

PCN Number:	20221219007.2	PCN Date:	December 21, 2022
Title:	Qualification of new Fab site (RFAB) using qualified Process Technology, Die Revision, and additional Assembly & Test Sites & BOM options for select devices		
Customer Contact:	PCN Manager	Dept:	Quality Services
Proposed 1st Ship Date:	Jun 18, 2023	Sample requests accepted until:	Jan 20, 2023*

***Sample requests received after Jan 20, 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 checked="" type="checkbox"/>	Design	<input checked="" 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 checked="" type="checkbox"/>	Wafer Fab Process
		<input type="checkbox"/>	Part number change		

PCN Details

Description of Change:

Texas Instruments is pleased to announce the qualification of a new fab & process technology (RFAB, LBC9) and Assembly & Test sites & BOM option for selected devices as listed below in the product affected section. Construction differences are noted below:

Current Fab Site			Additional Fab Site		
Current Fab Site	Process	Wafer Diameter	Additional Fab Site	Process	Wafer Diameter
FR-BIP-1	ASLNONC10	200 mm	RFAB	LBC9	300 mm

The die was also changed as a result of the process change.

Construction differences are as follows:

Group 1 devices:

	HNA	HFTF
Mount Compound	SID#400180	SID#A-18
Bond wire composition, diameter	Au, 1.0 mil	Cu, 1.0 mil
Mold Compound	SID#450179	SID#R-27

Group 2 Device:

	Current	Additional
Mount Compound	4042500	4147858
Bond wire composition, diameter	Au, 0.96 mil	Cu, 1.0 mil
Mold Compound	4206193	4211471

Test site changes as follows for Group 1 devices:

Current Probe site	Addn Probe site	Current final test site	Addn final test site
FFAB	CDAT	HNA	HFTF

For the group 2 device, the probe step will be removed, the final test site will remain the same.

Test coverage, insertions, conditions will remain consistent with current testing and verified with test MQ

The datasheets will be changing as a result of the above mentioned changes. The datasheet change details can be reviewed in the datasheet revision history shown below. The links to the revised datasheets are available in the table below.

Product Folder	Current Datasheet Number	New Datasheet Number	Link to full datasheet
SN74LVC1T45-Q1	SCES677D	SCES677E	https://www.ti.com/product/SN74LVC1T45-Q1
SN74LVC8T245-Q1	SCES815	SCES815A	https://www.ti.com/product/SN74LVC8T245-Q1



SN74LVC1T45-Q1 Automotive 1.65-V to 5.5-V Single-Bit Dual-Supply Level Shifter

Changes from Revision D (July 2017) to Revision E (December 2022)	Page
• Updated the numbering format for tables, figures, and cross-references throughout the document.....	1
• Updated the thermals in the <i>Thermal Information</i> section.....	5
• Updated the <i>Switching Characteristics</i> sections: extended some minimum specifications for lower delays.....	7



SN74LVC8T245-Q1-Q1 Automotive 8-Bit Dual-Supply Bus Transceiver With Configurable Voltage Translation and 3-State Outputs

4 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision * (September 2010) to Revision A (December 2022)	Page
• Updated the numbering format for tables, figures, and cross-references throughout the document.....	1
• Added the <i>Detailed Description</i> sections, <i>Application and Implementation</i> sections, <i>Power Supply Recommendations</i> section, and <i>Layout</i> sections.....	1
• Added thermal values.....	6

Reason for Change:

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.

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:

Fab Site Information:

Chip Site	Chip Site Origin Code (20L)	Chip Site Country Code (21L)	Chip Site City
FR-BIP-1	TID	DEU	Freising
RFAB	RFB	USA	Richardson

Die Rev:**Current****New**

Die Rev [2P]	Die Rev [2P]
-	A

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
HNA	HNT	THA	Ayutthaya
HFTFAT	HFT	CHN	Hefei

Sample product shipping label (not actual product label)

