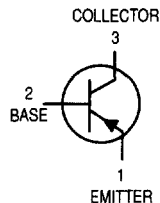


General Purpose Transistors

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		mA _{dc}
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	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C/W}$

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 ⁽¹⁾ ($I_C = -10 \text{ mA}_{dc}, I_E = 0$)	MPS2907 MPS2907A	$V_{(BR)CEO}$	-40 -60	—	Vdc
Collector-Base Breakdown Voltage ($I_C = -10 \mu\text{A}_{dc}, I_E = 0$)		$V_{(BR)CBO}$	-60	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = -10 \mu\text{A}_{dc}, I_C = 0$)		$V_{(BR)EBO}$	-5.0	—	Vdc
Collector Cutoff Current ($V_{CE} = -30 \text{ Vdc}, V_{EB(off)} = -0.5 \text{ Vdc}$)		I_{CEX}	—	-50	nA _{dc}
Collector Cutoff Current ($V_{CB} = -50 \text{ Vdc}, I_E = 0$)	MPS2907	I_{CBO}	—	-0.02	μA_{dc}
($V_{CB} = -50 \text{ Vdc}, I_E = 0, T_A = 150^\circ\text{C}$)	MPS2907A		—	-0.01	
	MPS2907		—	-20	
	MPS2907A		—	-10	
Base Current ($V_{CE} = -30 \text{ Vdc}, V_{EB(off)} = -0.5 \text{ Vdc}$)		I_B	—	-50	nA _{dc}

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

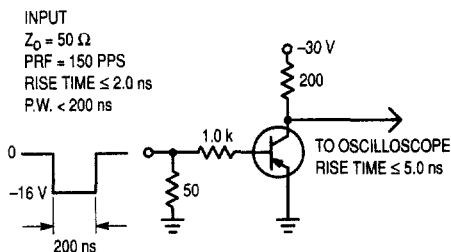
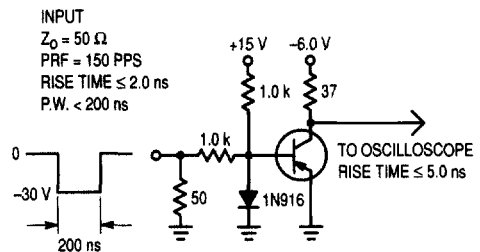
Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
DC Current Gain ($I_C = -0.1\text{ mA}$, $V_{CE} = -10\text{ Vdc}$) ($I_C = -1.0\text{ mA}$, $V_{CE} = -10\text{ Vdc}$) ($I_C = -10\text{ mA}$, $V_{CE} = -10\text{ Vdc}$) ($I_C = -150\text{ mA}$, $V_{CE} = -10\text{ Vdc}$) ⁽¹⁾ ($I_C = -500\text{ mA}$, $V_{CE} = -10\text{ Vdc}$) ⁽¹⁾	h_{FE} MPS2907 MPS2907A MPS2907 MPS2907A MPS2907 MPS2907A MPS2907, MPS2907A MPS2907 MPS2907A	35 75 50 100 75 100 100 30 50	— — — — — — 300 — —	—
Collector-Emitter Saturation Voltage ⁽¹⁾ ($I_C = -150\text{ mA}$, $I_B = -15\text{ mA}$) ($I_C = -500\text{ mA}$, $I_B = -50\text{ mA}$)	$V_{CE(sat)}$	— —	—0.4 —1.6	Vdc
Base-Emitter Saturation Voltage ⁽¹⁾ ($I_C = -150\text{ mA}$, $I_B = -15\text{ mA}$) ($I_C = -500\text{ mA}$, $I_B = -50\text{ mA}$)	$V_{BE(sat)}$	— —	—1.3 —2.6	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ⁽¹⁾ , ⁽²⁾ ($I_C = -50\text{ mA}$, $V_{CE} = -20\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	200	—	MHz
Output Capacitance ($V_{CB} = -10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{obo}	—	8.0	pF
Input Capacitance ($V_{EB} = -2.0\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ibo}	—	30	pF

SWITCHING CHARACTERISTICS

Turn-On Time	$(V_{CC} = -30\text{ Vdc}$, $I_C = -150\text{ mA}$, $I_{B1} = -15\text{ mA}$) (Figures 1 and 5)	t_{on}	—	45	ns
Delay Time		t_d	—	10	ns
Rise Time		t_r	—	40	ns
Turn-Off Time	$(V_{CC} = -6.0\text{ Vdc}$, $I_C = -150\text{ mA}$, $I_{B1} = I_{B2} = 15\text{ mA}$) (Figure 2)	t_{off}	—	100	ns
Storage Time		t_s	—	80	ns
Fall Time		t_f	—	30	ns

