

<b>PCN Number:</b>	20221215001.2		<b>PCN Date:</b>	December 16, 2022	
<b>Title:</b>	Qualification of new Fab site (RFAB), TI CD-PR as additional wafer probe (EWS) site and TI FMX as additional Assembly & Test Site for select devices				
<b>Customer Contact:</b>	<a href="#">PCN Manager</a>		<b>Dept:</b>	Quality Services	
<b>Proposed 1<sup>st</sup> Ship Date:</b>	June 16, 2023		<b>Sample Requests accepted until:</b>	Jan 16, 2023*	
*Sample requests received after Jan 16, 2023 will not be supported.					
<b>Change Type:</b>					
<input checked="" type="checkbox"/>	Assembly Site	<input type="checkbox"/>	Design	<input type="checkbox"/>	Wafer Bump Site
<input type="checkbox"/>	Assembly Process	<input type="checkbox"/>	Data Sheet	<input type="checkbox"/>	Wafer Bump Material
<input checked="" type="checkbox"/>	Assembly Materials	<input type="checkbox"/>	Part number change	<input type="checkbox"/>	Wafer Bump Process
<input type="checkbox"/>	Mechanical Specification	<input checked="" type="checkbox"/>	Test Site	<input checked="" type="checkbox"/>	Wafer Fab Site
<input checked="" type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process	<input checked="" type="checkbox"/>	Wafer Fab Materials
		<input type="checkbox"/>		<input type="checkbox"/>	Wafer Fab Process
<b>PCN Details</b>					
<b>Description of Change:</b>					
Texas Instruments is pleased to announce the Qualification of new Fab site (RFAB), CD-PR as additional probe (EWS) site and TI FMX as an additional Assembly & Test Site for selected devices listed in "Product Affected" section. Material differences are as follows:					
<b>Current Fab Site</b>			<b>New Fab Site</b>		
<b>Current Fab Site</b>	<b>Process</b>	<b>Wafer Diameter</b>	<b>New Fab Site</b>	<b>Process</b>	<b>Wafer Diameter</b>
MFAB	ABCD6	200 mm	RFAB	ABCD6	300 mm
<b>Current:</b>			<b>New:</b>		
Probe Site (EWS)		Maine Fab (MFAB)	<b><i>TI Chengdu (CD-PR)</i></b>		
<b>Material Differences:</b>					
<b>Group 1 Devices:</b>					
	<b>ASESH</b>	<b>FMX</b>			
Wire type	1.0 mil Au	1.0 mil Cu			
Mold Compound	EN2000509	4211880			
Mount Compound	EY1000063	4147858			
Pin 1 marking	Dot	Dimple			
Test coverage, insertions, conditions will remain consistent with current testing.					
<b>Reason for Change:</b>					
Continuity of Supply					
<b>Anticipated impact on Form, Fit, Function, Quality or Reliability (positive / negative):</b>					
None					
<b>Changes to product identification resulting from this PCN:</b>					
<b>Current</b>					
Chip Site	Chip Site Origin (20L)	Chip Site Country Code (21L)	Chip Site City		
MAINEFAB	CUA	USA	South Portland		
<b>New Fab Site</b>					
Chip Site	Chip Site Origin (20L)	Chip Site Country Code (21L)	Chip Site City		
RFAB	RFB	USA	Richardson		

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
ASESH	ASH	CHN	Shanghai
TI Mexico	MEX	MEX	Aguascalientes

Sample product shipping label (not actual product label)



#### Group 1 Product Affected (Wafer Fab, Probe site, Assembly & Test site):

UCC27282QDDAQ1 UCC27282QDDARQ1

#### Group 2 Product Affected (Wafer Fab site, Probe site only):

UCC27282QDRCRQ1 UCC27282QDRCTQ1

## Group 1 Qualification Report

Approve Date 04-Nov-2022

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

#### Product Attributes

Attributes	Qual Device: UCC27282QDDAQ1	QBS Reference: TCAN1042HVDRO1	QBS Reference: TCAN1051VDRQ1	QBS Reference: LM5141QRGERQ1	QBS Reference: UCC27282QDQ1	QBS Reference: LM5169FQDDARQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 150	-40 to 125	-40 to 125	-40 to 125	-40 to 150	-40 to 125
Product Function	Power Management	Interface	Interface	Power Management	Power Management	Power Management
Wafer Fab Supplier	RFAB	MH8	MH8	RFAB	RFAB	RFAB
Assembly Site	FMX	FMX	FMX	UTL1	FMX	FMX
Package Group	SOIC	SOIC	SOIC	QFN	SOIC	SOIC
Package Designator	DDA	D	D	RGE	D	DDA
Pin Count	8	8	8	24	8	8

