12500 TI Boulevard, MS 8640, Dallas, Texas 75243

PCN#20140721003
Qualification of new BOM for select devices in QFP package
Change Notification / Sample Request

Dear Customer:

This is an announcement of a change to a device that is currently offered by Texas Instruments. The details of this change are on the following pages.

Texas Instruments requires acknowledgement of receipt of this notification within 30 days of the date of this notice. Lack of acknowledgement of this notice within 30 days constitutes acceptance of the change. The proposed first ship date is indicated on page 3 of this notification, unless customer agreement has been reached on an earlier implementation of the change.

If samples or additional data are required, requests must be received within 30 days of acknowledgement as samples are not built ahead of the change. You may contact the PCN Manager or your local Field Sales Representative to acknowledge this PCN and request samples or additional data.

This notice does not change the end-of-life status of any product. Should product affected be on a previously issued product withdrawal/discontinuance notice, this notification does not extend the life of that product or change the life time buy offering/discontinuance plan.

For questions regarding this notice, contact your local Field Sales Representative or the PCN Manager (PCN_ww_admin_team@list.ti.com).

Sincerely,

PCN Team
SC Business Services
Phone: +1(214) 480-6037
Fax: +1(214) 480-6659

PCN# 20140721003
Attachment: 1

Products Affected:

According to our records, there are the affected device(s) that you have purchased within the past twenty-four (24) months. Technical details of this Product Change follow on the next page(s).

PCN Number:	20140721003	**PCN Date:**	07/29/2014
Title:	Qualification of new BOM for select devices in QFP package		
Customer Contact:	PCN Manager	**Phone:** +1(214)480-6037	**Dept:** Quality Services
Proposed 1st Ship Date:	01/29/2015	**Estimated Sample Availability:**	Date provided upon request
Change Type:			
☒ Assembly Process		☒ Assembly Materials	

PCN Details

Description of Change:

Texas Instruments is pleased to announce the qualification of a new material set for the 3 groups of devices listed below:
Group A will be converted to Cu wire only.
Group B will be converted to Cu wire as well as a new mold and mount compound.
Group C will be converted to Cu wire as well as a new mold compound.

Change Group# A

	Current	New
Bond Wire/Diameter	**Au, 1.0 mil**	**Cu, 0.8 mil**

Change Group# B

	Current	New
Mold Compound	**4205442 4073520**	**4211649**
Mount Compound	**4042504**	**4208458**
Bond Wire/Diameter	**Au, 0.96 mil**	**Cu, 0.8 mil**

Change Group# C

	Current	New
Mold Compound	**4205442 4073520**	**4211649**
Bond Wire/Diameter	**Au, 0.96 mil**	**Cu, 0.8 mil**

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) Copper wire is easier to obtain and stock.

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

None

Changes to product identification resulting from this PCN:

Not Applicable

Product Affected

Group A Devices:

TMS320F28062FPFPQ	TMS320F28065PZPQ	TMS320F28068MPFPQ	TMS320F28069PZPQ
TMS320F28062FPZPQ	TMS320F28066PFPQ	TMS320F28068MPZPQ	TMS320F28232PTPQ
TMS320F28062MPZPQ	TMS320F28066PZPQ	TMS320F28069FPFPQ	TMS320F28234PTPQ
TMS320F28062PFPQ	TMS320F28067PFPQ	TMS320F28069FPZPQ	TMS320F28235PTPQ
TMS320F28062PZPQ	TMS320F28067PZPQ	TMS320F28069MPFPQ	TMS320F28332PTPQ
TMS320F28063PFPQ	TMS320F28068FPFPQ	TMS320F28069MPZPQ	TMS320F28334PTPQ
TMS320F28063PZPQ	TMS320F28068FPZPQ	TMS320F28069PFPQ	TMS320F28335PTPQ
TMS320F28065PFPQ			

Group B Devices:

C336A049PZQTW	SD2811PBKQDO	TMS320F28031PNQ	TMS320F2806PZQ
C336A050PZQTW	SD2811PBKQOP	TMS320F28032PAGQ	TMS320F2808PZQ
C346A0003PZ-TR	TMS320F28015PZQ	TMS320F28032PNQ	TMS320F2809PZQ
DE017001APZQ	TMS320F28016PZQ	TMS320F28033PAGQ	TMS320F2810PBKQ
DE017005APZQ	TMS320F2801PZQ	TMS320F28033PNQ	TMS320F2810PBKQR
DE017008APZQ	TMS320F2802PZQ	TMS320F28034PAGQ	TMS320F2811PBKQ
SD2802PZQ-60	TMS320F28030PAGQ	TMS320F28034PNQ	TMS320F2812PGFQ
SD2811PBKQ	TMS320F28030PNQ	TMS320F28035PAGQ	TMS320R2811PBKQ
SD2811PBKQ/G	TMS320F28031PAGQ	TMS320F28035PNQ	TMS320R2812PGFQ

Group C Devices:

S4703388HPZQRDL	S470PV246BBPZQQ1	S470PV345BBPZIRQ1	SVAVF48CPGEARG4
S470AV3388HPZQRQ1	S470PV247BBPZIRQ1	S470PV348BBPZQQ1	TMS470AV3388HPZQQ1
S470AV3388IPZQQ1R	S470PV249BBPZIRQ1	S470PV348BPZQQ1	TMS470AV3388IPZQQ1
S470AV689GPGEQRQ1	S470PV249BPZIRQ1	S470PV349BBPZIRQ1	TMS470AVF336HPZQQ1
S470PV241BBPNIRQ1	S470PV344BBPZIRQ1	S470PV349BPZIRQ1	TMS470AVF336IPZQQ1
S470PV242BBPZIRQ1	S470PV344BPZIRQ1	S470R1VF55BHPGEQ	TMS470R1VF334EPNQ1
S470PV242BPZIRQ1			

Technology Qualification Report

F05 and C05 silicon technology products in QFP package family using Cu wire

Qualification Information			
Qual Type:	Bonding wire qualification using AEC-Q100: with x05 Silicon node	**Affected Sites:**	Wafer fab: TI DALLAS EAST - DMOS5 Assembly / test : TI PHILIPPINES
Affected business:	Microcontroller and C2000 Products	**Status:**	Approved

Summary:

QFP package technology level qualification on Cu bond wire on F05 (Embedded Flash) and C05 (CMOS) automotive products out of DMOS5 wafer fab. Qualification is based on AEC-Q100 grade 1 conditions. Reliability robustness above Q100 standard was demonstrated with extended duration read points.

Family level qualification is applicable:

1. Same ball bond parameters are used across all automotive F05 and C05 devices from DMOS5
2. The same bond pad design/ construction is used on all automotive F05 and C05 devices from DMOS5

Three main material set combinations passed reliability testing:-

Combination	Mold compound	Die attach	Comments
A	4205442	4042504	Existing materials used with current x05 LQFP production.
B	**4211649**	**4208458**	Plan for Powerpad and conventional LQFP/TQFP leadframe
C	**4211649**	**4073495**	Plan for LQFP/ TQFP "SPAD" type of leadframe

Plan of record is to release material combinations B and C for automotive MCU and C2000 devices.

Construction information:			
Package Attributes:			
Assembly Site	PHI	**Body Thickness**	1.4 mm or 1.6mm.
Bond Wire Composition	Copper	**Bond Wire Diameter**	0.8 mils
Die Attach Technique	Epoxy Dispense	**Flammability Rating**	UL 94 V-0
Lead Finish	NiPdAu	**Lead Frame Material**	Copper
Pin Count	Up to 176 pin.	**Moisture Sensitivity Level**	LEVEL3-260C
Mold Compound	4211649	**Mount Compound**	4208458 or 4073495
Package Designators	Px suffixes.	**Package Families**	LQFP, TQFP and Powerpad.
Silicon Attributes:			
Die Size	Varies per device type	**Fab Process**	F05 (Flash) and C05 (CMOS) nodes
Wafer Fab Site	DMOS5	**Wafer Size**	200 mm

