PCN Number:	20200115000.2	**PCN Date:**	Jan 22, 2020
Title:	Qualification of UMC12i and DMOS6 as additional Fab site options and Design Change for select devices		
Customer Contact:	PCN Manager	**Dept:**	Quality Services
Proposed 1st Ship Date:	July 22, 2020	**Estimated Sample Availability:**	Date provided at sample request.

Change Type:					
☐	Assembly Site	☐	Assembly Process	☐	Assembly Materials
☒	Design	☒	Electrical Specification	☐	Mechanical Specification
☐	Test Site	☐	Packing/Shipping/Labeling	☐	Test Process
☐	Wafer Bump Site	☐	Wafer Bump Material	☐	Wafer Bump Process
☒	Wafer Fab Site	☐	Wafer Fab Materials	☒	Wafer Fab Process
		☐	Part number change		

PCN Details

Description of Change:

Texas Instruments is pleased to announce the qualification of UMC12i and DMOS6 as additional Wafer Fab sources for the selected devices listed in the "Product Affected" section. In support of the qualification the devices will undergo a flash design library change as described below.

Current Fab Site			Additional Fab Site		
Current Fab Site	**Process**	**Wafer Diameter**	**New Fab Site**	**Process**	**Wafer Diameter**
TSMC-F14	F021	300mm	UMC12i	F65	300mm
TSMC-F14	F021	300mm	DMOS6	F65	300mm

In addition, please reference the footnote to the datasheet section "Identification".

Device Family	Latest Datasheet:
TMS320F2837xD	http://www.ti.com/lit/sprs880
TMS320F2837xS	http://www.ti.com/lit/sprs881
TMS320F2807x	http://www.ti.com/lit/sprs902

In support of the qualification of UMC12i and DMOS6 Wafer Fab sites, the devices will undergo a change of the flash design library to allow production in the new fab sites.

- The change does not impact device performance or datasheet specifications (except PARTIDH), and the updated flash design libraries remain on 65nm technology.

The device electrical part identification number PARTIDH may now have one of two values for each part number, with the eight most significant bits being 0x00 or 0x02.

TMS320F2837xD – Literature number SPRS880

NAME	ADDRESS	SIZE (x16)	DESCRIPTION	
PARTIDH	0x0005 D00A (CPU1) 0x0007 0202 (CPU2)	2	Device part identification number(1)	
			TMS320F28379D	0x**F9 0300
			TMS320F28378D	0x**FA 0300
			TMS320F28377D	0x**FF 0300
			TMS320F28376D	0x**FE 0300
			TMS320F28375D	0x**FD 0300
			TMS320F28374D	0x**FC 0300

(1) PARTIDH may have one of two values for each part number, with the eight most significant bits identified with '**' above being 0x00 or 0x02.

TMS320F2837xS – Literature number SPRS881

NAME	ADDRESS	SIZE (x16)	DESCRIPTION
PARTIDH	0x0005 D00A	2	Device part identification number(1) TMS320F28379S 0x**F9 0400 TMS320F28378S 0x**FA 0400 TMS320F28377S 0x**FF 0400 TMS320F28376S 0x**FE 0400 TMS320F28375S 0x**FD 0400 TMS320F28374S 0x**FC 0400

(1) PARTIDH may have one of two values for each part number, with the eight most significant bits identified with '**' above being 0x00 or 0x02.

TMS320F2807x – Literature number SPRS902

NAME	ADDRESS	SIZE (x16)	DESCRIPTION
PARTIDH	0x0005 D00A	2	Device part identification number(1) TMS320F28076 0x**FC 0500 TMS320F28075 0x**FF 0500

(1) PARTIDH may have one of two values for each part number, with the eight most significant bits identified with '**' above being 0x00 or 0x02.

Flash programming tools may need to be updated as a result of the change to PARTIDH, depending on the programming solution currently used.

Code Composer Studio:

- Code Composer Studio (CCS) will need a minimum version of CCSv8.3.1 for 32-bit Windows systems and CCSv9.x for 64-bit Windows systems.
- Once CCS is updated and the packages are installed, CCS On-chip Flash Plugin will work for both F65 and F021 processed devices.
- CCS Link: https://software-dl.ti.com/ccs/esd/documents/ccs_downloads.html

UniFlash:
UniFlash will need a minimum version of:

- UniFlash v4.6 for 32-bit windows systems and UniFlash v5.1 for 64-bit windows systems
- Above UniFlash versions work for both F65 and F021 processed devices.
- Uniflash Link: http://software-dl.ti.com/ccs/esd/uniflash/docs/release_archive.html

3rd party Flash Programming tools:
Users of other third party programmers will need to confirm with the vendor that the tool

- Is not using DEVICE_CLASS_ID bit-field in PARTIDH register
- Adheres to errata advisory "Flash: Minimum Programming Word Size"

Flash API Library:

- There is no change to the Flash API library. Users can continue to use the same Flash API library (F021_API_F2837xD_FPU32.lib) provided in C2000Ware at C2000Ware_x_xx_xx_xx\libraries\flash_api\f2837xd\lib.
- This library works for both F65 and F021 processed devices.

Misc.:

- There is no need to rebuild the application using the latest compilers available in the updated CCS, unless required by the application. Users can continue to use their existing executables.
- There is no change to Flash Datasheet Spec parameters (erase time, program time, Write/Erase cycles, Data retention duration, wait-states).

Qual details are provided in the Qual Data Section.

