




<b>PCN Number:</b>	20221021001.2		<b>PCN Date:</b>	October 21, 2022	
<b>Title:</b>	Qualification of HFTF as an alternate Assembly and 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>	Apr 21, 2023	<b>Sample requests accepted until:</b>	Nov 21, 2022*		
*Sample requests received after (Nov 21, 2022) 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 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"/>	Wafer Fab Process
<b>PCN Details</b>					
<b>Description of Change:</b>					
Texas Instruments Incorporated is announcing the qualification of HFTF as an additional Assembly and Test site for select devices. Construction differences are as follows:					
	<b>ASESH</b>	<b>TIEMA</b>	<b>HFTF</b>		
Mount Compound	SID#EY1000063	4213245	SID# A-18		
Mold Compound	SID#EN2000515	8096859	SID#R-30		
Lead finish	NiPdAuAg (Roughened single side top)	Matte Sn	NiPdAu (Roughened dual side)		
Test coverage, insertions, conditions will remain consistent with current testing.					
<b>Reason for Change:</b>					
Supply continuity					
<b>Anticipated impact on Form, Fit, 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		
<b>Changes to product identification resulting from this PCN:</b>					
<b>Assembly Site</b>	<b>Assembly Site Origin (22L)</b>	<b>Assembly Country Code (23L)</b>	<b>Assembly City</b>		
ASESH	ASH	CHN	Shanghai		
TIEMA	CU6	MYS	Melaka		
<b>HFTF</b>	<b>HFT</b>	<b>CHN</b>	<b>Hefei</b>		
Sample product shipping label (not actual product label)					


**TEXAS INSTRUMENTS**  
 MADE IN: Malaysia  
 2DC: 2Q:


**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

OPT:  
 ITEM: 39  
**LBL: 5A (L)T0:1750**

**Product Affected:**

INA282AQDGKRQ1	LM3478QMM/NOPB	LM3478QMMX/S7002552	INA225AQDGKRQ1
LM3476QMM/NOPB	LM3478QMMX/E7002548	LM3481QMM/NOPB	
LM3476QMMX/NOPB	LM3478QMMX/E7002663	LM3481QMMX/NOPB	
LM3478MMX/E7002426	LM3478QMMX/NOPB	PGA308AQDGSRQ1	

**Qualification Data**

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

Approve Date: 2 June 2022

**Qualification Results (AEC-Q100)**

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: INA225AQDGKRQ1	Qual Device: INA282AQDGKRQ1	Qual Device: LM3476QMMX / NOPB (AU)	Qual Device: LM3476QMMX / NOPB (CU)
<b>TEST GROUP A – ACCELERATED ENVIRONMENT STRESS TESTS</b>										
PC	A1	J-STD-020 JESD22-A113	3	-	Auto Preconditioning	Level 1 - 260C	-	3/597/0	3/597/0	3/597/0
PC	A1	J-STD-020 JESD22-A113	3	-	Auto Preconditioning	Level 2 - 260C	3/597/0	-	-	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C	96 Hours	-	-	-	-
AC	A3	JEDEC JESD22-A102	3	77	Autoclave, 121C	96 Hours	3/231/0	3/231/0	3/231/0	3/231/0
TC	A4	JEDEC JESD22-A104 & Appendix 3	3	77	Temperature Cycle, Grade 1, -65/150C	500 Cycles	3/231/0	3/231/0	3/231/0	3/231/0
TC-WBP	A4	MIL-STD883 Method 2011	3	30	Auto Post TC Bond Pull	Wires	3/90/0	3/90/0	3/90/0	3/90/0
PTC	A5	JEDEC JESD22-A105	3	45	Power Temperature Cycle	1000 Cycles	N/A	N/A	N/A	N/A
HTSL	A6	JEDEC JESD22-	3	45	High Temperature	420 Hours	3/135/0	3/135/0	3/135/0	3/135/0

		A103			Storage Life, 170C					
TEST GROUP B – ACCELERATED LIFETIME SIMULATION TESTS										
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, Grade 1, 125C	1000 Hours	-	-	-	-
ELFR	B2	AEC Q100-008	3	800	Early Failure Rate, 125C	48 Hours	-	-	-	-
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, Operational Life	-	N/A	N/A	N/A	N/A
TEST GROUP C – PACKAGE ASSEMBLY INTEGRITY TESTS										
WBS	C1	AEC Q100-001	3	30	Wire Bond Shear (Cpk>1.67)	Bonds, 5 devices (minimum)	3/90/0	3/90/0	3/90/0	3/90/0
WBP	C2	MIL-STD883 Method 2011	3	30	Wire Bond Pull (Cpk>1.67)	Wires, 5 devices (minimum)	3/90/0	3/90/0	3/90/0	3/90/0
SD	C3	JEDEC JESD22-B102	3	15	Surface Mount Solderability (Pb)	>95% Lead Coverage, 155C Dry Bake	3/45/0	3/45/0	3/45/0	3/45/0
SD	C3	JEDEC JESD22-B102	3	15	Surface Mount Solderability (Pb-Free)	>95% Lead Coverage, 155C Dry Bake	3/45/0	3/45/0	3/45/0	3/45/0
PD	C4	JEDEC JESD22-B100 and B108	3	10	Auto Physical Dimensions	(Cpk>1.67)	3/30/0	3/30/0	3/30/0	3/30/0
SBS	C5	AEC Q100-010 AEC Q003	3	50	Solder Ball Shear	5 balls from a min. of 10 devices (Cpk>1.67)	N/A	N/A	N/A	N/A
LI	C6	JEDEC JESD22-B105	3	50	Lead Integrity	10 leads from a min. of 5 devices	N/A	N/A	N/A	N/A
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
TDDDB	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
HCI	D3	JESD60 & 28	-	-	Hot Injection Carrier	-	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
SM	D5	-	-	-	Stress Migration	-	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**

