

358-848

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	40	Vdc
Collector-Base Voltage	V _{CBO}	40	Vdc
Emitter-Base Voltage	V _{EBO}	5.0	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 Power Dissipation @ T _A = 60°C	P _D	250	mW
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 Case	R _{θJC}	83.3	°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	200	°C/W

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage(1) (I _C = 1.0 mAdc, I _B = 0)	V _{(BR)CEO}	40	—	Vdc
Collector-Base Breakdown Voltage (I _C = 10 μAdc, I _E = 0)	V _{(BR)CBO}	40	—	Vdc
Emitter-Base Breakdown Voltage (I _E = 10 μAdc, I _C = 0)	V _{(BR)EBO}	5.0	—	Vdc
Base Cutoff Current (V _{CE} = 30 Vdc, V _{BE} = 3.0 Vdc)	I _{BL}	—	50	nAdc
Collector Cutoff Current (V _{CE} = 30 Vdc, V _{BE} = 3.0 Vdc)	I _{CEX}	—	50	nAdc
ON CHARACTERISTICS(1)				
DC Current Gain (I _C = 0.1 mAdc, V _{CE} = 1.0 Vdc)	h _{FE}	30	—	—
(I _C = 1.0 mAdc, V _{CE} = 1.0 Vdc)	40	80	—	—
(I _C = 10 mAdc, V _{CE} = 1.0 Vdc)	50	100	150	300
(I _C = 50 mAdc, V _{CE} = 1.0 Vdc)	30	60	—	—
(I _C = 100 mAdc, V _{CE} = 1.0 Vdc)	15	30	—	—
Collector-Emitter Saturation Voltage (I _C = 10 mAdc, I _B = 1.0 mAdc)	V _{CE(sat)}	—	0.25	Vdc
(I _C = 50 mAdc, I _B = 5.0 mAdc)				
Base-Emitter Saturation Voltage (I _C = 10 mAdc, I _B = 1.0 mAdc)	V _{BE(sat)}	0.65	0.85	Vdc
(I _C = 50 mAdc, I _B = 5.0 mAdc)				
SMALL-SIGNAL CHARACTERISTICS				
Current Gain — Bandwidth Product (I _C = 10 mAdc, V _{CE} = 20 Vdc, f = 100 MHz)	f _T	200	—	MHz
Output Capacitance (V _{CE} = 5.0 Vdc, I _E = 0, f = 100 kHz)	C _{obo}	—	4.5	pF

2N3905 2N3906

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

**GENERAL PURPOSE
TRANSISTOR**

PNP SILICON

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ELECTRICAL CHARACTERISTICS (continued) ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
Input Capacitance ($V_{BE} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 100\text{ kHz}$)	C_{ibo}	—	10.0	pF
Input Impedance ($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{ie}	2N3905: 0.5 2N3906: 2.0	8.0 12	k ohms
Voltage Feedback Ratio ($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{re}	2N3905: 0.1 2N3906: 0.1	5.0 10	$\times 10^{-4}$
Small-Signal Current Gain ($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{fe}	2N3905: 50 2N3906: 100	200 400	—
Output Admittance ($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{oe}	2N3905: 1.0 2N3906: 3.0	40 60	μmhos
Noise Figure ($I_C = 100\ \mu\text{A}$, $V_{CE} = 5.0\text{ Vdc}$, $R_S = 1.0\text{ k ohm}$, $f = 10\text{ Hz to }15.7\text{ kHz}$)	NF	—	5.0 4.0	dB

SWITCHING CHARACTERISTICS

Characteristic	Conditions	Symbol	Min	Max	Unit
Delay Time	$V_{CC} = 3.0\text{ Vdc}$, $V_{BE} = 0.5\text{ Vdc}$ $I_C = 10\text{ mAdc}$, $I_{B1} = 1.0\text{ mAdc}$	t_d	—	35	ns
Rise Time		t_r	—	35	ns
Storage Time	$V_{CC} = 3.0\text{ Vdc}$, $I_C = 10\text{ mAdc}$, $I_{B1} = I_{B2} = 1.0\text{ mAdc}$	t_s	—	200 225	ns
Fall Time		t_f	—	60 75	ns

