Reliability Report
For

TPS793285YEQ

New model qualification

09/18/2003

Texas Instruments
High Performance Analog Products

Approved by:

Mark Yampolsky
Supervisor/Reliability Engineering

The **TPS793285YEQ** is qualified and fully meets the Texas Instruments quality and reliability standards for High Performance Analog Products per the testing described below.

Packaging Information		**Manufacturing Information**	
Assembly Site:	Unitive/TI-Tucson	Die Name:	ALBD79118AAW
Package Type:	WCSP/YEG	Die Size:	55 x 33 mils
Solder Bump Alloy:	63%/37% Tin/Lead	Mask Revision:	A
Solder Bump Diameter:	170µm	Wafer Fab Site:	DFAB (Dallas)
Bump Pitch:	500µm	Process:	LBC3S
Number of Solder Bumps:	5	Technology:	CMOS
Wafer Coating Material:	LC2850	Metal 1:	TIW/ALSiCu 0.5%
Redistribution Layer l:	Electroplated Copper	Metal 2:	TIW/ALSiCu 0.5%
Flammability Rating	UL94 V-O and IEC Standard 695-2-2	Metal 3:	N/A
Moisture Sensitivity Level	1	Passivation:	12kA CN
Reflow Temperature	240ºC	Transistor Count:	400

Thermal Information

Absolute Max Junction Temp $T_{J\text{-}MAX}$	-40ºC to 125ºC
Recommended Junction Temp T_J	<125ºC
θ_{JC}	3.562ºC/W
θ_{JB}	N/A
SpecificationOperating Temperature T_A	-40ºC to 85ºC
Lead SolderingTemperature 1.6mm from case	N/A
Storage Temperature T_{STG}	-65ºC to 150ºC

Qualification Evaluation & Results:

New model qualification in Nanostar package with Redistribution and Ti-Cu.

Qualification Material			
HTOL assem/wafer/lot :	B-0309053-03-H0/3035742	Latch Up assem/wafer/lot	B-0309053-03-HD/3035743 B-0309053-03-HD/3036157
HAST assem/wafer/lot :	B-0309053-03-H0/3035742	ESD assem/wafer/lot	B-0309053-03-HD/3035743 B-0309053-03-HD/3036157
Autoclave assem/wafer/lot :	B-0309053-03-H0/3035742	X-Ray assem/wafer/lot	N/A
Temp Cycle assem/wafer/lot :	B-0309053-03-HD/3035743 B-0309053-03-HD/3036157	MSL assem/wafer/lot	B-0309053-03-HD/3035743 B-0309053-03-HD/3036157

Qualification by Similarity (QBS):
Reliability data on similar packages and wafer fab processes may be used to support generic qualifications as approved by QRE.

Reliability Test Results

Test	Conditions	Lot 1 SS/F	Lot 2 SS/F	Lot 3 SS/F	QBS Reference
Life Test	150°C, 307 Hrs.	348/0			
HAST	130ºC, 85%RH, 33.5 psia, 100 Hrs.	231/0			
Autoclave	121°C, 15 psia, 100%RH, 168 Hrs.	239/0			
Temp Cycle	-40 C to 125C, 500 cycles	239/0			
BLR Temp Cycle	-40ºC to 125ºC, 1230 cycles, 5ºC/ min Temp Ramp Rate, 12 min dwell	35/0			
BLR 3 Point Bend Test	Strain Rate 5 mm/min., 85 mm span	8/0			
BLR Key Push Test	100 cycles/min, 1300µ[a] displacement = 2.7 mm max	8/0			
BLR Drop Test	50 cm	8/0			
ESD	HBM/500 volts	3/0			
	HBM/1000 volts	3/0			
	HBM/1500 volts	3/0			
	HBM/2000 volts	3/0			
	HBM/3000 volts	3/0			
	HBM/4000 volts	3/2			
	CDM/100 volts	3/0			
	CDM/200 volts	3/0			
	CDM/500 volts	3/0			
	CDM/1000 volts	3/0			
Latch Up		6/0			
Elec. Charac. over Temp	PDS	15/0			
Physical Dimensions		15/0			
Flammability- WSP		15/0			OPA2347YED
Manufacturability		Passed			
Bump Shear		150/0			
Hi Temp Storage Life Test	420Hrs@170ºC	150/0			
Moisture Sensitivity Test	Level 1 240ºC	12/0	12/0		

The FIT rate for this device is based upon qualification data from this qualification, process qualification data, and/or ongoing reliability monitoring. Current FIT information is available from the product quality web page.

MODEL	**TPS793285YEQ**		**ACTIVATION ENERGY (eV)**
OVEN TEMP C°	**150**		**0.7**
TEST DEVICES	**348**		**(90% Confidence level)**
PROCESS	**LBC3S**		

READ POINTS (HOURS)	**TOTAL FAILURES**	**PASS**	**DEVICE HOURS**
307	0	348	106836

TEMP.	**FAILRATE (FITS)**	**MTTF (HOURS)**	**MTTF (YEARS)**
25	6.84E+00	1.46E+08	16690.9
30	1.07E+01	9.32E+07	10644.3
35	1.66E+01	6.03E+07	6888.1
40	2.53E+01	3.96E+07	4519.8
45	3.80E+01	2.63E+07	3005.4
50	5.64E+01	1.77E+07	2023.8
55	**8.28E+01**	**1.21E+07**	**1379.3**
60	1.20E+02	8.33E+06	950.9
65	1.72E+02	5.81E+06	662.9
70	2.44E+02	4.09E+06	467.0
75	3.44E+02	2.91E+06	332.3
80	4.78E+02	2.09E+06	238.7
85	**6.59E+02**	**1.52E+06**	**173.1**
90	9.01E+02	1.11E+06	126.6
95	1.22E+03	8.19E+05	93.4
100	1.64E+03	6.09E+05	69.5
105	2.19E+03	4.56E+05	52.1
110	2.90E+03	3.45E+05	39.4
115	3.81E+03	2.62E+05	29.9
120	4.98E+03	2.01E+05	22.9
125	6.45E+03	1.55E+05	17.7

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Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265