台灣半導體股份有限公司
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comparison report

Prepared by May Zhang
Checked by Venkey
Approved by Keller
Issued date at 2017.2.16
Reversion for A

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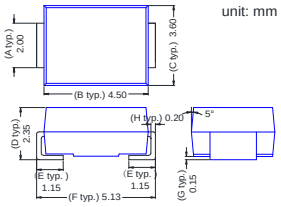
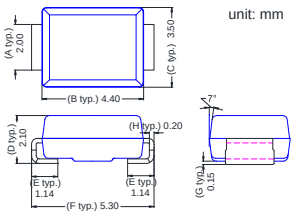
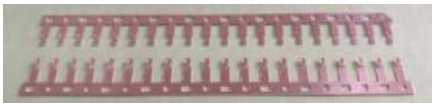
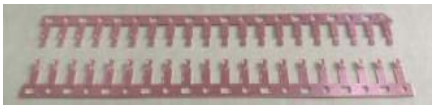
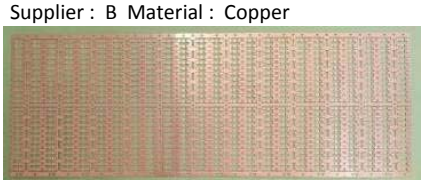
Comparison report

Subject PCN NO: PCN17014
Consumer SMB Comparison Report

No	Item	Before	After	Remark
1	**Processes**	manual SMB production line	1.manual SMB production line 2.fully-automated SMB production line	Refer the attached 1.Processes Comparison
2	**General appearance**	Follow D/S POD refer to the attached	Follow D/S POD refer to the attached	Refer the attached 2.SMB Appearance
3	**Package Outline**	Follow D/S Spec. 	Follow D/S Spec. 	
4	**Lead Frame**	Supplier : A Material : Copper 	1. manual SMB Supplier : A Material : Copper  2. fully-automated SMB Supplier : B Material : Copper 	
5	**Molding Compound**	Consumer (Non-HF) Type: EME-1100 Supplier : A Material : Epoxy Consumer (HF) Type: EME-E110 Supplier : A Material : Epoxy	1.manual SMB Consumer (Non-HF) Type: EME-1100 Supplier : A Material : Epoxy Consumer (HF) Type: EME-E110 Supplier : A Material : Epoxy 2. fully-automated SMB Consumer (Non-HF) Type: EME-66XX series Supplier : B Material : Epoxy Consumer (HF) Type: EME-E500 Supplier : A Material : Epoxy	

6	**Marking**	Marking no square around datecode	1.manual SMB Marking no special square around datecode 2. fully-automated SMB Marking add special square around datecode	Refer the attached 6.Marking
7	**Packing**	refer to the attached	refer to the attached	Refer the attached 7.Packing

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PPAP

(Production Part Approval Process)

Customer：		ALL
Customer Part Number：		SS22 ~ SS215
Part Number：		SS22 ~ SS215
Ordering Code :		SS2xHR2/ SS2xHR3
Qualification :	☑	AEC-Q101 Qualified
	☐	Non AEC-Q101 Qualified
Purpose:	☑	New Part Approval
	☐	PCN
	☐	Annual validation
Application :	☑	Automotive
	☐	Others
PPAP Level :		3

Prepared by：	Benny Yeh
Approved by：	Brian Bie
Date：	29th Sep. 2016
Doc No:	HPP16092913A

****** TSC PPAP format based on ZVEI/ PPA VDA 2 / AIAG 4th edition. ******

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Change History of this PPAP documentation

Rev.	Date	Item / Section	Essential Changes
A	2016/9/29	All pages	Creation

TSC generic family P/N including as follows：

☑ : Identifies P/N we used for this family qualification.

Family Defination is based on AEC-Q101 Rev.D

- ☐ SS22
- ☐ SS23
- ☐ SS24
- ☐ SS25
- ☑ SS26
- ☐ SS29
- ☐ SS210
- ☑ SS215

- ☐ Green compound.
- ☑ Non-Green compound.

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Index

項目 Item	說明 Description	Available YES	Available N/A	Included YES	Included No	Comment
1.	設計記錄 Design Record	☑	☐	☑	☐	
2.	工程變更通知書 Authorized Engineering Change Documents (PCN)	☑	☐	☑	☐	
3.	客戶批准書 Customer Engineering Approval	☑	☐	☑	☐	
4.	設計潛在的失效模式及效應分析 Design FMEA	☑	☐	☐	☑	Confidential Docs not Included.
5.	過程流程圖 Process Flow Diagrams	☑	☐	☑	☐	
6.	過程潛在失效模式及效應分析 Process FMEA	☑	☐	☐	☑	Confidential Docs not Included.
7.	控制計劃 Control Plan	☑	☐	☐	☑	Confidential Docs not Included.
8.	量測系統分析 Measurement System Analysis Studies (GR&R)	☑	☐	☑	☐	
9.	全尺寸測量結果 Dimensional Results	☑	☐	☑	☐	
10.	材料/性能試驗結果記錄 Material, Performance Test Results	☑	☐	☑	☐	
11.	初始過程研究 Initial Process Study	☑	☐	☑	☐	
12.	合格實驗室文件 Qualified Laboratory Documentation	☑	☐	☐	☑	List the hyperlinks
13.	外觀批准報告 Appearance Approval Report	☐	☑	☐	☐	
14.	生產件樣品 Sample Production Parts	☑	☐	☐	☑	Via Marketing
15.	標準樣品 Master Sample	☐	☑	☐	☐	
16.	檢驗治具 Checking Aids	☐	☑	☐	☐	
17	客戶特殊要求 Customer-Specific Requirements	☐	☑	☐	☐	
18	零件提交保證書 Part Submission Warrant (PSW)	☑	☐	☑	☐	

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1 Certification of design, construction and qualification

Item Name	Supplier Response
1. User's Part Number:	SS22 ~ SS215
2. Supplier Part Number/Generic Part Number:	SS22 ~ SS215
3. Device Description:	2A, 20V - 150V Surface Mount Schottky Barrier Rectifiers
4. Wafer/Die Fab Location & Process ID: Site1	
a. Facility name/plant #:	Hangzhou Lion Microelectronics Co.,Ltd
b. Country:	China
5. Wafer/Die Fab Location & Process ID: Site2	N/A, Site1 only
a. Facility name/plant #:	
b. Country:	
6. Assembly Location & Process ID:	
a. Facility name/plant #:	Yangxin Everwell Electronic Co.,Ltd.
b. Country:	China
7. Final Quality Control A (Test) Location:	
a. Facility name/plant #:	Yangxin Everwell Electronic Co.,Ltd.
b. Country:	China
8. Wafer/Die:	
a. Wafer size:	6"
b. Die family:	Schottky
c. Die mask set revision & name:	Not available
9. Wafer/Die Technology Description:	
a. Wafer/Die process technology:	Planar Epitaxy
b. Gate oxide thickness (MOSFETs only):	Not available
c. Number of mask steps:	3
10. Die Dimensions:	
a. Die Height:	45mil
b. Die length:	45mil
c. Die thickness (finished):	280±10um
11. Die (frontside) Metallization:	
a. Die metallization material(s):	Ti-Ni-AG
b. Number of layers:	3 layers
c. Thickness :	Typical 4.75um
d. % of alloys (if present):	Not available
12. Die Passivation:	
a. Number of passivation layers:	1 layer
b. Die passivation material(s):	SiO2
c. Thickness(es) & tolerances:	Typical 0.4um

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1 Certification of design, construction and qualification

Item Name	Supplier Response
13. Die Overcoat Material (e.g., Polyimide):	Not available
14. Die Prep Backside:	
a. Die prep method:	Not available
b. Die metallization:	Ti-Ni-AG
c. Thickness(es) & tolerances:	Typical 1.72um
15. Die Separation Method:	
a. Kerf width (μm):	20~25um
b. Kerf depth (if not 100% saw):	100% saw
c. Saw method:	Single ☑ Dual ☐
16. Die Attach:	
a. Die attach material ID:	Solder paste
b. Die attach method:	Soldering
c. Die placement diagram:	See attached ☐ Not available ☑
17. Package:	
a. Type of package (e.g., plastic, ceramic,unpackaged):	Plastic
b. JEDEC designation (e.g., MS029, MS034,etc.):	SMB
18. Mold Compound:	
a. Mold compound supplier & ID:	Sumitomo BAKELITE(SUZHOU) CO.,LTD
b. Mold compound type:	EME-6650
c. Flammability rating:	UL 94 V1 ☐ UL 94 V0 ☑
d. Fire Retardant type/composition:	Brominated Epoxy Resin & Antimony Oxide
e. Tg (glass transition temperature)(°C):	Typ.150°C
19. Wire Bond:	Not available
a. Wire bond material:	
b. Wire bond diameter (mils):	
c. Type of wire bond at die:	
d. Type of wire bond at leadframe:	
20. Leadframe (if applicable):	
a. Header material:	Alloy Copper
b. Header diameter (mm):	Not available
c. Header length (mm):	Not available
d. Header plating composition:	Not available
e. Header plating thickness (μinch):	Not available
f. Leadframe material:	Alloy Copper
g. Leadframe bonding plating composition:	Not available
h. Leadframe bonding plating thickness(μinch):	Not available
i. External lead plating composition:	Matte tin
j. External lead plating thickness (um):	8~15um

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1 Certification of design, construction and qualification

Item Name	Supplier Response
21. Thermal Resistance: a. θJA °C/W (typical): b. θJL °C/W (typical):	 70 °C/W 24 °C/W
22. Maximum Process Exposure Conditions: a. MSL @ rated SnPb temperature: b. MSL @ rated Pb-free temperature:	* Note: Temperatures are as measured on the center of the plastic package body top surface. Level 1 at 85°C/85%RH (SnPb) Level 1 at 85°C/85%RH (Pb-free)
Attachments: 1. Die Photo 2. Package Outline Drawing 3. Die Cross-Section Photo/Drawing 4. Material Composition Declaration	Requirements: 1. A separate Certification of Design,Construction & Qualification must be submitted for each part number, wafer fab, and assembly location. 2. Design, Construction & Qualification shall be signed by the responsible individual at the supplier who can verify the above information is accurate and complete. Type name and sign below.
Completed by: Benny Yeh Date: 2016/09/29	Certified by: Brian Bie Date: 2016/09/29
Title: HQ Engineer	Title: HQ Engineer

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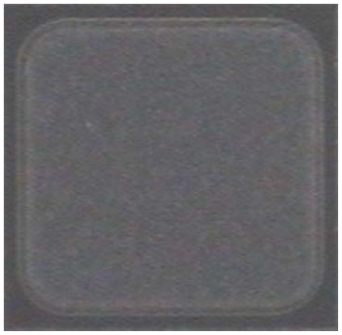
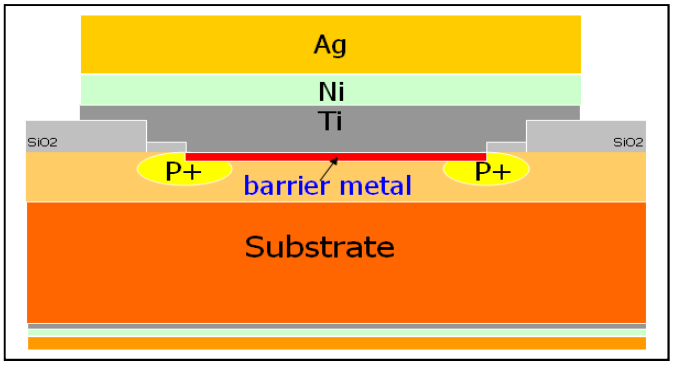
1 Certification of design, construction and qualification

