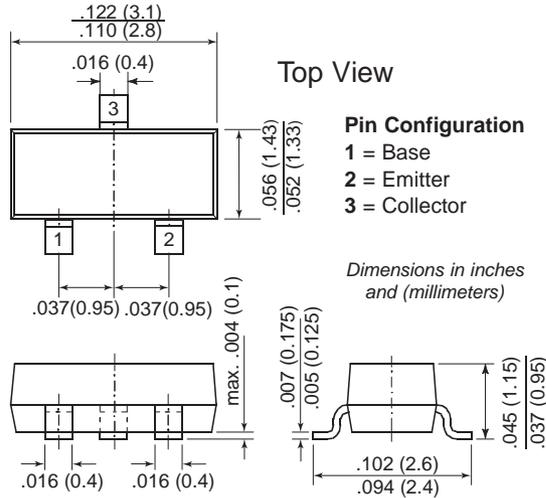




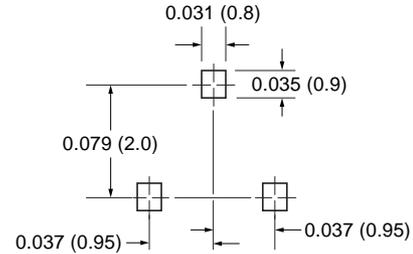
Small Signal Transistors (NPN)



TO-236AB (SOT-23)



Mounting Pad Layout



| Type | Marking | Type | Marking |
|--------|---------|--------|---------|
| BC846A | 1A | BC848A | 1J |
| B | 1B | B | 1K |
| | | C | 1L |
| BC847A | 1E | BC849B | 2B |
| B | 1F | C | 2C |
| C | 1G | | |

Features

- NPN Silicon Epitaxial Planar Transistors for switching and AF amplifier applications.
- Especially suited for automatic insertion in thick and thin-film circuits.
- These transistors are subdivided into three groups (A, B, and C) according to their current gain. The type BC846 is available in groups A and B, however, the types BC847 and BC848 can be supplied in all three groups. The BC849 is a low noise type available in groups B and C. As complementary types, the PNP transistors BC856...BC859 are recommended.

Mechanical Data

Case: SOT-23 Plastic Package
Weight: approx. 0.008g
Packaging Codes/Options:
 E8/10K per 13" reel (8mm tape), 30K/box
 E9/3K per 7" reel (8mm tape), 30K/box

Maximum Ratings and Thermal Characteristics (T_A = 25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|--------------------------------|------------------------|------|
| Collector-Base Voltage | BC846 BC847 BC848, BC849 | VCBO 80 50 30 | V |
| Collector-Emitter Voltage | BC846 BC847 BC848, BC849 | VCEs 80 50 30 | V |
| Collector-Emitter Voltage | BC846 BC847 BC848, BC849 | VCEO 65 45 30 | V |
| Emitter-Base Voltage | BC846, BC847 BC848, BC849 | VEBO 6 5 | V |
| Collector Current | IC | 100 | mA |
| Peak Collector Current | ICM | 200 | mA |
| Peak Base Current | IBM | 200 | mA |
| Peak Emitter Current | -IEM | 200 | mA |
| Power Dissipation at T _{SB} = 50°C | P _{tot} | 310 ⁽¹⁾ | mW |
| Thermal Resistance Junction to Ambient Air | R _{θJA} | 450 ⁽¹⁾ | °C/W |
| Thermal Resistance Junction to Substrate Backside | R _{θSB} | 320 ⁽¹⁾ | °C/W |
| Junction Temperature | T _j | 150 | °C |
| Storage Temperature Range | T _s | -65 to +150 | °C |

Note: (1) Device on fiberglass substrate, see layout on third page.

