BF 173

SILICON PLANAR NPN

VIDEO IF AMPLIFIER

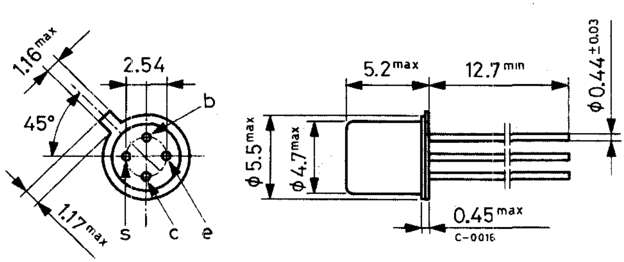
The BF 173 is a silicon planar epitaxial NPN transistor in a Jedec TO-72 metal case with a very low feedback capacitance. This transistor is intended for use in video IF amplifiers, particularly for the output stage.

ABSOLUTE MAXIMUM RATINGS

V_{CBO}	Collector-base voltage ($I_E = 0$)	40	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	25	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	4	V
I_C	Collector current	25	mA
P_{tot}	Total power dissipation at $T_{amb} \leq 25\,°C$	175	mW
	at $T_{case} \leq 25\,°C$	230	mW
T_{stg}	Storage temperature	-55 to 175	°C
T_j	Junction temperature	175	°C

MECHANICAL DATA

Dimensions in mm



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THERMAL DATA

$R_{th\ j-amb}$	Thermal resistance junction-ambient	max	850	°C/W

ELECTRICAL CHARACTERISTICS (T$_{case}$ = 25 °C unless otherwise specified)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cutoff current (V_{BE} = 0)	V_{CE} = 20 V			20	nA
I_{EBO}	Emitter cutoff current (I_C = 0)	V_{EB} = 4 V			100	μA
$V_{(BR)\ CBO}$	Collector-base breakdown voltage (I_E = 0)	I_C = 100 μA	40			V
$V_{(BR)\ CEO}$	Collector-emitter breakdown voltage (I_B = 0)	I_C = 2 mA	25			V
V_{BE}	Base-emitter voltage	I_C = 7 mA V_{CE} = 10 V			0.9	V
f_T	Transition frequency	I_C = 5 mA V_{CE} = 10 V		1000		MHz
$-C_{re}$	Reverse capacitance	I_C = 5 mA V_{CE} = 10 V f = 0.5 MHz		0.23		pF
I_B	Base current	I_C = 7 mA V_{CE} = 10 V		61	185	μA
V_o*	Output voltage	I_C = 7.2 mA V_{CE} = 12 V f = 38.9 MHz	6	7.7		V
G_{tr}	Transducer power gain	I_C = 7.2 mA V_{CE} = 12 V f = 36.4 MHz		26		dB
g_{ie}	Input conductance	I_C = 7 mA V_{CE} = 10 V f = 35 MHz		3		mS
C_{ie}	Input capacitance	I_C = 7 mA V_{CE} = 10 V f = 35 MHz		22		pF

* Voltage across the detector load R_L = 2.7 kΩ for 30% syncronisation pulse compression

ELECTRICAL CHARACTERISTICS (continued)

	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$\|y_{re}\|$	Reverse transadmittance	I_C = 7 mA V_{CE} = 10 V f = 35 MHz		55		µS
φ_{re}	Phase angle of reverse transadmittance	I_C = 7 mA V_{CE} = 10 V f = 35 MHz		267°		—
$\|y_{fe}\|$	Forward transadmittance	I_C = 7 mA V_{CE} = 10 V f = 35 MHz		165		mS
φ_{fe}	Phase angle of forward transadmittance	I_C = 7 mA V_{CE} = 10 V f = 35 MHz		336°		—
g_{oe}	Output conductance	I_C = 7 mA V_{CE} = 10 V f = 35 MHz		65		µS
C_{oe}	Output capacitance	I_C = 7 mA V_{CE} = 10 V f = 35 MHz		1.9		pF
G_{UM}*	Maximum unilateralized power gain	I_C = 7 mA V_{CE} = 10 V f = 35 MHz		44.5		dB

