TEXAS INSTRUMENTS 12500 TI Boulevard, MS 8640, Dallas, Texas 75243

The rev A is being issued to update the ZVEI IDs and add final wafer thickness.

PCN Number:	**20260702002.2A**	**PCN Issued**	August 12, 2026
Qualification of RFAB using qualified Process Technology and design change for select devices		**Sample request deadline:**	September 06, 2026
		Estimated 1st ship date:	January 04, 2027
***Sample requests received after September 06, 2026* will not be supported.**			

Change Type(s)	Packing/Shipping/Labeling Design Wafer Fab Site Wafer Fab Material Wafer Fab Process
ZVEI ID	SEM-PW-13, SEM-PW-09, SEM-PW-02, SEM-PW-03, ~~SEM-PS-04~~

PCN Details

Description of Change:

Texas Instruments is pleased to announce the addition of RFAB using the TIB qualified process technology and Design for the devices listed below.

Current Fab Site			Additional Fab Site		
Current Fab Site	**Process**	**Wafer Diameter**	**Additional Fab Site**	**Process**	**Wafer Diameter**
CFAB	JI3	200mm	RFAB	TIB	300mm

	CFAB	**RFAB**
Final Wafer Thickness	267µm	190.5µm

Qual details are provided in the Qual Data Section.

Reason for Change:	Supply continuity.

Anticipated impact on Form, Fit, Function, Quality or Reliability:	• These devices include new die with schematic or behavior changes. • Review the Standard Data Packet for more details on the changes.
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**
☒ No Change	☒ No Change	☒ No Change	☒ No Change

Changes to product	**Fab Site**

identification resulting from this PCN:

Information

Chip Site	Chip Site Origin Code (20L)	Chip Site Country Code (21L)	Chip Site City
CFAB	CU3	CHN	CHENGDU
RFAB	**RFB**	**USA**	**Richardson**

Die Rev:

Current	**New**
Die Rev [2P]	**Die Rev [2P]**
C	**A**

Sample product shipping label (not actual product label):

Products Affected:

LM2904AVQDRG4Q1	LM2904BAQPWRQ1	LM2904QPWRG4Q1	LM2904VZQDRQ1
LM2904AVQDRQ1	LM2904BQDGKRQ1	LM2904QPWRQ1	MLA00339DRG4
LM2904AVQPWRG4Q1	LM2904BQDRQ1	LM2904VQDRG4Q1	MLA00415PWR
LM2904AVQPWRQ1	LM2904BQPWRQ1	LM2904VQDRQ1	
LM2904BAQDGKRQ1	LM2904QDRG4Q1	LM2904VQPWRG4Q1	
LM2904BAQDRQ1	LM2904QDRQ1	LM2904VQPWRQ1	

Approve Date 17-June-2026

Attributes	Qual Device: LM2904BAQDRQ1	QBS Package Reference: LM2903BQDRQ1	QBS Package Reference: TLC555QDRQ1	QBS Package Reference: INA241A2QDRQ1	QBS Package Reference: INA241A3QDRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125
Product Function	Signal Chain	Signal Chain	Signal Chain	Signal Chain	Signal Chain
Wafer Fab Supplier	RFAB	CFAB	RFAB	AIZU	AIZU
Assembly Site	FMX	FMX	FMX	FMX	FMX
Package Group	SOIC	SOIC	SOIC	SOIC	SOIC
Package Designator	D	D	D	D	D
Pin Count	8	8	8	8	8

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: LM2904BAQDRQ1	QBS Reference: LM2903BQDRQ1	QBS Reference: TLC555QDRQ1	QBS Reference: INA241A2QDRQ1	QBS Reference: INA241A3QDRQ1
Test Group A - Accelerated Environment Stress Tests												
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	-	-	1/Pass	1/Pass	-	-

