2N5031
2N5032

CASE 20-03, STYLE 10
TO-72 (TO-206AF)

HIGH FREQUENCY TRANSISTOR

NPN SILICON

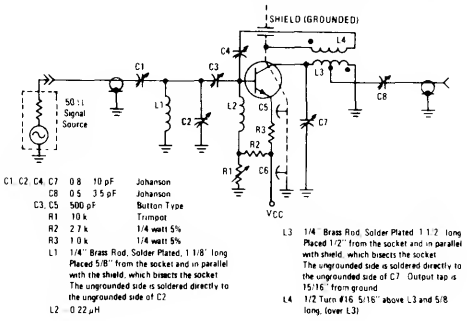
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	10	Vdc
Collector-Base Voltage	V_{CBO}	15	Vdc
Emitter-Base Voltage	V_{EBO}	3.0	Vdc
Collector Current — Continuous	I_C	20	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	200 1.14	mW mW/°C
Operating and Storage Junction Temperature Range	T_J, 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 = 1.0 mAdc, I_B = 0)		$V_{(BR)CEO}$	10	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 0.01 mAdc, I_E = 0)		$V_{(BR)CBO}$	15	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 0.01 mAdc, I_C = 0)		$V_{(BR)EBO}$	3.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = 6.0 Vdc, I_E = 0)		I_{CBO}	—	1.0	10	nAdc
ON CHARACTERISTICS						
DC Current Gain (I_C = 1.0 mAdc, V_{CE} = 6.0 Vdc)		h_{FE}	25	—	300	—
SMALL SIGNAL CHARACTERISTICS						
Current-Gain — Bandwidth Product (I_C = 5.0 mAdc, V_{CE} = 6.0 Vdc, f = 100 MHz)		f_T	1000	—	3500	MHz
Collector-Base Capacitance (V_{CE} = 6.0 Vdc, I_E = 0, f = 0.1 MHz)		C_{cb}	—	1.3	1.5	pF
Collector Base Time Constant (I_C = 6.0 mAdc, V_{CE} = 6.0 Vdc, f = 31.8 MHz)		$rb'C_c$	—	5.0	—	ps
Noise Figure (Figure 1) (I_C = 1.0 mAdc, V_{CE} = 6.0 Vdc, f = 450 MHz)	2N5031 2N5032	NF	— —	— —	2.5 3.0	dB
FUNCTIONAL TEST						
Common-Emitter Amplifier Power Gain (Figure 1) (V_{CE} = 6.0 Vdc, I_C = 1.0 mAdc, f = 450 MHz)		G_{pe}	14	17	25	dB

FIGURE 1 – POWER GAIN AND NOISE FIGURE TEST CIRCUIT



C1, C2, C4, C7 0.8 – 10 pF Johanson
C8 0.5 – 3.5 pF Johanson
C3, C5 500 pF Button Type
R1 10 k Trimpot
R2 2.7 k 1/4 watt 5%
R3 1.0 k 1/4 watt 5%
L1 1/4" Brass Rod, Solder Plated, 1 1/8" long Placed 5/8" from the socket and in parallel with the shield, which bisects the socket The ungrounded side is soldered directly to the ungrounded side of C2
L2 0.22 μH
L3 1/4" Brass Rod, Solder Plated 1 1/2" long Placed 1/2" from the socket and in parallel with shield, which bisects the socket The ungrounded side is soldered directly to the ungrounded side of C7 Output tap is 15/16" from ground
L4 1/2 Turn #16, 5/16" above L3 and 5/8 long, (over L3)

