

PCN Number:	20230306002.2D		PCN Date:	August 28, 2023		
Title:	Qualification of CFAB & DFAB8 as additional Fab sites, Additional AT options, and Cu bond wire					
Customer Contact:	Change Management Team		Dept:	Quality Services		
Proposed 1st Ship Date:	Sept 3, 2023		Sample requests accepted until:	April 7, 2023*		
*Sample requests received after April 7, 2023 will not be supported.						
Change Type:						
<input checked="" type="checkbox"/>	Assembly Site	<input checked="" type="checkbox"/>	Assembly Process	<input checked="" type="checkbox"/>	Assembly Materials	
<input type="checkbox"/>	Design	<input type="checkbox"/>	Electrical Specification	<input type="checkbox"/>	Mechanical Specification	
<input checked="" type="checkbox"/>	Test Site	<input type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process	
<input type="checkbox"/>	Wafer Bump Site	<input type="checkbox"/>	Wafer Bump Material	<input type="checkbox"/>	Wafer Bump Process	
<input checked="" type="checkbox"/>	Wafer Fab Site	<input checked="" type="checkbox"/>	Wafer Fab Materials	<input type="checkbox"/>	Wafer Fab Process	
		<input type="checkbox"/>	Part number change			
PCN Details						
Description of Change:						
Revision D is to include a change type (wafer Thickness) that was not in the original PCN publication for some of the devices in Group 3. Affected devices and rev D updates are noted below in bold yellow font.						
Qualification of additional Fab sites (CFAB & DL-LIN) using qualified Process Technology and additional Assembly sites options for the list of devices in the product affected section below.						
Current Fab Site			Additional Fab Site			
Current Fab Site	Process	Wafer Diameter	Additional Fab Site	Process	Wafer Diameter	
DL-LIN	LBC3S	150mm	CFAB DL-LIN	LBC3S	200mm	
Construction differences (No construction differences for Group 1) are as follows:						
Group 2: CFAB & DFAB as an additional Fab sites and Cu as additional bond wire						
		Current	Additional			
Bond wire composition, diameter		Au, 0.96 mil	Cu, 0.96 mil			
Group 3: CFAB & DFAB8 as additional fab sites and additional AT sites						
	LEN	TAI	UTL1	CDAT	FMX	MLA
Mold Compound	SID #0011G60007	4205443 or 4211880	SID #CZ0135	4222198	4211880	4211649
Bond wire composition, diameter	Au, 1.0 mil	Au, 0.96 mil	Cu, 1.0 mil	Cu, 0.8 or 1.0 mil	Cu, 0.96	Cu, 0.96 mil
Mount Compound	SID #0003C10332	4208458 or 4147858	SID #PZ0037	4226215, or 4207123	4147858	4208458
Lead finish	NiPdAu	NiPdAu	NiPdAu	NiPdAu or Matte Sn	NiPdAu	NiPdAu
Final Test site	LEN	TAI	UTL2	CDAT	FMX	MLA
Group 4: CFAB as an additional Fab site and Cu as additional bond wire						
		Current	Additional			
Bond wire composition,		Au, 0.96 mil	Cu, 0.96 mil			

diameter		
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Group 5: CFAB as an additional Fab site and additional AT sites

	LEN	TAI	UTL1	CDAT	FMX	MLA
Mold Compound	SID #0011G60007	4205443 or 4211880	SID #CZ0135	4222198	4211880	4211649
Bond wire composition, diameter	Au, 1.0 mil	Au, 0.96 mil	Cu, 1.0 mil	Cu, 0.8 or 1.0 mil	Cu, 0.96	Cu, 0.96 mil
Mount Compound	SID #0003C10332	4208458 or 4147858	SID #PZ0037	4226215 or 4207123	4147858	4208458
Lead finish	NiPdAu	NiPdAu	NiPdAu	NiPdAu or Matte Sn	NiPdAu	NiPdAu
Final Test site	LEN	TAI	UTL2	CDAT	FMX	MLA

Probe site change: All devices listed in this notification will also be qualified at CD-PR as an additional probe site with the following exceptions: MAX3232EIPWRQ1 & TRS3232EQPWRQ1 (these devices have no probe step)

Upon expiry of this PCN TI will combine lead free solutions in a single **standard part number**, for the devices in groups 3 & 5. For example; **TLV2374QDRQ1** – can ship with both Matte Sn and NiPdAu/Ag.

