

**Final Notification of Qualification of New  
Environmentally Friendly (green) Mold Compound  
for TQFP/LQFP Packages Assembled at  
TI Philippines and TI Taiwan Assembly Sites**

**Change Notification Letter**

**PCN# 20040714001**

**August 12, 2004**

**Abstract**

The purpose of this notification is to inform you of a change to Texas Instruments, Inc. (TI) products that will achieve environmental improvements through the use of new package material sets.

Texas Instruments has been a leader in the industry in implementing Pb-free solderable finishes such as nickel-palladium (NiPd) and nickel-palladium-gold (NiPdAu) on lead-frame based packages. In our continuing effort to meet the customers' need for environmentally friendly (i.e. "green") packages, we will also be offering to the customers products built with green mold compounds.

Extensive product qualifications have been completed to achieve this change with minimal risk.

This is the final notification, and applies to the specific products listed below.

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**Analysis**

Please see the attached qualification information which summarizes the various test methods and conditions that TI has completed.

The products changed under this notice are fully compatible with both Lead-based (Pb-based) and Lead-free (Pb-free) soldering processes.

**Lead (Pb)-Free Definition:** TI defines "Lead (Pb)-Free" or "Pb-Free" to mean RoHS compatible, including a lead concentration that does not exceed 0.1% of total product weight, and, if designed to be soldered, suitable for use in specified lead-free soldering processes."

There is no requirement for any customers to make any changes in their soldering processes, provided they are in compliance with TI soldering recommendations as provided in the Application Notes listed at the following web site:

<http://www.ti.com/leadfree>

Customers who have not converted to Pb-free soldering processes and fluxes can use these parts without any changes to assembly or soldering processes. Customers who have converted to Pb-free soldering processes and fluxes can use these parts per the Moisture Sensitivity Levels (MSL) and Reflow temperatures listed below in the Summary of Change Section.

**Conversion Schedule**

These changes will be implemented beginning November 12, 2004. Due to inventory lag times between TI Product Distribution Centers and Distributor inventories, it will be possible for customers to receive either Pb-free or Pb-based products for some time after the conversion date. Pb-free materials will be marked on the box/bag/reel label with TI's Pb-free logo. Materials that do not meet the full Pb-free definition listed above will not have the Pb-free logo.

Customers who have changed their assembly processes to Pb-free soldering and need to receive only Pb-free materials should contact their local sales channel to be set up to just receive Pb-free materials.

**Risk Assessment** (Anticipated positive/negative impact on Fit, Form, Function and Reliability)

These materials have been developed to meet the environmental and reliability requirements of the new International environmental standards and regulations. Aside from any noted changes in Moisture Sensitivity Levels – there are no changes to the fit, form, function and reliability of the devices. Customers may notice minor cosmetic visual changes to the color or reflectivity of the mold compound and leads.

**Affected Package List**

Qualified Pin/Package Combinations					
Package Family	Package Designator	Maximum Pin Count Qualified	Lead Frame Finish	Mold Compound Qualified	Moisture Level/Reflow Qualified
TQFP LQFP	PFB, PAG, PZT, PDT, VF, PT, PM, PZ, PBK, PGE, PBL, PGF, PDV, PEF	256	NiPdAu	Hitachi CEL9200HF13 and CEL9200HF13 -U (low alpha version)	L1 – L4 / 260C

**Specific Products Affected:**

Available upon request

**Product Identification**

As with other material changes, since there is no change to functionality there will be no change to the TI Orderable part number. The shipping label, with the Pb-free logo and the dual MSL/Reflow information for both Pb-based and Pb-free solders is as per the example shown below. The label shown below is an example, not the actual label matching this notice. Dual MSL levels will only be shown if the devices qualify at two different moisture sensitivity levels.

