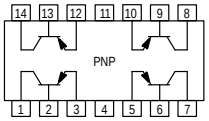
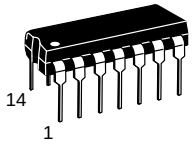
Quad General Purpose Transistors

PNP Silicon



MPQ2906
MPQ2907
MPQ2907A*

***Motorola Preferred Device**



CASE 646–06, STYLE 1
TO–116

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		mAdc
		Each Transistor	**Total Device**	
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	0.65 6.5	1.9 19	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +125		°C

THERMAL CHARACTERISTICS

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

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage(1) (I_C = –10 mAdc, I_B = 0)	 MPQ2906, MPQ2907 MPQ2907A	$V_{(BR)CEO}$	 –40 –60	 — —	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} = –30 Vdc, I_E = 0) (V_{CB} = –50 Vdc, I_E = 0)	 MPQ2906, MPQ2907 MPQ2907A	I_{CBO}	—	–50	nAdc
Emitter Cutoff Current (V_{EB} = –3.0 Vdc, I_E = 0)	MPQ2906,7 Only	I_{EBO}	—	–50	nAdc

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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

REV 3

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Max	Unit
ON CHARACTERISTICS					
DC Current Gain(1)		h_{FE}			—
(I_C = –100 μAdc, V_{CE} = –10 Vdc)	MPQ2907A		75	—	
(I_C = –1.0 mAdc, V_{CE} = –10 Vdc)	MPQ2907A		100	—	
(I_C = –10 mAdc, V_{CE} = –10 Vdc)	MPQ2906		35	—	
	MPQ2907		75	—	
(I_C = –10 mAdc, V_{CE} = –10 Vdc)	MPQ2907A		100	—	
(I_C = –150 mAdc, V_{CE} = –10 Vdc)	MPQ2907A		100	300	
(I_C = –150 mAdc, V_{CE} = –10 Vdc)	MPQ2906		40	—	
	MPQ2907		100	—	
(I_C = –300 mAdc, V_{CE} = –10 Vdc)	MPQ2906		20	—	
	MPQ2907		30	—	
(I_C = –500 mAdc, V_{CE} = –10 Vdc)	MPQ2907A		50	—	
Collector–Emitter Saturation Voltage(1)		$V_{CE(sat)}$			Vdc
(I_C = –150 mAdc, I_B = –15 mAdc)			—	–0.4	
(I_C = –300 mAdc, I_B = –30 mAdc)	MPQ2906, MPQ2907		—	–1.6	
(I_C = –500 mA, I_B = –500 mA)	MPQ2907A		—	–1.6	
Base–Emitter Saturation Voltage(1)		$V_{BE(sat)}$			Vdc
(I_C = –150 mAdc, I_B = –15 mAdc)	MPQ2906, MPQ2907		—	–1.3	
(I_C = –300 mAdc, I_B = –30 mAdc)	MPQ2906, MPQ2907		—	–2.6	
(I_C = –500 mA, I_B = –50 mA)	MPQ2907A		—	–2.6	
SMALL–SIGNAL CHARACTERISTICS					
Current–Gain — Bandwidth Product (I_C = –50 mAdc, V_{CE} = –20 Vdc, f = 100 MHz)		f_T	200	—	MHz
Output Capacitance (V_{CB} = –10 Vdc, I_E = 0, f = 1.0 MHz)		C_{obo}	—	8.0	pF
Input Capacitance (V_{EB} = 2.0 Vdc, I_C = 0, f = 1.0 MHz)		C_{ibo}	—	30	pF
SWITCHING CHARACTERISTICS					
Turn–On Time (V_{CC} = –30 Vdc, I_C = –150 mAdc, I_{B1} = 15 mAdc)	MPQ2907A Only	t_{on}	—	45	ns
Turn–Off Time (V_{CC} = –6.0 Vdc, I_C = –150 mAdc, I_{B1} = I_{B2} = 15 mAdc)	MPQ2907A Only	t_{off}	—	180	ns

