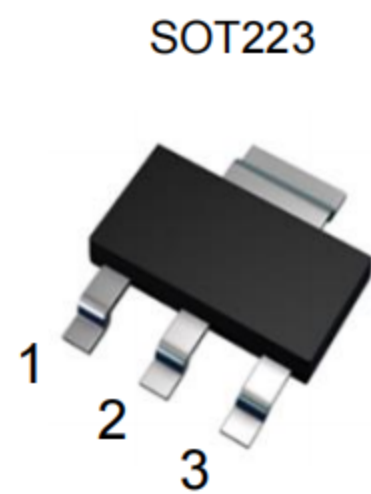


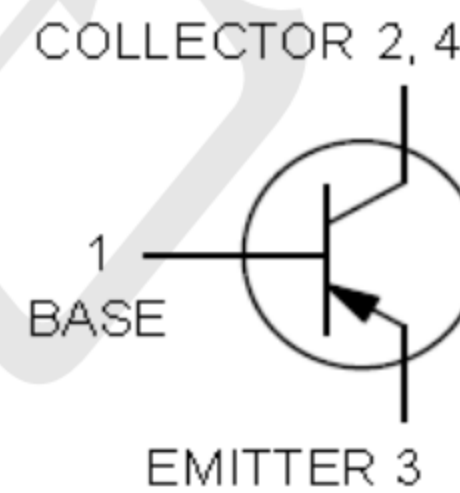


### Features

- High Voltage
- High Voltage Amplifier Application



### Circuit Diagram



Marking: ZT3906

### Absolute Maximum Ratings (T<sub>amb</sub>=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit
V <sub>CEO</sub>	Collector-Emitter Voltage	-40	V
V <sub>CB0</sub>	Collector-Base Voltage	-40	V
V <sub>EBO</sub>	Emitter-Base Voltage	-5.0	V
I <sub>C</sub>	Collector Current - Continuous	-200	mA
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Junction Temperature Range	-55 to +150	°C



## Thermal Characteristics

Symbol	Parameter	Maximum			Unit
		2N3906 <sup>(3)</sup>	MMBT3906 <sup>(2)</sup>	PZT3906 <sup>(3)</sup>	
P <sub>D</sub>	Total Device Dissipation	625	350	1,000	mW
	Derate Above 25°C	5.0	2.8	8.0	mW/°C
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	83.3			°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	200	357	125	°C/W

## Electrical Characteristics (TA=25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>					
V <sub>(BR)CEO</sub>	Collector-Emitter Breakdown Voltage <sup>(4)</sup>	I <sub>C</sub> = -1.0 mA, I <sub>B</sub> = 0	-40		V
V <sub>(BR)CBO</sub>	Collector-Base Breakdown Voltage	I <sub>C</sub> = -10 μA, I <sub>E</sub> = 0	-40		V
V <sub>(BR)EBO</sub>	Emitter-Base Breakdown Voltage	I <sub>E</sub> = -10 μA, I <sub>C</sub> = 0	-5.0		V
I <sub>BL</sub>	Base Cut-Off Current	V <sub>CE</sub> = -30 V, V <sub>BE</sub> = 3.0 V		-50	nA
I <sub>CEX</sub>	Collector Cut-Off Current	V <sub>CE</sub> = -30 V, V <sub>BE</sub> = 3.0 V		-50	nA
<b>ON CHARACTERISTICS</b>					
h <sub>FE</sub>	DC Current Gain <sup>(4)</sup>	I <sub>C</sub> = -0.1 mA, V <sub>CE</sub> = -1.0 V	60		
		I <sub>C</sub> = -1.0 mA, V <sub>CE</sub> = -1.0 V	80		
		I <sub>C</sub> = -10 mA, V <sub>CE</sub> = -1.0 V	100	300	
		I <sub>C</sub> = -50 mA, V <sub>CE</sub> = -1.0 V	60		
		I <sub>C</sub> = -100 mA, V <sub>CE</sub> = -1.0 V	30		
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = -10 mA, I <sub>B</sub> = -1.0 mA		-0.25	V
		I <sub>C</sub> = -50 mA, I <sub>B</sub> = -5.0 mA		-0.40	
V <sub>BE(sat)</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> = -10 mA, I <sub>B</sub> = -1.0 mA	-0.65	-0.85	V
		I <sub>C</sub> = -50 mA, I <sub>B</sub> = -5.0 mA		-0.95	
<b>SMALL SIGNAL CHARACTERISTICS</b>					
f <sub>T</sub>	Current Gain - Bandwidth Product	I <sub>C</sub> = -10 mA, V <sub>CE</sub> = -20 V, f = 100 MHz	250		MHz
C <sub>obo</sub>	Output Capacitance	V <sub>CB</sub> = -5.0 V, I <sub>E</sub> = 0, f = 100 kHz		4.5	pF
C <sub>ibo</sub>	Input Capacitance	V <sub>EB</sub> = -0.5 V, I <sub>C</sub> = 0, f = 100 kHz		10.0	pF
NF	Noise Figure	I <sub>C</sub> = -100 μA, V <sub>CE</sub> = -5.0 V, R <sub>S</sub> = 1.0 kΩ, f = 10 Hz to 15.7 kHz		4.0	dB
<b>SWITCHING CHARACTERISTICS</b>					
t <sub>d</sub>	Delay Time	V <sub>CC</sub> = -3.0 V, V <sub>BE</sub> = -0.5 V		35	ns
t <sub>r</sub>	Rise Time	I <sub>C</sub> = -10 mA, I <sub>B1</sub> = -1.0 mA		35	ns
t <sub>s</sub>	Storage Time	V <sub>CC</sub> = -3.0 V, I <sub>C</sub> = -10 mA,		225	ns
t <sub>f</sub>	Fall Time	I <sub>B1</sub> = I <sub>B2</sub> = -1.0 mA		75	ns