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: LM2904BAQDRQ1	QBS Reference: LM2903BQDRQ1	QBS Reference: TLC555QDRQ1	QBS Reference: INA241A2QDRQ1	QBS Reference: INA241A3QDRQ1
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL2 260C	-	-	-	-	1/Pass	1/Pass
PC	A1.1	-	3	22	SAM Precon Pre	Review for delamination	-	-	1/22/0	1/22/0	1/22/0	1/22/0
PC	A1.2	-	3	22	SAM Precon Post	Review for delamination	-	-	1/22/0	1/22/0	1/22/0	1/22/0
HAST	A2.1	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	1/77/0	-	-	-
HAST	A2.1.2	-	3	1	Cross Section, post bHAST, 1X	Post stress cross section	Completed	-	1/1/0	1/1/0	1/1/0	1/1/0
HAST	A2.1.3	-	3	3	Wire Bond Shear, post bHAST, 1X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
HAST	A2.1.4	-	3	3	Bond Pull over Stitch, post bHAST, 1X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
HAST	A2.1.5	-	3	3	Bond Pull over Ball, post bHAST, 1X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
HAST	A2.2	JEDEC JESD22-A110	3	70	Biased HAST	130C/85%RH	192 Hours	-	1/67/0	1/67/0	167/0	1/67/0
HAST	A2.2.1	-	3	22	SAM Analysis, post bHAST 2X	Review for delamination	Completed	-	1/22/0	1/22/0	1/22/0	1/22/0
HAST	A2.2.2	-	3	1	Cross Section, post bHAST, 2X	Post stress cross section	Completed	-	1/1/0	1/1/0	1/1/0	1/1/0
HAST	A2.2.3	-	3	3	Wire Bond Shear, post bHAST, 2X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
HAST	A2.2.4	-	3	3	Bond Pull over Stitch, post bHAST, 2X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
HAST	A2.2.5	-	3	3	Bond Pull over Ball, post bHAST, 2X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
TC	A4.1	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	-	1/77/0	1/77/0	1/77/0	1/77/0
TC	A4.1.1	-	3	22	SAM Analysis, post TC 1X	Review for delamination	Completed	-	1/22/0	1/22/0	1/22/0	1/22/0
TC	A4.1.2	-	3	1	Cross Section, post TC, 1X	Post stress cross section	Completed	-	1/1/0	1/1/0	1/1/0	1/1/0

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: LM2904BAQDRQ1	QBS Reference: LM2903BQDRQ1	QBS Reference: TLC555QDRQ1	QBS Reference: INA241A2QDRQ1	QBS Reference: INA241A3QDRQ1
TC	A4.1.3	-	3	3	Wire Bond Shear, post TC, 1X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
TC	A4.1.4	-	3	3	Bond Pull over Stitch, post TC, 1X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
TC	A4.1.5	-	3	3	Bond Pull over Ball, post TC, 1X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
TC	A4.2	JEDEC JESD22-A104 and Appendix 3	3	70	Temperature Cycle	-65C/150C	1000 Cycles	-	1/67/0	1/67/0	1/67/0	1/67/0
TC	A4.2.1	-	3	22	SAM Analysis, post TC, 2X	Review for delamination	Completed	-	1/22/0	1/22/0	1/22/0	1/22/0
TC	A4.2.2	-	3	1	Cross Section, post TC, 2X	Post stress cross section	Completed	-	1/1/0	1/1/0	1/1/0	1/1/0
TC	A4.2.3	-	3	3	Wire Bond Shear, post TC, 2X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
TC	A4.2.4	-	3	3	Bond Pull over Stitch, post TC, 2X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
TC	A4.2.5	-	3	3	Bond Pull over Ball, post TC, 2X	Post stress	-	-	1/3/0	1/3/0	1/3/0	1/3/0
HTSL	A6.1	JEDEC JESD22-A103	3	45	High Temperature Storage Life	150C	1000 Hours	-	-	1/45/0	1/45/0	1/45/0
HTSL	A6.1.1	-	3	1	Cross Section, post HTSL, 1X	Post stress cross section	Completed	-	-	1/1/0	1/1/0	1/1/0
HTSL	A6.2	JEDEC JESD22-A103	3	44	High Temperature Storage Life	150C	2000 Hours	-	-	1/43/0	1/43/0	1/43/0
HTSL	A6.2.1	-	3	1	Cross Section, post HTSL, 2X	Post stress cross section	Completed	-	-	1/1/0	1/1/0	1/1/0
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	1/30/0	1/30/0	1/30/0	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	1/30/0	1/30/0	1/30/0	1/30/0

