

2N3012

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

SWITCHING TRANSISTOR

PNP SILICON

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	12	Vdc
Collector-Base Voltage	V_{CBO}	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°C	P_D	0.36 2.06	Watts mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.2 6.85	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	$^\circ\text{C}$

Refer to 2N869A for graphs.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ($I_C = 10\text{ }\mu\text{A dc}, V_{BE} = 0$)	$V_{(BR)CES}$	12	—	Vdc
Collector-Emitter Sustaining Voltage(1) ($I_C = 10\text{ mA dc}, I_B = 0$) (Emitter-Base Termination — Open Base)	$V_{CEO(sus)}$	12	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A dc}, I_E = 0$)	$V_{(BR)CBO}$	12	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 100\text{ }\mu\text{A dc}, I_C = 0$)	$V_{(BR)EBO}$	4.0	—	Vdc
Collector Cutoff Current ($V_{CE} = 6.0\text{ Vdc}, V_{BE} = 0$) ($V_{CE} = 6.0\text{ Vdc}, V_{BE} = 0, T_A = +85^\circ\text{C}$)	I_{CES}	—	80 5.0	$\mu\text{A dc}$ $\mu\text{A dc}$
Base Current ($V_{CE} = 6.0\text{ Vdc}, V_{BE} = 0$)	I_B	—	30	$\mu\text{A dc}$

ON CHARACTERISTICS

DC Current Gain ($I_C = 10\text{ mA dc}, V_{CE} = 0.3\text{ Vdc}$) ($I_C = 30\text{ mA dc}, V_{CE} = 0.5\text{ Vdc}$) ($I_C = 100\text{ mA dc}, V_{CE} = 1.0\text{ Vdc}$)(1)	h_{FE}	25 30 20	— 120 —	—
Collector-Emitter Saturation Voltage(1) ($I_C = 10\text{ mA dc}, I_B = 1.0\text{ mA dc}$) ($I_C = 30\text{ mA dc}, I_B = 3.0\text{ mA dc}$) ($I_C = 30\text{ mA dc}, I_B = 3.0\text{ mA dc}, T_A = +85^\circ\text{C}$) ($I_C = 100\text{ mA dc}, I_B = 10\text{ mA dc}$)	$V_{CE(sat)}$	— — — —	0.15 0.2 0.4 0.5	Vdc
Base-Emitter Saturation Voltage(1) ($I_C = 10\text{ mA dc}, I_B = 1.0\text{ mA dc}$) ($I_C = 30\text{ mA dc}, I_B = 3.0\text{ mA dc}$) ($I_C = 100\text{ mA dc}, I_B = 10\text{ mA dc}$)	$V_{BE(sat)}$	0.78 0.85 —	0.98 1.2 1.7	Vdc

SMALL-SIGNAL CHARACTERISTICS

Output Capacitance ($V_{CB} = 5.0\text{ Vdc}, I_E = 0, f = 140\text{ kHz}$)	C_{obo}	—	6.0	pF
Input Capacitance ($V_{EB} = 0.5\text{ Vdc}, I_C = 0, f = 140\text{ kHz}$)	C_{ibo}	—	6.0	pF
Small-Signal Current Gain ($I_C = 30\text{ mA dc}, V_{CE} = 10\text{ Vdc}, f = 100\text{ MHz}$)	h_{fe}	4.0	—	—

SWITCHING CHARACTERISTICS

Turn-On Time ($V_{CC} = 2.0\text{ Vdc}, I_C \approx 30\text{ mA dc}, I_{B1} \approx 1.5\text{ mA dc}$)	t_{on}	—	60	ns
Turn-Off Time ($V_{CC} = 2.0\text{ Vdc}, I_C \approx 30\text{ mA dc}, I_{B1} = I_{B2} \approx 1.5\text{ mA dc}$)	t_{off}	—	75	ns

(1) Pulse Test: Pulse Width = 300 μs , Duty Cycle = 1.0%.