2N743 (SILICON)

NPN silicon annular transistor designed for high-speed, low-current, saturated switching operations.

CASE 22
(TO-18)

Collector connected to case

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	12	Vdc
Collector-Base Voltage	V_{CB}	20	Vdc
Emitter-Base Voltage	V_{EB}	5.0	Vdc
Collector Current - Continuous	I_C	200	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	300 1.71	mW mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	°C

SWITCHING TEST CIRCUITS

FIGURE 1 — TURN-ON AND TURN-OFF TIME TEST CIRCUIT

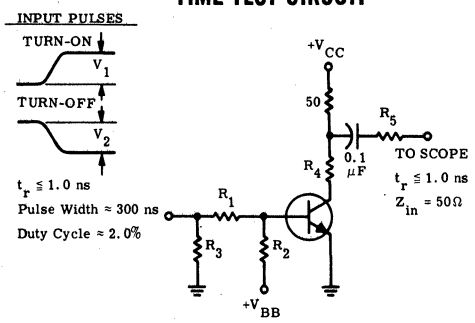
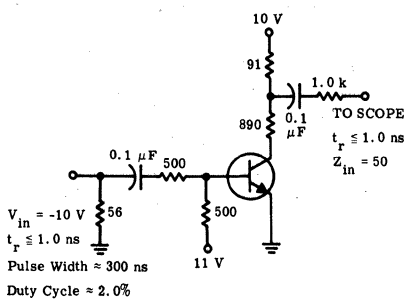


FIGURE 2 — CHARGE-STORAGE TIME TEST CIRCUIT



	CIRCUIT CONDITIONS								
	(VOLTS)					(OHMS)			
	t_{on}		t_{off}						
Condition	V_1	V_{BB}	V_2	V_{BB}	V_{CC}	$R_1 = R_2$	R_3	R_4	R_5
1	15	-3.0	-15	+12	3.0	3.3 k	50	220	-
2	20	-4.5	-20	+15.3*	6.0	330	56	-	1.0 k

* V_{BB} is pulsed for 1.5 s at less than 10% Duty Cycle to maintain $T_C < 30°C$.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)	BV_{CEO}	12	-	Vdc
Collector-Cutoff Current (V_{CE} = 20 Vdc, V_{BE} = 0)	I_{CES}	-	1.0	μAdc
(V_{CE} = 20 Vdc, V_{BE} = 0, T_A = 170°C)		-	100	
Collector Cutoff Current (V_{CE} = 10 Vdc, $V_{EB(off)}$ = 0.35 Vdc, T_A = 100°C)	I_{CEX}	-	30	μAdc
Collector Cutoff Current (V_{CB} = 20 Vdc, I_E = 0)	I_{CBO}	-	1.0	μAdc
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)	I_{EBO}	-	10	μAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 1.0 mAdc, V_{CE} = 0.25 Vdc)	h_{FE}	10	-	
(I_C = 10 mAdc, V_{CE} = 0.35 Vdc)		20	60	
(I_C = 10 mAdc, V_{CE} = 0.35 Vdc, T_A = -55°C)		10	-	
(I_C = 100 mAdc, V_{CE} = 1.0 Vdc)		10	-	
Collector-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1.0 mAdc, T_A = 170°C)	$V_{CE(sat)}$	-	0.35	Vdc
(I_C = 100 mAdc, I_B = 10 mAdc, T_A = 170°C)		-	1.0	
(I_C = 10 mAdc, I_B = 1.0 mAdc, T_A = -55°C)		-	1.1	
Base-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1.0 mAdc)	$V_{BE(sat)}$	0.65	0.85	Vdc
(I_C = 10 mAdc, I_B = 1.0 mAdc, T_A = -55°C)		-	1.1	
(I_C = 100 mAdc, I_B = 10 mAdc)		-	1.5	
(I_C = 100 mAdc, I_B = 10 mAdc, T_A = -55°C)		-	1.6	
DYNAMIC CHARACTERISTICS				
Current-Gain—Bandwidth Product (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	f_T	282	-	MHz
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	-	5.0	pF
Turn-On Time (V_{CC} = 3.0 Vdc, $V_{BE(off)}$ = 1.5 Vdc, I_C = 10 mAdc, I_{B1} = 3.0 mAdc, Condition 1)	t_{on}	-	16	ns
(V_{CC} = 6.0 Vdc, $V_{BE(off)}$ = 2.4 Vdc, I_C = 100 mAdc, I_{B1} = 40 mAdc, Figure 1, Condition 2)		-	12	
Turn-Off Time (V_{CC} = 3.0 Vdc, I_C = 10 mAdc, I_{B1} = 3.0 mAdc, I_{B2} = 1.5 mAdc, Condition 1)	t_{off}	-	24	ns
(V_{CC} = 6.0 Vdc, I_C = 100 mAdc, I_{B1} ≈ 40 mAdc, I_{B2} ≈ 20 mAdc, Figure 1, Condition 2)		-	40	
Storage Time (I_C = 10 mAdc, I_{B1} = I_{B2} = 10 mAdc, V_{CC} = 10 Vdc, Figure 2)	t_s	-	14	ns