PCN Number:	20220311000.2	**PCN Date:**	March 17, 2022
Title:	Qualification of TI Chengdu as an additional Assembly and Test site for select devices		
Customer Contact:	PCN Manager	**Dept:**	Quality Services
Proposed 1st Ship Date:	Sept 17, 2022	**Estimated Sample Availability:**	Date Provided at Sample request

Change Type:

☒	Assembly Site	☐	Design	☐	Wafer Bump Site
☒	Assembly Process	☐	Data Sheet	☐	Wafer Bump Material
☒	Assembly Materials	☐	Part number change	☐	Wafer Bump Process
☐	Mechanical Specification	☒	Test Site	☐	Wafer Fab Site
☒	Packing/Shipping/Labeling	☐	Test Process	☐	Wafer Fab Materials
				☐	Wafer Fab Process

PCN Details

Description of Change:

Texas Instruments is pleased to announce the qualification of TI Chengdu as additional Assembly and Test Site for Select Devices listed in the "Product Affected" Section. Material differences are as follows.

Assembly Site	Assembly Site Origin	Assembly Country Code	Assembly City
UTAC	NSE	THA	Bangkok
TI Chengdu	CDA	CHN	Chengdu

Group 1 Material Differences:

	UTAC	TI Chengdu
Mount Compound	PZ0035	4207123
Lead finish	Matte Sn	NiPdAu
Wire type	1.0mil Cu	0.8mil Cu

Group 2 Material Differences:

	UTAC	TI Chengdu
Mount Compound	PZ0035	4207123
Wire type	1.0mil, 1.3mil Au	1.0mil Cu
Lead finish	Matte Sn	NiPdAu

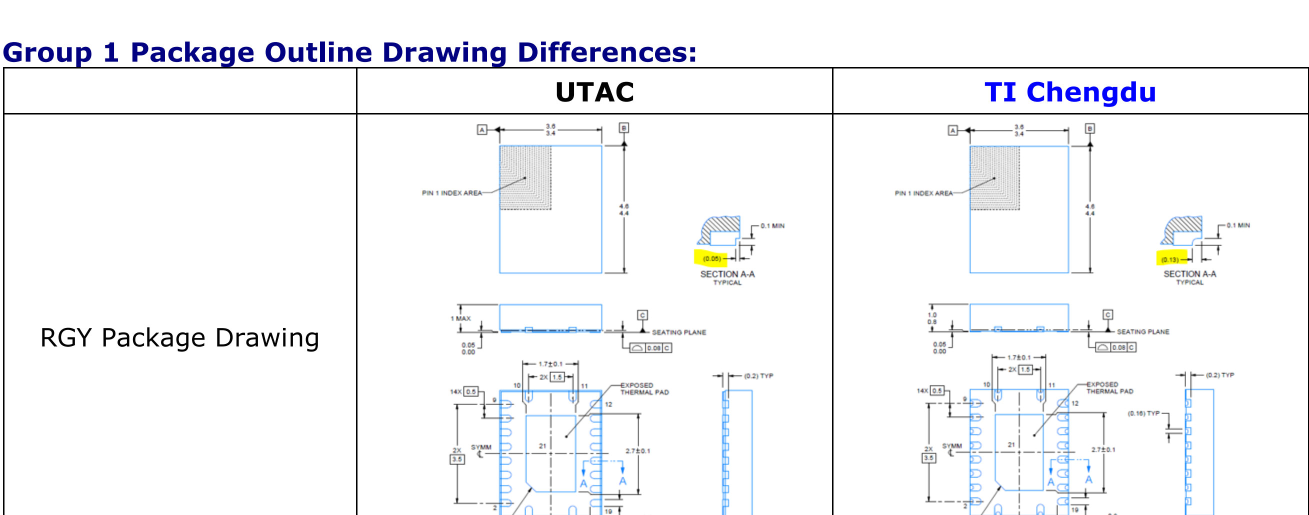
Marking Differences:

	UTAC	TI Chengdu
	O TPS 59632 TI YMS LLLL G3 TI = TI LETTERS YM = YEAR MONTH CODE LLLL = ASSEMBLY LOT CODE S = ASSEMBLY SITE CODE O = PIN 1	O TPS 59632 TI YMS LLLL G4 TI = TI LETTERS YM = YEAR MONTH CODE LLLL = ASSEMBLY LOT CODE S = ASSEMBLY SITE CODE O = PIN 1
**ECAT	G3	**G4**

** - Not all devices have ECAT information included in the symbolization.

Test coverage, insertions, conditions will remain consistent with current testing.

