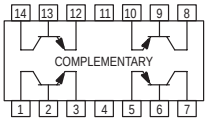
Quad Complementary Pair Transistor

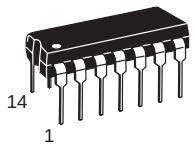
NPN/PNP Silicon



TYPE B

MPQ6842

Voltage and current are negative for PNP transistors



CASE 646–06, STYLE 1
TO–116
TYPE B

MAXIMUM RATINGS

Rating	Symbol	Value		Unit
Collector–Emitter Voltage	V_{CEO}	30		Vdc
Collector–Base Voltage	V_{CBO}	30		Vdc
Emitter–Base Voltage	V_{EBO}	4.0		Vdc
Collector Current — Continuous	I_C	200		mAdc
		Each Transistor	**Four Transistors Equal Power**	
Total Device Dissipation @ T_A = 25°C(1) Derate above 25°C	P_D	500 4.0	900 7.2	mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	825 6.7	2400 19.2	mW mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150		°C

THERMAL CHARACTERISTICS

Characteristic		Junction to Case	Junction to Ambient	Unit
Thermal Resistance	Each Die	151	250	°C/W
	Effective, 4 Die	52	139	°C/W
Coupling Factors	Q1–Q4 or Q2–Q3	34	70	%
	Q1–Q2 or Q3–Q4	2.0	26	%

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage(2) (I_C = 10 mAdc, I_B = 0)	$V_{(BR)CEO}$	30	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	$V_{(BR)CBO}$	30	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = 20 Vdc, I_E = 0)	I_{CBO}	—	—	50	nAdc
Emitter Cutoff Current (V_{EB} = 3.0 Vdc, I_E = 0)	I_{EBO}	—	—	50	nAdc

1. Second Breakdown occurs at power levels greater than 3 times the power dissipation rating.
2. Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 2.0%.

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

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS(2)						
DC Current Gain		h_{FE}				—
(I_C = 0.5 mAdc, V_{CE} = 1.0 Vdc)			30	—	—	
(I_C = 1.0 mAdc, V_{CE} = 1.0 Vdc)			50	—	—	
(I_C = 10 mAdc, V_{CE} = 1.0 Vdc)			70	—	—	
Collector–Emitter Saturation Voltage		$V_{CE(sat)}$				Vdc
(I_C = 0.5 mAdc, I_B = 0.05 mAdc, 0°C ≤ T ≤ 70°C)			—	0.05	0.15	
Base–Emitter Saturation Voltage		$V_{BE(sat)}$				Vdc
(I_C = 0.5 mAdc, I_B = 0.05 mAdc)			—	0.65	0.9	
SMALL–SIGNAL CHARACTERISTICS						
Current–Gain — Bandwidth Product(2)		f_T				MHz
(I_C = 10 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)			200	350	—	
Output Capacitance		C_{obo}				pF
(V_{CB} = 5.0 Vdc, I_E = 0, f =1.0 MHz)			—	3.0	4.5	
Input Capacitance		C_{ibo}				pF
(V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)	PNP		—	5.0	10	
	NPN		—	4.0	8.0	
SWITCHING CHARACTERISTICS (T_A = 25°C, V_{CC} = 5.0 Vdc)						
Propagation Delay Time						ns
(50% Points TP1 to TP3)		t_{PLH}	—	15	25	
(50% Points TP2 to TP4)		t_{PHL}	—	6.0	15	
Rise Time		t_r				ns
(0.3 V to 4.7 V, TP3 or TP4)			5.0	25	35	
Fall Time		t_f				ns
(4.7 V to 0.3 V, TP3 or TP4)			5.0	10	20	

2. Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 2.0%.

