PCN Number:	20220628000.1	PCN Date:	June 29, 2022
Title:	Qualification of new Fab site (RFAB) 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:	Sept 27, 2022	Sample requests accepted until:	July 29, 2022*

***Sample requests received after July 29, 2022 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 (RFAB, LBC9) and Assembly & BOM option for selected devices as listed below in the product affected section. Construction differences are noted below:

Current Fab Site			Additional Fab Site		
Current Fab Site	**Process**	**Wafer Diameter**	**Additional Fab Site**	**Process**	**Wafer Diameter**
SFAB	HCMOS	150 mm	RFAB	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: (RFAB/Process migration & BOM Update)

	Current	Additional
Bond wire diameter (Cu)	0.96 mils	0.8 mils

Group 2: (RFAB/Process migration BOM update & HFTF & TI Malaysia as alternate Assembly sites for select devices)

	MLA Current	ASESH	FMX	MLA New	HFTF
Bond wire diameter (Cu)	0.96 mil	1.0 mil	0.96 mil	0.8 mil	0.8 mil
Mold Compound	4147858	SID#EN200 0506	4211880	4147858	SID#R-30
Mount Compound	4147858	SID#EY1000 063	4147858	4147858	SID#A-03
Lead Finish	NiPdAu	Matte Sn	NiPdAu	NiPdAu	Matte Sn

Group 3: (RFAB/Process migration BOM Update & TFME as alternate Assembly site for select device)

	MLA Current	MLA New	TFME
Bond wire diameter (Cu)	0.96 mil	0.8 mils	0.8 mils
Mount Compound	4147858	4147858	SID#A-03
Mold Compound	4211471	4211471	SID#R-31
Lead Finish	NiPdAu	NiPdAu	Matte Sn

Group 4: (RFAB/Process migration BOM update & HFTF alternate Assembly site for select devices)

	MLA Current	MLA New	ASESH	FMX	HFTF
Bond wire diameter (Cu)	0.96 mil	0.8 mil	1.0 mil	0.96 mil	0.8 mil
Mold Compound	4147858	4147858	SID#EN200 0506	4211880	SID#R-30
Mount Compound	4147858	4147858	SID#EY1000 063	4147858	SID#A-03
Lead Finish	NiPdAu	NiPdAu	Matte Sn	NiPdAu	Matte Sn

Upon expiry of this PCN TI will combine lead free solutions in a single ***standard part number***, for the devices in group 3. For example; ***CD74HCT132M96*** – can ship with both Matte Sn and NiPdAu/Ag.

Example:

- Customer order for 7500 units of CD74HCT132M96 with 2500 units SPQ (Standard Pack Quantity per Reel).

- TI can satisfy the above order in one of the following ways.
  I. 3 Reels of NiPdAu finish.
  II. 3 Reels of Matte Sn finish
  III. 2 Reels of Matte Sn and 1 reel of NiPdAu finish.
  IV. 2 Reels of NiPdAu and 1 reel of Matte Sn finish.

The following table provides the updated thermal characteristics to all devices contained within this

PCN. All thermal values can be compared to the existing devices by reviewing the datasheets currently on TI.com. The impact to the customer system is anticipated to be negligible, however the customer must review their system design to assess any risk due to the change in thermal characteristics. Please see the table below which provides a summary of thermal values that the devices will be updated to based on each pin/pkg combination.

THERMAL METRIC		D (SOIC) 14 PINS	D (SOIC) 16 PINS	PW (TSSOP) 16 PINS	N (PDIP) 16 PINS	NS (SO) 16 PINS	DB (SSOP) 20 PINS	DW (SOIC) 20 PINS	N (PDIP) 20 PINS	NS (SO) 20 PINS	PW (TSSOP) 20 PINS	UNIT
RθJA	Junction-to-ambient thermal resistance	138.7	117.2	139.9	90.1	109.4	122.7	109.1	84.6	113.4	131.8	°C/W
RθJC(top)	Junction-to-case (top) thermal resistance	93.8	77.2	75.3	79.3	70.1	81.6	76.0	72.5	78.6	72.2	°C/W
RθJB	Junction-to-board thermal resistance	94.7	75.6	84.8	69.9	71.2	77.5	77.6	65.3	78.4	82.8	°C/W
ΨJT	Junction-to-top characterization parameter	49.1	38.1	25.1	59.3	36.6	46.1	51.5	55.3	47.1	21.5	°C/W
ΨJB	Junction-to-board characterization parameter	94.3	75.3	84.3	69.8	70.9	77.1	77.1	65.2	78.1	82.4	°C/W
RθJC(bot)	Junction-to-case (bottom) thermal resistance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	°C/W

