2N5108

CASE 79-02, STYLE 1
TO-39 (TO-205AD)

HIGH FREQUENCY TRANSISTOR

NPN SILICON

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	30	Vdc
Collector-Emitter Voltage (R_{BE} = 10Ω)	V_{CER}	55	Vdc
Collector-Base Voltage	V_{CBO}	55	Vdc
Emitter-Base Voltage	V_{EBO}	3.0	Vdc
Collector Current — Continuous	I_C	0.4	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	3.5 0.02	Watts mW/°C
Storage Temperature	T_{stg}	−65 to +200	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 5.0 mAdc, R_{BE} = 10 ohms)	$V_{(BR)CER}$	55	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 0.1 mAdc, I_E = 0)	$V_{(BR)CBO}$	55	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 0.1 mAdc, I_C = 0)	$V_{(BR)EBO}$	3.0	—	—	Vdc
Collector Cutoff Current (V_{CE} = 15 Vdc, I_B = 0)	I_{CEO}	—	—	20	μAdc
Collector Cutoff Current (V_{CE} = 50 Vdc, V_{BE} = 0) (V_{CE} = 15 Vdc, V_{BE} = 0, T_C = 150°C)	I_{CES}	— —	— —	1.0 10	μAdc mAdc
ON CHARACTERISTICS					
Collector-Emitter Saturation Voltage (I_C = 100 mAdc, I_B = 10 mAdc)	$V_{CE(sat)}$	—	—	0.5	Vdc
SMALL SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I_C = 50 mAdc, V_{CE} = 15 Vdc, f = 200 MHz)	f_T	1200	—	—	MHz
Output Capacitance (V_{CB} = 30 Vdc, I_E = 0, f = 1.0 MHz)	C_{obo}	—	1.3	3.0	pF
FUNCTIONAL TEST					
Common-Emitter Amplifier Power Gain (Figure 1) (P_{out} = 1.0 W, V_{CC} = 28 Vdc, I_C = 102 mAdc, f = 1.0 GHz)	G_{PE}	5.0	—	—	dB
Power Output (Figure 1) (P_{in} = 316 mW, V_{CE} = 28 Vdc, f = 1.0 Ghz)	P_{out}	1.0	—	—	Watt
Collector Efficiency (Figure 1) (P_{in} = 316 mW, V_{CE} = 28 Vdc, f = 1.0 GHz)	η	35	—	—	%
Power Output (Oscillator) (Figure 2) (V_{CE} = 20 Vdc, V_{EB} = 1.5 Vdc, f = 1.68 GHz) (Minimum Efficiency = 15%)	P_{out}	—	0.3	—	Watt

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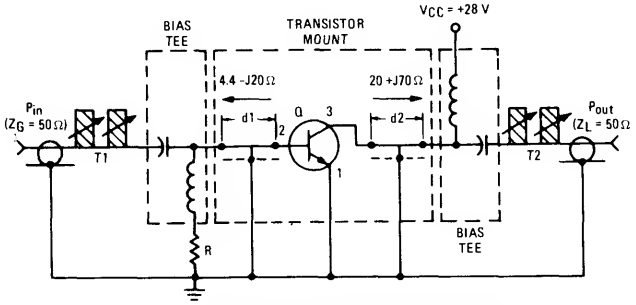
FIGURE 1 – 1 GHz RF AMPLIFIER OUTPUT POWER TEST CIRCUIT



d1: 1" Input line, center conductor width = 0.280"
d2: 1" Output line, center conductor width = 0.125"
Q: 2N5108
R: 3.9 ohms
T1, T2: Microlab Double Stub Tuner, or Equivalent
Bias Tee: Microlab 08N, or Equivalent
Transistor Mount: 1/32" Microstrip board

Note. Impedance measurements are made at transistor socket pins.

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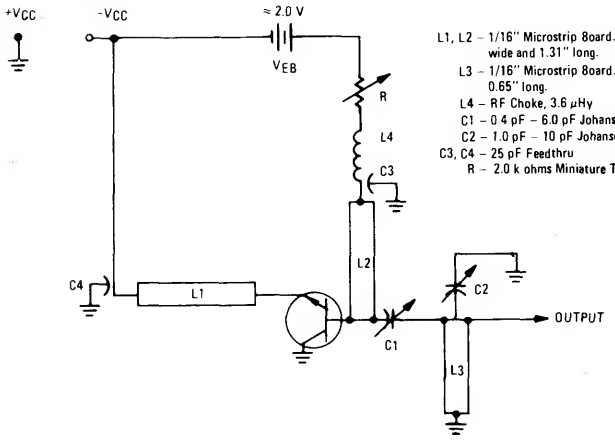
FIGURE 2 – 1.68 GHz RF OSCILLATOR OUTPUT POWER TEST CIRCUIT



