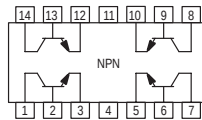


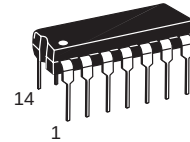
Quad Core Driver Transistor

NPN Silicon



MPQ3725

Motorola Preferred Device



CASE 646-06, STYLE 1
TO-116

MAXIMUM RATINGS

Rating	Symbol	Value		Unit
Collector–Emitter Voltage	V_{CEO}	40		Vdc
Collector–Emitter Voltage	V_{CES}	60		Vdc
Emitter–Base Voltage	V_{EBO}	5.0		Vdc
Collector Current — Continuous	I_C	1.0		Adc
		One Transistor	Four Transistors Equal Power	
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0 8.0	2.5 20	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max		Unit
		One Transistor	Effective For Four Transistors	
Thermal Resistance, Junction to Ambient(1)	$R_{\theta JA}$	125	50	$^\circ\text{C}/\text{W}$

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(2) ($I_C = 10 \text{ mAdc}$, $I_E = 0$)	$V_{(BR)CEO}$	40	—	—	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 100 \mu\text{Adc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	60	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}$, $I_C = 0$)	$V_{(BR)EBO}$	5.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 40 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	0.5	μAdc

1. $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.

2. 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.

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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS(2)					
DC Current Gain ($I_C = 100\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 500\text{ mAdc}$, $V_{CE} = 2.0\text{ Vdc}$)	h_{FE}	35 25	75 45	200 —	—
Collector–Emitter Saturation Voltage ($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$)	$V_{CE(sat)}$	—	0.32	0.45	Vdc
Base–Emitter Saturation Voltage ($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$)	$V_{BE(sat)}$	0.8	0.9	1.1	Vdc

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ($I_C = 50\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	250	275	—	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{obo}	—	5.1	10	pF
Input Capacitance ($V_{EB} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ibo}	—	62	80	pF

SWITCHING CHARACTERISTICS

Turn–On Time ($I_C = 500\text{ mAdc}$, $I_{B1} = 50\text{ mAdc}$ $V_{BE(off)} = -3.8\text{ Vdc}$)	t_{on}	—	20	35	ns
Turn–Off Time ($I_C = 500\text{ mAdc}$, $I_{B1} = I_{B2} = 50\text{ mAdc}$)	t_{off}	—	50	60	ns

