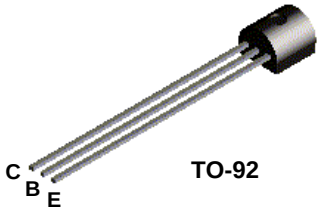
FAIRCHILD SEMICONDUCTOR TM

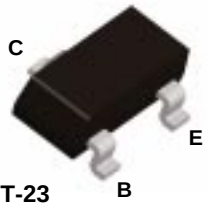
Discrete POWER & Signal Technologies

2N5086 2N5087

MMBT5086 MMBT5087



TO-92



SOT-23
Mark: 2P / 2Q

PNP General Purpose Amplifier

This device is designed for low level, high gain, low noise general purpose amplifier applications at collector currents to 50 mA. Sourced from Process 62.

Absolute Maximum Ratings*

TA = 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	5.0	V
I_C	Collector Current - Continuous	100	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +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.

Thermal Characteristics

TA= 25°C unless otherwise noted

Symbol	Characteristic	Max		Units
		2N5086 2N5086	***MMBT5086 *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" X 1.6" X 0.06."

PNP General Purpose Amplifier
(continued)

Electrical Characteristics
TA= 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Max	Units
OFF CHARACTERISTICS						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	I_C = 1.0 mA, I_B = 0		50		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 100 µA, I_E = 0		50		V
I_{CBO}	Collector Cutoff Current	V_{CB} = 10 V, I_E = 0 V_{CB} = 35 V, I_E = 0			10 50	nA nA
I_{EBO}	Emitter Cutoff Current	V_{EB} = 3.0 V, I_C = 0			50	nA
ON CHARACTERISTICS						
h_{FE}	DC Current Gain	I_C = 100 µA, V_{CE} = 5.0 V	**2N5086**	150	500	
			2N5087	250	800	
		I_C = 1.0 mA, V_{CE} = 5.0 V	**2N5086**	150		
			2N5087	250		
		I_C = 10 mA, V_{CE} = 5.0 V	**2N5086**	150		
			2N5087	250		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 10 mA, I_B = 1.0 mA			0.3	V
$V_{BE(on)}$	Base-Emitter On Voltage	I_C = 1.0 mA, V_{CE} = 5.0 V			0.85	V
SMALL SIGNAL CHARACTERISTICS						
f_T	Current Gain - Bandwidth Product	I_C = 500 µA, V_{CE} = 5.0 V, f = 20 MHz		40		MHz
C_{cb}	Collector-Base Capacitance	V_{CB} = 5.0 V, I_E = 0, f = 100 kHz			4.0	pF
h_{fe}	Small-Signal Current Gain	I_C = 1.0 mA, V_{CE} = 5.0, f = 1.0 kHz	**2N5086**	150	600	
			2N5087	250	900	
NF	Noise Figure	I_C = 100 µA, V_{CE} = 5.0 V, R_S = 3.0 kΩ, f = 1.0 kHz	**2N5086**		3.0	dB
			2N5087		2.0	dB
		I_C = 20 µA, V_{CE} = 5.0 V, R_S = 10 kΩ, f = 10 Hz to 15.7 kHz	**2N5086**		3.0	dB
			2N5087		2.0	dB

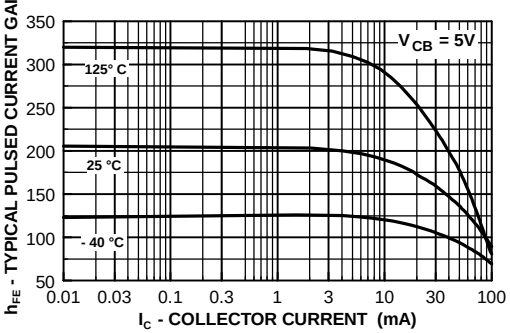
*Pulse Test: Pulse Width ≤ 300 ms, Duty Cycle ≤ 2.0%

Spice Model

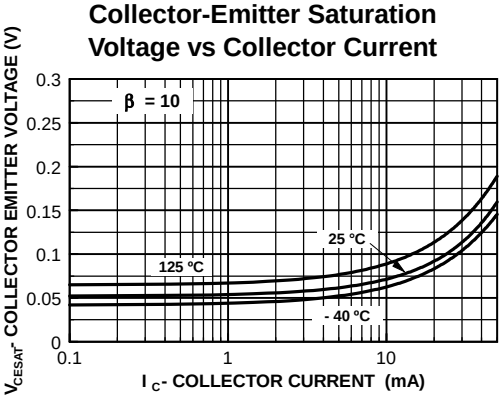
PNP (Is=6.734f Xti=3 Eg=1.11 Vaf=45.7 Bf=254.1 Ne=1.741 Ise=6.734f Ikf=.1962 Xtb=1.5 Br=2.683 Nc=2 Isc=0 Ikr=0 Rc=1.67 Cjc=6.2p Mjc=.301 Vjc=.75 Fc=.5 Cje=7.5p Mje=.2861 Vje=.75 Tr=10.1n Tf=467.8p Itf=.17 Vtf=5 Xtf=8 Rb=10)

