DATE: 15 November, 2021

PCN #: 2554

PCN Title: Qualified Additional Assembly & Test Sites, Bill of Material and updated Device Data Sheets for Package Outline Dimension Change

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-2554 REV 1

Notification Date:	Implementation Date:	Product Family:	Change Type:	PCN #:
15 November, 2021	15 February, 2022	Analog Semiconductors	A/T Sites, BOM and Data Sheet Change	**2554**

TITLE

Qualified Additional Assembly & Test (A/T) Sites, Bill of Material (BOM) and updated Data Sheets for Package Outline Dimension Change

DESCRIPTION OF CHANGE

This PCN is being issued to notify customers that in order to assure continuity of supply, Diodes has qualified additional A/T Site JCET Group Co., Ltd. (JCET) located in Suqian, China, and Tianshui Huatian Technology Co., Ltd. (TSHT) located in Tianshui, Gansu, China. In addition, we have qualified (BOM) New Die Revision, PdCu Bond Wire and Lead Frame that includes a Package Outline Dimension (POD) change for SOT353-5L and SOT363-6L as noted in Tables 5 and 6.

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 in Table 5 and 6.

PRODUCTS AFFECTED

Table 1 - Qualified Additional (BOM) PdCu Bond Wire
Table 2 - Qualified Additional AT Site (JCET SQ)
Table 3 - Qualified Additional AT Site (TSHT) and New Die Revision
Table 4 - Qualified Additional (BOM) Lead Frame with POD Change
Table 5 - POD Change for SOT353-5L
Table 6 - POD Change for SOT 363-6L

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.

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Table 1 - Qualified Additional (BOM) PdCu Bond Wire					
AP22800HB-7					

Table 2 - Qualified Additional AT Site (JCET SQ)					
PI3USB9281CXWEX					

Table 3 - Qualified Additional AT Site (TSHT) and New Die Revision					
GP4624S-13					

Table 4 - Qualified Additional (BOM) Lead Frame with POD Change					
PI5A121BCEX	PI5A3157BC6EX	PI5A3157CEX	PI5A3166CEX	PI5A3167CCEX	PI5A4157CEX
PI5A4599BCEX					

Table 5 – POD Change for SOT353-5L

Current POD	New POD
TOP VIEW, BOTTOM VIEW, SIDE VIEW	TOP VIEW, BOTTOM VIEW, SIDE VIEW

Current POD

PKG. DIMENSIONS (MM)		
SYMBOL	Min	Max
A	-	1.10
A1	0.00	0.10
A2	0.70	1.00
b	0.15	0.30
c	0.08	0.22
D	1.80	2.20
E	1.10	1.40
E1	1.80	2.40
e	0.65 BSC	
e1	1.30 BSC	
L	0.26	0.46
θ	0	8

New POD

PKG. DIMENSIONS (MM)		
SYMBOL	Min	Max
A	-	1.10
A1	0.00	0.10
A2	0.70	1.00
b	0.15	0.30
c	0.08	0.22
D	1.80	2.20
E	1.10	1.40
E1	2.15	2.45
e	0.65 BSC	
e1	1.30 BSC	
L	0.26	0.46
θ	0	8

DIODES INCORPORATED

Table 6 – POD Change for SOT 363-6L

Current POD	New POD
D, E1, E, e, PIN1, TOP VIEW; L, θ, c, BOTTOM VIEW; A, A1, A2, b, SIDE VIEW	D, E1, E, e, PIN1, TOP VIEW; L, θ, c, BOTTOM VIEW; A, A1, A2, b, SIDE VIEW

Current POD

PKG.	DIMENSIONS	(MM)
SYMBOL	Min	Max
A	-	1.10
A1	0.00	0.10
A2	0.70	1.00
b	0.15	0.40
c	0.08	0.22
D	1.80	2.20
E	1.10	1.40
E1	1.80	2.40
e	0.65 BSC	
e1	1.30 BSC	
L	0.26	0.46
θ	0	8

New POD

PKG.	DIMENSIONS	(MM)
SYMBOL	Min	Max
A	-	1.10
A1	0.00	0.10
A2	0.70	1.00
b	0.15	0.40
c	0.08	0.22
D	1.80	2.20
E	1.10	1.40
E1	2.15	2.45
e	0.65 BSC	
e1	1.30 BSC	
L	0.26	0.46
θ	0	8

