

<b>PCN Number:</b>	20240723003.1	<b>PCN Date:</b>	July 23, 2024		
<b>Title:</b>	Qualification of RFAB using qualified Process Technology, Die Revision, and additional Assembly site (MLA) & BOM options for select devices				
<b>Customer Contact:</b>	Change Management Team	<b>Dept:</b>	Quality Services		
<b>Proposed 1<sup>st</sup> Ship Date:</b>	October 21, 2024	<b>Sample requests accepted until:</b>	August 22, 2024*		
<b>*Sample requests received after August 22, 2024 will not be supported.</b>					
<b>Change Type:</b>					
<input checked="" type="checkbox"/>	Assembly Site	<input checked="" type="checkbox"/>	Design		
<input checked="" type="checkbox"/>	Assembly Process	<input type="checkbox"/>	Data Sheet		
<input checked="" type="checkbox"/>	Assembly Materials	<input type="checkbox"/>	Part number change		
<input type="checkbox"/>	Mechanical Specification	<input type="checkbox"/>	Test Site		
<input checked="" type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process		
<input type="checkbox"/>		<input type="checkbox"/>	Wafer Bump Material		
<input type="checkbox"/>		<input type="checkbox"/>	Wafer Bump Process		
<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Wafer Fab Site		
<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Wafer Fab Material		
<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Wafer Fab Process		
<b>PCN Details</b>					
<b>Description of Change:</b>					
Texas Instruments is pleased to announce the qualification of its RFAB fabrication facility as an additional Wafer Fab option in addition to an Assembly site (MLA) and BOM options for the devices listed below.					
<b>Current Fab Site</b>			<b>Additional Fab Site</b>		
<b>Fab Site</b>	<b>Process</b>	<b>Wafer Diameter</b>	<b>Fab Site</b>	<b>Process</b>	<b>Wafer Diameter</b>
SFAB	J11	150 mm	RFAB	TIB	300 mm
The die was also changed as a result of the process change.					
Construction differences are as follows:					
<b>Group 1 BOM Table (RFAB/Process migration, die change plus MLA (VSSOP Packaged devices) as new Assembly site):</b>					
What	<b>UTL2</b>	<b>HNA</b>	<b>ASESH</b>	<b>MLA</b>	
Bond Wire composition, diameter	Au, 1.0 mil	Au, 1.0 mil	Cu, 1.0 mil	Cu, 0.8 mil	
Mold Compound	SID#CZ0094	SID#450179	SID#EN2000763	4211880	
Mount Compound	SID#PZ0013	SID#400180	SID#EY1000063	4147858	
<b>Group 2 BOM Table (RFAB/Process migration, die change plus BOM update):</b>					
What	<b>Current</b>	<b>Additional</b>			
Bond Wire composition, diameter	Cu, 0.96 or 1.0 mil	Cu, 0.8 mil			
<b>Group 3 BOM Table (RFAB/Process migration, die change plus MLA (D packaged Devices) as new Assembly site):</b>					
What	<b>FMX</b>	<b>MLA</b>			
Bond Wire composition, diameter	Cu, 0.96	Cu, 0.8 mil			
Qual details are provided in the Qual Data Section.					
<b>Reason for Change:</b>					

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.

RoHS	REACH	Green Status	IEC 62474
<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
SH-BIP-1	SHE	USA	Sherman
<b>RFAB</b>	<b>RFB</b>	<b>USA</b>	<b>Richardson</b>

**Die Rev: Current**

**New**

Die Rev [2P]	<b>Die Rev [2P]</b>
B, A	<b>A</b>

**Assembly Site Information:**

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
UTL2	NS2	THA	Bangpakong, Chachoengsao
HNA	HNT	THA	Ayutthaya
ASESH	ASH	CHN	Shanghai
FMX	MEX	MEX	Aguascalientes
<b>TIM</b>	<b>MLA</b>	<b>MYS</b>	<b>Kuala Lumpur</b>

Sample product shipping label (not actual product label):

**Product Affected:**

**Group 1 Device list: RFAB/Process migration, die change plus MLA (VSSOP Packaged devices) as new Assembly site:**

RC4558DGKR	RC4558IDGKR	RC4558IDGKRG4
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**Group 2 Device list: RFAB/Process migration, die change plus BOM update:**

RC4558IP	RC4558P	RC4559P	RC4559PE4
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RC4558IPWR	RC4558PWR		
<b>Group 3 Device list: RFAB/Process migration, die change plus MLA (D packaged Devices) as new Assembly site:</b>			
RC4558DR	RC4558IDR	RC4558IDRG4	RC4559DR

For alternate parts with similar or improved performance, please visit the product page on [TI.com](https://www.ti.com)

