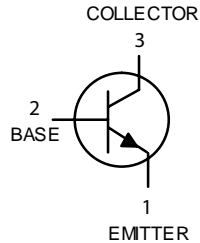
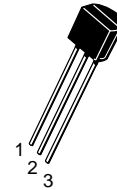


RoHS Compliant Product

A suffix of "-C" specifies halogen & lead-free



TO-92



● FEATURES

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MPS2907A)
- Ideal for Medium Power Amplification and Switching

● MAXIMUM RATINGS

RATING	SYMBOL	VALUE	UNIT
Collector - Emitter Voltage	V_{CEO}	40	V
Collector - Base Voltage	V_{CBO}	75	V
Emitter - Base Voltage	V_{EBO}	6.0	V
Collector Current - Continuous	I_C	600	mA
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 ~ +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 ($I_C = 10\text{ mA}, I_B = 0$)	$V_{(BR)CEO}$	40	-	V
Collector - Base Breakdown Voltage ($I_C = 10\ \mu\text{A}, I_E = 0$)	$V_{(BR)CBO}$	75	-	V
Emitter - Base Breakdown Voltage ($I_E = 10\ \mu\text{A}, I_C = 0$)	$V_{(BR)EBO}$	6.0	-	V
Collector Cutoff Current ($V_{CE} = 60\text{ V}, V_{EB(OFF)} = 3.0\text{ V}$)	I_{CEX}	-	10	nA
Collector Cutoff Current ($V_{CB} = 60\text{ V}, I_E = 0$) ($V_{CB} = 60\text{ V}, I_E = 0, T_A = 150^\circ\text{C}$)	I_{CBO}	- -	0.01 10	μA
Emitter Cutoff Current ($V_{EB} = 3.0\text{ V}, I_C = 0$)	I_{EBO}	-	10	nA
Collector Cutoff Current ($V_{CE} = 10\text{ V}$)	I_{CEO}	-	10	nA
Base Cutoff Current ($V_{CE} = 60\text{ V}, V_{EB(OFF)} = 3.0\text{ V}$)	I_{BEX}	-	20	nA

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

CHARACTERISTIC	SYMBOL	Min.	Max.	UNIT
ON CHARACTERISTICS				
DC Current Gain ($I_C = 0.1\text{ mA}$, $V_{CE} = 10\text{ V}$) ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ V}$) ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ V}$) ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ V}$, $T_A = -55\text{ }^\circ\text{C}$) ($I_C = 150\text{ mA}$, $V_{CE} = 10\text{ V}$) ⁽¹⁾ ($I_C = 150\text{ mA}$, $V_{CE} = 1.0\text{ V}$) ⁽¹⁾ ($I_C = 500\text{ mA}$, $V_{CE} = 10\text{ V}$) ⁽¹⁾	h_{FE}	35 50 75 35 100 50 40	- - - - 300 - -	-
Collector - Emitter Saturation Voltage ⁽¹⁾ ($I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$) ($I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$)	$V_{CE(sat)}$	- -	0.3 1.0	V
Base - Emitter Saturation Voltage ⁽¹⁾ ($I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$) ($I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$)	$V_{BE(sat)}$	0.6 -	1.2 2.0	V

SMALL - SIGNAL CHARACTERISTICS

Current - Gain - Bandwidth Product ⁽²⁾ ($I_C = 20\text{ mA}$, $V_{CE} = 20\text{ V}$, $f = 100\text{ MHz}$)	f_T	300	-	MHz
Output Capacitance ($V_{CB} = 10\text{ V}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{obo}	-	8.0	pF
Input Capacitance ($V_{EB} = 0.5\text{ V}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ibo}	-	25	pF
Input Impedance ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ KHz}$) ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ KHz}$)	h_{ie}	2.0 0.25	8.0 1.25	K Ω
Voltage Feedback Ratio ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ KHz}$) ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ KHz}$)	h_{re}	- -	8.0 4.0	$\times 10^{-4}$
Small - Signal Current Gain ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ KHz}$) ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ KHz}$)	h_{fe}	50 75	300 375	-
Output Admittance ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ KHz}$) ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ KHz}$)	h_{oe}	5.0 25	35 200	μmhos
Collector Base Time Constant ($I_E = 20\text{ mA}$, $V_{CB} = 20\text{ V}$, $f = 31.8\text{ KHz}$)	r_b, C_C	-	150	ps
Noise Figure ($I_C = 100\text{ }\mu\text{A}$, $V_{CE} = 10\text{ V}$, $R_S = 1.0\text{ K}\Omega$, $f = 1.0\text{ KHz}$)	N_F	-	4.0	dB