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

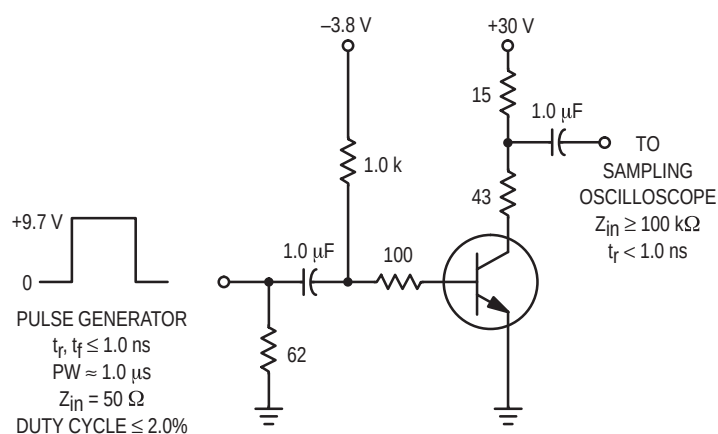


Figure 1. Switching Times Test Circuit

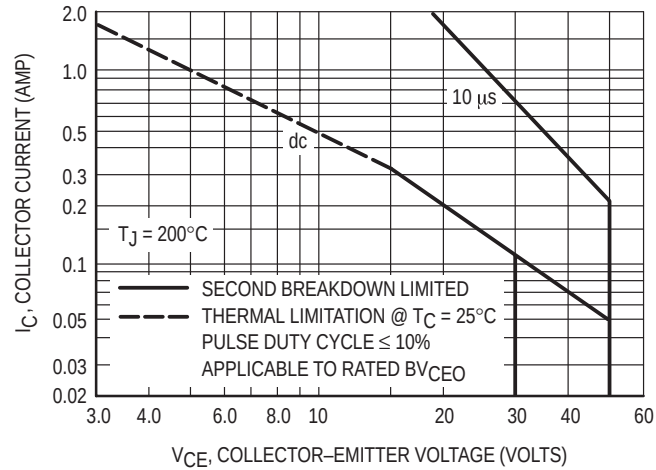


Figure 2. Active-Region Safe Operating Area

TYPICAL DC CHARACTERISTICS

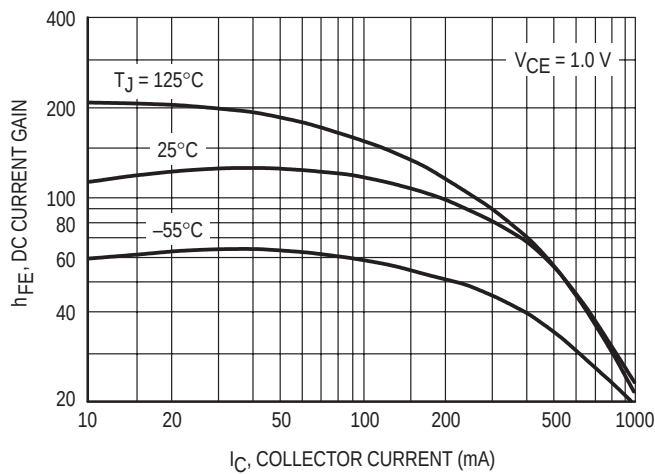


Figure 3. DC Current Gain

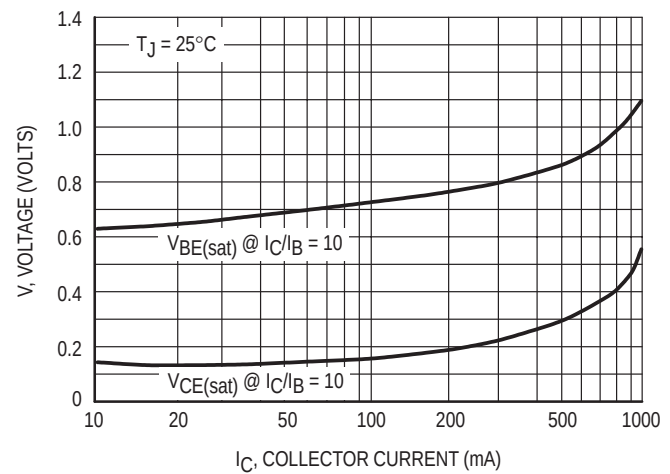


Figure 4. "ON" Voltages

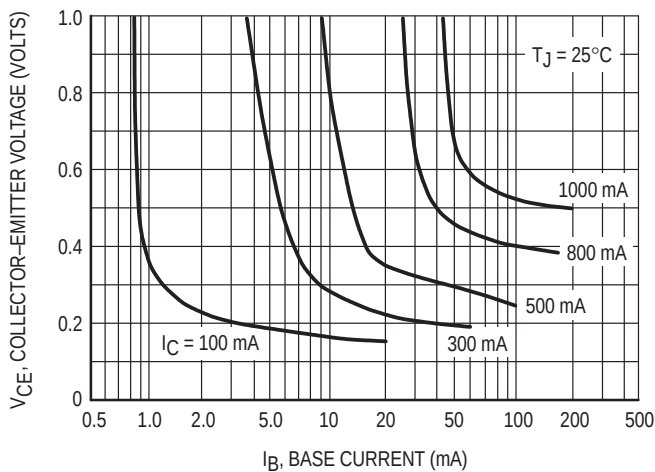


Figure 5. Collector Saturation Region

