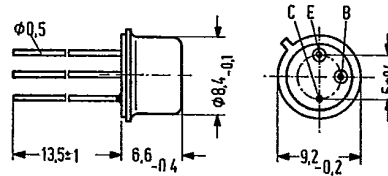


T-29-23

**PNP Silicon Transistors SIEMENS AKTIENGESELLSCHAFT BC 160 BC 161**

BC 160 and BC 161 are epitaxial PNP silicon transistors in TO 39 case (5 C 3 DIN 41873). The collector is electrically connected to the case. The transistors are intended for use as complementary transistors to BC140 and BC141 and are available upon request as matched pairs.

Type	Ordering code
BC 160 <sup>1)</sup>	Q62702-C228
BC 160-6	Q62702-C228-V6
BC 160-10	Q62702-C228-V10
BC 160-16	Q62702-C228-V16
BC 160 paired	Q62702-C228-P
BC 160/BC 140 paired	Q62702-C228-S2
BC 161 <sup>1)</sup>	Q62702-C252
BC 161-6	Q62702-C230
BC 161-10	Q62702-C231
BC 161-16	Q62702-C239
BC 161 paired	Q62702-C230-P
BC 161/BC 141 paired	Q62702-C230-S2



Approx. weight 1.5 g Dimensions in mm

Maximum ratings		BC 160	BC 161	
Collector-base voltage	$-V_{CBO}$	40	60	V
Collector-emitter voltage	$-V_{CEO}$	40	60	V
Emitter-base voltage	$-V_{EBO}$	5	5	V
Collector current	$-I_C$	1	1	A
Base current	$-I_B$	0.1	0.1	A
Junction temperature	$T_j$	175	175	°C
Storage temperature range	$T_{stg}$	-55 to +175	-55 to +175	°C
Total power dissipation	$P_{tot}$	3.7	3.7	W

**Thermal resistance**

Junction to ambient air	$R_{thJA}$	≤200	≤200	K/W
Junction to case	$R_{thJC}$	≤35	≤35	K/W

**Static characteristics ( $T_{amb} = 25^\circ\text{C}$ )**

The transistors BC 160 and BC 161 are grouped at  $-I_C = 100\text{ mA}$  and  $-V_{CE} = 1\text{ V}$  according to the DC current gain  $h_{FE}$ , and are marked by numerals of the DIN standard series. For the operating points quoted below, the following values apply:

Type	BC 160, BC 161			
$h_{FE}$ group	6	10	16	
$-I_C$ mA	$h_{FE}$ $I_C/I_B$	$h_{FE}$ $I_C/I_B$	$h_{FE}$ $I_C/I_B$	$-V_{BE}$ V
0.1	46	80	120	-
100	63 (40 to 100)	100 (63 to 160)	160 (100 to 250)	-
1000	15	20	30	1.0 (<1.7)

<sup>1)</sup> If the order does not include any exact indication of the current amplification group desired, a transistor of a current amplification group just available from stock will be delivered.

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BC 160  
 BC 161

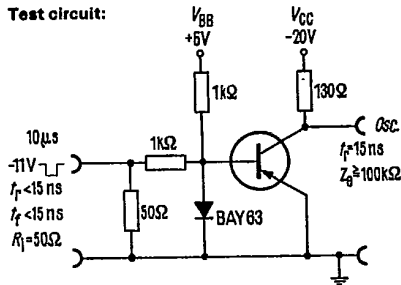
**Static characteristics ( $T_{amb} = 25^{\circ}\text{C}$ )**