TI Information  
Selective Disclosure

**Qualification Report**

**RC4558IDGKR- Redbull device**  
**Approve Date 07-JUNE -2024**

**Qualification Results**

Data Displayed as: Number of lots / Total sample size / Total failed

Type	#	Test Name	Condition	Duration	Qual Device: RC4558IDGKR	QBS Product Reference: RC4580IPWR	QBS Process Reference: LM2902BQPWRQ1	QBS Process Reference: LM324BIPWR	QBS Package Reference: SN74LV244AQDGSRQ1	QBS Package Reference: SN74LV541AQDGSRQ1	QBS Package Reference: TLV1812QDGKRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	1/77/0	1/77/0	1/77/0
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	-	1/77/0	1/77/0	-
UHAST	A3	Unbiased HAST	110C/85%RH	264 Hours	-	-	3/231/0	-	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	3/231/0	-	-	1/77/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	3/231/0	1/77/0	1/77/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	3/231/0	3/231/0	1/45/0	1/45/0	-
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	-	-	-	-	1/77/0
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	3/231/0	1/77/0	-	-
HTOL	B1	Life Test	150C	300 Hours	-	-	-	-	-	-	1/77/0
HTOL	B1	Life Test	150C	408 Hours	-	-	3/231/0	-	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	3/2400/0	-	-	-

Type	#	Test Name	Condition	Duration	Qual Device: RC4558IDGKR	QBS Product Reference: RC4580IPWR	QBS Process Reference: LM2902BQPWRQ1	QBS Process Reference: LM324BIPWR	QBS Package Reference: SN74LV244AQDQGRQ1	QBS Package Reference: SN74LV541AQDQGRQ1	QBS Package Reference: TLV1812QDGKRQ1
SD	C3	PB Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	-	1/15/0	-	1/15/0
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	-	1/15/0	-	1/15/0
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	3/30/0	-	1/10/0	1/10/0	1/10/0
ESD	E2	ESD CDM	-	1500 Volts	-	-	3/9/0	-	-	-	-
ESD	E2	ESD CDM	-	250 Volts	-	1/3/0	-	1/3/0	-	-	-
ESD	E2	ESD CDM	-	500 Volts	-	-	-	-	1/3/0	1/3/0	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	1/3/0	-	1/3/0	-	-	-
ESD	E2	ESD HBM	-	2000 Volts	-	-	3/9/0	-	1/3/0	1/3/0	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	1/3/0	3/18/0	1/3/0	1/6/0	1/6/0	1/6/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	1/30/0	3/90/0	1/30/0	1/30/0	1/30/0	1/30/0
FTY	E6	Final Test Yield	-	-	1/Pass	-	-	-	-	-	-

- QBS: Qual By Similarity
- Qual Device RC4558IDGKR 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

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

TI Qualification ID: R-CHG-2307-024

TI Information  
Selective Disclosure

## Qualification Report

RC4558IPWR - Redbull device  
Approve Date 07-June-2024

### Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	#	Test Name	Condition	Duration	Qual Device: RC4558IPWR	QBS Product Reference: RC4580IPWR	QBS Package/Process Reference: LM2902BQPWRQ1	QBS Process Reference: LM324BIPWR	QBS Package Reference: OPA4991QPWRQ1
HAST	A2	Biased HAST	110C/85%RH	264 Hours	-	-	-	1/77/0	
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-	
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	3/231/0	
UHAST	A3	Unbiased HAST	110C/85%RH	264 Hours	-	-	3/231/0	-	
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	3/231/0	
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	1/77/0	
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	3/231/0	1/45/0	
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	3/231/0	
HTOL	B1	Life Test	150C	300 Hours	-	-	-	3/231/0	
HTOL	B1	Life Test	150C	408 Hours	-	-	3/231/0	-	
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	-	
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	3/30/0	1/10/0	
ESD	E2	ESD CDM	-	1500 Volts	-	-	3/9/0	1/3/0	

Type	#	Test Name	Condition	Duration	Qual Device: <a href="#">RC4558IPWR</a>	QBS Product Reference: <a href="#">RC4580IPWR</a>	QBS Package/Process Reference: <a href="#">LM2902BQPWRQ1</a>	QBS Process Reference: <a href="#">LM324BIPWR</a>	QBS Package Reference: <a href="#">OPA4991QPWRQ1</a>
ESD	E2	ESD CDM	-	250 Volts	-	1/3/0	-	1/3/0	-
ESD	E2	ESD HBM	-	1000 Volts	-	1/3/0	-	1/3/0	-
ESD	E2	ESD HBM	-	2000 Volts	-	-	3/9/0	-	-
ESD	E2	ESD HBM	-	4000 Volts	-	-	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	1/3/0	3/18/0	1/3/0	3/18/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	1/30/0	-	1/30/0	-
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	-	3/90/0	-	3/90/0
FTY	E6	Final Test Yield	-	-	1/Pass	-	-	-	-

