

**BUT 76 · BUT 76 A**



T-33-13

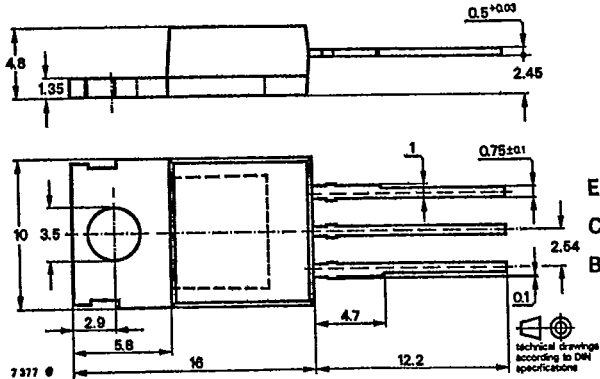
**Silicon NPN Power Transistors**

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

Features:

- In multi diffusion technique
- High reverse voltage
- Power dissipation  $P_{tot} = 110 \text{ W}$
- 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. 564 542

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 current	$I_{CM}$	20	A
Collector current, average	$I_{CAV}$	12	A
Base peak current	$I_{BM}$ $-I_{BM}$	6 2	A A
Base current, average	$I_{BAV}$	3	A
Total power dissipation	$P_{tot}$	110	W
$T_{case} \leq 25 \text{ }^\circ\text{C}$	$T_j$	150	$^\circ\text{C}$
Junction temperature	$T_{stg}$	-85 ... +150	$^\circ\text{C}$
Storage temperature range			
Maximum thermal resistance			
Junction case	$R_{thJC}$	1.13	K/W

T1.2/1673.0888 E

**Characteristics**

$T_{case} = 25\text{ }^\circ\text{C}$ , unless otherwise specified

Min.      Typ.      Max.

**Collector cut-off current**

$V_{CE} = 850\text{ V}$	<b>BUT 76</b>	$I_{CES}$	0.5	mA
$V_{CE} = 1000\text{ V}$	<b>BUT 76 A</b>	$I_{CES}$	0.5	mA
$T_{case} = 150\text{ }^\circ\text{C}$ , $V_{CE} = 850\text{ V}$	<b>BUT 76</b>	$I_{CES}$	2.0	mA
$V_{CE} = 1000\text{ V}$	<b>BUT 76 A</b>	$I_{CES}$	2.0	mA

**Collector-emitter breakdown voltage**

$I_C = 1\text{ mA}$	<b>BUT 76</b>	$V_{(BR)CES}$	850	V
	<b>BUT 76 A</b>	$V_{(BR)CES}$	1000	V
$I_C = 500\text{ mA}$ , $L_C = 125\text{ mH}$	<b>BUT 76</b>	$V_{(BR)CEO}^{(1)}$	400	V
	<b>BUT 76 A</b>	$V_{(BR)CEO}^{(1)}$	450	V

**Emitter-base breakdown voltage**

$I_E = 1\text{ mA}$		$V_{(BR)EBO}$	6	V
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**Collector-emitter saturation voltage**

$I_C = 6\text{ A}$ , $I_B = 1.2\text{ A}$	<b>BUT 76</b>	$V_{CEsat}^{(1)}$	1.5	V
$I_C = 5\text{ A}$ , $I_B = 1.0\text{ A}$	<b>BUT 76 A</b>	$V_{CEsat}^{(1)}$	1.5	V

**Base-emitter saturation voltage**

$I_C = 6\text{ A}$ , $I_B = 1.2\text{ A}$	<b>BUT 76</b>	$V_{BEsat}^{(1)}$	1.6	V
$I_C = 5\text{ A}$ , $I_B = 1.0\text{ A}$	<b>BUT 76 A</b>	$V_{BEsat}^{(1)}$	1.6	V

**DC forward current transfer ratio**

$V_{CE} = 3\text{ V}$ , $I_C = 8\text{ A}$		$h_{FE}$	3.2	
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**Gain bandwidth product**

