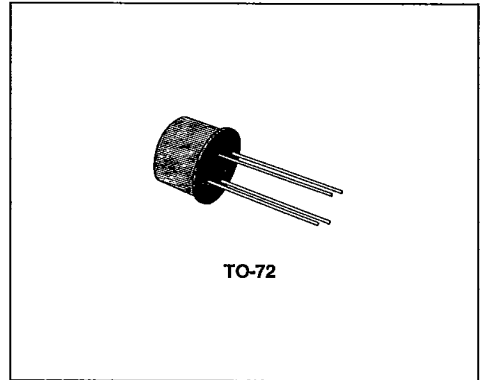


## WIDE BAND VHF/UHF AMPLIFIER

- SILICON PLANAR EPITAXIAL TRANSISTORS
- TO-72 METAL CASE
- VERY LOW NOISE

### APPLICATIONS :

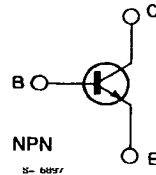
- TELECOMMUNICATIONS
- WIDE BAND UHF AMPLIFIER
- RADIO COMMUNICATIONS



### DESCRIPTION

The BFX89 and BFY90 are silicon planar epitaxial NPN transistors produced using interdigitated base emitter geometry. They are particularly designed for use in wide band common-emitter linear amplifiers up to 1 GHz. They feature very high  $f_T$ , low reverse capacitance, excellent cross modulation properties and very low noise performance. The BFY90 is complementary to the BFR99A. Typical applications include telecommunication and radio communication equipment.

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )	30	V
$V_{CER}$	Collector-emitter Voltage ( $R_{BE} \leq 50 \Omega$ )	30	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )	15	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )	2.5	V
$I_C$	Collector Current	25	mA
$I_{CM}$	Collector Peak Current ( $f \geq 1$ MHz)	50	mA
$P_{tot}$	Total Power Dissipation at $T_{amb} \leq 25^\circ C$	200	mW
$T_{stg}, T_j$	Storage and Junction Temperature	- 65 to 200	$^\circ C$

**THERMAL DATA**

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	580	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	880	°C/W

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ °C}$  unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	$V_{CB} = 15\text{ V}$			10	nA
$V_{CEK}^*$	Collector-emitter Knee Voltage	$I_C = 20\text{ mA}$			0.75	V
$h_{FE}$	DC Current Gain	$I_C = 2\text{ mA}$ $V_{CE} = 1\text{ V}$ for <b>BFX89</b> $I_C = 25\text{ mA}$ $V_{CE} = 1\text{ V}$ for <b>BFY90</b>	20 25 20		150 150 125	
$f_T$	Transition Frequency	$V_{CE} = 5\text{ V}$ $f = 500\text{ MHz}$ $I_C = 2\text{ mA}$  $I_C = 25\text{ mA}$ for <b>BFX89</b> for <b>BFY90</b>  for <b>BFX89</b> for <b>BFY90</b>	1 1.3	1 1.1 1.2 1.4		GHz GHz GHz GHz
$C_{CBO}^{(1)}$	Collector-base Capacitance	$I_E = 0$ $V_{CB} = 10\text{ V}$ $f = 1\text{ MHz}$ for <b>BFX89</b> for <b>BFY90</b>			1.7 1.5	pF pF
$C_{re}^{(2)}$	Reverse Capacitance	$I_C = 2\text{ mA}$ $V_{CE} = 5\text{ V}$ $f = 1\text{ MHz}$ for <b>BFX89</b> for <b>BFY90</b>		0.6 0.6	0.8	pF pF
$NF^{(2)}$	Noise Figure	$I_C = 2\text{ mA}$ $V_{CE} = 5\text{ V}$ $R_g = \text{Optimized}$ $f = 100\text{ kHz}$ for <b>BFY90</b> Only $f = 200\text{ MHz}$  $R_g = \text{Optimized}$ for <b>BFX89</b> for <b>BFY90</b> $f = 500\text{ MHz}$  $R_g = 50\ \Omega$ for <b>BFX89</b> for <b>BFY90</b> $f = 800\text{ MHz}$  $R_g = \text{Optimized}$ for <b>BFX89</b> for <b>BFY90</b> $f = 800\text{ MHz}$		3.3 2.5	4 4 3.5 6.5 5	dB dB dB dB dB
$G_{pe}^{(2)}$	Power Gain (not neutralized)	for <b>BFX89</b> $I_C = 8\text{ mA}$ $V_{CE} = 10\text{ V}$ $f = 200\text{ MHz}$ $f = 800\text{ MHz}$  for <b>BFY90</b> $I_C = 14\text{ mA}$ $V_{CE} = 10\text{ V}$ $f = 200\text{ MHz}$ $f = 800\text{ MHz}$	19 21	22 7 23 8		dB dB dB dB

