

<b>PCN Number:</b>	20230210001.2	<b>PCN Date:</b>	February 13, 2023
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<b>Title:</b>	Qualification of TI Malaysia as an additional Assembly and Test site for select devices		
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<b>Customer Contact:</b>	<a href="#">PCN Manager</a>	<b>Dept:</b>	Quality Services
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<b>Proposed 1<sup>st</sup> Ship Date:</b>	Aug 13, 2023	<b>Sample requests accepted until:</b>	Mar 13, 2023*
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**\*Sample requests received after Mar 13, 2023 will not be supported.**

**Change Type:**

<input checked="" type="checkbox"/>	Assembly Site	<input type="checkbox"/>	Design	<input type="checkbox"/>	Wafer Bump Site
<input checked="" 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 type="checkbox"/>	Wafer Fab Site
<input checked="" type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process	<input type="checkbox"/>	Wafer Fab Materials
		<input type="checkbox"/>		<input type="checkbox"/>	Wafer Fab Process

**PCN Details**

**Description of Change:**

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

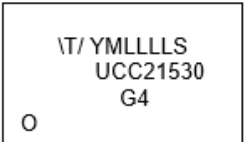

Assembly Site	Assembly Site Origin	Assembly Country Code	Assembly City
TI Taiwan	TAI	TWN	Chung Ho, New Taipei City
<a href="#">TI Malaysia</a>	<a href="#">MLA</a>	<a href="#">MYS</a>	<a href="#">Kuala Lumpur</a>

**Material Differences:**

	TAI	MLA
Wire type	0.96mil Au	1.0mil Cu (Die to leadframe) *

\*Wire type Die to Die: 0.96mil Au

**Package Marking Differences:**

	TAI	MLA
TI Bug	Include	Replace with "TI" text
**ECAT	Include Value	Remove
Example	 <p>TI/Y = TI LOGO  YM = YEAR MONTH DATE CODE  S = ASSY SITE CODE  LLLL = LOT TRACE CODE  G4 = ECAT VALUE  O = PIN 1 INDICATOR</p>	 <p>TI = TI LETTER  YM = YEAR MONTH DATE CODE  S = ASSY SITE CODE  LLLL = LOT TRACE CODE  O = PIN 1 INDICATOR</p>

\*\* - Not all devices have ECAT information included in the symbolization, but for the ones that do, this information will be removed.

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

**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
<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		
TI Taiwan	Assembly Site Origin (22L)	ASO: TAI
TI Malaysia	Assembly Site Origin (22L)	ASO: MLA

Sample product shipping label (not actual product label)



**Product Affected:**

SN21530QDWKQ1	UCC21320QDWKQ1	UCC21530BQDWKRQ1	UCC21540AQDWKRQ1
SN21530QDWKRQ1	UCC21320QDWKRQ1	UCC21530QDWKQ1	UCC21540QDWKRQ1
SN21540QDWKRQ1	UCC21530BQDWKQ1	UCC21530QDWKRQ1	

## Qualification Report

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

Approve Date 31-Jan-2023

**Product Attributes**

Attributes	Qual Device:	QBS Reference:	QBS Reference:	QBS Reference:	QBS Reference:	QBS Reference:	QBS Reference:
	UCC21320QDWKRQ1	ISQW7841EQDWQ01	UCC21520QDWKRQ1	ISQ7741FEDWRQ1	ISQ6741QDWQ01	UCC21520AQDWKRQ1	TMP451AQQQERQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 0	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 150	-40 to 125	-40 to 125	-40 to 125
Product Function	Power Management	Interface	Power Management	Interface	Interface	Power Management	Power Management
Wafer Fab Supplier	DP1DM5, DP1DM5, DP1DM5	DP1DM5, DP1DM5	DP1DM5, DP1DM5	MH8, MH8	MH8, MH8	MH8, MH8, MH8	DP1DM5
Assembly Site	MLA	TAI	TAI	TAI	MLA	MLA	UTL1
Package Group	SOIC	SOIC	SOIC	SOIC	SOIC	SOIC	QFN
Package Designator	DWK	DWE	DW	DW	DW	DW	DQF
Pin Count	14	16	16	16	16	16	8

