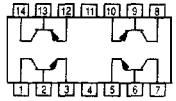
Quad Complementary Pair Transistors

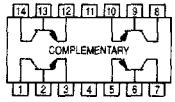
NPN/PNP Silicon

MPQ6001
MPQ6002
MPQ6502

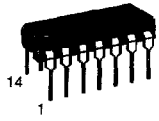
Voltage and current are negative for PNP transistors



MPQ6001, MPQ6002
TYPE A



MPQ6502
TYPE B



CASE 646–06, STYLE 1
TO–116

MAXIMUM RATINGS

Rating	Symbol	Value		Unit
Collector–Emitter Voltage	V_{CEO}	30		Vdc
Collector–Base Voltage	V_{CBO}	60		Vdc
Emitter–Base Voltage	V_{EBO}	5.0		Vdc
Collector Current — Continuous	I_C	500		mAdc
		Each Transistor	**Four Transistors Equal Power**	
Total Device Dissipation @ T_A = 25°C(1)	P_D			Watts
MPQ6001, MPQ6002, MPQ6502		0.65	1.25	
Derate above 25°C				mW/°C
MPQ6001, MPQ6002, MPQ6502		5.18	10	
Total Device Dissipation @ T_C = 25°C	P_D			Watts
MPQ6001, MPQ6002, MPQ6502		1.0	3.0	
Derate above 25°C				mW/°C
MPQ6001, MPQ6002, MPQ6502		8.0	24	
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				°C/W
Each Die	MPQ6001, MPQ6002, MPQ6502	125	193	
Effective, 4 Die	MPQ6001, MPQ6002, MPQ6502	41.6	100	
Coupling Factors				%
Q1–Q4 or Q2–Q3	MPQ6001, MPQ6002, MPQ6502	30	60	
Q1–Q2 or Q3–Q4	MPQ6001, MPQ6002, MPQ6502	20	24	

1. Voltage and Current are negative for PNP devices.

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)		$V_{(BR)CBO}$	60	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		$V_{(BR)EBO}$	5.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = 50 Vdc, I_E = 0)		I_{CBO}	—	—	30	nAdc
Emitter Cutoff Current (V_{EB} = 3.0 Vdc, I_C = 0)		I_{EBO}	—	—	30	nAdc
ON CHARACTERISTICS						
DC Current Gain(2)		h_{FE}				—
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc)	MPQ6001		25	—	—	
	MPQ6002, MPQ6502		50	—	—	
(I_C = 10 mAdc, V_{CE} = 10 Vdc)	MPQ6001		35	—	—	
	MPQ6002, MPQ6502		75	—	—	
(I_C = 150 mAdc, V_{CE} = 10 Vdc)	MPQ6001		40	—	—	
	MPQ6002, MPQ6502		100	—	—	
(I_C = 300 mAdc, V_{CE} = 10 Vdc)	MPQ6001		20	—	—	
	MPQ6002, MPQ6502		30	—	—	
Collector–Emitter Saturation Voltage(2)		$V_{CE(sat)}$				Vdc
(I_C = 150 mAdc, I_B = 15 mAdc)			—	—	0.4	
(I_C = 300 mAdc, I_B = 30 mAdc)			—	—	1.4	
Base–Emitter Saturation Voltage(2)		$V_{BE(sat)}$				Vdc
(I_C = 150 mAdc, I_B = 15 mAdc)			—	—	1.3	
(I_C = 300 mAdc, I_B = 30 mAdc)			—	—	2.0	
SMALL–SIGNAL CHARACTERISTICS						
Current–Gain — Bandwidth Product(2) (I_C = 50 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)		f_T	200	350	—	MHz
Output Capacitance		C_{obo}				pF
(V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)	PNP		—	6.0	8.0	
	NPN		—	4.5	8.0	
Input Capacitance		C_{ibo}				pF
(V_{EB} = 2.0 Vdc, I_C = 0, f = 1.0 MHz)	PNP		—	20	30	
	NPN		—	17	30	
SWITCHING CHARACTERISTICS						
Turn–On Time (V_{CC} = 30 Vdc, V_{EB} = 0.5 Vdc, I_C = 150 mAdc, I_{B1} = 15 mAdc, Figure 1)		t_{on}	—	30	—	ns
Turn–Off Time (V_{CC} = 30 Vdc, I_C = 150 mAdc, I_{B1} = I_{B2} = 15 mAdc)		t_{off}	—	225	—	ns