Typical Characteristics

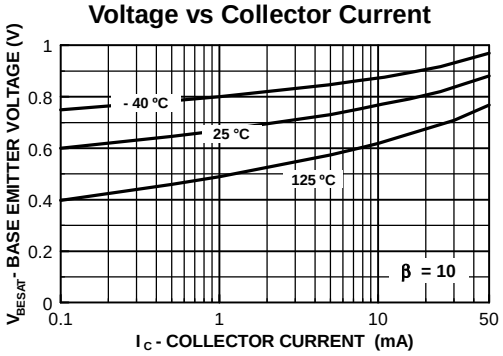
Typical Pulsed Current Gain vs Collector Current



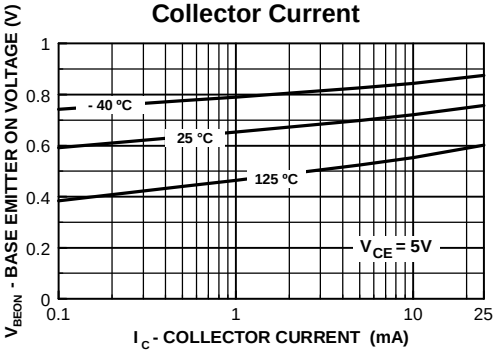
Collector-Emitter Saturation Voltage vs Collector Current



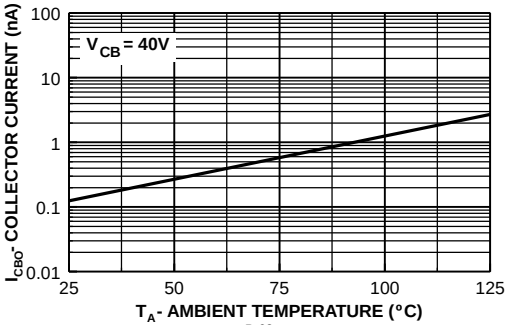
Base-Emitter Saturation Voltage vs Collector Current



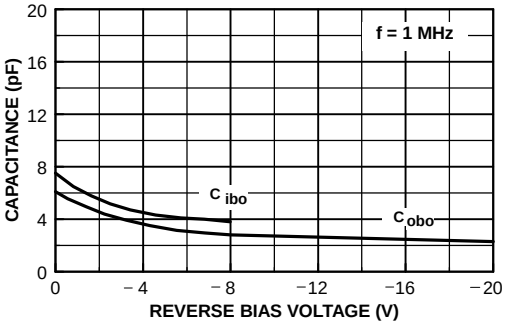
Base Emitter ON Voltage vs Collector Current



Collector-Cutoff Current vs. Ambient Temperature

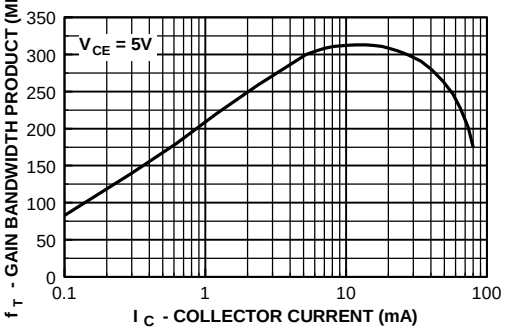


Input and Output Capacitance vs Reverse Bias Voltage

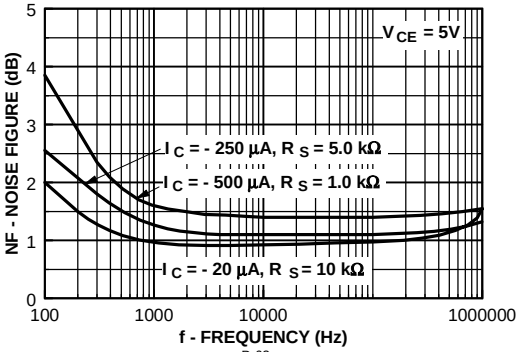


Typical Characteristics (continued)

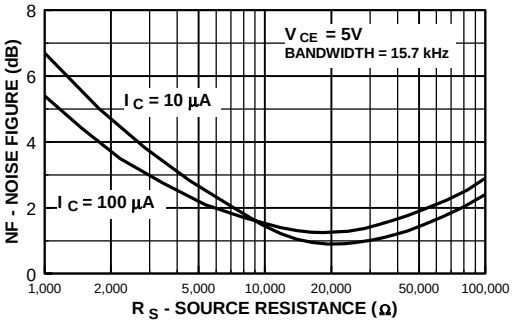
Gain Bandwidth Product vs Collector Current



