

2N5222 (SILICON)

NPN SILICON ANNULAR TRANSISTOR

... designed for RF amplifier, mixer, and video IF applications.

- High Current-Gain-Bandwidth Product –
 $f_T = 450 \text{ MHz (Min) @ } I_C = 4.0 \text{ mA dc}$
- Collector-Emitter Saturation Voltage –
 $V_{CE} = 1.0 \text{ V dc (Max) @ } I_C = 4.0 \text{ mA dc}$
- Low Collector-Base Capacitance –
 $C_{cb} = 1.3 \text{ pF (Max) @ } V_{CB} = 10 \text{ V dc}$

NPN SILICON AMPLIFIER TRANSISTOR



*MAXIMUM RATINGS

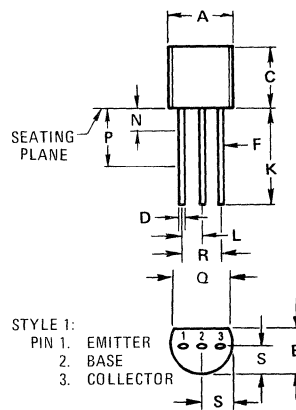
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	15	Vdc
Collector-Base Voltage	V_{CB}	20	Vdc
Emitter-Base Voltage	V_{EB}	2.0	Vdc
Collector Current – Continuous	I_C	50	mA dc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	350 2.8	mW mW/ $^\circ\text{C}$
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0 8.0	Watt mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

*THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA} (1)$	357	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	125	$^\circ\text{C/W}$

*Indicates JEDEC Registered Data.

(1) $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.



	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.450	5.200	0.175	0.205
B	3.180	4.190	0.125	0.165
C	4.320	5.330	0.170	0.210
D	0.407	0.533	0.016	0.021
F	0.407	0.482	0.016	0.019
K	12.700	—	0.500	—
L	1.150	1.390	0.045	0.055
N	—	1.270	—	0.050
P	6.350	—	0.250	—
Q	3.430	—	0.135	—
R	2.410	2.670	0.095	0.105
S	2.030	2.670	0.080	0.105

CASE 29-02
TO-92

*** ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ($I_C = 1.0 \text{ mA}$, $I_B = 0$)	BV_{CEO}	15	-	Vdc
Collector-Base Breakdown Voltage ($I_C = 100 \mu\text{A}$, $I_E = 0$)	BV_{CBO}	20	-	Vdc
Emitter-Base Breakdown Voltage ($I_E = 100 \mu\text{A}$, $I_C = 0$)	BV_{EBO}	2.0	-	Vdc
Collector Cutoff Current ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	-	100	nA
Emitter Cutoff Current ($V_{BE} = 2.0 \text{ Vdc}$, $I_C = 0$)	I_{EBO}	-	100	nA

ON CHARACTERISTICS

DC Current Gain(1) ($I_C = 4.0 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)	h_{FE}	20	1500	-
Collector-Emitter Saturation Voltage ($I_C = 4.0 \text{ mA}$, $I_B = 400 \mu\text{A}$)	$V_{CE(sat)}$	-	1.0	Vdc
Base-Emitter Saturation Voltage ($I_C = 4.0 \text{ mA}$, $I_B = 400 \mu\text{A}$)	$V_{BE(sat)}$	-	1.2	Vdc

DYNAMIC CHARACTERISTICS

Current-Gain-Bandwidth Product ($I_C = 4.0 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 20 \text{ MHz}$)	f_T	450	-	MHz
Collector-Base Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{cb}	-	1.3	pF
Small-Signal Current Gain ($I_C = 4.0 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	h_{fe}	20	3000	-

* Indicates JEDEC Registered Data

(1) Pulse Test: Pulse Width $\approx 300 \mu\text{s}$, Duty Cycle $\approx 2.0\%$.

COMMON-BASE y PARAMETERS versus FREQUENCY

($V_{CB} = 10 \text{ Vdc}$, $I_C = 4.0 \text{ mA}$, $T_A = 25^\circ\text{C}$)