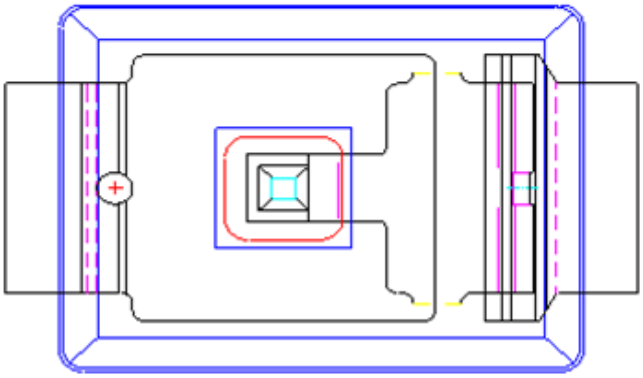
Die Photo

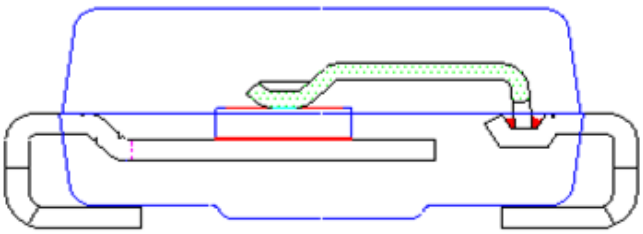


Die cross-section drawing



Inner structure drawing





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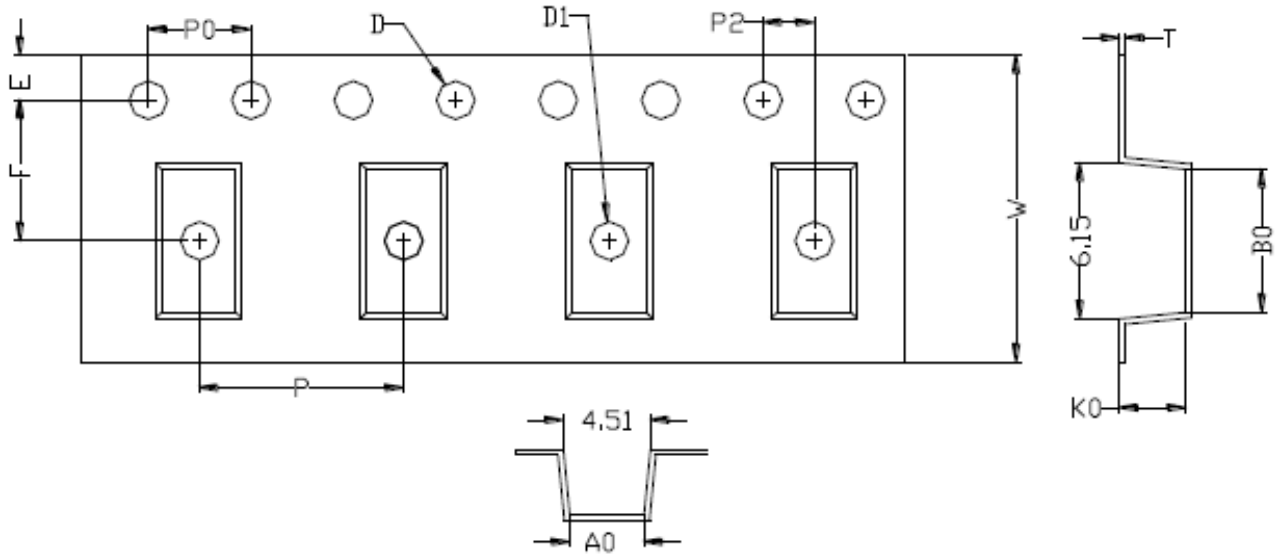
1 Certification of design, construction and qualification

Packing Information

1.Embossed Carrier Specification

User Direction of Feed



Unit : mm

DIM	W	P	E	F	D	D1	P0	P0*10	P2
Spec.	12 +0.3; -0.1	8 ±0.1	1.75 ±0.1	5.5 ±0.05	1.55 ±0.05	1.5 +0.25; -0	4 ±0.1	40 ±0.2	2 ±0.05

DIM	A0	B0	K0	T
Spec.	3.7 ±0.1	5.55 ±0.1	2.35 ±0.1	0.265 ±0.015

NOTE

A0,B0,K0 are determined by component size. The clearance between the component and the cavity must be within 0.05mm(.002")min. to 0.65mm(.025")max. for 12mm tape, 0.05mm(.002")min to 0.90mm(.035")max. for 16mm tape. In addition, the components cannot rotate more than 20° within the determined cavity.

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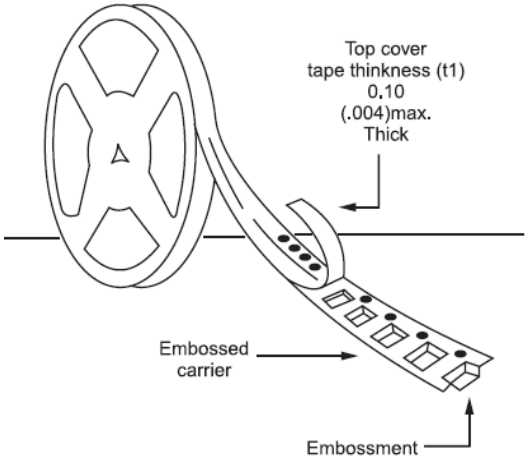
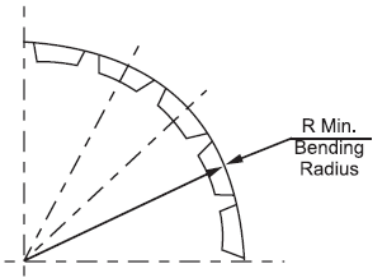
1 Certification of design, construction and qualification

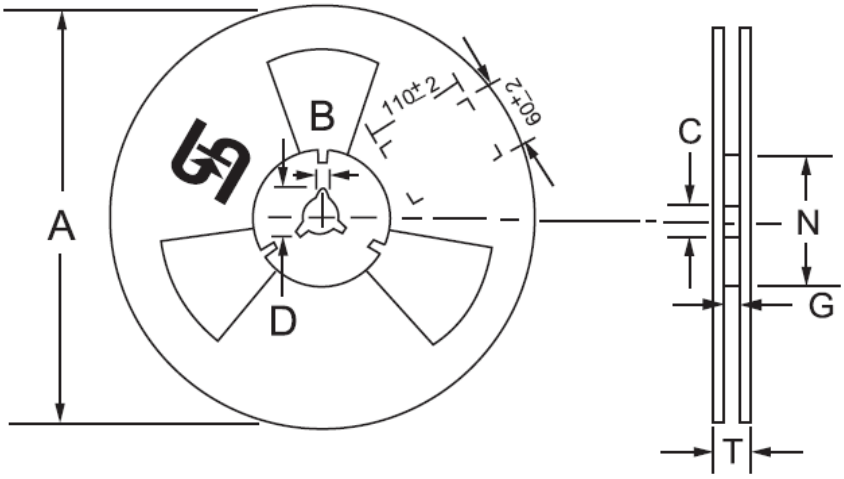
Packing Information

2. Reel Specification





Tape with components shall pass around bending radius without damage, for reels with hub diameters approaching minimum dimension



Unit : mm

Reel Size	Tape Size	A max	B ±0.5	C ±0.5	D min	N ±0.5	G (+2.0;-0)	T max
13"	12	330	2	13	20.2	75	12.4	18.4
7"	12	178	1.9	13	21	62	12.2	14.6

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1 Certification of design, construction and qualification

Packing Information

Min. Packing

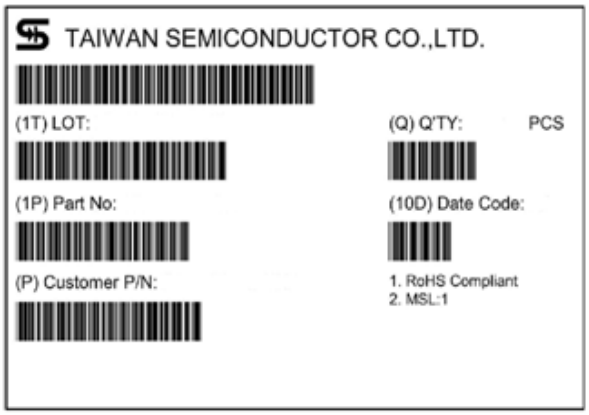
Reel

Pizza Box

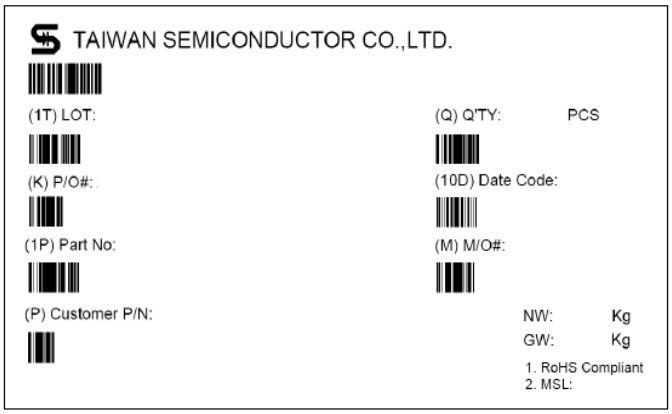
Outside Carton

3. Label

Bar-Code Label on Reel



Bar-Code Label on Carton



4. Order Information

Package	AEC-Q101 Qualified	Packing Code	Green Compound Code	Reel Size/ Material	Reel (pcs)	Carton (pcs)	Carton Size W*L*H (mm)
SMB	H	M4	G	13" Plastic	3000	30000	345x340x220
		R5		7" Plastic	850	17000	370x195x210

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2A, 20V - 150V Surface Mount Schottky Barrier Rectifiers

FEATURES

- Low power loss, high efficiency
- Ideal for automated placement
- Guardring for overvoltage protection
- High surge current capability
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

DO-214AA (SMB)

MECHANICAL DATA

Case: DO-214AA (SMB)
Molding compound, UL flammability classification rating 94V-0
Moisture sensitivity level: level 1, per J-STD-020
Part No. with suffix "H" means AEC-Q101 qualified
Packing code with suffix "G" means green compound (halogen-free)
Terminal: Matte tin plated leads, solderable per JESD22-B102
Meet JESD 201 class 2 whisker test
Polarity: Indicated by cathode band
Weight: 0.093 g (approximately)

