PCN Number:	20220615006.2	**PCN Date:**	June 16, 2022
Title:	Qualification of new Fab site (CFAB) using qualified Process Technology, Die Revision, final test site, and additional Assembly site/BOM options for the LM2903QDGKRQ1		
Customer Contact:	PCN Manager	**Dept:**	Quality Services
Proposed 1st Ship Date:	Dec 13, 2022	**Sample requests accepted until:**	July 17, 2022

***Sample requests received after July 17, 2022 will not be supported.**

Change Type:

☒	Assembly Site	☒	Assembly Process	☒	Assembly Materials
☒	Design	☐	Electrical Specification	☐	Mechanical Specification
☒	Test Site	☒	Packing/Shipping/Labeling	☐	Test Process
☐	Wafer Bump Site	☐	Wafer Bump Material	☐	Wafer Bump Process
☒	Wafer Fab Site	☒	Wafer Fab Materials	☒	Wafer Fab Process
		☒	Device Symbolization		

PCN Details

Description of Change:

Texas Instruments is pleased to announce the qualification of a new fab & process technology, (CFAB, JI3), die revision, final test site, and Assembly (MLA) site for the LM2903QDGKRQ1. Construction differences are noted below:

Current Fab Site			New Fab Site		
Current Fab Site	**Process**	**Wafer Diameter**	**New Fab Site**	**Process**	**Wafer Diameter**
SFAB	JI1	150 mm	CFAB	JI3	200 mm

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

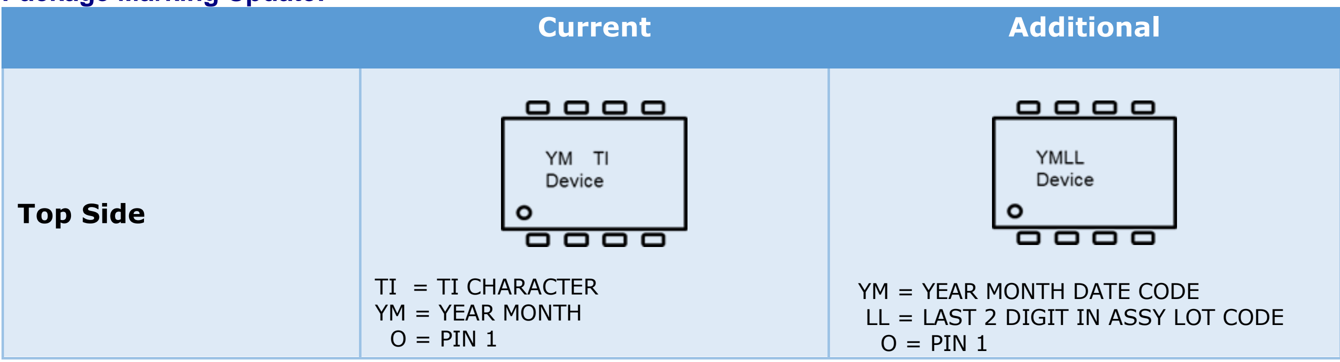
Probe site change:

	Current:	**New:**
Probe Site & Final Test	TI Sherman-Probe (SH-BIP) & ASESHAT	**n/a & HFTFAT**

Construction differences are noted below:

	Current – ASESH	**Additional - HFTF**
Mold Compound	SID#EN2000763	SID#R-30
Bond wire diameter	Au, 1.0 mils	Cu, 0.80 mil
Mount Compound	SID#EY1000063	SID#A-18
Top Protective Layer	Nitride	Oxide, Nitride

Package Marking Update:



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

Reason for Change:

These changes are part of our multiyear plan to transition products from our 150-milimeter 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.

