DATE: 20 March, 2023

PCN #: 2603

PCN Title: Qualified Additional Wafer Fab Source (SFAB2/JKFAB), Die Revision, Bill of Material

Dear Customer:

This is an announcement of change(s) to products that are currently being offered by Diodes Incorporated.

We request that you acknowledge receipt of this notification within 30 days of the date of this PCN. If you require samples for evaluation purposes, please make a request within 30 days as well. Otherwise, samples may not be built prior to this change. Please refer to the implementation date of this change as it is stated in the attached PCN form. Please contact your local Diodes sales representative to acknowledge receipt of this PCN and for any sample requests.

The changes announced in this PCN will not be implemented earlier than 90 days from the notification date stated in the attached PCN form.

Previously agreed upon customer specific change process requirements or device specific requirements will be addressed separately.

For questions or clarification regarding this PCN, please contact your local Diodes sales representative.

Sincerely,

Diodes Incorporated PCN Team

PRODUCT CHANGE NOTICE PCN-2603 REV 1

Notification Date:	Implementation Date:	Product Family:	Change Type:	PCN #:
20 March, 2023	20 June, 2023	Analog Semiconductors	Wafer Fab Source, Die Revision, Bill of Material	**2603**

TITLE
Qualified Additional Wafer Fab Source (SFAB2/JKFAB), Die Revision, Bill of Material

DESCRIPTION OF CHANGE

This PCN is being issued to notify customers that in order to assure continuity of supply, Diodes Incorporated has qualified additional Diodes internal wafer Fab sources (SFAB2) located in Shanghai, China, and (JKFAB) located in HsinChu, Taiwan.

Diodes has also qualified additional Die Revision and Bill of Materials (BOM), Epoxy Die Attach.

Full electrical characterization and high reliability testing has been completed on representative part numbers to ensure no change to device functionality or electrical specifications in the datasheet. Refer to the attached qualification report embedded in this file (to view, download this PCN file then open it with a PDF viewer to see the attached qual report).

IMPACT

Continuity of Supply. There will be no change to the Form, Fit or Function of products affected, unless specifically indicated.

PRODUCTS AFFECTED

Table 1 - Qualification of Additional Wafer Fab Source (JKFAB Diodes Internal FAB)

Table 2 - Qualification of Additional Die Revision (Metal Only)

Table 3 - Qualification of Additional Wafer Fab Source (SFAB2 Diodes Internal FAB)

Table 4 - Qualification of Additional Bill Of Material (BOM), Epoxy Die Attach

WEB LINKS	
Manufacturer's Notice:	https://www.diodes.com/quality/product-change-notices/diodes-product-change-notices/
For More Information Contact:	https://www.diodes.com/about/contact-us/contact-sales/
Data Sheet:	https://www.diodes.com/catalog/

DISCLAIMER

Unless a Diodes Incorporated Sales representative is contacted in writing within 30 days of the posting of this notice, all changes described in this announcement are considered approved.

DIODES INCORPORATED

Table 1 – Qualification of Additional Wafer Fab Source (JKFAB Diodes Internal FAB)					
AP2213M-3.3TRG1	AP3036BKTR-G1				

Table 2 - Qualification of Additional Die Revision (Metal Only)					
AL1665S-13	AL1666S-13				

Table 3 - Qualification of Additional Wafer Fab Source (SFAB2 Diodes Internal FAB)					
AP39811AS7-13	AP39811BS7-13	AP3981B2S7-13	AP3981BS7-13	AP3987CTS7-13	AP3987HMTR-G1
AP3987TS7-13	AP3987VMTR-G1	GP4507SMTR-G1			

Table 4 - Qualification of Additional Bill Of Material (BOM) Epoxy Die Attach					
PI5A121BCE+DLX	PI5A3167CCEX	PT7M3808G01TAEX	PT7M3808G09TAEX	PT7M3808G12TAEX	PT7M3808G15TAEX
PT7M3808G18TAEX	PT7M3808G25TAEX	PT7M3808G30TAEX	PT7M3808G33TAEX	PT7M3808G50TAEX	PT7M7809STEX

Certificate of Design, Construction and Qualification

Description: Qualification for 2u18V_BPLS (AP2213&AP2210&Ap2202)

General	Part Number	Qual Device 1	Qual Device 2	Qual Device 3	Qual Device by QBS
		AP2210N-3.3TRG1	AP2213M-3.3TRG1	AP2202K-ADJTRG1	AP2210 AP2213 AP2202 (Refer to Sheet "Complete Device List")
	Package	SOT-23-3 (SC59)	SOIC-8	SOT23-5	N/A
	Wire Bond, Cu Piller, CSP	Wire Bond	Wire Bond	Wire Bond	Wire Bond
	MSL Level	MSL3	MSL3	MSL3	MSL3
	Package Size	2.92mm*1.6mm*1.15mm	4.9mm*3.9mm*1.55mm	2.96mm*1.6mm*1.15mm	N/A
	Die Quantity (eg. Die per package)	1	1	1	1
	Die Name(1)	AA057RA-H	AA057TA-H	AA054SA-H	Refer to Sheet "Complete Device List"
	Die Size (W/L/Thickness	1200um*1070um*230um	1200um*1070um*350um	1090um*1070um*230um	N/A
	Die Process / Technology	2u18V_BPLS bipolar	2u18V_BPLS bipolar	2u18V_BPLS bipolar	2u18V_BPLS bipolar
	Wire Bond Material (Au, Cu, Al)	PdCu	PdCu	PdCu	N/A
	Wire Diameter	1.0mil	1.0mil	1.0mil	1.0mil
	# of Down Bonds	1	1	1	N/A
	Wire Bond Material (Au, Cu, Al)	PdCu	PdCu	PdCu	N/A
	Wire Diameter	1.0mil	1.0mil	1.0mil	1.0mil
Fab	Wafer FAB	LITE-ON	LITE-ON	LITE-ON	LITE-ON
	Wafer Diameter	6"	6"	6"	6"
	Wafer Thickness	675um	675um	675um	675um
	Top Metal Type/Bond Pad Composition	AL-Si-Cu	AL-Si-Cu	AL-Si-Cu	AL-Si-Cu
	Top Metal Thickness	1.2um	1.2um	1.2um	1.2um
	Die Passivation thickness range	5KA SO2+5KA SiN	5KA SO2+5KA SiN	5KA SO2+5KA SiN	5KA SO2+5KA SiN
	Max Junction Temp	150 ℃	150 ℃	150 ℃	150 ℃
	No of masks Steps	11	11	11	11
	Metal Layers	1	1	1	1
	Metal Density per Layer	0.7	0.7	0.7	N/A
	Min Metal Width	6um	6um	6um	N/A
	Min Metal Spacing	5um	5um	5um	N/A
	Power Consumption	0.6W	0.6W	0.6W	N/A
	RDL Design and Process	2u18V_BPLS bipolar	2u18V_BPLS bipolar	2u18V_BPLS bipolar	N/A
	Number of Transistors	200	200	200	N/A
Package	*BackgrindThinkness*	230um	350um	230um	N/A
	Backgrind Location	JCET	JCET	JCET	JCET
	Bond Type (at Die)	Ball	Ball	Ball	Ball
	Bond Type (at LF)	Wedge	Wedge	Wedge	Wedge
	DB Epoxy/Solder Type	epoxy	epoxy	epoxy	epoxy
	Die Attach Material	84-3J(绝缘胶)	DAD-91L	8290	N/A
	Min Bond Pad Pitch	166um	166um	166um	166um
	# of pad/ball/pin Pitch	6	6	6	6
	Leadframe Type	SOT-23-3	SOIC-8	SOT-23-5	N/A
	Leadframe Material	C194	C194	C194	N/A
	Molding Compound Type	GE-1030S	KL-G450H	GE-1030S	N/A
	Green Compound (Yes/No)	Yes	Yes	Yes	Yes
	Lead-Free (Yes/No)	Yes	Yes	Yes	Yes
AT/Rel	Assembly Site	JCET	JCET	JCET	JCET
	FT Test Site	JCET	JCET	JCET	JCET
	Realibility Test Site	BCD	BCD	BCD	BCD
	Qual Plan #	20062206	20062206	20062206	20062206

