

<b>PCN Number:</b>	20231003000.2A			<b>PCN Date:</b>	December 05, 2023
<b>Title:</b>	Qualify TI Chengdu (CDAT) as an additional Assembly and Test site for select devices				
<b>Customer Contact:</b>	Change Management team		<b>Dept:</b>	Quality Services	
<b>Proposed 1<sup>st</sup> Ship Date:</b>	Apr 04, 2024		<b>Sample requests accepted until:</b>	Nov 04, 2023*	
*Sample requests received after Nov 04, 2023 will not be supported.					
<b>Change Type:</b>					
<input checked="" type="checkbox"/>	Assembly Site	<input type="checkbox"/>	Design	<input type="checkbox"/>	Wafer Bump Material
<input checked="" type="checkbox"/>	Assembly Process	<input type="checkbox"/>	Data Sheet	<input type="checkbox"/>	Wafer Bump Process
<input checked="" type="checkbox"/>	Assembly Materials	<input type="checkbox"/>	Part number change	<input type="checkbox"/>	Wafer Fab Site
<input type="checkbox"/>	Mechanical Specification	<input checked="" type="checkbox"/>	Test Site	<input type="checkbox"/>	Wafer Fab Material
<input checked="" type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process	<input type="checkbox"/>	Wafer Fab Process
<b>PCN Details</b>					
<b>Description of Change:</b>					
<b>Revision A</b> is to announce a correction on the lead finish which was not included on the original PCN notification as shown on the material differences table below.					
Texas Instruments is pleased to announce the qualification of TI Chengdu (CDAT) as an additional Assembly and Test site for the list of devices shown below. Material differences between sites as follows.					
	<b>Assembly Site</b>	<b>Assembly Site Origin</b>	<b>Assembly Country Code</b>	<b>Assembly City</b>	
	Hana Semiconductor	HNT	THA	Ayutthaya	
	TFME	NFM	CHN	Chongchuan	
	UTAC	NS2	THA	Bangpakong	
	<b>TI Chengdu</b>	<b>CDA</b>	<b>CHN</b>	<b>Chengdu</b>	
<b>Material Differences:</b>					
	<b>Hana</b>	<b>TFME</b>	<b>UTAC</b>	<b>TI Chengdu</b>	
Wire type	0.8mil, 1.0mil Au	0.8mil Au	0.8mil, 1.0 mil Au	0.8mil Cu	
Mount compound	400180	A-03	PZ0013	4207123	
Mold compound	450207 450042	R-27 R-13	CZ0096	4222198	
<b>Lead finish</b>	<b>NiPdAu</b>	<b>NiPdAu</b>	<b>NiPdAu</b>	<b>Matte Sn</b>	
Test coverage, insertions, conditions will remain consistent with current testing.					
<b>Reason for Change:</b>					
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					
<b>Anticipated impact on Fit, Form, Function, Quality or Reliability (positive / negative):</b>					
None					
<b>Impact on Environmental Ratings:</b>					
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.					

<b>RoHS</b>	<b>REACH</b>	<b>Green Status</b>	<b>IEC 62474</b>
<input checked="" type="checkbox"/> No Change	<input checked="" type="checkbox"/> No Change	<input checked="" type="checkbox"/> No Change	<input checked="" type="checkbox"/> No Change

**Changes to product identification resulting from this PCN:**

Assembly Site		
Hana Semiconductor	Assembly Site Origin (22L)	ASO: HNT
TFME	Assembly Site Origin (22L)	ASO: NFM
UTAC	Assembly Site Origin (22L)	ASO: NS2
TI Chengdu	Assembly Site Origin (22L)	ASO: CDA

Sample product shipping label (not actual product label)

Sample product shipping label (not actual product label)

G4 = NiPdAu  
G3 = Matte Sn

(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

### Product Affected

OPA170AQDBVRQ1	TLV314QDBVRQ1	TLV70212QDBVRQ1	TMP235AQDBZRQ1
OPA171AQDBVRQ1	TLV314QDBVTQ1	TLV70215QDBVRQ1	TMP235AQDBZTQ1
OPA314AQDBVRQ1	TLV316QDBVRQ1	TLV70218QDBVRQ1	TMP236AQDBZRQ1
OPA314AQDBVTQ1	TLV316QDBVTQ1	TLV70227QDBVRQ1	TMP236AQDBZTQ1
OPA316QDBVRQ1	TLV70032QDDCRQ1	TLV70228QDBVRQ1	TMP708AQDBVRQ1
OPA316QDBVTQ1	TLV70033QDDCRCT	TLV70229QDBVRQ1	TMP709AQDBVRQ1
SN5022A1DBZRQ1	TLV70033QDDCRQ1	TLV70230QDBVRQ1	
TLV171QDBVRQ1	TLV702125QDBVRQ1	TLV70233QDBVRQ1	

