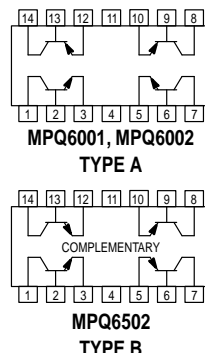


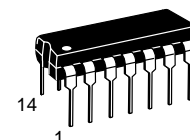
# Quad Complementary Pair Transistors

## NPN/PNP Silicon



**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
		Each Transistor	Four Transistors Equal Power	
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
		5.18	10	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
		8.0	24	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	$^\circ\text{C/W}$
	Effective, 4 Die	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.

# 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 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	30	—	—	Vdc
Collector–Base Breakdown Voltage (I <sub>C</sub> = 10 μAdc, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	60	—	—	Vdc
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 10 μAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	5.0	—	—	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 50 Vdc, I <sub>E</sub> = 0)	I <sub>CBO</sub>	—	—	30	nAdc
Emitter Cutoff Current (V <sub>EB</sub> = 3.0 Vdc, I <sub>C</sub> = 0)	I <sub>EBO</sub>	—	—	30	nAdc

## ON CHARACTERISTICS

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

## SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product <sup>(2)</sup> (I <sub>C</sub> = 50 mAdc, V <sub>CE</sub> = 20 Vdc, f = 100 MHz)		f <sub>T</sub>	200	350	—	MHz
Output Capacitance (V <sub>CB</sub> = 10 Vdc, 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 Vdc, 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 Vdc, V <sub>EB</sub> = 0.5 Vdc, I <sub>C</sub> = 150 mAdc, I <sub>B1</sub> = 15 mAdc, Figure 1)		t <sub>on</sub>	—	30	—	ns
Turn–Off Time (V <sub>CC</sub> = 30 Vdc, I <sub>C</sub> = 150 mAdc, I <sub>B1</sub> = I <sub>B2</sub> = 15 mAdc)		t <sub>off</sub>	—	225	—	ns