Realibility Testing

Test	Test Conditions	Duration / Limits	Fail/SS	X = Test Needed	Results Pass/Fail	X = Test Needed	Results Pass/Fail	X = Test Needed	Results Pass/Fail	X = Test Needed	Results Pass/Fail
MSL3 Pre-condition	**(JESD22-A113)** Bake 125C	24 Hrs	0/154	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
	Soak 30C, 60% RH	192Hrs	0/154	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
	IR reflow 260C	3 cycles	0/154	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
Temp Cycle (TC)	**(JESD22-A104)** -65C-150C Mounted on PCB Board (Daughter Card)	500 cycles	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
		1000 cycles	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
HAST	**JESD22-A101/A110** 130C, 85%RH 33.3 psia Vcc = Op Max	96 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
UHAST	**JESD22-A118** 130C, 85%RH 33.3 psia	96 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
HTSL **High Temperature Storage**	**(JESD22-A103)** Ta>150C	168 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
		500 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
		1000 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
HTOL	Ta=105C, 100% Vcc	168 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
	or Ta=150 for 408 hrs	500 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
		1000 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
ELFR **Earlier Life Failure Rate**	Ta=125C, 100% Vcc	48 hrs	0/800	X	Pass	QBS to Qual Device 1		QBS to Qual Device 1		QBS to Qual Device 1	
WBS	JESD22-B116B	Cpk>1.66	0/5	X	Pass	X	Pass	X	Pass	X	
WBP	MIL-STD883-2011	Cpk>1.66	0/5	X	Pass	X	Pass	X	Pass	X	
SD **Solderability**	>95% Coverage	5 Seconds	0/15	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
PD **Physical Dimensions**		Package Outline	Ppk>1.67 Cpk>1.33	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	
Human Body Model	HBM (AEC-Q100-002)	+-2KV	0/3	X	Pass +/-6KV	X	Pass +/-2KV	X	Pass +/-1000V	QBS to Qual Device 1/2/3	
Charged Device Model	CDM (AEC-Q100-011)	+-750V	0/3	X	Pass +/-1500V	X	Pass +/-1500V	X	Pass +/-1500V	QBS to Qual Device 1/2/3	
LU **Latch-up (Class II)**	Max Operating Ta or Tc or Tj	100mA	0/6	X	Pass +/-200mA	X	Pass +/-200mA	X	Pass +/-200mA	QBS to Qual Device 1/2/3	
Char **Characterization**	Typ -40C, 25C, 125C	Operating Range	0/30	X	Pass	X	Pass	X	Pass	QBS to Qual Device 1/2/3	