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

PARAMETER	SYMBOL	SS 22	SS 23	SS 24	SS 25	SS 26	SS 29	SS 210	SS 215	UNIT
Maximum repetitive peak reverse voltage	V_{RRM}	20	30	40	50	60	90	100	150	V
Maximum RMS voltage	V_{RMS}	14	21	28	35	42	63	70	105	V
Maximum DC blocking voltage	V_{DC}	20	30	40	50	60	90	100	150	V
Maximum average forward rectified current	$I_{F(AV)}$	2								A
Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load	I_{FSM}	50								A
Maximum instantaneous forward voltage (Note 1) I_F= 2 A @ 25°C I_F= 2 A @ 100°C	V_F	0.5 0.4			0.70 0.65		0.85 0.70		0.95 0.80	V
Maximum reverse current @ rated V_R T_J=25°C	I_R	0.4					0.1			mA
Maximum reverse current @ rated V_R T_J=100°C	I_R	10			5		-			mA
Maximum reverse current @ rated V_R T_J=125°C	I_R	-			-		5			mA
Voltage rate of change (Rated V_R)	dV/dt	10000								V/μs
Typical thermal resistance	$R_{\theta JL}$ $R_{\theta JA}$	24 70								°C/W
Operating junction temperature range	T_J	- 55 to +125			- 55 to +150					°C
Storage temperature range	T_{STG}	- 55 to +150								°C

Note 1: Pulse test with PW=300μs, 1% duty cycle

ORDERING INFORMATION					
PART NO.	PART NO. SUFFIX	PACKING CODE	PACKING CODE SUFFIX	PACKAGE	PACKING
SS2xx (Note 1)	H	R5	G	SMB	850 / 7" Plastic reel
		R4		SMB	3,000 / 13" Paper reel
		M4		SMB	3,000 / 13" Plastic reel

Note 1: "xx" defines voltage from 20V (SS22) to 150V (SS215)

EXAMPLE					
PREFERRED PART NO.	PART NO.	PART NO. SUFFIX	PACKING CODE	PACKING CODE SUFFIX	DESCRIPTION
SS26HR5G	SS26	H	R5	G	AEC-Q101 qualified Green compound

RATINGS AND CHARACTERISTICS CURVES

(T_A=25°C unless otherwise noted)

FIG.1 MAXIMUM FORWARD CURRENT DERATING CURVE

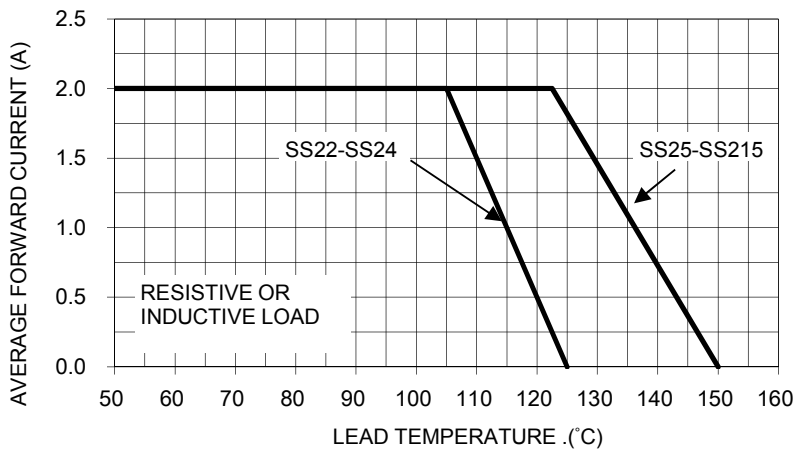


FIG. 2 MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

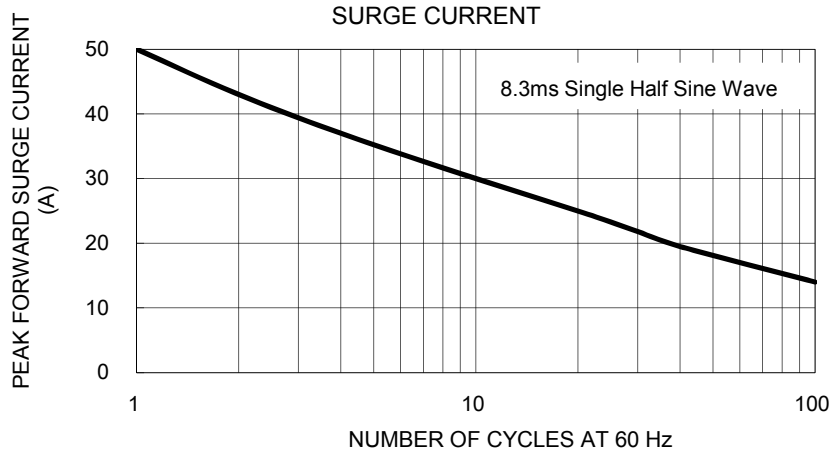


FIG. 3 TYPICAL FORWARD CHARACTERISTICS

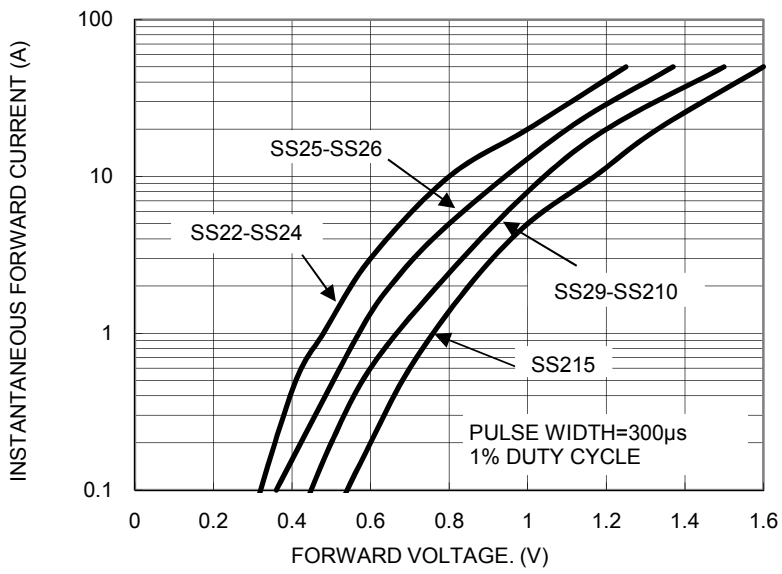


FIG. 4 TYPICALREVERSE CHARACTERISTICS

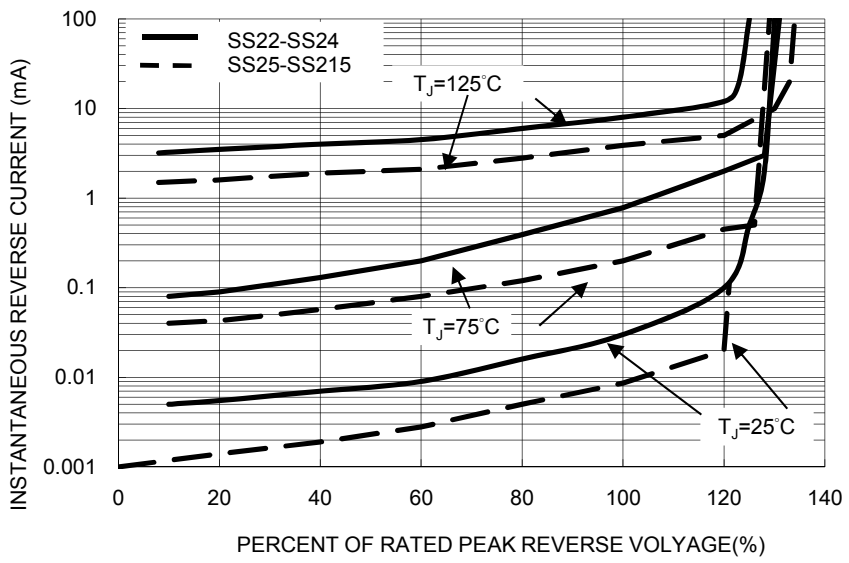
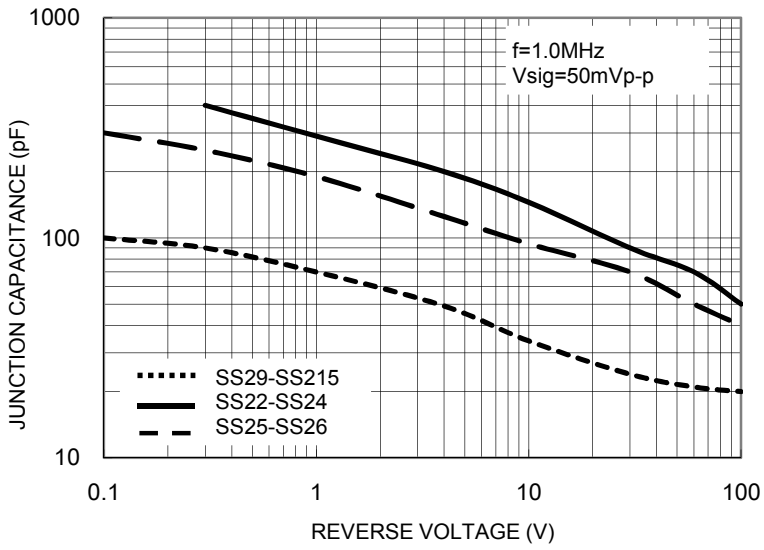
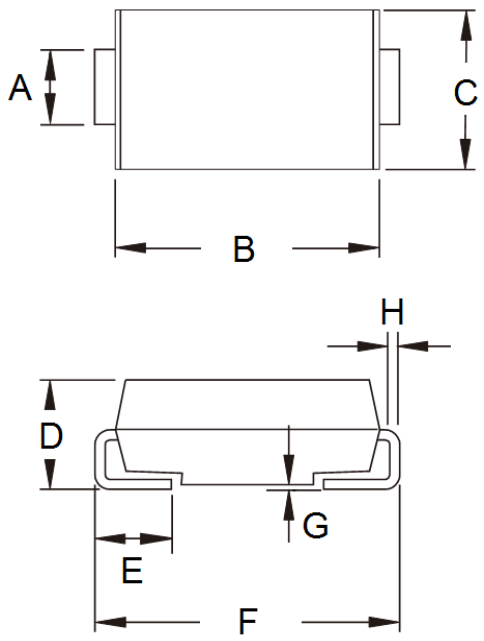


FIG. 5 TYPICAL JUNCTION CAPACITANCE



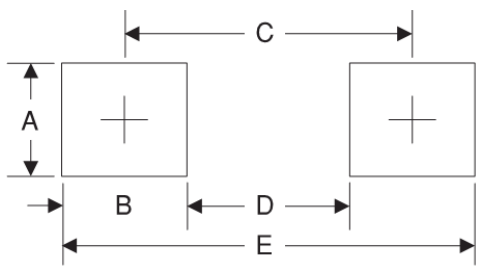
PACKAGE OUTLINE DIMENSIONS

DO-214AA (SMB)



