

# 12500 TI Boulevard, MS 8640, Dallas, Texas 75243

# PCN# 20230713001.1

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

**Date:** July 14, 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 and approval of this 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 Change Management team. For sample requests or sample related questions, contact your local Field Sales Representative. As always, we thank you for your continued business.

Change Management Team SC Business Services

# 20230713001.1 Attachment: 1

# **Products Affected:**

The devices listed on this page are a subset of the complete list of affected devices. According to our records, you have recently purchased these devices. The corresponding customer part number is also listed, if available.

DEVICE	<b>CUSTOMER PART NUMBER</b>
OPA4990IPWR	null
TL032IDR	null
TL062ACDR	null
TL064ACDR	null
TL064IDR	null
TL062CPWR	null
TL064BCDR	null
TL061IDR	null
TL062IPWR	null
TL064IPWR	null
UA741CDR	null
TL062IDR	null
TL062CDR	null
TL064CPWR	null
UA741CP	null
TL062CP	null
TLV9104IPWR	null

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

PCN Num					.3001.1			CN Da		July 14, 2023
Title:	_				b site (RFAB) y site/BOM o					ology, Die Revision
Customer	Cont	act:		Cha	ange Manage	ment tean	<b>D</b>	ept:		Quality Services
Proposed 1 <sup>st</sup> Ship Date:			:	Oct	t 13, 2023	E	stimat A	ed Sa vailat	-	August 13, 2023*
*Sample i	reque	sts rece	eived a	fte	r August 13	, 2023 wi	II not	be su	pportec	l
Change Ty										
				$\boxtimes$	Design					Bump Material
Assemb				Ц	Data Sheet			ļЦ		Bump Process
Assemb				<u>Ц</u>	Part numbe	r change				Fab Site
☐ Mechan				<u> </u>	Test Site					Fab Materials
□ Packing	g/Ship	oing/Lab	eling	Ш	Test Proces	S			Wafer	Fab Process
					PCN	Details				
Description	on of (	Change	:							
	C9) an									ess technology low in the product
	С	urrent F	ab Sit	:е			A	dditio	nal Fab	Site
Current		Pro	cess		Wafer Diameter	Addition Fab S	_	Pr	ocess	Wafer Diameter
SFAB		J	I1		150 mm	RFA			LBC9	300 mm
The die was also changed as a result of the process change.  Additionally, there will be a BOM/Assembly options introduced for these devices:										
Group 1:	( REAP		ss mia		, ,					
		3/Proce	ss mig		ion, & MLA a				oly site)	
Group 1: ( TSSOP (  Mount	PW) P	<mark>8/Proce</mark> ackage	ss mig		, ,					
TSSOP (	PW) P	B/Proce ackage ound	ss mig		ion, & MLA a				oly site) MLA	8
TSSOP (  Mount  Mold c	PW) Pocompo	B/Proce ackage ound und	ss mig		ion, & MLA a ASESHAT EY1000063 EN2000508				MLA 414785 421147	8
TSSOP (	PW) Pocompo	B/Proce ackage ound und	ss mig	ırat	ion, & MLA a ASESHAT EY1000063 EN2000508	as additio		sseml	MLA 414785 421147 MLA	8 1
TSSOP (  Mount  Mold c	PW) Pocompo	s/Proce ackage ound und kage	ss mig	ırat	ion, & MLA a ASESHAT EY1000063 EN2000508	as additio		sseml	MLA 414785 421147	8 1
TSSOP (  Mount  Mold c  SOIC (I	PW) Pocomposition (PW) Pace Type	B/Proce ackage bund und kage		rat	ion, & MLA a ASESHAT EY1000063 EN2000508 FMX 0.96mil Au/C	as addition		sseml	MLA 414785 421147 MLA 0.8mil C	8 1
TSSOP (  Mount  Mold of  SOIC (I  Wir	PW) Paccomposition of the composition of the compos	S/Proce ackage ound und kage	ss mig	ırat	ASESHAT EY1000063 EN2000508 FMX 0.96mil Au/C	u odate)		ssemb	MLA 414785 421147 MLA 0.8mil C	8 1 Cu
TSSOP (  Mount  Mold of  SOIC (I  Wir	PW) Pocomposition (PW) Pace Type	S/Proce ackage ound und kage	ss mig	ırat	ion, & MLA a ASESHAT EY1000063 EN2000508 FMX 0.96mil Au/C	u odate)		ssemb	MLA 414785 421147 MLA 0.8mil C	8 1 Cu
TSSOP (  Mount  Mold c  SOIC (I  Wir  Group 2: (	PW) Pacompo compo D) Pac re type (RFAE	S/Proce ackage ound und kage	ss mig	ıjrat	ASESHAT EY1000063 EN2000508 FMX 0.96mil Au/C	u odate)		ssemb	MLA 414785 421147 MLA 0.8mil C	8 1 Cu
TSSOP (  Mount  Mold of  SOIC (I  Wir  Group 2: (  Wir  Qual detail  Reason fo	PW) Pacompo  compo  D) Pacome type  (RFAE  re type  s are por Cha	s/Proce ackage bund und kage e brovided nge:	ss mig 0.8m in the	ırat il Au	FMX 0.96mil Au/C  Current u, 0.96mil Au al Data Section	u odate) , 0.96 Cu on.	onal As	ssemb	MLA 414785 421147  MLA 0.8mil C	8 1
SOIC (I Wir  Group 2: (  Wir  Qual detail  Reason fo  These char factories to	PW) Paccomposition of the composition of the compos	s/Proce ackage bund und kage e brovided nge: re part cer, more	0.8m in the	ırat iil Aı Qua	ion, & MLA a ASESHAT EY1000063 EN2000508 FMX 0.96mil Au/C ion, BOM Up Current u, 0.96mil Au al Data Section iyear plan to	u  odate)  transition processes	produc	ets fro	MLA 414785 421147  MLA 0.8mil C	8 1 Cu
SOIC (I Wir  Group 2: (  Wir  Qual detail  Reason fo  These char factories to commit me	PW) Paccomposition of the composition of the compos	s/Proce ackage ound und kage e brovided nge: re part ce er, more product I	0.8m in the of our n efficier ongevit	il Au Qua	ion, & MLA a ASESHAT EY1000063 EN2000508 FMX 0.96mil Au/C ion, BOM Up Current u, 0.96mil Au al Data Section iyear plan to nanufacturing nd supply con	odate)  transition processes	products and t	ets fro echno	MLA 414785 421147  MLA 0.8mil C	8 1 Su ed u 50 - millimeter

