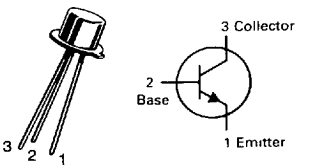
Boca Semiconductor Corp. (BSC)

2N930, A

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



AMPLIFIER TRANSISTORS

NPN SILICON

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°C Derate above 25°C	P_D	0.5 3.33		W mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.2 6.9		Watt mW/°C
Operating and Storage Temperature Temperature Range	T_J, T_{stg}	−65 to +175		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	350	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	146	°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)		$V_{(BR)CEO}$	45	—	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	2N930 2N930A	$V_{(BR)CBO}$	45 60	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	2N930 2N930A	$V_{(BR)EBO}$	— 5.0 6.0	— —	Vdc
Collector Cutoff Current (V_{CE} = 5.0 Vdc, I_B = 0)		I_{CEO}	—	2.0	nAdc
Collector Cutoff Current (V_{CB} = 45 Vdc, I_E = 0)	2N930 2N930A	I_{CBO}	— —	10 2.0	nAdc
Collector Cutoff Current (V_{CB} = 45 Vdc, V_{BE} = 0)	2N930 2N930A	I_{CES}	— —	10 2.0	nAdc
(V_{CE} = 45 Vdc, V_{BE} = 0, T_A = 170°C)	2N930 2N930A		— —	10 2.0	μAdc
Emitter Cutoff Current (V_{EB} = 5.0 Vdc, I_C = 0)	2N930 2N930A	I_{EBO}	— —	10 2.0	nAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 1.0 μAdc, V_{CE} = 5.0 Vdc)	2N930A	h_{FE}	60 100	— 300	—
(I_C = 1.0 μAdc, V_{CE} = 5.0 Vdc)			20 30	— —	
(I_C = 10 μAdc, V_{CE} = 5.0 Vdc, T_A = −55°C)	2N930 2N930A		150 —	— —	
(I_C = 500 μAdc, V_{CE} = 5.0 Vdc)	2N930 2N930A		— —	600 600	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)(1)	2N930 2N930A				

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

Characteristic		Symbol	Min	Max	Unit
Collector-Emitter Saturation Voltage (1) (I_C = 10 mAdc, I_B = 0.5 mAdc)	2N930 2N930A	$V_{CE(sat)}$	— —	1.0 0.5	Vdc
Base-Emitter Saturation Voltage (1) (I_C = 10 mAdc, I_B = 0.5 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 μAdc, V_{CE} = 5.0 Vdc, f = 30 MHz)	2N930 2N930A	f_T	30 45	— —	MHz
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 1.0 MHz)	2N930 2N930A	C_{obo}	— —	8.0 6.0	pF
Input Impedance (I_E = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)		h_{ib}	25	32	ohms
Voltage Feedback Ratio (I_E = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)		h_{rb}	—	600	X 10^{-6}
Small Signal Current Gain (I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc, f = 1.0 kHz)		h_{fe}	150	600	—
Output Admittance (I_E = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)		h_{ob}	—	1.0	μmhos
Noise Figure (I_C = 10 μAdc, V_{CE} = 5.0 Vdc, R_S = 10 k ohms, f = 1.0 kHz)		NF	—	3.0	dB

