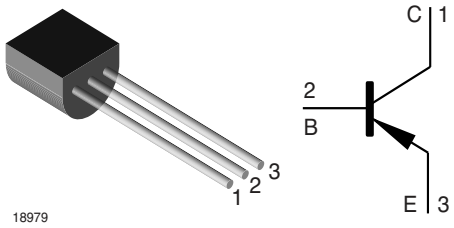
# Small Signal Transistors (PNP)

## Features

- PNP Silicon Epitaxial Planar Transistors for switching and AF amplifier applications.
- These transistors are subdivided into three groups A, B, and C according to their current gain. The type BC556 is available in groups A and B, however, the types BC557 and BC558 can be supplied in all three groups. As complementary types, the NPN transistors BC546...BC548 are recommended.
- On special request, these transistors are also manufactured in the pin configuration TO-18.




## Mechanical Data

**Case:** TO-92 Plastic case

**Weight:** approx. 177 mg

**Packaging Codes/Options:**

BULK / 5 k per container 20 k/box

TAP / 4 k per Ammopack 20 k/box

## Parts Table

| Part | Ordering code | Remarks |
|---|---|---|
| BC556A | BC556A-BULK or BC556A-TAP | Bulk / Ammopack |
| BC556B | BC556B-BULK or BC556B-TAP | Bulk / Ammopack |
| BC557A | BC557A-BULK or BC557A-TAP | Bulk / Ammopack |
| BC557B | BC557B-BULK or BC557B-TAP | Bulk / Ammopack |
| BC557C | BC557C-BULK or BC557C-TAP | Bulk / Ammopack |
| BC558A | BC558A-BULK or BC558A-TAP | Bulk / Ammopack |
| BC558B | BC558B-BULK or BC558B-TAP | Bulk / Ammopack |
| BC558C | BC558C-BULK or BC558C-TAP | Bulk / Ammopack |

## Absolute Maximum Ratings

$T_{amb}$ = 25 °C, unless otherwise specified

| Parameter | Test condition | Part | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Collector - base voltage | | BC556 | $-V_{CBO}$ | 80 | V |
| | | BC557 | $-V_{CBO}$ | 50 | V |
| | | BC558 | $-V_{CBO}$ | 30 | V |
| Collector - emitter voltage | | BC556 | $-V_{CES}$ | 80 | V |
| | | BC557 | $-V_{CES}$ | 50 | V |
| | | BC558 | $-V_{CES}$ | 30 | V |
| | | BC556 | $-V_{CEO}$ | 65 | V |
| | | BC557 | $-V_{CEO}$ | 45 | V |
| | | BC558 | $-V_{CEO}$ | 30 | V |
| Emitter - base voltage | | | $-V_{EBO}$ | 5 | V |
| Collector current | | | $-I_C$ | 100 | mA |
| Peak collector current | | | $-I_{CM}$ | 200 | mA |
| Peak base current | | | $-I_{BM}$ | 200 | mA |
| Peak emitter current | | | $I_{EM}$ | 200 | mA |
| Power dissipation | $T_{amb}$ = 25 °C | | $P_{tot}$ | 500[1)] | mW |

[1)] Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case.

## Maximum Thermal Resistance

| Parameter | Test condition | Symbol | Value | Unit |
|---|---|---|---|---|
| Thermal resistance junction to ambient air | | $R\theta_{JA}$ | 250[1)] | °C/W |
| Junction temperature | | $T_j$ | 150 | °C |
| Storage temperature range | | $T_S$ | - 65 to + 150 | °C |

[1)] Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case.

## Electrical DC Characteristics

| Parameter | Test condition | Part | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Small signal current gain (current gain group A) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{fe}$ | | 220 | | |
| Small signal current gain (current gain group B) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{fe}$ | | 330 | | |
| Small signal current gain (current gain group C) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{fe}$ | | 600 | | |
| Input impedance (current gain group A) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{ie}$ | 1.6 | 2.7 | 4.5 | kΩ |
| Input impedance (current gain group B) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{ie}$ | 3.2 | 4.5 | 8.5 | kΩ |
| Input impedance (current gain group C) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{ie}$ | 6 | 8.7 | 15 | kΩ |
| Output admittance (current gain group A) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{oe}$ | | 18 | 30 | µS |
| Output admittance (current gain group B) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{oe}$ | | 30 | 60 | µS |
| Output admittance (current gain group C) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{oe}$ | | 60 | 110 | µS |
| Reverse voltage transfer ratio (current gain group A) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{re}$ | | $1.5 \times 10^{-4}$ | | |

