

PCN Number:	20170928002A	PCN Date:	Dec. 7, 2017
Title:	Qualification of Carsem Suzhou (CSZ) as additional Assembly and Test Site for Select Devices		
Customer Contact:	PCN Manager	Dept:	Quality Services
Proposed 1st Ship Date:	Mar. 7, 2018	Estimated Sample Availability:	Date Provided at Sample request
Change Type:			
<input checked="" type="checkbox"/>	Assembly Site	<input type="checkbox"/>	Design
<input type="checkbox"/>	Assembly Process	<input type="checkbox"/>	Data Sheet
<input checked="" type="checkbox"/>	Assembly Materials	<input type="checkbox"/>	Part number change
<input type="checkbox"/>	Mechanical Specification	<input checked="" type="checkbox"/>	Test Site
<input type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process
		<input type="checkbox"/>	Wafer Bump Site
		<input type="checkbox"/>	Wafer Bump Material
		<input type="checkbox"/>	Wafer Bump Process
		<input type="checkbox"/>	Wafer Fab Site
		<input type="checkbox"/>	Wafer Fab Materials
		<input type="checkbox"/>	Wafer Fab Process

PCN Details

Description of Change:

Revision A is to announce the addition of new devices that were not included on the original PCN notification. These new devices are in Group 3 of the product affected section below. The expected first shipment date for these new devices will be 90 days from this notice for these newly added devices only.

Qualification of Carsem Suzhou (CSZ) as additional Assembly and Test Site for Select Devices listed in the "Product Affected" Section. Current assembly sites and Material differences are as follows.

Assembly Site	Assembly Site Origin	Assembly Country Code	Assembly Site City
TI Clark	QAB	PHL	Angeles City, Pampanga
TI Malaysia	MLA	MYS	Kuala Lumpur
UTAC Thailand	NSE	THA	Bangkok
Carsem Suzhou	CSZ	CHN	Jiangsu

Group 1 Material Differences:

	TI Clark	TI Malaysia	Carsem Suzhou
Mount compound	4207768	4207768	435143

Group 2 Material Differences:

	TI Malaysia	Carsem Suzhou
Mount compound	4207768	435143
Wire type	Au	Cu

Group 3 Material Differences:

	TI Clark	UTAC	Carsem Suzhou
Mount compound	4212088	6491321	435933

Test coverage, insertions, conditions will remain consistent with current testing and verified with test MQ.

Reason for Change:

Continuity of Supply

Anticipated impact on Form, Fit, Function, Quality or Reliability (positive / negative):

None

Anticipated impact on Material Declaration

<input type="checkbox"/>	No Impact to the Material Declaration	<input checked="" type="checkbox"/>	Material Declarations or Product Content reports are driven from production data and will be available following the production release. Upon production release the revised reports can be obtained from the TI Eco-Info website . There is no impact to the material meeting current regulatory compliance requirements with this PCN change.
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Anticipated impact on Form, Fit, Function, Quality or Reliability (positive / negative):

None

Changes to product identification resulting from this PCN:

Assembly Site		
TI Clark Philippines	Assembly Site Origin (22L)	ASO: QAB
TI Malaysia	Assembly Site Origin (22L)	ASO: MLA
UTAC Thailand	Assembly Site Origin (22L)	ASO: THA
Carsem Suzhou	Assembly Site Origin (22L)	ASO: CSZ

Sample product shipping label (not actual product label)

Group 1 Product Affected:

AFE031AIRGZR	AFE031AIRGZT	TPS53316RGTR	TPS53316RGTT
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Group 2 Product Affected:

THS6212IRHFR	THS6212IRHFT	THS6214IRHFR	THS6214IRHFT
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Group 3 Product Affected:

TPS60151DRVR	TPS60151DRVT
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Group 1 Qualification Report
Qualify RGZ/RGT QFN packages in CARZ
 Approve Date 26-Sep-2017

Product Attributes

Attributes	Qual Device: AFE031AIRGZ	Qual Device: TPS53316RGTR
Assembly Site	CARZ	CARZ
Package Family	QFN 7.0 X 7.0 (MM)	QFN 3.0 X 3.0 (MM)
Wafer Fab Supplier	DP1-DM5	MH8
Wafer Process	50HPA07X3	LBC7

