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

PCN Number:	20260702000.1	PCN Issued	July 02, 2026
Qualification of FFAB using qualified Process Technology, Die Revision, Datasheet and FMX as an additional Assembly site option for select devices		Sample request deadline:	August 31, 2026
		Estimated 1st ship date:	September 30, 2026

Change type(s)
Assembly Site
Assembly Material
Packing/Shipping/Labeling
Design
Data Sheet/Electrical Specification
Wafer Fab Site
Wafer Fab Material
Wafer Fab Process

PCN Details

Description of Change:

Texas Instruments is pleased to announce the addition of FFAB using the BICOMHD qualified process technology and FMX as additional Assembly site options for the devices listed below.

Current Fab Site			Additional Fab Site		
Current Fab Site	Process	Wafer Diameter	Additional Fab Site	Process	Wafer Diameter
DFAB	VIP2	150mm	FFAB	BICOMHD	200mm

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

Construction Differences are as follows:

Group 1 Device

	Current	Additional
Assembly Site	TIEM	FMX
Lead Finish	Matte Sn	NiPdAu
Bond Wire diam/type	0.96mils Cu	0.8mil Cu* 0.96mil Cu
Mold Compound	8095179	4226323
Mount Compound	8075531	4147858
Marking	NS Logo	TI Letters

*LM6142xxx device only

Group 2 Device

	Current	Additional
Assembly Site	MLA	FMX
Bond Wire diam/type	0.96mils Cu	0.8mil Cu
Mold Compound	4211880	4226323
Marking	NS Logo	TI Logo

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.

Changes from Revision E (September 2014) to Revision F (June 2026) **Page**

- Deleted "Swing 0.01V to 4.99V" in *Features* 1
- Deleted Supply Current vs. Supply Voltage plot 1
- Deleted Offset Voltage vs. Supply Voltage plot 1
- Added Functional Block Diagram 1
- Updated table note 3 in *Absolute Maximum Ratings* 4
- Changed from (V–) – 0.3V to (V–) – 0.5V 4
- Changed from (V+) + 0.3V to (V+) + 0.5V 4
- Updated table note 4 in *Absolute Maximum Ratings* 4
- Updated table note 2 in *Absolute Maximum Ratings* 4
- Changed from ±25mA to Continuous 4
- Changed rating from Current at Output Pin to Output short circuit 4
- Added Operating ambient temperature rating 4
- Added CDM ESD rating 4
- Updated table note in *ESD Ratings* 4
- Added table note in *ESD Ratings* 4
- Deleted table note 1 in *Recommended Operating Conditions* 4
- Changed minimum supply voltage from 1.8V to 2.7V 4
- Changed Junction-to-case thermal resistance for LM6132D from 193°C/W to 127.1°C/W 5
- Changed Junction-to-case thermal resistance for LM6132P from 115°C/W to 84.45°C/W 5
- Added Junction-to-case (top) thermal resistance for packages 5
- Added Junction-to-board thermal resistance for packages 5
- Added Junction-to-top characterization parameter for packages 5
- Added Junction-to-board characterization parameter for packages 5
- Changed Junction-to-case thermal resistance for LM6134D from 126°C/W to 82.48°C/W 5
- Updated all *Electrical Characteristics* tables to latest format 6
- Updated Output Swing format to refer to rails 6
- Changed typical voltage output swing for 100kΩ load from 4.992V to 30mV from positive rail 6
- Changed maximum voltage output swing for 100kΩ load from 4.98V to 40mV from positive rail 6
- Changed typical voltage output swing for 100kΩ load from 0.007V to 30mV from negative rail 6
- Changed maximum voltage output swing for 100kΩ load from 0.017V to 35mV from negative rail 6
- Changed maximum voltage output swing for 100kΩ load over temperature from 0.019V to 50mV from negative rail 6
- Deleted table notes for all *Electric Characteristic* tables 6
- Updated Output Swing format to refer to rails 8
- Updated Output Swing format to refer to rails 9
- Added CMRR and PSRR vs Frequency plot for new die 10
- Added Gain and Phase vs Frequency plot for new die 10
- Added a new sub-section *Old Versus New Die Comparison* 15
- Deleted sub-section *Enhanced Slew Rate* 16

