Low-level, low-noise amplifier

The BFY 76 is an NPN double-diffused silicon Planar transistor designed for use in high-performance, low-level, low-noise amplifier circuits from audio through high-frequency ranges.

ELECTRICAL CHARACTERISTICS
(T_A = 25° C unless otherwise noted)

Symbol	Characteristic and test conditions	Min.	Typ.	Max.	Unit
h_{FE}	DC Current Gain (5)				
	I_C = 10 μA V_{CE} = 5V	30	70	150	
	I_C = 100 μA V_{CE} = 5V		120		
	I_C = 1 mA V_{CE} = 5V	150	190	220	
	I_C = 5 mA V_{CE} = 5V		220		
$V_{BE\,on}$	Base-Emitter On Voltage				
	I_C = 100 μA V_{CE} = 5V	0.5	0.58	0.70	V
$V_{CE\,sat}$	Collector Saturation Voltage (5)				
	I_C = 1 mA I_B = 0.1 mA		0.15	0.35	V
I_{CES}	Collector Reverse Current				
	V_{CE} = 50V V_{EB} = 0		0.1	20	nA
	V_{CE} = 50V V_{EB} = 0 T_A = 150° C		0.1	20	μA
I_{EBO}	Emitter Reverse Current				
	V_{EB} = 5V I_C = 0		0.1	20	nA
BV_{CES}	Collector to Emitter Breakdown Voltage				
	I_C = 10 μA V_{EB} = 0	60			V
BV_{EBO}	Emitter to Base Breakdown Voltage				
	I_E = 10 μA I_C = 0	8			V
LV_{CEO}	Collector to Emitter Sustaining Voltage (4 and 5)				
	I_C = 10 μA I_B = 0	60			V
h_{fe}	Small Signal Current Gain (f = 1 kHz)				
	I_C = 1 mA V_{CE} = 5V	80	220	300	
h_{ie}	Input Resistance (f = 1 kHz)				
	I_C = 1 mA V_{CE} = 5V	1.5	8	15	kΩ
h_{oe}	Output Conductance (f = 1 kHz)				
	I_C = 1 mA V_{CE} = 5V		11	35	μmho
h_{re}	Voltage Feedback Ratio (f = 1 kHz)				
	I_C = 1 mA V_{CE} = 5V		3	8	$\times 10^{-4}$
h_{ib}	Input Resistance (f = 1 kHz)				
	I_C = 1 mA V_{CB} = 5V	25	27	32	Ω
h_{fe}	High Freq. Current Gain (f = 20 MHz)				
	I_C = 1 mA V_{CE} = 5V	3.5	5		
C_{TE}	Emitter Transition Capacitance				
	I_C = 0 V_{EB} = 0.5V		3.5	6	pF
C_{obo}	Base-Collector Capacitance				
	I_E = 0 V_{CB} = 5V		3.5	6	pF
NF	Wide Band Noise Figure (6)				
	I_C = 10 μA V_{CE} = 5V		1.9	4	dB
NF	Narrow Band Noise Figure				
	I_C = 10 μA V_{CE} = 5V (7)		1.5	4	dB
	I_C = 10 μA V_{CE} = 5V (8)		4	15	dB

NOTES:
(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
(2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
(3) These ratings give a maximum junction temperature of 200° C and junction-to-case thermal resistance of 146° C/W (derating factor of 6.9 mW/° C); junction-to-ambient thermal resistance of 486° C/W (derating factor of 2.1 mW/° C).
(4) These ratings refer to a high-current point where collector-to-emitter voltage is lowest. For more information send for SGS AR 5.
(5) Measured under pulse conditions: pulse length = 300 μsec; duty cycle = 1%.
(6) R_S = 10 kΩ; Power Bandwidth of 15.7 kHz with 3 dB points at 10 Hz and 10 kHz.
(7) f = 1 kHz; R_S=10 kΩ; Power Bandwidth of 200 Hz.
(8) f = 100 Hz; R_S = 10 kΩ; Power Bandwidth of 20 Hz.

