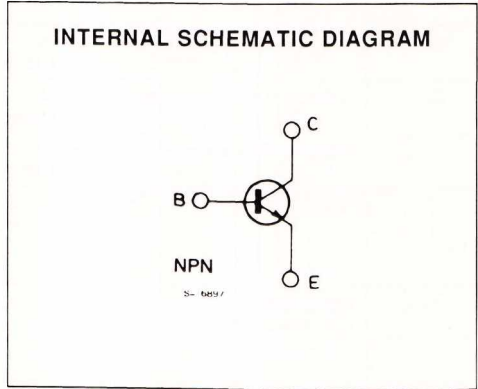
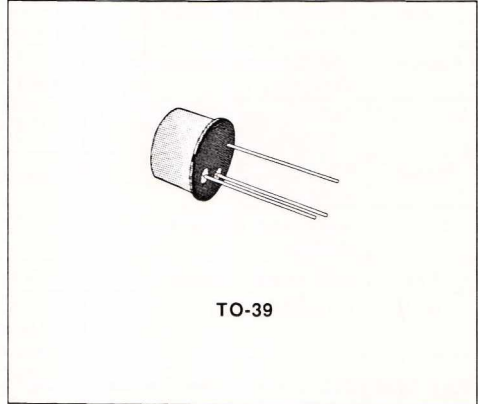




**CATV ULTRA-LINEAR HIGH GAIN TRANSISTOR**

**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.



**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 $T_{amb} \leq 40\text{ }^\circ\text{C}$ at $T_{case} \leq 50\text{ }^\circ\text{C}$	0.8	W
		5	W
$T_{stg}, T_j$	Storage and Junction Temperature	- 55 to 200	$^\circ\text{C}$

## THERMAL DATA

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

ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\ ^{\circ}C$  unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	$V_{CB} = 20\ V$ $V_{CB} = 20\ V$	$T_{amb} = 150\ ^{\circ}C$			150 20	nA $\mu A$
$V_{(BR)CBO}$	Collector–base Breakdown Voltage ( $I_E = 0$ )	$I_C = 100\ \mu A$		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 ( $I_C = 0$ )	$I_E = 100\ \mu A$		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	$I_C = 70\ mA$ $I_C = 150\ mA$ $I_C = 70\ mA$ $I_C = 150\ mA$	$V_{CE} = 5\ V$ $V_{CE} = 5\ V$ $V_{CE} = 15\ V$ $V_{CE} = 15\ V$	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	$I_C = 0$ $f = 1\ MHz$	$V_{EB} = 0.4\ V$		7		pF
$C_{CBO}$	Collector–base Capacitance	$I_E = 0$ $f = 1\ MHz$	$V_{CB} = 15\ V$			3	pF
$C_{re}$	Reverse Capacitance	$I_C = 0$ $f = 1\ MHz$	$V_{CE} = 15\ V$		1.7	2.2	pF
NF	Noise Figure	$V_{CE} = 15\ V$ $f = 200\ MHz$	$R_g = 50\ \Omega$ $I_C = 30\ mA$ $I_C = 70\ mA$		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

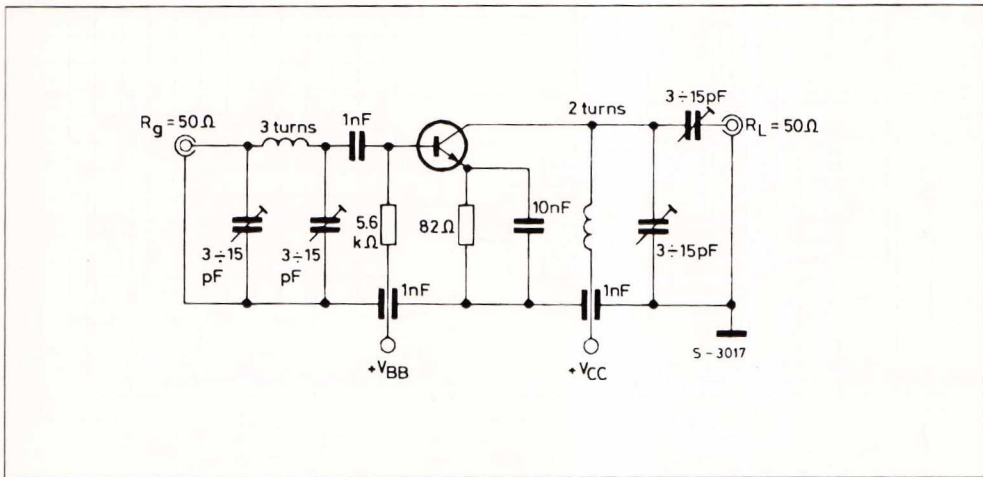
\* Pulsed : pulse duration = 300 $\mu s$ , duty cycle = 1%.