Group 1 Package Outline Drawing Differences:

	UTAC	TI Chengdu
RGY Package Drawing		
Wettable Flank design	Step Cut	Dimple

Group 2 Package Outline Drawing Differences:

	UTAC	TI Chengdu
DRB Package Drawing		
RHB Package Drawing		
Wettable Flank design	Step Cut	Dimple

Reason for Change:

Continuity of supply.

1) To align with world technology trends and use wiring with enhanced mechanical and electrical properties
2) Maximize flexibility within our Assembly/Test production sites.
3) Cu is easier to obtain and stock

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

None

Impact on Environmental Ratings

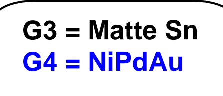
Checked boxes indicate the status of environmental ratings following implementation of this change. If below boxes are checked, there are no changes to the associated environmental ratings.

RoHS	REACH	Green Status	IEC 62474
☒ No Change	☒ No Change	☒ No Change	☒ No Change

Changes to product identification resulting from this PCN:

Assembly Site		
UTAC	Assembly Site Origin (22L)	ASO: NSE
CDAT	Assembly Site Origin (22L)	ASO: CDA

Sample product shipping label (not actual product label)



MADE IN: Malaysia
2DC: 2Q:
MSL 2 /260C/1 YEAR | SEAL DT
MSL 1 /235C/UNLIM | 03/29/04
OPT:
ITEM: 39
LBL: 5A (L)TO:1750

Pb G4

(1P) SN74LS07NSR
(Q) 2000 (D) 0336
(31T)LOT: 3959047MLA
(4W) TKY(1T) 7523483SI2
(P)
(2P) REV: (V) 0033317
(20L) CSO: SHE (21L) CCO:USA
(22L) ASO: MLA (23L) ACO: MYS

Group 1 Product Affected:

LM5145QRGYRQ1	LM5146QRGYRQ1	LM5146QRGYTQ1

Group 2 Product Affected:

TPS3431SQDRBRQ1	TPS3851G33EQDRBRQ1	TPS3851H25SQDRBRQ1	TPS3852G18QDRBRQ1
TPS3851G18EQDRBRQ1	TPS3851G33SQDRBRQ1	TPS3851H30EQDRBRQ1	TPS3852G33QDRBRQ1
TPS3851G18SQDRBRQ1	TPS3851G50EQDRBRQ1	TPS3851H30SQDRBRQ1	TPS3852H18QDRBRQ1
TPS3851G25EQDRBRQ1	TPS3851G50SQDRBRQ1	TPS3851H33EQDRBRQ1	TPS3852H33QDRBRQ1
TPS3851G25SQDRBRQ1	TPS3851H18EQDRBRQ1	TPS3851H33SQDRBRQ1	TPS59632QRHBRQ1
TPS3851G30EQDRBRQ1	TPS3851H18SQDRBRQ1	TPS3851H50EQDRBRQ1	TPS59632QRHBTQ1
TPS3851G30SQDRBRQ1	TPS3851H25EQDRBRQ1	TPS3851H50SQDRBRQ1	

Group 1 Qualification Report

Automotive New Product Qualification Summary
(As per AEC-Q100 and JEDEC Guidelines)
Approve Date 04-March-2022

Product Attributes

Attributes	Qual Device: LM5146QRGYRQ1	Qual Device: LM5145QRGYRQ1	QBS Reference: UCC27282QDRCRQ1	QBS Reference: LM74810QDRRRQ1	QBS Reference: TS3A5017QRGYRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125
Product Function	Power Management	Power Management	Power Management	Power Management	Logic
Wafer Fab Supplier	MAINEFAB	MAINEFAB	MAINEFAB	RFAB	FR-BIP-1
Assembly Site	CDAT	CDAT	CDAT	CDAT	CDAT
Package Group	QFN	QFN	QFN	QFN	QFN

