2N3762, 2N3763
2N3764, 2N3765

JAN, JTX, JTXV AVAILABLE
CASE 79, CASE 26, STYLE 1
TO-39, TO-46

SWITCHING TRANSISTOR

PNP SILICON

4

MAXIMUM RATINGS

Rating	Symbol	2N3762 2N3764	2N3763 2N3765	Unit
Collector-Emitter Voltage	V_{CEO}	40	60	Vdc
Collector-Base Voltage	V_{CBO}	40	60	Vdc
Emitter-Base Voltage	V_{EBO}	5.0		Vdc
Collector Current — Continuous	I_C	1.5		Adc
		TO-5 2N3762 2N3763	TO-46 2N3764 2N3765	
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	1.0 5.71	0.5 2.86	Watt mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	4.0 22.8	2.0 11.4	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200		°C
Lead Temperature 1/16" from Case for 10 Seconds	T_L	+235		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	2N3762 2N3763	2N3764 2N3765	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	44	88	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	175	350	°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 = 10 mAdc, I_B = 0)	2N3762, 2N3764 2N3763, 2N3765	$V_{(BR)CEO}$	 40 60	 — —	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	2N3762, 2N3764 2N3763, 2N3765	$V_{(BR)CBO}$	 40 60	 — —	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current (V_{CE} = 20 Vdc, V_{EB} = 2.0 Vdc) (V_{CE} = 20 Vdc, V_{EB} = 2.0 Vdc, T_A = 100°C) (V_{CE} = 30 Vdc, V_{EB} = 2.0 Vdc) (V_{CE} = 30 Vdc, V_{EB} = 2.0 Vdc, T_A = 100°C)	 2N3762, 2N3764 2N3763, 2N3765 	I_{CEX}	 — — — —	 0.10 10 0.10 10	μAdc
Base Cutoff Current (V_{CE} = 20 Vdc, V_{EB} = 2.0 Vdc) (V_{CE} = 30 Vdc, V_{EB} = 2.0 Vdc)	 2N3762, 2N3764 2N3763, 2N3765	I_{BL}	 — —	 0.2 0.2	μAdc
ON CHARACTERISTICS					
DC Current Gain(1) (I_C = 10 mAdc, V_{CE} = 1.0 Vdc) (I_C = 150 mAdc, V_{CE} = 1.0 Vdc) (I_C = 500 mAdc, V_{CE} = 1.0 Vdc) (I_C = 1.0 Adc, V_{CE} = 1.5 Vdc) (I_C = 1.5 Adc, V_{CE} = 5.0 Vdc)	 2N3762, 2N3764 2N3763, 2N3765 2N3762, 2N3764 2N3763, 2N3765	h_{FE}	 35 40 35 30 20 30 20	 — — — 120 80 — —	—
Collector-Emitter Saturation Voltage(1) (I_C = 10 mAdc, I_B = 1.0 mAdc) (I_C = 150 mAdc, I_B = 15 mAdc) (I_C = 500 mAdc, I_B = 50 mAdc) (I_C = 1.0 Adc, I_B = 100 mAdc)		$V_{CE(sat)}$	 — — — —	 0.1 0.22 0.5 0.9	Vdc
Base-Emitter Saturation Voltage(1) (I_C = 10 mAdc, I_B = 1.0 mAdc) (I_C = 150 mAdc, I_B = 15 mAdc) (I_C = 500 mAdc, I_B = 50 mAdc) (I_C = 1.0 Adc, I_B = 100 mAdc)		$V_{BE(sat)}$	 — — — 0.9	 0.8 1.0 1.2 1.4	Vdc

