

MAXIMUM RATINGS

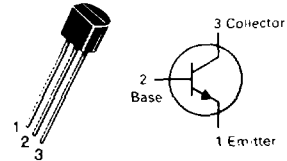
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	45	Vdc
Collector-Base Voltage	V _{CBO}	45	Vdc
Emitter-Base Voltage	V _{EBO}	6.5	Vdc
Collector Current — Continuous	I _C	200	mAdc
Total Device Dissipation @ T _A = 25°C Derate above 25°C	P _D	625 5.0	mW mW/°C
Total Device Dissipation @ T _C = 25°C Derate above 25°C	P _D	1.5 12	Watts mW/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	R _{θJA} (1)	200	°C/W
Thermal Resistance, Junction to Case	R _{θJC}	83.3	°C/W

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**CASE 29-04, STYLE 1
TO-92 (TO-226AA)**



LOW NOISE TRANSISTOR

NPN SILICON

★This is a Motorola designated preferred device.

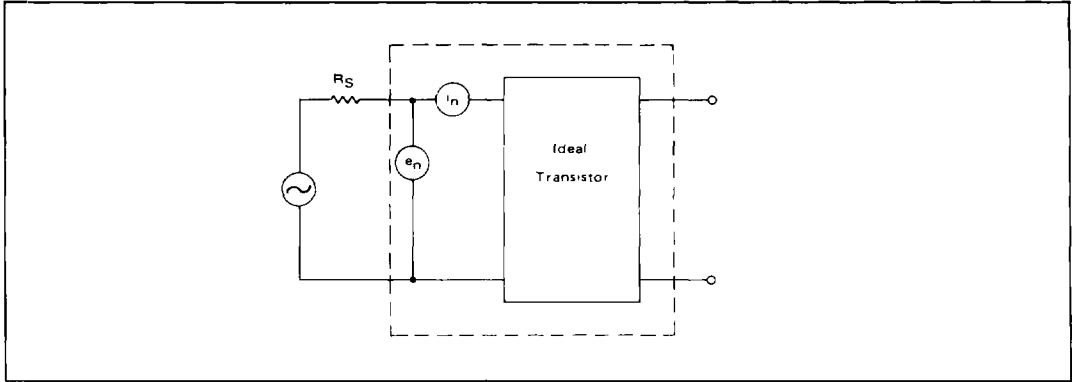
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage(2) (I _C = 10 mAdc, I _B = 0)	V _{(BR)CEO}	45	—	—	Vdc
Collector-Base Breakdown Voltage (I _C = 100 μAdc, I _E = 0)	V _{(BR)CBO}	45	—	—	Vdc
Emitter-Base Breakdown Voltage (I _E = 10 μAdc, I _C = 0)	V _{(BR)EBO}	6.5	—	—	Vdc
Collector Cutoff Current (V _{CB} = 30 Vdc, I _E = 0)	I _{CBO}	—	1.0	50	nAdc
ON CHARACTERISTICS(2)					
DC Current Gain (I _C = 10 μAdc, V _{CE} = 5.0 Vdc) (I _C = 100 μAdc, V _{CE} = 5.0 Vdc) (I _C = 1.0 mAdc, V _{CE} = 5.0 Vdc) (I _C = 10 mAdc, V _{CE} = 5.0 Vdc)	h _{FE}	400 500 500 500	580 850 1100 1150	— — — 1500	—
Collector-Emitter Saturation Voltage (I _C = 10 mAdc, I _B = 0.5 mAdc) (I _C = 50 mAdc, I _B = 5.0 mAdc)	V _{CE(sat)}	— —	— 0.08	0.2 0.3	Vdc
Base-Emitter On Voltage (I _C = 1.0 mAdc, V _{CE} = 5.0 Vdc)	V _{BE(on)}	—	0.6	0.7	Vdc
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I _C = 1.0 mAdc, V _{CE} = 5.0 Vdc, f = 100 MHz)	f _T	100	160	—	MHz
Collector-Base Capacitance (V _{CB} = 5.0 Vdc, I _E = 0, f = 1.0 MHz)	C _{cb}	—	1.7	3.0	pF
Emitter-Base Capacitance (V _{EB} = 0.5 Vdc, I _C = 0, f = 1.0 MHz)	C _{eb}	—	5.6	6.5	pF
Noise Figure (I _C = 100 μAdc, V _{CE} = 5.0 Vdc, R _S = 10 kΩ, f = 1.0 kHz) (I _C = 100 μAdc, V _{CE} = 5.0 Vdc, R _S = 1.0 kΩ, f = 100 Hz)	NF	— —	0.5 4.0	1.5 —	dB
Equivalent Short Circuit Noise Voltage (I _C = 100 μAdc, V _{CE} = 5.0 Vdc, R _S = 1.0 kΩ, f = 100 Hz)	V _T	—	6.5	—	nV/√Hz

