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## ON SEMICONDUCTOR TIN WHISKER REPORT

### Seremban Assembly Site, Matte Tin over Copper

#### Introduction

This report is for an evaluation being conducted to measure tin whisker growth on a copper leadframe package assembled at ON Semiconductor's Seremban, Malaysia assembly site. The results of this evaluation are applicable to all Cu based leadframe packages at this assembly site.

Package type: SOT223

Leadframe material: Cu

Plating: Matte tin

Anneal: 1 hour at 150°C within 24 hours of plating

#### Test Conditions/Procedure

Three test conditions are being used, per JEDEC standard JESD201:

Temp Cycle (-55/85°C) for 3000 cycles (inspections at 500 cycle intervals)

Storage at 55°C/85%RH for 4000 hours (inspections at 1000 hour intervals)

Storage at 30°C/60%RH for 4000 hours (inspections at 1000 hour intervals)

Testing is being conducted on units with three different preconditioning treatments:

1. no preconditioning
2. units preconditioned with a SnPn reflow profile (peak temp 220°C)
3. units preconditioned with a Pb-free reflow profile (peak temp 260°C).

Samples were taken from three separate assembly lots. Three units per lot, three leads per sample, and five areas per lead are inspected by SEM at each inspection point.

#### Results

The maximum whisker length observed for each unit was noted and compared to the acceptance criteria listed in JESD201 for Class 2 products (40µ maximum for the storage tests and 45µ maximum for temperature cycle).

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### WHISKER INSPECTION RESULTS

Precon.	30°C/60%RH (hours)				55°C/85%RH (hours)				Temp Cycles					
	1000	2000	3000	4000	1000	2000	3000	4000	500	1000	1500	2000	2500	3000
None	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SnPb	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Pb-free	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

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