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

Characteristic		Symbol	Min	Max	Unit
SMALL-SIGNAL CHARACTERISTICS					
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)		C_{obo}	—	15	pF
Input Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 100 kHz)		C_{ibo}	—	80	pF
Current Gain — High Frequency (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	2N3762, 2N3764 2N3763, 2N3765	$\|h_{fe}\|$	1.8 1.5	— —	—
SWITCHING CHARACTERISTICS					
Delay Time	(V_{CC} = 30 V, $V_{BE(off)}$ = 2.0 V, I_C = 1.0 Amp, I_{B1} = 100 mA)	t_d	—	8.0	ns
Rise Time		t_r	—	3.5	ns
Storage Time	(V_{CC} = 30 V, I_C = 1.0 Amp, I_{B1} = $-I_{B2}$ = 100 mA)	t_s	—	80	ns
Fall Time		t_f	—	35	ns
Total Control Charge (I_C = 1.0 Amp, I_B = 100 mA, V_{CC} = 30 V)		Q_T	—	30	pC

(1) Pulse Test: PW ≤ 300 μs, Duty Cycle ≤ 2.0%.

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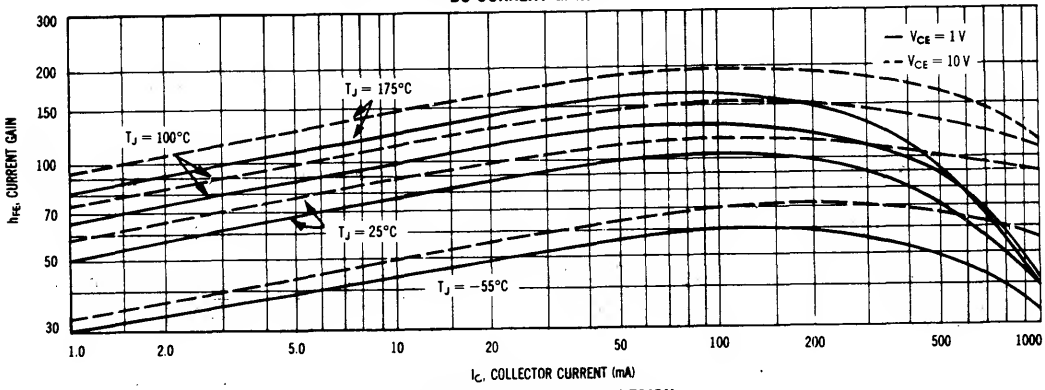
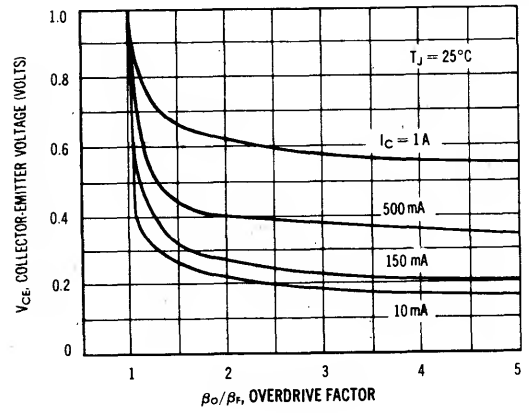
"ON" CONDITION CHARACTERISTICS

DC CURRENT GAIN



COLLECTOR SATURATION REGION

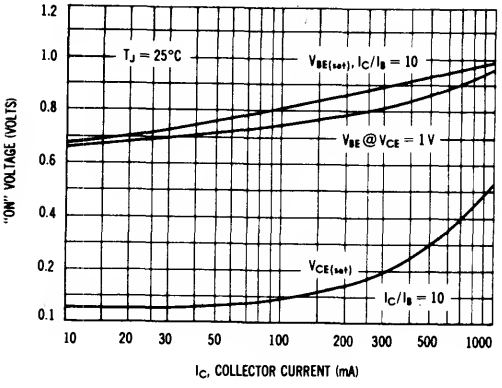


This graph shows the effect of base current on collector current. β_O (current gain at the edge of saturation) is the current gain of the transistor at 1 volt, and β_F (forced gain) is the ratio of I_C/I_{BF} in a circuit. EXAMPLE: For type 2N3734, estimate a base current (I_{BF}) to ensure saturation at a temperature of 25°C and a collector of 500 mA.

