TELEFUNKEN electronic
Creative Technologies

BUT 76 · BUT 76 A

T-33-13

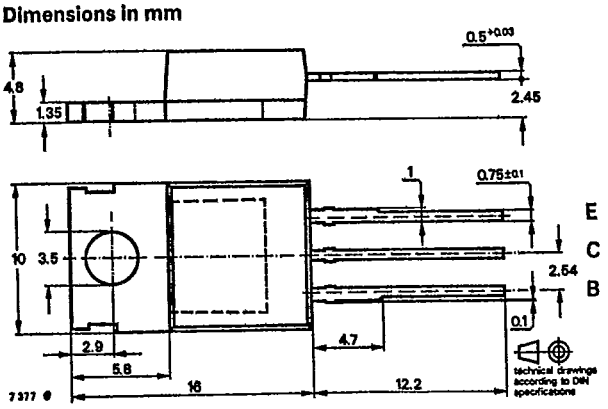
Silicon NPN Power Transistors

Applications: Switching mode power supply, inverters, motor control and relay driver

Features:

- In multi diffusion technique
- High reverse voltage
- Power dissipation P_{tot} = 110 W
- Glass passivation
- Short switching times

Dimensions in mm



Collector connected with metallic surface

Standard plastic case
14 A3 DIN 41 869
JEDEC TO 220
Weight max. 2.5 g

Accessories:
Isolating washer No. 564542

Absolute maximum ratings		**BUT 76**	**BUT 76 A**	
Collector-emitter voltage	V_{CEO}	400	450	V
	V_{CES}	850	1000	V
Emitter-base voltage	V_{EBO}	7		V
Collector peak curent	I_{CM}	20		A
Collector current, average	I_{CAV}	12		A
Base peak current	I_{BM}	6		A
	$-I_{BM}$	2		A
Base current, average	I_{BAV}	3		A
Total power disspation $T_{case} \leq 25$ °C	P_{tot}	110		W
Junction temperature	T_j	150		°C
Storage temperature range	T_{stg}	−65 ...+150		°C
Maximum thermal resistance				
Junction case	R_{thJC}	1.13		K/W

BUT 76 · BUT 76 A

T-33-13

Characteristics

T_{case} = 25 °C, unless otherwise specified

			Min.	Typ.	Max.	
Collector cut-off current						
V_{CE} = 850 V	BUT 76	I_{CES}			0.5	mA
V_{CE} = 1000 V	BUT 76 A	I_{CES}			0.5	mA
T_{case} = 150 °C, V_{CE} = 850 V	BUT 76	I_{CES}			2.0	mA
V_{CE} = 1000 V	BUT 76 A	I_{CES}			2.0	mA
Collector-emitter breakdown voltage						
I_C = 1 mA	BUT 76	$V_{(BR)CES}$	850			V
	BUT 76 A	$V_{(BR)CES}$	1000			V
I_C = 500 mA, L_C = 125 mH	BUT 76	$V_{(BR)CEO}$ [1]	400			V
	BUT 76 A	$V_{(BR)CEO}$ [1]	450			V
Emitter-base breakdown voltage						
I_E = 1 mA		$V_{(BR)EBO}$	6			V
Collector-emitter saturation voltage						
I_C = 6 A, I_B = 1.2 A	BUT 76	V_{CEsat} [1]			1.5	V
I_C = 5 A, I_B = 1.0 A	BUT 76 A	V_{CEsat} [1]			1.5	V
Base-emitter saturation voltage						
I_C = 6 A, I_B = 1.2 A	BUT 76	V_{BEsat} [1]			1.6	V
I_C = 5 A, I_B = 1.0 A	BUT 76 A	V_{BEsat} [1]			1.6	V
DC forward current transfer ratio						
V_{CE} = 3 V, I_C = 8 A		h_{FE}	3.2			
Gain bandwidth product						
V_{CE} = 10 V, I_C = 1 A		f_T		7		MHz
Collector-base capacitance						
V_{CB} = 10 V, I_E = 0, f = 1 MHz		C_{CBO}		150		pF

