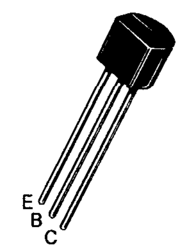
BF 366

NPN SILICON ANNULAR TRANSISTORS

. . . designed for common-base FM/VHF RF applications.

- Complete y-Parameter Curves at 50 MHz, 100 MHz and 200 MHz
- Low Feedback Capacitance Allowing Stable Unneutralized Operation
- High Power Gain in the VHF Range

NPN SILICON FM/VHF TRANSISTORS



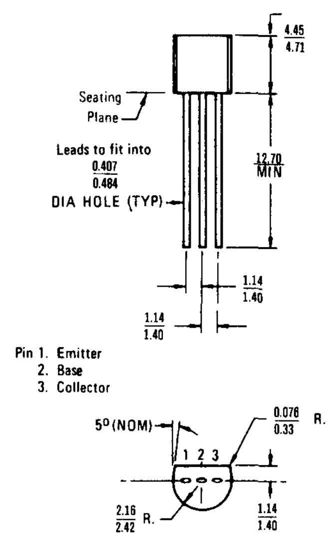
Shield available on request

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	30	Vdc
Collector-Base Voltage	V_{CB}	35	Vdc
Emitter-Base Voltage	V_{EB}	4.0	Vdc
Collector Current (continous)	I_C	25	mA
Total Device Dissipation @ $T_A = 25°C$ Derate above 25°C	P_D	310 2.47	mW mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to + 150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	θ_{JA}	0.404	°C/mW



CASE 29(1)
TO-92

All dimensions in Millimeters

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (I_C = 1.0 mAdc, I_B = 0)	BV_{CEO}	30	–	Vdc
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	BV_{CBO}	35	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)	BV_{EBO}	4.0	–	Vdc
Collector Cutoff Current (V_{CB} = 15 Vdc, I_E = 0)	I_{CBO}	–	50	nAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 3.0 mAdc, V_{CE} = 10 Vdc) (I_C= 12 mAdc, V_{CE}= 7 V)	 h_{FE1} h_{FE2}	 15 5.0	–	–
Base-Emitter On Voltage (I_C= 12 mAdc, V_{CE}= 7 Vdc)	$V_{BE(on)}$	–	1.0	Vdc
DYNAMIC CHARACTERISTICS				
Current-Gain-Bandwidth Product (for typical values see figure 13) (I_C = 3.0 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	f_T	400	–	MHz
Collector-Emitter Capacitance (common base feedback capacitance) (V_{CE} = 10 Vdc, I_B = 0, f = 1.0 MHz, base guarded)	C_{12b} (C_{rb})	–	0.3	pF
Noise Figure (Figures 2,11 and 14) (I_C = 3.0 mAdc, V_{CB} = 10 Vdc, R_S = 50 Ohms, f = 100 MHz) (I_C = 3.0 mAdc, V_{CB} = 10 Vdc, R_S = 50 Ohms, f = 200 MHz)	NF	 – –	 3.2 3.5	dB

Characteristic	Symbol	Typ	Unit
FUNCTIONAL TEST			
Common-Emitter Amplifier Power Gain (Figures 1 and 14) (I_C = 3.0 mAdc, V_{CB} = 10 Vdc, R_S = 50 Ohms, f = 100 MHz) (I_C = 3.0 mAdc, V_{CB} = 10 Vdc, R_S = 50 Ohms, f = 200 MHz)	G_{pb}	 30 20	dB
Forward AGC Current (Figures 1,2 and 14) (Gain Reduction = 30 dB, R_S = 50 Ohms, f = 100 MHz) (Gain Reduction = 30 dB, R_S = 50 Ohms, f = 200 MHz)	I_{AGC}	 5.5 5.0	mAdc
DESIGN DATA			
Maximum unilateralized Power Gain (common base configuration. Base guarded) $G_{UM} = 10 \text{ Log } \frac{\lvert Y21b\rvert^2}{4g_{11b}g_{22b}} = (10 \text{ Log } \frac{\lvert Yfb\rvert^2}{4g_{ib}g_{ob}})$			
I_C = 3 mA VCB = 10 Volts f = 50 MHz f = 200 MHz		 31 21	 db db
I_C = 2 mA VCB = 10 Volts f = 100 MHz		 30	 db