SWITCHING CHARACTERISTICS

Delay Time ($V_{CC} = 30\text{ V}$, $V_{BE(off)} = -2.0\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$) (Figure 1)	t_d	-	10	ns
Rise Time ($V_{CC} = 30\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = I_{B2} = 15\text{ mA}$) (Figure 2)	t_r	-	25	ns
Storage Time	t_s	-	225	ns
Fall Time	t_f	-	60	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.

● **SWITCHING TIME EQUIVALENT TEST CIRCUITS**

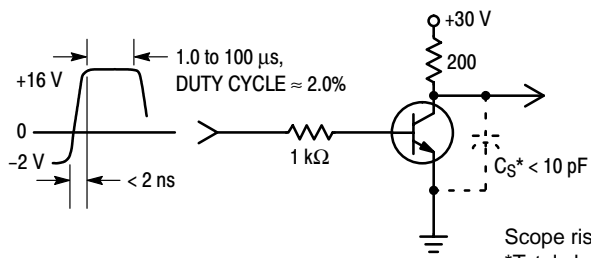


Figure 1. Turn-On Time

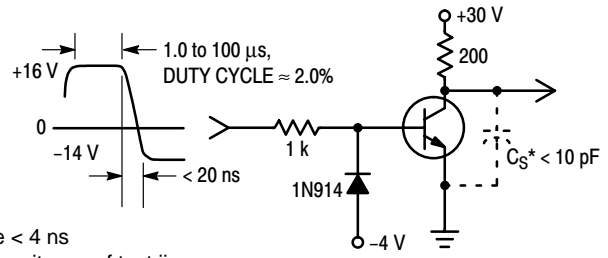


Figure 2. Turn-Off Time

Scope rise time $< 4 \text{ ns}$
*Total shunt capacitance of test jig,
connectors, and oscilloscope.

