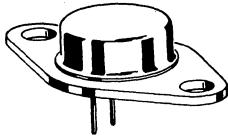


2N3766 (SILICON)

2N3767



Medium-power NPN silicon transistors, for use in switching, and medium-power-amplifier applications. Complement to PNP 2N3740 (2N3766) 2N3741 (2N3767).

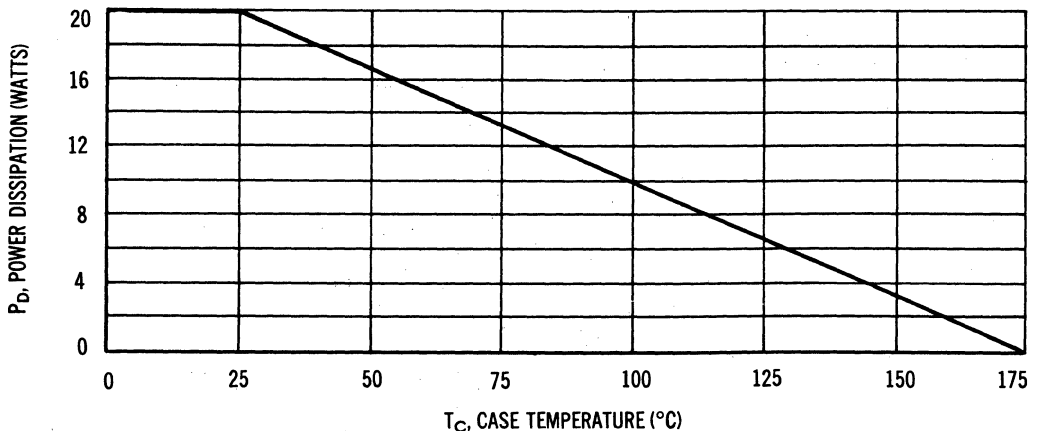
CASE 80
(TO-66)

Collector connected to case

MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	2N3766	2N3767	Unit
Collector-Base Voltage	V_{CB}	80	100	Vdc
Emitter-Base Voltage	V_{EB}	6.0	6.0	Vdc
Collector-Emitter Voltage	V_{CEO}	60	80	Vdc
Collector Current - Continuous	I_C	4.0		Adc
Peak		4.0		
Base Current	I_B	2.0		Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$	P_D	20		Watts
Derate above 25°C		0.133		W/ $^\circ\text{C}$
Thermal Resistance	θ_{JC}	7.5		$^\circ\text{C}/\text{W}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to $^\circ 175$		$^\circ\text{C}$

POWER-TEMPERATURE DERATING CURVE



Safe area curves are indicated. Both limits are applicable and must be observed.

2N3766, 2N3767 (continued)

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Voltage ⁽¹⁾ ($I_C = 100\text{ mAdc}$, $I_B = 0$)	BV_{CEO}	60 80	—	Vdc
Emitter-Base Cutoff Current ($V_{EB} = 6\text{ Vdc}$)	I_{EBO}	—	0.75	mAdc
Collector Cutoff Current ($V_{CE} = 80\text{ Vdc}$, $V_{BE} = 1.5\text{ Vdc}$)	I_{CEX}	—	0.1	mAdc
($V_{CE} = 100\text{ Vdc}$, $V_{BE} = 1.5\text{ Vdc}$)		—	0.1	
($V_{CE} = 50\text{ Vdc}$, $V_{BE} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$)		—	1.0	
($V_{CE} = 70\text{ Vdc}$, $V_{BE} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$)		—	1.0	
Collector-Emitter Cutoff Current ($V_{CE} = 60\text{ Vdc}$, $I_B = 0$)	I_{CEO}	—	0.7	mAdc
($V_{CE} = 80\text{ Vdc}$, $I_B = 0$)		—	0.7	
Collector-Base Cutoff Current ($V_{CB} = 80\text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	0.1	mAdc
($V_{CB} = 100\text{ Vdc}$, $I_E = 0$)		—	0.1	