Reason for Change:

These changes are part of our multiyear plan to transition products from our 150-milimeter 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
RFAB	**RFB**	**USA**	**Richardson**

Die Rev:

Current	**New**
Die Rev [2P]	**Die Rev [2P]**
E, F, I, J,-	**A, B**

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

TFME	NFM	CHN	Economic Development Zone

Sample product shipping label (not actual product label)

Product Affected:

Group 1 Device list (RFAB/Process migration & BOM Update select devices)

CD74HC245E	CD74HCT688M96	SN74HC245NSR	SN74HCT245N
CD74HC4094NSR	SN74HC148NSR	SN74HC245NSRE4	SN74HCT245NE4
CD74HC4094NSRE4	SN74HC175N	SN74HC245PWR	SN74HCT245NSR
CD74HC85E	SN74HC175NE4	SN74HCT245APWR	SN74HCT245PWR
CD74HC85EE4	SN74HC245DBR	SN74HCT245APWRG4	SN74HCT245PWRE4
CD74HCT245E	SN74HC245DBRG4	SN74HCT245DBR	SN74HCT245PWRG4
CD74HCT245EE4	SN74HC245N	SN74HCT245DBRG4	

Group 2 Device list (RFAB/Process migration BOM update and HFTF & MLA as alternate Assembly sites for select device)

SN74HC148DR	CD74HC147M96	CD74HC4094M96	CD74HCT4094M96

Group 3 Device list (RFAB/Process migration BOM Update & TFME as alternate Assembly site for select devices)

SN74HC4020PWR	SN74HCT139PWR	CD74HC173PWR	CD74HC4094PWR
SN74HC4040PWR			

Group 4 Device list (RFAB/Process migration, BOM update & HFTF as alternate Assembly site for select devices

CD74HC283M96	CD74HCT132M96	CD74HCT283M96	SN74HC4040DR
CD74HC390M96	CD74HCT165M96	CD74HCT365M96	SN74HCT139DR
CD74HC4020M96	CD74HCT166M96	CD74HCT367M96	SN74HCT157DR
CD74HC4040M96	CD74HCT251M96	CD74HCT393M96	SN74HCT257DR
CD74HC4511M96	CD74HCT259M96	SN74HC4020DR	

Qualification Report
Approve Date 06-JUNE -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: SN74HCT139PWR	Qual Device: SN74HC4020PWR	Qual Device: SN74HC4040PWR	Qual Device: SN74HC4020PWR	Qual Device: SN74HC4040PWR	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74HCS74PWR	QBS Reference: SN74HCS595QPWRQ1
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	-	-	-	-	-	-	-	1/77/0
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	150C	1000 Hours	-	-	-	-	-	3/135/0	3/135/0	1/45/0
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	-	-	3/231/0	-	-
HTOL	B1	Life Test	150C	300 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	3/15/0	3/30/0
ESD	E2	ESD CDM	-	2000 Volts	-	-	-	-	-	-	-	1/3/0
ESD	E2	ESD CDM	-	1500 Volts	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	-	3/9/0	-
ESD	E2	ESD HBM	-	5000 Volts	1/3/0	1/3/0	1/3/0	-	-	-	-	-
LU	E4	Latch-Up	Per JESD78	-	1/3/0	1/3/0	1/3/0	-	-	-	-	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	1/30	1/30/0	-	-	3/90/0	3/90/0	3/90/0

- QBS: Qual By Similarity
- Qual Device SN74HCT139PWR is qualified at MSL1 260C
- Qual Device SN74HC4020PWR is qualified at MSL1 260C
- Qual Device SN74HC4040PWR is qualified at MSL1 260C
- Qual Device SN74HC4020PWR is qualified at MSL1 260C
- Qual Device SN74HC4040PWR 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-CHG-2203-021

Qualification Report
Approve Date 06-JUNE -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: SN74HCT257DR	Qual Device: CD74HCT251M96	Qual Device: CD74HCT259M96	Qual Device: CD74HCT166M96	Qual Device: CD74HCT165M96	Qual Device: CD74HCT251M96	QBS Reference: SN74HCS174DR	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74HCS74QDRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	-	-	-	-	3/231/0	3/231/0	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	-	-
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	-	-	3/135/0	3/135/0
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	-	-	-	3/231/0	3/231/0	3/231/0
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 HBM	-	5000 Volts	1/3/0	1/3/0	1/3/0	-	-	-	-	1/3/0	1/3/0
ESD	E2	ESD CDM	-	1500 Volts	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	3/9/0	1/3/0	1/3/0
LU	E4	Latch-Up	Per JESD78	-	1/3/0	1/3/0	1/3/0	-	-	-	-	-	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	1/30/0	1/30/0	-	-	-	3/90/0	3/90/0	3/90/0

