

ITC57300

**dynamic parametric test system
for discrete semiconductors**



overview

The ITC57300 Dynamic Parametric Test System mainframe accepts Test Heads that perform nondestructive transient measurements on semiconductor devices such as Insulated Gate Bipolar Transistors (IGBT), power MOSFETs, diodes, and other bipolar devices. Included in the mainframe are all test equipment and software necessary to analyze and perform resistive and inductive switching time, switching losses, gate charge, Trr/Qrr, and other transient tests.

Test Heads, which are designed for a specific type of transient test, mate to a special Test Head Receiver on the mainframe. While Test Heads are designed to perform only one specific test, personality boards within each Test Head reconfigure the Test Head for a specific device, device package, and various device circuit arrangements.

capabilities

- Test voltage: maximum of 1200 Vdc at 200 A (Isc up to 1000A)
- Timing Measurement: minimum of 1 ns
- Drain Current Limit Monitor

options

- Scope Substitutions
- Additional Power Supplies
- Additional Test Heads
- Large Package Adapters

test heads

- ITC57210 - R Switching Time for N- and P-channel Power MOSFETs, MIL-STD-750, Method 3472
- ITC57220 - Trr/Qrr for power MOSFETs and Diodes, MIL-STD-750, Method 3473
- ITC57230 - Gate Charge for power MOSFETs, MIL-STD-750, Method 3471
- ITC57240 Inductive switching time for IGBT, MIL-STD-750, Method 3477
- ITC57250 Short circuit (Isc) withstand time, MIL-STD-750, Method 3479

system features

- Easily Changeable Test Heads
- Automated Testing of Different Parameters
- Ruggedized PC Compatible Computer
- User-Friendly Menu Driven Software
- Programmable Test Output Bins
- Spreadsheet Compatible Test Data
- Selectable Internal Inductance Loads
- GPIB Programmable Test Equipment
- Four channel high bandwidth Digitizing Oscilloscope
- Pulse Generator
- 1200V Power Supply

safety features

- Test Head High-Voltage Interlock
- Receiver High-Voltage Interlock
- High-Speed Drain Supply Switch

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ITC57230 gate charge

Gate charge test capabilities per MIL-STD-750, Method 3471 for power MOSFET devices are provided by the ITC57230 Gate Charge Test Head.

A voltage is applied to the gate of a MOSFET, and a constant current, high impedance load is connected to its Drain while its Gate is turned on.

Drain current ramps to a user specified level and the charge is removed from the DUT's gate by sinking (or sourcing for a P-channel device) a programmable constant current. Gate voltage is monitored and the area under various portions of the curve are used to calculate charge.

ITC57210 switching time

This test head verifies switching times of N- and P- channel power MOSFETs (Metal Oxide Semiconductor Field Effect Transistors) as defined by MIL-STD-750, Method 3472 for power MOSFETs. Parameters measured are: Time Delay On [t_d (on)], Rise Time (t_r), Time Delay Off [t_d (off)], fall time (t_f)

ITC57220 Trr/Qrr

The ITC57220 Test Head performs a Trr/Qrr test as defined in MIL-STD-750, Method 3473.

First, current ramps up in the inductor of the driver circuit. When the specified current is reached, current is turned off and the inductor current discharges through the diode in the DUT. A short time later, the the driver is again turned on, causing the DUT diode to undergo reverse recovery. The resultant waveform is captured and analyzed to derive data on reverse recovery peak current, stored charge, and recovery time.

ITC57240 inductive switching time

The ITC57240 Test Head performs an inductive switching test as defined by MIL-STD-750, Method 3477

The driver IGBT builds the test current in the inductor. When it is turned off, current flows in the zener. At this point, the switching time and switching energy test begins, by turning on and off the DUT. In its switching, the DUT will see the test current that is flowing into the inductor and the voltage across the zener, without any reverse recovery component from a freewheeling diode.

ITC57250 short circuit withstand time

The ITC57250 Test Head performs a short circuit withstand time test as defined in MIL-STD-750, Method 3479

In some circuits, such as motor drives, it is necessary for a semiconductor device to withstand a short circuit condition for short periods of time. This test verifies the time period a device can withstand such a condition. The current in the device is dependent on the gain of the device and the pulse width of the applied drive.

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