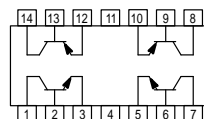
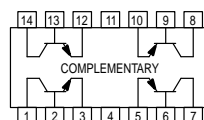


# Quad Complementary Pair Transistors

## NPN/PNP Silicon



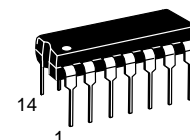
MPQ6001, MPQ6002  
TYPE A



MPQ6502  
TYPE B

**MPQ6001**  
**MPQ6002**  
**MPQ6502**

Voltage and current are negative  
for PNP transistors



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
		<b>Each Transistor</b>	<b>Four Transistors Equal Power</b>	
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ (1) MPQ6001, MPQ6002, MPQ6502 Derate above $25^\circ\text{C}$ MPQ6001, MPQ6002, MPQ6502	$P_D$	0.65	1.25	Watts mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ MPQ6001, MPQ6002, MPQ6502 Derate above $25^\circ\text{C}$ MPQ6001, MPQ6002, MPQ6502	$P_D$	1.0	3.0	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150		$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic		Junction to Case	Junction to Ambient	Unit
Thermal Resistance	Each Die	125	193	$^\circ\text{C}/\text{W}$
	Effective, 4 Die	41.6	100	
Coupling Factors	Q1-Q4 or Q2-Q3	30	60	%
	Q1-Q2 or Q3-Q4	20	24	

1. Voltage and Current are negative for PNP devices.

## MPQ6001 MPQ6002 MPQ6502

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector–Emitter Breakdown Voltage <sup>(2)</sup> (I <sub>C</sub> = 10 mA <sub>dc</sub> , I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	30	—	—	V <sub>dc</sub>
Collector–Base Breakdown Voltage (I <sub>C</sub> = 10 μA <sub>dc</sub> , I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	60	—	—	V <sub>dc</sub>
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 10 μA <sub>dc</sub> , I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	5.0	—	—	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = 50 V <sub>dc</sub> , I <sub>E</sub> = 0)	I <sub>CBO</sub>	—	—	30	nA <sub>dc</sub>
Emitter Cutoff Current (V <sub>EB</sub> = 3.0 V <sub>dc</sub> , I <sub>C</sub> = 0)	I <sub>EBO</sub>	—	—	30	nA <sub>dc</sub>

### ON CHARACTERISTICS

DC Current Gain <sup>(2)</sup> (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )	MPQ6001 MPQ6002, MPQ6502	h <sub>FE</sub>	25 50	— —	— —	—
(I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )	MPQ6001 MPQ6002, MPQ6502		35 75	— —	— —	
(I <sub>C</sub> = 150 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )	MPQ6001 MPQ6002, MPQ6502		40 100	— —	— —	
(I <sub>C</sub> = 300 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )	MPQ6001 MPQ6002, MPQ6502		20 30	— —	— —	
Collector–Emitter Saturation Voltage <sup>(2)</sup> (I <sub>C</sub> = 150 mA <sub>dc</sub> , I <sub>B</sub> = 15 mA <sub>dc</sub> ) (I <sub>C</sub> = 300 mA <sub>dc</sub> , I <sub>B</sub> = 30 mA <sub>dc</sub> )		V <sub>CE(sat)</sub>	— —	— —	0.4 1.4	V <sub>dc</sub>
Base–Emitter Saturation Voltage <sup>(2)</sup> (I <sub>C</sub> = 150 mA <sub>dc</sub> , I <sub>B</sub> = 15 mA <sub>dc</sub> ) (I <sub>C</sub> = 300 mA <sub>dc</sub> , I <sub>B</sub> = 30 mA <sub>dc</sub> )		V <sub>BE(sat)</sub>	— —	— —	1.3 2.0	V <sub>dc</sub>

### SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product <sup>(2)</sup> (I <sub>C</sub> = 50 mA <sub>dc</sub> , V <sub>CE</sub> = 20 V <sub>dc</sub> , f = 100 MHz)		f <sub>T</sub>	200	350	—	MHz
Output Capacitance (V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)	PNP NPN	C <sub>obo</sub>	— —	6.0 4.5	8.0 8.0	pF
Input Capacitance (V <sub>EB</sub> = 2.0 V <sub>dc</sub> , I <sub>C</sub> = 0, f = 1.0 MHz)	PNP NPN	C <sub>ibo</sub>	— —	20 17	30 30	pF

### SWITCHING CHARACTERISTICS

Turn–On Time (V <sub>CC</sub> = 30 V <sub>dc</sub> , V <sub>EB</sub> = 0.5 V <sub>dc</sub> , I <sub>C</sub> = 150 mA <sub>dc</sub> , I <sub>B1</sub> = 15 mA <sub>dc</sub> , Figure 1)		t <sub>on</sub>	—	30	—	ns
Turn–Off Time (V <sub>CC</sub> = 30 V <sub>dc</sub> , I <sub>C</sub> = 150 mA <sub>dc</sub> , I <sub>B1</sub> = I <sub>B2</sub> = 15 mA <sub>dc</sub> )		t <sub>off</sub>	—	225	—	ns

