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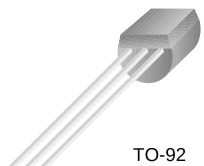
2N5086/2N5087/MMBT5087

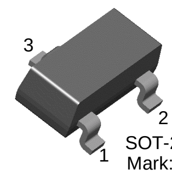
PNP General Purpose Amplifier

- This device is designed for low level, high gain, low noise general purpose amplifier applications at collector currents to 50mA.



1 TO-92

1. Emitter 2. Base 3. Collector



3 2 1 SOT-23 Mark: 2Q

1. Base 2. Emitter 3. Collector

Absolute Maximum Ratings* T_a=25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	-50	V
V_{CBO}	Collector-Base Voltage	-50	V
V_{EBO}	Emitter-Base Voltage	-3.0	V
I_C	Collector current - Continuous	-100	mA
T_J, T_{stg}	Junction and Storage Temperature	-55 ~ +150	°C

* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1. These ratings are based on a maximum junction temperature of 150 degrees C.
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Electrical Characteristics T_a=25°C unless otherwise noted

Symbol	Parameter	Test Condition		Min.	Max.	Units
Off Characteristics						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage *	I_C = -1.0mA, I_B = 0		-50		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = -100μA, I_E = 0		-50		V
I_{CEO}	Collector Cutoff Current	V_{CB} = -10V, I_E = 0 V_{CB} = -35V, I_E = 0			-10 -50	nA nA
I_{CBO}	Emitter Cutoff Current	V_{EB} = -3.0V, I_C = 0			-50	nA
On Characteristics						
h_{FE}	DC Current Gain	I_C = -100μA, V_{CE} = -5.0V	5086 5087	150 250	500 800	
		I_C = -1.0mA, V_{CE} = -5.0V	5086 5087	150 250		
		I_C = -10mA, V_{CE} = -5.0V	5086 5087	150 250		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = -10mA, I_B = -1.0mA			-0.3	V
$V_{BE(on)}$	Base-Emitter On Voltage	I_C = -1.0mA, V_{CE} = -5.0V			-0.85	V
Small Signal Characteristics						
f_T	Current Gain Bandwidth Product	I_C = -500μA, V_{CE} = -5.0V, f = 20MHz		40		MHz
C_{cb}	Collector-Base Capacitance	V_{CB} = -5.0V, I_E = 0, f = 100KHz			4.0	pF
h_{fe}	Small-Signal Current Gain	I_C = -1.0mA, V_{CE} = -5.0V, f = 1.0KHz	5086 5087	150 250	600 900	
NF	Noise Figure	I_C = -100μA, V_{CE} = -5.0V R_S = 3.0kΩ, f = 1.0KHz	5086 5087		3.0 2.0	dB dB
		I_C = -20μA, V_{CE} = -5.0V R_S = 10kΩ f = 10Hz to 15.7KHz	5086 5087		3.0 2.0	dB dB

* Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

Thermal Characteristics T_a=25°C unless otherwise noted

Symbol	Parameter	Max.		Units
		2N5086 2N5087	*MMBT5087	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	350 2.8	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	°C/W

* Device mounted on FR-4 PCB 1.6” × 1.6” × 0.06."

