

12500 TI Boulevard, MS 8640, Dallas, Texas 75243

PCN# 20230128000.1

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

Date: January 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. The details of this change are on the following pages.

Texas Instruments 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.

The changes discussed within this PCN will not take effect any earlier than the proposed first ship date on Page 3 of this notification, unless customer agreement has been reached on an earlier implementation of the change.

This notice does not change the end-of-life status of any product. Should product affected be on a previously issued product withdrawal/discontinuance notice, this notification does not extend the life of that product or change the life time buy offering/discontinuance plan.

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 www.admin_team@list.ti.com). For sample requests or sample related questions, contact your local Field Sales Representative.

PCN Team SC Business Services

20230128000.1 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
LMV358IDR	null
LMV324IDR	null
LMV324IPWR	null
TLV9004IPWR	null
LMV324IPWRG4	null
LMV358IPWR	null
LMV358IDRG4	null

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

PC	N Numl	ber:	202:	3012	28000.1			PC	N Da	te:	Jan 30, 2023	
Titl	e:	Qualification of and Assembly			•	, -	•	l Pro	cess	Techr	ology, Die Revisi	on
Cus	stomer	Contact:		PCN Manager				Dej	pt:		Quality Services	;
Pro	posed	1 st Ship Date	:	Apr	30, 2023		Sample accept		-		Mar 01, 2023*	
*Sa	ample re	equests receive	ed afte	er M	ar 01, 2023	will not	be supp	orte	d.			
	ange Ty	•										
		nbly Site		\boxtimes	Assembly I				\boxtimes		mbly Materials	
X	Design			<u> </u>	Electrical S	•					anical Specificati	on
H	Test S			<u> </u>	Packing/Sh				<u> </u>		Process	
		Bump Site			Wafer Bur	•					r Bump Process	
	Wafer	Fab Site			Wafer Fab					Wafe	r Fab Process	
					Part number							
					PCN	l Deta	IIS					
		on of Change:				1:0:					ocess technology	
-	AB, LBC ected se	C9) and Assemlection.	oly BC	OM c	ptions for se	elected	devices	as lis	sted	below	in the product	
		Curre et Er	. h C:	ha.					low	Eab C		
		Current Fa								Fab S		
F	ab Site				Diameter	Fab	Site		lew oce		ite Wafer Diamet	er
F	R-BIP-1	Process BCB	Wa	afer 20	0 mm	RF.A	λB	Pr		SS		er
The Cor	R-BIP-1 e die wa nstructio	Process BCB s also changed on differences a	l as a	20 resu	0 mm ult of the pro	RFA ocess ch	λB	Pr	oce	SS	Wafer Diamet	er
The Cor	R-BIP-1 e die wa nstructio	Process BCB s also changed	l as a	20 resu	0 mm ult of the pro	RFA	AB ange.	Pr	coces	SS	Wafer Diamet	er
The Cor	R-BIP-1 e die wa nstructio	Process BCB s also changed on differences a	l as a	20 resu	0 mm Ilt of the problem: below: Assembly	RFA ocess ch	AB ange.	Pr	roce:	SS	Wafer Diamet 300 mm	er
F The Cor	R-BIP-1 e die wa nstructio	BCB s also changed on differences a	l as a are no revis	20 resu	o mm ult of the problem: , Assembly FMX (Cu	RFA ocess ch Site: urrent)	AB ange.	Pr	roce:	LA (N	Wafer Diamet 300 mm	er
F The Cor	R-BIP-1 e die wa nstructio	Process BCB s also changed on differences a Vafer fab, Die Wire type	l as a are no revis	20 resu	o mm ult of the problem: , Assembly FMX (Cu	RFA ocess ch Site: urrent) nil Cu Site:	AB ange.	Pr	M	LA (N	Wafer Diamet 300 mm	er
F The Cor	R-BIP-1 e die wa nstructio	Process BCB s also changed on differences a Vafer fab, Die Wire type	l as a are no revis	20 resu	below: , Assembly FMX (Cu 0.96m	Site: urrent) Site: Current	AB ange.	Pr	M	LA (No.8mil	Wafer Diamet 300 mm ew) Cu	er
F The Cor	R-BIP-1 e die wa enstruction oup 1 W	Process BCB s also changed on differences a Vafer fab, Die Wire type Vafer fab, Die	as a are no revis	20 resu	below: , Assembly FMX (Cu 0.96m , Assembly ASSESH (C	Site: urrent) nil Cu Site: Current	AB ange.	Pr	M (LA (NO).8mil	Wafer Diamet 300 mm ew) Cu ew)	er
F The Cor	R-BIP-1 e die wa enstruction oup 1 W	Process BCB s also changed on differences a Vafer fab, Die Wire type Vafer fab, Die Lead finish	as a are no reviserevis	20 resu	below: , Assembly FMX (Cu 0.96m , Assembly ASESH (C	Site: urrent) iil Cu Site: Current e Sn 0063	AB ange.	Pr	M (LA (NO).8mil	Wafer Diamet 300 mm ew) Cu ew) u 58	er

