# FEC CV300B Clamping Voltage Tester

The CV300B tests silicon Transient Voltage Suppressor (TVS) diodes, both uni-polar and bipolar. The waveform used for the main test is the 10/1000µs waveform.

The tester can also produce 8/20µs and 6/70µs exponential waveforms, 8.3ms half sine and rectangle pulses.

These tests not only prove the ability of the DUT to endure the pulses without failure, but also measures the peak voltage across the device during the pulse.

The CV300B can also measure the VZ of the device both before and after the pulse. Limits may be applied to the absolute value of these VZ tests and to the difference between them. If the initial VZ is outside the programmed limits, the part can be rejected and the main pulse not be applied.

IR can be measured before and after the main pulse. This test is intended to detect damage due to the main pulse which is too slight to be detected by the main pulse or VZ test.

The tester is designed to work with 1 or 2 automatic handlers or manual test stations. Bin sort outputs sort the parts into good devices that pass all requirements, several classes of rejects, and those parts which were not completely tested because of some fault condition.

- *Maximum Peak Current (at low voltage) 400A*
- *Maximum Peak Voltage (at low current) 525V*
- *The tester is designed to work with 1 or 2 automatic handlers or manual test stations.*
- *Guaranteed Peak Power (7.5V to 525V) 3KW*
- *Worst case peak current error at ± 3%*
- *Worst case current error at 1ms ± 1.5%*
- *Rise time of current (10% to 90%) 6µs to 12µs*
- *Accuracy of VC readout 5V to 525V ±1%*
- *Accuracy of VZ readout 5V to 525V ± .25%*
- *These testers are equally at home doing production sorting or accurate QC or HI-REL testing with data-logging and statistics. Reports for statistical process control (SPC) are very easy to produce.*

# FEC CV300B Detail Page

The CV300B is a computer-controlled tester for Transient Voltage Suppressors. It produces high current pulses with various pulse widths and shapes and measures the peak voltage across the device during these pulses.

It is assumed that some of the tested parts will be degraded during the test, or shorted. The CV300B therefore can also test the VZ of the device. This can be done before as well as after the stress pulse and the difference, or ratio, can be measured.

The IR test can be used for the same purpose and it can detect even smaller changes in reverse characteristics than VZ can.

The software controlling the CV300B is called CVMAXX. This software was derived from MAXX which controls our FEC200 testers. This program allows the user to write and store complex programs on disk. These can test and sort with either manual or automatic test stations (2 multiplex stations are built-in). The readings can also be viewed on the computer screen and/or printed and/or saved to disk files.

In addition to programming the parametric tests such as VZ, IR, and 10/1000μs, for example, you can also use such features as jump on pass or fail, or pseudotest LOOP which allows sequences to be repeated n times or until failure. MP is a pseudotest which can insert programmable time delays, for cooling time or other purposes. In short, you can use all of the power of MAXX that is consistent with the types of parametric tests that can be performed by the CV300B hardware.

The CV300B uses large mercury displacement relays to multiplex and to orient the parts on a station. These relays in most cases are the limiting factor for the throughput rate of the test, although at the highest current end of the range and for long pulses the power supply ratings may dominate. Generally, you can expect that a test using the high current pulse generators will take 150ms even though the pulse itself takes only microseconds.

Although the CV300B was intended primarily to produce pulses with fast leading edges and exponential decay (such as 8/20μs or 10/1000μs), it can also produce rectangular (VF, VZ, DELVZ) or half sine (SURGE) pulses.

A built-in hardware test checks the polarity of unipolar parts and also checks for all four Kelvin contacts to be connected. Unipolar parts are oriented automatically as defined below. The test TCPOL if used first, orients bipolar parts so that the side with the lower voltage is tested in the default direction.

The exponential decay pulses and VZ, DELVZ are by default "reverse" tests and the VF and SURGE are by default "forward" tests. However, the F1 switch on a test description line reverses the orientation. Once reversed, the orientation persists for the rest of the sequence or until another F1 is encountered. Although the F1 switch is placed at one end of the line, it is performed first before the current test.

All of the tests except VF, VZ, IR, and DELVZ read the "peak" voltage across the device. VF, VZ, IR, and DELVZ use track/hold with the voltage measured at the end of the pulse. Peak reading, of course, is appropriate for the exponential and half sine tests. However, it should be noted that the peak reading meter can react to fairly short overshoots or other perturbances on the pulse being measured. This and the high compliance voltage necessary from the pulse generators to produce the fast rise times, makes the length and routing of the external test leads rather critical. This is particularly true at the highest current end of the range.

Please note that the CV400 and CV500 are very similar to CV300B and sell for the same price. The difference is that the CV400 and CV500 are designed to produce 15KW pulses, but over a narrower range of voltage. The CV400 is the low voltage unit and will produce full power to 160V minimum. The CV500 is the high voltage unit which starts where the CV400 leaves off and goes up to 525V.