Typical Performance Characteristics

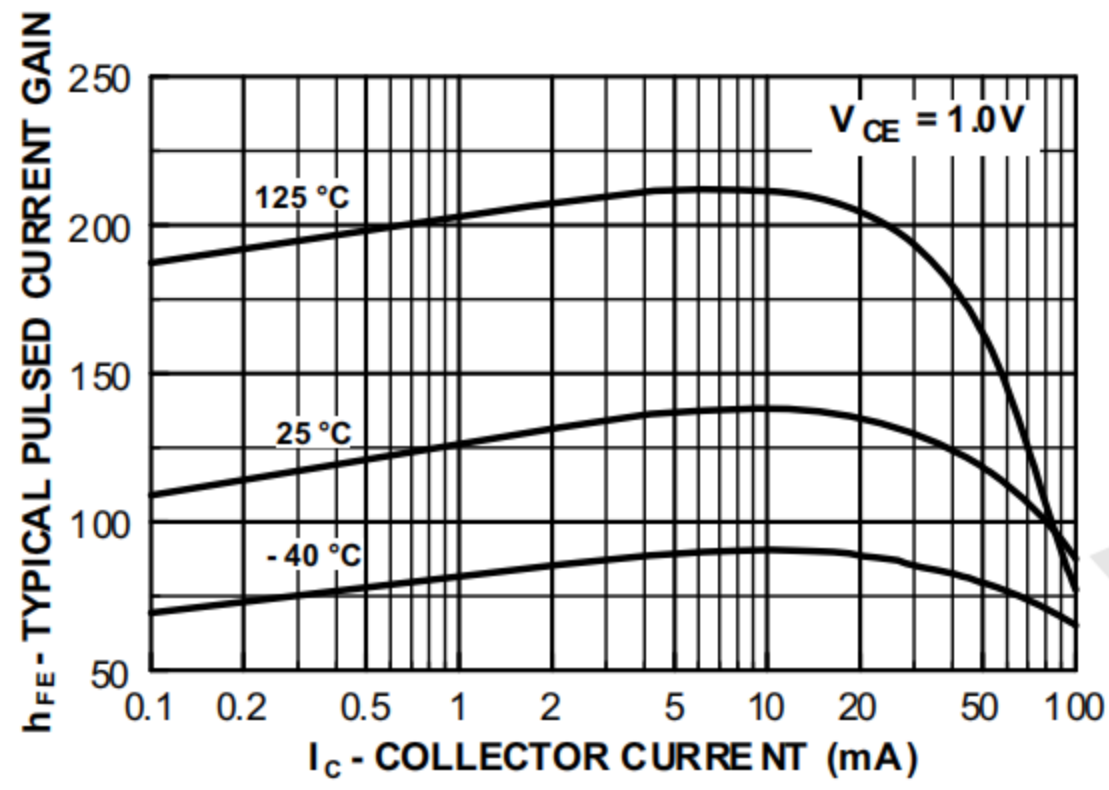


Figure 1. Typical Pulsed Current Gain vs. Collector Current

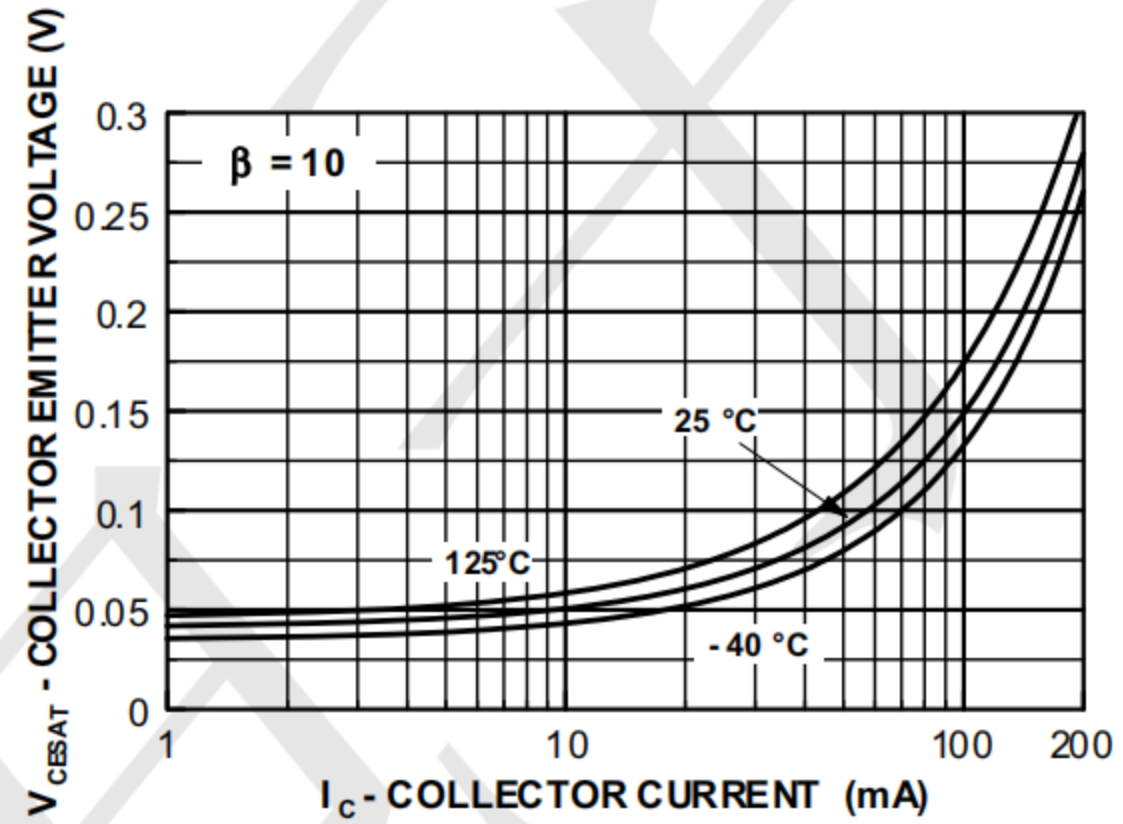


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

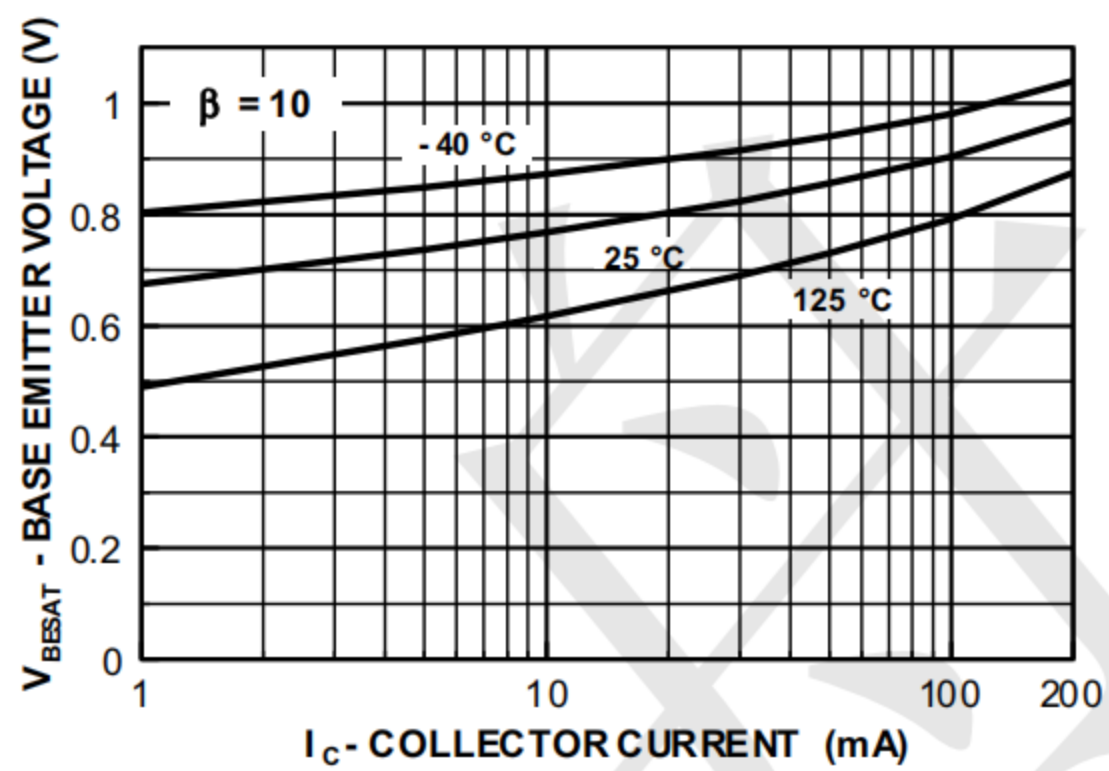


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