Characteristic	Symbol	Typ	Unit
DESIGN DATA (continued)			
Y parameters			
f = 50 MHz (common base) I_E = 3 mA, V_{CB} = 10 Volts			
Input conductance	$g_{11b}(g_{ib})$	90	mA/V
Input susceptance	$b_{11b}(b_{ib})$	18	mA/V
Feedback admittance	$\|Y_{12b}\|(\|Y_{rb}\|)$	55	μA/V
Phase angle of feedback admittance	$\varphi_{12b}(\Phi_{rb})$	270°	degree
Transfer admittance	$\|Y_{21b}\|(\|Y_{fb}\|)$	98	mA/V
Phase angle of transfer admittance	$\varphi_{21b}(\Phi_{fb})$	165°	degree
Output conductance	$g_{22b}(g_{ob})$	20	μA/V
Output susceptance	$b_{22b}(b_{ob})$	400	μA/V
f = 100 MHz (common emitter) I_C = 2 mA, V_{CE} = 10 Volts			
Input conductance	$g_{11e}(g_{ie})$	3	mA/V
Input capacitance	$C_{11e}(C_{ie})$	13	pF
Feedback admittance	$\|Y_{12e}\|(\|Y_{re}\|)$	0,935	mA/V
Phase angle of feedback admittance	$\varphi_{12e}(\Phi_{re})$	270°	degree
Transfer admittance	$\|Y_{21e}\|(\|Y_{fe}\|)$	68	mA/V
Phase angle of transfer admittance	$\varphi_{21e}(\Phi_{fe})$	342°	degree
Output conductance	$g_{22e}(g_{oe})$	18	μA/V
Output capacitance	$C_{22e}(C_{oe})$	1,27	pF
f = 200 MHz (common base) I_E = 3 mA, V_{CB} = 10 Volts			
Input conductance	$g_{11b}(g_{ib})$	80	mA/V
Input susceptance	$b_{11b}(b_{ib})$	50	mA/V
Feedback admittance	$\|Y_{12b}\|(\|Y_{rb}\|)$	180	μA/V
Phase angle of feedback admittance	$\varphi_{12b}(\Phi_{rb})$	270°	degree
Transfer admittance	$\|Y_{21b}\|(\|Y_{fb}\|)$	85	mA/V
Phase angle of transfer admittance	$\varphi_{21b}(\Phi_{fb})$	130°	degree
Output conductance	$g_{22b}(g_{ob})$	180	μA/V
Output susceptance	$b_{22b}(b_{ob})$	1,6	mA/V

AGC CHARACTERISTICS

V_{CC} = 10 Vdc, R_S = 50 Ohms, See Figure 14

——f = 100 MHz – – – f = 200 MHz

FIG. 1 _ POWER GAIN

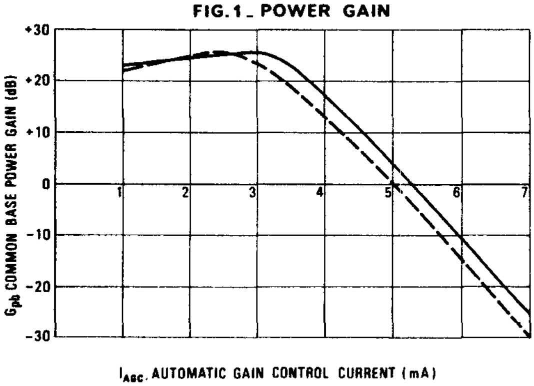
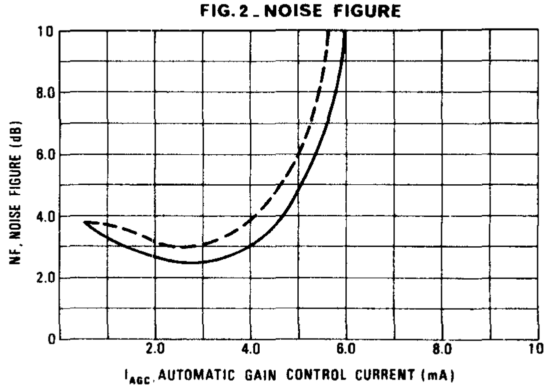


