PCN Number:	20111114000A	**PCN Date:**	02/20/2012
Title:	HNT offload SOT - CMS C1111011		

Customer Contact:	PCN_ww_admin_team@list.ti.com	**Phone:**	+1(214)480-6037	**Dept:**	Quality Services

Proposed 1st Ship Date:	08/20/2012	**Estimated Sample Availability:**	01/01/2012

Change Type:

☒	Assembly Site	☐	Assembly Process	☐	Assembly Materials
☐	Design	☐	Electrical Specification	☐	Design
☐	Test Site	☐	Packing/Shipping/Labeling	☐	Test Site
☐	Wafer Bump Site	☐	Wafer Bump Material	☐	Wafer Bump Site
☐	Wafer Fab Site	☐	Wafer Fab Materials	☐	Wafer Fab Site

PCN Details

Description of Change:

The Physical Dimension qualification results have been corrected to 3/10/0.

This final notification reflects a change to the initial PCN notification. Instead of an offload from subcon Hana Ayuthaya, Thailand, the subcon Nantong Fujitsu Micorelectroni (NFME) is being qualified as an alternative assembly site for devices in DCK package. Subcon Hana Ayuthaya, Thailand will remain a qualified site for devices in DBV and DCK packages. The devices in DBV package are removed from the PCN and some devices in DCK package are also being removed. Changes from the initial notification are highlighted in yellow.

Reason for Change:

Hana Ayuthaya site was flooded, has recovered and has resumed production.

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

No anticipated impact.

Changes to product identification resulting from this PCN:

The box label Assembly Site Origin (ASO) code will indicate the assembly site.

The product box label site origin codes will change as described below:

Current Label Information		
Assembly Site	Assembly Site origin (ASO) (22L)	Assembly Country Origin (ACO) country code (23L)
Hana	HNT	THA

New Label Information		
Assembly Site	Assembly Site origin (ASO) (22L)	Assembly Country Origin (ACO) country code (23L)
NFME	NFM	CHN

Sample product shipping label (not actual product label):

TEXAS INSTRUMENTS
MADE IN: Malaysia
2DC: 2Q:
MSL 2 /260C/1 YEAR SEAL DT
MSL 1 /235C/UNLIM 03/29/04
OPT:
ITEM: 39
LBL: 5A (L)TO:1750
Pb G4
(1P) SN74LS07NSR
(Q) 2000 (D) 0336
(31T)LOT: 3959047MLA
(4W) TKY(1T) 7523483SI2
(P)
(2P) REV: (V) 0033317
~~(20L) CSO: SHE~~ ~~(21L) CCO:USA~~
(22L) ASO:MLA (23L) ACO:MYS

Product Affected:

~~1A1G04QDBVRG4Q1~~	~~CAHCT1G86QDCKRQ1~~	TPS3803-01QDCKRQ1
~~1P1G125QDCKRG4Q1~~	~~CCB3T1G125QDCKRQ1~~	TPS3803G15QDCKRQ1
~~1P1G125QDCKRQ1~~	~~CLVC1G3208IDCKRQ1~~	TPS3805H33QDCKRQ1
~~1P1G66QDBVRG4Q1~~	INA213AQDCKRQ1	TPS71501QDCKRQ1
~~1P1G66QDBVRQ1~~	INA214AQDCKRQ1	TPS71525QDCKRQ1
2T03-01QDCKRG4Q1	MLA00466DCKR	TPS71530QDCKRQ1
2T03G15QDCKRG4Q	~~MSA00287DCKR~~	TPS71533QDCKRQ1
2T05H33QDCKRG4Q	~~SN74AHC1G04QDBVRQ1~~	TPS71533QDCKRSV
~~CAHCT1G04QDCKRG4Q1~~	~~SN74AHC1G04QDCKRQ1~~	TPS71550QDCKRQ1
~~CAHCT1G04QDCKRQ1~~	~~SN74LVC1G11IDCKRQ1~~	TPS79718QDCKRQ1
~~CAHCT1G125QDCKRG4Q~~	~~SN74LVC1T45TDCKRQ1~~	TPS79730QDCKRQ1
~~CAHCT1G125QDCKRQ1~~	~~TPD2E001IDRLRQ1~~	TPS79733QDCKRQ1
~~CAHCT1G126QDCKRQ1~~	TPS3803-01QDCKRCM	~~TS321QDBVRQ1~~

