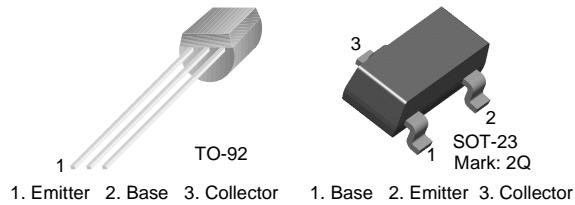




2N5086/2N5087/MMBT5087

PNP General Purpose Amplifier

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



Absolute Maximum Ratings* $T_a=25^\circ\text{C}$ 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:

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

Electrical Characteristics $T_a=25^\circ\text{C}$ unless otherwise noted

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

* Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

Thermal Characteristics $T_a=25^\circ\text{C}$ unless otherwise noted

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

* Device mounted on FR-4 PCB 1.6" \times 1.6" \times 0.06."

Typical Characteristics

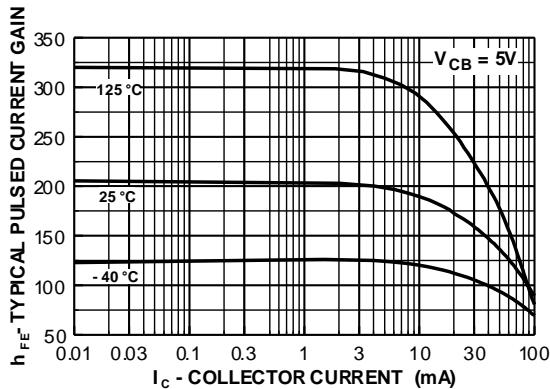


Figure 1. Typical Pulsed Current Gain
vs Collector Current

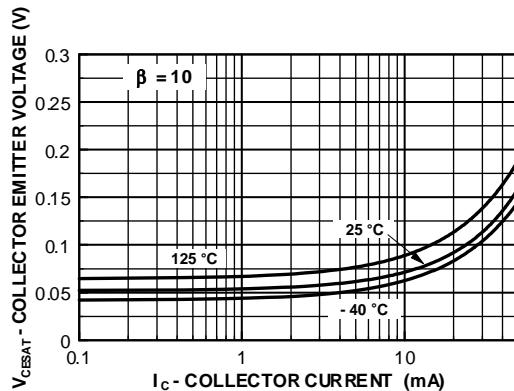


Figure 2. Collector-Emitter Saturation Voltage
vs Collector Current

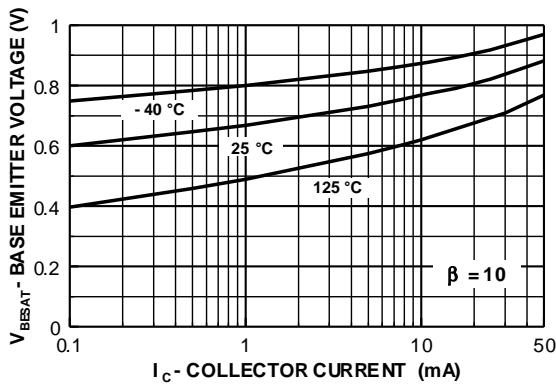


Figure 3. Base-Emitter Saturation Voltage
vs Collector Current

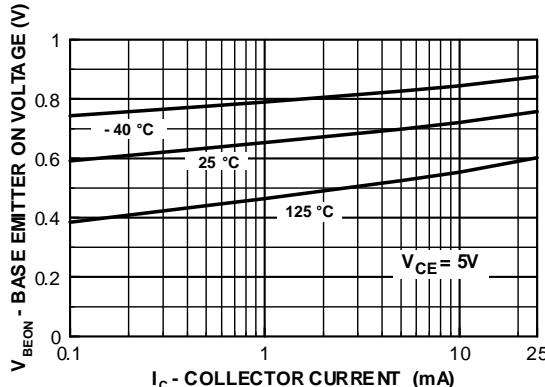


Figure 4. Base-Emitter On Voltage
vs Collector Current

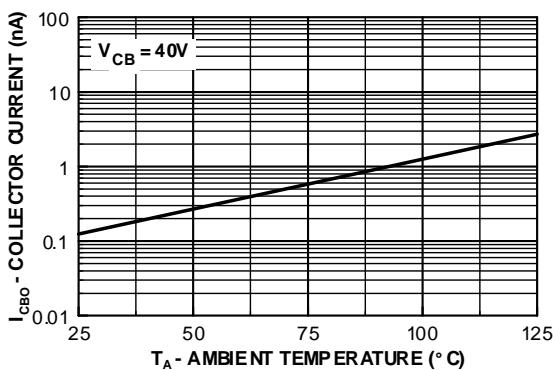


Figure 5. Collector Cutoff Current
vs Ambient Temperature

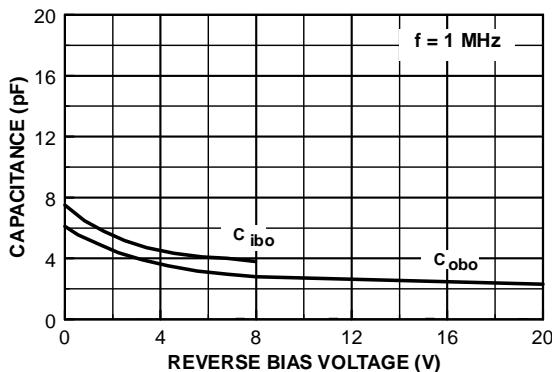


Figure 6. Input and Output Capacitance
vs Reverse Voltage

Typical Characteristics (Continue)

