PCN Number:	20160520000	PCN Date:	05/25/2016
Title:	TLC6C598QDRQ1 Leadframe		
Customer Contact:	PCN Manager	PCN Type: 180 day	Dept: Quality Services
Proposed 1st Ship Date:	11/25/2016	Estimated Sample Availability:	Date provided at sample request

Change Type:

☐	Assembly Site	☐	Design	☐	Wafer Bump Site
☐	Assembly Process	☐	Data Sheet	☐	Wafer Bump Material
☒	Assembly Materials	☐	Part number change	☐	Wafer Bump Process
☐	Mechanical Specification	☐	Test Site	☐	Wafer Fab Site
☐	Packing/Shipping/Labeling	☐	Test Process	☐	Wafer Fab Materials
				☐	Wafer Fab Process

PCN Details

Description of Change:

Texas Instruments Incorporated is announcing the qualification of TLC6C598QDRQ1 Leadframe redesign.

Material	Current TI p/n	New TI p/n
Leadframe	4221108-0001	4222126-0001

Reason for Change:

Improve Lead Pull / Package Mold Lock robustness for internal manufacturing.

Anticipated impact on Fit, Form, Function, Quality or Reliability (positive / negative):

None.

Changes to product identification resulting from this PCN:

None.

Product Affected:

TLC6C598QDRQ1

TI Confidential
NDA Restrictions

Automotive New Product Qualification Summary
(As per AEC-Q100 and JEDEC Guidelines)
TPS6C598QDQ1 (LF126) Qual
Approved 20-May-2016

Product Attributes

Attributes	Qual Device: TLC6C598QDRQ1 (LF 126)	QBS Product Reference: TLC6C598QDRQ1 (LF 616 & LF 108)	QBS Product Reference: TLC6C598QPWQ1 (TSSOP version)	QBS Process References: TPS65300QPWPRQ1	QBS Package References: MSA00021DG4
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range	-40°C to +125°C	-40°C to +125°C	-40°C to +125°C	-40°C to +125°C	-40°C to +125°C
Product Function	Power Management	Power Management	Power Management	Power Management	Power Management
Die Attributes	-	-	-	-	-
Wafer Fab Supplier	DMOS5	DMOS5	DMOS5	DMOS5	SFAB
Wafer Diameter (mm)	200	200	200	200	200
Wafer Process Technology	Power BiCMOS	Power BiCMOS	Power BiCMOS	Power BiCMOS	Logic
Wafer Process ID	LBC5 with MetDCu	LBC5 with MetDCu	LBC5 with MetDCu	LBC5 with MetDCu	74HC-CMOS
Die Revision	B	B	B	A	G
Die Size (L,W) (mm)	1.1 x 1.0	1.1 x 1.0	1.1 x 1.0	3.2 x 2.6	3.3 x 2.5
Die Size (H) (mils)	10.5	10.5	10.5	15.0	15.0
Package Attributes	-	-	-	-	-
Assembly Site	TI Malaysia	TI Malaysia	TI Taiwan	TI Taiwan	TI Malaysia
Package Type	SOIC	SOIC	TSSOP	HTSSOP	SOIC
Package Designator	D	D	PW	PWP	D
Ball/Lead Count	16	16	16	24	16
Die Attach Material	Hitachi EN4088Z	Hitachi EN4088Z	CRM-1076WD	Henkel FS849	Hitachi EN4088Z
Mold Compound & Supplier	Loctite GR825	Loctite GR825	Nitto GE1030MDP	EME G700LB	Loctite GR825
Wire Bond Material	Au	Au	Au and Cu	Cu	Au
Wire Bond	1.0	1.0	1.0	1.3	1.0

Attributes	Qual Device: TLC6C598QDRQ1 (LF 126)	QBS Product Reference: TLC6C598QDRQ 1 (LF 616 & LF 108)	QBS Product Reference: TLC6C598QPWQ 1 (TSSOP version)	QBS Process References: TPS65300QPWPRQ 1	QBS Package References: MSA00021DG4
Diameter (mils)					
Lead Frame Material	Cu	Cu	Cu	Cu	Cu
Leadframe Plating Composition	NiPdAu	NiPdAu	NiPdAu	NiPdAu	NiPdAu
TI Reference (eQDB ID)	20151006-115514	20120903-65761 20130910-92942	20121009-68901 20130904-92582	20090609-7201	Qual memo loaded in 20120903-65761