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

NPN DATA

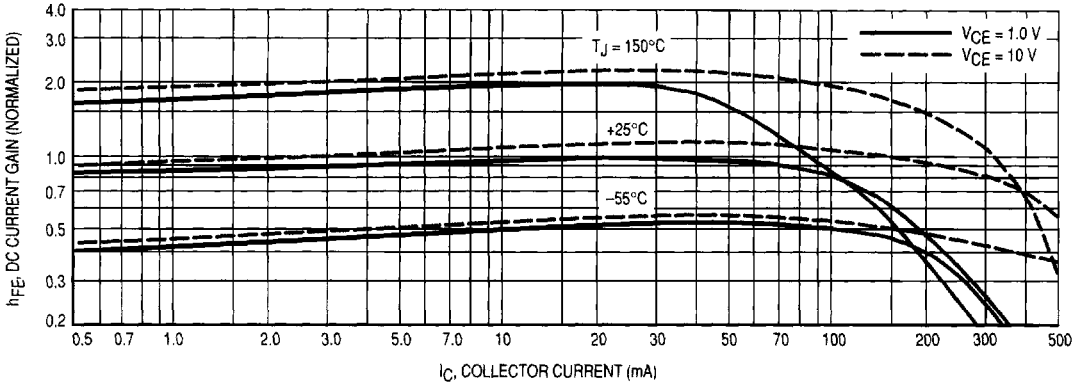


Figure 1. Normalized DC Current Gain

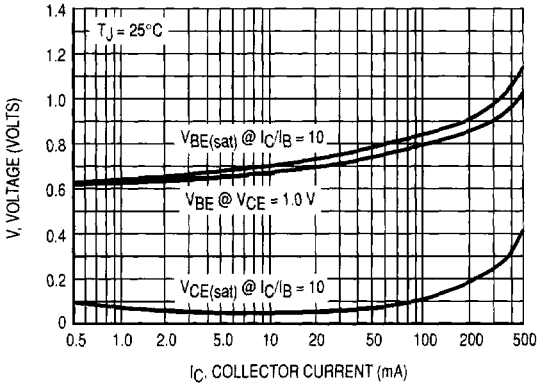


Figure 2. "ON" Voltages

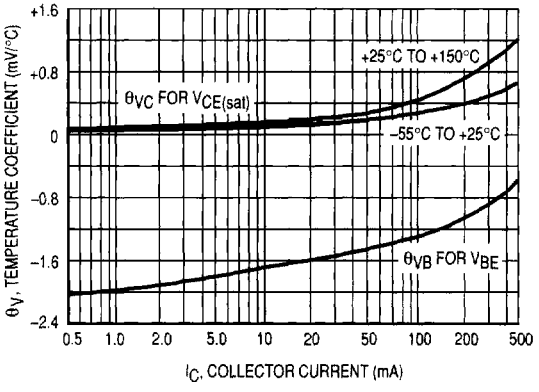


Figure 3. Temperature Coefficients

NOISE FIGURE

(V_{CE} = 10 Vdc, T_A = 25°C)

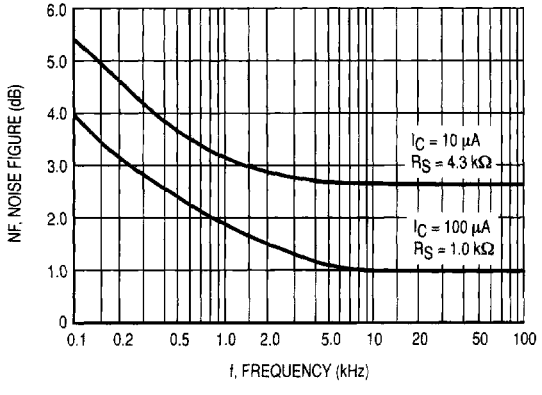


Figure 4. Frequency Effects

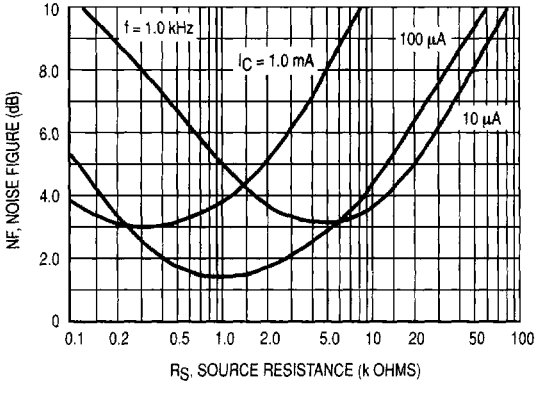


Figure 5. Source Resistance Effects