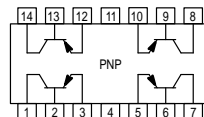


# Quad General Purpose Transistors

## PNP Silicon

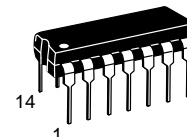


**MPQ2906**  
**MPQ2907**  
**MPQ2907A\***

\*Motorola Preferred Device

### MAXIMUM RATINGS

Rating	Symbol	MPQ2906 MPQ2907	MPQ2907A	Unit
Collector–Emitter Voltage	$V_{CEO}$	–40	–60	Vdc
Collector–Base Voltage	$V_{CBO}$	–60		Vdc
Emitter–Base Voltage	$V_{EBO}$	–5.0		Vdc
Collector Current — Continuous	$I_C$	–600		mA dc
		Each Transistor	Total Device	
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	0.65 6.5	1.9 19	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–55 to +125		$^\circ\text{C}$



CASE 646-06, STYLE 1  
TO-116

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	66	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage <sup>(1)</sup> ( $I_C = -10 \text{ mA dc}$ , $I_E = 0$ )	MPQ2906, MPQ2907 MPQ2907A	$V_{(BR)CEO}$	–40 –60	— —	Vdc
Collector–Base Breakdown Voltage ( $I_C = -10 \text{ } \mu\text{A dc}$ , $I_E = 0$ )		$V_{(BR)CBO}$	–60	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -10 \text{ } \mu\text{A dc}$ , $I_C = 0$ )		$V_{(BR)EBO}$	–5.0	—	Vdc
Collector Cutoff Current ( $V_{CB} = -30 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = -50 \text{ Vdc}$ , $I_E = 0$ )	MPQ2906, MPQ2907 MPQ2907A	$I_{CBO}$	—	–50	nA dc
Emitter Cutoff Current ( $V_{EB} = -3.0 \text{ Vdc}$ , $I_E = 0$ )	MPQ2906,7 Only	$I_{EBO}$	—	–50	nA dc

1. Pulse Test: Pulse Width  $\leq 300 \text{ } \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

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

REV 3

# MPQ2906 MPQ2907 MPQ2907A

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

Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>				
DC Current Gain <sup>(1)</sup> (I <sub>C</sub> = -100 $\mu$ Adc, V <sub>CE</sub> = -10 Vdc) (I <sub>C</sub> = -1.0 mAdc, V <sub>CE</sub> = -10 Vdc) (I <sub>C</sub> = -10 mAdc, V <sub>CE</sub> = -10 Vdc)  (I <sub>C</sub> = -10 mAdc, V <sub>CE</sub> = -10 Vdc) (I <sub>C</sub> = -150 mAdc, V <sub>CE</sub> = -10 Vdc) (I <sub>C</sub> = -150 mAdc, V <sub>CE</sub> = -10 Vdc)  (I <sub>C</sub> = -300 mAdc, V <sub>CE</sub> = -10 Vdc)  (I <sub>C</sub> = -500 mAdc, V <sub>CE</sub> = -10 Vdc)	h <sub>FE</sub>  MPQ2907A MPQ2907A MPQ2906 MPQ2907 MPQ2907A MPQ2907A MPQ2906 MPQ2907 MPQ2906 MPQ2907 MPQ2907A	75 100 35 75 100 100 40 100 20 30 50	— — — — — 300 — — — — —	—
Collector-Emitter Saturation Voltage <sup>(1)</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) (I <sub>C</sub> = -500 mA, I <sub>B</sub> = -500 mA)	V <sub>CE(sat)</sub>  MPQ2906, MPQ2907 MPQ2907A	— — —	— -0.4 -1.6 -1.6	Vdc
Base-Emitter Saturation Voltage <sup>(1)</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) (I <sub>C</sub> = -500 mA, I <sub>B</sub> = -50 mA)	V <sub>BE(sat)</sub>  MPQ2906, MPQ2907 MPQ2906, MPQ2907 MPQ2907A	— — —	— -1.3 -2.6 -2.6	Vdc