Typical Characteristics

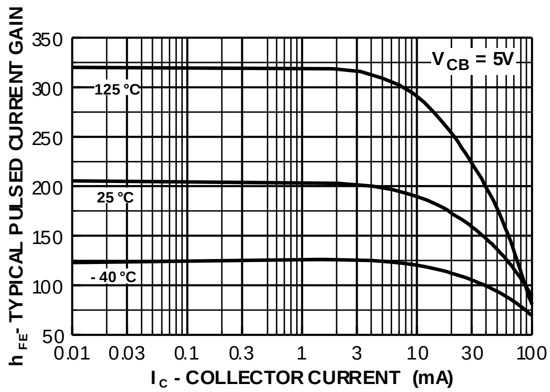


Figure 1. Typical Pulsed Current Gain vs Collector Current

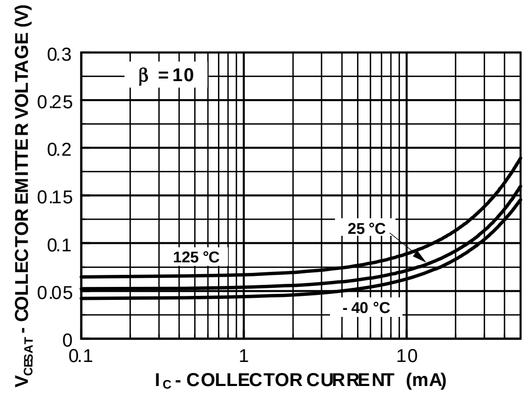


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

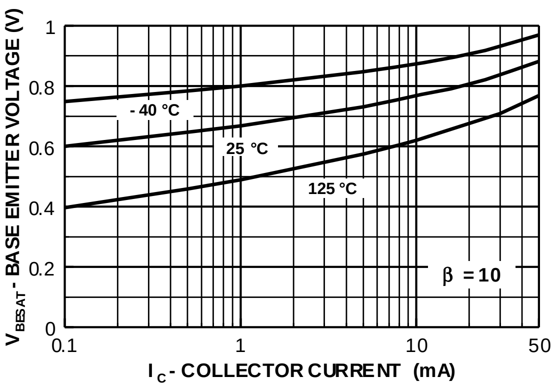


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

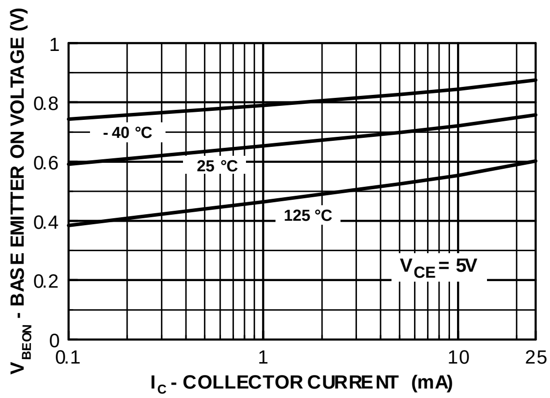


Figure 4. Base-Emitter On Voltage vs Collector Current

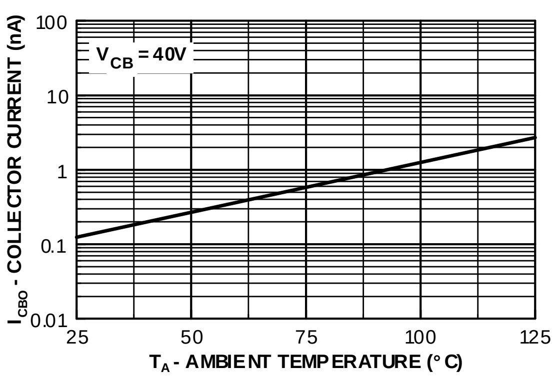


Figure 5. Collector Cutoff Current vs Ambient Temperature

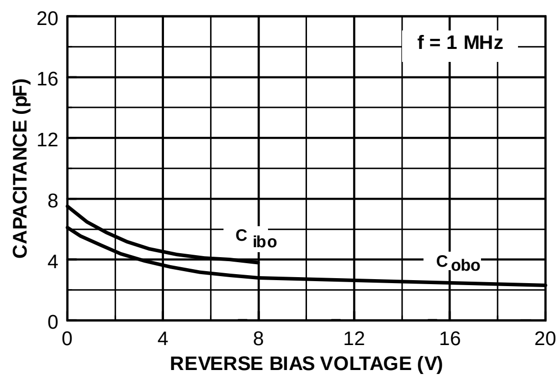


Figure 6. Input and Output Capacitance vs Reverse Voltag

Typical Characteristics(Continuce)