Changes from Revision D (March 2013) to Revision E (May 2026) **Page**

- Deleted "Swing 0.005V to 4.995V" in *Features* ... 1
- Deleted "Small Signal, 5V/µs" in *Features* ... 1
- Deleted "Large Signal, 30V/µs" in *Features* ... 1
- Changed Slew Rate to Slew Rate: 30V/µs in *Features* ... 1
- Changed supply range from 1.8V to 2.7V in *Features* ... 1
- Changed from "Operating on supplies of 1.8V" to "Operating on supplies of 2.7V" ... 1
- Updated table note 1 of *Absolute Maximum Ratings* ... 5
- Changed absolute maximum rating for supply voltage from 35V to 33V ... 5
- Deleted absolute maximum rating for current at power supply pin ... 5
- Updated table note 3 of *Absolute Maximum Ratings* ... 5
- Changed absolute maximum rating for input (common-mode) voltage from (V±) ± 0.3V to (V±) ± 0.5V ... 5
- Updated table note 4 of *Absolute Maximum Ratings* ... 5
- Changed absolute maximum rating for differential input voltage from 15V to ±15V ... 5
- Updated table note 2 of *Absolute Maximum Ratings* ... 5
- Changed absolute maximum rating for output current from ±25mA to Continuous ... 5
- Added absolute maximum rating for operating ambient temperature ... 5
- Deleted absolute maximum rating for lead temperature ... 5
- *Added ESD Ratings* table ... 5
- Changed HBM ESD rating from 2500V to ±4000V ... 5
- Changed minimum operating voltage from 1.8V to 2.7V ... 5
- Deleted table note 1 on Operating Ratings ... 5
- Added *Thermal Information* table for LM6142 ... 6
- Changed junction-to-ambient thermal resistance for LM6142D from 193°C/w to 127.1°C/W ... 6
- Changed junction-to-ambient thermal resistance for LM6142P from 115°C/w to 84.45°C/W ... 6
- Added junction-to-case thermal resistance for LM6142 ... 6
- Added junction-to-board thermal resistance for LM6142 ... 6
- Added junction-to-top characterization parameter for LM6142 ... 6
- Added junction-to-board characterization parameter for LM6142 ... 6
- Added *Thermal Information* table for LM6144 ... 6
- Changed junction-to-ambient thermal resistance for LM6144D from 126°C/W to 82.48°C/W ... 6
- Added junction-to-case (top) thermal resistance for LM6144 ... 6
- Added junction-to-board thermal resistance for LM6144 ... 6
- Added junction-to-top characterization parameter for LM6144 ... 6
- Added junction-to-board characterization parameter for LM6144 ... 6
- Updated all *Electrical Characteristics* tables to latest format ... 7
- Updated Output Swing format to refer to rails ... 7
- Changed typical voltage output swing for 100kΩ load from 4.995V to 30mV from positive rail ... 7
- Changed maximum voltage output swing for 100kΩ load from 4.98V to 40mV from positive rail ... 7
- Changed typical voltage output swing for 100kΩ load from 0.005V to 45mV from negative rail ... 7
- Changed maximum voltage output swing for 100kΩ load from 0.01V to 50mV from negative rail ... 7
- Changed maximum voltage output swing for 100kΩ load over temp range from 0.013V to 60mV from negative rail ... 7
- Changed typical voltage output swing for 10kΩ load from 4.97V to 40mV from positive rail ... 7
- Changed typical voltage output swing for 10kΩ load from 0.02V to 50mV from negative rail ... 7
- Deleted table notes for *Electrical Characteristics* tables ... 7
- Updated Output Swing format to refer to rails ... 9
- Changed maximum voltage output swing for 100kΩ load from 2.66V to 75mV from positive rail ... 9
- Updated Output Swing format to refer to rails ... 10
- Added Open Loop Gain vs Load, for New Die ... 11
- Added CMRR and PSRR vs Frequency, for New Die ... 11
- Added a new sub-section *Old Versus New Die Comparison* ... 16
- Deleted sub-section *Enhanced Slew Rate* ... 17