# **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
RFAB	RFB	USA	Richardson

# Die Rev:

Current New

Die Rev [2P]	Die Rev [2P]
A, C, F	A, B

# **Assembly Site Information:**

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
ASESH	ASH	CHN	Shanghai
FMX	MEX	MEX	Aguascalientes
MLA	MLA	MYS	Kuala Lumpur

Sample product shipping label (not actual product label)

TEXAS INSTRUMENTS

MADE IN: Malaysia 2DC: 2Q;

MSL 2 /260C/1 YEAR SEAL DT MSL 1 /235C/UNLIM 03/29/04

OPT: ITEM:

LBL: 5A (L)TO:1750



(1P) SN74LS07NSR

(Q) 2000 (D) 0336 (31T)LOT: 3959047MLA (4W) TKY(1T) 7523483812

(2P) REV: (V) 0099317 (20L) CSO: SHE (Z1L) CCO:USA (22L) ASO: MLA (23L) ACO: MYS

# **Product Affected:**

# Group 1 Device List: (RFAB/Process migration, BOM Update & MLA as an additional Assembly site)

OPA4990IPWR	TL032CDR	TL062ACDRG4	UA741CDR
TL031CDR	TL032IDR	TL062BCDR	
TL032ACDR	TL061ACDR	TLV9104IPWR	
TL032AIDR	TL062ACDR	TLV9304IPWR	