Water lab, Die le	valer lab, die revision, Assembly born.										
	Current	Additional									
Wire type	0.8mil Au, 0.96mil Cu	0.8mil Cu									

Qual details are provided in the Qual Data Section.

Reason for Change:

Continuity of supply.

- 1) To align with world technology trends and use wiring with enhanced mechanical and electrical properties
- 2) Maximize flexibility within our Assembly/Test production sites.
- 3) Cu is easier to obtain and stock

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

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	
FFAB	TID	DEU	Freising	
RFAB	RFB	USA	Richardson	

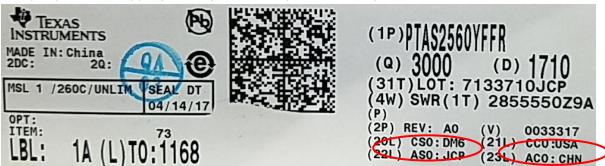
Die Rev:

Current New

Die Rev [2P]	Die Rev [2P]
A, -	A

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

Sample product shipping label (not actual product label)



Product Affected:

Group 1 Device list (Wafer fab, Die revision, Assembly Site)

LMV358IDRG4 LMV358QDR

Group 2 Device list (Wafer fab, Die revision, Assembly Site)

TLV9004IPWR

Group 3 Device list (Wafer fab, Die revision, Assembly BOM)

LMV324IDR	LMV324IPWRE4	LMV324QDRG4	LMV358IPWRG4
LMV324IDRE4	LMV324IPWRG4	LMV358IDR	SN0402093PWR
LMV324IDRG4	LMV324IPWRRB	LMV358IDRE4	
LMV324IPWR	LMV324QDR	LMV358IPWR	

Approved 18-Aug-2022

Qualification Results

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

Туре	#	Test Name	Condition	Duration	Qual Device: TLV9004IDR	QBS Reference: SN74HCS74QDRQ1	QBS Reference: OPA4991QDRQ1	QBS Reference: LMV393QDRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	-	-
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	3/231/0
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	3/231/0	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	3/231/0
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	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	2/154/0	3/231/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	3/135/0	-	-
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	1/45/0	-
HTOL	B1	Life Test	125C	1000 Hours	-	3/231/0	-	3/231/0
HTOL	B1	Life Test	150C	408 Hours	-	-	1/77/0	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	-	3/2400/0
PD	C4	Physical Dimensions	Cpk>1.67	-	-	3/30/0	-	3/30/0
ESD	E2	ESD CDM	-	1500 Volts	-	-	1/3/0	-
ESD	E2	ESD CDM	-	500 Volts	-	1/3/0	-	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	-	1/3/0	-	1/3/0
ESD	E2	ESD HBM	-	4000 Volts	-	-	1/3/0	-
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	3/90/0	3/90/0	3/90/0

QBS: Qual By Similarity

Qual Device TLV9004IDR 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 Tl's external Web site: http://www.ti.com/

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

PCN# 20230128000.1

Approved 13-Jan-2023

Qualification Results

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

Туре	#	Test Name	Condition	Duration	Qual Device: TLV9004IPWR	QBS Reference: TLV7031QDCKRQ1	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: OPA4991QPWRQ1	QBS Reference: TLV9004QPWRQ1
HAST	A2	Biased HAST	110C/85%RH	264 Hours	-	-	-	1/77/0	-
HAST	A2	Biased HAST	110C/85%RH	264 Hours	-	-	-	2/154/0	-
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	-	-	3/231/0	3/231/0	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	3/231/0	3/231/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	3/231/0	3/135/0	3/135/0	-
HTOL	B1	Life Test	125C	1000 Hours	-	3/231/0	3/231/0	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	-	-
SD	С3	PB Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	1/15/0	1/15/0	-	-
SD	СЗ	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	1/15/0	1/15/0		-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	3/30/0	3/30/0	1/10/0	-
ESD	E2	ESD CDM	-	500 Volts	-	1/3/0	1/3/0	-	-
ESD	E2	ESD HBM	-	2000 Volts	-	1/3/0	1/3/0	-	-
LU	E4	Latch-Up	Per JESD78	-	-	1/6/0	1/6/0	3/18/0	1/6/0
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	3/90/0	3/90/0	3/90/0	3/90/0