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

NPN DATA

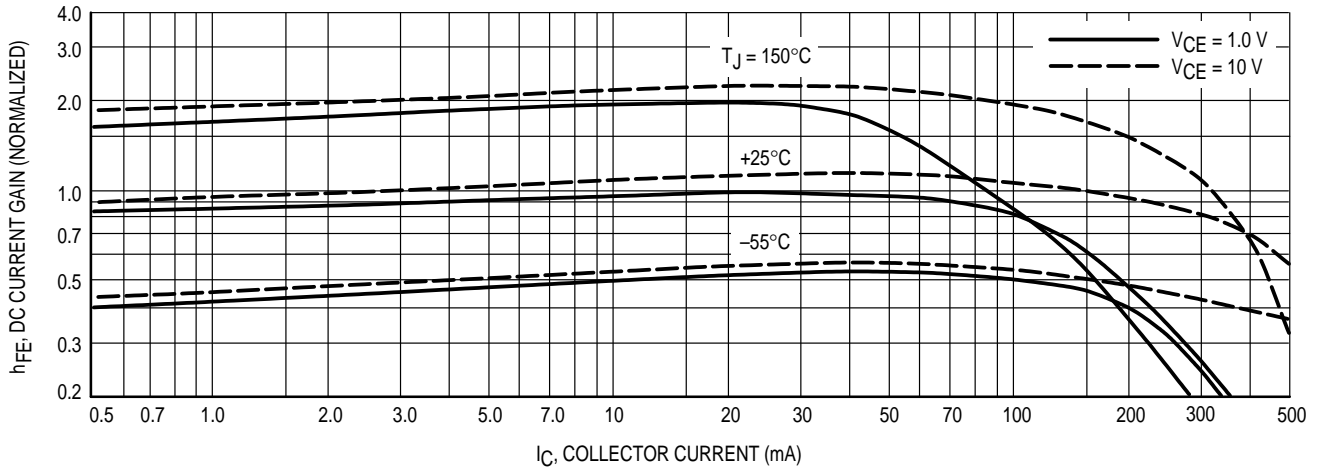


Figure 1. Normalized DC Current Gain

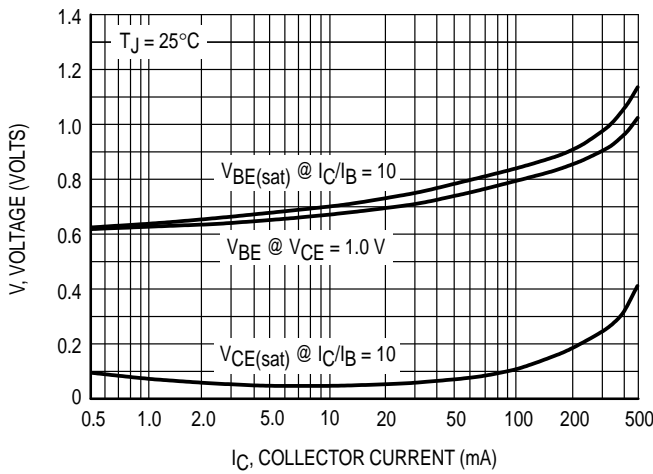


Figure 2. "ON" Voltages

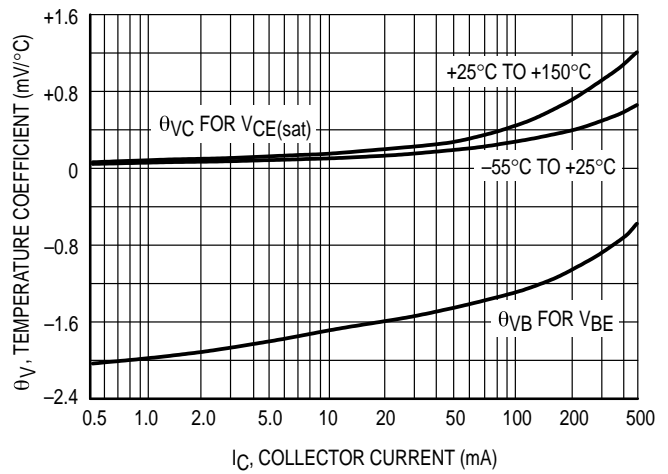


Figure 3. Temperature Coefficients

NOISE FIGURE  
(VCE = 10 Vdc, TA = 25°C)

