

PCN Number:	20210326004.2		PCN Date:	Mar 29 2021	
Title:	Qualification of new Fab site (CFAB) using qualified Process Technology, Die Revision, Probe site, and additional Assembly site/BOM options for select devices				
Customer Contact:	PCN Manager	Dept:	Quality Services		
Proposed 1st Ship Date:	Sep 25 2021		Estimated Sample Availability:	Date provided at sample request	
Change Type:					
<input checked="" type="checkbox"/>	Assembly Site	<input checked="" type="checkbox"/>	Design	<input type="checkbox"/>	Wafer Bump Site
<input checked="" type="checkbox"/>	Assembly Process	<input type="checkbox"/>	Data Sheet	<input type="checkbox"/>	Wafer Bump Material
<input checked="" type="checkbox"/>	Assembly Materials	<input type="checkbox"/>	Part number change	<input type="checkbox"/>	Wafer Bump Process
<input type="checkbox"/>	Mechanical Specification	<input type="checkbox"/>	Test Site	<input checked="" type="checkbox"/>	Wafer Fab Site
<input type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process	<input checked="" type="checkbox"/>	Wafer Fab Materials
				<input checked="" type="checkbox"/>	Wafer Fab Process
PCN Details					
Description of Change:					
Texas Instruments is pleased to announce the qualification of a new fab & process technology, (CFAB, JI3), die revisions, probe site, and AT (FMX) site/BOM (MLA) options 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
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	D-Lin		None		
Construction differences are noted below:					
Group 1 CFAB/Process migration & updated BOM in FMX for D Devices:					
	Current - FMX		New - FMX		
Lead finish/prep	NiPdAu, Non RLF or RLF		NiPdAu, RLF		
Bond wire diameter	Au, 0.96 or Cu, 0.96 mils		Cu, 0.80 mils		
Mold Compound	4205694 or 4211880		4211880		
MSL	L3/260C or L1/260C		L1/260C		
Group 2 CFAB/Process migration & FMX as additional AT site from MLA for D Devices:					
	Current - MLA		New - FMX		
Mount Compound	4208458		4147858		
Mold Compound	4209640		4211880		
Lead finish	NiPdAu, non RLF		NiPdAu, RLF		
Bond wire diameter	Au, 0.96 mils		Cu, 0.80 mils		
Group 3 CFAB/Process migration & FMX as additional AT site from TAI for D Devices:					
	Current - TAI		New - FMX		
Mount Compound	4042500		4147858		
Mold Compound	4205694		4211880		
Lead finish	NiPdAu, non RLF		NiPdAu, RLF		
Bond wire diameter	Au, 0.96 mils		Cu, 0.80 mils		

Group 4 CFAB/Process migration & updated BOM in MLA for PW Devices:

	MLA - Current	MLA - New
Bond wire diameter	Au, 0.96 mils or Cu, 1.0 mils	Cu, 0.80 mils

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

Anticipated impact on Material Declaration

<input type="checkbox"/>	No Impact to the Material Declaration	<input checked="" type="checkbox"/>	Material Declarations or Product Content reports are driven from production data and will be available following the production release. Upon production release the revised reports can be obtained at the site link below http://www.ti.com/quality/docs/materialcontentsearch.tsp
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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]
E	C

Assembly Site Information:

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
TAI	TAI	TWN	Chung Ho, New Taipei City
MLA	MLA	MYS	Kuala Lumpur
FMX	MEX	MEX	Aguascalientes

Sample product shipping label (not actual product label)



TEXAS INSTRUMENTS
MADE IN: Malaysia
2DC: 20:

MSL 2 /260C/1 YEAR	SEAL DT
MSL 1 /235C/UNLIM	03/29/04

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



(1P) SN74LS07NSR
(Q) 2000 (D) 0336
(31T) LOT: 3959047MLA
(4W) TKY (1T) 7523483SI2
(P)
(2P) REV: (V) 0033317
(20L) CSO: SHE (21L) CCO:USA
(22L) ASO: MLA (23L) ACO: MYS

Product Affected:**Group 1 Device list: CFAB/Process migration & updated BOM in FMX for D Devices:**

LM158AQDRDL	LM2904DRCT	LM2904QDRSV	LM2904VQDRQ1
LM2904AVQDR	LM2904QDRDL	LM2904VQDR	MLA00339DRG4
LM2904AVQDRG4	LM2904QDRG4Q1	LM2904VQDRG4	SN102755DR
LM2904AVQDRG4Q1	LM2904QDRQ1	LM2904VQDRG4Q1	SN104630DR
LM2904AVQDRQ1			

Group 2 Device list: CFAB/Process migration & FMX as additional AT site from MLA for D Devices:

MLA00312DR	LBT-LM2904DR	LM2904VZQDRQ1
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Group 3 Device list: CFAB/Process migration & FMX as additional AT site from TAI for D Devices:

LM2904QDR

Group 4 Device list: CFAB/Process migration & updated BOM in MLA for PW Devices:

LM2904AVQPWR	LM2904AVQPWRQ1	LM2904QPWRQ1	LM2904VQPWRG4Q1
LM2904AVQPWRCT	LM2904AVQPWRRB	LM2904VQPWR	LM2904VQPWRKN
LM2904AVQPWRG4	LM2904AVQPWRRBG4	LM2904VQPWRCT	LM2904VQPWRQ1
LM2904AVQPWRG4Q1	LM2904QPWRG4Q1	LM2904VQPWRG4	MLA00415PWR