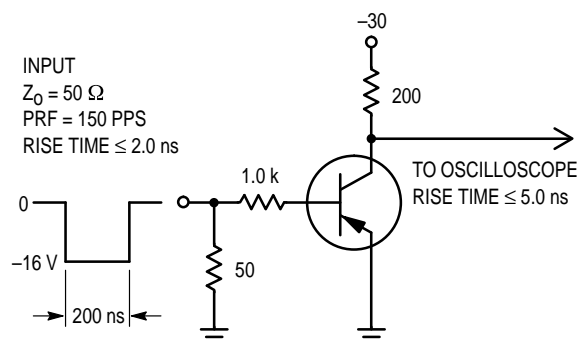
## SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product (I <sub>C</sub> = -50 mAdc, V <sub>CE</sub> = -20 Vdc, f = 100 MHz)	f <sub>T</sub>	200	—	MHz
Output Capacitance (V <sub>CB</sub> = -10 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>obo</sub>	—	8.0	pF
Input Capacitance (V <sub>EB</sub> = 2.0 Vdc, I <sub>C</sub> = 0, f = 1.0 MHz)	C <sub>ibo</sub>	—	30	pF

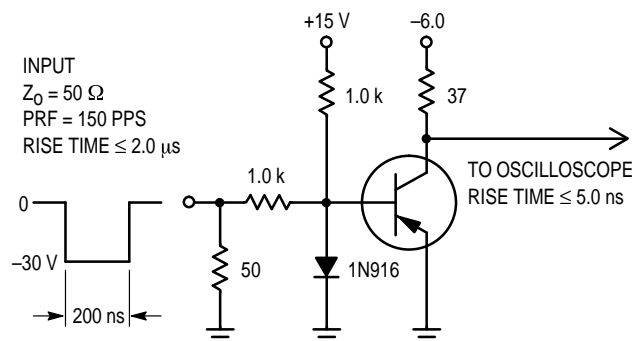
## SWITCHING CHARACTERISTICS

Turn-On Time (V <sub>CC</sub> = -30 Vdc, I <sub>C</sub> = -150 mAdc, I <sub>B1</sub> = 15 mAdc)	t <sub>on</sub>	—	45	ns
Turn-Off Time (V <sub>CC</sub> = -6.0 Vdc, I <sub>C</sub> = -150 mAdc, I <sub>B1</sub> = I <sub>B2</sub> = 15 mAdc)	t <sub>off</sub>	—	180	ns