y_{ib} , INPUT ADMITTANCE

FIGURE 1 – RECTANGULAR FORM

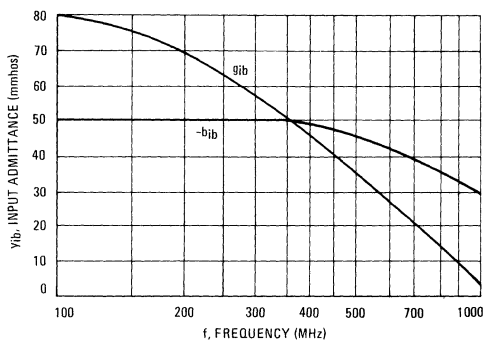
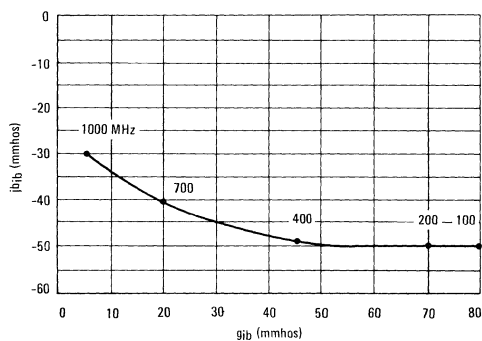


FIGURE 2 – POLAR FORM



y_{fb} , FORWARD TRANSFER ADMITTANCE

FIGURE 3 – RECTANGULAR FORM

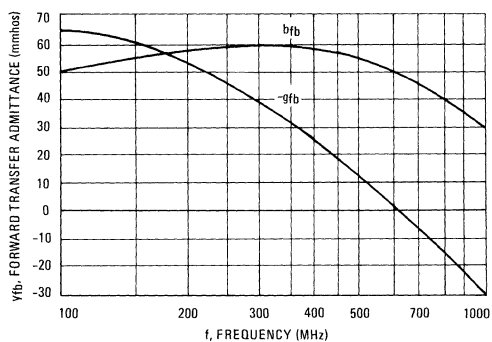
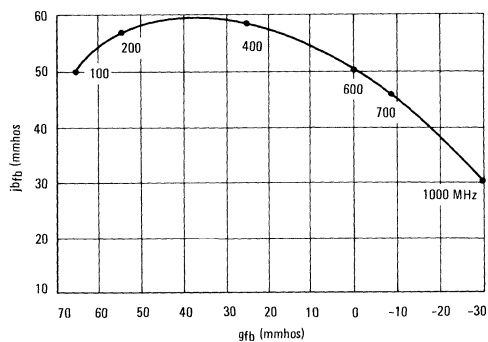


FIGURE 4 – POLAR FORM



COMMON-BASE y PARAMETERS versus FREQUENCY

($V_{CB} = 10$ Vdc, $I_C = 4.0$ mA dc, $T_A = 25^\circ\text{C}$)

y_{rb} , REVERSE TRANSFER ADMITTANCE

FIGURE 5 – RECTANGULAR FORM

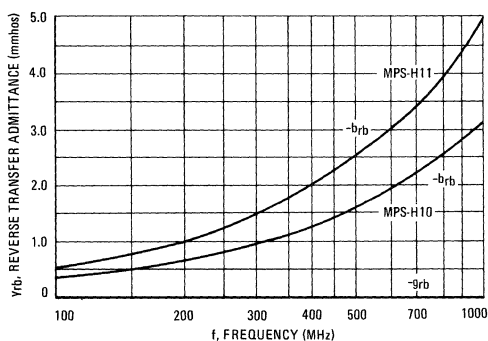
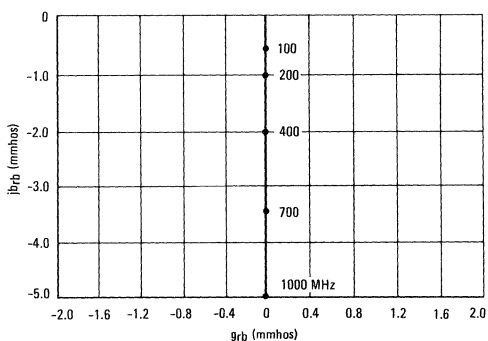


FIGURE 6 – POLAR FORM



y_{ob} , OUTPUT ADMITTANCE

FIGURE 7 – RECTANGULAR FORM

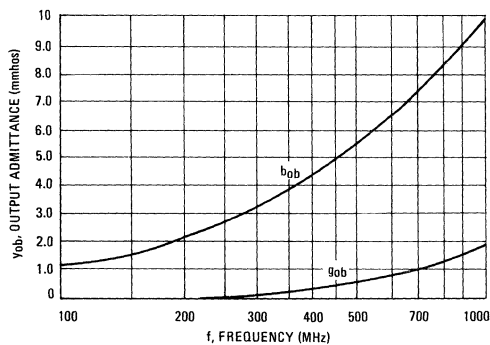


FIGURE 8 – POLAR FORM