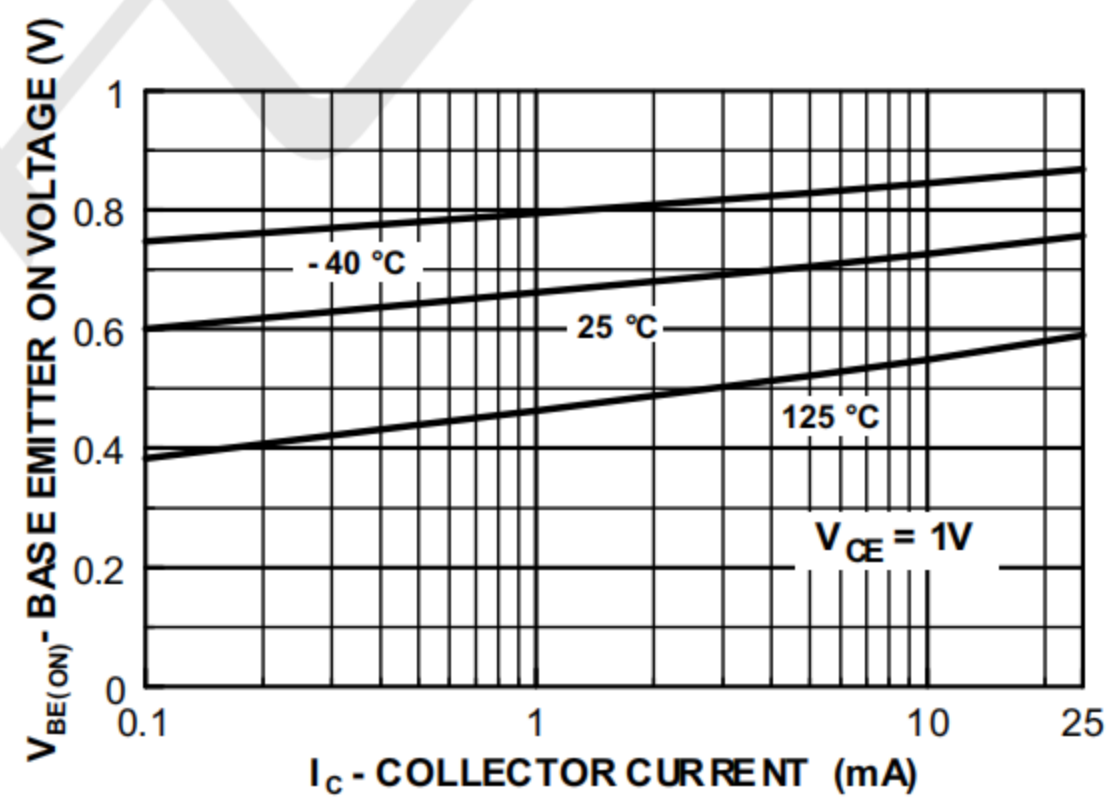


Figure 4. Base-Emitter On Voltage vs. Collector Current

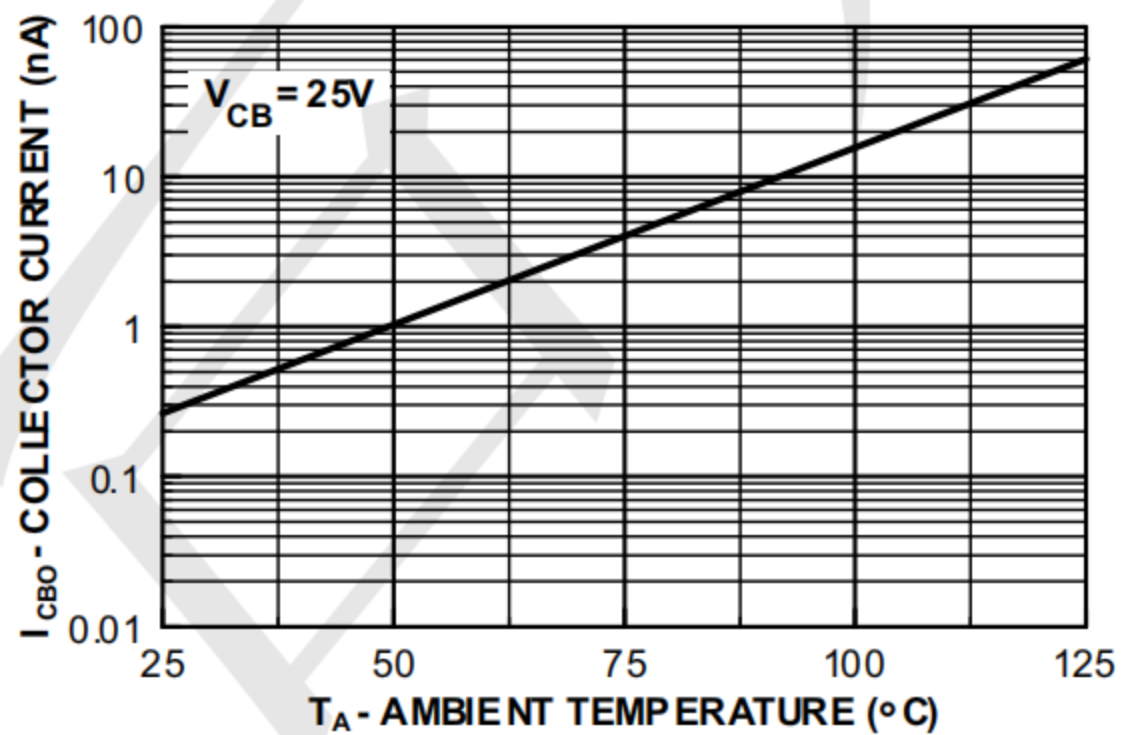


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

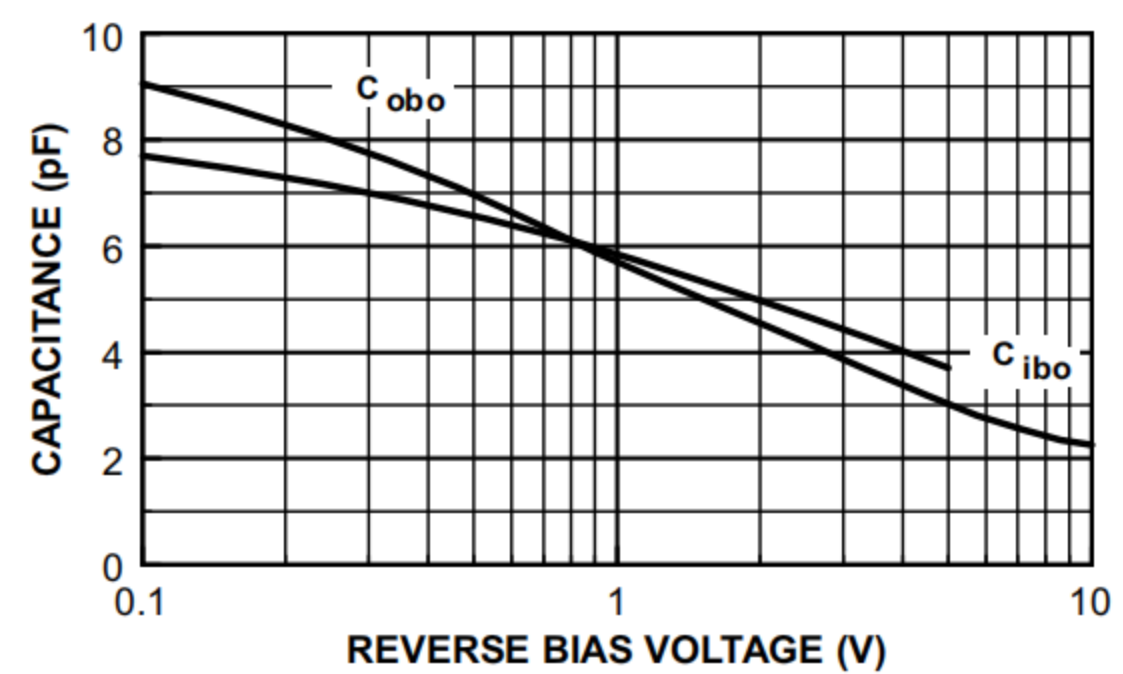


Figure 6. Common-Base Open Circuit Input and Output Capacitance vs. Reverse Bias Voltage