FIGURE 2 – COLLECTOR-BASE CAPACITANCE versus VOLTAGE

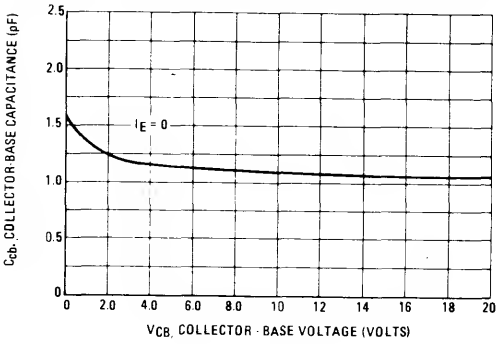


FIGURE 3 – CURRENT-GAIN–BANDWIDTH PRODUCT

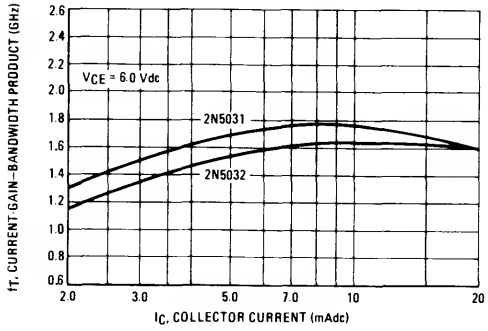


FIGURE 4 – S_{11} AND S_{22}

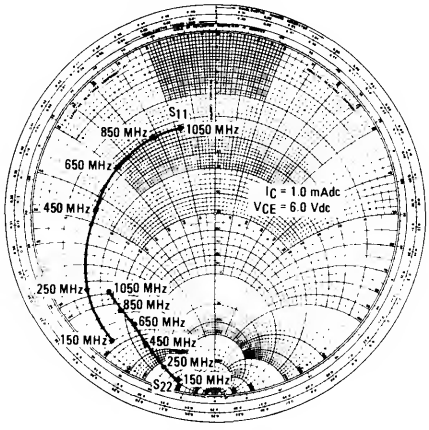


FIGURE 5 – S_{12}

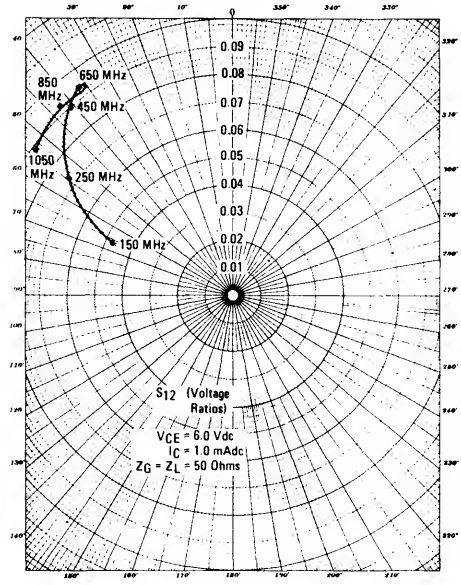


FIGURE 6 – S_{21}

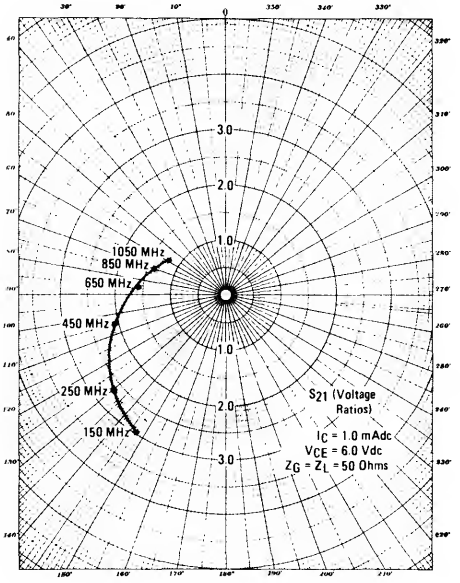


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FIGURE 7 – NOISE FIGURE versus FREQUENCY

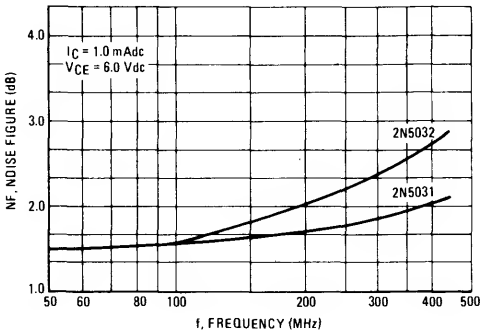


FIGURE 8 – POWER GAIN versus FREQUENCY

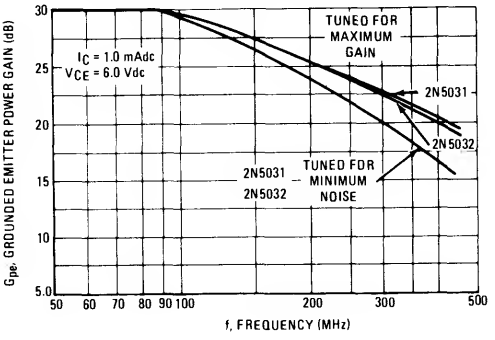


FIGURE 9 – INPUT ADMITTANCE versus FREQUENCY

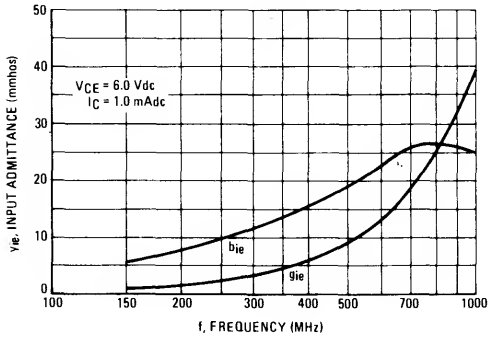


FIGURE 10 – OUTPUT ADMITTANCE versus FREQUENCY

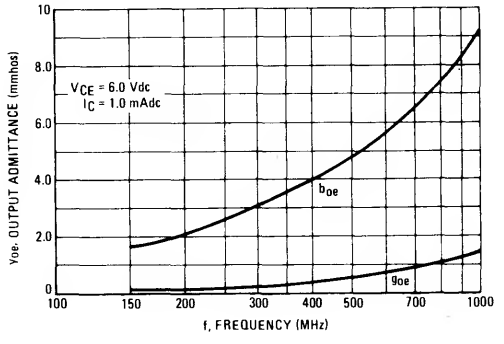


FIGURE 11 – FORWARD TRANSFER ADMITTANCE versus FREQUENCY

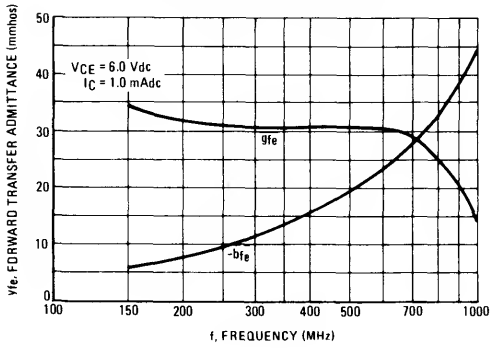
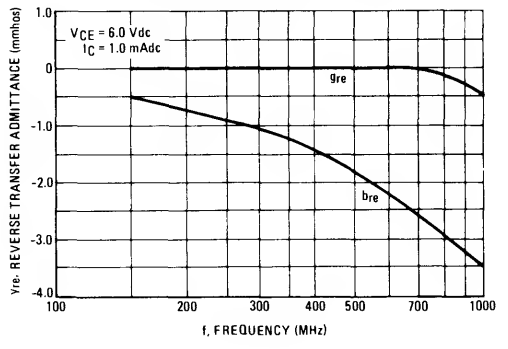


FIGURE 12 – REVERSE TRANSFER ADMITTANCE versus FREQUENCY



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