FIG. 2 _ NOISE FIGURE



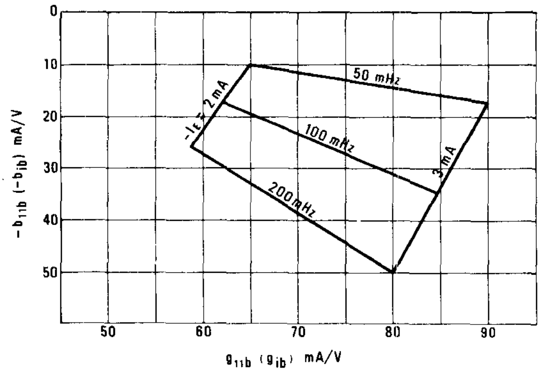
COMMON-BASE y PARAMETERS

V_{CB}=10 Vdc, T_A=25°C

--- f = 50 MHz —— f = 100 MHz -·-·-·- f = 200 MHz

FIG. 3 INPUT ADMITTANCE Y_{11b} (Y_{ib}) FIG. 4

POLAR COORDINATES



RECTANGULAR COORDINATES

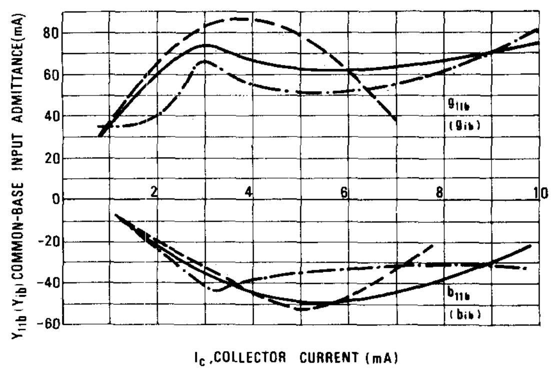
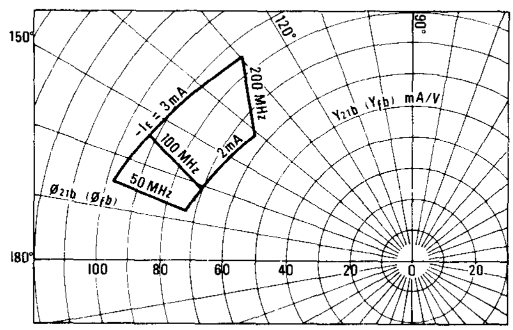


FIG. 5 FORWARD TRANSFER ADMITTANCE Y_{21b} (Y_{fb}) FIG. 6



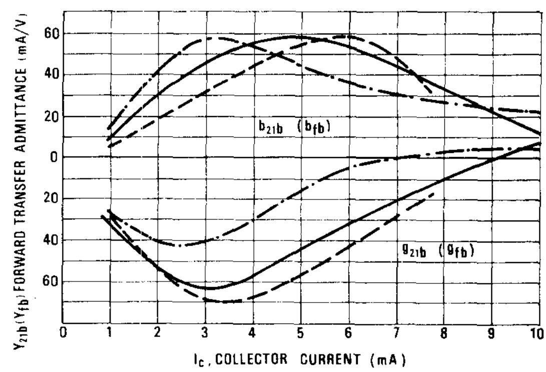
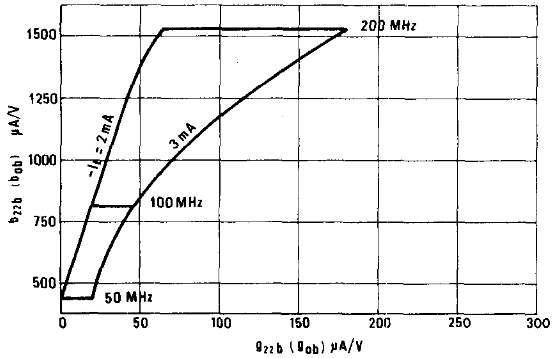


