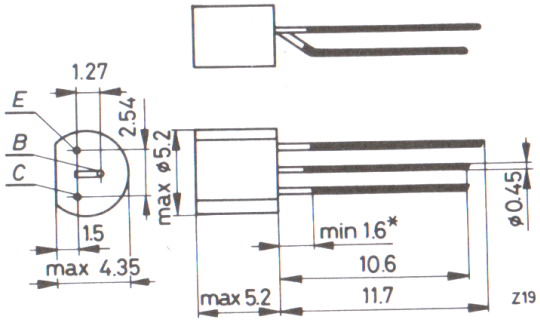
## NPN Silicon Planar Epitaxial Transistors

intended for use in AF pre-amplifier, and driver stages as well as in DC voltage amplifiers. The BC 184 is primarily used for low-noise pre-amplifiers. BC 182, BC 183 and BC 184 are complementary pairs with BC 212, BC 213 and BC 214 together, respectively.

**Dimensions in mm**




* not tinned

Case: TO-92Z

Mass: approx. 0.25 g

| **Absolute maximum ratings** | | **BC 182** | **BC 183** | **BC 184** | |
|---|---|---|---|---|---|
| Collector-emitter voltage | $V_{CEO}$ | 50 | 30 | 30 | V |
| Collector-base voltage | $V_{CBO}$ | 60 | 45 | 45 | V |
| Emitter-base voltage | $V_{EBO}$ | | 6 | | V |
| Collector current | $I_C$ | | 200 | | mA |
| Junction temperature | $T_j$ | | 150 | | °C |
| Storage temperature | $T_s$ | | −65 . . . + 150 | | °C |
| Total power dissipation $T_{amb}$ = 25°C | $P_{tot}$ | | 300 | | mW |
| **Thermal resistance** | | | | | |
| junction to ambient | $R_{thja}$ | | = 420 | | K/W |
| **Static characteristics**[1] | | | | | |
| $T_{amb}$ = 25°C | | | | | |
| Collector-base cut-off current | | | | | |
| $V_{CB}$ = 50 V | $I_{CBO}$ | ≤15 | – | – | nA |
| $V_{CB}$ = 30 V | $I_{CBO}$ | – | ≤15 | ≤15 | nA |
| Emitter-base cut-off current $V_{EB}$ = 4 V | $I_{EBO}$ | ≤15 | ≤15 | ≤15 | nA |
| Collector-base breakdown voltage $I_C$ = 10 µA | $V_{(BR)CBO}$ | ≥60 | ≥45 | ≥45 | V |
| Collector-emitter breakdown voltage $I_C$ = 2 mA | $V_{(BR)CEO}$ | ≥50 | ≥30 | ≥30 | V |
| Emitter-base breakdown voltage $I_E$ = 10 µA | $V_{(BR)EBO}$ | ≥6 | ≥6 | ≥6 | V |