Product Folder	Current Datasheet	New Datasheet	Link to full datasheet

	Number	Number	
LM613X	SNOS751E	SNOS751F	https://www.ti.com/product/LM6132
LM614X	SNOS726D	SNOS726E	https://www.ti.com/product/LM6142

Qual details are provided in the Qual Data Section.

Reason for Change:

Continuity of supply
Design Refresh

Anticipated impact on Form, Fit, Function, Quality or Reliability:

These devices include new die based on a new schematic in a new process flow.

There are changes in the electrical tables.

Physical aspects of the device have changed. Device quality and reliability have improved.

Review the updated datasheets and /or the standard Data Packet for more details on the changes. Evaluating samples is encouraged.

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
DFAB	DLN	USA	Dallas
FFAB	TID	DEU	Freising

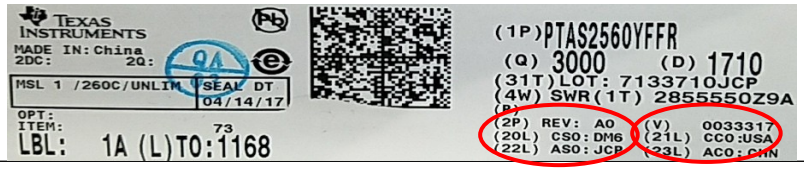
Die Rev:

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

Assembly Site Information

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
MLA	MLA	MYS	Kuala Lumpur
TIEM	CU6	MYS	Melaka
TI Mexico	MEX	MEX	Aguasclientas

Sample product shipping label (not actual product label):

Group 1 Products Affected:

LM6132AIMX/NOPB	LM6134BIMX/ J7000531	LM6144AIMX/NOPB
LM6132BIMX/NOPB	LM6134BIMX/NOPB	LM6144BIMX/ J7000532
LM6132BIMX/ S7002551	LM6134BIMX/ S7002550	LM6144BIMX/NOPB
LM6134AIMX/NOPB	LM6142AIMX/NOPB	
LM6134BIMX/ E7002931	LM6142BIMX/NOPB	

Group 2 Products Affected:

LM6132BIN/NOPB	LM6142BIN/NOPB

Qualification Report

Redbull Qual LM6132AIMX/NOPB Dual Channel SOIC OPA2993
Approve Date 07-May-2026

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM6132AIMX/NOPB	QBS Package, Product Reference: OPA2993IDR	QBS Process Reference: THS3491IDDAR	QBS Process Reference: OPA2810IDGKR	QBS Package Reference: MC33063ADR	QBS Package Reference: MC33063AQDRQ1	QBS Package Reference: OPA207ID	QBS Package Reference: ULQ2003AQDRQ1	QBS Package Reference: TCAN844VDRQ1	QBS Package Reference: SN74LVC165ADRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	3/231/0	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	130C/85%RH	96 Hours	-	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	-	1/77/0	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	1/77/0	1/77/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	3/135/0	-	1/45/0	-	1/45/0
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	3/231/0	3/231/0	3/231/0	-	3/231/0	-	-	-
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	-	-	-	-	-	-	1/45/0	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	3/231/0	1/77/0	3/231/0	-	-	-	1/77/0
HTOL	B1	Life Test	150C	300 Hours	-	-	-	-	-	-	3/231/0	3/231/0	1/77/0	-
HTOL	B1	Life Test	70C Vcc Max (self heating brings Tj up to 150C)	300 Hours	-	-	3/231/0	-	-	-	-	-	-	-
ELFR	B2	Early Life Failure Rate	70C (self heating brings Tj up to 150C)	24 Hours	-	-	3/3000/0	-	-	-	-	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	-	3/3000/0	-	-	-	-	-	-
SD	C3	PB Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	-	-	1/15/0	-	1/15/0	-	-