Group 1, 2, & 3 (SOIC Devices) Qual report:

TI Information
Selective Disclosure

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

Approved 16-Mar-2021

Product Attributes

Attributes	Qual Device: LM2904BQDRQ1	QBS Product Reference: LM2904BQDRQ1	QBS Package Reference: LM2903BQDRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1
Operating Temp Range	-40 to +125 C	-40 to +125 C	-40 to +85 C
Product Function	Signal Chain	Signal Chain	Signal Chain
Wafer Fab Supplier	CFAB	CFAB	CFAB
Die Revision	2.0	2.0	A0
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 LM2904BQDRQ1 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: LM2904BQDRQ1	QBS Product Reference: LM2904BQDRQ1	QBS Package Reference: LM2903BQDRQ1
Test Group A – Accelerated Environment Stress Tests									
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditioning Level 1	Level 1-260C	1/78/0	-	-
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditioning Level 2	Level 2-260C	-	3/1499/10 (1)	-
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	1/77/0	-	-
UHAST	A3	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, -65/150C	500 Cycles	1/77/0	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 175C	500 Hours	-	3/135/0	-
Test Group B – Accelerated Lifetime Simulation Tests									
HTOL	B1	JEDEC JESD22-AA108	3	77	Auto High Temp Operating Life Grade 1, 150C	408 Hours	-	3/231/0	-
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 125C	48 Hours	-	3/2400/4 (1)	-
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	Wire Bond Pull (Cpk>1.67)	Wires	-	3/90/0	-
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	10	Auto 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 - Q100	2000 V	-	-	3/9/0 -
CDM	E3	AEC Q100-011	1	3	ESD - CDM - Q100	1500 V	-	-	3/9/0 -
LU	E4	AEC Q100-004	1	6	Latch-up	Per AEC-Q100-004	-	-	3/18/0 -
ED	E5	AEC Q100-009	3	30	Auto Electrical Distributions	Cpk>1.67	-	-	3/90/0 -
Additional Tests									
MSL	-	Moisture Sensitivity Level	1	12	Automotive Moist Sens. L1	Level 1-260C	-	1/12/0	- 3/36/0
MSL	-	Moisture Sensitivity Level	1	12	Automotive Moist Sens. L2	Level 2-260C	-	-	3/36/0 -

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
 Note (1): Precon and ELFR fails due to a defect screenable at production test.

Group 4 (PW Devices) Qual report:



TI Information
Selective Disclosure

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

Approved 28-Jul-2020

Product Attributes

Attributes	Qual Device: LM2904BQPWRQ1	QBS Product Function / Package Reference: LM2903BQPWRQ1	QBS Process Reference: LM2904BQDRQ1
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	Signal Chain	Signal Chain	Signal Chain
Wafer Fab Supplier	CFAB	CFAB	CFAB
Die Revision	C	1.0	2.0
Assembly Site	MLA	MLA	FMX
Package Type	TSSOP	TSSOP	SOIC
Package Designator	PW	PW	D
Ball/Lead Count	8	8	8

- QBS: Qual By Similarity

- Qual Device LM2904BQPWRQ1 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: LM2904BQPWRQ1	QBS Product Function / Package Reference: LM2903BQPWRQ1	QBS Process Reference: LM2904BQDRQ1
Test Group A – Accelerated Environment Stress Tests									
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditioning Level 1	Level 1-260C	1/479/0	12/1275/2 (1)	-
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditioning Level 2	Level 2-260C	-	-	3/1499/10 (3)
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	1/77/0	3/231/0	3/231/0
AC	A3	JEDEC JESD22-A102	3	77	Autoclave 121C	96 Hours	1/77/0	-	-
UHAST			-	-	Unbiased HAST 130C/85%RH	96 Hours	-	3/231/0	3/231/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	1/77/0	3/231/2 (2)	3/231/0
TC-BP	A4	MIL-STD883 Method 2011	1	60	Post TC Bond Pull	Wires	1/30/0	-	-
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	1/45/0	-	3/135/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 175C	500 Hours	-	3/231/0	-
Test Group B – Accelerated Lifetime Simulation Tests									
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 150C	300 Hours	-	3/231/0	-
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 150C	408 Hours	1/77/0	-	3/231/0
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 125C	48 Hours	-	-	3/2400/4 (3)
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	1/30/0	-	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull (Cpk>1.67)	Wires	1/30/0	-	3/90/0
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	Pb	1/15/0	-	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	50	Lead Pull to Destruction	Leads	1/24/0	-	-
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 - Q100	2000 V	1/3/0	3/9/0	3/9/0
CDM	E3	AEC Q100-011	1	3	ESD - CDM - Q100	1500 V	1/3/0	3/9/0	3/9/0
LU	E4	AEC Q100-004	1	6	Latch-up	Per AEC-Q100-004	1/6/0	3/18/0	3/18/0
ED	E5	AEC Q100-009	3	30	Auto Electrical Distributions	Cpk>1.67	3/90/0	-	3/90/0
Additional Tests									
MSL			-	12	Automotive Moist Sens. L1	Level 1-260C	1/12/0	-	-
MSL			-	12	Automotive Moist Sens. L2	Level 2-260C	-	-	3/36/0

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

Note (1): Two units damaged due to mishandling at test. Discounted.

Note (2): Two units damaged in handler at test. Discounted.

Note (3): Precon and ELFR fails due to a defect screenable at production test.

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

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