



2N3632

For Specifications, See 2N3375 Data.

2N3634 thru 2N3637 (SILICON)



CASE 31
(TO-5)

PNP silicon annular transistors for high-voltage switching and low-power amplifier applications.

Collector connected to case

MAXIMUM RATINGS

Rating	Symbol	2N3634 2N3635	2N3636 2N3637	Unit
Collector-Emitter Voltage	V_{CEO}	140	175	Vdc
Collector-Base Voltage	V_{CB}	140	175	Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current	I_C	1.0		Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0	5.71	Watt mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	5.0	28.6	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		$^\circ\text{C}$

FIGURE 1 — JUNCTION CAPACITANCE VARIATIONS

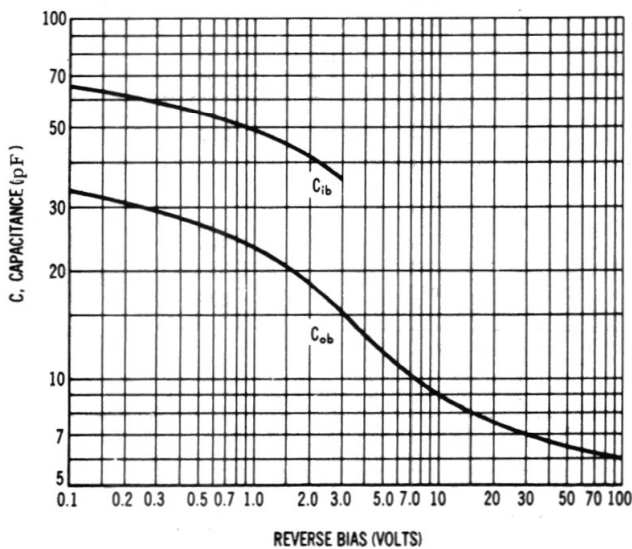
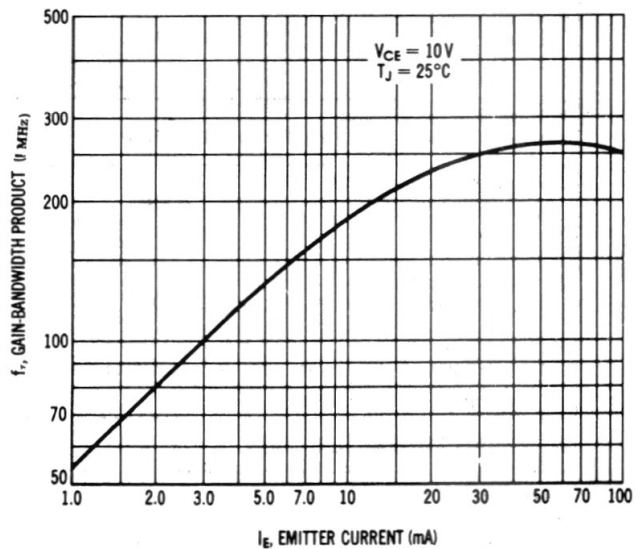


FIGURE 2 — GAIN-BANDWIDTH PRODUCT



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

Characteristic	Fig. No.	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage* (I _C = 10 mA _{dc} , I _B = 0)	2N3634, 2N3635 2N3636, 2N3637	-	BV _{CEO} *	140 175	- -	V _{dc}
Collector-Base Breakdown Voltage (I _C = 100 μA _{dc} , I _E = 0)	2N3634, 2N3635 2N3636, 2N3637	-	BV _{CBO}	140 175	- -	V _{dc}
Emitter-Base Breakdown Voltage (I _E = 10 μA _{dc} , I _C = 0)		-	BV _{EBO}	5.0	-	V _{dc}
Collector Cutoff Current (V _{CB} = 100 V _{dc} , I _E = 0)		-	I _{CBO}	-	100	nA _{dc}
Emitter Cutoff Current (V _{BE} = 3.0 V _{dc} , I _C = 0)		-	I _{EBO}	-	50	nA _{dc}