BC846 thru BC849

Vishay Semiconductors
formerly General Semiconductor



Electrical Characteristics (T_J = 25°C unless otherwise noted)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|--|--|---|----------|------------------------|------------|----------|
| Small Signal Current Gain | | | | | | |
| Current Gain Group A | h _{fe} | V _{CE} = 5V, I _C = 2mA f = 1kHz | — | 220 | — | — |
| B | | | — | 330 | — | — |
| C | | | — | 600 | — | — |
| Input Impedance | | | | | | |
| Current Gain Group A | h _{ie} | V _{CE} = 5V, I _C = 2mA f = 1kHz | 1.6 | 2.7 | 4.5 | kΩ |
| B | | | 3.2 | 4.5 | 8.5 | |
| C | | | 6.0 | 8.7 | 15.0 | |
| Output Admittance | | | | | | |
| Current Gain Group A | h _{oe} | V _{CE} = 5V, I _C = 2mA f = 1kHz | — | 18 | 30 | μS |
| B | | | — | 30 | 60 | |
| C | | | — | 60 | 110 | |
| Reverse Voltage Transfer Ratio | | | | | | |
| Current Gain Group A | h _{re} | V _{CE} = 5V, I _C = 2mA f = 1kHz | — | 1.5 · 10 ⁻⁴ | — | — |
| B | | | — | 2 · 10 ⁻⁴ | — | — |
| C | | | — | 3 · 10 ⁻⁴ | — | — |
| DC Current Gain | | | | | | |
| Current Gain Group A | h _{FE} | V _{CE} = 5V, I _C = 10μA | — | 90 | — | — |
| B | | | — | 150 | — | — |
| C | | | — | 270 | — | — |
| Current Gain Group A | h _{FE} | V _{CE} = 5V, I _C = 2mA | 110 | 180 | 220 | — |
| B | | | 200 | 290 | 450 | — |
| C | | | 420 | 520 | 800 | — |
| Collector Saturation Voltage | V _{CEsat} | I _C = 10mA, I _B = 0.5mA I _C = 100mA, I _B = 5mA | — — | 90 200 | 250 600 | mV |
| Base Saturation Voltage | V _{BEsat} | I _C = 10mA, I _B = 0.5mA I _C = 100mA, I _B = 5mA | — — | 700 900 | — — | mV |
| Base-Emitter Voltage V _{BEon} | V _{CE} = 5V, I _C = 2mA | 580 V _{CE} = 5V, I _C = 10mA | 660 — | 700 — | mV 770 | |
| Collector-Base Cutoff Current | I _{CBO} | V _{CB} = 30V V _{CB} = 30V, T _J = 150°C | — — | — — | 15 5 | nA μA |
| Gain-Bandwidth Product | f _T | V _{CE} = 5V, I _C = 10mA f = 100MHz | — | 300 | — | MHz |
| Collector-Base Capacitance | C _{CB0} | V _{CB} = 10V, f = 1MHz | — | 3.5 | 6 | pF |
| Emitter-Base Capacitance | C _{EB0} | V _{EB} = 0.5V, f = 1MHz | — | 9 | — | pF |
| Noise Figure | F | V _{CE} = 5V, I _C = 200μA R _G = 2kΩ, f = 1kHz, Δf = 200Hz | — — | 2 1.2 | 10 4 | dB dB |
| | | V _{CE} = 5V, I _C = 200μA R _G = 2kΩ, f = 30...15000Hz | — | 1.4 | 4 | dB |

Note: (1) Device on fiberglass substrate, see layout on next page

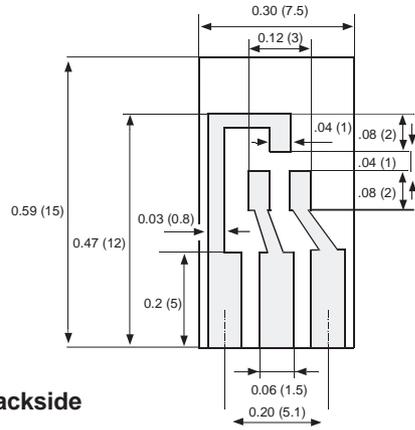


BC846 thru BC849

Vishay Semiconductors
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Layout for $R_{\theta JA}$ test

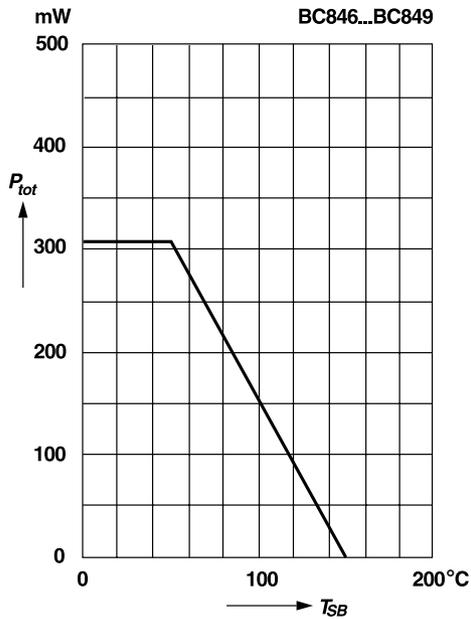
Thickness:
Fiberglass 0.059 in. (1.5 mm)
Copper leads 0.012 in. (0.3 mm)