| Parameter | Test condition | Part | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Reverse voltage transfer ratio (current gain group B) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{re}$ | | $2 \times 10^{-4}$ | | |
| Reverse voltage transfer ratio (current gain group C) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz | | $h_{re}$ | | $3 \times 10^{-4}$ | | |
| DC current gain (current gain group A) | $-V_{CE}$ = 5 V, $-I_C$ = 10 μA | | $h_{FE}$ | | 90 | | |
| DC current gain (current gain group B) | $-V_{CE}$ = 5 V, $-I_C$ = 10 μA | | $h_{FE}$ | | 150 | | |
| DC current gain (current gain group C) | $-V_{CE}$ = 5 V, $-I_C$ = 10 μA | | $h_{FE}$ | | 270 | | |
| DC current gain (current gain group A) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA | | $h_{FE}$ | 110 | 180 | 220 | |
| DC current gain (current gain group B) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA | | $h_{FE}$ | 200 | 290 | 450 | |
| DC current gain (current gain group C) | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA | | $h_{FE}$ | 420 | 500 | 800 | |
| DC current gain (current gain group A) | $-V_{CE}$ = 5 V, $-I_C$ = 100 mA | | $h_{FE}$ | | 120 | | |
| DC current gain (current gain group B) | $-V_{CE}$ = 5 V, $-I_C$ = 100 mA | | $h_{FE}$ | | 200 | | |
| DC current gain (current gain group C) | $-V_{CE}$ = 5 V, $-I_C$ = 100 mA | | $h_{FE}$ | | 400 | | |
| Collector saturation voltage | $-I_C$ = 10 mA, $-I_B$ = 0.5 mA | | $V_{CEsat}$ | | 80 | 300 | mV |
| | $-I_C$ = 100 mA, $-I_B$ = 5 mA | | $V_{CEsat}$ | | 250 | 650 | mV |
| Base saturation voltage | $-I_C$ = 10 mA, $-I_B$ = 0.5 mA | | $V_{BEsat}$ | | 700 | | mV |
| | $-I_C$ = 100 mA, $-I_B$ = 5 mA | | $V_{BEsat}$ | | 900 | | mV |
| Base - voltage | $-V_{CE}$ = 5 V, $-I_C$ = 2 mA | | $V_{BE}$ | 600 | 660 | 700 | mV |
| | $-V_{CE}$ = 5 V, $-I_C$ = 10 mA | | $V_{BE}$ | | | 800 | mV |
| Collector-emitter cut-off current | $-V_{CE}$ = 80 V | BC556 | $I_{CES}$ | | 0.2 | 15 | nA |
| | $-V_{CE}$ = 50 V | BC557 | $I_{CES}$ | | 0.2 | 15 | nA |
| | $-V_{CE}$ = 30 V | BC558 | $I_{CES}$ | | 0.2 | 15 | nA |
| | $-V_{CE}$ = 80 V, $T_j$ = 125 °C | BC556 | $I_{CES}$ | | | 4 | μA |
| | $-V_{CE}$ = 50 V, $T_j$ = 125 °C | BC557 | $I_{CES}$ | | | 4 | μA |
| | $-V_{CE}$ = 30 V, $T_j$ = 125 °C | BC558 | $I_{CES}$ | | | 4 | μA |

## Electrical AC Characteristics

| Parameter | Test condition | Part | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Gain bandwidth product | $-V_{CE}$ = 5 V, $-I_C$ = 10 mA, f = 100 MHz | | $f_T$ | | 150 | | MHz |
| Collector - base capacitance | $-V_{CB}$ = 10 V, f = 1 MHz | | $C_{CBO}$ | | | 6 | pF |
| Noise figure | $-V_{CE}$ = 5 V, $-I_C$ = 200 μA, $R_G$ = 2 kΩ, f = 1 kHz, Δf = 200 Hz | BC556 | F | | 2 | 10 | dB |
| | | BC557 | F | | 2 | 10 | dB |
| | | BC558 | F | | 2 | 10 | dB |