DIM.	Unit (mm)		Unit (inch)	
	Min	Max	Min	Max
A	1.95	2.10	0.077	0.083
B	4.25	4.75	0.167	0.187
C	3.48	3.73	0.137	0.147
D	1.99	2.61	0.078	0.103
E	0.90	1.41	0.035	0.056
F	5.10	5.30	0.201	0.209
G	0.10	0.20	0.004	0.008
H	0.15	0.31	0.006	0.012

SUGGESTED PAD LAYOUT



Symbol	Unit (mm)	Unit (inch)
A	2.3	0.091
B	2.5	0.098
C	4.3	0.169
D	1.8	0.071
E	6.8	0.268

MARKING DIAGRAM

P/N = Specific Device Code
G = Green Compound
YW = Date Code
F = Factory Code

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Document Number: DS_D1409049 Version: J15

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1 Certification of design, construction and qualification

Materials Composition Declaration

Item	Material Name	Tradedname	Substance Name	CAS No.	Raw Material Proportion	Proportion	ID	Exemption
1	Dice	SKY Dice	Si	7440-21-3	95.21%	0.934%	RD-02	EX:7(C)-I
			Ag	7440-22-4	3.72%			
			Ni	7440-02-0	0.92%			
			Ti	7440-32-6	0.15%			
2	Solder	Solder Paste	Pb	7439-92-1	92.50%	2.634%	RS-01	EX:7a
			Sn	7440-31-5	5.00%			
			Ag	7440-22-4	2.50%			
3	Lead Frame	Alloy Copper	Cu	7440-50-8	99.81%	29.888%	ASM	
			Fe	7439-89-6	0.12%			
			P	7723-14-0	0.03%			
			Zn	7440-66-6	0.02%			
			Sn	7440-31-5	0.01%			
			Ni	7440-02-0	0.01%			
4	Lead Clip	Alloy Copper	Cu	7440-50-8	99.996%	11.895%	ASM	
			Suifur	7704-34-9	0.002%			
			P	7723-14-0	0.001%			
			O	80937-33-3	0.001%			
5	Epoxy	H MOLDING COMPOUND	Epoxy Resin A	Trade Secret	7.50%	54.425%	RM-05	
			Epoxy Resin B	Trade Secret	4.00%			
			Phenolic Resin	9003-35-4	0.50%			
			Antimony oxide(Sb2O3)	1309-64-4	3.00%			
			Brominated epoxy Resin	40039-93-8	78.50%			
			Silica(Amorphous)A	60676-86-0	2.50%			
			Silica(Amorphous)B	7631-86-9	3.50%			
			Carbon Black	1333-86-4	0.50%			
6	TIN LAYER	Tin	Sn	7440-31-5	100.00%	0.225%	RP-01	

Notes:

符合RoHS排外條款 It's apply to the exemption term

7(a). Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead)

7(C)-I. Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors.

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4 設計潛在的失效模式及后果分析 (Design Potential Failure Mode and Effect Analysis)

Cover Sheet of FMEA with reference number, date and revision.
Full FMEA is not included in the PPAP submission, FMEA is visible during visit TSC only.

项目: 矩阵式SMD
Item: Matrix SMD

产品型号: 矩阵式SMD系列
Product Type: Matrix SMD series

主要参加人: 张忠辉、秦义文、范桂芝、宋梅芳、李文宗、赵春明、杨俊峰、张学梅、焦鲁宾、路辉、冯云霞、姚静
Core Team: Eric, Reyn, Lucy, Meifang, Vince, Jaming, Junfeng, May, Roben, Shirley, Yunxia, Yao

過程責任部門：工程/制造/品管/維修
Process Responsibility:ENG/MFG/QRA/RM

关键日期：2014.6.2
Key Date: 2014.6.2

FMEA 编号: DFMEAYG11901-B 版次: B
FMEA Number: DFMEAYG11901-B Version: B

FMEA日期(编制): 2014.6.2 编制人: 李文宗
FMEA Date(Orig.): 2014.6.2 Edit by: Vince

FMEA 日期(修订): 2016.8.5 修订人: 李文宗
FMEA Date(Revise): 2016.8.5 Revise by: Vince

設計功能要求 Design function requirements		潜在的失效模式 Potential failure mode	潜在的失效后果 Potential effect(s)of failure	嚴重度 (S)	級別 Class	潜在的失效原因/機理 Potential cause(s)mechanism (s) of failure	频度 (O)	現行设计控制 Current design controls		探測度 (D)	風險順序數 (RPN)	建議的措施 Recommended actions(s)	責任及目標完成日期 Responsibility and target completion date	措施結果Action results				
								預防Prevention	探測Detection					采取的措施 Action taken	嚴重度數 (S)	頻度 (O)	探測度 (D)	風險順序數 (RPN)
基本功能-额定功率整流 Basic functions - Rated power rectifier	额定Io 下可以正常工作 Continuous working under rated Io	材料不能满足额定Io 要求 Cannot continuous work under rated Io	使用过程中材料失效 Device failed at field	8		晶粒尺寸选择错误，不能承受此Io Select improper die size and cannot bear rated Io	2	SMD 物料使用单 SMD BOM	评估报告 - 寿命试验 Qualification report - Op-life	3	48	无 None						
						支架Pad 尺寸小，散热不足 Lead frame Pad dimension too Small lead to thermal dissipation not suitable	3	设计评审 Design Review	评估报告 - 寿命试验 Qualification report - Op-life	3	72	无 None						
						Dimple 尺寸小，散热不足 Dimple of clip too small lead to thermal dissipation not suitable	3	设计评审 Design Review	评估报告 - 寿命试验 Qualification report - Op-life	3	72	无 None						

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5 過 程 流 程 图(Process flow chart)

Item: Matrix SMD **Documents No: HFCMS001-A**

Product Type: Matrix SMA/ Matrix SMB/ Matrix SMC SERIES

过程次序 Process step	过程流程 Process Step △检验 ○制造 □储存	过程次序 Process step	过程流程 Process Step △检验 ○制造 □储存
1	△ 进料检验 in-coming inspection	13	○ 切弯脚过程 Triming and Formming Process
2	□ 储存过程 Storage	14	△ 切弯脚检验 T/F inspection
3	○ 晶片切割 Wafer dicing	15	○ 測試过程(TMTT) TMTT Process
4	△ 切割检验 Dicing inspection	16	△ TMTT检验 TMTT inspection
5	○ 焊接 Soldering	17	△ 出货检测 Out-going inspection
6	△ 焊接检验 Soldering inspection	18	○ 包装过程 Packing process
7	○ 清洗 Cleaning	19	△ 包装检测 Packing inspection
8	△ 清洗检验 cleaning process inspection	20	□ 储存 Storage
9	○ 压模 Molding	21	△ 出货检测 Q.A inspection
10	△ 压模检验 Molding inspection	22	○ 交付 Delivery
11	○ 電鍍 Plating	23	
12	△ 电镀检测 Plating inspection	24	

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6 過程潛在失效模式及后果分析(Potential Failure Mode And Effects Analysis (Procss FMEA)

Cover Sheet of FMEA with reference number, date and revision.
Full FMEA is not included in the PPAP submission, FMEA is visible during visit TSC only.

項目: Matrix SMD
Item: Matrix SMD

產品型別: Matrix SMD
Product Type: Matrix SMD

主要參加人: 秦義文、李文宗、赵春明、杨俊峰、姚靜、路辉、张雪梅、邢恩芳、焦鲁宾
Core Team: Reyn /Vince/Jaming / Yjf/ Yao / Shirley/Yunxia/May/Enfang/Roben

設計責任部門 : 工程/制造/品管/維修
Design Responsibility:ENG/MFG/QRA/RM

關鍵日期: 2015.1.15
Key Date: 2015.1.15

FMEA編號: PFMEAYG11901-B
FMEA Number: PFMEAYG11901-B

版次: B
Version: B

FMEA日期(編制): 2015.1.15
FMEA Date(Orig.): 2015.1.15

编制人: 李文宗
Edit by: Vince

FMEA日期(修訂): 2016.8.5
FMEA Date(Revise): 2016.8.5

修訂人: 秦义文
Revise by: Reyn

站別代码 Station code	过程功能要求 Process function requirements	潛在的失效模式 Potential failure mode	潛在的失效后果 Potential effect(s)of failure	嚴重度 (S)	級別 Class	潛在的失效原因/機理 Potential cause(s)mechanism(s) of failure	频度 (O)	現行设计控制 Current design controls		探測度 (D)	風險順序數 (RPN)	建議的措施 Recommended actions(s)	責任及目標完成日期 Responsibility and target completion date	措施結果Action results				
								預防Prevention	探測Detection					采取的措施 Action taken	嚴重度數 (S)	頻度 (O)	探測度 (D)	風險順序數 (RPN)
I001	进料检验 IQC inspection 检验芯片电性 Test wafer electrical data	晶粒损伤 Die pre-damage	漏电大或者短路，在客户端出现失效 IR over/ short, failed at customer	8		芯片点测探针磨损 Probe pin wear out	2	探针寿命控制 Probe pin life control	芯片点测制程初件／自主检查 Probing process preliminary ,self check	4	64	无 None						
				8		芯片点测过程中探针或平台调整不当导致探针与芯片接触不良，测试过程中打火损伤晶粒 Poor contact between probe pin and wafer lead to arcing during test due to probe pin height and chuck table height not well adjust.	2	1. Calibrate chuck table flatness monthly. 2. Test Z axis accuracy monthly 3. Probe pin height is forbidden to adjust by stick label. 4. Adjust chuck height by golden gage according to check box which find contact point of probe pin and chuck table , then rise chuck table 0.10mm and confirm spring force less than 13g by precision electronic balance.	1. 操作员操作前使用标准片确认探针高度，但不能调整，如果出现异常需通知工程师处理 2. 芯片点测制程初件／自主检查 1. Operator check probe pin height by golden gage before working, inform engineer when abnormal find and cannot adjust probe pin height. 2. Probing process preliminary ,self check	3	48	无 None						

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7 控 制 计 划(Control Plan)

Detailed Control Plan is not included in the PPAP submission,
Control Plan is visible during visit TSC only.