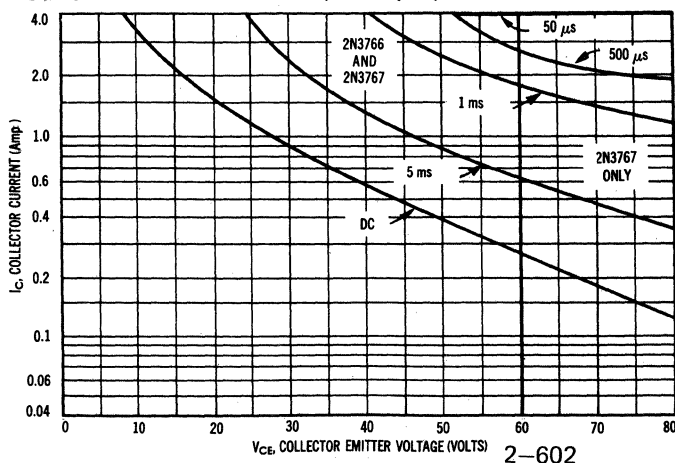
ON CHARACTERISTICS

DC Current Gain ($I_C = 50\text{ mAdc}$, $V_{CE} = 5\text{ Vdc}$) ($I_C = 500\text{ mAdc}$, $V_{CE} = 5\text{ Vdc}$) ($I_C = 1.0\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$)	h_{FE}	30 40 20	— 160 —	—
Collector-Emitter Saturation Voltage ($I_C = 1\text{ Adc}$, $I_B = 0.1\text{ Adc}$) ($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$)	$V_{CE(sat)}$	—	2.5 1.0	Vdc
Base-Emitter Voltage ($I_C = 1.0\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$)	V_{BE}	—	1.5	Vdc

TRANSIENT CHARACTERISTICS

Current-Gain - Bandwidth Product ($I_C = 500\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 10\text{ MHz}$)	f_T	10	—	MHz
Common-Base Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_C = 0\text{ Adc}$, $f = 100\text{ kHz}$)	C_{ob}	—	50	pF
Small-Signal Current Gain ($I_C = 100\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 1\text{ kHz}$)	h_{fe}	40	—	—

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



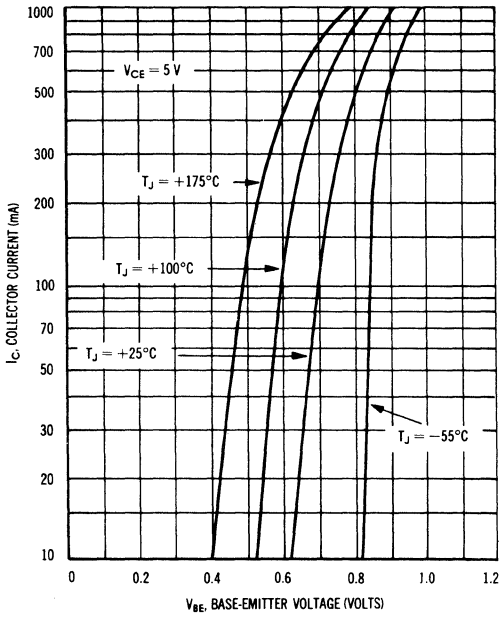
ACTIVE REGION SAFE AREAS

The Safe Operating Area Curves indicate I_C - V_{CE} limits below which the device will not go into secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a collector-emitter short. (Case temperature and duty cycle of the excursions make no significant change in these safe areas.) The load line may exceed the BV_{CEO} voltage limit only if the collector current has been reduced to 20 mA or less before or at the BV_{CES} limit; then and only then may the load line be extended to the absolute maximum voltage rating of BV_{CBO} . To insure operation below the maximum T_J , the power-temperature derating curve must be observed for both steady state and pulse power conditions.