QBS: Qual By Similarity

Qual Device UCC27282QDDAQ1 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: UCC27282QDDAQ1	QBS Reference: TCAN1042HVDRO1	QBS Reference: TCAN1051VDRQ1	QBS Reference: LM5141QRGERQ1	QBS Reference: UCC27282QDQ1	QBS Reference: LM5169FQDDARQ1
Test Group A - Accelerated Environment Stress Tests													
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	1 Step	-	No Fails	No Fails	-	-	-

PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL2 260C	1 Step	No Fails	-	-	-	No Fails	No Fails
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	110C/85%RH	264 Hours	-	-	-	-	-	3/224/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	2/154/0	1/77/0	-	1/77/0	-
ACU/HAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Autoclave	121C/15psig	96 Hours	-	2/154/0	1/77/0	-	1/77/0	-
ACU/HAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Unbiased HAST	110C/85%RH	264 Hours	-	-	-	-	-	3/231/0

TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	2/154/0	1/77/0	-	1/77/0	3/210/0
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	1/5/0	-	-	-	-	1/5/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	1/77/0	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	500 Hours	-	2/90/0	1/45/0	-	-	3/135/0

**Test Group B - Accelerated Lifetime Simulation Tests**

HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	-	-	-	3/231/0	-	-
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	150C	1000 Hours	-	-	-	-	3/231/0	-
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	125C	48 Hours	-	-	-	3/2400/0	-	-
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	150C	48 Hours	-	-	-	-	1/800/0	-

**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	-	2/60/0	1/30/0	-	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	-	2/60/0	1/30/0	-	3/90/0	3/90/0
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	-	-	-	-	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 JESD22-B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	1/10/0	2/20/0	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	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	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	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	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	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	1/3/0	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	1/3/0	-	-	1/3/0	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	-

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/>

[1]-6 fails across 3 lots (as well as 6 fails on control material) were attributed to electrically induced physical damage. Extensive FA and 8D (attached to eQDB) attributed these to board issues and were discounted as not related to the fab change.

[2]-6 fails across 3 lots (as well as 6 fails on control material) were attributed to electrically induced physical damage. Extensive FA and 8D (attached to eQDB) attributed these to board issues and were discounted as not related to the fab change.

[3]-6 fails across 3 lots (as well as 6 fails on control material) were attributed to electrically induced physical damage. Extensive FA and 8D (attached to eQDB) attributed these to board issues and were discounted as not related to the fab change.

[4]-EOS. Discounted

## Group 2 Qualification Report

Approve Date 04-Nov-2022

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

#### Product Attributes

Attributes	Qual Device: UCC27282QDRCTQ1	Qual Device: UCC27284DRCT	Qual Device: UCC27289DRCT	Qual Device: UCC27282DRCT	QBS Reference: BQ25171QWDRCBQ1	QBS Reference: LM5141QBGGERQ1	QBS Reference: UCC27282QDQ1	QBS Reference: UCC27284QDQ1	QBS Reference: UCC27289D	QBS Reference: CAXC8T2450RH1RQ1
Automotive Grade Level	Grade 1	-	-	-	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	-40 to 125	-40 to 150	-40 to 150	-40 to 125	-40 to 125
Product Function	Power Management	-	-	-	Power Management	Power Management	Power Management	Power Management	-	Signal Chain
Wafer Fab Supplier	RFAB	RFAB	RFAB	RFAB	RFAB	RFAB	RFAB	RFAB	RFAB	MH8
Assembly Site	CDAT	CDAT	CDAT	CDAT	CDAT	UTL1	FMX	FMX	FMX	CDAT
Package Group	QFN	QFN	QFN	QFN	-	QFN	SOIC	SOIC	SOIC	QFN
Package Designator	DRC	DRC	DRC	DRC	DRC	RGE	D	D	D	RHL
Pin Count	10	10	10	10	10	24	8	8	8	24