 <p>MADE IN: Malaysia 2DC: 2Q:</p>	 <p>G4</p>		<p>(1P) SN74LS07NSR (Q) 2000 (D) 0336 (31T) LOT: 3959047MLA (4W) TKY (1T) 7523483SI2 (P) (2P) REV: (V) 0033317 (20L) CS0: SHE (21L) CC0: USA (22L) AS0: MLA (23L) AC0: MYS</p>				
<table border="1"> <tr> <td>MSL 2 / 260C / 1 YEAR</td> <td>SEAL DT</td> </tr> <tr> <td>MSL 1 / 235C / UNLIM</td> <td>03 / 29 / 04</td> </tr> </table>	MSL 2 / 260C / 1 YEAR	SEAL DT	MSL 1 / 235C / UNLIM	03 / 29 / 04	<p>OPT: ITEM: 39 LBL: 5A (L) TO: 1750</p>		
MSL 2 / 260C / 1 YEAR	SEAL DT						
MSL 1 / 235C / UNLIM	03 / 29 / 04						

Product that is completely Pb-free/Green will be shipped with the Pb-free logo on the box/bag/reel shipping label. TI will print the "G(N)" designator to indicate green/terminal finish. The devices affected by this PCN will have the "G4" designator to indicate a green/NiPdAu terminal finish.

Customers may go to TI's Eco-Info & Lead (Pb)-Free web site and enter an individual part number or a list of part numbers and obtain the finish, MSL, reflow temperatures and planned conversion dates:

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<http://focus.ti.com/quality/docs/prdcntsearch.jsp?templateId=5909&navigationId=11220>

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**Summary of Changes:**

<b>Item</b>	<b>From</b>	<b>To</b>
Mold Compound	Hitachi MC606-P2P24 (TQFP) Shinetsu KMC178 (TQFP/LQFP) Shinetsu KMC288P3 (LQFP) Shinetsu KMC240 (LQFP)	Hitachi CEL9200HF13 and HF13-U Hitachi CEL9200HF13 and HF13-U Hitachi CEL9200HF13 and HF13-U Hitachi CEL9200HF13 and HF13-U
MSL	L1-L4 @ 220°C	L1-L4 @ 260°C

**Sample Devices**

If you need sample devices, please contact your local FIELD SALES OFFICE. For questions regarding this notice, e-mails can be sent to the regional contacts shown below or your local Field Sales Representative.

Sincerely,

PCN Team  
 SC Business Services  
 12500 TI Blvd, MS 8640 Phone: (214) 480-2185  
 Dallas, TX. 75243 Fax: (214) 480-6659

<b>Location</b>	<b>E-Mail</b>
USA	<a href="mailto:PCNAmericasContact@list.ti.com">PCNAmericasContact@list.ti.com</a>
Europe	<a href="mailto:PCNEuropeContact@list.ti.com">PCNEuropeContact@list.ti.com</a>
Asia Pacific	<a href="mailto:PCNAsiaContact@list.ti.com">PCNAsiaContact@list.ti.com</a>
Japan	<a href="mailto:PCNJapanContact@list.ti.com">PCNJapanContact@list.ti.com</a>

**Affected Device List:**

33P3721-CGTJ	F731727APAG	MSP430F449IPZ	SN105076PDV	TNETC4042APDV
CF43056PT	F731791CPBK-TEB	MSP430F449IPZR	SN105118BPDV	TNETD2011APZ
CF43155PZ	F731821APGE	MSP430FE423IPM	SN105118PDV	TNETD2013APZ
CF45101PZ	F731891PDV	MSP430FE425IPM	SN105123PDT	TNETD4020PZ
CF45517PZ-A	F731914CPBL	MSP430FE425IPMR	SN105210PDT	TNETD8200PGE-80
CF45702PGF	F731936PGF	MSP430FE427IPM	SN12LV01CPZT	TNETE110APGE
D172A4PZA92R	F731993APGE	MSP430FE427IPMR	SN2046BVFR	TNETE2101PZ
D731746BPGF-R	F741503APGF	MSP430FW423IPM	SP3721DAAOPM	TNETV1001DIWPEF
D741606DPGF	F741504/P	MSP430FW423IPMR	SP3721DBAOPM	TNETV100PZ
D741667APGF	F741504PAG	MSP430FW425IPM	SP3723CABOPM	TNETV2402VIDPGE

