

PCN Number:	20240529002.1	PCN Date:	May 29, 2024
Title:	Qualification of RFAB using qualified Process Technology, Die Revision, and additional Assembly BOM options for select devices		
Customer Contact:	Change Management Team	Dept:	Quality Services
Proposed 1st Ship Date:	August 27, 2024	Sample requests accepted until:	June 28, 2024*
*Sample requests received after June 28, 2024 will not be supported.			
Change Type:			
<input 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 Material	
<input checked="" type="checkbox"/> Packing/Shipping/Labeling	<input type="checkbox"/> Test Process	<input checked="" type="checkbox"/> Wafer Fab Process	
PCN Details			
Description of Change:			
Texas Instruments is pleased to announce the qualification of its RFAB fabrication facility as an additional Wafer Fab option in addition to Assembly BOM options for the devices listed below.			
Current Fab Site			Additional Fab Site
Current Fab Site	Process	Wafer Diameter	Additional Fab Site
Process	TI	Wafer Diameter	Additional Fab Site
SFAB	J11	150 mm	RFAB
			TIB
			300 mm
The die was also changed as a result of the process change.			
Construction differences are as follows:			
Group 1 device device marking:			
	Current	Proposed	
U2003AIPWR	U2003AI \TI/ YMSG4 LLLL O	U2003AI TI YMS LLLL O (CAV)	
	\TI/ = TI LOGO YM = YEAR/MONTH DATE CODE LLLL = LOT TRACE CODE G4 = ECAT O = PIN 1 DIMPLE	TI = TI LETTER YM = YEAR/MONTH DATE CODE LLLL = LOT TRACE CODE CAV = CAVITY ID O = PIN 1 DOT	
U2003APWR	U2003A \TI/ YMSG4 LLLL O	U2003A TI YMS LLLL O (CAV)	
	\TI/ = TI LOGO YM = YEAR/MONTH DATE CODE LLLL = LOT TRACE CODE G4 = ECAT O = PIN 1 DIMPLE	TI = TI LETTER YM = YEAR/MONTH DATE CODE LLLL = LOT TRACE CODE CAV = CAVITY ID O = PIN 1 DOT	
Group 2 device:			
	MLA	FMX	MLA, FMX
Wire diameter/type	1.15mil Au	0.96mil Cu	1.0mil Cu
Mold compound	4042503	4211880	4211880
Mount compound	4042500	4147858	4147858
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
RFAB	RFB	USA	Richardson
Die Rev:			
Current		New	
Die Rev [2P]	Die Rev [2P]		
F	A		
Sample product shipping label (not actual product label):			
Group 1 Product Affected:			
ULN2003AIPWR	ULN2003APWR		
Group 2 Product Affected:			
ULN2003AN			

For alternate parts with similar or improved performance, please visit the product page on [TI.com](https://www.ti.com)

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: ULN2003APWR	QBS Reference: SN3257QPWRQ1	QBS Reference: MC33063ADR	QBS Reference: MC33063ADR	QBS Reference: ULN2003ADR
HAST	A2	Biased HAST	130C	96 Hours	-	3/231/0	-	-	-
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	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	-	-	3/231/0	3/231/0	-
TC	A4	Temperature Cycle	-55/150C	1000 Cycles	-	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	170C	420 Hours	-	-	3/231/0	3/231/0	-
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	3/135/0	-	-	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	2/154/0	1/77/0	-
HTOL	B1	Life Test	150C	300 Hours	-	3/231/0	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	1/800/0	2/1600/0	-

Type	#	Test Name	Condition	Duration	Qual Device: ULN2003APWR	QBS Reference: SN3257QPWRQ1	QBS Reference: MC33063ADR	QBS Reference: MC33063ADR	QBS Reference: ULN2003ADR
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	-	-	-
ESD	E2	ESD CDM	-	2000 Volts	-	1/3/0	-	-	-
ESD	E2	ESD CDM	-	250 Volts	-	-	1/3/0	-	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	-	1/3/0	-	1/3/0
ESD	E2	ESD HBM	-	5000 Volts	-	1/3/0	-	-	-
LU	E4	Latch-Up	Per JESD78	-	-	1/6/0	1/3/0	-	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	1/30/0	1/30/0	1/30/0
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	3/90/0	-	-	-

- QBS: Qual By Similarity
- Qual Device ULN2003APWR 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-2305-087

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: ULN2003AN	QBS Package Reference: SN74LS03N	QBS Process Reference: MC33063ADR	QBS Process Reference: MC33063ADR	QBS Product Reference: ULN2003ADR
HAST	A2	Biased HAST	130C/85%RH	96 Hours	1/77/0	-	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	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	3/231/0	3/231/0	3/231/0	1/77/0
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	-	-	2/154/0	1/77/0	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	1/800/0	2/1600/0	-
SD	C3	PB-Free Solderability	8 Hours Steam Age	-	-	3/66/0	-	-	-
ESD	E2	ESD CDM	-	250 Volts	-	-	1/3/0	-	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	-	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

- QBS: Qual By Similarity
- Qual Device ULN2003AN 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/>

