SGS-THOMSON MICROELECTRONICS

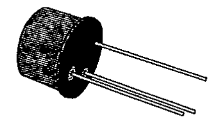
BFR36

S G S-THOMSON

CATV ULTRA-LINEAR HIGH GAIN TRANSISTOR

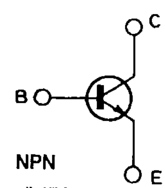
DESCRIPTION

The BFR36 is a multi-emitter silicon planar epitaxial NPN transistor in Jedec TO-39 metal case. It is designed for CATV-MATV amplifier applications over a wide frequency range (40 to 860MHz). The device features very good intermodulation properties, very low reverse capacitance, high power gain and high power dissipation.



TO-39

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector–base Voltage ($I_E = 0$)	40	V
V_{CEO}	Collector–Emitter Voltage ($I_B = 0$)	30	V
V_{EBO}	Emitter–base Voltage ($I_C = 0$)	3	V
I_C	Collector Current	200	mA
I_{CM}	Collector Peak Current	400	mA
P_{tot}	Total Power Dissipation at $T_{amb} \leq 40$ °C at $T_{case} \leq 50$ °C	0.8 5	W W
T_{stg}, T_j	Storage and Junction Temperature	– 55 to 200	°C

THERMAL DATA

$R_{th\ j-case}$	Thermal Resistance Junction–case	Max	30	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction–ambient	Max	200	°C/W

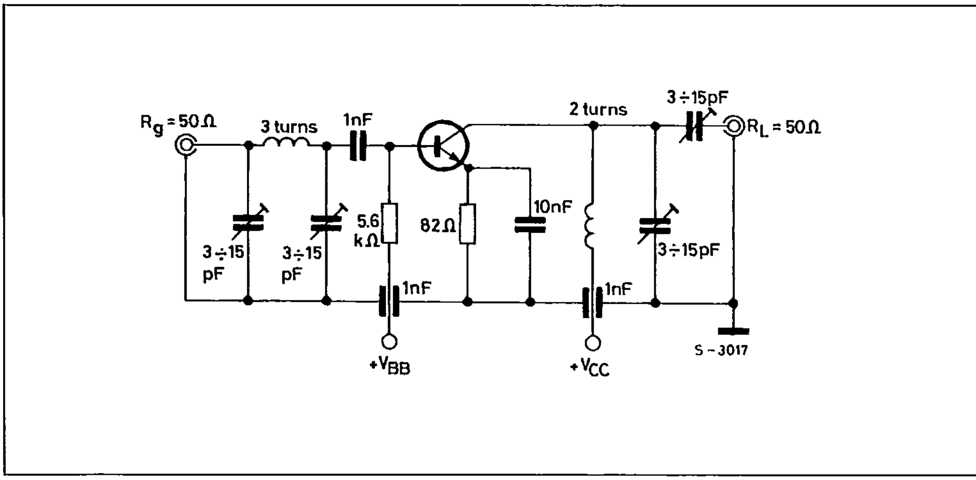
ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	V_{CB} = 20 V V_{CB} = 20 V T_{amb} = 150 °C			150 20	nA µA
$V_{(BR)CBO}$	Collector–base Breakdown Voltage (I_E = 0)	I_C = 100 µA	40			V
$V_{CEO(sus)}$*	Collector–emitter Sustaining Voltage (I_B = 0)	I_C = 10 mA	30			V
$V_{(BR)EBO}$	Emitter–base Breakdown Voltage (I_C = 0)	I_E = 100 µA	3			V
V_{CEK}**	Collector–emitter Knee Voltage	I_C = 100 mA		700	750	mV
V_{BE}	Base–emitter Voltage	I_C = 70 mA V_{CE} = 5 V		750		mV
h_{FE}*	DC Current Gain	I_C = 70 mA V_{CE} = 5 V I_C = 150 mA V_{CE} = 5 V I_C = 70 mA V_{CE} = 15 V I_C = 150 mA V_{CE} = 15 V	60 60 65 65	130		
f_T	Transition Frequency	V_{CE} = 15 V f = 100 MHz I_C = 70 mA I_C = 150 mA	1	1.4 1.2		GHz GHz
C_{EBO}	Emitter–base Capacitance	I_C = 0 V_{EB} = 0.4 V f = 1 MHz		7		pF
C_{CBO}	Collector–base Capacitance	I_E = 0 V_{CB} = 15 V f = 1 MHz			3	pF
C_{re}	Reverse Capacitance	I_C = 0 V_{CE} = 15 V f = 1 MHz		1.7	2.2	pF
NF	Noise Figure	V_{CE} = 15 V R_g = 50 Ω f = 200 MHz I_C = 30 mA I_C = 70 mA		4 4.5		dB dB
G_{pe}	Power Gain (see test circuit)	I_C = 70 mA V_{CE} = 18 V f = 200 MHz f = 500 MHz f = 800 MHz		16 9.5 6.5		dB dB dB
P_o (1)	Output Power (see test circuit)	I_C = 70 mA V_{CE} = 18 V f = 200 MHz f = 800 MHz	130 70	150 90		mW mW

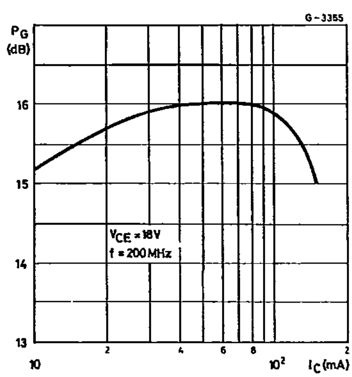
* Pulsed : pulse duration = 300µs, duty cycle = 1%.
** I_B = Value corresponding to I_C = 110mA and V_{CE} = 1V.
(1) Output VSMR < 2, d_{im} = – 30dB @ f = 2 (f_q – f_p), f_p = 798MHz and f_q = 802MHz.