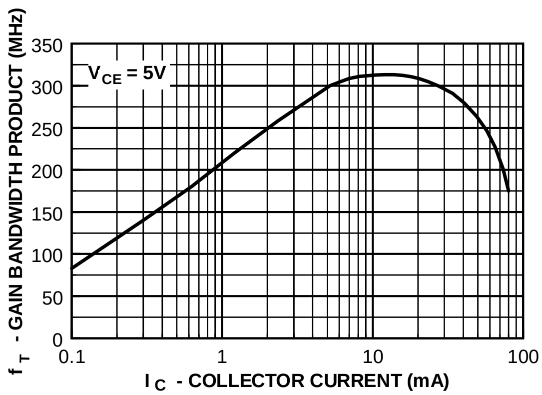


Figure 7. Gain Bandwidth Product vs Collector Current

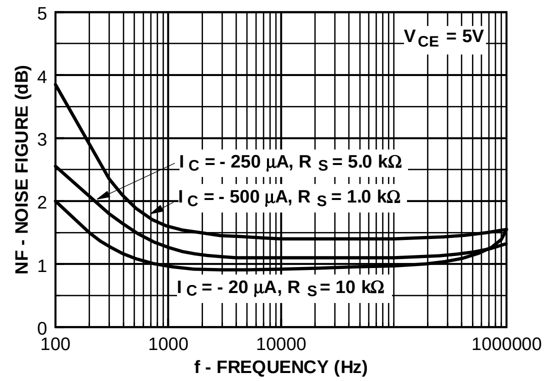


Figure 8. Noise Figure vs Frequency

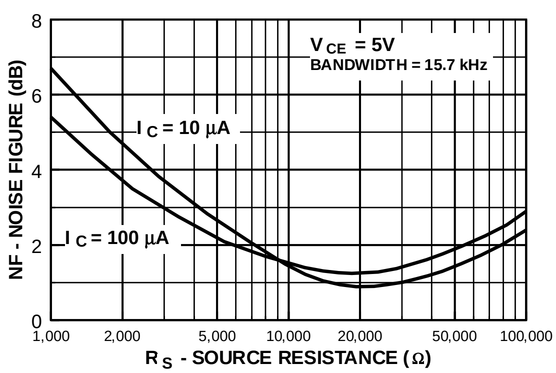


Figure 9. Wideband Noise Frequency vs Source Resistance

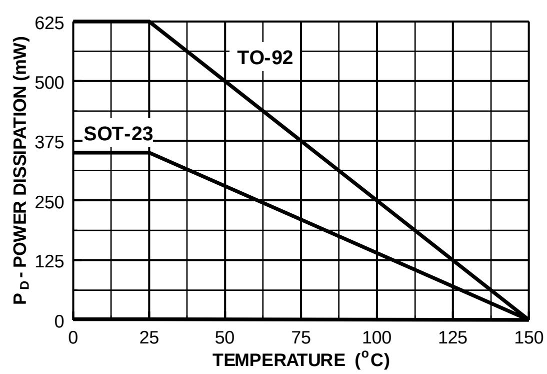


Figure 10. Power Dissipation vs Ambient Temperature

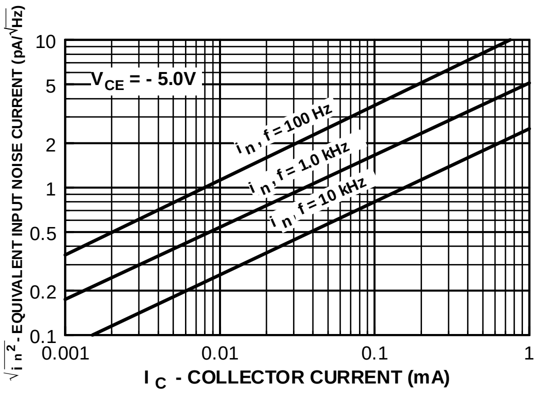


Figure 11. Equivalent Input Noise Current vs Collector Current

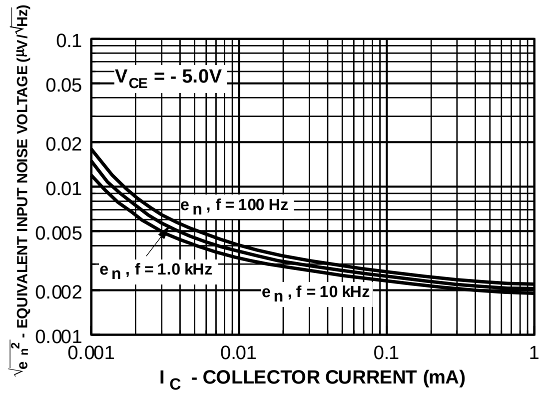


Figure 12. Equivalent Input Noise Voltage vs Collector Current

Typical Characteristics (Continuce)

