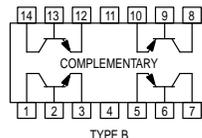


# Quad Amplifier Transistors

## PNP Silicon

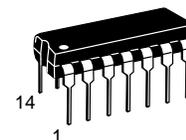


**MPQ7091**  
**MPQ7093\***

\*Motorola Preferred Device

### MAXIMUM RATINGS

Rating	Symbol	MPQ7091	MPQ7093	Unit
Collector–Emitter Voltage	$V_{CEO}$	-150	-250	Vdc
Collector–Base Voltage	$V_{CBO}$	-150	-250	Vdc
Emitter–Base Voltage	$V_{EBO}$	-5.0		Vdc
Collector Current — Continuous	$I_C$	-500		mAdc
		Each Die	Four Die Equal Power	
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	750 5.98	1700 13.6	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.25 10	3.2 25.6	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150		$^\circ\text{C}$



CASE 646-06, STYLE 1  
TO-116

### THERMAL CHARACTERISTICS

Characteristic		Junction to Case	Junction to Ambient	Unit
Thermal Resistance	Each Die	100	167	$^\circ\text{C}/\text{W}$
	Effective, 4 Die	39	73.5	$^\circ\text{C}/\text{W}$
Coupling Factors	Q1–Q4 or Q2–Q3	46	56	%
	Q1–Q2 or Q3–Q4	5.0	10	%

### 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 ( $I_C = -1.0$ mAdc, $I_B = 0$ )	MPQ7091 MPQ7093	$V_{(BR)CEO}$	-150 -250	— —	— —	Vdc
Collector–Base Breakdown Voltage ( $I_C = -100$ $\mu\text{Adc}$ , $I_E = 0$ )	MPQ7091 MPQ7093	$V_{(BR)CBO}$	-150 -250	— —	— —	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -100$ $\mu\text{Adc}$ , $I_C = 0$ )		$V_{(BR)EBO}$	-5.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = -120$ Vdc, $I_E = 0$ )	MPQ7091 MPQ7093	$I_{CBO}$	— —	— —	-250 -250	nAdc
Emitter Cutoff Current ( $V_{EB} = -3.0$ Vdc, $I_C = 0$ )		$I_{EBO}$	—	—	-100	nAdc

Preferred devices are Motorola recommended choices for future use and best overall value.

# MPQ7091 MPQ7093

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

Characteristic	Symbol	Min	Max	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = -1.0\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ ) ( $I_C = -10\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ ) ( $I_C = -30\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ )	$h_{FE}$	25 35 25	40 55 50	— — —	—
Collector–Emitter Saturation Voltage ( $I_C = -20\text{ mA}$ , $I_B = -2.0\text{ mA}$ )	$V_{CE(sat)}$	—	-0.3	-0.5	Vdc
Base–Emitter Saturation Voltage ( $I_C = -20\text{ mA}$ , $I_B = -2.0\text{ mA}$ )	$V_{BE(sat)}$	—	-0.7	-0.9	Vdc

## SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ( $I_C = -10\text{ mA}$ , $V_{CE} = -20\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$f_T$	50	70	—	MHz
Output Capacitance ( $V_{CB} = -20\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	—	3.0	5.0	pF
Input Capacitance ( $V_{EB} = -3.0\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ibo}$	—	60	75	pF

## DC CHARACTERISTICS

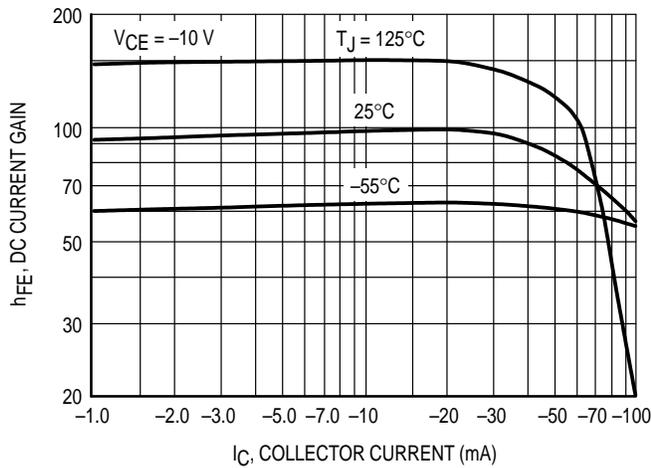


Figure 1. DC Current Gain

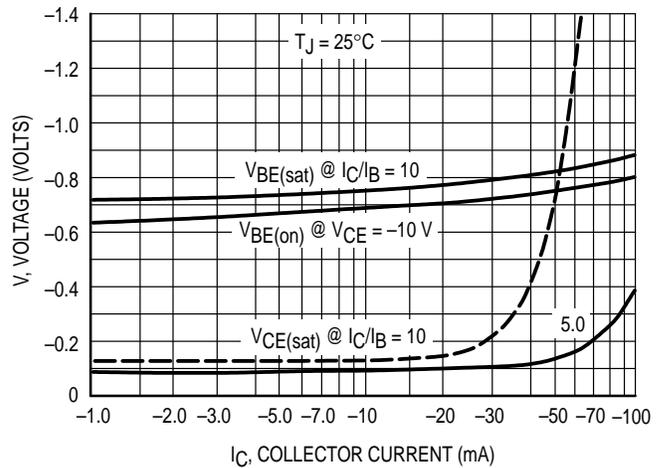


Figure 2. "ON" Voltages

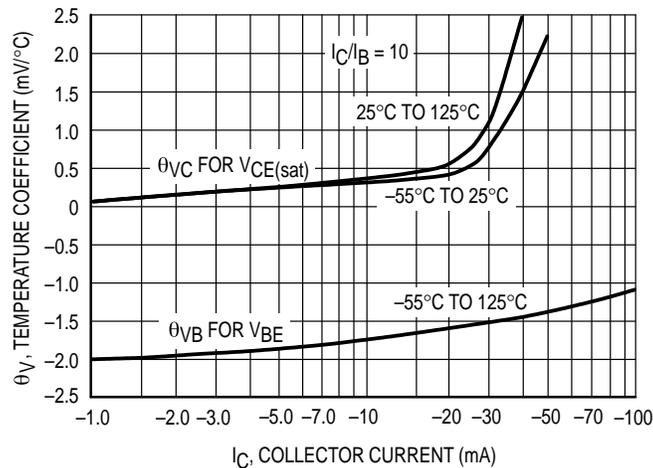
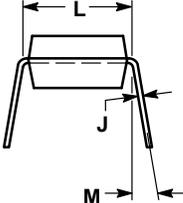
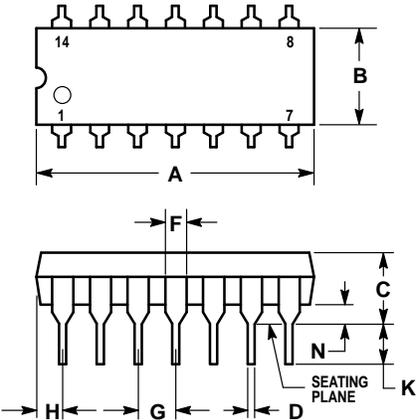


Figure 3. Temperature Coefficients

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:  
 1. LEADS WITHIN 0.13 (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.  
 2. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.  
 3. DIMENSION B DOES NOT INCLUDE MOLD FLASH.  
 4. 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  
 TO-116  
 ISSUE M

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