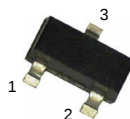


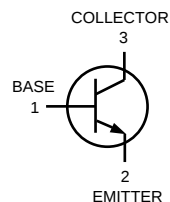
## General Purpose Transistor

### NPN Silicon

**BC848A,B,C**



SOT-23



#### MAXIMUM RATINGS

| Rating                       | Symbol           | Value | Unit            |
|------------------------------|------------------|-------|-----------------|
| Collector-Emitter Voltage    | V <sub>CEO</sub> | 30    | V <sub>dc</sub> |
| Collector-Base Voltage       | V <sub>CB0</sub> | 30    | V <sub>dc</sub> |
| Emitter-Base Voltage         | V <sub>EB0</sub> | 5.0   | V <sub>dc</sub> |
| Collector Current-Continuous | I <sub>c</sub>   | 100   | mAdc            |

#### THERMAL CHARACTERISTICS

| Characteristic                                                                                       | Symbol                           | Max.        | Unit          |
|------------------------------------------------------------------------------------------------------|----------------------------------|-------------|---------------|
| Total Device Dissipation FR-5 Board <sup>(1)</sup> T <sub>A</sub> =25°C<br>Derate above 25°C         | P <sub>D</sub>                   | 225<br>1.8  | mW<br>mW / °C |
| Thermal Resistance Junction to Ambient                                                               | R <sub>θJA</sub>                 | 556         | °C / W        |
| Total Device Dissipation Alumina Substrate, <sup>(2)</sup> T <sub>A</sub> =25°C<br>Derate above 25°C | P <sub>D</sub>                   | 300<br>2.4  | mW<br>mW / °C |
| Thermal Resistance Junction to Ambient                                                               | R <sub>θJA</sub>                 | 417         | °C / W        |
| Junction and Storage Temperature                                                                     | T <sub>J</sub> ,T <sub>STG</sub> | -55 to +150 | °C            |

#### DEVICE MARKING

**BC848A=1J; BC848B=1K; BC848C=1L**

#### ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise noted)

| Characteristic | Symbol | Min. | Typ. | Max. | Unit |
|----------------|--------|------|------|------|------|
|----------------|--------|------|------|------|------|

#### OFF CHARACTERISTICS

|                                                                                                            |                      |        |        |           |                 |
|------------------------------------------------------------------------------------------------------------|----------------------|--------|--------|-----------|-----------------|
| Collector-Emitter Breakdowe Voltage<br>( I <sub>C</sub> =10mA )                                            | V <sub>(BR)CEO</sub> | 30     | -      | -         | V <sub>dc</sub> |
| Collector-Emitter Breakdowe Voltage<br>( I <sub>C</sub> =10 uA, V <sub>EB</sub> =0 )                       | V <sub>(BR)CES</sub> | 30     | -      | -         | V <sub>dc</sub> |
| Collector-Base Breakdowe Voltage<br>( I <sub>C</sub> =10 uA )                                              | V <sub>(BR)CBO</sub> | 30     | -      | -         | V <sub>dc</sub> |
| Emitter-Base Breakdowe Voltage<br>( I <sub>E</sub> =1.0 uA )                                               | V <sub>(BR)EBO</sub> | 5.0    | -      | -         | V <sub>dc</sub> |
| Collector Cutoff Current<br>( V <sub>CB</sub> =30 V )<br>( V <sub>CB</sub> =30 V, T <sub>A</sub> = 150°C ) | I <sub>CBO</sub>     | -<br>- | -<br>- | 15<br>5.0 | nAdc<br>uAdc    |

(1) FR-5=1.0 x 0.75 x 0.062in.

(2) Alumina=0.4 x 0.3 x 0.024in. 99.5% alumina.

