

<b>PCN Number:</b>	20231129001.1		<b>PCN Date:</b>	November 30, 2023	
<b>Title:</b>	Qualification of LFAB and RFAB as additional options for METDCU processing				
<b>Customer Contact:</b>	Change Management team		<b>Dept:</b>	Quality Services	
<b>Proposed 1<sup>st</sup> Ship Date:</b>	Feb 29, 2024		<b>Sample requests accepted until:</b>	Dec 30, 2023*	
<b>*Sample requests received after December 29, 2023 will not be supported.</b>					
<b>Change Type:</b>					
<input type="checkbox"/>	Assembly Site	<input type="checkbox"/>	Design	<input type="checkbox"/>	Wafer Bump Material
<input type="checkbox"/>	Assembly Process	<input type="checkbox"/>	Data Sheet	<input type="checkbox"/>	Wafer Bump Process
<input 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 type="checkbox"/>	Wafer Fab Material
<input type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process	<input type="checkbox"/>	Wafer Fab Process
<b>PCN Details</b>					
<b>Description of Change:</b>					
Texas Instruments is pleased to announce the qualification of LFAB and RFAB as additional options for METDCU processing for the selected devices listed below in the product affected section.					
<b>Current Fab Site</b>			<b>Additional Fab Site</b>		
<b>Current Fab Site</b>	<b>Process</b>	<b>Wafer Diameter</b>	<b>Additional Fab Site</b>	<b>Process</b>	<b>Wafer Diameter</b>
DMOS6	LBC9	300 mm	LFAB	LBC9	300 mm
			RFAB	LBC9	300 mm
Qual details are provided in the Qual Data Section.					
<b>Reason for Change:</b>					
Capacity increase to support demand and continuity of supply					
<b>Anticipated impact on Fit, Form, Function, Quality or Reliability (positive / negative):</b>					
No anticipated impact.					
<b>Changes to product identification resulting from this PCN:</b>					
None					
<b>Product Affected:</b>					
BQ75614PAPRQ1	BQ79612PAPRQ1	BQ79616HPAPRQ1			
BQ75614PAPTQ1	BQ79614PAPRQ1	BQ79616PAPRQ1			

## 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: BQ79616HPAPRQ1	QBS Reference: BQ79616PAPRQ1
Test Group A - Accelerated Environment Stress Tests									
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	3/231/0	-
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Autoclave	121C/15psig	96 Hours	3/231/0	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	3/231/0	-
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	175C	500 Hours	3/135/0	-
Test Group B - Accelerated Lifetime Simulation Tests									
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	3/231/0	-
ELFR	B2	AEC Q100-008	1	77	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	3/90/0	-
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	3/90/0	-
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	1/15/0	-
SD	C3	JEDEC JESD22-B102	1	15	PB-Free Solderability	>95% Lead Coverage	-	1/15/0	-
Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: BQ79616HPAPRQ1	QBS Reference: BQ79616PAPRQ1
PD	C4	JEDEC JESD22-B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	3/30/0	-
Test Group D - Die Fabrication Reliability Tests									
EM	D1	JESD61	-	-	Electromigration	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
Tddb	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	-	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
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
SM	D5	-	-	-	Stress Migration	-	-	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	-	3000 Volts	1/3/0	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1000 Volts	1/3/0	-
LU	E4	AEC Q100-004	1	6	Latch-Up	Per AEC Q100-004	-	1/6/0	-
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	3/90/0	-
Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device	QBS Reference

- 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

- QBS: Qual By Similarity
- Qual Device BQ79616HPAPRQ1 is qualified at MSL3 260C
- 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-NPD-2202-003

## Automotive New Product Qualification Summary (As per AEC-Q100, AEC-Q006, and JEDEC Guidelines)

### 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: BQ79616HPAPRQ1
<b>Test Group A - Accelerated Environment Stress Tests</b>								
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL3 260C	1 Step	No Fails
PC	A1.1	-	3	22	SAM Precon Pre	Review for delamination	1 Step	3/66/0
PC	A1.2	-	3	22	SAM Precon Post	Review for delamination	1 Step	3/66/0
HAST	A2.1	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	3/231/0
HAST	A2.1.2	-	3	1	Cross Section, post bHAST, 1X	Post stress cross section	Completed	3/3/0
HAST	A2.1.3	-	3	30	Wire Bond Shear, post bHAST, 1X	Post stress	Wires	3/9/0
HAST	A2.1.4	-	3	30	Bond Pull over Stitch, post bHAST, 1X	Post stress	Wires	3/9/0