 TEXAS INSTRUMENTS MADE IN: Malaysia 2DC: 20:	 G4		(1P) SN74LS07NSR (Q) 2000 (D) 0336 (31T) LOT: 3959047MLA (4W) TKY (1T) 7523483SI2 (P) (2P) REV: (V) 0033317 (20L) CSO: CHE (21L) CCO: USA (22L) ASO: MLA (23L) ACO: MYS				
<table border="1"> <tr> <td>MSL 2 /260C/1 YEAR</td> <td>SEAL DT</td> </tr> <tr> <td>MSL 1 /235C/UNLIM</td> <td>03/29/04</td> </tr> </table> OPT: ITEM: 39 LBL: 5A (L)T0:1750	MSL 2 /260C/1 YEAR	SEAL DT	MSL 1 /235C/UNLIM	03/29/04			
MSL 2 /260C/1 YEAR	SEAL DT						
MSL 1 /235C/UNLIM	03/29/04						

Product Affected:**Group 1 devices:**

SN74LVC1T45QDCKRQ1	SN74LVC1T45TDCKRQ1
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Group 2 device:

SN74LVC8T245QPWRQ1

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

FAB5 LVC1T DCK-HFTF (Automotive)
Approve Date 13-SEPTEMBER-2022

Product Attributes

Attributes	Qual Device: SN74LVC1T450DCKRQ1	Qual Device: SN74LVC1T45TDCKRQ1	QBS Reference: SN74HCS74QFWRQ1	QBS Reference: SN74AUP1T34QDCKRQ1	QBS Reference: SN74LVC1G17DCKR
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	-
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-
Product Function	Logic	Logic	-	Logic	-
Wafer Fab Supplier	RFAB	RFAB	RFAB	MH8	FR-BIP-1
Assembly Site	HFTFAT	HFTFAT	MLA	HFTFAT	TFME
Package Group	SOT	SOT	TSSOP	SOT	SOT
Package Designator	DCK	DCK	PW	DCK	DCK
Pin Count	6	6	14	5	5

- QBS: Qual By Similarity
- Qual Device [SN74LVC1T45QDCKRQ1](#) is qualified at MSL1 260C
- Qual Device [SN74LVC1T45TDCKRQ1](#) 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: SN74LVC1T45QDCKRQ1	Qual Device: SN74LVC1T45TDCKRQ1	QBS Reference: SN74HCS74QFWRQ1	QBS Reference: SN74AUP1T34QDCKRQ1
Test Group A - Accelerated Environment Stress Tests											
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	1 Step	-	-	3/0/0	-
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	1 Step	1/0/0	-	-	3/0/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	1/77/0	-	-	3/231/0
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Autoclave	121C/15psig	96 Hours	1/77/0	-	-	3/231/0
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Unbiased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	-	-	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	150C	1000 Hours	-	-	-	1/45/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	500 Hours	1/45/0	-	-	-
Test Group B - Accelerated Lifetime Simulation Tests											
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	1/77/0	-	3/231/0	1/77/0
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	-

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	1/30/0	-	3/90/0	1/30/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	-	3/90/0	1/30/0
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	-	-	1/15/0	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	-	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
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
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
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											
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	-	1000 Volts	-	-	-	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	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	-	3/90/0	-	3/90/0	3/90/0
Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device	Qual Device	QBS Reference	QBS Reference