D741667BPGF	F741505A/A	MSP430FW425IPMR	SP3723CAD0PM	TNETV2409FIDPGE
D741667DPGF	F741505A/P	MSP430FW427IPM	SP3723CAE0PM	TNETV2409VIDPGE
D741708CPGF	F741505APZT	MSP430FW427IPMR	SP3723CAG0PM	TNETV2840FIDPGF
DM041003APZ	F741521APGE	MSP430P325AIPM	SP3723DBA0PM	TNETV2840PGF
DM043020BPZA	F741521BPGE	MSP430P325IPM	SP3723DBB0PM	TNETV2842VNDPGF
DM047001APZA	F741574APGF	MSP430P325IPMR	SP3723DBC0PM	TNETV901APAG
DM047001PZA	F741580APZ	MSP430U132IPMR	SP3731ADBOPZ	TSB11LV00PM
DM047002APZA	F741580APZ-TEB	MSP430U144IPM	SP3732ACA0PZ	TSB11LV01PT
DM047002PZA	F741583/A	MSP430U186IPM	TI380C25PGE	TSB11LV01PT-TEB
DM047004APZA	F741583/P	MSP430U191IPM	TI380C60APAH	TSB12C01APZ
DM047005APZA	F741583PGF	MSP430U196IPM	TIR2000PAG	TSB12LV01APZ
DM047006APZA	F741598/A	MSP430U207IPM	TL16C550BPT	TSB12LV01BPZT
DM047020BPZA	F741598/P	MSP430U210IPM	TL16C550CIPT	TSB12LV12PGE
DM067001APZA	F741598PEF	MSP430U215IPM	TL16C550CIPTR	TSB12LV21APGF
F312746APZ	F741779APGE	MSP430U218IPM	TL16C550CPFB	TSB12LV21BPGF
F312795PGE	F741814APBL	MSP430U221IPMR	TL16C550CPFBR	TSB12LV23PZ
F312872PBK	F741814APBL-1	MSP430U227IPMR	TL16C550CPT	TSB12LV26PZT
F312993PAG	F741824PGF	MSP430U230IPMR	TL16C550CPTR	TSB12LV31PZ
F313230CPZ	F741890A/P	MSP430U238IPMR	TL16C550DIPT	TSB12LV32PZ
F313315PGE	F741890APDV	MSP430U241IPMR	TL16C750IPM	TSB12LV41APZ
F313410PGE	HPC3130APBK	MSP430U243IPMR	TL16C750PM	TSB14AA1AIPFB
F313625APGF	HPC3130APGE	MSP430U248IPMR	TL16C752BPT	TSB14AA1APFB
F313871BPGF	HPC3130PBK	MSP430U249IPM	TL16C752BPTR	TSB14AA1PFB
F422007BPGF	MSP430F133IPAG	MSP430U249IPMR	TL16C752PT	TSB14C01APM
F422009PGE	MSP430F133IPM	MSP430U251IPM	TL16CFM504APZR	TSB14C01APMR
F432009PM	MSP430F133IPMR	MSP430U252IPMR	TL16CFM700PGE	TSB21LV03CPM
F432177PDT	MSP430F135IPAG	MSP430U260IPMR	TL16PC564BLVPZ	TSB42AA4PDT
F432179APDT	MSP430F135IPM	MSP430U262IPMR	TL16PC564BPZ	TSB42AA4PDTR
F432179APDT-S	MSP430F135IPMR	MSP430U266IPMR	TLC320AD52CPT	TSB42AA4PGE
F432301PGF	MSP430F1471IPM	PCI1031PDV	TLC320AD535IPM	TSB42AA4PGER
F432522PBK	MSP430F1471IPMR	PCI1131PDV	TLC320AD535PM	TSB42AA9APZT
F432532APGF	MSP430F147IPAG	PCI1210PGE	TLC320AD535PM-MCI	TSB42AA9APZTR
F432535PGE	MSP430F147IPM	PCI1211PGE	TLV320AIC22CPT	TSB42AA9PZT
F432541APZ	MSP430F147IPMR	PCI1221PDV	TLV320AIC22CPTR	TSB42AA9PZTR
F432615PZ	MSP430F1481IPM	PCI1225PDV	TLV320AIC22PT	TSB42AB4PDT
F433000PDT	MSP430F1481IPMR	PCI1410APGE	TLV320AIC22PTR	TSB42AC3PZT
F433101PGE	MSP430F148IPAG	PCI1410ASPGE	TMP320F2810PBKA	TSB43AA22PDT
F433411PZ	MSP430F148IPM	PCI1410PGE	TMP320F2810PBKS	TSB43AA82APGE
F436005BPGF-S	MSP430F148IPMR	PCI1420PDV	TMP320F2811PBKA	TSB43AA82PGE
F591606PZ	MSP430F1491IPM	PCI1510PGE	TMP320F2812PGFA	TSB43AB21APDT
F642018APGF	MSP430F1491IPMR	PCI1520PDV	TMP320F2812PGFS	TSB43AB21PDT
F643845PZ	MSP430F149IPAG	PCI1620PDV	TMP320LF2401AVFA	TSB43AB22APDT
F711087PGF	MSP430F149IPM	PCI2031PGF	TMS320ACL2PGF	TSB43AB22PDT
F711109PGE	MSP430F149IPMR	PCI2032PGF	TMS320ACLPGF	TSB43AB23PDT
F711164PGE	MSP430F155IPM	PCI2040PGE	TMS320F243PGE	TSB43AB23PGE
F711217PGE	MSP430F155IPMR	PCI2050APDV	TMS320F243PGEA	TSB43CA42PGF
F711221PZT	MSP430F156IPM	PCI2050BIPDV	TMS320F2810PBKA	TSB43CA43APGF
F711264PGE	MSP430F157IPM	PCI2050BPDV	TMS320F2810PBKQ	TSB43CB43APGF
F711264PGER	MSP430F157IPMR	PCI2050IPDV	TMS320F2810PBKS	TSB43LV81PGE
F711274BPGF	MSP430F167IPM	PCI2050PDV	TMS320F2811PBKA	TSB82AA2PGE
F711309PGF	MSP430F167IPMR	PCI2250PGF	TMS320F2811PBKS	TUSB2036AVF
F711445PZT	MSP430F168IPM	PCI4410APDV	TMS320F2812PGFA	TUSB2036VF
F711533PGE	MSP430F169IPM	PCI7510PDV	TMS320F2812PGFQ	TUSB2036VFR