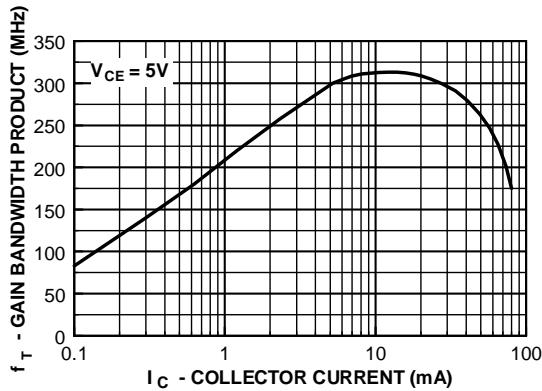


Figure 7. Gain Bandwidth Product vs Collector Current

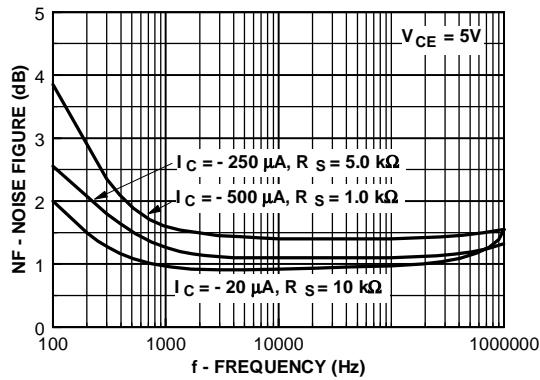


Figure 8. Noise Figure vs Frequency

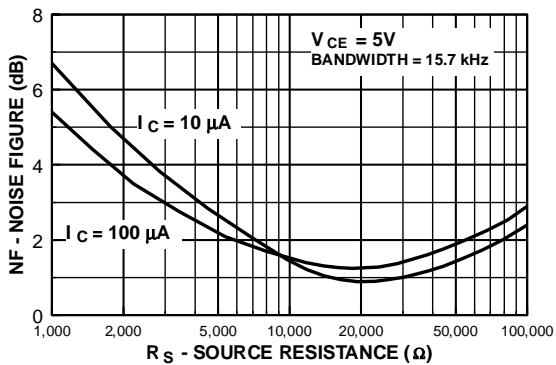


Figure 9. Wideband Noise Frequency vs Source Resistance

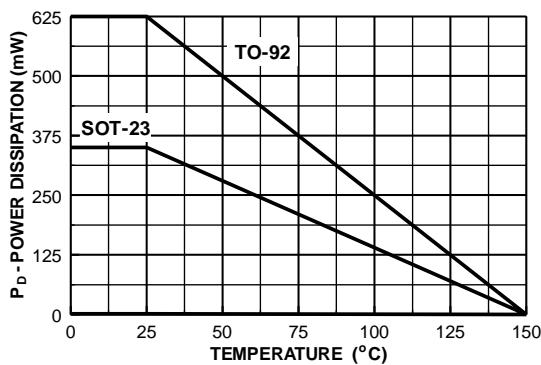


Figure 10. Power Dissipation vs Ambient Temperature