- QBS: Qual By Similarity
- Qual Device SN74HCT257DR is qualified at MSL1 260C
- Qual Device CD74HCT251M96 is qualified at MSL1 260C
- Qual Device CD74HCT259M96 is qualified at MSL1 260C
- Qual Device CD74HCT367M96 is qualified at MSL1 260C
- Qual Device SN74HCT157DR is qualified at MSL1 260C
- Qual Device CD74HCT166M96 is qualified at MSL1 260C
- Qual Device CD74HCT365M96 is qualified at MSL1 260C
- Qual Device CD74HCT393M96 is qualified at MSL1 260C
- Qual Device CD74HCT283M96 is qualified at MSL1 260C
- Qual Device CD74HC390M96 is qualified at MSL1 260C
- Qual Device SN74HC4040DR is qualified at MSL1 260C
- Qual Device SN74HC4020DR is qualified at MSL1 260C

- Qual Device CD74HC283M96 is qualified at MSL1 260C
- Qual Device CD74HCT166M96 is qualified at MSL1 260C
- Qual Device CD74HCT165M96 is qualified at MSL1 260C
- Qual Device CD74HCT251M96 is qualified at MSL1 260C
- Qual Device CD74HCT283M96 is qualified at MSL1 260C
- Qual Device CD74HC4511M96 is qualified at MSL1 260C
- Qual Device CD74HC4511M96 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-CHG-2203-024

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: SN74HC175N	QBS Reference: MSP430F2013IN	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74HC175PWR
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	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	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	-
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	3/135/0	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	3/231/0	-	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	3/231/0	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	3/30/0	-
ESD	E2	ESD CDM	-	1500 Volts	1/3/0	-	-	1/3/0
ESD	E2	ESD HBM	-	4000 Volts	-	-	1/3/0	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	-	-	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	3/90/0	1/30/0

- QBS: Qual By Similarity
- Qual Device SN74HC175N is qualified at NOT CLASSIFIED NOT CLASSIFIED
- Qual Device SN74HC175N 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

TI Information
Selective Disclosure

Qualification Report
Approve Date 06-JUNE -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: SN74HCT139PWR	Qual Device: SN74HC4020PWR	Qual Device: SN74HC4040PWR	Qual Device: SN74HC4020PWR	Qual Device: SN74HC4040PWR	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74HCS74PWR	QBS Reference: SN74HCS595QPWRQ1
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	-	-	-	-	-	-	-	1/77/0
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	150C	1000 Hours	-	-	-	-	-	3/135/0	3/135/0	1/45/0
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	-	-	3/231/0	-	-
HTOL	B1	Life Test	150C	300 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	3/15/0	3/30/0
ESD	E2	ESD CDM	-	2000 Volts	-	-	-	-	-	-	-	1/3/0
ESD	E2	ESD CDM	-	1500 Volts	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	-	3/9/0	-
ESD	E2	ESD HBM	-	5000 Volts	1/3/0	1/3/0	1/3/0	-	-	-	-	-
LU	E4	Latch-Up	Per JESD78	-	1/3/0	1/3/0	1/3/0	-	-	-	-	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	1/30	1/30/0	-	-	3/90/0	3/90/0	3/90/0

- QBS: Qual By Similarity
- Qual Device SN74HCT139PWR is qualified at MSL1 260C
- Qual Device SN74HC4020PWR is qualified at MSL1 260C
- Qual Device SN74HC4040PWR is qualified at MSL1 260C
- Qual Device SN74HC4020PWR is qualified at MSL1 260C
- Qual Device SN74HC4040PWR 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-CHG-2203-021

