PCN Number:	20161014001	PCN Date:	Dec. 1, 2016
Title:	TPS6213xA/15xA-Q1 and TPS6216x/17x-Q1 Robustness Improvement		
Customer Contact:	PCN Manager	Dept:	Quality Services
Proposed 1st Ship Date:	June 1, 2017	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 pleased to announce continuous design improvement efforts for robustness of the existing TPS62130A-Q1, TPS62133A-Q1, TPS62150A-Q1, TPS62153A-Q1, TPS62160Q-Q1, TPS62170Q-Q1 and TPS62172Q-Q1 family products.

- The modifications consist of:
  - Metal levels modification only.
  - No change in fit, form or function of the devices.
  - No parameter limits in the Electrical Characteristics table in the data sheet will change.
- Improvements implemented in the new silicon:
  - Gate driver control logic
  - Output voltage regulation during input voltage transition from 6V to 7V
  - Current limit detection and logic

Only applicable for TPS62130A/133A/150A/153A:
  - Add frequency selection feature
  - SS pin leakage

Reason for Change:

Robustness improvements.

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

Positive: Quality/Robustness.

Changes to product identification resulting from this PCN:

None.

Product Affected:

TPS62130AQRGTRQ1	TPS62160QDSGRQ1
TPS62130AQRGTTQ1	TPS62160QDSGTQ1
TPS62133AQRGTRQ1	TPS62170QDSGRQ1
TPS62133AQRGTTQ1	TPS62170QDSGTQ1
TPS62150AQRGTRQ1	TPS62172QDSGRQ1
TPS62150AQRGTTQ1	TPS62172QDSGTQ1
TPS62153AQRGTRQ1	
TPS62153AQRGTTQ1	

TI Information
Selective Disclosure

Automotive New Product Qualification Summary

(As per AEC-Q100 and JEDEC Guidelines)

TPS62130AQRGTRQ1, TPS62150AQRGTRQ1, TPS62133AQRGTRQ1, and TPS62153AQRGTRQ1
Approved 07-Sep-2016

Product Attributes

Attributes	Qual Devices: TPS62130AQRGTRQ1 TPS62150AQRGTRQ1 TPS62133AQRGTRQ1 TPS62153AQRGTRQ1	QBS Product Reference: TPS62130AQRGTRQ1	QBS Product Reference: TPS62150AQRGTRQ1	QBS Process Reference: TPS55340QPWPRQ1	QBS Package Reference: TPS62152QRGTRQ1
Operating Temp Range	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	-
Product Function	Power Management	-	-	-	-
Wafer Fab Supplier	MIHO8	MIHO 8	MIHO 8	MIHO8	MIH0 8
Die Revision	A6	A1	A1	PG2.0	F
Assembly Site	CLARK AT	CLARK AT	CLARK AT	TAI	CLARK AT
Package Type	QFN 3.0 X 3.0 (MM)	QFN 3.0 X 3.0 (MM)	QFN 3.0 X 3.0 (MM)	HTSSOP	VQFN
Package Designator	RGT	RGT	RGT	PWP	RGT
Ball/Lead Count	16	16	16	14	16

- QBS: Qual By Similarity
- Qual Device TPS62130AQRGTRQ1 is qualified at LEVEL2-260CG

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: TPS62130 AQRGTRQ1	QBS Product Reference: TPS62130 AQRGTR1	QBS Product Reference: TPS6215 AQRGTR1	QBS Process Reference: TPS55340 QPWPRQ1	QBS Package Reference: TPS62152 QRGTRQ1
Test Group A – Accelerated Environment Stress Tests											
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditioning	Level 2-260C	1/130/0	-	-	-	1/320/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	-	2/80/0	-	3/231/0	1/77/0
AC	A3	JEDEC JESD22-A102	3	77	Autoclave 121C	96 Hours	-	1/77/0	-	3/231/0	1/77/0
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	1/77/0
TC-BP	A4	MIL-STD883 Method 2011	1	60	Post Temp. Cycle Bond Pull	per MIL-STD 883 Method 2011	-	1/Pass	-	3/15/0	1/5/0
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle, -40/125C	1000 Cycles	1/50/0	1/50/0	-	1/50/0	-

HTSL	A6	JEDEC JESD22-A103	1	45	High Temp. Storage Bake, 150C	1000 Hours	-	1/50/0	-	1/50/0	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp. Storage Bake, 175C	500 Hours	-	-	-	-	1/77/0
Test Group B – Accelerated Lifetime Simulation Tests											
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 125C Grade 1	1000 Hours	-	1/77/0	-	3/231/0	-
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 125C	48 Hours	-	-	-	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	Bond Shear (Ppk>1.67 and Cpk>1.33)	Wires	-	1/76/0	-	-	1/76/0
WBP	C2	MIL-STD883 Method 2011	1	30	Bond Pull (Ppk>1.67 and Cpk>1.33)	Wires	-	1/76/0	-	-	1/76/0
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	Pb	-	-	-	-	1/44/0
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	Pb Free	-	-	-	-	1/44/0
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions (Cpk>1.33 Ppk>1.67)	--	-	1/10/0	-	-	1/30/0
LI	C6	JEDEC JESD22-B105	1	50	Lead Integrity	Leads	-	-	-	-	-
Test Group D – Die Fabrication Reliability Tests											
EM	D1	JESD61	-	-	Electromigration	-	Completed Per Process Technology Requirements	-	-	-	-
TDD B	D2	JESD35	-	-	Time Dependant 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	-	-	-	-
Test Group E – Electrical Verification Tests											
HBM	E2	AEC Q100-002	1	3	ESD - HBM	3000V	1/3/0	-	-	-	-
CDM	E3	AEC Q100-011	1	3	ESD - CDM	1500 V	1/3/0	1/3/0	-	-	1/3/0
LU	E4	AEC Q100-004	1	6	Latch-up	(Per AEC Q100-004)	2/12/0	1/6/0	-	1/6/0	1/6/0
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and	3/90/0	3/90/0	1/30/0	1/30/0	1/30/0

						cold test					

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

TI Information
Selective Disclosure

Automotive New Product Qualification Summary

(As per AEC-Q100 and JEDEC Guidelines)