Example:

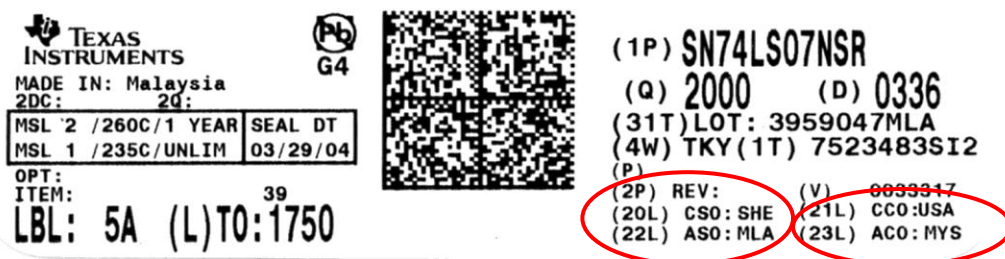
- Customer order for 7500 units of TLV2374QDRQ1 with 2500 units SPQ (Standard Pack Quantity per Reel).
- TI can satisfy the above order in one of the following ways.
 - I. 3 Reels of NiPdAu finish.
 - II. 3 Reels of Matte Sn finish
 - III. 2 Reels of Matte Sn and 1 reel of NiPdAu finish.
 - IV. 2 Reels of NiPdAu and 1 reel of Matte Sn finish.

Qual details are provided in the Qual Data Section.

Reason for Change:												
These changes are part of our multiyear plan to transition products from our 150-millimeter factories to newer, more efficient manufacturing processes and technologies, underscoring our commitment to product longevity and supply continuity.												
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.												
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>RoHS</th> <th>REACH</th> <th>Green Status</th> <th>IEC 62474</th> </tr> <tr> <td><input checked="" type="checkbox"/> No Change</td> <td><input checked="" type="checkbox"/> No Change</td> <td><input checked="" type="checkbox"/> No Change</td> <td><input checked="" type="checkbox"/> No Change</td> </tr> </table>	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				
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:												
<p>Fab Site Information:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>Chip Site</th> <th>Chip Site Origin Code (20L)</th> <th>Chip Site Country Code (21L)</th> <th>Chip Site City</th> </tr> <tr> <td>DL-LIN</td> <td>DLN</td> <td>USA</td> <td>Dallas</td> </tr> <tr> <td>CFAB</td> <td>CU3</td> <td>CHN</td> <td>Chengdu</td> </tr> </table>	Chip Site	Chip Site Origin Code (20L)	Chip Site Country Code (21L)	Chip Site City	DL-LIN	DLN	USA	Dallas	CFAB	CU3	CHN	Chengdu
Chip Site	Chip Site Origin Code (20L)	Chip Site Country Code (21L)	Chip Site City									
DL-LIN	DLN	USA	Dallas									
CFAB	CU3	CHN	Chengdu									
Assembly Site Information:												

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
TAI	TAI	TWN	Chung Ho, New Taipei City
LEN	LIN	TWN	Taichung
UTL1	NSE	THA	Bangkok
CDAT	CDA	CHN	Chengdu
TI Malaysia	MLA	MYS	Kuala Lumpur
FMX	MEX	MEX	Aguascalientes

Sample product shipping label (not actual product label)



Product Affected:

Group 1 (CFAB & DFAB8 as additional Fab sites) Device list:

TLV2462QDQGRQ1

Group 2 (CFAB & DFAB as an additional Fab sites and Cu as additional bond wire) Device list:

TLC2264AIDRCT	TLV2374QDRG4Q1	TLV2462QDRG4Q1	TLV2474QDRG4Q1
TLC2264AQPWRG4Q1	TLV2374QDRQ1	TLV2462QDRQ1	TLV2474QDRQ1
TLC2264AQPWRQ1	TLV2374QPWRG4Q1	TLV2462QPWRG4Q1	TLV272QDRQ1
TLV2264AQPWRQ1	TLV2374QPWRQ1	TLV2463AQPWRG4Q1	TLV274QDRQ1
TLV2371QDRG4Q1	TLV2374QPWRRB	TLV2474AQDRG4Q1	TLV274QPWRG4Q1
TLV2372QDRQ1	TLV2462AQDRQ1	TLC084QPWRQ1	