Summary: Pass
Submitted By: XiaoMin Zhang
Approved By: M. Kulbeth 5/17/2021

Certificate of Design, Construction & Qualification

Description: Qualification of 90 Mohm HVR Fab transfer from SFAB1 to SFAB2

		Qual Device 1	Qual Device 2	Qual Device 3
General	Part Number	**GP4505DHMTR-G1**	**AP3987HMTR-G1**	**AP3987TS7-13**
	Package	SO-8	SO-8	SO-7
	Wire Bond, Cu Piller, CSP	Wire Bond	Wire Bond	Wire Bond
	MSL Level	3	3	3
	Package Size	4.9mm*3.9mm*1.55mm	4.9mm*3.9mm*1.55mm	4.9mm*3.9mm*1.55mm
	Die Quantity (eg. Die per package)	3	3	3
	Die Name(1)	BN026A2-2	BN026A8-2	BN026C3-2
	Die Size (W/L/Thickness	1.71mm*1.73mm*0.675mm	1.71mm*1.73mm*0.675mm	1.71mm*1.73mm*0.675mm
	Die Process / Technology	1.2UM CDMOS 1P1M	1.2UM CDMOS 1P1M	1.2UM CDMOS 40V 1P1M
	Wire Bond Material (Au, Cu, Al)	PdCu	PdCu	Cu
	Wire Diameter	1.0mil	1.0mil	1.2mil
	Die Name(2)	DN007D0-2	DN052A0-8	SS05N70
	Die Size (W/L/Thickness	3.84mm*2.47mm*0.2mm	3.84mm*2.47mm*0.2mm	1.66mm*2.23mm*0.2mm
	Die Process / Technology	MOS	MOS	COOLMOS
	Wire Bond Material (Au, Cu, Al)	1.0mil	1.0mil	1.2mil
	Wire Diameter	PdCu	PdCu	Cu
	Die Name(3)	BN150A0-2	BN150A0-2	BN150A0-2
	Die Size (W/L/Thickness	1.09mm*0.4mm*0.675mm	1.09mm*0.4mm*0.675mm	1.09mm*0.4mm*0.675mm
	Die Process / Technology	ENG_MC529KN-2	ENG_MC529KN-2	ENG_MC529KN-2
	Wire Bond Material (Au, Cu, Al)	PdCu	PdCu	Cu
	Wire Diameter	1.0mil	1.0mil	1.2mil
Fab	Wafer FAB	Die1:SFABII Die2:SFABII Die3:SFABII	Die1:SFABII Die2:SFABII Die3:SFABII	Die1:SFABII Die2:Infineon Die3:SFABII
	Wafer Diameter	Die1:6" Die2:6" Die3:6"	Die1:6" Die2:8" Die3:6"	Die1:6" Die2:12" Die3:6"
	Wafer Thickness	Die1:675um Die2:200um Die3:675um	Die1:675um Die2:200um Die3:675um	Die1:675um Die2:200um Die3:675um
	Top Metal Type/Bond Pad Composition	Die1:Al Die2:Al Die3:Al	Die1:Al Die2:Al Die3:Al	Die1:Al Die2:Al Die3:Al
	Top Metal Thickness	Die1:1.2um Die2:4um Die3:1.2um	Die1:1.2um Die2:4um Die3:1.2um	Die1:1.2um Die2:4um Die3:1.2um
	Back Metal Type (All Layers)	Die1:N/A Die2:Ti/Ni/Ag Die3:N/A	Die1:N/A Die2:Ti/Ni/Ag Die3:N/A	Die1:N/A Die2:Ni/Ag Die3:N/A
	Die passivation thickness range	SiO2 5KA +/- 0.5KA SiN 5KA +/- 0.5KA	SiO2 5KA +/- 0.5KA SiN 5KA +/- 0.5KA	SiO2 5KA +/- 0.5KA SiN 5KA +/- 0.5KA
	Glass Transistion Temp	140 ℃	140 ℃	125 ℃
	Max Junction Temp	150 ℃	150 ℃	150 ℃
	Max Thermal resistance Junc (case)	38°C/W	40°C/W	N/A
	Max Thermal resistance Junc (amibent)	75°C/W	80°C/W	80°C/W
	No of masks Steps	Die1:11 Die2:6 Die3:4	Die1:11 Die2:6 Die3:4	Die1:11 Die2:8 Die3:4
Package	*Backgrind Location*	JCET	JCET	SIMAT
	Bond Type (at Die)	Ball	Ball	Ball
	Bond Type (at LF)	Wedge	Wedge	Wedge
	DB Epoxy/Solder Type	WBC+Epoxy+DAF	WBC+Epoxy+DAF	Epoxy+DAF
	Die Attach Material	8006,84-1,FH-SC13	8006,84-1,FH-SC13	9005SP-2,9005SP-2,ES-229NS
	# of pad/ball/pin Pitch	17/9/8	17/9/8	17/10/7
	Leadframe Type	SOP8(109x169mil)	SOP8(109x169mil)	SOP7(2.05x2.32mm)(2.05x2.77 mm)
	Leadframe Material	C194	C194	C194
	Molding Compound Type	EME-G600	EME-G600	CEL-9220HF
	Green Compound (Yes/No)	Yes	Yes	Yes
	Lead-Free (Yes/No)	Yes	Yes	Yes
AT/Rel	Assembly Site	JCET	JCET	SIMAT
	FT Test Site	JCET	JCET	58I
	Realibility Test Site	BCD	BCD	BCD
	Qual Plan #	21071305	21071305	21071305

Realibility Testing

Test	Test Conditions	Duration / Limits	Fail/SS	X = Test Needed	Results Pass/Fail	X = Test Needed	Results Pass/Fail	X = Test Needed	Results Pass/Fail
MSL3 Pre-cond	**(JESD22-A113)** Bake 125C	24 Hrs	0/154	X	Pass	X	Pass	X	Pass
	Soak 30C, 60% RH	192Hrs	0/154	X	Pass	X	Pass	X	Pass
	IR reflow 260C	3 cycles	0/154	X	Pass	X	Pass	X	Pass
Temp Cycle (TC)	**(JESD22-A104)** -65C-150C Mounted on PCB Board (Daughter Card)	500 cycles	0/77	X	Pass	X	Pass	X	Pass
		1000 cycles	0/77	X	Pass	X	Pass	X	Pass
HAST	**JESD22-A101/A110** 130C, 85%RH 33.3 psia Vcc = Op Max	96 Hrs	0/77	X	Pass	X	Pass	X	Pass
HTSL **High Temperature Storage**	**(JESD22-A103)** Ta>150C	168 Hrs	0/77	X	Pass	X	Pass	X	Pass
		500 Hrs	0/77	X	Pass	X	Pass	X	Pass
		1000 Hrs	0/77	X	Pass	X	Pass	X	Pass
HTOL	Ta=125C, 100% Vcc	168 Hrs	0/77	X	Pass	X	Pass	X	Pass
	or Ta=150 for 408 hrs	500 Hrs	0/77	X	Pass	X	Pass	X	Pass
		1000 Hrs	0/77	X	Pass	X	Pass	X	Pass
WBS	JESD22-B116B	Cpk>1.66	0/5	X	Pass	X	Pass	X	Pass
WBP	MIL-STD883-2011	Cpk>1.66	0/5	X	Pass	X	Pass	X	Pass
Human Body Model	HBM (AEC-Q100-002)	+-2KV	0/3	X	Pass +-4KV	X	Pass +-4KV	X	Pass +-4KV
Charged Device Model	CDM (AEC-Q100-011)	+-750V	0/3	X	Pass +-1000V	X	Pass +-1000V	X	Pass +-1000V
LU **Latch-up (Class II)**	Max Operating Ta or Tc or Tj	100mA	0/6	X	Pass +-200mA	X	Pass +-200mA	X	Pass +-200mA
Char **Characterization**	Typ -40C, 0C, 25C, 85C, 125C	Operating Range	0/30	X	Pass				

Summary:	Pass
Submitted By:	____________Z. Shi____________________
Approved By:	G. Shi 9/15/2021

