12500 TI Boulevard, MS 8640, Dallas, Texas 75243

PCN# 20230328001.1
Qualification of new Fab site (FFAB) using qualified Process Technology, Die Revision and additional Assembly BOM options for select devices
Change Notification / Sample Request

Date: March 30, 2023
To: TOKYO ELECTRON DEVICE (DSTR) PCN

Dear Customer:

This is an announcement of a change to a device that is currently offered by Texas Instruments (TI). The details of this change are on the following pages, and are in alignment with our standard product change notification (PCN) process.

TI requires acknowledgement of receipt of this notification within 30 days of the date of this notice. Lack of acknowledgement of this notice within 30 days constitutes acceptance of the change. If samples or additional data are required, requests must be received within 30 days of this notification, given that samples are not built ahead of the change.

The Proposed First Ship date in this PCN letter is the earliest possible date that customers could receive the changed material. It is our commitment that the changed device will not ship before that date. If samples are requested within the 30 day sample request window, customers will still have 30-days to complete their evaluation regardless of the proposed 1st ship date.

This particular PCN is related to TI's multiyear transition plan for our two remaining factories with 150-millimeter production (DFAB in Dallas, Texas, and SFAB in Sherman, Texas). DFAB will remain open, but will focus on 200-mm production, with a smaller set of technologies. SFAB will close no earlier than 2024 and no later than 2025. As referenced in the "reason for change" below, these changes are part of our multiyear plan to transition these products to newer, more efficient manufacturing processes and technologies, underscoring our commitment to product longevity and supply continuity.

For questions regarding this notice or to provide acknowledgement of this PCN, you may contact your local Field Sales Representative or the PCN Team (PCN_ww_admin_team@list.ti.com). For sample requests or sample related questions, contact your local Field Sales Representative. As always, we thank you for your continued business.

PCN Team
SC Business Services

20230328001.1
Attachment: 1

Products Affected:

The devices listed on this page are a subset of the complete list of affected devices. According to our records, these are the devices that you have purchased within the past twenty-four (24) months. The corresponding customer part number is also listed, if available.

DEVICE	CUSTOMER PART NUMBER
OPA277UA	null
OPA277UA/2K5	null
OPA4277UA	null
OPA4277UA/2K5	null
OPA277UAG4	null

Technical details of this Product Change follow on the next page(s).

PCN Number:	20230328001.1	PCN Date:	March 30, 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 30, 2023	Sample requests accepted until:	April 30, 2023*

***Sample requests received after April 30, 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	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]**
B, D	**A**

Sample product shipping label (not actual product label)

Product Affected:

Group 1 Device list:

OPA277UA	OPA277UA/2K5E4	OPA277UAE4	OPA277UAG4
OPA277UA/2K5			

Group 2 Device list:

OPA4277UA	OPA4277UA/2K5E4	OPA4277UAE4	OPA4277UAG4
OPA4277UA/2K5			

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

Qualification Report
Approve Date 15-March-2023

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: OPA277UA	QBS Process Reference: INA849DR	QBS Package Reference: INA821ID
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	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
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	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	-	500 Volts	1/3/0	-	-
ESD	E2	ESD CDM	-	750 Volts	-	1/3/0	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	1/3/0	1/3/0	-
ESD	E2	ESD HBM	-	1500 Volts	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	1/3/0	1/6/0	1/6/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	1/30/0	3/90/0

- QBS: Qual By Similarity
- Qual Device OPA277UA 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

Qualification Report
Approve Date 14-NOVEMBER -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: OPA4277UA	QBS Process Reference: OPA202ID	QBS Process Reference: INA828ID	QBS Process Reference: INA821ID	QBS Process Reference: OPA207ID	QBS Package Reference: OPA4187ID	QBS Package Reference: OPA4227UA	QBS Pacage Reference: OPA4388ID	QBS Product Reference: OPA2277U
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	3/231/0	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	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	3/231/0	3/231/0	3/231/0	2/154/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	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	125C	1000 Hours	-	3/231/0	3/231/0	-	-	-	-	-	-
HTOL	B1	Life Test	150C	300 Hours	-	-	-	3/231/0	3/231/0	-	-	-	-
ESD	E2	ESD CDM	-	1000 Volts	-	-	-	-	-	-	1/3/0	-	1/3/0
ESD	E2	ESD CDM	-	1750 Volts	-	-	-	-	-	-	-	1/3/0	-
ESD	E2	ESD CDM	-	500 Volts	1/3/0	-	1/3/0	1/3/0	1/3/0	1/3/0	-	-	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	-	-	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	-	1/3/0

LU	E4	Latch-Up	Per JESD78	-	1/3/0	-	1/6/0	1/6/0	1/3/0	1/6/0	1/3/0	1/3/0	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	3/90/0	3/90/0	3/90/0	1/30/0	1/30/0	1/30/0	1/30/0	1/30/0

- QBS: Qual By Similarity
- Qual Device OPA4277UA is qualified at MSL2 260C

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Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

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