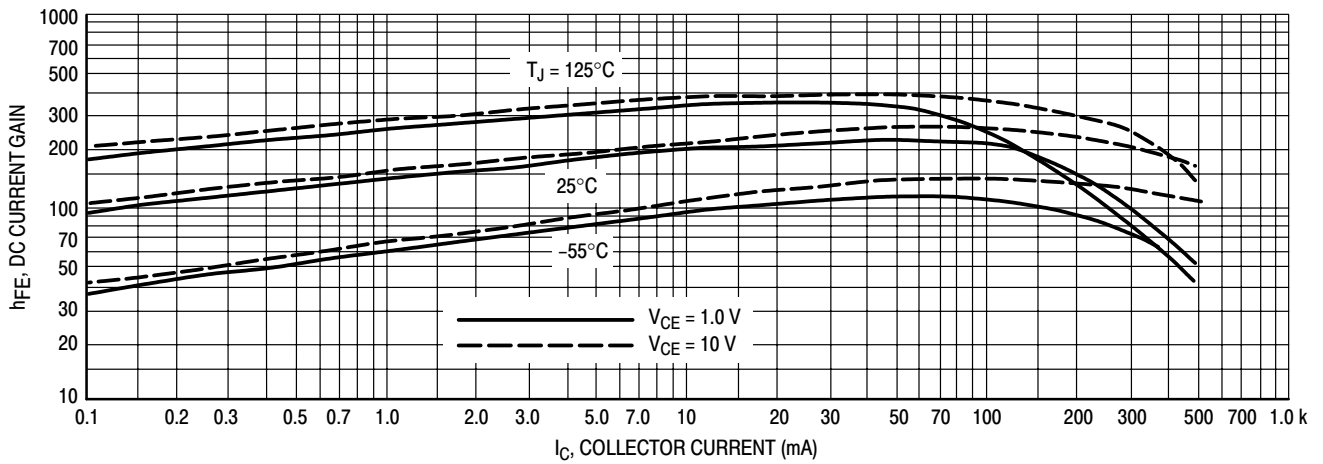


Figure 3. DC Current Gain

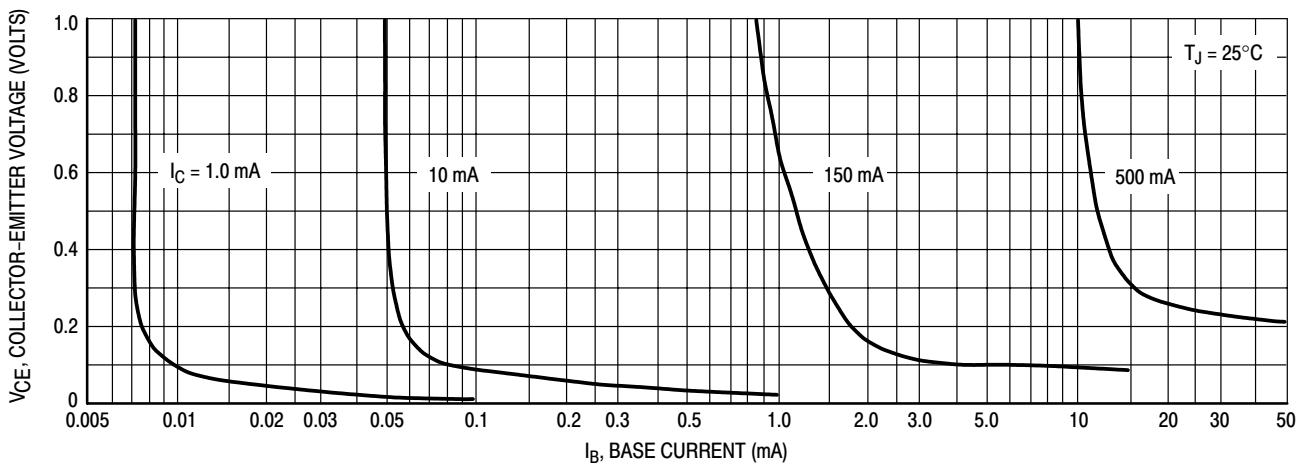


Figure 4. Collector Saturation Region

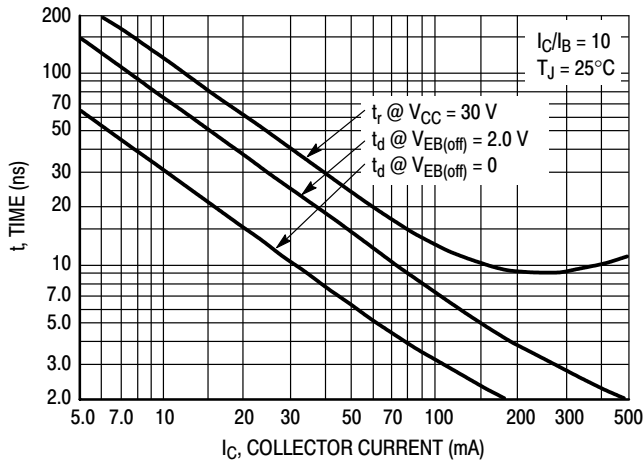


Figure 5. Turn-On Time

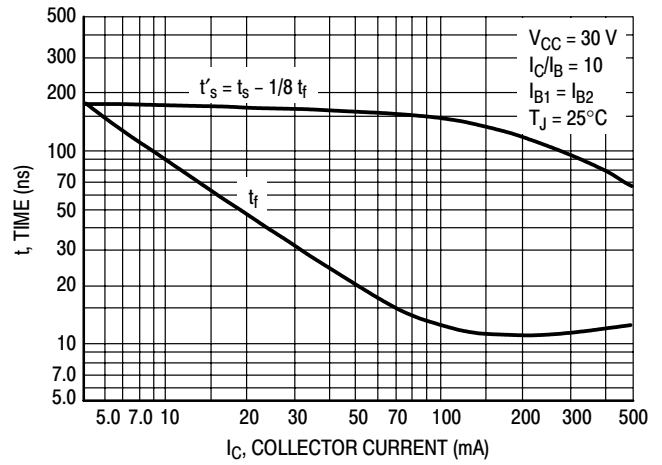


Figure 6. Turn-Off Time

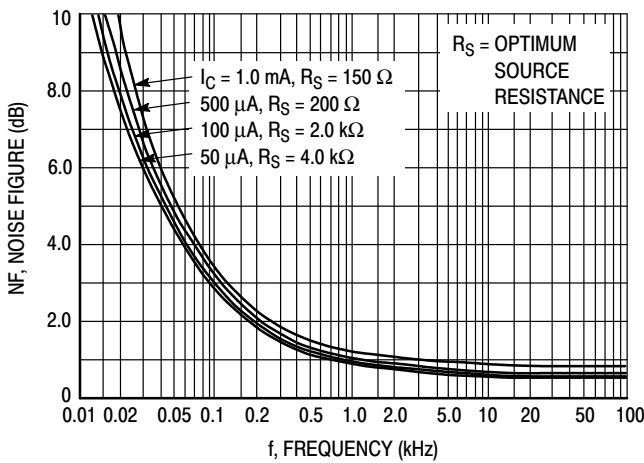


