

#### PCN#20231004002.0 MSL Improvement for Select Devices Information Only

Date: October 05, 2023 To: Digi-Key PCN

Dear Customer:

This is an information-only announcement of a change to a device that is currently offered by Texas Instruments.

The changes discussed within this notification are for your information only.

Any negotiated alternative change requirements will be provided via the customer's defined process. Customers with previously negotiated, special requirements will be handled separately. Any inquiries should be directed to your local Field Sales Representative.

For questions regarding this notice, contact your local Field Sales Representative or the Change Management team.

Sincerely,

Change Management Team SC Business Services

#### 20231004002.0 Attachment: 1

### **Products Affected:**

The devices listed on this page are a subset of the complete list of affected devices. According to our records, you have recently purchased these devices. The corresponding customer part number is also listed, if available.

DEVICE	CUSTOMER PART NUMBER
LM74502HQDDFRQ1	null
LM745020DDFR01	null
LMR50410Y3FQDBVRQ1	null
LMR50410Y5FODBVRO1	null
LMR50410YFODBVR01	null
LMR50410YODBVR01	null
OPA607QDBVRQ1	null
TLIN1039DDFRO1	null
TLV73310PODBVR01	null
TLV73311PODBVRO1	null
TLV73312PODBVRO1	null
TLV73318PODBVRO1	null
TLV73325PODBVRO1	null
TLV73328PODBVRO1	null
TLV73330PQDBVRQ1	null
TLV73333PQDBVRQ1	null
TPS22810TDBVRQ1	null
TPS560430YFQDBVRQ1	null
TPS560430YQDBVRQ1	null
TPS6285010MQDRLRQ1	null
TPS628501QDRLRQ1	null
TPS6285020MQDRLRQ1	null
TPS6285021HQDRLRQ1	null
TPS62850220QDRLRQ1	null
TPS62850240QDRLRQ1	null
TPS628502QDRLRQ1	null
TPS628503QDRLRQ1	null
TPS78401QDBVRQ1	null
TPS78408QDBVRQ1	null
TPS78412QDBVRQ1	null
TPS78415QDBVRQ1	null
TPS78417QDBVRQ1	null
TPS78418QDBVRQ1	null
TPS78425QDBVRQ1	null
TPS78428QDBVRQ1	null
TPS78429QDBVRQ1	null
TPS78450QDBVRQ1	null
TPS92612QDBVRQ1	null

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

PCN Number:		202310040	20231004002.0						Dat	e:	October 05, 2023		
Title:	MSL Improver	ment for Select Devices											
Custom	ner Contact:	Change Management team Dept					t:	Qı	Quality Services				
Change	е Туре:												
As	sembly Site			Design						Wat	er Bump Material		
As	sembly Process			Data Sh	eet					Wat	er Bump Process		
As As	sembly Materials			Part nur	nber ch	nange	9			Wat	er Fab Site		
	chanical Specifi	cation		Test Sit	е					Wat	er Fab Materials		
X Pa	cking/Shipping/L	abeling		Test Pro	cess					Wat	er Fab Process		
				PCN D	Details	S							
Descrip	tion of Change												
This not selectio	This notice is to communicate an update in the MSL Level for the devices in the product affected selection as follows:												
				Cur	rent		Ne	ew		]			
		MSI			2			1					
		INSE			2			-					
Reason	Reason for Change												
Standar	dization												
Anticipa	ated impact on	Fit, Form,	Fune	ction, Qu	ality o	r Reli	iabili	ity (	(pos	sitive	e / negative):		
None													
Change	es to product id	entification	res	ulting fro	om this	s PCN	1:						
None													
Product	t Affected:												
LM7450	)2HQDDFRQ1	TLV73312P	QDB	VRQ1	TPS62	85018	8AQD	RLR	Q1	TPS	578415QDBVRQ1		
LM7450	2QDDFRQ1	TLV73315P	QDB	VRQ1	TPS62	85010	QDRL	RQ1		TPS	78417QDBVRQ1		
LMR504	10Y3FQDBVRQ1	TLV73318P	QDB	VRQ1	TPS62	85020	OMQ		Q1	TPS	78418QDBVRQ1		
LMR504	10Y5FQDBVRQ1	TLV73325P	QDB	VRQ1	TPS62	8502	1HQC		Q1	TPS	78425QDBVRQ1		
LMR504	10YFQDBVRQ1	TLV73328P	QDB	VRQ1	TPS62	85022	20QD	RLR	Q1	TPS	78428QDBVRQ1		
LMR504	LMR50410YQDBVRQ1 TLV73330P			VRQ1	TPS62	85024	40QD	RLR	Q1	TPS	78429QDBVRQ1		
OPA607QDBVRQ1 TLV73333P			QDB	VRQ1	TPS62	85020	QDRL	RQ1		TPS	78430QDBVRQ1		
TLIN10	21ADDFRQ1	TPS22810T	DBV	RQ1	TPS62	85030	QDRL	QDRLRQ1			TPS78433QDBVRQ1		
TLIN10	39DDFRQ1	TPS560430	YFQ	DBVRQ1	TPS78	401Q	DBVR	Q1		TPS	78450QDBVRQ1		
TLV73310PQDBVRQ1 TPS560430				BVRQ1	TPS78	408Q	DBVR	RQ1		TPS	92612QDBVRQ1		
TLV733	11PQDBVRQ1	TPS628501	.0MQ	DRLRQ1	TPS78	412Q	DBVR	Q1					