QUALIFICATION RESULTS

Test Type	Condition/Duration	Lots	Fails	Sample size	Actual duration/ results	Qualification vehicle	Comments
AEC Q100: TEST GROUPS A – ACCELERATED ENVIRONMENT STRESS TESTS							
PC : Preconditioning	MSL3/ 260C	3 lots x 231 min	0	Units before THB, AC and TC.	MSL3/260C	See appendix A	Pass
THB : Biased Humidity	THB 85C/85% RH 1000 hours	3 lots x 77 units	0	231 exceeded	1000 hours	See appendix A	Pass
AC: Autoclave	121C/15psig/96 hours	3 lots x 77 units	0	231 exceeded	Up to 268 hours	See appendix A	Pass
TC: Temp cycling	-65C/150C, 500 cycles	3 lots x 77 units	0	231 exceeded	1000 cycles	See appendix A	Pass
	Post-TC bond pull		0	5	Passed 3gF limit	Driver qualification devices	Pass
HTSL : High Temp storage	150C/1000 hours	1 lots x 45 units	0	45 units exceeded	Up to 2000 hours	See appendix A	Pass
AEC Q100: TEST GROUPS B – ACCELERATED LIFETIME SIMULATION TESTS							
HTOL	125C x 1000 hours	3 lots x 77 units	0	231	1000 hours	QBS to enterprise Qual	Pass
ELFR: Early life failure rate	8 hours, 48 hours	3 lots x 800 units	0	2400	48 hours	QBS to enterprise Qual	Pass
EDR: Non-Volatile memory endurance	150C/ 1008 hours	3 lots x 77 units	0	231	1000 hours	QBS to enterprise Qual	Pass
WE / Write and Erase cycling	1000 cycles	3 lots x 77 units	0	231	1000 cycles	QBS to enterprise Qual	Pass

AEC Q100: TEST GROUPS C – PACKAGE INTEGRITY TESTS							
WBS: Wire bond test	Ppk>1.67 and Cpk > 1.33	1 lot x 5 parts x 30 bonds	0	150 bonds	Passed	Validated on each package type during manufacturing qual.	Pass
WBP: Wire bond pull	Ppk>1.67 and Cpk > 1.33	1 lot x 5 parts x 30 bonds	0	150 bonds	Passed	Validated on each package type during manufacturing qual.	Pass
SD: Solderability	95% coverage	3 lots x 15 units	-	-		QBS to existing devices: leadframe unchanged	Pass
PD: Physical dimensions	Ppk>1.67 and Cpk > 1.33	3 lots x 10	0	30	Passed	QBS to existing devices: dimensions unchanged	Pass
AEC Q100: TEST GROUPS E– ELECTRICAL VERIFICATION							
HBM: ESD	2000V	1 lot	0	9	Passed	QBS to existing device qualifications	Pass
CDM: ESD	500V (750V corner pins)	1 lot	0	9	Passed	QBS to existing device qualifications	Pass
LU : Latchup	100mA / 1.5V @ 125C	1 lot	0	15	Passed	QBS to existing device qualifications	Pass
	200mA / 1.5V @ 25C	1 lot	0	15	passed	QBS to existing device qualifications	Pass
Electrical distributions	Split lot characterization	Split lot x 5 units per split	0	15	Passed	QBS to existing device qualifications	Pass

Appendix A: Package reliability testing of Cu wire with x05 silicon and mold compound/ die attach combinations

Mold Compound 4205442
Die attach 4042504

Device	Reliability Tests	Condition	Q100 Grade 1	Extended reliability Testing	Results
TMS320F28035PN	Preconditioning	MSL3/260C	-	-	3 x 0/320
(80 pin LQFP)	Autoclave	121C 2ATM	96 hours	192, 288 hrs	3 x 0/77 including extended tests
	Temperature Cycling	-65C/150C	500 cycles	1000 cycles	3 x 0/77 including extended tests
	High Temp Storage	150C	1000 hours	2000, 3000 hours	3 x 0/77 including extended tests
	THB	85C/85% RH	1000 hours	not conducted	3 x 0/77
TMS320F2812PGF	Preconditioning	MSL3/260C	all units	NA	2 x 0/180
(176 pin LQFP)	Autoclave	121C 2ATM	96 hours	192	2 x 0/77 including extended tests
	Temperature Cycling	-65C/150C	500 cycles	1000 cycles	2 x 0/77 including extended tests

