SGS-THOMSON MICROELECTRONICS

S G S-THOMSON

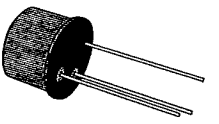
# BFW16A BFW17A

## CATV-MATV AMPLIFIERS

### DESCRIPTION

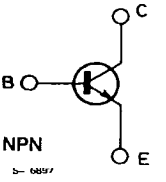
The BFW 16A and BFW 17A are multi-emitter silicon planar epitaxial NPN transistors in Jedec TO-39 metal case, with extremely good intermodulation properties and high power gain. They are primarily intended for final and driver stages in channel-and band-aerial amplifiers with high output power from 40 to 860 MHz.

Another possible application is as the final stage of the wide band vertical amplifier in high speed oscilloscopes.



TO-39

### INTERNAL SCHEMATIC DIAGRAM




### ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-base Voltage ($I_E = 0$) | 40 | V |
| $V_{CER}$ | Collector-emitter Voltage ($R_{BE} \leq 50\ \Omega$) | 40 | V |
| $V_{CEO}$ | Collector-emitter Voltage ($I_B = 0$) | 25 | V |
| $V_{EBO}$ | Emitter-base Voltage ($I_C = 0$) | 3 | V |
| $I_C$ | Collector Current | 150 | mA |
| $I_{CM}$ | Collector Peak Current | 300 | mA |
| $P_{tot}$ | Total Power Dissipation at $T_{amb} \leq 25$ °C<br>at $T_{case} \leq 125$ °C | 0.7<br>1.5 | W<br>W |
| $T_{stg}$, $T_j$ | Storage and Junction Temperature | – 65 to 200 | °C |

## THERMAL DATA

| | | | | |
|---|---|---|---|---|
| $R_{th\ j\text{-}case}$ | Thermal Resistance Junction-case | Max | 50 | °C/W |
| $R_{th\ j\text{-}amb}$ | Thermal Resistance Junction-ambient | Max | 250 | °C/W |

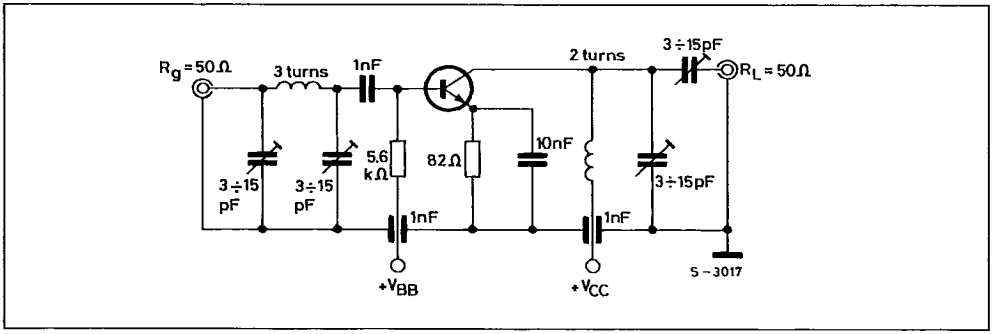
## ELECTRICAL CHARACTERISTICS ($T_{amb}$ = 25 °C unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{CBO}$ | Collector Cutoff Current ($I_E$ = 0) | $V_{CB}$ = 20 V $T_{amb}$ = 150 °C | | | 20 | µA |
| $V_{(BR)EBO}$ | Emitter-base Breakdown Voltage ($I_C$ = 0) | $I_E$ = 100 µA | 3 | | | V |
| $V_{CEK}$*/** | Collector-emitter Knee Voltage | $I_C$ = 100 mA | | | 0.75 | V |
| $h_{FE}$* | DC Current Gain | $I_C$ = 50 mA $V_{CE}$ = 5 V<br>$I_C$ = 150 mA $V_{CE}$ = 5 V | 25<br>25 | | | |
| $f_T$ | Transition Frequency | $I_C$ = 150 mA $V_{CE}$ = 15 V<br>f = 500 MHz<br>for **BFW 16A**<br>for **BFW 17A** | | <br><br>1.2<br>1.1 | | <br><br>GHz<br>GHz |
| $C_{CBO}$ | Collector-base Capacitance | $I_E$ = 0 $V_{CB}$ = 15 V<br>f = 1 MHz | | | 4 | pF |
| $C_{re}$ | Reverse Capacitance | $I_C$ = 10 mA $V_{CE}$ = 15 V<br>f = 1 MHz | | 1.7 | | pF |
| NF | Noise Figure<br>(for **BFW 16A** only) | $I_C$ = 30 mA $V_{CE}$ = 15 V<br>$R_g$ = 75 Ω f = 200 MHz | | | 6 | dB |
| $G_{pe}$ | Power Gain (not neutralized) | $I_C$ = 70 mA $V_{CE}$ = 18 V<br>f = 200 MHz<br>for **BFW 16A** and **BFW 17A**<br>f = 800 MHz<br>For **BFW 16A** only | | <br><br>16<br><br>6.5 | | <br><br>dB<br><br>dB |
| $P_0$ | Output Power | $I_C$ = 70 mA $V_{CE}$ = 18 V<br>Channel 9(1)<br>for **BFW 16A**<br>for **BFW 17A**<br>Channel 62(2)<br>For **BFW 16A** only | <br><br>130<br><br>70 | <br><br>150<br>150<br><br>90 | | <br><br>mW<br>mW<br><br>mW |