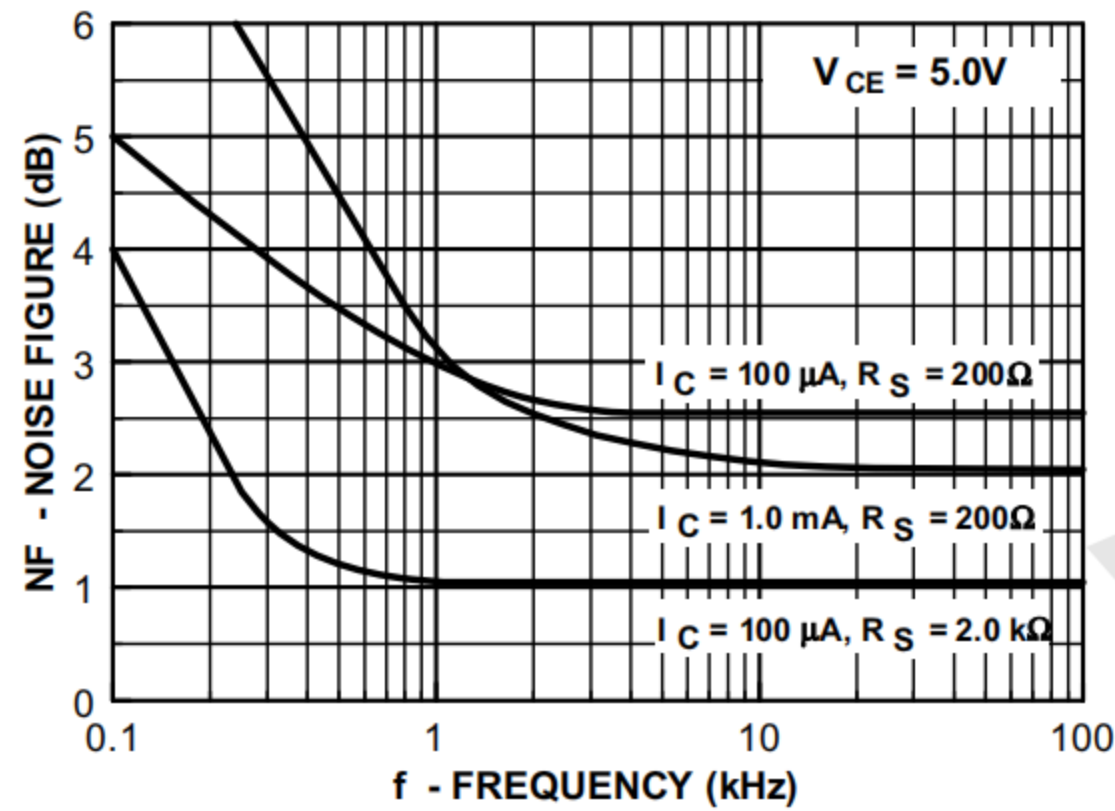


Figure 7. Noise Figure vs. Frequency

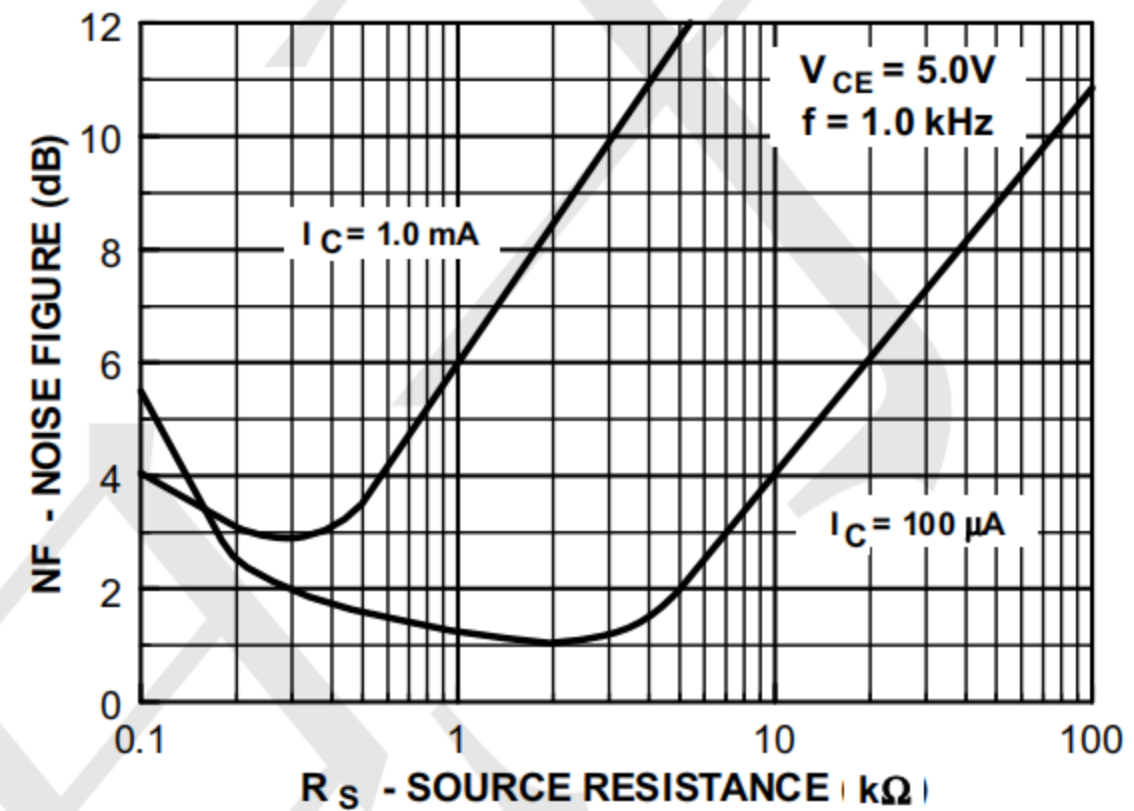


Figure 8. Noise Figure vs. Source Resistance

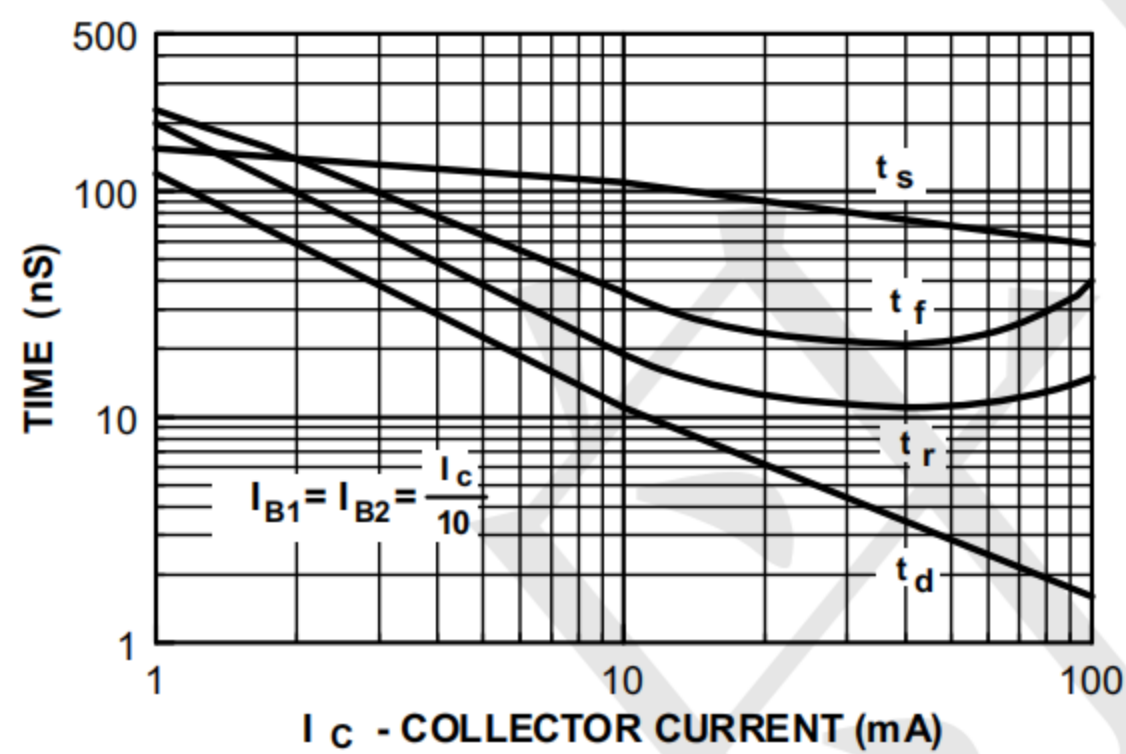