Reason for Change:

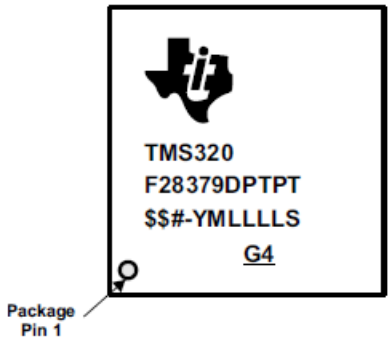
Continuity of supply

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

None

Changes to product identification resulting from this PCN:

Device Symbol:



YMLLLLS = Lot Trace Code

YM = 2-Digit Year/Month Code
LLLL = Assembly Lot
S = Assembly Site Code
$$ = Wafer Fab Code as applicable
= Silicon Revision Code

G4 = Green (Low Halogen and RoHS-compliant)

Original Fab Field:

$$ = YF → TSMC-F14

Updated Fab Field:

$$ = YF → TSMC-F14
Or
$$ = $7 → UMC 12i
Or
$$ = $4 → DMOS6

Current:

Current Chip Site	Chip Site Origin Code (20L)	Chip Site Country Code (21L)	Chip Site City
TSMC-F14	T14	TWN	Tainan City

New Fab Site:

New Chip Site	Chip Site Origin Code (20L)	Chip Site Country Code (21L)	Chip Site City
UMC 12i	UMI	SGP	Singapore
DMOS6	DM6	USA	Dallas

Sample product shipping label (not actual product label)

Product Affected:

TMS320F28075PTPQ	TMS320F28375SPZPQR	TMS320F28377DZWTQR	TMS320F28377SPZPQ
TMS320F28075PZPQ	TMS320F28377DPTPQ	TMS320F28377SPTPQ	TMS320F28377SZWTQ
TMS320F28375SPZPQ	TMS320F28377DZWTQ		

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

TMS320F2837x family of devices: Addition DMOS6 and UMCi wafer fabs
Approved 16-Oct-2018

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

								DMOS6 wafer fab		UMC wafer fab	
	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TMS320F2837x ZWT	Process Reference: TMS320F2837xPTP	Qual Device: TMS320F2837x ZWT	Process Reference: TMS320F2837XPTP
	Test Group A – Accelerated Environment Stress Tests										
	PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning MSL3/260C	3x reflow	1/360/0	3/693/0	1/360/0	3/693/0
	THB	A2	JEDEC JESD22-A101	3	77	THB 85C/85%RH	1000 hours	1/77/0	-	1/77/0	-
	HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 hours	-	3/231/0	-	3/231/0
	UHAST	A3	JEDEC JESD22-A102	3	77	Unbiased HAST 130C/85%RH	96 hours	1/77/0	3/231/0	1/77/0	1/77/0
	TC	A4	JEDEC JESD22-A104 and Appendix 3	1	77	Temperature Cycling - 55/125C	1000 cycles	1/77/0	-	1/77/0	-
	TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycling - 65/150C	500 cycles	-	3/231/0	-	3/231/0-

								DMOS6 wafer fab		UMC wafer fab	
	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TMS320F2837x ZWT	Process Reference: TMS320F2837xPTP	Qual Device: TMS320F2837x ZWT	Process Reference: TMS320F2837XPTP
	PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle	1000 Cycles	N/A	N/A	N/A	N/A
	HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 150C	1000 hours	1/77/0	3/231/0	1/77/0	3/231/0
	Test Group B – Accelerated Lifetime Simulation Tests										
	HTOL	B1	JEDEC JESD22-A108	3	77	HTOL 125C [1]	1000 hours	1/77/0	3/231/0	1/77/0	3/231/0
	ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 125C	48 hours	-	3/2400/0	-	3/2400/0
	EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, and Operational Life 150C [1]	1000 hours	-	3/231/0	-	3/231/0
	Test Group C – Package Assembly Integrity Tests										
	WBS	C1	AEC Q100-001	1	30	Wire Bond Shear	> 1.67 Cpk	1/30/0	1/30/0	1/30/0	1/30/0
	WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	> 1.67 Cpk	1/30/0	1/30/0	1/30/0	1/30/0
	WBP	C2	MIL-STD883 Method 2011	1	30	Bond Pull post-Temp cycle	>2.5gF	1/30/0	1/30/0	1/30/0	1/30/0
	SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability >95% Lead Coverage	-	N/A	QBS to NiPdAu leadframe technology	N/A	QBS to NiPdAu leadframe technology
	PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions (Cpk>1.67)	-	QBS to existing ZWT package technology data	QBS to existing PTP package technology data -	QBS to existing ZWT package technology data	QBS to existing PTP package technology data -
	SBS	C5	AEC Q100-010	3	50	Solder Ball Shear (Cpk>1.67)	Solder Balls	QBS to existing ZWT package technology data	-	QBS to existing ZWT package technology data	-

Test Group D – Die Fabrication Reliability Tests											
	EM	D1	JESD61	-	-	Electro-migration	-	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
	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 Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
Test Group E – Electrical Verification Tests											
	HBM	E2	AEC Q100-002	1	3	ESD - HBM	2000V	1/3/0	1/3/0	1/3/0	1/3/0
	CDM	E3	AEC Q100-011	1	3	ESD - CDM	500V 750V corners	1/3/0	1/3/0	1/3/0	1/3/0
	LU	E4	AEC Q100-004	1	6	Latch-up	125C	1/6/0	1/6/0	1/6/0	1/6/0

- QBS: Qual By Similarity

[1] HTOL and EDR were preconditioned with 20,000 Write and Erase of the flash memory.

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

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

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