Type	#	Test Name	Condition	Duration	Qual Device: LM6132AIMX/NOPB	QBS Package, Product Reference: OPA2993IDR	QBS Process Reference: THS3491IDDAR	QBS Process Reference: OPA2810IDGKR	QBS Package Reference: MC33063ADR	QBS Package Reference: MC33063AQDRQ1	QBS Package Reference: OPA207ID	QBS Package Reference: ULQ2003AQDRQ1	QBS Package Reference: TCAN844VDRQ1	QBS Package Reference: SN74LVC165ADRQ1
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	-	-	1/15/0	-	1/15/0	-	1/15/0
PD	C4	Physical Dimensions	(per mechanical drawing)	-	1/5/0	-	-	-	-	-	-	-	-	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	-	-	-	3/30/0	-	1/10/0	1/10/0	1/10/0
ESD	E2	ESD CDM	-	250 Volts	1/3/0	1/3/0	3/9/0	3/9/0	-	-	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	3/9/0	3/9/0	-	-	1/3/0	-	-	-
ESD	E2	ESD HBM	-	2000 Volts	-	-	-	-	-	1/3/0	-	1/3/0	-	-
ESD	E2	ESD HBM	-	2500 Volts	1/3/0	1/3/0	-	-	-	-	-	-	-	-
LU	E4	Latch-Up	Per JESD78	-	1/3/0	1/3/0	3/18/0	3/9/0	-	1/6/0	1/3/0	1/6/0	-	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	1/30/0	3/90/0	3/90/0	1/30/0	3/90/0	1/30/0	3/90/0	-	1/30/0
FTY	E6	Final Test Yield	-	-	1/Pass	-	-	-	-	-	-	-	-	-

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM6132AIMX/NOPB 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-2503-029

Qualification Report

Redbull Qual LM6134AIMX/NOPB Quad Channel SOIC
Approve Date 01-June-2026

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM6134AIMX/NOPB	QBS Product Reference: OPA2993IDR[1]	QBS Process Reference: THS3491IDDAR	QBS Process Reference: OPA2810IDGKR	QBS Package Reference: TL494IDR	QBS Process Reference: OPA2863QDRQ1	QBS Package Reference: ULQ2003AQDRQ1	QBS Package Reference: ULQ2003AQDRQ1	QBS Package Reference: TCAN1043DQ1	QBS Package Reference: TCAN844VDRQ1	SN
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	3/231/0	-	-	-	3/231/0	1/77/0	
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	-	3/231/0	-	3/231/0	3/231/0	3/231/0	-	
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	1/77/0	3/231/0	3/231/0	3/231/0	-	3/231/0	-	-	-	1/77/0	
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	1/77/0	
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	3/135/0	-	-	-	-	
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	3/231/0	3/231/0	3/231/0	-	-	-	-	-	
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	-	-	-	-	-	-	3/135/0	1/45/0	
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	3/231/0	-	-	-	3/231/0	3/231/0	-	
HTOL	B1	Life Test	150C	300 Hours	-	-	-	-	3/231/0	3/231/0	-	-	-	1/77/0	
HTOL	B1	Life Test	70C Vcc Max (self heating brings Tj up to 150C)	300 Hours	-	-	3/231/0	-	-	-	-	-	-	-	
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	-	3/3000/0	-	3/2400/0	-	-	-	-	
ELFR	B2	Early Life Failure Rate	70C (self heating brings Tj up to 150C)	24 Hours	-	-	3/3000/0	-	-	-	-	-	-	-	
WBP	C2	Bond Pull	76 Wires, 3 units min	Wires	1/76/0	-	-	-	3/228/0	-	-	-	-	-	
WBS	C2	Wire bond shear	76 Balls, 3 units min	Wires	1/76/0	-	-	-	-	-	-	-	-	-	

