

Boca Semiconductor Corp. (BSC)

MAXIMUM RATINGS

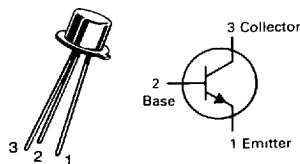
Rating	Symbol	2N930	2N930A	Unit
Collector-Emitter Voltage	V_{CEO}	45	45	Vdc
Collector-Base Voltage	V_{CBO}	45	60	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	6.0	Vdc
Collector Current	I_C	30		mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	0.5	3.33	W mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.2	6.9	Watt mW/ $^\circ\text{C}$
Operating and Storage Temperature Temperature Range	T_J, T_{stg}	-65 to +175		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	350	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	146	$^\circ\text{C/W}$

2N930, A

CASE 22-03, STYLE 1
TO-18 (TO-206AA)



AMPLIFIER TRANSISTORS

NPN SILICON

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage(1) ($I_C = 10 \text{ mAdc}, I_B = 0$)	$V_{(BR)CEO}$	45	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 10 \text{ }\mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	45 60	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \text{ }\mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	5.0 6.0	—	Vdc
Collector Cutoff Current ($V_{CE} = 5.0 \text{ Vdc}, I_B = 0$)	I_{CEO}	—	2.0	nAdc
Collector Cutoff Current ($V_{CB} = 45 \text{ Vdc}, I_E = 0$)	I_{CBO}	— —	10 2.0	nAdc
Collector Cutoff Current ($V_{CB} = 45 \text{ Vdc}, V_{BE} = 0$)	I_{CES}	— —	10 2.0	nAdc μAdc
($V_{CE} = 45 \text{ Vdc}, V_{BE} = 0, T_A = 170^\circ\text{C}$)		— —	10 2.0	μAdc
Emitter Cutoff Current ($V_{EB} = 5.0 \text{ Vdc}, I_C = 0$)	I_{EBO}	— —	10 2.0	nAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 1.0 \text{ }\mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$)	2N930A	h_{FE}	60	—	—
($I_C = 1.0 \text{ }\mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$)			100	300	
($I_C = 10 \text{ }\mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}, T_A = -55^\circ\text{C}$)	2N930 2N930A		20 30	— —	
($I_C = 500 \text{ }\mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$)	2N930 2N930A		150 —	— —	
($I_C = 10 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$)(1)	2N930 2N930A		— —	600 600	

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

Characteristic		Symbol	Min	Max	Unit
Collector-Emitter Saturation Voltage (1) ($I_C = 10\text{ mAdc}$, $I_B = 0.5\text{ mAdc}$)	2N930 2N930A	$V_{CE(sat)}$	— —	1.0 0.5	Vdc
Base-Emitter Saturation Voltage (1) ($I_C = 10\text{ mAdc}$, $I_B = 0.5\text{ mAdc}$)	2N930 2N930A	$V_{BE(sat)}$	0.6 0.7	1.0 0.9	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ($I_C = 500\ \mu\text{A}$ dc, $V_{CE} = 5.0\text{ Vdc}$, $f = 30\text{ MHz}$)	2N930 2N930A	f_T	30 45	— —	MHz
Output Capacitance ($V_{CB} = 5.0\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	2N930 2N930A	C_{obo}	— —	8.0 6.0	pF
Input Impedance ($I_E = 1.0\text{ mA}$ dc, $V_{CB} = 5.0\text{ Vdc}$, $f = 1.0\text{ kHz}$)		h_{ib}	25	32	ohms
Voltage Feedback Ratio ($I_E = 1.0\text{ mA}$ dc, $V_{CB} = 5.0\text{ Vdc}$, $f = 1.0\text{ kHz}$)		h_{rb}	—	600	$\times 10^{-6}$
Small Signal Current Gain ($I_C = 1.0\text{ mA}$ dc, $V_{CE} = 5.0\text{ Vdc}$, $f = 1.0\text{ kHz}$)		h_{fe}	150	600	—
Output Admittance ($I_E = 1.0\text{ mA}$ dc, $V_{CB} = 5.0\text{ Vdc}$, $f = 1.0\text{ kHz}$)		h_{ob}	—	1.0	μmhos
Noise Figure ($I_C = 10\ \mu\text{A}$ dc, $V_{CE} = 5.0\text{ Vdc}$, $R_S = 10\text{ k ohms}$, $f = 1.0\text{ kHz}$)		NF	—	3.0	dB