$$* \; G_{UM} = 10 \log \frac{|y_{fe}|^2}{4\, g_{ie}\, g_{oe}}$$

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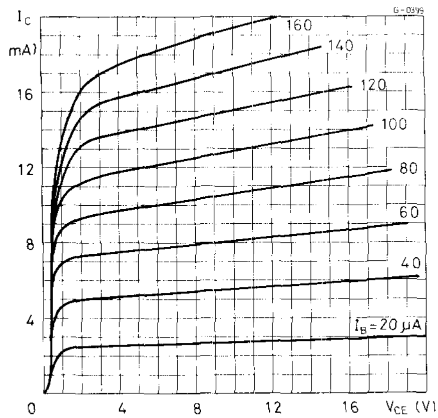
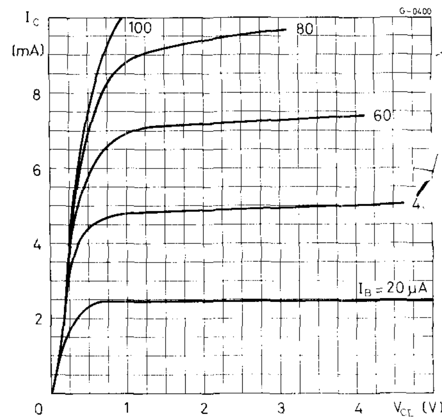
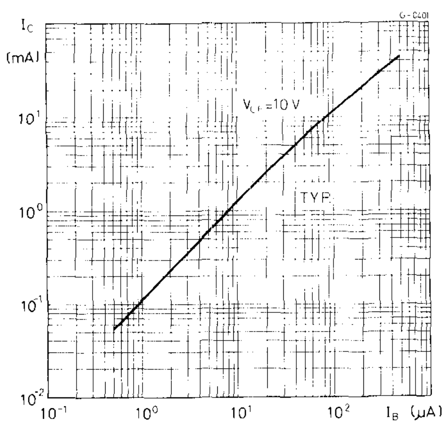
Typical output characteristics



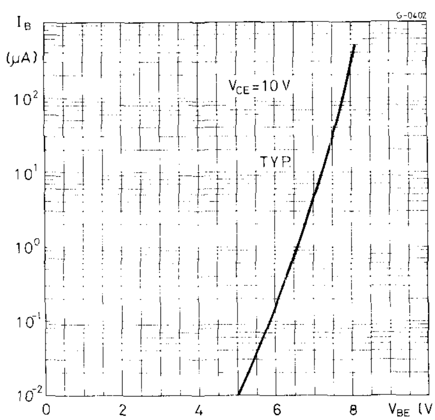
Typical output characteristics



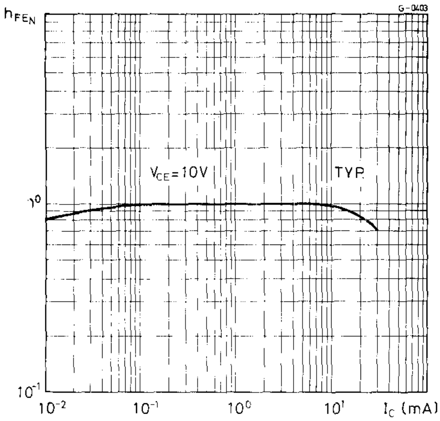
Collector characteristic



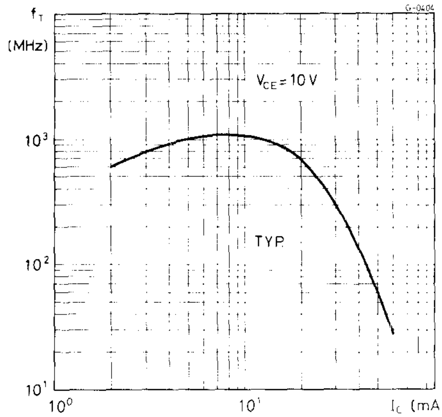
Input characteristic



DC normalized current gain

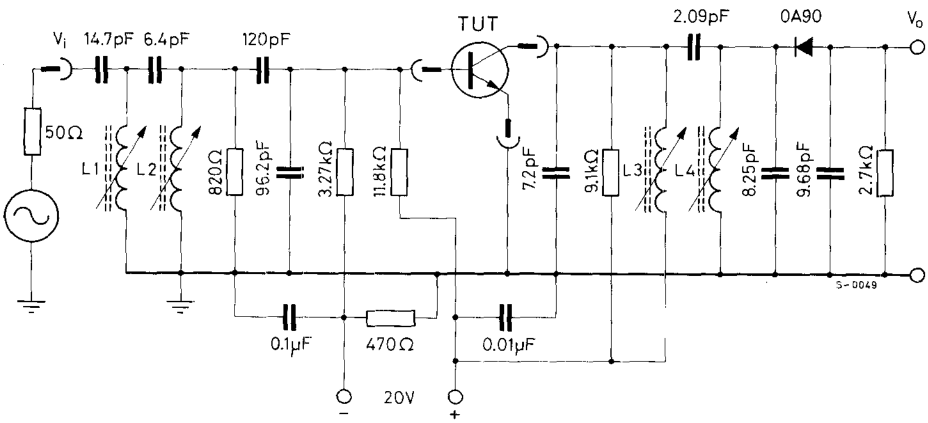


Transition frequency



TEST CIRCUIT

G_{tr} test circuit



L_1 = 0.8 μH, 9 turns ∅ 0.15 mm. enameled silk-covered copper wire. L_2 = 0.25 μH, 4 turns ∅ 0.15 mm. enameled silk-covered copper wire. L_3 = 1.7 μH, 12.5 turns ∅ 0.15 mm. enameled silk-covered copper wire L_4 = 1.3 μH, 11 turns ∅ 0.15 mm. enameled silk-covered copper wire.