[1] measured under pulsed conditions

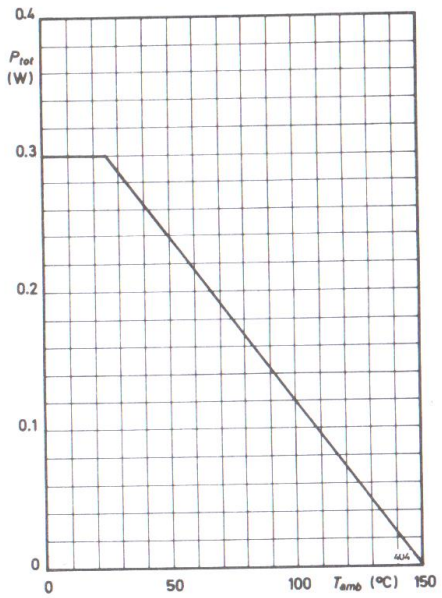
| | | BC 182 | BC 183 | BC 184 | |
|---|---|---|---|---|---|
| DC forward current transfer ratio[1] | | | | | |
| $V_{CE}$ = 5 V, $I_C$ = 0.01 mA | $h_{21E}$ | 90 | 90 | – | in group A |
| | $h_{21E}$ | 150 | 150 | 150 | in group B |
| | $h_{21E}$ | – | 270 | 270 | in group C |
| $V_{CE}$ = 5 V, $I_C$ = 2 mA | $h_{21E}$ | 170 (120 . . . 220) | 170 (120 . . . 220) | – | in group A |
| | $h_{21E}$ | 290 (180 . . . 460) | 290 (180 . . . 460) | 290 (180 . . . 460) | in group B |
| | $h_{21E}$ | – | 500 (380 . . . 800) | 500 (380 . . . 800) | in group C |
| $V_{CE}$ = 5 V, $I_C$ = 100 mA | $h_{21E}$ | 120 | 120 | – | in group A |
| | $h_{21E}$ | 200 | 200 | – | in group B |
| | $h_{21E}$ | – | 400 | – | in group C |
| Collector-emitter saturation voltage | | | | | |
| $I_C$ = 10 mA, $I_B$ = 0.5 mA | $V_{CEsat}$ | | ≤0.25 | | V |
| $I_C$ = 100 mA, $I_B$ = 5 mA | $V_{CEsat}$ | | ≤0.6 | | V |
| Base-emitter saturation voltage | | | | | |
| $I_C$ = 100 mA, $I_B$ = 5 mA | $V_{BEsat}$ | | ≤1.2 | | V |
| Base-emitter voltage | | | | | |
| $V_{CE}$ = 5 V, $I_C$ = 10 µA | $V_{BE}$ | | 0.52 | | V |
| $V_{CE}$ = 5 V, $I_C$ = 2 mA | $V_{BE}$ | | 0.55 . . . 0.7 | | V |
| **Dynamic characteristics** | | | | | |
| $T_{amb}$ = 25 °C | | | | | |
| Transition frequency $V_{CE}$ = 5 V, $I_C$ = 10 mA, f = 100 MHz | $f_T$ | | ≥150 | | MHz |
| Collector-base capacitance $V_{CB}$ = 10 V, f = 1 MHz | $C_{CBO}$ | | 3 (≤5) | | pF |
| Emitter-base capacitance $V_{EB}$ = 0.5 V, f = 1 MHz | $C_{EBO}$ | | 8 | | pF |
| Noise figure $V_{CE}$ = 5 V, $I_C$ = 200 µA, $R_G$ = 2 kΩ, f = 1 kHz, B = 1 Hz | F | 2 (≤10) | 2 (≤10) | – | dB |
| $V_{CE}$ = 5 V, $I_C$ = 200 µA, $R_G$ = 2 kΩ, f = 10 Hz . . . 10 kHz | F | – | – | ≤4 | dB |

[1] as requested, the devices are available, at extra charge, selected in group A, B or C according to their DC forward current transfer ratios $h_{21E}$

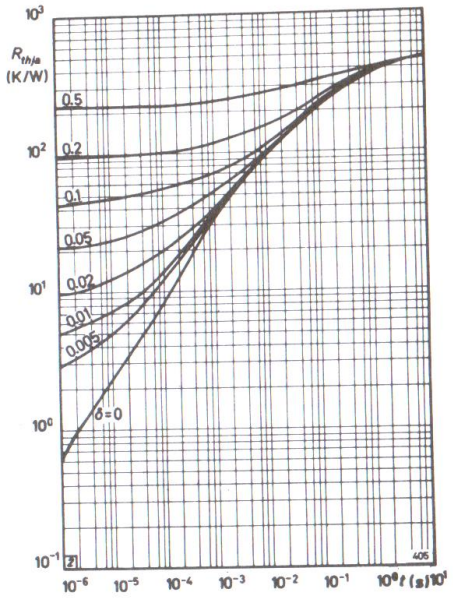
Low frequency small signal hybrid parameters
$V_{CE}$ = 5 V, $I_C$ = 2 mA, f = 1 kHz

| Type | BC 182 | BC 183 | BC 184 | |
|---|---|---|---|---|
| $h_{11e}$ | 3.6 (1.6 . . . 8.5) | 4.5 (1.6 . . . 15) | 6.6 (3.2 . . . 15) | kΩ |
| $h_{12e}$ | 1.7 | 2.0 | 2.5 | $10^{-4}$ |
| $h_{21e}$ | 222 (125 . . . 260)<br>330 (240 . . . 500)<br>– | 222 (125 . . . 260)<br>330 (240 . . . 500)<br>600 (450 . . . 900) | –<br>330 (240 . . . 500)<br>600 (450 . . . 900) | in group A<br>in group B<br>in group C |
| $h_{22e}$ | 25 (≤60) | 30 (≤110) | 45 (≤110) | µS |

