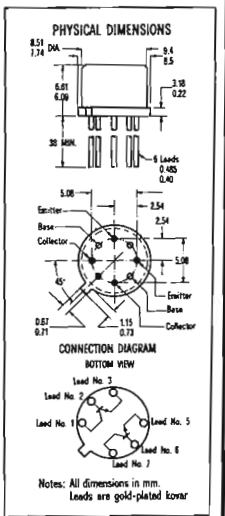
# BFY 84

## DUAL, ULTRA-HIGH FREQUENCY TYPE

### NPN DIFFUSED SILICON PLANAR EPITAXIAL TRANSISTORS

GENERAL DESCRIPTION - The BFY84 is a six terminal device containing two isolated ultra high frequency NPN double diffused silicon PLANAR transistors. The SGS-ATES planar process guarantees the stability of the initial match with time. The good thermal tracking over a wide current and temperature range, offers the circuit designer matched transistors with specified performance for differential amplifiers and operational amplifiers.




**ABSOLUTE MAXIMUM RATINGS** (Note 1)

**Maximum Temperatures**

| | |
|---|---|
| Storage Temperature | -65°C to + 200°C |
| Operating Junction Temperature | 200°C Maximum |
| Lead Temperature (Soldering, No Time Limit) | 300°C Maximum |

| **Maximum Power Dissipations** | One Side Only | Both Sides |
|---|---|---|
| Total Dissipation at 25°C Case Temperature (Note 2) | 0.6 Watt | 0.98 Watt |
| at 100°C Case Temperature (Note 2) | 0.34 Watt | 0.56 Watt |
| at 25°C Ambient Temperature (Note 2) | 0.3 Watt | 0.38 Watt |

**Maximum Voltages**

| | | |
|---|---|---|
| $BV_{CBO}$ | Collector to Base Voltage | 30 Volts |
| $LV_{CEO}$ | Collector to Emitter Voltage | 12 Volts |
| $BV_{EBO}$ | Emitter to Base Voltage | 3.0 Volts |

**ELECTRICAL CHARACTERISTICS** (25°C free air temperature unless otherwise noted)

| SYMBOL | CHARACTERISTIC | MIN. | MAX. | UNITS | TEST CONDITIONS |
|---|---|---|---|---|---|
| $h_{FE}$ | DC Current Gain | 20 | | | $I_C$ = 3.0 mA $V_{CE}$ = 1.0 V |
| $h_{FE1}/h_{FE2}$ | DC Current Gain Ratio | 0.8 | 1.0 | | $I_C$ = 3.0 mA $V_{CE}$ = 1.0 V |
| $V_{BE}$ (sat) | Base Saturation Voltage | | 1.0 | V | $I_C$ = 10 mA $I_B$ = 1.0 mA |
| $V_{CE}$ (sat) | Collector Saturation Voltage | | 0.4 | V | $I_C$ = 10 mA $I_B$ = 1.0 mA |
| $V_{BE1} - V_{BE2}$ | Base Emitter Voltage Differential | | 15 | mV | $I_C$ = 3.0 mA $V_{CE}$ = 1.0 V |
| $\Delta(V_{BE1}-V_{BE2})$ | Base Emitter Voltage Differential Change | | 25 | µV/°C | $I_C$ = 3.0 mA $V_{CE}$ = 1.0 V |
| $I_{CBO}$ | Collector Cutoff Current | | 10 | nA | $I_E$ = 0 $V_{CB}$ = 15 V |
| $I_{CBO}$ (150°C) | Collector Cutoff Current | | 1.0 | µA | $I_E$ = 0 $V_{CB}$ = 15 V |
| $BV_{CBO}$ | Collector to Base Breakdown Voltage | 30 | | V | $I_C$ = 1.0 µA $I_E$ = 0 |
| $BV_{EBO}$ | Emitter to Base Breakdown Voltage | 3.0 | | V | $I_C$ = 0 $I_E$ = 10 µA |
| $LV_{CEO}$ | Collector to Emitter Sustaining Voltage(Note 3) | 12 | | V | $I_C$ = 3.0 mA $I_B$ = 0 |
| $h_{fe}$ | High Frequency Current Gain (f = 100 Mc/s) | 6.0 | | | $I_C$ = 4.0 mA $V_{CE}$ = 10 V |
| $C_{ob}$ | Output Capacitance | | 3.0 | pF | $I_E$ = 0 $V_{CB}$ = 0 V |
| $C_{ob}$ | Output Capacitance | | 1.7 | pF | $I_E$ = 0 $V_{CB}$ = 10 V |
| $C_{TE}$ | Input Capacitance | | 2.0 | pF | $I_C$ = 0 $V_{EB}$ = 0.5 V |
| NF | Noise Figure (f = 60 Mc/s) | | 6.0 | db | $I_C$ = 1 mA $V_{CE}$ = 6.0 V |

NOTES:

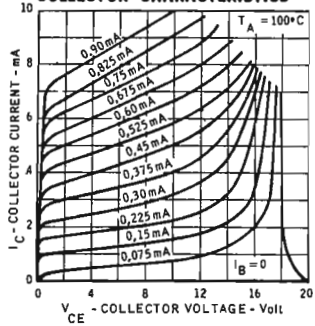
(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.

