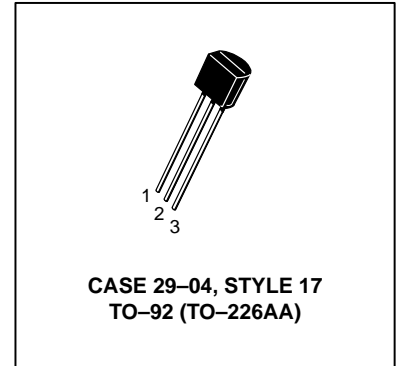
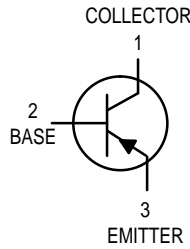


P2N2907A



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	-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}	-55 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
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ⁽¹⁾ ($I_C = -10$ mAdc, $I_E = 0$)	$V_{(BR)CEO}$	-60	—	Vdc
Collector–Base Breakdown Voltage ($I_C = -10$ μ Adc, $I_E = 0$)	$V_{(BR)CBO}$	-60	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = -10$ μ Adc, $I_C = 0$)	$V_{(BR)EBO}$	-5.0	—	Vdc
Collector Cutoff Current ($V_{CE} = -30$ Vdc, $V_{EB(off)} = -0.5$ Vdc)	I_{CEX}	—	-50	nAdc
Collector Cutoff Current ($V_{CB} = -50$ Vdc, $I_E = 0$) ($V_{CB} = -50$ Vdc, $I_E = 0$, $T_A = 150^\circ\text{C}$)	I_{CBO}	— —	-0.01 -10	μ Adc
Emitter Cutoff Current ($V_{EB} = -3.0$ Vdc)	I_{EBO}	—	-10	nAdc
Collector Cutoff Current ($V_{CE} = -10$ V)	I_{CEO}	—	-10	nAdc
Base Cutoff Current ($V_{CE} = -30$ Vdc, $V_{EB(off)} = -0.5$ Vdc)	I_{BEX}	—	-50	nAdc

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

P2N2907A

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 _{dc} , V _{CE} = -10 V _{dc}) (I _C = -1.0 mA _{dc} , V _{CE} = -10 V _{dc}) (I _C = -10 mA _{dc} , V _{CE} = -10 V _{dc}) (I _C = -150 mA _{dc} , V _{CE} = -10 V _{dc}) ⁽¹⁾ (I _C = -500 mA _{dc} , V _{CE} = -10 V _{dc}) ⁽¹⁾	h _{FE}	75 100 100 100 50	— — — 300 —	—
Collector–Emitter Saturation Voltage ⁽¹⁾ (I _C = -150 mA _{dc} , I _B = -15 mA _{dc}) (I _C = -500 mA _{dc} , I _B = -50 mA _{dc})	V _{CE(sat)}	— —	-0.4 -1.6	V _{dc}
Base–Emitter Saturation Voltage ⁽¹⁾ (I _C = -150 mA _{dc} , I _B = -15 mA _{dc}) (I _C = -500 mA _{dc} , I _B = -50 mA _{dc})	V _{BE(sat)}	— —	-1.3 -2.6	V _{dc}

SMALL-SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ^{(1), (2)} (I _C = -50 mA _{dc} , V _{CE} = -20 V _{dc} , f = 100 MHz)	f _T	200	—	MHz
Output Capacitance (V _{CB} = -10 V _{dc} , I _E = 0, f = 1.0 MHz)	C _{obo}	—	8.0	pF
Input Capacitance (V _{EB} = -2.0 V _{dc} , I _C = 0, f = 1.0 MHz)	C _{ibo}	—	30	pF

SWITCHING CHARACTERISTICS

Turn–On Time	(V _{CC} = -30 V _{dc} , I _C = -150 mA _{dc} , I _{B1} = -15 mA _{dc}) (Figures 1 and 5)	t _{on}	—	50	ns
Delay Time		t _d	—	10	ns
Rise Time		t _r	—	40	ns
Turn–Off Time	(V _{CC} = -6.0 V _{dc} , I _C = -150 mA _{dc} , I _{B1} = I _{B2} = -15 mA _{dc}) (Figure 2)	t _{off}	—	110	ns
Storage Time		t _s	—	80	ns
Fall Time		t _f	—	30	ns

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
2. f_T is defined as the frequency at which |h_{fe}| extrapolates to unity.