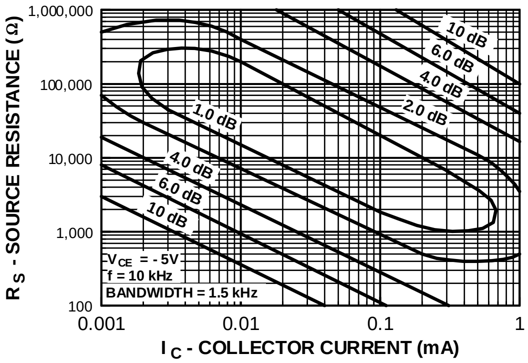


Figure 13. Contours of Constanct Narrow Band Noise Figure

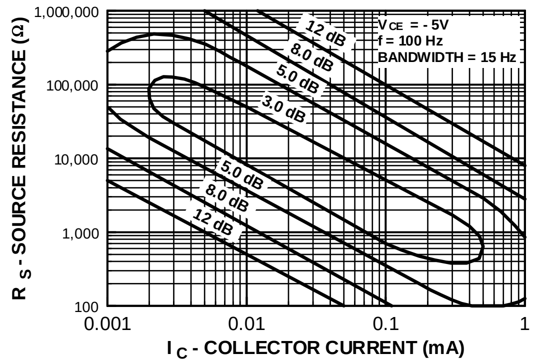


Figure 14. Contours of Constanct Narrow Band Noise Figure

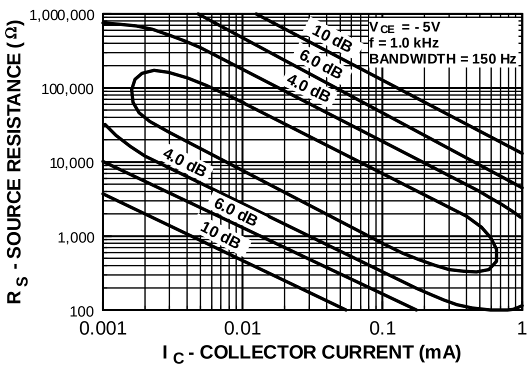


Figure 15. BContours of Constant Narrow Band Noise Figure

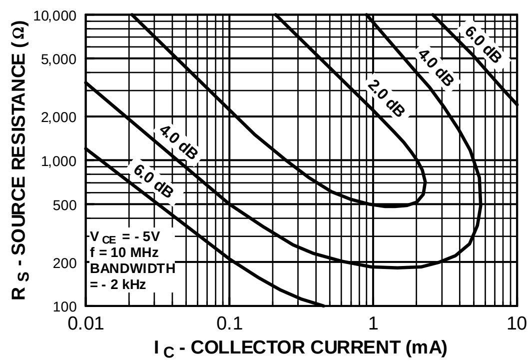
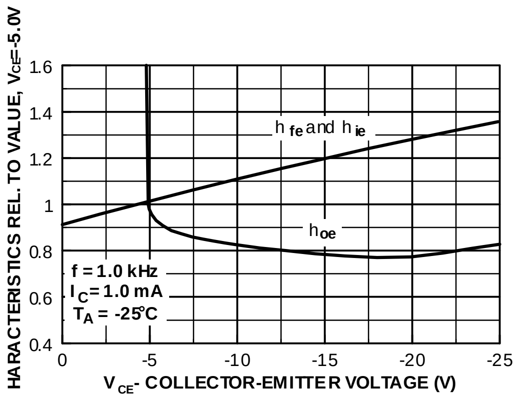
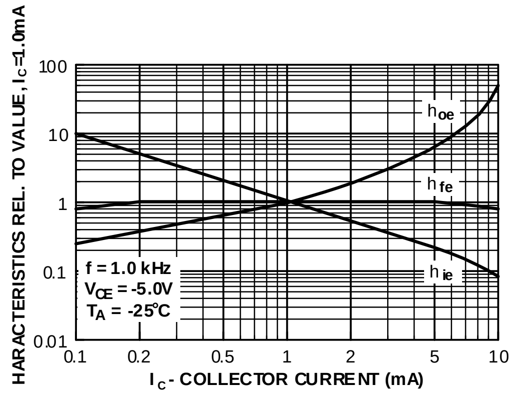


Figure 16. Contours of Constant Narrow Band Noisd Figure

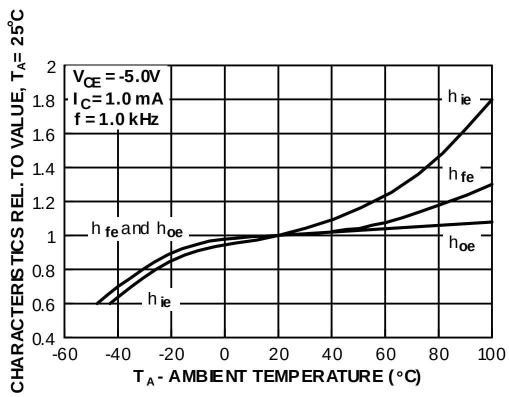
Typical Common Emitter Characteristics (f = 1.0KHz)



