

RoHS Compliant Product

**\* Features**

Power dissipation

$P_{CM} : 1.25 \text{ W (Temp.} = 25^{\circ}\text{C)}$

Collector current

$I_{CM} : -0.6 \text{ A}$

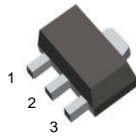
Collector-base voltage

$V_{(BR)CBO} : -60 \text{ V}$

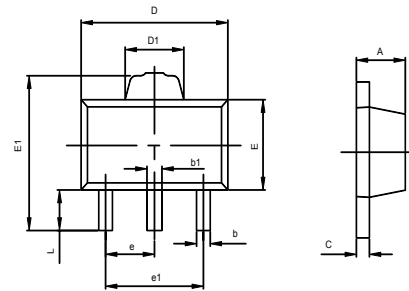
Operating & Storage junction Temperature

$T_j, T_{stg} : -55^{\circ}\text{C} \sim +150^{\circ}\text{C}$

**SOT-89**



- 1.BASE
- 2.COLLECTOR
- 3.EMITTER

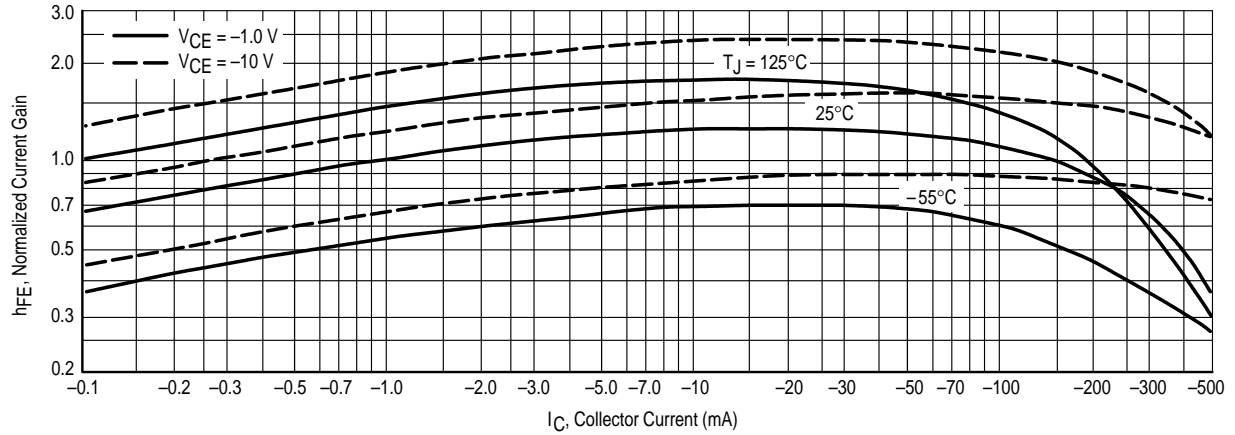


Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.360	0.560	0.014	0.022
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.400	1.800	0.055	0.071
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	2.900	3.100	0.114	0.122
L	0.900	1.100	0.035	0.043

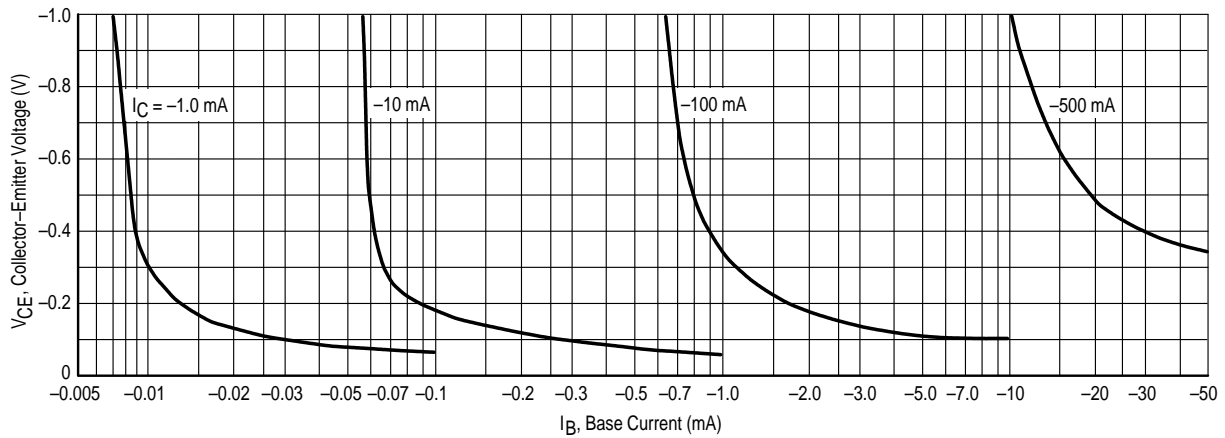
**Electrical Characteristics( Tamb=25°C unless otherwise specified)**