Certificate of Design, Construction & Qualification

Description: Qualification of AP22800HB-7 & AP22966DC8-7

			Qual Device 1		Qual Device 2		Qual Device 3		Qual Device 4	
General	Part Number		AP22800HB-7		AP22800HB-7		AP22800HB-7		AP22966DC8-7	
	Package		DFN2116-8		DFN2116-8		DFN2116-8		DFN3020-14-080E	
	Wire Bond, Cu Piller, CSP		wire bond		wire bond		wire bond		wire bond	
	MSL Level		1		1		1		1	
	Package Size		2.1 x 1.6 x 0.605		2.1 x 1.6 x 0.605		2.1 x 1.6 x 0.605		3.05 x 2.05 x 0.83 mm	
	Die Quantity (eg. Die per package)		1		1		1		1	
	Die Name(1)		A0339A/AD08070339A0		A0339A/AD08070339A0		A0339A/AD08070339A0		A0358B0	
	Die Size (W/L/Thickness		620 x 1320 x 140		620 x 1320 x 140		620 x 1320 x 140		0.705 x 1.99 x 0.205 mm	
	Die Process / Technology		CMOS, AN180		CMOS, AN180		CMOS, AN180		AN180	
	Wire Bond Material (Au, Cu, Al)		1.5mil/0.8mil PdCu		1.5mil/0.8mil PdCu		1.5mil/0.8mil PdCu		Cu	
	Wire Diameter		0.8mil/1.5mil		0.8mil/1.5mil		0.8mil/1.5mil		0.8 mil PdCu & 1.5milCu	
Fab	Wafer FAB		Dongbu Hitek		Dongbu Hitek		Dongbu Hitek		Dongbu Hitek/CB KF	
	Wafer Diameter		200mm		200mm		200mm		200mm (8")	
	Wafer Thickness		750um		750um		750um			
	Top Metal Type/Bond Pad Composition		Cu[10um]+Ni[2um]+Au[0.5mm]		Cu[10um]+Ni[2um]+Au[0.5mm]		Cu[10um]+Ni[2um]+Au[0.5mm]		Cu[10um]+Ni[2um]+Au[0.5um]	
	Top Metal Thickness		12.5um		12.5um		12.5um			
	Die passivation thickness range		Ni 6000Å + Oxide 11000Å		Ni 6000Å + Oxide 11000Å		Ni 6000Å + Oxide 11000Å		Ni 6000Å + Oxide 11000Å	
	No. of bond over active area		13		13		13		22	
	Glass Transistion Temp		135		135		135		135 degree C	
	Header plating (Die Land Area)		Ni [0.20-0.50um]; Pd [0.015-0.02um]; Au [0.003-0.015um]		Ni [0.20-0.50um]; Pd [0.015-0.02um]; Au [0.003-0.015um]		Ni [0.20-0.50um]; Pd [0.015-0.02um]; Au [0.003-0.015um]		NiPdAu	
	Max Junction Temp		125		125		125		150 degree C	
	Max Thermal resistance Junc (case)		189		189		189		8 °C/W	
	Max Thermal resistance Junc (amibent)		61		61		61		46.5°C/W	
	No of masks Steps		19 plus RDL		19 plus RDL		19 plus RDL		21 + Cu RDL	
	Metal Layers		3Mtl plus Thick Cu RDL		3Mtl plus Thick Cu RDL		3Mtl plus Thick Cu RDL		4 + RDL	
	Metal Density per Layer		MET1 = 39.5% MET2 = 65.3% MET3 = 66.3%		MET1 = 39.5% MET2 = 65.3% MET3 = 66.3%		MET1 = 39.5% MET2 = 65.3% MET3 = 66.3%		MET1 = 0.6156 MET2 = 0.7110 MET3 = 0.6951 MET4 = 0.6856 Cu RDL = 0.5415	
	Min Metal Width		0.34		0.34		0.34		0.23um	
	Min Metal Spacing		0.23		0.23		0.23		0.23um	
	Power Consumption		100uW		100uW		100uW		17mW @ 1A	
	RDL Design and Process		Cu[10um]+Ni[2um]+Au[0.5um]		Cu[10um]+Ni[2um]+Au[0.5um]		Cu[10um]+Ni[2um]+Au[0.5um]		Cu[10um]+Ni[2um]+Au[0.5um]	
	Number of Transistors		405		405		405		245	
Package	*BackgrindThinkness*		140		140		140		205um	
	Backgrind Location		SAT		SAT		SAT		SAT	
	Bond Type (at Die)		Ball		Ball		Ball		Ball	
	Bond Type (at LF)		Stitch		Stitch		Stitch		Stitch	
	DB Epoxy/Solder Type		WBC conductive		WBC conductive		WBC conductive		Epoxy	
	Die Attach Material		8008MD		8008MD		8008MD		QMI519	
	# of pad/ball/pin Pitch		7		7		7		10	
	Leadframe Type		SLP2116P8-B		SLP2116P8-B		SLP2116P8-B		SLP3020P14/DLF00694	
	Leadframe Material		C7025HH		C7025HH		C7025HH		C7025HH	
	Molding Compound Type		EMEG770HCD		EMEG770HCD		EMEG770HCD		EMEG770HCD	
	Green Compound (Yes/No)		Yes		Yes		Yes		Yes	
	Lead-Free (Yes/No)		Yes		Yes		Yes		Yes	
AT/Rel	Assembly Site/RDL site		SAT/Chipbond		SAT/Chipbond		SAT/Chipbond		SAT/Chipbond	
	FT Test Site		SAT		SAT		SAT		SAT	
	Realibility Test Site		ZUK		ZUK		ZUK		DHC	
	Qual Plan #		21012708		21012708		21012708		21012708	