QBS: Qual By Similarity  
Qual Device UCC21320QDWKRQ1 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: UCC21320QDVKRQ1	QBS Reference: ISOW7841FQDWEQ1	QBS Reference: UCC21520QDWRQ1	QBS Reference: SO7741FEDWRQ1	QBS Reference: IS06741QDWRQ1	QBS Reference: UCC21520AQDWRQ1	QBS Reference: TMP451AQDQFRQ1
<b>Test Group A - Accelerated Environment Stress Tests</b>														
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL2 260C	1 Step	No Fails	-	-	-	No Fails	-	-
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL3 260C	1 Step	-	-	-	-	No Fails	-	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	-	-	-	3/231/0	3/231/0	-
ACU/HAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Autoclave	121C/15psig	96 Hours	3/231/0	-	-	-	3/231/0	3/231/0	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	3/231/0	-	-	-	3/231/0	3/231/0	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	3/135/0	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	500 Hours	-	-	-	-	-	3/135/0	-
<b>Test Group B - Accelerated Lifetime Simulation Tests</b>														
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	-	3/231/0	3/231/0	-	3/231/0	1/77/0	-
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	150C	1000 Hours	-	-	-	3/231/0	-	-	-
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	150C	408 Hours	-	-	-	-	-	-	3/231/0
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	125C	48 Hours	-	3/840/3 <sup>1</sup>	-	-	-	-	-
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	150C	24 Hours	-	-	-	-	-	-	3/2400/0
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	150C	48 Hours	-	-	-	3/2400/0	-	-	-
<b>Test Group C - Package Assembly Integrity Tests</b>														
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	3/90/0	3/90/0	3/90/0	3/90/0	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	3/90/0	3/90/0	3/90/0	3/90/0	3/90/0	3/90/0	3/90/0
SD	C3	JEDEC J-STD-002	1	15	PB Solderability	>95% Lead Coverage	-	-	1/15/0	1/15/0	1/15/0	1/15/0	1/15/0	-
SD	C3	JEDEC J-STD-002	1	15	PB-Free Solderability	>95% Lead Coverage	-	-	1/15/0	1/15/0	1/15/0	1/15/0	1/15/0	-
PD	C4	JEDEC JESD22-B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	3/30/0	2/20/0	3/30/0	3/30/0	3/30/0	3/30/0	3/30/0
<b>Test Group D - Die Fabrication Reliability Tests</b>														
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
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	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	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	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
<b>Test Group E - Electrical Verification Tests</b>														
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	2000 Volts	-	1/3/0	1/3/0	1/3/0	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	1/3/0	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	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	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>

## Qualification Report

### Automotive New Product Qualification Summary (As per AEC-Q100, AEC-Q006 and JEDEC Guidelines)

Approve Date 16-Feb-2021

#### Product Attributes

Attributes	Qual Device: <u>ISO6741QDWRQ1</u>
Operating Temp Range	-40 to +125 C
Automotive Grade Level	Grade 1
Product Function	Interface
Wafer Fab Supplier	MH8
Assembly Site	MLA
Package Type	SOIC
Package Designator	DW
Ball/Lead Count	16

- QBS: Qual By Similarity

- Device ISO6741QDWRQ1 contains multiple dies.

#### 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: <u>ISO6741QDWRQ1</u>
<b>Test Group A – Accelerated Environment Stress Tests</b>							
PC	A1	-	3	22	SAM Analysis, Pre Stress	Completed	-
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	Level 2 -260C	No fails
PC	A1	-	3	22	SAM Analysis, Post Stress	Completed	2/44/0
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	-
HAST	A2	-	3	30	Wire Bond Shear, Post bHast, 96 Hours	Wires	-
HAST	A2	-	3	30	Bond Pull over Stitch, post bHAST, 96 Hours	Wires	-
HAST	A2	-	3	30	Bond Pull over Ball, Post bHAST, 96 Hours	Wires	-
HAST	A2	JEDEC	3	77	Biased HAST,	192 Hours	3/210/0

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: ISO6741QDWRQ1
		<b>JESD22-A110</b>			<b>130C/85%RH</b>		
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
<b>TC</b>	<b>A4</b>	<b>JEDEC JESD22-A104 and Appendix 3</b>	<b>3</b>	<b>77</b>	<b>Temperature Cycle, - 65/150C</b>	<b>500 Cycles</b>	<b>3/231/0</b>
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	-
<b>TC</b>	<b>A4</b>	<b>JEDEC JESD22-A104 and Appendix 3</b>	<b>3</b>	<b>77</b>	<b>Temperature Cycle, - 65/150C</b>	<b>1000 Cycles</b>	<b>3/210/0</b>
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
<b>HTSL</b>	<b>A6</b>	<b>JEDEC JESD22-A103</b>	<b>3</b>	<b>45</b>	<b>High Temp Storage Bake 150C</b>	<b>1000 Hours</b>	<b>3/135/0</b>
HTSL	A6	-	3	1	Cross Section, Post HTSL 1000 Hours	Completed	-
<b>HTSL</b>	<b>A6</b>	<b>JEDEC JESD22-A103</b>	<b>3</b>	<b>44</b>	<b>High Temp Storage Bake 150C</b>	<b>2000 Hours</b>	<b>3/132/0</b>
HTSL	A6	-	3	1	Cross Section, Post HTSL 2000 Hours	Completed	3/3/0
<b>Test Group C – Package Assembly Integrity Tests</b>							
WBS	C1	AEC Q100-001	3	30	Wire Bond Shear, Cpk>1.67	Wires	3/90/0
WBP	C2	MIL-STD883 Method	3	30	Bond Pull over Ball, Cpk >1.67	Wires	3/90/0

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: <u>ISO6741QDWRQ1</u>
		2011					

**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

ZVEI ID reference: SEM-PA-08, SEM-PA-13, SEM-PA-18, SEM-TF-01

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
WW PCN Team	<a href="mailto:PCN_ww_admin_team@list.ti.com">PCN_ww_admin_team@list.ti.com</a>

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