# Group 2 Device List: (RFAB/Process migration, BOM Update)

TL031CP	TL034CPWR	TL062ACP	TL062IPWR
TL031IP	TL034IDR	TL062BCP	TL064ACDR
TL032ACP	TL061ACP	TL062CDR	TL064BCDR
TL032AIP	TL061BCP	TL062CDRG4	TL064CDR
TL032CP	TL061CDR	TL062CP	TL064CPWR
TL032IP	TL061CP	TL062CPWR	TL064IDR
TL034ACDR	TL061IDR	TL062IDR	TL064IPWR

TL034AIDR	TL061IP	TL062IP	UA741CP	
TL034CDR				

For alternate parts with similar or improved performance, please visit the product page on  $\overline{\text{TI.com}}$ 

#### Qualification Results

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

Туре	#	Test Name	Condition	Duration	Qual Device: UA741CP	QBS Reference: OPA4990IDR	QBS Reference: NE5532P	QBS Reference: UCC37322P	QBS Reference: QPA990IDBVR
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	-	3/231/0
UHAST	A3	Autoclave	121C, 2 atm	96 Hours	-	3/231/5 <sup>1</sup>	-	-	-
TC	A4	Temperature Cycle	-65/150C	500 Cycles	-	3/231/0	-	3/231/0	3/231/0
HTOL	B1	Life Test	150C	300 Hours	-	3/231/10 <sup>2,3</sup>	3/231/0	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	1/800/0	-	-	-
SD	C3	PB-Free Solderability	8 Hours Steam Age	-	-	-	3/66/0	3/66/0	-
ESD	E2	ESD CDM	-	250 Volts	1/3/0	-	-	-	-
ESD	E2	ESD HBM	-	3000 Volts	-	-	-	-	3/9/0
LU	E4	Latch-Up	Per JESD78	-	-	3/18/0	-	-	3/9/0
CHAR	E5	Electrical Characterization	Min, Typ, Max Temp	-	-	3/90/0	-	-	3/90/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	3/90/0	-	-	3/90/0

- QBS: Qual By Similarity
- Qual Device UA741CP 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/

#### Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

TI Qualification ID: R-CHG-2201-021

- [1]-Discounted
- [2]-Discounted
- [3]-Discounted

# Qualification Results

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

	Data Displayed as: Number of lots / Total sample size / Total failed								
Туре	Test Name / Condition	Duration	Qual Device: OPA2990IPWR	QBS Process Reference: DRV8873SPWPRQ1	QBS Process Reference: <u>DRV8873SPWPRQ1-A0</u>	QBS Process Reference: <u>OPA2990IDR</u>			
AC	Autoclave 121C	96 Hours	-	2/202/0	1/77/0	-			
ED	Electrical Distributions	Cpk>1.67	-	2/60/0	1/30/0	-			
ED	Electrical Characterization	Per Datasheet Parameters	1/30/0	-	-	3/90/0			
ELFR	Early Life Failure Rate, 125C	48 Hours	-	2/1600/0	2/802/0	-			
HAST	Biased HAST, 130C/85%RH	96 Hours	3/231/0	2/150/0	1/106/0	3/231/0			
HBM	ESD - HBM	2500 V	1/3/0	-	-	-			
CDM	ESD - CDM	1500 V	1/3/0	-	-	3/9/0			
HTOL	Life Test, 125C	1000 Hours	-	2/154/0	1/77/0	-			
HTOL	Life Test, 150C	300 Hours	-	-	-	3/231/0			
HTSL	High Temp. Storage Bake 150C	1000 Hours	-	-	1/50/0	-			
HTSL	High Temp. Storage Bake 170C	420 Hours	3/231/0	-	-	3/231/0			
HTSL	High Temp. Storage Bake 175C	500 Hours	-	2/100/0	-	-			
LU	Latch-up	(per JESD78)	1/6/0	1/6/0	-	3/18/19			
PD	Physical Dimensions		-	2/20/0	1/10/0	-			
SD	Surface Mount Solderability	Pb Free	-	1/30/0	-	-			
SD	Solderability - Dip and Look	Pb Free	-	-	1/30/0	-			
SD	Solderability - Dip and Look	Pb	-	-	1/30/0	-			
SD	Surface Mount Solderability	Pb	-	1/30/0	-	-			
TC	Temperature Cycle, -65/150C	500 Cycles	3/231/0	2/154/0	1/77/0	3/231/0			
UHAST	Unbiased HAST, 130C/85%RH	96 Hours	3/231/0	-	-	3/231/0			
BP	Bond Pull	Wires	-	2/10/0	1/5/0	-			
WBS	Bond Shear	Wires	-	2/10/0	1/5/0	-			
	I D. Cimilanita								