- 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 : ACuHAST

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

TI Qualification ID: R-CHG-2109-074

TI Information
Selective Disclosure

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

**FABS LVC1T DCK-HFTF (Automotive)
Approve Date 13-SEPTEMBER-2022**

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: SN74LVC1T45QDCKRQ1	Qual Device: SN74LVC1T45TDCKRQ1	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74AXC1T45QDCKRQ1	QBS Reference: SN74AUIP1T34QDCKRQ1
Test Group A - Accelerated Environment Stress Tests												
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	1 Step	-	-	3/0/0	3/0/0	-
PC	A1.1	-	3	22	SAM Precon Pre	Review for delamination	1 Step	-	-	3/66/0	3/66/0	-
PC	A1.2	-	3	22	SAM Precon Post	Review for delamination	1 Step	-	-	3/66/0	3/66/0	-
HAST	A2.1	JEDEC JESD22-A110	3	77	Biased HAST	110C/85%RH	264 Hours	-	-	-	3/231/0	-
HAST	A2.1	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-	-
HAST	A2.1.2	-	3	1	Cross Section, post bHAST, 1X	Post stress cross section	Completed	-	-	3/3/0	3/3/0	-
HAST	A2.1.3	-	3	30	Wire Bond Shear, post bHAST, 1X	Post stress	Wires	-	-	3/9/0	3/9/0	-
HAST	A2.1.4	-	3	30	Bond Pull over Stitch, post bHAST, 1X	Post stress	Wires	-	-	3/9/0	3/9/0	-
HAST	A2.1.5	-	3	30	Bond Pull over Ball, post bHAST, 1X	Post stress	Wires	-	-	3/9/0	3/9/0	-
HAST	A2.2	JEDEC JESD22-A110	3	77	Biased HAST	110C/85%RH	528 Hours	-	-	-	3/231/0	-
HAST	A2.2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	192 Hours	-	-	3/231/0	-	-
HAST	A2.2.1	-	3	22	SAM Analysis, post bHAST, 2X	Review for delamination	Completed	-	-	3/66/0	3/66/0	-
HAST	A2.2.2	-	3	1	Cross Section, post bHAST, 2X	Post stress cross section	Completed	-	-	3/3/0	3/3/0	-
HAST	A2.2.3	-	3	30	Wire Bond Shear, post bHAST, 2X	Post stress	Wires	-	-	3/9/0	3/9/0	-
HAST	A2.2.4	-	3	30	Bond Pull over Stitch, post bHAST, 2X	Post stress	Wires	-	-	3/9/0	3/9/0	-
HAST	A2.2.5	-	3	30	Bond Pull over Ball, post bHAST, 2X	Post stress	Wires	-	-	3/9/0	3/9/0	-
TC	A4.1	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	3/231/0	-
TC	A4.1.1	-	3	22	SAM Analysis, post TC, 1X	Review for delamination	Completed	-	-	3/66/0	3/66/0	-
TC	A4.1.2	-	3	1	Cross Section, post TC, 1X	Post stress cross section	Completed	-	-	3/3/0	3/3/0	-
TC	A4.1.3	-	3	30	Wire Bond Shear, post TC, 1X	Post stress	Wires	-	-	3/9/0	3/9/0	-
TC	A4.1.4	-	3	30	Bond Pull over Stitch, post TC, 1X	Post stress	Wires	-	-	3/9/0	3/9/0	-
TC	A4.1.5	-	3	30	Bond Pull over Ball, post TC, 1X	Post stress	Wires	-	-	3/9/0	3/9/0	-
TC	A4.2	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	1000 Cycles	-	-	3/231/0	3/231/0	-
TC	A4.2.1	-	3	22	SAM Analysis, post TC, 2X	Review for delamination	Completed	-	-	3/66/0	3/66/0	-
TC	A4.2.2	-	3	1	Cross Section, post TC, 2X	Post stress cross section	Completed	-	-	3/3/0	3/3/0	-
TC	A4.2.3	-	3	30	Wire Bond Shear, post TC, 2X	Post stress	Wires	-	-	3/9/0	3/9/0	-

TC	A4.2.4	-	3	30	Bond Pull over Stich, post TC, 2X	Post stress	Wires	-	-	3/9/0	3/9/0	-
TC	A4.2.5	-	3	30	Bond Pull over Ball, post TC, 2X	Post stress	Wires	-	-	3/9/0	3/9/0	-
HTSL	A6.1	JEDEC JESD22-A103	3	45	High Temperature Storage Life	150C	1000 Hours	-	-	3/135/0	3/135/0	-
HTSL	A6.1.1	-	3	1	Cross Section, post HTSL, 1X	Post stress cross section	Completed	-	-	3/3/0	3/3/0	-
HTSL	A6.2	JEDEC JESD22-A103	3	45	High Temperature Storage Life	150C	2000 Hours	-	-	3/135/0	3/135/0	-
HTSL	A6.2.1	-	3	1	Cross Section, post HTSL, 2X	Post stress cross section	Completed	-	-	3/3/0	3/3/0	-
Test Group B - Accelerated Lifetime Simulation Tests												
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	1/77/0	-	3/231/0	3/231/0	1/77/0
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	-	-
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	1/30/0	-	3/90/0	3/90/0	1/30/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	-	3/90/0	3/90/0	1/30/0
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	-	-	1/15/0	-	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	-	3/30/0	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
TDD	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
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
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
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
Test Group E - Electrical Verification Tests												
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	2000 Volts	1/3/0	-	1/3/0	1/3/0	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1000 Volts	-	-	-	-	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	1/6/0	-
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	3/90/0	-	3/90/0	3/90/0	3/90/0

- QBS: Qual By Similarity
- Qual Device SN74LVC1T45QDCKRQ1 is qualified at MSL1 260C
- Qual Device SN74LVC1T45TDCKRQ1 is qualified at MSL1 260C