(1) Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

FIGURE 1 – DELAY AND RISE TIME EQUIVALENT TEST CIRCUIT

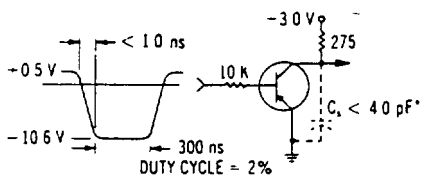
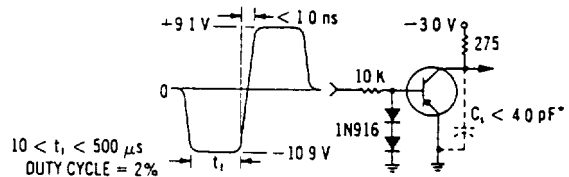


FIGURE 2 – STORAGE AND FALL TIME EQUIVALENT TEST CIRCUIT



*Total shunt capacitance of test jig and connectors

TRANSIENT CHARACTERISTICS
— $T_J = 25^\circ\text{C}$ --- $T_J = 125^\circ\text{C}$

FIGURE 3 – CAPACITANCE

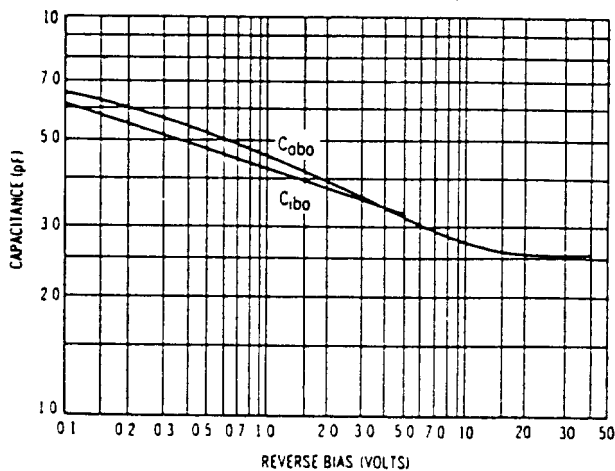


FIGURE 4 – CHARGE DATA

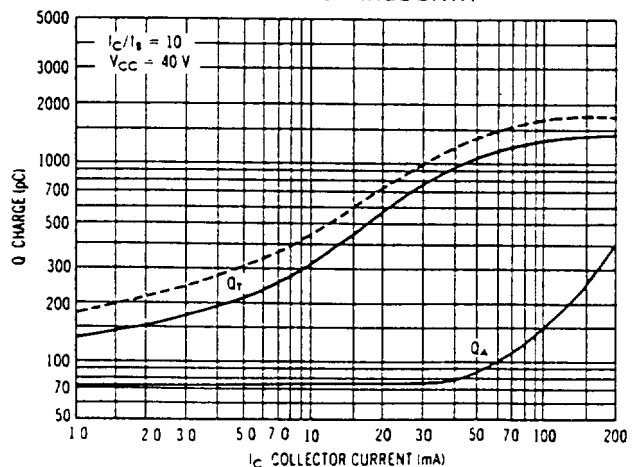


FIGURE 5 — TURN ON TIME

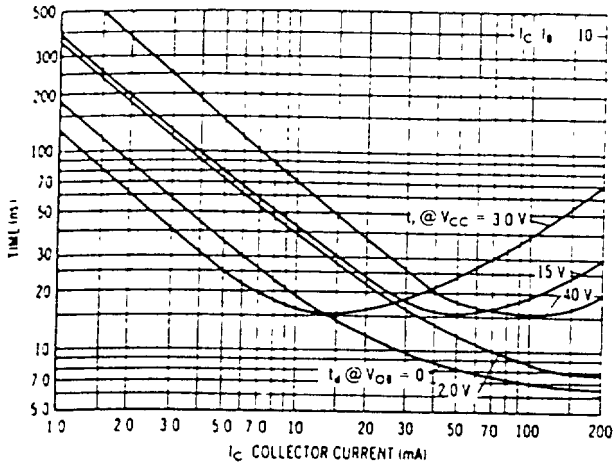
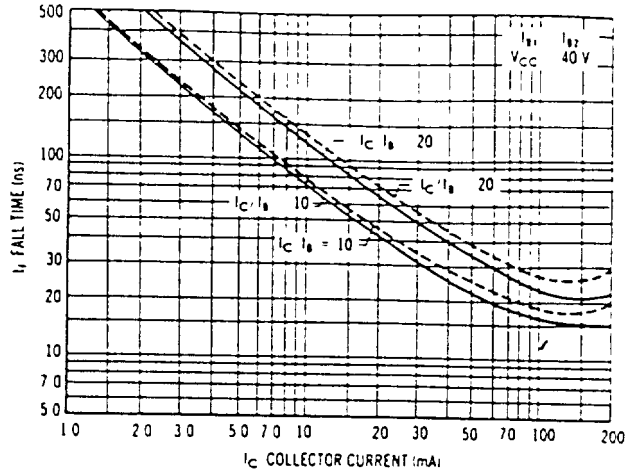


