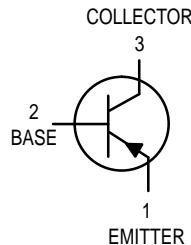


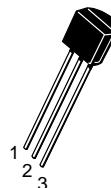
General Purpose Transistors

PNP Silicon



MPS2907
MPS2907A*

*Motorola Preferred Device



CASE 29-04, STYLE 1
TO-92 (TO-226AA)

MAXIMUM RATINGS

Rating	Symbol	MPS2907	MPS2907A	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
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D		625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D		1.5 12	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-500 to +150		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ⁽¹⁾ ($I_C = -10 \text{ mA}\text{dc}$, $I_B = 0$)	$V_{(BR)CEO}$	-40 -60	—	Vdc
Collector-Base Breakdown Voltage ($I_C = -10 \mu\text{A}\text{dc}$, $I_E = 0$)	$V_{(BR)CBO}$	-60	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = -10 \mu\text{A}\text{dc}$, $I_C = 0$)	$V_{(BR)EBO}$	-5.0	—	Vdc
Collector Cutoff Current ($V_{CE} = -30 \text{ Vdc}$, $V_{EB(\text{off})} = -0.5 \text{ Vdc}$)	I_{CEX}	—	-50	nAdc
Collector Cutoff Current ($V_{CB} = -50 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = -50 \text{ Vdc}$, $I_E = 0$, $T_A = 150^\circ\text{C}$)	I_{CBO}	— — — —	-0.02 -0.01 -20 -10	$\mu\text{A}\text{dc}$
Base Current ($V_{CE} = -30 \text{ Vdc}$, $V_{EB(\text{off})} = -0.5 \text{ Vdc}$)	I_B	—	-50	nAdc

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

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

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

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
DC Current Gain (I _C = -0.1 mA, V _{CE} = -10 Vdc)	MPS2907	h _{FE}	35	—
	MPS2907A		75	—
(I _C = -1.0 mA, V _{CE} = -10 Vdc)	MPS2907		50	—
	MPS2907A		100	—
(I _C = -10 mA, V _{CE} = -10 Vdc)	MPS2907		75	—
	MPS2907A		100	—
(I _C = -150 mA, V _{CE} = -10 Vdc) ⁽¹⁾	MPS2907, MPS2907A		100	300
(I _C = -500 mA, V _{CE} = -10 Vdc) ⁽¹⁾	MPS2907		30	—
	MPS2907A		50	—
Collector-Emitter Saturation Voltage ⁽¹⁾ (I _C = -150 mA, I _B = -15 mA) (I _C = -500 mA, I _B = -50 mA)	V _{CE(sat)}	—	-0.4	Vdc
		—	-1.6	
Base-Emitter Saturation Voltage ⁽¹⁾ (I _C = -150 mA, I _B = -15 mA) (I _C = -500 mA, I _B = -50 mA)	V _{BE(sat)}	—	-1.3	Vdc
		—	-2.6	

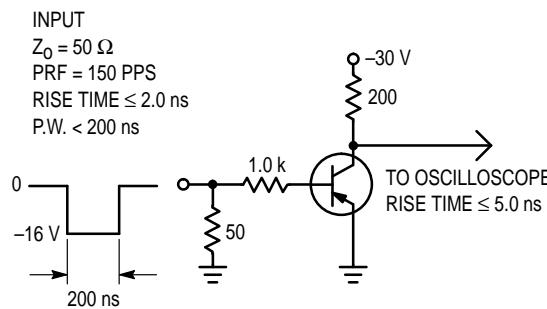
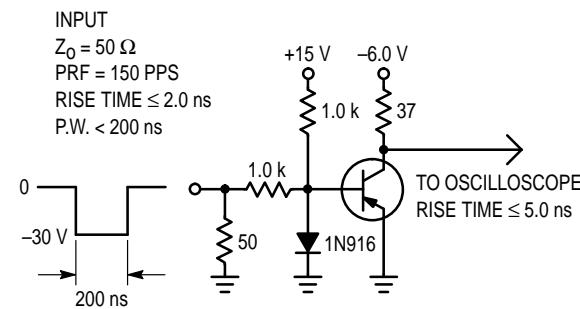
SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ^{(1), (2)} (I _C = -50 mA, 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 _{iob}	—	30	pF

