

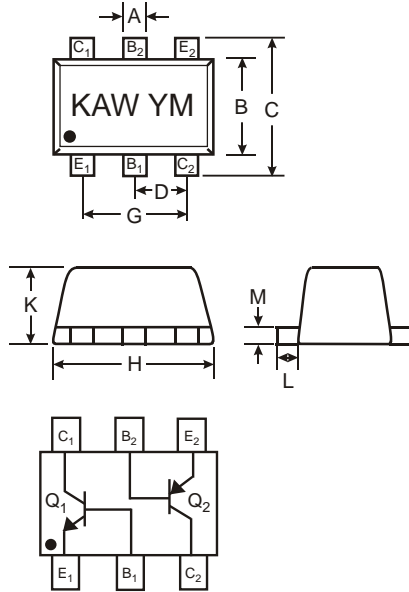
COMPLEMENTARY PAIR SMALL SIGNAL SURFACE MOUNT TRANSISTOR

Features

- Epitaxial Die Construction
- Two internally isolated NPN/PNP Transistors in one package
- Ultra-Small Surface Mount Package
- **Lead Free By Design/RoHS Compliant (Note 2)**
- **"Green" Device (Note 3)**

Mechanical Data

- Case: SOT-563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking (See Page 3): KAW YM
- Ordering & Date Code Information: See Page 4
- Weight: 0.003 grams (approximate)



| SOT-563 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.15 | 0.30 | 0.25 |
| B | 1.10 | 1.25 | 1.20 |
| C | 1.55 | 1.70 | 1.60 |
| D | 0.50 | | |
| G | 0.90 | 1.10 | 1.00 |
| H | 1.50 | 1.70 | 1.60 |
| K | 0.56 | 0.60 | 0.60 |
| L | 0.10 | 0.30 | 0.20 |
| M | 0.10 | 0.18 | |
| All Dimensions in mm | | | |

Maximum Ratings @ T_A = 25°C unless otherwise specified **NPN, BC847B Type (Q₁)**

| Characteristic | Symbol | Value | Unit |
|---------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | 50 | V |
| Collector-Emitter Voltage | V _{CEO} | 45 | V |
| Emitter-Base Voltage | V _{EBO} | 6.0 | V |
| Collector Current | I _C | 100 | mA |
| Peak Collector Current | I _{CM} | 200 | mA |
| Peak Emitter Current | I _{EM} | 200 | mA |

Maximum Ratings @ T_A = 25°C unless otherwise specified **PNP, BC857B Type (Q₂)**

| Characteristic | Symbol | Value | Unit |
|---------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | -50 | V |
| Collector-Emitter Voltage | V _{CEO} | -45 | V |
| Emitter-Base Voltage | V _{EBO} | -5.0 | V |
| Collector Current | I _C | -100 | mA |
| Peak Collector Current | I _{CM} | -200 | mA |
| Peak Emitter Current | I _{EM} | -200 | mA |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 1) @ T _A = 25°C Total Device | P _d | 150 | mW |
| Thermal Resistance, Junction to Ambient (Note 1) @ T _A = 25°C | R _{JA} | 833 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -65 to +150 | °C |

- Notes:
1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
 2. No purposefully added lead.
 3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified **NPN, BC847B Type (Q_1)**

| Characteristic (Note 4) | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------------|---------------|----------|------------|------------|---------------------|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 50 | — | — | V | $I_C = 10\mu\text{A}, I_B = 0$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | 45 | — | — | V | $I_C = 10\text{mA}, I_B = 0$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 6 | — | — | V | $I_E = 1\mu\text{A}, I_C = 0$ |
| DC Current Gain | h_{FE} | 200 | 290 | 450 | — | $V_{CE} = 5.0\text{V}, I_C = 2.0\text{mA}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | 90 200 | 250 600 | mV | $I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5.0\text{mA}$ |
| Base-Emitter Saturation Voltage | $V_{BE(SAT)}$ | — | 700 900 | — | mV | $I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5.0\text{mA}$ |
| Base-Emitter Voltage | $V_{BE(ON)}$ | 580 — | 660 — | 700 720 | mV | $V_{CE} = 5.0\text{V}, I_C = 2.0\text{mA}$ $V_{CE} = 5.0\text{V}, I_C = 10\text{mA}$ |
| Collector-Cutoff Current | I_{CBO} | — | — | 15 5.0 | nA μA | $V_{CB} = 30\text{V}$ $V_{CB} = 30\text{V}, T_A = 150^\circ\text{C}$ |
| Gain Bandwidth Product | f_T | 100 | 300 | — | MHz | $V_{CE} = 5.0\text{V}, I_C = 10\text{mA}$, $f = 100\text{MHz}$ |
| Collector-Base Capacitance | C_{CBO} | — | 3.5 | 6.0 | pF | $V_{CB} = 10\text{V}, f = 1.0\text{MHz}$ |

Note: 4. Short duration pulse test used to minimize self-heating effect.