Qualification Results:

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

Supplier Name:	Texas Instruments Inc.	**Supplier Wafer Fabrication Site:**	Texas Instruments Dallas fab (DFAB)
Supplier Code:		**Supplier Die Revision:**	B
Supplier Part Number:	TPS71530QDCKRQ1	**Supplier Assembly/Test Site:**	Nantong Fujitsu Micorelectronics (NFME) China
Customer Name:		**Supplier Package / Pin:**	DCK / 5
Customer Part Number:		**Pb-Free Lead Frame (Y/N):**	Y
Device Description:		**"Green" Mold Compound (Y/N):**	Y
MSL Rating:	Level1	**Operating Temp Range:**	-40C to +125C
Peak Solder Reflow Temp:	260C	**Automotive Grade Level (1):**	1

Test	#	Reference	Test Conditions	Min Lots (2)	SS / lot (2)	Min Total (2)	Results Lot/pass/fail	Comments: (N/A =Not Applicable)	Exceptions to AEC - Q100
TEST GROUP A – ACCELERATED ENVIRONMENT STRESS TESTS (3)									
PC	A1	JESD22-113 J-STD-020	Preconditioning: SMD only; Moisture Preconditioning for THB/HAST, AC/UHST, TC, HTSL, and HTOL	Performed on ALL SMD devices prior to THB/HAST, AC/UHST, TC and PTC					
THB or HAST	A2	JESD22-A101 JESD22-A110	Temperature Humidity Bias: 85°C/85%/1000 hours Highly Accelerated Stress Test: 130°C/85%/96 hours or 110°C/85%/264 hours	**3**	**77**	231	3/231/0	QBS to **TPS73201QDBVRQ1**	
AC or UHST	A3	JESD22-A102 JESD22-A118	Autoclave: 121°C/15 psig/96 hours Unbiased Highly Accelerated Stress Test: 130°C/85%/96 hours or 110°C/85%/264 hours	3	**77**	231	3/231/0	QBS to **TPS73201QDBVRQ1**	
TC	A4	JESD22-A104	Temperature Cycle: -65°C/+150°C/500 cycles Post Temperature Cycle Bond Pull: 3 grams minimum	3 1	**77** **5**	231 5	3/231/0 1/5/0	QBS to TPS73201QDBVRQ1	
TEST GROUP B – ACCELERATED LIFETIME SIMULATION TESTS (3)									
HTOL	B1	JESD22-A108	High Temp Operating Life: 125°C/1000 hours 150°C/408 hours	3	**77**	231	3/231/0	**QBS to current data**	
ELFR	B2	AEC-Q100-008	Early Life Failure Rate:	3	800	2400	3/800/0	**QBS to current data**	
TEST GROUP C – PACKAGE ASSEMBLY INTEGRITY TESTS (3)									
WBS	C1	AEC-Q100-001	Wire Bond Shear Test: (Cpk > 1.67)	30 bonds	5 parts min.	30 bonds	Pass		
WBP	C2	Mil-Std-883 Method 2011	Wire Bond Pull: Each bonder used (Cpk > 1.67)	30 bonds	5 parts min.	30 bonds	Pass		
SD	C3	JESD22-B102	Solderability: (>95% coverage) 8 hr steam age (1 hour for Au-plated leads)	1	30	30	1/30/0	QBS to TPS73201QDBVRQ1	
PD	C4	JESD22-B100 JESD22-B108	Physical Dimensions: (Cpk > 1.67)	3	10	30	3/10/0	QBS to TPS73201QDBVRQ1	

TEST GROUP E- ELECTRICAL VERIFICATION

TEST	E1	User/Supplier Specification	Pre and Post Stress Electrical Test:	All	All	All	Pass		
HBM	E2	AEC-Q100-002	Electrostatic Discharge, Human Body Model: (2kV - H2 or better)	1	See Test Method			QBS to current device data	
MM	E2	AEC-Q100-003	Electrostatic Discharge, Machine Model: (200V – M3 or better)	1	See Test Method			QBS to current device data	
CDM	E3	AEC-Q100-101	Electrostatic Discharge, Charged Device Model: (750V corner leads, 500V for all other pins)	1	See Test Method		Pass		
LU	E4	AEC-Q100-004	Latch-Up:	1	6	6		QBS to current device data	
ED	E5	AEC-Q100-009	Electrical Distributions: (Cpk > 1.67)	1	30	30	Pass		