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

FIGURE 1 — COLLECTOR SATURATION VOLTAGE CHARACTERISTICS

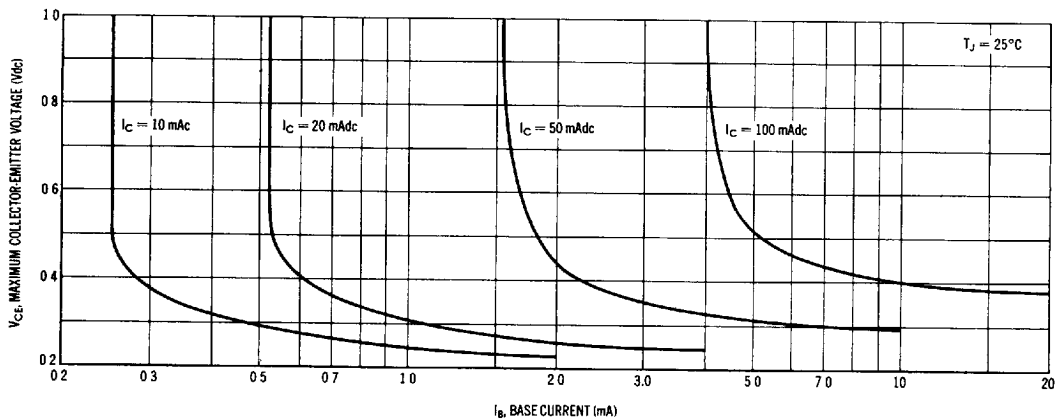


FIGURE 2 — MINIMUM CURRENT GAIN CHARACTERISTICS

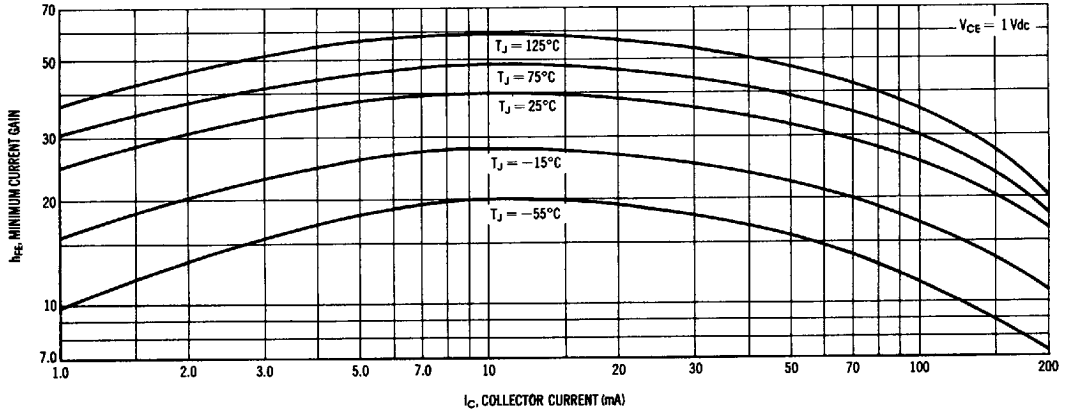


FIGURE 3 — LIMITS OF SATURATION VOLTAGES

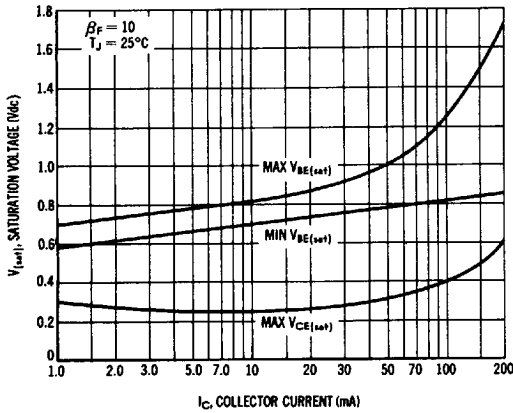
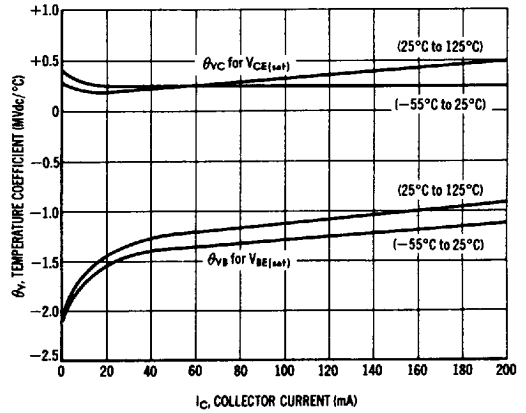