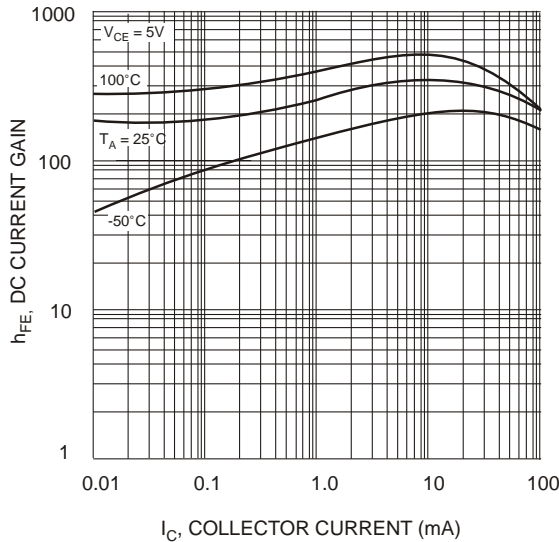


Fig. 1, DC Current Gain vs Collector Current (BC847B Type)

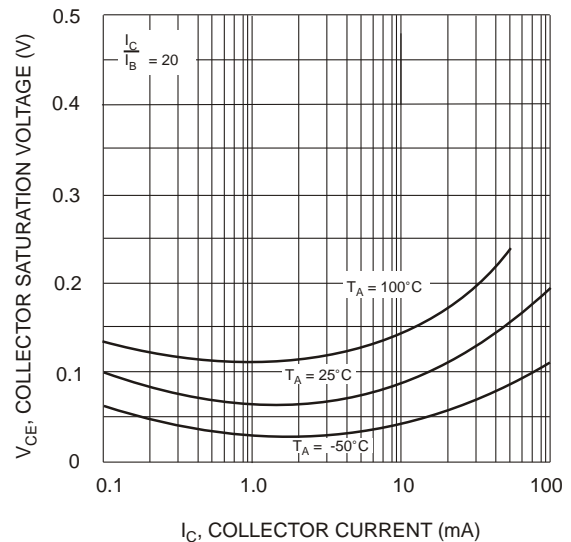


Fig. 2, Collector-Emitter Saturation Voltage vs Collector Current (BC847B Type)

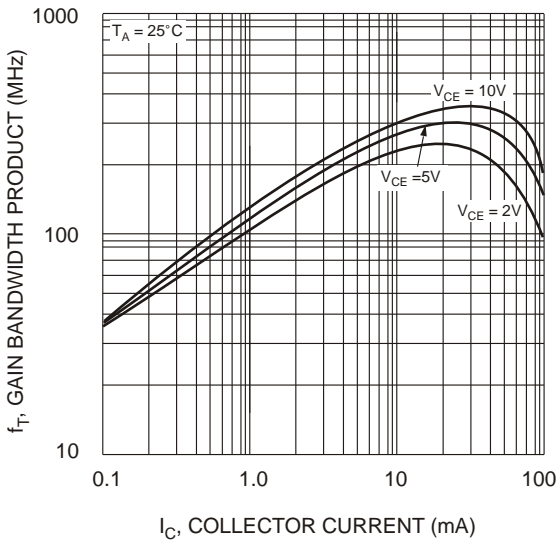


Fig. 3, Gain Bandwidth Product vs Collector Current (BC847B Type)

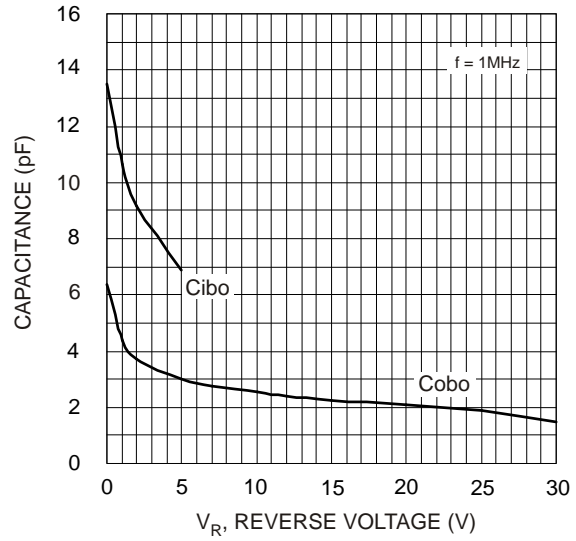


Fig. 4, Capacitance vs. Reverse Voltage (BC847B Type)