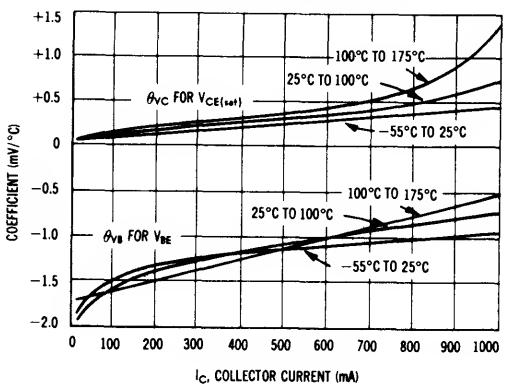
Observe that at I_C = 500 mA an overdrive factor of at least 2.0 is required to drive the transistor well into the saturation region. From Figure 1, it is seen that h_{FE} @ 1 volt is typically 54 (guaranteed limits from the Table of Characteristics can be used for "worst-case" design).

$$\frac{\beta_O}{\beta_F} = \frac{h_{FE}@\,1\,\text{Volt}}{I_C/I_{BF}} \qquad 2 = \frac{54}{500\,\text{mA}/I_{BF}} \qquad I_{BF} \approx 18.5\,\text{mA typ}$$

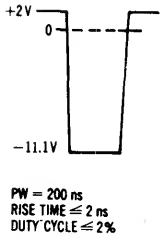