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

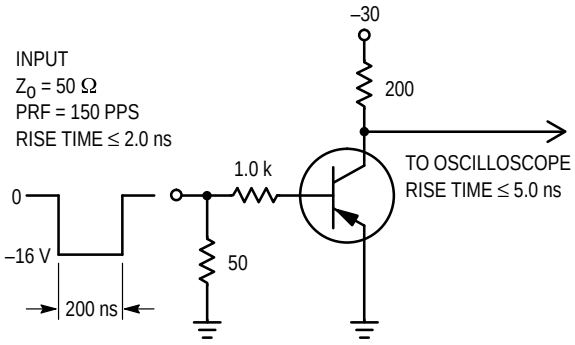


Figure 1. Delay and Rise Time Test Circuit

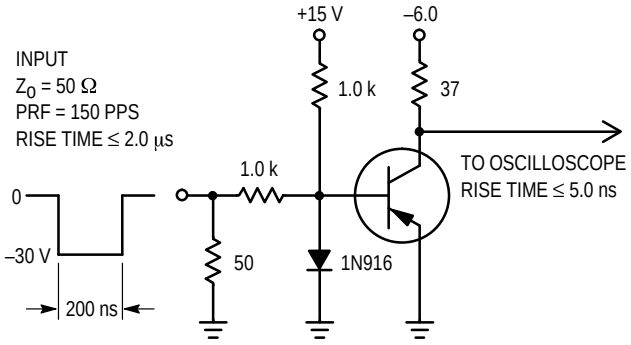


Figure 2. Storage and Fall Time Test Circuit

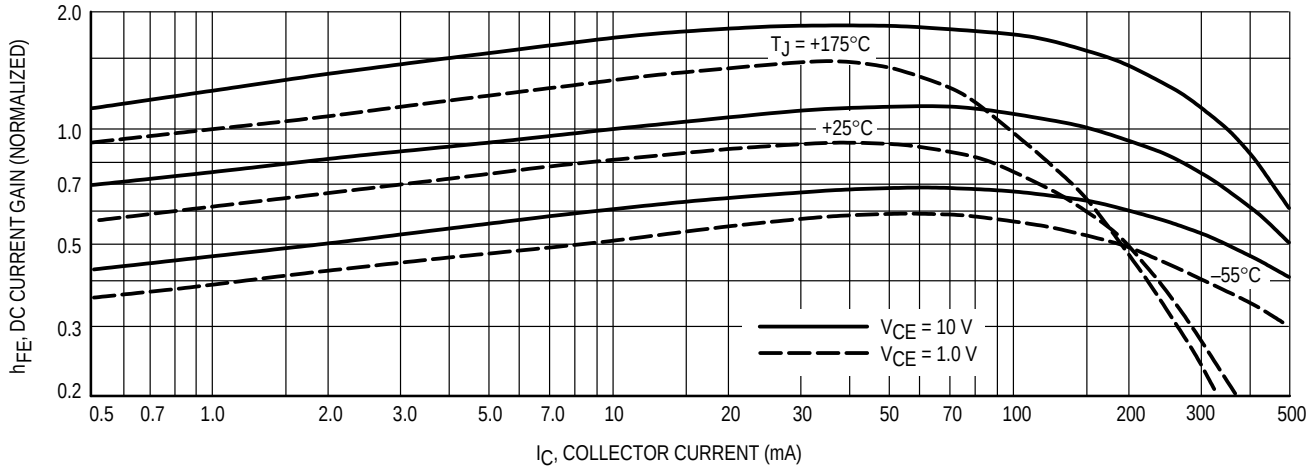


Figure 3. DC Current Gain

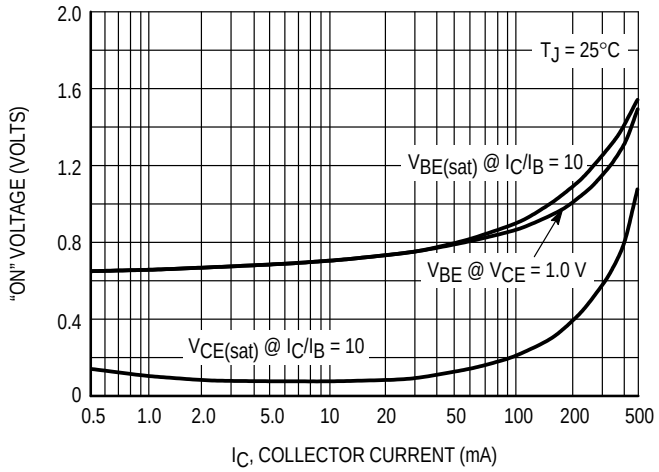


Figure 4. "ON" Voltages

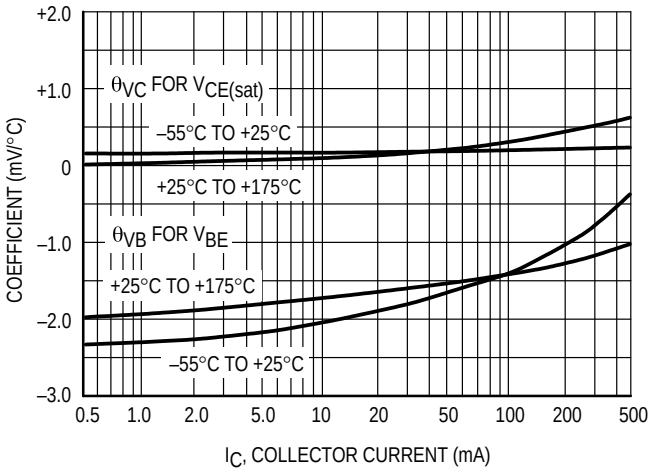


Figure 5. Temperature Coefficients

NOISE FIGURE

(V_{CE} = 10 V, T_A = 25°C)