(1) Grade 0 (or A): -40°C to +150°C ambient operating temperature range
Grade 1 (or Q): -40°C to +125°C ambient operating temperature range
Grade 2 (or T): -40°C to +105°C ambient operating temperature range
Grade 3 (or I): -40°C to +85°C ambient operating temperature range
Grade 4 (or C): -0°C to +150°C ambient operating temperature range

(2) These are recommended minimum lot/sample sizes. Lot/sample size may be reduced depending on available data.

(3) Generic data may be used.

NFME Qualification of SOT Package

MSA

Executive Summary

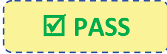
- Flooding in Thailand in 2011 affected supply chain for multiple devices assembled & tested in HANA facility (HNT) .
- TI MSA working two-fold to address customer supply needs
  - Resume production line in HNT (Recovery operation)
    - HNT facility is on-line, fully operational and is working its way back to full capacity for SOT package
    - The tooling has been certified to the same standards as prior to the flooding and the requirements for the incoming raw materials and process level control plans and monitoring have not changed.
    - Yields from recent lots are also in line with baseline performance for this product. Current production shipments from HNT passes to the same quality and reliability level as before the natural disaster occurred.
    - All SOT package lines are back in production in HNT as of Feb 2012.
  - Qualify secondary assembly site (NFME) for package families with low inventory levels for supply chain continuity
    - SOT packages (package extensions DCK, DBV) are AEC-Q100 qualified in NFME.
- Aggressive de-risking strategy has been taken for automotive devices moving to target sites
  - Test coverage remains same as of material in HANA to ensure equivalent customer quality
  - Material set was selected to minimize introduction of new interfaces wherever possible
  - NFME is TS certified site used for TI automotive production for over 5 years.
- Qualification plan and worst case vehicles were identified all package families. Material set commonality and existing commercial data is leveraged towards AEC-Q100 de-risking when applicable and data is attached for reference. Other devices in same material set will be QBS to primary vehicle. (more in next foils).

Material comparison between Current & Target site by package family

Package Group	Package	Pins	Current SITE	Target SITE	Current Mold	Target Mold	Current Dieattach	Target Dieattach	Bond wire	Material set is AEC-Q100 qualified
SOT	DBV	5,6	HNT	NFME	EME-G600	EME-G600	Ablebond 2200D	Ablebond 8200T	1.0 mil Au	Yes
SOT	DCK	5,6	HNT	NFME	EME-G600	EME-G600	Ablebond 2200D	Ablebond 8200T	1.0 mil Au	Yes

- Materials were selected based on below prioritization criteria
  - similar/ next generation of existing material to lower risk with change
  - High volume use in factories to ensure low manufacturability issues.
  - Improve performance when possible
- Mold compounds / Die attach were selected to be same or better than current options.
  - Ablebond 8200 is next generation of Ablebond 2200D for better adhesion
- Au bond wires of same diameter will be used in target site
- Leadframes with same pad dimensions are used to minimize introduction of systemic risk.

SOT DBV / DCK NFME Qualification Data (COMPLETE)



