

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage(1)	V_{CEO}	12	Vdc
Collector-Emitter Voltage	V_{CES}	30	Vdc
Collector-Base Voltage	V_{CBO}	30	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	Vdc
Collector Current — Continuous Peak (10 μ s Pulse)	I_C	200 500	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	0.36 2.06	Watt mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$ Derate above 25°C	P_D	1.20 0.68 6.85	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	°C

2N3011

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

SWITCHING TRANSISTOR

NPN SILICON

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Refer to 2N2368 for graphs.

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(2) ($I_C = 10\text{ mAdc}, I_B = 0$)	$V_{(BR)CEO}$	12	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 10\text{ } \mu\text{Adc}, V_{BE} = 0$)	$V_{(BR)CES}$	30	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 10\text{ } \mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	30	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 100\text{ } \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current ($V_{CE} = 20\text{ Vdc}, V_{BE} = 0$) ($V_{CE} = 20\text{ Vdc}, V_{BE} = 0, T_A = +85^\circ\text{C}$)	I_{CES}	—	0.4 10	μAdc
Base Cutoff Current ($V_{CE} = 20\text{ Vdc}, V_{BE} = 0$)	I_{BL}	—	0.4	μAdc

ON CHARACTERISTICS (2)

DC Current Gain ($I_C = 10\text{ mAdc}, V_{CE} = 0.35\text{ Vdc}$) ($I_C = 30\text{ mAdc}, V_{CE} = 0.4\text{ Vdc}$) ($I_C = 100\text{ mAdc}, V_{CE} = 1.0\text{ Vdc}$)	h_{FE}	30 25 12	120 — —	—
Collector-Emitter Saturation Voltage ($I_C = 10\text{ mAdc}, I_B = 1.0\text{ mAdc}$) ($I_C = 30\text{ mAdc}, I_B = 3.0\text{ mAdc}$) ($I_C = 100\text{ mAdc}, I_B = 10\text{ mAdc}$) ($I_C = 10\text{ mAdc}, I_B = 1.0\text{ mAdc}, T_A = +85^\circ\text{C}$)	$V_{CE(sat)}$	— — — —	0.20 0.25 0.50 0.30	Vdc
Base-Emitter Saturation Voltage ($I_C = 10\text{ mAdc}, I_B = 1.0\text{ mAdc}$) ($I_C = 30\text{ mAdc}, I_B = 3.0\text{ mAdc}$) ($I_C = 100\text{ mAdc}, I_B = 10\text{ mAdc}$)	$V_{BE(sat)}$	0.72 — —	0.87 1.15 1.60	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ($I_C = 20\text{ mAdc}, V_{CE} = 10\text{ Vdc}, f = 100\text{ MHz}$)	f_T	400	—	MHz
Output Capacitance ($V_{CB} = 5.0\text{ Vdc}, I_E = 0, f = 140\text{ kHz}$)	C_{obo}	—	4.0	pF

SWITCHING CHARACTERISTICS

Storage Time ($I_C = I_{B1} = -I_{B2} = 10\text{ mAdc}$)	t_s	—	13	ns
Turn-On Time ($V_{CC} = 2.0\text{ Vdc}, V_{EB(off)} = 0, I_C = 30\text{ mAdc}, I_{B1} = 3.0\text{ mAdc}$)	t_{on}	—	15	ns
Turn-Off Time ($V_{CC} = 2.0\text{ Vdc}, I_C = 30\text{ mAdc}, I_{B1} = -I_{B2} = 3.0\text{ mAdc}$)	t_{off}	—	20	ns

(1) Applicable from 0.01 mA to 10 mA (Pulsed).

(2) Pulse Test: Pulse Length = 30 μ s, Duty Cycle $\leq 2.0\%$.