T-31-15

TELEFUNKEN electronic
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BF 184

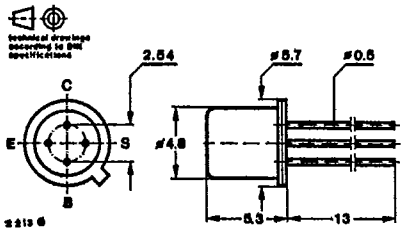
Silicon NPN Epitaxial Planar RF Transistor

Applications: General and controlled RF amplifier stages upt to 100 MHz

Features:

- Noise figure 3.5 dB
- Noise figure for mixer 2 dB

Dimensions in mm



Terminal "S" connected with case
Case 18 A 4 DIN 41876 JEDEC TO 72
Weight max. 0.5 g

Absolute maximum ratings

Collector-base voltage	V_{CBO}	30	V
Collector-emitter voltage	V_{CEO}	20	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	30	mA
Base current	I_B	1	mA
Total power dissipation $T_{amb} \leq 45$ °C	P_{tot}	145	mW
Junction temperature	T_j	175	°C
Storage temperature range	T_{stg}	−55 ... +175	°C

Thermal resistances		**Min.**	**Typ.**	**Max.**	
Junction ambient	R_{thJA}			900	K/W

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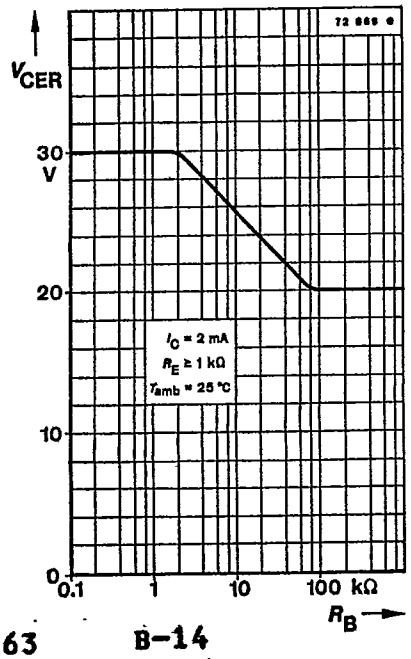
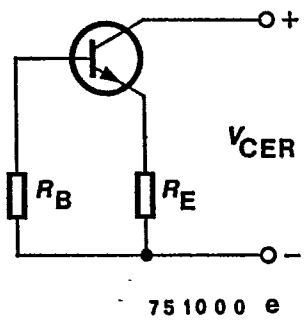
DC characteristics		Min.	Typ.	Max.	
$T_{amb} = 25\,°C$					
Collector-base breakdown voltage					
$I_C = 10\,\mu A$	$V_{(BR)CBO}$	30			V
Collector-emitter breakdown voltage					
$I_C = 2\,mA$	$V_{(BR)CEO}$ [1]	20			V
Emitter-base breakdown voltage					
$I_E = 10\,\mu A$	$V_{(BR)EBO}$	5			V
Base-emitter voltage					
$V_{CE} = 10\,V, I_C = 1\,mA$	V_{BE}	650	680	740	mV
$V_{CE} = 2\,V, I_C = 20\,mA$	V_{BE} [1]			1	V
DC forward current transfer ratio					
$V_{CE} = 10\,V, I_C = 1\,mA$	h_{FE}	67	115	220	
AC characteristics					
$T_{amb} = 25\,°C$					
Gain bandwidth product					
$V_{CB} = 10\,V, I_C = 1\,mA, f = 100\,MHz$	f_T		260		MHz
Feedback capacitance					
$V_{CB} = 10\,V, I_C = 1\,mA, f = 10.7\,MHz$	C_{0re}		0.65	0.9	pF
Noise figure					
$V_{CB} = 10\,V, I_C = 1\,mA, R_G = 300\,\Omega,$ $f = 200\,kHz$	F		1.45		dB
$V_{CB} = 10\,V, I_C = 1\,mA, R_G = 50\,\Omega,$ $f = 1\,MHz$	F		3.5		dB
Noise figure for mixer					
$V_{CB} = 10\,V, I_C = 1\,mA, R_G = 1670\,\Omega,$ $f = 200\,kHz$	F_c		3		dB
$V_{CB} = 10\,V, I_C = 1\,mA, R_G = 830\,\Omega,$ $f = 1\,MHz$	F_c		2		dB
Two port characteristics					
$T_{amb} = 25\,°C$					
Common emitter configuration					
$V_{CB} = 10\,V, I_C = 1\,mA, f = 0.45\,MHz$					
Short circuit input admittance	g_{ie}		0.35		mS
	C_{ie}		23		pF
Short circuit reverse transfer admittance	$\lvert y_{re} \rvert$		1.8		µS
	$-\varphi_{re}$		90°		
Short circuit forward transfer admittance	$\lvert y_{fe} \rvert$		35		mS
	$-\varphi_{fe}$		≈0°		
Short circuit output admittance	g_{oe}		6		µs
	C_{oe}		1.45		pF