(1) R_{θJA} is measured with the device soldered into a typical printed circuit board.
 (2) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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FIGURE 1 – TRANSISTOR NOISE MODEL



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NOISE CHARACTERISTICS ($V_{CE} = 5.0 \text{ Vdc}$, $T_A = 25^\circ\text{C}$)

NOISE VOLTAGE

FIGURE 2 – EFFECTS OF FREQUENCY

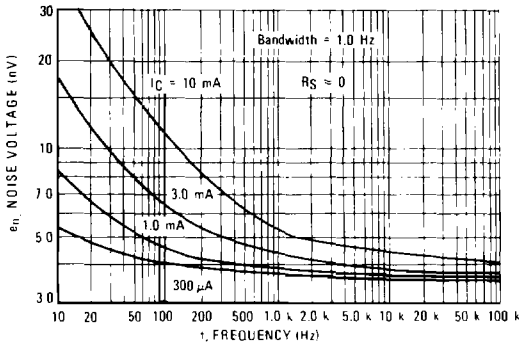


FIGURE 3 – EFFECTS OF COLLECTOR CURRENT

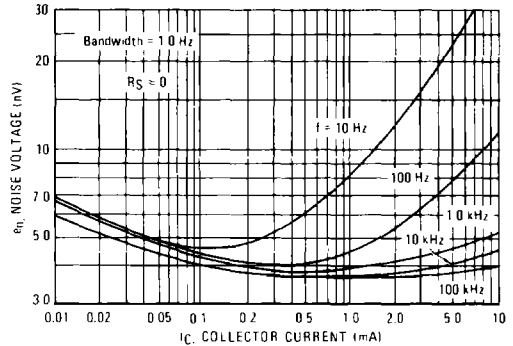


FIGURE 4 – NOISE CURRENT

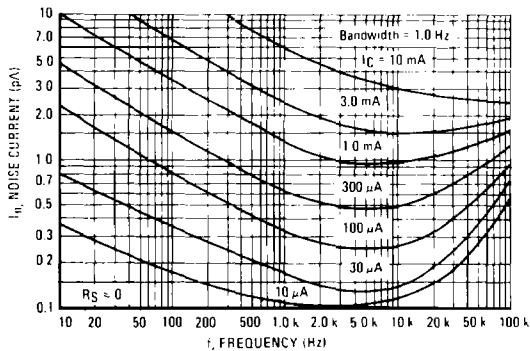
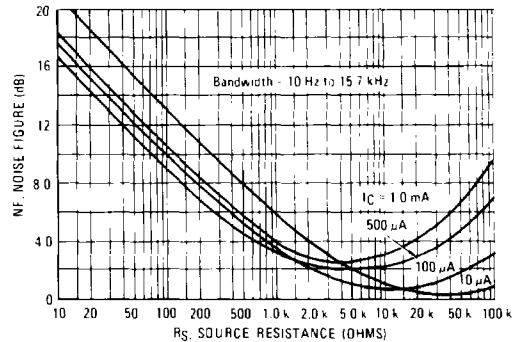