SWITCHING CHARACTERISTICS

Turn-On Time	(V _{CC} = -30 Vdc, I _C = -150 mA, I _{B1} = -15 mA) (Figures 1 and 5)	t _{on}	—	45	ns
Delay Time		t _d	—	10	ns
Rise Time		t _r	—	40	ns
Turn-Off Time	(V _{CC} = -6.0 Vdc, I _C = -150 mA, I _{B1} = I _{B2} = 15 mA) (Figure 2)	t _{off}	—	100	ns
Storage Time		t _s	—	80	ns
Fall Time		t _f	—	30	ns

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

 2. f_T is defined as the frequency at which |h_{fe}| extrapolates to unity.

Figure 1. Delay and Rise Time Test Circuit

Figure 2. Storage and Fall Time Test Circuit

TYPICAL CHARACTERISTICS

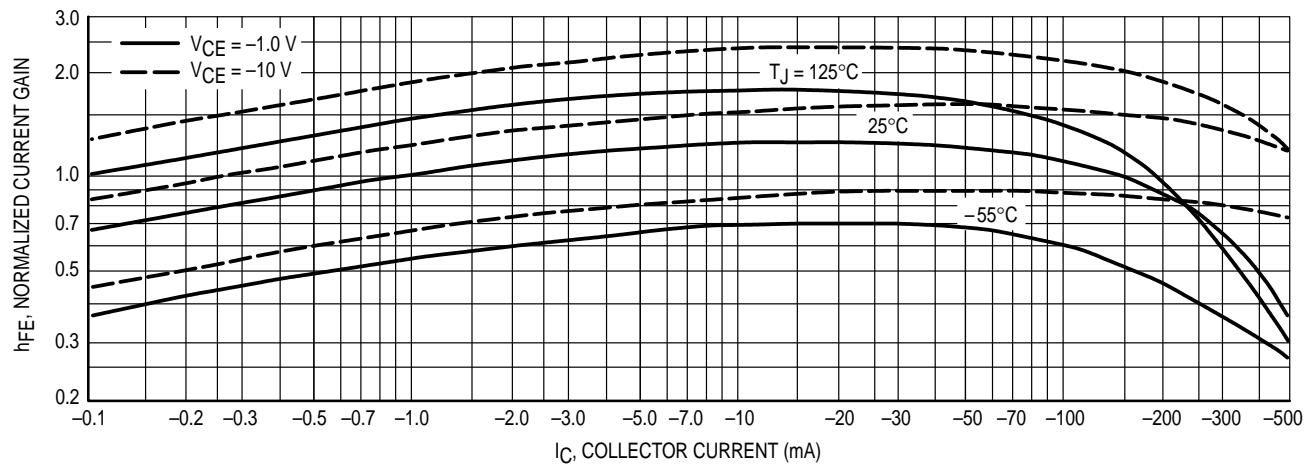


Figure 3. DC Current Gain

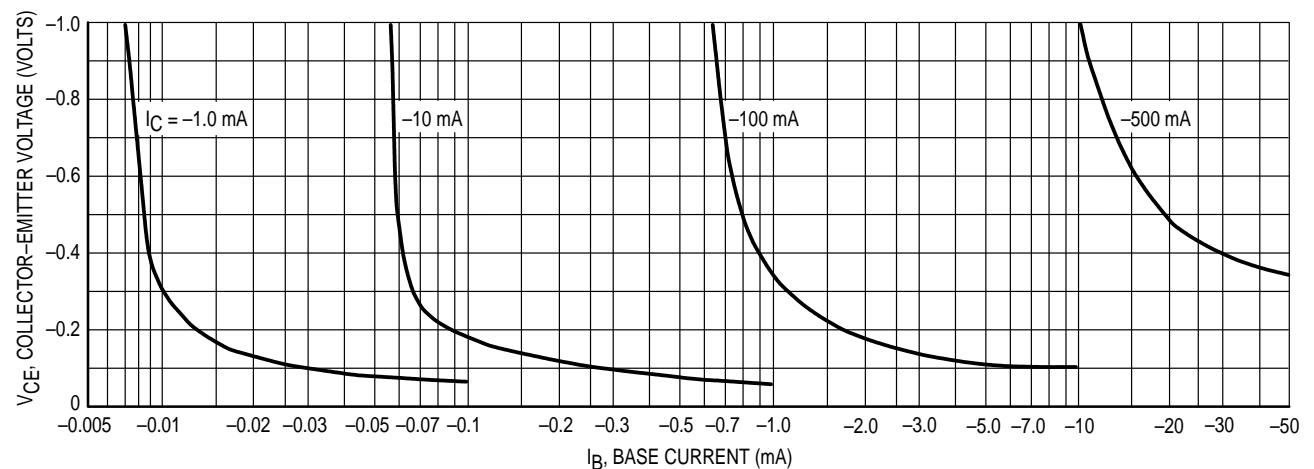


Figure 4. Collector Saturation Region

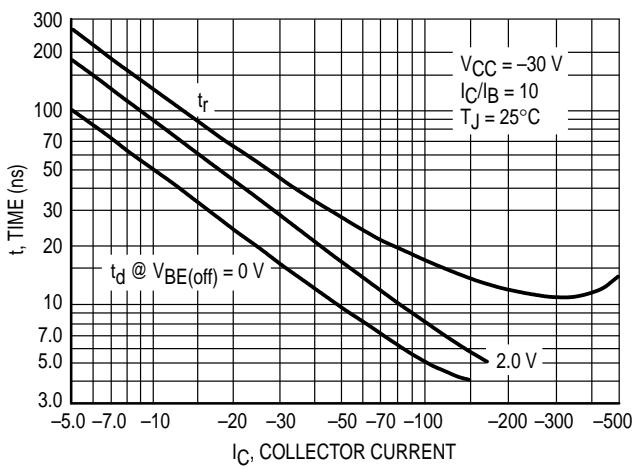