Type	#	Test Name	Condition	Duration	Qual Device: LM6134AIMX/NOPB	QBS Product Reference: OPA2993IDR[1]	QBS Process Reference: THS3491IDDAR	QBS Process Reference: OPA2810IDGKR	QBS Package Reference: TL494IDR	QBS Process Reference: OPA2863QDRQ1	QBS Package Reference: ULQ2003AQDRQ1	QBS Package Reference: ULQ2003AQDRQ1	QBS Package Reference: TCAN1043DQ1	QBS Package Reference: TCAN844VDRQ1	SN
SD	C3	PB Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	-	-	1/15/0	1/15/0	1/15/0	-	-	
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	1/22/0	-	-	-	-	1/15/0	1/15/0	1/15/0	-	-	
PD	C4	Physical Dimensions	(per mechanical drawing)	-	1/5/0	-	-	-	-	-	-	-	-	-	
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	-	-	-	3/30/0	3/30/0	-	-	1/10/0	
ESD	E2	ESD CDM	-	1500 Volts	-	-	-	-	-	-	-	-	1/3/0	-	
ESD	E2	ESD CDM	-	250 Volts	1/3/0	1/3/0	3/9/0	3/9/0	-	-	-	-	-	-	
ESD	E2	ESD CDM	-	500 Volts	-	-	-	-	-	1/3/0	-	-	-	-	
ESD	E2	ESD HBM	-	1000 Volts	-	1/3/0	3/9/0	3/9/0	-	-	-	-	-	-	
ESD	E2	ESD HBM	-	2000 Volts	-	-	-	-	-	1/3/0	-	-	-	-	
ESD	E2	ESD HBM	-	4000 Volts	-	-	-	-	-	-	-	-	1/3/0	-	
LU	E4	Latch-Up	Per JESD78	-	-	1/3/0	3/18/0	3/9/0	-	1/6/0	-	-	1/6/0	-	
CHAR	E5	Electrical Characterization	Min, Typ, Max Temp	-	-	1/30/0	3/90/0	3/90/0	1/30/0	-	-	-	-	-	
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	1/30/0	3/90/0	3/90/0	1/30/0	-	-	-	-	-	
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	-	-	-	-	3/90/0	3/90/0	-	3/90/0	-	
FTY	E6	Final Test Yield	-	-	1/Pass	-	-	-	-	-	-	-	-	-	

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM6134AIMX/NOPB 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-2503-031

[1] Same die used in the LM6134AIMX/NOPB

Qualification Report

Redbull Qual LM6142AIMX/NOPB Dual Channel SOIC OPA2993
Approve Date 02-June-2026

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM6142AIMX/NOPB	QBS Product Reference: OPA2993IDR	QBS Process Reference: THS3491IDDAR	QBS Package Reference: LM2903BQDRQ1	QBS Package Reference: LT1013DIDR	QBS Package Reference: LP2951-50QDRQ1M3
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	1/77/0	3/231/0	1/77/0
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	1/77/0	3/231/0	1/77/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	1/77/0	3/231/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	1/45/0
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	3/231/0	-	3/231/0	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	-	-	1/77/0
HTOL	B1	Life Test	150C	300 Hours	-	-	-	3/231/0	3/231/0	-

