Reliability Report
For

Qualifying TPS62000YEG in a new package

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Texas Instruments
High Performance Analog Products

Approved by:

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The **TPS62000YEG** 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:	BLBD62000C9W
Package Type:	WCSP/YEG		Die Size:	60 x 86 mils
Solder Bump Alloy:	63%/37% Tin/Lead		Mask Revision:	C
Solder Bump Diameter:	300µm		Wafer Fab Site:	Dfab
Bump Pitch:	500µm		Process:	LBC3S (non Cu)
Number of Solder Bumps:	12		Technology:	LinBiCMOS
Wafer Coating Material:	LC2850		Metal 1:	TiW/AlCu (2%)
Redistribution Layer l:	Electroplated Copper		Metal 2:	0.3umTiW/ 1.52um AlSiCu (0.5%)
Flammability Rating	UL94 V-O and IEC Standard 695-2-2		Passivation:	10KA CN
Moisture Sensitivity Level	1	NA	Transistor Count:	1739
Reflow Temperature	240ºC	N/A		

Thermal Information

Absolute Max Junction Temp $T_{J\text{-}MAX}$	-40ºC to +150ºC
Recommended Junction Temp T_J	-40ºC to +125ºC
θ_{JC}	21.2ºC/W
θ_{JB}	N/A
SpecificationOperating Temperature T_A	-65ºC to +150ºC
Lead SolderingTemperature 1.6mm from case	N/A
Storage Temperature T_{STG}	-65ºC to +150ºC

Qualification Evaluation & Results:

Qualify TPS62000YEG in Nanostar™ package.

Qualification Material			
HTOL assem/wafer/lot :	0304403/0415602; 0315205/0456001; 0315205/0456002	Latch Up assem/wafer/lot	0301319/3013939, 3013941,3013942
HAST assem/wafer/lot :	0304403/0415602; 0315205/0456001; 0315205/0456002	ESD assem/wafer/lot	0301319/3013939, 3013941,3013942
Autoclave assem/wafer/lot :	0304403/0415602; 0315205/0456001; 0315205/0456002	X-Ray assem/wafer/lot	N/A
Temp Cycle assem/wafer/lot :	0304403/0415602; 0315205/0456001; 0315205/0456002	MSL assem/wafer/lot	0304403/0415602; 0315205/0456001; 0315205/0456002

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 and Results**
Life Test	150°C, 300 Hrs.	116/0	116/0	116/0	
HAST	130ºC, 85%RH, 33.5 psia, 96 Hrs.	80/0	80/0	80/0	
Autoclave	121°C, 15 psia, 100%RH, 240 Hrs.	80/0	80/0	80/0	
Temp Cycle	-55ºC to 125ºC, 500 cycles	80/0	79/0	79/0	
BLR Temp Cycle	-40ºC to 125ºC, 1500 cycles, 5ºC/ min Temp Ramp Rate, 12 min dwell	36/0			
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	3/0			
	CDM/500 volts	3/0			
	CDM/750 volts	3/0			
	CDM/1000 volts	3/0			
	MM/100 volts	3/0			
	MM/200 volts	3/0			
	MM/300 volts	3/0			
Latch Up				6/0	
Elec. Charac. over Temp	PDS	20/0	10/0	10/0	
Physical Dimensions		96/0			
Flammability		15/0			OPA2347YED
Ball Shear		150/0			
Manufacturability		passed			
Hi Temp Storage Life Test	150ºC/ 1000 Hrs.	45/0	45/0	45/0	
Hi Temp Storage Life Test	170ºC/ 420 Hrs.	45/0	45/0	45/0	
Moisture Sensitivity	Level 1 @ 240ºC	12/0	12/0	12/0	

*Preconditioning bake and humidity soak condition prior to Life test, HAST, Temp Cycle, High Temp Storage Life, and Autoclave: 4 hour bake followed by 24 Hours@ 85ºC/85%RH. The shortened bake and humidity soak was based on data from moisture absorption and desorption analysis from this package.

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.

Reliability Calculations

MODEL	**TPS62000YEG**	**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
300	0	348	104400
	—		———
Total Failures	0		104400

TEMP.	FAILRATE (FITS)	MTTF (HOURS)	MTTF (YEARS)
25	7.00E+00	1.43E+08	16310.3
30	1.10E+01	9.11E+07	10401.6
35	1.70E+01	5.90E+07	6731.1
40	2.58E+01	3.87E+07	4416.8
45	3.89E+01	2.57E+07	2936.8
50	5.77E+01	1.73E+07	1977.6
55	**8.47E+01**	**1.18E+07**	**1347.8**
60	1.23E+02	8.14E+06	929.3
65	1.76E+02	5.67E+06	647.8
70	2.50E+02	4.00E+06	456.3
75	3.52E+02	2.84E+06	324.7
80	4.89E+02	2.04E+06	233.3
85	**6.75E+02**	**1.48E+06**	**169.2**
90	9.22E+02	1.08E+06	123.8
95	1.25E+03	8.00E+05	91.3
100	1.68E+03	5.95E+05	67.9
105	2.24E+03	4.46E+05	50.9
110	2.97E+03	3.37E+05	38.5
115	3.90E+03	2.56E+05	29.3
120	5.09E+03	1.96E+05	22.4
125	6.60E+03	1.51E+05	17.3

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