Reliability Datasheet

Philips Lumileds

SnapLED Qualification Reliability Testing

Reliability testing based on Philips Lumileds' in-house quality test – Multi Environment Over Stress Test (MEOST)

The development of SnapLED included extensive operational life-time and environmental testing to extremes exceeding both datasheet ratings as well as AEC-Q101C industry standard testing. In order to support the stringent reliability and design margin requirements of the automotive industry, Philips Lumileds has developed, in cooperation and collaboration with its Tier 1 customers, the Multi-Environment Over Stress Test (MEOST). MEOST provides designers with the confidence that products from Philips Lumileds exceed the stringent expectations and environmental challenges of the automotive industry while providing the quality, reliability and design margin required.

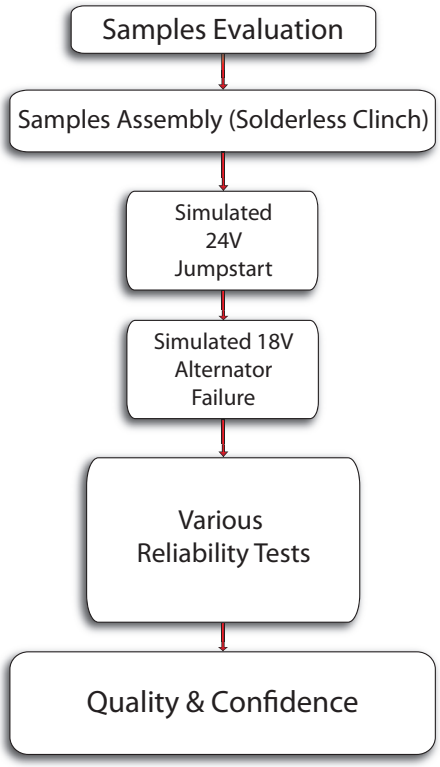

Figure 1: Test flow for Multi Environment Over Stress Test (MEOST)

The MEOST test program consists of a strenuous evaluation of LED components by applying very high levels of stress to quantify the reliability performance in extreme conditions and provide the design margin required to ensure robust designs. Prior to various long-term stress tests, all LEDs under evaluation are subjected to a series of baseline stress tests conducted to simulate a 24V vehicle jumpstart as well as an 18V load under the conditions of an alternator failure. Subsequently, all LEDs undergo long-term reliability testing at various power and temperature levels, including predominantly conditions where either the maximum continuous operational rating for drive current, junction temperature or both are exceeded. These long term tests are conducted for duty cycles 50% longer than the testing criteria defined by the Automotive Electronics Council (AEC). Figure 1 shows the test flow for LEDS undergoing the MEOST test and Table 1 summarizes the specific tests applied and cumulative test results obtained from MEOST testing demonstrating the robust nature of the SnapLED product and the design margin and reliability that customers trust from Philips Lumileds.

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Table 1. Operating Life, mechanical and environmental tests performed on SnapLED150 based on MEOST.

Stress Test	Stress Conditions	Stress Duration	Failure Criteria	Results
High Temperature Operating Life (HTOL-1) [1]	55°C, I_F = 200 mA (Tj = 115°C)	1500 hours	See Notes [2]	0 Failures
	55°C, I_F = 300 mA (Tj = 155°C)	1500 hours	See Notes [2]	0 Failures
	85°C, I_F = 200 mA (Tj = 145°C)	1500 hours	See Notes [2]	0 Failures
	85°C, I_F = 300 mA (Tj = 185°C)	1500 hours	See Notes [2]	0 Failures
	100°C, I_F = 200 mA (Tj = 160°C)	1500 hours	See Notes [2]	0 Failures
Low Temperature Operating Life (LTOL)	-40°C, I_F = 300 mA (Tj = 60°C)	1500 hours	See Notes [2]	0 Failures
Wet High Temperature Operating Life (WHTOL)	85°C/85%RH, I_F = 200 mA (Tj = 145°C)	1500 hours	See Notes [2]	0 Failures
	85°C/85%RH, I_F = 300 mA (Tj = 185°C)	1500 hours	See Notes [2]	0 Failures
Powered Temperature Cycle (PTMCL)	-40°C to 85°C, 10 minutes dwell, 20 minutes transfer, 5 minutes ON/5 minutes OFF, I_F = 200 mA (Tj = 145°C)	1500 hours	See Notes [2]	0 Failures
Powered Temperature Cycle (PTMCL-2)	-40°C to 85°C, 10 minutes dwell, 20 minutes transfer, 5 minutes ON/5 minutes OFF, I_F = 300 mA (Tj = 185°C)	1500 hours	See Notes [2]	0 Failures

Notes for Table 1:

1. Units attached to stress board using metal to metal clinching method without any heat induced. The temperature of the stress board is kept constant at the temperature noted. Max. DC = 150 for AlInGaP SnapLED150.
2. A failure is an LED that is open, shorted, or has lost more than 20% of its initial light output.