TI Confidential
NDA Restrictions

Qualification Report

Approve Date 16-JUNE -2022

Product Attributes

Attributes	Qual Device: SN74HC245PWR	Qual Device: SN74HCT245PWRG4	Qual Device: SN74HCT245PWR	Qual Device: SN74HCT245APWR	Qual Device: CD74HC173PWR	Qual Device: CD74HC173PWR	Qual Device: CD74HC4094PWR	Qual Device: CD74HC4094PWR	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74HCS74PWR
Die Attributes										
Wafer Fab Supplier	RFAB	RFAB	RFAB	RFAB	RFAB	RFAB	RFAB	RFAB	RFAB	RFAB
Wafer Process	LBC9	LBC9	LBC9	LBC9	LBC9	LBC9	LBC9	LBC9	LBC9	LBC9
Die Size (L,W) (um)	679 x 679	679 x 679	679 x 679	679 x 679	679 x 679	679 x 679	679 x 679	679 x 679	460 x 510	460 x 510
Passivation	Silicon Oxynitride	Silicon Oxynitride	Silicon Oxynitride	Silicon Oxynitride	Silicon Oxynitride	Silicon Oxynitride	Silicon Oxynitride	Silicon Oxynitride	Silicon Oxynitride	Silicon Oxynitride
Package Attributes										
Assembly Site	MLA	MLA	MLA	MLA	MLA	TFME	MLA	TFME	MLA	TFME
Package Group	TSSOP	TSSOP	TSSOP	TSSOP	TSSOP	TSSOP	TSSOP	TSSOP	TSSOP	TSSOP
Package Designator	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW
Package Size (mm)	6.5 x 4.4	6.5 x 4.4	6.5 x 4.4	6.5 x 4.4	5 x 4.4	5 x 4.4	5 x 4.4	5 x 4.4	5 x 4.4	5 x 4.4
Body Thickness (mm)	1	1	1	1	1	1	1	1	1	1
Pin Count	20	20	20	20	16	16	16	16	14	14
Lead Finish	NIPDAU	NIPDAU	NIPDAU	NIPDAU	NIPDAU	NIPDAU	NIPDAU	NIPDAU	NIPDAU	MATTE SN
Lead Pitch(mm)	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Mount Compound Supplier	HENKEL	HENKEL	HENKEL	HENKEL	HENKEL	HENKEL	HENKEL	HENKEL	HENKEL	HENKEL
Mount Compound Supplier Number	QMI 505MT	QMI 505MT	QMI 505MT	QMI 505MT	QMI 505MT	ABLEBOND 8200T	QMI 505MT	ABLEBOND 8200T	QMI 505MT	Ablebond 8200T
Mold Compound Supplier	SUMITOMO	SUMITOMO	SUMITOMO	SUMITOMO	SUMITOMO	HITACHI	SUMITOMO	HITACHI	SUMITOMO	HITACHI
Mold Compound Supplier Number	EME-G610TA	EME-G610TA	EME-G610TA	EME-G610TA	EME-G610TA	CEL-8240HF-10HD	EME-G610TA	CEL-8240HF-10HD	EME-G610TA	CEL-8240HF-10HD
Bond Wire Composition	CU	CU	CU	CU	CU	CU	CU	CU	CU	CU
Bond Wire Diameter(um)	20.3	20.3	20.3	20.3	20.3	20.32	20.3	20.32	20.32	20.32
Flammability Rating	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0

- QBS: Qual By Similarity
- Qual Device SN74HC245PWR is qualified at MSL1 260C
- Qual Device SN74HCT245PWRG4 is qualified at MSL1 260C
- Qual Device SN74HCT245PWR is qualified at MSL1 260C
- Qual Device SN74HCT245APWR is qualified at MSL1 260C
- Qual Device CD74HC173PWR is qualified at MSL1 260C
- Qual Device CD74HC173PWR is qualified at MSL1 260C
- Qual Device CD74HC4094PWR is qualified at MSL1 260C
- Qual Device CD74HC4094PWR is qualified at MSL1 260C

Qualification Report
Approve Date 15-JUNE -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: CD74HCT132M96	Qual Device: CD74HCT132M96	Qual Device: CD74HC147M96	Qual Device: CD74HC147M96	Qual Device: CD74HC4094M96	Qual Device: CD74HC4094M96	Qual Device: CD74HCT4094M96	QBS Reference: SN74HCS174DR	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74HCS74QDRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	-	-	-	-	-	3/231/0	3/231/0	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	-65/150C	500 Cycles	-	-	-	-	-	-	-	3/231/0	3/231/0	3/231/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	-	-	-	3/135/0	3/135/0
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	-	-	-	-	-	3/231/0	-	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	-	-	-	-	3/231/0	3/231/0	3/231/0
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	-	1/3/0	1/3/0	1/3/0	-	1/3/0	3/9/0	1/3/0	1/3/0
ESD	E2	ESD HBM	-	4000 Volts	1/3/0	-	1/3/0	-	-	-	1/3/0	-	1/3/0	1/3/0
LU	E4	Latch-Up	Per JESD78	-	1/3/0	-	1/3/0	-	-	-	1/3/0	-	-	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	-	1/30/0	-	-	-	1/30/0	3/90/0	3/90/0	3/90/0