Parameter	Symbol	Test conditions	MIN	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = -10 \mu\text{A}, I_E = 0$	-60		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -10\text{mA}, I_B = 0$	-60		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = -10 \mu\text{A}, I_C = 0$	-5		V
Collector cut-off current	$I_{CBO}$	$V_{CB} = -50 \text{ V}, I_E = 0$		-0.01	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -3\text{V}, I_C = 0$		-0.01	$\mu\text{A}$
DC current gain	$h_{FE(1)}$	$V_{CE} = -1\text{V}, I_C = -0.1\text{mA}$	75		
	$h_{FE(2)}$	$V_{CE} = -1\text{V}, I_C = -1\text{mA}$	100		
	$h_{FE(3)}$	$V_{CE} = -1\text{V}, I_C = -10\text{mA}$	100		
	$h_{FE(4)}$	$V_{CE} = -2\text{V}, I_C = -150\text{mA}$	100	300	
	$h_{FE(5)}$	$V_{CE} = -2\text{V}, I_C = -500\text{mA}$	50		
Collector-emitter saturation voltage	$V_{CE(sat)1}$	$I_C = -150 \text{ mA}, I_B = -15\text{mA}$		-0.4	V
	$V_{CE(sat)2}$	$I_C = -500 \text{ mA}, I_B = -50\text{mA}$		-1.6	V
Base-emitter saturation voltage	$V_{BE(sat)1}$	$I_C = -150 \text{ mA}, I_B = -15\text{mA}$		-1.3	V
	$V_{BE(sat)2}$	$I_C = -500 \text{ mA}, I_B = -50\text{mA}$		-2.6	V
Transition frequency	$f_T$	$V_{CE} = -20\text{V}, I_C = -50\text{mA}$ $f = 100\text{MHz}$	200		MHz
Output Capacitance	$C_{ob}$	$V_{CB} = -10\text{V}, I_E = 0$ $f = 1\text{MHz}$		8	pF
Input Capacitance	$C_{ib}$	$V_{EB} = -2\text{V}, I_C = 0$ $f = 1\text{MHz}$		30	pF
Delay time	$t_d$	$V_{CC} = -30\text{V},$ $I_C = -150\text{mA}, I_{B1} = -15\text{mA}$		12	nS
Rise time	$t_r$			30	nS
Storage time	$t_s$	$I_C = -150\text{mA}$		300	nS
Fall time	$t_f$	$I_{B1} = I_{B2} = -15\text{mA}$		65	nS