\*\*  $I_B$  = Value corresponding to  $I_C = 110\ mA$  and  $V_{CE} = 1\ V$ .

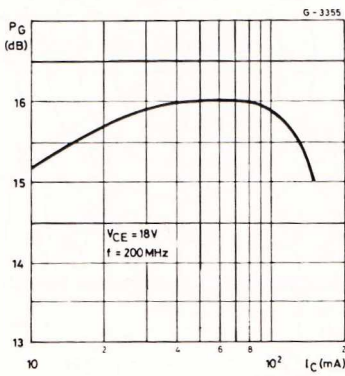
(1) Output VSMR < 2,  $d_m = -30\ dB$  @  $f = 2 (f_q - f_p)$ ,  $f_p = 798\ MHz$  and  $f_q = 802\ MHz$ .

TEST CIRCUIT

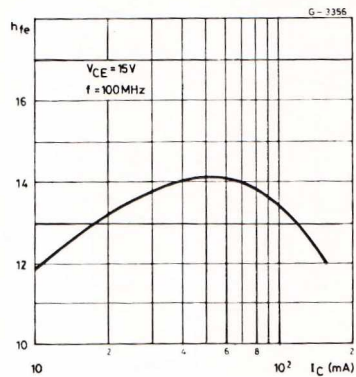
RF amplifier circuit for power gain test ( $f = 200\text{MHz}$ ).



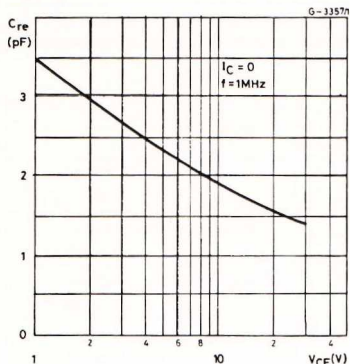
Power Gain vs. Collector Current.



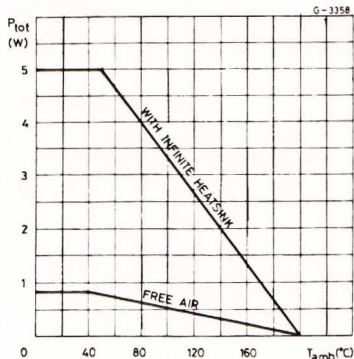
High Frequency Current Gain vs. Collector Current.



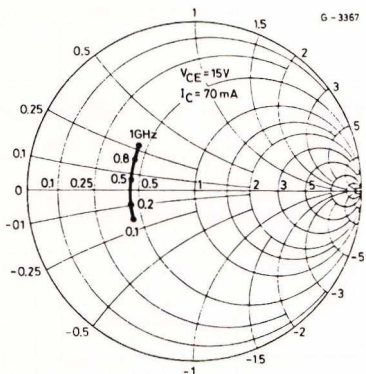
Reverse Capacitance.



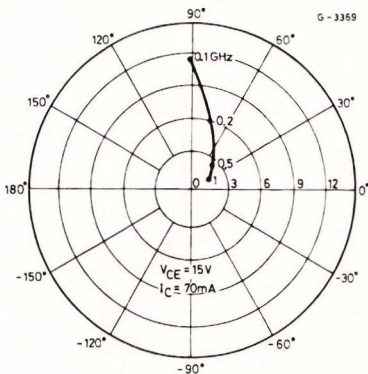
Power Rating Chart.



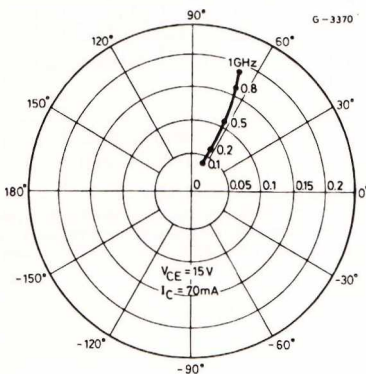
Input Impedance  $S_{11e}$  (normalized 50Ω).



Forward Transfer Coefficient  $S_{21e}$ .



Reverse Transfer Coefficient  $S_{12e}$ .



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

