

The new industry standard 370 and 371 curve tracers provide dc parameter characterization of transistors, thyristors, diodes, SCRs, MOSFETs, optoelectronic components, solar cells, solid state displays and other semiconductor devices. The 370 and 371 provide measurements to compare a device to the manufacturer's specifications, identification of components with the same characteristics and failure analysis.

Typical measurements include leakage, breakdown voltages up to 3000 V, MOSFET  $g_m/I_{dss}/V_{gs(th)}/I_{gss}$ , SCR  $V_{drm}/I_{drm}/I_{rrm}/V_{gt}/I_{gt}$ , DIODE  $V_f/P_{IV}/I_r$ , ZENER  $V_z/V_f$ , resistance as well as other dc parameters.

## PROGRAMMABLE CONTROL

With non-volatile memory cartridges, the 370/371 provide automatic test sequencing. Also the GPIB interface and a PEP 301 or other IBM compatible PC allow external controller test sequencing. With either method, the 370 or 371 front panel setting can be recalled and measurements made with storage of the results for later review or comparison.

## INTERACTIVE CONTROL

The 370 and 371 use the same familiar interactive manual controls that are available on Tektronix 576, 577D1 and 577D2 curve tracers. With interactive control, characterizations can be refined for unique devices during research or design. After the completion of the characterization definition, the interactive setting can be automated by storing the curve tracer setting in the curve tracer's non-volatile memory or an external controller.

## DIGITAL STORAGE DISPLAY

The digital storage display provides a bright, flicker-free trace and allows precise measurements and comparisons. There are 100 points per division in the vertical and horizontal directions for high resolution measurements. On-screen readout displays specific values to assure accurate measurements and eliminate interpretation errors.

On-screen annotation with 24 characters of displayed information can be done from either the front panel of 370 and 371 or remotely from an IBM PC compatible controller such as the Tektronix PEP 301.

## HARDCOPY

Plotter output data is sent directly from the 370 and 371 without the need for a controller. While plotting, the 370 and 371 can continue performing the next tasks.

## INTERFACE

The 370 and 371 provide both a GPIB interface conforming to IEEE Standard 488.1-1987 and with Tektronix codes and formats as well as an 8-bit parallel port supporting HPGL compatible plotters.

## TEST FIXTURING

Adapters allow mounting most popular devices for easy test characterizations. For other devices, the blank adapter allows mounting custom sockets.

## SOFTWARE

For automated custom device characterization, the 370 Utility Software or 371 Utility Software with an IBM PC such as the Tektronix PEP 301 provides customized tests, consistent measurements and logging of results. The 370 Device Test Software allows automatic characterization of most semiconductor components.

## 370 CHARACTERISTICS

Range	16 V	80 V	400 V	2000 V
Max Peak Current	10 A	2 A	.4 A	.05 A
Peak Current Pulsed	20 A	4 A	.8 A	.1 A
Min.Series Res. (ohms)	.26	6.4	160	20 k
Max Series Res. (ohms)	800	20 k	500 k	12.5 M

## ACQUISITION

In storage mode, information is displayed in one of three ways: normal, envelope or average.

## COLLECTOR/EMITTER CURRENT

Measurement range is 100 nA/div (1 nA resolution) to 2 A/div for collector current and 100 pA/div (1 pA resolution) to 2 mA for emitter current.

## COLLECTOR/BASE/EMITTER VOLTAGE

Measurement range is 5 mV/div (50  $\mu$ V resolution) to 500 V/div for the collector and 5 mV/div (50  $\mu$ V resolution) to 2 V/div for base or emitter voltage.

## STEP GENERATOR

The step generator has 0 to 10 steps, 50 nA to 200 mA in the current mode and 50 mV to 2 V in the voltage mode. Offset control is variable from -10 to +10X step amplitude. In pulsed mode, the step generator changes from stair step output to either 80  $\mu$ s or 300  $\mu$ s wide pulses.

## AUXILIARY SUPPLY

The auxiliary supply is a third voltage source for biasing devices from -40 V to +40 V with 20 mV resolution.

## S370DT

The S370DT is a complete 370 curve tracer system that includes the 370, PEP 301 controller (IBM compatible computer) with GPIB interface/GPIB software/system software, HC100 four color plotter for direct 370 hardcopy, S48P104 Device Test Software for automatic measurements and S48P105 Utility Software for custom device measurements.

## S370FA

The 370 automates the task of identifying failed pins on integrated circuits with up to 567 pins. The S370FA is specifically for identification of the pins which have failed before lid removal of integrated circuits. The S370FA system software highlights results from pins that don't match normal performance as well as logs results from all pins for future reference or comparison. The S370FA can be easily reconfigured as a standard 370 with a PEP 301 and GPIB interface.