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: BQ79616HPAPRQ1
HAST	A2.1.5	-	3	30	Bond Pull over Ball, post bHAST, 1X	Post stress	Wires	3/9/0
HAST	A2.2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	192 Hours	3/210/0
HAST	A2.2.1	-	3	22	SAM Analysis, post bHAST 2X	Review for delamination	Completed	3/66/0
HAST	A2.2.2	-	3	1	Cross Section, post bHAST, 2X	Post stress cross section	Completed	3/3/0
HAST	A2.2.3	-	3	30	Wire Bond Shear, post bHAST, 2X	Post stress	Wires	3/9/0
HAST	A2.2.4	-	3	30	Bond Pull over Stitch, post bHAST, 2X	Post stress	Wires	3/9/0
HAST	A2.2.5	-	3	30	Bond Pull over Ball, post bHAST, 2X	Post stress	Wires	3/9/0
TC	A4.1	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	3/231/0
TC	A4.1.1	-	3	22	SAM Analysis, post TC 1X	Review for delamination	Completed	3/66/0
TC	A4.1.2	-	3	1	Cross Section, post TC, 1X	Post stress cross section	Completed	3/3/0
TC	A4.1.3	-	3	30	Wire Bond Shear, post TC, 1X	Post stress	Wires	3/9/0
TC	A4.1.4	-	3	30	Bond Pull over Stitch, post TC, 1X	Post stress	Wires	3/9/0
TC	A4.1.5	-	3	30	Bond Pull over Ball, post TC, 1X	Post stress	Wires	3/9/0
TC	A4.2	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	1000 Cycles	3/210/0
TC	A4.2.1	-	3	22	SAM Analysis, post TC, 2X	Review for delamination	Completed	3/66/0
TC	A4.2.2	-	3	1	Cross Section, post TC, 2X	Post stress cross section	Completed	3/3/0
TC	A4.2.3	-	3	30	Wire Bond Shear, post TC, 2X	Post stress	Wires	3/9/0
TC	A4.2.4	-	3	30	Bond Pull over Stitch, post TC, 2X	Post stress	Wires	3/9/0

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: BQ79616HPAPRQ1
TC	A4.2.5	-	3	30	Bond Pull over Ball, post TC, 2X	Post stress	Wires	3/9/0
HTSL	A6.1	JEDEC JESD22-A103	3	45	High Temperature Storage Life	175C	500 Hours	3/135/0
HTSL	A6.1.1	-	3	1	Cross Section, post HTSL, 1X	Post stress cross section	Completed	3/3/0
HTSL	A6.2	JEDEC JESD22-A103	3	45	High Temperature Storage Life	175C	1000 Hours	3/132/0
HTSL	A6.2.1	-	3	1	Cross Section, post HTSL, 2X	Post stress cross section	Completed	3/3/0
Test Group B - Accelerated Lifetime Simulation Tests								
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	3/231/0
ELFR	B2	AEC Q100-008	1	77	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	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	3/90/0
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	1/15/0
SD	C3	JEDEC JESD22-B102	1	15	PB-Free Solderability	>95% Lead Coverage	-	1/15/0
PD	C4	JEDEC JESD22-B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	3/30/0
Test Group D - Die Fabrication Reliability Tests								
EM	D1	JESD61	-	-	Electromigration	-	-	Completed Per Process Technology Requirements
TDDb	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	-	Completed Per Process Technology Requirements
HCI	D3	JESD60 & 28	-	-	Hot Carrier Injection	-	-	Completed Per Process Technology Requirements

Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: BQ79616HPAPRQ1
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	Completed Per Process Technology Requirements
SM	D5	-	-	-	Stress Migration	-	-	Completed Per Process Technology Requirements
<b>Test Group E - Electrical Verification Tests</b>								
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	3000 Volts	1/3/0
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1000 Volts	1/3/0
LU	E4	AEC Q100-004	1	6	Latch-Up	Per AEC Q100-004	-	1/6/0
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	3/90/0

- 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-NPD-2202-003

**Automotive New Product Qualification Summary  
(As per AEC-Q100 and JEDEC Guidelines)  
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: BQ79616HPAPRQ1	QBS Reference: BQ79616HPAPRQ1
<b>Test Group A - Accelerated Environment Stress Tests</b>									
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	3/231/0	-
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Autoclave	121C/15psig	96 Hours	3/231/0	-
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	3/231/0	-
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	175C	500 Hours	3/135/0	-
<b>Test Group B - Accelerated Lifetime Simulation Tests</b>									
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	3/231/1 <sup>1</sup>	-
ELFR	B2	AEC Q100-008	1	77	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	3/90/0	-
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	3/90/0	-
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	-	1/15/0
SD	C3	JEDEC JESD22-B102	1	15	PB-Free Solderability	>95% Lead Coverage	-	-	1/15/0
Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: BQ79616HPAPRQ1	QBS Reference: BQ79616HPAPRQ1
PD	C4	JEDEC JESD22-B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	3/30/0	-
Test Group D - Die Fabrication Reliability Tests									
EM	D1	JESD61	-	-	Electromigration	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
Tddb	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	-	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
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
SM	D5	-	-	-	Stress Migration	-	-	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	-	2500 Volts	1/3/0	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1000 Volts	1/3/0	-
LU	E4	AEC Q100-004	1	6	Latch-Up	Per AEC Q100-004	-	1/6/0	-
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	3/90/0	-
Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device	QBS Reference