Certificate of Design, Construction & Qualification

DIODES INCORPORATED

Description: Qualification of AP3036BKTR-G1 from SFAB1 to LSC JKFAB

		Qual Device 1	Qual Device 2	Qual Device 3	QBS Device 1	QBS Device 2	QBS Device 3
General	Part Number	AP3036BKTR-G1	AP3036BKTR-G1	AP3036BKTR-G1	AP3031KTR-G1	AP3019AKTR-G1	AP3012KTR-G1
	Package	SOT26	SOT26	SOT26	SOT26	SOT26	SOT25
	Wire Bond, Cu Piller, CSP	Wire Bond	Wire Bond	Wire Bond	Wire Bond	Wire Bond	Wire Bond
	MSL Level	1	1	1	3	1	1
	Package Size	2.92mm*2.8mm*1.15mm	2.92mm*2.8mm*1.15mm	2.92mm*2.8mm*1.15mm	3.0mm*2.8mm*1.15mm	3.0mm*2.8mm*1.15mm	3.0mm*2.8mm*1.15mm
	Die Quantity (eg. Die per package)	1	1	1	1	1	1
	Die Name(1)	AA223PA-H	AA223PA-H	AA223PA-H	AA203AA-H	AA115KA-H	AA089A-H
	Die Size (W/L/Thickness	1.62mm*1.06mm*0.15mm	1.62mm*1.06mm*0.15mm	1.62mm*1.06mm*0.15mm	0.86mm*1.62mm	0.86mm*1.62mm	0.86mm*1.62mm
	Die Process / Technology	2UM20V / POLY-EMITTER / 1P1M	2UM20V / POLY-EMITTER / 1P1M	2UM20V / POLY-EMITTER / 1P1M	2UM20V / POLY-EMITTER / 1P1M	2UM20V / POLY-EMITTER / 1P1M	2UM20V / POLY-EMITTER / 1P1M
	Wire Bond Material (Au, Cu, Al)	PdCu	PdCu	PdCu	Cu	Au	Cu
	Wire Diameter	1.0mil	1.0mil	1.0mil	1.0mil	1.0mil	1.0mil
Fab	Wafer FAB	LSC JK FAB	LSC JK FAB	LSC JK FAB	LSC JK FAB	LSC JK FAB	LSC JK FAB
	Wafer Diameter	6"	6"	6"	6"	6"	6"
	Wafer Thickness	675um	675um	675um	675um	675um	675um
	Top Metal Type/Bond Pad Composition	Al/Si/Cu	Al/Si/Cu	Al/Si/Cu	Al/Si/Cu	Al/Si/Cu	Al/Si/Cu
	Top Metal Thickness	1.8um	1.8um	1.8um	1.8um	1.8um	1.2um
	Die passivation thickness range	SiO2 5KA +/- 0.5KA SiN 5KA +/- 0.5KA	SiO2 5KA +/- 0.5KA SiN 5KA +/- 0.5KA	SiO2 5KA +/- 0.5KA SiN 5KA +/- 0.5KA	SiO2 5KA +/- 0.5KA SiN 5KA +/- 0.5KA	SiO2 5KA +/- 0.5KA SiN 5KA +/- 0.5KA	SiO2 5KA +/- 0.5KA SiN 5KA +/- 0.5KA
	Glass Transistion Temp	130 ℃	130 ℃	130 ℃	110 ℃	130 ℃	110 ℃
	Max Junction Temp	150 ℃	150 ℃	150 ℃	150 ℃	150 ℃	150 ℃
	Max Thermal resistance Junc (amibent)	265°C/W	265°C/W	265°C/W	265°C/W	265°C/W	265°C/W
	No of masks Steps	11	11	11	11	11	11
Package	*Backgrind Location*	JCET	JCET	JCET	SIMAT	JCET	CAT
	Bond Type (at Die)	Ball	Ball	Ball	Ball	Ball	Ball
	Bond Type (at LF)	Wedge	Wedge	Wedge	Wedge	Wedge	Wedge
	DB Epoxy/Solder Type	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy
	Die Attach Material	8006NS	8006NS	8006NS	9005SP-2	8290	84-1LMISR4
	Leadframe Type	SOT-26(XHH)	SOT-26(XHH)	SOT-26(XHH)	SOT-23-6	SOT-23-6	TSOT23-5L A TYPE 16ROW
	Leadframe Material	A194.FH	A194.FH	A194.FH	C194	A194	A194
	Molding Compound Type	GE-1030S	GE-1030S	GE-1030S	CEL-1702HF9SMT	GE1030S	CEL-1700HF40SK-D3(M2)
	Green Compound (Yes/No)	YES	YES	YES	Yes	Yes	Yes
	Lead-Free (Yes/No)	YES	YES	YES	Yes	Yes	Yes
AT/Rel	Assembly Site	JCET	JCET	JCET	SIMAT	JCET	CAT
	FT Test Site	JCET	JCET	JCET	SIMAT	JCET	CAT
	Realibility Test Site	BCD	BCD	BCD	BCD	LSC	CAT
	Qual Plan #	21103101	21103101	21103101	20062205	20062205	20062205

	Realibility Testing									QPACK-20062205		QPACK-20062205		QPACK-20062205	
Test	**Test Conditions**	**Duration / Limits**	**Fail/SS**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**
MSL1 Pre-cond	**(JESD22-A113)** Bake 125C	24 Hrs	0/154	X	Pass	X	Pass	X	Pass			X	Pass	X	Pass
	Soak 85C, 85% RH	168Hrs	0/154	X	Pass	X	Pass	X	Pass			X	Pass	X	Pass
	IR reflow 260C	3 cycles	0/154	X	Pass	X	Pass	X	Pass			X	Pass	X	Pass
Temp Cycle (TC)	**(JESD22-A104)** -65C-150C	500 cycles	0/77	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
	Mounted on PCB Board (Daughter Card)	1000 cycles	0/77	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
HAST	**JESD22-A101/A110** 130C, 85%RH 33.3 psia Vcc = Op Max	96 Hrs	0/77	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
UHAST										X	Pass	X	Pass	X	Pass
HTSL **High Temperature Storage**	**(JESD22-A103)** Ta>150C	168 Hrs	0/77	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
		500 Hrs	0/77	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
		1000 Hrs	0/77	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
HTOL	Ta=125C, 100% Vcc or Ta=150 for 408 hrs	168 Hrs	0/77	X	Pass	QBS to QBS Device1,2,3		QBS to QBS Device1,2,3		X	Pass	X	Pass	X	Pass
		500 Hrs	0/77	X	Pass	QBS to QBS Device1,2,3		QBS to QBS Device1,2,3		X	Pass	X	Pass	X	Pass
		1000 Hrs	0/77	X	Pass	QBS to QBS Device1,2,3		QBS to QBS Device1,2,3		X	Pass	X	Pass	X	Pass
ELFR **Earlier Life Failure Rate**	Ta=125C, 100% Vcc	48 hrs	0/800							QBS to Qual Device 2		X	Pass	QBS to Qual Device 2	
WBS	JESD22-B116B	Cpk>1.66	0/5	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
WBP	MIL-STD883-2011	Cpk>1.66	0/5	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
SD **Solderability**	>95% Coverage	5 Seconds	0/15	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
PD **Physical Dimensions**		Package Outline	Ppk>1.67 Cpk>1.33	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
Human Body Model	HBM (AEC-Q100-002)	+-2KV	0/3	X	Pass +/-2.5KV					X	Pass +-4.5KV	X	Pass +-2KV	X	Pass +-3.5KV
Charged Device Model	CDM (AEC-Q100-011)	+-750V	0/3	X	Pass +/-1000V					X	Pass +-2000V	X	Pass +-2000V	X	Pass +-1500V
LU **Latch-up (Class II)**	Max Operating Ta or Tc or Tj	100mA	0/6	X	Pass 200mA					X	Pass 200mA	X	Pass 200mA	X	Pass 200mA
Char **Characterization**	Typ -40C, 0C, 25C, 85C~~, 125C~~	Operating Range	0/30	X	Pass					X	Pass	X	Pass	X	Pass