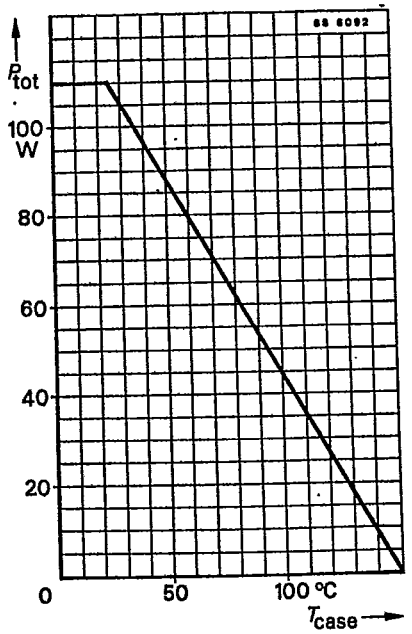
Switching characteristics

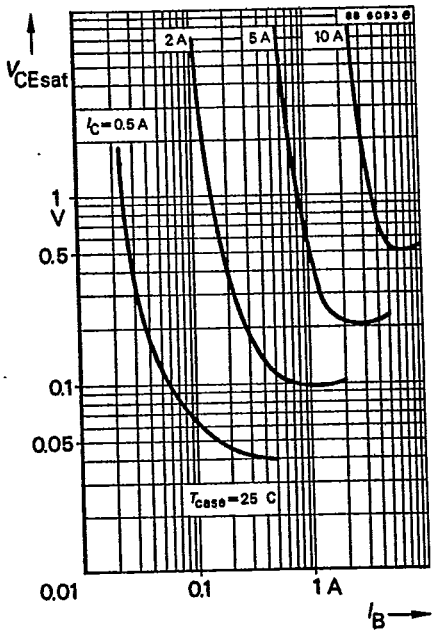
T_{case} = 150 °C, unless otherwise specified

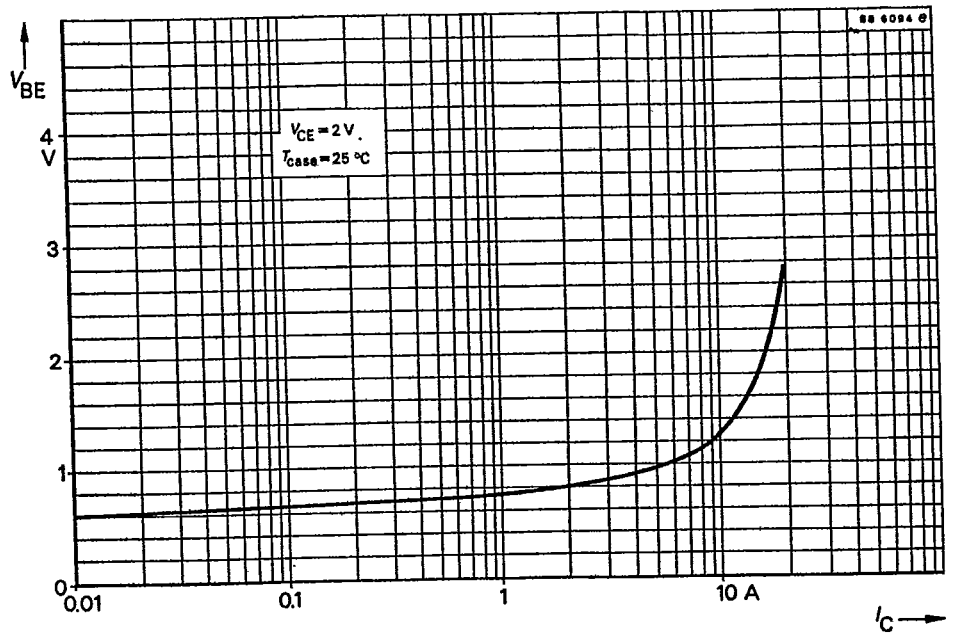
Resistive load						
V_{CE} = 150 V,						
I_C = 6 A, I_{B1} = $-I_{B2}$ = 1.2 A	BUT 76					
I_C = 5 A, I_{B1} = $-I_{B2}$ = 1.0 A	BUT 76 A					
Turn on time		t_{on}			1.0	µs
Storage time		t_s			3.0	µs
Fall time		t_f			0.8	µs
Inductive load						
V_{CE} = 300 V, $-V_{BEoff}$ = 5 V, L_B = 3 µH,						
I_C = 6 A, I_{Bend} = 1.2 A	BUT 76					
I_C = 5 A, I_{Bend} = 1.0 A	BUT 76 A					
Storage time		t_s		2.5		µs
	T_{case} = 100 °C	t_s			4	µs
Fall time		t_f		0.08		µs
	T_{case} = 100 °C	t_s			0.4	µs