Items	Stress Type	SOT	SOT	SOT
Data Type		Commercial	AEC-Q100	AEC-Q100
Device Name		OPA348	TPS73201	TPS71530
Manufacturing Site		NFME	NFME	NFME
Fab Technology		TSMC	LBC4	LBC4
Die Size (mils)		25x22	37x56	31x28
Mold Compound		EME-G600	EME-G600	EME-G600
Die Attach Material		Ablebond 8200T	Ablebond 8200T	Ablebond 8200T
Wire		1.0 mil	1.3 mil	1.0 mil
Leadframe		SID# L-18	SID# L-05	SID# L-18
Wire Bond Shear		1 lot / PASS	1 lot / PASS	1 lot / PASS
Wire Bond Pull		1 lot / PASS	1 lot / PASS	1 lot / PASS
Delamination evaluation (C/TSAM)		1 lot / PASS	1 lot / PASS	1 lot / PASS
Assembly Manufacturability Evaluation		1 lot / PASS	1 lot / PASS	1 lot / PASS
Solderability		PASS	PASS	QBS
Physical Dimensions		PASS	PASS	QBS
Pre-conditioning Level		Level-2, 260C	Level-2, 260C	QBS to TPS73201
Temperature Cycling & Post bond pull	JESD22 A104 -65C/+150C (500 Cyc)	3 x 77/ 0 FAILS	3 x 77/ 0 FAILS	QBS to TPS73201
HAST	JESD22 A110 130C/85%RH, 96hrs	3 x 77/ 0 FAILS	3 x 77/ 0 FAILS	QBS to TPS73201
Autoclave	JESD22 A102 121C, 15 PSIG, 29.7 PSIA, 96hrs	3 x 77/ 0 FAILS	3 x 77/ 0 FAILS	QBS to TPS73201
HTSL	JESD22 A103 1000hrs @ 150C	1 x 45/ 0 FAILS	1 x 45/ 0 FAILS	QBS to TPS73201
ESD-CDM		1 x 3 / 0 FAILS	1 x 3 / 0 FAILS	1 x 3 / 0 FAILS
Electrical characterization		PASS	PASS	1 x 30 units

REF: 20111107-46724

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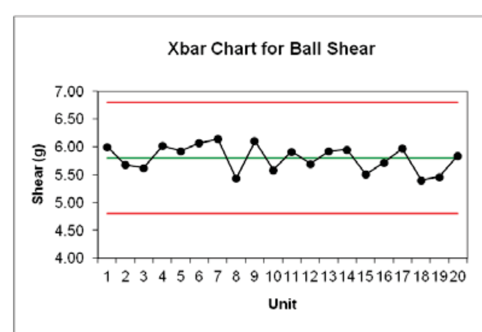
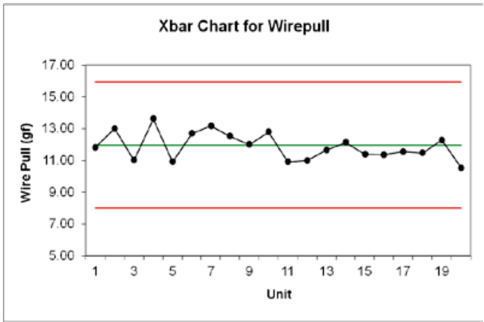
Assembly Qualification





No visual anomalies seen.

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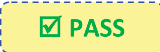
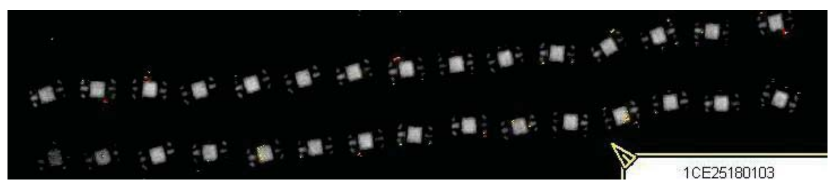
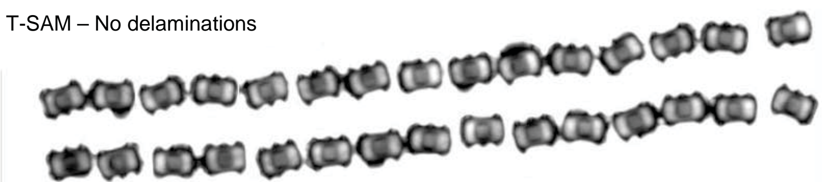
Delamination Evaluation

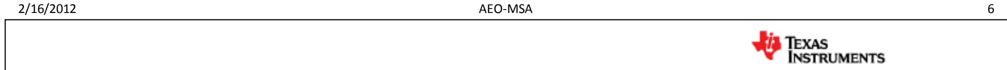


C-SAM – No delaminations

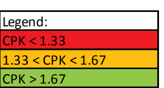


T-SAM – No delaminations

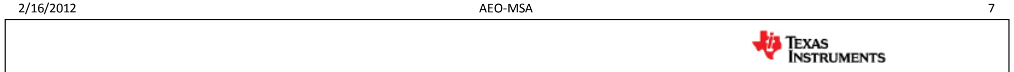




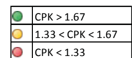
Electrical Characterization for TPS715x (TPS71530)