FIG. 7 OUTPUT ADMITTANCE Y_{22b} (Y_{ib}) FIG. 8



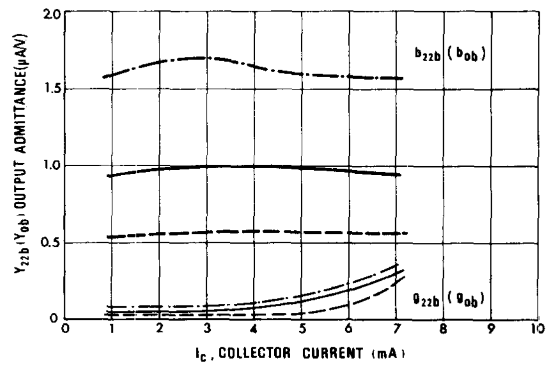
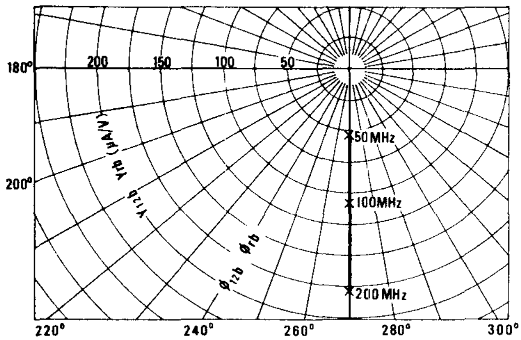


FIG. 9 REVERSE TRANSFER ADMITTANCE Y_{12b} (Y_{fb}) FIG.10

POLAR COORDINATES



RECTANGULAR COORDINATES

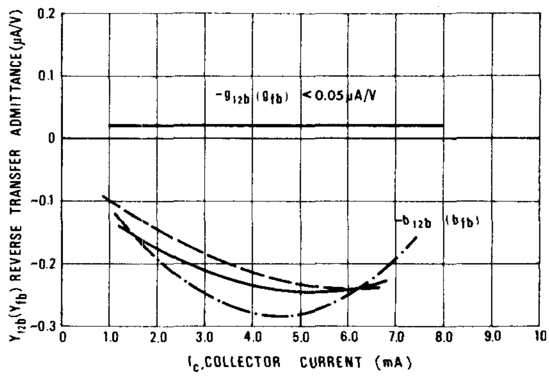


FIG. 11- NOISE FIGURE

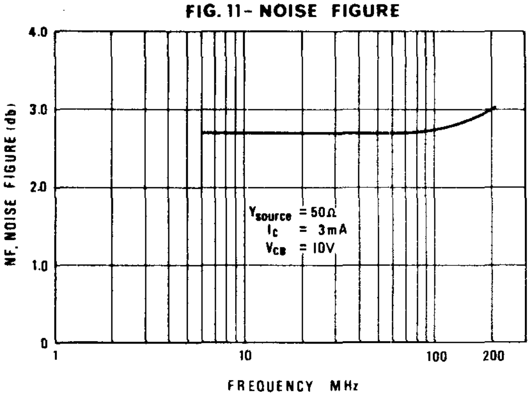


FIG. 12- COLLECTOR-BASE TIME CONSTANT

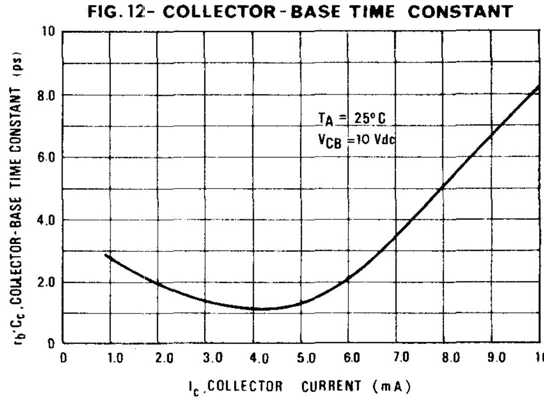


FIG.13- CURRENT GAIN BANDWIDTH PRODUCT

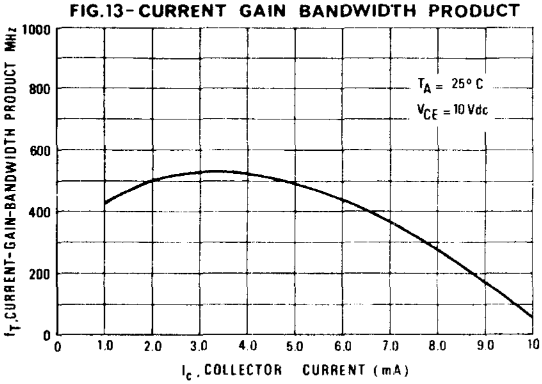


FIG.14- 100 MHz & 200 MHz COMMON BASE AMPLIFIER