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
MSL1 Pre-cond	**(JESD22-A113)** Bake 125C	24 Hrs	0/154	X	Pass	X	Pass	X	Pass	QBS to Qual device 1	
	Soak 85C, 85% RH	168Hrs	0/154	X	Pass	X	Pass	X	Pass	QBS to Qual device 1	
	IR reflow 260C	3 cycles	0/154	X	Pass	X	Pass	X	Pass	QBS to Qual device 1	
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	
		1000 cycles	0/77	X	Pass	X	Pass	X	Pass	QBS to Qual device 1	
THB Temperature Humidity Bias (Alternative to HAST)	**JESD22-A101/A110** 85C, 85%RH	1000 Hrs	0/77	X	pass	X	pass	X	pass	QBS to Qual device 1	
HTSL **High Temperature Storage**	**(JESD22-A103)** Ta>150C	168 Hrs	0/77	X	pass	X	pass	X	pass	QBS to Qual device 1	
		500 Hrs	0/77	X	pass	X	pass	X	pass	QBS to Qual device 1	
		1000 Hrs	0/77	X	pass	X	pass	X	pass	QBS to Qual device 1	
Human Body Model	HBM (AEC-Q100-002)	+-2KV	0/3	X	pass	X	pass	X	pass	QBS to Qual device 1	
Charged Device Model	CDM (AEC-Q100-011)	+-750V	0/3	X	pass	X	pass	X	pass	QBS to Qual device 1	
LU **Latch-up (Class II)**	Max Operating Ta or Tc or Tj	100mA	0/6	X	pass	X	pass	X	pass	QBS to Qual device 1	
Char **Characterization**	Typ -40C, 0C, 25C, 85C, 125C	Operating Range	0/30	X	pass	X	pass	X	pass	QBS to Qual device 1	