Spec Parameter	Test Parameter	LSL	USL	Units	Temp ©	Mean	StDev	CPk
VOUT Accuracy	P1100001_VregOut Vin *1mA	2.88	3.12	V	-40	3.006	2.15E-02	1.77
VOUT Accuracy	P1100001_VregOut Vin *1mA	2.88	3.12	V	25	3.008	1.97E-02	1.90
VOUT Accuracy	P1100001_VregOut Vin *1mA	2.88	3.12	V	125	2.983	8.47E-03	4.05
VOUT Accuracy	P1200001_VregOut VinMin *50mA	2.88	3.12	V	-40	2.993	2.15E-02	1.75
VOUT Accuracy	P1200001_VregOut VinMin *50mA	2.88	3.12	V	25	2.988	1.95E-02	1.85
VOUT Accuracy	P1200001_VregOut VinMin *50mA	2.88	3.12	V	125	2.946	8.87E-03	2.48
Ground-pin Current	P120100001_Iq Gnd *Vin 1mA		5.80E-06	Amps	-40	2.90E-06	5.31E-08	18.23
Ground-pin Current	P120100001_Iq Gnd *Vin 1mA		5.80E-06	Amps	25	3.43E-06	1.40E-07	5.64
Ground-pin Current	P120100001_Iq Gnd *Vin 1mA		5.80E-06	Amps	125	4.41E-06	1.22E-07	3.81
Ground-pin Current	P120200001_Iq Gnd *Vin 50mA		5.80E-06	Amps	-40	2.953E-06	5.07E-08	18.72
Ground-pin Current	P120200001_Iq Gnd *Vin 50mA		5.80E-06	Amps	25	3.493E-06	1.25E-07	6.15
Ground-pin Current	P120200001_Iq Gnd *Vin 50mA		5.80E-06	Amps	125	4.322E-06	1.62E-07	3.04
Dropout Voltage	P130100001_DropOut *50mA		0.75	V	-40	0.3605	6.53E-03	19.88
Dropout Voltage	P130100001_DropOut *50mA		0.75	V	25	0.4604	2.65E-03	36.43
Dropout Voltage	P130100001_DropOut *50mA		0.75	V	125	0.5974	8.42E-03	6.04
Dropout Voltage	P130500001_DropOut *15mA		0.75	V	-40	0.1023	1.84E-03	117.34
Dropout Voltage	P130500001_DropOut *15mA		0.75	V	25	0.1305	7.13E-04	289.62
Dropout Voltage	P130500001_DropOut *15mA		0.75	V	125	0.1695	2.35E-03	82.34
Output Current Limit	P180100001_ *ILimit	0.125	0.75	Amps	-40	0.3392	3.31E-03	21.57
Output Current Limit	P180100001_ *ILimit	0.125	0.75	Amps	25	0.2902	1.46E-03	37.72
Output Current Limit	P180100001_ *ILimit	0.125	0.75	Amps	125	0.1632	7.49E-03	1.70
VOUT Accuracy	P4000001_VregOut 3.2 *15mA	2.88	3.12	V	-40	2.998	2.05E-02	1.92
VOUT Accuracy	P4000001_VregOut 3.2 *15mA	2.88	3.12	V	25	2.991	1.76E-02	2.10
VOUT Accuracy	P4000001_VregOut 3.2 *15mA	2.88	3.12	V	125	2.949	9.94E-03	2.31