TEST CIRCUIT

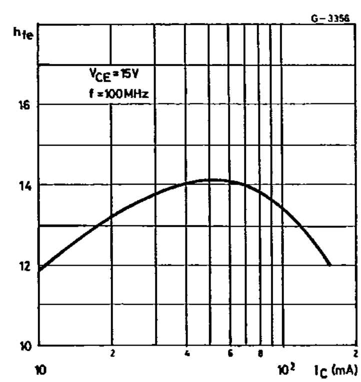
RF amplifier circuit for power gain test (f = 200MHz).



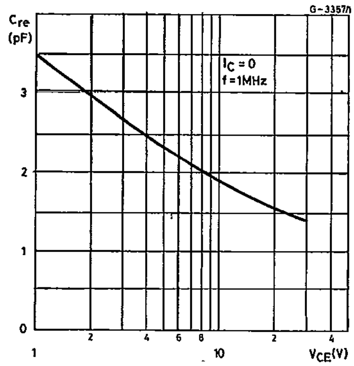
Power Gain vs. Collector Current.



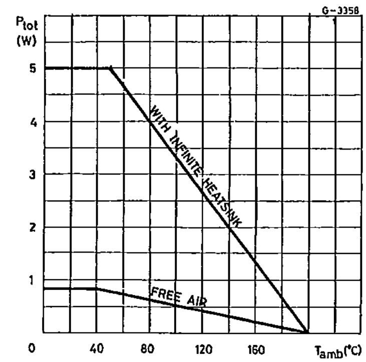
High Frequency Current Gain vs. Collector Current.



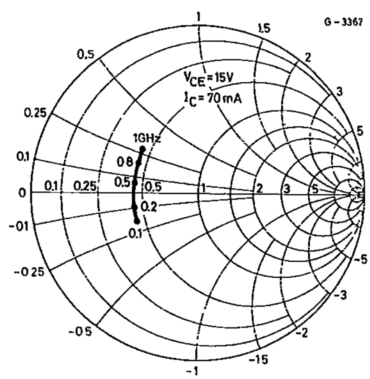
Reverse Capitance.



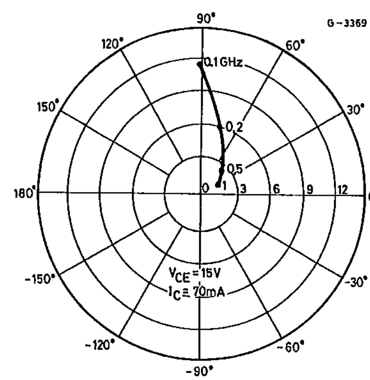
Power Rating Chart.



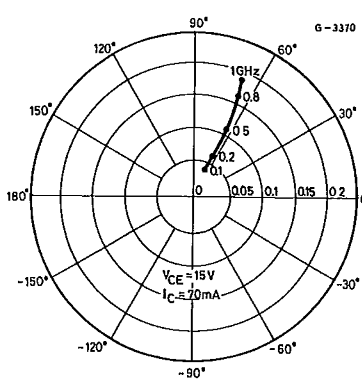
Input Impedance S_{11e} (normalized 50Ω).



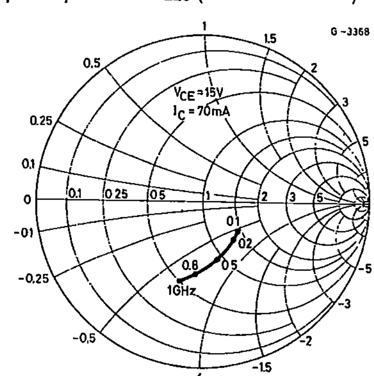
Forward Transfer Coefficient S_{21e}.



Reverse Transfer Coefficient S_{12e}.

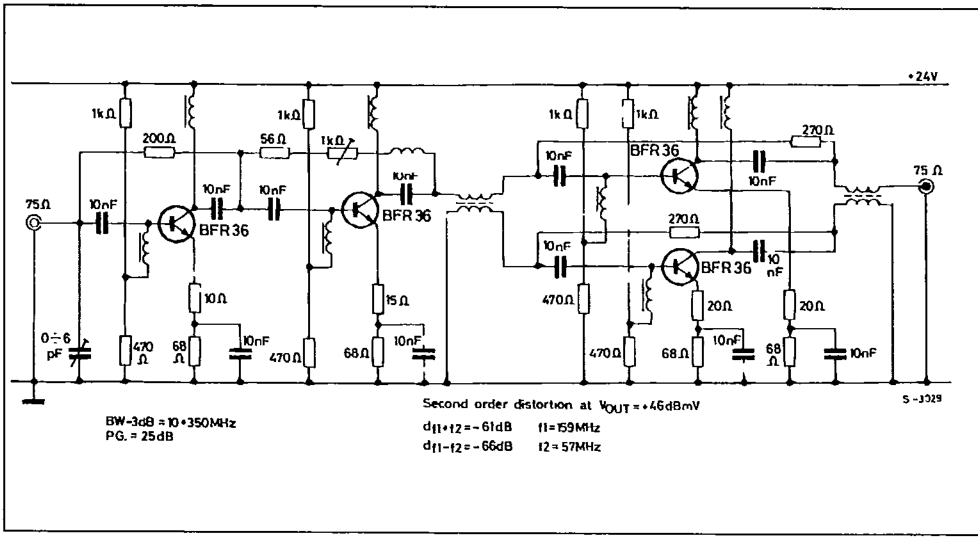


Output Impedance S_{22e} (normalized 50Ω).



TYPICAL APPLICATIONS

CATV-extender line amplifier.



MATV-200MHz channel amplifier.