

## Commercial TVS Diodes Product Reliability Information

This report shows general reliability results on commercial product families from Littelfuse TVS Diodes. All test standards listed are per the Mil-Std-750 unless otherwise stated.

For more information about any specific device, please contact [sales@littelfuse.com](mailto:sales@littelfuse.com) for further details.

Test	Standard	Test Condition	Sample Size
Pre-conditioning	JESD22A-113(SMD)	24 hours 125° C bake, 168 hours 85° C /85% RH soak, reflow 3 times	Prior to TC/UHAST/ H3TRB
High Temperature Reverse Bias	M1038 Method A	Junction temperature, bias VR, 1,008 hours	3 lots 77 pcs
Temperature Cycle	JESD22A -104	-55° C to +150° C, 15 minutes dwell, 1,000 cycles	3 lots 40 pcs
Unbiased HAST	JESD22A-118	130° C, 85% RH, 96 hours	3 lots 40 pcs
High Humidity High Temperature. Reverse Bias	JESD22A-101	85° C, 85% RH, bias VR, 1,008 hours	3 lots 40 pcs
Resistance to Solder Heat	JESD22A-111 (SMD) JESD22B-106 (PTH)	SMD 260° C, 10 s PTH 270° C, 7 s	1 lot 30 pcs
Moisture Sensitivity Level	J-STD-020(SMD)	24 hours 125° C bake, 168 hours 85° C /85% RH soak, reflow 3 times	2 lots 11 pcs
Solderability	JESD22B-102	Method A for through hole Method B & D for SMD	1 lot 10 pcs

### Estimate of Failure Rate, MTBF, FITS for a Given Operation Temperature

Temp. °C	% FR/khrs	MTBF (K)	FITS
30	0.00001	13118051	0
55	0.00014	710876	1
85	0.00272	36797	27
100	0.00999	10008	100
125	0.07037	1421	703
150	0.39351	254	3935

The Mean-Time-Between-Failure (MTBF) in hours and the percent failure rate per 1,000 hours (%FR/khr) are computed at a 60% confidence level using the chi square method and the Arrhenius derating model for various junction operating temperatures. For the calculations, a value of 1 eV was used for the activation energy.