Group 3 (CFAB & DFAB8 as additional fab sites and additional AT sites) Device list:

TLC072QDRQ1	TLV2371QDBVRQ1**	TLV271QDBVRQ1**	TPS3838E18QDBVRCT**
TLV2474QPWRQ1	TLV2474APWRQ1	TLV271QDBVRVS**	TPS3838K33QDBVRQ1**
TLV2264AQD			

**** - Devices will also undergo a wafer thickness change from 10 mils to 6 mils**

Group 4 (CFAB as an additional Fab site and Cu as additional bond wire) Device list:

MAX3232EIPWRQ1	MLA00464PWR	TLC2272MDRCT	TLC2272SDRG4SV
MLA00059DR	TLC2272AQDR	TLC2272QDRG4Q1	TLC2274AQDRG4Q1
MLA00060DR	TLC2272AQDRG4	TLC2272QDRQ1	TLC2274AQDRQ1
MLA00172DR	TLC2272AQDRG4Q1	TLC2272QDRSV	TLC2274AQPWRG4Q1
MLA00349PWR	TLC2272AQDRQ1	TLC2272QPWRG4	TLC2274AQPWRQ1
MLA00351PWR	TLC2272AQPWRG4Q1	TLC2272QPWRG4Q1	TLC2274ASDRDL
MLA00354DR	TLC2272AQPWRQ1	TLC2272QPWRQ1	TLC2274QPWRQ1

MLA00361PWR	TLC2272ASPWRCT	TLC2272QPWRSV	TRS3232EQPWRQ1
MLA00402PWR			

Group 5 (CFAB as an additional Fab site and additional AT sites) Device list:

TLC2272AMD	TLC2272AMDRG4	TLC2274AMD	TLC2274AQDRG4
TLC2272AMDR	TLC2272MDR	TLC2274AMDG4	



TI Information
Selective Disclosure

Automotive New Product Qualification Summary

(As per AEC-Q100 and JEDEC Guidelines)

Approved 2-March-2023

Product Attributes

Attributes	Qual Device: TLC2264AQPWRQ1	QBS Process Reference: TPS3838E18QDBVRCT	QBS Package Reference: SN3257QPWRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1
Operating Temp Range	-40C to 125C	-40C to 125C	-40C to 125C
Product Function	Signal Chain	Interface	Interface
Wafer Fab Supplier	CFAB	CFAB	RFAB
Assembly Site	MLA	CDAT	MLA
Package Type	TSSOP	SOT-23	TSSOP
Package Designator	D	DBV	PW
Ball/Lead Count	14	5	16

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: TLC2264AQPWRQ1	QBS Process Reference: TPS3838E18QDBVRCT	
Test Group A – Accelerated Environment Stress Tests									
PC	A1	JEDEC J-STD-020 JESD22-A113	3	231	Automotive Preconditioning	Level 1-260C	-	Pass	Pass
bHAST	A2	JEDEC JESD22-A101	3	77	Biased HAST, 130C/85%RH	192 Hours	-	3/231/0	3/210/0
AC	A3	JEDEC JESD22-A102	3	77	Autoclave, 121C	192 Hours	-	3/231/0	3/231/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	-	3/231/0	3/231/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	2000 Cycles	-	-	3/210
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp. Storage Life, 175C	500 Hours	-	1/45/0	3/135/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp. Storage Life, 175C	1000 Hours	-	-	3/132/0
Test Group B – Accelerated Lifetime Simulation Tests									
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 125C	1000 Hours	1/77/0	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	Bond Shear (Cpk>1.67)	Wires	1/30/0	3/90/0	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Bond Pull (Cpk>1.67)	Wires	1/30/0	3/90/0	3/90/0
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability >95% Lead Coverage	15	-	1/15/0	-
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions (Cpk>1.67)	10 units	1/10/0	3/30/0	-
Test Group D – Die Fabrication Reliability Tests									
EM	D1	JESD61	-	-	Electromigration	--	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	-
TDD	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	--	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
NBTI	D4	-	-	-	Negative Bias Temperature Instability	--	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
Test Group E – Electrical Verification Tests									
HBM	E2	AEC Q100-002	1	3	ESD - HBM	2000 V	1/3/0	1/3/0	-
CDM	E3	AEC Q100-011	1	3	ESD - CDM	1000 V	1/3/0	1/3/0	-
LU	E4	AEC Q100-004	1	6	Latch-up	+100mA, 125C	1/6/0	1/6/0	-
ED	E5	AEC Q100-005	3	30	Electrical Distribution	Cpk > 1.67	1/30/0	3/90/0	-