ON CHARACTERISTICS

DC Current Gain* (I _C = 0.1 mA _{dc} , V _{CE} = 10 V _{dc})	2N3634, 2N3636 2N3635, 2N3637	3, 4, 5, 6	h _{FE} *	40 80	- -	-
(I _C = 1.0 mA _{dc} , V _{CE} = 10 V _{dc})	2N3634, 2N3636 2N3635, 2N3637			45 90	- -	
(I _C = 10 mA _{dc} , V _{CE} = 10 V _{dc})	2N3634, 2N3636 2N3635, 2N3637			50 100	- -	
(I _C = 50 mA _{dc} , V _{CE} = 10 V _{dc})	2N3634, 2N3636 2N3635, 2N3637			50 100	150 300	
(I _C = 150 mA _{dc} , V _{CE} = 10 V _{dc})	2N3634, 2N3636 2N3635, 2N3637			25 50	- -	
Collector-Emitter Saturation Voltage* (I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc}) (I _C = 50 mA _{dc} , I _B = 5.0 mA _{dc})		11, 12	V _{CE(sat)} *	- -	0.3 0.5	V _{dc}
Base-Emitter Saturation Voltage* (I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc}) (I _C = 50 mA _{dc} , I _B = 5.0 mA _{dc})		11, 12	V _{BE(sat)} *	- 0.65	0.8 0.9	V _{dc}

SMALL-SIGNAL CHARACTERISTICS

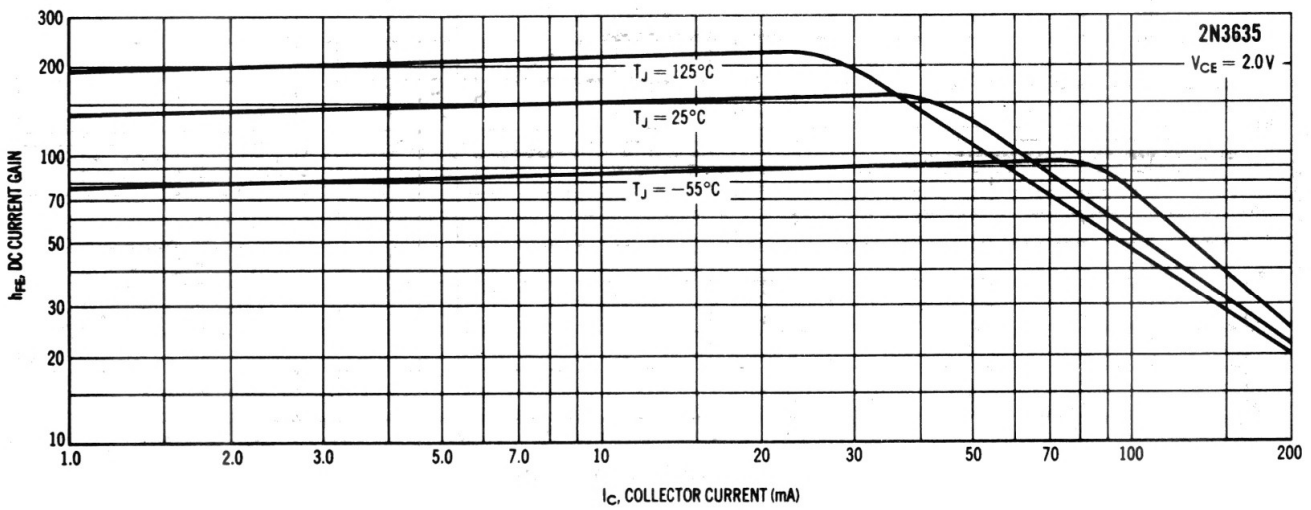
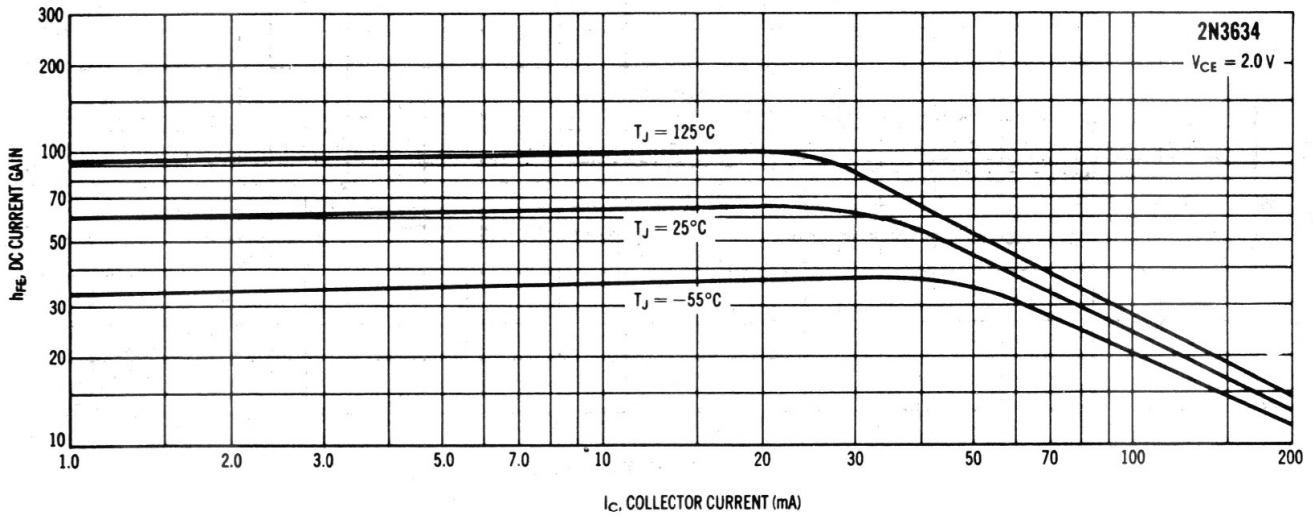
