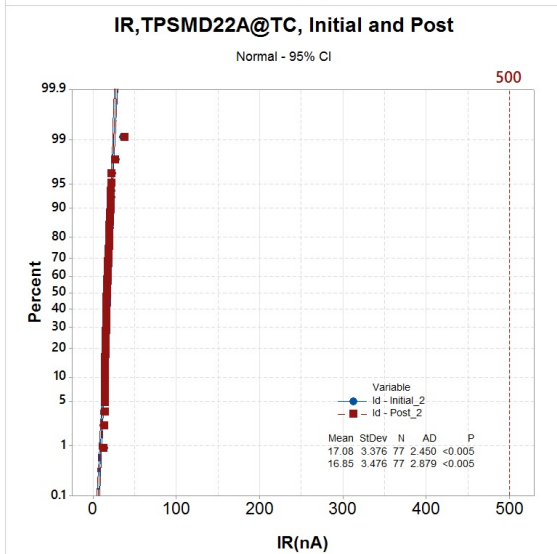
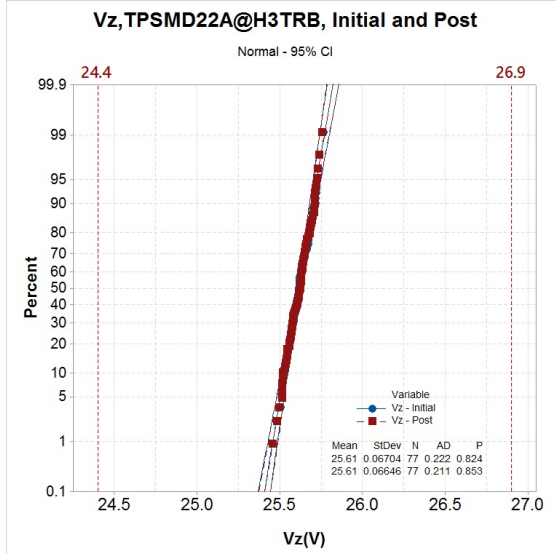
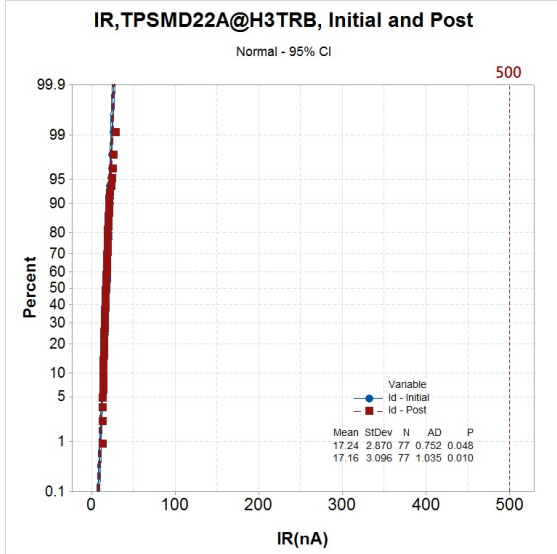
## Appendix 1: Leakage drift and distribution in stress tests