- QBS: Qual By Similarity
- Qual Device TLC2264AQPWRQ1 is qualified at LEVEL1-260C

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

TI Qualification ID: 20200903-135990



TI Information
Selective Disclosure

Automotive New Product Qualification Summary

(As per AEC-Q100 and JEDEC Guidelines)

Approved 2-March-2023

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: SN65HVD195QDRQ1
Test Group A – Accelerated Environment Stress Tests							
PC	A1	JEDEC J-STD-020 JESD22-A113	3	231	Automotive Preconditioning	Level 1-260C	Pass
bHAST	A2	JEDEC JESD22-A101	3	77	Biased HAST, 130C/85%RH	192 Hours	3/231/0
AC	A3	JEDEC JESD22-A102	3	77	Autoclave, 121C	192 Hours	3/231/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -85/150C	500 Cycles	3/231/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp. Storage Life, 175C	500 Hours	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
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	Bond Shear (Cpk>1.67)	Wires	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Bond Pull (Cpk>1.67)	Wires	3/90/0
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability >95% Lead Coverage	15	1/15/0
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions (Cpk>1.67)	10 units	3/30/0
Test Group D – Die Fabrication Reliability Tests							
EM	D1	JESD61	-	-	Electromigration	--	Completed Per Process Technology Requirements
TDD8	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	--	Completed Per Process Technology Requirements
HCI	D3	JESD60 & 28	-	-	Hot Injection Carrier	--	Completed Per Process Technology Requirements
NBTI	D4	-	-	-	Negative Bias Temperature Instability	--	Completed Per Process Technology Requirements
SM	D5	-	-	-	Stress Migration	--	Completed Per Process Technology Requirements

Test Group E – Electrical Verification Tests								
	HBM	E2	AEC Q100-002	1	3	ESD - HBM	2000 V	1/3/0
	CDM	E3	AEC Q100-011	1	3	ESD - CDM	1000 V	1/3/0
	LU	E4	AEC Q100-004	1	6	Latch-up	+100mA, 125C	1/6/0
	ED	E5	AEC Q100-005	3	30	Electrical Distribution	Cpk > 1.67	3/30/0

- QBS: Qual By Similarity

- Qual Device TPS3838E18QDBVRCT is qualified at LEVEL1-260C

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

TI Qualification ID: R-CHG-2211-005



TI Information
Selective Disclosure

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

Approve Date 11-Feb-2020

Updated 02/11/2020-Added QBS Data

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: TLV2401QDBVRQ1	QBS Process Reference: MAX3243IPWG4DL
Test Group A – Accelerated Environment Stress Tests								
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditioning Level 1	Level 1-260C	3/1199/0	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	3/231/0	3/231/0
AC	A3	JEDEC JESD22-A102	3	77	Autoclave 121C	96 Hours	3/231/0	3/231/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	3/231/0	3/231/0
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle	1000 Cycles	N/A	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 150C	1000 Hours	-	3/231/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 175C	500 Hours	3/135/0	-
Test Group B – Accelerated Lifetime Simulation Tests								
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 150C	408 Hours	3/231/0	3/231/0
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 125C	48 Hours	-	3/2400/0
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, and Operational Life	-	N/A	-
Test Group C – Package Assembly Integrity Tests								
WBP	C1	AEC Q100-001	1	30	Bond Pull, over ball	Minimum of 5 devices, 30 wires Cpk>1.67	3/90/0	1/30/0
WBP	C1	AEC Q100-001	1	30	Bond Pull, over stitch	Minimum of 5 devices, 30 wires Cpk>1.67	3/90/0	1/30/0
WBS	C1	AEC Q100-001	1	30	Auto Wire Bond Shear	Minimum of 5 devices, 30 wires Cpk>1.67	3/90/0	-