$V_{CE} = 10\text{ V}$ , $I_C = 1\text{ A}$		$f_T$	7	~ MHz
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**Collector-base capacitance**

$V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1\text{ MHz}$		$C_{CBO}$	150	pF
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**Switching characteristics**

$T_{case} = 150\text{ }^\circ\text{C}$ , unless otherwise specified

**Resistive load**

$V_{CE} = 150\text{ V}$ , $I_C = 6\text{ A}$ , $I_{B1} = -I_{B2} = 1.2\text{ A}$	<b>BUT 76</b>			
$I_C = 5\text{ A}$ , $I_{B1} = -I_{B2} = 1.0\text{ A}$	<b>BUT 76 A</b>			

**Turn on time**

	$t_{on}$	1.0	$\mu\text{s}$
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**Storage time**

	$t_s$	3.0	$\mu\text{s}$
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**Fall time**

	$t_f$	0.8	$\mu\text{s}$
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**Inductive load**

$V_{CE} = 300\text{ V}$ , $-V_{BEoff} = 5\text{ V}$ , $L_B = 3\text{ }\mu\text{H}$ , $I_C = 6\text{ A}$ , $I_{Bend} = 1.2\text{ A}$	<b>BUT 76</b>			
$I_C = 5\text{ A}$ , $I_{Bend} = 1.0\text{ A}$	<b>BUT 76 A</b>			

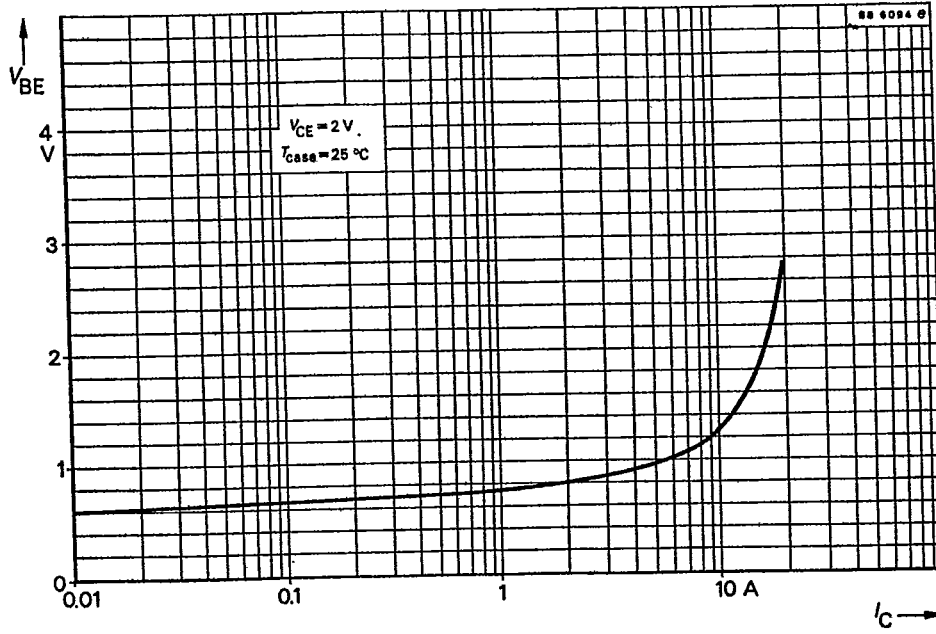
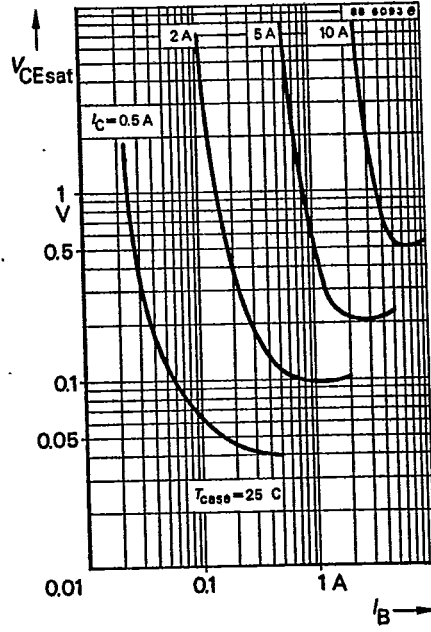
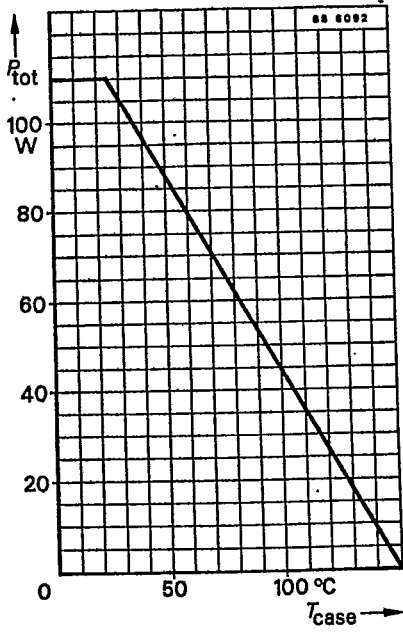
**Storage time**