Figure 5. Turn-On Time

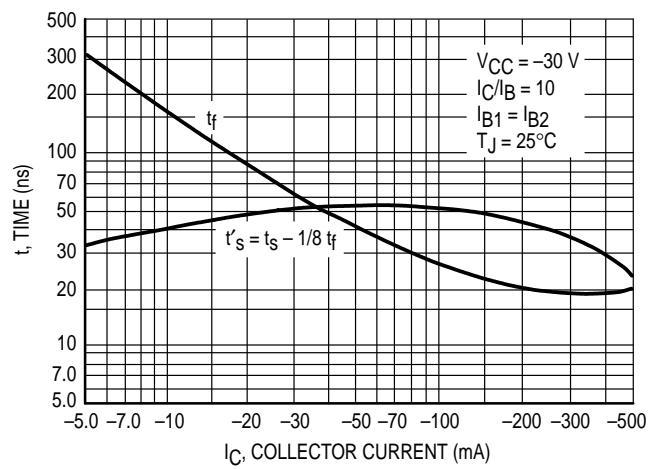


Figure 6. Turn-Off Time

TYPICAL SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE

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

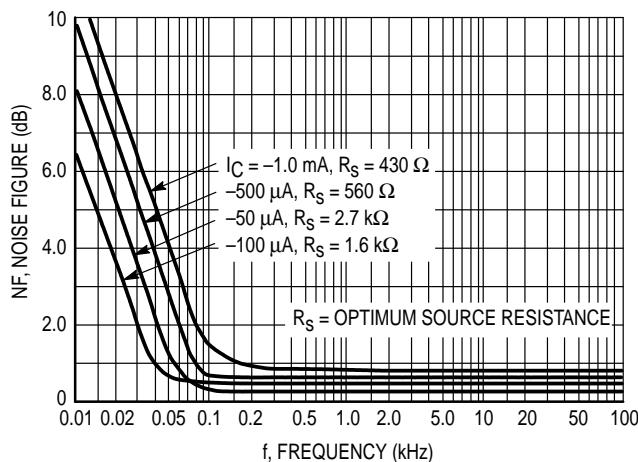


Figure 7. Frequency Effects

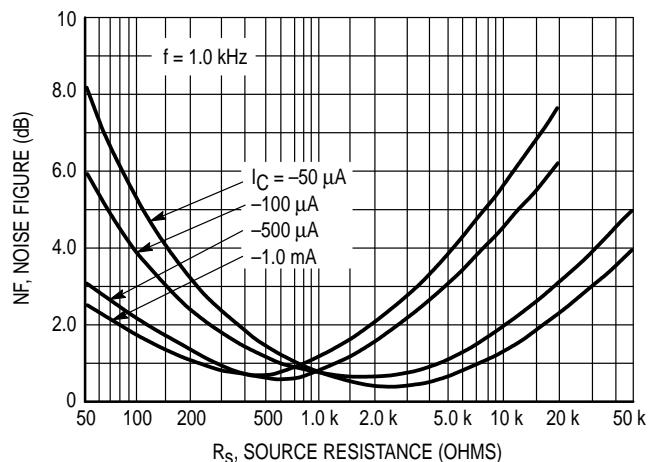


Figure 8. Source Resistance Effects

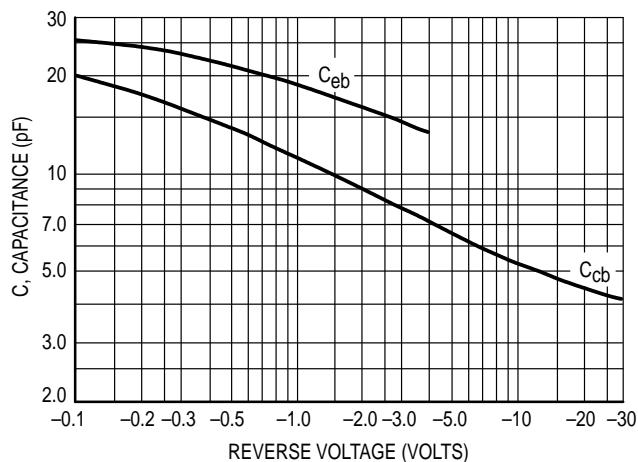