## Typical Characteristics ($T_{amb}$ = 25 °C unless otherwise specified)

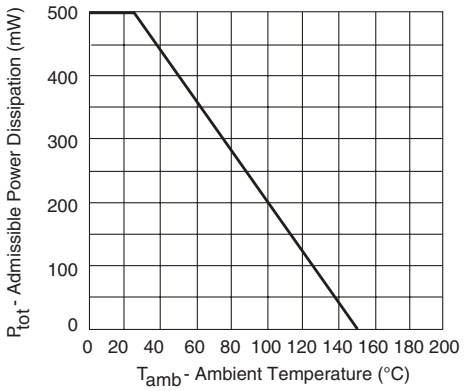



Figure 1. Admissible Power Dissipation vs. Ambient Temperature

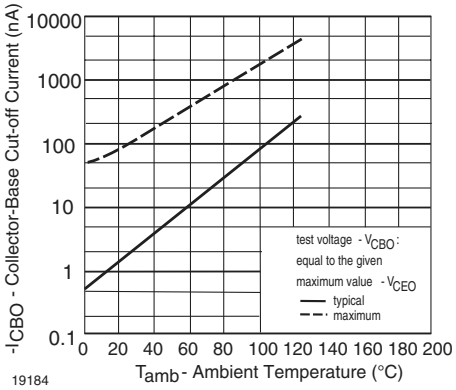



Figure 4. Collector-Base Cut-off Current vs. Ambient Temperature

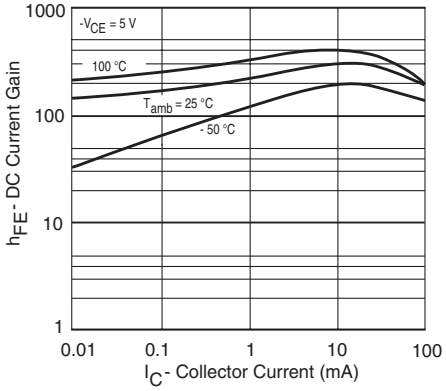



Figure 2. DC Current Gain vs. Collector Current

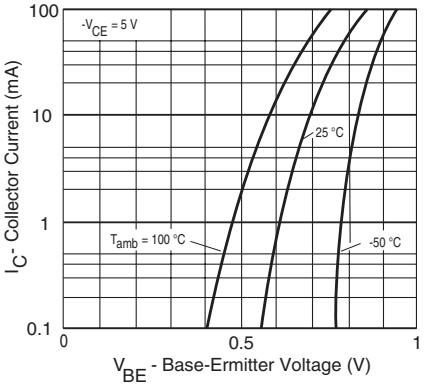



Figure 5. Collector Current vs. Base-Emitter Voltage

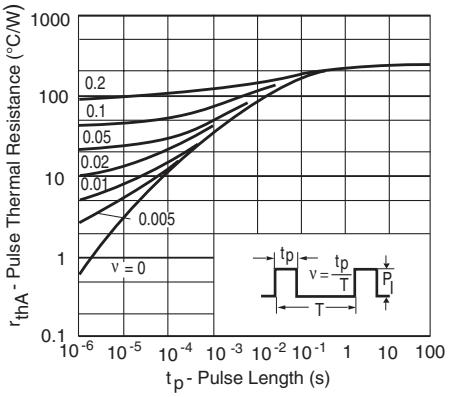



Figure 3. Pulse Thermal Resistance vs. Pulse Duration

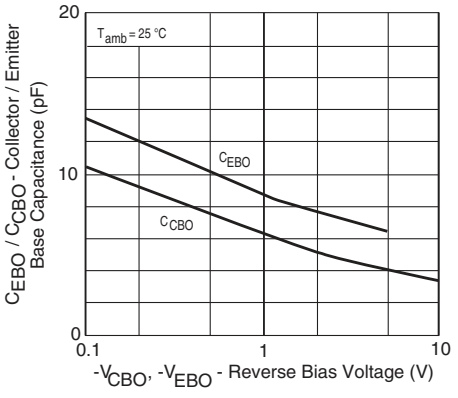



