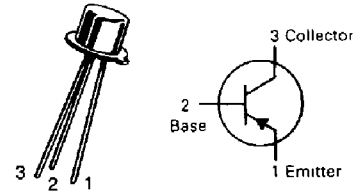


**2N2894**CASE 22-03, STYLE 1  
TO-18 (TO-206AA)**SWITCHING TRANSISTOR**

PNP SILICON

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**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage(1)	$V_{CE0}$	-12	Vdc
Collector-Base Voltage	$V_{CE0}$	-12	Vdc
Emitter-Base Voltage	$V_{EBO}$	-4.0	Vdc
Collector Current — Continuous	$I_C$	-200	mA dc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	360 2.06	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1200 6.85	mW mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	486	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	146	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage ( $I_C = -10 \mu\text{A dc}, V_{BE} = 0$ )	$V_{(BR)CES}$	-12	—	Vdc
Collector-Emitter Sustaining Voltage(2) ( $I_C = -10 \text{ mA dc}, I_B = 0$ )	$V_{CE0(sus)}$	-12	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = -10 \mu\text{A dc}, I_B = 0$ )	$V_{(BR)CBO}$	-12	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = -100 \mu\text{A dc}, I_C = 0$ )	$V_{(BR)EBO}$	-4.0	—	Vdc
Collector Cutoff Current ( $V_{CB} = -6.0 \text{ Vdc}, I_E = 0, T_A = 125^\circ\text{C}$ )	$I_{CBO}$	—	-10	$\mu\text{A dc}$
Collector Cutoff Current ( $V_{CE} = -6.0 \text{ Vdc}, V_{BE} = 0$ )	$I_{CES}$	—	-80	nA dc
Base Current ( $V_{CE} = -6.0 \text{ Vdc}, V_{BE} = 0$ )	$I_B$	—	-80	nA dc

**ON CHARACTERISTICS**

DC Current Gain(2) ( $I_C = -10 \text{ mA dc}, V_{CE} = -0.3 \text{ Vdc}$ ) ( $I_C = -30 \text{ mA dc}, V_{CE} = -0.5 \text{ Vdc}$ ) ( $I_C = -30 \text{ mA dc}, V_{CE} = -0.5 \text{ Vdc}, T_A = -55^\circ\text{C}$ ) ( $I_C = -100 \text{ mA dc}, V_{CE} = -1.0 \text{ Vdc}$ )(2)	$h_{FE}$	30 40 17 25	— 150 — —	—
Collector-Emitter Saturation Voltage(2) ( $I_C = -10 \text{ mA dc}, I_B = -1.0 \text{ mA dc}$ ) ( $I_C = -30 \text{ mA dc}, I_B = -3.0 \text{ mA dc}$ ) ( $I_C = -100 \text{ mA dc}, I_B = -10 \text{ mA dc}$ )	$V_{CE(sat)}$	— — —	-0.15 -0.2 -0.5	Vdc
Base-Emitter Saturation Voltage(2) ( $I_C = -10 \text{ mA dc}, I_B = -1.0 \text{ mA dc}$ ) ( $I_C = -30 \text{ mA dc}, I_B = -3.0 \text{ mA dc}$ ) ( $I_C = -100 \text{ mA dc}, I_B = -10 \text{ mA dc}$ )	$V_{BE(sat)}$	-0.78 -0.85 —	-0.98 -1.2 -1.7	Vdc

**SMALL-SIGNAL CHARACTERISTICS**

Current-Gain — Bandwidth Product ( $I_C = -30 \text{ mA dc}, V_{CE} = -10 \text{ Vdc}, f = 100 \text{ MHz}$ )	$f_T$	400	—	MHz
Output Capacitance ( $V_{CB} = -5.0 \text{ Vdc}, I_E = 0, f = 1.0 \text{ MHz}$ )	$C_{obo}$	—	6.0	pF
Input Capacitance ( $V_{EB} = -0.5 \text{ Vdc}, I_C = 0, f = 1.0 \text{ MHz}$ )	$C_{ibo}$	—	6.0	pF

**SWITCHING CHARACTERISTICS**

Turn-On Time ( $V_{CC} = -2.0 \text{ Vdc}, V_{EB} = -3.0 \text{ Vdc}, I_{B1} = -1.5 \text{ mA dc}$ )	$t_{on}$	—	60	ns
Turn-Off Time ( $V_{CC} = -2.0 \text{ Vdc}, I_C = -30 \text{ mA dc}, I_{B1} = I_{B2} = -1.5 \text{ mA dc}$ )	$t_{off}$	—	90	ns

(1) Applicable from 0.01 to 10 mA dc.

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

MOTOROLA SMALL-SIGNAL TRANSISTORS, FETs AND DIODES