RoHS	REACH	Green Status	IEC 62474
☒ No Change	☒ No Change	☒ No Change	☒ 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
SH-BIP-1	SHE	USA	Sherman
CFAB	**CU3**	**CHN**	**Chengdu**

Die Rev:

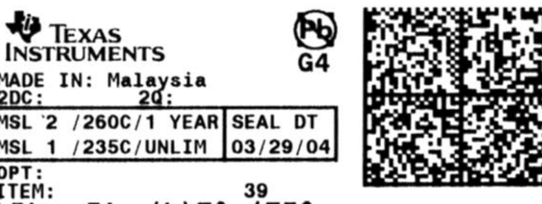
Current / **New**

Die Rev [2P]	**Die Rev [2P]**
A	**A**

Assembly Site Information:

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
ASESH	ASH	CHN	Shanghai
HFTF	**HFT**	**CHN**	**Hefei**

Sample product shipping label (not actual product label)



Product Affected:

LM2903QDGKRQ1

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

LM2903QDGKRQ1
Approve Date 17-FEBRUARY -2022

Product Attributes

Attributes	Qual Device: LM2903QDGKRQ1	QBS Product Reference: LM2903BQDRQ1	QBS Process Reference: LM2904BQDRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125
Product Function	Signal Chain	Signal Chain	Signal Chain
Wafer Fab Supplier	CFAB	CFAB	CFAB
Assembly Site	HFTFAT	FMX	FMX
Package Group	VSSOP	SOIC	SOIC
Package Designator	DGK	D	D
Pin Count	8	8	8

- QBS: Qual By Similarity
- Qual Device LM2903QDGKRQ1 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: LM2903QDGKRQ1	QBS Product Reference: LM2903BQDRQ1	QBS Process Reference: LM2904BQDRQ1
Test Group A - Accelerated Environment Stress Tests										
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	1 Step	3/924/0	-	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	110C/85%RH	264 Hours	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	1000 Cycles	3/231/0	-	-
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	1/72/0	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	150C	1000 Hours	3/231/0	-	-
Test Group B - Accelerated Lifetime Simulation Tests										
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	150C	300 Hours	1/77/0	3/231/0	-
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	150C	408 Hours	-	-	3/231/0
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	125C	48 Hours	-	1/800/0	3/2400/4[1]
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	3/300/0	-	-

WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	3/300/0	-	-
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	1/15/0	-	-
SD	C3	JEDEC JESD22-B102	1	15	PB-Free Solderability	>95% Lead Coverage	-	1/15/0	-	-
PD	C4	JEDEC JESD22-B100 and B108	1	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 Dependent Dielectric Breakdown	-	-	Completed Per Process Technology Requirements	-	-
HCI	D3	JESD60 & 28	-	-	Hot Carrier Injection	-	-	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										
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	2000 Volts	1/3/0	-	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1500 Volts	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 Room, hot, and cold	-	3/90/0	-	-

- Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable

- The following are equivalent HTOL options based on an activation energy of 0.7eV : 125C/1k Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours
- The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours
- The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles

Ambient Operating Temperature by Automotive Grade Level:

- Grade 0 (or E): -40C to +150C
- Grade 1 (or Q): -40C to +125C
- Grade 2 (or T): -40C to +105C
- Grade 3 (or I) : -40C to +85C

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

- Room/Hot/Cold : HTOL, ED
- Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU
- Room : AC/uHAST

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

TI Qualification ID: R-CHG-2110-016

[Note1]- ELFR fails due to a defect screenable at production test.

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

Q006 Summary for 0.8 PCC Wire JI3 AL Bond Pads in HFTF (Grade 1, -40/125C)

Approved 02-Jul-2021

Product Attributes

Attributes	Qual Device: LM2903BQDGKRQ1
Automotive Grade Level	Grade 1
Operating Temp Range (C)	-40 to 125
Product Function	Signal Chain
Wafer Fab Supplier	CFAB
Assembly Site	HFTFAT
Package Group	VSSOP
Package Designator	DGK
Ball/Lead Count	8