Package Designator	RGY	RGY	DRC	DRR	RGY
Pin Count	20	20	10	12	16

QBS: Qual By Similarity

Qual Device LM5146QRGYRQ1 is qualified at MSL2 260C

Qual Device LM5145QRGYRQ1 is qualified at MSL2 260C

Qualification Results

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

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: LM5146QRGYRQ1	Qual Device: LM5145QRGYRQ1	QBS Reference: UCC27282QDRCRQ1	QBS Reference: LM74810QDRRRQ1	QBS Reference: TS3A5017QRGYRQ1
Test Group A - Accelerated Environment Stress Tests												
PC	A1	JEDEC J-STD-020 JESD22A113	3	77	Preconditioning	MSL2 260C	-	-	-	Pass	Pass	Pass
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	3/231/0
AC	A3	JEDEC JESD22-A102	3	77	Autoclave	121C/15psig	96 Hours	-	-	-	3/231/0	3/231/0
AC	A3	JEDEC JESD22-A102	3	77	Unbiased HAST	130C	96 Hours	-	-	3/231/0	-	-
TC	A4	JEDEC JESD22A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	3/231/0	3/231/0
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	-	-	1/5/0	1/5/0	1/5/0
PTC	A5	JEDEC JESD22-A105	1	45	PTC	-40/125C	1000 Cycles	-	-	-	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake	150C	1000 Hours	-	-	1/45/0	1/45/0	1/45/0
Test Group B - Accelerated Lifetime Simulation Tests												

HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	125C	1000 Hours	-	-	3/231/0	3/231/0	3/231/0
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	-	-
Test Group C - Package Assembly Integrity Tests												
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	-	3/15/0	3/90/0	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	-	3/15/0	3/90/0	3/90/0
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	1/15/0	-	-	1/15/0	1/15/0
SD	C3	JEDEC JESD22-B102	1	15	PB-Free Solderability	>95% Lead Coverage	-	1/15/0	-	3/90/0	1/15/0	1/15/0
PD	C4	JEDEC JESD22B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	1/10/0	-	3/30/0	3/30/0	3/30/0
Test Group D - Die Fabrication Reliability Tests												
EM	D1	JESD 61	-	-	Electromigration	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
TDDB	D2	JESD 35	-	-	Time Dependent Dielectric Breakdown	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
HCI	D3	JESD 60 & 28	-	-	Hot Carrier Injection	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements

SM	D5	-	-	-	Stress Migration	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
Test Group E - Electrical Verification Tests												
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	2000 Volts	-	-	1/3/0	-	1/3/3
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1500 Volts	-	-	-	-	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	-	-	1/3/0	-	-
LU	E4	AEC Q100-004	1	6	Latch-Up	Per AEC Q100-004	-	-	-	1/6/0	-	1/6/0
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	1/30/0	3/90/0	3/90/0	3/90/0

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

Ambient Operating Temperature by Automotive Grade Level:

Grade 0 (or E): -40C to +150C

Grade 1 (or Q): -40C to +125C

Grade 2 (or T): -40C to +105C Grade 3 (or I) : -40C to +85C

E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):

Room/Hot/Cold : HTOL, ED
Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU
Room : AC/Uhast

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

Automotive Q006 Report
(As per AEC-Q006 Guidelines)

0.8 mil (20.3um) Cu wire in CDAT

Approved 13-Oct-2020

Product Attributes

Attributes	Qual Device: LM74810QDRRRQ1_A0DIE
Operating Temp Range	-40 to +125 C
Automotive Grade Level	Grade 1
Product Function	Power Management
Wafer Fab Supplier	RFAB
Wafer Diameter (mm)	300
Assembly Site	CDAT
Package Type	WSON
Package Designator	DRR

Attributes	Qual Device: LM74810QDRRRQ1_A0DIE
Ball/Lead Count	12

- QBS: Qual By Similarity
- Qual Devices LM74810QDRRRQ1 is qualified at LEVEL2-260C