## Qualification Report

### Automotive New Product Qualification Summary

(As per AEC-Q100 and JEDEC Guidelines)

Approved 02-Jun-2022

### Product Attributes

Attributes	Qual Device and Package QBS: TP3840PH30DBVR Q1	Process QBS: TP561378QWRTER Q1 (A0)	Process QBS: INA210BQDCK Q1	Process QBS: INA301A1QDGKRQ1 INA301A2QDGKRQ1 INA301A3QDGKRQ1	Process QBS: OPA4171AQDR Q1	Process QBS: SN0406082P W-B1	Process QBS: TMP235AEDBZR Q1	Process QBS: DRV5015A3EDBZ Q1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 0	Grade 0
Operating Temp Range (C)	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +150	-40 to +150
Product Function	Power Management	Power Management	Signal Chain	Signal Chain	Signal Chain	Power Management	Signal Chain	Signal Chain
Wafer Fab Supplier	RFAB	RFAB	AIZU	AIZU	DM5	MH8	RFAB	RFAB
Assembly Site	CDAT	CDAT	NFME	ASESH	MLA	TAI	HNT	NFME
Package Group	SOT-23	QFN/SON	SOT-SC70	VSSOP	SOIC	TSSOP	SOT-23	SOT-23
Package Designator	DBV	RTE	DKK	DGK	D	PW	DBZ	DBZ
Pin Count	5	16	6	8	14	16	3	3

- QBS: Qual By Similarity
- Qual Device TP3840PH30DBVRQ1 is qualified at LEVEL1-260CG

## 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 and Package QBS: TPS3840PH30D BVRQ1	Process QBS: TPS61378QWR TERQ1 (A0)	Process QBS: INA301A1QDGK RQ1 INA301A2QDGK RQ1 INA301A3QDGK RQ1	Process QBS: OPA4171AQ DRQ1	Process QBS: SN040608 2PW-B1	Process QBS: TMP235AED BZRQ1	Process QBS: DRV5015A3E DBZQ1
Test Group A – Accelerated Environment Stress Tests													
PC	A 1	JEDEC J-STD-020 JESD 22-A113	3	77	Preconditioning	Level 1-260C	No Fails	-	-	-	-	-	-
HAST	A 2	JEDEC JESD 22-A110	3	77	Biased HAST, 130C/85% RH	96 Hours	3/231/0	-	-	-	-	-	-
UHA ST	A 3	JEDEC JESD 22-A102	3	77	Unbiased HAST 130C/85% RH	96 Hours	3/231/0	-	-	-	-	-	-
TC	A 4	JEDEC JESD 22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	3/231/0	-	-	-	-	-	-
TC-WBP	A 4	MIL-STD883 Method 2011	1	60	Post Temp Cycle Bond Pull	Wires	3/108/0	-	-	-	-	-	-
PTC	A 5	JEDEC JESD 22-A105	1	45	Power Temperature Cycle	1000 Cycles	N/A	-	-	-	-	-	-
HTSL	A 6	JEDEC JESD	1	45	High Temp Storage Bake 150C	1000 Hours	3/231/0	-	-	-	-	-	-