Figure 9. Capacitances

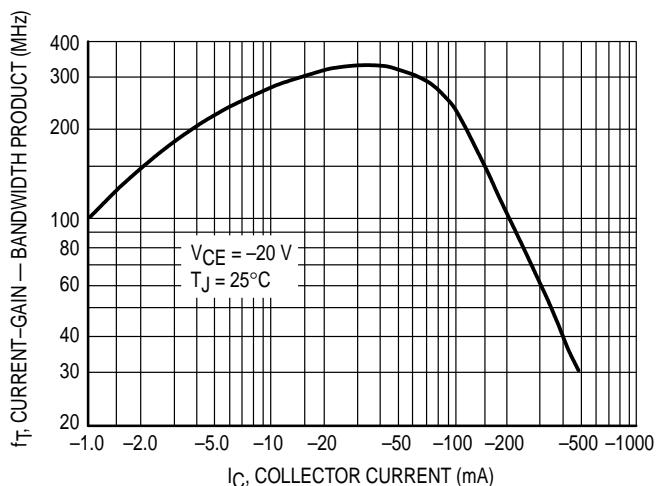


Figure 10. Current-Gain — Bandwidth Product

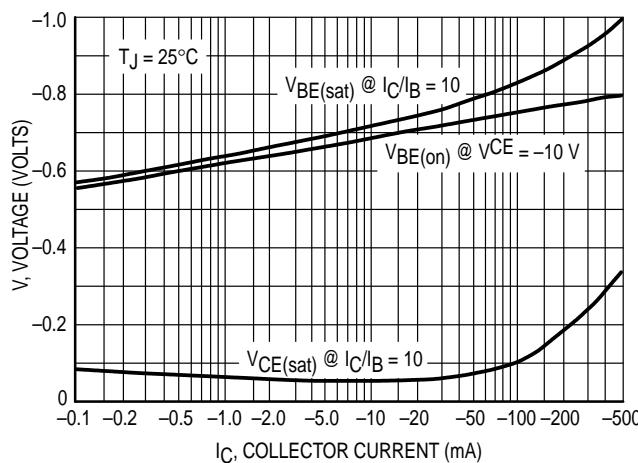


Figure 11. “On” Voltage

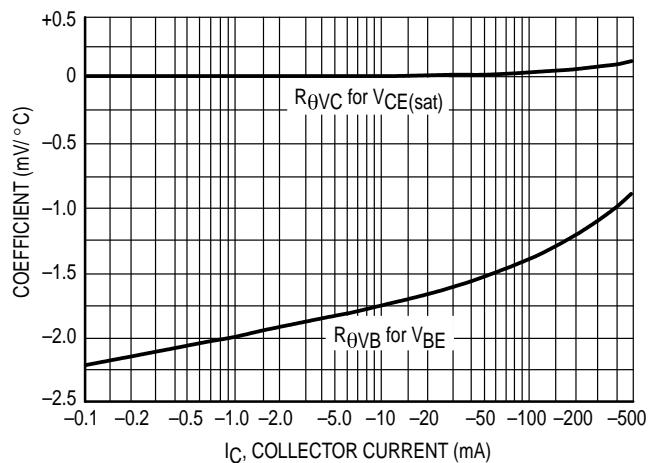
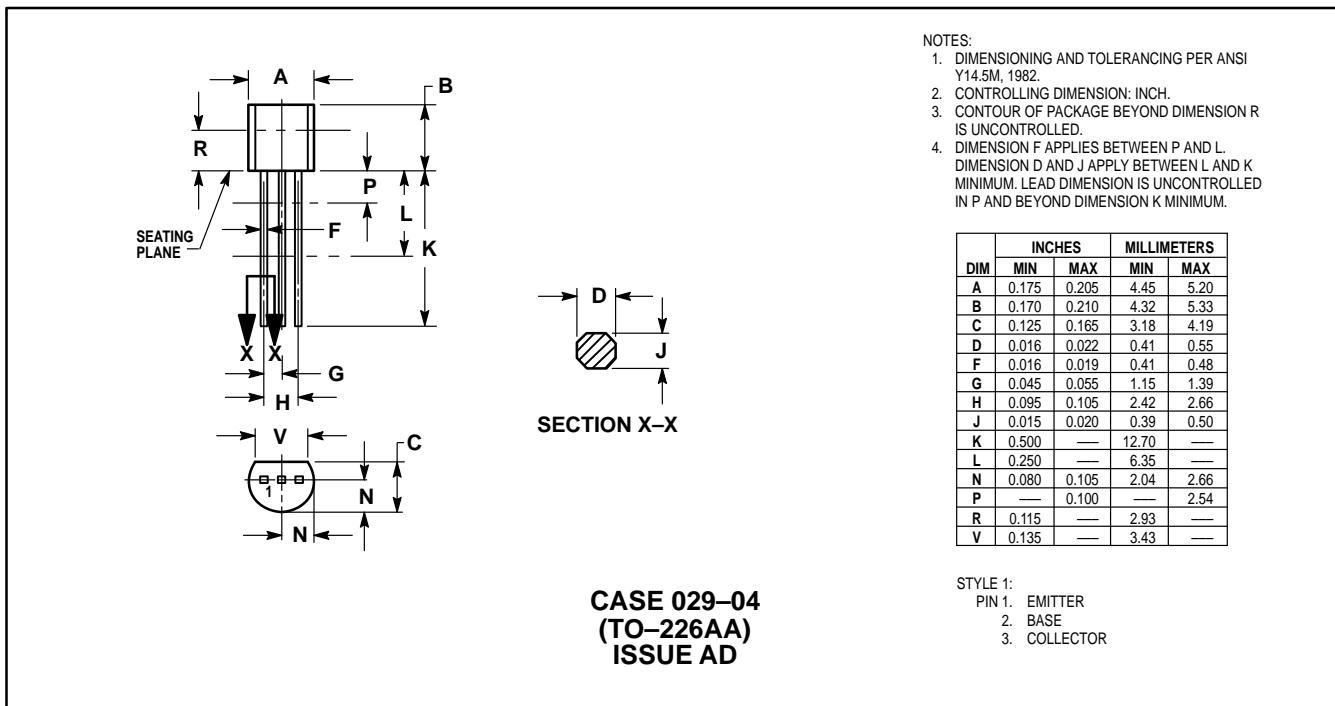


Figure 12. Temperature Coefficients

PACKAGE DIMENSIONS

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