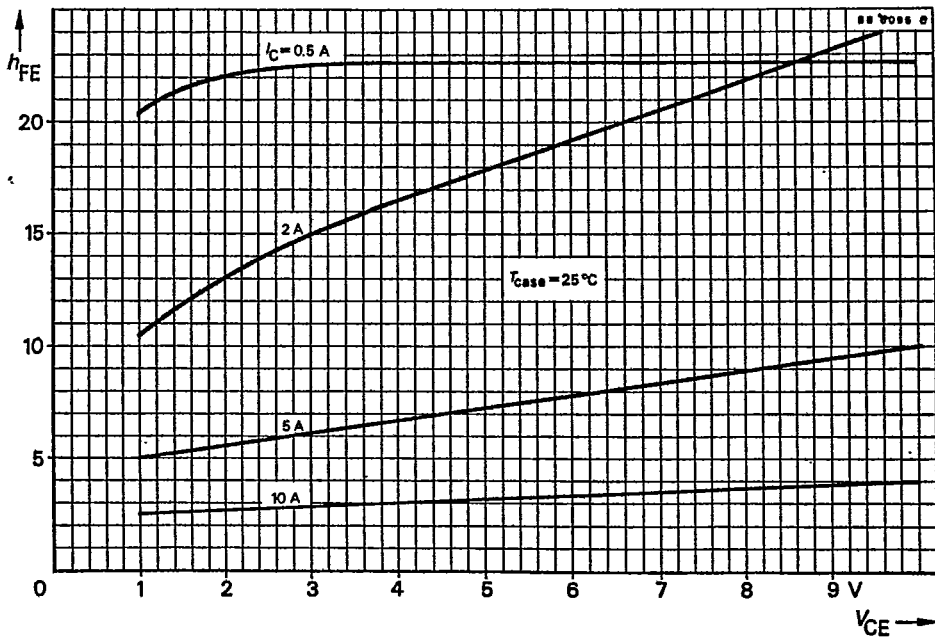
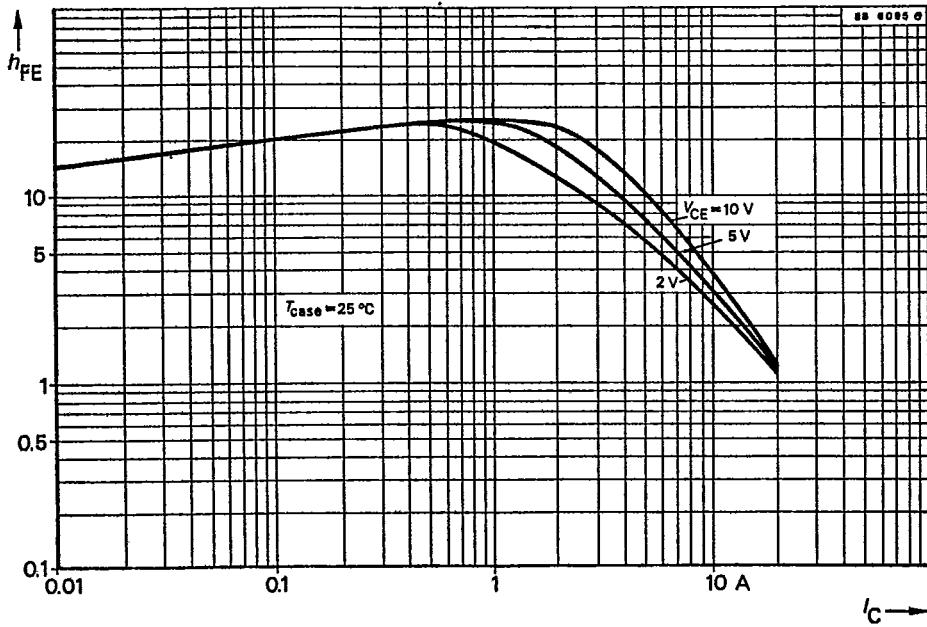
$T_{case} = 100\text{ }^\circ\text{C}$	$t_s$	2.5	$\mu\text{s}$
	$t_s$	4	$\mu\text{s}$