Figure 9. Switching Times vs. Collector Current

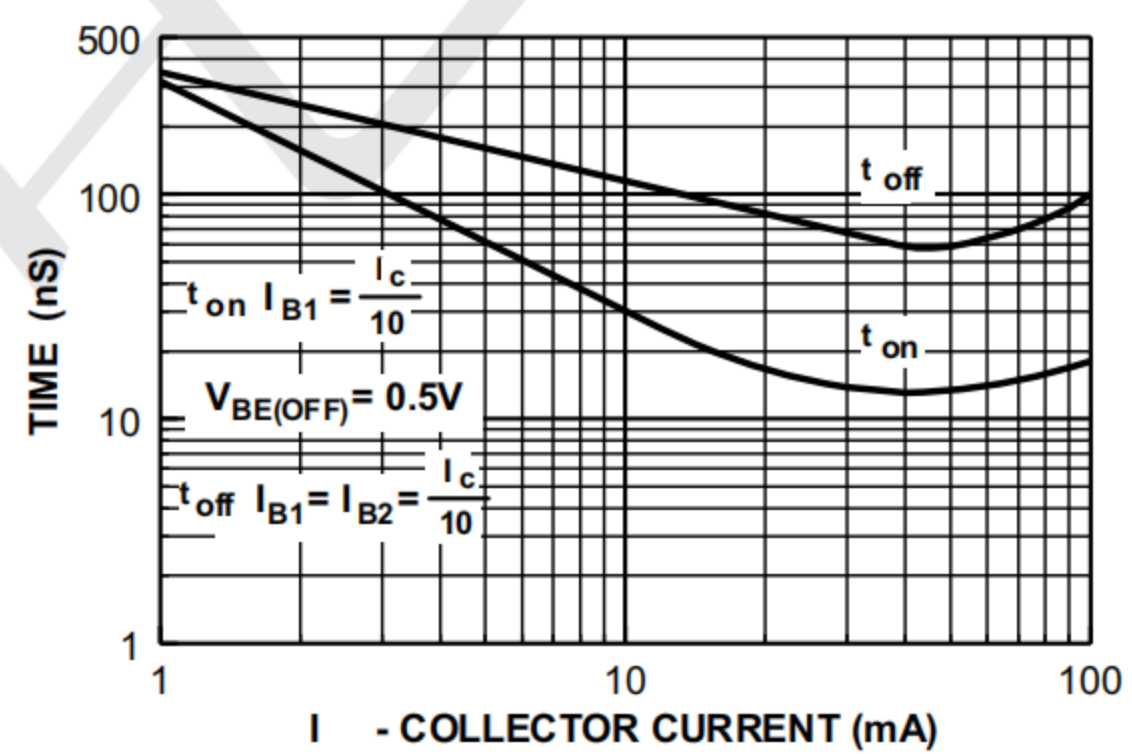


Figure 10. Turn-On and Turn-Off Times vs. Collector Current

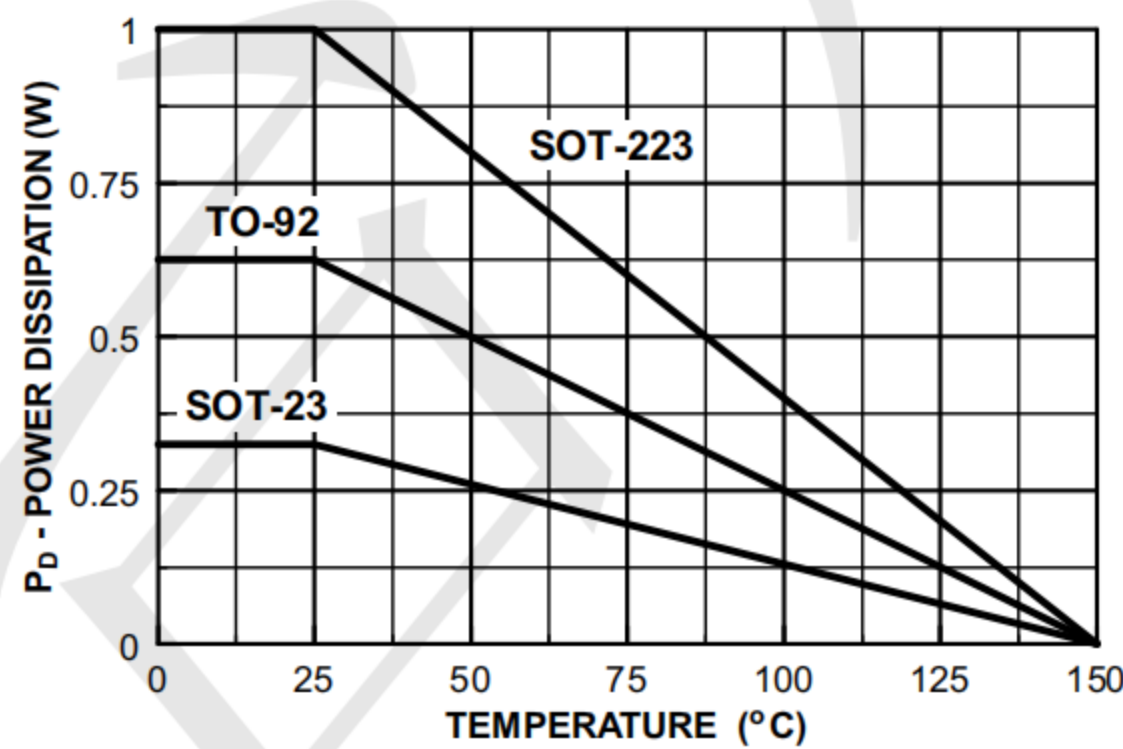