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified PNP, BC857B Type (Q_2)

| Characteristic (Note 5) | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------------|---------------|------|--------------|--------------|---------------------|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -50 | — | — | V | $I_C = -10\mu\text{A}, I_B = 0$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | -45 | — | — | V | $I_C = -10\text{mA}, I_B = 0$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -5 | — | — | V | $I_E = -1\mu\text{A}, I_C = 0$ |
| DC Current Gain | h_{FE} | 220 | 290 | 475 | — | $V_{CE} = -5.0\text{V}, I_C = -2.0\text{mA}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | -75 -250 | -300 -650 | mV | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$ $I_C = -100\text{mA}, I_B = -5.0\text{mA}$ |
| Base-Emitter Saturation Voltage | $V_{BE(SAT)}$ | — | -700 -850 | — -950 | mV | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$ $I_C = -100\text{mA}, I_B = -5.0\text{mA}$ |
| Base-Emitter Voltage | $V_{BE(ON)}$ | -600 | -650 | -750 -820 | mV | $V_{CE} = -5.0\text{V}, I_C = -2.0\text{mA}$ $V_{CE} = -5.0\text{V}, I_C = -10\text{mA}$ |
| Collector-Cutoff Current | I_{CBO} | — | — | -15 -4.0 | nA μA | $V_{CB} = -30\text{V}$ $V_{CB} = -30\text{V}, T_A = 150^\circ\text{C}$ |
| Gain Bandwidth Product | f_T | 100 | 200 | — | MHz | $V_{CE} = -5.0\text{V}, I_C = -10\text{mA},$ $f = 100\text{MHz}$ |
| Collector-Base Capacitance | C_{CBO} | — | 3 | 4.5 | pF | $V_{CB} = -10\text{V}, f = 1.0\text{MHz}$ |

Note: 5. Short duration pulse test used to minimize self-heating effect.

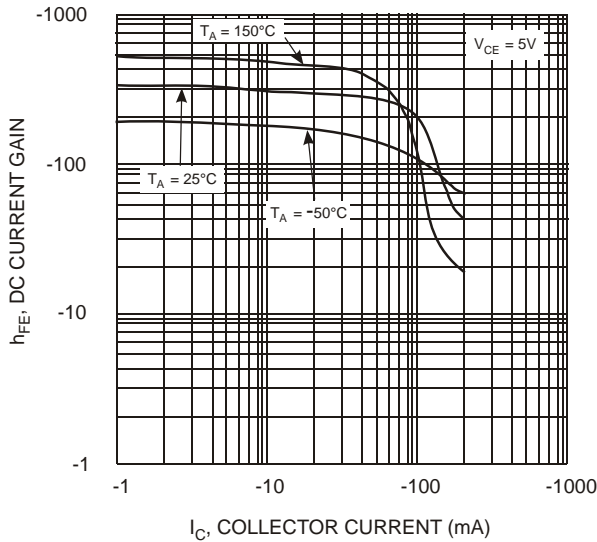


Fig. 5, DC Current Gain vs. Collector Current (BC857B Type)

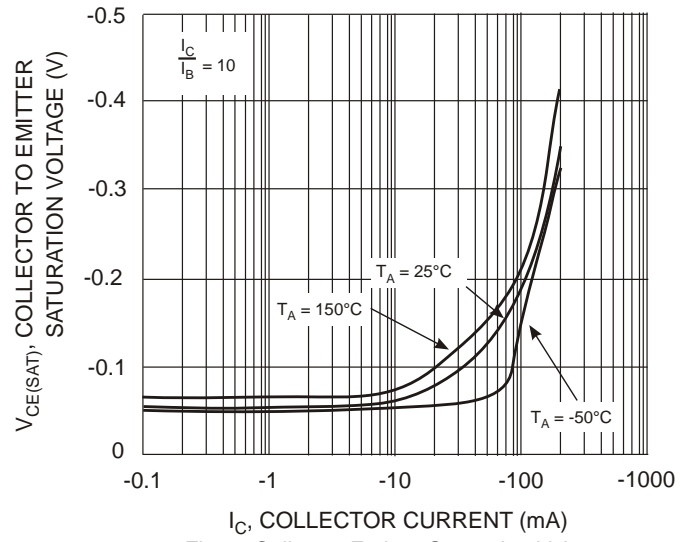


Fig. 6, Collector-Emitter Saturation Voltage vs. Collector Current (BC857B Type)