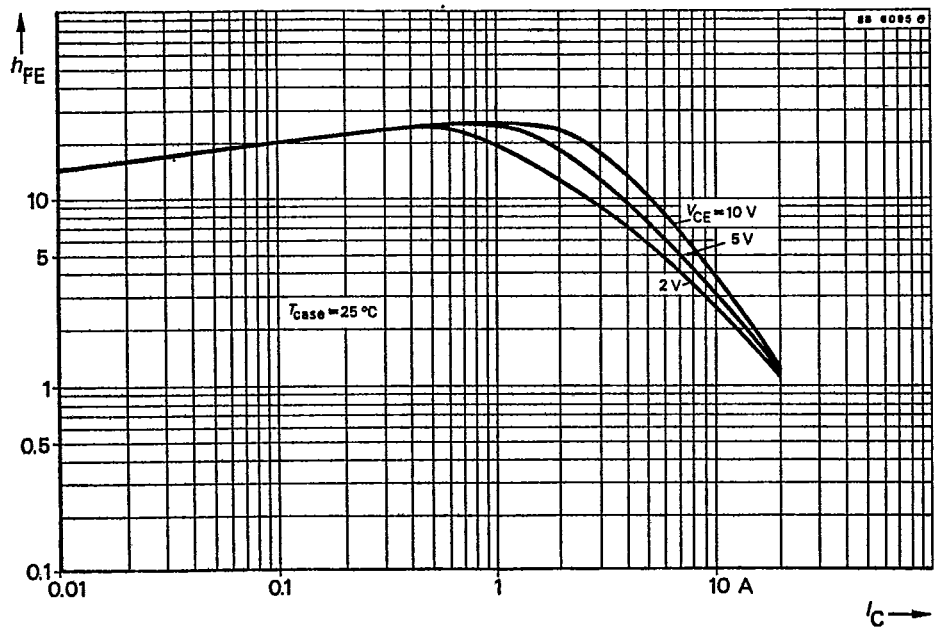
BUT 76 · BUT 76A

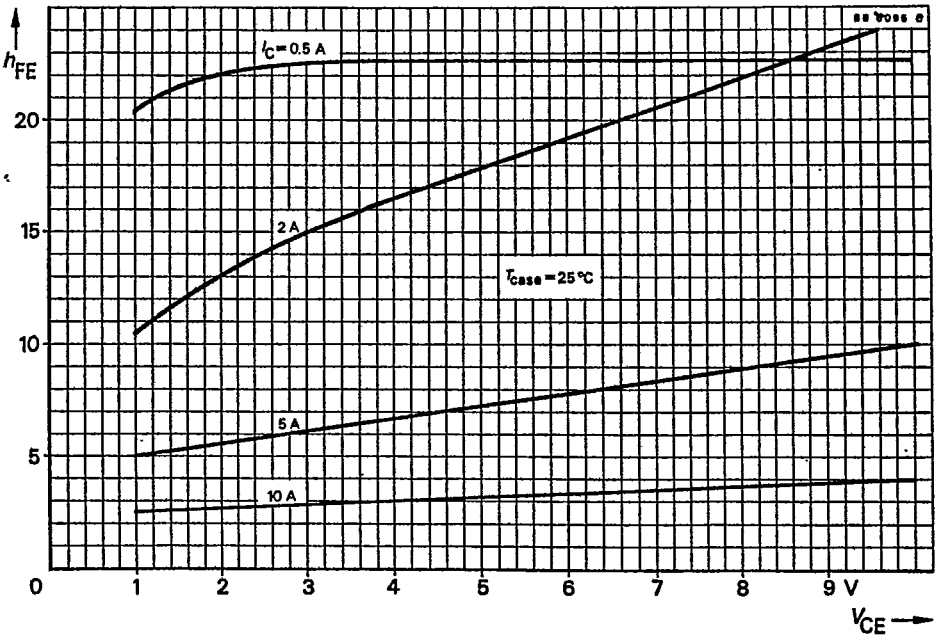
T-33-13





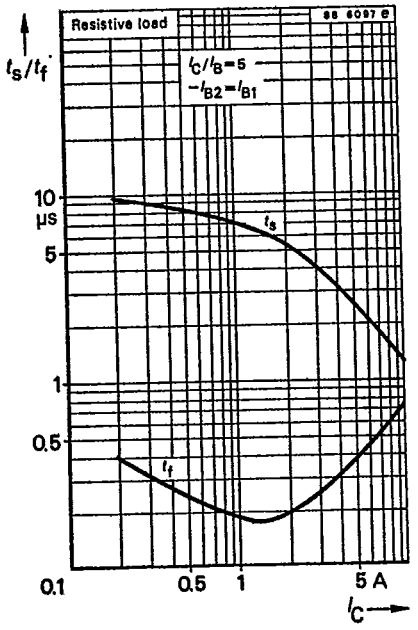



h_{FE}
10
5
1
0.5
0.1
0.01
0.1
1
10 A
I_C
V_{CE}=10 V
5 V
2 V
T_{case}=25 °C


h_{FE}
20
15
10
5
0
1
2
3
4
5
6
7
8
9 V
V_{CE}
I_C=0.5 A
2 A
5 A
10 A
T_{case}=25°C

BUT 76 · BUT 76A

T-33-13



T-91-20

● Family of curves

Besides the static (d. c.) and dynamic (a. c.) characteristics, family of curves are given for specified operating conditions. They show the typical interdepedence of individual characteristics. Partly are given the scattering limits. They signify that at least 95% of the delivery lies inside these tolerances.