Current-Gain-Bandwidth Product (V _{CE} = 30 V _{dc} , I _C = 30 mA _{dc} , f = 100 MHz)	2N3634, 2N3636 2N3635, 2N3637	2	f _T	150 200	- -	MHz
Output Capacitance (V _{CB} = 20 V _{dc} , I _E = 0, f = 100 kHz)		1	C _{ob}	-	10	pF
Input Capacitance (V _{BE} = 1.0 V _{dc} , I _C = 0, f = 100 kHz)		1	C _{ib}	-	75	pF
Input Impedance (I _C = 10 mA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)	2N3634, 2N3636 2N3635, 2N3637	7	h _{ie}	100 200	600 1200	ohms
Voltage Feedback Ratio (I _C = 10 mA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)		10	h _{re}	-	3.0	X 10 ⁻⁴
Small-Signal Current Gain (I _C = 10 mA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)	2N3634, 2N3636 2N3635, 2N3637	9	h _{fe}	40 80	160 320	-
Output Admittance (I _C = 10 mA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)		8	h _{oe}	-	200	μmhos
Noise Figure (I _C = 0.5 mA _{dc} , V _{CE} = 10 V _{dc} , R _S = 1.0 k ohms, f = 1.0 kHz)		-	NF	-	3.0	dB