Summary: ____________________________________

Submitted By: ____________________Vanessa Tien________________

Approved By: M Kulbeth 7/27/2021

Certificate of Design, Construction & Qualification

Description: GP4624S-13 A/T site transfer with BOM change

		Qual Device 1	QBS Vehicle1	QBS Vehicle2	QBS Vehicle3	QBS Vehicle4
General	Part Number	GP4624S-13	GP4624IS-13	GP4624IS-13	GP4624IS-13	GP4624S-13
	Package	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
	MSL Level	3	3	3	3	3
	Package Size	4.90mm/6.00mm/1.45mm	4.90mm/6.00mm/1.45mm	4.90mm/6.00mm/1.45mm	4.90mm/6.00mm/1.45mm	4.90mm/6.00mm/1.45mm
	Die Quantity (eg. Die per package)	2	2	2	2	2
	Die Name(1)	SF007Q	SF007V	SF007D	SF007V	SF007V
	Die Size (W/L/Thickness)	0.99mm/0.83mm/0.2mm	0.99mm/0.83mm/0.2mm	0.99mm/0.83mm/0.2mm	0.99mm/0.83mm/0.2mm	0.99mm/0.83mm/0.2mm
	Die Process / Technology	BCD 0.35um 32V 1P2M	BCD350GE	BCD350GE	BCD350GE	BCD350GE
	Wire Bond Material (Au, Cu, Al)	Cu	Cu	Cu	Cu	Cu
	Wire Diameter	25um	25um	25um	25um	25um
	Die Name(2)	B182DW	GL450180	GL450180	GL450180	B182DW
	Die Size (W/L/Thickness)	1.82mm/1.82mm/0.26mm	1.8mm/1.8mm/0.26mm	1.8mm/1.8mm/0.26mm	1.8mm/1.8mm/0.26mm	1.82mm/1.82mm/0.26mm
	Die Process / Technology	Triple diffusion	Triple diffusion	Triple diffusion	Triple diffusion	Triple diffusion
	Wire Bond Material (Au, Cu, Al)	Cu	Cu	Cu	Cu	Cu
	Wire Diameter	25um	25um	25um	25um	25um
Fab	Wafer FAB	(MicroPower) HH-Grace(Die1) JMSC(Die2)	(MicroPower) HH-Grace(Die1) Guanglei(Die2)	(MicroPower) HH-Grace(Die1) Guanglei(Die2)	(MicroPower) HH-Grace(Die1) Guanglei(Die2)	(MicroPower) HH-Grace(Die1) JMSC(Die2)
	Wafer Diameter	8-inch(Die1) 5-inch(Die2)	8-inch(Die1) 5-inch(Die2)	8-inch(Die1) 5-inch(Die2)	8-inch(Die1) 5-inch(Die2)	8-inch(Die1) 5-inch(Die2)
	Wafer Thickness	750um(Die1) 260um(Die2)	750um(Die1) 260um(Die2)	750um(Die1) 260um(Die2)	750um(Die1) 260um(Die2)	750um(Die1) 260um(Die2)
	Top Metal Type/Bond Pad Composition	Ti/TiN/AlCu(Die1) Si/Al(Die2)	Ti/TiN/AlCu(Die1) Si/Al(Die2)	Ti/TiN/AlCu(Die1) Si/Al(Die2)	Ti/TiN/AlCu(Die1) Si/Al(Die2)	Ti/TiN/AlCu(Die1) Si/Al(Die2)
	Top Metal Thickness	0.9um (Die1) 4.5um (Die2)	0.9um (Die1) 4.5um (Die2)	0.9um (Die1) 4.5um (Die2)	0.9um (Die1) 4.5um (Die2)	0.9um (Die1) 4.5um (Die2)
	Back Metal Type (All Layers)	N/A(Die1) Ti-Ni-Ag(Die2)	N/A(Die1) Ti-Ni-Ag(Die2)	N/A(Die1) Ti-Ni-Ag(Die2)	N/A(Die1) Ti-Ni-Ag(Die2)	N/A(Die1) Ti-Ni-Ag(Die2)
	Back Metal Thickness (All Layers)	N/A(Die1) (6800±680)A°(Die2)	N/A(Die1) (6800±680)A°(Die2)	N/A(Die1) (6800±680)A°(Die2)	N/A(Die1) (6800±680)A°(Die2)	N/A(Die1) (6800±680)A°(Die2)
	Die passivation thickness range	Die1(Si3N4:5000A,SiO2:2000A) Die2 (polyimide>1.5um)	Die1(Si3N4:5000A,SiO2:2000A) Die2 (polyimide>1.5um)	Die1(Si3N4:5000A,SiO2:2000A) Die2 (polyimide>1.5um)	Die1(Si3N4:5000A,SiO2:2000A) Die2 (polyimide>1.5um)	Die1(Si3N4:5000A,SiO2:2000A) Die2 (polyimide>1.5um)
	No. of bond over active area	No	No	No	No	No
	Glass Transistion Temp	130 degree C	130 degree C	130 degree C	130 degree C	130 degree C
	Lead Material Manufacture	JIANGFENG ELECTRONICS GUANGZHOU CO., LTD.	JIANGFENG ELECTRONICS GUANGZHOU CO., LTD.	JIANGFENG ELECTRONICS GUANGZHOU CO., LTD.	JIANGFENG ELECTRONICS GUANGZHOU CO., LTD.	SK ELECTRONICS SUZHOU CO., LTD.
	Header plating (Die Land Area)	Ag	Ag	Ag	Ag	Ag
	Max Junction Temp	150℃	150℃	150℃	150℃	150℃
	Max Thermal resistance Junc (case)	45℃/W	45℃/W	45℃/W	45℃/W	45℃/W
	Max Thermal resistance Junc (amibent)	130℃/W	130℃/W	130℃/W	130℃/W	130℃/W
	No of masks Steps	18(Die1) 6 (Die2)	18(Die1) 6 (Die2)	18(Die1) 6 (Die2)	18(Die1) 6 (Die2)	18(Die1) 6 (Die2)
	Metal Layers	2(Die1) 1(Die2)	2(Die1) 1(Die2)	2(Die1) 1(Die2)	2(Die1) 1(Die2)	2(Die1) 1(Die2)
	Metal Density per Layer	>30%(Die1) >80%(Die2)	>30%(Die1) >80%(Die2)	>30%(Die1) >80%(Die2)	>30%(Die1) >80%(Die2)	>30%(Die1) >80%(Die2)
	Min Metal Width	0.5um(Die1) 10um(Die2)	0.5um(Die1) 10um(Die2)	0.5um(Die1) 10um(Die2)	0.5um(Die1) 10um(Die2)	0.5um(Die1) 10um(Die2)
	Min Metal Spacing	0.45um(Die1) 10um(Die2)	0.45um(Die1) 10um(Die2)	0.45um(Die1) 10um(Die2)	0.45um(Die1) 10um(Die2)	0.45um(Die1) 10um(Die2)
	Power Consumption	0.45W	0.45W	0.45W	0.45W	0.45W
	RDL Design and Process	No	No	No	No	No
	Number of Transistors	>5000(Die1) 1 (Die2)	>5000(Die1) 1 (Die2)	>5000(Die1) 1 (Die2)	>5000(Die1) 1 (Die2)	>5000(Die1) 1 (Die2)
Package	*BackgrindThinkness*	200um (Die1) 260um (Die2)	200um (Die1) 260um (Die2)	200um (Die1) 260um (Die2)	200um (Die1) 260um (Die2)	200um (Die1) 260um (Die2)
	Backgrind Location	(MicroPower) TSHT(Die1) JMSC(Die2)	TSHT(Die1) GuangLei(Die2)	TSHT(Die1) GuangLei(Die2)	TSHT(Die1) GuangLei(Die2)	TSHT(Die1) GuangLei(Die2)
	Bond Type (at Die)	Ball	Ball	Ball	Ball	Ball
	Bond Type (at LF)	Wedge	Wedge	Wedge	Wedge	Wedge
	DB Epoxy/Solder Type	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy
	Die Attach Material	8200T	8200T	8200T	8200T	S216
	Min Bond Pad Pitch	105um(Die1) N/A(Die2)	105um(Die1) N/A(Die2)	105um(Die1) N/A(Die2)	105um(Die1) N/A(Die2)	105um(Die1) N/A(Die2)
	# of pad/ball/pin Pitch	6(Die1) 2(Die2)	6(Die1) 2(Die2)	6(Die1) 2(Die2)	6(Die1) 2(Die2)	6(Die1) 2(Die2)
	Leadframe Type	Stamping	Stamping	Stamping	Stamping	Stamping
	Leadframe Material	A149	A149	A149	A149	A149
	Molding Compound Type	CEL-8240HF	CEL-8240HF	CEL-8240HF	CEL-8240HF	G630AY
	Green Compound (Yes/No)	Yes	Yes	Yes	Yes	Yes
	Lead-Free (Yes/No)	Yes	Yes	Yes	Yes	Yes
	Solder Ball Diameter	62.3um	62.3um	62.3um	62.3um	62.3um
AT/Rel	Assembly Site	TIANSHUI HUATIAN TECHNOLOGY CO.,LTD. (TSHT)	TIANSHUI HUATIAN TECHNOLOGY CO.,LTD. (TSHT)	TIANSHUI HUATIAN TECHNOLOGY CO.,LTD. (TSHT)	TIANSHUI HUATIAN TECHNOLOGY CO.,LTD. (TSHT)	(MicroPower) JIANGSU YANXIN MICROELECTRONICS CO.LTD
	FT Test Site	TIANSHUI HUATIAN TECHNOLOGY CO.,LTD. (TSHT)	TIANSHUI HUATIAN TECHNOLOGY CO.,LTD. (TSHT)	TIANSHUI HUATIAN TECHNOLOGY CO.,LTD. (TSHT)	TIANSHUI HUATIAN TECHNOLOGY CO.,LTD. (TSHT)	(MicroPower) JIANGSU YANXIN MICROELECTRONICS CO.LTD
	Realibility Test Site	BCD	BCD	BCD	BCD	BCD
	Qual Plan #	21070704	18080703	18080703	18080703	18071203