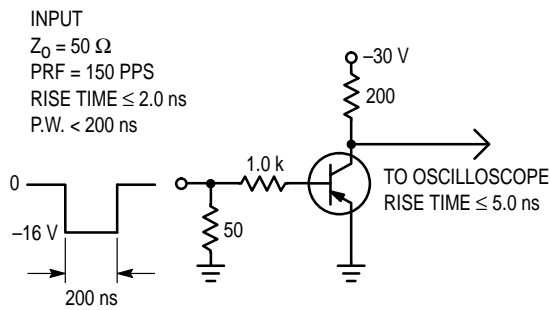


Figure 1. Delay and Rise Time Test Circuit

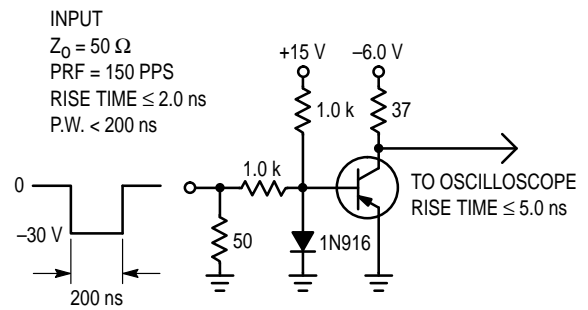


Figure 2. Storage and Fall Time Test Circuit

TYPICAL CHARACTERISTICS

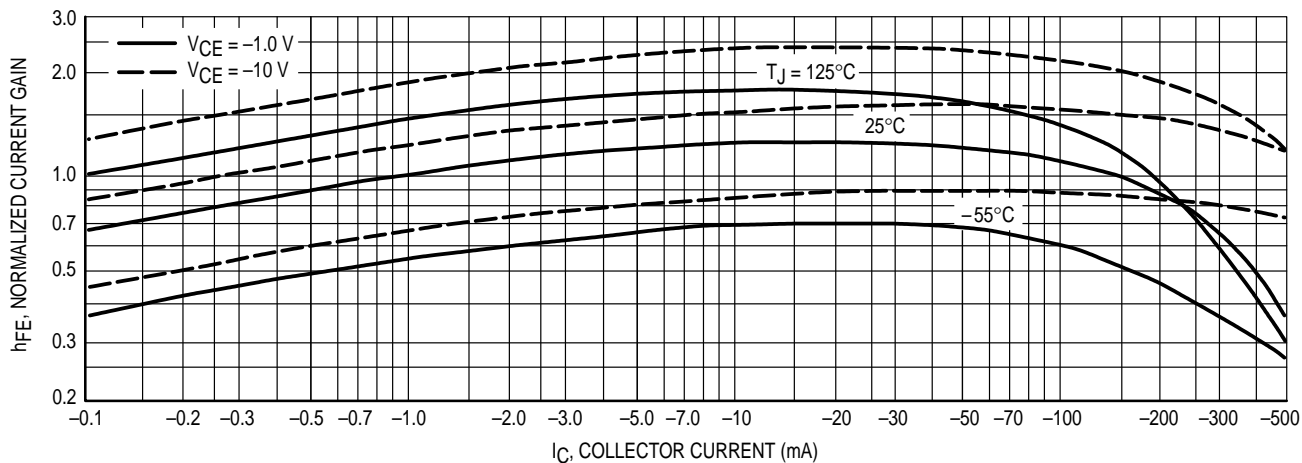


Figure 3. DC Current Gain

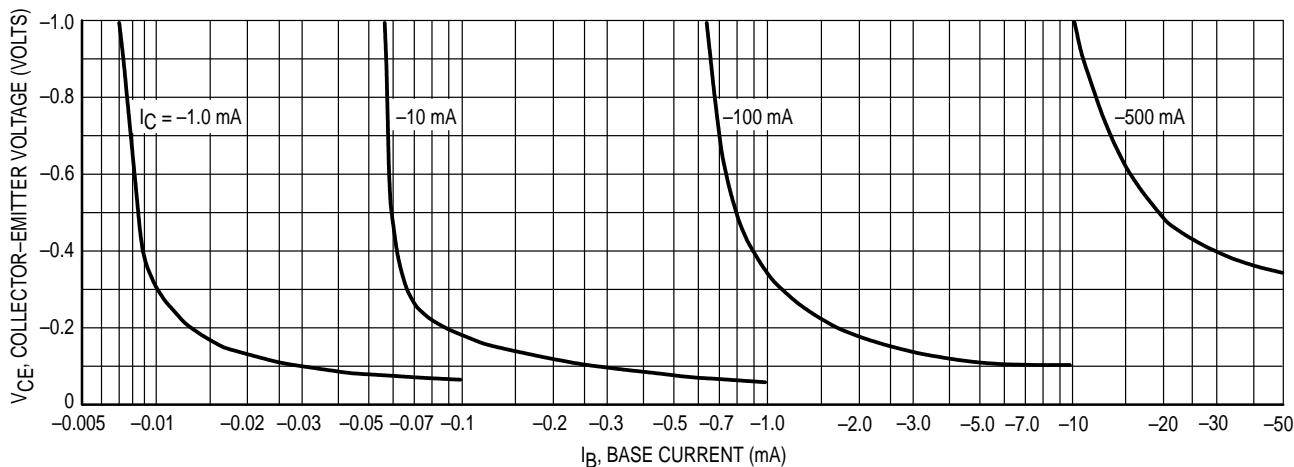


Figure 4. Collector Saturation Region