TPS62160QDSG[R|T]Q1, TPS62170QDSG[R|T]Q1,TPS62172QDSG[R|T]Q1 metal spins

Approved 09-Aug-2016

Product Attributes

Attributes	Qual Device: TPS62160QDSGR Q1	Qual Device: TPS62170QDSGR Q1	Qual Device: TPS62172QDSGR Q1	QBS Product Reference: TPS62160QDSGT Q1	QBS Product Reference: TPS62170QDS GTQ1	QBS Product Reference: TPS62172QDSG TQ1	QBS Process Reference: SN0406082PW-B1	QBS Process Reference: SN0406082PW-B2
Operating Temp Range	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Product Function	Power Management	Power Management	Power Management	-	-	-	-	-
Wafer Fab Supplier	MIHO-8	MIHO-8	MIHO-8	MIHO8	MIHO8	MIHO8	MIHO8	MIHO8
Die Revision	D1Z	D1Z	D1Z	D0 (PG2.0)	D0 (PG2.0)	D0 (PG2.0)	B1	B2
Assembly Site	TI MALAYSIA (MLA)	TI MALAYSIA (MLA)	TI MALAYSIA (MLA)	MLA / TIM	MLA / TIM	MLA / TIM	TAI	TAI
Package Type	WSON	WSON	WSON	SON, 2 x 2 MM	SON, 2 x 2 MM	SON, 2 x 2 MM	TSSOP	TSSOP
Package Designator	DSG	DSG	DSG	DSG	DSG	DSG	PW	PW
Ball/Lead Count	8	8	8	8	8	8	16	16

- QBS: Qual By Similarity
- Qual Device TPS62160QDSGRQ1 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: TPS62160 QDSGR Q1	Qual Device: TPS62170 QDSGR Q1	Qual Device: TPS62172 QDSGR Q1	QBS Product Reference: TPS62160 QDSGT Q1	QBS Product Ref: TPS62170 QDSGTQ1	QBS Product Ref: TPS6217 2QDSGT Q1	QBS Process Ref: SN04060 82PW-B1	QBS Process Ref: SN04060 82PW-B2
Test Group A – Accelerated Environment Stress Tests														
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditionin g	Level 2-260C	-	-	-	2/44/0	-	-	-	-
HAS T	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	-	-	-	3/231/0	-	-	3/231/0	-
AC	A3	JEDEC JESD22-A102	3	77	Autoclave 121C	96 Hours	-	-	-	3/231/0	-	-	3/230/0	-
TC	A4	JEDEC JESD22-A104 and	3	77	Temperature Cycle, -65/150C	500 Cycles	-	-	-	3/231/0	-	-	3/231/0	-

		Appendix 3												
TC-BP	A4	MIL-STD883 Method 2011	1	60	Post Temp. Cycle Bond Pull	per MIL-STD 883 Method 2011	-	-	-	1/5/0	-	-	1/5/0	-
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle, -40/125C	1000 Cycles	-	-	-	-	-	-	1/45/0	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp. Storage Bake, 150C	1000 Hours	-	-	-	1/50/0	-	-	3/224/0	-
Test Group B – Accelerated Lifetime Simulation Tests														
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 140C	480 Hours	-	-	-	-	-	-	3/229/0	1/77/0
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 150C	408/150 C / 17V	-	-	-	-	-	1/77/0	-	-
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 140C	48 Hours	-	-	-	-	-	-	3/2409/0	-
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, and Operational Life	-	N/A	N/A	N/A	-	-	-	-	-
Test Group C – Package Assembly Integrity Tests														
WBS	C1	AEC Q100-001	1	30	Bond Shear (Cpk>1.67)	Wires	-	-	-	-	-	-	-	-
WBP	C2	MIL-STD883 Method 2011	1	30	Bond Pull (Cpk>1.67)	Wires	-	-	-	-	-	-	-	-
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions (Cpk>1.33 Ppk>1.67)		-	-	-	3/30/0	-	-	-	-
LI	C6	JEDEC JESD22-B105	1	50	Lead Integrity	Leads	-	-	-	-	-	-	-	-
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	-	-	-	-	-
TDDB	D2	JESD35	-	-	Time Dependant Dielectric Breakdown	-	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	-	-	-	-	-
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	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	-	-	-	-	-
Test Group E – Electrical Verification Tests														
HBM	E2	AEC Q100-002	1	3	ESD - HBM	4000 V	-	-	-	1/3/0	-	-	1/3/0	1/3/0
CDM	E3	AEC Q100-011	1	3	ESD - CDM	1000 V	-	-	-	-	-	-	-	-
LU	E4	AEC Q100-004	1	6	Latch-up	(Per AEC Q100-	-	-	-	2/12/0	-	-	1/6/0	1/6/0

						004)								
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold test	1/30/0	1/30/0	1/30/0	3/90/0	1/30/0	1/30/0	-	-
ED	E5	AEC Q100-009	3	30	Electrical Characterization	Per Datasheet Parameters	-	-	-	-	-	-	3/90/0	3/90/0

A1 (PC): Preconditioning:
Performed for THB, Biased HAST, AC, uHAST &TC 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 your local Field Sales Representative.

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