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
MSL3 Pre-cond	**(JESD22-A113)** Bake 125C	24 Hrs	0/154	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
	Soak 30C, 60% RH	192Hrs	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 Mounted on PCB Board (Daughter Card)	500 cycles	0/77	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
		1000 cycles	0/77	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		X		X	Pass
HTSL High Temperature Storage	**(JESD22-A103)** Ta>150C	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
HTOL	Ta=125C, 100% Vcc	168 Hrs	0/77	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
	or Ta=150 for 408 hrs	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	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
SD Solderability	>95% Coverage	5 Seconds	0/15	QBS to QBS Vehicle 1,2,3	Pass	X	Pass	X	Pass	X	Pass	X	Pass
PD Physical Dimensions	JESD22-B100B108	Package Outline	Ppk>1.67 Cpk>1.33	QBS to QBS Vehicle 1,2,3	Pass	X	Pass	X	Pass	X	Pass	X	Pass
Human Body Model	HBM	+-2KV	0/3	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
Charged Device Model	CDM	+-750V	0/3	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
LU Latch-up (Class II)	Max Operating Ta or Tc or Tj	100mA	0/6	X	Pass	X	Pass	X	Pass	X	Pass	X	Pass
Char Characterization	Typ -40C, 0C, 25C, 85C, 125C	perating Ran	0/30	X	Pass								