Electrical Characterization for TPS3803



Spec Parameter	Test Parameter	LSL	USL	Units	Temp ©	Mean	Stddev	CPK	Notes
Supply current	100.1_IDD *6.0V	0.1	3.8	uA	-40	1.753	0.024	22.510	
Supply current	100.1_IDD *6.0V	0.1	3.8	uA	32	2.241	0.031	16.517	
Supply current	100.1_IDD *6.0V	0.1	3.8	uA	85	2.766	0.021	16.225	
Supply current	102.1_IDD *3.3V	0.1	3.8	uA	-40	1.637	0.025	20.452	
Supply current	102.1_IDD *3.3V	0.1	3.8	uA	32	2.095	0.036	15.708	
Supply current	102.1_IDD *3.3V	0.1	3.8	uA	85	2.599	0.024	16.959	
Isense Leakage	200.1_IIH *SENSE	-25	25	nA	-40	3.900	1.696	4.148	
Isense Leakage	200.1_IIH *SENSE	-25	25	nA	32	3.953	0.581	12.066	
Isense Leakage	200.1_IIH *SENSE	-25	25	nA	85	4.013	1.289	5.425	
Isense Leakage	202.1_IIL *SENSE	-25	25	nA	-40	0.286	1.254	6.570	
Isense Leakage	202.1_IIL *SENSE	-25	25	nA	32	0.495	0.610	13.402	
Isense Leakage	202.1_IIL *SENSE	-25	25	nA	85	0.781	1.310	6.164	
High level output current at RESET	360.1_IOH_OD *RESET	5	300	nA	-40	29.469	3.877	2.104	
High level output current at RESET	360.1_IOH_OD *RESET	5	300	nA	32	30.471	0.341	24.876	
High level output current at RESET	360.1_IOH_OD *RESET	5	300	nA	85	30.979	0.803	10.788	
Low level output voltage	410.1_VOL_RESET *6.0V	5	300	mV	-40	111.047	0.974	36.311	
Low level output voltage	410.1_VOL_RESET *6.0V	5	300	mV	32	128.861	1.033	39.968	
Low level output voltage	410.1_VOL_RESET *6.0V	5	300	mV	85	149.560	1.063	45.346	
Low level output voltage	411.1_VOL_RESET *3.3V	5	300	mV	-40	90.078	0.696	40.719	
Low level output voltage	411.1_VOL_RESET *3.3V	5	300	mV	32	107.011	0.679	50.094	
Low level output voltage	411.1_VOL_RESET *3.3V	5	300	mV	85	127.015	0.894	45.508	
Low level output voltage	412.1_VOL_RESET *1.5V	5	300	mV	-40	89.602	0.490	57.598	
Low level output voltage	412.1_VOL_RESET *1.5V	5	300	mV	32	106.331	0.558	60.582	
Low level output voltage	412.1_VOL_RESET *1.5V	5	300	mV	85	126.269	0.954	42.363	
Low level output voltage	413.1_VOL_RESET *0.99V	5	300	mV	-40	13.743	0.165	17.681	
Low level output voltage	413.1_VOL_RESET *0.99V	5	300	mV	32	12.767	0.147	17.554	
Low level output voltage	413.1_VOL_RESET *0.99V	5	300	mV	85	12.638	0.132	19.224	
Threshold voltage	550.1_VIT_SENSE *POS	1.213	1.27	V	-40	1.236	0.002	3.145	
Threshold voltage	550.1_VIT_SENSE *POS	1.213	1.27	V	32	1.237	0.002	4.471	
Threshold voltage	550.1_VIT_SENSE *POS	1.213	1.27	V	85	1.237	0.002	4.175	
Threshold voltage	551.1_VIT_SENSE *NEG	1.213	1.239	V	-40	1.225	0.002	1.724	
Threshold voltage	551.1_VIT_SENSE *NEG	1.213	1.239	V	32	1.225	0.001	2.565	
Threshold voltage	551.1_VIT_SENSE *NEG	1.213	1.239	V	85	1.223	0.002	1.814	
Hysteresis	552.1_VIT_SENSE *HYS	5	30	mV	-40	10.388	1.461	1.229	Discrete distribution. CPK is not relevant.
Hysteresis	552.1_VIT_SENSE *HYS	5	30	mV	32	12.170	1.548	1.544	Discrete distribution. CPK is not relevant.
Hysteresis	552.1_VIT_SENSE *HYS	5	30	mV	85	13.853	1.239	2.381	Discrete distribution. CPK is not relevant.

2/1 8

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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
USA	PCNAmericasContact@list.ti.com
Europe	PCNEuropeContact@list.ti.com
Asia Pacific	PCNAsiaContact@list.ti.com
Japan	PCNJapanContact@list.ti.com