Figure 7. Frequency Effects

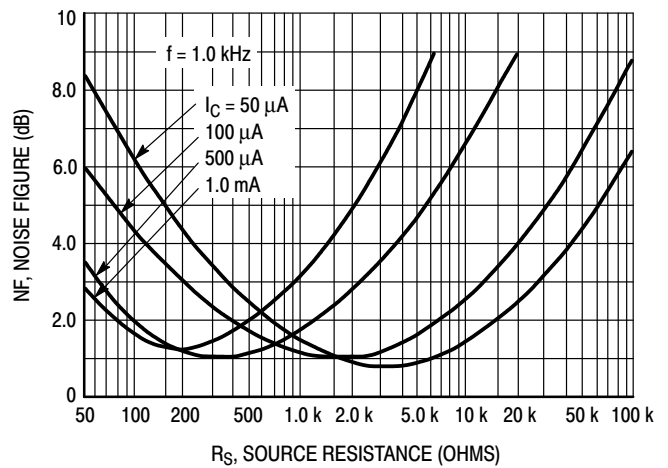


Figure 8. Source Resistance Effects

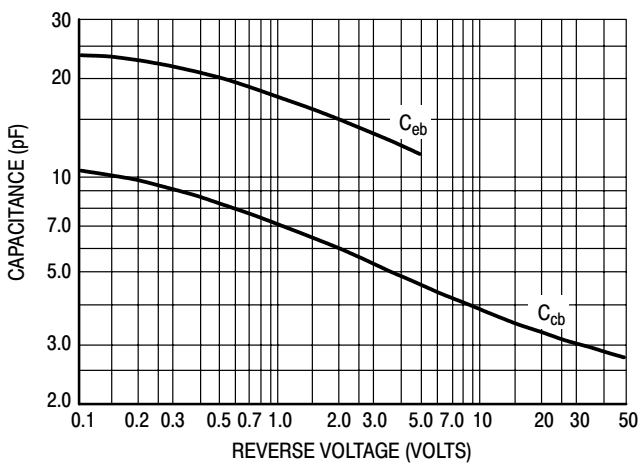


Figure 9. Capacitances

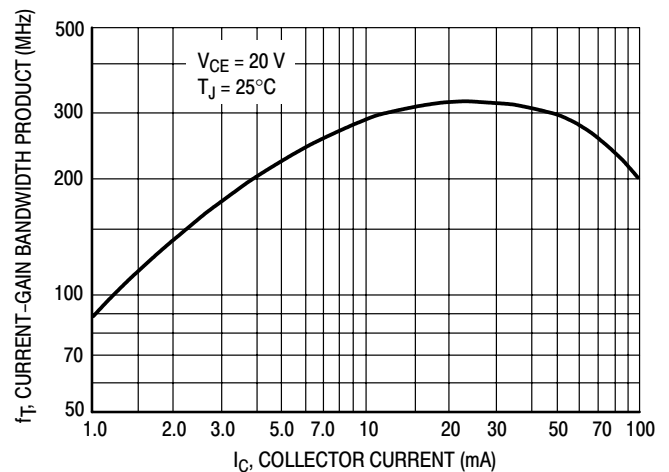


Figure 10. Current-Gain Bandwidth Product

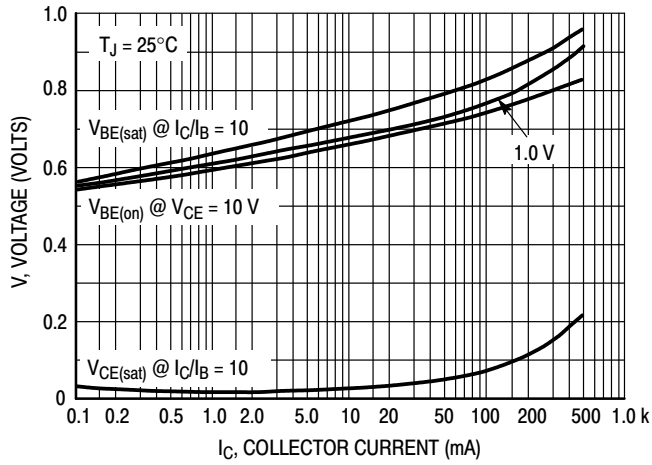


Figure 11. "On" Voltages

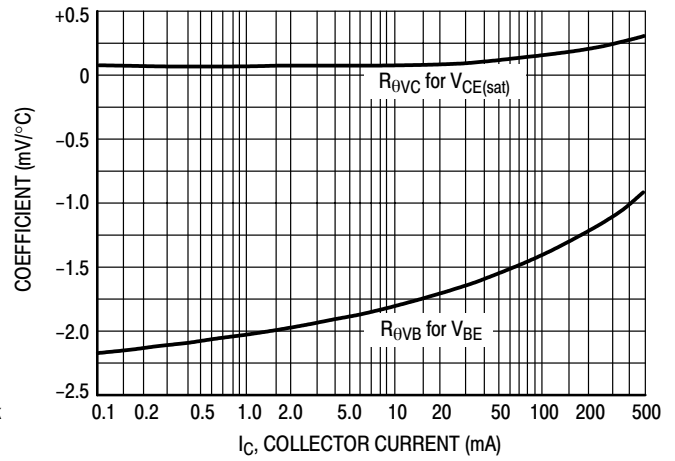