FIGURE 5 – WIDEBAND NOISE FIGURE



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100 Hz NOISE DATA

FIGURE 6 - TOTAL NOISE VOLTAGE

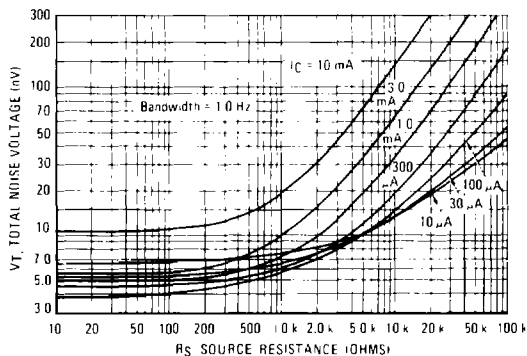


FIGURE 7 - NOISE FIGURE

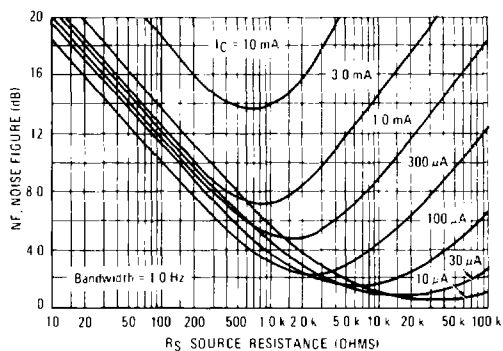


FIGURE 8 - DC CURRENT GAIN

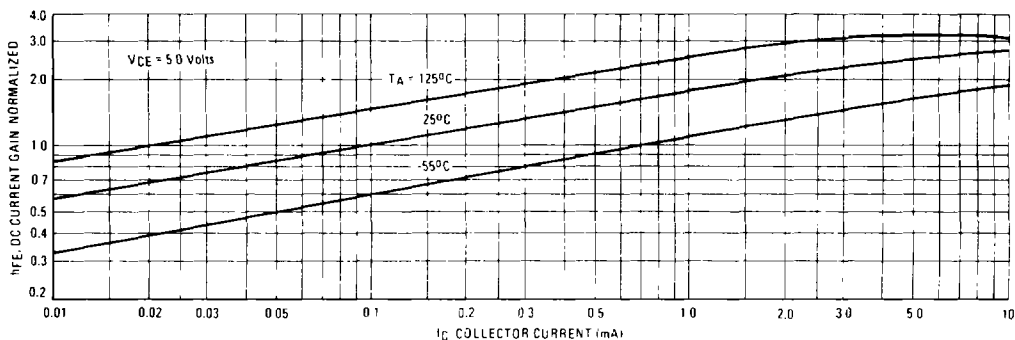


FIGURE 9 - "ON" VOLTAGES

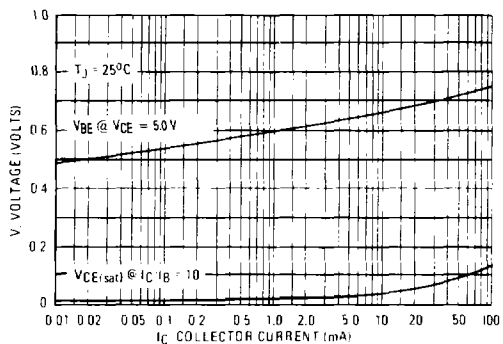
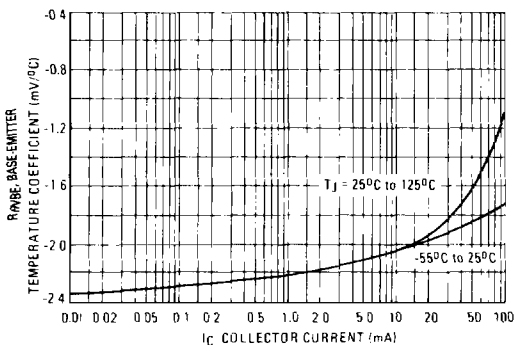


FIGURE 10 - TEMPERATURE COEFFICIENTS



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FIGURE 11 - CAPACITANCE

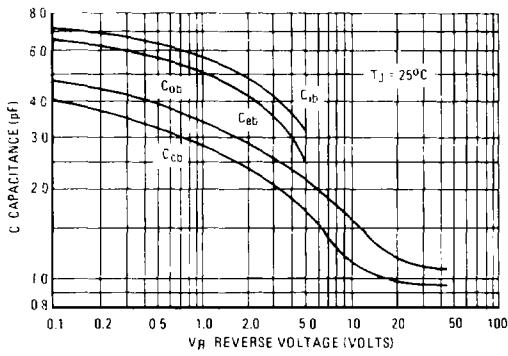


FIGURE 12 - CURRENT-GAIN-BANDWIDTH PRODUCT

