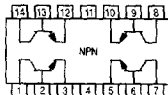


# Quad Switching Transistor

## NPN Silicon



**MPQ2369**

Motorola Preferred Device



CASE 646-06, STYLE 1  
TO-116

### MAXIMUM RATINGS

Rating	Symbol	Value		Unit
Collector-Emitter Voltage	$V_{CEO}$	15		Vdc
Collector-Base Voltage	$V_{CBO}$	40		Vdc
Emitter-Base Voltage	$V_{EBO}$	4.5		Vdc
Collector Current — Continuous	$I_C$	500		mAdc
		Each Transistor	Total Device	
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	0.5 5.0	1.5 15	Watts mW/°C
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +125		°C

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	83	°C/W

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

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage <sup>(1)</sup> ( $I_C = 10 \text{ mAdc}, I_E = 0$ )	$V_{(BR)CEO}$	15	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 10 \text{ } \mu\text{Adc}, I_E = 0$ )	$V_{(BR)CBO}$	40	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10 \text{ } \mu\text{Adc}, I_C = 0$ )	$V_{(BR)EBO}$	4.5	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 20 \text{ Vdc}, I_E = 0$ )	$I_{CBO}$	—	—	0.4	$\mu\text{Adc}$

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

Preferred devices are Motorola recommended choices for future use and best overall value.

**MPQ2369****ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain <sup>(1)</sup> ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ ) ( $I_C = 100\text{ mAdc}$ , $V_{CE} = 2.0\text{ Vdc}$ )	$h_{FE}$	40 20	— —	— —	—
Collector–Emitter Saturation Voltage ( $I_C = 10\text{ mAdc}$ , $I_B = 1.0\text{ mAdc}$ )	$V_{CE(sat)}$	—	—	0.25	Vdc
Base–Emitter Saturation Voltage ( $I_C = 10\text{ mAdc}$ , $I_B = 1.0\text{ mAdc}$ )	$V_{BE(sat)}$	—	—	0.9	Vdc
<b>SMALL–SIGNAL CHARACTERISTICS</b>					
Current–Gain — Bandwidth Product ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$f_T$	450	550	—	MHz
Output Capacitance ( $V_{CB} = 5.0\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	—	2.5	4.0	pF
Input Capacitance ( $V_{EB} = 0.5\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ibo}$	—	3.0	5.0	pF
<b>SWITCHING CHARACTERISTICS</b>					
Turn–On Time ( $V_{CC} = 3.0\text{ Vdc}$ , $V_{BE} = 1.5\text{ Vdc}$ , $I_C = 10\text{ mAdc}$ , $I_{B1} = 3.0\text{ mAdc}$ )	$t_{on}$	—	9.0	—	ns
Turn–Off Time ( $V_{CC} = 3.0\text{ Vdc}$ , $I_C = 10\text{ mAdc}$ , $I_{B1} = 3.0\text{ mAdc}$ , $I_{B2} = 1.5\text{ mAdc}$ )	$t_{off}$	—	15	—	ns