F711535APZ	MSP430F169IPMR	PCI950PT	TMS320F2812PGFS	TUSB2046BVF
F711615VFR	MSP430F412IPM	PMS430U227IPMR	TMS320LC2402APGS	TUSB2046BVFR
F711741VFR	MSP430F412IPMR	PTLFD240PAG	TMS320LF2401AVFA	TUSB2077APT
F711862PGE	MSP430F413IPM	PTLV320AIC22PT	TMS320LF2403APAGA	TUSB2077APTR
F711866PGE	MSP430F413IPMR	S579173PZ-TEB	TMS320LF2403APAGS	TUSB2136PM
F712001CPZ	MSP430F415IPM	S579174PZ-TEB	TMS320LF2406APZA	TUSB3210PM
F712003BPZ	MSP430F415IPMR	S579184PZ-TEB	TMS320LF2406APZAR	TUSB3410IVF
F712019PGF	MSP430F417IPM	S579189PZ-TEB6	TMS320LF2406APZS	TUSB3410VF
F712025PZ	MSP430F417IPMR	S579192PZ-TEB6	TMS320LF2406PZA	TUSB5052PZ
F712033PZ	MSP430F423IPMR	S579195PZ-TEB	TMS320LF2406PZS	TUSB5152PZ
F712504DPM-TEB	MSP430F425IPM	S579217PZ-TEB	TMS320LF2407APGEA	XD721555PZ
F712531BPT-TEB	MSP430F425IPMR	S579617PZ-TEB6	TMS320LF2407APGES	XD741649APDV
F721501APGF	MSP430F427IPM	S579624PZ-TEB6	TMS320LF2407PGEA	XD741649BPDV
F721595APZ	MSP430F427IPMR	S579626PZ-TEB6	TMS320LF2407PGES	XF741521APGE
F721730DPBK	MSP430F435IPZ	S579637PZ-TEB6	TMS320VC5441APGF	XF741521PGE
F721730EPBK	MSP430F435IPZR	S579641PZ-TEB6	TMS320VC5441PGF	XF741814APBL
F721730GPBK	MSP430F436IPZ	S579643PZ-TEB6	TMX320F2810PBKA	XMS430F169IPM
F721905PAG	MSP430F436IPZR	S579645PZ-TEB6	TMX320F2812PGFA	XMS430F169IPMR
F721940APZ	MSP430F437IPZ	S579646PZ-TEB6	TMX320F2812PGFS	XTNETC4042APDV
F731532APGE	MSP430F437IPZR	SN0302025PGF	TMX320LF2401AVFA	XTNETC4042PDV
F731541PGF	MSP430F447IPZ	SN0304082PDT	TMX320LF2406APZA	XTNETV901APAG
F731690APDT	MSP430F447IPZR	SN0304084PDT	TMX320LF2406PZA	XTNETV901PAG
F731690PDT	MSP430F448IPZ	SN0309070PMR	TMX320LF2407APGEA	
F731691A/P	MSP430F448IPZR	SN105076APDV	TNETA1585PGF	

