

**Micron Optics, Inc.****os4100 Temperature Compensation Sensor****Long Term Test Summary****Preliminary**

The following tests have been performed on the os4100 optical temperature sensor to determine the long term reliability of this product under extreme environmental conditions. The tests include thermal cycling, and high temperature humidity soak.

Thermal Cycling:

The os4100 sensor was subjected to thermal cycling for 500 cycles of -40°C to +120°C. A total of 4 sensors were mounted to a copper block using 1-72 screws. A Fluke-Hart Scientific 1521/5615 platinum resistance thermometer was used as a reference to monitor the temperature of the copper block. A Micron Optics si720 was used to monitor sensor wavelength. The sensors were placed in an ESPEC Temperature & Humidity chamber and cycled at a rate of 2°C/min. Temperature and sensor wavelength were recorded at 3 minute intervals for the duration of the test. Typical drift for the duration of the test was < 0.27°C (8pm).

High Temperature and Humidity Soak:

The os4100 was subjected to high temperature and humidity soak for 1000 hours at 75°C at 75% relative humidity. A total of 4 sensors were mounted to a copper block using 1-72 screws. A Fluke-Hart Scientific 1521/5615 platinum resistance thermometer was used as a reference to monitor the temperature of the copper block. A Micron Optics si720 was used to monitor sensor wavelength. The sensors were placed in an ESPEC Temperature & Humidity chamber. The chamber was allowed to stabilize at 75°C at 75% relative humidity for 30 minutes. Temperature and sensor wavelength were recorded at 3 minute intervals for the duration of the test. Typical drift over the 1000 hour test was < 0.35°C (10pm).

Fatigue Testing:

The os4100 builds on the same technology as the highly reliable os3100 optical strain gage. The os3100 has been tested to withstand over 100,000,000 fatigue cycles of +/- 2,000 micro-strain. The os4100 temperature sensor is designed and fabricated using the same technology as our os3100 strain gage. 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. All sensors survived fatigue tests with no signs of deterioration in performance.