- QBS: Qual By Similarity
- Qual Device CD74HCT132M96 is qualified at MSL1 260C
- Qual Device CD74HCT132M96 is qualified at MSL1 260C
- Qual Device CD74HC147M96 is qualified at MSL1 260C
- Qual Device CD74HC147M96 is qualified at MSL1 260C
- Qual Device CD74HC4094M96 is qualified at MSL1 260C
- Qual Device CD74HC4094M96 is qualified at MSL1 260C
- Qual Device CD74HCT4094M96 is qualified at MSL1 260C
- Qual Device CD74HCT4094M96 is qualified at MSL1 260C
- Qual Device SN74HC148DR is qualified at MSL1 260C
- Qual Device SN74HC148DR 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-2203-022

Qualification Report
Approve Date 16-June-2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: SN74HC148NSR	Qual Device: CD74HC4094NSR	Qual Device: SN74HC245NSR	Qual Device: SN74HCT245NSR	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74LVC8T245NSR	QBS Reference: SN74HCT245APWR	QBS Reference: SN74HC148DR	QBS Reference: CD74HC4094PWR	QBS Reference: SN74HCS245QWRKSRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	-	-	3/231/0	-	-	-	-	1/77/0
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	3/231/0	-	-	-	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	3/135/0	-	-	-	-	1/45/0
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	-	-	-	3/231/0	-	-	-	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	-	3/231/0	-	-	-	-	-
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	1/3/0	1/3/0	1/3/0	1/3/0	-	1/3/0	1/3/0	1/3/0	1/3/0
ESD	E2	ESD HBM	-	4000 Volts	-	-	-	-	1/3/0	-	1/3/0	1/3/0	1/3/0	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	-	-	-	-	-	1/3/0	1/3/0	1/3/0	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	-	-	3/90/0	-	1/30/0	1/30/0	1/30/0	3/90/0

- QBS: Qual By Similarity
- Qual Device SN74HC148NSR is qualified at MSL1 260C
- Qual Device CD74HC4094NSR is qualified at MSL1 260C
- Qual Device SN74HC245NSR is qualified at MSL1 260C
- Qual Device SN74HCT245NSR 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-2203-023

TI Information
Selective Disclosure

Qualification Report
Approve Date 16-JUNE -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: SN74HC245DBR	Qual Device: SN74HCT245DBR	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: ADS900E	QBS Reference: TLC320AD77CDBR	QBS Reference: SN74HCT245APWR	QBS Reference: TLC6946DBQR	QBS Reference: SN74HCS245QWRKSRQ1
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	-	-	1/77/0
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	1/74/0	3/231/0	-	3/231/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	3/135/0	-	-	-	3/135/0	1/45/0
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	-	-	3/231/0	-	-	-
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	-	-	-	-	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	3/30/0	-	-	-	-	3/30/0
ESD	E2	ESD CDM	-	1500 Volts	1/3/0	1/3/0	1/3/0	-	-	-	-	1/3/0
ESD	E2	ESD HBM	-	4000 Volts	-	-	1/3/0	-	-	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	-	-	-	-	1/3/0	1/3/0	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	3/90/0	-	-	1/30/0	3/90/0	3/90/0

- QBS: Qual By Similarity
- Qual Device SN74HC245DBR is qualified at MSL1 260C
- Qual Device SN74HCT245DBR 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-2203-025

TI Information
Selective Disclosure

Qualification Report
Approve Date 16-JUNE -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: CD74HC245E	Qual Device: SN74HC245N	Qual Device: CD74HCT245E	Qual Device: SN74HCT245N	QBS Reference: SN74HCT540N	QBS Reference: SN74HCS74QPWRQ1	QBS Reference: SN74HCT245APWR	QBS Reference: SN74HCS245QPWRQ1	QBS Reference: SN74HCS245QWRKSRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	-	-	-	3/231/0	-	1/77/0	1/77/0
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	-	3/231/0	-	-	1/77/0	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	-	1/77/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	3/135/0	-	1/45/0	1/45/0
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	-	-	3/231/0	-	-	-	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	-	-	3/231/0	-	-	-
HTOL	B1	Life Test	150C	300 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	-	1/10/0	3/30/0
ESD	E2	ESD CDM	-	1500 Volts	-	1/3/0	-	1/3/0	-	1/3/0	1/3/0	1/3/0	1/3/0
ESD	E2	ESD HBM	-	4000 Volts	-	-	-	-	-	1/3/0	1/3/0	1/3/0	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	-	-	-	-	-	1/3/0	-	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	-	-	-	3/90/0	1/30/0	3/90/0	3/90/0

- QBS: Qual By Similarity
- Qual Device CD74HC245E is qualified at MSL1 260C
- Qual Device SN74HC245N is qualified at MSL1 260C
- Qual Device CD74HCT245E is qualified at MSL1 260C
- Qual Device SN74HCT245N 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-2204-121

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