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TLV2401QDBVRQ1	QBS Process Reference: MAX3243IPWG4DL
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	Pb	1/15/0	-
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	Pb Free	1/15/0	1/15/0
PD	C4	JEDEC JESD22-B100 and B108	3	10	Auto Physical Dimensions	Cpk>1.67	3/30/0	3/30/0
LI	C6	JEDEC JESD22-B105	1	22	Lead Pull to Destruction	Leads	1/22/0	-
Test Group D – Die Fabrication Reliability Tests								
EM	D1	JESD61	-	-	Electromigration	-	Completed Per Process Technology Requirements	-
TDD8	D2	JESD35	-	-	Time Dependant Dielectric Breakdown	-	Completed Per Process Technology Requirements	-
HCI	D3	JESD60 & 28	-	-	Hot Injection Carrier	-	Completed Per Process Technology Requirements	-
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	Completed Per Process Technology Requirements	-
SM	D5	-	-	-	Stress Migration	-	Completed Per Process Technology Requirements	-
Test Group E – Electrical Verification Tests								
HBM	E2	AEC Q100-002	1	3	ESD - HBM - Q100	500 V (1)	1/3/0	-
CDM	E3	AEC Q100-011	1	3	ESD - CDM - Q100	1500 V	1/3/0	-
LU	E4	AEC Q100-004	1	6	Latch-up	Per AEC-Q100-004	1/6/0	-
ED	E5	AEC Q100-009	3	30	Auto Electrical Distributions	Cpk>1.67	3/90/0	-

- QBS: Qual By Similarity

- Qual Device TLV2401QDBVRQ1 is qualified at LEVEL 1-260C

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

Note (1): See ESD waiver attached to eQDB.

Change Number: NA

TI Qualification ID: 20190124-128331

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

Q006 Qual Summary for LBC3 BOAC with PCC wire in FMX with 150mm wafers (ALSiCu metalization) Q100H (Grade 1, -40/125C)

Approved 07-Sep-2016

Product Attributes

Attributes	Qual Device: SN65HVD233QDRQ1	Qual Device: SN65HVD234QDRQ1	Qual Device: SN65HVD235QDRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1
Operating Temp Range	-40 to +125 C	-40 to +125 C	-40 to +125 C
Product Function	Interface	Interface	Interface
Wafer Fab Supplier	DFAB	DFAB	DFAB
Die Revision	A	A	A
Assembly Site	FMX	FMX	FMX
Package Type	SOIC	SOIC	SOIC
Package Designator	D	D	D
Ball/Lead Count	8	8	8

- QBS: Qual By Similarity

- Qual Device SN65HVD233QDRQ1, Qual Device SN65HVD235QDRQ1, - Qual Device SN65HVD234QDRQ1 is qualified at LEVEL1-260C

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: SN65HVD233QDRQ1	Qual Device: SN65HVD234QDRQ1	Qual Device: SN65HVD235QDRQ1
Test Group A – Accelerated Environment Stress Tests									
-	-	-	-	-	SAM Analysis Post Precon	Completed	1/22/0	1/22/0	1/22/0
PC	A1	JEDEC J-STD-020 JESD22-A113	-	-	Preconditioning	Level 1- 260C	No Fails	No Fails	No Fails
-	-	-	-	-	SAM Analysis Post Precon	Completed	1/22/0	1/22/0	1/22/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST 130C/85%RH	96 Hours	1/77/0	1/77/0	1/77/0
-	-	-	3	1	Cross Section Post bHAST 96 Hours	Completed	1/1/0	1/1/0	1/1/0