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

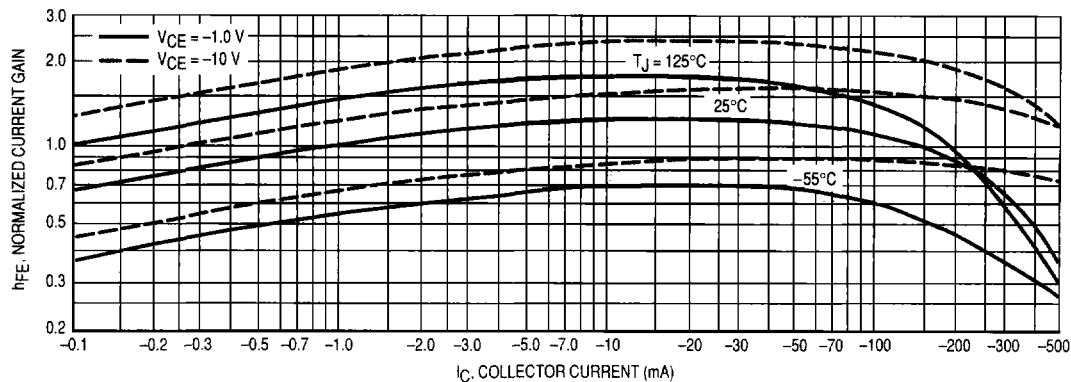


Figure 3. DC Current Gain

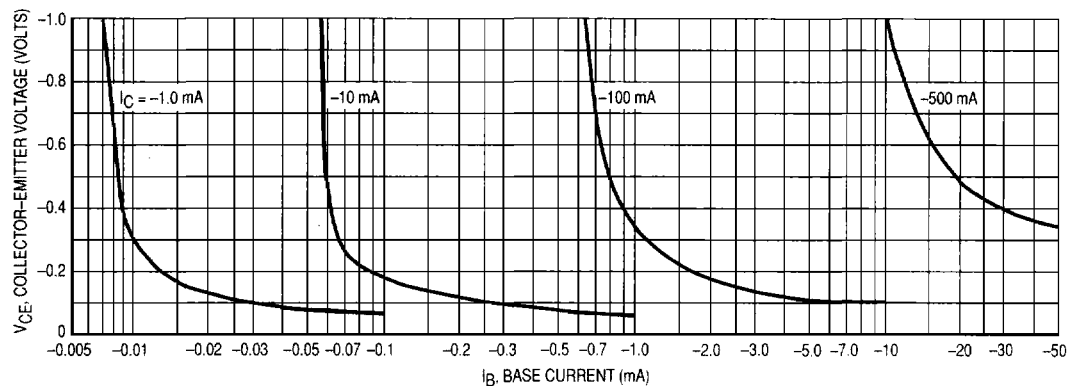


Figure 4. Collector Saturation Region

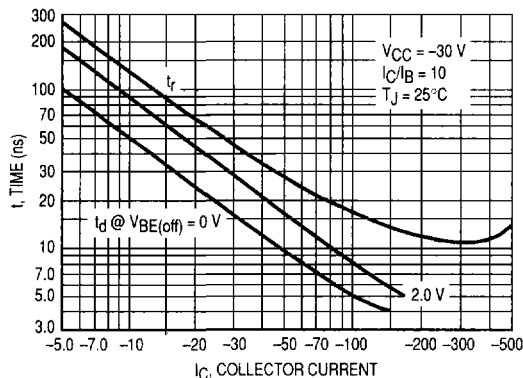


Figure 5. Turn-On Time

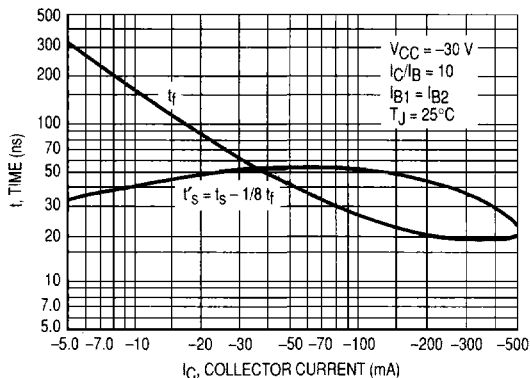


Figure 6. Turn-Off Time

TYPICAL SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE

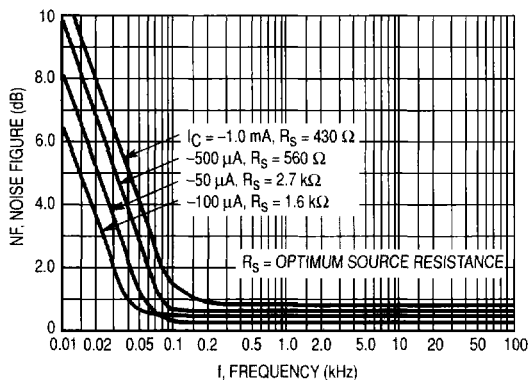