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

FIGURE 1 — COLLECTOR SATURATION VOLTAGE CHARACTERISTICS

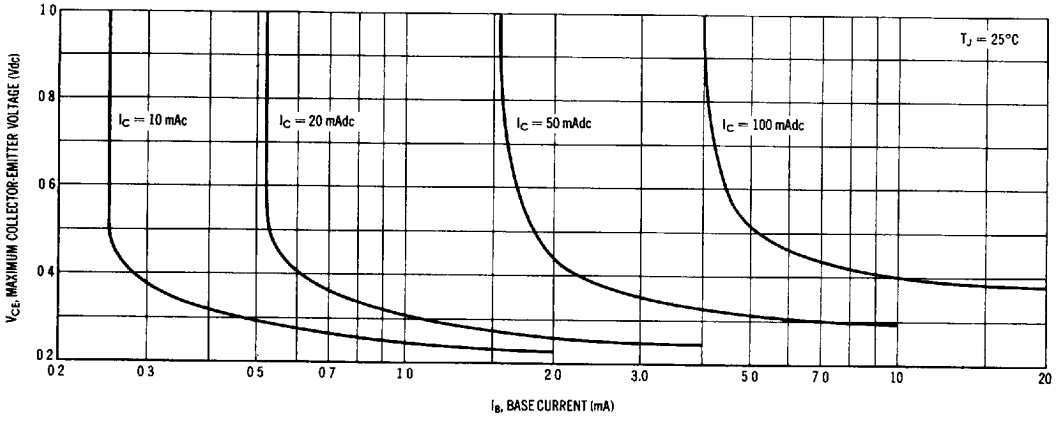


FIGURE 2 — MINIMUM CURRENT GAIN CHARACTERISTICS

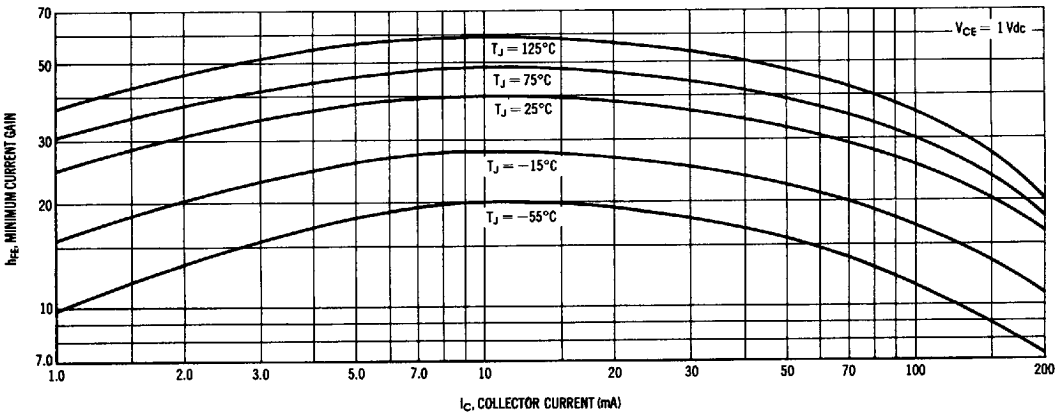


FIGURE 3 — LIMITS OF SATURATION VOLTAGES

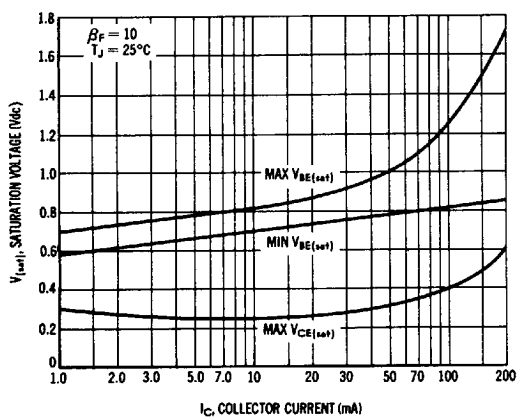
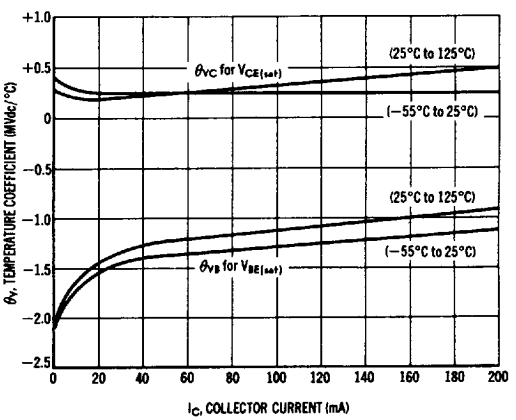