Summary: ____________________________

Submitted By: _______________Zhou Dawei___________

Approved By: M Kulbeth 9/28/2021

Certificate of Design, Construction & Qualification

Description: Qualification of PI3USB9281CXWEX at JCET-SQ

		Qual Device 1 - Lot 1	Qual Device 1 - Lot 2	Qual Device 1 - Lot 3
General	Part Number	PI3USB9281CXWEX	PI3USB9281CXWEX	PI3USB9281CXWEX
	Package	QFNWB3*4-20L	QFNWB3*4-20L	QFNWB3*4-20L
	PTC Package Code	XW20	XW20	XW20
	Wire Bond, Cu Piller, CSP	Wirebond	Wirebond	Wirebond
	MSL Level	MSL1	MSL1	MSL1
	Package Size	3.0mm x 4.0mm	3.0mm x 4.0mm	3.0mm x 4.0mm
	Die Quantity (eg. Die per package)	1	1	1
	Die Name(1)	M031-W1111	M031-W1111	M031-W1111
	Die Size (W/L/Thickness	1.58 x 2.08mm	1.58 x 2.08mm	1.58 x 2.08mm
	Die Process / Technology	MGN 0.35um	MGN 0.35um	MGN 0.35um
	Wire Bond Material (Au, Cu, Al)	AuPdCu	AuPdCu	AuPdCu
	Wire Diameter	1.0mil	1.0mil	1.0mil
Fab	Wafer FAB	MGN	MGN	MGN
	Wafer Diameter	8"	8"	8"
	Wafer Thickness	725um	725um	725um
	Top Metal Type/Bond Pad Composition	Al/Cu	Al/Cu	Al/Cu
Package	*BackgrindThinkness*	230±10um	230±10um	230±10um
	Backgrind Location	JCET-SQ	JCET-SQ	JCET-SQ
	Bond Type (at Die)	Ball	Ball	Ball
	Bond Type (at LF)	Wedge	Wedge	Wedge
	DB Epoxy/Solder Type	Epoxy	Epoxy	Epoxy
	Die Attach Material	EN-4900GC	EN-4900GC	EN-4900GC
	Min Bond Pad Pitch	150um	150um	150um
	# of pad/ball/pin Pitch	72pads/NA/0.5mm	72pads/NA/0.5mm	72pads/NA/0.5mm
	Leadframe Type	Etched	Etched	Etched
	Leadframe Material and Finish	Cu /Pb-free(Matte Tin)	Cu /Pb-free(Matte Tin)	Cu /Pb-free(Matte Tin)
	Molding Compound Type	EME-G700LALA	EME-G700LALA	EME-G700LALA
	Green Compound (Yes/No)	Yes	Yes	Yes
	Lead-Free (Yes/No)	Yes	Yes	Yes
Assy / Test / Rel	Assembly Site	JCET-SQ	JCET-SQ	JCET-SQ
	FT Test Site	JCET-SQ	JCET-SQ	JCET-SQ
	Reliability Test Site	JCET-SQ	JCET-SQ	JCET-SQ
	Qual Plan #	20111203	20111203	20111203