Qualification Results

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

	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: LM74810QDRRRQ1_A0DIE
Test Group A – Accelerated Environment Stress Tests								
	PC	A1	-	3	22	SAM Analysis, Pre Stress	Completed	3/66/0
	PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	Level 1-260C	No fails
	PC	A1	-	3	22	SAM Analysis, Post Stress	Completed	3/66/0
	HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	3/231/0
	HAST	A2	-	3	1	Cross Section, Post bHAST 96 Hours	Completed	3/3/0
	HAST	A2	-	3	30	Wire Bond Shear, Post bHast, 96 Hours	Wires	3/90/0
	HAST	A2	-	3	30	Bond Pull over Stitch, post bHAST, 96 Hours	Wires	3/90/0
	HAST	A2	-	3	30	Bond Pull over Ball, Post bHAST, 96 Hours	Wires	3/90/0
	HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	192 Hours	3/210/0
	HAST	A2	-	3	1	Cross Section, Post bHAST 192 Hours	Completed	3/3/0
	HAST	A2	-	3	22	SAM Analysis, Post bHAST, 192 Hours	Completed	3/66/0
	HAST	A2	-	3	30	Wire Bond Shear, Post bHast, 192 Hours	Wires	3/90/0
	HAST	A2	-	3	30	Bond Pull over Stitch, post bHAST, 192 Hours	Wires	3/90/0
	HAST	A2	-	3	30	Bond Pull over Ball, Post bHAST, 192 Hours	Wires	3/90/0
	TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	3/231/0
	TC	A4	-	3	1	Cross Section, Post T/C 500 Cycles	Completed	3/3/0
	TC	A4	-	3	22	SAM Analysis, Post T/C, 500	Completed	3/66/0

	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: LM74810QDRRRQ1_A0DIE
						Cycles		
	TC	A4	-	3	30	Wire Bond Shear, Post T/C 500 Cycles	Wires	3/90/0
	TC	A4	-	3	30	Bond Pull over Stitch Post T/C 500 Cycles	Wires	3/90/0
	TC	A4	-	3	30	Bond Pull over Ball Post T/C 500 Cycles	Wires	3/90/0
	TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	1000 Cycles	3/210/0
	TC	A4	-	3	1	Cross Section, Post T/C 1000 Cycles	Completed	3/3/0
	TC	A4	-	3	22	SAM Analysis, Post T/C, 1000 Cycles	Completed	3/66/0
	TC	A4	-	3	30	Wire Bond Shear, Post T/C 1000 Cycles	Wires	3/90/0
	TC	A4	-	3	30	Bond Pull over Stitch, Post T/C, 1000 Cycles	Wires	3/90/0
	TC	A4	-	3	30	Bond Pull over Ball, Post T/C, 1000 Cycles	Wires	3/90/0
	PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle -40/125C	1000 Cycles	1/45/0
	PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle -40/125C	2000 Cycles	1/45/0
	HTSL	A6	JEDEC JESD22-A103	3	45	High Temp Storage Bake 150C	1000 Hours	3/135/0
	HTSL	A6	-	3	1	Cross Section, Post HTSL 1000 Hours	Completed	(1)
	HTSL	A6	JEDEC JESD22-A103	3	44	High Temp Storage Bake 150C	2000 Hours	3/132/0
	HTSL	A6	-	3	1	Cross Section, Post HTSL 2000 Hours	Completed	3/3/0
Test Group C – Package Assembly Integrity Tests								
	WBS	C1	AEC Q100-001	3	30	Wire Bond Shear, Cpk>1.67	Wires	3/30/0
	WBP	C2	MIL-STD883 Method 2011	3	30	Bond Pull over Ball, Cpk >1.67	Wires	3/30/0

A1 (PC): Preconditioning:
Performed for THB, Biased HAST, AC, uHAST & TC samples, as applicable.
Ambient Operating Temperature by Automotive Grade Level:
Grade 0 (or E): -40C to +150C
Grade 1 (or Q): -40C to +125C

Grade 2 (or T): -40C to +105C
Grade 3 (or I) : -40C to +85C
E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):
Room/Hot/Cold : HTOL, ED
Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU
Room : AC/uHAST
Green/Pb-free Status:
Qualified Pb-Free(SMT) and Green

Group 2 Qualification Report

Automotive New Product Qualification Summary
(As per AEC-Q100 and JEDEC Guidelines)

Approve Date 01-March-2022

Product Attributes

Attributes	Qual Device: TPS3851H18SQDRBRQ1	Qual Device: TPS3851H33EQDRBRQ1	QBS Reference: TLIN2027DRBRQ1	QBS Reference: TPS61378QWRTERQ1	QBS Reference: CAXC8T245QRHLRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125
Product Function	Power Management	Power Management	Interface	Power Management	Signal Chain
Wafer Fab Supplier	RFAB	RFAB	RFAB	RFAB	MH8
Assembly Site	CDAT	CDAT	CDAT	CDAT	CDAT
Package Group	QFN	QFN	QFN	QFN	QFN
Package Designator	DRB	DRB	DRB	RTE	RTE
Pin Count	8	8	8	16	16