Typical Common Emitter Characteristics



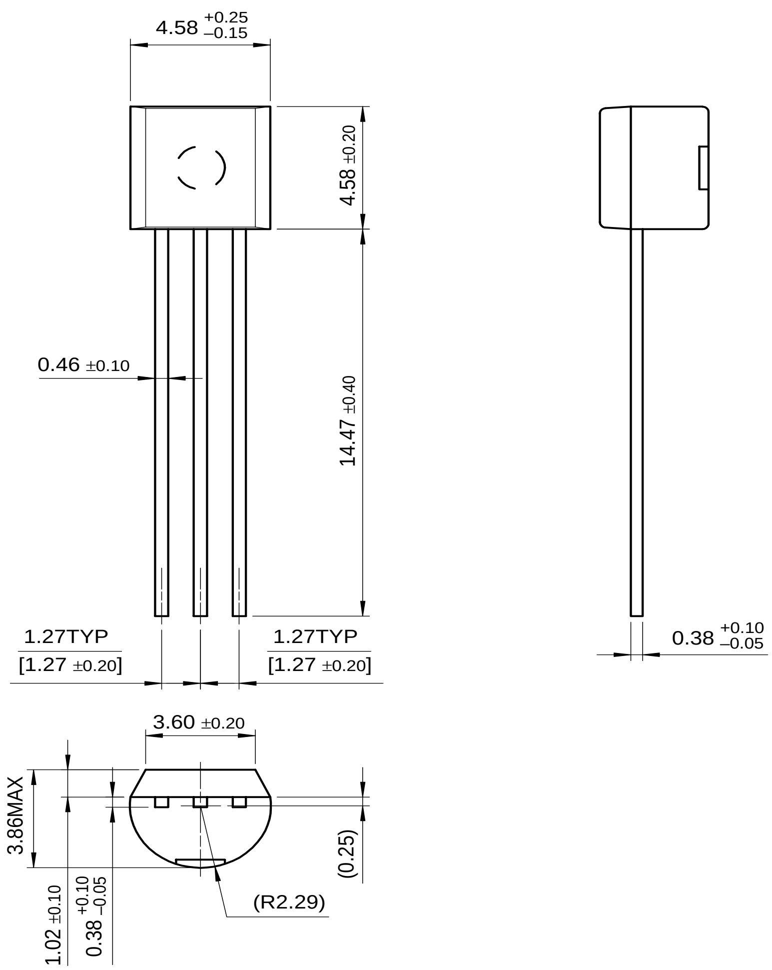
Typical Common Emitter Characteristics



Typical Common Emitter Characteristics

Package Dimensions

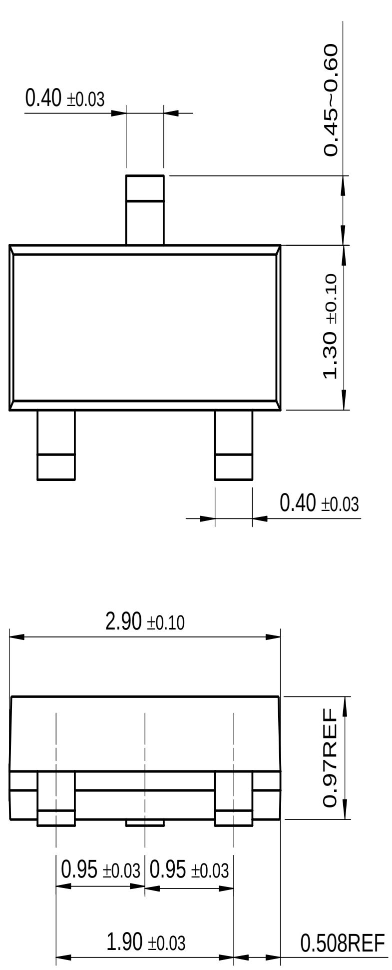
TO-92



Dimensions in Millimeters

Package Dimensions (Continued)

SOT-23



Dimensions in Millimeters

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