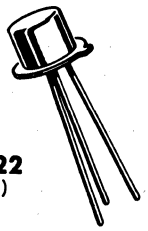
2N744 (SILICON)



CASE 22
(TO-18)

Collector connected to case

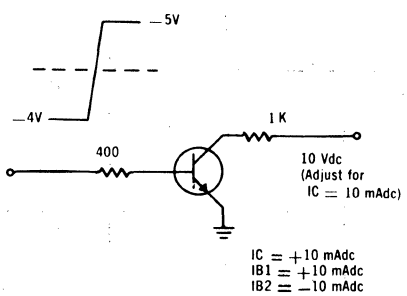
NPN silicon annular transistor for high-speed switching applications.

MAXIMUM RATINGS

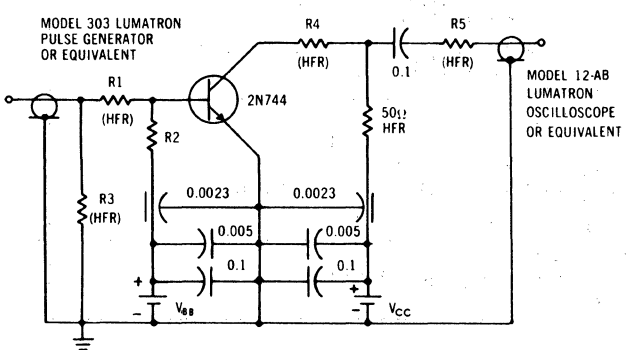
Rating	Symbol	Value	Unit
Collector-Base Voltage	V_{CB}	20	Vdc
Collector-Emitter Voltage*	V_{CEO}	12*	Vdc
Emitter-Base Voltage	V_{EB}	5.0	Vdc
Collector DC Current	I_C	200	mAdc
Total Device Dissipation at 25°C Case Temperature (Derate 6.67 mW/°C above 25°C)	P_D	1.0	Watt
Total Device Dissipation at 25°C Ambient Temperature Derate above 25°C	P_D	0.3 2.0	Watt mW/°C
Junction Temperature	T_J	+200	°C
Storage Temperature	T_{stg}	-65 to +200	°C

*Refers to the voltage at which the magnitude of h_{FE} approaches one when the emitter-base diode is open-circuited.

SWITCHING TIME TEST CIRCUIT



CHARGE STORAGE TEST CIRCUIT



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

Characteristic	Symbol	Min	Typ	Max	Unit
Collector Cutoff Current (V_{CE} = 20 Vdc, I_E = 0) (V_{CE} = 20 Vdc, I_B = 0, T_A = 170°C)	I_{CES}	 – –	 .005 –	 1.0 100	μAdc
Collector Cutoff Current (V_{CE} = 10 Vdc, V_{BE} = 0.35 Vdc, T_A = 100°C)	I_{CEX}	–	–	30	μAdc
Emitter Cutoff Current (V_{EB} = 5 Vdc, I_C = 0)	I_{EBO}	–	–	10	μAdc
Collector-Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)*	BV_{CEO}	12	30	–	Vdc
Forward Current Transfer Ratio (I_C = 1.0 mAdc, V_{CE} = 0.25 Vdc) (I_C = 10 mAdc, V_{CE} = 0.35 Vdc) (I_C = 10 mAdc, V_{CE} = 0.35 Vdc, T_A = -55°C) (I_C = 100 mAdc, V_{CE} = 1.0 Vdc)*	h_{FE}	 20 40 20 20	 – – – –	 – 120 – –	–
Small Signal Forward Current Transfer Ratio (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	h_{fe}	2.8	4.5	–	–
Base-Emitter Voltage (I_C = 10 mAdc, I_B = 1 mAdc) (I_C = 10 mAdc, I_B = 1 mAdc, T_A = -55°C) (I_C = 100 mAdc, I_B = 10 mAdc)* (I_C = 100 mAdc, I_B = 10 mAdc, T_A = -55°C) (1)	V_{BE}	 0.7 – – –	 – – – –	 0.85 1.1 1.5 1.6	Vdc
Collector-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1 mAdc, T_A = 170°C) (I_C = 100 mAdc, I_B = 10 mAdc, T_A = 170°C) (1)	$V_{CE(sat)}$	 – –	 – –	 0.35 1.0	Vdc
Output Capacitance (V_{CB} = 5 Vdc, I_E = 0)	C_{ob}	–	3.0	5.0	pF
Turn-on Time (Condition 1) (Condition 2) (Condition 3) (Condition 4)	t_{on}	 – – – –	 26 10 7.0 6.0	 – 16 – 12	ns
Turn-off Time (Condition 1) (Condition 2) (Condition 3) (Condition 4)	t_{off}	 – – – –	 30 17 18 23	 – 24 – 45	ns
Charge Storage Time Constant (I_C = 10 mAdc, I_{B1} = $-I_{B2}$ = 10 mAdc)	τ_s	–	–	18	ns

(1) Pulse Test: Pulse width ≤ 300 μs, duty cycle ≤ 2%

CONDITION	I_C mA	I_{B1} mA	I_{B2} mA	$V_{BE(off)}$ Vdc	V_{CC} Vdc	$R_1 = R_2$ Ω	R_3 Ω	R_4 Ω	R_5 Ω	t_{on}		t_{off}	
										V_{BB} V	V_{IN} V	V_{BB} V	V_{IN} V
1	3	1	-0.5	-0.9	3.4	6.8 K	50	1 K	0	-1.8	10.2	8.4	-10.2
2	10	3	-1.5	-1.5	3.0	3.3 K	50	220	0	-3.0	15.0	12.0	-15 0
3	50	15	-7.5	-1.8	4.0	680	50	18	1 K	-3.5	15.3	* 11.7	-15.3
4	100	40	-20.0	-2.4	6.0	330	56	0	1 K	-4.5	20.0	*15.3	-20.0

*V_{BB} is pulsed for 1.5 s @ less than 10% duty cycle

2N753 (SILICON)

For Specifications, See 2N706 Data.