QBS: Qual By Similarity
Qual Device TPS3851H18SQDRBRQ1 is qualified at MSL2 260C
Qual Device TPS3851H33EQDRBRQ1 is qualified at MSL2 260C

Qualification Results

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

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: TPS3851H18SQDRBRQ1	Qual Device: TPS3851H33EQDRBRQ1	QBS Reference: TLIN2027DRBRQ1	QBS Reference: TPS61378QWRTERQ1	QBS Reference: CAXC8T245QRHLRQ1
Test Group A - Accelerated Environment Stress Tests												
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	-	-	-	-	-	Pass
PC	A1	JEDEC J-STD-020 JESD22A113	3	77	Preconditioning	MSL2 260C	-	-	-	Pass	Pass	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	3/231/0

AC	A3	JEDEC JESD22-A102	3	77	Autoclave	121C/15 psig	96 Hours	-	-	3/231/0	-	-
AC	A3	JEDEC JESD22-A102	3	77	Unbiased HAST	130C/85 %RH	96 Hours	-	-	-	3/231/0	3/231/0
TC	A4	JEDEC JESD22A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	-	-	-	3/231/0	3/231/0
TC-WBP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	-	-	1/5/0	1/5/0	1/5/0
PTC	A5	JEDEC JESD22-A105	1	45	PTC	-40/125C	1000 Cycles	-	-	-	1/45/0	1/45/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake	150C	1000 Hours	-		1/45/0	1/45/0	-
Test Group B - Accelerated Lifetime Simulation Tests												
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	125C	1000 Hours	-	-	-	-	3/231/0
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	150C	408 Hours	-	-	-	3/231/0	-
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate	125C	48 Hours	-	-	-	3/2400/0	-
Test Group C - Package Assembly Integrity Tests												
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	-	1/30/0	3/90/0	3/90/0	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	-	1/30/0	3/90/0	3/90/0	3/90/0
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	-	1/15/0	-	1/15/0	1/15/0
SD	C3	JEDEC JESD22-B102	1	15	PB-Free Solderability	>95% Lead Coverage	-	-	1/15/0	-	1/15/0	1/15/0
PD	C4	JEDEC JESD22B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	-	1/10/0	-	3/30/0	3/30/0

Test Group D - Die Fabrication Reliability Tests												
EM	D1	JESD61	-	-	Electromigration	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
TDDB	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
HCI	D3	JESD60 & 28	-	-	Hot Carrier Injection	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
SM	D5	-	-	-	Stress Migration	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
Test Group E - Electrical Verification Tests												
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	2000 Volts	-	-	-	-	-
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	3000 Volts	-	-	-	1/3/0	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1000 Volts	-	-	-	1/3/0	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	-	-	-	-	-
LU	E4	AEC Q100-004	1	6	Latch-Up	Per AEC Q100-004	-	-	-	1/6/0	1/6/0	1/6/0
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	1/30/0	-	3/90/0	3/90/0	3/90/0

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 Ambient Operating

Ambient Operating Temperature by Automotive Grade Level:

Grade 0 (or E): -40C to +150C

Grade 1 (or Q): -40C to +125C

Grade 2 (or T): -40C to +105C Grade 3 (or I) : -40C to +85C

E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):

Room/Hot/Cold : HTOL, ED

Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU

Room : AC/Uhast

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

Qualification Report

Automotive New Product Qualification Summary
(As per AEC-Q100 and JEDEC Guidelines)

Approve Date 01-March-2022

Product Attributes

Attributes	Qual Device: TPS59632QRHBRQ1	QBS Reference: TPS61378QWRTERQ1	QBS Reference: CAXC8T245QRHLRQ1	QBS Reference: DRV8703QRHBRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 125
Product Function	Power Management	Power Management	Signal Chain	Signal Chain
Wafer Fab Supplier	RFAB	RFAB	MH8	RFAB
Assembly Site	CDAT	CDAT	CDAT	CDAT
Package Group	QFN	QFN	QFN	QFN
Package Designator	RHB	RTE	RHL	RHB
Pin Count	32	16	24	32