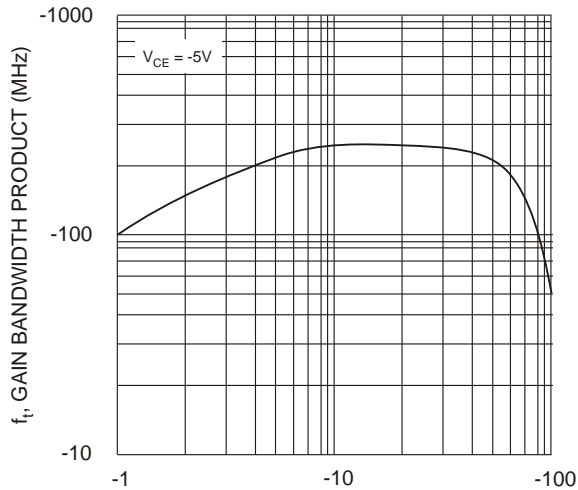


Fig. 7, Gain Bandwidth Product vs Collector Current (BC857B Type)

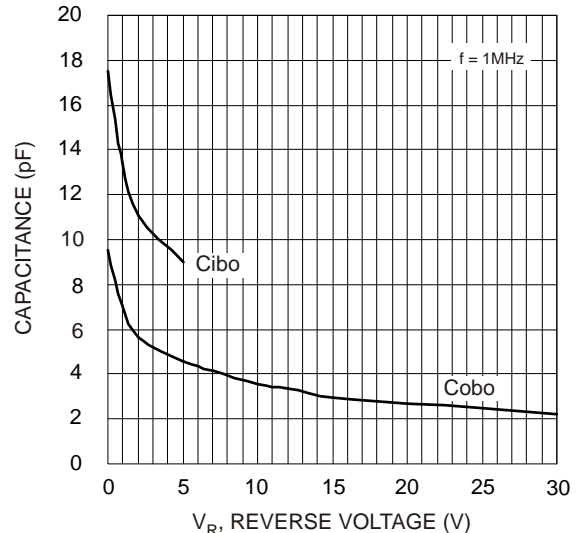
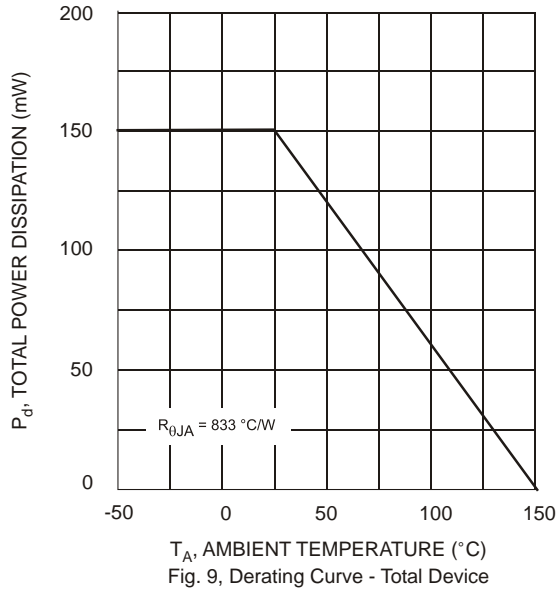


Fig. 8, Capacitance vs. Reverse Voltage (BC857B Type)

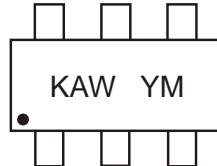


Ordering Information (Note 6)

| Device | Packaging | Shipping |
|------------|-----------|------------------|
| BC847BVN-7 | SOT-563 | 3000/Tape & Reel |

Notes: 6. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



KAW = Product Type Marking Code
 YM = Date Code Marking
 Y = Year ex: R = 2004
 M = Month ex: 9 = September

Date Code Key

| Year | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|------|------|
| Code | R | S | T | U | V | W | X | Y | Z |

| Month | Jan | Feb | March | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

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