 $V_{CE} = 10 \text{ Vdc}$, $T_A = 25^\circ\text{C}$ 

Figure 7. Frequency Effects

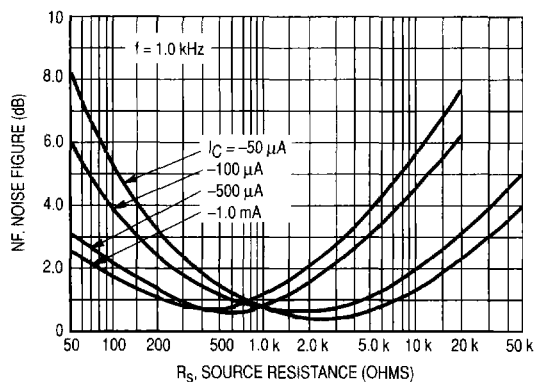


Figure 8. Source Resistance Effects

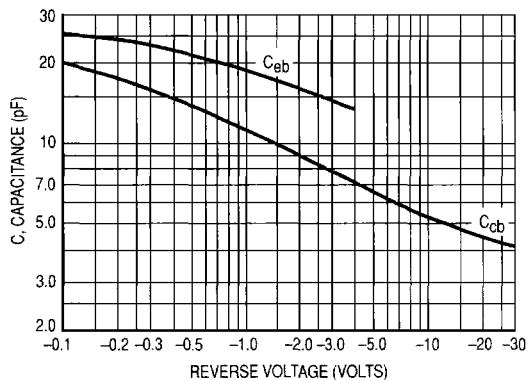


Figure 9. Capacitances

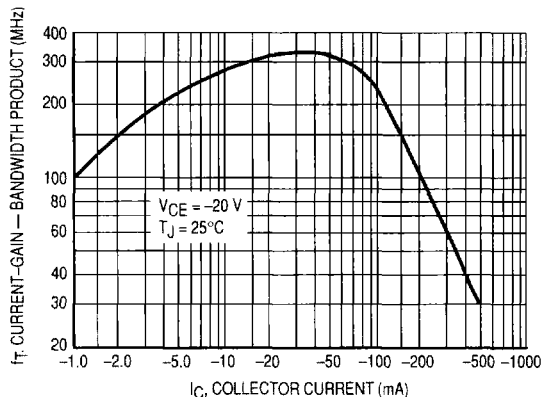


Figure 10. Current-Gain — Bandwidth Product

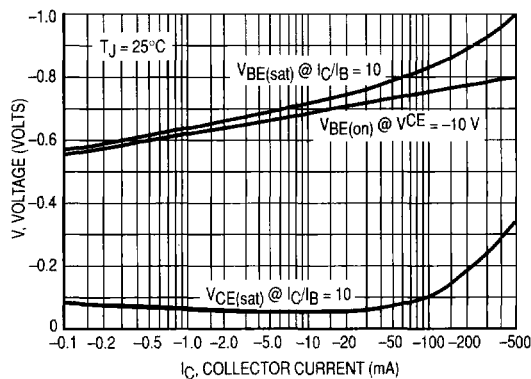


Figure 11. "On" Voltage

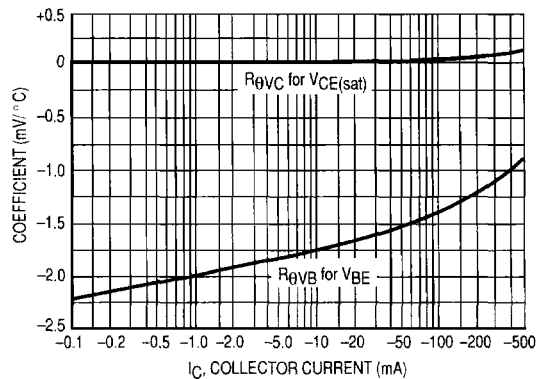


Figure 12. Temperature Coefficients