L1, L2 – 1/16" Microstrip Board. Lines are 0.16" wide and 1.31" long.
L3 – 1/16" Microstrip Board. 0.16" wide and 0.65" long.
L4 – RF Choke, 3.6 μHy
C1 – 0.4 pF – 6.0 pF Johanson 4640
C2 – 1.0 pF – 10 pF Johanson 4355
C3, C4 – 25 pF Feedthru
R – 2.0 k ohms Miniature Trim pot

FIGURE 3 – OUTPUT POWER versus INPUT POWER

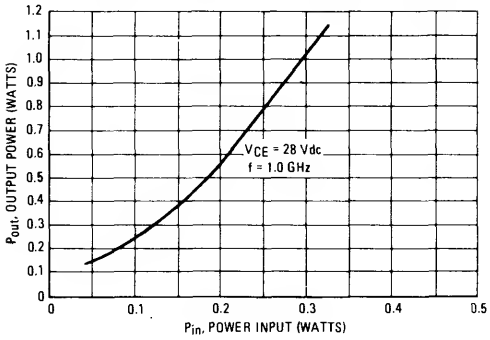


FIGURE 4 – OUTPUT POWER versus FREQUENCY

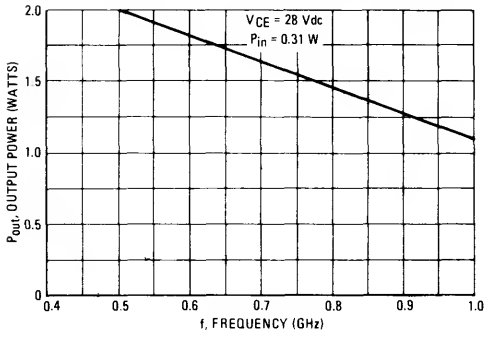


FIGURE 5 – OUTPUT POWER versus COLLECTOR-EMITTER VOLTAGE

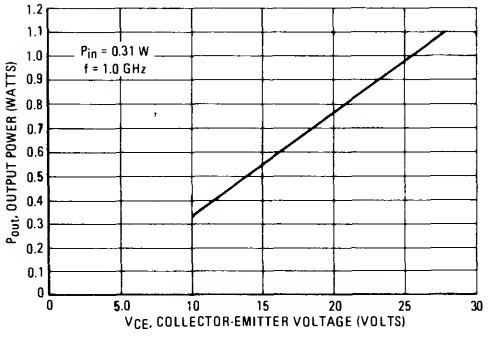


FIGURE 6 – OSCILLATOR OUTPUT POWER versus COLLECTOR CURRENT

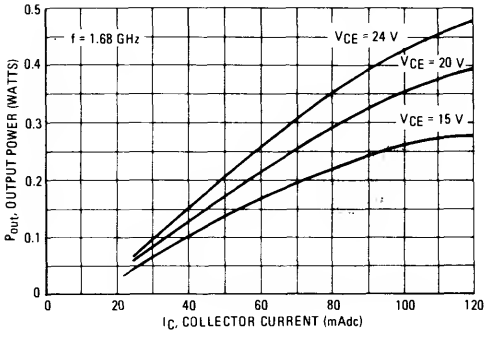


FIGURE 7 CURRENT-GAIN–BANDWIDTH PRODUCT versus CURRENT

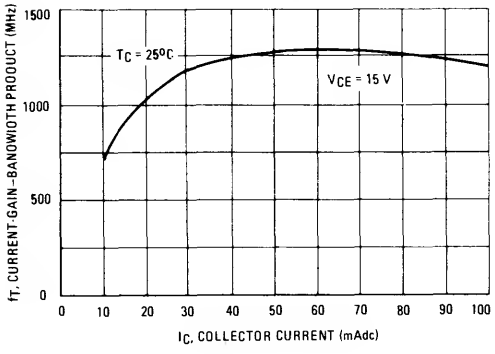
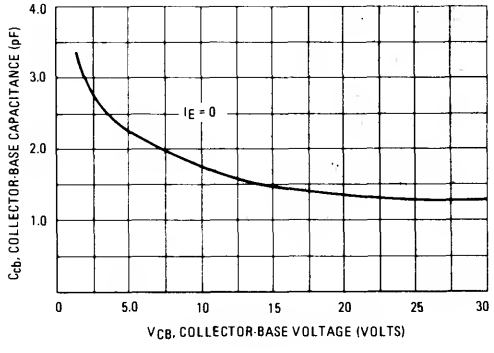


FIGURE 8 COLLECTOR BASE CAPACITANCE versus VOLTAGE



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