[1] $\frac{t_p}{T} = 0.01, t_p = 0{,}3\,ms$

		Min.	Typ.	Max.	
Common emitter configuration					
$V_{CB} = 10$ V, $I_C = 1$ mA, $f = 10.7$ MHz					
Short circuit input admittance	g_{ie}		0.45		mS
	C_{ie}		23		pF
Short circuit reverse transfer admittance	$\lvert y_{re} \rvert$		44		µS
	$-\varphi_{re}$		90°		
Short circuit forward transfer admittance	$\lvert y_{fe} \rvert$		35		mS
	$-\varphi_{fe}$		5°		
Short circuit output admittance	g_{oe}		8.5		µs
	C_{oe}		1.5		pF
Common base configuration					
$V_{CB} = 10$ V, $I_C = 1$ mA, $f = 35$ MHz					
Short circuit input admittance	g_{ie}		0.85		mS
	C_{ie}		19		pF
Short circuit reverse transfer admittance	$\lvert y_{re} \rvert$		140		µS
	$-\varphi_{re}$		90°		
Short circuit forward transfer admittance	$\lvert y_{fe} \rvert$		34		mS
	$-\varphi_{fe}$		16°		
Short circuit output admittance	g_{oe}		11		µS
	C_{oe}		1.5		pF





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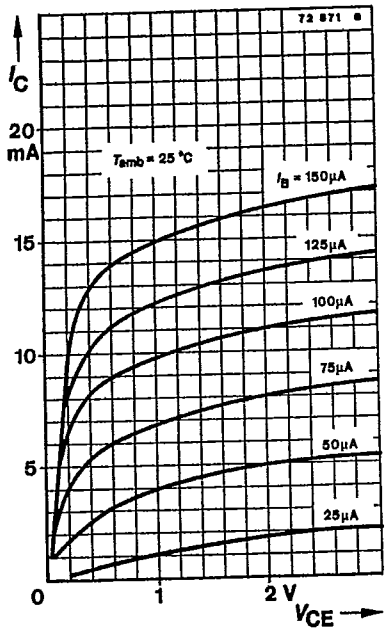
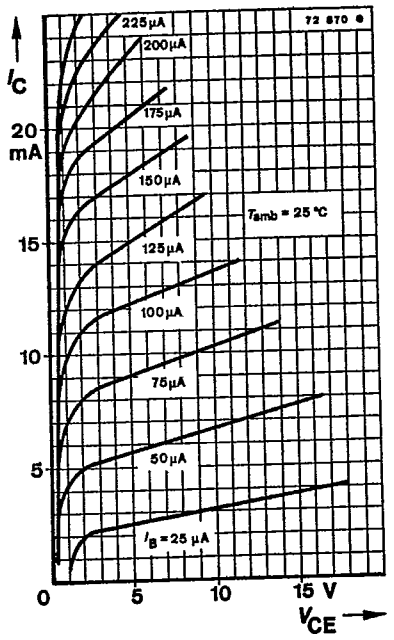
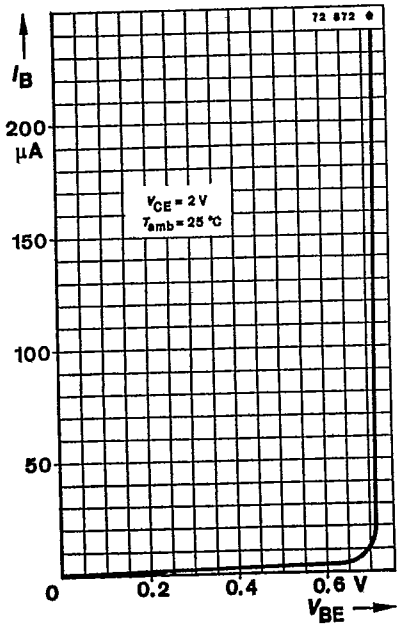
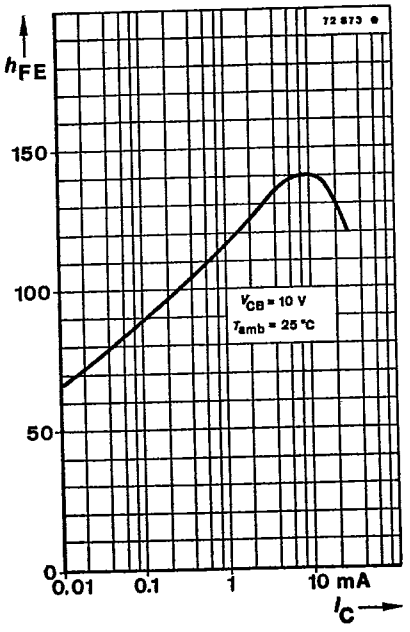

72 871
I_C
20 mA
15
10
5
0
1
2 V
V_{CE}
T_{amb} = 25 °C
I_B = 150µA
125µA
100µA
75µA
50µA
25µA


72 870
I_C
20 mA
15
10
5
0
5
10
15 V
V_{CE}
T_{amb} = 25 °C
225µA
200µA
175µA
150µA
125µA
100µA
75µA
50µA
I_B = 25 µA


72 872
I_B
200 µA
150
100
50
0
0.2
0.4
0.6 V
V_{BE}
V_{CE} = 2 V
T_{amb} = 25 °C


72 873
h_{FE}
150
100
50
0
0.01
0.1
1
10 mA
I_C
V_{CB} = 10 V
T_{amb} = 25 °C

7. Taping and Reeling

T-91-20

7.1. Taping of TO-92 Transistors

Standard reeling: Taped on reel, reeled together with a paper film.