ABSOLUTE MAXIMUM RATINGS (1)
(T_A = 25° C unless otherwise noted)

Voltages and Currents

Collector to Emitter Voltage (4)	V_{CEO}	60V
Collector to Emitter Voltage	V_{CES}	60V
Emitter to Base Voltage	V_{EBO}	8V
DC Collector Current	I_C	50 mA

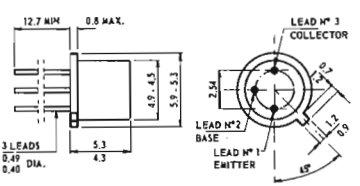
Temperatures

Storage Temperature	T_{STG}	- 55° C to 200° C
Junction Temperature	T_J	200° C
Lead Temperature (Soldering, 10 sec.)	T_L	260° C

Power (2-3)

Dissipation at 25° C Case Temperature	P_D	1.2W
Dissipation at 25° C Ambient Temperature	P_D	0.36W

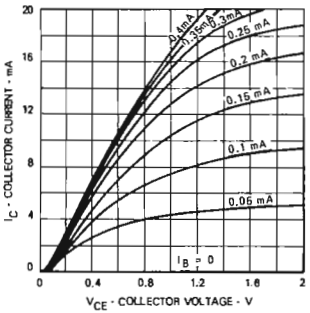
PHYSICAL DIMENSIONS
in accordance with
JEDEC TO-18 out-line



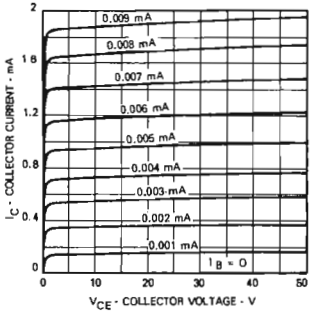
Notes: All dimensions in mm.
Collector internally connected to case.
Leads are gold-plated Kovar.

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

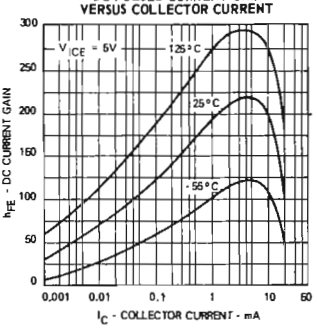
COLLECTOR CHARACTERISTICS *



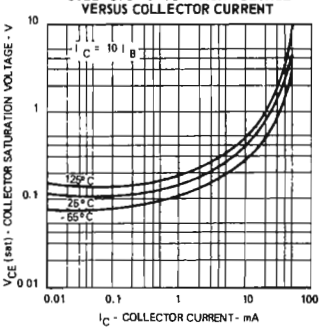
COLLECTOR CHARACTERISTICS *



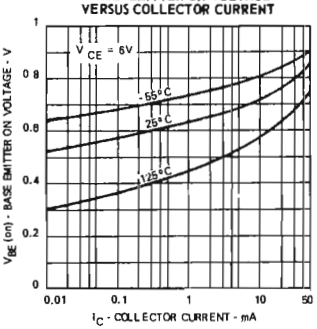
DC PULSED CURRENT GAIN VERSUS COLLECTOR CURRENT



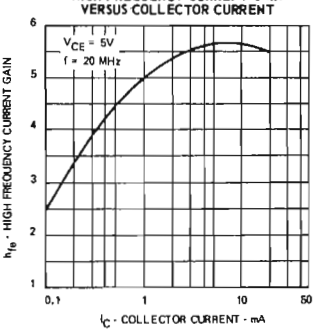
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



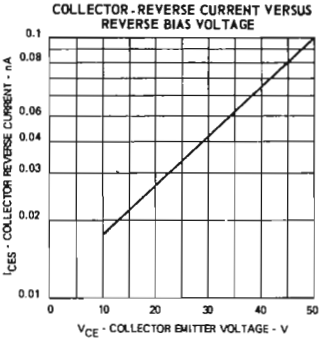
BASE-EMITTER ON VOLTAGE VERSUS COLLECTOR CURRENT