**ELECTRICAL CHARACTERISTICS** (TA=25°C unless otherwise noted) (Continued)

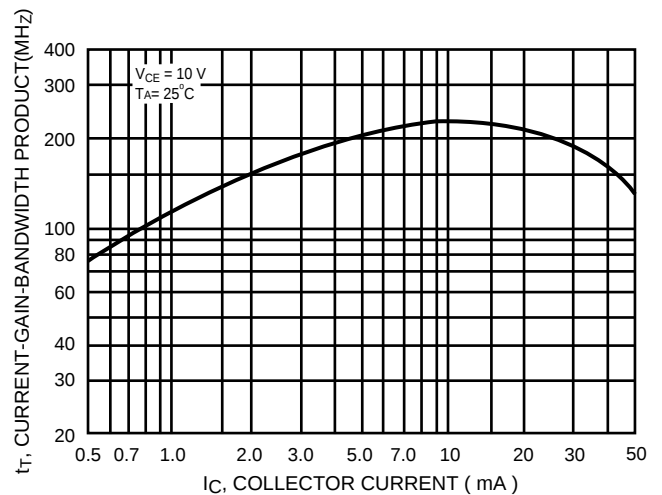
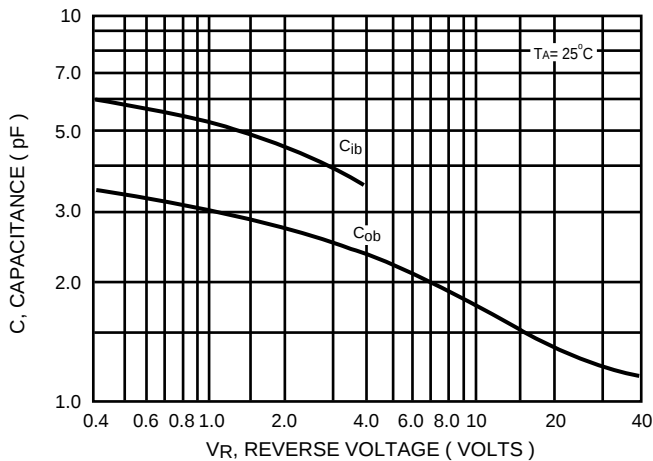
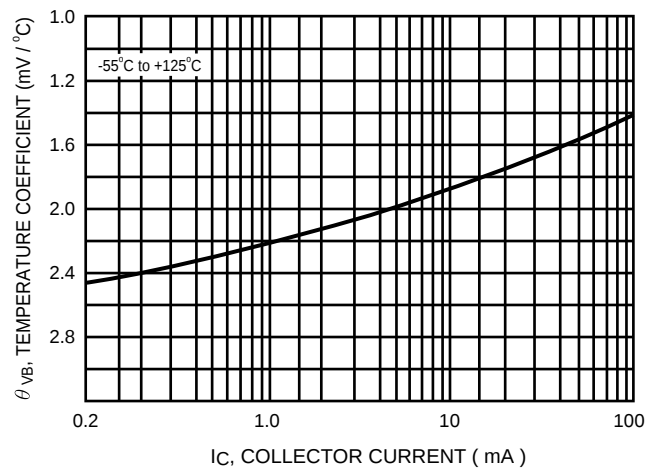
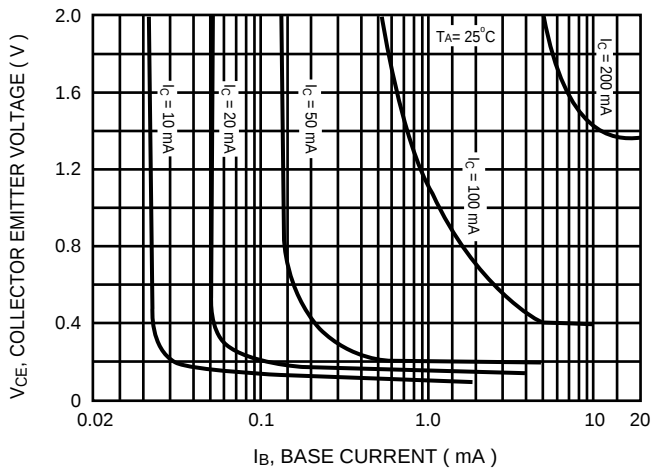
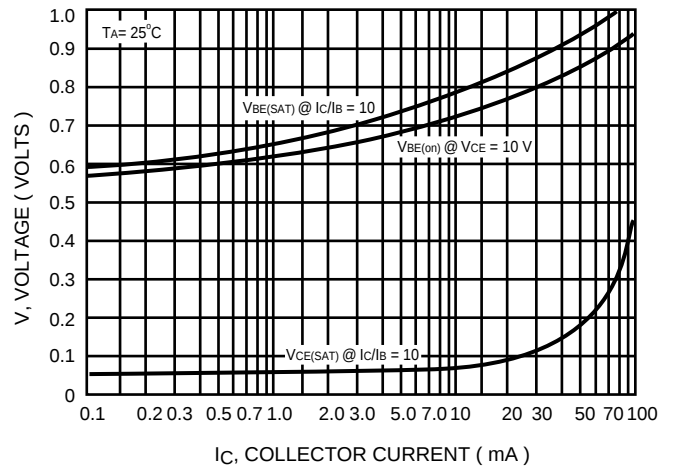
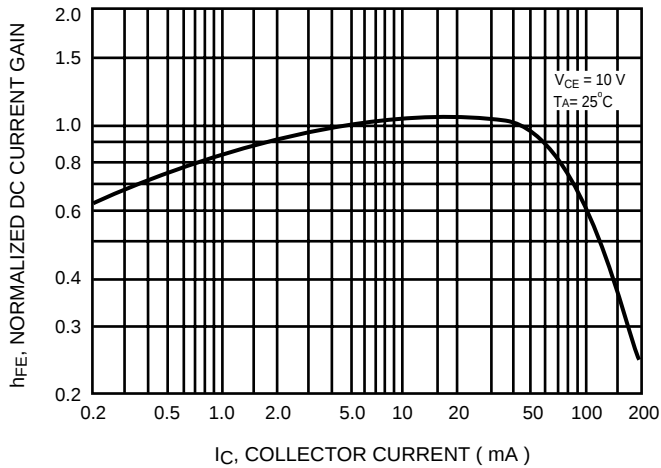
| Characteristic | Symbol | Min. | Typ. | Max. | Unit |
|----------------|--------|------|------|------|------|
|----------------|--------|------|------|------|------|