<sup>-</sup> QBS: Qual By Similarity

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 Results**

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

Туре	#	Test Name	Condition	Duration	Qual Device: OPA2990IDR	QBS Reference: <u>OPA2990IDR</u>	QBS Reference: OPA2991IDR	QBS Reference: <u>OPA2991IDR</u>
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	-	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	1/77/0
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	-	-
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes); PB-Free Solder;	-	-	1/22/0	-	-
ESD	E2	ESD CDM	-	250 Volts	-	1/3/0	-	-
ESD	E2	ESD HBM	-	1000 Volts	-	1/3/0	-	-
LU	E4	Latch-Up	Per JESD78	-	-	1/3/0	1/3/0	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	1/30/0	1/30/0	-

- · OBS: Qual By Similarity
- Qual Device OPA2990IDR 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-2305-064

<sup>-</sup> Qual Device OPA2990IPWR is qualified at LEVEL2-260C

<sup>-</sup> Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable

<sup>-</sup> 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

<sup>-</sup> 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

#### **Qualification Results**

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

Туре	#	Test Name	Condition	Duration	Qual Device: <u>OPA4990IDR</u>	QBS Reference: <u>OPA4990IDR</u>	QBS Reference: <u>OPA4991IDR</u>
HAST	A2	Biased HAST	130C	96 Hours	-	3/231/0	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	3/231/0	1/77/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	1/77/0
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	3/231/0	-
HTOL	B1	Life Test	150C	300 Hours	-	3/231/0	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	3/2400/0	-
LU	E4	Latch-Up	Per JESD78	-	-	3/18/0	-
CHAR	<b>E</b> 5	Electrical Characterization	Per datasheet limits	-	-	3/90/0	-

- QBS: Qual By Similarity
- Qual Device OPA4990IDR 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
- $\bullet \quad \text{The following are equivalent HTSL options based on an activation energy of 0.7eV: } 150\text{C/1k Hours, and } 170\text{C/420 Hours}$
- 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 Tl's external Web site: http://www.ti.com/

TI Qualification ID: R-CHG-2305-066

# **Qualification Results**

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

Туре	#	Test Name	Condition	Duration	Qual Device: OPA4990IPWR	QBS Process Reference: <u>OPA2991QDGKRQ1</u>	QBSProduct/Process/ Package Reference: <u>OPA4991QPWRQ1</u>
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	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	-	-	1/45/0
HTSL	A6	High Temperature Storage Life	175C	630 Hours	-	3/135/0	-
HTOL	B1	Life Test	150C	300 Hours	-	-	3/231/0
HTOL	B1	Life Test	150C	408 Hours	-	3/230/0	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	3/2397/0	-
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	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	3/30/0	1/10/0

Туре	#	Test Name	Condition	Duration	Qual Device: OPA4990IPWR	QBS Process Reference: <u>OPA2991QDGKRQ1</u>	QBSProduct/Process/ Package Reference: <u>OPA4991QPWRQ1</u>
ESD	E2	ESD CDM	-	1500 Volts	-	-	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	-	-	1/6/0	3/18/0
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	3/90/0	3/90/0