- 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
- QBS: Qual By Similarity
- Qual Device BQ79616HPAPRQ1 is qualified at MSL3 260C
- 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-NPD-2201-085

[1]-QEM-EVAL-2206-00212: EOS undetermined root cause. Contact QRE for 8D.

**Automotive New Product Qualification Summary**  
(As per AEC-Q100, AEC-Q006, and JEDEC Guidelines)

**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: <a href="#">B:Q79616HPAPRQ1</a>	QBS Reference: <a href="#">B:Q79616PAPRQ1</a>
<b>Test Group A - Accelerated Environment Stress Tests</b>									
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL3 260C	1 Step	No Fails	-
PC	A1.1	-	3	22	SAM Precon Pre	Review for delamination	1 Step	3/66/0	-
PC	A1.2	-	3	22	SAM Precon Post	Review for delamination	1 Step	3/66/0	-
HAST	A2.1	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	3/231/0	-
HAST	A2.1.2	-	3	1	Cross Section, post bHAST, 1X	Post stress cross section	Completed	3/3/0	-
Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: <a href="#">B:Q79616HPAPRQ1</a>	QBS Reference: <a href="#">B:Q79616PAPRQ1</a>
HAST	A2.1.3	-	3	30	Wire Bond Shear, post bHAST, 1X	Post stress	Wires	3/9/0	-
HAST	A2.1.4	-	3	30	Bond Pull over Stitch, post bHAST, 1X	Post stress	Wires	3/9/0	-
HAST	A2.1.5	-	3	30	Bond Pull over Ball, post bHAST, 1X	Post stress	Wires	3/9/0	-
HAST	A2.2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	192 Hours	3/210/0	-
HAST	A2.2.1	-	3	22	SAM Analysis, post bHAST 2X	Review for delamination	Completed	3/66/0	-
HAST	A2.2.2	-	3	1	Cross Section, post bHAST, 2X	Post stress cross section	Completed	3/3/0	-
HAST	A2.2.3	-	3	30	Wire Bond Shear, post bHAST, 2X	Post stress	Wires	3/9/0	-
HAST	A2.2.4	-	3	30	Bond Pull over Stitch, post bHAST, 2X	Post stress	Wires	3/9/0	-
HAST	A2.2.5	-	3	30	Bond Pull over Ball, post bHAST, 2X	Post stress	Wires	3/9/0	-
TC	A4.1	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	3/231/0	-
TC	A4.1.1	-	3	22	SAM Analysis, post TC 1X	Review for delamination	Completed	3/66/0	-
TC	A4.1.2	-	3	1	Cross Section, post TC, 1X	Post stress cross section	Completed	3/3/0	-
TC	A4.1.3	-	3	30	Wire Bond Shear, post TC, 1X	Post stress	Wires	3/9/0	-
TC	A4.1.4	-	3	30	Bond Pull over Stitch, post TC, 1X	Post stress	Wires	3/9/0	-
TC	A4.1.5	-	3	30	Bond Pull over Ball, post TC, 1X	Post stress	Wires	3/9/0	-



Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: BQ79616HPAPRQ1	QBS Reference: BQ79616PAPRQ1
TC	A4.2	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	1000 Cycles	3/210/0	-
TC	A4.2.1	-	3	22	SAM Analysis, post TC, 2X	Review for delamination	Completed	3/66/0	-
TC	A4.2.2	-	3	1	Cross Section, post TC, 2X	Post stress cross section	Completed	3/3/0	-
TC	A4.2.3	-	3	30	Wire Bond Shear, post TC, 2X	Post stress	Wires	3/9/0	-
TC	A4.2.4	-	3	30	Bond Pull over Stitch, post TC, 2X	Post stress	Wires	3/9/0	-
TC	A4.2.5	-	3	30	Bond Pull over Ball, post TC, 2X	Post stress	Wires	3/9/0	-
HTSL	A6.1	JEDEC JESD22-A103	3	45	High Temperature Storage Life	175C	500 Hours	3/135/0	-
HTSL	A6.1.1	-	3	1	Cross Section, post HTSL, 1X	Post stress cross section	Completed	3/3/0	-
HTSL	A6.2	JEDEC JESD22-A103	3	45	High Temperature Storage Life	175C	1000 Hours	3/132/0	-
HTSL	A6.2.1	-	3	1	Cross Section, post HTSL, 2X	Post stress cross section	Completed	3/3/0	-
Test Group B - Accelerated Lifetime Simulation Tests									
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	3/231/1 <sup>1</sup>	-
ELFR	B2	AEC Q100-008	1	77	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	3/90/0	-
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	3/90/0	-
Type	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: BQ79616HPAPRQ1	QBS Reference: BQ79616PAPRQ1
SD	C3	JEDEC JESD22-B102	1	15	PB Solderability	>95% Lead Coverage	-	-	1/15/0
SD	C3	JEDEC JESD22-B102	1	15	PB-Free Solderability	>95% Lead Coverage	-	-	1/15/0
PD	C4	JEDEC JESD22-B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	3/30/0	-
Test Group D - Die Fabrication Reliability Tests									
EM	D1	JESD61	-	-	Electromigration	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
TDD	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	-	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
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
SM	D5	-	-	-	Stress Migration	-	-	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	-	2500 Volts	1/3/0	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1000 Volts	1/3/0	-
LU	E4	AEC Q100-004	1	6	Latch-Up	Per AEC Q100-004	-	1/6/0	-
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	3/90/0	-