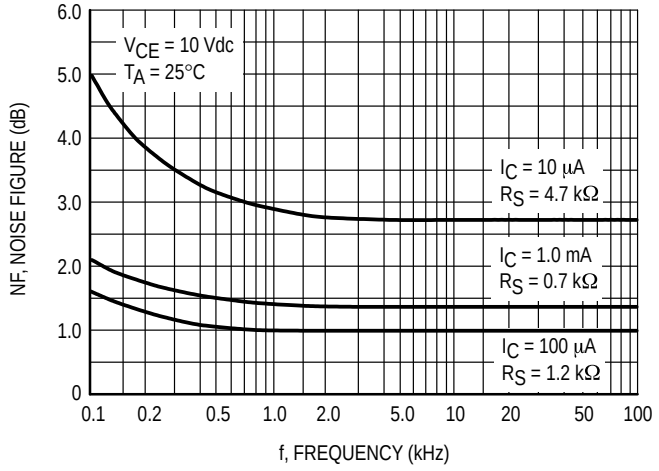


Figure 6. Frequency Effects

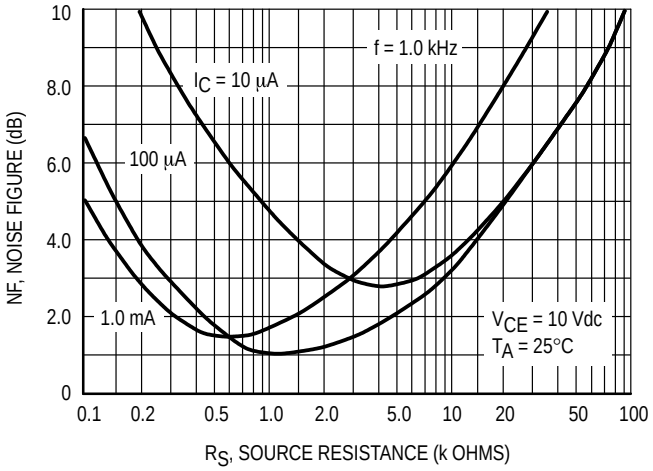


Figure 7. Source Resistance Effects

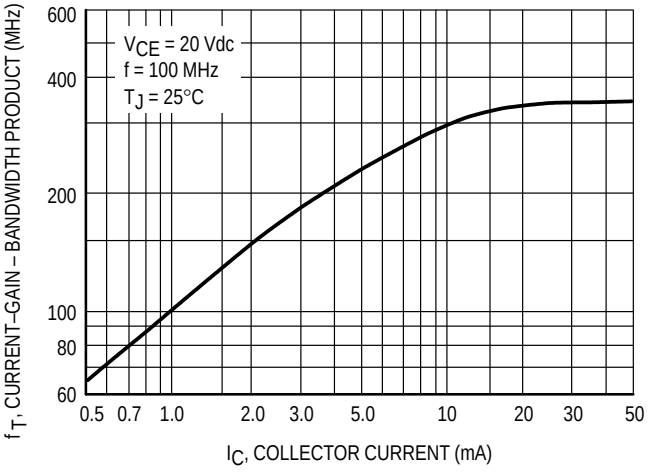


Figure 8. Current–Gain — Bandwidth Product

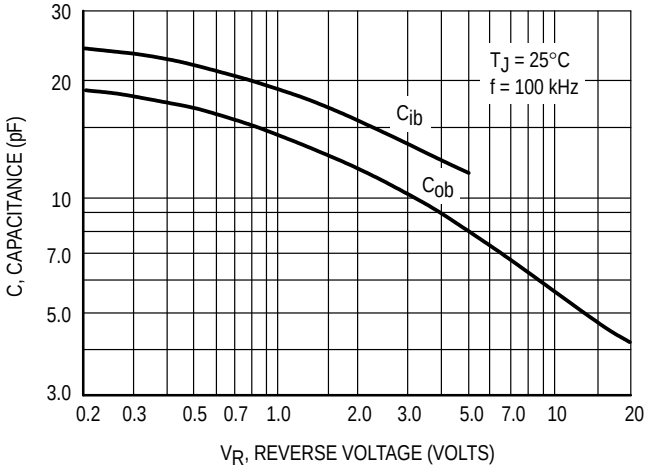


Figure 9. Capacitance

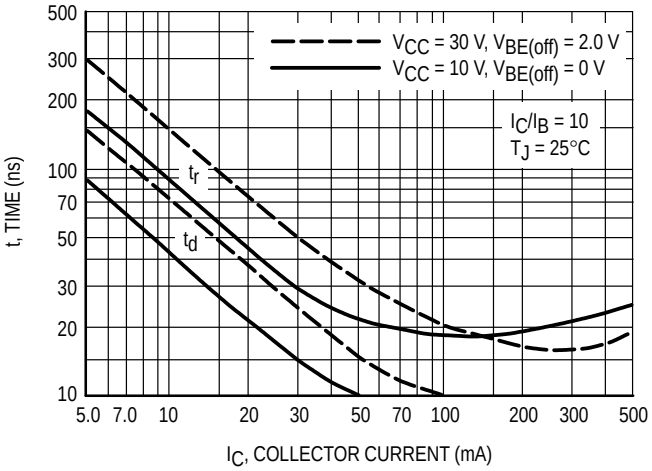