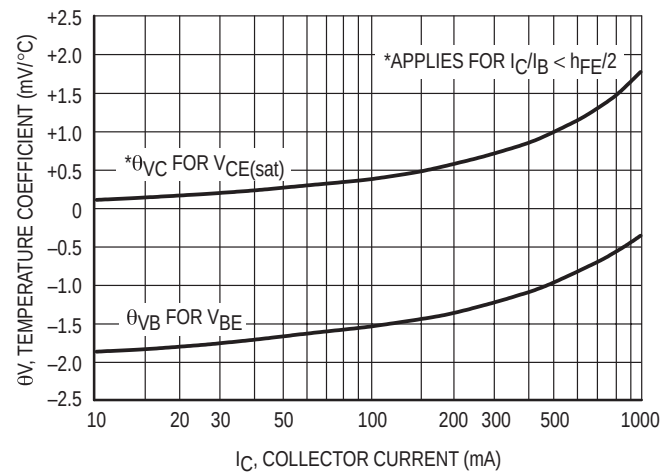


Figure 6. Temperature Coefficients

TYPICAL DYNAMIC CHARACTERISTICS

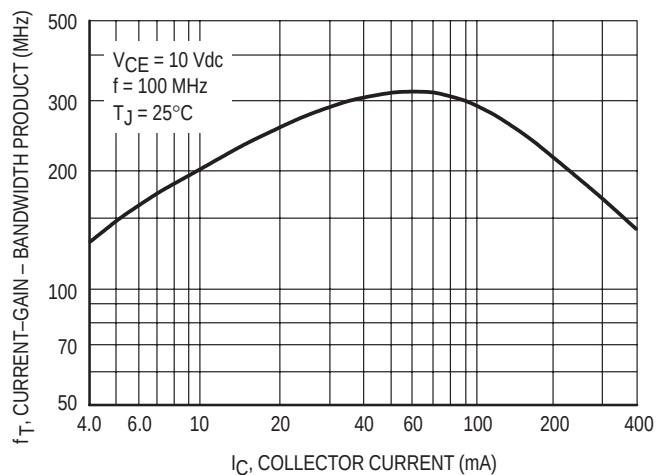


Figure 7. Current-Gain — Bandwidth Product

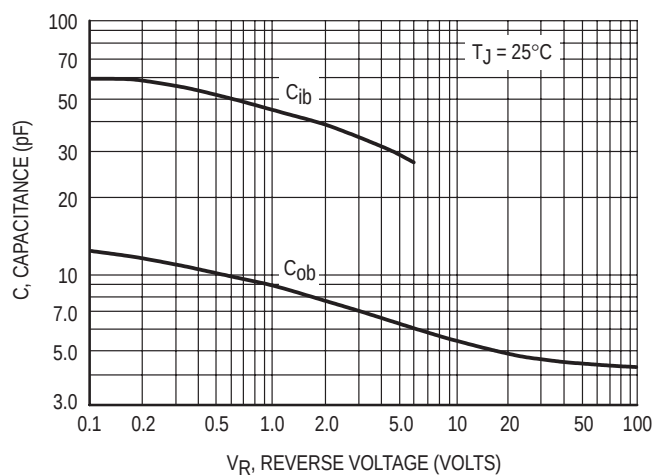


Figure 8. Capacitance

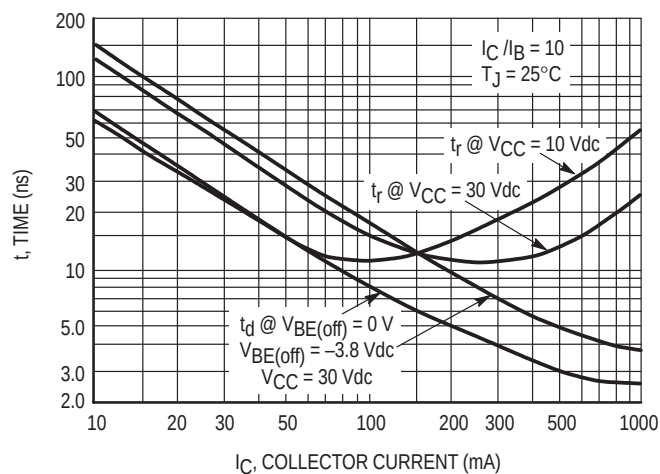


Figure 9. Turn-On Time

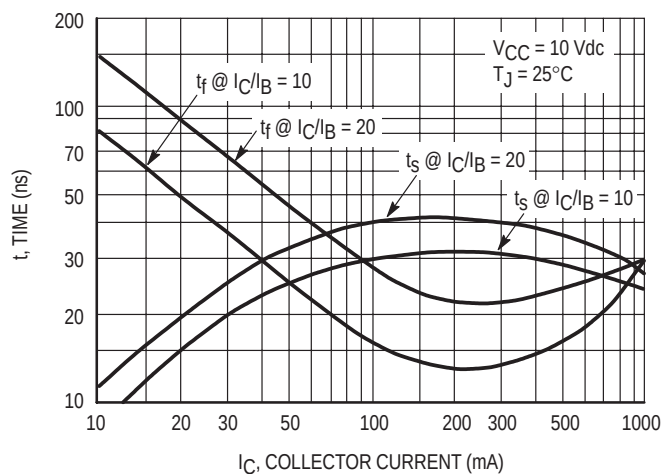


Figure 10. Turn-Off Time

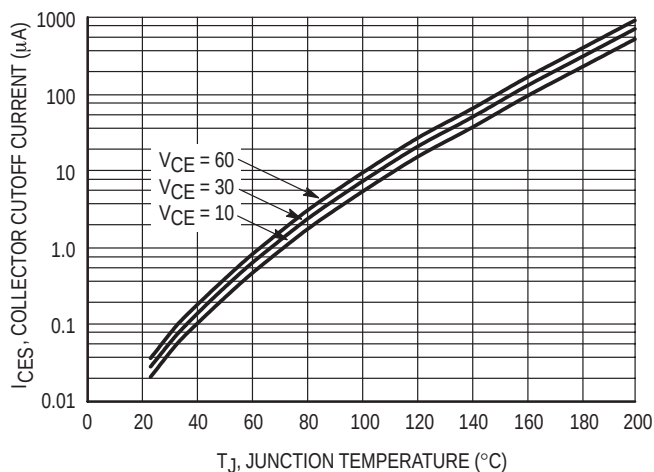


Figure 11. Collector Cutoff Current