Summary: Pass

Submitted By: ____________Huafeng Yin_____________

Approved By: M. Kulbeth 9/9/2022

Certificate of Design, Construction and Qualification

Description: Qualification for Epoxy change to ABP8611

				Qual Device 1		Qual Device 1		Qual Device 1	
General	Part Number			PT7M3808G30TAEX		PT7M3808G30TAEX		PT7M3808G30TAEX	
	Package			SOT-26		SOT-26		SOT-26	
	Wire Bond, Cu Piller, CSP			Wire bond		Wire bond		Wire bond	
	MSL Level			1		1		1	
	Package Size			3.05*1.75*1.45		3.05*1.75*1.45		3.05*1.75*1.45	
	Die Quantity (eg. Die per package)			1		1		1	
	Die Name(1)			TN011C0-2-30		TN011C0-2-30		TN011C0-2-30	
	Die Size (W/L/Thickness			0.69*1.24*0.205		0.69*1.24*0.205		0.69*1.24*0.205	
	Die Process / Technology			0.5UM BCD		0.5UM BCD		0.5UM BCD	
	Wire Bond Material (Au, Cu, Al)			PdCu		PdCu		PdCu	
	Wire Diameter			0.8mil		0.8mil		0.8mil	
Fab	Wafer FAB			SFAB2		SFAB2		SFAB2	
	Wafer Diameter			6"		6"		6"	
	Wafer Thickness			675um		675um		675um	
	Top Metal Type/Bond Pad Composition			Al/Cu		Al/Cu		Al/Cu	
	Top Metal Thickness			1.1um		1.1um		1.1um	
	Die passivation thickness range			SiO2 5kA+SiN 5kA		SiO2 5kA+SiN 5kA		SiO2 5kA+SiN 5kA	
	No. of bond over active area			0		0		0	
	Max Junction Temp			150 ℃		150 ℃		150 ℃	
	No of masks Steps			14		14		14	
	Metal Layers			2		2		2	
	Metal Density per Layer			0.3		0.3		0.3	
	Min Metal Width			0.6um		0.6um		0.6um	
	Min Metal Spacing			0.6um		0.6um		0.6um	
	Power Consumption			35mW		35mW		35mW	
Package	*BackgrindThinkness*			205um		205um		205um	
	Backgrind Location			CAT		CAT		CAT	
	Bond Type (at Die)			Ball		Ball		Ball	
	Bond Type (at LF)			Wedge		Wedge		Wedge	
	DB Epoxy/Solder Type			Epoxy		Epoxy		Epoxy	
	Die Attach Material			ABP8611		ABP8611		ABP8611	
	Min Bond Pad Pitch			110um		110um		110um	
	# of pad/ball/pin Pitch			85um		85um		85um	
	Leadframe Type			TSOT23-6L R		TSOT23-6L R		TSOT23-6L R	
	Leadframe Material			A194		A194		A194	
	Molding Compound Type			CEL-1700HF40SK-D3 (M2)		CEL-1700HF40SK-D3 (M2)		CEL-1700HF40SK-D3 (M2)	
	Green Compound (Yes/No)			Yes		Yes		Yes	
AT/Rel	Assembly Site			CAT		CAT		CAT	
	FT Test Site			CAT		CAT		CAT	
	Realibility Test Site			CAT		CAT		CAT	
	Qual Plan #			22032403		22032403		22032403	
	Realibility Testing								
Test	**Test Conditions**	**Duration / Limits**	**Fail/SS**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**
MSL1 Pre-cond	**(JESD22-A113)** Bake 125C	24 Hrs	0/154	X	Pass	X	Pass	X	Pass
	Soak 85C, 85% RH	168Hrs	0/154	X	Pass	X	Pass	X	Pass
	IR reflow 260C	3 cycles	0/154	X	Pass	X	Pass	X	Pass
Temp Cycle (TC)	**(JESD22-A104)** -65C-150C Mounted on PCB Board (Daughter Card)	500 cycles	0/77	X	Pass	X	Pass	X	Pass
		1000 cycles	0/77	X	Pass	X	Pass	X	Pass
HTSL High Temperature Storage	**(JESD22-A103)** Ta>150C	168 Hrs	0/77	X	Pass	X	Pass	X	Pass
		500 Hrs	0/77	X	Pass	X	Pass	X	Pass
		1000 Hrs	0/77	X	Pass	X	Pass	X	Pass
HTOL	Ta=125C, 100% Vcc	168 Hrs	0/77	X	Pass	QBS to Qual Device 1		QBS to Qual Device 1	
	or Ta=150 for 408 hrs	500 Hrs	0/77	X	Pass	QBS to Qual Device 1		QBS to Qual Device 1	
		1000 Hrs	0/77	X	Pass	QBS to Qual Device 1		QBS to Qual Device 1	
WBS	JESD22-B116B	Cpk>1.66	0/5	X	Pass	X	Pass	X	Pass
WBP	MIL-STD883-2011	Cpk>1.66	0/5	X	Pass	X	Pass	X	Pass
Summary:	Pass								
Submitted By:	W. Cao								
Approved By:	M Kulbeth 4/5/2022								