# Enterprise Qualification Report

## For

### Green/Pb-Free @ 260C Reflow in Taiwan & Philippines for TQFP/LQFP packages

07/28/2004

Prepared By: Joseph Pambid (ASP QRE) and Willis C. Chambers, Jr. (MAKE QRE HPA)  
 Approved By: Colin Martin (WW MAKE ASP/Wireless QRE) and Paul Danahy (WW MAKE HPA/HVALQRE)

The TQFP/LQFP packages at 260C Reflow temperature capability and green material sets are fully qualified and meet the Texas Instruments quality and reliability standards for ALL SC Products per the testing described below.

#### Qualification Description

### New Material Set and Reflow Capability for TQFP/LQFP Packages

Includes Package Families:	5x5x1.0mm (32PBS); TQFP
	7x7x1.0mm (32PJT, 48PFB, 64PEG); TQFP
	10x10x1.0mm (52PAH, 64PAG); TQFP
	12x12x1.0mm (80PFC); TQFP
	14x14x1.0mm (100PZT, 128PDT); TQFP
	7x7x1.4mm (32VF, 48PT, 64PTA); LQFP
	10x10x1.4mm (64PM); LQFP
	12x12x1.4mm (80PN); LQFP
	14x14x1.4mm (80PZA, 100PZ, 128PBK); LQFP
	20x20x1.4mm (144PGE, 176PBL); LQFP
	24x24x1.4mm (176PGF); LQFP
28x28x1.4mm (208PDV, 256PEF); LQFP	

#### Device Attributes

Product & Process Related		Package Related	
Qualification Device:	TVP5150PBS	Assembly Site:	TAIWAN
Die Name:	CTVP5150AAIN	Package:	PBS
Die Revision:	A	Pin Count:	32
Die Size (mils):	110 X 110	Mold Compound:	CEL9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	DM5	Bond Wire:	TS-0.95 Au
Fab Process:	1833C05.X4L	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L3/260C
		Flammability Rating:	Class UL94-V0

#### Reliability Test Results for TVP5150PBS

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Autoclave, 121C	240 Hours	77/0	77/0	77/0
**Thermal Shock, -65/150C	1000 Cycles	77/0	77/0	77/0
Temp Cycle, -65/+150C	2000 Cycles	77/0	77/0	77/0
**High-Temp Storage, 150C	1000 hours	77/0	77/0	77/0
Bond Strength		22/0	22/0	22/0
Manufacturability (Assembly)		Approved		
Preconditioning Information: ** Preconditioning sequence: JEDEC Level 3/260C				

#### TLV320A10Q Attributes

Product & Process Related		Package Related	
Qualification Device:	TLV320A10QPFB	Assembly Site:	TAIWAN
Die Name:	BLEFAC10BIN	Package:	PFB
Die Revision:		Pin Count:	48
Die Size (mils):	127 X 127	Mold Compound:	CEL9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	DFAB	Bond Wire:	TS-0.95 Au
Fab Process:	A21	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L2/260C
		Flammability Rating:	Class UL94-V0

#### Reliability Test Results for TLV320A10QPFB

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Autoclave, 121C	240 Hours	77/0	77/0	77/0
**Thermal Shock, -65/150C	1000 Cycles	77/0	77/0	77/0
Temp Cycle, -65/+150C	1000 Cycles	77/0	77/0	77/0
**High-Temp Storage, 150C	1000 hours	77/0	77/0	77/0
Bond Strength		22/0	22/0	22/0
Manufacturability (Assembly)		Approved		
Preconditioning Information: ** Preconditioning sequence: JEDEC Level 2/260C				