	BC 160	BC 161	
Collector cutoff current ( $-V_{CES} = 40\text{ V}$ or $60\text{ V}$ )	$-I_{CES}$	10 (<100)	10 (<100) nA
Collector cutoff current ( $-V_{CES} = 40\text{ V}$ or $60\text{ V}$ ; $T_{amb} = 150^{\circ}\text{C}$ )	$-I_{CES}$	10 (<100)	10 (<100) $\mu\text{A}$
Collector-emitter breakdown voltage ( $-I_{CEO} = 50\text{ mA}$ pulse width = $200\text{ }\mu\text{sec}$ ; duty cycle 1%)	$-V_{(BR)CEO}$	>40	>60 V
Collector-emitter breakdown voltage ( $-I_{CES} = 100\text{ }\mu\text{A}$ )	$-V_{(BR)CES}$	>40	>60 V
Emitter-base breakdown voltage ( $-I_{EBO} = 100\text{ }\mu\text{A}$ )	$-V_{(BR)EBO}$	>5	>5 V
Collector-emitter saturation voltage ( $-I_C = 0.5\text{ A}$ ; $-I_B = 25\text{ mA}$ )	$-V_{CEsat}^{1)}$	0.6 (<1.0)	0.6 (<1.0) V
Conditions for matching pairs: ( $-I_C = 100\text{ mA}$ ; $-V_{CE} = 1\text{ V}$ )	$\frac{h_{FE1}}{h_{FE2}}$	$\leq 1.25$	$\leq 1.25$

**Dynamic characteristics ( $T_{amb} = 25^{\circ}\text{C}$ )**

Transition frequency ( $-I_C = 50\text{ mA}$ ; $-V_{CE} = 10\text{ V}$ ; $f = 20\text{ MHz}$ )	$f_T$	>60	>60	MHz
Collector-base capacitance ( $-V_{CB} = 10\text{ V}$ ; $f = 1\text{ MHz}$ )	$C_{CBO}$	<30	<30	pF
Emitter-base capacitance ( $-V_{EB} = 0.5\text{ V}$ ; $f = 1\text{ MHz}$ )	$C_{EBO}$	<180	<180	pf

**Test circuit:**



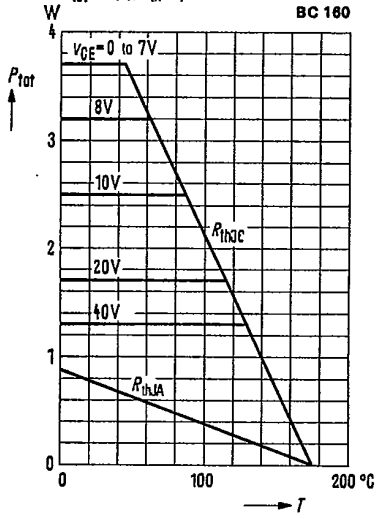
**Switching times for transistors  
 BC 160, BC 161:**

( $-I_C = 100\text{ mA}$ ;  $I_{B1}$  approx.  $-I_{B2}$  approx.  $5\text{ mA}$ )

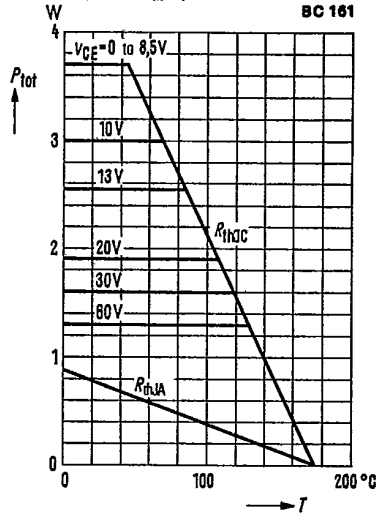
$t_{on}$	<500	ns
$t_{off}$	<650	ns

1) The transistor is overloaded to such an extent that the DC current gain decreases to  $h_{FE} = 20$

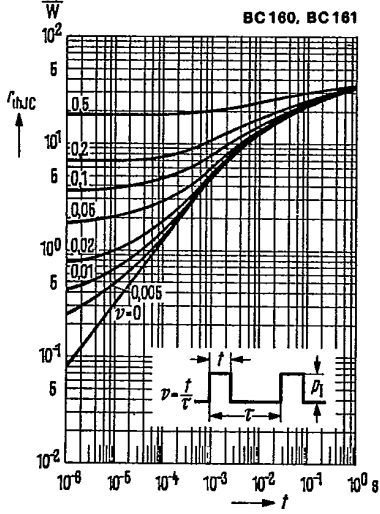
Total power dissipation versus temperature  
 $P_{tot} = f(T); R_{th} = \text{parameter}$