Dimensions in inches (millimeters)

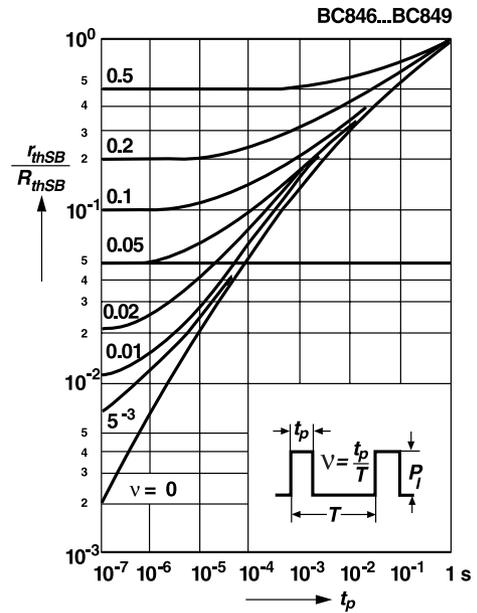
Admissible power dissipation versus temperature of substrate backside

Device on fiberglass substrate, see layout

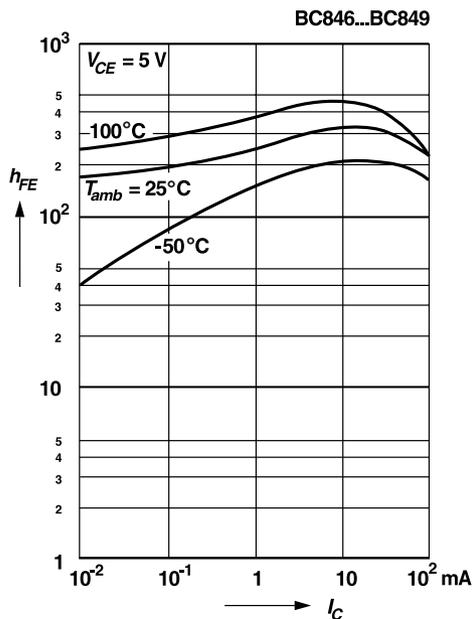


Pulse thermal resistance versus pulse duration (normalized)

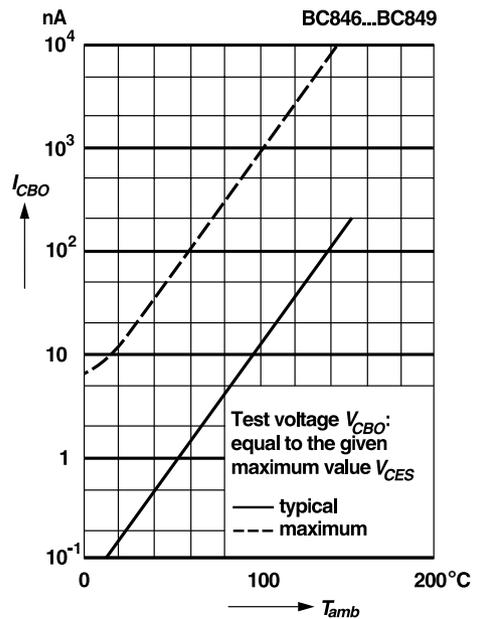
Device on fiberglass substrate, see layout