7.1.1. Order Numbers
Add the taping-code to the order number.

Example:

BC 238 C DU 06 Z

- Order-No. of Type
- Code for TO-92 Transistors
- Orientation of transistor on tape [1]
- Additional marking for specials [2]

[1] 06 = View on flat side of transistor, view on gummed tape
05 = View on round side of transistor, view on gummed tape

[2] Additional marking "0": taping without paper film
Additional marking "Z": Zigzag folded tape in special box. Marking for orientation of transistor not necessary, because box can be opened on top or bottom

Example for order No.: BC 237 C DU Z

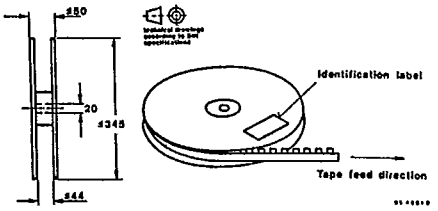


Fig. 7.1. Dimensions of reel in mm

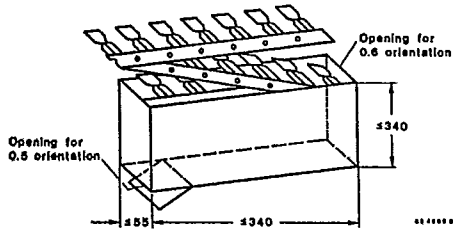


Fig. 7.2. Dimension of box for Zigzag folding in mm

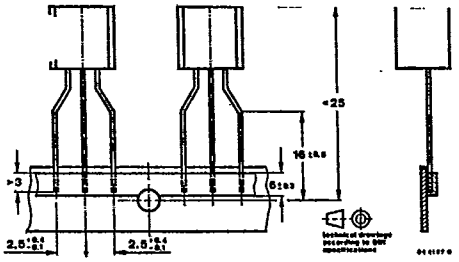


Fig. 7.3 Dimensions of tape in mm

7.1.2 Quantity of devices
1 000 devices per reel
2 000 devices per folded tape in special box.

7.2. Taped transistors in SOT 23 and SOT 143 case

7.2.1. Designation

a) Standard taping
Designation is attached with code GS 08 in case of standard taping. Example for normal version transistors as standard taped: BF 569-GS 08.

Example for R-version transistors as standard taped: BF 569 R-GS 08.

In case of standard taping, the transistor orientation on the tape is shown in Fig. 7.4 and Fig. 7.5.

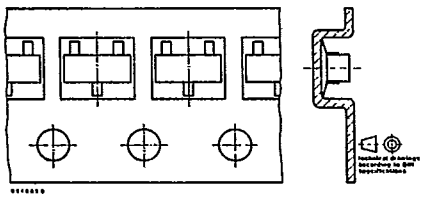


Fig. 7.4 Standard taped SOT 23

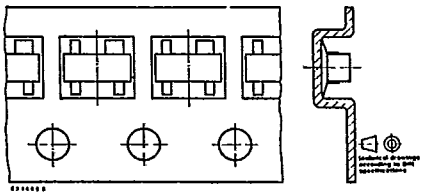


Fig. 7.5. Standard taped SOT 143

b) Reverse taping

Designation is attached with code GS 07 in case of reverse taping. Example for normal version transistors as reverse taped: BF 569-GS 07.

Example for R-version transistors as reverse taping: BF 569 R-GS 07.

In case of reverse taping, the transistor orientation on the tape is shown in Fig. 7.6.

Regarding MOS-FET and MES-FET devices, reverse taping is at present not available.

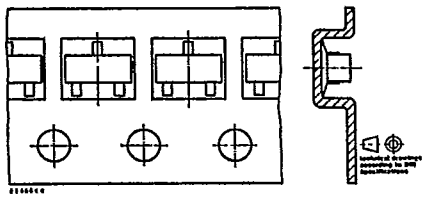


Fig. 7.6 Reverse taped SOT 23

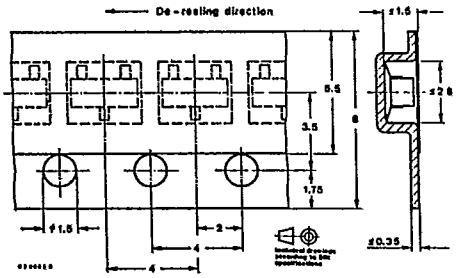


Fig. 7.7 Dimensions of tape in mm

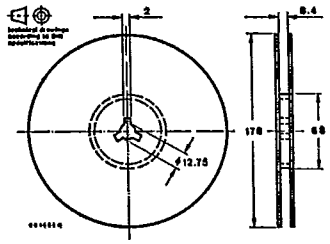


Fig. 7.8 Dimensions of reel in mm

7.2.2 Quantity of devices

3000 devices per reel