

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CE0}	15	Vdc
Collector-Emitter Voltage	V_{CES}	40	Vdc
Collector-Base Voltage	V_{CBO}	40	Vdc
Emitter-Base Voltage	V_{EBO}	4.5	Vdc
Collector Current (10 μ s pulse)	$I_C(\text{Peak})$	500	mA
Collector Current — Continuous	I_C	200	mA
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	0.36 2.06	Watt mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 100^\circ\text{C}$ Derate above 100°C	P_D	.68 6.85	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	486	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	147	$^\circ\text{C}/\text{W}$

2N2369,A★

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

SWITCHING TRANSISTORS

NPN SILICON

★2N2369A is a Motorola designated preferred device.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ($I_C = 10 \mu\text{A}, V_{BE} = 0$)	$V_{(BR)CES}$	40	—	Vdc
Collector-Emitter Sustaining Voltage(1) ($I_C = 10 \text{ mAdc}, I_B = 0$)	$V_{CE0(\text{sus})}$	15	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 10 \mu\text{A}, I_B = 0$)	$V_{(BR)CBO}$	40	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	4.5	—	Vdc
Collector Cutoff Current ($V_{CB} = 20 \text{ Vdc}, I_E = 0$) ($V_{CB} = 20 \text{ Vdc}, I_E = 0, T_A = 150^\circ\text{C}$)	I_{CBO}	— —	0.4 30	μAdc
Collector Cutoff Current ($V_{CE} = 20 \text{ Vdc}, V_{BE} = 0$)	I_{CES}	—	0.4	μAdc
Base Current ($V_{CE} = 20 \text{ Vdc}, V_{BE} = 0$)	I_B	—	0.4	μAdc
ON CHARACTERISTICS				
DC Current Gain(1) ($I_C = 10 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc}$)	h_{FE}	40 —	120 120	—
($I_C = 10 \text{ mAdc}, V_{CE} = 1.0 \text{ Vdc}, T_A = -55^\circ\text{C}$)	2N2369	20	—	
($I_C = 10 \text{ mAdc}, V_{CE} = 0.35 \text{ Vdc}, T_A = -55^\circ\text{C}$)	2N2369A	20	—	
($I_C = 30 \text{ mAdc}, V_{CE} = 0.4 \text{ Vdc}$)	2N2369A	30	—	

2N2369,A

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

Characteristic	Symbol	Min	Max	Unit
($I_C = 100\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$)	2N2369A	20	—	
($I_C = 100\text{ mAdc}$, $V_{CE} = 2.0\text{ Vdc}$)	2N2369	20	—	
Collector-Emitter Saturation Voltage(1) ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$)	2N2369 2N2369A	— —	0.25 0.20	Vdc
($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$, $T_A = +125^\circ\text{C}$)	2N2369A	—	0.30	
($I_C = 30\text{ mAdc}$, $I_B = 3.0\text{ mAdc}$)	2N2369A	—	0.25	
($I_C = 100\text{ mAdc}$, $I_B = 10\text{ mAdc}$)	2N2369A	—	0.50	
Base-Emitter Saturation Voltage(1) ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$)	All Types	0.70	0.85	Vdc
($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$, $T_A = +125^\circ\text{C}$)	2N2369A	0.59	—	
($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$, $T_A = -55^\circ\text{C}$)	2N2369A	—	1.02	
($I_C = 30\text{ mAdc}$, $I_B = 3.0\text{ mAdc}$)	2N2369A	—	1.15	
($I_C = 100\text{ mAdc}$, $I_B = 10\text{ mAdc}$)	2N2369A	—	1.60	

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ($I_C = 10\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	500	—	MHz
Output Capacitance ($V_{CB} = 5.0\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{obo}	—	4.0	pF
Input Capacitance ($V_{EB} = 1.0\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ibo}	—	4.0	pF