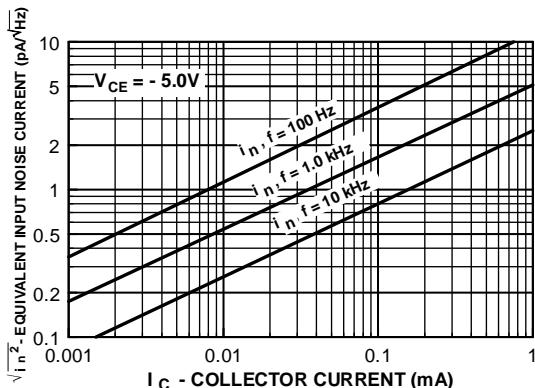


Figure 11. Equivalent Input Noise Current vs Collector Current

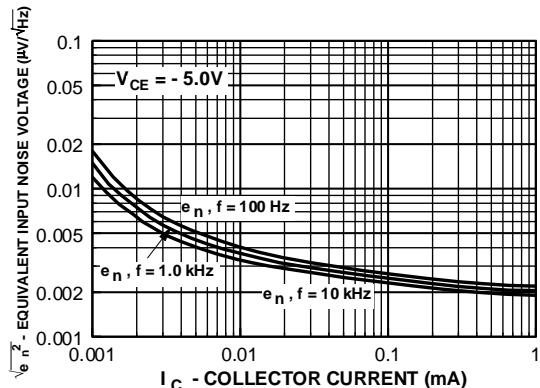
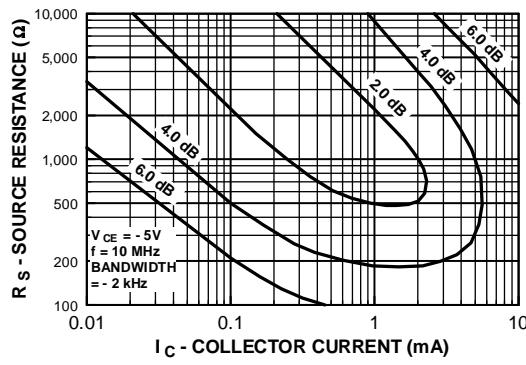
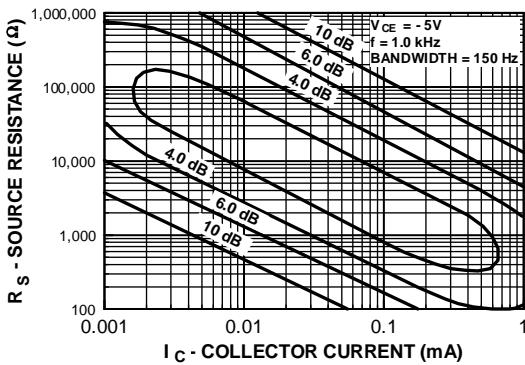
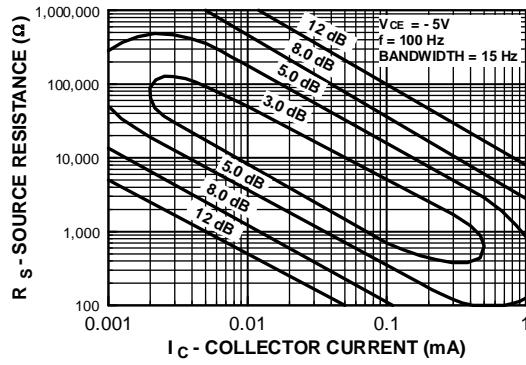
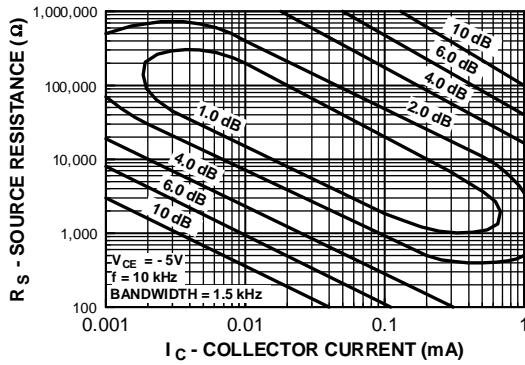
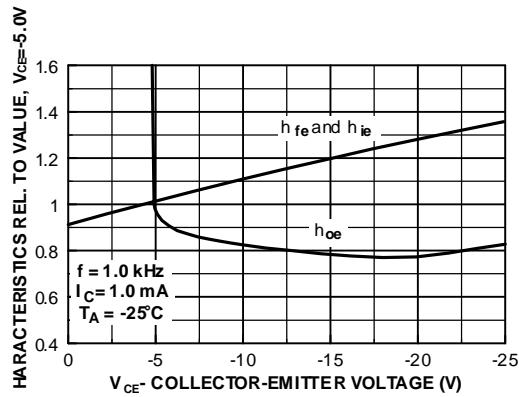