- 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

EI (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 : ACU/HAST

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

TI Qualification ID: R-CHG-2109-074

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

FAB5 LVC8T PW-MLA (Automotive)
Approve Date 31-MARCH -2022

Product Attributes

Attributes	Qual Device: SN74LVC8T245QPWRQ1	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74AXC8T245QPWRQ1	QBS Reference: SN74LXC8T245QPWRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 125
Product Function	Logic	Logic	Logic	Logic
Wafer Fab Supplier	RFAB	RFAB	MH8	RFAB
Assembly Site	MLA	MLA	MLA	MLA
Package Group	TSSOP	TSSOP	TSSOP	TSSOP
Package Designator	PW	PW	PW	PW
Pin Count	24	14	24	24

- QBS: Qual By Similarity
- Qual Device SN74LVC8T245QPWRQ1 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: SN74LVC8T245QPWRQ1	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74AXC8T245QPWRQ1	QBS Reference: SN74LXC8T245QPWRQ1
Test Group A - Accelerated Environment Stress Tests											
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	1 Step	-	3/0/0	3/0/0	-
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	1 Step	1/0/0	-	3/0/0	1/0/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	-	-	1/77/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	1/77/0	-	-	-
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Autoclave	121C/15psig	96 Hours	1/77/0	-	3/231/0	1/77/0
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Autoclave	130C/85%RH	96 Hours	1/77/0	-	3/231/0	1/77/0
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Unbiased HAST	130C/85%RH	96 Hours	-	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	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	-	-	-	1/77/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	-	-	-
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	1/5/0	-	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	150C	1000 Hours	-	3/135/0	3/135/0	-

HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	500 Hours	-	-	-	1/45/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	500 Hours	1/45/0	-	-	-
Test Group B - Accelerated Lifetime Simulation Tests											
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	1/77/0	3/231/0	3/231/0	1/77/0
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	125C	48 Hours	-	3/2400/0	-	-
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	1/30/0	3/90/0	3/90/0	1/30/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	3/90/0	3/90/0	1/30/0
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	1/15/0	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	3/30/0	-	1/10/0
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
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
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
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											
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	2000 Volts	1/3/0	1/3/0	-	-
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	4500 Volts	-	-	-	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	2000 Volts	-	-	-	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	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
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	3/90/0	3/90/0	3/90/0	3/90/0
Additional Tests											
Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device	QBS Reference	QBS Reference	QBS Reference

- 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 : ACuHAST

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

TI Qualification ID: R-CHG-2110-039

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

FAB5 LVC8T PW-MLA (Automotive)
Approve Date 31-MARCH -2022

Product Attributes

Attributes	Qual Device: SN74LVC8T245QPWRQ1	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74AXC8T245QPWRQ1	QBS Reference: SN74LXC8T245QPWRQ1
Die Attributes				
Wafer Fab Supplier	RFAB	RFAB	MH8	RFAB
Wafer Process	LBC9	LBC9	LBC7T	LBC9
Die Size (L,W) (um)	890 x 1130	460 x 510	882.8 x 1166.3	940 x 1180
Package Attributes				
Assembly Site	MLA	MLA	MLA	MLA
Package Group	TSSOP	TSSOP	TSSOP	TSSOP
Package Designator	PW	PW	PW	PW
Package Size (mm)	7.8 x 4.4	5 x 4.4	7.8 x 4.4	7.8 x 4.4
Body Thickness (mm)	1	1	1	1
Pin Count	24	14	24	24