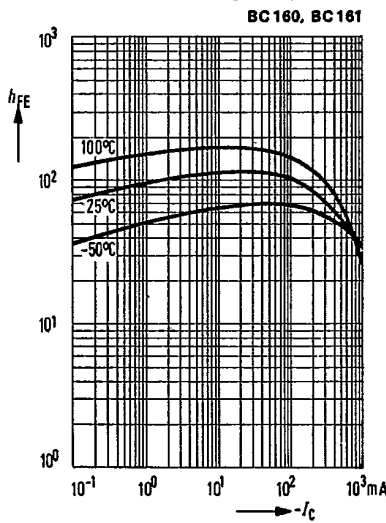
Total power dissipation versus temperature  
 $P_{tot} = f(T); R_{th} = \text{parameter}$



Permissible pulse load  
 $i_{thJC} = f(t); v = \text{parameter}$

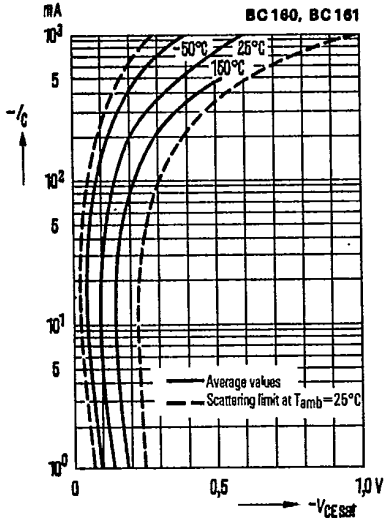


DC current gain  $h_{FE} = f(I_C)$   
 $-V_{CE} = 1V; T_{amb} = \text{parameter}$   
(common emitter configuration)



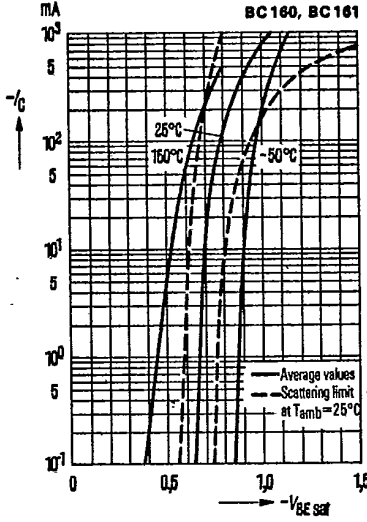
**Collector-emitter saturation voltage**

$V_{CE sat} = f(I_C)$   
 $h_{FE} = 10; T_{amb} = \text{parameter}$   
(common emitter configuration)



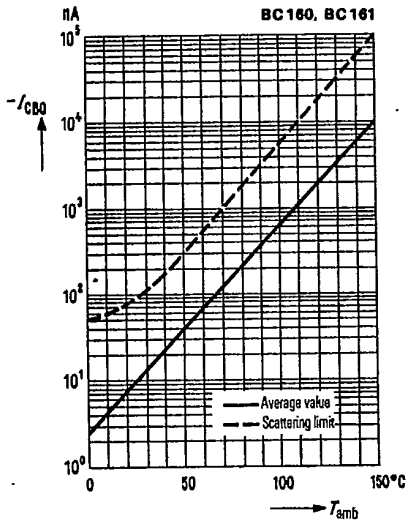
**Emitter-base saturation voltage**

$V_{BE sat} = f(I_C)$   
 $h_{FE} = 10; T_{amb} = \text{parameter}$   
(common emitter configuration)



**Collector cutoff current versus temperature**

$I_{CBO} = f(T_{amb}); -V_{CBO} = 60 V$



**Transition frequency  $f_T = f(f_C)$**   
( $-V_{CE} = 10 V$ )

