Reliability Report

1129-02

AS18XX

(AS1854, AS1844, AS1834,

AS1824, AS1822)

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Akros Silicon

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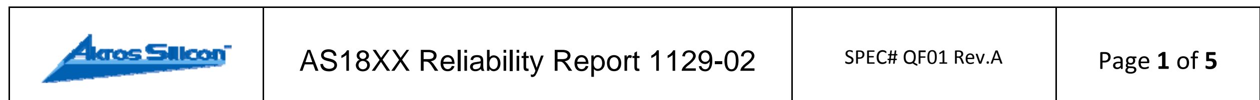
Quality Director



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INTRODUCTION

AS18xx product family is fabricated at Telefunken, Germany and Global Foundries, Singapore with Pb-free package assembly at SPEL, India. This report will provide the Reliability and MSL (level 1) qualification results.

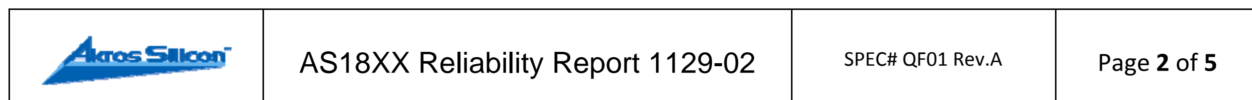
PROCEDURE

The following environmental reliability stress tests have been performed

a) External visual examination @ 40X
b) Temperature cycle (-40°C to +60°C, 5 cycles)
c) Stabilization bake (125°C, 24 hours)
d) C-Mode Scanning Acoustic Microscopy (CSAM)
e) Moisture soak (85 °C / 85 % RH, 168 hours)
f) Solder reflow (260°C, 3 cycles)
g) C-Mode Scanning Acoustic Microscopy (CSAM)
h) Electrical Test
i) Unbiased HAST (130°C; 85% RH, 96 hours)
j) Temperature Cycling (-65°C to 150°C, 500 cycles)
k) High Temperature Storage (150°C, 1000 hours)
l) Biased HAST (110°C; 85% RH, 164 hours)
m) C-Mode Scanning Acoustic Microscopy (CSAM)
n) Electrical Test

Conclusion

The AS18xx products successfully passed all Quality and Reliability Standards requirements with MSL-1 package rating.



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Manufacturing information

Description/Function	Digital Power PoD PD Controller
Process	0.13µ , 0.18µ & 0.8µ CMOS
Fabrication	Telefunken, Germany
	Global Foundries, Singapore
Assembly	SPEL, India
Test	SPEL, India

Package information

Package Type	64 Lead QFN (9x9 mm, 0.4mm pitch)
Lead Frame	Copper – C194
Lead Finish	100% Tin
Die Attach	Conductive Epoxy - CRM 1076
Bond Wire	1.2 mil Gold (Au)
Mold Material	Sumitomo G770 Series
Mark	Laser Mark
Moisture Sensitivity Level (MSL)	Level 1
Theta JA	23°C/W

Die Information

Die material	Si
Passivation	Silicon Nitride (Si_3N_4)
Interconnect	Al
Isolation Dielectric	Silicon Dioxide (SiO_2)

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Die Reliability Test Results

Stress Test	Reference Standard	Stress Condition & Duration	Elect.Test Quantity	Elect.Test Result
Operating Life Test	JESD22-A108	125°C, 168 Hrs, 48V, 5.5V	77	Pass
		125°C, 500 Hrs, 48V, 5.5V	77	Pass
		125°C, 1000 Hrs, 48V, 5.5V	77	Pass
High Temp Storage	JESD22-A103	150°C, 1000 Hrs	25	Pass
ESD (HBM)	JESD22-A114	±2000V	3	Pass
ESD (CDM)	JESD22-C101C	±500V	3	Pass
Latch-Up	JESD 78A	85°C, ±200mA	6	Pass

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Package Reliability Test Results

Stress Test	Reference Standard	Stress Condition & Duration	Elect.Test Quantity	Elect.Test Result
Preconditioning	JESD22-A113F LEVEL 1	External Visual - 40X Temperature Cycle -40°C to +60°C, 5 Cycles Bake 125°C, 24 Hrs Moisture soak 85°C/85% RH, 168 Hrs IR reflow 260°C, 3 Cycles.	95	Pass
Un-Biased HAST	JESD22-A118	130°C; 85% RH, 96 Hrs	25	Pass
Temperature Cycle	JESD22-A104D	-65°C to 150°C, 500 cycles	25	Pass
High Temp Storage	JESD22-A103C	150°C, 1000 Hrs	25	Pass
Biased HAST	JESD22 A110; MSL-1	110°C; 85% RH, 164 Hrs	45	Pass

FIT Evaluation

Activation Energy (*Ea*)	0.8eV
Operating/Stress ambient temp. (*Ta/Ts*)	50°C / 125°C
Acceleration Factor (*AF*)	221
Device Hours	188000 Dev. hrs
FIT Rate	22

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