Figure 11. Power Dissipation vs. Ambient Temperature

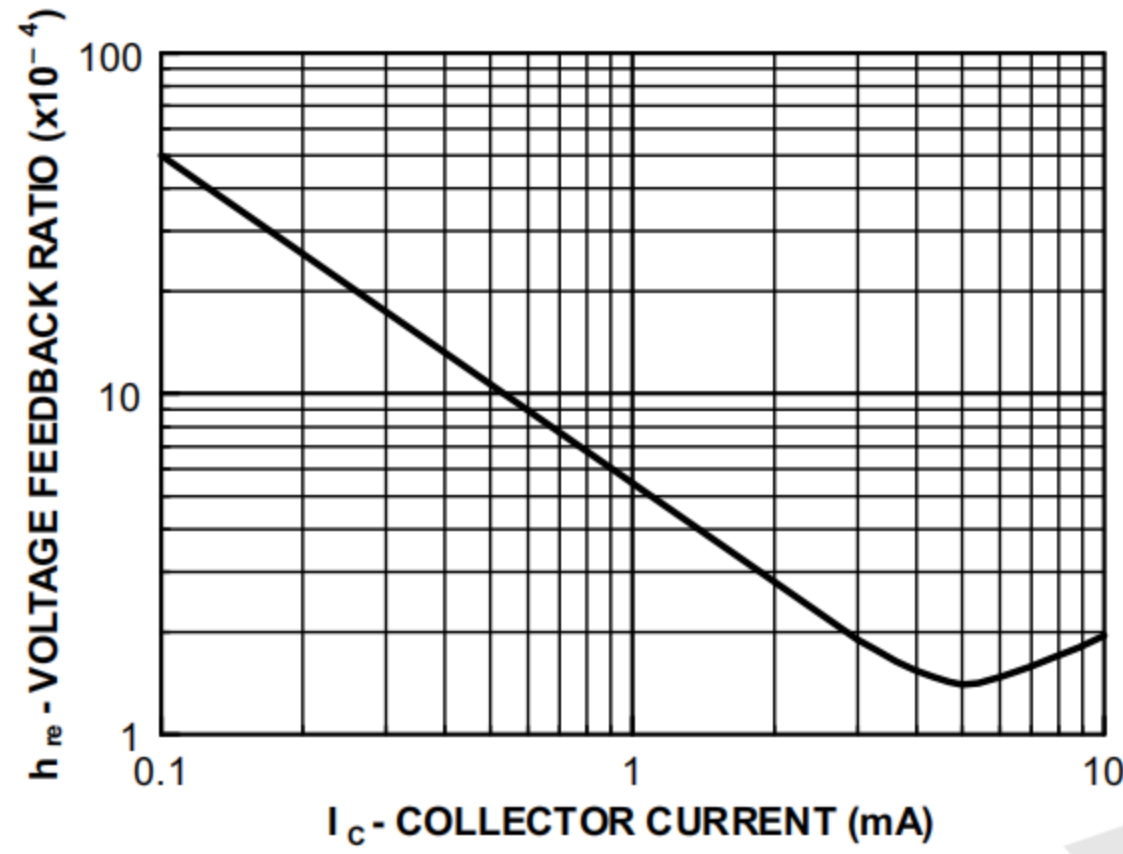


Figure 12. Voltage Feedback Ratio

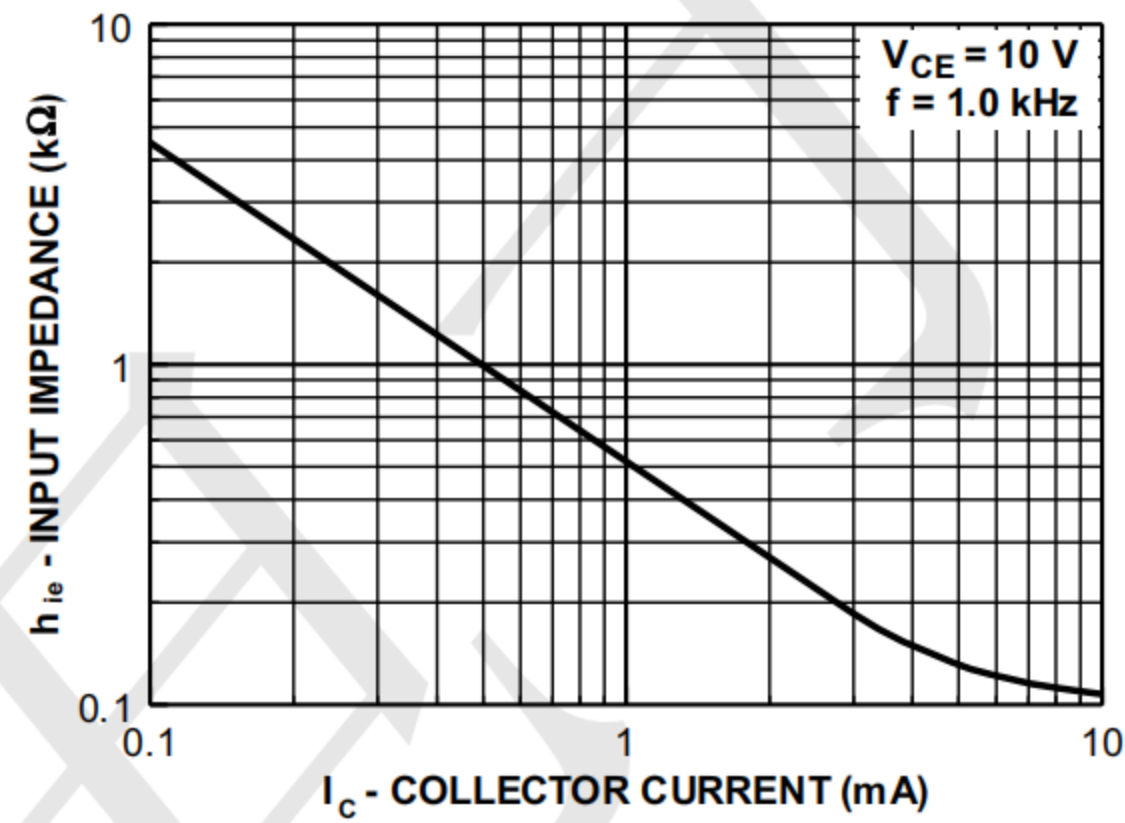


Figure 13. Input Impedance