- QBS: Qual By Similarity

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: LM2903BQDGKRQ1
Test Group A – Accelerated Environment Stress Tests							
PC	A1	-	3	22	SAM Analysis, Pre Stress	Completed	3/66/0
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	Level 1-260C	3/924/0
PC	A1	-	3	22	SAM Analysis, Post Stress	Completed	3/66/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 110C/85%RH	264 Hours	3/231/0
HAST	A2	-	3	1	Cross Section, Post bHAST 264 Hours	-	-
HAST	A2	-	3	30	Wire Bond Shear, Post bHast, 264 Hours	Wires	-
HAST	A2	-	3	30	Bond Pull over Stitch, post bHAST, 264 Hours	Wires	-
HAST	A2	-	3	30	Bond Pull over Ball, Post bHAST, 264 Hours	Wires	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 110C/85%RH	528 Hours	3/210/0
HAST	A2	-	3	1	Cross Section, Post bHAST 528 Hours	Completed	3/3/0
HAST	A2	-	3	22	SAM Analysis, Post bHAST, 528 Hours	Completed	3/66/0
HAST	A2	-	3	30	Wire Bond Shear, Post bHast, 528 Hours	Wires	3/24/0
HAST	A2	-	3	30	Bond Pull over Stitch, post bHAST, 528 Hours	Wires	3/24/0
HAST	A2	-	3	30	Bond Pull over Ball, Post bHAST, 528 Hours	Wires	3/24/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	3/231/0
TC	A4	-	3	1	Cross Section, Post T/C 500 Cycles	-	-
TC	A4	-	3	22	SAM Analysis, Post T/C, 500 Cycles	Completed	3/66/0
TC	A4	-	3	30	Wire Bond Shear, Post T/C 500 Cycles	Wires	-
TC	A4	-	3	30	Bond Pull over Stitch Post T/C 500 Cycles	Wires	-
TC	A4	-	3	30	Bond Pull over Ball Post T/C 500 Cycles	Wires	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	1000 Cycles	3/210/0

	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: LM2903BQDGKRQ1
	TC	A4	-	3	1	Cross Section, Post T/C 1000 Cycles	Completed	3/3/0
	TC	A4	-	3	22	SAM Analysis, Post T/C, 1000 Cycles	Completed	3/66/0
	TC	A4	-	3	30	Wire Bond Shear, Post T/C 1000 Cycles	Wires	3/24/0
	TC	A4	-	3	30	Bond Pull over Stitch, Post T/C, 1000 Cycles	Wires	3/24/0
	TC	A4	-	3	30	Bond Pull over Ball, Post T/C, 1000 Cycles	Wires	3/24/0
	PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle -40/125C	1000 Cycles	-
	PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle -40/125C	2000 Cycles	-
	HTSL	A6	JEDEC JESD22-A103	3	45	High Temp Storage Bake 150C	1000 Hours	3/231/0
	HTSL	A6	-	3	1	Cross Section, Post HTSL 1000 Hours	-	-
	HTSL	A6	JEDEC JESD22-A103	3	44	High Temp Storage Bake 150C	2000 Hours	3/228/0
	HTSL	A6	-	3	1	Cross Section, Post HTSL 2000 Hours	Completed	3/3/0
Test Group C – Package Assembly Integrity Tests								
	WBS	C1	AEC Q100-001	3	30	Wire Bond Shear, Cpk>1.67	Wires	3/300/0
	WBP	C2	MIL-STD883 Method 2011	3	30	Bond Pull over Ball, Cpk >1.67	Wires	3/300/0

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

Ambient Operating Temperature by Automotive Grade Level:
Grade 0 (or E): -40C to +150C
Grade 1 (or Q): -40C to +125C
Grade 2 (or T): -40C to +105C
Grade 3 (or I) : -40C to +85C

E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):
Room/Hot/Cold : HTOL, ED
Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU
Room : AC/uHAST

Green/Pb-free Status:
Qualified Pb-Free(SMT) and Green

TI Qualification ID: 20190802-130791

For questions regarding this notice, e-mails can be sent to the contacts shown below or your local Field Sales Representative.

Location	E-Mail
WW Change Management Team	PCN_ww_admin_team@list.ti.com

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