☐ 样件 ☐ 试生产 ■ 生产 ☐Prototype ☐Pre-launch ■ Production 控制计划编号: Documents No: CPYG11902-B				主要联系人/电话 Key contact person/Telephone Venkey（+86-543-8691091-3101)					日期(编制） Date(Original) 2016.1.15		日期(修订） Date(Revise) 2016.8.5	版次 Revision B
零件编号/最新更改等级: Part number/Last change level:				核心小组 Core Team member 秦義文、李文宗、趙春明.、姚靜、 張學梅 、邢恩芳 、魏叢叢、王永方、牛知音、Venkey Reyn, Vince, Jaming, Yao, May, Enfang, Vicky, Stark, Jane, Venkey					顾客工程批准/日期(如需要）Customer engineer approval date(If req'd) N.A			
零件名称/描述 Part number/Description Matrix SMB				供方/工厂批准/日期 Supplier approval date					顾客质量批准/日期(如需要）Customer quality approval date (If req'd) N.A			
供方/工厂(Supplier plant) 陽信長威電子有限公司		供方代码(Code)		其他批准/日期（如需要）Other approval date(if req'd) N/A					其他批准/日期(如需要) Other approval date(if req'd) N/A			
步驟 Step	过程名称操作描述 Process name operation	机器/装置夹具/工装 Machine/Device/tools	特 性(Characterictics) 产品 Product	过程 Process	特殊特性分类 Spec.Char.	方法(method) 产品/过程规范/公差 Productr/Process/Spec./Tolerence	评价测量技术 Evaluation/Measure	执行人员	样本 容量 Size	频率 Frequency	控制方法 Control method	反应计划 Reaction plan
I001	進料檢測 In-coming inspection		晶片電性 Elec, Function(Wafer)			良率 Yield target limit	產線試做 Trial run	IQC品檢員 IQC inspector	50pcs	每來料電壓 Per shipment Voltage	進料檢測報告 Inspection test report	隔離, 退貨 Isolation, reject
			晶片外觀 Appearance(wafer)			缺角崩邊，劃傷，破片，鍍層脫落，氧化，髒汙 Chipping, Scratch, Split, Peeling, Oxidize, Dirty	顯微鏡 Microscope	IQC品檢員 IQC inspector	1片 500pcs	每來料電壓 Per shipment Voltage	進料檢測報告 Inspection test report	隔離, 退貨 Isolation, reject
			支架尺寸 Lead frame Dimension			全尺寸量測 Dimension measurement	測量顯微鏡 Measurement Microscope	IQC品檢員 IQC inspector	5PCS	每批 Per lot	進料檢測報告 Inspection test report	隔離, 退貨 Isolation, reject
			支架外觀 Lead frame Appearance			氧化，成分 Oxidize, composition	目視 Visual inspection	IQC品檢員 IQC inspector	512PCS	每批 Per lot	進料檢測報告 Inspection test report	隔離, 退貨 Isolation, reject
			Clip尺寸 Clip Dimension			全尺寸量測 Dimension measurement	測量显微镜 Measurement Microscope	IQC品检员 IQC	5pcs	每批 Per lot	進料检測报告 Inspection test report	隔离, 退货 Isolation, reject

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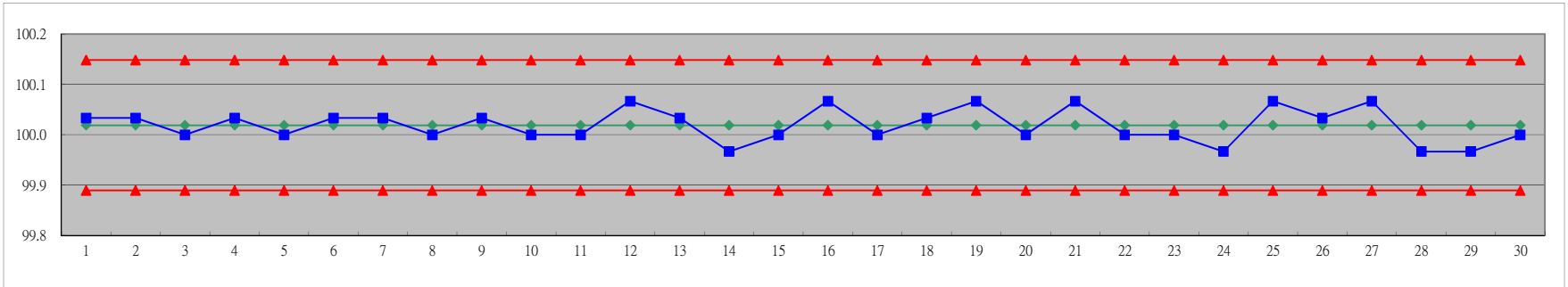
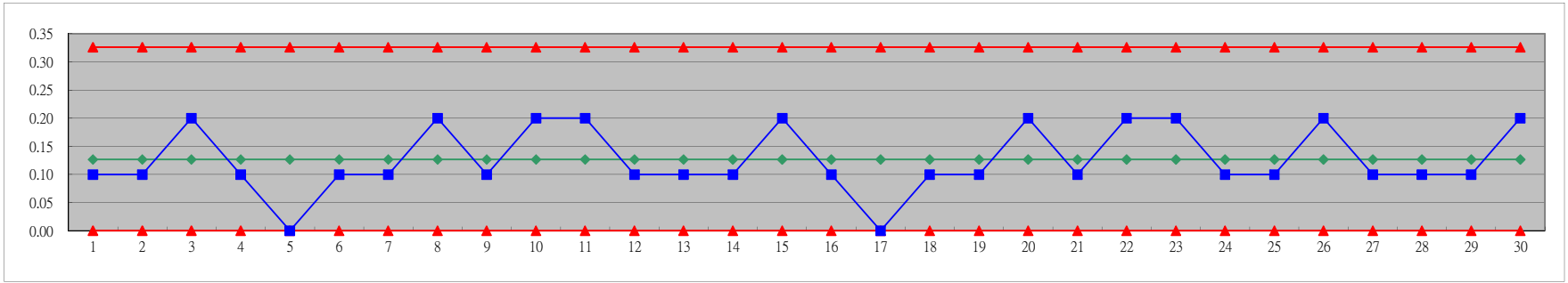
8 測量系统分析- 穩定性 (Measurement Systems Analysis-Stability)

零件編號(Part Number)	測儀名稱(Gage Name)	測儀編號(Gage No.)	測量特性(Characteristics)	規格(Specification)	時間(Duration)	操作者(Operator)	審核(Check by)
Standard Sample_10MΩ	TVS-600	S31783	VR	98V~102V	2016/5/3	焦魯賓	May

$CL=\bar{\bar{X}}=$ 100.019 $UCL = \bar{\bar{X}}+A_2\bar{R} =$ 100.148 $LCL = \bar{\bar{X}}-A_2\bar{R} =$ 99.889



$CL=\bar{R}=$ 0.127 $UCL = D_4\bar{R} =$ 0.326 $LCL = D_3\bar{R} =$ 0



Calculation:

$\bar{\bar{X}}$ = 100.019
$\bar{R}$ = 0.127
σ = 0.0747

Abnormal Explanation:

Note:

n	1	100.0	100.1	99.9	100.1	100.0	100.0	100.0	99.9	100.1	100.0	100.1	100.0	100.0	100.0	100.0	100.1	100.0	100.0	100.1	99.9	100.0	100.0	100.1	100.0	100.1	100.1	100.0	100.0	100.0	100.0	n	$1/d_2$	A_2	D_3	D_4
	2	100.0	100.0	100.1	100.0	100.0	100.1	100.0	100.1	100.0	100.1	100.0	100.1	100.0	100.0	99.9	100.1	100.0	100.0	100.1	100.1	100.1	99.9	99.9	99.9	100.1	99.9	100.1	100.0	100.0	100.1	2	0.886	1.880	0	3.267
	3	100.1	100.0	100.0	100.0	100.0	100.0	100.1	100.0	100.0	99.9	99.9	100.1	100.1	99.9	100.1	100.0	100.0	100.1	100.0	100.0	100.1	100.1	100.0	100.0	100.0	100.1	100.1	99.9	99.9	99.9	3	0.590	1.023	0	2.575
SUM		300.1	300.1	300.0	300.1	300.0	300.1	300.1	300.0	300.1	300.0	300.0	300.2	300.1	299.9	300.0	300.2	300.0	300.1	300.2	300.0	300.2	300.0	300.0	299.9	300.2	300.1	300.2	299.9	299.9	300.0					
$\bar{X}$		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.1	100.0	100.0	100.0	100.1	100.0	100.0	100.1	100.0	100.1	100.0	100.0	100.0	100.1	100.0	100.1	100.0	100.0	100.0					
R		0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.2					

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8 測量系統分析- 偏移性
(Measurement Systems Analysis-Bias)

樣品名稱(Part Name)： Resistance_1Ω/2A
量具名稱(Gage Name) TVS-600
量具編號(Gage No.)： S31133

樣品基準值(Reference Value)： 1.9989 V
測量特性(Characteristics) VF
分析日期(Date)： 2016/3/29
分析者(Appraiser)： Roben

次數 (Trials)	測量值 (Measurement)	偏倚 (Bias)
1.	2.000	-0.001
2.	1.999	0.000
3.	1.999	0.000
4.	1.999	0.000
5.	2.000	-0.001
6.	2.000	-0.001
7.	1.999	0.000
8.	1.998	0.001
9.	2.000	-0.001
10.	1.999	0.000
11.	2.000	-0.001
12.	1.998	0.001
13.	1.999	0.000
14.	1.997	0.002
15.	1.999	0.000

相關參數(Date sheet)

次數(m) = 15	g = 1	α = 0.050

查表得(From Table)

d_2 = 3.472	d_2^* = 3.5500	df(v) = 15

統計得(Statistics)

平均值(Average) 1.9991	偏倚(Bias) 0.000166667	σr 0.001
σb 0.0002	統計 t 0.7638	

查 t-分布表得$t_{v,1-\alpha/2}$=	2.1314

計算偏倚的95%自信度區間上限為(H)：	0.0006215
計算偏倚的95%自信度區間下限為(L)：	-0.000288

分析結果：因為 0 落在偏倚置區間(-0.000288 ~ 0.0006215)
內，可以假設測量偏倚是可以接受的，同時假定實際使用不會導致附加變差源。

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8 測量系统分析- 線性
(Measurement Systems Analysis-Linearity)

量具名稱：(Gage Name)：游標卡尺 (Calipers)
零件名稱：(Part Name)：標準塊規 (Gage Block)
量具編號：(Gage No.)：S23215
測量人：(Performed by)：Roben
測量特性：尺度 (Characteristics)：Dimension
單位：(Unit)：mm
量具時間：(Date)：2016/4/21

零件參考值 Part Reference Value		1		2		3		4		5	
		1.000		2.000		3.000		4.000		5.000	
		Measured	Bias	Measured	Bias	Measured	Bias	Measured	Bias	Measured	Bias
TRIALS	1	1.00	0.000	2.00	0.000	3.00	0.000	4.00	0.000	5.00	0.000
	2	1.00	0.000	2.00	0.000	3.00	0.000	4.00	0.000	5.00	0.000
	3	1.00	0.000	2.00	0.000	3.00	0.000	4.01	0.010	5.00	0.000
	4	1.00	0.000	2.01	0.010	3.00	0.000	4.00	0.000	5.00	0.000
	5	0.99	-0.010	2.00	0.000	3.00	0.000	4.00	0.000	5.00	0.000
	6	1.00	0.000	2.00	0.000	3.00	0.000	4.01	0.010	5.00	0.000
	7	1.00	0.000	2.01	0.010	3.00	0.000	4.00	0.000	5.00	0.000
	8	1.00	0.000	2.00	0.000	3.00	0.000	4.00	0.000	5.00	0.000
	9	1.00	0.000	2.00	0.000	3.00	0.000	4.00	0.000	5.00	0.000
	10	1.00	0.000	2.01	0.010	3.00	0.000	4.00	0.000	5.00	0.000
	11	0.98	-0.020	2.00	0.000	3.00	0.000	4.00	0.000	5.00	0.000
	12	1.00	0.000	2.00	0.000	3.00	0.000	4.00	0.000	5.00	0.000
	總和SUM	11.97	-0.030	24.03	0.030	36.00	0.000	48.02	0.020	60.00	0.000
	平均值 Average	0.998	-0.0025	2.003	0.002	3.000	0.0000	4.002	0.0017	5.000	0.000