#### SN105210 Attributes

Product & Process Related		Package Related	
Qualification Device:	SN105210PDT	Assembly Site:	TAIWAN
Die Name:	H731972BIN	Package:	PDT
Die Revision:		Pin Count:	128
Die Size (mils):	239 X 239	Mold Compound:	CEL9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	MIHO	Bond Wire:	TS- 0.95 Au
Fab Process:	C12	Leadframe Material:	Copper

	Leadframe Finish:	NiPdAu
	Moisture Sensitivity Level:	L3/260C
	Flammability Rating:	Class UL94-V0

**Reliability Test Results for SN105210PDT**

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Autoclave, 121C	240 Hours	77/0	77/0	77/0
**Thermal Shock, -65/150C	1000 Cycles	77/0	77/0	77/0
Temp Cycle, -65/+150C	2000 Cycles	77/0	77/0	77/0
**High-Temp Storage, 150C	1000 hours	77/0	77/0	77/0
Bond Strength		22/0	22/0	22/0
Moisture Sensitivity – L3	SAM/X-Section	12/0	12/0	12/0
Manufacturability (Assembly)		Approved		
Preconditioning Information: ** Preconditioning sequence: JEDEC Level 3/260C				

**TNETV901A Attributes**

Product & Process Related		Package Related	
Qualification Device:	TNETV901APAG	Assembly Site:	PHILIPPINES
Die Name:	D751874B	Package:	PAG
Die Revision:	B	Pin Count:	64
Die Size (mils):	206 X 192	Mold Compound:	CEL-9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	KFAB	Bond Wire:	TS-0.95 Au
Fab Process:	EPIC.35 (C035)	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L4/260C
		Flammability Rating:	Class UL94-V0

**Reliability Test Results for TNETV901APAG**

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Life Test, 125C	1000 Hours	40/0	40/0	40/0
**THB 85C/85%RH	1000 Hours	26/0	26/0	26/0
**Autoclave, 121C	240 Hours	77/0	77/0	77/0
**Thermal Shock, -65/150C	1000 Cycles	77/0	77/0	77/0
Temp Cycle, -65/+150C	1000 Cycles	77/0	77/0	77/0
**High-Temp Storage, 150C	1000 hours	77/0	77/0	77/0
ESD	CDM: 750V	5/0	5/0	5/0
Bond Strength		22/0	22/0	22/0
Flammability	UL 94 V-0	5/0	5/0	5/0
	IEC 695-2-2	5/0	5/0	5/0
Manufacturability (Assembly)		Approved		



Preconditioning Information:

\*\* Preconditioning sequence: JEDEC Level 4/260C

Note: C035 Devices shall be released at MSL4 at this time

**SN104950 Attributes**

Product & Process Related		Package Related	
Qualification Device:	SN104950PAG	Assembly Site:	TAIWAN
Die Name:	H104950DIN	Package:	PAG
Die Revision:	D	Pin Count:	64
Die Size (mils):	191 X 158	Mold Compound:	CEL-9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	MH6	Bond Wire:	TS-0.95 Au
Fab Process:	50A12.23LO	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L2/260C
		Flammability Rating:	Class UL94-V0

**Reliability Test Results for SN104950PAG**

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Life Test, 155C	240 Hours	40/0	40/0	40/0
**HAST 130C/85%RH	96 Hours	40/0	40/0	40/0
ESD	CDM: 750V	5/0	5/0	5/0
Bond Strength		22/0	22/0	22/0
Flammability	UL 94 V-0	5/0	5/0	5/0
	IEC 695-2-2	5/0	5/0	5/0
Manufacturability (Assembly)		Approved		

Preconditioning Information: \*\* Preconditioning sequence: JEDEC Level 2/260C

**TMS320LF2401A Attributes**

Product & Process Related		Package Related	
Qualification Device:	DLF2401AVFA	Assembly Site:	PHILIPPINES
Die Name:	C721862C	Package:	VF
Die Revision:	C	Pin Count:	32
Die Size (mils):	181 x 192	Mold Compound:	CEL-9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	DM5	Bond Wire:	24.3UM AU-TI
Fab Process:	EPIC.35 (F10)	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L3/260C
		Flammability Rating:	Class UL94-V0