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM2904BAQDRQ1 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

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/

TI Qualification ID: R-CHG-2509-033

Product Attributes

Attributes	Qual Device: LM2904BAQDRQ1	QBS Package Reference: LM2903BQDRQ1	QBS Product Reference: LM2901BQDRQ1	QBS Package Reference: TLC555QDRQ1	QBS Process Reference: MC33063AQDRQ1	QBS Package Reference: INA241A3QDRQ1	QBS Product Reference: LM2902BQDRQ1	QBS Product Reference: RC4580QDRQ1	QBS Package Reference: TLV2365QDRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125
Product Function	Signal Chain	Signal Chain	Signal Chain	Signal Chain	Power Management	Signal Chain	Signal Chain	Signal Chain	Signal Chain
Wafer Fab Supplier	RFAB	CFAB	RFAB	RFAB	RFAB	AIZU	RFAB	RFAB	RFAB
Assembly Site	FMX	FMX	MLA	FMX	FMX	FMX	MLA	MLA	FMX
Package Group	SOIC	SOIC	SOIC	SOIC	SOIC	SOIC	SOIC	SOIC	SOIC
Package Designator	D	D	D	D	D	D	D	D	D
Pin Count	8	8	14	8	8	8	14	8	8

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM2904BAQDRQ1 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: LM2904BAQDRQ1	QBS Package Reference: LM2903BQDRQ1	QBS Product Reference: LM2901BQDRQ1	QBS Package Reference: TLC555QDRQ1	QBS Process Reference: MC33063AQDRQ1	QBS Package Reference: INA241A3QDRQ1	QBS Product Reference: LM2902BQDRQ1	QBS Product Reference: RC4580QDRQ1	QBS Package Reference: TLV2365QDRQ1
Test Group A - Accelerated Environment Stress Tests																
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	-	1/Pass	1/Pass	1/Pass	1/Pass	3/Pass	-	1/Pass	1/Pass	1/Pass
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL2 260C	-	-	-	-	-	-	1/Pass	-	-	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	1/77/0	1/77/0	1/77/0	-	-	-	1/77/0	1/77/0	1/77/0

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: LM2904BAQDRQ1	QBS Package Reference: LM2903BQDRQ1	QBS Product Reference: LM2901BQDRQ1	QBS Package Reference: TLC555QDRQ1	QBS Process Reference: MC33063AQDRQ1	QBS Package Reference: INA241A3QDRQ1	QBS Product Reference: LM2902BQDRQ1	QBS Product Reference: RC4580QDRQ1	QBS Package Reference: TLV2365QDRQ1
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Unbiased HAST	130C/85%RH	96 Hours	1/77/0	1/77/0	1/77/0	1/77/0	3/231/0	1/77/0	1/77/0	1/77/0	1/77/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	1/77/0	1/77/0	1/77/0	3/231/0	1/77/0	1/77/0	1/77/0	1/77/0
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	1/5/0	-	1/5/0	-	-	-	1/5/0	1/5/0	1/5/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	150C	1000 Hours	-	-	-	1/45/0	3/135/0	1/45/0	-	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	500 Hours	1/45/0	-	1/77/0	-	-	-	1/45/0	1/45/0	1/45/0
Test Group B - Accelerated Lifetime Simulation Tests																
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	125C	1000 Hours	-	-	-	2/154/0	3/231/0	1/77/0	-	-	1/77/0
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	150C	300 Hours	1/77/0	3/231/0	1/77/0	-	-	-	1/77/0	1/77/0	-
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate	125C	48 Hours	-	1/800/0	-	-	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	1/30/0	1/30/0	1/30/0	3/90/0	1/30/0	1/30/0	1/30/0	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	1/30/0	1/30/0	1/30/0	3/90/0	1/30/0	1/30/0	1/30/0	1/30/0
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	-	-	-	-
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	-	-	-	1/15/0
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions	Cpk>1.67	-	1/10/0	1/10/0	1/10/0	-	3/30/0	1/10/0	1/10/0	1/10/0	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	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	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	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: LM2904BAQDRQ1	QBS Package Reference: LM2903BQDRQ1	QBS Product Reference: LM2901BQDRQ1	QBS Package Reference: TLC555QDRQ1	QBS Process Reference: MC33063AQDRQ1	QBS Package Reference: INA241A3QDRQ1	QBS Product Reference: LM2902BQDRQ1	QBS Product Reference: RC4580QDRQ1	QBS Package Reference: TLV2365QDRQ1
BTI	D4	-	-	-	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	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	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	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1500 Volts	-	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	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	Corner pins	750 Volts	1/3/0	1/3/0	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	3	Latch-Up	Per AEC Q100-004	-	1/3/0	1/6/0	1/6/0	1/6/0	1/6/0	1/6/0	1/3/0	1/3/0	1/3/0
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	3/90/0	3/90/0	1/30/0	1/30/0	3/90/0	1/30/0	3/90/0	1/30/0	3/90/0
Additional Tests																