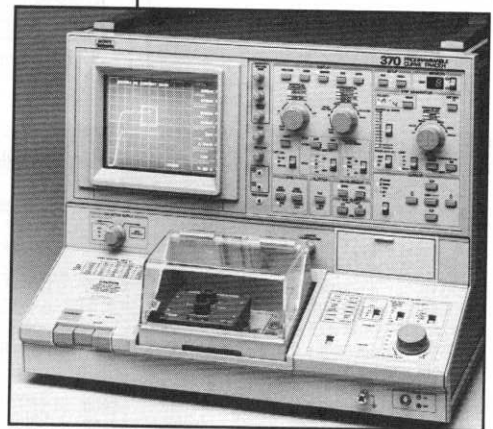
## Programmable Curve Tracer

### AUTOMATED DEVICE CHARACTERIZATION FOR:

- Manufacturing Processes
- Incoming Inspection
- Semiconductor R & D
- Quality Control
- Component Engineering
- Component Matching
- Failure Analysis

### FEATURES

- Automatic Tests Sequences
- Non-Volatile Storage via GPIB Interface
- Waveform Comparison
- Dot Cursor
- Windowing
- Auxiliary Supply
- On Screen Readout
- Envelope Display
- Digital Storage Display and Non-Storage Mode
- Waveform Averaging



370 Curve Tracer

# 370/371 SEMICONDUCTOR TESTERS

## 370

### Device Test Software

- Automatic Measurements from a PEP 301 IBM Compatible PC with GPIB
- Select from Common Device Types
- Select One to All Common dc Measurements
- Software Automatically Handles GPIB and 370 Controls
- Pass/Fail Result Comparison
- Log Files for Storage of Results

## 370 or 371 Utility Software

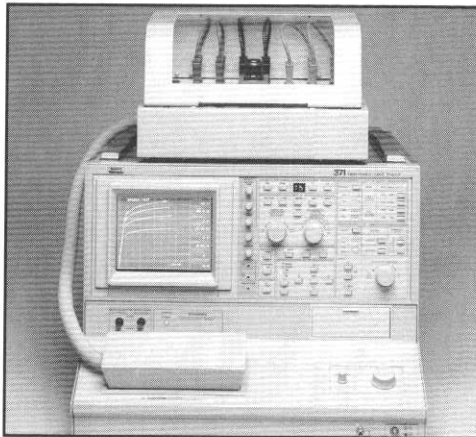
- Automatic Measurements from a Tektronix PEP 301 with GPIB or IBM Compatible PC
- Develop Custom Device Tests
- Archives Curves and Front Panel Settings
- Example Test Programs
- Source Code Included
- Log Files for Storage of Results

### 371 CHARACTERISTICS

Peak Power Watts	3 k* <sup>1</sup>	300* <sup>1</sup>	30* <sup>2</sup>	3* <sup>2</sup>
Collector Current Available				
Amps	400	40	40 mA	4 mA
Maximum Peak Collector Voltage				
Volts	30	30	3 k	3 k

\*<sup>1</sup> 250  $\mu$ sec pulsed collector supply

\*<sup>2</sup> Sinewave collector supply



371 Curve Tracer

### ORDERING INFORMATION

<b>370 Curve Tracer</b>	<b>\$18,950</b>
Includes: Blank adapter A1001; In-line transistor adapter A1002; Axial diode lead adapter A1005; 4 and 6 lead transistor/FET adapter A1007; non-volatile memory (020-1310-00); protective cover (337-3344-00); spare fuses 125 V/4A (159-0259-00); slow blow 250 V/2A (159-0160-00); power cord (161-0066-00); operator's manual (070-6064-00); instrument interfacing guide (070-6067-00) and pocket reference guide (070-6066-00).	
Opt. 1P - HC100 Plotter	+\$900
Opt. 1R - Rackmount	+\$450
Opt. 25 - PEP 301 System Controller	+\$7,995
Opt. 26 - Utility Software	+\$890
Opt. 27 - Device Test Software	+\$1,850
<b>OPTIONAL ACCESSORIES</b>	
Service Manual - Order 070-6065-01	\$55
Calibration Fixture - Order 067-1286-00	\$440
Rackmount Kit - Order 016-0930-00	\$415
Socket Adapters - See adapters section	
Cart - K217 Rack Instrument Cart	\$570
<b>S370DT - Device Test System</b>	<b>\$30,465</b>
Includes: 370, PEP 301; Device Test Software (S48P401); 370 Utility Software (S48P104) and HC100 Plotter.	
<b>S370FA - Failure Analysis</b>	<b>\$49,190</b>
Includes: 370, PEP 301; 93 pin system; 40 pin adapter; TS18150; operators manual (070-6852-00) and rack cabinet.	
<b>OPTIONS</b>	
Opt. 01 - Delete PEP 301	-\$5,000
Opt. 02 - 189 pin expansion	+\$6,350