- QBS: Qual By Similarity
- Qual Device AFE031AIRGZ is qualified at LEVEL2-260CG

Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	Test Name / Condition	Duration	Qual Device: AFE031AIRGZ	Qual Device: TPS53316RGTR
ED	Electrical Characterization	Per Datasheet Parameters	Pass	Pass

MQ	Manufacturability	(per mfg. Site specification)	Pass	Pass
TC	Temperature Cycle, -65/150C	500 Cycles	2/154/0	-
YLD	FTY and Bin Summary	--	Pass	Pass

- Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable

- The following are equivalent HTOL options based on an activation energy of 0.7eV: 125C/1k Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours

- The following are equivalent HTSL options based on an activation energy of 0.7eV: 150C/1k Hours, and 170C/420 Hours

- The following are equivalent Temp Cycle options per JESD47: -55C/125C/700 Cycles and -65C/150C/500 Cycles

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

Group 2 Qualification Report

THS6212IRHFR/THS6214IRHFR Qualification in CARZ

Approve Date 27-Sep-2017

Product Attributes

Attributes	Qual Device: THS6212IRHFR	Qual Device: THS6214IRHFR	QBS Product Reference: THS6212IRHF	QBS Product Reference: THS6214IPWP	QBS Process Reference: TNETD7122APAP
Assembly Site	CARSEM SUZHOU	CARSEM SUZHOU	MLA	MLA	TAI
Package Family	VQFN	QFN	QFN	HTSSOP	HTQFP
Flammability Rating	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0
Wafer Fab Supplier	FFAB	FFAB	DFAB	DFAB	DFAB
Wafer Process	BICOM2HV	BICOM2HV	BICOM2XHV	BICOM2XHV	BICOM2XHV

- QBS: Qual By Similarity

- Qual Devices qualified at LEVEL2-260C: THS6212IRHFR, THS6214IRHFR

Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	Test Name / Condition	Duration	Qual Device: THS6212IRHFR	Qual Device: THS6214IRHFR	QBS Product Reference: THS6212IRHF	QBS Product Reference: THS6214IPWP	QBS Process Reference: TNETD7122APAP
AC	Autoclave 121C	96 Hours	-	-	-	-	3/105/0
ED	Electrical Characterization	Per Datasheet Parameters	-	-	Pass	Pass	Pass
HAST	Biased HAST, 130C/85%RH	96 Hours	-	3/230/0	-	-	3/105/0
HBM	ESD - HBM	2000 V	-	-	1/3/0	1/3/0	-
CDM	ESD - CDM	500 V	-	-	1/3/0	-	-
HTOL	Life Test, 125C	967 Hours	-	-	-	-	3/231/0
HTSL	High Temp. Storage Bake, 150C	1000 Hours	-	-	-	-	3/105/0
HTSL	High Temp. Storage Bake, 170C	420 Hours	-	3/231/0	-	-	-
LU	Latch-up	(per	-	-	1/6/0	2/12/0	3/15/0

		JESD78)					
PD	Physical Dimensions	--	1/5/0	2/10/0	-	-	-
SD	Solderability	Pb Free	-	3/66/0	-	-	-
TC	Temperature Cycle, -65/150C	500 Cycles	-	3/231/0	-	-	3/105/0
TS	Thermal Shock, -65/150C	500 Cycles	-	-	-	-	3/105/0
UHA	Unbiased HAST 130C/85%RH	96 Hours	-	3/231/0	-	-	-
WBP	Bond Pull	Wires	1/76/0	3/228/0	-	-	-
WBS	Ball Bond Shear	Wires	1/76/0	3/228/0	-	-	-

- Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable

- The following are equivalent HTOL options based on an activation energy of 0.7eV : 125C/1k Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours

- The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours

- The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

Group 3 Qualification Report
TPS60151DRV Dual Source A/T at CARZ
 Approve Date 21-Nov-2017