**Reliability Test Results for TMS320LF2401AVF**

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3

**Autoclave, 121C	240 Hours	77/0	77/0	77/0
**Thermal Shock, -65/150C	1000 Cycles	77/0	77/0	77/0
**Temp Cycle, -65/+150C	1000 Cycles	77/0	77/0	77/0
**High-Temp Storage, 150C	1000 hours	77/0	77/0	77/0
Bond Strength		22/0	22/0	22/0
ESD	CDM: 750V	5/0	5/0	5/0
Bond Strength		22/0	22/0	22/0
Flammability	UL 94 V-0	5/0	5/0	5/0
	IEC 695-2-2	5/0	5/0	5/0
Manufacturability (Assembly)		Approved		
Preconditioning Information:				
** Preconditioning sequence: JEDEC Level 3/260C				

#### TLV320AIC22 Attributes

Product & Process Related		Package Related	
Qualification Device:	TLV320AIC22PT	Assembly Site:	TAIWAN
Die Name:	HLV320AIC22BIN	Package:	PT
Die Revision:	B	Pin Count:	48
Die Size (mils):	185 X 182	Mold Compound:	CEL9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	MH6	Bond Wire:	TS-0.95 Au
Fab Process:	33A12	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L3/260C
		Flammability Rating:	Class UL94-V0

#### Reliability Test Results for TLV320AIC22PT

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Autoclave, 121C	240 Hours	77/0	77/0	77/0
**Thermal Shock, -65/150C	1000 Cycles	77/0	77/0	77/0
**Temp Cycle, -65/+150C	2000 Cycles	77/0	77/0	77/0
**High-Temp Storage, 150C	1000 hours	77/0	77/0	77/0
Bond Strength		22/0	22/0	22/0
Moisture Sensitivity – L3	SAM/X-Section	12/0	12/0	12/0
Manufacturability (Assembly)		Approved		
Preconditioning Information: ** Preconditioning sequence: JEDEC Level 3/260C				

#### TLS1056A Attributes

Product & Process Related		Package Related	
Qualification Device:	TLS1056APZ	Assembly Site:	TAIWAN
Die Name:	JTLS1056AIN	Package:	PZ
Die Revision:		Pin Count:	100
Die Size (mils):	232 X 242	Mold Compound:	CEL9200HF13

Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	HIJI	Bond Wire:	TS-0.95mil Au
Fab Process:	Lin-ImpactC50	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L3/260C
		Flammability Rating:	Class UL94-V0

#### Reliability Test Results for TLS1056APZ

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Autoclave, 121C	240 Hours	77/0	77/0	77/0
**Thermal Shock, -65/150C	1000 Cycles	77/0	77/0	77/0
**Temp Cycle, -65/+150C	1000 Cycles	77/0	77/0	77/0
**High-Temp Storage, 150C	1000 hours	77/0	77/0	77/0
Bond Strength		22/0	22/0	22/0
Moisture Sensitivity – L3	SAM/X-Section	12/0	12/0	12/0
Manufacturability (Assembly)		Approved		
Preconditioning Information: ** Preconditioning sequence: JEDEC Level 3/260C				

#### TMS320F206 Attributes

Product & Process Related		Package Related	
Qualification Device:	TMS320F206PZ	Assembly Site:	PHILIPPINES
Die Name:	F6EC2Z14T22	Package:	PZ
Die Revision:	2.2	Pin Count:	100
Die Size (mils):	384 X 326	Mold Compound:	CEL9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	HOU	Bond Wire:	AU T1-24.3UM
Fab Process:	EPIC.70	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L17/28/2004 6:03 PM/260C
		Flammability Rating:	Class UL94-V0

#### Reliability Test Results for TMS320F206PZ

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Autoclave, 121C	240 Hours	77/0	77/0	77/0
**Thermal Shock, -65/150C	1000 Cycles	77/0	77/0	77/0
**Temp Cycle, -65/+150C	1000 Cycles	77/0	77/0	77/0
**High-Temp Storage, 150C	1000 hours	77/0	77/0	77/0
ESD	CDM: 750V	5/0	5/0	5/0
Bond Strength		22/0	22/0	22/0
Flammability	UL 94 V-0	5/0	5/0	5/0
	IEC 695-2-2	5/0	5/0	5/0