參考值 Reference Value	1.000	2.000	3.000	4.000	5.000
偏倚平均值 Bias Average	-0.003	0.002	0.000	0.002	0.000

$\Sigma X =$ 180.00 $m=$ 12 $\bar{\bar{y}}=$ 0.000333 $\Sigma Y^2=$ 0.0010

$\Sigma Y =$ 0.0200 $g=$ 5 $\bar{X}=$ 3

$\Sigma XY =$ 0.1100 $b=\bar{\bar{y}}-\alpha\bar{x}=$ -0.000917

$1/gm =$ 0.01667 $t_{gm-2,1-\alpha/2}=$ 2.0198

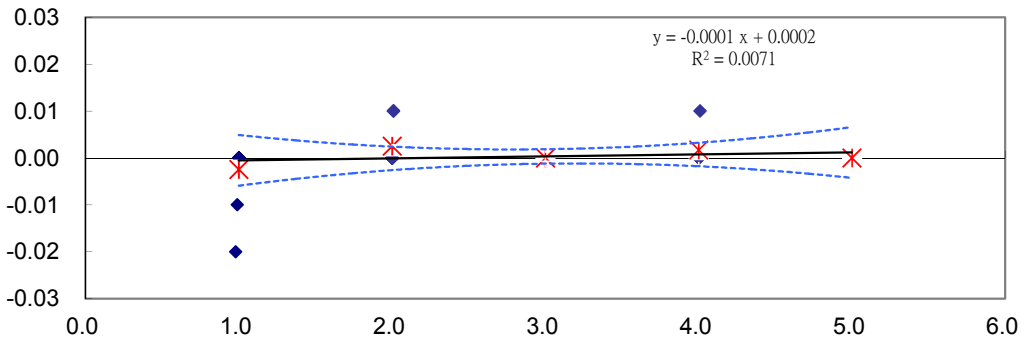
$\Sigma X^2 =$ 660.0

$$S=\left(\frac{\Sigma y_i^2-b\Sigma y_i-\alpha\Sigma x_i y_i}{gm-2}\right)^{1/2}= 0.00409$$

$$\alpha=\frac{\Sigma XY-\left(\frac{\Sigma Y\Sigma X}{gm}\right)}{\Sigma X^2-\frac{(\Sigma X)^2}{gm}}= 0.0004167$$

Bias Average=	-0.00250	0.00250	0.00000	0.00167	0.00000
上限H=	0.0048	0.0027	0.0014	0.0036	0.0065
下限L=	-0.0058	-0.0029	-0.0007	-0.0021	-0.0042

回歸線



置信度= 95%

偏倚=0

— 回歸(直線)
--- a置信區間
* 偏倚均值

分析Analyze： 1.OK！"偏倚= 0"線完全在擬合線置信帶以內，測量系統可接受，不存在線性問題！

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8 測量系統分析- 重覆性與再現性 (Measurement Systems Analysis-Gauge R&R)

評價人/測量次數 Appraiser/Trial#		零件(Part) 1	2	3	4	5	6	7	8	9	10	平均值 (Average)	
操作者 A	1	38.62	38.73	39.05	38.60	37.93	38.36	38.63	39.06	38.59	38.07		38.56
	2	38.60	38.72	39.05	38.63	37.95	38.36	38.64	39.08	38.56	38.09		38.57
	3	38.63	38.70	39.03	38.63	37.94	38.34	38.65	39.09	38.59	38.08		38.57
	平均值 (Average)	38.62	38.72	39.04	38.62	37.94	38.35	38.64	39.08	38.58	38.08	Xa=	38.57
	全距 (Range)	0.03	0.03	0.02	0.03	0.02	0.02	0.02	0.03	0.03	0.02	Ra=	0.02
操作者 B	1	38.61	38.72	39.07	38.62	37.92	38.34	38.64	39.07	38.58	38.08		38.57
	2	38.65	38.73	39.06	38.64	37.94	38.35	38.65	39.07	38.59	38.09		38.58
	3	38.63	38.74	39.05	38.63	37.95	38.34	38.63	39.09	38.57	38.07		38.57
	平均值 (Average)	38.63	38.73	39.06	38.63	37.94	38.34	38.64	39.08	38.58	38.08	Xa=	38.57
	全距 (Range)	0.04	0.02	0.02	0.02	0.03	0.01	0.02	0.02	0.02	0.02	Ra=	0.02
操作者 C	1	38.62	38.73	39.04	38.63	37.93	38.35	38.63	39.06	38.58	38.07		38.56
	2	38.60	38.73	39.05	38.61	37.93	38.37	38.65	39.09	38.59	38.08		38.57
	3	38.60	38.70	39.05	38.63	37.95	38.35	38.63	39.07	38.58	38.05		38.56
	平均值 (Average)	38.61	38.72	39.05	38.62	37.94	38.36	38.64	39.07	38.58	38.07	Xa=	38.57
	全距 (Range)	0.02	0.03	0.01	0.02	0.02	0.02	0.02	0.03	0.01	0.03	Ra=	0.02
零件平均值 (Part Average)		38.6	38.7	39.1	38.6	37.9	38.4	38.6	39.1	38.6	38.1	X=	38.57
												Rp=	1.14
(Ra+Rb+Rc)/評估人數(# of appraisers)												R=	0.02
XMAX-XMIN												X_{DIFF}=	0.01
R*D4												UCL_{R}=	0.06

操作者數量 Appraiser	K2	測量次數 Trial	D4	K1
2	0.7071	2	3.27	0.8862
3	0.5231	3	2.58	0.5908

2次測量時D4 = 3.27；3次測量時D4 = 2.58，7次试验以内D_3 = 0，UCLR代表個別R值得限值，圈出那些超出這限值的點，查明原因並採取矯正措施；讓相同的評估人使用相同的量具用原來的方法重新讀值，或剔除這些數值並由其於的數值重新平均和計算R，以及控制限值。

D4=2.37 for 2 trials and 2.58 for 3 trials;D3=0 for up to 7 trials, UCLR represents the limit of individual R's. Cricle those that are beyond this limit .Identify the cause and correct. Repeat thest readings using the same appraiser and unit as originally.

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8 測量系統分析- 重覆性與再現性 (Measurement Systems Analysis-Gauge R&R)

零件編號和名稱：(Part No. and Name)：	TVS39A Sample	測儀名稱：(Gage Name)：	Diode Tester	日期：(Date)：	2016/4/23
特性：(Characteristics)：	VR	量具編號：(Gage No)：	S31783	操作人：(Performed by)：	Roben
規格：(Specification)：	37.1V~41.0V	量具型式: Gage Type	TVS-600		

R= 0.0227 X_{DIFF}= 0.0057 Rp= 1.138

測量系統分析 Measurement Unit Analysis	總變異%(TV) Total Variation
重復性-設備差異（EV） Repeatability-Equipment Variation(EV) EV = R*K1 = 0.0134	%EV = 100[EV/TV] = 3.74 %
再現性-評價人差異(AV) Reproducibility-Appraiser Variation(AV) AV = $[(X_{DIFF}*K2)^2-(EV^2/(nr))]^{1/2}$ r = 測量次數 Tria = 0.00168 n = 零件數 Parts	%AV = 100[AV/TV] = 0.47 %
重復性和再現性(GRR) Repeatability & Reproducibility(R&R) GRR = $[(EV^2+AV^2)]^{1/2}$ = 0.0135	%GRR = 100[GRR/TV] = 3.77 %
零件差異(PV) Part Variation(PV) PV = Rp*K3 = 0.3579	%PV = 100[PV/TV] = 99.93 %
總差異(TV) Total Variation(TV) TV = $[GRR^2+PV^2]^{1/2}$ = $[GRR^2+PV^2]^{1/2}$ = 0.3582	ndc = 1.41(PV/GRR) = 37.40

試驗次數 Trials	K1
2	0.8862
3	0.5908

Appraisers	2	3
K2	0.7071	0.5231

Parts	K3
2	0.7071
3	0.5231
4	0.4467
5	0.4030
6	0.3742
7	0.3534
8	0.3375
9	0.3249
10	0.3146

所有計算都基於預期5.15σ(正態分佈區線之下99.0%的面積）

All calculation are based upon predicting 5.15sigma(99.0% of the area under the normal distribution curve)

K1為5.15/d2；d2取決於試驗次數(m)和零件數語評價人數的乘積(g)，並假設該值大於15。

K1 is 5.15/d2, where d2 is dependent on the number of troals(m) and the number of parts times the number od appraisers(g) which is assumed to be greater than 15.

AV-如果計算中根號下出現負值。評價人變差缺省為0。

AV-If a negative value is calculated under the square root sign, the appraiser variation(AV) defaults to zero

K2為5.15d2；d2取決於評價人(m)和數量(g)；g為1，因為只有單極差計算。

K2 is 5.15/d2, where is d2 is depend on the number of apprasiers(m) and (g) is 1, since there is only one range calculation

K3為5.15d2；d2取決於評價人(m)和數量(g)；g為1，因為只有單極差計算。

K3 is 5.15/d2, where is d2 is depend on the number of apprasiers(m) and (g) is 1, since there is only one range calculation

d2來自數據表

d2 is obtained from data sheet

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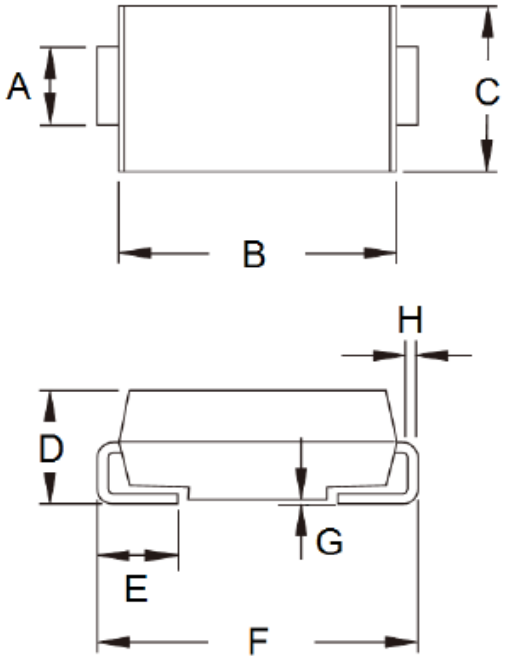
9 Production Part Approval - Dimensional Results

Supplier name： Taiwan Semiconductor Co.,Ltd.

