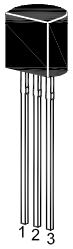
2N5088 / 2N5089

NPN Silicon Epitaxial Planar Transistor

for switching and AF amplifier applications.

The transistor is subdivided into one group according to it DC current gain. As complementary type the PNP transistor 2N5086 and 2N5087 are recommended.



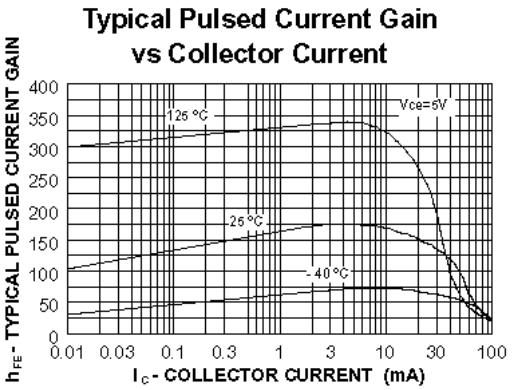
1. Emitter 2. Base 3. Collector
TO-92 Plastic Package

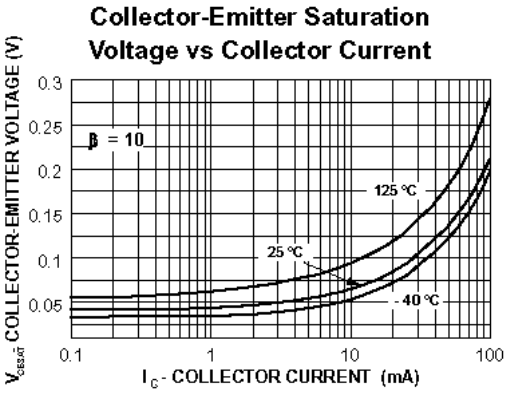
Absolute Maximum Ratings (T_a = 25 °C)

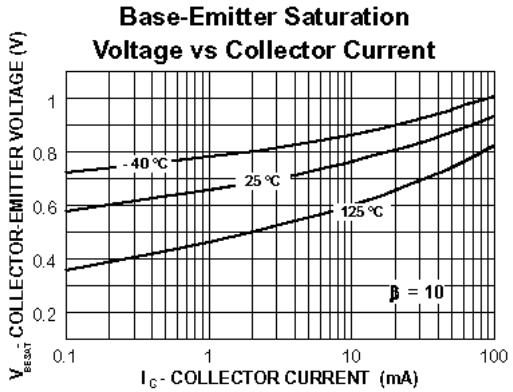
Parameter	Symbol	Value	Unit
Collector Base Voltage	V_{CBO}	35	V
Collector Emitter Voltage	V_{CEO}	30	V
Emitter Base Voltage	V_{EBO}	4.5	V
Collector Current	I_C	50	mA
Power Dissipation	P_{tot}	500	mW
Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{stg}	- 55 to + 150	°C

