

Micron Optics, Inc.
os3100 Style Strain Sensor
Long Term Test Summary

Preliminary

The following tests have been performed on the os3100 style optical strain sensor to determine the long term reliability of this product under extreme environmental conditions. The tests include thermal cycling, high temperature humidity soak and fatigue.

Thermal Cycling:

The os3100 sensor was subjected to thermal cycling for 500 cycles of -40°C to +120°C. A total of 5 sensors were subjected to this test. Three sensors were subjected to a strain of +1,600 μ strain and two sensors were subjected to a strain of -1,600 μ strain. The sensors were cycled at a rate of 3.5 hours per one complete temperature cycle. Typical drift for the duration of the test was 4 μ strain.

High Temperature and Humidity Soak:

The os3100 was subjected to high temperature and humidity soak for 1000 hours at 75°C at 75% relative humidity. A total of 5 sensors were subjected to this test. Three sensors were subjected to a strain of +1,600 μ strain and two sensors were subjected to a strain of -1,600 μ strain. Typical drift over the 1000 hour test was 50 μ strain.

Fatigue Testing:

The os3100 sensor was subjected to low frequency strain cycling at high strain rates to establish the expected life cycle for an optical strain sensor. Sensors were tested for both bending and tensile strain. The table below is a summary of the data.

Sensor	Strain Type	Strain Range	Frequency	# Cycles	Comments
FP1-12	Bending	0 to -1,100 μ s	20 Hz	13,346,780	Test Completed
FP1-14	Bending	0 to +1,100 μ s	20 Hz	13,346,780	Test Completed
FP1-92	Elongation	\pm 2,950 μ s	31 Hz	32,223,384	Test Completed
FP1-121	Elongation	\pm 2,400 μ s	30 Hz	20,813,070	Test Completed
FP1-126	Elongation	\pm 2,400 μ s	30 Hz	20,813,070	Test Completed
FP1-139	Elongation	\pm 1,990 μ s	31 Hz	102,122,959	Test Completed
FP1-140	Elongation	\pm 1,990 μ s	31 Hz	102,122,959	Test Completed

All sensors survived fatigue tests with no signs of deterioration in performance.