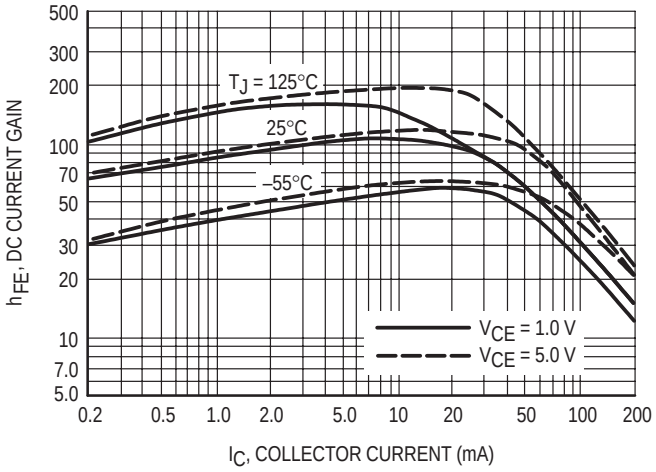


Figure 1. DC Current Gain

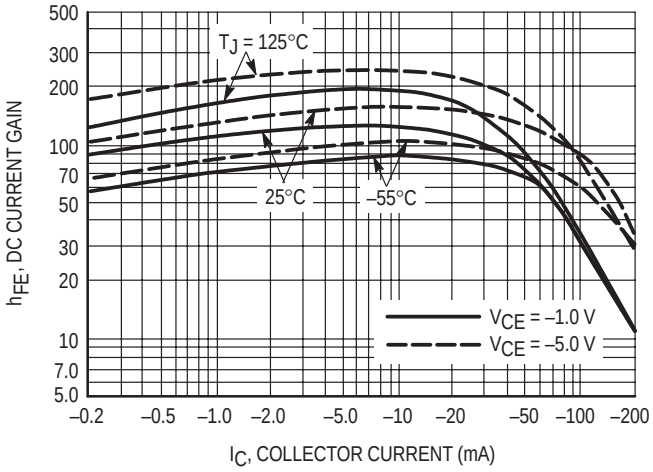


Figure 2. DC Current Gain

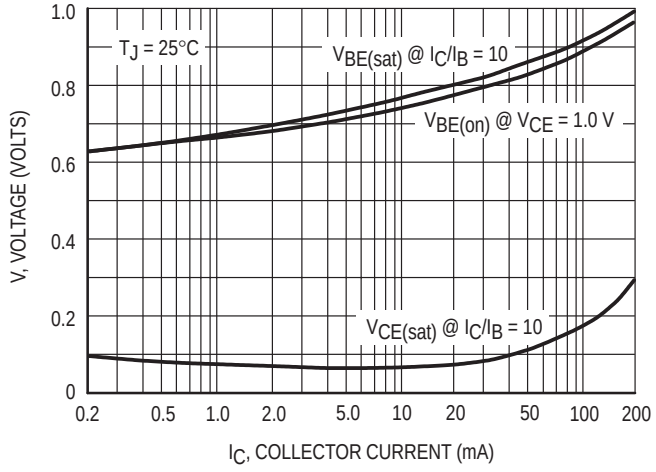


Figure 3. “ON” Voltage

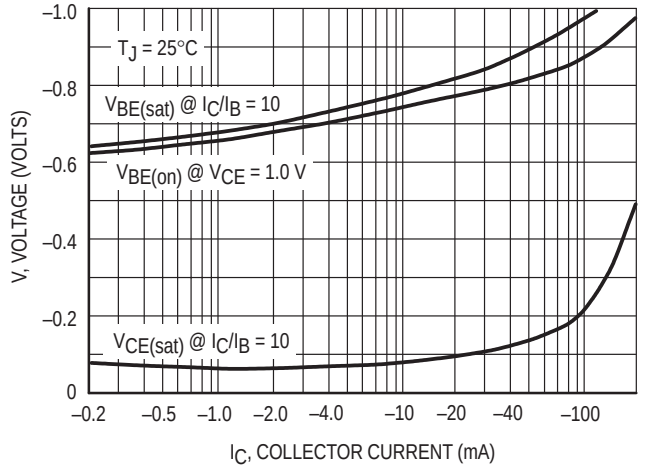


Figure 4. “ON” Voltage

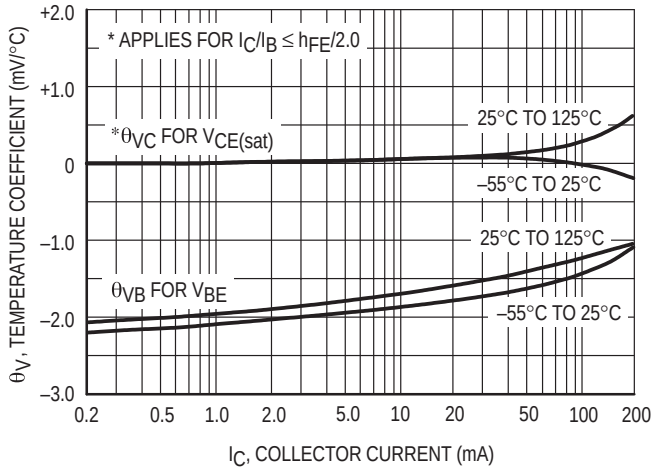


Figure 5. Temperature Coefficients

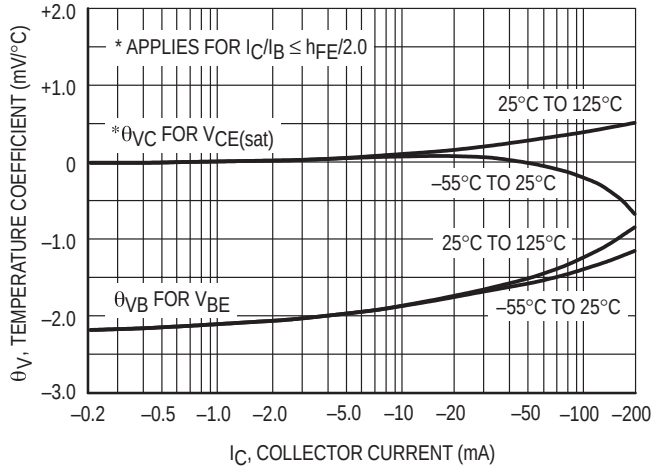