FIGURE 6 — FALL TIME



AUDIO SMALL SIGNAL CHARACTERISTICS
NOISE FIGURE VARIATIONS

$V_{CE} = 5.0 V_{dc}$, $T_A = 25^\circ C$,
Bandwidth = 1.0 Hz

FIGURE 7 —

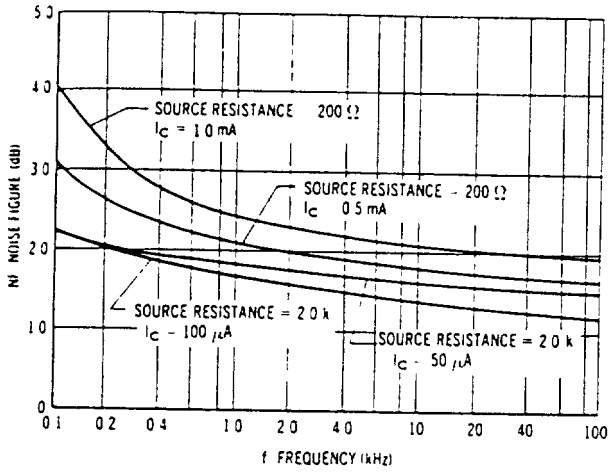
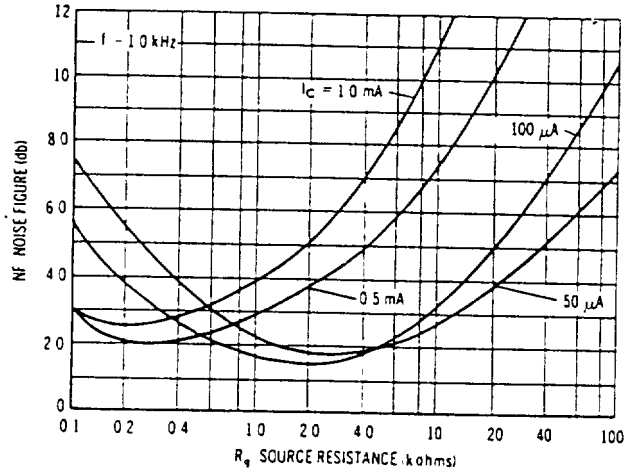


FIGURE 8 —



h PARAMETERS

($V_{CE} = 10 V_{dc}$, $f = 1.0 kHz$, $T_A = 25^\circ C$)

FIGURE 9 — CURRENT GAIN

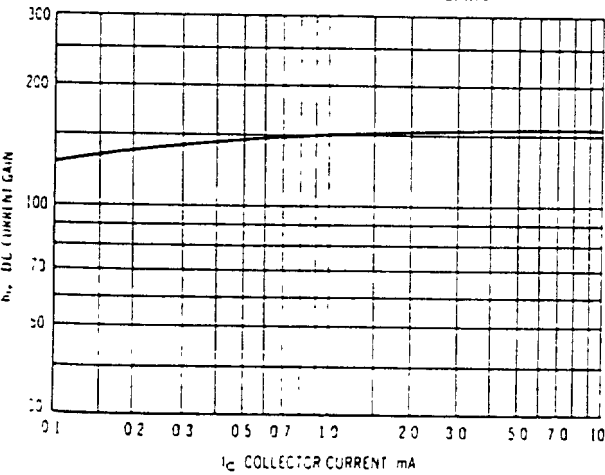
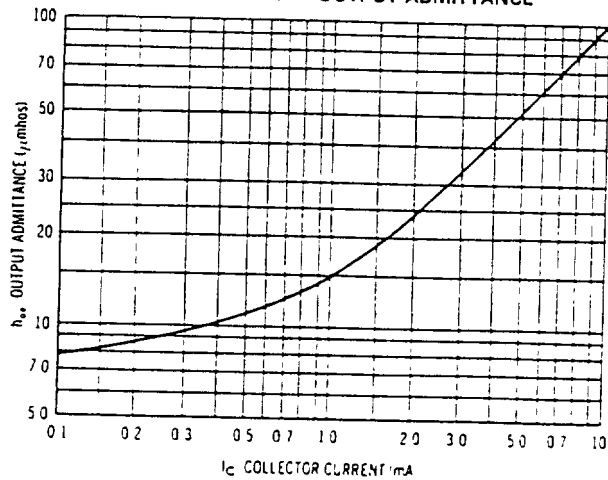