TEST	E1	Test program to supplier data sheet	All	All	Pre- and Post-Stress Function/Parameter	-	N/A	N/A	N/A	N/A
HBM	E2	AEC Q100-002	3	3	Electrostatic Discharge, Human Body Model	0 Fails 2KV HBM (Classification 2 or better)	3/9/0	3/9/0	3/9/0	3/9/0
CDM	E3	AEC Q100-011	3	3	Electrostatic Discharge, Charged Device Model	0 Fails 750V corner pins, 500V all other pins (Classification C4B or better)	3/9/0	3/9/0	3/9/0	3/9/0
LU	E4	AEC Q100-004	3	6	Latch-Up	0 Fails	-	-	-	-
ED	E5	AEC Q100-009 AEC Q003	3	30	Electrical Distributions	Cpk>1.67 at room, hot, cold test temperatures	-	-	-	-
FG	E6	AEC Q100-007	-	-	Fault Grading	AEC Q100-007 unless otherwise specified	N/A	N/A	N/A	N/A
CHAR	E7	AEC Q003	-	-	Characterization	-	N/A	N/A	N/A	N/A

**OTHER QUALIFICATION TESTS**

MQ	-	Per Auto Requirements	3	1	Manufacturability (Auto Assembly)	-	3/PASS	3/PASS	3/PASS	3/PASS
DSS	-	MIL-STD-883 Method 2019	3	10	Die Shear	Die	3/30/0	3/30/0	3/30/0	3/30/0
BPCC	-	-	3	5	Bond Pad Cratering Check	Bond Pads	3/15/0	3/15/0	3/15/0	3/15/0
LFA	-	-	3	15	Lead Finish Adhesion	Leads, 5 parts minimum	3/45/0	3/45/0	3/45/0	3/45/0
LP	-	-	3	24	Lead Pull	Leads, 8 parts minimum	3/72/0	3/72/0	3/72/0	3/72/0
XR	-	-	3	5	X-Ray	Top side only	3/15/0	3/15/0	3/15/0	3/15/0
YLD	-	Per datasheet specifications	3	All	FTY and Bin Summary	-	3/PASS	3/PASS	3/PASS	3/PASS
MSL	-	-	3	12	Moisture Sensitivity	Level 1 – 260C	-	3/36/0	3/36/0	3/36/0
MSL	-	-	3	12	Moisture Sensitivity	Level 2 – 260C	3/36/0	-	-	-