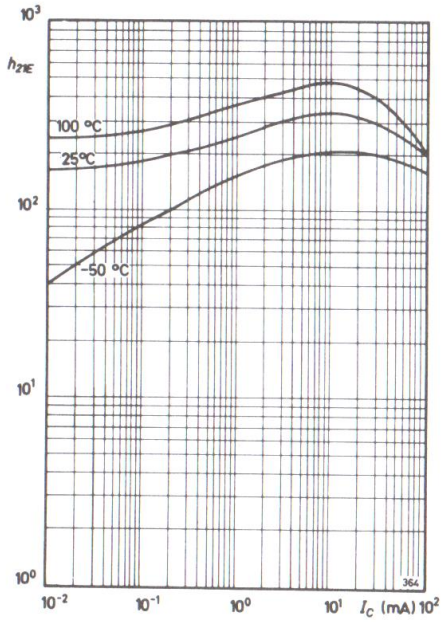
**Permissible total power dissipation versus ambient temperature**
$P_{tot}$ = f ($T_{amb}$)



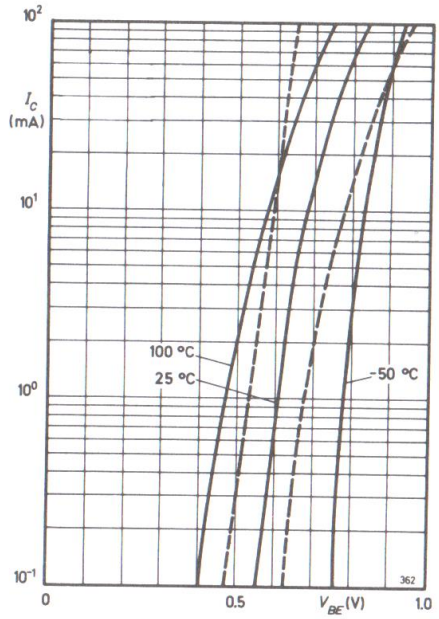

**Pulse thermal resistance versus pulse duration**
$R_{thja}$ = f (t), δ = parameter



**DC forward current transfer ratio versus collector current**
$h_{21E} = f(I_C)$
$V_{CE} = 5\ V$, $T_{amb}$ = parameter
(common emitter configuration)

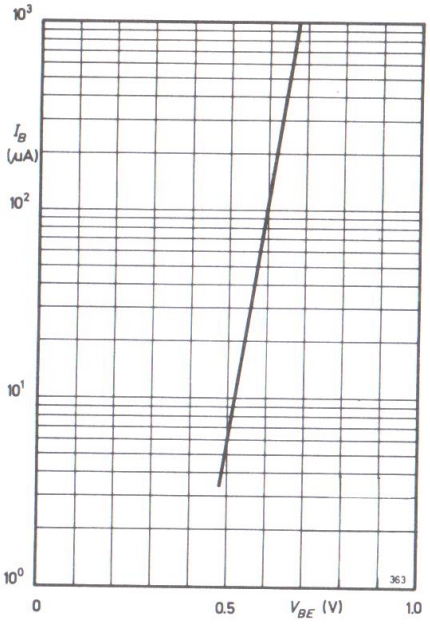



**Collector current versus base-emitter voltage**
$I_C = f(V_{BE})$
$V_{CE} = 5\ V$, $T_{amb}$ = parameter
(common emitter configuration)