SWITCHING CHARACTERISTICS

Storage Time ($I_C = I_{B1} = 10\text{ mAdc}$, $I_{B2} = -10\text{ mAdc}$)	t_s	—	13	ns
Turn-On Time ($I_C = 10\text{ mAdc}$, $I_{B1} = 3.0\text{ mA}$, $I_{B2} = -1.5\text{ mA}$, $V_{CC} = 3.0\text{ Vdc}$)	t_{on}	—	12	ns
Turn-Off Time ($I_C = 10\text{ mAdc}$, $I_{B1} = 3.0\text{ mA}$, $I_{B2} = -1.5\text{ mA}$, $V_{CC} = 3.0\text{ Vdc}$)	t_{off}	—	18	ns

(1) Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

SWITCHING TIME EQUIVALENT TEST CIRCUITS FOR 2N2369, 2N3227

FIGURE 1 — t_{on} CIRCUIT — 10 mA

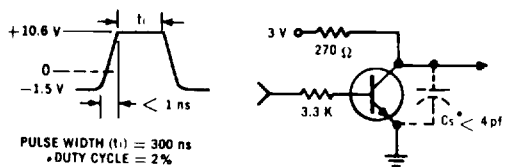


FIGURE 3 — t_{off} CIRCUIT — 10 mA

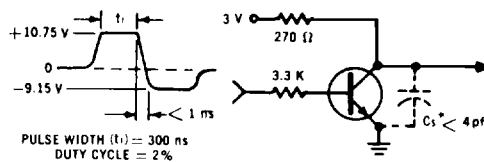


FIGURE 2 — t_{on} CIRCUIT — 100 mA

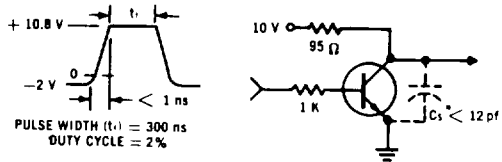
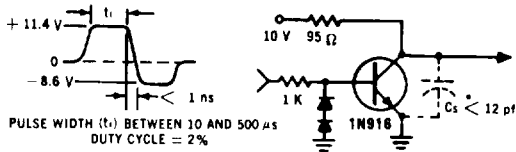


FIGURE 4 — t_{off} CIRCUIT — 100 mA



* Total shunt capacitance of test jig and connectors.