# **Qualification Report**

#### Automotive New Product Qualification Summary (As per AEC-Q100 and JEDEC Guidelines) Approved 22-Nov-2021

#### **Product Attributes**

Attributes	Qual Device: <u>SN74HC S164QDYYRQ1</u>	QBS Process Reference: <u>SN74HC S595QPWRQ1</u>	QBS Process Reference: <u>SN74HC S74QPWRQ1</u>	QBS Package Reference: <u>SN3257QDYYRQ1</u>	QBS Package Reference: <u>SN74HC S595QDYYRQ1</u>
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C
Product Function	Logic	Logic	Logic	Logic	Logic
Wafer Fab Supplier	RFAB	RFAB	RFAB	RFAB	RFAB
Die Revision	A0	A2	B1	A	A2
Assembly Site	PHI	MLA	MLA	PHI	PHI
Package Type	SOT-23 THN	TSSOP	TSSOP	SOT-23 THN	SOT-23 THN
Package Designator	DYY	PW	PW	DYY	DYY
Ball/Lead Count	14	16	14	16	16

- QBS: Qual By Similarity

- Qual Device SN74HCS164QDYYRQ1 is qualified at LEVEL1-260C

#### **Qualification Results**

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

Ту	pe -	#	Test Spec	Min Lot Qty	\$\$/Lot	Test Name / Condition	Duration	Qual Device: <u>\$N74HC \$164QDYYRQ1</u>	QBS Process Reference: <u>\$N74HC \$595QPWRQ1</u>	QBS Process Reference: <u>\$N74HC \$74QPWRQ1</u>	QBS Package Reference: <u>\$N3257QDYYRQ1</u>	QBS Package Reference: <u>SN74HC S595QDYYRQ1</u>
	Tes	st Gr	oup A – Ac	celera	ted Enviro	onment Stress Tes	its					
P	. ,	A1	JEDEC J-STD- 020 JESD22- A113	3	77	Automotive Preconditioning Level 1	(Level 1- 260C)	No Fails	No Fails	No Fails	No Fails	No Fails
HA	ST /	A2	JEDEC JESD22- A110	3	77	Biased HAST, 130C/85%RH	96 Hours	-	1/77/0	3/231/0	3/231/0	3/231/0
A		A3	JEDEC JESD22- A102	3	77	Autoclave 121C	96 Hours	-	1/77/0	3/231/0	3/231/0	3/231/0
т		A4	JEDEC JESD22- A104 and Appendix 3	з	77	Temperature Cycle, -85/150C	500 Cycles	-	1/77/0	3/231/0	3/231/0	3/231/0
PT	c /	A5	JEDEC JESD22- A105	1	45	Power Temperature Cycle	1000 Cycles	N/A	-	-	-	-
HT	SL /	A6	JEDEC JESD22- A103	1	45	High Temp Storage Bake 150C	1000 Hours	-	1/45/0	3/135/0	3/135/0	1/45/0
	Tes	st Gr	oup B – Ac	celera:	ted Lifetir	me Simulation Tes	ts					
нт	DLE	B1	JEDEC JESD22- A108	з	77	Life Test, 150C	300 Hours	-	1/77/0	3/231/0	3/231/0	3/231/0
EU	R	B2	AEC Q100- 008	3	800	Early Life Failure Rate, 125C	48 Hours	-	-	3/2400/0	-	-
	Т	est (	Group C – I	Packaç	je Assem	bly Integrity Tests						
WE	is c	C1	AEC Q100- 001	1	30	Wire Bond Shear (Cpk>1.67)	Wires	1/30/0	1/30/0	3/90/0	3/90/0	1/30/0
WE	P (	C2	MIL- STD883 Method 2011	1	30	Bond Pull, Cpk >1.67	Wires	1/30/0	1/30/0	3/90/0	3/90/0	1/30/0
SI		СЗ	JEDEC JESD22- B102	1	15	Surface Mount Solderability	Pb Free	-	-	3/45/0	1/15/0	-