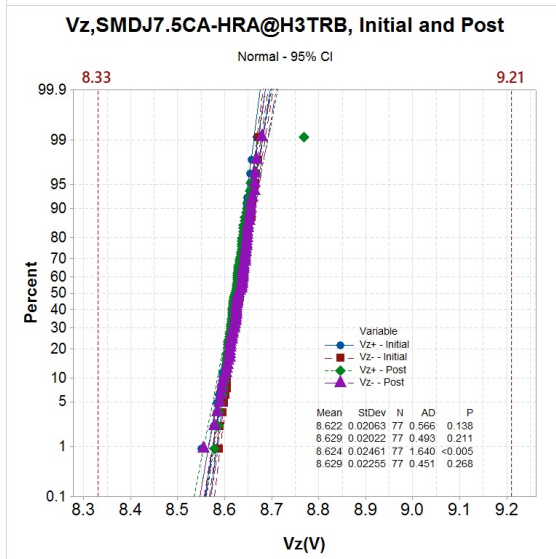
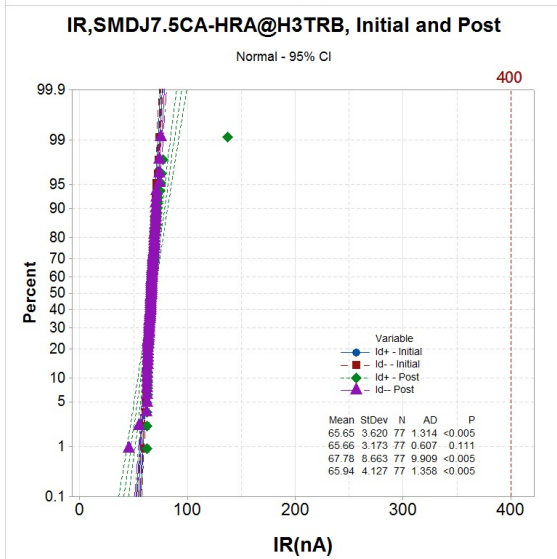
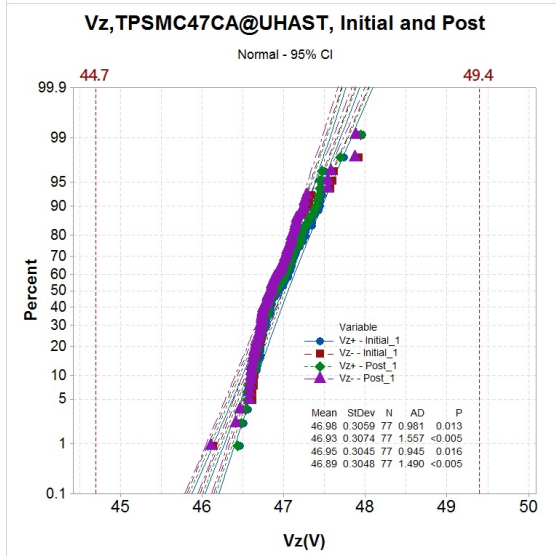
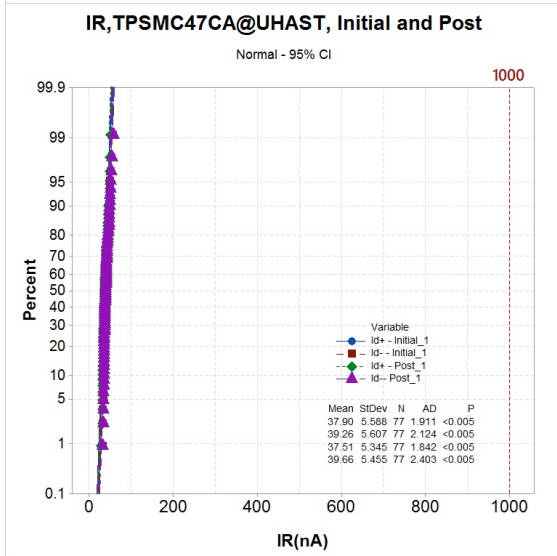
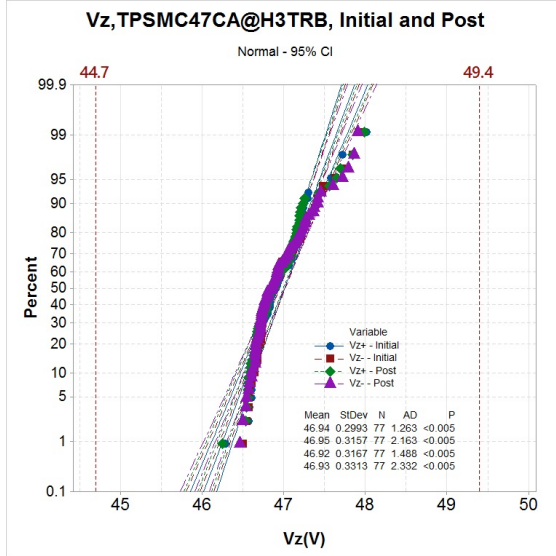
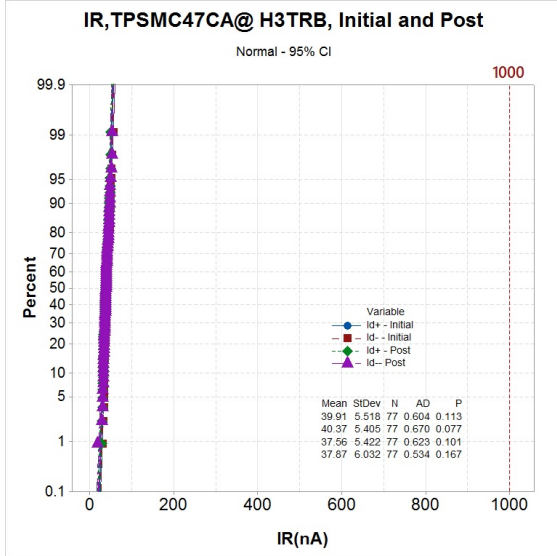
All qual vehicles pass reliability test and meet the drift requirement of AEC-Q101.

