

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

Bormio TPS7B4255 DYB Q100/Q006 Qualification Approve Date 16-August-2023

Product Attributes

Attributes	Qual Device: <u>TPS7B4255QDYBRQ1</u>	QBS Product Reference: <u>TPS7B4255QDBVRQ1</u>	QBS Process Reference: <u>TPS62810QWRWYRQ1</u>
Automotive Grade Level	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125
Product Function	Power Management	Power Management	Power Management
Wafer Fab Supplier	RFAB	RFAB	RFAB
Assembly Site	HFTFAT	PHI	UTL1
Package Group	SOT	SOT-23	-
Package Designator	DYB	DBV	RWY
Package Size (mm)	2.93 x 1.5	1.6 x 2.9	3 x 2
Body Thickness (mm)	1	1.45	0.9
Pin Count	5	5	9

- QBS: Qual By Similarity
- Qual Device TPS7B4255QDYBRQ1 is qualified at MSL1 260C

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: <u>TPS7B4255QDYBRQ1</u>	QBS Product Reference: <u>TPS7B4255QDBVRQ1</u>	QBS Process Reference: <u>TPS62810QWRWYRQ1</u>
Test Group A - Accelerated Environment Stress Tests										
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	-	3/Pass	1/Pass	3/Pass
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	3/231/0	1/77/0	3/231/0
AC/UHAST	A3	JEDEC JESD22-A118	3	77	Unbiased HAST	130C/85%RH	96 Hours	3/231/0	1/77/0	3/231/0
TC	A4	JEDEC JESD22A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	3/231/0	1/77/0	3/231/0
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	-	-	-
PTC		JEDEC JESD22-A105	1	45	Power Temp Cycle	-40C/125C	1000	1/45/0	1/45/0	3/135/0
HTSL	A6	JEDEC JESD22A103	1	45	High Temperature Storage Life	150C	1000 Hours	3/145/0	1/45/0	1/45/0
Test Group B - Accelerated Lifetime Simulation Tests										
HTOL	B1	JEDEC JESD22A108	1	77	Life Test	125C	1000 Hours	-	1/77/0	3/231/0
ELFR	B2	AEC Q100008	1	77	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0
EDR	B3	AEC Q100005	1	77	NVM Endurance, Data Retention, and Op Life	Per QSS-009018	1 Step	-	-	
Test Group C - Package Assembly Integrity Tests										
WBS	C1	AEC Q100001	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, wires Cpk>1.67	30 Wires	3/90/0	-	-
SD	C3	JEDEC JSTD-002	1	15	PB Solderability	>95% Lead Coverage	-	1/15/0	-	-
SD	C3	JEDEC JSTD-002	1	15	PB-Free Solderability	>95% Lead Coverage	-	1/15/0	-	-
PD	C4	JEDEC JESD22B100 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	Completed Per Process Technology Requirements
TDDB	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	-	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
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	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
ESD	E2	AEC Q100002	1	3	ESD HBM	-	2000 Volts	1/3/0	1/3/0	1/3/0
ESD	E2	AEC Q100002	1	3	ESD HBM	-	3000 Volts	1/3/0	-	-
ESD	E2	AEC Q100002	1	3	ESD HBM	-	4000 Volts	-	-	1/3/0
ESD	E3	AEC Q100011	1	3	ESD CDM	-	1500 Volts	1/3/0	1/3/0	1/3/0
LU	E4	AEC Q100004	1	6	Latch-Up	Per AEC Q100-004	-	1/6/0	1/6/0	1/6/0
ED	E5	AEC Q100009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	3/90/0	1/30/0	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

Orderable Part Numbers

The following table contains a list of all TI Orderable Part Numbers (OPNs) released by this qualification per Product Qualification Family definition (AEC Q100 Appendix 1). Group E results shown above cover all part numbers listed here.

TPS7B4255QDYBRQ1

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-2202-027

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