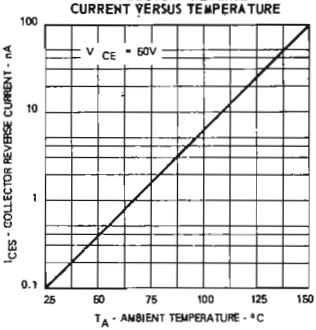
HIGH FREQUENCY CURRENT GAIN VERSUS COLLECTOR CURRENT



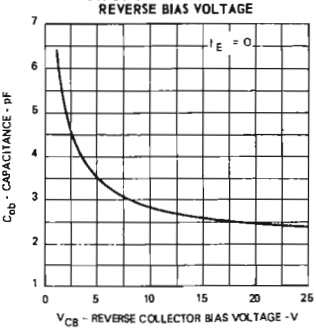
COLLECTOR-REVERSE CURRENT VERSUS REVERSE BIAS VOLTAGE



COLLECTOR - REVERSE CURRENT VERSUS TEMPERATURE



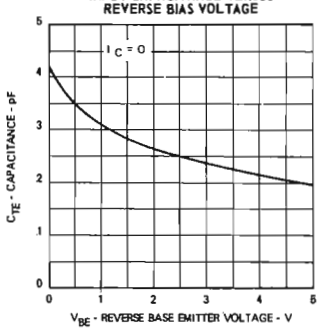
OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



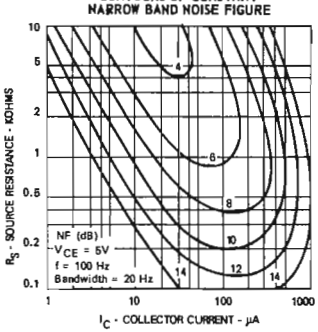
* Single family characteristics on Transistor Curve Tracer.

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

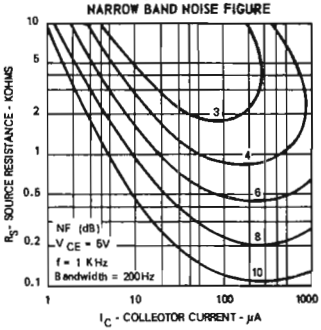
INPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



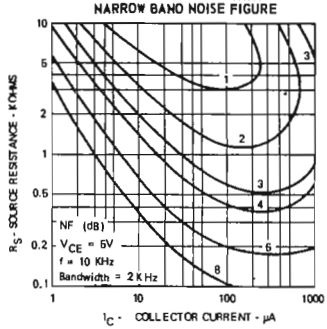
CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



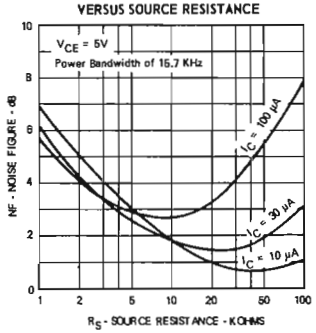
CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



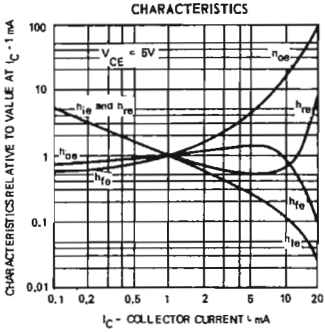
CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



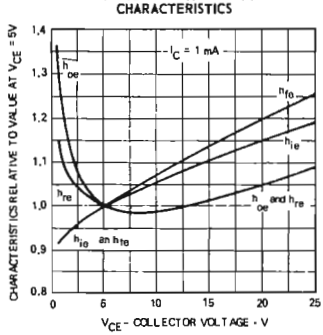
WIDE BAND NOISE FIGURE VERSUS SOURCE RESISTANCE



TYPICAL COMMON EMITTER CHARACTERISTICS



TYPICAL COMMON EMITTER CHARACTERISTICS



NOISE FIGURE VERSUS FREQUENCY