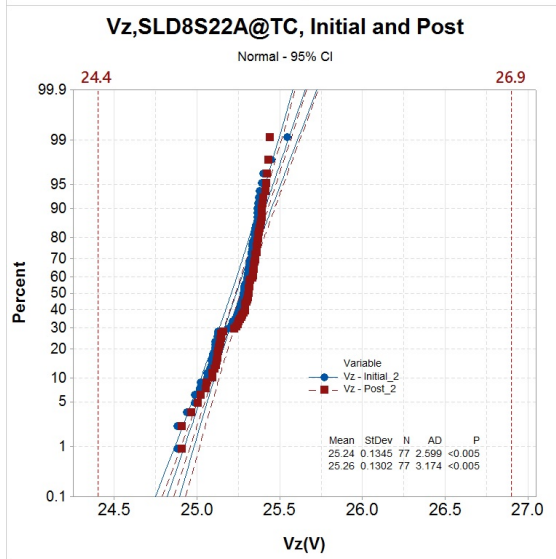
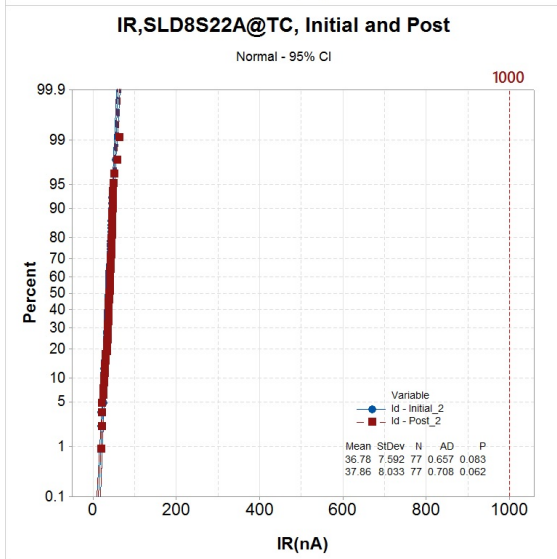
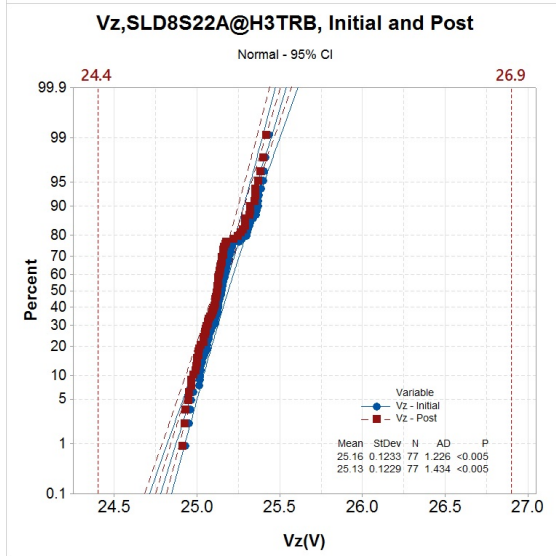
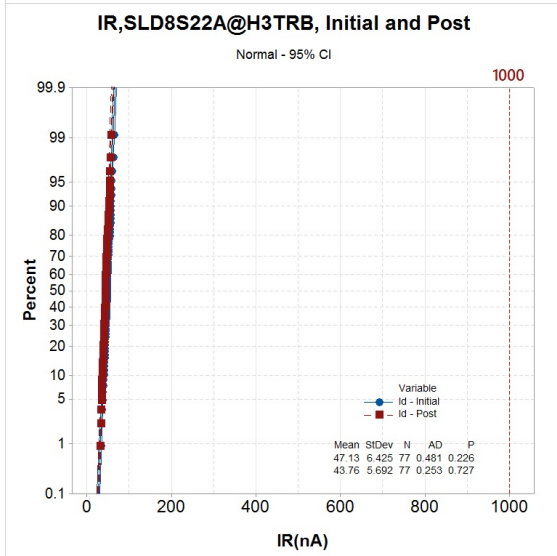
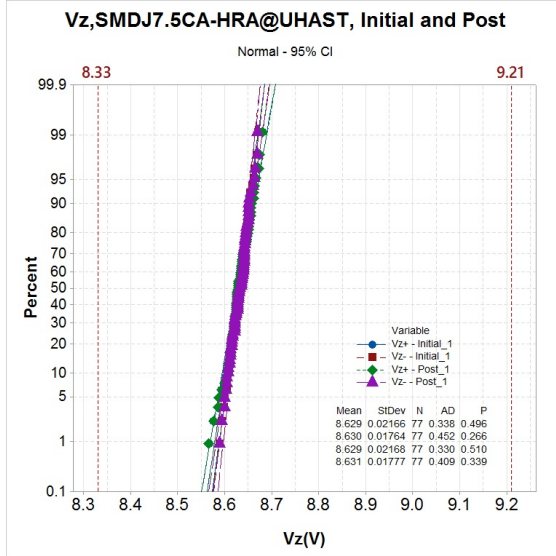
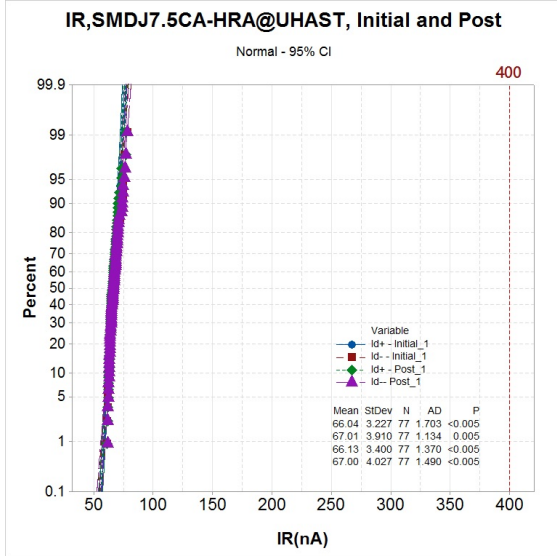
Note: The reference line is equal to or tighter than the specification defined in datasheet.