Mold compound **4211649**
Die attach **4208458**

Device	Reliability Tests	Condition	Q100 Grade 1	Extended reliability Testing	Results
52C1RFPT	Preconditioning	MSL3/260C	-	-	3 x 0/346
(144 pin HTQFP)	Autoclave	121C 2ATM	96 hours	268 hrs	3 x 0/77 including extended tests
	Temperature Cycling	-65C/150C	500 cycles	1000, 2000 cycles	3 x 0/77 including extended tests
	High Temp Storage	150C	1000 hours	1500 hours	3 x 0/77 including extended tests
	THB	85C/85% RH	1000 hours	not conducted	3 x 0/77
TMS320F28055PN	Preconditioning	MSL3/260C	all units	-	2 x 0/180
(80 pin LQFP)	Autoclave	121C 2ATM	96 hours	192	2 x 0/77 including extended tests
	Temperature Cycling	-65C/150C	500 cycles	1000 cycles	2 x 0/77 including extended tests
S470PEF363APZQRCV	Preconditioning	MSL3/260C	all units	-	3 x 0/231
(100 pin LQFP)	Autoclave	121C 2ATM	96 hours	192	3 x 0/77 including extended tests
	Temperature Cycling	-65C/150C	500 cycles	1000 cycles	3 x 0/77 including extended tests
	High Temp Storage	150C	1000 hours	-	3 x 0/77

Mold compound 4211649

Die attach 4073495

Device	Reliability Tests	Condition	Q100 Grade 1	Extended reliability Testing	Results
S5PB61PGEQ*	Preconditioning	MSL3/260C	-	NA	3 x 0/276
(144 pin LQFP)	Autoclave	121C 2ATM	96 hours	240 hrs	3 x 0/77 including extended tests
	Temperature Cycling	-65C/150C	500 cycles	1000 cycles	3 x 0/77 including extended tests
	High Temp Storage	150C	1000 hours	-	3 x 0/77 including extended tests
	THB	85C/85% RH	1000 hours	-	2 x 0/77
S470AV689GPGEQRQ1	Preconditioning	MSL3/260C	all units	-	3 x 0/231
(144 pin LQFP)	Autoclave	121C 2ATM	96 hours	192	3 x 0/77 including extended tests
	Temperature Cycling	-65C/150C	500 cycles	1000	3 x 0/77 including extended tests
	High Temp Storage	150C	1000 hours		3 x 0/77
S470PV241BBPN-TRB	Preconditioning	MSL3/260C	all units	-	3 x 0/231
(80 pin LQFP)	Autoclave	121C 2ATM	96 hours	192	3 x 0/77 including extended tests
	Temperature Cycling	-65C/150C	500 cycles	1000	3 x 0/77 including extended tests
	High Temp Storage	150C	1000 hours		3 x 0/77
S4703388HPZQRDL	Preconditioning	MSL3/260C	all units	-	3 x 0/231
(80 pin LQFP)	Autoclave	121C 2ATM	96 hours	192	3 x 0/77 including extended tests
	Temperature Cycling	-65C/150C	500 cycles	1000	3 x 0/77 including extended tests
	High Temp Storage	150C	1000 hours		3 x 0/77

* S5PB61PGEQ is an Automotive MCU from F035 technology but provides THB data for 4073495 die attach with 4211649 mold compound /Cu wire. F05 devices in 4073495 will refer to this THB data to Qualify by similarity.

All other devices are F05 devices.

Use Disclaimer

Plastic encapsulated TI semiconductor devices are not designed and are not warranted to be suitable for use in some military applications and/or military environments. Use of plastic encapsulated TI semiconductor devices in military applications and/or military environments., in lieu of hermetically sealed ceramic devices, is understood to be fully at the risk of the buyer.

Quality and Reliability Data Disclaimer

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customer should provide adequate design and operating safeguards.

Quality and reliability data provided by Texas Instruments is intended to be an estimate of product performance based upon history only. It does not imply that any performance levels reflected in such data can be met if the product is operated outside the conditions expressly stated in the latest published data sheet for a device.

Reliability data shows characteristic failure mechanisms of the specific environmental stress as documented in the industry standards for each stress condition.

For questions regarding this notice, e-mails can be sent to the regional contacts shown below or your local Field Sales Representative.

Location	E-Mail
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