Type	#	Test Name	Condition	Duration	Qual Device: LM6142AIMX/NOPB	QBS Product Reference: OPA2993IDR	QBS Process Reference: THS3491IDDAR	QBS Package Reference: LM2903BQDRQ1	QBS Package Reference: LT1013DIDR	QBS Package Reference: LP2951-50QDRQ1M3
HTOL	B1	Life Test	70C Vcc Max (self heating brings Tj up to 150C)	300 Hours	-	-	3/231/0	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	-	1/800/0	-	-
ELFR	B2	Early Life Failure Rate	150C	24 Hours	-	-	-	-	3/2400/0	-
ELFR	B2	Early Life Failure Rate	70C (self heating brings Tj up to 150C)	24 Hours	-	-	3/3000/0	-	-	-
SD	C3	PB Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	1/15/0	-	-
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	1/15/0	1/22/0	-
PD	C4	Physical Dimensions	(per mechanical drawing)	-	1/5/0	-	-	1/10/0	-	1/10/0
ESD	E2	ESD CDM	-	1500 Volts	-	-	-	1/3/0	-	-
ESD	E2	ESD CDM	-	250 Volts	-	1/3/0	3/9/0	-	-	-
ESD	E2	ESD CDM	-	500 Volts	-	-	-	-	1/3/0	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	1/3/0	3/9/0	-	1/3/0	-

Type	#	Test Name	Condition	Duration	Qual Device: LM6142AIMX/NOPB	QBS Product Reference: OPA2993IDR	QBS Process Reference: THS3491IDDAR	QBS Package Reference: LM2903BQDRQ1	QBS Package Reference: LT1013DIDR	QBS Package Reference: LP2951-50QDRQ1M3
ESD	E2	ESD HBM	-	2000 Volts	-	-	-	1/3/0	-	1/3/0
ESD	E2	ESD HBM	-	2500 Volts	-	1/3/0	-	-	-	-
LU	E4	Latch-Up	Per JESD78	-	-	1/3/0	3/18/0	1/6/0	1/3/0	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	1/30/0	3/90/0	3/90/0	1/30/0	3/90/0
FTY	E6	Final Test Yield	-	-	1/Pass	-	-	-	-	-

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM6142AIMX/NOPB 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-2509-100

Qualification Report

Redbull Qual LM6144AIMX/NOPB Quad Channel SOIC
Approve Date 07-May-2026

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM6144AIMX/NOPB	QBS Product Reference: OPA2993IDR	QBS Process Reference: THS3491IDDAR	QBS Process Reference: OPA2810IDGKR	QBS Process Reference: OPA2863QDRQ1	QBS Package Reference: TCAN1043DQ1	QBS Package Reference: TL494IDR	QBS Package Reference: ULQ2003AQDRQ1	QBS Package Reference: ULQ2003AQDRQ1	QBS Package Reference: TCAN1043DQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	-	3/231/0	3/231/0	-	-	3/231/0
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	-	-	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	1/77/0	3/231/0	3/231/0	3/231/0	3/231/0	-	-	-	-	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0	3/231/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	3/135/0	-	-	-	-	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	3/231/0	3/231/0	-	-	3/231/0	-	-	-
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	-	-	-	1/45/0	-	-	-	3/135/0
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	3/231/0	-	1/77/0	-	-	3/231/0	3/231/0
HTOL	B1	Life Test	150C	300 Hours	-	-	-	-	3/231/0	-	3/231/0	-	-	-
HTOL	B1	Life Test	70C Vcc Max (self heating brings Tj up to 150C)	300 Hours	-	-	3/231/0	-	-	-	-	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	-	3/3000/0	3/2400/0	-	-	-	-	-
ELFR	B2	Early Life Failure Rate	70C (self heating brings Tj up to 150C)	24 Hours	-	-	3/3000/0	-	-	-	-	-	-	-
SD	C3	PB Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	-	1/15/0	1/15/0	-	1/15/0	1/15/0	-