Certificate of Design, Construction & Qualification

Description: Qualification for AL1665S-13 and AL1666S-13

				Qual Device 1		Qual Device 2		Qual Device 3		QBS Device 1		QBS Device 2		QBS Device 3	
General	Part Number			AL1665S-13		AL1666S-13		AL1666S-13		AL1665S-13		AL1666S-13		AL1665S-13	
	PG #			P533.1.13		P533.1.14		P533.1.14		P533.1.3		P533.1.4		P533.1.2A	
	Package			SO-8		SO-8		SO-8		SO-8		SO-8		SO-8	
	Wire Bond, Cu Piller, CSP			Wire Bond		Wire Bond		Wire Bond		Wire Bond		Wire Bond		Wire Bond	
	MSL Level			1		1		1		1		1		1	
	Package Size			4.9mm*6.0mm*1.6mm		4.9mm*6.0mm*1.6mm		4.9mm*6.0mm*1.6mm		4.9mm*6.0mm*1.6mm		4.9mm*6.0mm*1.6mm		4.9mm*6.0mm*1.6mm	
	Die Quantity (eg. Die per package)			1		1		1		1		1		1	
	Die Name(1)			BN123R0-2		BN123S0-2		BN123S0-2		BN123F0-2		BN123G0-2		BN123C0-2	
	Die Size (W/L/Thickness			1.38mmx1.12mmx0.250mm		1.38mmx1.12mmx0.250mm		1.38mmx1.12mmx0.250mm		1.38mmx1.12mmx0.250mm		1.38mmx1.12mmx0.250mm		1.38mmx1.12mmx0.250mm	
	Die Process / Technology			BCD,0.5um,30V,1P3M		BCD,0.5um,30V,1P3M		BCD,0.5um,30V,1P3M		BCD,0.5um,30V,1P3M		BCD,0.5um,30V,1P3M		BCD,0.5um,30V,1P3M	
	No of masks Steps			25		25		25		25		25		25	
	Wire Bond Material (Au, Cu, Al)			PdCu		PdCu		PdCu		PdCu		PdCu		PdCu	
	Wire Diameter			1mil		1mil		1mil		1mil		1mil		1mil	
Fab	Wafer FAB			SFAB2		SFAB2		SFAB2		SFAB2		SFAB2		SFAB2	
	Wafer FAB Location			ShangHai SFAB2		ShangHai SFAB2		ShangHai SFAB2		ShangHai SFAB2		ShangHai SFAB2		ShangHai SFAB2	
	Wafer Diameter			6"		6"		6"		6"		6"		6"	
	Wafer Thickness			675um		675um		675um		675um		675um		675um	
	Top Metal Type/Bond Pad Composition			AlCu		AlCu		AlCu		AlCu		AlCu		AlCu	
	Top Metal Thickness			1.2um		1.2um		1.2um		1.2um		1.2um		1.2um	
	Glass Transistion Temp			125℃		125℃		125℃		125℃		125℃		125℃	
	Max Junction Temp			150℃		150℃		150℃		150℃		150℃		150℃	
	Max Thermal resistance Junc (case)			30℃/W		30℃/W		30℃/W		30℃/W		30℃/W		30℃/W	
	Max Thermal resistance Junc (amibent)			136℃/W		136℃/W		136℃/W		136℃/W		136℃/W		136℃/W	
	No of masks Steps			25		25		25		25		25		25	
	Metal Layers			3		3		3		3		3		3	
	Min Metal Width			3um		3um		3um		3um		3um		3um	
	Min Metal Spacing			2um		2um		2um		2um		2um		2um	
Package	Bond Type (at Die)			ball		ball		ball		ball		ball		ball	
	Bond Type (at LF)			wedge		wedge		wedge		wedge		wedge		wedge	
	DB Epoxy/Solder Type			Epoxy		Epoxy		Epoxy		Epoxy		Epoxy		Epoxy	
	Die Attach Material			503CuM		503CuM		503CuM		503CuM		503CuM		503CuM	
	Min Bond Pad Pitch			108um		108um		108um		108um		108um		108um	
	# of pad/ball/pin Pitch			9		9		9		9		9		9	
	Leadframe Type (Stamped or Etched)			Stamped [SOP-8L C TYPE 12ROW]		Stamped [SOP-8L C TYPE 12ROW]		Stamped [SOP-8L C TYPE 12ROW]		Stamped [SOP-8L C TYPE 12ROW]		Stamped [SOP-8L C TYPE 12ROW]		Stamped [SOP-8L C TYPE 12ROW]	
	Leadframe Material			CDA194		CDA194		CDA194		CDA194		CDA194		CDA194	
	Ag plated or Bare Cu			Bare Cu		Bare Cu		Bare Cu		Bare Cu		Bare Cu		Bare Cu	
	Lead Frame Manufacturer			SHE		SHE		SHE		SHE		SHE		SHE	
	Molding Compound Type			EME-G700L Type S		EME-G700L Type S		EME-G700L Type S		EME-G700L Type S		EME-G700L Type S		EME-G700L Type S	
	Molding Compound Manufacturer			SUMITOMO		SUMITOMO		SUMITOMO		SUMITOMO		SUMITOMO		SUMITOMO	
	Green Compound (Yes/No)			Yes		Yes		Yes		Yes		Yes		Yes	
	Lead-Free (Yes/No)			Yes		Yes		Yes		Yes		Yes		Yes	
AT/Rel	Assembly Site/ Location			CAT		CAT		CAT		CAT		CAT		CAT	
	Test Site/ Location			CAT		CAT		CAT		CAT		CAT		CAT	
	Realibility Test Site			SFAB		SFAB		SFAB		SFAB		SFAB		SFAB	
	Qual Plan #			22070506		22070506		22070506		19010401		19102504		19010401	
	Realibility Testing									**QPACK-19010401**		**QPACK-19102504**		**QPACK-19010401**	
Test	**Test Conditions**	**Duration / Limits**	**Fail/SS**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**	**X = Test Needed**	**Results Pass/Fail**
MSL1 Pre-cond	**(JESD22-A113)** Bake 125C	24 Hrs	0/154	X	Pass	X	Pass			QBS to QBS Device3		QBS to QBS Device3		X	Pass
	Soak 85C, 85% RH	168Hrs	0/154	X	Pass	X	Pass			QBS to QBS Device3		QBS to QBS Device3		X	Pass
	IR reflow 260C	3 cycles	0/154	X	Pass	X	Pass			QBS to QBS Device3		QBS to QBS Device3		X	Pass
Temp Cycle (TC)	**(JESD22-A104)** -65C-150C	500 cycles	0/77	X	Pass	X	Pass			QBS to QBS Device3		QBS to QBS Device3		X	Pass
	Mounted on PCB Board (Daughter Card)	1000 cycles	0/77	X	Pass	X	Pass			QBS to QBS Device3		QBS to QBS Device3		X	Pass
HAST	**JESD22-A101/A110** 130C, 85%RH 33.3 psia Vcc = Op Max	96 Hrs	0/77	X	Pass	X	Pass			QBS to QBS Device3		QBS to QBS Device3		X	Pass
HTSL High Temperature Storage	**(JESD22-A103)** Ta>150C	168 Hrs	0/77	X	Pass	X	Pass			QBS to QBS Device3		QBS to QBS Device3		X	Pass
		500 Hrs	0/77	X	Pass	X	Pass			QBS to QBS Device3		QBS to QBS Device3		X	Pass
		1000 Hrs	0/77	X	Pass	X	Pass			QBS to QBS Device3		QBS to QBS Device3		X	Pass
HTOL	Ta=125C, 100% Vcc or Ta=150 for 408 hrs	168 Hrs	0/77	X	Pass	X	Pass			X	Pass	X	Pass	X	Pass
		500 Hrs	0/77	X	Pass	X	Pass			X	Pass	X	Pass	X	Pass
		1000 Hrs	0/77	X	Pass	X	Pass			X	Pass	X	Pass	X	Pass
WBS	JESD22-B116B	Cpk>1.66	0/5	QBS to QBS Device		QBS to QBS Device				QBS to QBS Device3		QBS to QBS Device3		X	Pass
WBP	MIL-STD883-2011	Cpk>1.66	0/5	QBS to QBS Device		QBS to QBS Device				QBS to QBS Device3		QBS to QBS Device3		X	Pass
Human Body Model	HBM (AEC-Q100-002)	+-2KV	0/3	X	Pass +/-3KV	X	Pass +/-3KV	X	Pass+/-3KV	X	Pass				
Charged Device Model	CDM (AEC-Q100-011)	+-750V	0/3	X	Pass +/-2000V	X	Pass +/-2000V	X	Pass+/-2000V	X	Pass				
LU Latch-up (Class II)	Max Operating Ta or Tc or Tj	100mA	0/6	X	Pass 200mA	X	Pass 200mA	X	Pass200mA	X	Pass				
Char Characterization	Typ -40C, 0C, 25C, 85C, ~~125C~~ 105C	Operating Range	0/30	X	Pass	X	Pass	X	Pass	X	Pass				