"ON" VOLTAGES



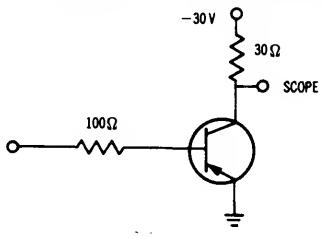
TEMPERATURE COEFFICIENTS



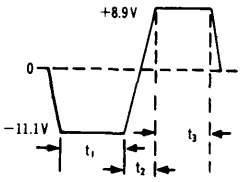
TURN-ON TIME

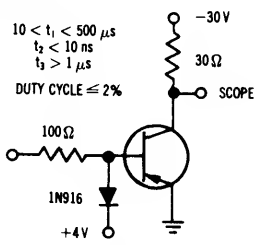


SWITCHING TIME EQUIVALENT TEST CIRCUITS



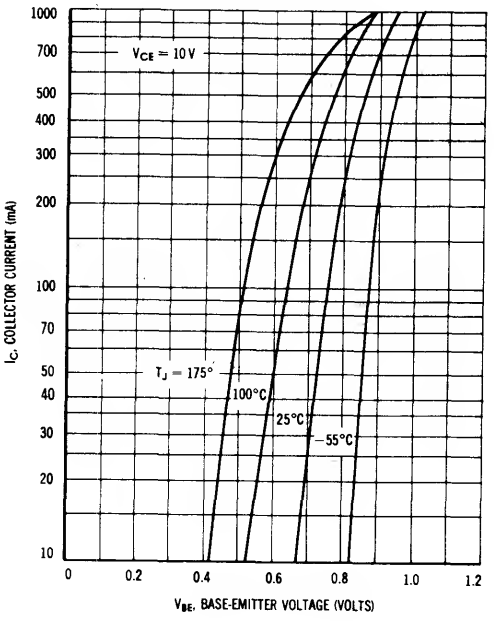
TURN-OFF TIME





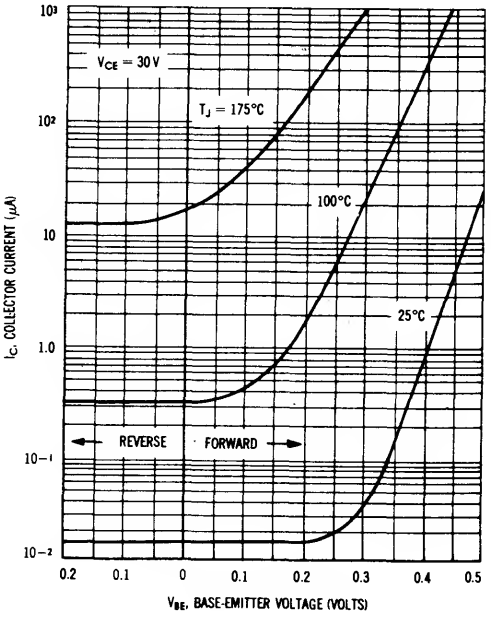
LARGE SIGNAL CHARACTERISTICS

TRANSCONDUCTANCE

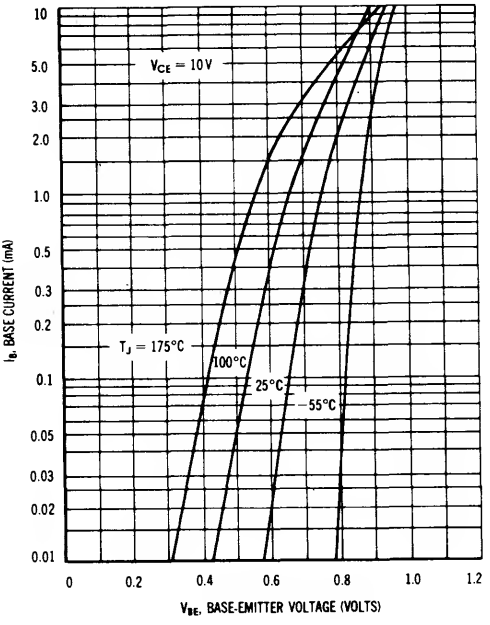


"OFF" CONDITION CHARACTERISTICS

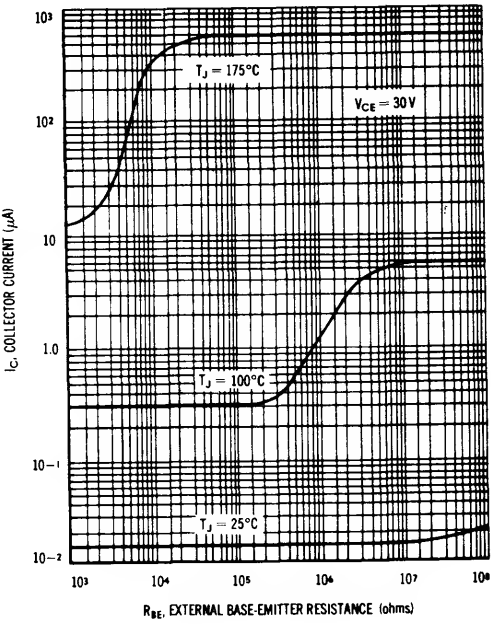