DC current gain versus collector current



Collector-Base cutoff current versus ambient temperature



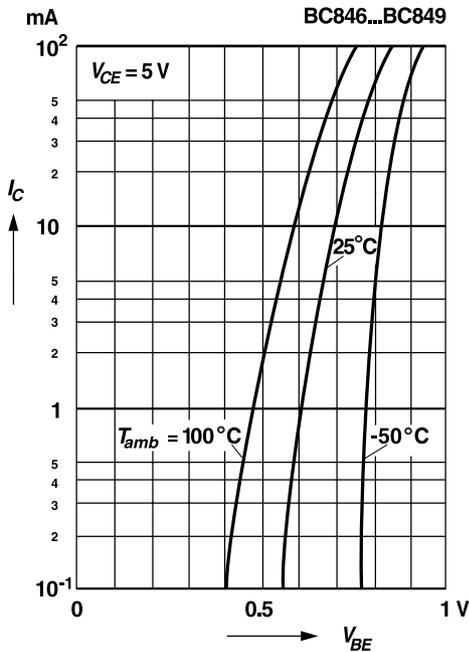
BC846 thru BC849

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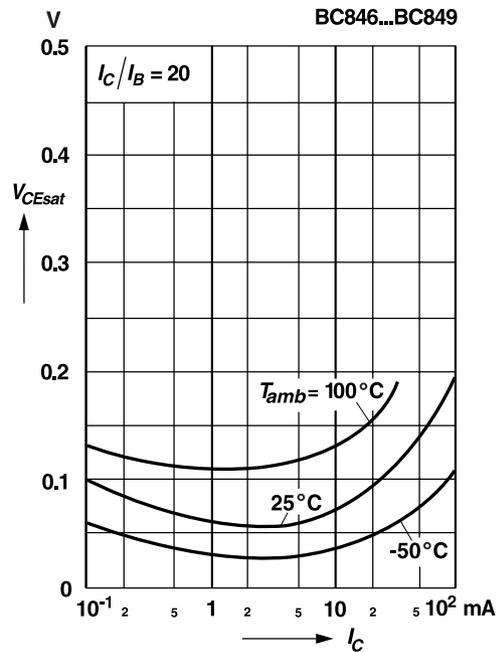


Ratings and Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

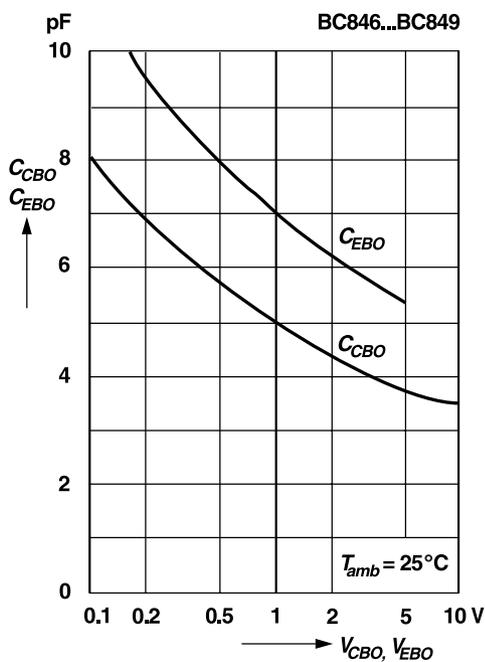
Collector current versus base-emitter voltage



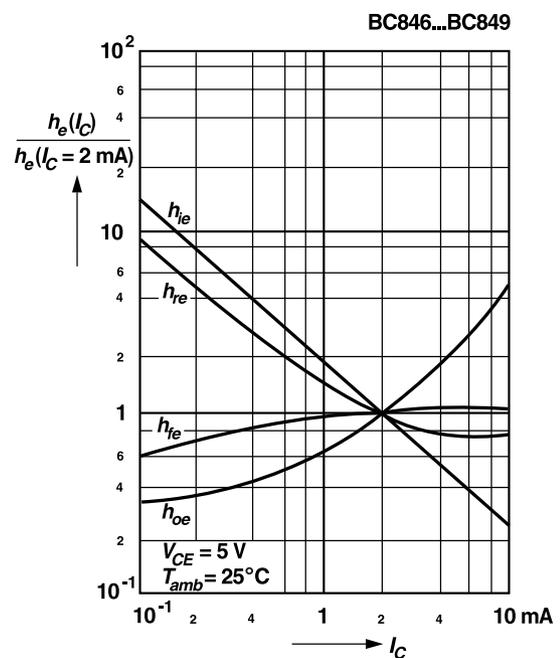
Collector saturation voltage versus collector current