1. Pulse Test: Pulse Width  $\leq$  300  $\mu$ s, Duty Cycle  $\leq$  2.0%.



**Figure 1. Delay and Rise Time Test Circuit**



**Figure 2. Storage and Fall Time Test Circuit**

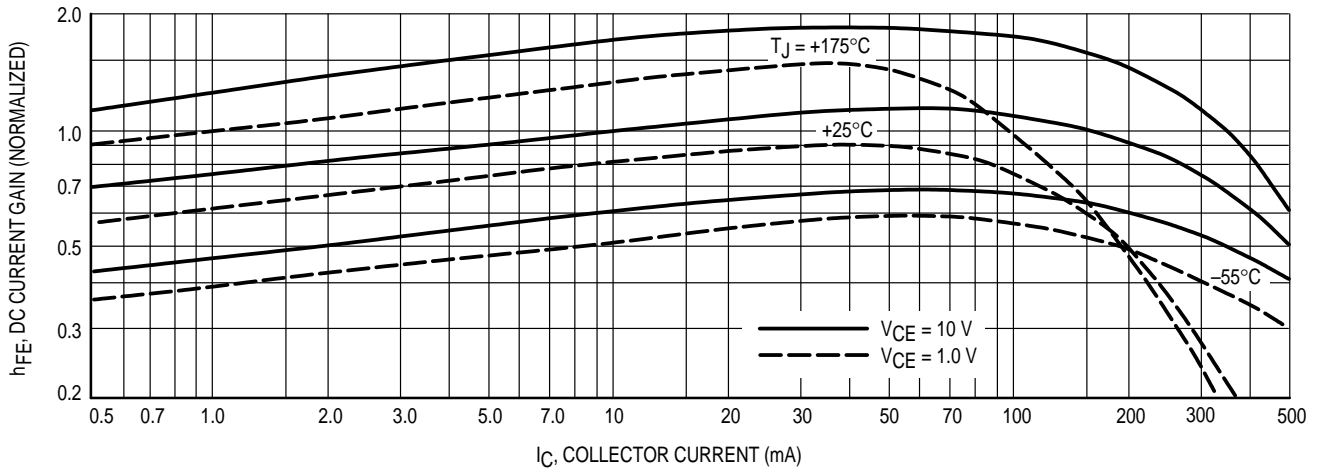


Figure 3. DC Current Gain

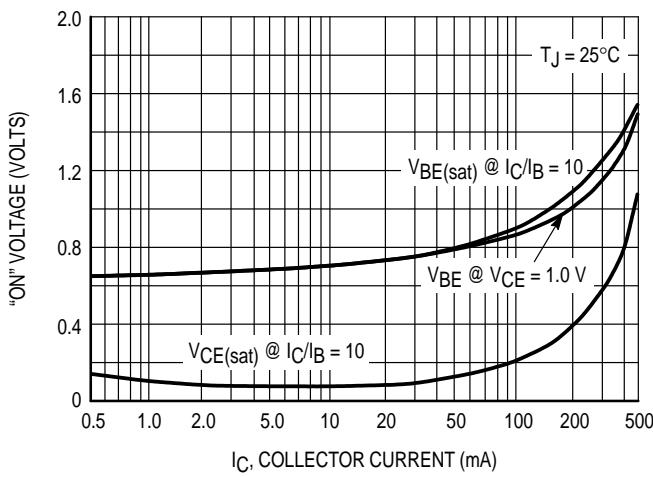


Figure 4. "ON" Voltages

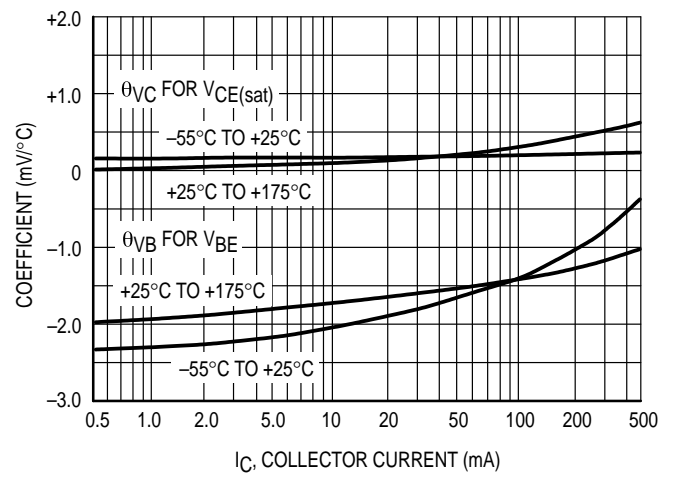


Figure 5. Temperature Coefficients

### NOISE FIGURE ( $V_{CE} = 10\text{ V}$ , $T_A = 25^\circ\text{C}$ )

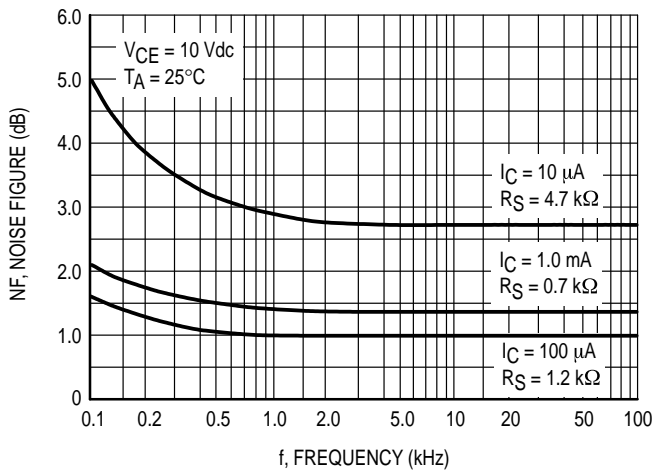