			22-A103											
Test Group B – Accelerated Lifetime Simulation Tests														
	HTO L	B 1	JEDE C JESD 22-A108	3	77	Life Test, 125C	1000 Hours	3/231/0	-	-	-	-	-	-
	ELF R	B 2	AEC Q100-008	3	800	Early Life Failure Rate, 140C	48 Hours	-	3/2400/0	3/2400/0	3/2400/0	3/2400/0	3/2400/0	3/2400/0
	EDR	B 3	AEC Q100-005	3	77	NVM Endurance , Data Retention, and Operationa I Life	-	N/A	-	-	-	-	-	-
Test Group C – Package Assembly Integrity Tests														
	WBS	C 1	AEC Q100-001	1	30	Wire Bond Shear, Cpk>1.67	Wires	3/90/0	-	-	-	-	-	-
	WBP	C 2	MIL-STD883 Method 2011	1	30	Bond Pull, Cpk>1.67	Wires	3/90/0	-	-	-	-	-	-
	SD	C 3	JEDE C JESD 22-B102	1	15	Surface Mount Solderabilit y	Pb Free Solder	3/45/0	-	-	-	-	-	-
	SD	C 3	JEDE C JESD 22-B102	1	15	Surface Mount Solderabilit y	Pb Solder	3/45/0	-	-	-	-	-	-
	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device and Package QBS: <a href="#">TPS3840PH30D BVRQ1</a>	Process QBS: <a href="#">TPS61378QWR TERQ1 (A0)</a>	Process QBS: <a href="#">INA301A1QDGK RQ1</a> <a href="#">INA301A2QDGK RQ1</a> <a href="#">INA301A3QDGK RQ1</a>	Process QBS: <a href="#">OPA4171AQ DRQ1</a>	Process QBS: <a href="#">SN040608 2PW-B1</a>	Process QBS: <a href="#">TMP235AED BZRQ1</a>	Process QBS: <a href="#">DRV5015A3E DBZQ1</a>
	PD	C 4	JEDE C JESD 22-B100 and B108	3	10	Physical Dimensions	Cpk>1.67	3/30/0	-	-	-	-	-	-
	LI	C 6	JEDE C JESD 22-B105	1	50	Lead Fatigue	Leads	3/66/0	-	-	-	-	-	-
	LI	C 6	JEDE C JESD 22-B105	1	50	Lead Pull to Destruction	Leads	3/66/0	-	-	-	-	-	-
Test Group D – Die Fabrication Reliability Tests														
	EM	D 1	JESD 61	-	-	Electromigration	-	Completed Per Process Technology Requirements	-	-	-	-	-	-
	TDD B	D 2	JESD 35	-	-	Time Dependant Dielectric Breakdown	-	Completed Per Process Technology Requirements	-	-	-	-	-	-
	HCI	D 3	JESD 60 & 28	-	-	Hot Injection Carrier	-	Completed Per Process Technology Requirements	-	-	-	-	-	-
	NBTI	D 4	-	-	-	Negative Bias Temperature Instability	-	Completed Per Process Technology Requirements	-	-	-	-	-	-
	SM	D 5	-	-	-	Stress Migration	-	Completed Per Process Technology Requirements	-	-	-	-	-	-

Test Group E – Electrical Verification Tests														
ED	E5	AEC Q100-009	3	30	Auto Electrical Distributions	Cpk>1.67 Room, hot, and cold test	3/90/0	-	-	-	-	-	-	-

A1 (PC): Preconditioning:

Performed for THB, Biased HAST, AC, uHAST, TC & PTC samples, as applicable.

**Ambient Operating Temperature by Automotive Grade Level:**

Grade 0 (or E): -40°C to +150°C

Grade 1 (or Q): -40°C to +125°C

Grade 2 (or T): -40°C to +105°C

Grade 3 (or I): -40°C to +85°C

**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

## Qualification Report

### Automotive New Product Qualification Summary

(As per AEC-Q100, AEC-Q006, and JEDEC Guidelines)

Approved 25-Jul-2022

### Product Attributes

Attributes	Qual Device: TPS3840PH30DBVRQ1
Automotive Grade Level	Grade 1
Operating Temp Range	-40 to +125 C
Product Function	Power Management
Wafer Fab Supplier	RFAB
Assembly Site	CDA T
Package Type	SOT-23
Package Designator	DBV
Ball/Lead Count	5

- QBS: Qual By Similarity

- Qual Device TPS3840PH30DBVRQ1 is qualified at LEVEL1-260CG

### 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: TPS3840PH30DBVRQ1
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	-

	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: <u>TPS3840PH30DBVRQ1</u>
	HAST	A2	-	3	30	Wire Bond Shear, Post bHast, 96 Hours	Wires	-
	HAST	A2	-	3	30	Bond Pull over Stitch, post bHA ST, 96 Hours	Wires	-
	HAST	A2	-	3	30	Bond Pull over Ball, Post bHA ST, 96 Hours	Wires	-
	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	-
	TC	A4	-	3	22	SAM Analysis, Post T/C, 500 Cycles	Completed	-
	TC	A4	-	3	30	Wire Bond Shear, Post T/C 500 Cycles	Wires	-
	TC	A4	-	3	30	Bond Pull over Stitch Post T/C 500 Cycles	Wires	-
	TC	A4	-	3	30	Bond Pull over Ball Post T/C 500 Cycles	Wires	-
	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	3/54/0
	TC	A4	-	3	30	Bond Pull over Stitch, Post T/C, 1000 Cycles	Wires	3/54/0
	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

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TPS3840PH30DBVRQ1
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:**

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

Room : AC/uHAST

**Green/Pb-free Status:**

Qualified Pb-Free(SMT) and Green

ZVEI ID reference: SEM-PA-18, SEM-PA-08, SEM-PA-11, SEM-PA-07, SEM-TF-01, SEM-PA-05

For questions regarding this notice, e-mails can be sent to the Change Management team or your local Field Sales Representative.

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