- 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/

TI Qualification ID: R-CHG-2509-033

Approve Date 17-June-2026

Attributes	Qual Device: LM2904BAQPWRQ1	Qual Device: LM2904BAQDGKRQ1	QBS Package Reference: SN74HCS74QPWRQ1	QBS Package Reference: TPS92622QDGNRQ1	QBS Package Reference: LM2903BQPWRQ1	QBS Package Reference: XM0L1306QDGS28RQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125
Product Function	Signal Chain	Signal Chain	Logic	Power Management	Signal Chain	Microprocessor
Wafer Fab Supplier	RFAB	RFAB	RFAB	RFAB	CFAB	UMCI
Assembly Site	MLA	MLA	MLA	MLA	MLA	MLA
Package Group	TSSOP	VSSOP	TSSOP	VSSOP	TSSOP	VSSOP
Package Designator	PW	DGK	PW	DGN	PW	DGS
Pin Count	8	8	14	12	8	28

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: LM2904BAQPWRQ1	Qual Device: LM2904BAQDGKRQ1	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: LM2903BQPWRQ1	QBS Reference: XM0L1306QDGS28RQ1
Test Group A - Accelerated Environment Stress Tests												
Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: LM2904BAQPWRQ1	Qual Device: LM2904BAQDGKRQ1	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: LM2903BQPWRQ1	QBS Reference: XM0L1306QDGS28RQ1
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	-	-	-	3/Pass	3/Pass	-
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL2 260C	-	-	-	-	-	3/Pass
PC	A1.1	-	3	22	SAM Precon Pre	Review for delamination	-	-	-	3/66/0	3/66/0	3/66/0
PC	A1.2	-	3	22	SAM Precon Post	Review for delamination	-	-	-	3/66/0	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	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	3	Wire Bond Shear, post bHAST, 1X	Post stress	-	-	-	3/9/0	-	3/9/0
HAST	A2.1.4	-	3	3	Bond Pull over Stitch, post bHAST, 1X	Post stress	-	-	-	3/9/0	-	3/9/0
HAST	A2.1.5	-	3	3	Bond Pull over Ball, post bHAST, 1X	Post stress	-	-	-	3/9/0	-	3/9/0
HAST	A2.2	JEDEC JESD22-A110	3	70	Biased HAST	130C/85%RH	192 Hours	-	-	3/210/0	3/210/0	3/210/0
HAST	A2.2.1	-	3	22	SAM Analysis, post bHAST 2X	Review for delamination	Completed	-	-	3/66/0	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	3/3/0
HAST	A2.2.3	-	3	3	Wire Bond Shear, post bHAST, 2X	Post stress	-	-	-	3/9/0	3/9/0	3/9/0
HAST	A2.2.4	-	3	3	Bond Pull over Stitch, post bHAST, 2X	Post stress	-	-	-	3/9/0	3/9/0	3/9/0
HAST	A2.2.5	-	3	3	Bond Pull over Ball, post bHAST, 2X	Post stress	-	-	-	3/9/0	3/9/0	3/9/0

