

MODEL 82-DOS SPECIFICATIONS

PART NUMBER

SPEC-82-DOS

ANALYSIS CAPABILITIES

CONSTANTS: Flatband C and V
Threshold Voltage
Bulk Doping
Effective Oxide Charge
Work Function
Doping Type
Average Doping
Best Depth

GRAPHICS:

Measured: Simultaneous C vs. Gate Voltage
High Frequency C vs. Gate Voltage
Quasistatic C vs. Gate Voltage
Conductance vs. Gate Voltage
Q/t Current vs. Gate Voltage
Quasistatic C and Q/t Current vs. Delay Time

Calculated: Interface Trap Density vs. Trap Energy
Doping vs. Depletion Depth
Ziegler (MCC) Doping vs. Depth
Depletion Depth vs. Gate Voltage
High Frequency $1/C^2$ vs. Gate Voltage
Band Bending vs. Gate Voltage
High Frequency C vs. Band Bending
Quasistatic C vs. Band Bending

VOLTAGE MEASUREMENT

ACCURACY (1 Year, 18°-28°C): $\pm(0.05\% \text{ rdg} + 50\text{mV})$.

RESOLUTION: 10mV.

TEMPERATURE COEFFICIENT (0°-18° & 28°-40°C): $\pm(0.005\% + 1\text{mV})/^\circ\text{C}$.

VOLTAGE SOURCE

VOLTAGE	P-P NOISE (0.1 Hz to 10 Hz)	RESOLUTION
$\leq 20\text{ V}$	150 μV	10 mV
$> 20\text{ V to } 120\text{ V}$	250 μV	100 mV

*Typically 3 mV up to 75 MHz.

MAXIMUM SWEEP SPAN, $|V_{\text{START}} - V_{\text{STOP}}|$: 40V.

MAXIMUM OUTPUT CURRENT: $\pm 2\text{mA}$ (-0%, +20%).

SWEEP STEP VOLTAGE SELECTIONS: 10mV, 20mV, 50mV, 100mV.

DC OUTPUT RESISTANCE: $<10\Omega$.

GENERAL

READING RATES: 4-1/2 readings per second to one reading every 400 seconds.

DATA BUFFER: 1000 points maximum.

GRAPHICAL OUTPUTS: Computer display or digital plotter supporting HPGL with IEEE-488 interface; also "screen copy" to compatible printer.

DIGITAL I/O: Consists of one output, four inputs, +5V (series limited with 33 Ω), and COMMON referenced to IEEE-488 COMMON. Output will drive one TTL load. Inputs represent one TTL load.

MAXIMUM INPUT: 30V peak, DC to 60Hz sine wave.

MAXIMUM COMMON MODE VOLTAGE: 30V maximum, DC to 60Hz sine wave.

OPERATING ENVIRONMENT: 0° to 40°C, 70% non-condensing RH up to 35°C.

STORAGE ENVIRONMENT: -25° to +65°C.

WARM-UP: 2 hours to rated accuracy.

Specifications subject to change without notice.

QUASISTATIC CAPACITANCE*

RANGE	RESOLUTION	ACCURACY (1 Year, 18°-28°C) $\pm(\% \text{rdg} + \text{pF})$	NOISE P-P (typical)
200 pF	10 fF	1.0 + 0.1	$(0.12\% \text{rdg} + 0.13 \text{pF}) \times (100 \text{mV/STEP V}) + 0.01 \text{pF}$
2 nF	100 fF	0.8 + 0.2	$(0.09\% \text{rdg} + 0.13 \text{pF}) \times (100 \text{mV/STEP V}) + 0.1 \text{pF}$

TEMPERATURE COEFFICIENT (0°-18° & 28°-40°C): $\pm(0.02\% \text{ rdg} + 0.1 \text{ pF})/^\circ\text{C}$.

HIGH FREQUENCY CAPACITANCE*

100 kHz:

RANGE	RESOLUTION	ACCURACY (1 Year, 18°-28°C) $\pm(\% \text{rdg} + \text{pF})$	TEMPERATURE COEFFICIENT (0°-18° & 28°-40°C) $\pm(\% \text{rdg})/^\circ\text{C}$	NOISE P-P
200 pF	10 fF	0.7 + 0.05	0.03	180 fF
2 nF	100 fF	0.9 + 0.5	0.08	1800 fF

1MHz:

RANGE	RESOLUTION	ACCURACY (1 Year, 18°-28°C) $\pm(\% \text{rdg} + \text{pF})$	TEMPERATURE COEFFICIENT (0°-18° & 28°-40°C) $\pm(\% \text{rdg})/^\circ\text{C}$	NOISE P-P
200 pF	10 fF	0.9 + 0.05	0.03	200 fF
2 nF	100 fF	1.4 + 0.5	0.14	400 fF

SHUNT CAPACITANCE LOADING EFFECT: 0.1% of reading additional error per 100pF load with equal shunt load on input and output.

TEST VOLTAGE: 15mV rms $\pm 10\%$.

TEST FREQUENCY TOLERANCE: $\pm 0.1\%$.

*NOTES

Specifications are based on parallel RC model and Quality Factor ≥ 20 .

Assumes proper cable correction and open circuit suppression.

Quasistatic capacitance accuracy is exclusive of noise, for STEP V $\geq 0.05\text{V}$ and DELAY TIME ≤ 1 second. For other parameters, derate by $(5\text{mV/STEP V}) \times (\text{DELAY TIME}/1 \text{ second})$ in pF at 23°C. Double the derating for every 10°C rise in ambient temperature above 23°C.

Typical allowable non-equilibrium current plus leakage current: $<20\text{pA}$ on 200pF range; $<200\text{pA}$ on 2nF range during capacitance measurements.

MINIMUM COMPUTER CONFIGURATION:

IBM AT, PS/2, or 100% compatible DOS 3.2 or greater
640k of memory Hard disk drive
CGA, EGA, VGA, or Hercules Graphics adapter.

IEEE-488 (GPIB) INTERFACE CARDS SUPPORTED:

Using IOtech Driver488 software V2.60 or earlier:
Capital Equipment PC-488, 4x488; IBM GPIB Adapter; IOtech GP488, GP488A, GP488B+, MP488, MP488CT; Keithley PC-488-CEC, 4-488-CEC-0M, 4-488-CEC-1M; Metrabyte KM488-DD, KM488-ROM; National Instruments PC-II, PC-IIA, PC-III.

Using IOtech Driver488 software V2.61:

IOtech GP488B+, MP488, MP488CT
IOtech Personal 488/2 is required for PS/2 operation.

MODEL 82-DOS COMPONENTS:

Model 230-1: Programmable Voltage Source
Model 595: Quasistatic CV Meter
Model 590: 100k/1M CV Analyzer
Model 5909: Calibration Sources
Model 5957: Model 82-DOS CV Software and Manual
Model 5951: Remote Input Coupler—Includes Models:
4801: Low Noise BNC Cable, 1.2m (4 ft.) (5 supplied)
7007-1: Shielded IEEE-488 Cable, 1m (3.3 ft.) (2 supplied)
7007-2: Shielded IEEE-488 Cable, 2m (6.6 ft.) (1 supplied)
7051-2: RG-58C BNC to BNC Cable, 0.6m (2 ft.) (3 supplied)

BRUNING 40-21 62198

LTR	REVISIONS	APP.	DATE	DRN. MH	DATE
A	REL. #			CKD.	10-10-88
B	114572 REVISED		5-14-91	APP.	

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SPECIFICATION

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