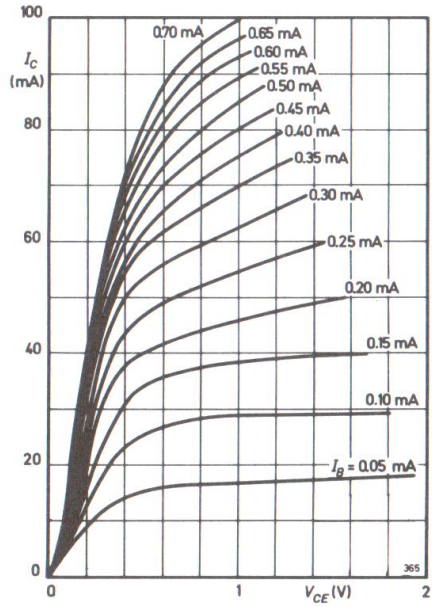



——— Typical
------ Scattering limit at $T_{amb} = 25°C$

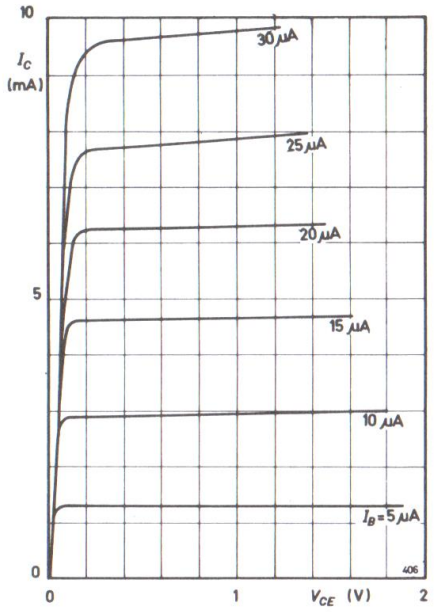
**Base current versus base-emitter voltage**
$I_B = f(V_{BE})$, $V_{CE} = 5\ V$
(common emitter configuration)



**Collector current versus collector-emitter voltage**
$I_C$ = f ($V_{CE}$), $I_B$ = parameter
(common emitter configuration)

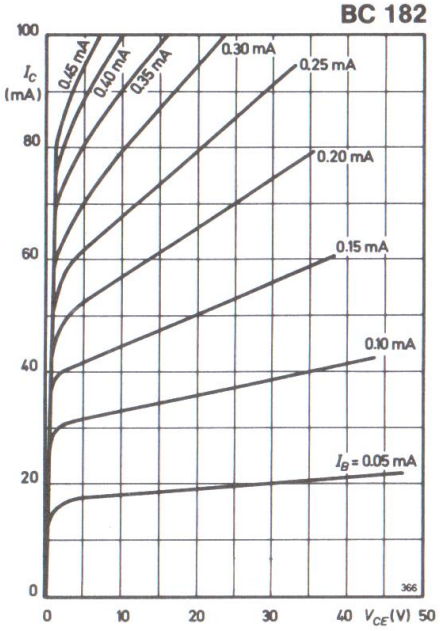



**Collector current versus collector-emitter voltage**
$I_C$ = f ($V_{CE}$), $I_B$ = parameter
(common emitter configuration)



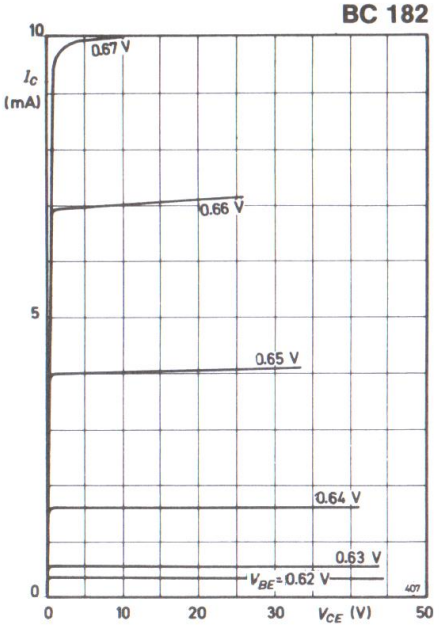

**Collector current versus collector-emitter voltage**
$I_C$ = f ($V_{CE}$), $I_B$ = parameter
(common emitter configuration)