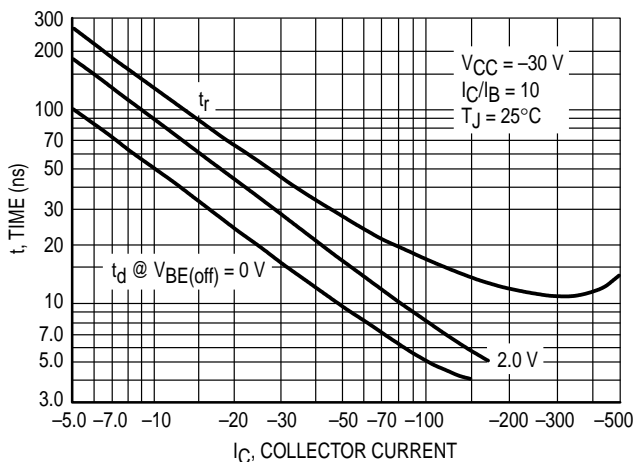


Figure 5. Turn-On Time

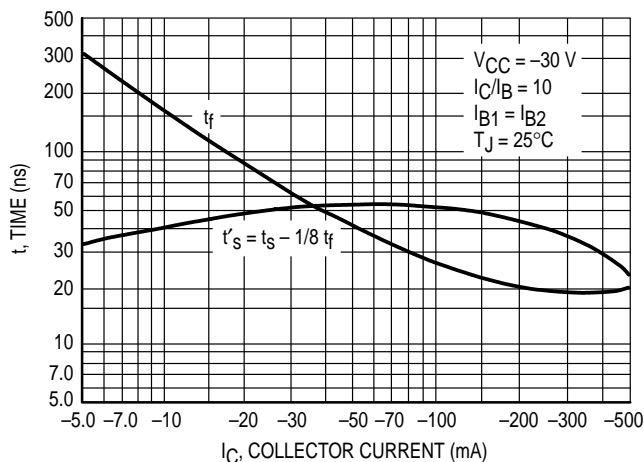


Figure 6. Turn-Off Time

TYPICAL SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE

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

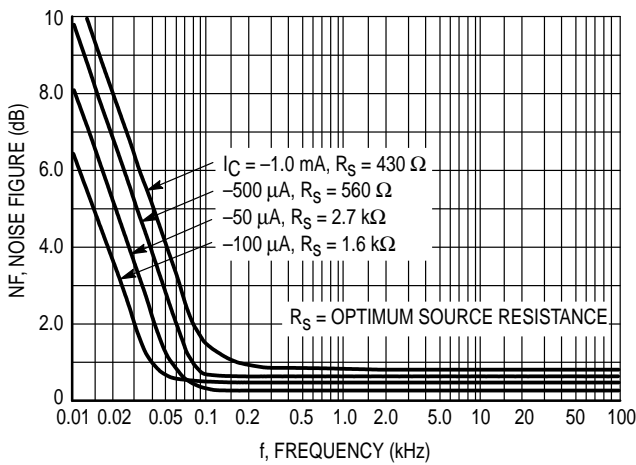


Figure 7. Frequency Effects

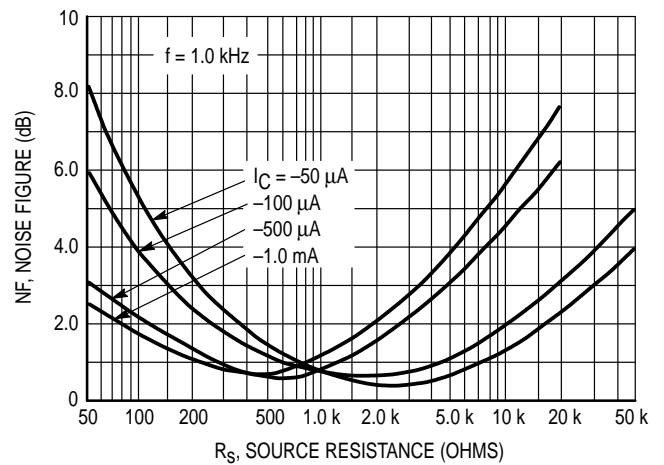


