PCN Number:	20220804001.2	**PCN Date:**	August 04, 2022
Title:	Add Cu as Alternative Wire Base Metal for Selected Device		
Customer Contact:	PCN Manager	**Dept:**	Quality Services
Proposed 1st Ship Date:	Feb 08, 2023	**Sample requests accepted until:**	Sept 08, 2022*

*Sample requests received after (Sept 08, 2022) will not be supported.

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 is pleased to announce the qualification of new assembly material set to add Cu as an additional bond wire option for selected device listed in "Product affected" section below. Device will remain in current assembly facility and piece part changes as follows:

Material	Current	Proposed
Wire type	0.96 mil Au	0.96 mil Cu

Reason for Change:

Continuity of supply.

1) To align with world technology trends and use wiring with enhanced mechanical and electrical properties
2) Maximize flexibility within our Assembly/Test production sites.
3) Cu is easier to obtain and stock

Anticipated impact on Fit, Form, 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
☒ No Change	☒ No Change	☒ No Change	☒ No Change

Changes to product identification resulting from this PCN:

None.

Product Affected:

TLC6C5912QDWRQ1

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

Qualification Report

Approved 26-Jul-2022

Product Attributes

Attributes	Qual Device: TLC6C5912QDWRQ1	Qual Product Reference: TLC6C5912QPWRQ1	Qual Package Reference: TPD3S714QDBQRQ1	QBS Process Reference: TPIC7218PFP
Automotive Grade Level	Grade 1	Grade 1	Grade-1	Grade 1
Operating Temp Range	-40 to +125 C	-40 to +125 C	-40C to 125C	-40 to +125 C
Product Function	Power Management	Power Management	Power Management	Power Management
Wafer Fab Supplier	DM5-DALLAS	DM5-DALLAS	DM5-DALLAS	DM5-DALLAS
Die Revision	B0	B0	A2	-
Assembly Site	MLA	TITL	MLA	TITL
Package Type	HTSSOP	TSSOP	SSOP	HTQFP
Package Designator	DCP	PW	DBQ	PFP
Ball/Lead Count	38	20	16	80

- QBS: Qual By Similarity
- Qual Device Qual Device TLC6C5912QDWRQ1 is qualified at LEVEL3-260CG

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: TLC6C5912QDWRQ1	Qual Product Reference: TLC6C5912QPWRQ1	Qual Package Reference: TPD3S714QDBQRQ1	QBS Process Reference: TPIC7218PFP
Test Group A – Accelerated Environment Stress Tests										
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditioning Level 2	Level 2 -260C	Pass	-	Pass	Pass
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	1/77/0	-	3/231/0	-
UHAST	A3	JEDEC JESD22-A118	3	77	Unbiased HAST, 130C/85%RH	96 Hours	1/77/0	-	-	-
AC	A3	JEDEC JESD22-A102	3	77	Autoclave 121C	96 Hours	-	-	3/231/0	3/231/0

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TLC6C5912QDWRQ1	Qual Product Reference: TLC6C5912QPWRQ1	Qual Package Reference: TPD3S714QDBQRQ1	QBS Process Reference: TPIC7218PFP
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	1/77/0	-	3/231/0	3/231/0
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post TC Bond Pull	500 Cycles	1/5/0	-	3/15/0	3/15/0
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle	1000 Cycles	-	-	NA	N/A
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 175C	500 Hours	-	-	3/135/0	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 150C	1000 Hours	1/45/0	-	-	-
Test Group B – Accelerated Lifetime Simulation Tests										
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 150C	408 Hours	-	-	3/231/0	-
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 125C	1000 Hours	-	-	-	3/231/0
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 150C	24 Hours	-	-	3/2400/0	3/2400/0
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, and Operational Life	-	N/A	N/A	N/A	N/A
Test Group C – Package Assembly Integrity Tests										
WBS	C1	AEC Q100-001	1	30	Auto Wire Bond Shear	Minimum of 5 device	-	-	3/90/0	-

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TLC6C5912QDWRQ1	Qual Product Reference: TLC6C5912QPWRQ1	Qual Package Reference: TPD3S714QDBQRQ1	QBS Process Reference: TPIC7218PFP
						s, 30 wires Cpk>1.67				
WBP	C2	MIL-STD883 Method 2011	1	30	Auto Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	-	-	3/90/0	-
SD	C3	JEDEC JESD22-B102	1	15	Auto Solderability (Pb and Pb-Free)	>95% Lead Coverage 8 Hr Steam Age	-	-	3/45/0	-
PD	C4	JEDEC JESD22-B100 and B108	3	10	Auto Physical Dimensions	Cpk>1.67	-	-	3/30/0	-
LI	C6	JEDEC JESD22-B105	1	50	Lead Integrity	-	-	-	-	-
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
TDDB	D2	JESD35	-	-	Time Dependant Dielectric Breakdown	-	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 Injection Carrier	-	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
SM	D5	-	-	-	Stress Migration	-	Completed Per Process Technology	Completed Per Process Technology	Completed Per Process Technology	Completed Per Process Technology