Collector base capacitance, Emitter base capacitance versus reverse bias voltage



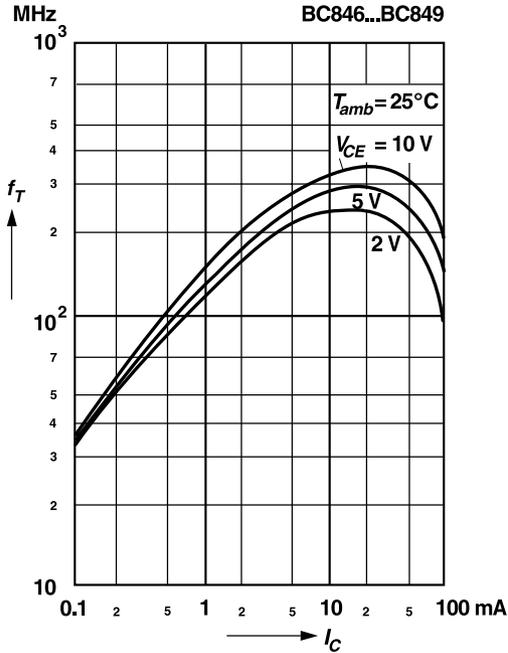
Relative h-parameters versus collector current



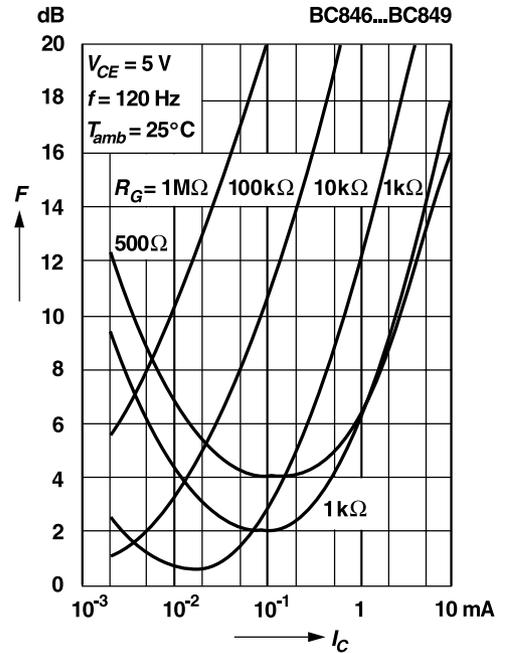


Ratings and Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

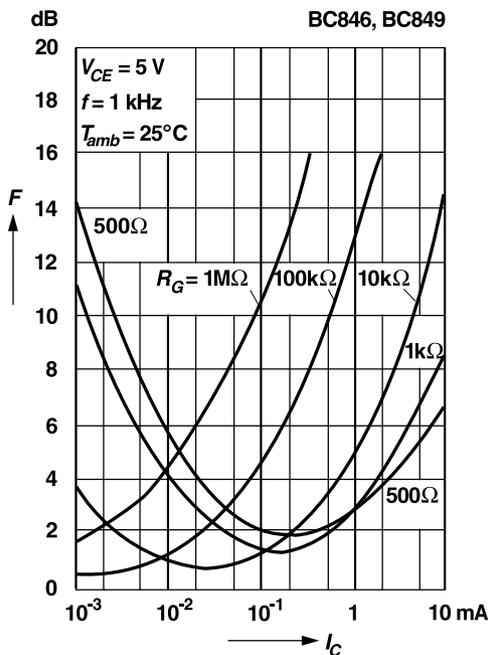
Gain-bandwidth product versus collector current



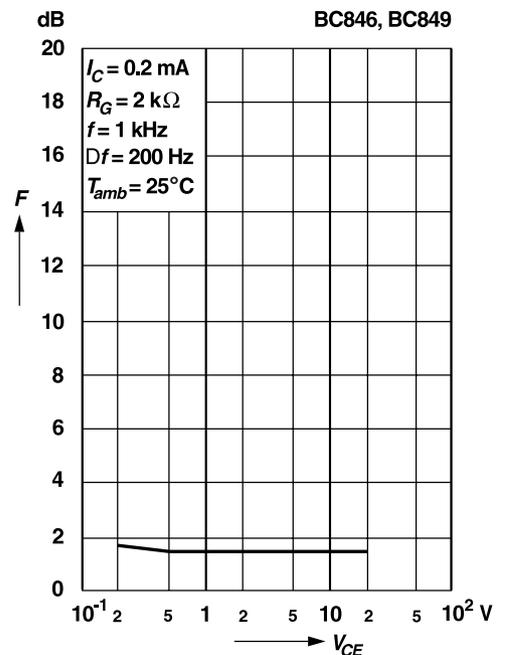
Noise figure versus collector current



Noise figure versus collector current



Noise figure versus collector emitter voltage



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