QBS: Qual By Similarity
Qual Device TPS59632QRHBRQ1 is qualified at MSL2 260C

Qualification Results

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

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: TPS59632QRHBR	QBS Reference: TPS61378QWRTE	QBS Reference: CAXC8T245QRHL	QBS Reference: DRV8703QRHBRQ1
Test Group A - Accelerated Environment Stress Tests											
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	-	-	-	Pass	-
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL2 260C	-	-	Pass	-	Pass
HAST	A2	JEDEC JESD22A11	3	77	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	3/231/0
AC	A3	JEDEC JESD22-A102	3	77	Autoclave	121C/15psig	96 Hours	-	-	3/231/0	3/231/0
AC	A3	JEDEC JESD22A10	3	77	Unbiased HAST	130C/85%RH	96 Hours	-	3/231/0	-	-
TC	A4	JEDEC JESD22A10 and	3	77	Temperature Cycle	-65C/150C	500 Cycl	-	3/231/0	3/231/0	3/231/0

		Appendix :									
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	-	1/5/0	1/5/0	1/5/0
PTC	A5	JEDEC JESD22-A105	1	45	PTC	-40/125C	1000 Cy	-	1/45/0	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake	150C	1000 Hours	-	1/45/0	1/45/0	1/45/0
Test Group B - Accelerated Lifetime Simulation Tests											
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	125C	1000 Hours	-	-	3/231/0	-
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	150C	408 Hours	-	3/231/0	-	-
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate	125C	48 Hours	-	3/2400/0	-	-
Test Group C - Package Assembly Integrity Tests											
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear	Minimum o devices, 30 w Cpk>1.67	Wires	1/30/0	3/90/0	3/90/0	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum o devices, 30 w Cpk>1.67	Wires	1/30/0	3/90/0	3/90/0	3/90/0
SD	C3	JEDEC JESD22B10	1	15	PB Solderability	>95% Lead Coverage	-	-	1/15/0	-	1/15/0
SD	C3	JEDEC JESD22-B102	1	15	PB-Free Solderability	>95% Lead Coverage	-	-	1/15/0	-	1/15/0
PD	C4	JEDEC JESD22B10 and B108	1	10	Physical Dimensions	Cpk>1.67	-	1/10/0	3/30/0	3/30/0	3/30/0
Test Group D - Die Fabrication Reliability Tests											
EM	D1	JESD61	-	-	Electromigration	-	-	Completed Per Process Technolo Requirements	Completed Per Process Technolog Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
TDDE	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	-	Completed Per Process Technolo Requirements	Completed Per Process Technolog Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
HCI	D3	JESD60 & :	-	-	Hot Carrier Inject	-	-	Completed Per Process Technolo Requirements	Completed Per Process Technolog Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements

NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	Completed Per Process Technolo Requirements	Completed Per Process Technolog Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
SM	D5	-	-	-	Stress Migration	-	-	Completed Per Process Technolo Requirements	Completed Per Process Technolog Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
Test Group E - Electrical Verification Tests											
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	2000 Volts	-	-	-	1/3/0
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	3000 Volts	-	1/3/0	-	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1000 Volts	-	1/3/0	-	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	-	-	-	1/3/0
LU	E4	AEC Q100-004	1	6	Latch-Up	Per AEC Q100 004	-	-	1/6/0	1/6/0	1/6/0
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Ro hot, and cold	-	1/30/0	3/90/0	3/90/0	3/90/0

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 Ambient Operating

Ambient Operating Temperature by Automotive Grade Level:

Grade 0 (or E): -40C to +150C

Grade 1 (or Q): -40C to +125C

Grade 2 (or T): -40C to +105C Grade 3 (or I) : -40C to +85C

E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):

Room/Hot/Cold : HTOL, ED

Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU

Room : AC/Uhast

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

Automotive Q006 Report
(As per AEC-Q006 Guidelines)

1 mil (25um) Cu Wire in CDAT

Approved 24-Jul-2019

Product Attributes

Attributes	Qual Device: CAXC8T245QRHLRQ1
Operating Temp Range	-40 to +125 C
Automotive Grade Level	Grade 1
Product Function	Logic
Wafer Fab Supplier	MIHO-8