Manufacturability (Assembly)	Approved
Preconditioning Information: ** Preconditioning sequence: JEDEC Level 1/260C.	
Note: Devices with a die area to package area ratio greater than 0.17 will be de-rated to MSL2 @260C	

F741719A Attributes			
Product & Process Related		Package Related	
Qualification Device:	F741719APDV-A	Assembly Site:	PHILIPPINES
Die Name:	C741719DINH	Package:	PDV
Die Revision:	D	Pin Count:	128
Die Size (mils):	142x142	Mold Compound:	CEL9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	DM5	Bond Wire:	24.3 UM (0.95MILS)
Fab Process:	EPIC.15	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L3/260C
		Flammability Rating:	Class UL94-V0

Reliability Test Results for F741719APDV				
Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Autoclave, 121C	240 Hours	77/0	77/0	77/0
**Thermal Shock, -65/150C	1000 Cycles	77/0	77/0	77/0
**Temp Cycle, -65/+150C	1000 Cycles	77/0	77/0	77/0
**High-Temp Storage, 150C	1000 hours	77/0	77/0	77/0
ESD	CDM: 750V	5/0	5/0	5/0
Bond Strength		22/0	22/0	22/0
Flammability	UL 94 V-0	5/0	5/0	5/0
	IEC 695-2-2	5/0	5/0	5/0
Manufacturability (Assembly)		Approved		
Preconditioning Information: ** Preconditioning sequence: JEDEC Level 3/260C				

F741598 Attributes			
Product & Process Related		Package Related	
Qualification Device:	F741598PEF	Assembly Site:	PHILIPPINES
Die Name:	E741598IN	Package:	PEF
Die Revision:	-	Pin Count:	256
Die Size (mils):	461 x 458	Mold Compound:	CEL9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	DM4	Bond Wire:	24.3 UM
Fab Process:	EPIC.15	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L1/260C
		Flammability Rating:	Class UL94-V0

**Reliability Test Results for F741598PEF**

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Autoclave, 121C	240 Hours	77/0	77/0	77/0
**Thermal Shock, -65/150C	1000 Cycles	77/0	77/0	77/0
**Temp Cycle, -65/+150C	1000 Cycles	77/0	77/0	77/0
**High-Temp Storage, 150C	1000 hours	77/0	77/0	77/0
ESD	CDM: 750V	5/0	5/0	5/0
Bond Strength		22/0	22/0	22/0
Flammability	UL 94 V-0	5/0	5/0	5/0
	IEC 695-2-2	5/0	5/0	5/0
Manufacturability (Assembly)		Approved		
Preconditioning Information: ** Preconditioning sequence: JEDEC Level 1/260C				

**TMS471R1F138 Attributes**

Product & Process Related		Package Related	
Qualification Device:	S471AF138PZQR	Assembly Site:	PHILIPPINES
Die Name:	C721930E	Package:	PZ
Die Revision:	E	Pin Count:	100
Die Size (mils):	288x309	Mold Compound:	CEL 9200HF13
Transistor Count:		Mount Compound:	HIT EN-4085S2K3
Wafer Fab Site:	ANA	Bond Wire:	TS-0.96mils Au
Fab Process:	EPIC.40	Leadframe Material:	Copper
		Leadframe Finish:	NiPdAu
		Moisture Sensitivity Level:	L3/260C
		Flammability Rating:	Class UL94-V0

**Reliability Test Results for TMS471R1F138**

Test Type	Conditions/Duration	Sample Size/Results		
		Lot#1	Lot#2	Lot#3
**Life Test, 125C	1000 Hours	40/0	40/0	40/0
**THB 85C/85%RH	1000 Hours	26/0	26/0	26/0
Bond Strength		22/0	22/0	22/0
Flammability	UL 94 V-0	5/0	5/0	5/0
	IEC 695-2-2	5/0	5/0	5/0
Manufacturability (Assembly)		Approved		
Preconditioning Information: ** Preconditioning sequence: JEDEC Level 3/260C				