The principle of the dynamic test is to fire a single or double pulse at the desired operating conditions in order to extract the device switching characteristics from the measured waveforms.

Dynex can offer a range of power semiconductor dynamic testers designed to achieve the test conditions as defined in IEC 60747 - 8 & 9 and MIL-STD-750E for a number of device parameters, including:

- Reverse biased safe operating area (RBSOA),
- Short-circuit safe operating area (SCSOA),
- IGBT/MOSFET turn-on intervals (td(on), tr, ton) and turn-on energy (E_on),
- IGBT/MOSFET turn-off intervals (td(off), tf, toff, tz) and turn-off energy (E_off),
- Diode reverse recovery characteristics (Q_{rr}, I_{rr} and E_{rec}),
- Gate charge (Q_g), (optional).

Dynex IGBT Module Dynamic Tester
The device characteristics extracted from the dynamic tests are important for an end-user to select the appropriate device for an application and for the design of gate drivers. The dynamic testers are designed to conduct these tests accurately, efficiently, reliably and safely. The key features of the testers include:

- Maximum test voltage up to 10 kV and a maximum test current up to 6 kA for RBSOA tests and 10 kA for SC/SCOA tests – capable of testing most commercially available power modules.
- Maximum test temperature of device up to 175°C – suitable for testing SiC devices.
- The dynamic test inductance is made using a multi-position inductance selection bank, ranging from 1μH up to 1264μH.
- The test circuit is designed and built with low stray inductance, at approximately 50 nH.
- Compatibility for a wide range of DUT packaging. Tester variations are available to suit IGBT Power Modules, Press-Pack IGBTs, Automotive Modules and Discrete IGBT devices.
- Productivity is excellent, allowing for the completion of all the tests in one go. With automatic parameter extraction from the measured waveforms and recorded data. With support for the scanning of device serial numbers to maintain full traceability.
- High accuracy is ensured by making the dynamic test measurements using a 4 channel oscilloscope with up-to 14-bit resolution, 200MHz bandwidth and a 1 GS/s sampling rate. This gives a ±1% full-scale accuracy.
- The equipment is highly reliable, a custom design based on proven technology. An industrial PC provides reliable control and recording of test data. The test results can be backed up to an external drive or to a networked location.
- With a user-friendly control interface, all test parameters are set and displayed using a touchscreen control panel. Real-time display of switching waveforms is available and batch reports can be generated with summarised test results and pass rates.
- Comprehensive safety features including but not limited to; over temperature protection, smoke detection, safety interlocks and short circuit protection.

![IGBT Module Dynamic Tester DUT Enclosure (left) and test software user interface (right).](image-url)