Reliability Test Site

Test	Test Conditions	Duration / Limits	Fail/SS	Lots Required	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	3 Assy lots	0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	
	Soak 85C, 85% RH	168Hrs	0/154	3 Assy lots	0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass
	IR reflow 260C	3 cycles	0/154	3 Assy lots	0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass
Temp Cycle (TC)	**(JESD22-A104)** -65C-150C Mounted on PCB Board (Daughter Card)	500 cycles	0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
		1000 cycles	0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
HAST	**JESD22-A101/A110** 130C, 85%RH, 192hrs 33.3 psia Vcc = Op Max	96 Hrs	0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
UHAST	**JESD22-A118** 130C, 85%RH 33.3 psia	96 Hrs	0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
HTSL High Temperature Storage	**(JESD22-A103)** Ta>150C	168 Hrs	0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
		500 Hrs	0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
		1000 Hrs	0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
WBS	JESD22-B116B	Cpk>1.66	0/5	3 Assy lots	Cpk 4.39	Pass	Cpk 4.67	Pass	Cpk 4.04	Pass
WBP	MIL-STD883-2011	Cpk>1.66	0/5	3 Assy lots	Cpk 2.76	Pass	Cpk 3.45	Pass	Cpk 2.63	Pass
SD Solderability	>95% Coverage	5 Seconds	0/15	3 Assy lots	0 / 1 x 15pcs	Pass	0 / 1 x 15pcs	Pass	0 / 1 x 15pcs	Pass
PD Physical Dimensions		Package Outline	Ppk>1.67 Cpk>1.33	3 Assy lots	Cpk > 1.67	Pass	Cpk > 1.67	Pass	Cpk > 1.67	Pass

Summary:

Submitted By: V. Cheung

Approved By: Pam Finer 12/01/2020

Certificate of Design, Construction & Qualification

Description: Qualification of Lead Frame for SOT-353/363

		Qual Device 1 - Lot 1	Qual Device 1 - Lot 2	Qual Device 1 - Lot 3
General	Part Number	PI5A4157CEX	PI5A4157CEX	PI5A4157CEX
	Diodes Package ID #	SOT363 (SC70)	SOT363 (SC70)	SOT363 (SC70)
	PTC Package Code	C6 (Au) Sn	C6 (Au) Sn	C6 (Au) Sn
	Construct Type: Wire Bond, Cu Pillar, CSP	Wire Bond	Wire Bond	Wire Bond
	MSL Level	MSL-1	MSL-1	MSL-1
	Package Size in mm	2x 1.25 x 1.1 (mm)	2x 1.25 x 1.1 (mm)	2x 1.25 x 1.1 (mm)
	Die Quantity (eg. Die per package)	1	1	1
	Die Name(1)	F3M023-ZZ32	F3M023-ZZ32	F3M023-ZZ32
	Die Size (W/L/Thickness)	0.71mm*0.43mm	0.71mm*0.43mm	0.71mm*0.43mm
	Wafer Fab/Die Process / Technology	Key Foundry 3 0.5um CMOS	Key Foundry 3 0.5um CMOS	Key Foundry 3 0.5um CMOS
	Top Metal Type/Bond Pad Composition	Al/Cu	Al/Cu	Al/Cu
	Wire Bond Material (Au, PdCu, Cu, Al)	Au-wire	Au-wire	Au-wire
	Wire Diameter	0.8mil	0.8mil	0.8mil
Wafer/Fab	Wafer Fab	Key Foundry 3	Key Foundry 3	Key Foundry 3
	Wafer Diameter	200	200	200
	Wafer Thickness	725	725	725
	Top Metal Thickness	0.9	0.9	0.9
	Die passivation thickness range	Nitride (1um)	Nitride (1um)	Nitride (1um)
	No. of bond over active area	zero	zero	zero
	Glass Transition Temp	130C	130C	130C
	Max Junction Temp	150	150	150
	Max Thermal resistance Junc (case)	229	229	229
	Max Thermal resistance Junc (ambient)	340	340	340
	Power Consumption	55uW	55uW	55uW
Package	Backgrind Thickness	230±20（um)	230±20（um)	230±20（um)
	Backgrind Location	JCET	JCET	JCET
	Bond Type (at Die)	Ball	Ball	Ball
	Bond Type (at LF)	Wedge	Wedge	Wedge
	DB Epoxy/Solder Type	Epoxy	Epoxy	Epoxy
	Die Attach Material	84-3J	84-3J	84-3J
	Min Bond Pad Pitch	75um	75um	75um
	# of pad/ball/pin Pitch	15pads/NA/0.65mm	15pads/NA/0.65mm	15pads/NA/0.65mm
	Leadframe Type	Stamping	Stamping	Stamping
	Leadframe Material / Lead Finish	Fe with Matte Sn	Fe with Matte Sn	Fe with Matte Sn
	Molding Compound Type	ELER-8-100HFV	ELER-8-100HFV	ELER-8-100HFV
	Green Compound (Yes/No)	Yes	Yes	Yes
	Lead-Free (Yes/No)	Yes	Yes	Yes
Assy/Test/Reliability	Assembly Site	JCET	JCET	JCET
	FT Test Site	JCET	JCET	JCET
	Reliability Test Site	iST	iST	iST
	Qual Plan #	21030404	21030404	21030404

Reliability Testing

Test	Test Conditions	Duration / Limits	Test Method	Fail/SS	Lots Required	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	JESD22 A113 JEDEC J-STD-020	0/231	3 Assy lots	0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass
	Soak 85C, 85% RH	168Hrs				0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass
	IR reflow 260C	3 cycles				0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass	0 / 1 x 240pcs	Pass
Temp Cycle	**(JESD22-A104)** -65C-150C	500 cycles - ATE (qual point)	JESD22-A104	500h = 0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
		1000 cycles - ATE (for reference)		1000h = 0/72		0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
BHAST	**JESD22-A101/A110** 130C, 85%RH 33.3 psia Vcc = Op Max	96 Hrs	JESD22-A110	0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
UHAST	**JESD22-A118** 130C, 85%RH, 33.3 psia, no power	96 Hrs	JESD22 A118	0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
HTSL	JESD22-A103 Ta > 150C	500 Hrs	JESD22 A103	0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
		1000 Hrs (qual point)		0/77	3 Assy lots	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass	0 / 1 x 80pcs	Pass
WBS Wire Bond Shear	JESD22-B116B	Cpk>1.66	AEC-Q100-001	0/5	30 Bonds	0 / 1 x 5cps avg=27.0g ; cpk>1.67	Pass	0 / 1 x 5cps avg=27.0g ; cpk>1.67	Pass	0 / 1 x 5cps avg=27.13g ; cpk>1.67	Pass
WBP Wire Bond Pull	MIL-STD883-2011	Cpk>1.66	MIL-STD-883 M2011	0/5	30 Bonds	0 / 1 x 5cps avg=7.0g ; cpk>1.67	Pass	0 / 1 x 5cps avg=6.99g ; cpk>1.67	Pass	0 / 1 x 5cps avg=7.01g ; cpk>1.67	Pass
SD Solderability	Check solderability on 5 units >95% Coverage	5 Seconds	JESD22 B102	0/5	3 Assy	0 / 1 x 5pcs	Pass	0 / 1 x 5pcs	Pass	0 / 1 x 5pcs	Pass
PD Physical Dimensions	Measure dimensions on 15 units	Package Outline	JESD22 B100 JESD22 B108	Ppk>1.67 Cpk>1.33	3 Assy	Cpk > 1.67	Pass	Cpk > 1.67	Pass	Cpk > 1.67	Pass

Summary:

Submitted By: Virginia Cheung

Approved By: P. Finer 07/22/2020