\*  $I_B$  = value for which  $I_C = 22\text{ mA}$  at  $V_{CE} = 1\text{ V}$

(1) Shield lead not grounded

(2) Shield lead grounded

(3)  $f_p = 202\text{ MHz}$ ,  $f_q = 205\text{ MHz}$ ,  $f_{(2q,p)} = 208\text{ MHz}$

(4)  $f_p = 798\text{ MHz}$ ,  $f_q = 802\text{ MHz}$ ,  $f_{(2q,p)} = 806\text{ MHz}$

SGS-THOMSON

T-31-15

ELECTRICAL CHARACTERISTICS (continued)

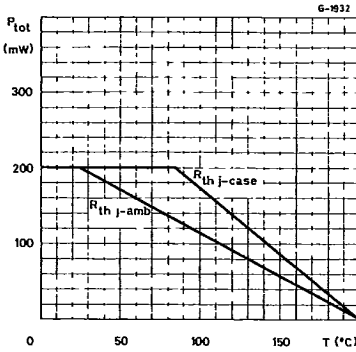
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
P <sub>o</sub>	Output Power	for <b>BFX89</b> I <sub>C</sub> = 8 mA      V <sub>CE</sub> = 10 V d <sub>m</sub> = -30 dB (3) Channel 9 (4) Channel 62		6		mW
		for <b>BFY90</b> I <sub>C</sub> = 14 mA      V <sub>CE</sub> = 10 V d <sub>m</sub> = -30 dB (3) Channel 9 (4) Channel 62	10	12	12	mW

\* I<sub>b</sub> = value for which I<sub>C</sub> = 22 mA at V<sub>CE</sub> = 1 V

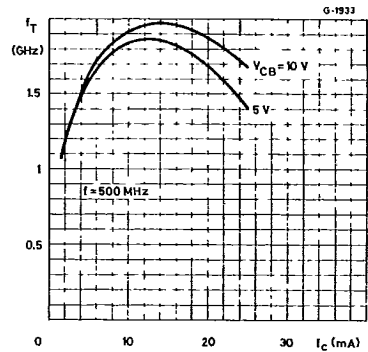
- (1) Shield lead not grounded
- (2) Shield lead grounded

- (3) f<sub>p</sub> = 202 MHz, f<sub>q</sub> = 205 MHz, f<sub>2qP</sub> = 208 MHz
- (4) f<sub>p</sub> = 798 MHz, f<sub>q</sub> = 802 MHz, f<sub>2qP</sub> = 806 MHz

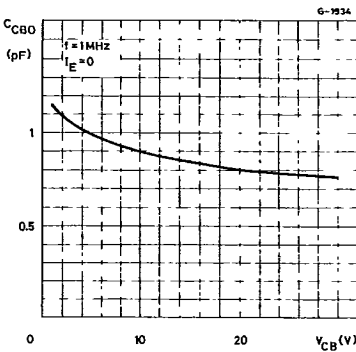
Power Rating Chart.



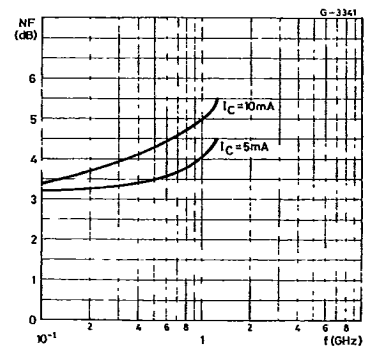
Transition Frequency.



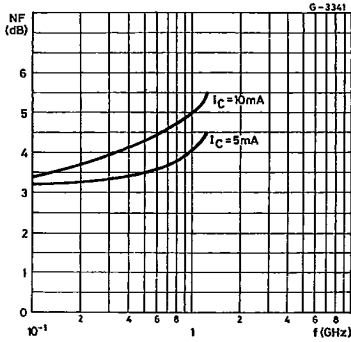
Collector-base Capacitance.



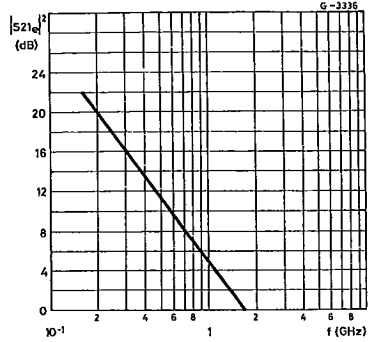
Noise Figure vs. Collector Current.



Noise Figure vs. Frequency.



Forward Transmission Gain vs. Frequency.



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