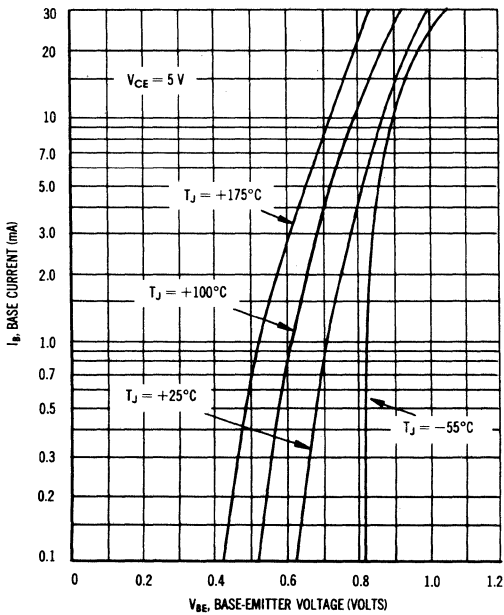
2N3766, 2N3767 (continued)

LARGE SIGNAL CHARACTERISTICS

TRANSCONDUCTANCE

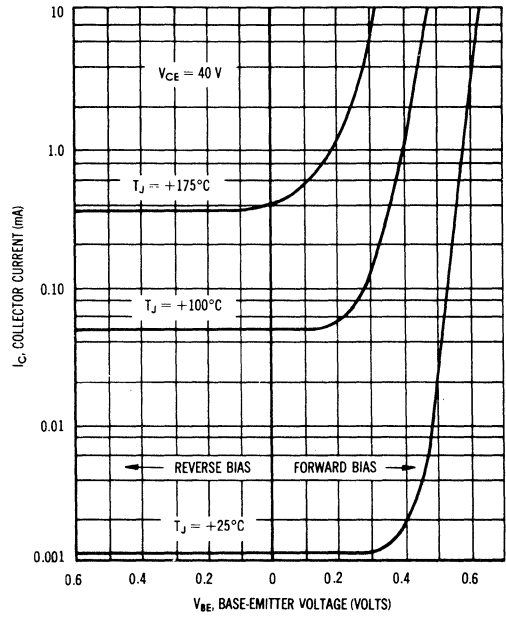


INPUT ADMITTANCE

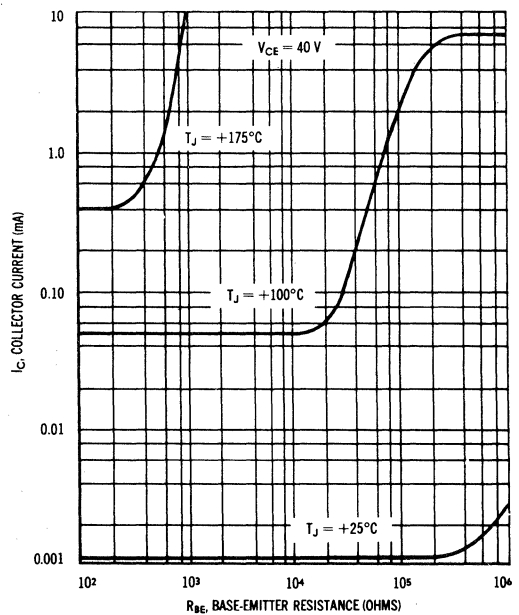