(2) These ratings give a maximum junction temperature of 200°C and junction-to-case thermal resistance of 290°C/Watt for one side and 145°C/Watt for both sides.

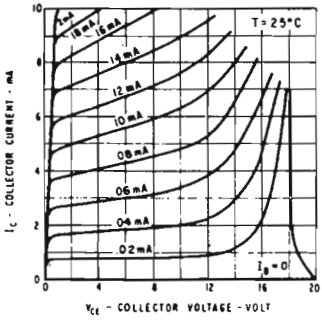
(3) Pulse Conditions: length = 300 µsec; duty cycle = 1%.

## TYPICAL ELECTRICAL CHARACTERISTICS

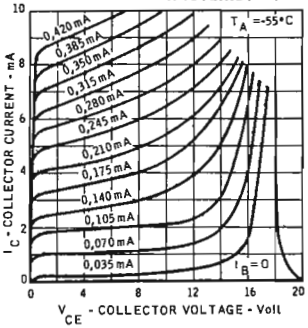
### COLLECTOR CHARACTERISTICS *



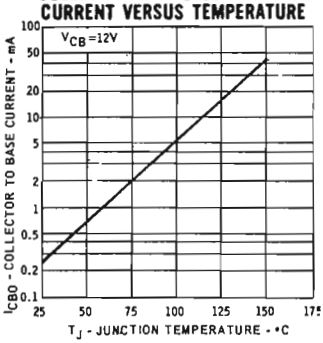

### COLLECTOR CHARACTERISTICS *



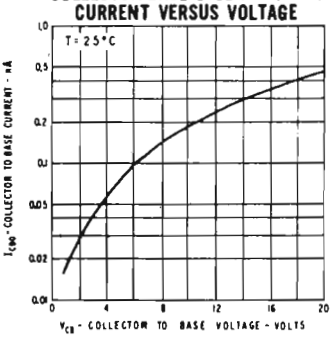

### COLLECTOR CHARACTERISTICS *



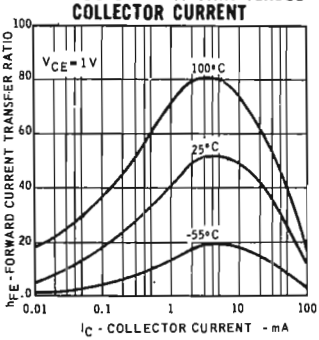

### COLLECTOR-BASE DIODE REVERSE CURRENT VERSUS TEMPERATURE



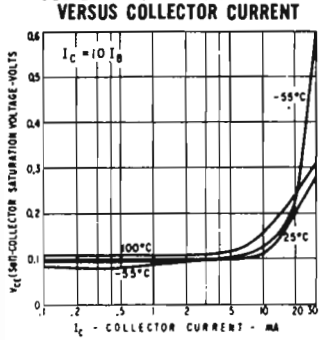

### COLLECTOR-BASE DIODE REVERSE CURRENT VERSUS VOLTAGE



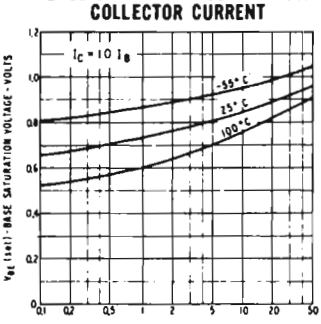

### PULSED DC CURRENT GAIN VERSUS COLLECTOR CURRENT



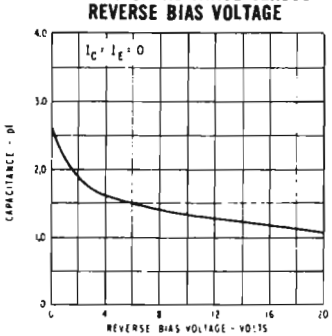

### COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT




### BASE SATURATION VOLTAGE VS. COLLECTOR CURRENT

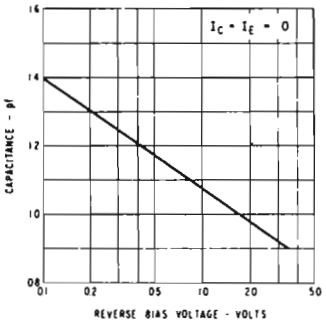



### OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE

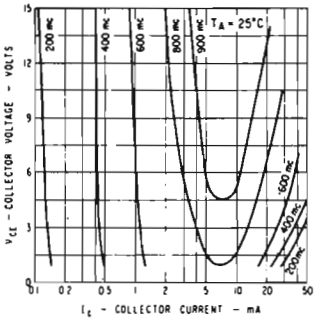



* Single family characteristics on Curve Tracer.

## INPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE




## CONTOURS OF CONSTANT GAIN BANDWIDTH PRODUCT ($f_T$)




## NOISE FIGURE VERSUS FREQUENCY