SWITCHING CHARACTERISTICS

Turn-On Time	(V _{CC} = 100 V _{dc} , V _{BE} = 4.0 V _{dc} , I _C = 50 mA _{dc} , I _{B1} = I _{B2} = 5.0 mA _{dc})	13, 14	t _{on}	-	400	ns
Turn-Off Time		13, 15	t _{off}	-	600	ns

* Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

FIGURE 3 — CURRENT GAIN CHARACTERISTICS versus JUNCTION TEMPERATURE



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FIGURE 4 — CURRENT GAIN CHARACTERISTICS versus COLLECTOR EMITTER VOLTAGE

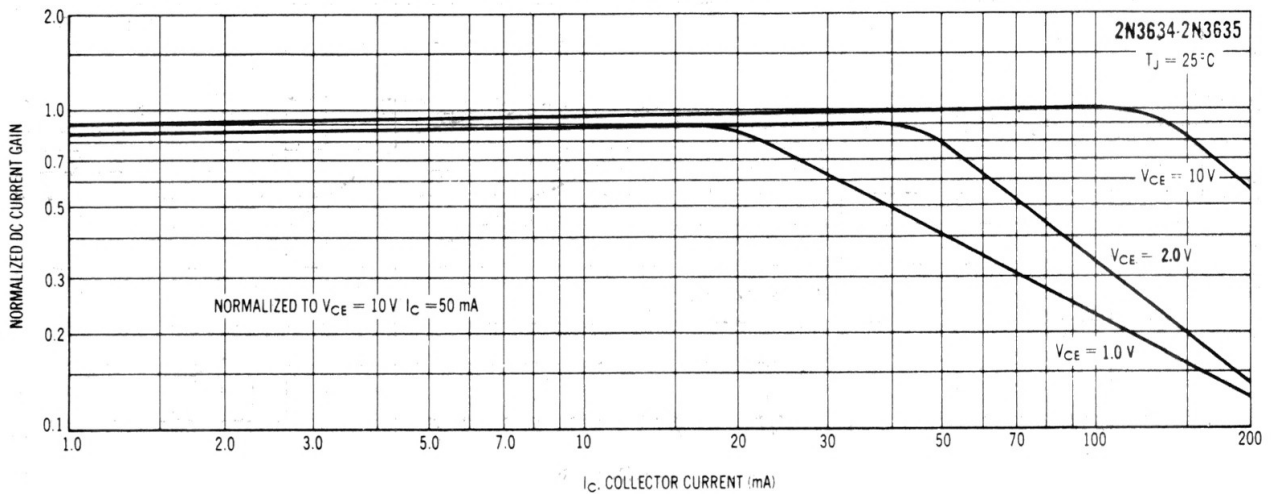


FIGURE 5 — CURRENT GAIN CHARACTERISTICS versus JUNCTION TEMPERATURE

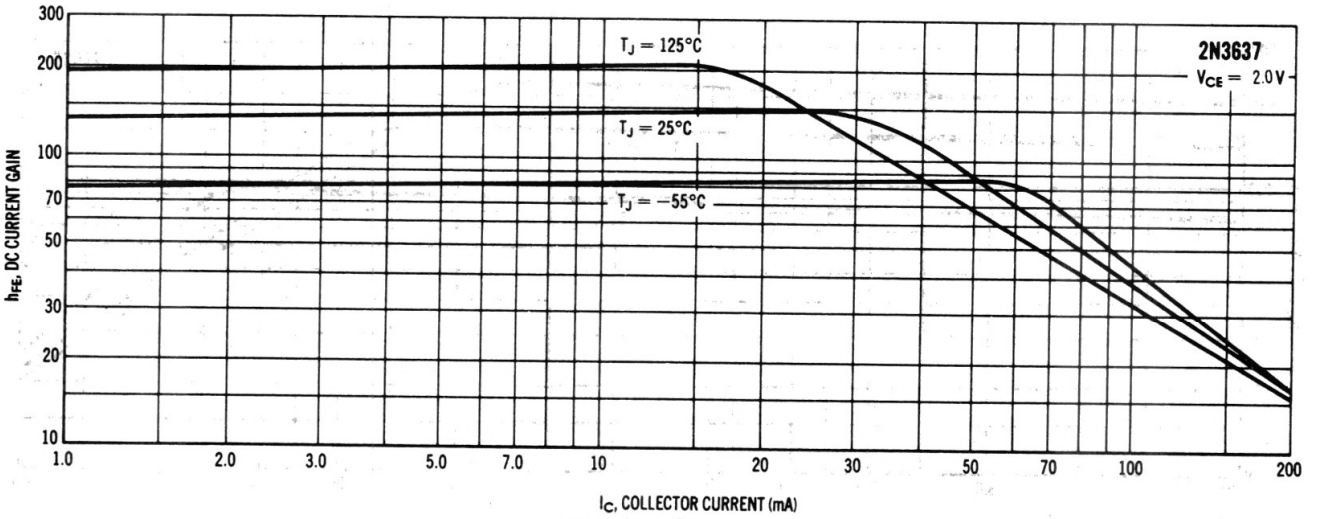
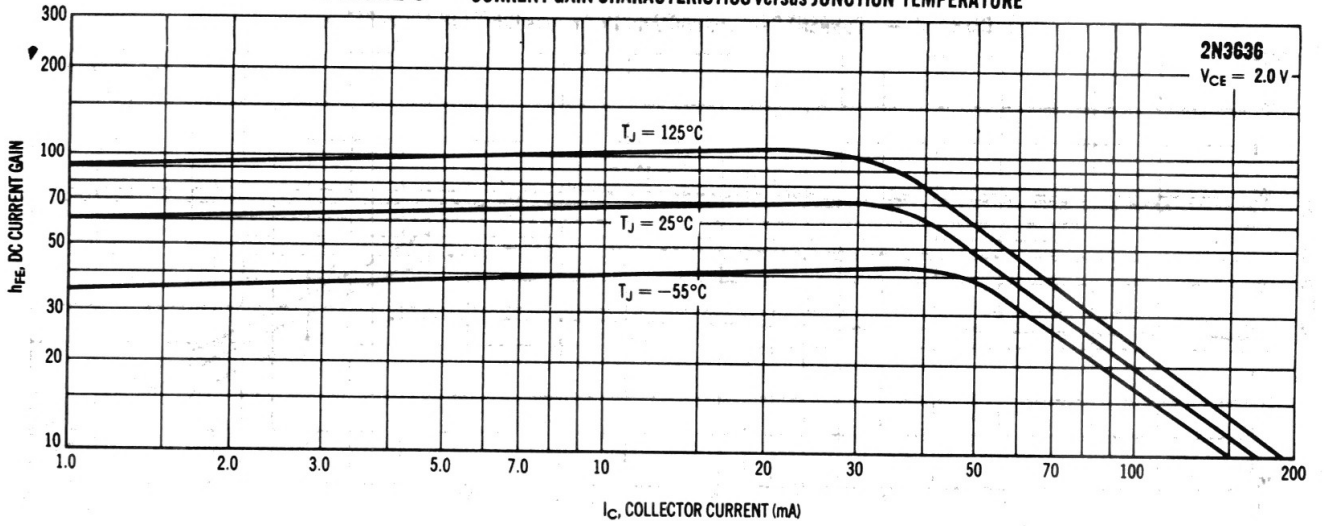