Figure 12. Equivalent Input Noise Voltage vs Collector Current

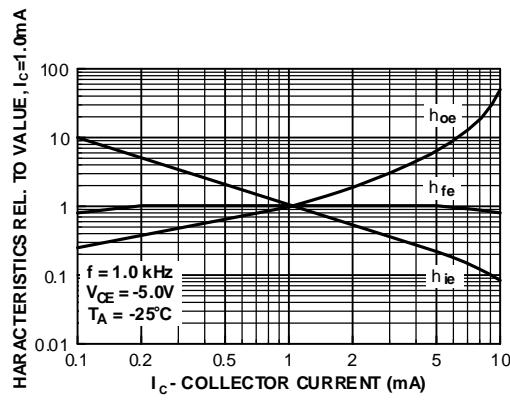
Typical Characteristics (Continue)



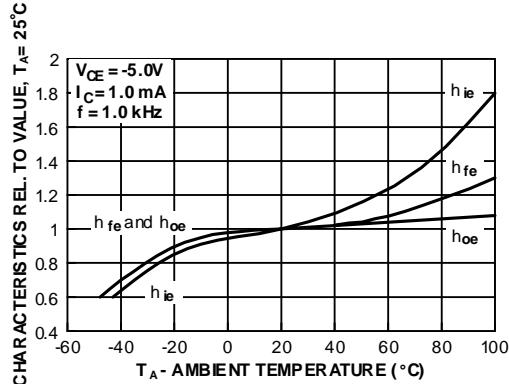
Typical Common Emitter Characteristics $(f = 1.0\text{kHz})$