Figure 6. Frequency Effects

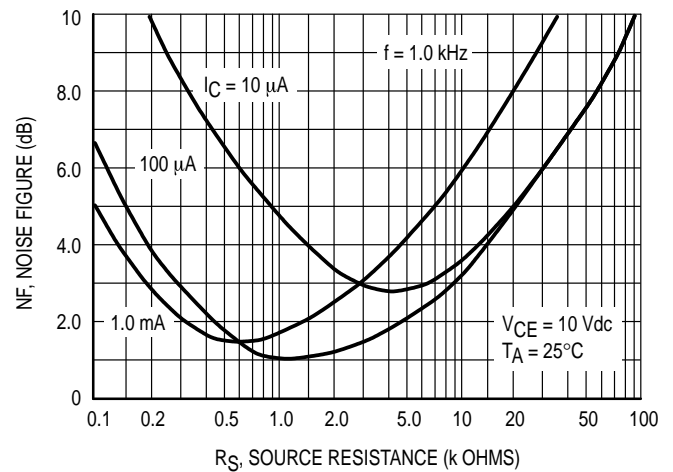


Figure 7. Source Resistance Effects

# MPQ2906 MPQ2907 MPQ2907A

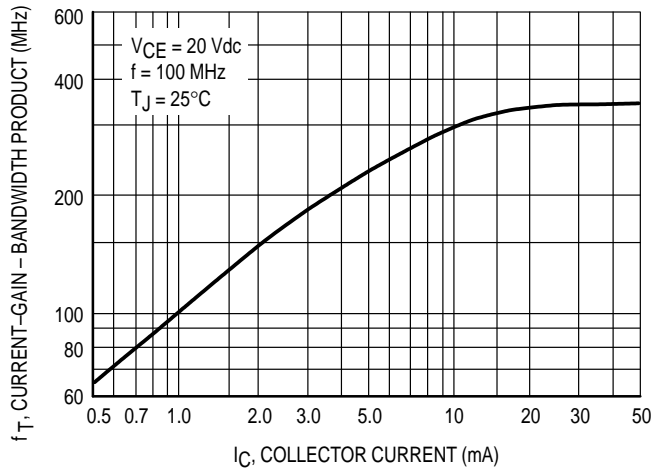


Figure 8. Current-Gain — Bandwidth Product

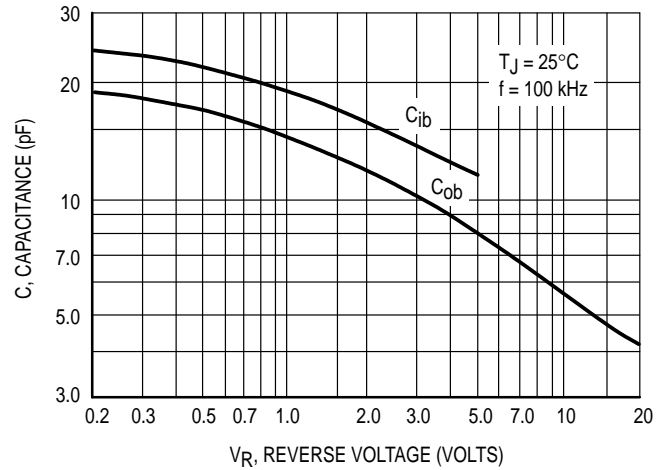


Figure 9. Capacitance

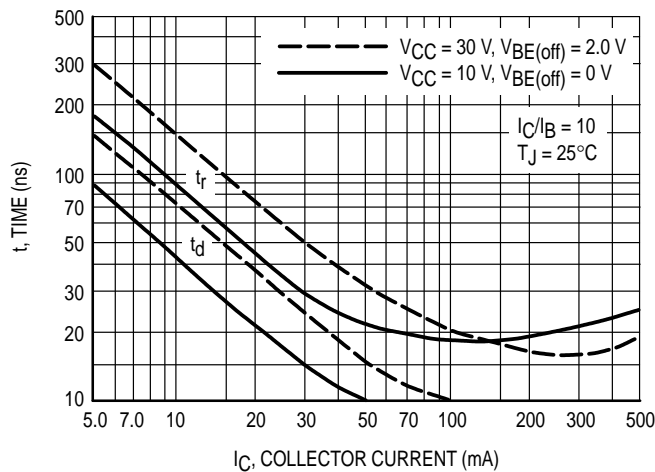


Figure 10. Turn-On Time

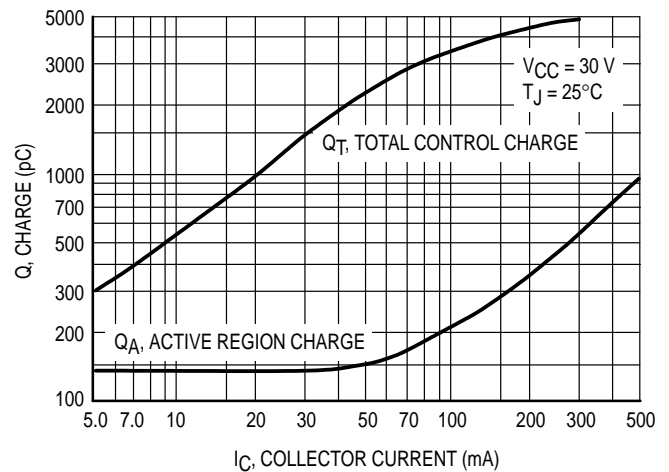


Figure 11. Charge Data

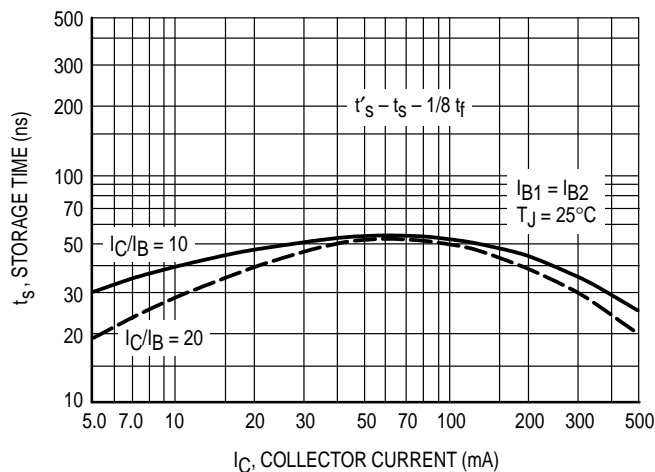


Figure 12. Storage Time

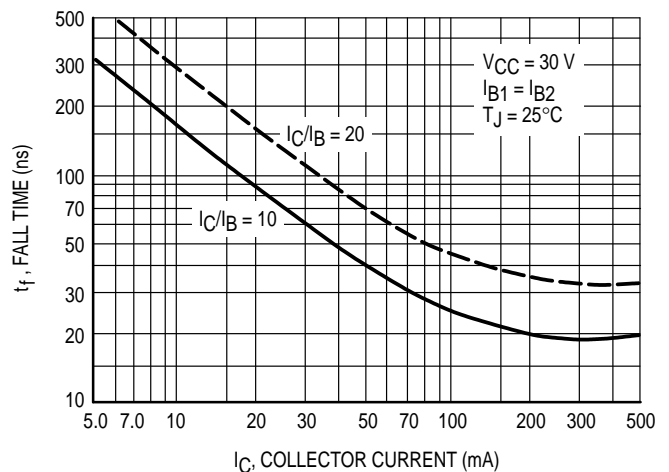