Figure 10. Turn–On Time

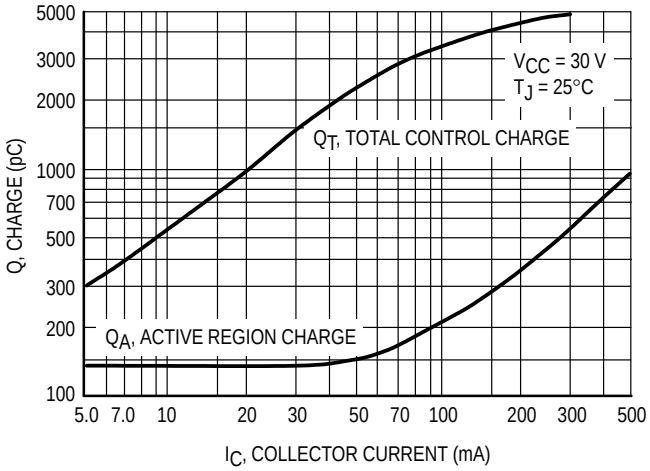


Figure 11. Charge Data

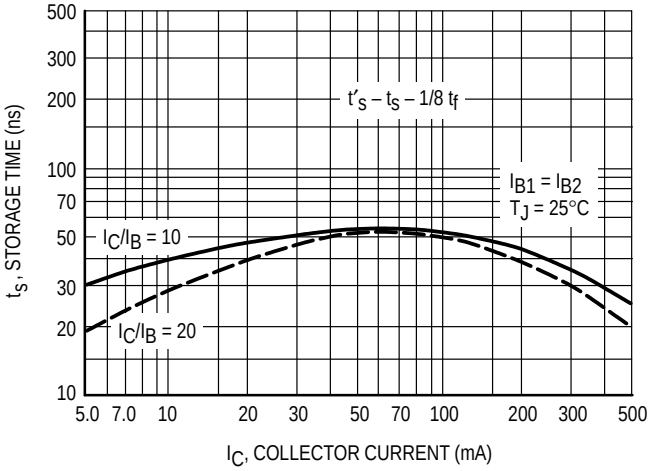


Figure 12. Storage Time

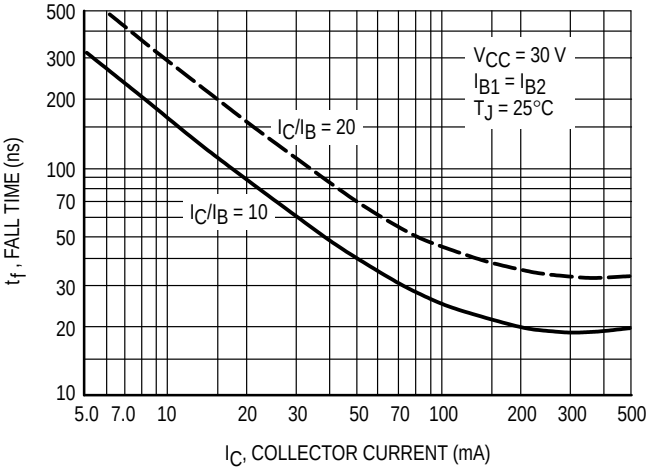


Figure 13. Fall Time

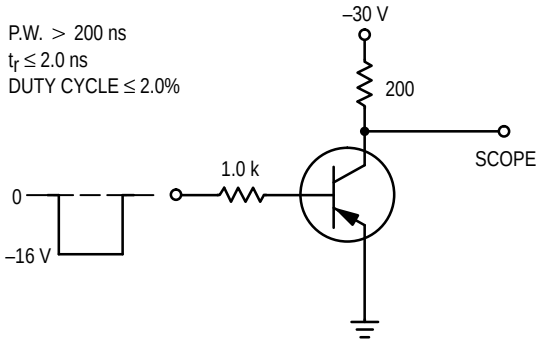


Figure 14. Delay and Rise Time Test Circuit