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TLC6C5912QDWRQ1	Qual Product Reference: TLC6C5912QPWRQ1	Qual Package Reference: TPD3S714QDBQRQ1	QBS Process Reference: TPIC7218PFP
							Requirements	Requirements	Requirements	Requirements
Test Group E – Electrical Verification Tests										
HBM	E2	AEC Q100-002	1	3	ESD - HBM - Q100	2500 V	-	1/3/0	-	-
CDM	E3	AEC Q100-011	1	3	ESD - CDM - Q100	1000 V	-	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	Auto Electrical Distributions	Cpk>1.67 Room, hot, and cold test	3/90/0	1/30/0	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

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

Qualification Report
Approved 11-Aug-2016

Product Attributes

Attributes	Qual Device: TPD3S714QDBQRQ1
Automotive Grade Level	Grade-1
Operating Temp Range	-40C to 125C
Product Function	Power Management
Wafer Fab Supplier	DM5-DALLAS

Attributes	Qual Device: TPD3S714QDBQRQ1
Die Revision	A2
Assembly Site	MLA
Package Type	SSOP
Package Designator	DBQ
Ball/Lead Count	16

- QBS: Qual By Similarity
- Qual Device TPD3S714QDBQRQ1 is qualified at LEVEL2-260C

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: TPD3S714QDBQRQ1
Test Group A – Accelerated Environment Stress Tests							
PC	A1	-	3	22	SAM Analysis, Pre Stress	Completed	3/66/0
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	Level 2-260C	No fails
PC	A1	-	3	22	SAM Analysis, Post Stress	Completed	3/66/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	3/231/0
HAST	A2	-	3	1	Cross Section, Post bHAST 96 Hours	Completed	3/3/0
HAST	A2	-	3	30	Wire Bond Shear, Post bHast, 96 Hours	Wires	3/90/0
HAST	A2	-	3	30	Bond Pull over Stitch, post bHAST, 96 Hours	Wires	3/90/0
HAST	A2	-	3	30	Bond Pull over Ball, Post bHAST, 96 Hours	Wires	3/90/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	192 Hours	3/210/0
HAST	A2	-	3	1	Cross Section, Post bHAST 192 Hours	Completed	3/3/0
HAST	A2	-	3	22	SAM Analysis, Post bHAST, 192 Hours	Completed	3/66/0
HAST	A2	-	3	30	Wire Bond Shear, Post bHast, 192 Hours	Wires	3/90/0
HAST	A2	-	3	30	Bond Pull over Stitch, post bHAST, 192 Hours	Wires	3/90/0
HAST	A2	-	3	30	Bond Pull over Ball, Post bHAST, 192 Hours	Wires	3/90/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	3/231/0
TC	A4	-	3	1	Cross Section, Post	Completed	3/3/0

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TPD3S714QDBQRQ1
					T/C 500 Cycles		
TC	A4	-	3	22	SAM Analysis, Post T/C, 500 Cycles	Completed	3/66/0
TC	A4	-	3	30	Wire Bond Shear, Post T/C 500 Cycles	Wires	3/90/0
TC	A4	-	3	30	Bond Pull over Stitch Post T/C 500 Cycles	Wires	3/90/0
TC	A4	-	3	30	Bond Pull over Ball Post T/C 500 Cycles	Wires	3/90/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	1000 Cycles	3/210/0
TC	A4	-	3	1	Cross Section, Post T/C 1000 Cycles	Completed	3/3/0
TC	A4	-	3	22	SAM Analysis, Post T/C, 1000 Cycles	Completed	3/66/0
TC	A4	-	3	30	Wire Bond Shear, Post T/C 1000 Cycles	Wires	3/90/0
TC	A4	-	3	30	Bond Pull over Stitch, Post T/C, 1000 Cycles	Wires	3/90/0
TC	A4	-	3	30	Bond Pull over Ball, Post T/C, 1000 Cycles	Wires	3/90/0
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle -40/125C	1000 Cycles	NA
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle -40/125C	2000 Cycles	NA
HTSL	A6	JEDEC JESD22-A103	3	45	High Temp Storage Bake 175C	1000 Hours	3/135/0
HTSL	A6	-	3	1	Cross Section, Post HTSL 500 Hours	Completed	3/3/0
HTSL	A6	JEDEC JESD22-A103	3	44	High Temp Storage Bake 175C	2000 Hours	3/132/0
HTSL	A6	-	3	1	Cross Section, Post HTSL 1000 Hours	Completed	3/3/0
Test Group C – Package Assembly Integrity Tests							
WBS	C1	AEC Q100-001	3	30	Wire Bond Shear, Cpk>1.67	Wires	3/30/0
WBP	C2	MIL-STD883 Method 2011	3	30	Bond Pull over Ball, Cpk >1.67	Wires	3/30/0

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
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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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