Figure 6. Collector-Base Capacitance, Emitter-Base Capacitance vs. Bias Voltage

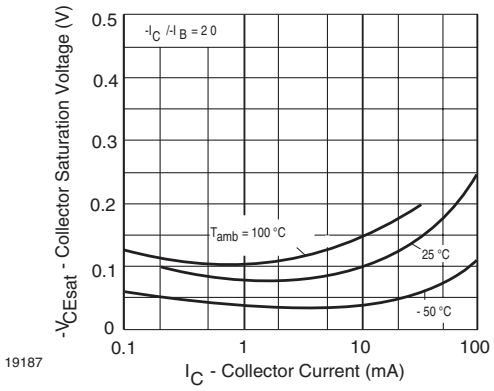



Figure 7. Collector Saturation Voltage vs. Collector Current

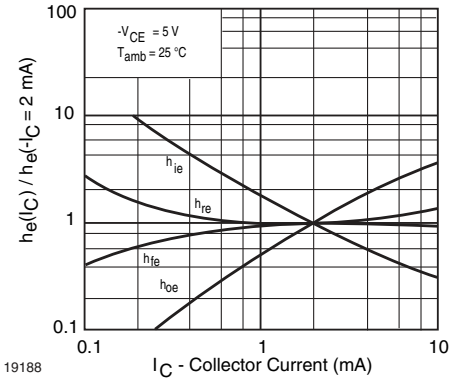



Figure 8. Relative h-Parameters vs. Collector Current

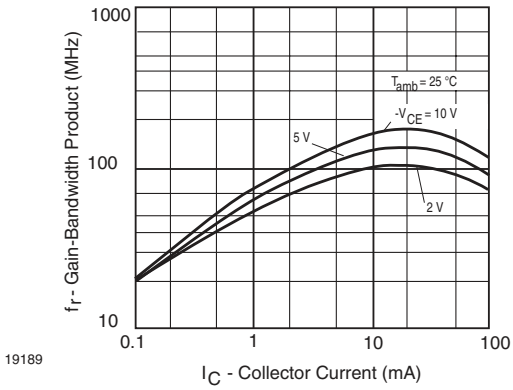
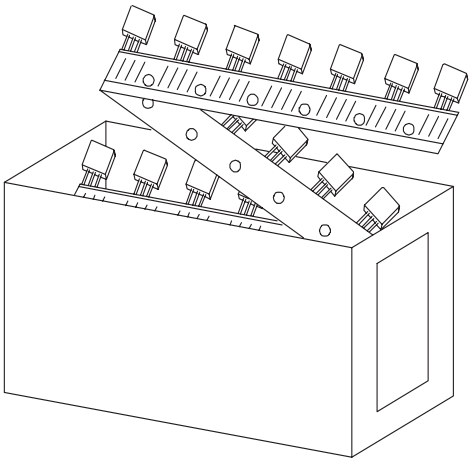
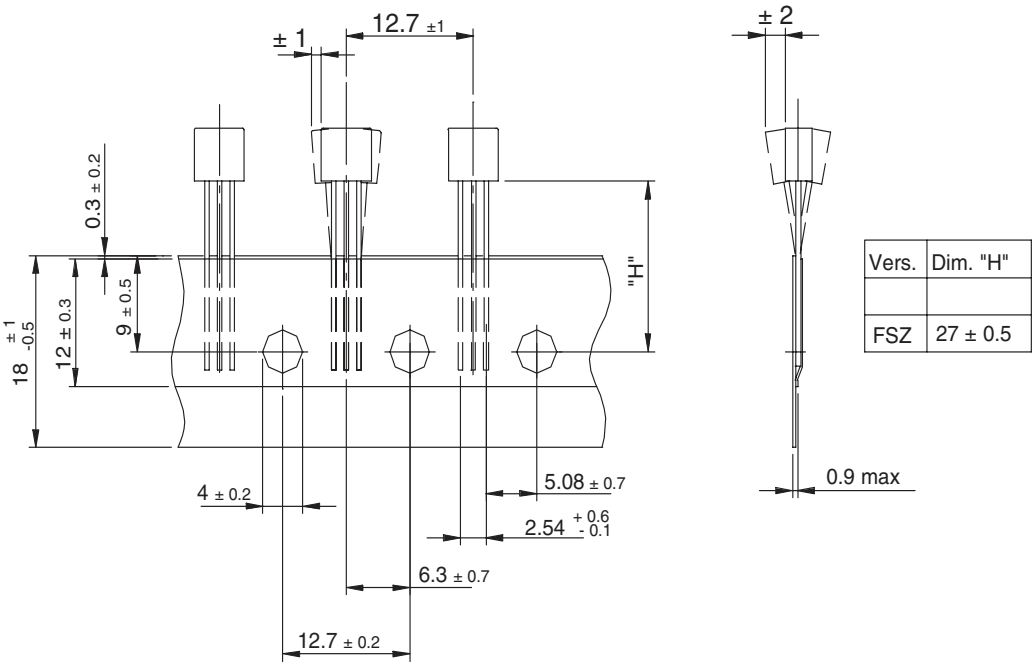



Figure 9. Gain-Bandwidth Product vs. Collector Current

## Packaging for Radial Taping

Dimensions in mm






| Vers. | Dim. "H" |
|---|---|
| | |
| FSZ | 27 ± 0.5 |

Measure limit over 20 index - holes: ± 1

18787

## Package Dimensions in mm (Inches)