Sample size(pcs)： 30 Units weight(g)： 0.09

Package： M-SMB Measure Machine： 3D Family (MCS02)

Item	Spec LSL	Spec USL	Units	Measurement Results					Results
				Max.	Avg.	Min.	STDEV	Cpk	
A	1.95	2.10	mm	2.00	2.01	2.00	0.003	5.49	OK
B	4.25	4.75	mm	4.39	4.41	4.40	0.004	12.03	OK
C	3.48	3.73	mm	3.49	3.51	3.50	0.004	1.80	OK
D	1.99	2.61	mm	2.10	2.12	2.11	0.006	6.22	OK
E	0.90	1.41	mm	1.11	1.18	1.14	0.020	4.05	OK
F	5.10	5.30	mm	5.27	5.30	5.29	0.007	1.70	OK
G	0.10	0.20	mm	0.10	0.13	0.11	0.005	1.68	OK
H	0.15	0.31	mm	0.20	0.22	0.21	0.004	4.58	OK



Prepared by：	ZhangYanyan	Approved by：	Cui HeJun
Title：	IPQC Inspector	Title：	Leader of QA

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10 Records of Material/Performance Test Results

Supplier name：	Taiwan Semiconductor Co.,Ltd.	Part Name：	2A, 20V - 150V Surface Mount Schottky Barrier Rectifiers
Supplier code：	N/A	Sample size(pcs)：	50
Supplier P/N：	SS26	Measure Machine：	DS-610

Item	Spec LSL	Spec USL	Units	Test Results					Results
				Max.	Avg.	Min.	3sigma	Cpk	
VF	-	0.7	V	0.606	0.589	0.583	0.003	10.02	OK
VR	60	-	V	72.6	71.7	70.1	0.376	3.30	OK
IR	-	400	uA	6.510	4.900	3.130	0.546	3.12	OK

Supplier P/N：	SS215	Measure Machine：	DS-610

Item	Spec LSL	Spec USL	Units	Test Results					Results
				Max.	Avg.	Min.	3sigma	Cpk	
VF	-	0.95	V	0.809	0.803	0.799	0.002	19.53	OK
VR	150	-	V	174.2	172.4	165.5	1.713	2.32	OK
IR	-	400	uA	0.013	0.006	0.002	0.002	400.47	OK

Prepared by：	Xueping	Approved by：	Cui HeJun
Title：	OQC Supervisor	Title：	Leader of QA

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10 Production Part Approval - Material, Performance Test Results
Discrete Semiconductor Component Qualification Plan

Supplier Name：	Taiwan Semiconductor Co.,Ltd.	General Specification：	TSC Data sheet
		Supplier Manufacturing Site：	ShanDong, China
Supplier Internal P/N：	SS22 ~ SS215	Family Type：	M-SMB SF
Reason for Qual.：	Qualification plan	According to：	AEC-Q101 Rev.D

Item	Test	Test Conditions	# Lots	S.S	Remarks
1	Test	Electrical characterization @25℃	3	552	OK
2	External Visual	Per AEC-Q101	3	552	OK
3	Parameter Verification	Electrical characterization @25℃	3	552	OK
4	Pre-conditioning	Per AEC-Q101	3	308	OK
5	Temp. Cycling	150℃(+15,-0)/15mins, -55℃(-10,+0)/15mins / 1000 cycles	3	77	OK
6	Autoclave (A.C)	Ta=121±2℃ 15Psig(1.057kgf/cm2),RH=100%/96hrs	3	77	OK
7	H3TRB	Ta:85±2℃ R.H:85±5%&VR=48V/1000hrs	3	77	OK
8	IOL TEST	On/2mins, Off/2mins,15000cycles	3	77	OK
9	H.T.R.B.	100% Rated VR (Tj=150℃) /1000hrs	3	77	OK
10	ESD	HBM:8KV(C=100pf R:1500Ω)/6Pulses	3	30	OK
11	Fwd Surge test	Peak forward surge current 8.3ms half sine-wave(50A)/1 Pulses	3	10	OK
12	High Temp. Storage Life	Ta=150℃ /1000hrs	3	77	OK
13	Resist.to Solder Heat	Ta=260±5℃/10 secs	3	30	OK
14	Solderability	Ta=245 ± 5℃/5sec	3	10	OK
15	Thermal Resistance	Mounted on Copper plate of 0.2" * 0.2" Copper plate heat sink	3	10	OK
16	DPA	Per AEC-Q101	3	2	OK

Comment：
Family data, test by SS26 / SS215

Prepared by：	Roben	Approved by：	Venkat Kumar
Title：	Rel Lab Supervisor	Title：	QA Manager

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TAIWAN SEMICONDUCTOR

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11 初始過程研究 Initial Process Study

Part No.: SS215 **DATE :** 2016.4.30

Prepared by : Hong juan **Checked by:** Hejun Cui

STATION	SAMPLE SIZE	DEFECTS (%)	MAX	MIN	AVG	STD	Cpk	Spec./Tolerence
IQC Inspection								
Elec, Function	200pcs	0	174.00	165.50	171.92	1.63	2.44	VB>160V@IR=0.5mA
	200pcs	0	0.01	0.00	0.01	0.00	383.39	IR<2uA@VR=150V
Wafer thickness	125pcs	0	285	275	280			280±15uM
Wafer Saw								
Die chipping	125pcs	0	1.14	0.49	0.79	0.16	2.54	P side≦2mil
Soldering								
Before Soldering	125pcs	0	1.928	1.027	1.481	0.242	2.090	Rotation≦3°
Clip shift	125pcs	0	2.00	1.02	1.45	0.26	2.02	Shift≦3mil
Die shift	125pcs	0	1.97	0.98	1.46	0.26	2.00	Shift≦3mil
Die rotation	125pcs	0	1.930	0.976	1.476	0.241	2.110	Rotation≦3°
Solder diameter	125pcs	0	0.63	0.58	0.60	0.01	1.69	P side(0.54-0.66)mil
Solder diameter	125pcs	0	0.88	0.83	0.85	0.01	2.36	N side(0.765-0.935)mil
After Soldering Clip rotation	125pcs	0	2.47	0.03	1.25	0.65	1.91	Rotation≦5°
Clip shift	125pcs	0	2.803	0.039	1.398	0.678	1.770	Shift≦5mil
Die shift	125pcs	0	1.693	0.039	0.884	0.513	2.670	Shift≦5mil
Die rotation	125pcs	0	2.091	0.019	1.108	0.642	2.020	Rotation≦5°
Molding								
Body length	125pcs	0	4.186	4.172	4.177	0.004	1.710	(4.145-4.195)mm
Body width	125pcs	0	2.609	2.590	2.599	0.005	1.770	(2.575-2.625)mm
Body thickness	125pcs	0	2.015	1.994	2.001	0.004	1.890	(1.975-2.025)mm
Trimming & Forming								
Length	125pcs	0	5.058	5.032	5.046	0.003	1.710	(5.03-5.13)mm
Height	125pcs	0	2.120	2.100	2.107	0.004	3.330	(2.05-2.15)mm
DH	125pcs	0	0.133	0.122	0.127	0.001	6.550	(0.1-0.15)mm
Plating								
Plating thickness	125pcs	0	12.530	10.020	11.174	0.629	1.680	8-15um
Layer composition	125pcs	0	100.00%	99.25%	99.63%			98.5% Sn
TMTT								
TMTT	1000pcs	0	0.809	0.799	0.803	0.002	19.534	VF<0.92V@IF=2A
	1000pcs	0	174.20	165.50	171.91	1.71	2.32	VB>160V@IR=0.5mA
	1000pcs	0	0.01	0.00	0.01	0.00	400.47	IR<2uA@VR=150V

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12 合格實驗室文件 Qualified Laboratory Documentation

TSC Certification data list on the link below:

1. TS16949 Certification
http://www.taiwansemi.com/en/quality/certification/ts16949-certification

2. OHSAS18001 Certification
http://www.taiwansemi.com/en/quality/certification/ohsas18001-certification

3. ISO14001 Certification
http://www.taiwansemi.com/en/quality/certification/iso14001-certification

4. SONY Green Partner
http://www.taiwansemi.com/en/quality/certification/sony-green-partner

5. ISO9001 Certification
http://www.taiwansemi.com/en/quality/certification/iso9001-certification

6. UL certification
http://www.taiwansemi.com/en/quality/certification/ul-certification

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13 Appearance Approval Report

NA

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14 Sample Production Parts

NA

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15 Master Sample

NA

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16 Checking Aids

NA

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17 Customer-Specific Requirements

No specific customer requirements!

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18 零件提交保證書 Part Submission Warrant (PSW)

Part Name: 2A, 20V - 150V Surface Mount Schottky Barrier Rectifiers — Part Number: SS22 ~ SS215

Shown on Drawing Number: N/A — Org. Part Number: N/A

Engineering Drawing Change Level: N/A — Dated: N/A

Additional Engineering Changes: N/A — Dated: N/A

Safety and/or Government Regulation: ☑ Yes ☐ No — Purchase Order No.: N/A — Weight (g): 0.09

Checking Aid Number: N/A — Engineering Change Level: N/A — Dated: N/A

SUPPLIER MANUFACTURING INFORMATION

Yangxin Everwell Electronic Co., Ltd
Supplier Name — Site Code

He Liu Zhen
Street Address

Yangxin — Shandong — 251807 — China
City — Region — Postal Code — Country

CUSTOMER SUBMITTAL INFORMATION

Customer Name/Division

Buyer/Buyer Code

Application

MATERIALS REPORTING

Has customer-required Substances of Concern information been reported ☑ Yes ☐ No

Submitted by IMDS or other customer formate: Nickel(7440-02-0)

Are plastic parts identified with appropriate ISO marking codes? ☐ Yes ☐ No ☑ N/A

REASON FOR SUBMISSION

- ☑ Initial submission
- ☐ Engineering Change(s)
- ☐ Tooling: Transfer, Replacement, Refurbishment, or additional
- ☐ Correction of Discrepancy
- ☐ Tooling Inactive > than 1 year
- ☐ Change to Optional Construction or Material
- ☑ Sub-Supplier or Material Source Change
- ☑ Change in Part Processing
- ☐ Parts produced at Additional Location
- ☐ Other - please specify

REQUESTED SUBMISSION LEVEL (Check one)

- ☐ Level 1 - Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer.
- ☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
- ☑ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
- ☐ Level 4 - Warrant and other requirements as defined by customer.
- ☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

SUBMISSION RESULTS

The results for ☑ dimensional measurements ☑ material and functional tests ☑ appearance criteria ☑ statistical process package

These results meet all drawing and specification requirements: ☑ Yes ☐ No (If "NO" - Explanation Required)

Mold / Cavity / Production Process

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts, which made by a process that meets all Production Part Approval Process Manual 4th Edition Requirements. I further affirm that these samples were produced at the production rate of 11000pcs / 1 hours. I also certify that documented evidence of such compliance is on file and availiable for review.I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS: N/A

