ICE 1002 (2.23V) Testing Information

Situation:

The ICE 1002 (2.23V) device requires an elevated temperature test. The test involves increasing the ambient room temperature to 38.3°C and repeating the characterization curve.

Configuration:

The ICE1002 device was connected to a power supply with a voltmeter in parallel, an amperage meter in series and a thermocouple attached to the surface of the device. An insulated enclosure was created with a thermostat installed to control the internal enclosures temperature. The ICE1002 was placed within the enclosure.

Test Equipment Used:

- Fluke 76 – Current Measurements
- Fluke 1587 – Voltage Measurements
- Fluke 51 – Temperature Measurements

Procedure:

The enclosure was heated above 38.3°C. The power supply was placed into constant current mode, and slowly increased 10mA at a time. At each 10mA interval the voltage across the ICE device, the surface temperature and the ambient air temperature was recorded. This was repeated from 0mA to 300mA.

After recording the characterization curve of the ICE1002 device, the power supply was moved into constant voltage and increased to 2.8V. The voltage was left for 30mins and then brought back down into constant current where the device was in regulation at 200mA. The voltage was measured to ensure the ICE2001 device was within specification.

Once the high voltage test was concluded, the ICE1002 device was removed from the heat chamber and cooled to room temperature (25°C). At this point the ICE2001 was re-characterized to show the difference between the elevated and room temperature tests.

Results:

Temperature:

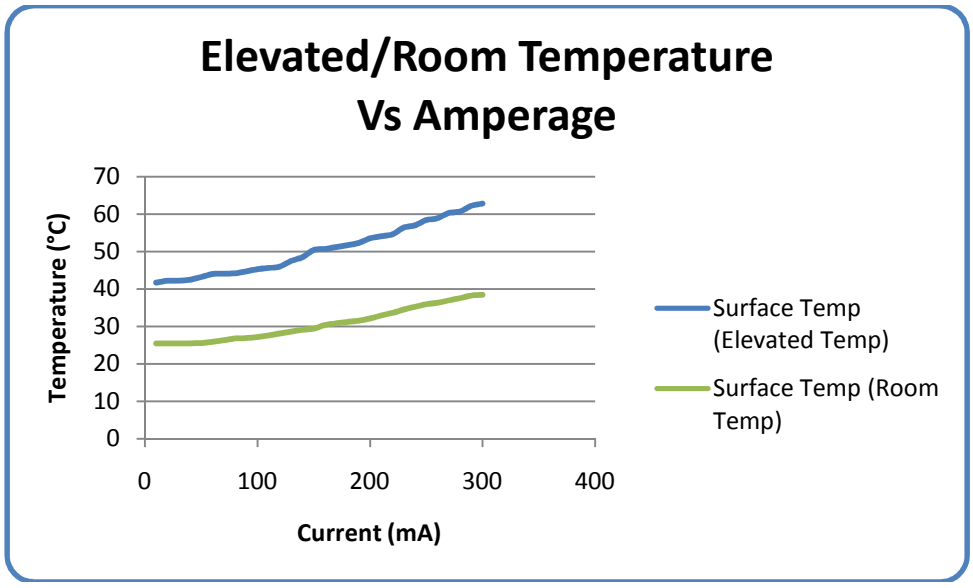

Figure 1 - Temperature Graph

The device was in regulation throughout the entire test. As the current was increased, the ICE1002 would shunt more current internally. The more current shunted the more heat generated by the ICE device itself.

The ambient air temperature was controlled to 38.3°C ± 2°C at all times.

Elevated Temperature Test:

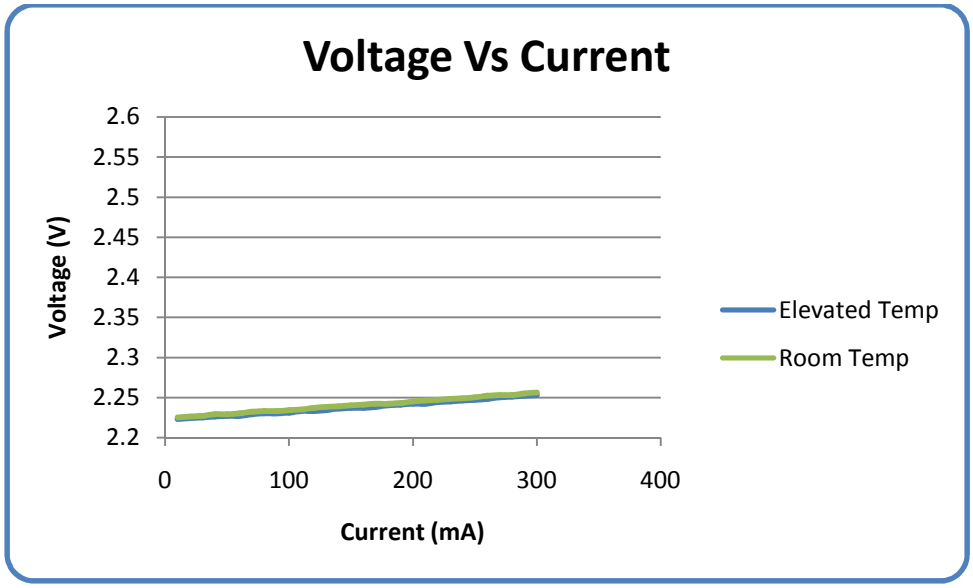

Figure 2 - Voltage Graph

As the current increases there is a slight increase in voltage. As shown in the graph, the differences between the elevated temperature and the room temperature are very minimal.

At current equals 10mA, the difference between the elevated and room temperature voltages were 0.002V, the surface temperature difference was 16.3°C.

At current equals 300mA, the differences between the elevated and room temperature voltages were 0.003V, the surface temperature difference was 24.4°C.

High Voltage Test:

As required, the device was brought up to 2.8V after the elevated temperature test. The ICE2001 device began shunting current at 490mA for 30minutes. The temperature over this time increased from 71.7°C to 97.8°C. After 15minutes of the temperature was stable at 97°C.

After 30 minutes, the ICE1002 device was brought down to 200mA and voltage was measured at 2.236V proving the device is back in regulation. The surface temperature was measured at 94.8°C.

Conclusion:

Due to the above test, the ICE 1002 is capable of operation in an environment of 38.3°C. The device operates within 3mV of accuracy as an equivalent device at room temperature (25°C). This test also shows that, even after bringing the ICE1002 up to 2.8V (out of regulation) for 30minutes will not damage the device, or hinder its ability to be used immediately after a high voltage scenario.