FIGURE 4 — TYPICAL TEMPERATURE COEFFICIENTS



TYPICAL SWITCHING CHARACTERISTICS

FIGURE 5 — TURN-ON TIME VARIATIONS WITH VOLTAGE

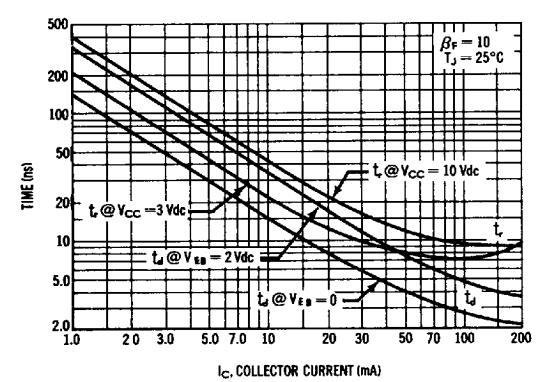


FIGURE 6 — RISE TIME BEHAVIOR

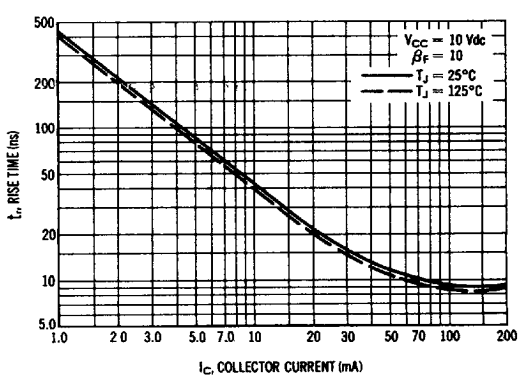


FIGURE 7 — STORAGE TIME BEHAVIOR

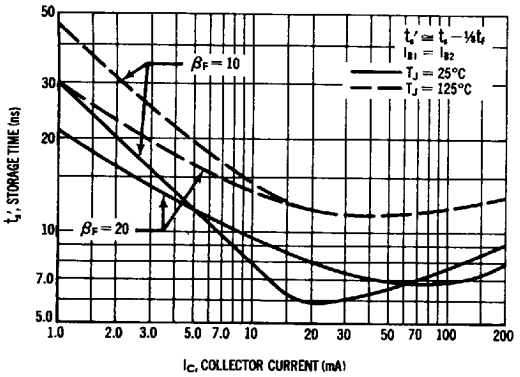


FIGURE 8 — FALL TIME BEHAVIOR

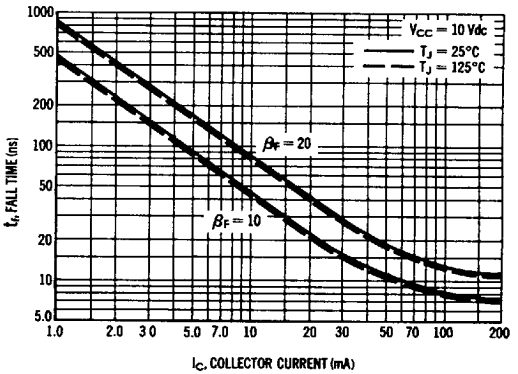


FIGURE 9 — JUNCTION CAPACITANCE VARIATIONS

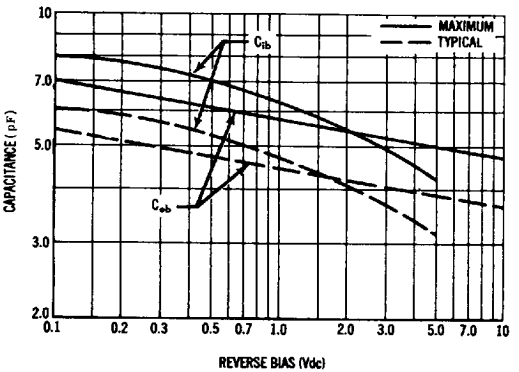
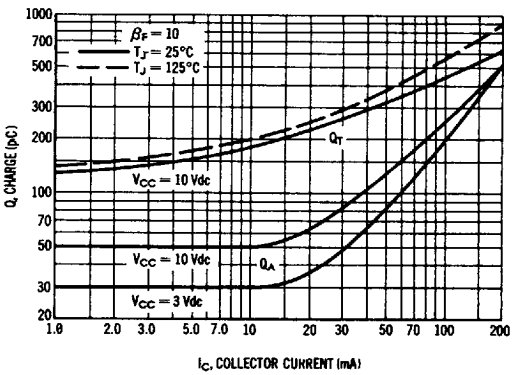


FIGURE 10 — MAXIMUM CHARGE DATA



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