QBS: Qual By Similarity

Qual Device TLV9004IPWR 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 Tl's external Web site: http://www.ti.com/Green/Pb-free Status: Qualified Pb-Free(SMT) and Green

Approved 12-Jan-2023

Qualification Results

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

Туре	#	Test Name	Condition	Duration	Qual Device: TLV9002IPWR	Qual Device: OPA2991IPWR	Qual Device: OPA2990IPWR	Qual Device: TLV9062IPWR	QBS Reference: <u>OPA4990IDR</u>	QBS Reference: <u>OPA2992IDR</u>	QBS Reference: OPA4991QPWRQ1	QBS Reference: <u>OPA2990IPWR</u>
HAST	A2	Biased HAST	110C/85%RH	264 Hours	-	-	-	-			3/231/0	-
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	-	-	3/231/0		-	3/231/0
UHAST	А3	Autoclave	121C, 2 atm	96 Hours	-	-	-	-	3/231/51	-	3/231/0	-
UHAST	А3	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
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	-	1/45/0	-
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	-	2/90/0	-
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 ^{2,3}	1/77/0	3/231/0	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	-	-	1/800/0		-	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	-	-	-		1/10/0	-
ESD	E2	ESD CDM	-	1500 Volts	-	-	-	-	-	1/3/0	-	1/3/0
ESD	E2	ESD HBM	-	2500 Volts	-	-	-	-	-	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	-	-	-	3/18/0	1/3/0	3/18/0	1/6/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	-	-	3/90/0	1/30/0	-	1/30/0

QBS: Qual By Similarity

Qual Device TLV9002IPWR is qualified at MSL2 260C

Qual Device OPA2991IPWR is qualified at MSL1 260C

Qual Device OPA2990IPWR is qualified at MSL1 260C

Qual Device TLV9062IPWR 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 $0.7 \, \text{eV}$: $150 \, \text{C/1k}$ 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/

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

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

Approved 08-June-2022

Qualification Results

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

					, ,				•				
Туре		Test Name	Condition	Duration	Qual Device: TLV9002IDR	Qual Device: TLV9062IDR	QBS Reference: TLV1805QDBVRQ1	QBS Reference: TLV9002QDRQ1	QBS Reference: TLV9062QDRQ1	QBS Reference: TLV9002QDRQ1	QBS Reference: TLV9002QDRQ1	QBS Reference: TLV9062QDRQ1	QBS Reference: TLV9062QDRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-	-	-	-	-	-
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	-	-	-	-	1/77/0	3/231/0	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	3/231/0	-	-	-	-	-	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	1/77/11	1/77/0	-	1/77/0	3/231/0	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	-	-	-	-	-	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	-	1/77/0	1/77/0	-	1/77/0	2/154/0	1/77/0
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	3/135/0	-	-	-	-	-	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	3/231/0	-	-	-	-	-	-
HTOL	B1	Life Test	150C	408 Hours	-	-	-	-	-	-	1/77/0	1/77/0	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	3/30/0	-	-	-	-	3/30/0	-
ESD	E2	ESD CDM	-	1000 Volts	-	-	-	-	-	1/3/0	-	-	1/3/0
ESD	E2	ESD CDM	-	500 Volts	-	-	1/3/0	-	-	-	-	-	-
ESD	E2	ESD HBM	-	2000 Volts	-	-	1/3/0	-	-	-	-	-	-
ESD	E2	ESD HBM	-	4000 Volts	-	-	-	-	-	1/3/0	-	-	1/3/0
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	-	3/90/0	-	-	1/30/0	-	2/60/0	1/30/0

QBS: Qual By Similarity

Qual Device TLV9002IDR is qualified at MSL1 260C

Qual Device TLV9062IDR 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 $0.7 \, \text{eV}$: $150 \, \text{C/1k}$ 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/

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

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

Location	E-Mail
WW Change Management Team	PCN www admin team@list.ti.com

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