PCN Number:	20230306000.1	PCN Date:	March 07, 2023
Title:	Qualification of new Fab site (FFAB) using qualified Process Technology, Die Revision and additional Assembly BOM options for select devices		
Customer Contact:	PCN Manager	Dept:	Quality Services
Proposed 1st Ship Date:	Jun 7, 2023	Sample requests accepted until:	April 7, 2023*

***Sample requests received after April 6, 2023 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
		☐	Part number change		

PCN Details

Description of Change:

Texas Instruments is pleased to announce the qualification of a new fab & process technology (FFAB, BICOM3XHV) and assembly BOM options for selected devices as listed below in the product affected section.

Current Fab Site			Additional Fab Site		
Current Fab Site	**Process**	**Wafer Diameter**	**Additional Fab Site**	**Process**	**Wafer Diameter**
SFAB	JIBB	150 mm	FFAB	BICOM3XHV	200 mm

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

Assembly BOM options are noted below for both Group 1 and Group 2 device:

	Current	Additional
Bond wire composition, diameter	Au, 1.2 or 1.3 mils	Cu,1.0 mil
Mold Compound	4209640	4226323
Mount Compound	4205846	4147858
Die coat step	TI Malaysia	Bump Site

For the devices in Group 2, they will also be subjected to the following changes in addition to above:

	Current	Additional
Die /Product Technology	Single die solution	Dual Die Solution
Bond	Single Bond (pins 4& 11)	Double Bond (pins 4 & 11)

Qual details are provided in the Qual Data Section.

Reason for Change:

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
☒ 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
FR-BIP-1	**TID**	**DEU**	**Freising**

Die Rev:

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

Sample product shipping label (not actual product label)

Product Affected:

Group 1 Device list:

OPA2227U/2K5G4	OPA227UA	OPA228UG4	OPA228UAG4
OPA228UA	OPA2228UA/2K5	OPA2227UE4	OPA2227UA/2K5E4
OPA2227UAG4	OPA37GUE4	OPA2228U/2K5	OPA228UA/2K5
OPA227U	OPA227U/2K5	OPA2227UAE4	OPA2227UA/2K5
OPA2227UG4	OPA228U	OPA227UA/2K5	OPA2227U
OPA227UA/2K5G4	OPA2227UA	OPA2228UA	OPA37GU
OPA2227U/2K5	OPA27GU	OPA27GUE4	OPA2228U
OPA2228UE4	OPA27GU/2K5	OPA27GUG4	OPA37GU/2K5

Group 2 Device list:

OPA4227UA/2K5	OPA4227UA	OPA4227UAG4

For alternate parts with similar or improved performance, please visit the product page on TI.com

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

Type	Test Name / Condition	Duration	Qual Device: OPA2227U	Qual Device: OPA2228U	QBS Process Reference: INA821ID	QBS Process Reference: OPA207ID	QBS Package Reference: INA849D
HTOL	Life Test, 100C[A]	300 Hours	-	-	-	-	1/77/0
HTOL	Life Test, 150C	300 Hours	-	-	3/231/0	3/231/0	-
HBM	ESD - HBM	1500 V	-	-	1/3/0	-	-
HBM	ESD - HBM	2000 V	1/3/0	-	-	3/9/0	1/3/0
CDM	ESD - CDM	500 V	1/3/0	-	1/3/0	3/9/0	1/3/0
CDM	ESD - CDM	750 V	-	-	1/3/0	3/9/0	1/3/0
LU	Latch-up	Per JESD78	1/6/0	-	1/6/0	3/18/0	1/6/0
ED	Electrical Characterization	Per Datasheet Parameters	1/30/0	1/30/0	3/90/0	3/90/0	1/30/0
HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	-
HTSL	High Temp Storage Bake 170C	420 Hours	-	-	3/231/0	3/231/0	3/231/0
TC	Temperature Cycle, -65/150C	500 Cycles	-	-	3/231/0	3/231/0	3/231/0
THB	Biased Temperature and Humidity, 85C/85%RH	1000 Hours	-	-	-	-	3/231/0
UHAST	Unbiased HAST 130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	3/231/0

- 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
- QBS: Qual By Similarity
- Qual Device OPA2227U/OPA2227UA are qualified at L2, 260C
- Qual Device OPA2228U/OPA2228UA are qualified at L2, 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/

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

TI Qualification ID: 20210224-138801

TI Information
Selective Disclosure

Qualification Report
Approve Date 31-AUGUST -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: OPA4227UA	QBS Reference: INA821ID	QBS Reference: OPA4187ID	QBS Reference: OPA4388ID
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	2/154/0
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	3/231/0	3/231/0	3/231/0	2/154/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	3/231/0	3/231/0	3/231/0	2/154/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	3/231/0	-	-	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	3/231/0	3/231/0	-
HTOL	B1	Life Test	150C	300 Hours	-	3/231/0	-	-
ESD	E2	ESD CDM	-	1000 Volts	1/3/0	-	-	-
ESD	E2	ESD CDM	-	1750 Volts	-	-	-	1/3/0
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	1/3/0	-	-	-
ESD	E2	ESD HBM	-	4500 Volts	-	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	1/3/0	1/6/0	1/6/0	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	3/90/0	1/30/0	1/30/0

