

# ITC75300

unclamped inductive load tester



## overview

The ITC75300 is a 400A, enhanced unclamped inductive load (UIL) test system that builds on the success of ITC's industry leading ITC55 series of testers by adding additional test and measurement capability.

The ITC75300 performs ruggedness testing of power MOSFETs, IGBTs and diodes that conforms to MIL-STD-750 method 3470 by stressing them to controlled energy levels, accomplished by the devices driving an unclamped inductive load. Improved Test Specifications allow complete control of test parameters.

Included as standard in the ITC75300 are an internal parallel energy path (crowbar) and an external gate drive and voltage measurement POD.

The crowbar can be set to trigger in the event of a device under test (DUT) going into avalanche fail. If the crowbar fires then all the remaining energy will pass through the parallel energy path and not into the DUT. In a package test this prevents the die being completely destroyed so that failure analysis can be performed and protects the handler or socket contacts from being damaged. In a wafer probe application it limits the damage to the die so that there is no debris scattered across the wafer and it protects the probe card. This same crowbar can be utilized as a driver to reduce DUT current pulse-widths to minimize high current stress on DUT fixtures and handler contacts.

## safety features

- Test time-out
- Excessive leakage shutdown
- External safety lockout
- Two parallel connected Manual Start push buttons
- Device currents are constantly monitored. Testing is terminated if currents exceed or fail to reach programmable levels in a specified or calculated time

## features

- High-speed, calibrated 16-bit DACs for higher test accuracy
- Single and Dual N/P-channel or combination device testing
- Front panel touch-screen tablet for standalone operation and test specification entry with screen-specific help
- Calibrated current and voltage waveform capture
- Self test is performed on power up of all operating voltages to ensure accurate measurements and results
- Improved Drain power supply voltage regulation for more accurate testing
- Capable of testing devices up to 2500V Avalanche rating
- High-Speed, Solid-State 400A Switch with fault detection
- Pre and Post Avalanche Leakage tests can be performed at a user defined voltage
- Port 1 and Port 2 Test Results Screens
- New Kelvin detection circuit
- Crowbar circuitry to protect DUT and probe card/contact after Avalanche failure
- Sourcemeter and calibration program for automatic field calibration
- Bipolar front panel and GPIB controlled Gate drive (30Volt maximum differential)
- GPIB interface for remote control
- High-speed Serial I/O interface
- Up to 15 DUT bins for standalone operation
- Front and rear parallel connected Serial I/O RS-232 connectors
- Scope Trigger Output for accurate Avalanche testing measurement
- Multipulse operation has been increased to perform up to 1,000,000 Avalanche tests
- Measurement POD with local gate drive

## tests performed

- Real-time Kelvin testing of device socket and/or contacts
- DC zero gate bias Drain-to-Source leakage test (for shorts)
- Drain-to-Source open/intermittent conductivity test (wire bonds)
- Avalanche duration test (latch-up of parasitic transistor)
- Pre-avalanche and Post-avalanche leakage surge test
- Bipolar Gate Drive allows testing of Depletion and Enhancement Mode DUTs

## test modes

- Single-Pulse Unclamped Inductive Switching (UIS) mode
- Single-Pulse Avalanche Stress (EAS) mode
- Repetitive Pulse Avalanche Stress (EAR) mode
- Repetitive Pulse to Failure (RPF) mode

# ITC75300 POD

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## ITC75300 POD

The POD is designed to be installed very close to the DUT. It contains a local gate drive with a total swing of 30V that can be set to 20V to turn a N-Channel DUT on and a negative voltage to hold the DUT in the off condition. The POD also has a kelvin sense line for accurate measurement of voltage. This capability allows additional measurements to be taken during and after the avalanche test. These include  $R_{dson}$ ,  $V_{dson}$  and  $V_f$  measurements. All connections from the POD to the DUT are verified with Kelvin resistance measurements.

Additional testing capability includes high current  $R_{dson}$  and  $V_f$  testing utilizing low pulse-width DUT currents plus Reverse Biased Diode Avalanche tests.

### POD features

- Works with the 75x00 Series of UIS testers
- 400A avalanche current
- Up to 2500 avalanche volts
- Test specs and parameters are stored in the tester
- GPIB testing control
- Bipolar 30V On/Off Isolated Gate drive
- Programmable Gate Resistor (1 to 255 Ohms)
- Isolated Pod signals
- No external power supply
- Measurements referenced to the DUT's Source lead
- Kelvin contacts measure and reported in Ohms
- Kelvin contact resistance limits
- Programmable Time Delays and Pulse Width after avalanche
- High resolution  $V_{ds}$  sensing
- Converts tester's Force/Force to true Force/Sense connections

### POD tests performed

- $R_{DSON}/V_{DSON}/V_{CEON}$  measurement
- Die Temperature before and after testing
- Die Attach Tests
- Body Diode Tests

### available interfaces

- Serial communication and control interface
- IEEE 488 GPIB control interface
- 15 bin handler control interface for improved sorting of failures for process control analysis

### available options

- All ITC Inductor Boxes
- TC55-RSF Output Selector Box allows the ITC75300 Testers to test various configurations of MOSFETs, IGBTs, and dual and single diodes without having to replacing the DUT fixture up to 1500V avalanche voltage.
- TC55HVD1 (High Voltage Diode Interface Box) - The ITC55HVD1 is a high voltage avalanche interface adapter box option for testing diodes using the ITC75300 at voltages up to 2500v.
- MTSDGEN Generic Test Socket may be used with the ITC75300 tester to provide a convenient method of manual avalanche testing for single or dual devices
- ITC-MTF-55HV-2017- Manual Test Fixture, Dual Die with plug-in socket boards
- ITC Multiplexers - Dual and Quad

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