FIGURE 10 — OUTPUT ADMITTANCE



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FIGURE 11 — INPUT IMPEDANCE

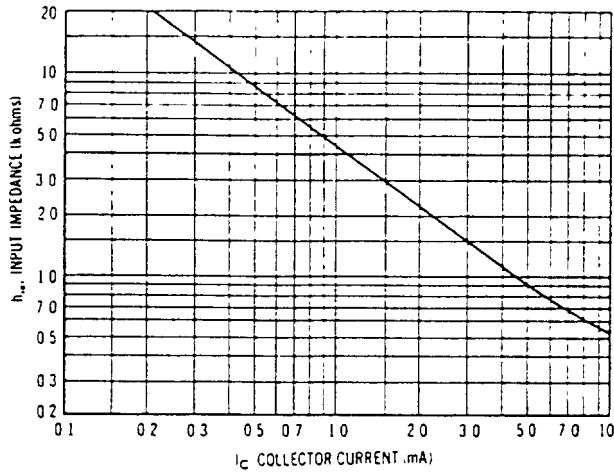
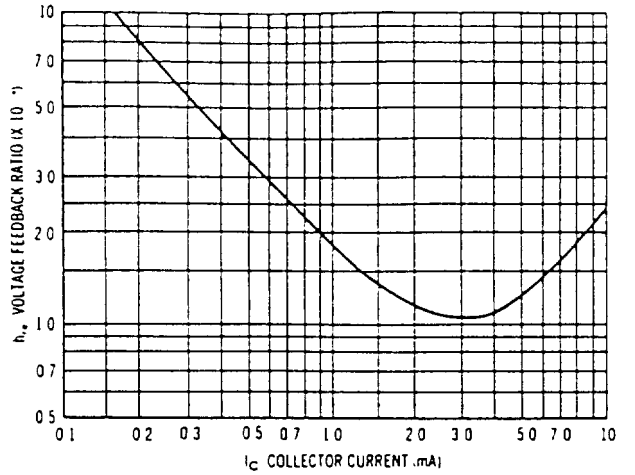