QBS: Qual By Similarity

Qual Device UCC27282QDRCTQ1 is qualified at MSL2 260C

Qual Device UCC27284DRCT is qualified at MSL2 260C

Qual Device UCC27289DRCT is qualified at MSL2 260C

Qual Device UCC27282DRCT is qualified at MSL1 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: UCC27282QDRCTQ1	Qual Device: UCC27284DRCT	Qual Device: UCC27289DRCT	Qual Device: UCC27282DRCT	QBS Reference: BQ25171QWDRCBQ1	QBS Reference: LM5141QBGGERQ1	QBS Reference: UCC27282QDQ1	QBS Reference: UCC27284D
Test Group A - Accelerated Environment Stress Tests															
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	1 Step	-	-	-	-	-	-	-	-
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL2 260C	1 Step	1/0/0	-	-	-	3/0/0	-	3/0/0	-

HAST	A2	JEDEC JESD22-A110	3	77	Temperature Humidity Bias	85C/85%RH	1000 Hours	-	-	-	-	-	-	-
ACUHA	A3	JEDEC JESD22-A103/JEDEC JESD22-A118	3	77	Autoclave	121C/15psig	96 Hours	-	-	-	-	-	1/770	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	1/770	-	-	-	3/2310	3/2310	-
PTC	A5	JEDEC JESD22-A105	1	45	PTC	-40/125C	1000 Cycles	-	-	-	-	1/450	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	3/1350	1/770	-
Test Group B - Accelerated Lifetime Simulation Tests														
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	-	-	-	-	3/2310	-	-
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	150C	1000 Hours	-	-	-	-	-	3/2310	-
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	125C	48 Hours	-	-	-	-	3/24000	-	-
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	150C	48 Hours	-	-	-	-	-	18000	-
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	1/300	-	-	-	3/150	-	-
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/300	-	-	-	3/150	-	-
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	-	-	-	-	1/150	-	-
SD	C3	JEDEC JESD22-B102	1	15	PB-Free Solderability	>95% Lead Coverage	-	-	-	-	-	1/150	-	-
PD	C4	JEDEC JESD22-B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	1/100	-	-	-	3/300	-	-
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	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
TDOB	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	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
HCI	D3	JESD60 &	-	-	Hot Carrier	-	-	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	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
		28			Injection			Process Technology Requirements	Process Technology Requirements	Process Technology Requirements	Process Technology Requirements	Process Technology Requirements	Process Technology Requirements	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	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	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	1/30	-	-	-	-	1/30	1/30
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	1/30	-	-	-	-	1/30	1/30
LU	E4	AEC Q100-004	1	6	Latch-Up	Per AEC Q100-004	-	1/60	-	-	-	-	1/60	1/60
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	1/300	-	-	-	-	3/900	1/300

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/>

[1]-Fab Defect. Corrective actions implemented

QEM-EVAL-2009-00457

[2]-6 fails across 3 lots (as well as 6 fails on control material) were attributed to electrically induced physical damage. Extensive FA and 8D (attached to eQDB) attributed these to board issues and were discounted as not related to the fab change.  
[3]-6 fails across 3 lots (as well as 6 fails on control material) were attributed to electrically induced physical damage. Extensive FA and 8D (attached to eQDB) attributed these to board issues and were discounted as not related to the fab change.  
[4]-6 fails across 3 lots (as well as 6 fails on control material) were attributed to electrically induced physical damage. Extensive FA and 8D (attached to eQDB) attributed these to board issues and were discounted as not related to the fab change.  
[5]-Discounted. QEM-EVAL-1710-00385

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

Location	E-Mail
WW Change Management Team	<a href="mailto:PCN_ww_admin_team@list.ti.com">PCN_ww_admin_team@list.ti.com</a>

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