	Туре	#	Test Spec	Min Lot Qty	\$\$/Lot	Test Name / Condition	Duration	Qual Device: <u>\$N74HC \$164QDYYRQ1</u>	QBS Process Reference: <u>\$N74HC \$595QPWRQ1</u>	QBS Process Reference: <u>\$N74HC \$74QPWRQ1</u>	QBS Package Reference: <u>\$N3257QDYYRQ1</u>	QBS Package Reference: <u>SN74HC \$595QDYYRQ1</u>
	SD	C3	JEDEC JESD22- B102	1	15	Surface Mount Solderability	Pb	-	-	3/45-0	1/15/0	-
	PD	C4	JEDEC JESD22- B100 and B108	3	10	Physical Dimensions	Cpk>1.67	-	3/90/0	3/90/0	3/90/0	1/30/0
	LI	C6	JEDEC JESD22- B105	1	50	Lead Pull	Leads	1/24/0	-	-	1/40/0	-
		Tes	t Group D –	Die Fa	abrication	Reliability Tests						
	EM	D1	JESD61	-	-	Electromigration	-	Completed Per Process Technology Requirements	-	-	-	-
٦	TDDB	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	Completed Per Process Technology Requirements	-	-	-	-
	HCI	D3	JESD60 & 28	-	-	Hot Injection Carrier	-	Completed Per Process Technology Requirements	-	-	-	-
	NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	Completed Per Process Technology Requirements	-	-	-	-
	SM	D5	-	-	-	Stress Migration	-	Completed Per Process Technology Requirements	-	-	-	-
		Т	est Group E	E – Ele	ctrical Ve	rification Tests						
	нвм	E2	AEC Q100- 002	1	3	ESD - HBM	2000 V	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0
	CDM	E3	AEC Q100- 011	1	3	ESD - CDM	1500 V	1/3/0	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	1/8/0	1/6/0	1/8/0	1/6/0
	ED	E5	AEC Q100- 009	3	30	Auto Electrical Distributions	Cpk>1.67 Room, hot, and cold test	1/30/0	3/90/0	3/90/0	3/90/0	3/90/0

#### A1 (PC): Preconditioning:

Performed for THB, Biased HAST, AC, uHAST, TC & PTC samples, as applicable.