FIGURE 12 — VOLTAGE FEEDBACK RATIO



STATIC CHARACTERISTICS

FIGURE 13 — DC CURRENT GAIN

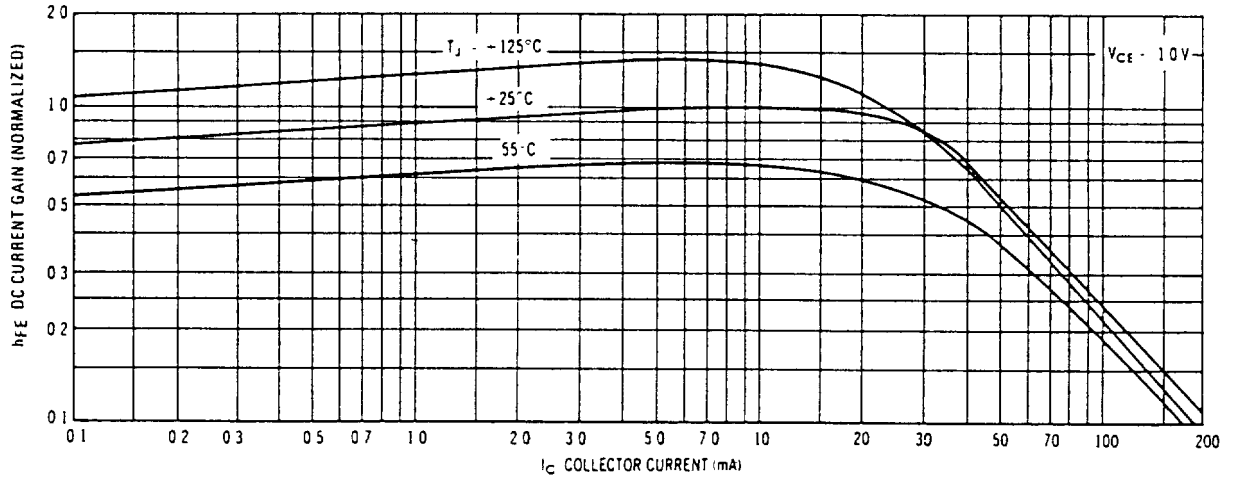


FIGURE 14 — COLLECTOR SATURATION REGION

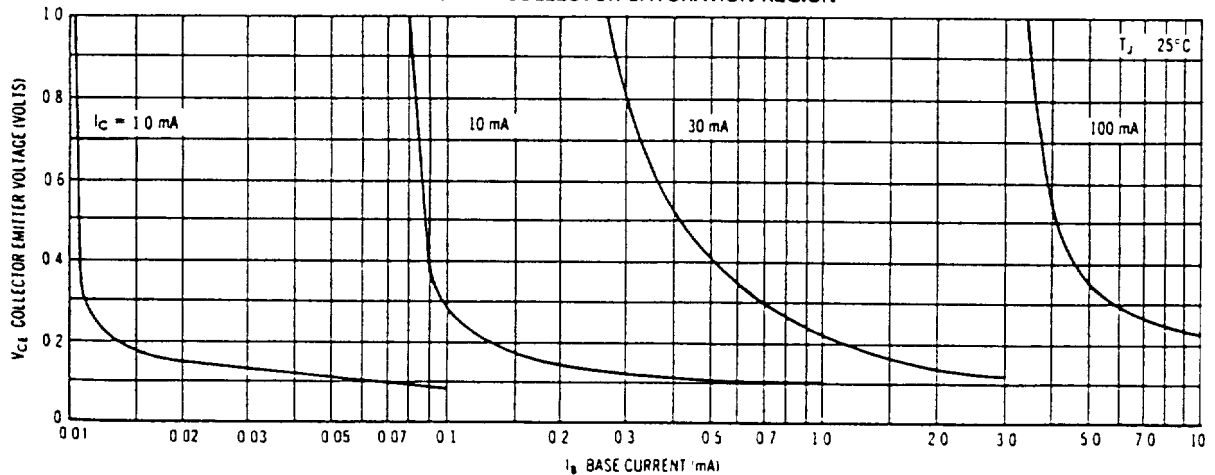


FIGURE 15 — "ON" VOLTAGES

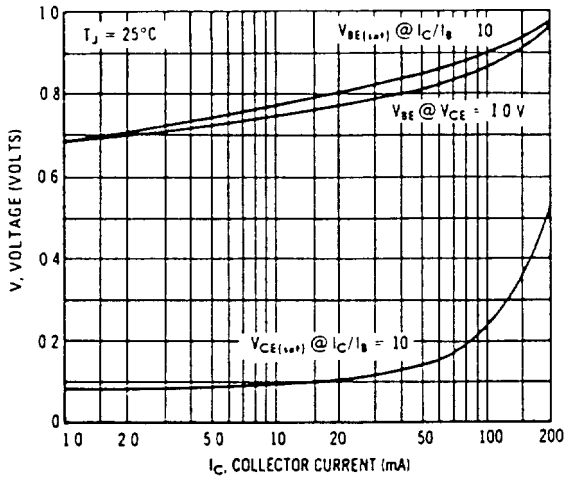
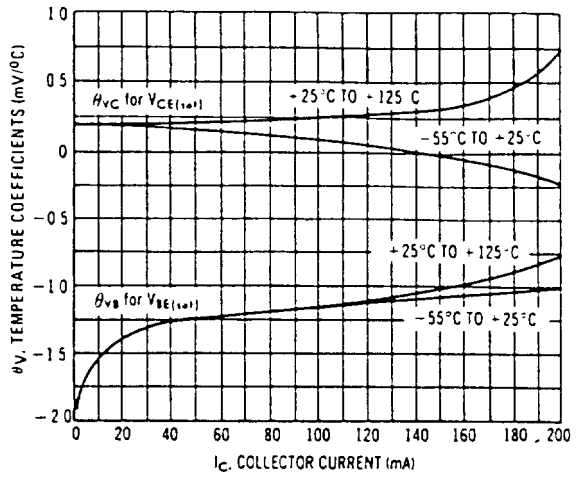


FIGURE 16 — TEMPERATURE COEFFICIENTS



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