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

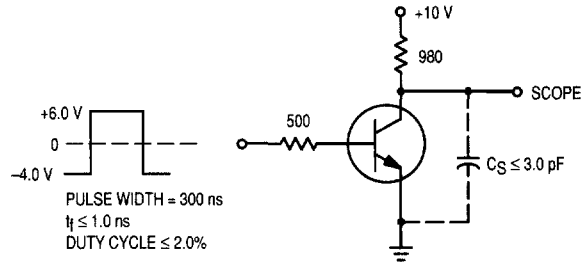


Figure 1. Storage Time Test Circuit

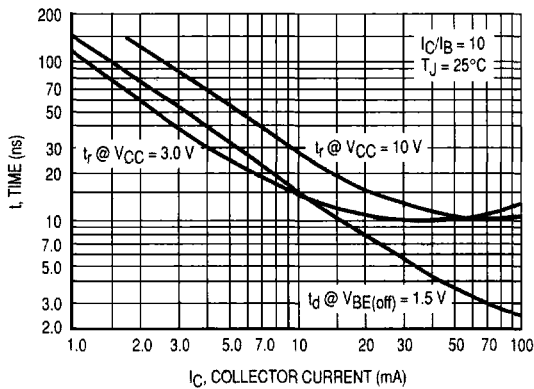


Figure 2. Turn-On Time

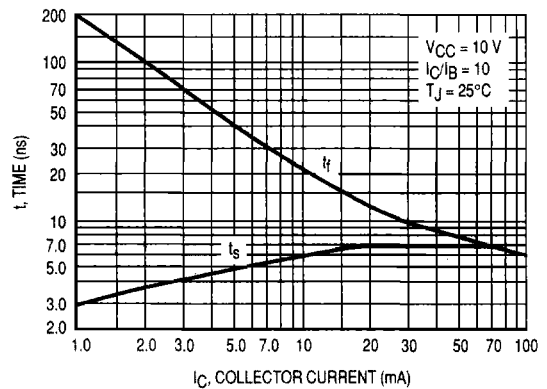


Figure 3. Turn-Off Time

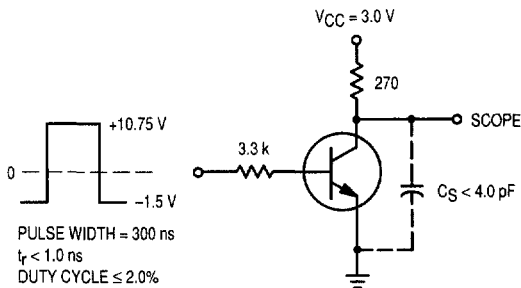


Figure 4. Turn-On Test Circuit

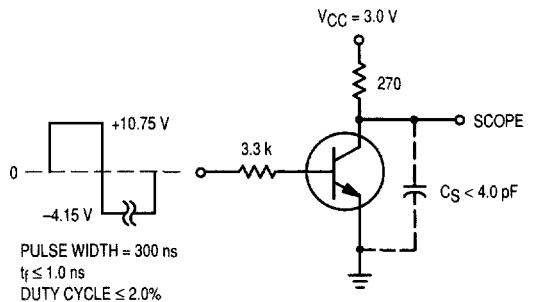


Figure 5. Turn-Off Test Circuit

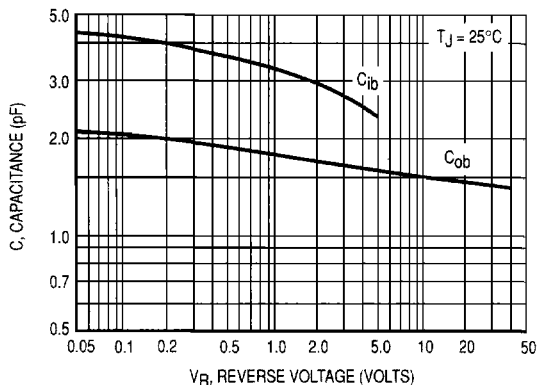


Figure 6. Capacitance

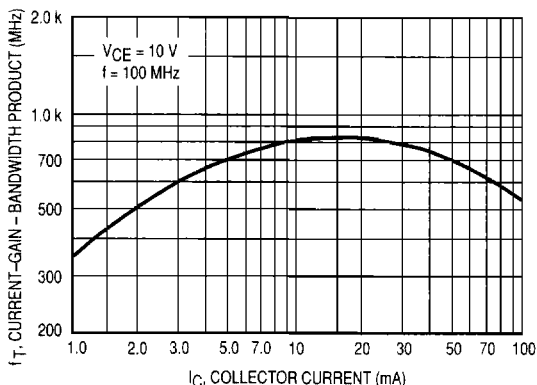


Figure 7. Current-Gain — Bandwidth Product

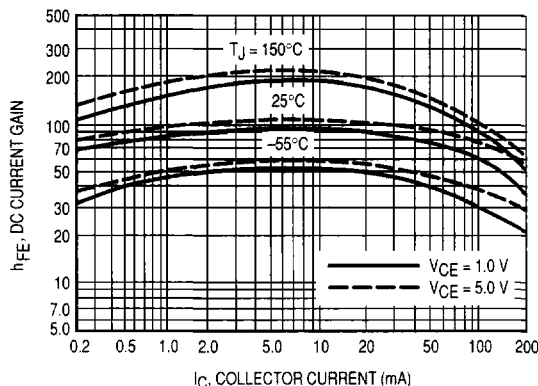


Figure 8. DC Current Gain

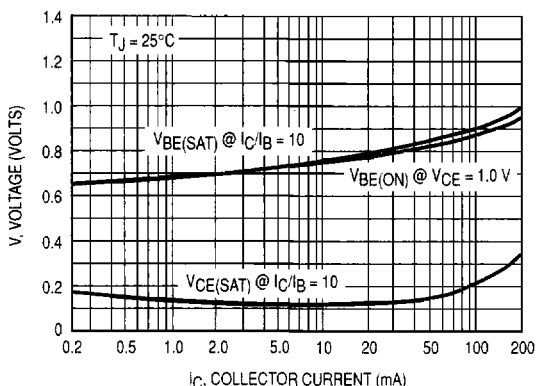


Figure 9. "ON" Voltages

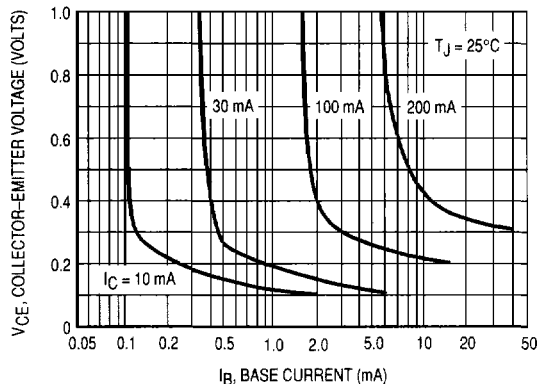


Figure 10. Collector Saturation Region

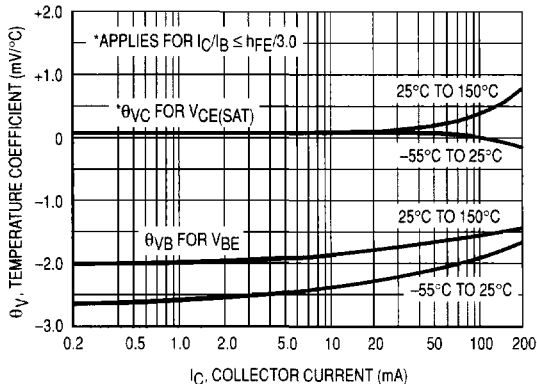


Figure 11. Temperature Coefficients