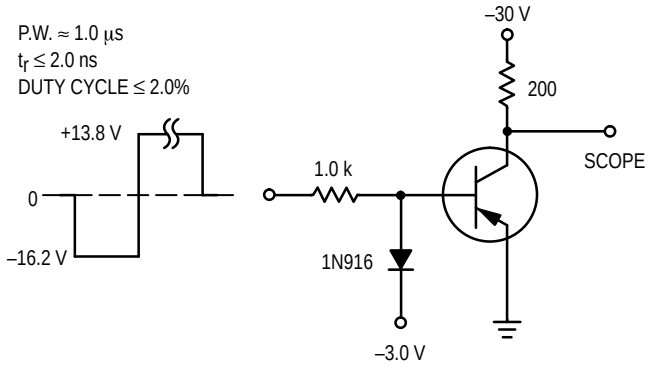
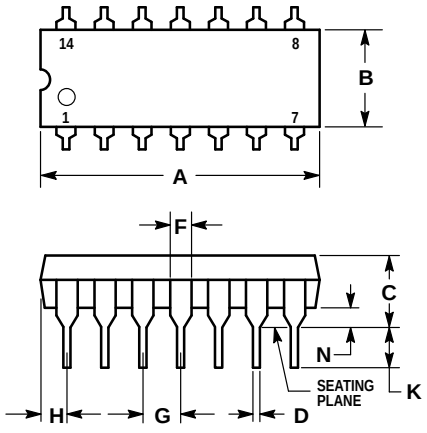


Figure 15. Storage and Fall Time Test Circuit

PACKAGE DIMENSIONS



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.

	INCHES		MILLIMETERS	
DIM	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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