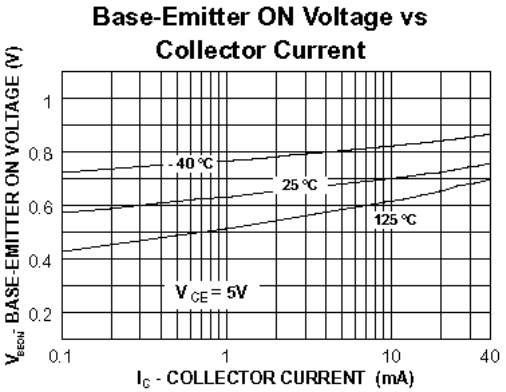
Characteristics at T_a = 25 °C

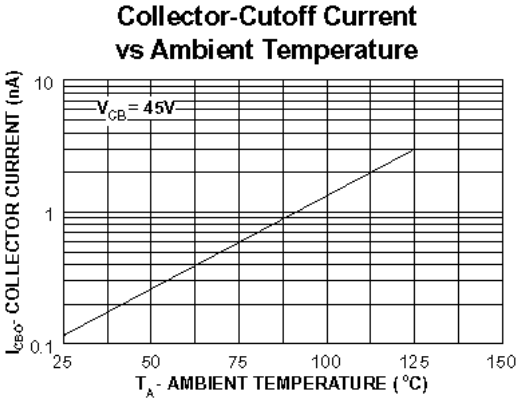
Parameter		Symbol	Min.	Max.	Unit
DC Current Gain					
at V_{CE} = 5 V, I_C = 0.1 mA	2N5088	h_{FE}	300	900	-
	2N5089	h_{FE}	400	1200	-
at V_{CE} = 5 V, I_C = 1 mA	2N5088	h_{FE}	300	-	-
	2N5089	h_{FE}	400	-	-
at V_{CE} = 5 V, I_C = 10 mA	2N5088	h_{FE}	300	-	-
	2N5089	h_{FE}	400	-	-
Collector Base Cutoff Current at V_{CB} = 35 V		I_{CBO}	-	50	nA
Emitter Base Cutoff Current at V_{EB} = 4.5 V		I_{EBO}	-	50	nA
Collector Base Breakdown Voltage at I_C = 100 µA		$V_{(BR)CBO}$	35	-	V
Collector Emitter Breakdown Voltage at I_C = 1 mA		$V_{(BR)CEO}$	30	-	V
Emitter Base Breakdown Voltage at I_E = 10 µA		$V_{(BR)EBO}$	4.5	-	V
Collector Emitter Saturation Voltage at I_C = 10 mA, I_B = 1 mA		$V_{CE(sat)}$	-	0.5	V
Base Emitter Voltage at V_{CE} = 5 V, I_C = 10 mA		$V_{BE(on)}$	-	0.8	V
Gain Bandwidth Product at V_{CE} = 5 V, I_C = 0.5 mA		f_T	50	-	MHz
Collector Output Capacitance at V_{CB} = 10 V, f = 1 MHz		C_{ob}	-	4	pF


Typical Pulsed Current Gain
vs Collector Current
h_{FE} - TYPICAL PULSED CURRENT GAIN
400
350
300
250
200
150
100
50
0
125 °C
Vce=5V
25 °C
-40 °C
0.01 0.03 0.1 0.3 1 3 10 30 100
I_C - COLLECTOR CURRENT (mA)

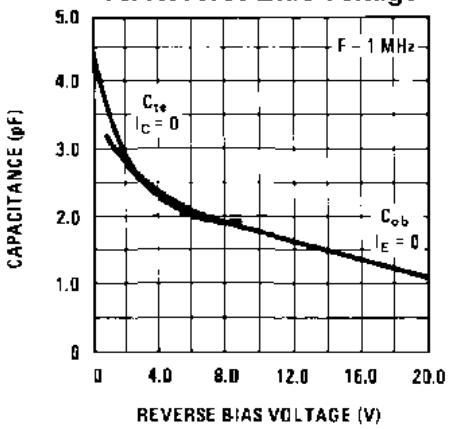

Collector-Emitter Saturation
Voltage vs Collector Current
$V_{CE(sat)}$ COLLECTOR-EMITTER VOLTAGE (V)
0.3
0.25
0.2
0.15
0.1
0.05
β = 10
125 °C
25 °C
-40 °C
0.1 1 10 100
I_C - COLLECTOR CURRENT (mA)


Base-Emitter Saturation
Voltage vs Collector Current
$V_{BE(sat)}$ COLLECTOR-EMITTER VOLTAGE (V)
1
0.8
0.6
0.4
0.2
-40 °C
25 °C
125 °C
β = 10
0.1 1 10 100
I_C - COLLECTOR CURRENT (mA)

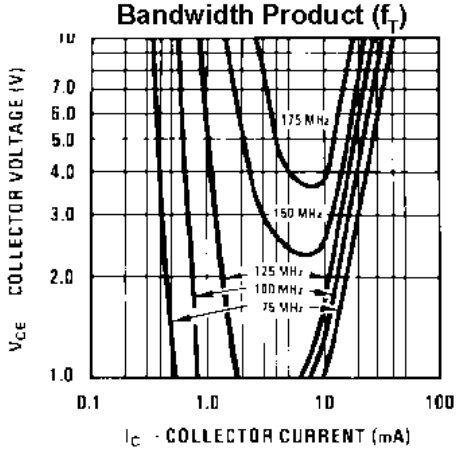

Base-Emitter ON Voltage vs
Collector Current
$V_{BE(ON)}$ BASE-EMITTER ON VOLTAGE (V)
1
0.8
0.6
0.4
0.2
-40 °C
25 °C
125 °C
V_{CE} = 5V
0.1 1 10 40
I_C - COLLECTOR CURRENT (mA)


Collector-Cutoff Current
vs Ambient Temperature
I_{CBO} COLLECTOR CURRENT (nA)
10
1
0.1
V_{CB} = 45V
25 50 75 100 125 150
T_A - AMBIENT TEMPERATURE (°C)