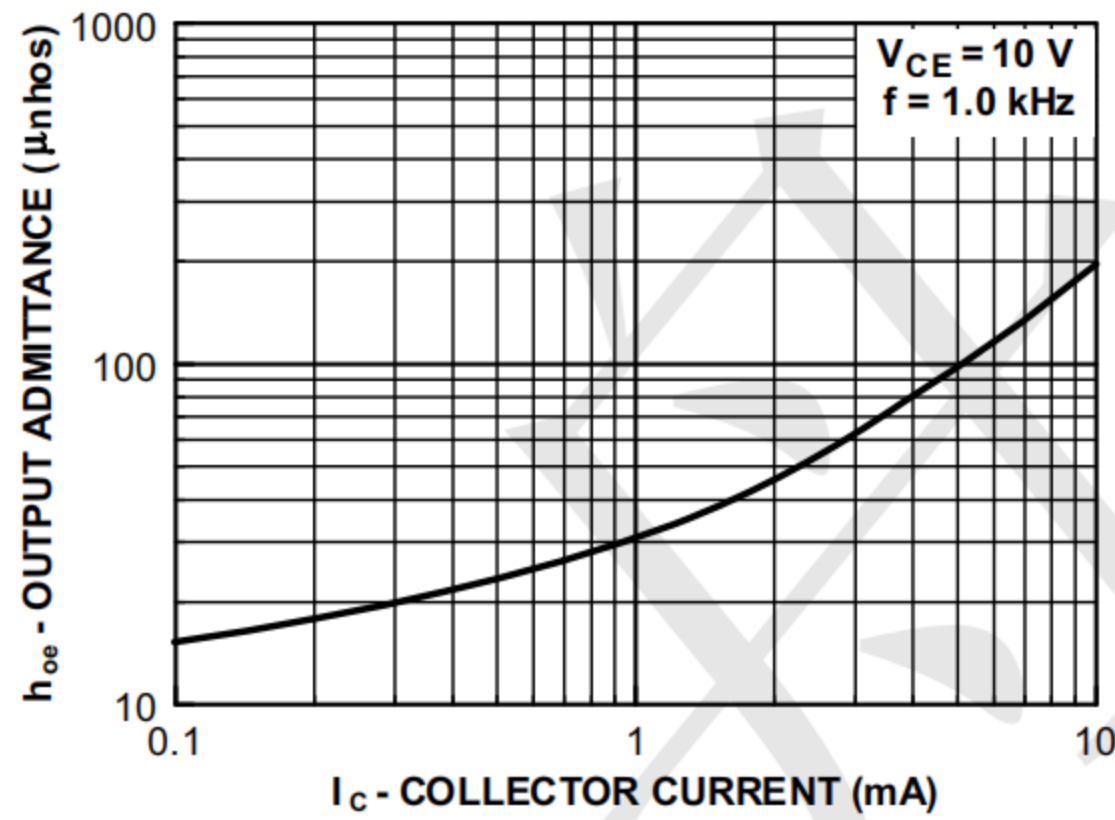


Figure 14. Output Admittance

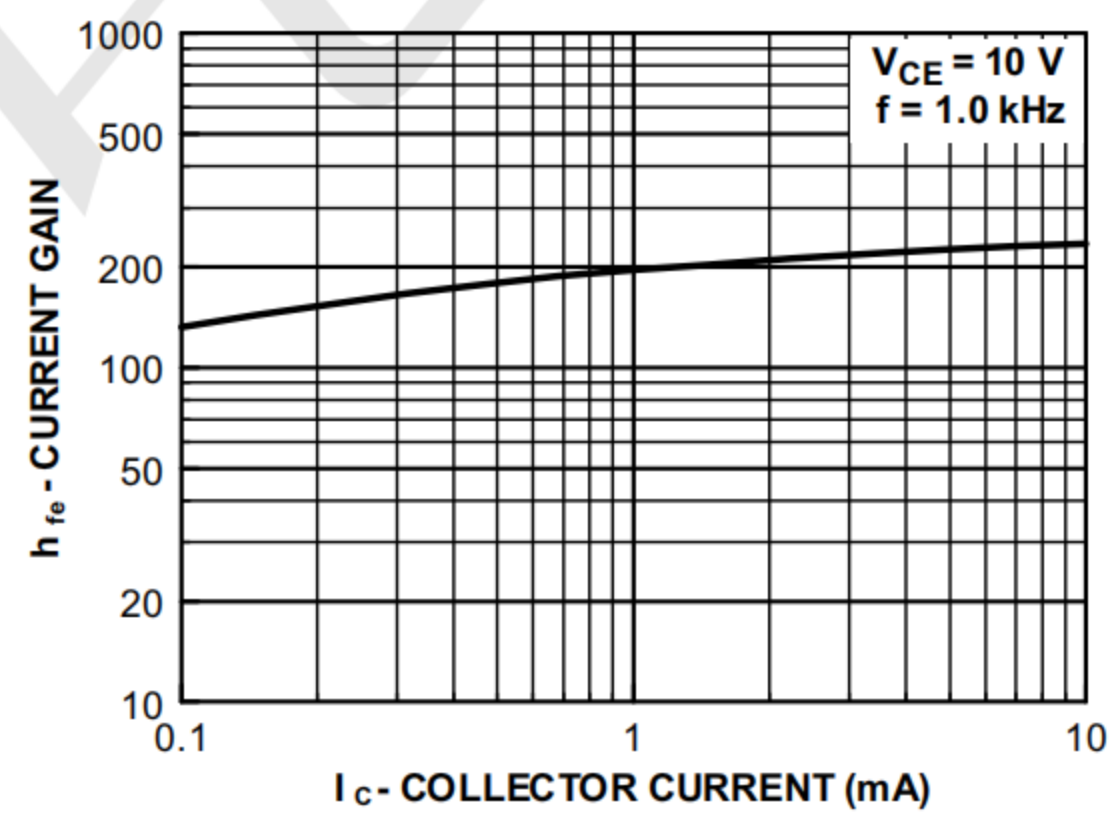
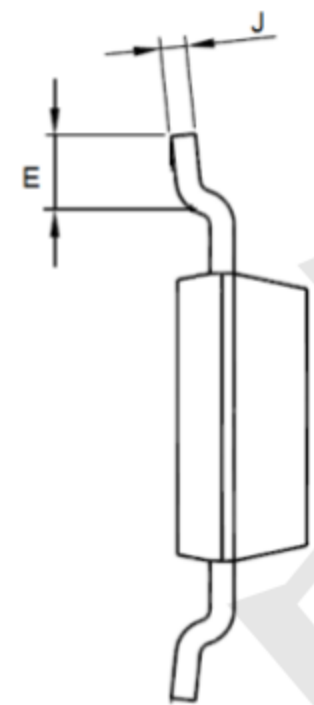
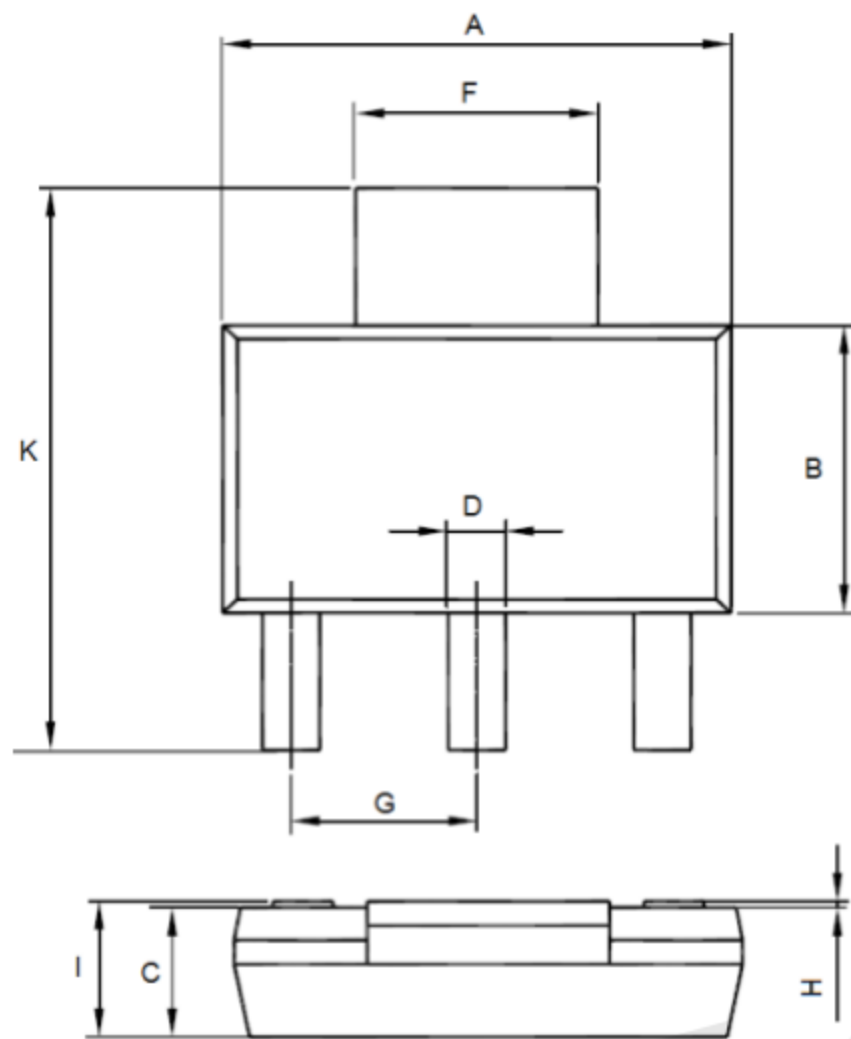


Figure 15. Current Gain



### Outline Drawing - SOT223



SOT-223		
Dim	Min	Max
A	6.10	6.50
B	3.30	3.70
C	1.50	1.70
D	0.66	0.82
E	0.90	1.15
F	2.90	3.10
G	2.20	2.40
H	0.02	0.10
I	1.52	1.80
J	0.20	0.40
K	6.70	7.30