Typical Common Emitter Characteristics



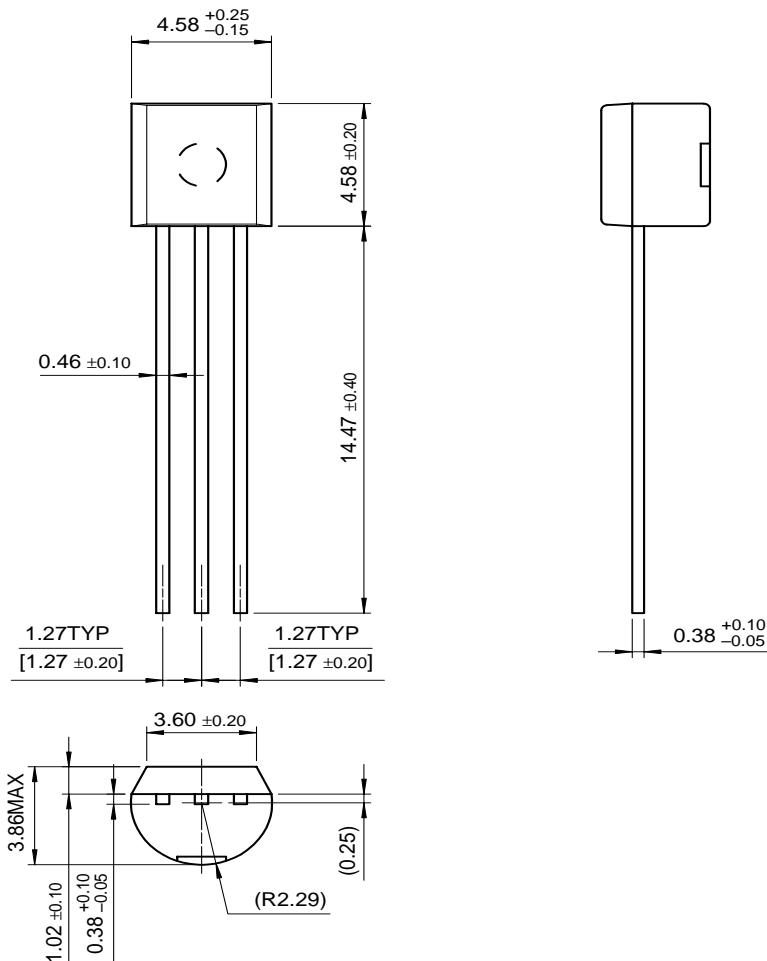
Typical Common Emitter Characteristics



Typical Common Emitter Characteristics

Package Dimensions

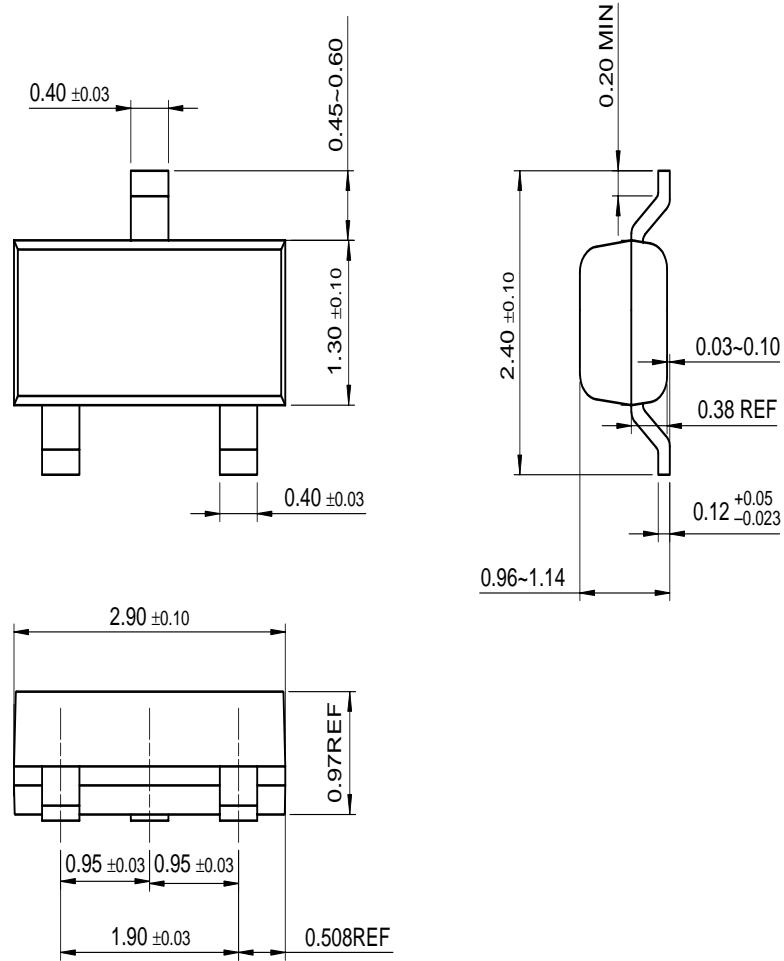
TO-92



Dimensions in Millimeters

Package Dimensions (Continued)

SOT-23



Dimensions in Millimeters

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DOME™	GTO™	MSX™	Quiet Series™	TruTranslation™
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