FIGURE 5 — TURN-ON AND TURN-OFF TIME TEST CIRCUIT

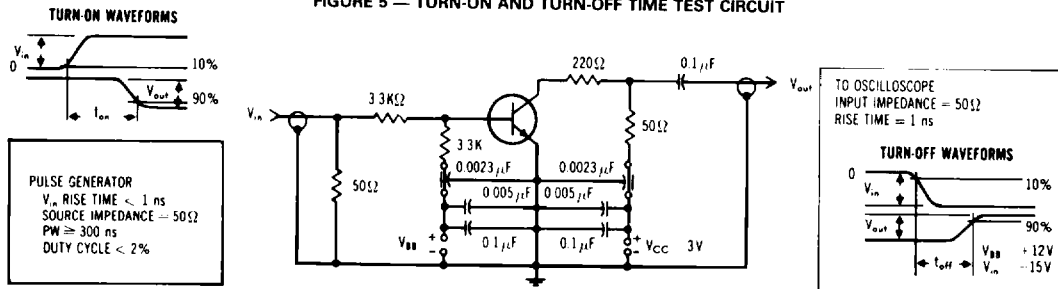


FIGURE 6 — JUNCTION CAPACITANCE VARIATIONS

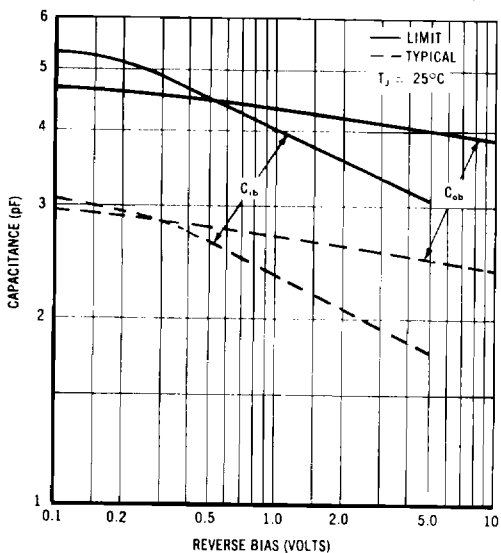


FIGURE 7 — TYPICAL SWITCHING TIMES

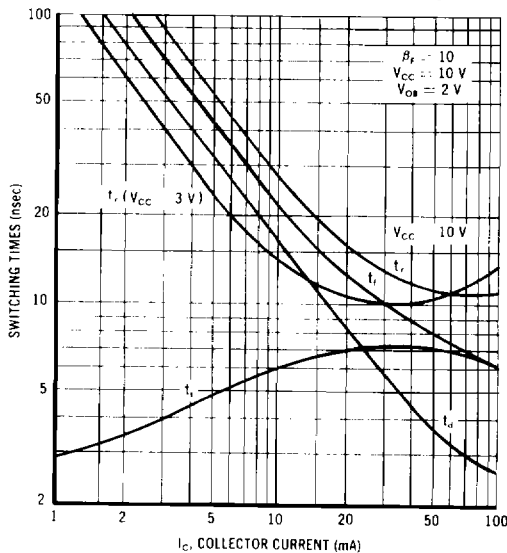


FIGURE 8 — MAXIMUM CHARGE DATA

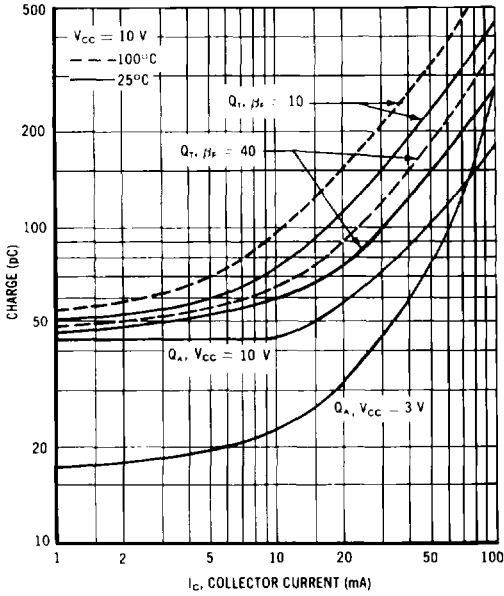


FIGURE 9 — Q_T TEST CIRCUIT

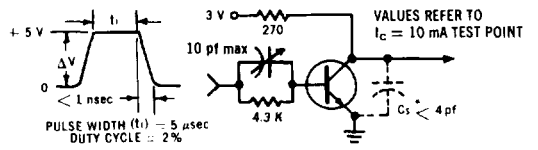


FIGURE 10 — TURN-OFF WAVE FORM