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: LM2904BAQPWRQ1	Qual Device: LM2904BAQDGKRQ1	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: LM2903BQPWRQ1	QBS Reference: XM0L1306QDGS28RQ1
TC	A4.2	JEDEC JESD22-A104 and Appendix 3	3	70	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	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	3	Wire Bond Shear, post TC, 1X	Post stress	-	-	-	3/9/0	-	3/9/0
TC	A4.1.4	-	3	3	Bond Pull over Stitch, post TC, 1X	Post stress	-	-	-	3/9/0	-	3/9/0
TC	A4.1.5	-	3	3	Bond Pull over Ball, post TC, 1X	Post stress	-	-	-	3/9/0	-	3/9/0
TC	A4.2	JEDEC JESD22-A104 and Appendix 3	3	70	Temperature Cycle	-65C/150C	1000 Cycles	-	-	3/210/0	3/210/0	3/210/0
TC	A4.2.1	-	3	22	SAM Analysis, post TC, 2X	Review for delamination	Completed	-	-	3/66/0	3/66/0	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	3/3/0
TC	A4.2.3	-	3	3	Wire Bond Shear, post TC, 2X	Post stress	-	-	-	3/9/0	3/9/0	3/9/0
TC	A4.2.4	-	3	3	Bond Pull over Stitch, post TC, 2X	Post stress	-	-	-	3/9/0	3/9/0	3/9/0
TC	A4.2.5	-	3	3	Bond Pull over Ball, post TC, 2X	Post stress	-	-	-	3/9/0	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	JEDEC JESD22-A103	3	45	High Temperature Storage Life	175C	500 Hours	-	-	-	3/135/0	-

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: LM2904BAQPWRQ1	Qual Device: LM2904BAQDGKRQ1	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: LM2903BQPWRQ1	QBS Reference: XM0L1306QDGS28RQ1
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	44	High Temperature Storage Life	150C	2000 Hours	-	-	3/132/0	-	3/132/0
HTSL	A6.2	JEDEC JESD22-A103	3	44	High Temperature Storage Life	175C	1000 Hours	-	-	-	3/132/0	-
HTSL	A6.2.1	-	3	1	Cross Section, post HTSL, 2X	Post stress cross section	Completed	-	-	3/3/0	3/3/0	3/3/0
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	1/30/0	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	1/30/0	1/30/0	3/90/0	3/90/0	3/90/0

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM2904BAQPWRQ1 is qualified at MSL1 260C
- Qual Device LM2904BAQDGKRQ1 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

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/

TI Qualification ID: R-CHG-2505-016

Product Attributes

Attributes	Qual Device: LM2904BAQPWRQ1	Qual Device: LM2904BAQDGKRQ1	QBS Package Reference: SN74HCS74QPWRQ1	QBS Package Reference: TPS92622QDGNRQ1	QBS Package Reference: LM2903BQPWRQ1	QBS Product Reference: LM2904BQPWRQ1	QBS Process, Product Reference: LM2903EPWRQ1	QBS Package Reference: TXS0108EQDGSRQ1	QBS Package Reference: TLV3232QDGKRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 0	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 150	-40 to 125	-40 to 125
Product Function	Signal Chain	Signal Chain	Logic	Power Management	Signal Chain	Signal Chain	Signal Chain	Interface,Logic	Signal Chain
Wafer Fab Supplier	RFAB	RFAB	RFAB	RFAB	CFAB	CFAB	RFAB	RFAB	RFAB
Assembly Site	MLA	MLA	MLA	MLA	MLA	MLA	MLA	MLA	MLA
Package Group	TSSOP	VSSOP	TSSOP	VSSOP	TSSOP	TSSOP	TSSOP	VSSOP	VSSOP
Package Designator	PW	DGK	PW	DGN	PW	PW	PW	DGS	DGK
Pin Count	8	8	14	12	8	8	8	20	8