**ON CHARACTERISTICS**

|                                                                                                 |          |     |     |      |    |
|-------------------------------------------------------------------------------------------------|----------|-----|-----|------|----|
| DC Current Gain<br>( IC= 10 $\mu$ A, VCE= 5.0 V )<br><br>( IC= 2.0 mA, VCE= 5.0 V )             | BC848A   | -   | 90  | -    | -  |
|                                                                                                 | BC848B   | -   | 150 | -    |    |
|                                                                                                 | BC848C   | -   | 270 | -    |    |
|                                                                                                 | BC848A   | 110 | 180 | 220  |    |
|                                                                                                 | BC848B   | 200 | 290 | 450  |    |
|                                                                                                 | BC848C   | 420 | 520 | 800  |    |
| Collector-Emitter Saturation Voltage<br>( IC= 10 mA, IB= 0.5 mA )<br>( IC= 100 mA, IB= 5.0 mA ) | VCE(sat) | -   | -   | 0.25 | V  |
|                                                                                                 |          | -   | -   | 0.60 |    |
| Base-Emitter Saturation Voltage<br>( IC= 10 mA, IB= 0.5 mA )<br>( IC= 100 mA, IB= 5.0 mA )      | VBE(sat) | -   | 0.7 | -    | V  |
|                                                                                                 |          | -   | 0.9 | -    |    |
| Base-Emitter Voltage<br>( IC= 2.0 mA, VCE= 5.0 V )<br>( IC= 10 mA, VCE= 5.0 V )                 | VBE(on)  | 580 | 660 | 700  | mV |
|                                                                                                 |          | -   | -   | 770  |    |

**SMALL-SIGNAL CHARACTERISTIC**

|                                                                                   |                  |     |   |     |     |
|-----------------------------------------------------------------------------------|------------------|-----|---|-----|-----|
| Current-Gain-Bandwidth Product<br>( IC= 10 mA, VCE= 5.0 V, f=100 MHz )            | f <sub>T</sub>   | 100 | - | -   | MHz |
| Output Capacitance<br>( VCB= 10 V, f=1.0 MHz )                                    | C <sub>obo</sub> | -   | - | 4.5 | pF  |
| Noise Figure<br>( VCE= 5.0 Vdc, IC= 0.2 mA, RS= 2.0k ohms, f=1.0 kHz, BW = 200Hz) | NF               | -   | - | 10  | dB  |