CUT-OFF CHARACTERISTICS

TRANSCONDUCTANCE

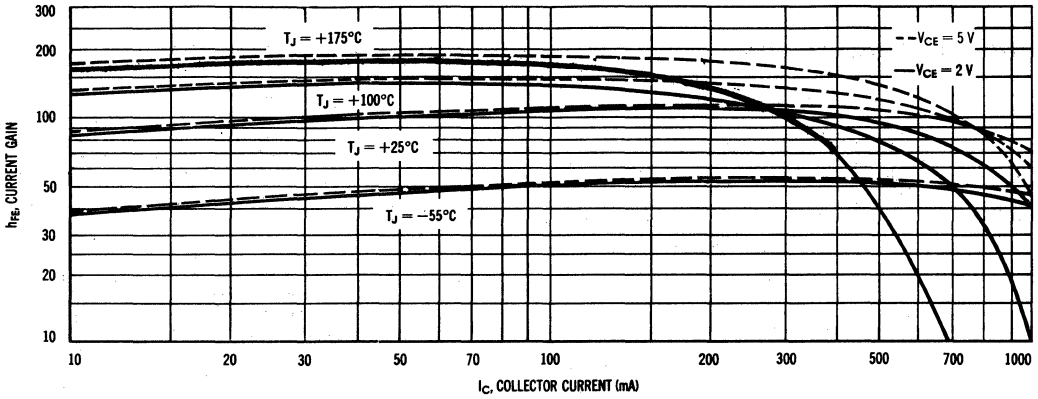


EFFECT OF BASE-EMITTER RESISTANCE

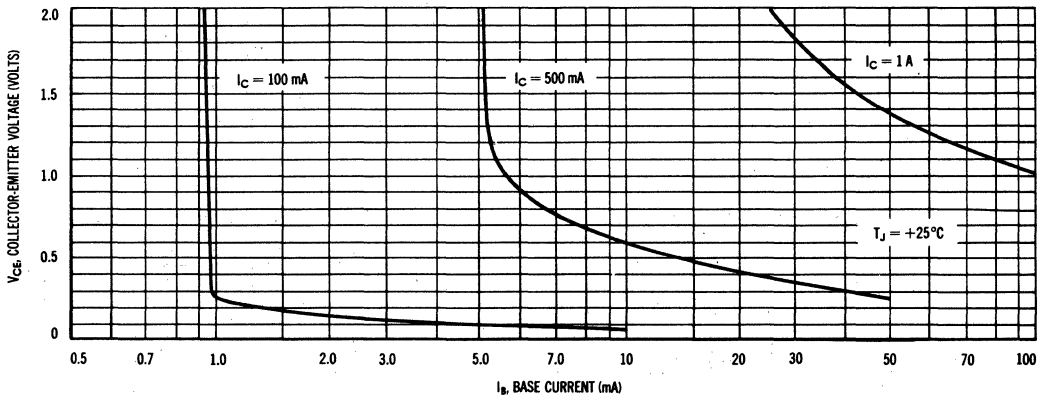


2N3766, 2N3767 (continued)