TI Qualification ID: R-CHG-2305-091

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: ULN2003AN	QBS Package Reference: NE5532P	QBS Process Reference: MC33063ADR	QBS Process Reference: MC33063ADR	QBS Product Reference: ULN2003ADR
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	3/231/0	-
UHA	A3	Unbiased HAST	130C/85%RH	96 Hours	1/77/0	-	3/231/0	3/231/0	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	-	3/231/0	3/231/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	1/77/0	-	-	-	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	3/231/0	3/231/0	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	2/154/0	1/77/0	-
HTOL	B1	Life Test	150C	300 Hours	-	3/231/0	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	1/800/0	2/1600/0	-
SD	C3	PB-Free Solderability	8 Hours Steam Age	-	-	3/66/0	-	-	-
ESD	E2	ESD CDM	-	250 Volts	-	-	1/3/0	-	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	-	1/3/0	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	-	1/3/0	-	1/3/0

Type	#	Test Name	Condition	Duration	Qual Device: ULN2003AN	QBS Package Reference: NE5532P	QBS Process Reference: MC33063ADR	QBS Process Reference: MC33063ADR	QBS Product Reference: ULN2003ADR
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	-	1/30/0	1/30/0	1/30/0

- QBS: Qual By Similarity
- Qual Device ULN2003AN 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/>

TI Qualification ID: R-CHG-2305-092

Qualification Results

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

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: ULQ2003ATPWRQ1	QBS Package Reference: SN3257QFWRQ1	QBS Process Reference: MC33063AQDRQ1	QBS Process, Product Reference: ULQ2003AQDRQ1	QBS Package Reference: CD4051BQFWRQ1
Test Group A - Accelerated Environment Stress Tests												
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	-	1/0/0	3/0/0	3/0/0	1/0/0	1/0/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C	96 Hours	-	3/231/0	-	-	-
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	1/77/0	-	3/231/0	1/77/0	1/77/0
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Autoclave	121C/15psig	96 Hours	-	3/231/0	-	1/77/0	-
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Unbiased HAST	130C/85%RH	96 Hours	1/77/0	-	3/231/0	-	1/77/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-55/150C	1000 Cycles	-	3/231/0	-	-	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-55C/125C	1000 Cycles	1/77/0	-	-	-	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	1/77/0	1/77/0
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	1/5/0	-	-	1/5/0	1/5/0
PTC	A5	JEDEC JESD22-A105	1	45	PTC	-40/125C	1000 Cycles	-	-	-	1/45/0	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	150C	1000 Hours	-	-	3/135/0	1/45/0	1/45/0

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: ULQ2003ATPWRQ1	QBS Package Reference: SN3257QFWRQ1	QBS Process Reference: MC33063AQDRQ1	QBS Process, Product Reference: ULQ2003AQDRQ1	QBS Package Reference: CD4051BQFWRQ1
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	150C	500 Hours	1/45/0	-	-	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	500 Hours	-	3/135/0	-	-	-
Test Group B - Accelerated Lifetime Simulation Tests												
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	125C	1000 Hours	-	-	3/231/0	-	1/77/0
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test	150C	300 Hours	-	3/231/0	-	3/231/0	-
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	-	-
Test Group C - Package Assembly Integrity Tests												
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	3/90/0	3/90/0	1/30/0	1/30/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	3/90/0	3/90/0	1/30/0	1/30/0
SD	C3	JEDEC J-STD-002	1	15	PB Solderability	>95% Lead Coverage	-	-	1/15/0	1/15/0	1/15/0	-
SD	C3	JEDEC J-STD-002	1	15	PB-Free Solderability	>95% Lead Coverage	-	1/15/0	1/15/0	1/15/0	1/15/0	-
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions	Cpk>1.67	-	1/10/0	3/30/0	3/30/0	1/10/0	1/10/0
Test Group D - Die Fabrication Reliability Tests												
EM	D1	JESD61	-	-	Electromigration	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: ULQ2003ATPWRQ1	QBS Package Reference: SN3257QFWRQ1	QBS Process Reference: MC33063AQDRQ1	QBS Process, Product Reference: ULQ2003AQDRQ1	QBS Package Reference: CD4051BQFWRQ1
TDDb	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
HCI	D3	JESD60 & 28	-	-	Hot Carrier Injection	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
BTI	D4	-	-	-	Bias Temperature Instability	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
SM	D5	-	-	-	Stress Migration	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
Test Group E - Electrical Verification Tests												
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	2000 Volts	1/3/0	-	1/3/0	1/3/0	1/3/0
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	5000 Volts	-	1/3/0	-	-	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	2000 Volts	-	1/3/0	-	-	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	1/3/0	-	1/3/0	1/3/0	1/3/0
LU	E4	AEC Q100-004	1	6	Latch-Up	Per AEC Q100-004	-	-	1/6/0	1/6/0	1/6/0	1/6/0
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	1/30/0	3/90/0	3/90/0	3/90/0	1/30/0
Additional Tests												

- 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

Ambient Operating Temperature by Automotive Grade Level:

- Grade 0 (or E): -40C to +150C
- Grade 1 (or Q): -40C to +125C
- Grade 2 (or T): -40C to +105C
- Grade 3 (or I) : -40C to +85C

E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):

- Room/Hot/Cold : HTOL, ED
- Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU
- Room : AC/uHAST

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

TI Qualification ID: R-CHG-2305-088

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 (www.ti.com/legal/termsofsale.html) 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.