

MICRO

Burn-in & Technology, Inc.

MODEL 5692 Thermal Fatigue Power Cycling System

TEST POWER DEVICES FOR THERMAL FATIGUE AND POWER CYCLING CHARACTERISTICS

Features:

- ✦ Modular Flexibility – Each module is a complete test system. Use only as many modules as you need. Run independent tests in different modules.
- ✦ Time of Temperature Controlled – The power is cycled in accordance with either preset on/off times or by present high/low temperature points.
- ✦ Front panel digital temperature gauge – know the temperature of the devices at any time during test.
- ✦ Rack Mountable – You may mount your system in a standard 19" equipment rack.

Fixturing Flexibility – High temperature fixturing is available for a wide range of products to assure you of testing flexibility.

Applications

Thermal fatigue testing is NOT the same as thermal shock. Thermal shock testing is usually done in a non biased condition and is primarily used to test the device packaging. Thermal fatigue testing is done by power cycling in accordance with either time or temperature and is used to test the device structure. The heat applied is "self heat" generated by operating in the forward power mode. When the self heat reaches a predetermined temperature, the power is cycled "off," and the devices are quickly brought down to a preset lower temperature. The number of cycles is determined by the system user.

This test stresses the die integrity as well as the bonds inside the device.

Many device manufacturers, especially of MOS devices, are performing thermal fatigue tests on their products as an engineering, and QA, evaluation tool. Power cycling, to test for thermal fatigue, has gained interest because it's better at identifying members of the substandard population than more standardized types of tests.



Micro Instrument Company's Model 5692, Thermal Fatigue / Power Cycling system for power devices.

Description

The Model 5692 Thermal Fatigue Power Cycling System from MICRO BURN IN consists of independent thermal cycle test modules. The exact number of modules used in a system is a matter of customer specifications.

Each module provides a test card rack to support 4 test cards of 20 positions for a total of 80 DUT's (Devices Under Test) per module. The system total DUT count is a function of the number of modules used. As an example, a system comprised of 6 independent modules has a total system DUT count of 480. The modules are housed in 19" wide equipment cabinets, and may be housed independently in bench top cabinets.

Each module is an independent test system, containing its own power source, control circuitry, and cooling system. The power source is determined by customer requirements.

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Test Technique

The devices are alternately heated in a power ON condition and then cooled in a power OFF condition. The heat & cool cycles may be controlled by either time or temperature. This choice is selectable, by module, via a front panel switch.

In the time mode the devices are heated for a predetermined length of time and then cooled for a predetermined length of time. In the temperature mode the devices are heated to a preset temperature and then cooled to a preset temperature.

The devices are heated by the regulated test current through them. They're cooled by reducing the current to 0.0 amps and switching on a large centrifugal blower to pull cooling air across them. The system has a panel mounted speed select switch for the fan. Standard test cards are designed for a maximum power dissipation of 20 watts per device.

The ON/OFF time is a dual set repeat cycle timer. This means the length of "ON" time and the length of "OFF" time are independently adjustable. When operating the module in the time mode the "ON" and "OFF" times require setting by the operator.

Test temperature is sensed by thermocouples connected in parallel for an averaging effect. The output of the thermocouple network is used to trigger the upper and lower limits of the dual set controller.

The controller includes a digital temperature gauge. The average DUT temperature may be read directly from the front panel display any time the system is in operation, in either mode. When the temperature mode is selected the system will cycle on and off automatically.

Device Test Cards

Either TO-3 or TO-220 devices may be tested in the Model 5692 by using our standard 5691 (20 position) device test cards. Other device types may be tested by using other MICRO BURN IN device test cards.

Each DUT position consists of a constant power circuit containing the DUT as its series element. This assures each device is operated at the same power level. A circuit protecting fuse of 1.25 amps is included in the circuit of each DUT test position.

Power Supply

The output voltage of the supply must be specified when ordering. The voltage required is determined by the devices being tested. However, the product of the voltage and current must not exceed the wattage rating of the test card. As an example, the system shown is rated for a power dissipation of 20 watts per device. So when this system is set for a test voltage of 20 volts across the DUT's, there must not be more than 1 amp per device.

Higher wattage systems or systems designed to meet your specific needs are available from MICRO BURN IN. If you need more information on the Model 5692, or if you need a custom system contact us today.