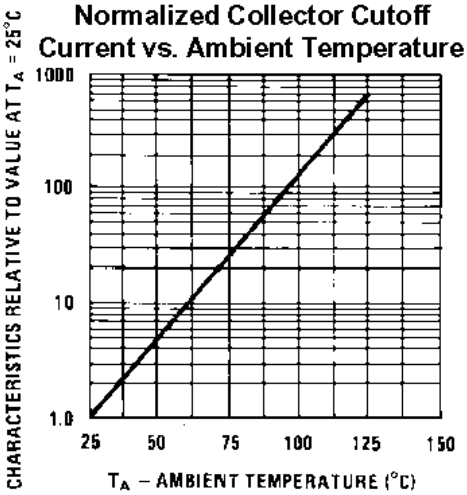
Input / Output Capacitance vs. Reverse Bias Voltage



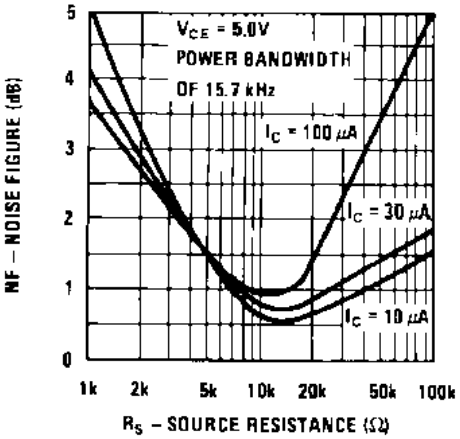
Contours of Constant Gain Bandwidth Product (f_T)



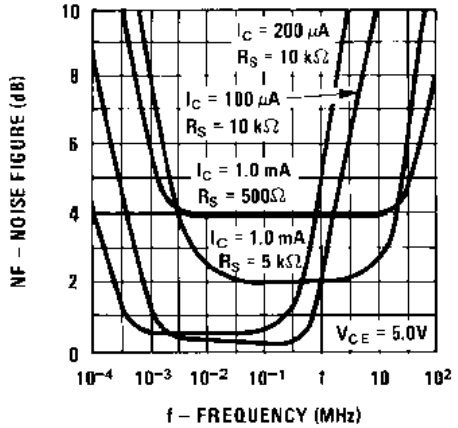
Normalized Collector Cutoff Current vs. Ambient Temperature



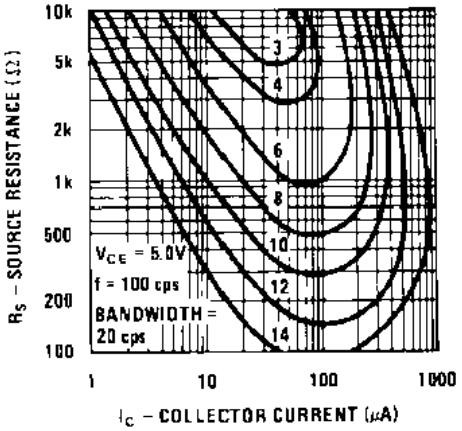
Wideband Noise Figure vs. Source Resistance



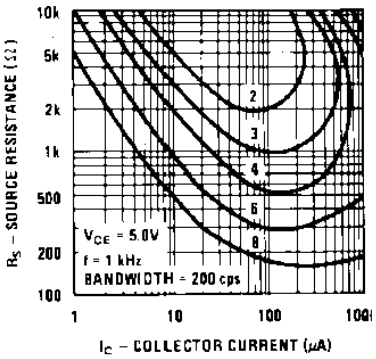
Noise Figure vs. Frequency



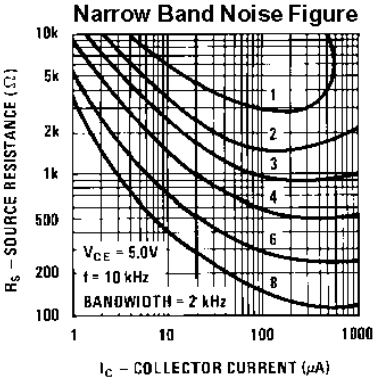
Contours of Constant Narrow Band Noise Figure



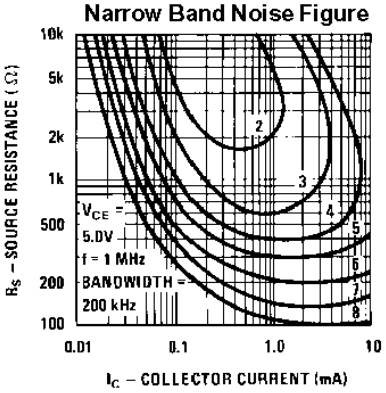
Contours of Constant Narrow Band Noise Figure



Contours of Constant Narrow Band Noise Figure



Contours of Constant Narrow Band Noise Figure



Maximum Power Dissipation vs. Ambient Temperature