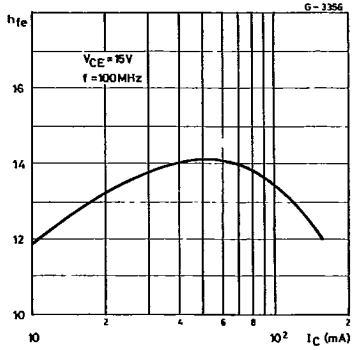
* Pulsed : pulse duration = 300 µs, duty cycle = 1 %.
** $I_B$ = value for which $I_C$ = 110 mA at $V_{CE}$ = 1V.
(1) $f_p$ = 202 MHz, $f_q$ = 205 MHz, $f_{(2q-p)}$ = 208 MHz.
(2) $f_p$ = 798 MHz, $f_q$ = 802 MHz, $f_{(2q-p)}$ = 806 MHz.

## TEST CIRCUIT

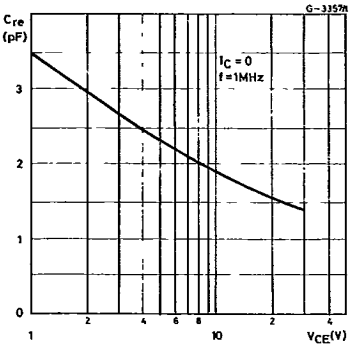
Test Circuit for Power Gain and Output Power Measurements (f = 200 MHz).



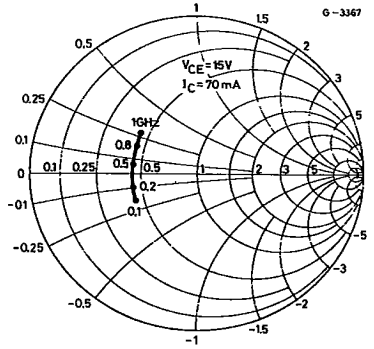

High Frequency Current Gain.



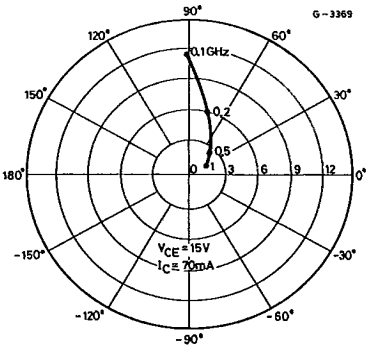

Reverse Capacitance.



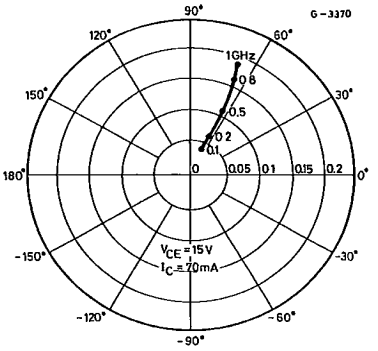

Input Impedance $S_{11e}$ (normalized 50 Ω).




Forward Transfer Coefficient $S_{21e}$.



Reverse Transfer Coefficient $S_{12e}$.




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