**Fall time**

$T_{case} = 100\text{ }^\circ\text{C}$	$t_f$	0.08	$\mu\text{s}$
	$t_s$	0.4	$\mu\text{s}$

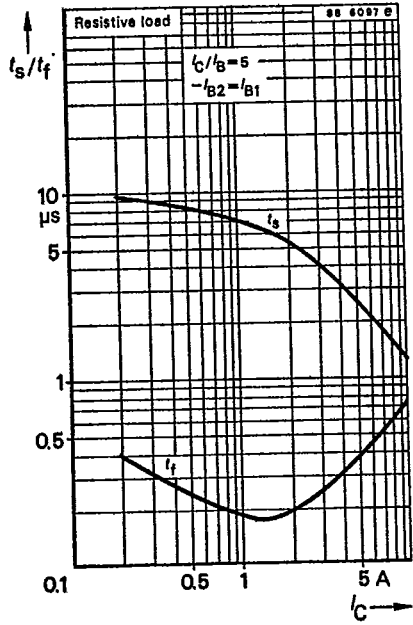
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### ● Family of curves

Besides the static (d. c.) and dynamic (a. c.) characteristics, family of curves are given for specified operating conditions. They show the typical interdependence 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

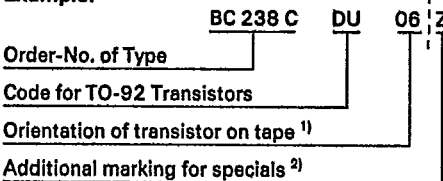
### 7.1. Taping of TO-92 transistors

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:



<sup>1)</sup> 06 = View on flat side of transistor, view on gummed tape

05 = View on round side of transistor, view on gummed tape

<sup>2)</sup> Additional marking "O":

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

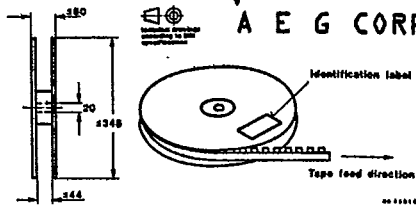


Fig. 7.1. Dimensions of reel in mm

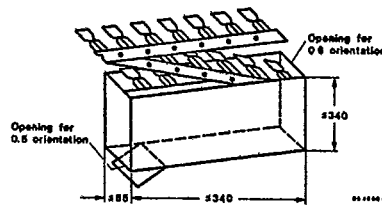


Fig. 7.2. Dimension of box for Zigzag folding in mm

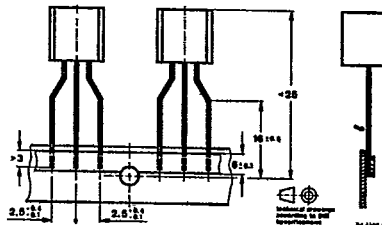


Fig. 7.3. Dimensions of tape in mm

#### 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

#### 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.