- · QBS: Qual By Similarity
- Qual Device OPA4990IPWR 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-2305-067

# **Qualification Results**

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

Туре	#	Test Name	Condition	Duration	Qual Device: TLC271CDR	QBS Reference: <u>OPA4990IDR</u>	QBS Reference: <u>OPA990IDBVR</u>	QBS Reference: SN74HCS08QDRQ1	QBS Reference: TCAN1044VDRQ1
HAST	A2	Biased HAST	130C	96 Hours	-	3/231/0	-	-	-
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-	-
UHAST	А3	Autoclave	121C, 2 atm	96 Hours	-	3/231/51	-	-	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	3/231/0	-	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	3/231/0	3/231/0
TC	A4	Temperature Cycle	-65/150C	500 Cycles	-	3/231/0	-	-	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	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	150C	300 Hours	-	3/231/10 <sup>2,3</sup>	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	1/800/0	-	-	-
WBS	C1	Ball Shear	76 balls, 3 units min	Wires	1/76/0	-	-	-	-
WBP	C2	Bond Pull	76 Wires, 3 units min	Wires	1/76/0	-	-	-	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	-	3/30/0	3/30/0

ESD	E2	ESD CDM	-	1500 Volts	-	-	3/9/0	-	-
ESD	E2	ESD CDM	-	250 Volts	1/3/0	-	-	-	-
ESD	E2	ESD HBM	-	3000 Volts	-	-	3/9/0	-	-
LU	E4	Latch-Up	Per JESD78	-	-	3/18/0	3/9/0	-	-
CHAR	E5	Electrical Characterization	Min, Typ, Max Temp	-	-	3/90/0	3/90/0	-	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	3/90/0	3/90/0	-	-

- · QBS: Qual By Similarity
- Qual Device TLC271CDR 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/

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

TI Qualification ID: R-NPD-2209-036

- [1]-Mechanical damage from mis-handling @ test. [2]-Faulty BI sockets. [3]-Faulty BI sockets.

#### **Qualification Results**

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

Туре	#	Test Name	Condition	Duration	Qual Device: TL062CP	QBS Reference: OPA4990IDR	QBS Reference: LM2904BQDRQ1	QBS Reference: <u>NE5532P</u>	QBS Reference: UCC37322P	QBS Reference: <u>OPA2990IDR</u>
HAST	A2	Biased HAST	130C	96 Hours	-	3/231/0	3/231/0	3/231/0	-	3/231/0
UHAST	A3	Autoclave	121C, 2 atm	96 Hours	-	3/231/5 <sup>1</sup>	-	-	3/231/0	-
UHAST	A3	Unbiased HAST	130C	192 Hours	-	-	3/231/0	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	-	-	3/231/0
TC	A4	Temperature Cycle	-65/150C	500 Cycles	-	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	-	3/231/0	3/135/0	-	3/231/0	-
HTOL	B1	Life Test	150C	300 Hours	-	3/231/10 <sup>2,3</sup>	3/231/0	3/231/0	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	1/800/0	3/2400/4 <sup>4,5</sup>	-	-	-
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	-	-	-
ESD	E2	ESD CDM	-	250 Volts	-	-	-	-	-	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	-	-	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	3/18/0	-	-	-	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	3/90/0	-	-	-	1/30/0

- · QBS: Qual By Similarity
- Qual Device TL062CP 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/

#### Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

TI Qualification ID: R-CHG-2108-022

- [1]- Discounted Handling [2]- Discounted - Handling [3]- Discounted - Handling
- [4]- Discounted Test Coverage [5]- Discounted - Test Coverage

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

# 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 (<a href="www.ti.com/legal/termsofsale.html">www.ti.com/legal/termsofsale.html</a>) 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.