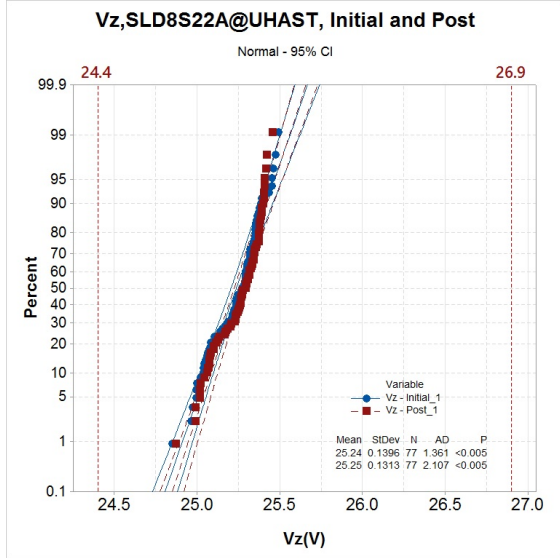
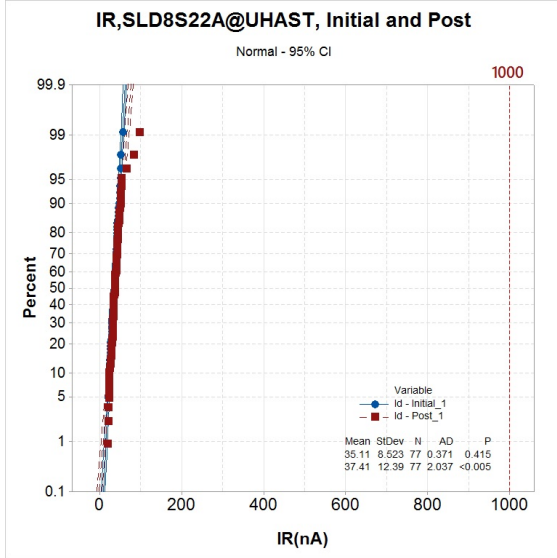
