<b>OPTIONAL ACCESSORIES</b>	
Service Manual - Order 070-6853-00	\$30
<b>371 High Power Curve Tracer</b>	<b>\$22,780</b>
Includes: A1002 In-line transistor adapter; A1003 TO3/TO66 adapter; non-volatile memory (020-1310-00); power cord (161-0066-00); operator's manual (070-6839-00); and pocket reference guide (070-6841-00).	
<b>OPTIONAL ACCESSORIES</b>	
Service Manual - Order 070-6840-00	\$55
Calibration Fixture - Order 067-1345-00	\$3,200
Service Maintenance Cable - Order 174-1001-00	\$65
Service Maintenance Kit - Order 067-1286-00	\$440
371 Rackmount Kit - Order 016-0930-00	\$415
Cart - K217 Rack Instrument Cart	\$570
Sockets - See adapters section	
<b>SOFTWARE</b>	
S48P104 370 Utility Software	\$900
S48P105 371 Utility Software	\$900
S48P401 370 Device Test Software	\$1,860
Order Opt. 01 with all software products to specify 5 1/4" media	NC
<b>APPLICATION NOTES</b>	
Bipolar Measurements - 48W-6756	NC
MOSFET Measurements - 48W-6757	NC
<b>DATA SHEETS</b>	
370 Data Sheet - 48W-6938	NC
371 Data Sheet - 48W-6827	NC
S370FA Failure Analysis - 48W-6940	NC
S48P104/5 Software - 48W-6778-1	NC
S48P401 Software - 48W-6762	NC

### TEST FIXTURING

The test fixture is a standard accessory that provides a safety enclosure when device measurements are performed to assure operator protection. The test fixture accommodates standard A1001 through A1005 with Kelvin sensing, 3-pin adapters without Kelvin sensing (013-0128-00, 013-0073-00, 013-0070-01, 013-0072-00) and the A1023 device socket adapter. Also the test fixture accommodates devices as large as 8" x 5" x 4.75" with special attachment leads included with the 371 Test Fixture.

If you wish to construct a unique test fixture unit, order the optional Field Wiring Cable (cable/plug assembly without test fixture enclosure).

### COLLECTOR CURRENT

Peak Power	Resolution	Current/Div
3 kW	10 mA	1 A to 50 A
300 W	5 mA	.5 A to 5 A
30 W	1 $\mu$ A	100 $\mu$ A to 5 mA
3 W	100 nA	10 $\mu$ A to 500 $\mu$ A

### COLLECTOR VOLTAGE

Measurement resolution is 100 mV/div (1 mV resolution) to 5 V/div at 3 kW and 300 W. For 300 W and 3 W, measurement resolution is 50 V/div (500 mV resolution) to 500 V/div.

### STEP GENERATOR

The step generator provides 0 to 5 normal staircase steps for 30 W and 3 W or pulse mode steps for 3 kW and 300 W. Pulsed current steps are 500  $\mu$ seconds pulses. The current range is 1  $\mu$ A to 2 mA with normal steps and 1 mA to 2 A with peak power at 3 kW or 300 W. In voltage mode, voltage steps range from 200 mV to 5 V.

### 370 DEVICE TEST SOFTWARE

The pop-up windows prompt selection of devices and tests:

- NPN and PNP transistors:** V(br)ceo, V(br)ebo, V(br)cbo, Vce(sat), Vebo(sat), Icev, hFE
- N and P MOSFET:** BVdss, Idss, Vgs(th), Id(on), Rds(on), gm, Igss
- N and P JFET:** Idss, V(br)gss, Igss, gm, Vgs(off)
- SCR:** Vdrm, Idrm, Irrm, Igt, Vgt, Vtm, Ih
- Diode:** Vf, PIV, Ir
- Zener:** Vz, Vf
- Resistor:** Ohms

These common dc measurements are typically performed at least four times faster than manual methods.

### 370 OR 371 UTILITY SOFTWARE

With a library of user defined custom measurements stored in the IBM PC or compatible, unique or uncommon device measurement sequences can characterize any device. The Utility software menu provides easy-to-use access to functions that simplify curve tracer operations.

The 370 and 371 Utility Software are separate products to optimize the performance for each curve tracer.

Since the measurements are performed by the same method with a PC, devices are quickly and consistently characterized.