FIGURE 6 — CURRENT GAIN CHARACTERISTICS versus COLLECTOR EMITTER VOLTAGE

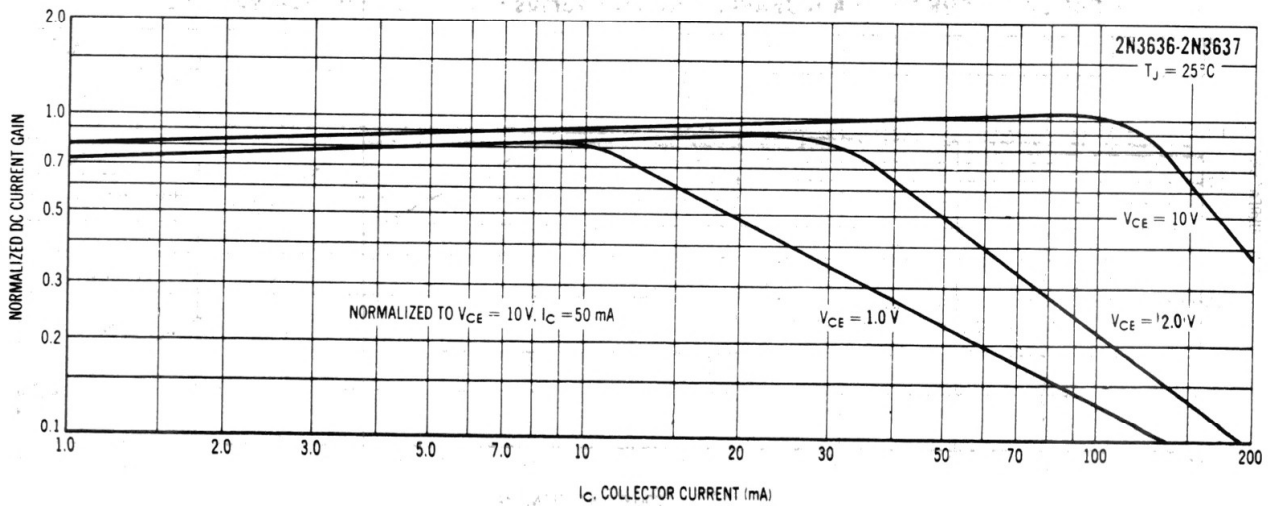




FIGURE 7 — INPUT IMPEDANCE

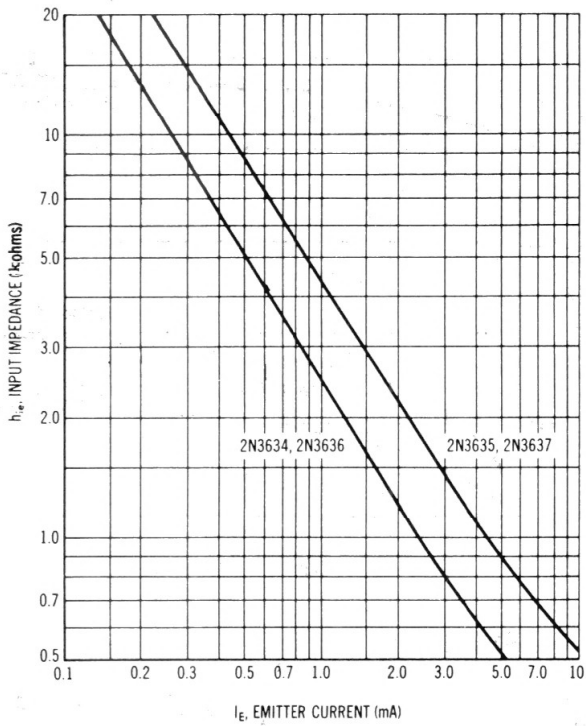


FIGURE 8 — OUTPUT IMPEDANCE

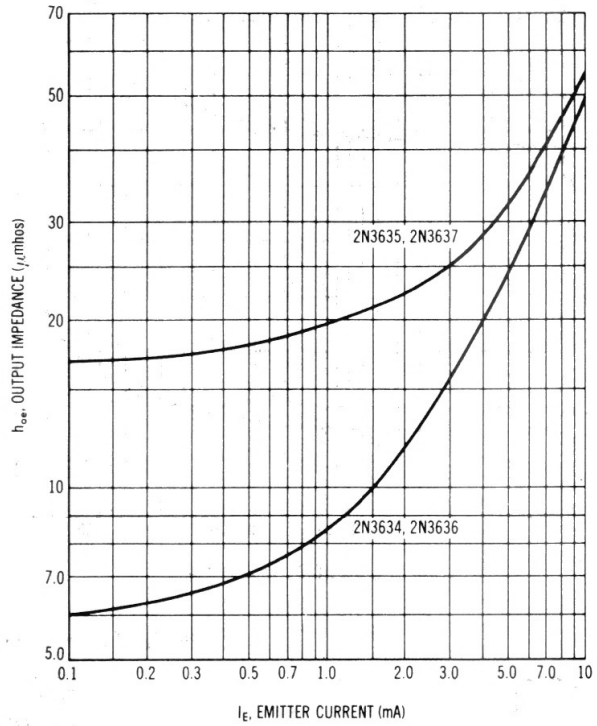


FIGURE 9 — CURRENT GAIN