### Certificate of Registration

This certifies that the Quality Management System of

## Jiangyin Sunny Orient Technology Co.,Ltd.

No.8-6, Xiangyang Road, Xiangyang Village, HuashiTown,  
Jiangyin City, Jiangsu Province, China214421

Has been assessed by NSF-ISR and found to be in conformance to the following standard(s):

### IATF 16949:2016

**Scope of Registration:**  
Manufacture of Electroplate Tin Parts

**Exclusions:** Product Design

	IATF Certificate Number: 0341773 Certificate Number: CNIAIF035193 Certificate Issue Date: 08-NOV-2018 Registration Date: 03-NOV-2018 Expiration Date*: 02-NOV-2021	 Carl Blazik, Director, Technical Operations & Business Units, NSF-ISR, Ltd.
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 \*Company is audited for conformance at regular intervals. To verify registration call (888) NSF-9000 or visit our web site at www.nsf-ISR.org



## Certificate of Approval

This is to certify that the Management System of:

### Jiangyin Sunny Orient Technology Co., Ltd.

No.1 Xiangyang Road, Xiangyang Village, Huashi Town, Jiangyin City, Jiangsu Province 214421, China

Unified Social Credit Code: 9132020057818605902

has been approved by LRQA to the following standards:

ISO 9001:2015  
GB/T 19001-2016



Rhett Wang - Area Operations Manager, Greater China  
 Issued by: Lloyd's Register Quality Assurance (Shanghai) Co., Ltd.  
 for and on behalf of: Lloyd's Register Quality Assurance Limited

Current issue date: 11 December 2018  
 Expiry date: 10 December 2021  
 Certificate identity number: 10157064

Original approval(s):  
 ISO 9001 – 11 December 2012

Approval number(s): ISO 9001 – 0071560

The scope of this approval is applicable to:  
 Assembly and testing of semiconductor discrete components and integrated circuits.



