FEC VF40D

The VF40D is intended for testing VF, TRANSIENT THERMAL RESPONSE, and HALF CYCLE SURGE on small and medium power diodes and rectifiers. VZ can also be measured on Unipolar and Bipolar devices up to the compliance voltage of the VF40D.

Many characteristics are programmable by the user, and just about everything else may be programmed by FEC into an easily changeable EPROM. The characteristics described on the detail page are those of the hardware and of the standard EPROM supplied with the tester.

FEC VF40D Tester Detail Page

The major HARDWARE components of the VF40D are as follows:

1. *Programmable constant current supply.*
2. *Constant current supply for the reference current used by the thermal response tests. The three values available are 1mA, 10mA, and 100mA.*
3. *Analog to Digital Converter used to digitize all of the measured parameters.*
4. *Dual differential amplifiers to pre-condition and scale the VF readings on the ranges 0-1.6383V and 24.574V.*
5. *Machine or test station interface driver compatible with most common handlers, may also drive up to 16 binning lamps.*
6. *Last, but definitely not least, is the microcontroller. This module programs and controls all the above. The user communicates with the controller, using a keypad and LCD display. A serial port also allows optional control by a remote computer.*

Description of Standard Firmware

The tests performed are listed and briefly described below.

1. ***VF:*** *The VF test at a programmable current and pulse width produces a reading which is compared with both upper and lower limits.*
2. ***SURGE:*** *This is an 8.3mS half sine pulse intended to prove the ability of the diode to withstand this condition. We also measure the VF corresponding with the peak current. This is displayed and compared with the upper and lower limits.*
3. ***DVF:*** *This thermal response test measures the VF at a low reference current (IM) before and after a larger heating pulse. The difference between the two readings is DVF. This is displayed and compared with the limits.*
4. ***THETA:*** *The THETA test is exactly the same as the DVF test except that the displayed reading is compensated for the applied power and for the presumably known (programmable) value of DVF per degree Celsius (1/K or VTC). The readout is in units of "degrees C per watt."*
5. ***TR:*** *This is steady state thermal resistance from the junction to outside world. The "world" could be an infinite heat sink to which a device such as a DO-5 could be attached. It could be the surrounding air if a DO-35 were suspended by very small wires attached to the end of the leads. TR works*

by doing a long series of tests similar to DVF except that a single "cold reference" reading is used with each hot reading compared to the original cold. When the rate of change of DVF becomes very small, the test is stopped and TR is calculated. Since no heat sink is truly infinite and even very small test leads do conduct some heat, you should carefully evaluate the effects of these matters on your readings. The point at which we terminate the test must be considered also. At this writing, we do this when we see 3 identical DVF readings (100µV resolution, sampled approximately twice per second). We also stop the test if we calculate a rise in junction temperature of more than 100 degrees Celsius. The reading is then marked "invalid".

6. ***IMCHK:*** *This is intended to allow tests to be made at one of the three IM currents. This allows the IM supplies to be checked. It could also be used with a hot pot to measure the 1/K of the part to be tested. (Yields hot and cold VF. You calculate 1/K.)*

Derating IF Supply

The Forward current supply can produce very long pulses at low currents. However as the current increases, the pulse width is restricted. A derating chart is built into the firmware. If you choose a combination of current and time that is not possible, the firmware will ask you to reduce one or the other. Please see the printed derating chart below.

FORWARD CURRENT DERATING CHART

IF CURRENT IS LESS THAN	PULSE WIDTH MAY BE UP TO
3A	30 Seconds
5A	500mS
8A	50mS
20A	25mS
40A	10mS

- *When you have gone through all the programmable items, the tester will display "Ready," the type of test, and the test current.*
- *Note 1: Minimum pulse width at any current is 300µS*
- *Note 2: If you use 3 amps or above at the maximum pulse width, you should limit the speed of any automatic handler to 7200 parts. This will*

avoid excessive heating of the power supplies. If the current is 3 amps or less, or the pulse width is 50% of the maximum or less, you can test as fast as your machine will run.

- *Note 3: For currents below 10mA use a pulse width of not less than 10mS.*
- *Note 4: The optional remote control software can bypass the internal derating chart and establish its own limits. We do this for some low-duty cycles.*