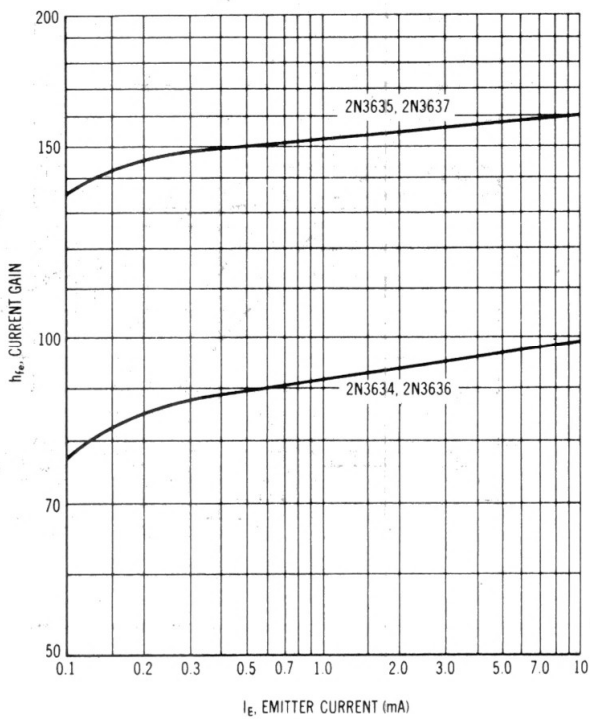


FIGURE 10 — VOLTAGE FEEDBACK RATIO

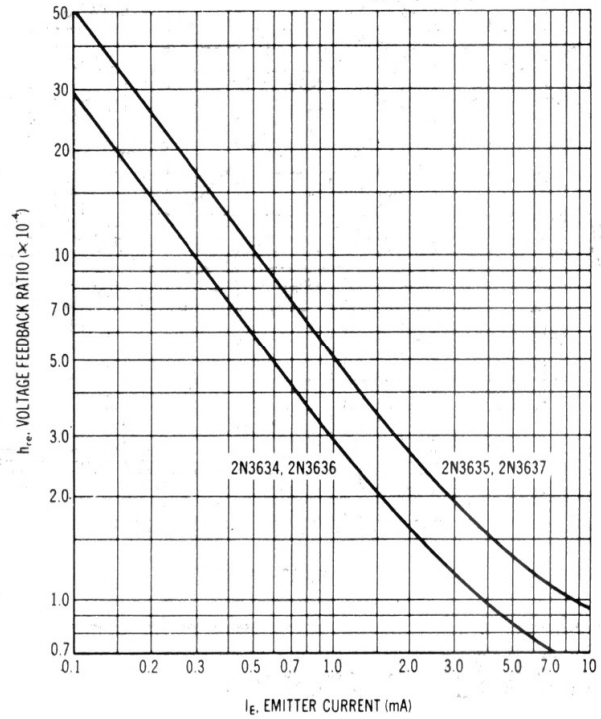


FIGURE 11 — SATURATION VOLTAGES

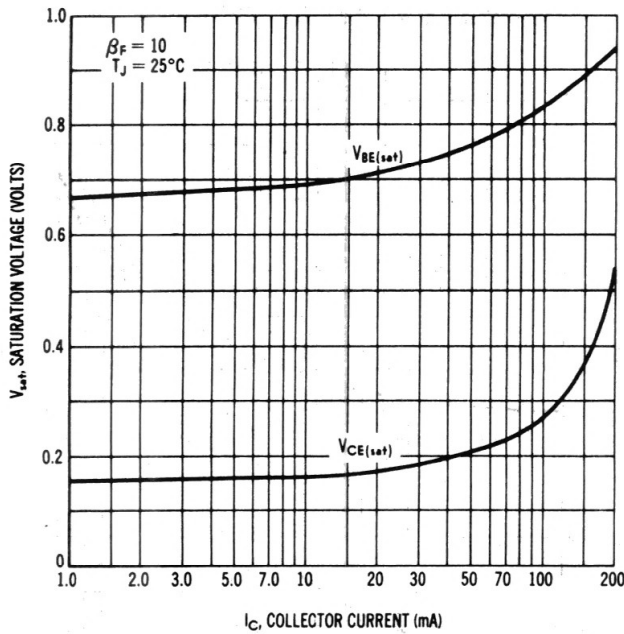


FIGURE 12 — TEMPERATURE COEFFICIENTS

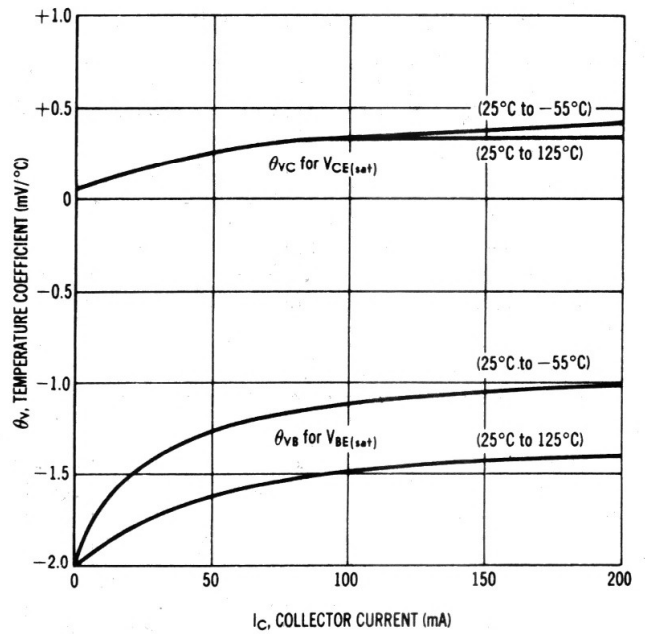
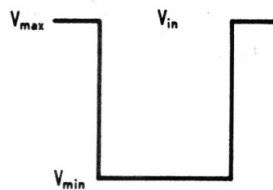