The certificate can be checked for validity on CMAA website (www.cmaa.gov.cn) 30 working days after the date of issuance. This approval is subject to surveillance assessment carried out in accordance with the LRQA assessment and certification procedures.  
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## Appendix 2: Affected PN list

TPSMB			TPSMB-VR		
TPSMB7.5A	TPSMB56CA	TPSMB300CA-A	TPSMB6.5A-VR	TPSMB36A-VR	TPSMB160A-VR
TPSMB8.2A	TPSMB58A	TPSMB350A-A	TPSMB7.0A-VR	TPSMB36CA-VR	TPSMB160CA-VR
TPSMB9.1A	TPSMB58CA	TPSMB350CA-A	TPSMB7.5A-VR	TPSMB40A-VR	TPSMB170A-VR
TPSMB10A	TPSMB62A	TPSMB400CA-A	TPSMB8.0A-VR	TPSMB40CA-VR	TPSMB170CA-VR
TPSMB10CA	TPSMB62CA	TPSMB440CA-A	TPSMB8.5A-VR	TPSMB43A-VR	TPSMB180A-VR
TPSMB11A	TPSMB64A	TPSMB400A-A	TPSMB8.5CA-VR	TPSMB43CA-VR	TPSMB180CA-VR
TPSMB11CA	TPSMB64CA	TPSMB440A-A	TPSMB9.0A-VR	TPSMB45A-VR	TPSMB188A-VR
TPSMB12A	TPSMB68A	TPSMB480A-A	TPSMB9.0CA-VR	TPSMB45CA-VR	TPSMB188CA-VR
TPSMB12CA	TPSMB68CA	TPSMB480CA-A	TPSMB10A-VR	TPSMB48A-VR	TPSMB200A-VR
TPSMB13A	TPSMB75A	TPSMB510A-A	TPSMB10CA-VR	TPSMB48CA-VR	TPSMB200CA-VR
TPSMB13CA	TPSMB75CA	TPSMB510CA-A	TPSMB11A-VR	TPSMB51A-VR	TPSMB220A-VR
TPSMB15A	TPSMB82A	TPSMB520A-A	TPSMB11CA-VR	TPSMB51CA-VR	TPSMB220CA-VR
TPSMB15CA	TPSMB82CA	TPSMB520CA-A	TPSMB12A-VR	TPSMB54A-VR	TPSMB250A-VR
TPSMB16A	TPSMB91A	TPSMB530A-A	TPSMB12CA-VR	TPSMB54CA-VR	TPSMB250CA-VR
TPSMB16CA	TPSMB91CA	TPSMB530CA-A	TPSMB13A-VR	TPSMB58A-VR	TPSMB300A-VR
TPSMB18A	TPSMB100A	TPSMB540A-A	TPSMB13CA-VR	TPSMB58CA-VR	TPSMB300CA-VR
TPSMB18CA	TPSMB100CA	TPSMB540CA-A	TPSMB14A-VR	TPSMB60A-VR	TPSMB350A-VR
TPSMB20A	TPSMB110A	TPSMB550A-A	TPSMB14CA-VR	TPSMB60CA-VR	TPSMB350CA-VR
TPSMB20CA	TPSMB110CA	TPSMB550CA-A	TPSMB15A-VR	TPSMB64A-VR	TPSMB400A-VR
TPSMB22A	TPSMB120A	TPSMB600CA-A	TPSMB15CA-VR	TPSMB64CA-VR	TPSMB400CA-VR
TPSMB22CA	TPSMB120CA	TPSMB650CA-A	TPSMB16A-VR	TPSMB70A-VR	TPSMB440A-VR
TPSMB24A	TPSMB130A		TPSMB16CA-VR	TPSMB70CA-VR	TPSMB440CA-VR
TPSMB24CA	TPSMB130CA		TPSMB17A-VR	TPSMB75A-VR	
TPSMB27A	TPSMB150A		TPSMB17CA-VR	TPSMB75CA-VR	
TPSMB27CA	TPSMB150CA		TPSMB18A-VR	TPSMB78A-VR	
TPSMB30A	TPSMB160A		TPSMB18CA-VR	TPSMB78CA-VR	
TPSMB30CA	TPSMB160CA		TPSMB20A-VR	TPSMB85A-VR	
TPSMB33A	TPSMB170A		TPSMB20CA-VR	TPSMB85CA-VR	
TPSMB33CA	TPSMB170CA		TPSMB22A-VR	TPSMB90A-VR	
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TPSMB47A	TPSMB220A		TPSMB28CA-VR	TPSMB120CA-VR	
TPSMB47CA	TPSMB220CA		TPSMB30A-VR	TPSMB130A-VR	
TPSMB51A	TPSMB250A		TPSMB30CA-VR	TPSMB130CA-VR	
TPSMB51CA	TPSMB250CA		TPSMB33A-VR	TPSMB150A-VR	
TPSMB56A	TPSMB300A-A		TPSMB33CA-VR	TPSMB150CA-VR	