Attributes	Qual Device: CAXC8T245QRHLRQ1
Wafer Diameter (mm)	200
Assembly Site	CDAT
Package Type	VQFN
Package Designator	RHL
Ball/Lead Count	24

- QBS: Qual By Similarity

Qualification Results

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

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: CAXC8T245QRHLRQ1
Test Group A – Accelerated Environment Stress Tests							
PC	A1	-	3	22	SAM Analysis, Pre Stress	Completed	3/66/0
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	Level 1-260C	No fails
PC	A1	-	3	22	SAM Analysis, Post Stress	Completed	3/66/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	3/231/0
HAST	A2	-	3	1	Cross Section, Post bHAST 96 Hours	Completed	3/3/0
HAST	A2	-	3	30	Wire Bond Shear, Post bHast, 96 Hours	Wires	3/90/0
HAST	A2	-	3	30	Bond Pull over Stitch, post bHAST, 96 Hours	Wires	3/90/0
HAST	A2	-	3	30	Bond Pull over Ball, Post bHAST, 96 Hours	Wires	3/90/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	192 Hours	3/210/0
HAST	A2	-	3	1	Cross Section, Post bHAST 192 Hours	Completed	3/3/0
HAST	A2	-	3	22	SAM Analysis, Post bHAST, 192 Hours	Completed	3/66/0
HAST	A2	-	3	30	Wire Bond Shear, Post bHAST, 192 Hours	Wires	3/90/0
HAST	A2	-	3	30	Bond Pull over Stitch, post bHAST, 192 Hours	Wires	3/90/0
HAST	A2	-	3	30	Bond Pull over Ball, Post bHAST, 192 Hours	Wires	3/90/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	3/231/0
TC	A4	-	3	1	Cross Section, Post T/C 500 Cycles	Completed	3/3/0
TC	A4	-	3	22	SAM Analysis, Post T/C, 500 Cycles	Completed	3/66/0
TC	A4	-	3	30	Wire Bond Shear, Post T/C 500 Cycles	Wires	3/90/0
TC	A4	-	3	30	Bond Pull over Stitch Post T/C 500 Cycles	Wires	3/90/0
TC	A4	-	3	30	Bond Pull over Ball Post T/C 500 Cycles	Wires	3/90/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	1000 Cycles	3/210/0
TC	A4	-	3	1	Cross Section, Post T/C 1000 Cycles	Completed	3/3/0
TC	A4	-	3	22	SAM Analysis, Post T/C, 1000 Cycles	Completed	3/66/0
TC	A4	-	3	30	Wire Bond Shear, Post T/C	Wires	3/90/0

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: CAXC8T245QRHLRQ1
					1000 Cycles		
TC	A4	-	3	30	Bond Pull over Stitch, Post T/C, 1000 Cycles	Wires	3/90/0
TC	A4	-	3	30	Bond Pull over Ball, Post T/C, 1000 Cycles	Wires	3/90/0
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle -40/125C	1000 Cycles	NA
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle -40/125C	2000 Cycles	NA
HTSL	A6	JEDEC JESD22-A103	3	45	High Temp Storage Bake 150C	1000 Hours	3/135/0
HTSL	A6	-	3	1	Cross Section, Post HTSL 1000 Hours	Completed	3/3/0
HTSL	A6	JEDEC JESD22-A103	3	44	High Temp Storage Bake 150C	2000 Hours	3/132/0
HTSL	A6	-	3	1	Cross Section, Post HTSL 2000 Hours	Completed	3/3/0
Test Group C – Package Assembly Integrity Tests							
WBS	C1	AEC Q100-001	3	30	Wire Bond Shear, Cpk>1.67	Wires	3/30/0
WBP	C2	MIL-STD883 Method 2011	3	30	Bond Pull over Ball, Cpk >1.67	Wires	3/30/0

A1 (PC): Preconditioning:
Performed for THB, Biased HAST, AC, uHAST & TC samples, as applicable.
Ambient Operating Temperature by Automotive Grade Level:
Grade 0 (or E): -40C to +150C
Grade 1 (or Q): -40C to +125C
Grade 2 (or T): -40C to +105C
Grade 3 (or I) : -40C to +85C
E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):
Room/Hot/Cold : HTOL, ED
Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU
Room : AC/uHAST
Green/Pb-free Status:
Qualified Pb-Free(SMT) and Green

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