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM2904BAQPWRQ1 is qualified at MSL1 260C
- Qual Device LM2904BAQDGKRQ1 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: LM2904BAQPWRQ1	Qual Device: LM2904BAQDGKRQ1	QBS Package Reference: SN74HCS74QPWRQ1	QBS Package Reference: TPS92622QDGNRQ1	QBS Package Reference: LM2903BQPWRQ1	QBS Product Reference: LM2904BQPWRQ1	QBS Process, Product Reference: LM2903EPWRQ1	QBS Package Reference: TXS0108EQDGSRQ1	QBS Package Reference: TLV3232QDGKRQ1
Test Group A - Accelerated Environment Stress Tests																
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	-	1/Pass	-	3/Pass	3/Pass	3/Pass	1/Pass	3/Pass	3/Pass	1/Pass
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	1/77/0	3/231/0	1/77/0	3/231/0	1/77/0	1/77/0
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Autoclave	121C/15psig	96 Hours	-	-	3/231/0	-	-	1/77/0	-	-	-
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Unbiased HAST	130C/85%RH	96 Hours	1/77/0	-	-	3/231/0	3/231/0	-	3/231/0	1/77/0	1/77/0

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: LM2904BAQPWRQ1	Qual Device: LM2904BAQDGKRQ1	QBS Package Reference: SN74HCS74QPWRQ1	QBS Package Reference: TPS92622QDGNRQ1	QBS Package Reference: LM2903BQPWRQ1	QBS Product Reference: LM2904BQPWRQ1	QBS Process, Product Reference: LM2903EPWRQ1	QBS Package Reference: TXS0108EQDGSRQ1	QBS Package Reference: TLV3232QDGKRQ1
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-55C/150C	1500 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	3/231/0	3/231/0	1/77/0	-	3/231/0	1/77/0
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	1/5/0	-	-	-	-	1/5/0	1/5/0	1/5/0	1/5/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	150C	1000 Hours	-	-	3/135/0	1/45/0	-	-	-	1/45/0	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	1000 Hours	-	-	-	-	-	-	1/45/0	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	500 Hours	-	-	-	2/90/0	3/135/0	1/45/0	-	-	1/77/0
Test Group B - Accelerated Lifetime Simulation Tests																
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	125C	1000 Hours	-	-	3/231/0	-	-	-	-	1/77/0	1/77/0
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	150C	1000 Hours	-	-	-	-	-	-	3/231/0	-	-
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	150C	300 Hours	-	1/77/0	-	-	3/231/0	-	-	-	-
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	150C	408 Hours	-	-	-	-	-	1/77/0	-	-	-
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	150C	560 Hours	-	-	-	-	1/77/0	-	-	-	-
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	-	-	-	-	-	-
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate	150C	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	1/30/0	3/90/0	3/90/0	3/90/0	1/30/0	3/90/0	1/30/0	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	1/30/0	3/90/0	3/90/0	3/90/0	1/30/0	3/90/0	1/30/0	1/30/0
SD	C3	JEDEC J-STD-002	1	15	PB Solderability	>95% Lead Coverage	-	-	-	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
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions	Cpk>1.67	-	1/10/0	1/10/0	3/30/0	3/30/0	3/30/0	-	3/30/0	1/10/0	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	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

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: LM2904BAQPWRQ1	Qual Device: LM2904BAQDGKRQ1	QBS Package Reference: SN74HC574QPWRQ1	QBS Package Reference: TPS92622QDGNRQ1	QBS Package Reference: LM2903BQPWRQ1	QBS Product Reference: LM2904BQPWRQ1	QBS Process, Product Reference: LM2903EPWRQ1	QBS Package Reference: TXS0108EQDGSRQ1	QBS Package Reference: TLV3232QDGKRQ1
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	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	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
BTI	D4	-	-	-	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	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	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	1/3/0	1/3/0	1/3/0	-	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1500 Volts	-	-	-	-	1/3/0	1/3/0	-	-	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	1/3/0	1/3/0	1/3/0	1/3/0	-	-	1/3/0	1/3/0	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	750 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	3	Latch-Up	Per AEC Q100-004	-	1/3/0	-	1/6/0	1/6/0	-	1/6/0	1/3/0	-	1/3/0
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	2/60/0	1/30/0	3/90/0	1/30/0	3/90/0	3/90/0	3/90/0	1/30/0	3/90/0
Additional Tests																

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E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):

- Room/Hot/Cold : HTOL, ED
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Quality and Environmental data is available at TI's external Web site: http://www.ti.com/

TI Qualification ID: R-CHG-2505-016

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