

# 2N706,A,B

(2N706 JAN AVAILABLE)  
CASE 22, STYLE 1  
TO-18 (TO-206AA)

## SWITCHING TRANSISTOR

NPN SILICON

Refer to 2N2368 for graphs.

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	2N706A,B V <sub>CEO</sub>	15	Vdc
Collector-Emitter Voltage(1)	V <sub>CER</sub>	20	Volts
Collector-Base Voltage	V <sub>CBO</sub>	25	Volts
Emitter-Base Voltage	2N706 2N706A 2N706B V <sub>EBO</sub>	3.0 5.0 5.0	Volts
Collector Current	2N706,A,B I <sub>C</sub>	50	mA
Total Device Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	0.3 2.0	Watt mW/°C
Total Device Dissipation @ T <sub>C</sub> = 25°C Derate above 25°C	P <sub>D</sub>	1.0 6.67	Watts mW/°C
Total Device Dissipation @ T <sub>C</sub> = 100°C Derate above 100°C	P <sub>D</sub>	0.5	Watt
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to +200	°C

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	150	°C/W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	500	°C/W

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

#### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage(2) (I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	15	—	Vdc
Collector-Emitter Breakdown Voltage(2) (R = 10 ohms, I <sub>C</sub> = 10 mAdc)	V <sub>(BR)CER</sub>	20	—	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 15 Vdc, I <sub>E</sub> = 0) (V <sub>CB</sub> = 15 Vdc, I <sub>E</sub> = 0, T <sub>A</sub> = 150°C) (V <sub>CB</sub> = 25 Vdc, I <sub>E</sub> = 0)	I <sub>CBO</sub>	—	0.5 30 10	μAdc
Collector Cutoff Current (V <sub>CE</sub> = 20 Vdc, R <sub>BE</sub> = 100k)	I <sub>CER</sub>	—	10	μAdc
Emitter Cutoff Current (V <sub>EB</sub> = 3.0 Vdc, I <sub>C</sub> = 0) (V <sub>EB</sub> = 5.0 Vdc, I <sub>C</sub> = 0)	I <sub>EBO</sub>	—	10 10	μAdc

#### ON CHARACTERISTICS

DC Current Gain(2) (I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 1.0 Vdc)	h <sub>FE</sub>	20 20	— 60	—
Collector-Emitter Saturation Voltage(2) (I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 1.0 mAdc)	V <sub>CE(sat)</sub>	—	0.6 0.4	Vdc
Base-Emitter Saturation Voltage(2) (I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 1.0 mAdc)	V <sub>BE(sat)</sub>	—	0.9 0.9	Vdc

#### SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product (V <sub>CE</sub> = 15 Vdc, I <sub>E</sub> = 10 mAdc, f = 100 MHz)	f <sub>T</sub>	200	—	MHz
Output Capacitance (V <sub>CB</sub> = 5.0 Vdc, I <sub>E</sub> = 0) (V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0)	C <sub>obo</sub>	—	5.0 6.0	pF
Magnitude of Forward Current Transfer Ratio, Common-Emitter (V <sub>CE</sub> = 15 Vdc, I <sub>E</sub> = 10 mAdc, f = 100 MHz) (V <sub>CE</sub> = 10 Vdc, I <sub>E</sub> = 10 mAdc, f = 100 MHz)	h <sub>fe</sub>	2.0 2.0	— —	—

## 2N706,A,B

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

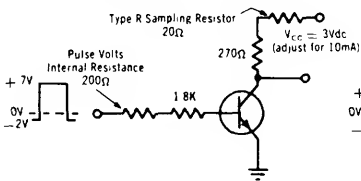
Characteristic	Symbol	Min	Max	Unit
Collector Base Time Constant ( $V_{CE} = 15\text{ Vdc}$ , $I_E = 10\text{ mAdc}$ , $f = 300\text{ MHz}$ )	$r_b$	—	50	ohms
Storage Time 2N706B	$t_s$	—	25	ns
Turn-On Time ( $I_{B1} = 3.0\text{ mA}$ , $I_{B2} = 1.0\text{ mA}$ )	$t_{on}$	—	40	ns
Turn-Off Time ( $I_{B1} = 3.0\text{ mA}$ , $I_{B2} = 1.0\text{ mA}$ )	$t_{off}$	—	75	ns
Charge Storage Time Constant(2) 2N706 2N706A,B	$\tau_s$	—	60 25	ns

(1) Refers to collector breakdown voltage in the high current region when  $R_{BE} = 10\ \Omega$

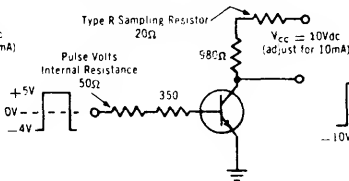
(2) Pulse Test: Pulse Width  $\leq 12\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

(3) Switching Times Measured with Tektronix Type R Plug-In (50  $\Omega$  Internal Impedance).

#### SWITCHING TIME TEST CIRCUIT



#### STORAGE TIME TEST CIRCUIT



#### MEASUREMENT CIRCUIT

