Echelon Corporation
Package Qualification Report

RoHS Compliant FT 3120®-E4P40, FT 3120-E4S40, and FT 3150®-P20 Free Topology Smart Transceivers

and

FT-X1 Transformer

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Component-Level Tests

FT 3120-E4P40 and FT 3150-P20 Smart Transceiver

Test	Conditions	Sample Size (units)	Results
Preconditioning*	JESD22-A113 Rev. D Level 3 192 hours @30ºC/60% R.H. 260ºC +5ºC/-0ºC reflow (3x)	30	0 failures
Temperature Cycling*	-65 to +150ºC 1000 cycles (With preconditioning above)	90	0 failures
Pressure Pot*	2 atm pressure 121ºC, 100% R.H. 168 hours (With preconditioning above)	45	0 failures
HAST*	130ºC, 3.63V, 85% R.H. 128 hours (With preconditioning above)	45	0 failures
Tin Whiskers	N/A (Not needed for NiPdAu lead finish)		

*Tests conducted by part manufacturer on similarly constructed parts from the same package family.

Component-Level Tests

FT 3120-E4S40 Smart Transceiver

Test	Conditions	Sample Size	Results
Preconditioning*	JESD22-A113 Rev. D Level 3 192 hours @30ºC/60% R.H. 260ºC +5ºC/-0ºC reflow (3x)	45	0 failures
Temperature Cycling*	-65 to +150ºC 1000 cycles (With preconditioning above)	134	0 failures
Pressure Pot*	2 atm pressure 121ºC, 100% R.H. 168 hours (With preconditioning above)	45	0 failures
HAST*	130ºC, 5.5V, 85% R.H. 128 hours (With preconditioning above)	45	0 failures
Tin Whiskers	N/A (Not needed for NiPdAu lead finish)		

* Tests conducted by part manufacturer on similarly constructed parts from the same package family.

Component-Level Tests

FT-X1 Transformer

Test	Conditions	Sample Size	Results
HALT	85ºC, 85% R.H. 1000 hours	240	0 failures attributable to RoHS materials or processes
HASS	-50 to +95ºC 10ºC/minute 59-minute dwells 50 hours	32	0 failures
Tin Whiskers	N/A. (Leads are dipped in tin, which sits on a barrier layer of nickel. Tin whiskers are a concern for electroplated tin, not dipped tin.)		

Second-Level Interconnect Tests

FT 3120-E4P40 Smart Transceiver

Test	Conditions	Sample Size	Results
HALT	85ºC, 85% R.H. 1000 hours	24	0 failures
HASS	-50 to +95ºC 10ºC/minute 59-minute dwells 50 hours	20	0 failures
Second-Level Interconnect Temperature Cycling	0 to +90ºC 1.45 cycles/hour 5-minute dwells 1000 cycles Sn-Ag-Cu Solder	40	0 failures found: -Functional test -Lead pull test* -Cross-sections*
Second-Level Interconnect Temperature Cycling (for backward compatibility in non-RoHS processes)	0 to +90ºC 1.45 cycles/hour 5-minute dwells 1000 cycles Sn-Pb Solder	5	0 failures found: -Functional test -Lead pull test* -Cross-sections*

*Results based on a sampling of the total units tested.

FT 3120-E4S40 Smart Transceiver

The lead finish technology is the same as that used in the FT 3120-E4P40 Smart Transceiver. Therefore, the data can reasonably be shared.

FT 3150-P20 Smart Transceiver

The lead finish technology is the same as that used in the FT 3120-E4P40 Smart Transceiver. Therefore, the data can reasonably be shared.

Second-Level Interconnect Tests

FT-X1 Transformer

Test	Conditions	Sample Size	Results
HALT	85ºC, 85% R.H. 1000 hours	24	0 failures
HASS	-50 to +95ºC 10ºC/minute 59-minute dwells 50 hours	20	0 failures
Second-Level Interconnect Temperature Cycling	0 to +90ºC 1.45 cycles/hour 5-minute dwells 1000 cycles with Sn-Ag-Cu Solder	40	0 failures found: -Functional test -Cross-sections*
Second-Level Interconnect Temperature Cycling (for backward compatibility in non-RoHS processes)	0 to +90ºC 1.45 cycles/hour 5-minute dwells 1000 cycles with Sn-Pb Solder	5	0 failures found: -Functional test -Cross-sections*

*Results based on a sampling of the total units tested.

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