FIGURE 13 — SWITCHING TIME TEST CIRCUIT



P.W. $\approx 20 \mu\text{s}$
 DUTY CYCLE $\leq 2\%$
 RISE TIME $\leq 20 \text{ ns}$

	V_{max}	V_{min}
TURN-ON	+4.0 V	-5.65 V
TURN-OFF	+4.1 V	-5.9 V

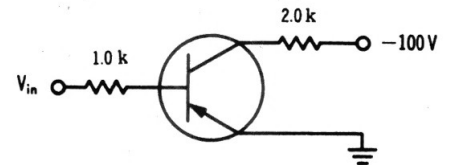


FIGURE 14 — TURN-ON TIME VARIATIONS WITH VOLTAGE

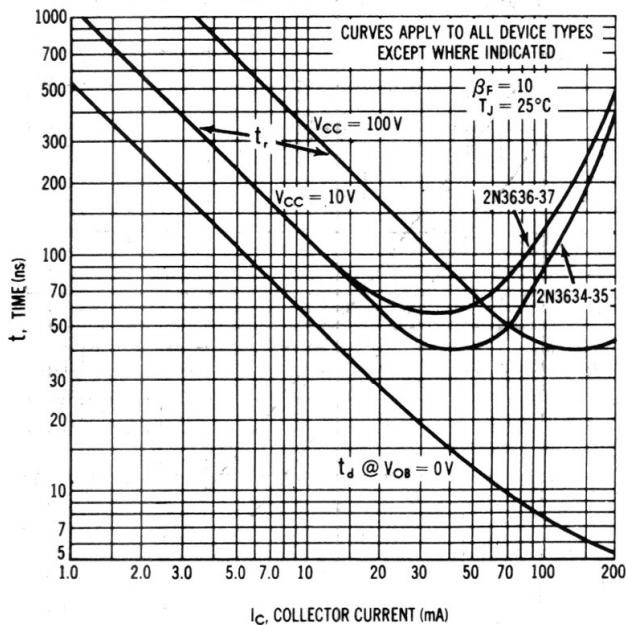
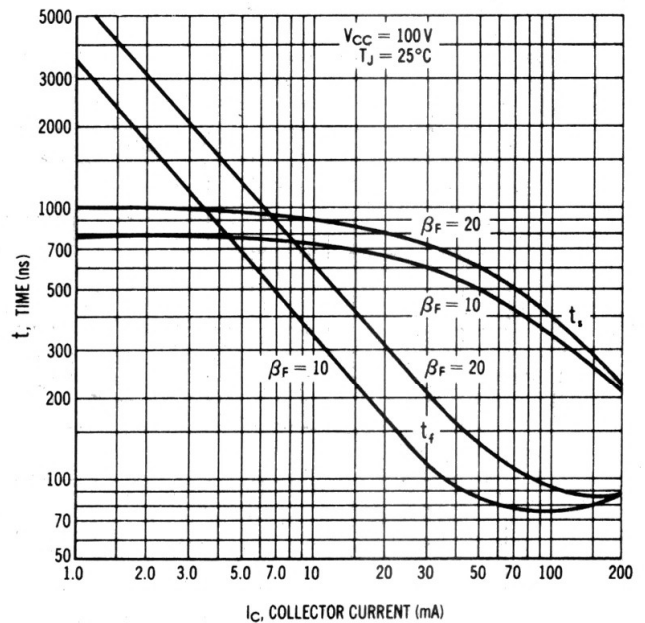


FIGURE 15 — TURN-OFF TIME VARIATIONS WITH CIRCUIT GAIN



2N3647 (SILICON)

2N3648

For Specifications, See 2N3510 Data.