TRANSCONDUCTANCE



INPUT ADMITTANCE



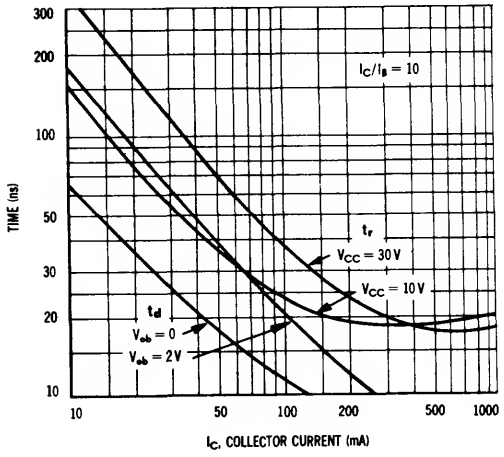
EFFECT OF BASE-EMITTER RESISTANCE



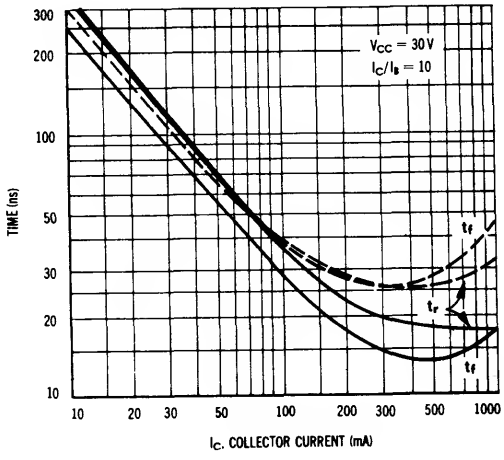
SWITCHING CHARACTERISTICS

— T_J = 25°C -- T_J = 150°C

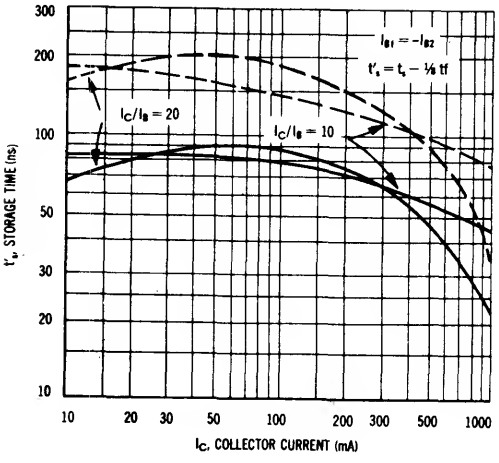
TURN-ON TIME



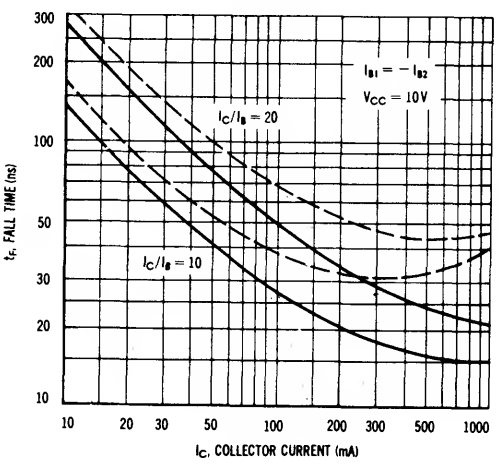
RISE AND FALL TIME



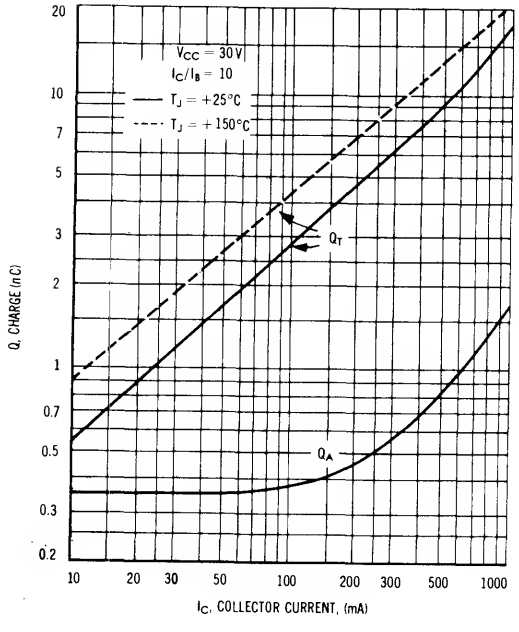
STORAGE TIME



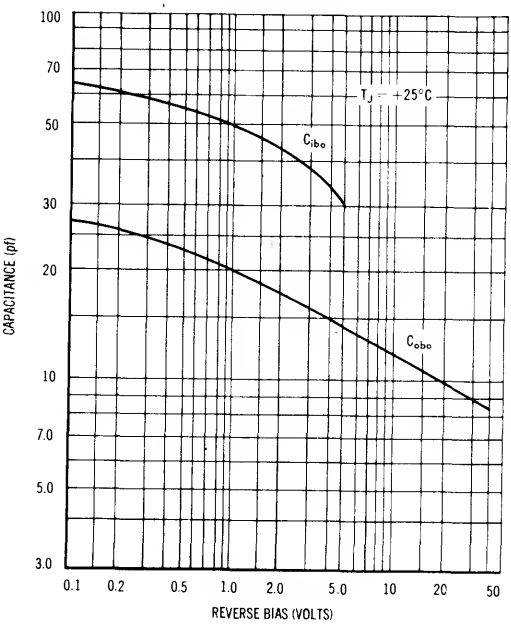
FALL TIME



CHARGE DATA



CAPACITANCE



ACTIVE REGION SAFE OPERATING AREAS