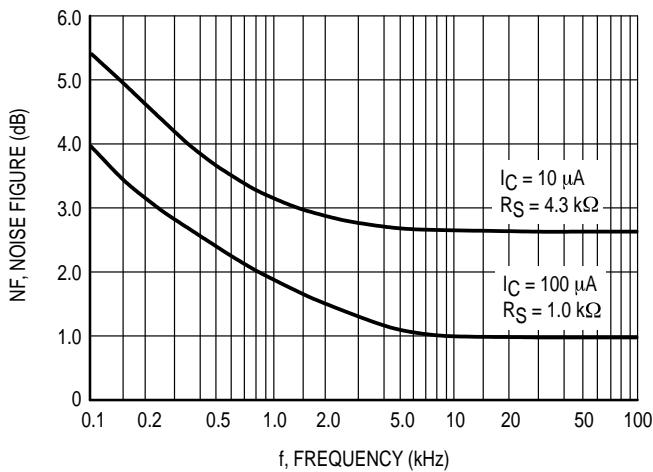


Figure 4. Frequency Effects

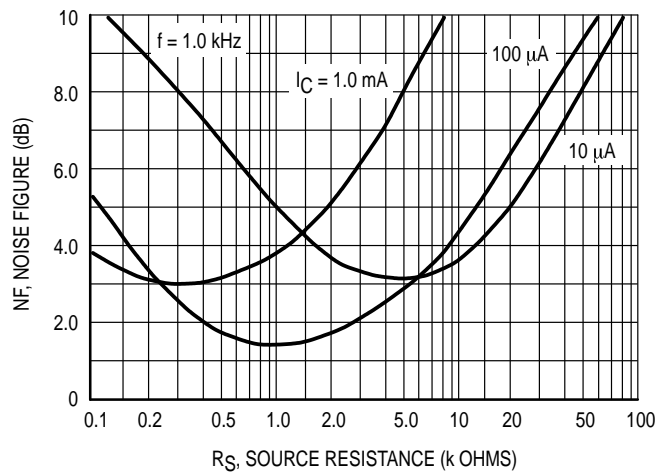
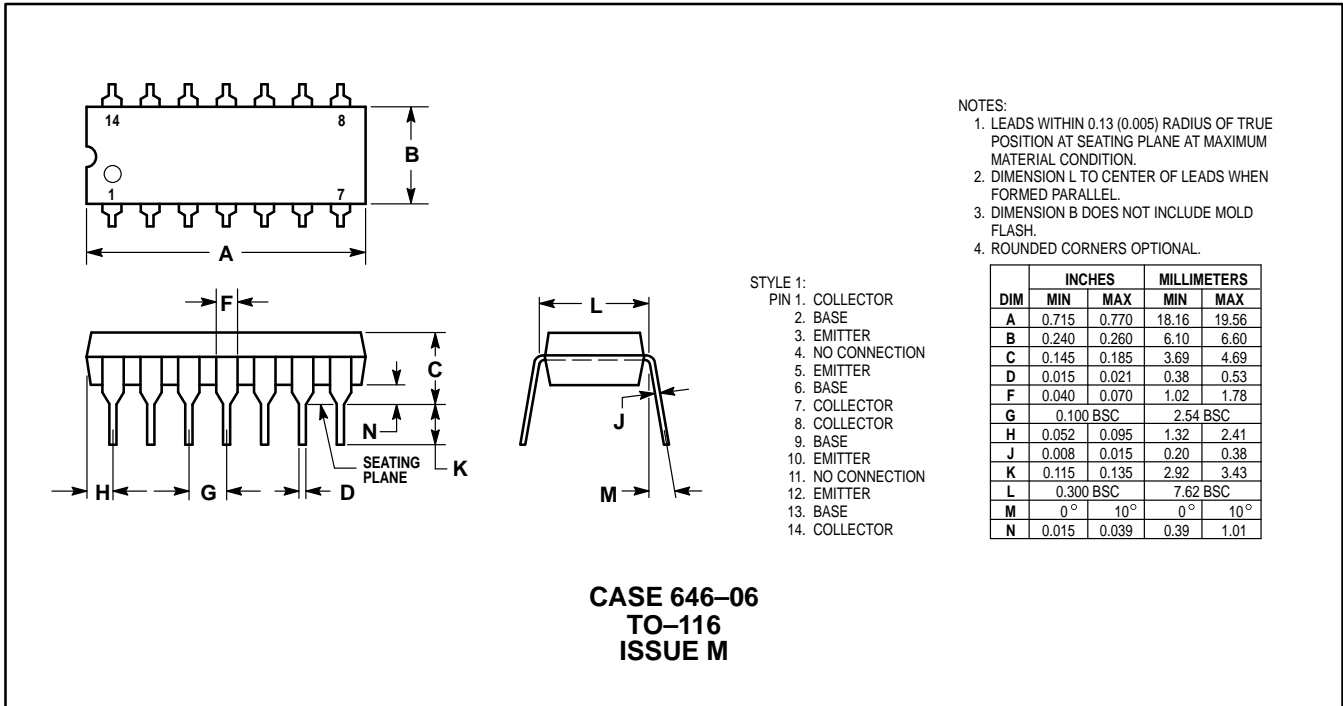


Figure 5. Source Resistance Effects

PACKAGE DIMENSIONS



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 Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan. 81-3-5487-8488

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 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

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