

Extended Shelf Life for Sn Plated Devices

Texas Instruments
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TI ESL Program History

- June 1, 2008, TI implemented a new extended shelf life (ESL) program. With the use of an extended-life MBB and an increased amount of desiccant, TI has enabled 6 years of storage for certain designated products. **6 years = 5 year shelf life plus 1 year at the customer or distributor location.**
- October 2014, TI extended the ESL program to include products with Matte Sn finish
- Through extensive testing, TI has seen no negative effects from these changes. Solderability of TI devices were tested to 8+ years showing consistent performance. As a result, no shelf-life or date-code restrictions are necessary inside the TI standard parameters.
- The ESL program has resulted in increased supply flexibility for our customers, particularly for those who purchase low-volume products often used in support of legacy or replacement equipment.

Extended Shelf Life benefits

Extending TI's shelf life of certain designated products benefits customers in multiple ways:

- Increased assurance of supply
- More immediate and on-the-shelf availability of product
- Eliminating customer burden of forced re-designs of many End-of-Life (EOL) products
- Increased supply continuity to customers during rapid market transitions.
- No negative impact to quality
- TI warranty is unchanged

ESL Evaluation Summary

- In 2013, TI started long term storage evaluation on Matte Sn products.
 - ✓ Objective:
 - ✓ Evaluate effect of extended storage time on Matte Sn products to enable ESL
 - ✓ Evaluation:
 - ✓ Preparation:
 - ✓ Risk assessment completed for the effect of long term storage on Matte Sn products
 - ✓ Select old Matte Sn products used for the evaluation representing various package groups and assembly factories.
 - ✓ Tests: Tests were planned based on Risk Assessment
 - ✓ Solderability (virgin and steam aged)
 - ✓ Plating Inspection
 - ✓ Device Internal and External Integrity
 - ✓ Whisker Inspection and Reliability Tests
 - ✓ Packing
 - ✓ Conclusion:
 - ✓ All selected device and package samples passed all testing criteria

Evaluation Results Summary

Matte Sn ESL Evaluation – 17 devices, 7 assembly sites sampled with up to 8 years of storage.

Package Group	MSL	Solderability Test	Plating Inspection	Visual and Internal Inspection	Packing Test	Whisker Inspection	Whisker Reliability Test
SOIC	LEVEL1	Not Tested	PASS	PASS	PASS	PASS	Not Tested
TSSOP	LEVEL1	PASS/2013	PASS	PASS		PASS	Not Tested
TSSOP	LEVEL2	PASS/2014	PASS	PASS		PASS	PASS
SFM	LEVEL3	Not Tested	PASS	PASS		PASS	Not Tested
TO220	LEVEL1	Not Tested	PASS	PASS		PASS	Not Tested
TO220	LEVEL1	Not Tested	PASS	PASS		PASS	Not Tested
SFM	LEVEL3	Not Tested	PASS	PASS		PASS	PASS
SOIC	LEVEL1	PASS/2013	PASS	PASS		PASS	PASS
SOIC	LEVEL3	Not Tested	PASS	PASS		PASS	PASS
LQFP	LEVEL3	PASS	PASS	PASS		PASS	PASS
SOT	LEVEL2	PASS/2014	PASS	PASS		PASS	PASS
SOIC	LEVEL1	PASS/2014	PASS	PASS		PASS	PASS
SFM	LEVEL3	PASS/2013	PASS	PASS		PASS	PASS
PFM	NC-G	PASS/2013	PASS	PASS		PASS	Not Tested
QFN	LEVEL3	PASS/2013	PASS	PASS		PASS	Not Tested
SOP	LEVEL2	PASS/2013	PASS	PASS		PASS	Not Tested
SSOP	LEVEL1	PASS/2013	PASS	PASS		PASS	Not Tested

Conclusion:

- All Sampled Matte Sn devices passed all testing – eligible for ESL

Matte Tin ESL Evaluation Summary

Solderability:	Pass
Plating:	Pass
Tin whiskers:	Pass
Internal and External Integrity	Pass
Whisker	Pass
Packing material:	Pass

Summary:

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