- QBS: Qual By Similarity
- Qual Device is qualified at LEVEL3-260

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: TLC6C598QDRQ1 (LF 126)	QBS Product Reference: TLC6C598QDRQ1 (LF 616 + LF108)	QBS Product Reference: TLC6C598QPWQ1 (TSSOP version)	QBS Process References: TPS65300QPWPRQ1	QBS Package References: MSA00021DG4
Test Group A – Accelerated Environment Stress Tests												
	PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Auto Preconditioning	L3-260C	3/all/0	1/all/0	4/all/0	3/all/0	3/all/0
	HAST	A2	JEDEC JESD22-A110	3	77	**Auto Biased HAST	130C/85% RH 96 Hrs	-	-	3/231/0	3/231/0	3/231/0
	AC	A3	JEDEC JESD22-A102	3	77	**Auto Autoclave	121C 96 Hrs	3/231/0	-	3/231/0	3/231/0	3/231/0
	TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	**Auto T/C Grade 1	-65C/+150C 500 cycles	3/231/0	1/77/0	4/308/0	3/231/0	3/231/0
				1	5	Bond Pull	Post TC	1/5/0	1/5/0	2/10/0	3/15/0	3/15/0
	PTC	A5	JEDEC JESD22-A105	1	45	**Auto Power T/C Grade 1	-40C/125C, 1000 Cycles	1/45/0	1/45/0	2/90/0	-	-
	HTSL	A6	JEDEC JESD22-A103	1	45	**Auto High Temp. Storage Life Grade	150C 1000 Hrs or 175C 500 Hrs	-	1/45/0	2/90/0	3/135/0	1/45/0

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TLC6C598QDRQ1 (LF 126)	QBS Product Reference: TLC6C598QDRQ1 (LF 616 + LF108)	QBS Product Reference: TLC6C598QPWQ1 (TSSOP version)	QBS Process References: TPS65300QPWPRQ1	QBS Package References: MSA00021DG4
					1						
Test Group B – Accelerated Lifetime Simulation Tests											
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 125C	1000 Hrs	-	-	1/77/0	3/231/0	3/231/0
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 125C	48 Hrs	-	-	-	3/2400/0	3/2400/0
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, and Operational Life	-	N/A	-	-	-	-
Test Group C – Package Assembly Integrity Tests											
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear	Cpk>1.67	3/60/0	2/60/0	1/30/0	1/30/0	1/30/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Cpk>1.67	3/60/0	2/60/0	1/30/0	1/30/0	1/30/0
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	>95% Lead Coverage	3/15/0	-	-	-	3/66/0
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions	Cpk>1.67	3/90/0	-	-	-	3/30/0
SBS	C5	AEC Q100-010	3	50	Solder Ball Shear (Cpk > 1.67)	Post HTSL/Bump	N/A	-	-	-	-
LI	C6	JEDEC JESD22-B105	1	50	Lead Integrity	-	N/A	-	-	-	-
Test Group D – Die Fabrication Reliability Tests											
EM	D1	JESD61	-	-	Electro-migration	-	Completed Per Process Technology Requirements	-	-	-	-
TDDB	D2	JESD35	-	-	Time Dependent Dielectric	-	Completed Per Process	-	-	-	-

	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TLC6C598QDRQ1 (LF 126)	QBS Product Reference: TLC6C598QDRQ1 (LF 616 + LF108)	QBS Product Reference: TLC6C598QPWQ1 (TSSOP version)	QBS Process References: TPS65300QPWPRQ1	QBS Package References: MSA00021DG4
						Breakdown		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	-	-	-	-
Test Group E – Electrical Verification Tests												
	HBM	E2	AEC Q100-002	1	3	Auto ESD HBM	2000 V	-	-	1/3/0	-	-
	CDM	E3	AEC Q100-011	1	3	Auto ESD CDM	500 V (all pins) 750 V (corner pins)	-	1/3/0	1/3/0	-	-
	LU	E4	AEC Q100-004	1	6	Auto Latch-up	125 C	-	-	1/6/0	-	-
	ED	E5	AEC Q100-009	3	30	Auto Electrical Distributions	Cpk > 1.67 at Room, hot, and cold test	3/90/0	2/60/0	1/30/0	-	-
Additional tests												
				1	5	Lead Pull	> 240 g (lead break); > 2200 g (lead	3/15/0	-	-	-	-

	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TLC6C598QDRQ1 (LF 126)	QBS Product Reference: TLC6C598QDRQ1 (LF 616 + LF108)	QBS Product Reference: TLC6C598QPWQ1 (TSSOP version)	QBS Process References: TPS65300QPWPRQ1	QBS Package References: MSA00021DG4
							pulled out of package) 5 units, 22 leads total					
						X-ray	Post lead pull	3/9/0				
				1	12	SAM	No delamination over silicon die surface	3/66/0 (time zero) 3/66/0 (after pre-conditioning)	1/12/0	-	-	-

A1 (PC): Preconditioning:
Performed for THB, Biased HAST, AC, uHAST &TC samples, as applicable.

Junction 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

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