TPSMC		TPSMC-VR		TPSMD		SLD8S
TPSMC12A	TPSMC82A	TPSMC11A-VR	TPSMC51A-VR	TPSMD10A	TPSMD48A	SLD8S12A
TPSMC12CA	TPSMC82CA	TPSMC11CA-VR	TPSMC51CA-VR	TPSMD11A	TPSMD48CA	SLD8S13A
TPSMC13A	TPSMC91A	TPSMC12A-VR	TPSMC54A-VR	TPSMD12A	TPSMD48CA-T7	SLD8S14A
TPSMC13CA	TPSMC91CA	TPSMC12CA-VR	TPSMC54CA-VR	TPSMD13A	TPSMD51A	SLD8S15A
TPSMC15A	TPSMC100A	TPSMC13A-VR	TPSMC58A-VR	TPSMD14A	TPSMD51CA	SLD8S16A
TPSMC15CA	TPSMC200CA	TPSMC13CA-VR	TPSMC58CA-VR	TPSMD15A	TPSMD54A	SLD8S17A
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TPSMC43A		TPSMC30A-VR		TPSMD17CA		
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TPSMC47A		TPSMC33A-VR		TPSMD20CA		
TPSMC47CA		TPSMC33CA-VR		TPSMD22CA		
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TPSMC56CA		TPSMC40CA-VR		TPSMD30CA		
TPSMC62A		TPSMC43A-VR		TPSMD33CA		
TPSMC62CA		TPSMC43CA-VR		TPSMD36CA		
TPSMC68A		TPSMC45A-VR		TPSMD40CA		
TPSMC68CA		TPSMC45CA-VR		TPSMD43CA		
TPSMC75A		TPSMC48A-VR		TPSMD45A		
TPSMC75CA		TPSMC48CA-VR		TPSMD45CA		



<b>-1000</b>		
SMAJ6.0CA-1000	SMCJ6.0A-1000	SMDJ7.5CA-1000
SMAJ11A-1000	SMCJ6.0CA-1000	SMDJ10A-1000
SMAJ11CA-1000	SMCJ6.5A-1000	SMDJ10CA-1000
SMAJ15A-1000	SMCJ6.5CA-1000	SMDJ11A-1000
SMAJ20A-1000	SMCJ10A-1000	SMDJ11CA-1000
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SMBJ16A-1000	SMCJ60A-1000	5.0SMDJ40A-1000
SMBJ16CA-1000	SMCJ60CA-1000	5.0SMDJ40CA-1000
SMBJ20A-1000	SMDJ6.0A-1000	5.0SMDJ43A-1000
SMBJ20CA-1000	SMDJ6.0CA-1000	5.0SMDJ43CA-1000
SMBJ36A-1000	SMDJ6.5A-1000	5.0SMDJ45A-1000
SMBJ36CA-1000	SMDJ6.5CA-1000	5.0SMDJ45CA-1000
SMBJ48A-1000	SMDJ7.0A-1000	5.0SMDJ60A-1000
SMBJ48CA-1000	SMDJ7.0CA-1000	5.0SMDJ60CA-1000
SMBJ150CA-1000	SMDJ7.5A-1000	