Type	#	Test Spec	Min Lot Qty	SS/ Lot	Test Name / Condition	Duration	Qual Device: SN65HVD233QDRQ1	Qual Device: SN65HVD234QDRQ1	Qual Device: SN65HVD235QDRQ1
-	-	-	3	22	SAM Analysis Post bHAST 96 Hours	Completed	1/22/0	1/22/0	1/22/0
-	-	-	3	30	Wire Bond Shear Post bHAST 96 Hours	Wires	1/30/0	1/30/0	--
-	-	-	3	30	Bond Pull over Stitch, post bHAST, 96 Hours	Wires	1/30/0	1/30/0	-
-	-	-	3	30	Bond Pull over Ball, Post bHAST, 96 Hours	Wires	1/30/0	1/30/0	-
HAST	A2	JEDEC JESD22-A110	3	70	Biased HAST 130C/85%RH	192 Hours	1/70/0	1/70/0	1/70/0
-	-	-	3	1	Cross Section Post bHAST 192 Hours	Completed	1/1/0	1/1/0	1/1/0
-	-	-	3	22	SAM Analysis Post bHAST 192 Hours	Completed	1/22/0	1/22/0	1/22/0
-	-	-	3	30	Wire Bond Shear Post bHAST 192 Hours	Wires	1/20/0 (1)	1/30/0	1/30/0
-	-	-	3	30	Bond Pull over Stitch, post bHAST, 192 Hours	Wires	1/30/0	1/30/0	1/30/0
-	-	-	3	30	Bond Pull over Ball, Post bHAST, 192 Hours	Wires	1/20/0 (1)	1/30/0	1/30/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle -65/150C	500 Cycles	1/77/0	1/77/0	1/77/0
-	-	-	3	1	Cross Section Post T/C 500 Cycles	Completed	1/1/0	1/1/0	1/1/0
-	-	-	3	22	SAM Analysis Post T/C 500 Cycles	Completed	1/22/0	1/22/0	1/22/0
TC- WBS	-	-	3	30	Wire Bond Shear Post T/C 500 Cycles	Wires	1/30/0	1/30/0	1/30/0
TC- WBP	A4	MIL-STD883 Method 2011	3	30	Bond Pull over Ball Post T/C 500 Cycles	Wires	1/30/0	1/30/0	1/30/0
TC- WBP	A4	MIL-STD883 Method 2011	3	30	Bond Pull over Stitch Post T/C 500 Cycles	Wires	1/30/0	1/30/0	1/30/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	70	Temperature Cycle -65/150C	1000 Cycles	1/70/0	1/70/0	1/70/0
-	-	-	3	1	Cross Section Post T/C 1000 Cycles	Completed	1/1/0	1/1/0	1/1/0
-	-	-	3	22	SAM Analysis Post T/C 1000 Cycles	Completed	1/22/0	1/22/0	1/22/0
TC- WBS	-	-	3	30	Wire Bond Shear Post T/C 1000 Cycles	Wires	1/30/0	1/30/0	1/30/0
TC- WBP	A4	MIL-STD883 Method 2011	3	30	Bond Pull over Ball Post T/C 1000 Cycles	Wires	1/30/0	1/30/0	1/30/0
TC- WBP	A4	MIL-STD883 Method 2011	3	30	Bond Pull over Stitch Post T/C 1000 Cycles	Wires	1/30/0	1/30/0	1/30/0

Type	#	Test Spec	Min Lot Qty	SS/ Lot	Test Name / Condition	Duration	Qual Device: SN65HVD233QDRQ1	Qual Device: SN65HVD234QDRQ1	Qual Device: SN65HVD235QDRQ1
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle - 40/125C	1000 Cycles	N/A	N/A	N/A
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle - 40/125C	2000 Cycles	N/A	N/A	N/A
HTSL	A6	JEDEC JESD22-A103	3	45	High Temp Storage Bake 150C	1000 Hours	1/45/0	1/45/0	1/45/0
-	-	-	3	1	Cross Section Post Bake 1000 Hours	Completed	1/1/0	1/1/0	1/1/0
HTSL	A6	JEDEC JESD22-A103	3	44	High Temp Storage Bake 150C	2000 Hours	1/44/0	1/44/0	1/44/0
-	-	-	3	1	Cross Section Post Bake 2000 Hours	Completed	1/1/0	1/1/0	1/1/0
Test Group C – Package Assembly Integrity Tests									
WBS	C1	AEC Q100-001	3	30	Wire Bond Shear Cpk>1.67	Wires	1/30/0	1/30/0	1/30/0
WBP	C2	MIL-STD883 Method 2011	3	30	Bond Pull Cpk>1.67	Wires	1/30/0	1/30/0	1/30/0

A1 (PC): Preconditioning:

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

Junction 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

TI Qualification ID: 20160217-116814

Notes/ Comments:

(1) Performed on only 2 devices



**TI Information
Selective Disclosure**

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

**SN3257QPWRQ1 (Grade 1, Q100H, -40/125C)
Approved 13-Feb-2020**

Product Attributes

Attributes	Qual Device: SN3257QPWRQ1	QBS Process Reference: SN3257QDYRQ1
Automotive Grade Level	Grade 1	Grade 1
Operating Temp Range	-40 to +125 C	-40 to +125 C
Product Function	Interface	Interface
Wafer Fab Supplier	RFAB	RFAB
Die Revision	A	A
Assembly Site	MLA	PHI
Package Type	TSSOP	SOT-23
Package Designator	PW	DYY
Ball/Lead Count	16	16

- QBS: Qual By Similarity

- Qual Device SN3257QPWRQ1 is qualified at LEVEL1-260C

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: <u>SN3257QPWRQ1</u>	QBS Process Reference: <u>SN3257QDYRQ1</u>
Test Group A – Accelerated Environment Stress Tests								
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	Level 1-260C	No Fails	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	3/231/0	-
AC	A3	JEDEC JESD22-A102	3	77	Autoclave 121C	96 Hours	3/231/0	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -55/150C	1000 Cycles	3/231/0	-
TC-WBP	A4	MIL-STD883 Method 2011	1	60	Bond Pull Post Temp Cycle	Wires	1/60/0	-
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle	1000 Cycles	N/A	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 175C	500 Hours	3/135/0	-
Test Group B – Accelerated Lifetime Simulation Tests								
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 150C	300 Hours	3/231/0	3/231/0
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 150C	24 Hours	-	3/2400/0
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, and Operational Life	-	N/A	-
Test Group C – Package Assembly Integrity Tests								
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear, Cpk >1.67	Wires	3/90/0	-
WBP	C2	MIL-STD883 Method 2011	1	30	Bond Pull, Cpk >1.67	Wires	3/90/0	-
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	PB Solder	1/15/0	-
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	Pb Free Solder	1/15/0	-
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions	Cpk>1.67	3/30/0	-
Test Group D – Die Fabrication Reliability Tests								
EM	D1	JESD61	-	-	Electromigration	-	Completed Per Process Technology Requirements	-
Tddb	D2	JESD35	-	-	Time Dependant Dielectric Breakdown	-	Completed Per Process Technology Requirements	-
HCI	D3	JESD60 & 28	-	-	Hot Injection Carrier	-	Completed Per Process Technology Requirements	-
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	Completed Per Process Technology Requirements	-
SM	D5	-	-	-	Stress Migration	-	Completed Per Process Technology Requirements	-

Test Group E – Electrical Verification Tests									
	HBM	E2	AEC Q100-002	1	3	ESD - HBM	5000 V	1/3/0	-
	CDM	E3	AEC Q100-011	1	3	ESD - CDM	2000 V	1/3/0	-
	LU	E4	AEC Q100-004	1	6	Latch-up	Per AEC Q100-004	1/6/0	-
	ED	E5	AEC Q100-009	3	30	Electrical Distributions	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

TI Qualification ID: 20190311-128972



TI Information
Selective Disclosure

Automotive New Product Qualification Summary

(As per AEC-Q100 and JEDEC Guidelines)

Q100H Grade-1 qual for TLV27L2QDRQ1 (DFAB/LBC3S) in FMX using 8-pin SOIC pkg

Approved 03-Sep-2015

Updated 08/03/2015-Added QBS Data

Product Attributes

Attributes	Qual Device: TLV2372QDRG4Q1	Qual Device: TLV2372QDRQ1	Qual Device: TLV27L2QDRQ1	QBS Process Reference: MAX3243IPWG4DL	QBS Package Reference: SN65HVD230D	QBS Package Reference: TPS28225TDRQ1
Operating Temp Range	-40°C to +125°C	-40°C to +125°C	-40°C to +125°C	-40°C to +125°C	-40°C to +125°C	-40°C to +105°C
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 2
Product Function	Signal Chain	Signal Chain	Signal Chain	-	-	-
Wafer Fab Supplier	DFAB	DFAB	DFAB	DFAB	DFAB	DMOS5
Die Revision	A	A	A	A	B	D
Assembly Site	FMX	FMX	FMX	MLA	FMX	FMX
Package Type	SOIC	SOIC	SOIC	TSSOP	SOIC	SOIC
Package Designator	D	D	D	PW	D	D
Ball/Lead Count	8	8	8	28	8	8

