

<b>PCN Number:</b>	<b>20240202011.1</b>	<b>PCN Date:</b>	February 02, 2024																					
<b>Title:</b>	Qualification of FFAB using qualified Process Technology, Die Revision and Assembly site/BOM option qualification for select devices																							
<b>Customer Contact:</b>	Change Management team	<b>Dept:</b>	Quality Services																					
<b>Proposed 1<sup>st</sup> Ship Date:</b>	May 02, 2024	<b>Estimated Sample Availability:</b>	March 03, 2024*																					
<b>*Sample requests received after March 03, 2024* will not be supported.</b>																								
<b>Change Type:</b>																								
<input checked="" type="checkbox"/> Assembly Site	<input checked="" type="checkbox"/> Design	<input type="checkbox"/>	Wafer Bump Material																					
<input checked="" type="checkbox"/> Assembly Process	<input type="checkbox"/> Data Sheet	<input type="checkbox"/>	Wafer Bump Process																					
<input checked="" type="checkbox"/> Assembly Materials	<input type="checkbox"/> Part number change	<input checked="" type="checkbox"/>	Wafer Fab Site																					
<input type="checkbox"/> Mechanical Specification	<input type="checkbox"/> Test Site	<input checked="" type="checkbox"/>	Wafer Fab Materials																					
<input checked="" type="checkbox"/> Packing/Shipping/Labeling	<input type="checkbox"/> Test Process	<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 a new fab & process technology (FFAB, BICOMHD & BICOM3XHV) and Assembly site/BOM option qualification for selected devices as listed below in the product affected section.																								
<table border="1"> <thead> <tr> <th colspan="3">Current Fab Site</th> <th colspan="3">Additional Fab Site</th> </tr> <tr> <th>Current Fab Site</th> <th>Process</th> <th>Wafer Diameter</th> <th>Additional Fab Site</th> <th>Process</th> <th>Wafer Diameter</th> </tr> </thead> <tbody> <tr> <td>SFAB</td> <td>CBC10 JIBB</td> <td rowspan="2">150 mm</td> <td rowspan="2">FFAB</td> <td>BICOMHD</td> <td rowspan="2">200 mm</td> </tr> <tr> <td>DL-LIN-1</td> <td>BICOM</td> <td>BICOM3XHV</td> </tr> </tbody> </table>			Current Fab Site			Additional Fab Site			Current Fab Site	Process	Wafer Diameter	Additional Fab Site	Process	Wafer Diameter	SFAB	CBC10 JIBB	150 mm	FFAB	BICOMHD	200 mm	DL-LIN-1	BICOM	BICOM3XHV	
Current Fab Site			Additional Fab Site																					
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SFAB	CBC10 JIBB	150 mm	FFAB	BICOMHD	200 mm																			
DL-LIN-1	BICOM			BICOM3XHV																				
The die was also changed as a result of the process change.																								
BOM option comparisons are as follows:																								
<b>Group 1 BOM Table (FFAB/Process migration, Die Change &amp; CDAT as additional Assembly site):</b>																								
<table border="1"> <thead> <tr> <th>What</th> <th>UTL2</th> <th>CDAT</th> </tr> </thead> <tbody> <tr> <td>Bond Wire composition, diameter</td> <td>Au, 1.0 mil</td> <td>Cu, 1.0 mil</td> </tr> <tr> <td>Mold Compound</td> <td>SID#CZ0096</td> <td>4224115</td> </tr> <tr> <td>Mount Compound</td> <td>SID#PZ0001</td> <td>4226215</td> </tr> </tbody> </table>				What	UTL2	CDAT	Bond Wire composition, diameter	Au, 1.0 mil	Cu, 1.0 mil	Mold Compound	SID#CZ0096	4224115	Mount Compound	SID#PZ0001	4226215									
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<b>Group 2 BOM Table (FFAB/Process migration, Die Change &amp; MLA as additional Assembly site):</b>																								
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Mold Compound	SID#450179	4211880																						
Mount Compound	SID#400180	44223772																						

**Group 3 BOM Table (FFAB/Process migration, Die Change & additional BOM options):**

What	Current	Additional
Bond Wire composition, diameter	Au, 1.2 mil	Cu, 1.0 mil
Mold Compound	4209640	4211880 or 4226323
Mount Compound	4205846	4147858
Die Coat	PI or none	None
MSL	3	2

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
<input checked="" type="checkbox"/> No Change	<input checked="" type="checkbox"/> No Change	<input checked="" type="checkbox"/> No Change	<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
DL-LIN-1	DLN	USA	Dallas
<b>FR-BIP-1</b>	<b>TID</b>	<b>DEU</b>	<b>Freising</b>

**Die Rev:**

Current	New
Die Rev [2P] A,B	Die Rev [2P] <b>A,B</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
<b>CDAT</b>	<b>CDA</b>	<b>CHN</b>	<b>Chengdu</b>
<b>MLA</b>	<b>MLA</b>	<b>MYS</b>	<b>Kuala Lumpur</b>

Sample product shipping label (not actual product label)

TEXAS  
INSTRUMENTS  
MADE IN: Malaysia  
2DC: 29:



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) 830: SHE (21L) 660: USA  
(22L) ASO: MLA (23L) ACO: MYS

#### Product Affected:

**Group 1 Device list (FFAB/Process migration, Die Change & CDAT as additional Assembly site):**

OPA656NB/250

**Group 2 Device list (FFAB/Process migration, Die Change & MLA as additional Assembly site):**

THS4022IDGNR

**Group 3 Device list (FFAB/Process migration, Die Change & additional BOM options):**

OPA656UB/2K5

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 Results

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

Type	#	Test Name	Condition	Duration	Qual Device: OPA656DBV	QBS Product Reference: OPA656U	QBS Process Reference: OPA2810IDGKR	QBS Process Reference: OPA2863AIDSN	QBS Package Reference: TPS26610DDFR	QBS Package Reference: TPS26610DDFR	QBS Package Reference: OPA328DBV
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	-	3/231/0	3/231/0
UHA	A3	Autoclave	121C/15psig	96 Hours	-	-	-	-	-	3/231/0	-
UHA	A3	Unbiased HAST	130C/85%RH	96 Hours	1/77/0	-	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
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	3/231/0	-	-	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	1/77/0	1/77/0	3/231/0	-	-	3/231/0	3/231/0
HTOL	B1	Life Test	125C	1000 Hours	-	1/77/0	3/231/0	3/231/0	1/77/0	3/231/0	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	3/3000/0	-	-	-	-

Type	#	Test Name	Condition	Duration	Qual Device: OPA656DBV	QBS Product Reference: OPA656U	QBS Process Reference: OPA2810IDGKR	QBS Process Reference: OPA2863AIDSN	QBS Package Reference: TPS26610DDFR	QBS Package Reference: TPS26610DDFR	QBS Package Reference: OPA328DBV
SD	C3	PB Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	-	-	-	3/66/0
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	-	-	-	3/66/0
PD	C4	Physical Dimensions	(per mechanical drawing)	-	-	-	-	-	-	-	3/15/0
ESD	E2	ESD CDM	-	1500 Volts	-	-	-	-	1/3/0	-	-
ESD	E2	ESD CDM	-	250 Volts	-	1/3/0	-	3/9/0	-	-	1/3/0
ESD	E2	ESD CDM	-	500 Volts	1/3/0	1/3/0	3/9/0	-	-	-	-
ESD	E2	ESD HBM	-	1000 Volts	-	-	3/9/0	3/9/0	-	-	1/3/0
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	3/9/0	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	1/30/0	-	1/30/0

- QBS: Qual By Similarity
- Qual Device OPA656NB/250 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-NPD-2202-076

TI Information  
Selective Disclosure

## Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: OPA656U	QBS Process Reference: OPA2810IDGKR	QBS Package Reference: OPA2810IDR	QBS Package Reference: INA849DR
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	-
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	1/77/0	3/231/0	3/231/0	3/231/0
HTOL	B1	Life Test	100C	300 Hours	-	-	-	1/77/0
HTOL	B1	Life Test	125C	1000 Hours	1/77/0	3/231/0	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	3/3000/0	-	-
ESD	E2	ESD CDM	-	250 Volts	1/3/0	3/9/0	1/3/0	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	3/9/0	1/3/0	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	1/3/0	-	-	-
LU	E4	Latch-Up	Per JESD78	-	1/3/0	3/9/0	1/6/0	1/6/0
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 OPA656U 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-2206-163

TI Information  
Selective Disclosure

### Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: <a href="#">THS4022IDGNR</a>	QBS Product Reference: <a href="#">THS4032IDR</a>	QBS Process Reference: <a href="#">THS3491IDDAR</a>	QBS Package Reference: <a href="#">OPA2828IDGNR</a>	QBS Package Reference: <a href="#">THS3091IDGNR</a>
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-	-
HAST	A2	Temperature Humidity Bias	85C/85%RH	1000 Hours	-	-	-	3/231/1 <sup>1</sup>	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0	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	115C	300 Hours	-	-	3/231/0	1/77/1 <sup>1</sup>	-
HTOL	B1	Life Test	70C <sup>2</sup>	300 Hours	-	-	3/231/0	1/77/1 <sup>1</sup>	-
ELFR	B2	Early Life Failure Rate	70C <sup>2</sup>	24 Hours	-	-	3/3000/0	-	-

Type	#	Test Name	Condition	Duration	Qual Device: <a href="#">THS4022IDGNR</a>	QBS Product Reference: <a href="#">THS4032IDR</a>	QBS Process Reference: <a href="#">THS3491IDDAR</a>	QBS Package Reference: <a href="#">OPA2828IDGNR</a>	QBS Package Reference: <a href="#">THS3091IDGNR</a>
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes); PB-Free Solder;	-	-	-	-	1/22/0	-
PD	C4	Physical Dimensions	(per mechanical drawing)	-	-	-	-	3/15/0	-
ESD	E2	ESD CDM	-	1000 Volts	1/3/0	1/3/0	-	-	-
ESD	E2	ESD CDM	-	250 Volts	-	-	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
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

- QBS: Qual By Similarity
- Qual Device THS4022IDGNR 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/>

TI Qualification ID: R-NPD-2302-003

[1]-EOS  
[2] Tj=150C

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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