- 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



- QBS: Qual By Similarity
- Qual Device BQ79616HPAPRQ1 is qualified at MSL3 260C
- 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-NPD-2201-085

[1]-QEM-EVAL-2206-00212: EOS undetermined root cause. Contact QRE for 8D.

## RFAB Qualification Plan

Qual Device	Req Name	Conditions	Lots	SS/Lot	Readpoints	Accept
BQ79616	Precon Q006 MSL3	MSL3 260C	3	0	1	1
BQ79616	Autoclave Q100	121C/15psig	3	77	96	96
BQ79616	BHAST Q006 (130C)	130C	3	77	96, 192	192
BQ79616	Ball Bond Pull Q006 1X	Post stress	3	3	1	1
BQ79616	Ball Bond Shear Q006 1X	Post stress	3	3	1	1
BQ79616	Stitch Bond Pull Q006 1X	Post stress	3	3	1	1
BQ79616	X-sec Q006 1x	Post stress cross section	3	1	1	1
BQ79616	SAM Q006	Review for delamination	3	22	1	1
BQ79616	Ball Bond Shear Q006 2X	Post stress	3	3	1	1
BQ79616	Ball Bond Shear Q006 2X	Post stress	3	3	1	1
BQ79616	Stitch Bond Pull Q006 2X	Post stress	3	3	1	1
BQ79616	X-sec Q006 2X	Post stress cross section	3	1	1	1
BQ79616	TC Q006 Grade 1 (-65C/+150C)	-65/150C	3	77	500, 1000, 1500	1000
BQ79616	SAM Q006	Review for delamination	3	22	1	1
BQ79616	Ball Bond Pull Q006 1X	Post stress	3	3	1	1
BQ79616	Ball Bond Shear Q006 1X	Post stress	3	3	1	1
BQ79616	Stitch Bond Pull Q006 1X	Post stress	3	3	1	1
BQ79616	X-sec Q006 1x	Post stress cross section	3	1	1	1
BQ79616	SAM Q006	Review for delamination	3	22	1	1
BQ79616	Ball Bond Pull Q006 2X	Post stress	3	3	1	1
BQ79616	Ball Bond Shear Q006 2X	Post stress	3	3	1	1
BQ79616	Stitch Bond Pull Q006 2X	Post stress	3	3	1	1

Qual Device	Req Name	Conditions	Lots	SS/Lot	Readpoints	Accept
BQ79616	X-sec Q006 2X	Post stress cross section	3	1	1	1
BQ79616	HTSL Q006 Grade 1 (150C)	150C	3	45	1000, 2000	2000
BQ79616	X-sec Q006 1x	Post stress cross section	3	1	1	1
BQ79616	X-sec Q006 2X	Post stress cross section	3	1	1	1
BQ79616	Characterization Q100	Cpk>1.67 Room, hot, and cold	3	30	1	1
BQ79616	Assembly MQ Q100	Per site specification	3	1	1	1
BQ79616	Ball Bond Pull Q100	Minimum of 5 devices, 30 wires Cpk>1.67	3	5	1	1
BQ79616	Ball Bond Shear Q100	Minimum of 5 devices, 30 wires Cpk>1.67	3	5	1	1
BQ79616	Stitch Bond Pull Q100	Minimum of 5 devices, 30 wires Cpk>1.67	3	5	1	1
BQ79616	Physical Dimensions Q100	Cpk>1.67	3	10	1	1
BQ79616	Solderability Pb Free Q100	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	1	15	1	1
BQ79616	Solderability Pb Q100	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	1	15	1	1

ZVEI ID: SEM-PW-13

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

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