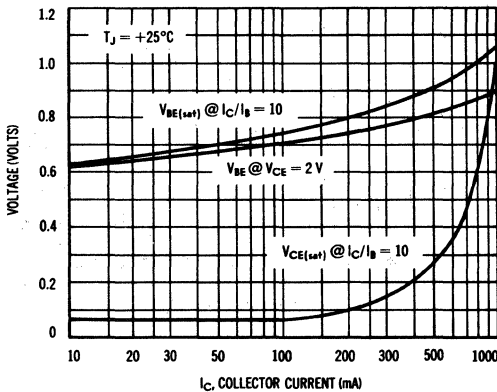
CURRENT GAIN



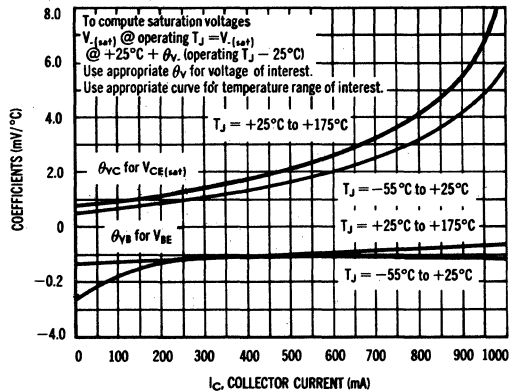
COLLECTOR SATURATION REGION



"ON" VOLTAGES



TEMPERATURE CO-EFFICIENTS

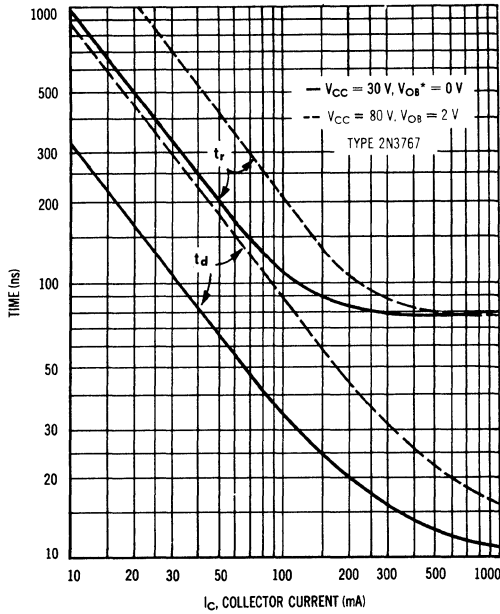


2N3766, 2N3767 (continued)

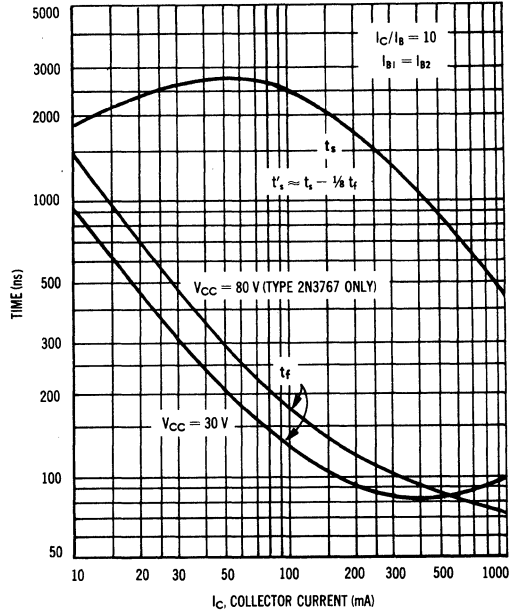
TRANSIENT CHARACTERISTICS

($T_J = 25^\circ\text{C}$)

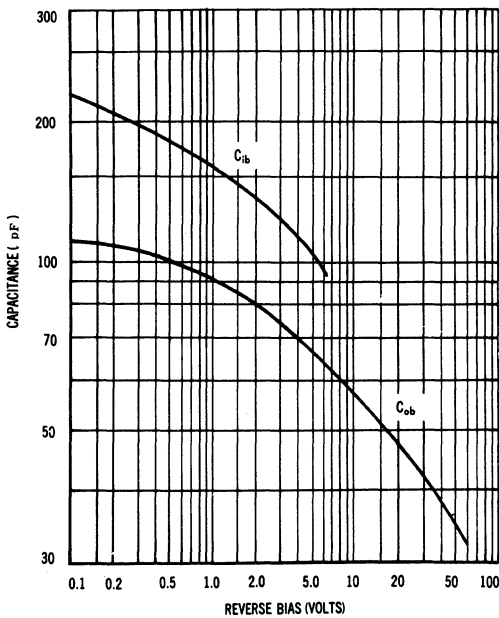
TURN-ON TIME



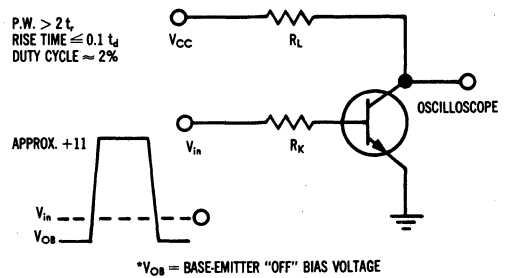
TURN-OFF TIME



CAPACITANCE



EQUIVALENT CIRCUIT FOR MEASURING DELAY AND RISE TIME



EQUIVALENT CIRCUIT FOR MEASURING STORAGE AND FALL TIMES