**BC 182**

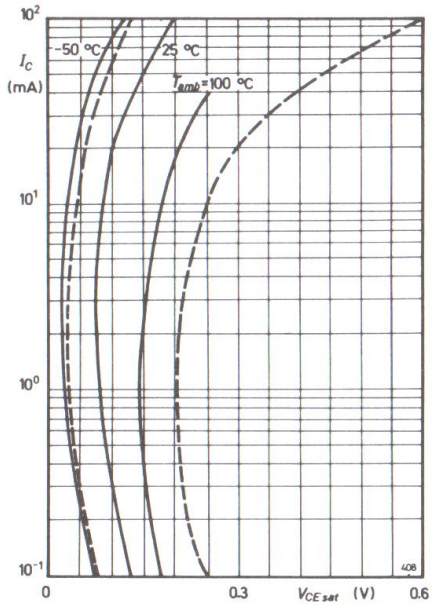



**Collector current versus collector-emitter voltage**
$I_C$ = f ($V_{CE}$), $V_{BE}$ = parameter
(common emitter configuration)

**BC 182**

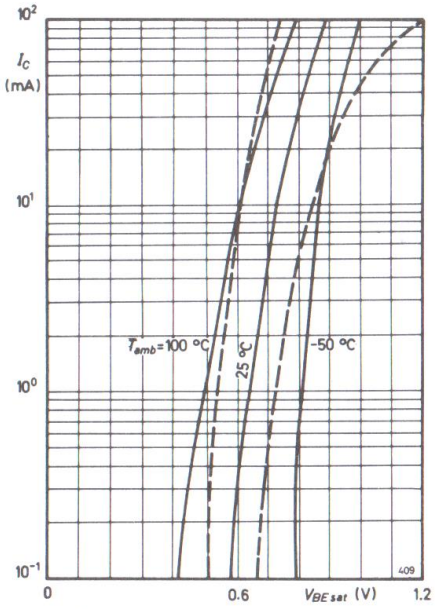


**Collector current versus collector-emitter saturation voltage**
$I_C = f(V_{CEsat})$
$h_{21E} = 20$, $T_{amb}$ = parameter
(common emitter configuration)



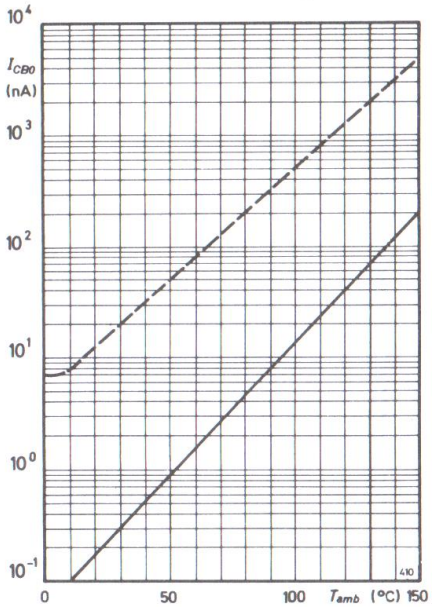

——— Typical
------ Scattering limit at $T_{amb}$ = 25 °C

**Collector current versus base-emitter saturation voltage**
$I_C = f(V_{BEsat})$
$h_{21E} = 20$, $T_{amb}$ = parameter
(common emitter configuration)



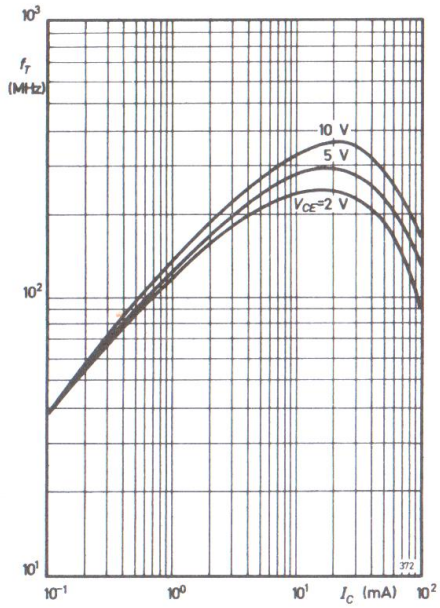

——— Typical
------ Scattering limit at $T_{amb}$ = 25 °C

**Collector-base cut-off current versus ambient temperature**
$I_{CBO} = f(T_{amb})$ at the maximum permissible reverse voltage