- QBS: Qual By Similarity
- Qual Device OPA4227UA is qualified at MSL2 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/

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

TI Qualification ID: R-CHG-2207-061

TI Information
Selective Disclosure

Qualification Report
Approve Date 21-FEBRUARY -2023

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: OPA27GU/2K5	QBS Reference: INA849DR	QBS Reference: INA821ID	QBS Reference: OPA227U	QBS Reference: OPA207ID
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-	3/231/0
HAST	A2	Temperature Humidity Bias	85C/85%RH	1000 Hours	-	3/231/0	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	-	3/231/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	-	3/231/0
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	3/231/0	3/231/0	-	3/231/0
HTOL	B1	Life Test	100C	300 Hours	-	1/77/0	-	-	-
HTOL	B1	Life Test	150C	300 Hours	-	-	3/231/0	-	3/231/0
ESD	E2	ESD CDM	-	250 Volts	-	1/3/0	1/3/0	1/3/0	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	1/3/0	1/3/0	1/3/0	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	1/6/0	1/6/0	1/3/0	1/3/0
CHAR	E5	Electrical Characterization	Min, Typ, Max Temp	-	-	1/30/0	3/90/0	1/30/0	1/30/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	1/30/0	3/90/0	1/30/0	1/30/0

- QBS: Qual By Similarity
- Qual Device OPA27GU/2K5 is qualified at MSL2 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/

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

TI Qualification ID: R-NPD-2203-142

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

	Type	Test Name / Condition	Duration	Qual Device: OPA227U	Qual Device: OPA228U	QBS Process Reference: INA821ID	QBS Process Reference: OPA207ID	QBS Package Reference: INA849D
	HTOL	Life Test, 100C[A]	300 Hours	-	-	-	-	1/77/0
	HTOL	Life Test, 150C	300 Hours	-	-	3/231/0	3/231/0	-
	HBM	ESD - HBM	2000 V	1/3/0	-	1/3/0	3/9/0	1/3/0
	CDM	ESD - CDM	1500 V	1/3/0	-	1/3/0	3/9/0	1/3/0
	CDM	ESD - CDM	1000 V	1/3/0	-	-	3/9/0	1/3/0
	LU	Latch-up	Per JESD78	1/6/0	-	1/6/0	3/18/0	1/6/0
	ED	Electrical Characterization	Per Datasheet Parameters	1/30/0	1/30/0	3/90/0	3/90/0	1/30/0
	HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	-
	HTSL	High Temp Storage Bake 170C	420 Hours	-	-	3/231/0	3/231/0	3/231/0
	TC	Temperature Cycle, -65/150C	500 Cycles	-	-	3/231/0	3/231/0	3/231/0
	THB	Biased Temperature and Humidity, 85C/85%RH	1000 Hours	-	-	-	-	3/231/0
	UHAST	Unbiased HAST 130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	3/231/0

- QBS: Qual By Similarity
- Qual Device OPA227U is qualified at L2, 260C
- Qual Device OPA228U is qualified at L2, 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/

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

TI Qualification ID: 20210224-138802
[A] Tj of device at 150C

TI Information
Selective Disclosure

Qualification Report
Approve Date 12-MAY -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: OPA37GU/2K5	QBS Package Reference: INA849DR	QBS Package Reference: THP210DR	QBS Process Reference: INA821ID	QBS Product Reference: OPA227U	QBS Product Reference: OPA228U
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	-	-
HAST	A2	Temperature Humidity Bias	85C/85%RH	1000 Hours	-	3/231/0	-	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	3/231/0	-	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	3/231/0	-	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	3/231/0	3/231/0	3/231/0	-	-
HTOL	B1	Life Test	100C[A]	300 Hours	-	1/77/0	-	-	-	-
HTOL	B1	Life Test	150C	300 Hours	-	-	-	3/231/0	-	-
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	1/3/0	-
LU	E4	Latch-Up	Per JESD78	-	-	1/6/0	-	1/6/0	1/3/0	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	1/30/0	-	3/90/0	1/30/0	1/30/0

- QBS: Qual By Similarity
- Qual Device OPA37GU/2K5 is qualified at MSL2 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/

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

TI Qualification ID: R-NPD-2203-143

[A] Tj = 150C

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

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

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to TI's Terms of Sale (www.ti.com/legal/termsofsale.html) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.