Product Attributes

Attributes	Qual Device: <u>TPS60151DRV</u>	QBS Product Reference: <u>TPS60150DRV</u>	QBS Product Reference: <u>TPS60151DRV</u>	QBS Process Reference: <u>TPS51217DSC</u>
Assembly Site	CARZ	MLA (TIM)	MLA (TIM)	CLARK-AT
Package Family	QFN/ SON	QFN/ SON	QFN/ SON	QFN/ SON
Flammability Rating	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0
Wafer Fab Supplier	RFAB	MIHO8	MIHO8	RFAB
Wafer Process	LBC7	LBC7	LBC7	LBC7

Attributes	QBS Package Reference: <u>TLV70028DSER</u>	QBS Package Reference: <u>TPS53211RGTR</u>	QBS Package Reference: <u>TPS62160DSGR</u>	QBS Package Reference: <u>TPS62590DRV</u>
Assembly Site	CARZ	CARZ	CARZ	CARZ
Package Family	QFN/ SON	QFN/ SON	QFN/ SON	QFN/ SON
Flammability Rating	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0
Wafer Fab Supplier	MIHO8	MIHO8	MIHO8	UMC FAB8AB
Wafer Process	LBC7	LBC7	LBC7	LBC7

- QBS: Qual By Similarity

- Qual Device TPS60151DRV is qualified at LEVEL1-260C

Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	Test Name / Condition	Duration	Qual Device: <u>TPS60151DRV</u>	QBS Product Reference: <u>TPS60150DRV</u>	QBS Product Reference: <u>TPS60151DRV</u>	QBS Process Reference: <u>TPS51217DSC</u>
ED	Electrical Characterization	Per Datasheet Parameters	Pass	Pass	Pass	Pass
HBM	ESD - HBM	4000 V	-	1/3/0	-	-

CDM	ESD - CDM	1000 V	-	1/3/0	-	3/9/0
LU	Latch-up	(per JESD78)	-	1/6/0	-	3/18/0
HTOL	Life Test, 135C	635 Hours	-	-	-	3/231/0
HTSL	High Temp. Storage Bake, 170C	420 Hours	-	-	-	3/231/0
HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	-	3/231/0
AC	Autoclave 121C	96 Hours	-	-	-	3/231/0
TC	Temperature Cycle, -65/150C	500 Cycles	-	-	-	3/231/0
PD	Physical Dimensions	--	1/5/0	-	-	-
SD	Solderability	Pb Free	-	-	-	-
SD	Solderability	SnPb	-	-	-	-
WBP	Bond Pull	Wires	1/76/0	-	-	-
WBS	Ball Bond Shear	Wires	1/76/0	-	-	-

Type	Test Name / Condition	Duration	QBS Package Reference: <u>TLV70028DSER</u>	QBS Package Reference: <u>TPS53211RGTR</u>	QBS Package Reference: <u>TPS62160DSGR</u>	QBS Package Reference: <u>TPS62590DRVR</u>
ED	Electrical Characterization	Per Datasheet Parameters	-	-	-	Pass
HBM	ESD - HBM	4000 V	-	-	-	-
CDM	ESD - CDM	1000 V	-	-	-	-
LU	Latch-up	(per JESD78)	-	-	-	-
HTOL	Life Test, 135C	635 Hours	-	-	-	-
HTSL	High Temp. Storage Bake, 170C	420 Hours	3/230/0	3/231/0	-	3/228/0
HAST	Biased HAST, 130C/85%RH	96 Hours	-	3/230/0	-	-
AC	Autoclave 121C	96 Hours	3/231/0	3/231/0	1/77/0	3/231/0
TC	Temperature Cycle, -65/150C	500 Cycles	3/231/0	3/231/0	1/77/0	3/230/0
PD	Physical Dimensions	--	-	-	-	-
SD	Solderability	Pb Free	3/66/0	-	-	-
SD	Solderability	SnPb	3/66/0	-	-	-
WBP	Bond Pull	Wires	-	-	-	-
WBS	Ball Bond Shear	Wires	-	-	-	-

- Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable

- The following are equivalent HTOL options based on an activation energy of 0.7eV : 125C/1k Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours

- The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours

- The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

For questions regarding this notice, e-mails can be sent to the regional contacts shown below or your local Field Sales Representative.

Location	E-Mail
USA	PCNAmericasContact@list.ti.com
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