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

## NPN DATA

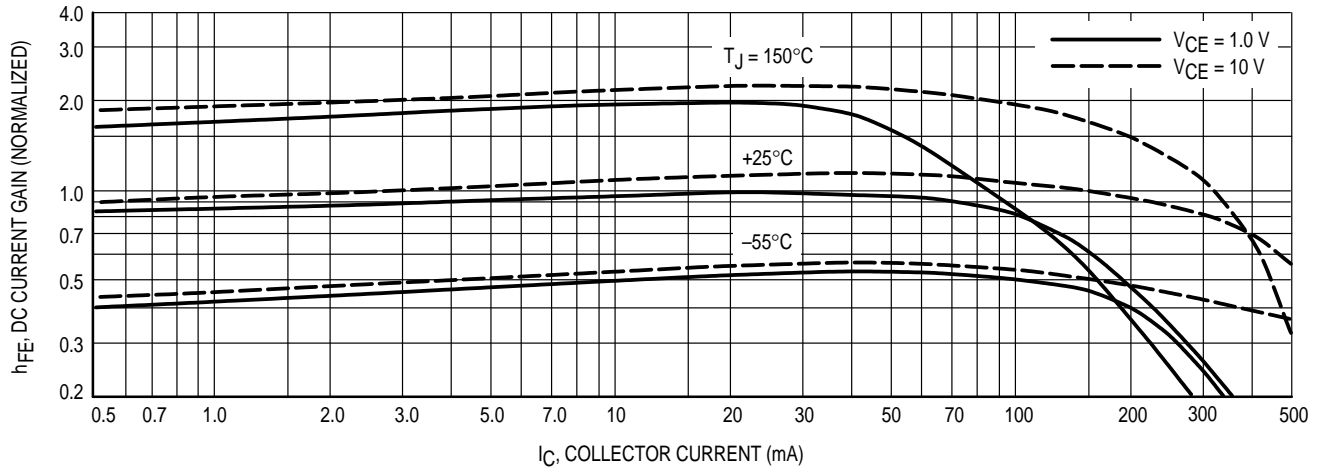


Figure 1. Normalized DC Current Gain

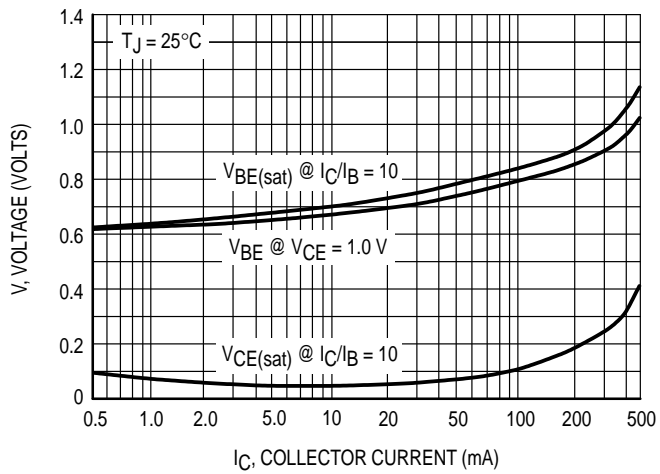


Figure 2. "ON" Voltages

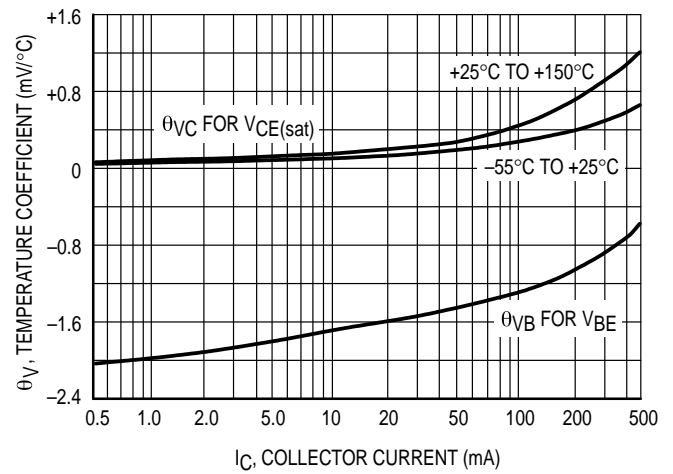


Figure 3. Temperature Coefficients

### NOISE FIGURE

( $V_{CE} = 10\text{ Vdc}$ ,  $T_A = 25^\circ\text{C}$ )

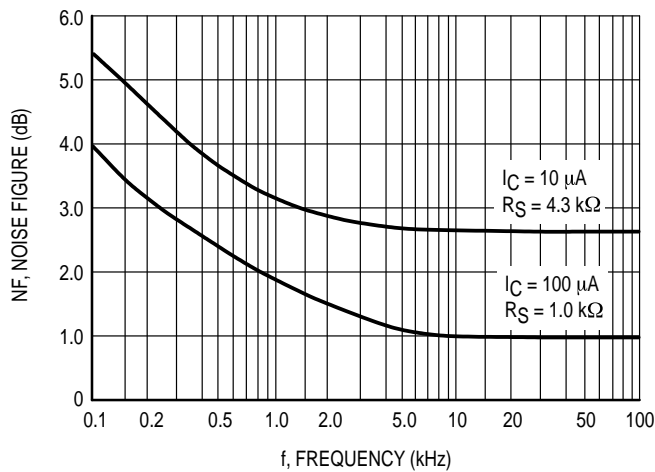


Figure 4. Frequency Effects

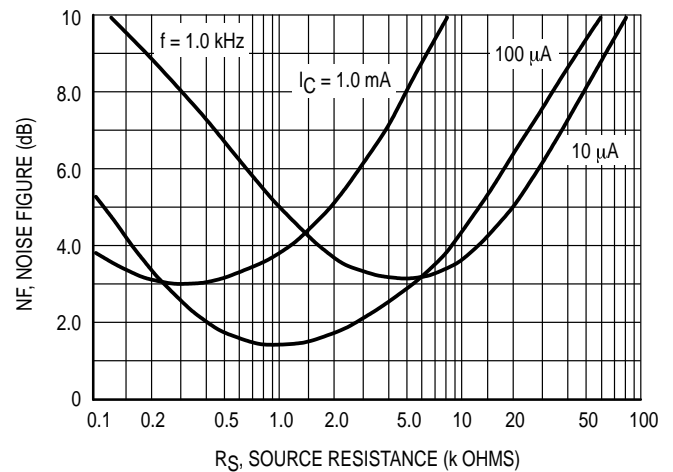
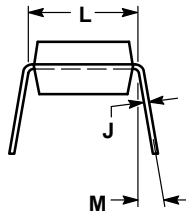
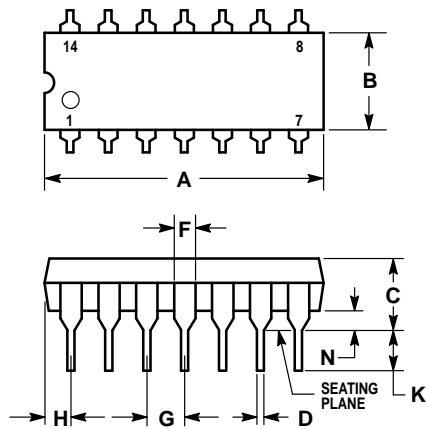


Figure 5. Source Resistance Effects

## PACKAGE DIMENSIONS



## STYLE 1:


- PIN 1. COLLECTOR  
 2. BASE  
 3. EMITTER  
 4. NO CONNECTION  
 5. EMITTER  
 6. BASE  
 7. COLLECTOR  
 8. COLLECTOR  
 9. BASE  
 10. EMITTER  
 11. NO CONNECTION  
 12. EMITTER  
 13. BASE  
 14. COLLECTOR

## NOTES:

- LEADS WITHIN 0.13 (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
- DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
- DIMENSION B DOES NOT INCLUDE MOLD FLASH.
- ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.715	0.770	18.16	19.56
B	0.240	0.260	6.10	6.60
C	0.145	0.185	3.69	4.69
D	0.015	0.021	0.38	0.53
F	0.040	0.070	1.02	1.78
G	0.100 BSC		2.54 BSC	
H	0.052	0.095	1.32	2.41
J	0.008	0.015	0.20	0.38
K	0.115	0.135	2.92	3.43
L	0.300 BSC		7.62 BSC	
M	0°	10°	0°	10°
N	0.015	0.039	0.39	1.01

CASE 646-06  
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 ISSUE M

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