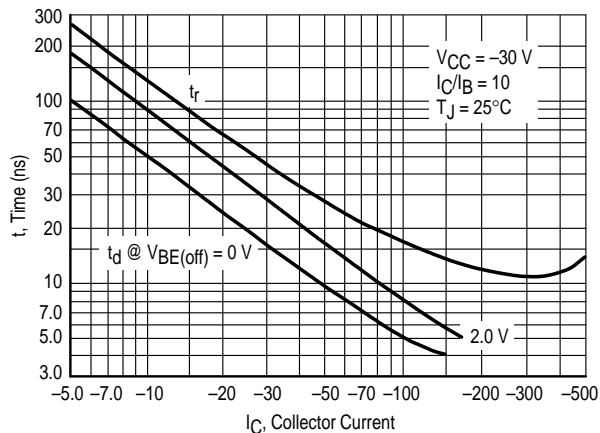
**TYPICAL CHARACTERISTICS**



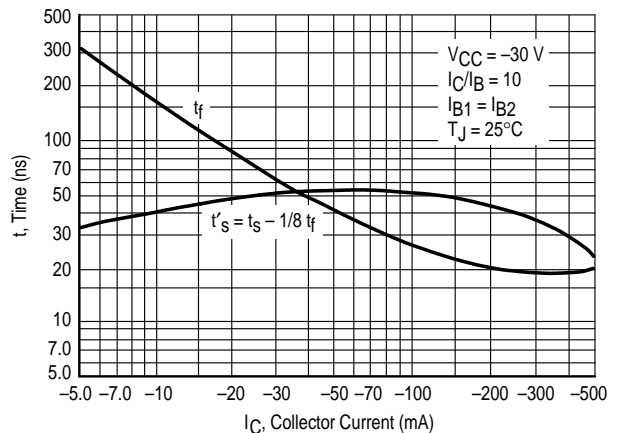
**Figure 3. DC Current Gain**



**Figure 4. Collector Saturation Region**



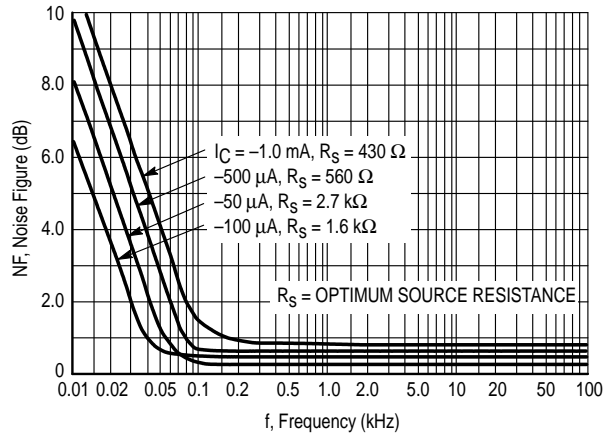
**Figure 5. Turn-On Time**



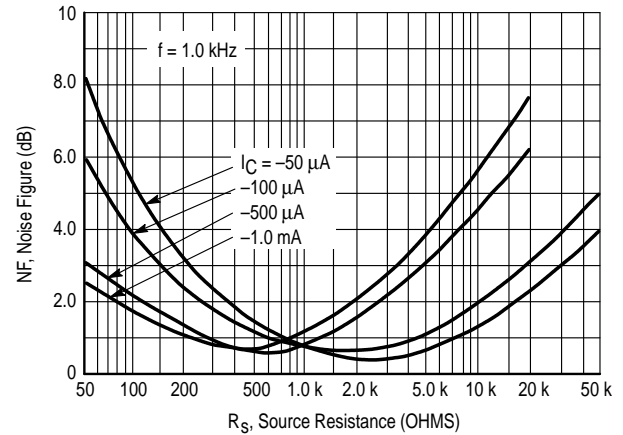
**Figure 6. Turn-Off Time**

**TYPICAL SMALL-SIGNAL CHARACTERISTICS**  
**NOISE FIGURE**

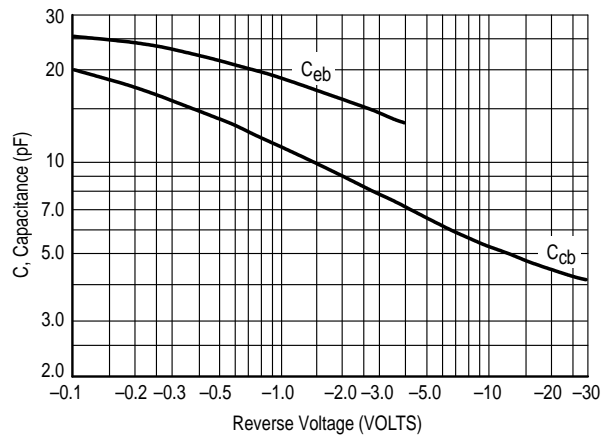
$V_{CE} = 10 \text{ Vdc}$ ,  $T_A = 25^\circ\text{C}$



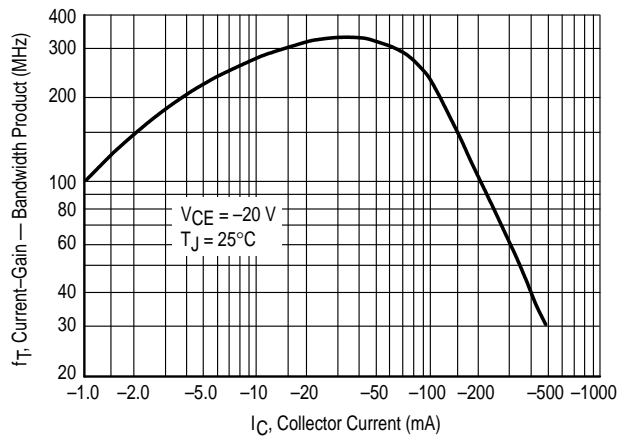
**Figure 7. Frequency Effects**



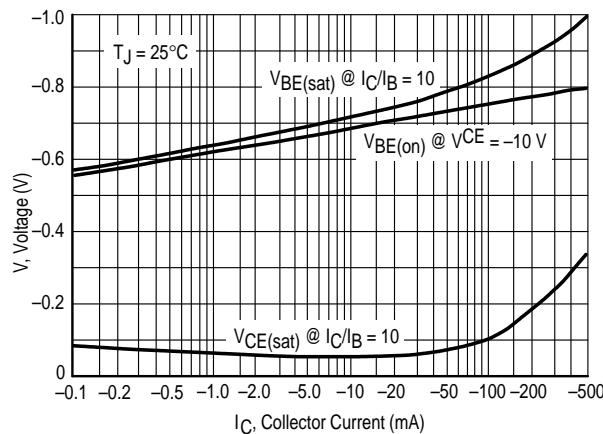
**Figure 8. Source Resistance Effects**



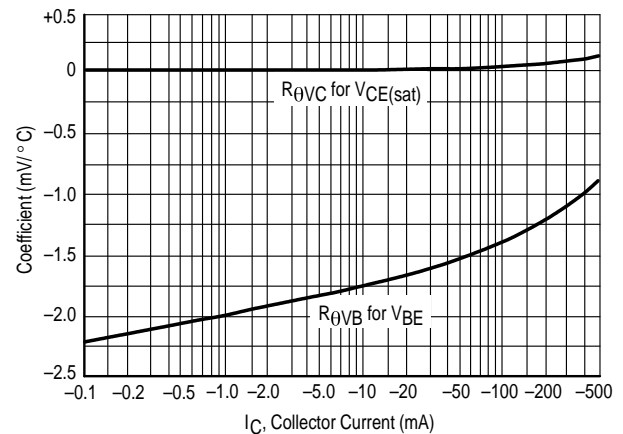
**Figure 9. Capacitances**



**Figure 10. Current-Gain — Bandwidth Product**



**Figure 11. "On" Voltage**



**Figure 12. Temperature Coefficients**