SGS-THOMSON
MICROELECTRONICS

S G S-THOMSON

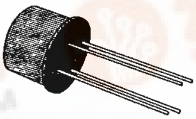
BFX89
BFY90

WIDE BAND VHF/UHF AMPLIFIER

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

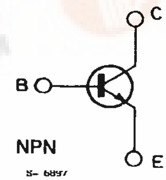
APPLICATIONS :

- TELECOMMUNICATIONS
- WIDE BAND UHF AMPLIFIER
- RADIO COMMUNICATIONS



TO-72

INTERNAL SCHEMATIC DIAGRAM



DESCRIPTION

The BFX89 and BFY90 are silicon planar epitaxial NPN transistors produced using interdigitated base emitter geometry. They are particulary 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.

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 $T_{amb} \leq 25$ °C	200	mW
T_{stg}, T_j	Storage and Junction Temperature	– 65 to 200	°C

THERMAL DATA

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

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C unless otherwise specified)

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

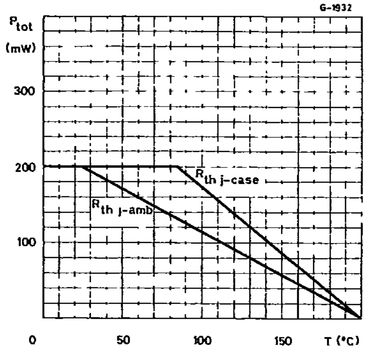
* I_B = value for which I_C = 22 mA at V_{CE} = 1 V
(1) Shield lead not grounded
(2) Shield lead grounded
(3) f_p = 202 MHz, f_q = 205 MHz, $f_{(2q\text{-}p)}$ = 208 MHz
(4) f_p = 798 MHz, f_q = 802 MHz, $f_{(2q\text{-}p)}$ = 806 MHz

ELECTRICAL CHARACTERISTICS (continued)

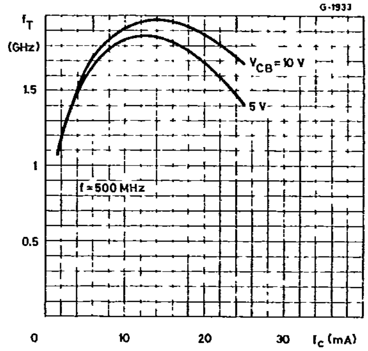
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
P_o	Output Power	for **BFX89** I_C = 8 mA V_{CE} = 10 V d_{im} = − 30 dB (3) Channel 9 (4) Channel 62		 6 6		 mW mW
		for **BFY90** I_C = 14 mA V_{CE} = 10 V d_m = − 30 dB (3) Channel 9 (4) Channel 62	 10	 12 12		 mW mW

* I_B = value for witch I_C = 22 mA at V_{CE} = 1 V
(1) Shield lead not grounded
(2) Shield lead grounded
(3) f_p = 202 MHz, f_q = 205 MHz, f_{2q-p} = 208 MHz
(4) f_p = 798 MHz, f_q = 802 MHz, f_{2q-p} = 806 MHz

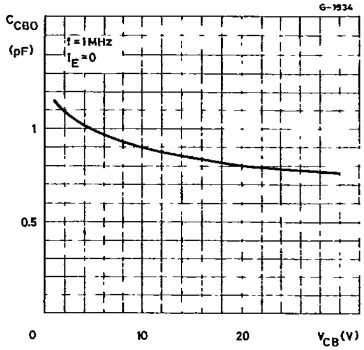
Power Rating Chart.



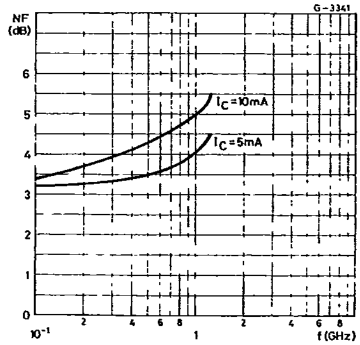
Transition Frequency.



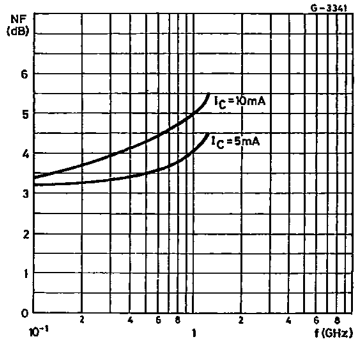
Collector-base Capacitance.



Noise Figure vs. Collector Current.



Noise Figure vs. Frequency.



Forward Transmission Gain vs. Frequency.