- QBS: Qual By Similarity
- Qual Device RC4558IPWR 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

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

TI Qualification ID: R-CHG-2307-023

TI Information  
Selective Disclosure

## Qualification Report

**RC4558IDR- Redbull device**  
**Approve Date 04-JUNE -2024**

### Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	#	Test Name	Condition	Duration	Qual Device: <a href="#">RC4558IDR</a>	QBS Process Reference: <a href="#">LM2902BQPWRQ1</a>	QBS Process Reference: <a href="#">TL431BQDBZR</a>	QBS Process Reference: <a href="#">TL431AIDBZR</a>	QBS Package Reference: <a href="#">LM2901BQDRQ1</a>	QBS Package Reference: <a href="#">MC33063ADR</a>
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	1/77/0	3/231/0	3/231/0
UHAST	A3	Unbiased HAST	110C/85%RH	264 Hours	-	3/231/0	-	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	3/231/0	1/77/0	3/231/0	3/231/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	1/77/0	3/231/0	3/231/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	3/231/0	3/231/0	-	-	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	-	-	3/231/0	3/231/0
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	-	1/77/0	-	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	-	2/154/0	1/77/0

Type	#	Test Name	Condition	Duration	Qual Device: RC4558IDR	QBS Process Reference: LM2902BQPWRQ1	QBS Process Reference: TL431BQDBZR	QBS Process Reference: TL431AIDBZR	QBS Package Reference: LM2901BQDRQ1	QBS Package Reference: MC33063ADR
HTOL	B1	Life Test	150C	300 Hours	-	-	3/231/0	1/77/0	-	-
HTOL	B1	Life Test	150C	408 Hours	-	3/231/0	-	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	3/2400/0	-	-	1/800/0	2/1600/0
ESD	E2	ESD CDM	-	1500 Volts	-	3/9/0	-	-	-	-
ESD	E2	ESD CDM	-	250 Volts	1/3/0	-	-	-	1/3/0	-
ESD	E2	ESD CDM	-	500 Volts	-	-	1/3/0	1/3/0	-	-
ESD	E2	ESD HBM	-	1000 Volts	1/3/0	-	-	-	1/3/0	-
ESD	E2	ESD HBM	-	2000 Volts	-	3/9/0	1/3/0	1/3/0	-	-
LU	E4	Latch-Up	Per JESD78	-	1/3/0	3/18/0	1/6/0	1/6/0	1/3/0	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	3/90/0	3/90/0	1/30/0	1/30/0	1/30/0
FTY	E6	Final Test Yield	-	-	1/Pass	-	-	-	-	-

- QBS: Qual By Similarity
- Qual Device RC4558IDR 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

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

TI Qualification ID: R-CHG-2401-091

## Qualification Report

RC4558IP- Redbull Project  
Approve Date 05-JULY -2024

### Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	#	Test Name	Condition	Duration	Qual Device: RC4558IP	QBS Product Reference: RC4580IPWR	QBS Process Reference: LM2902BQPWRQ1	QBS Package Reference: NE5532P	QBS Package Reference: UCC37322P	QBS Package Reference: OPA2277P
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	-	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	-	3/231/0	-
UHAST	A3	Unbiased HAST	110C/85%RH	264 Hours	-	-	3/231/0	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	-	-	1/77/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	-	3/231/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	3/231/0	-	-	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	-	-	3/231/0	-
HTOL	B1	Life Test	150C	300 Hours	-	-	-	3/231/0	-	-
HTOL	B1	Life Test	150C	408 Hours	-	-	3/231/0	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	-	-	-
SD	C3	PB-Free Solderability	8 Hours Steam Age	-	-	-	-	3/66/0	3/66/0	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	3/30/0	-	-	-

Type	#	Test Name	Condition	Duration	Qual Device: RC4558IP	QBS Product Reference: RC4580IPWR	QBS Process Reference: LM2902BQPWRQ1	QBS Package Reference: NE5532P	QBS Package Reference: UCC37322P	QBS Package Reference: OPA2277P
ESD	E2	ESD CDM	-	1500 Volts	-	-	3/9/0	-	-	-
ESD	E2	ESD CDM	-	250 Volts	1/3/0	1/3/0	-	-	-	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	1/3/0	-	-	-	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	-	-	3/9/0	-	-	-
LU	E4	Latch-Up	Per JESD78	-	-	1/3/0	3/18/0	-	-	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/10/0	1/30/0	3/90/0	-	-	1/30/0
FTY	E6	Final Test Yield	-	-	1/Pass	-	-	-	-	-

- QBS: Qual By Similarity
- Qual Device RC4558IP is qualified at NOT CLASSIFIED NOT CLASSIFIED

- 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

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

TI Qualification ID: R-CHG-2307-021

For questions regarding this notice, e-mails can be sent to the Change Management team or your local Field Sales Representative.

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