Type	#	Test Name	Condition	Duration	Qual Device: LM6144AIMX/NOPB	QBS Product Reference: OPA2993IDR	QBS Process Reference: THS3491IDDAR	QBS Process Reference: OPA2810IDGKR	QBS Process Reference: OPA2863QDRQ1	QBS Package Reference: TCAN1043DQ1	QBS Package Reference: TL494IDR	QBS Package Reference: ULQ2003AQDRQ1	QBS Package Reference: ULQ2003AQDRQ1	QBS Package Reference: TCAN1043DQ1
SD	C3	PB Solderability	>95% Lead Coverage 8 Hr Steam Age	-	-	-	-	-	1/15/0	1/15/0	-	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	-	1/15/0	1/15/0	-
SD	C3	PB-Free Solderability	>95% Lead Coverage 8 Hr Steam Age	-	-	-	-	-	1/15/0	1/15/0	-	1/15/0	1/15/0	-
PD	C4	Physical Dimensions	(per mechanical drawing)	-	1/5/0	-	-	-	3/30/0	3/30/0	-	3/30/0	-	-
ESD	E2	ESD CDM	-	1500 Volts	-	-	-	-	-	-	-	-	-	1/3/0
ESD	E2	ESD CDM	-	250 Volts	1/3/0	1/3/0	3/9/0	3/9/0	-	-	-	-	-	-
ESD	E2	ESD CDM	-	500 Volts	-	-	-	-	1/3/0	-	-	-	-	-
ESD	E2	ESD HBM	-	1000 Volts	-	1/3/0	3/9/0	3/9/0	-	-	-	-	-	-
ESD	E2	ESD HBM	-	2000 Volts	-	-	-	-	1/3/0	-	-	-	-	-
ESD	E2	ESD HBM	-	2500 Volts	1/3/0	1/3/0	-	-	-	-	-	-	-	-
ESD	E2	ESD HBM	-	4000 Volts	-	-	-	-	-	-	-	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	1/3/0	1/3/0	3/18/0	3/9/0	1/6/0	-	-	-	-	1/6/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	1/30/0	3/90/0	3/90/0	3/90/0	1/30/0	1/30/0	3/90/0	-	3/90/0

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM6144AIMX/NOPB 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-2509-102

Qualification Report

Redbull Qual LM6132BIN/NOPB (CMS#C2503105) Dual Channel 8-PDIP OPA2993
Approve Date 07-May-2026

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM6132BIN/NOPB	QBS Product Reference: OPA2993IDR	QBS Process Reference: THS3491IDDAR	QBS Process Reference: OPA2810IDGKR	QBS Package Reference: NE5532P	QBS Package Reference: TS12A4514P	QBS Package Reference: SN74HC00N	QBS Package Reference: SN74HC04N	QBS Package Reference: SN74HC164N	QBS Package Reference: OP07CP	QBS Package Reference: TL071CP	QBS Package Reference: ULN2003AN	QBS Package Reference: NE556N
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	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	-	-	-	-	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	3/231/0	-	-	-	-	-	1/77/0	1/77/0	1/77/0	1/77/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	3/231/0	-	1/77/0	1/77/0	-	-	1/77/0	1/77/0	1/77/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	-	-	-	-	-	-	1/77/0	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	3/231/0	3/231/0	-	1/77/0	-	-	-	-	-	-	1/77/0
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	3/231/0	-	-	-	-	-	-	-	-	-
HTOL	B1	Life Test	150C	300 Hours	-	-	-	-	3/231/0	-	-	-	-	-	-	-	-
HTOL	B1	Life Test	70C Vcc Max (self heating brings Tj up to 150C)	300 Hours	-	-	3/231/0	-	-	-	-	-	-	-	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	-	3/3000/0	-	-	-	-	-	-	-	-	-
ELFR	B2	Early Life Failure Rate	70C (self heating brings Tj up to 150C)	24 Hours	-	-	3/3000/0	-	-	-	-	-	-	-	-	-	-
SD	C3	PB-Free Solderability	8 Hours Steam Age	-	-	-	-	-	3/66/0	-	-	-	-	-	-	-	-
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes); PB-Free Solder;	-	1/22/0	-	-	-	3/66/0	-	-	-	-	-	-	-	-
PD	C4	Physical Dimensions	(per mechanical drawing)	-	1/5/0	-	-	-	-	-	-	-	-	-	-	-	-
ESD	E2	ESD CDM	-	1000 Volts	-	1/3/0	-	-	-	-	-	-	-	1/3/0	-	-	1/3/0
ESD	E2	ESD CDM	-	2000 Volts	-	-	-	-	-	-	1/3/0	-	-	1/3/0	-	-	-
ESD	E2	ESD CDM	-	250 Volts	1/3/0	1/3/0	3/9/0	3/9/0	-	-	-	-	-	-	-	-	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	1/3/0	1/3/0	3/9/0	3/9/0	-	-	-	-	-	-	-	-	1/3/0
ESD	E2	ESD HBM	-	2500 Volts	1/3/0												
LU	E4	Latch-Up	Per JESD78	-	1/3/0	1/3/0	3/18/0	3/9/0	-	-	-	-	-	-	-	-	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	1/30/0	3/90/0	3/90/0	-	-	-	-	-	1/30/0	-	1/30/0	1/30/0