Summary: Pass

Submitted By: ______________Huafeng Yin______________________

Approved By: M. Kulbeth 9/28/2022

Certificate of Design, Construction & Qualification

DIODES INCORPORATED

Description: Add SFAB2 MOS as 2nd Source for AP3981 series products

		Qual Device 1	Qual Device 2	Qual Device 3	Qual Device 4((by QBS))	QBS Device 1	QBS Device 2
General	Part Number	AP3981B2S7-13	AP39811AS7-13	AP39811BS7-13	AP3981BS7-13	AP3981BS7-13	AP39811AS7-13
	Package	S0-7	S0-7	S0-7	S0-7	S0-7	SO-7
	Wire Bond, Cu Piller, CSP	Wire Bond	Wire Bond	Wire Bond	Wire Bond	Wire Bond	wire bond
	MSL Level	MSL3	MSL3	MSL3	MSL3	MSL3	3
	Package Size	6.2mm*5.1mm*1.75mm	6.2mm*5.1mm*1.75mm	6.2mm*5.1mm*1.75mm	6.2mm*5.1mm*1.75mm	6.2mm*5.1mm*1.75mm	6.2mm*5.1mm*1.75mm
	Die Quantity (eg. Die per package)	2	2	2	2	2	2
	Die Name(1)	BN132K0-2+DN050B0-2	BN122AE-2+DN050B0-2	BN122AF-2+DN050B0-2	BN132E0-2	BN132E0-2	BN122AE-2
	Die Size (W/L/Thickness	1.68mm*1mm*0.675mm	1.68mm*1mm*0.675mm	1.68mm*1mm*0.675mm	1.68mm*1mm*0.675mm	1.68mm*1mm*0.675mm	1*1.68*0.675mm
	Die Process / Technology	BCD,CMOS/1.2um/650V/1P2M	BCD,CMOS/1.2um/650V/1P2M	BCD,CMOS/1.2um/650V/1P2M	BCD,CMOS/1.2um/650V/1 P2M	BCD,CMOS/1.2um/650V/ 1P2M	1.2um CDMOS-150A
	No of masks Steps	13	13	13	13	13	13
	Wire Bond Material (Au, Cu, Al)	Cu	Cu	Cu	Cu	Cu	Cu
	Wire Diameter	1mil	1mil	1mil	1mil	1mil	1mil
	Die Name(2)	DN050B0-2	DN050B0-2	DN050B0-2	DN050B0-2	MCS5G65015B	CS5B6501B
	Die Size (W/L/Thickness	1.55mm*1.55mm*0.2mm	1.55mm*1.55mm*0.2mm	1.55mm*1.55mm*0.2mm	1.55mm*1.55mm*0.2mm	1.48mm*1.49mm	1.55*1.55*0.3mm
	Die Process / Technology	PLANAR HIGH-VOLTAGE MOSFET	PLANAR HIGH-VOLTAGE MOSFET	PLANAR HIGH-VOLTAGE MOSFET	PLANAR HIGH-VOLTAGE MOSFET	PLANAR HIGH-VOLTAGE MOSFET	PLANAR HIGH-VOLTAGE MOSFET
	No of masks Steps	7	7	7	7	N/A	N/A
	Wire Bond Material (Au, Cu, Al)	Cu	Cu	Cu	Cu	Cu	Cu
	Wire Diameter	1.0mil	1.0mil	1.0mil	1.0mil	1.0mil	1.0mil
Fab	Wafer FAB	Die1:SFAB2; Die2:SFAB2	Die1:SFAB2; Die2:SFAB2	Die1:SFAB2; Die2:SFAB2	Die1:SFAB2; Die2:SFAB2	Die1:SFAB2; Die2:CRHJ	Die1:SFAB2; Die2:CRHJ
	Wafer FAB Location	Shang Hai	Shang Hai	Shang Hai	Shang Hai	N/A	N/A
	Wafer Diameter	Die1:6"; Die2:6"	Die1:6"; Die2:6"	Die1:6"; Die2:6"	Die1:6"; Die2:6"	Die1:6"; Die2:6"	Die1:6"; Die2:6"
	Wafer Thickness	Die1:675um; Die2:200um	Die1:675um; Die2:200um	Die1:675um; Die2:200um	Die1:675um; Die2:200um	Die1:675um; Die2:300um	Die1:675um; Die2:300um
	Top Metal Type/Bond Pad Composition	Die1:AlCu, Die2:AlCu	Die1:AlCu, Die2:AlCu	Die1:AlCu, Die2:AlCu	Die1:AlCu, Die2:AlCu	Die1:AlCu, Die2:Al	Die1:AlCu, Die2:Al
	Top Metal Thickness	Die1:1.2um,Die2:4um	Die1:1.2um,Die2:4um	Die1:1.2um,Die2:4um	Die1:1.2um,Die2:4um	Die1:1.2um,Die2:6um	Die1:1.2um,Die2:4um
	Back Metal Type (All Layers)	Die1:N/A, Die2:Ti/Ni/Ag	Die1:N/A, Die2:Ti/Ni/Ag	Die1:N/A, Die2:Ti/Ni/Ag	Die1:N/A, Die2:Ti/Ni/Ag	Die1:N/A, Die2:Ag	Die1:N/A, Die2:Ag
	Back Metal Thickness (All Layers)	Die1:N/A Die2:1150A+2000A+8000A	Die1:N/A Die2:1150A+2000A+8000A	Die1:N/A Die2:1150A+2000A+8000A	Die1:N/A Die2:1150A+2000A+8000A	NA	Die1:N/A Die2:1150A+2000A+8000 A
	Die Conforming Coating	Die1:SiO2 + SIN,Die2:N/A	Die1:SiO2 + SIN,Die2:N/A	Die1:SiO2 + SIN,Die2:N/A	Die1:SiO2 + SIN,Die2:N/A	Die1:SiO2 + SIN,Die2:N/A	Die1:SiO2 + SIN,Die2:N/A
	Die passivation thickness range	Die1:5000A+5000A, Die2:7000A	Die1:5000A+5000A, Die2:7000A	Die1:5000A+5000A, Die2:7000A	Die1:5000A+5000A;Die2:N A	Die1:5000A+5000A, Die2:7000A	Die1:5000A+5000A, Die2:7000A
	No. of bond over active area	0	0	0	0	0	0
	Glass Transition Temp	125℃	125℃	125℃	125℃	125℃	125℃
	Header plating (Die Land Area)	Ag	Ag	Ag	Ag	Ag	Ag
	Max Junction Temp	150℃	150℃	150℃	150℃	150℃	150℃
	Max Thermal resistance Junc (case)	3 ℃/W	2 ℃/W	2 ℃/W	3 ℃/W	3 ℃/W	1.79 ℃/W
	Max Thermal resistance Junc (amibent)	77 ℃/W	78 ℃/W	78 ℃/W	77 ℃/W	77 ℃/W	78 ℃/W
	No of masks Steps	Die1:13, Die2:7	Die1:13, Die2:7	Die1:13, Die2:7	Die1:13, Die2:7	N/A	N/A
Package	Bond Type (at Die)	Ball	Ball	Ball	Ball	Ball	Ball
	Bond Type (at LF)	Wedge	Wedge	Wedge	Wedge	Wedge	Wedge
	DB Epoxy/Solder Type	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy
	Die Attach Material	9005SP-2	9005SP-2	9005SP-2	9005SP-2	9005SP-2	9005SP-2
	Leadframe Type (Stamped or Etched)	SOP7 (109×081/091×081)	SOP7 (109×081/091×081)	SOP7 (109×081/091×081)	SOP7 (109×081/091×081)	SOP7 (109×081/091×081)	SOP7 (109×081/091×081)
	Leadframe Material	A194	A194	A194	A194	A194	A194
	Ag plated or Bare Cu	Ag plated	Ag plated	Ag plated	Ag plated	Ag plated	Ag plated
	Lead Frame Manufacturer	ASM	ASM	ASM	ASM	ASM	ASM
	Molding Compound Type	CEL-9220HF	CEL-9220HF	CEL-9220HF	CEL-9220HF	CEL-9220HF	CEL-9220HF
	Molding Compound Manufacturer	Hitachi	Hitachi	Hitachi	Hitachi	Hitachi	Hitachi
	Green Compound (Yes/No)	Yes	Yes	Yes	Yes	Yes	Yes
	Lead-Free (Yes/No)	Yes	Yes	Yes	Yes	Yes	Yes
AT/Rel	Assembly Site/ Location	SIMAT	SIMAT	SIMAT	SIMAT	SIMAT	SIMAT
	Test Site/ Location	SIMAT	SIMAT	SIMAT	SIMAT	SIMAT	SIMAT
	Realibility Test Site	BCD	BCD	BCD	BCD	BCD	BCD
	Qual Plan #	22072401	22072401	22072401	22072401	19031503	18012402