Bond Wire Composition	CU	CU	CU	CU
Bond Wire Diameter(um)	25.4	20.32	25.4	25.4

- QBS: Qual By Similarity
- Qual Device SN74LVC8T245QPWRQ1 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: SN74LVC8T245QPWRQ1	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74AXC8T245QPWRQ1	QBS Reference: SN74LXC8T245QPWRQ1
Test Group A - Accelerated Environment Stress Tests											
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	1 Step	-	3/0/0	3/0/0	-
PC	A1.1	-	3	22	SAM Precon Pre	Review for delamination	1 Step	-	3/66/0	3/66/0	-
PC	A1.2	-	3	22	SAM Precon Post	Review for delamination	1 Step	-	3/66/0	3/66/0	-
HAST	A2.1	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	-
HAST	A2.1.2	-	3	1	Cross Section, post bHAST, 1X	Post stress cross section	Completed	-	3/3/0	3/3/0	-
HAST	A2.1.3	-	3	30	Wire Bond Shear, post bHAST, 1X	Post stress	Wires	-	3/9/0	3/9/0	-
HAST	A2.1.4	-	3	30	Bond Pull over Stitch, post bHAST, 1X	Post stress	Wires	-	3/9/0	3/9/0	-
HAST	A2.1.5	-	3	30	Bond Pull over Ball, post bHAST, 1X	Post stress	Wires	-	3/9/0	3/9/0	-
HAST	A2.2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	192 Hours	-	3/231/0	3/217/0	-
HAST	A2.2.1	-	3	22	SAM Analysis, post bHAST 2X	Review for delamination	Completed	-	3/66/0	3/66/0	-
HAST	A2.2.2	-	3	1	Cross Section, post bHAST, 2X	Post stress cross section	Completed	-	3/3/0	3/3/0	-
HAST	A2.2.3	-	3	30	Wire Bond Shear, post bHAST, 2X	Post stress	Wires	-	3/9/0	3/9/0	-
HAST	A2.2.4	-	3	30	Bond Pull over Stitch, post bHAST, 2X	Post stress	Wires	-	3/9/0	3/9/0	-
HAST	A2.2.5	-	3	30	Bond Pull over Ball, post bHAST, 2X	Post stress	Wires	-	3/9/0	3/9/0	-
TC	A4.1	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	-
TC	A4.1.1	-	3	22	SAM Analysis, post TC 1X	Review for delamination	Completed	-	3/66/0	3/66/0	-
TC	A4.1.2	-	3	1	Cross Section, post TC, 1X	Post stress cross section	Completed	-	3/3/0	3/3/0	-
TC	A4.1.3	-	3	30	Wire Bond Shear, post TC, 1X	Post stress	Wires	-	3/9/0	3/9/0	-
TC	A4.1.4	-	3	30	Bond Pull over Stitch, post TC, 1X	Post stress	Wires	-	3/9/0	3/9/0	-
TC	A4.1.5	-	3	30	Bond Pull over Ball, post TC, 1X	Post stress	Wires	-	3/9/0	3/9/0	-
TC	A4.2	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	1000 Cycles	-	3/231/0	3/210/0	-
TC	A4.2.1	-	3	22	SAM Analysis, post TC, 2X	Review for delamination	Completed	-	3/66/0	3/66/0	-
TC	A4.2.2	-	3	1	Cross Section, post TC, 2X	Post stress cross section	Completed	-	3/3/0	3/3/0	-
TC	A4.2.3	-	3	30	Wire Bond Shear, post TC, 2X	Post stress	Wires	-	3/9/0	3/9/0	-

TC	A4.2.4	-	3	30	Bond Pull over Stitch, post TC, 2X	Post stress	Wires	-	3/9/0	3/9/0	-
TC	A4.2.5	-	3	30	Bond Pull over Ball, post TC, 2X	Post stress	Wires	-	3/9/0	3/9/0	-
HTSL	A6.1	JEDEC JESD22-A103	3	45	High Temperature Storage Life	150C	1000 Hours	-	3/135/0	3/135/0	-
HTSL	A6.1.1	-	3	1	Cross Section, post HTSL, 1X	Post stress cross section	Completed	-	3/3/0	3/3/0	-
HTSL	A6.2	JEDEC JESD22-A103	3	45	High Temperature Storage Life	150C	2000 Hours	-	3/135/0	3/133/0	-
HTSL	A6.2.1	-	3	1	Cross Section, post HTSL, 2X	Post stress cross section	Completed	-	3/3/0	3/3/0	-
Test Group B - Accelerated Lifetime Simulation Tests											
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	1/77/0	3/231/0	3/231/0	1/77/0
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	125C	48 Hours	-	3/2400/0	-	-
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	1/30/0	3/90/0	3/90/0	1/30/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	3/90/0	3/90/0	1/30/0
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	1/15/0	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	3/30/0	-	1/10/0
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
TDD	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 Carrier Injection	-	-	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											
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	2000 Volts	1/3/0	1/3/0	-	-
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	4500 Volts	-	-	-	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	2000 Volts	-	-	-	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	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
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	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

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TI Qualification ID: R-CHG-2110-039

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