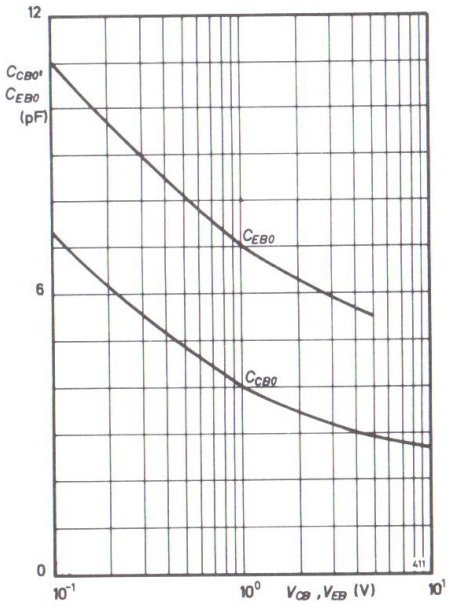

——— Typical
------ Scattering limit

**Transition frequency versus collector current**
$f_T = f(I_C)$, $V_{CE}$ = parameter



**Collector-base and emitter-base capacitance versus collector-base and emitter-base voltage, respectively**

$C_{CBO} = f(V_{CB})$; $C_{EBO} = f(V_{EB})$

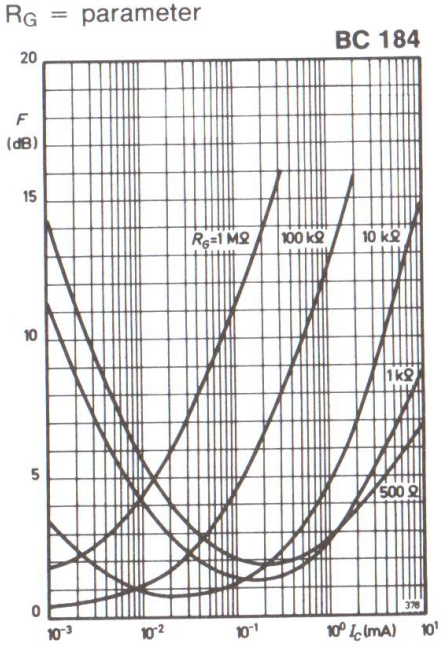



**Noise figure versus collector current**

$F = f(I_C)$, $V_{CE} = 5$ V, f = 1 kHz

$R_G$ = parameter

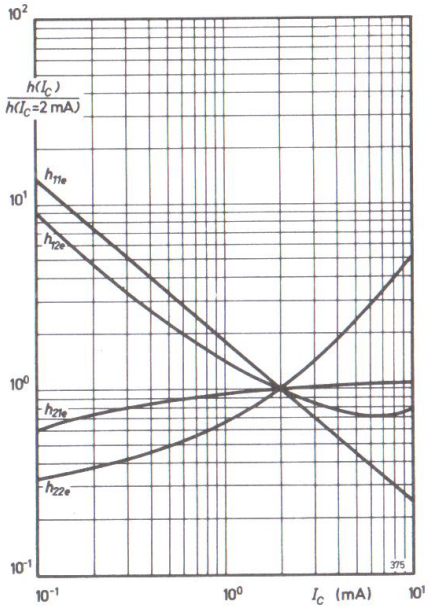
**BC 184**




**h-parameters versus collector current**

$$\frac{h_e(I_C)}{h_e(I_C = 2\text{ mA})} = f(I_C)$$

$V_{CE} = 5$ V




**h-parameters versus collector-emitter voltage**

$$\frac{h_e(V_{CE})}{h_e(V_{CE} = 5\text{ V})} = f(V_{CE})$$

$I_C = 2$ mA