Figure 6. Temperature Coefficients

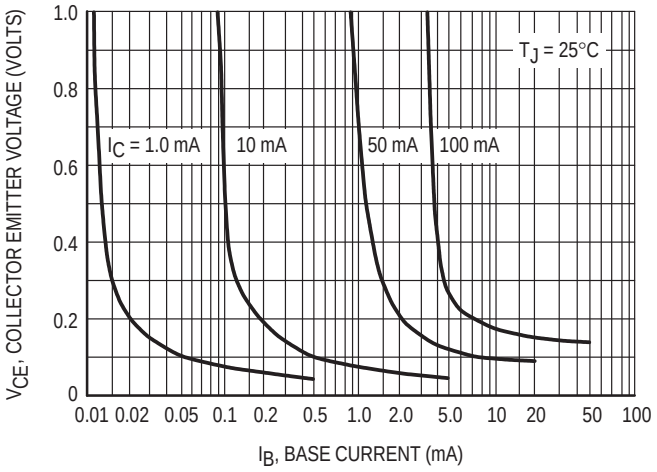


Figure 7. Collector Saturation Region

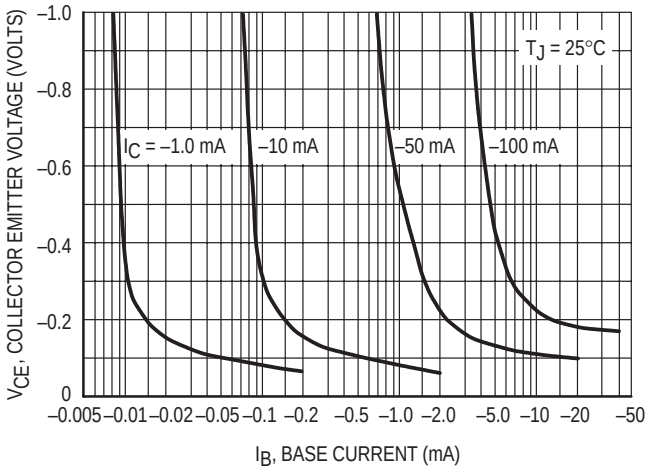
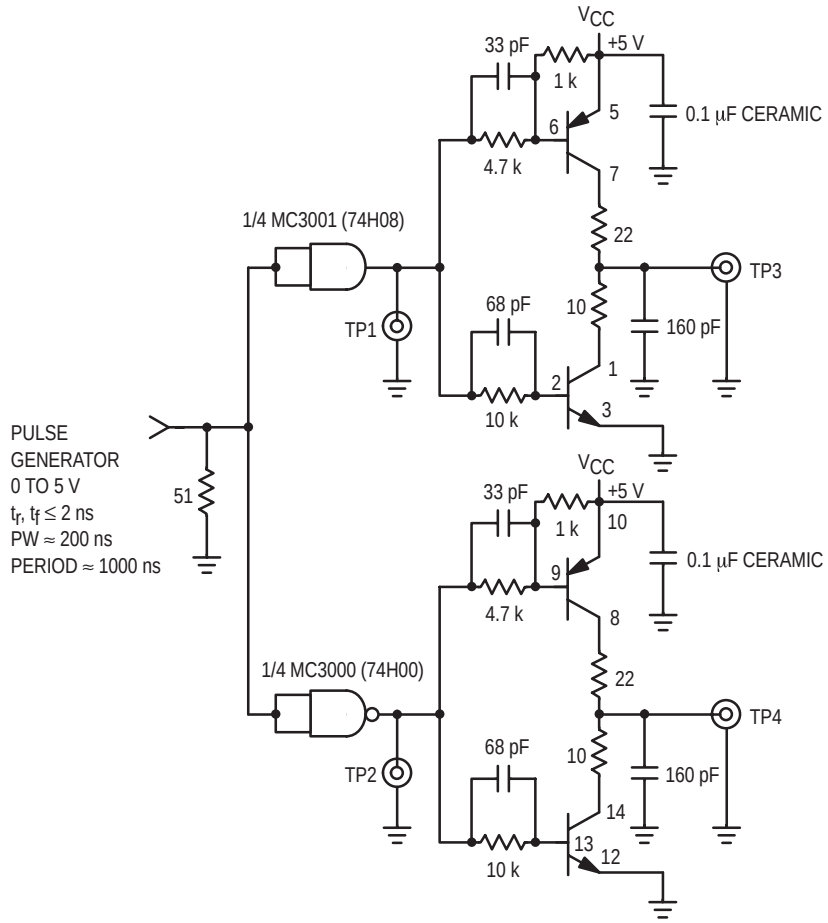


Figure 8. Collector Saturation Region



NOTES:
1. Unless otherwise noted, all resistors carbon composition $^1/_4$ W ±5%, all capacitors dipped mica ±2%.
2. Use short interconnect wiring with good power and ground buses.
3. TP1 thru TP4 are coaxial connectors to accept scope probe tip and provide a good ground.
4. Device under test is MPQ6842.
5. 160 pF load does not include stray or scope probe capacitance.
6. Scope probe resistance > 5 kΩ.
   Scope probe capacitance < 10 pF.

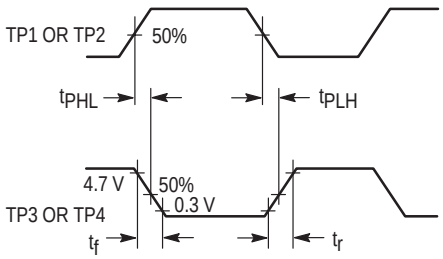


Figure 9. Switching Times Test Circuit and Waveforms