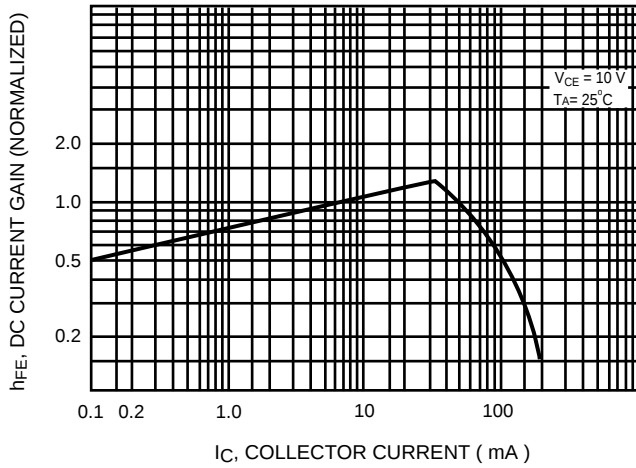


Figure 7. DC Current Gain

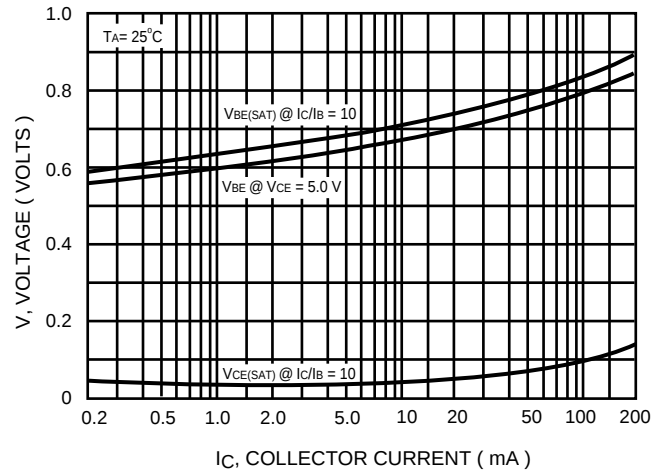


Figure 8. "On" Voltage

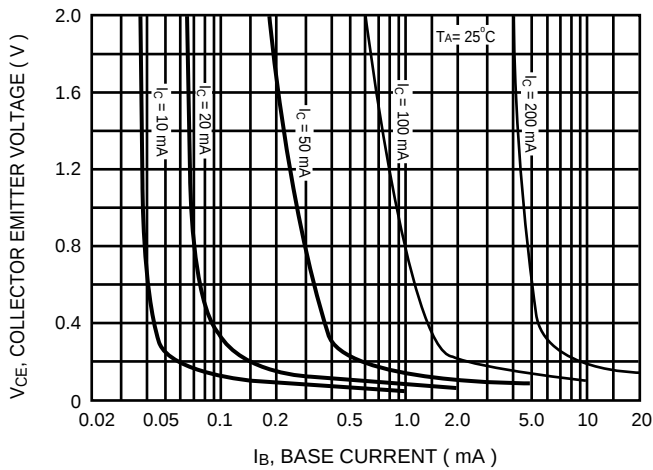


Figure 9. Collector Saturation Region

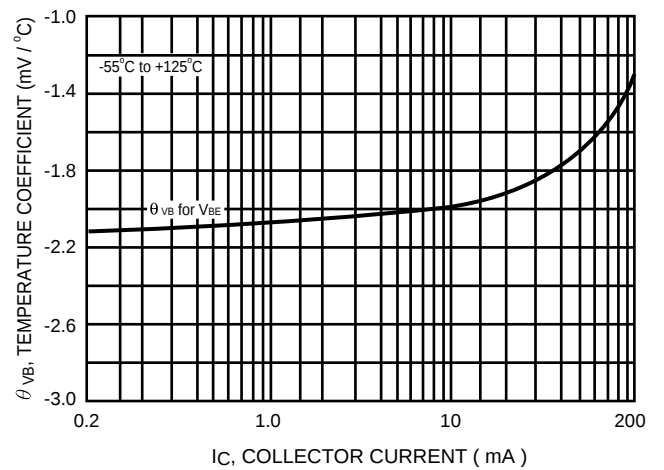


Figure 10. Base-Emitter Temperature Coefficient