6.6. Additional informations

Preliminary specifications

This heading indicates that some information on the device concerned may be subject to slight changes.

Not for new developments

This heading indicates that the device concerned should not be used in equipment under development, it is, however, available for present production.

7. Taping and reeling

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 inspecial box. Marking for orientation of transistor not necessary, because box can be opened on top or botton.

Example for order No.: BC 237 C DU Z

A E G CORP

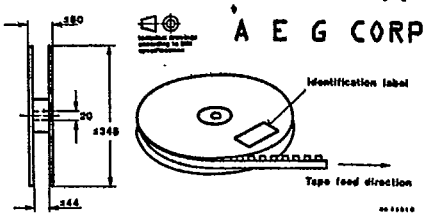


Fig. 7.1. Dimensions of reel in mm

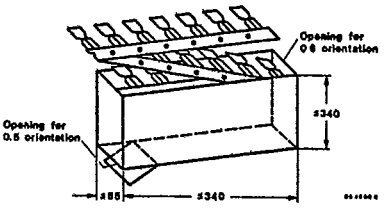


Fig. 7.2. Dimension of box for Zigzag folding in mm

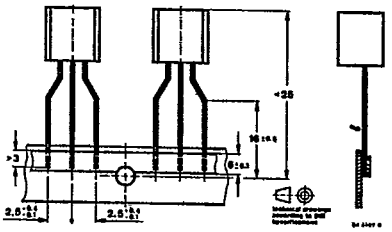


Fig. 7.3. Dimensions of tape in mm

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

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-GS08.

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.

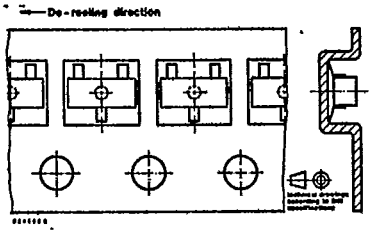


Fig. 7.4 Standard taped SOT 23

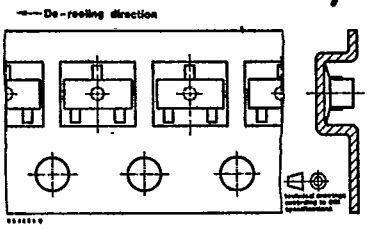


Fig. 7.6 Reverse taped SOT 23

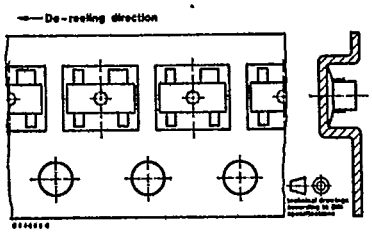


Fig. 7.5 Standard taped SOT 143

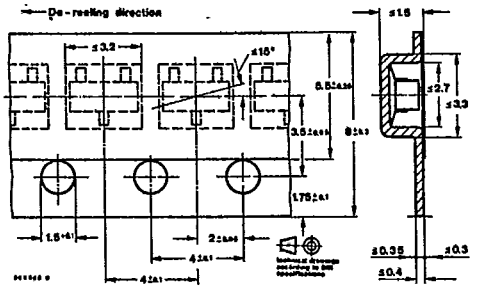


Fig. 7.7 Dimensions of tape in mm

b) Reverse taping
Desigantion is attached with code GS 07 in case of reverse taping. Example for normal version transistors as reverse taped: BF 569 R-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. 6.
Regarding MOF-FET and MES-FET devices, reverse taping is at present not available.

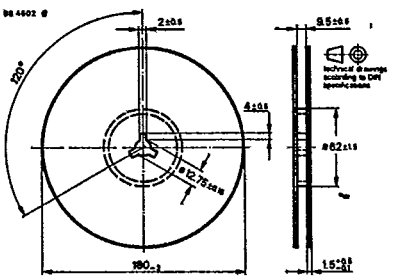


Fig. 7.8 Dimensions of reel in mm

7.2.2 Quantity of devices
3000 devices per reel

8. Assessories

Number	Fig.	Designation	For case
119880	8.1.	Isolating washer thickness 60 µm	12A 3 DIN 41869 JEDEC TO 126 (SOT 32)
564542	8.2.	Isolating washer thickness 50 µm	14A 3 DIN 41869 JEDEC TO 220 (SOT 78)
912884	8.3	Isolating washer thickness 50 µm	15A 3 DIN 41869 (TOP3) for clip mounting
191131	8.4	Isolating washer thickness 50 µm	15A 3 DIN 41869 (TOP3) for screw mounting
191140	8.5	Mounting clip	15A 3 DIN 41869 (TOP3)
569524	8.6	Isolating washer thickness 100 µm + 50 µm	3B 2 DIN 41872 JEDEC TO 3 Devices with high reverse voltage