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM6132BIN/NOPB 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-2503-039

Qualification Report

Redbull Qual LM6142BIN/NOPB Dual Channel 8-PDIP OPA2993
Approve Date 11-May-2026

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM6142BIN/NOPB	QBS Product Reference: OPA2993IDR	QBS Process Reference: THS3491IDDAR	QBS Package Reference: NE5532P	QBS Package Reference: TL074IN	QBS Package Reference: OPA2277P	QBS Package Reference: OP07CP	QBS Package Reference: TL071CP	QBS Package Reference: ULN2003AN	QBS Package Reference: NE556N
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	1/77/0	-	-	-	-	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	-	1/77/0	-	-	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	-	-	1/77/0	1/77/0	1/77/0	1/77/0	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	1/77/0	1/77/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	-	-	-	1/77/0	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	3/231/0	-	1/77/0	-	-	-	-	1/77/0
HTOL	B1	Life Test	150C	300 Hours	-	-	-	3/231/0	-	-	-	-	-	-
HTOL	B1	Life Test	70C Vcc Max (self heating brings Tj up to 150C)	300 Hours	-	-	3/231/0	-	-	-	-	-	-	-
ELFR	B2	Early Life Failure Rate	70C (self heating brings Tj up to 150C)	24 Hours	-	-	3/3000/0	-	-	-	-	-	-	-
SD	C3	PB-Free Solderability	8 Hours Steam Age	-	-	-	-	3/66/0	-	-	-	-	-	-
PD	C4	Physical Dimensions	(per mechanical drawing)	-	1/5/0	-	-	-	-	-	-	-	-	-

Type	#	Test Name	Condition	Duration	Qual Device: LM6142BIN/NOPB	QBS Product Reference: OPA2993IDR	QBS Process Reference: THS3491IDDAR	QBS Package Reference: NE5532P	QBS Package Reference: TL074IN	QBS Package Reference: OPA2277P	QBS Package Reference: OP07CP	QBS Package Reference: TL071CP	QBS Package Reference: ULN2003AN	QBS Package Reference: NE556N
ESD	E2	ESD CDM	-	1000 Volts	1/3/0	1/3/0	3/9/0	-	-	1/3/0	1/3/0	-	-	1/3/0
ESD	E2	ESD CDM	-	250 Volts	1/3/0	1/3/0	3/9/0	-	-	1/3/0	-	-	-	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	1/3/0	3/9/0	-	-	1/3/0	-	-	-	1/3/0
ESD	E2	ESD HBM	-	2500 Volts	-	1/3/0	-	-	-	-	-	-	-	-
LU	E4	Latch-Up	Per JESD78	-	-	1/3/0	3/18/0	-	-	1/3/0	-	-	-	1/3/0
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

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM6142BIN/NOPB 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-2509-101

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