Realibility Testing

Test	Test Conditions	Duration / Limits	Fail/SS	X = Test Needed	Results Pass/Fail	X = Test Needed	Results Pass/Fail	X = Test Needed	Results Pass/Fail	X = Test Needed	Results Pass/Fail	X = Test Needed	Results Pass/Fail	X = Test Needed	Results Pass/Fail
MSL3 Pre-cond	**(JESD22-A113)** Bake 125C	24 Hrs	0/154	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
	Soak 30C, 60% RH	192Hrs	0/154	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
	IR reflow 260C	3 cycles	0/154	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
Temp Cycle (TC)	**(JESD22-A104)** -65C-150C	500 cycles	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
	Mounted on PCB Board (Daughter Card)	1000 cycles	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
HAST	**JESD22-A101/A110** 130C, 85%RH 33.3 psia Vcc = Op Max	96 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
HTSL High Temperature Storage	**(JESD22-A103)** Ta>150C	168 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
		500 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
		1000 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
HTOL	Ta=125C, 100% Vcc	168 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
	or Ta=150 for 408 hrs	500 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
		1000 Hrs	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
WBS	JESD22-B116B	Cpk>1.66	0/5	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
WBP	MIL-STD883-2011	Cpk>1.66	0/5	X	Pass	X	Pass	X	Pass	QBS to Qual Device1		X	Pass	X	Pass
Human Body Model	HBM (AEC-Q100-002)	+-2KV	0/3	X	Pass +-4KV	X	Pass +-6KV	X	Pass +-6KV	QBS to Qual Device1		X	Pass	X	Pass
Charged Device Model	CDM (AEC-Q100-011)	+-750V	0/3	X	Pass +-1000V	X	Pass +-1000V	X	Pass +-1000V	QBS to Qual Device1		X	Pass	X	Pass
LU Latch-up (Class II)	Max Operating Ta or Tc or Tj	100mA	0/6	X	Pass 200mA	X	Pass 200mA	X	Pass 200mA	QBS to Qual Device1		X	Pass	X	Pass
Char Characterization	Typ -40C, 0C, 25C, 85C~~, 125C~~	Operating Range	0/30	X	Pass										

Summary: Pass
Submitted By: Z. Shi
Approved By: M. Kulbeth 9/28/22