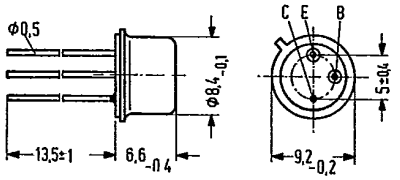
PNP Silicon Transistors SIEMENS AKTIENGESELLSCHAF BC 160 BC 161

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 BC 140 and BC 141 and are available upon request as matched pairs.

Type	Ordering code
BC 160[1]	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[1]	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 °C)

The transistors BC 160 and BC 161 are grouped at $-I_C$ = 100 mA and $-V_{CE}$ = 1 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)

1) 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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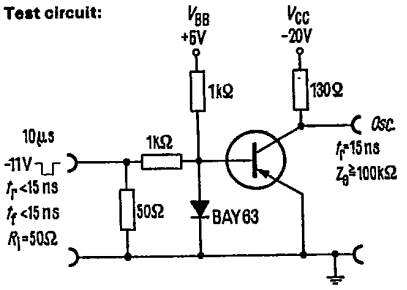
Static characteristics (T_{amb} = 25 °C)		BC 160	BC 161	
Collector cutoff current ($-V_{CES}$ = 40 V or 60 V)	$-I_{CES}$	10 (<100)	10 (<100)	nA
Collector cutoff current ($-V_{CES}$ = 40 V or 60 V; T_{amb} = 150 °C)	$-I_{CES}$	10 (<100)	10 (<100)	µA
Collector-emitter breakdown voltage ($-I_{CEO}$ = 50 mA pulse width = 200 µsec: duty cycle 1%)	$-V_{(BR)CEO}$	>40	>60	V
Collector-emitter breakdown voltage ($-I_{CES}$ = 100 µA)	$-V_{(BR)CES}$	>40	>60	V
Emitter-base breakdown voltage ($-I_{EBO}$ = 100 µA)	$-V_{(BR)EBO}$	>5	>5	V
Collector-emitter saturation voltage ($-I_C$ = 0.5 A; $-I_B$ = 25 mA)	$-V_{CEsat}$ [1]	0.6 (<1.0)	0.6 (<1.0)	V
Conditions for matching pairs: ($-I_C$ = 100 mA; $-V_{CE}$ = 1 V)	$\frac{h_{FE1}}{h_{FE2}}$	≤1.25	≤1.25	
Dynamic characteristics (T_{amb} = 25 °C)				
Transition frequency ($-I_C$ = 50 mA; $-V_{CE}$ = 10 V; f = 20 MHz)	f_T	>50	>50	MHz
Collector-base capacitance ($-V_{CB}$ = 10 V; f = 1 MHz)	C_{CBO}	<30	<30	pF
Emitter-base capacitance ($-V_{EB}$ = 0.5 V; f = 1 MHz)	C_{EBO}	<180	<180	pf

Test circuit:



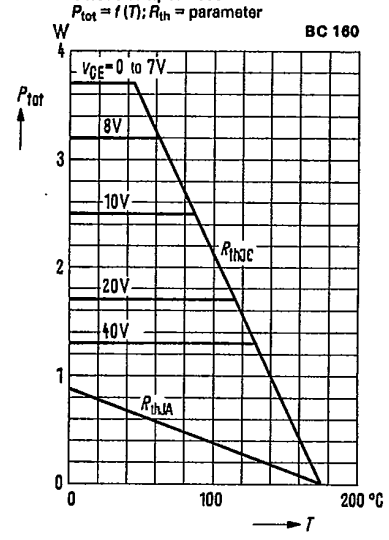
Switching times for transistors BC 160, BC 161:

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



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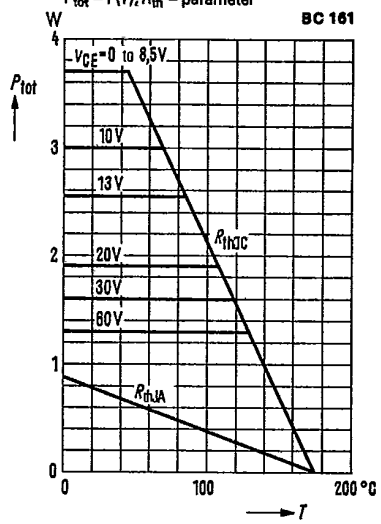
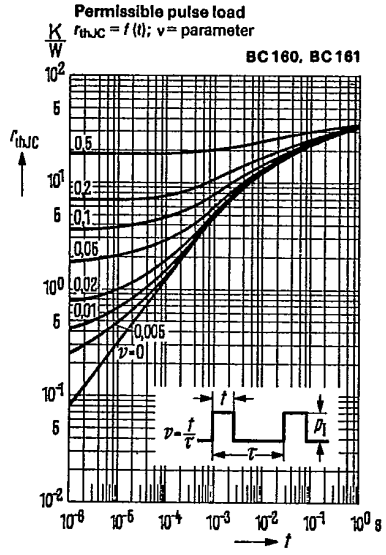
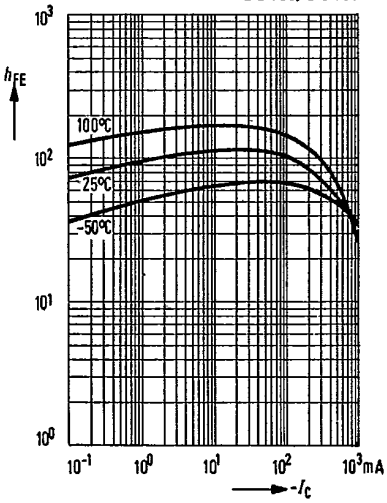


Permissible pulse load
$r_{thJC} = f(t)$; v = parameter



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



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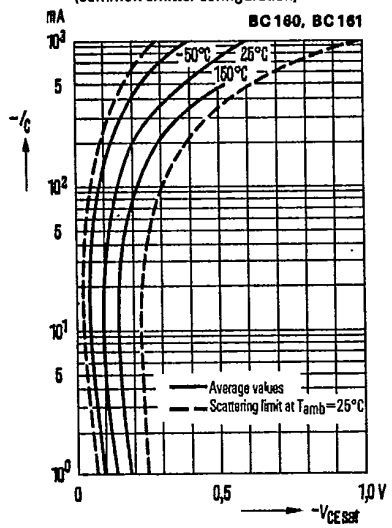
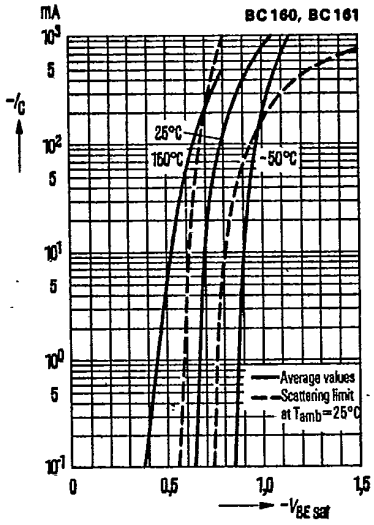
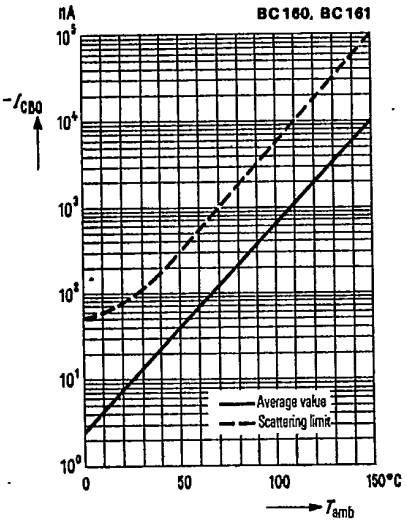
Collector-emitter saturation voltage
$V_{CEsat} = f(I_C)$
$h_{FE} = 10$; T_{amb} = parameter
(common emitter configuration)



Emitter-base saturation voltage
$V_{BEsat} = f(I_C)$
$h_{FE} = 10$; T_{amb} = parameter
(common emitter configuration)



Collector cutoff current versus temperature
$I_{CBO} = f(T_{amb})$; $-V_{CBO}$ = 60 V



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