- QBS: Qual By Similarity

- Qual Devices qualified at LEVEL1-200C: TLV2372QDRG4Q1, TLV2372QDRQ1, TLV27L2QDRQ1

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: TLV2372QDRG4Q1	Qual Device: TLV2372QDRQ1	Qual Device: TLV27L2QDRQ1	QBS Process Reference: MAX3243IPWG4DL	QBS Package Reference: SN65HVD230D	QBS Package Reference: TPS28225TDRQ1
Test Group A – Accelerated Environment Stress Tests												
PC	A1	JEDEC J-STD-020 JESD22-A113	1	0	Automotive Preconditioning	Level 3-260C	1/243/0	1/240/0	1/300/0	-	-	-
THB	A2	JEDEC JESD22-A101	3		Biased Temperature and Humidity, 85C/85%RH	1000 Hours	1/77/1 (Note 1)	1/77/0	-	-	-	-
HAST	A2	JEDEC JESD22-A110	1	77	Biased HAST, 130C/85%RH	96 Hours	-	-	1/77/0	3/231/0	-	-
AC	A3	JEDEC JESD22-A102	1	77	Autoclave 121C	96 Hours	1/77/0	1/77/0	1/77/0	3/231/0	-	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	1	77	Temperature Cycle, -65/150C	500 Cycles	1/77/0	1/77/0	1/77/0	3/231/0	-	-
TC-BP		MIL-STD883 Method 2011	1	30	Post Temp Cycle Bond Pull	Wires	-	-	1/30/0	-	-	-
PTC	A5	JEDEC JESD22-A105	1		Power Temperature Cycle, -40/105C	1000 Cycles	N/A	N/A	N/A	-	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp. Storage Bake, 150C	1000 Hours	-	-	-	1/45/0	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp. Storage Bake, 175C	500 Hours	-	-	1/45/0	-	-	-
Test Group B – Accelerated Lifetime Simulation Tests												
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test, 150C	408 Hours	1/77/0	1/77/0	1/77/0	3/231/0	-	-
ELFR	B2	AEC Q100-008	3		Early Life Failure Rate, 125C	48 Hours	-	-	-	1/800/0	-	-
ELFR	B2	AEC Q100-008	3		Early Life Failure Rate, 150C	48 Hours	-	-	-	2/1600/0	-	-
EDR	B3	AEC Q100-005	3		NVM Endurance, Data Retention, and Operational Life	-	N/A	N/A	N/A	-	-	-

Test Group C – Package Assembly Integrity Tests											
WBS	C1	AEC Q100-001	1	30	Bond Shear (Cpk>1.67)	Wires	-	-	1/30/0	-	-
WBP	C2	MIL-STD883 Method 2011	1	30	Bond Pull (Cpk>1.67)	Wires	-	-	1/30/0	-	-
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	Pb	-	-	-	-	1/15/0
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	Pb-Free	-	-	-	-	1/15/0
PD	C4	JEDEC JESD22-B100 and B108	3		Physical Dimensions (Cpk>1.67)	--	-	-	-	3/30/0	3/30/0
Test Group E – Electrical Verification Tests											
HBM	E2	AEC Q100-002	1	3	ESD - HBM	2000 V	-	-	1/3/0	-	-
CDM	E3	AEC Q100-011	1	3	ESD - CDM	1000 V	-	-	1/3/0	-	-
LU	E4	AEC Q100-004	1	6	Latch-up	(Per AEC-Q100-004)	-	-	1/6/0	-	-
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67	-	-	3/90/0	-	-

A1 (PC): Preconditioning:
Performed for THB, Biased HAST, AC, uHAST & TC samples, as applicable.

Junction 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

Note (1): Die EOS, 1 unit – capacitor pinhole, discounted (QTS 439122-1)

TI Qualification ID: 20150513-113887

Affected ZVEI IDs: SEM-PW-02, SEM-PW-13, SEM-PA-05, SEM-PA-07, SEM-PA-08, SEM-PA-11, SEM-TF-01, **SEM-PW-03**

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