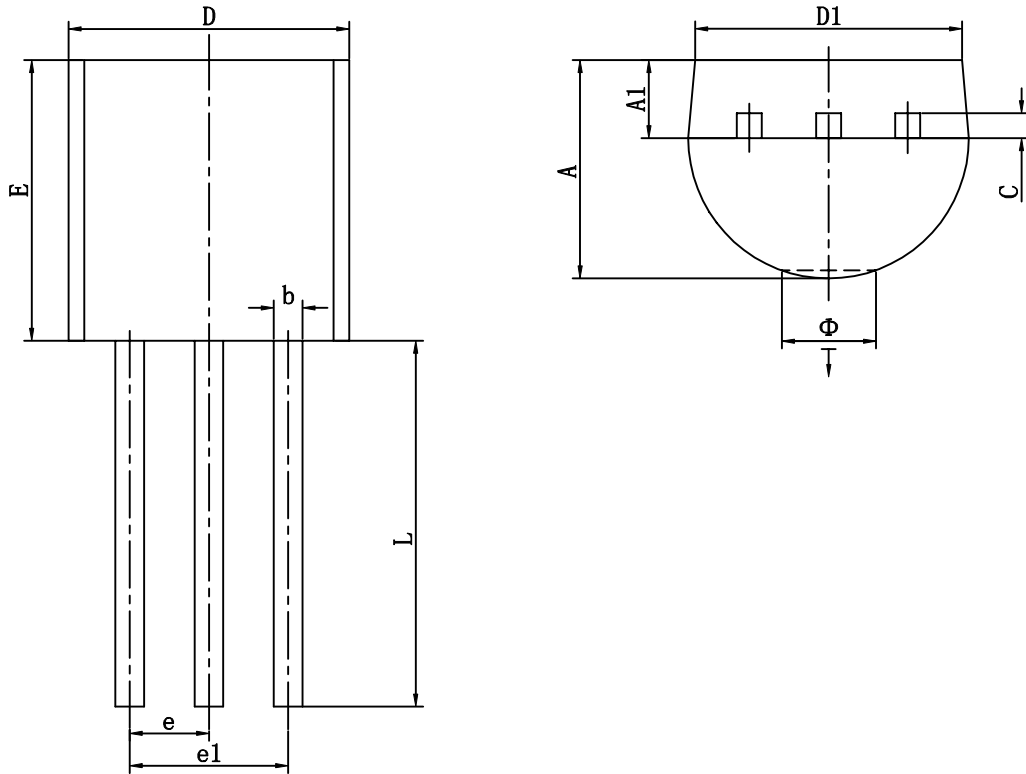


Figure 12. Temperature Coefficients

● TO-92 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.400	4.700	0.173	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270TYP		0.050TYP	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Ø		1.600		0.063
↓	0.000	0.380	0.000	0.015