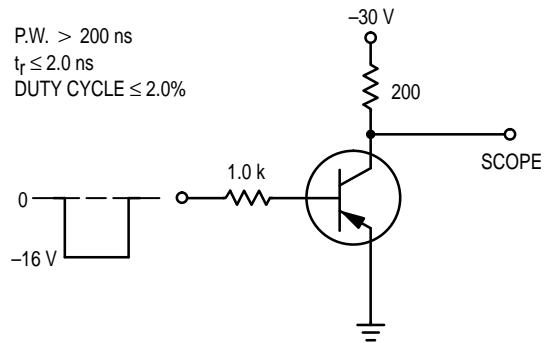
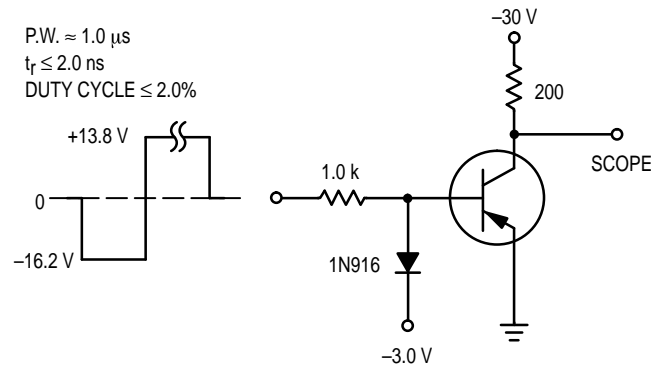


Figure 13. Fall Time

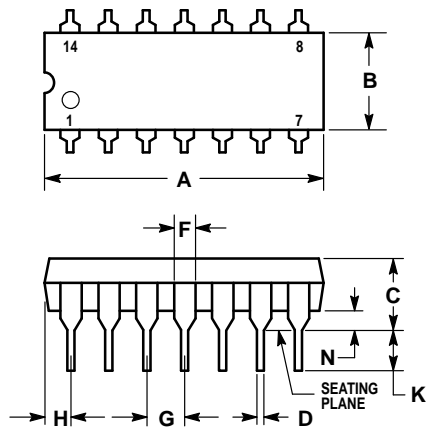


**Figure 14. Delay and Rise Time Test Circuit**



**Figure 15. Storage and Fall Time Test Circuit**

## PACKAGE DIMENSIONS



## 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.

## 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

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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