**Qualification Results (AEC-Q100)**

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: TPD2S703QDGSRQ1
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TEST GROUP A – ACCELERATED ENVIRONMENT STRESS TESTS							
PC	A1	JEDEC J-STD-020 JESD22-A113	3	-	(Q006) Auto Preconditioning	Level 2 - 260C	3/1059/0
HAST	A2	JEDEC JESD22-A110	3	77	(Q006) Biased HAST	130C (96, 192* Hours)	3/231/0
AC	A3	JEDEC JESD22-A102	3	77	(Q006) Auto Autoclave	121C, 2 atm (96 Hours)	3/231/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	(Q006) Auto T/C Grade 1	-65C/+150C (500, 1000* Cycles)	3/231/0
TC-WBP	A4	MIL-STD883 Method 2011	3	30	Auto Post TC Bond Pull	30 ball bonds, min. 5 units	3/90/0
PTC	A5	JEDEC JESD22-A105	3	45	Power Temperature Cycle	1000 Cycles	N/A
HTSL	A6	JEDEC JESD22-A103	3	45	(Q006) Auto High Temp. Storage Life Grade 1	175C (500, 1000* Hours)	3/135/0
TEST GROUP B – ACCELERATED LIFETIME SIMULATION TESTS							
HTOL	B1	JEDEC JESD22-A108	3	77	Auto High Temp Operating Life Grade 1	125C (1000, 2000* Hours); VCC max	3/231/0
ELFR	B2	AEC Q100-008	3	80 0	Early Failure Rate, 125C	48 Hours	-
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, Operational Life	-	N/A
TEST GROUP C – PACKAGE ASSEMBLY INTEGRITY TESTS							
WBS	C1	AEC Q100-001	3	30	Wire Bond Shear (Cpk>1.67)	Bonds, 5 devices (minimum)	3/90/0
WBP	C2	MIL-STD883 Method 2011	3	30	Wire Bond Pull (Cpk>1.67)	Wires, 5 devices (minimum)	3/90/0
SD	C3	JEDEC JESD22-B102	3	15	Surface Mount Solderability (Pb)	>95% Lead Coverage, 155C Dry Bake	3/45/0
SD	C3	JEDEC JESD22-B102	3	15	Surface Mount Solderability (Pb-Free)	>95% Lead Coverage, 155C Dry Bake	3/45/0
PD	C4	JEDEC JESD22-B100 and B108	3	10	Auto Physical Dimensions	Cpk>1.67	3/30/0
SBS	C5	AEC Q100-010 AEC Q003	3	50	Solder Ball Shear	5 balls, 10 devices (min.), (Cpk>1.67)	N/A
LI	C6	JEDEC JESD22-B105	3	50	Lead Integrity	10 leads from a min. of 5 devices	N/A
TEST GROUP D – DIE FABRICATION RELIABILITY TESTS							
EM	D 1	JESD61	-	-	Electromigration	-	Completed Per Process Technology Requirements
TDDB	D 2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	Completed Per Process Technology Requirements
HCI	D 3	JESD60 & 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							
TEST	E1	Test program to supplier data sheet	All	All	Pre- and Post-Stress Function/Parameter	-	N/A
HBM	E2	AEC Q100-002	3	3	Electrostatic Discharge, Human Body Model	0 Fails 2KV HBM (Classification 2 or better)	3/9/0
CDM	E3	AEC Q100-011	3	3	Electrostatic Discharge, Charged Device Model	0 Fails 750V corner pins, 500V all other pins (Classification C4B or better)	3/9/0
LU	E4	AEC Q100-004	3	6	Latch-Up	0 Fails	-
ED	E5	AEC Q100-009 AEC Q003	3	30	Electrical Distributions	Cpk>1.67 at room, hot, cold test temperatures	3/90/0
FG	E6	AEC Q100-007	-	-	Fault Grading	AEC Q100-007 unless otherwise specified	N/A
CHAR	E7	AEC Q003	-	-	Characterization	-	N/A
OTHER QUALIFICATION TESTS							
MQ	-	-	-	-	Manufacturability (Auto Assembly)	(per automotive requirements)	3/PASS
DS	-	MIL-STD-883 Method 2019	1	5	Die Shear	QSS 009-009	3/30/0
BPCC	-	-	3	5	Bond Pad Cratering Check	Bond Pads	3/15/0
XR	-	-	3	5	X-Ray	Top side only	3/15/0
YLD	-	Per datasheet specifications	3	All	FTY and Bin Summary	-	3/PASS
MSL	-	-	3	12	Moisture Sensitivity (Cu Wire)	Level 2 - 260C	3/36/0
SA	-	-	3	22	Salt Atmosphere	24 Hours	3/66/0
VM	-	-	-	-	Visual / Mechanical	(per manufacturing site specification)	3/30/0
AEC-Q006 QUALIFICATION TESTS							
-	-	-	-	-	(Q006) Cross Section, Post Stress	BHAST 130C, 192 Hours	3/3/0
-	-	-	-	-	(Q006) Wire Bond Shear, Post Stress	BHAST 130C, 192 Hours	3/90/0
-	-	-	-	-	(Q006) Bond Pull Over Ball Bond, Post Stress	BHAST 130C, 192 Hours	3/90/0
-	-	-	-	-	(Q006) Bond Pull Over Stitch Bond, Post Stress	BHAST 130C, 192 Hours	3/90/0
-	-	-	-	-	(Q006) SAM Analysis, Post Stress	BHAST 130C, 192 Hours	3/66/0
-	-	-	-	-	(Q006) Cross Section, Post Stress	T/C Grade 1, 1000 Cycles	3/3/0
-	-	-	-	-	(Q006) Wire Bond Shear, Post Stress	T/C Grade 1, 1000 Cycles	3/90/0
-	-	-	-	-	(Q006) Bond Pull Over Ball Bond, Post Stress	T/C Grade 1, 1000 Cycles	3/90/0

-	-	-	-	-	(Q006) Bond Pull Over Stitch Bond, Post Stress	T/C Grade 1, 1000 Cycles	3/90/0
-	-	-	-	-	(Q006) SAM Analysis, Post Stress	T/C Grade 1, 1000 Cycles	3/66/0
-	-	-	-	-	(Q006) Cross Section, Post Stress	HTSL Grade 1, 1000 Hours	3/3/0
Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TPD2S703QDGSRQ 1
-	-	-	-	-	Bond Pull, over ball	5 devices (min.), 30 wires, Cpk>1.67	3/90/0
-	-	-	-	-	Bond Pull, over stitch	5 devices (min.), 30 wires, Cpk>1.67	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

For questions regarding this notice, e-mails can be sent to the contacts shown below or 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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