FIGURE 4 — TYPICAL TEMPERATURE COEFFICIENTS



TYPICAL SWITCHING CHARACTERISTICS

FIGURE 5 — TURN-ON TIME VARIATIONS WITH VOLTAGE

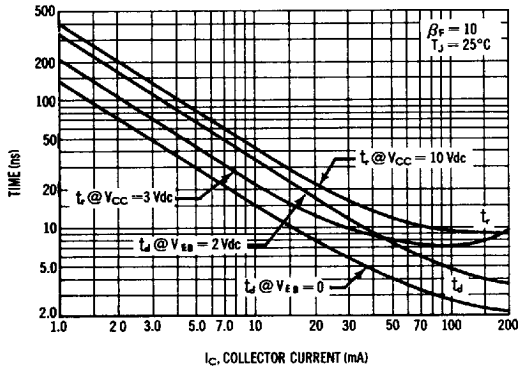


FIGURE 6 — RISE TIME BEHAVIOR

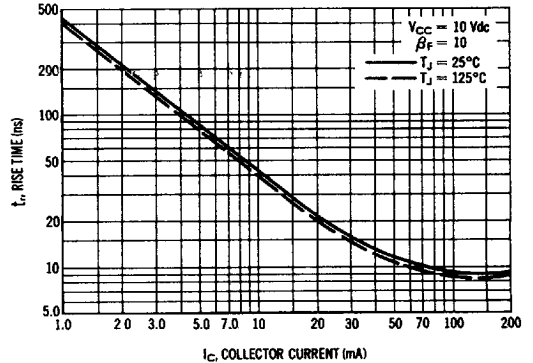


FIGURE 7 — STORAGE TIME BEHAVIOR

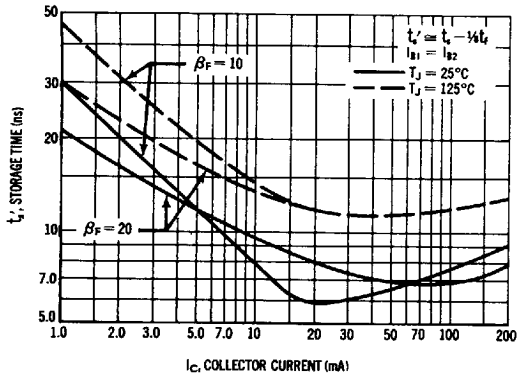


FIGURE 8 — FALL TIME BEHAVIOR

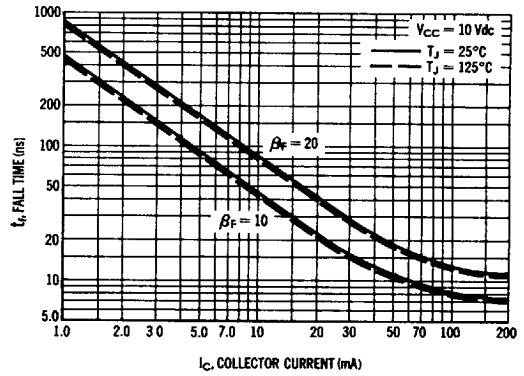


FIGURE 9 — JUNCTION CAPACITANCE VARIATIONS

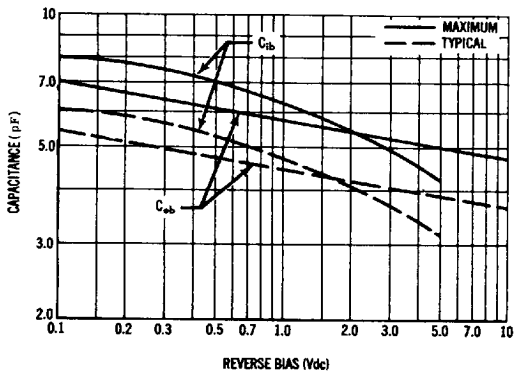


FIGURE 10 — MAXIMUM CHARGE DATA