#### Ambient Operating Temperature by Automotive Grade Level:

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

# 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

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

# **Qualification Report**

Automotive New Product Qualification Summary (As per AEC-Q100 and JEDEC Guidelines) Approve Date 16-December-2022

#### **Product Attributes**

A Holbudon	Qual Device:	Qual Device:	Qual Device:	QBS Reference:	QBS Reference:	QBS Reference:
Attributes	SN6505AQDBVRQ1	SN6505DQDBVRQ1	SN6505BQDBVRQ1	TLV2401QDBVRQ1	LP87332ARHDRQ1	UCC27517AQDBVRQ1
Automotive Grade Level	Grade 1	Grade 1				
Operating Temp Range (C)	-40 to 125	-40 to 125				
Product Function	Interface	Interface	Interface	Signal Chain	Power Management	Power Management
Wafer Fab Supplier	RFAB	RFAB	RFAB	DL-LIN	RFAB	RFAB
Assembly Site	PHI	PHI	PHI	PHI	UTL1	PHI
Package Group	SOT	SOT	SOT	SOT	QFN	SOT
Package Designator	DBV	DBV	DBV	DBV	RHD	DBV
Pin Count	6	6	6	5	28	5

QBS: Qual By Similarity

Qual Device SN6505AQDBVRQ1 is qualified at MSL1 260C Qual Device SN6505DQDBVRQ1 is qualified at MSL1 260C Qual Device SN6505BQDBVRQ1 is qualified at MSL1 260C

#### **Qualification Results**

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

Туре	"	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device: <u>SN6505AQDBVRQ1</u>	Qual Device: <u>SN6505DQDBVRQ1</u>	Qual Device: <u>SN6505BQDBVRQ1</u>	QBS Reference: TLV2401QDBVRQ1	QBS Reference: LP87332ARHDRQ1	QBS Reference: UCC27517AQDBVRQ1
Test Group	A - Acce	lerated Environ	nment St	ress Te:	sts		,					•	
PC	A1	JEDEC J- STD-020 JESD22- A113	3	77	Preconditioning	MSL1 260C	1 Step	No Fails	-	-	No Fails	-	No Fails
HAST	A2	JEDEC JESD22- A110	3	77	Biased HAST	130C/85%RH	96 Hours	1/77/0	-	-	3/231/0	-	-
AC/UHAST	A3	JEDEC JESD22- A102/JEDEC JESD22- A118	3	77	Autoclave	121C/15psig	96 Hours	1/77/0	-	-	-	-	-
AC/UHAST	A3	JEDEC JESD22- A102/JEDEC JESD22- A118	з	77	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	-	-	3/231/0
тс	A4	JEDEC JESD22- A104 and Appendix 3	з	77	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	-	-	3/231/0	-	3/231/0
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	1/5/0	-	-	-	-	3/15/0
HTSL	A6	JEDEC JESD22- A103	1	45	High Temperature Storage Life	150C	1000 Hours	1/45/0	-	-	-	-	3/135/0
HTSL	A6	JEDEC JESD22- A103	1	45	High Temperature Storage Life	175C	500 Hours	-	-	-	3/135/0	-	-
Test Group	B - Acce	lerated Lifetim	e Simula	tion Tes	ts								
HTOL	В1	JEDEC JESD22- A108	1	77	Life Test	150C	408 Hours	-			3/231/0		-
HTOL	В1	JEDEC JESD22- A108	1	77	Life Test	150C	500 Hours	-	-	-	-	3/231/0	-
ELFR	B2	AEC Q100- 008	1	77	Early Life Failure Rate	150C	24 Hours	-	-	-	-	3/2400/0	
Test Group	C - Pack	age 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	1/30/0	1/30/0	3/15/0	-	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	1/30/0	1/30/0	3/15/0	-	3/90/0
SD	СЗ	JEDEC J- STD-002	1	15	PB Solderability	>95% Lead Coverage	-	-	-	-	1/15/0	-	-
SD	СЗ	JEDEC J- STD-002	1	15	PB-Free Solderability	>95% Lead Coverage	-	-	-	-	1/15/0	-	1/15/0
PD	C4	JEDEC JESD22- B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	1/10/0	1/10/0	1/10/0	3/30/0	-	3/30/0

ЕМ	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	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	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
нсі	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	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	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	Completed Per Process Technology Requirements
Test Group	E - Elect	rical Verificatio	n 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	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	1/30/0	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 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

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

ZVEI ID reference: SEM-PS-02

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

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