Figure 8. Source Resistance Effects

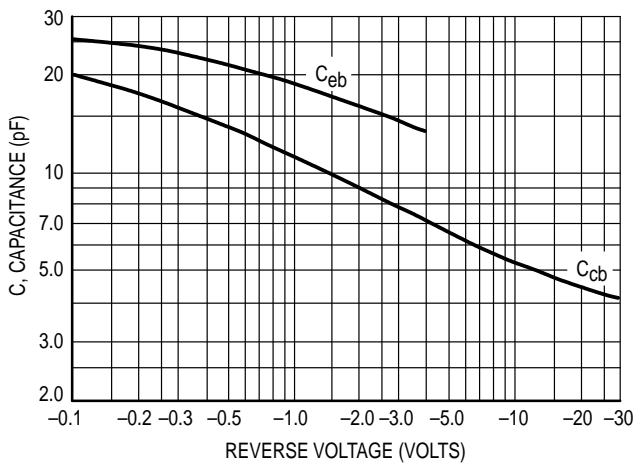


Figure 9. Capacitances

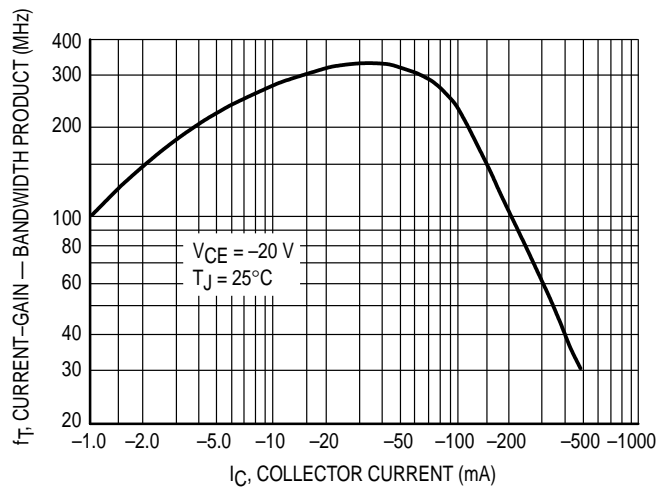


Figure 10. Current-Gain — Bandwidth Product

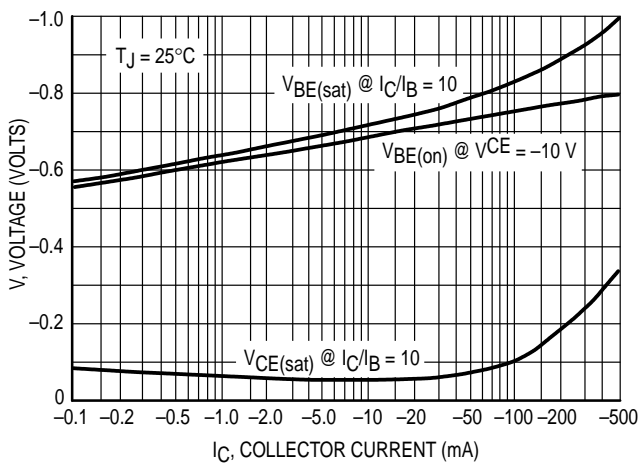


Figure 11. "On" Voltage

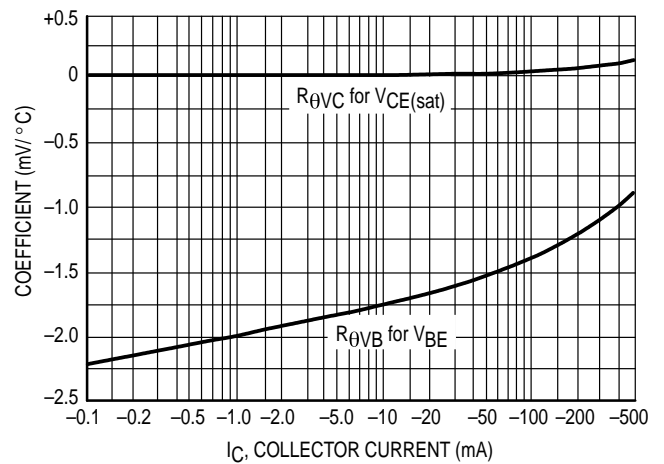


Figure 12. Temperature Coefficients