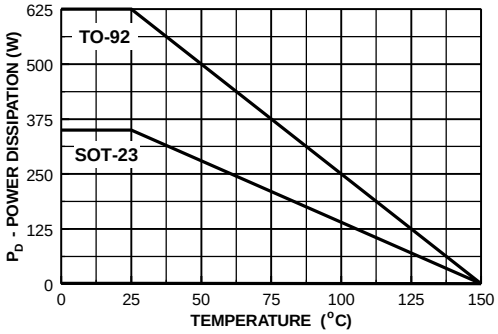
Noise Figure vs Frequency



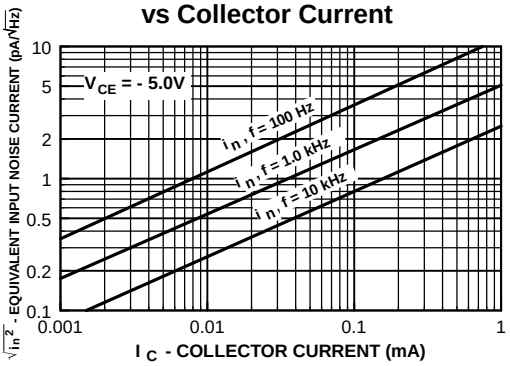
Wideband Noise Frequency vs Source Resistance



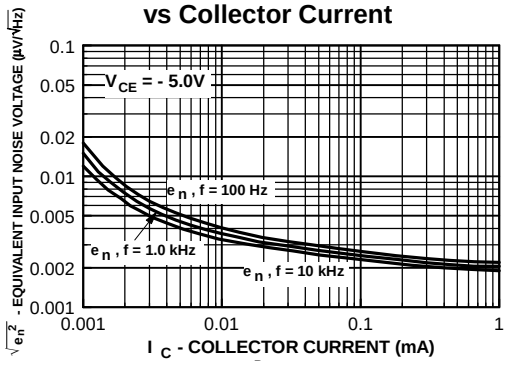
Power Dissipation vs Ambient Temperature



Equivalent Input Noise Current vs Collector Current

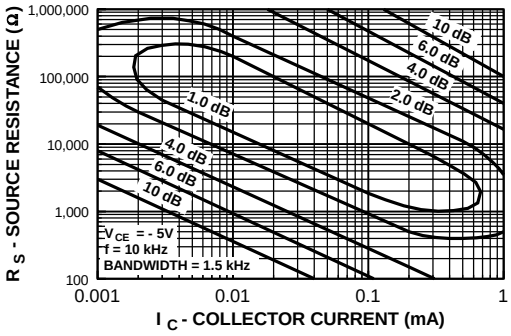


Equivalent Input Noise Voltage vs Collector Current

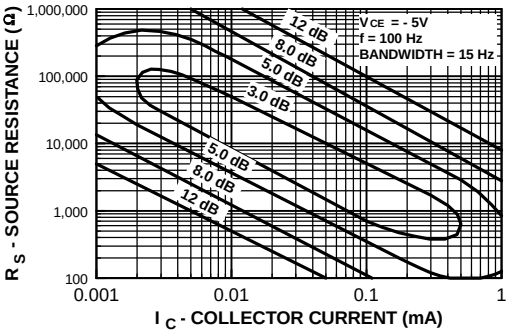


Typical Characteristics (continued)

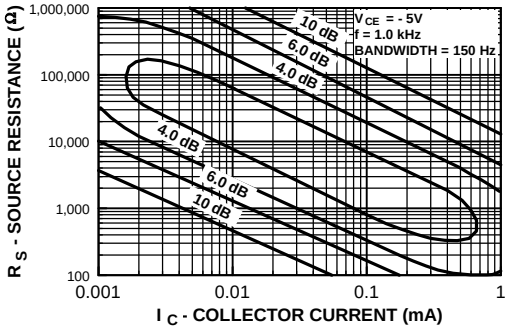
Contours of Constant Narrow Band Noise Figure



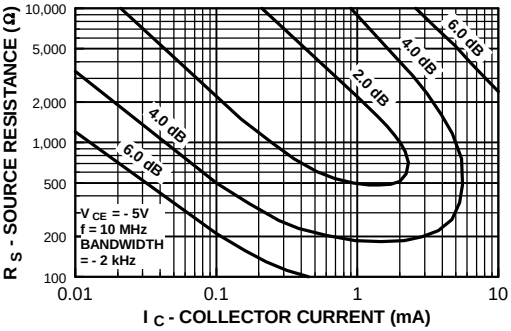
Contours of Constant Narrow Band Noise Figure



Contours of Constant Narrow Band Noise Figure



Contours of Constant Narrow Band Noise Figure



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