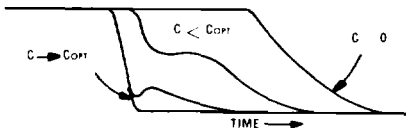


FIGURE 11 — STORAGE TIME EQUIVALENT TEST CIRCUIT

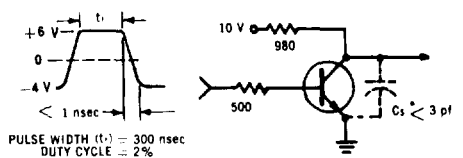


FIGURE 12 — MAXIMUM COLLECTOR SATURATION VOLTAGE CHARACTERISTICS

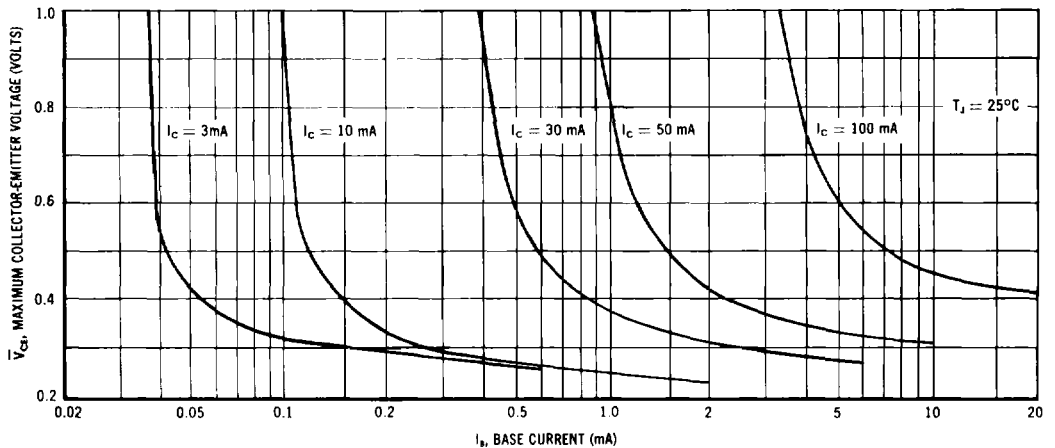


FIGURE 13 — MINIMUM CURRENT GAIN CHARACTERISTICS

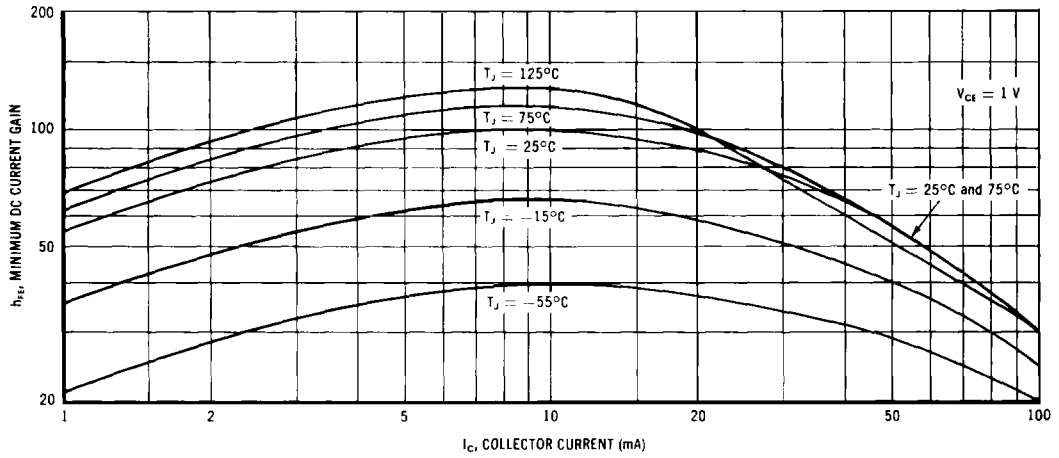


FIGURE 14 — SATURATION VOLTAGE LIMITS

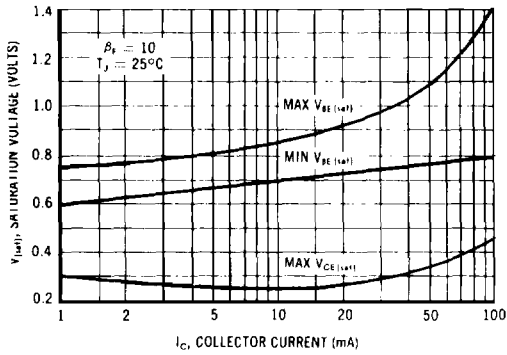


FIGURE 15 — TYPICAL TEMPERATURE COEFFICIENTS