Is each Customer Tool properly tagged and numbered? ☐ Yes ☐ No ☑ N/A

Organization Authorzed Signature: Brian Bie — Date: 29th-Sep.-'16

Print Name: Brian_Bie — Phone No.: 886-2-89131588 — FAX No.: 886-2-8913-1788

Title: HQ QRA Engineer — E-mail: brian_bie@mail.ts.com.tw

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signatur — Date

Print Name — Customer Tracking Number(optional)

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Processes Comparison---fully-automated SMD vs manual SMD processes

fully-automated SMD

Die attached
clip bonder
Soldering

All in one design with high solution CCD inspection

→ Cleaning → Auto-molding

→ Baking

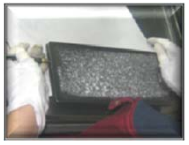
→ Strip plating

→ T/F

→ TMTT

manual SMD

Pre-soldering
Pre-soldering assembly
Soldering



→ Cleaning → Auto loading
Compound pre-heating
Molding
De-runner

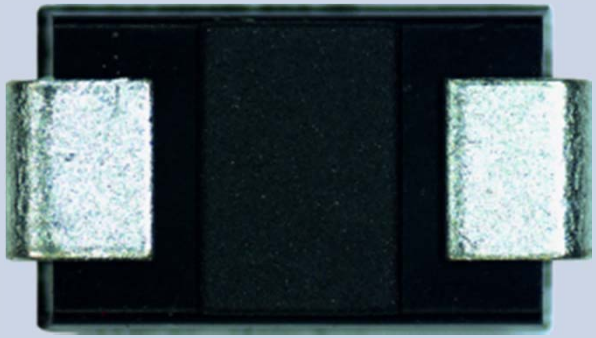
→ Baking

→ De-flash → T/F

→ Barrel plating

→ TMTT

Appearance Comparison---fully-automated SMB & SMB

Item	fully-automated SMB	SMB
Top		
Side		
Bottom		

Uniform forming designed

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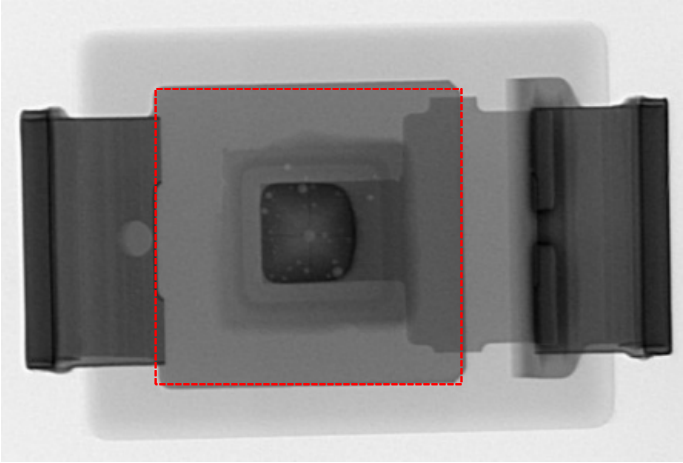
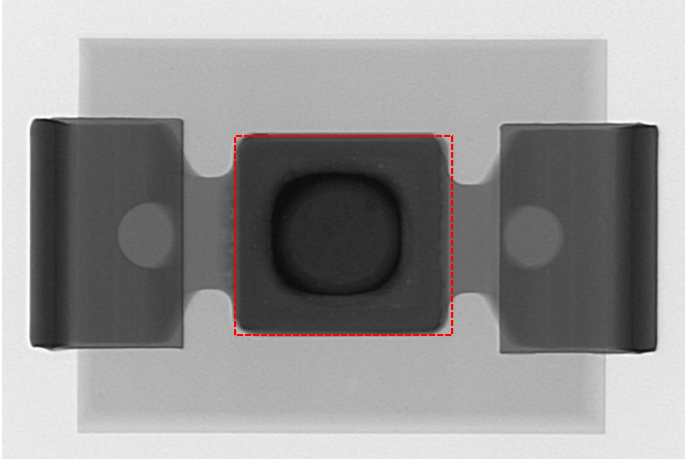
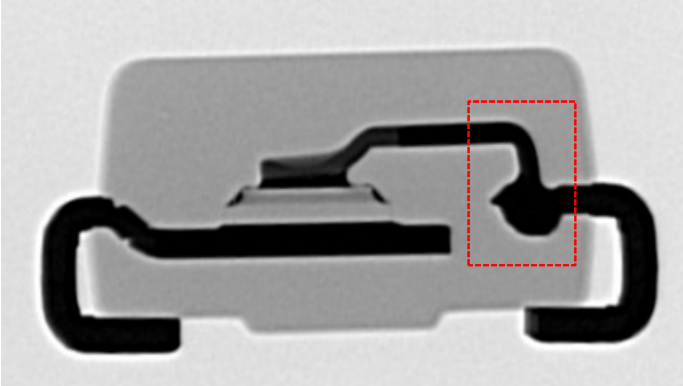
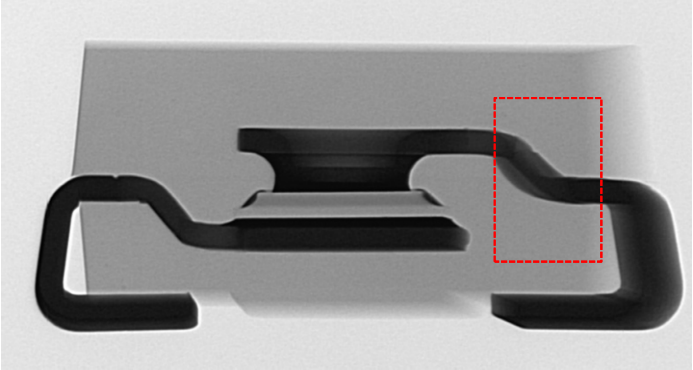
X-RAY Comparison----- example SMB

Item	fully-automated SMB	SMB
Top		
Side		

Big die solder pad designed for better thermal dissipation.
Additional solder join between Leadframe and clip reduce soldering thermal stress from wave soldering.
Extension temperature cycle from 1000cyc. To 3000cyc.

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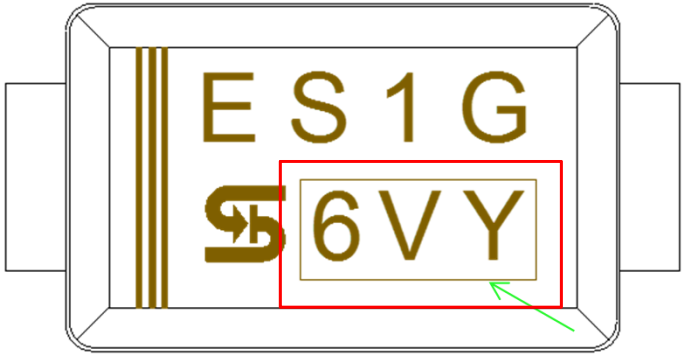
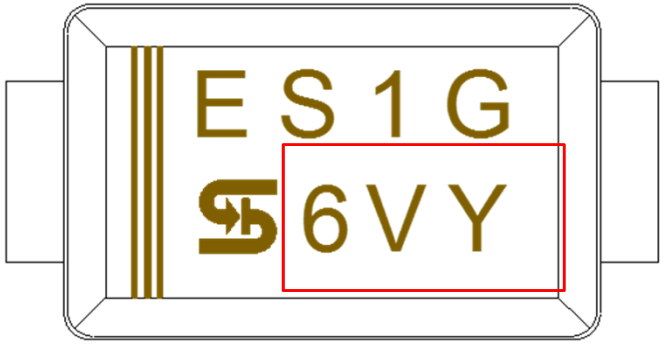
Identified marking on device between fully-automated SMD VS manual SMD

fully-automated SMD	manual SMD
	

Device special square around datecode during marking to identified new fully-automated SMD comparing with before

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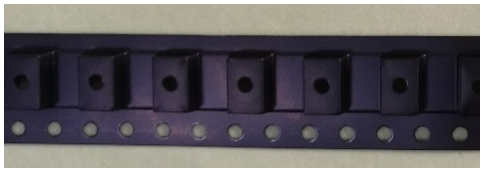
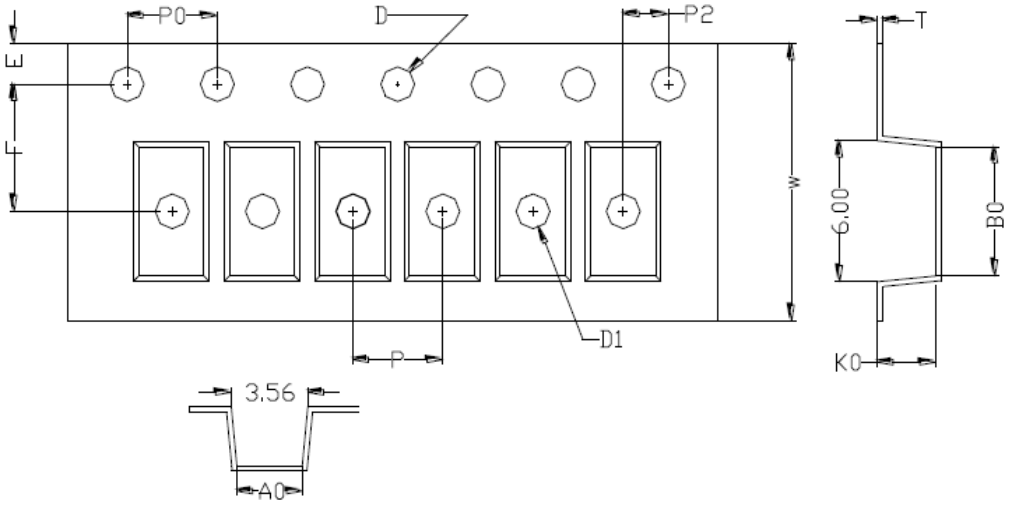
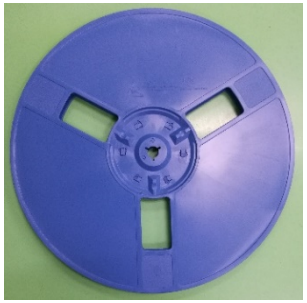
fully-automated SMD APPLIED STATIC FRES PACKING INSTEAD ANTi_ESD

Package	fully-automated SMD (Static Free)	Original SMD (Anti-ESD)
Carry	 Surface resistance10^6~10^8; Term of validity: permanent SMA:A0:2.80mm;B0:5.33mm;K0:2.35mm SMB:A0:3.70mm;B0:5.55mm;K0:2.35mm A0:width B0:length K0:height	 Surface resistance: 10^6~10^{11} Term of validity: 12 months SMA:A0:2.90mm; B0:5.59mm;K0:2.36mm SMB:A0:3.76mm; B0:5.69mm;K0:2.67mm A0:width B0:length K0:height
		

fully-automated SMD APPLIED STATIC FRES PACKING INSTEAD ANTi_ESD

Package	fully-automated SMD (Static Free)	Original SMD (Anti-ESD)	
Reel	 13" Plastic Reel Surface resistance < 10^8	 13" Paper Reel	 13" Plastic Reel Surface resistance < 10^{11}
Pizza Box	 		