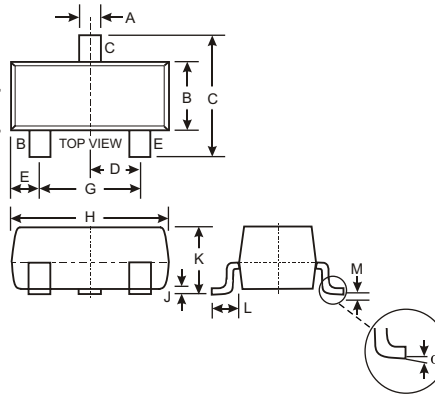


### Features

- Ideally Suited for Automatic Insertion
- Complementary NPN Types Available (BC846-BC848)
- For Switching and AF Amplifier Applications

### Mechanical Data

- Case: SOT-23, Molded Plastic
- Case material - UL Flammability Rating Classification 94V-0
- Moisture sensitivity: Level 1 per J-STD-020A
- Terminals: Solderable per MIL-STD-202, Method 208
- Pin Connections: See Diagram
- Marking Codes (See Table Below & Diagram on Page 3)
- Ordering & Date Code Information: See Page 3
- Approx. Weight: 0.008 grams



| SOT-23               |       |      |
|----------------------|-------|------|
| Dim                  | Min   | Max  |
| A                    | 0.37  | 0.51 |
| B                    | 1.20  | 1.40 |
| C                    | 2.30  | 2.50 |
| D                    | 0.89  | 1.03 |
| E                    | 0.45  | 0.60 |
| G                    | 1.78  | 2.05 |
| H                    | 2.80  | 3.00 |
| J                    | 0.013 | 0.10 |
| K                    | 0.903 | 1.10 |
| L                    | 0.45  | 0.61 |
| M                    | 0.85  | 0.80 |
| $\alpha$             | 0°    | 8°   |
| All Dimensions in mm |       |      |

| Marking Code (Note 2) |              |        |                   |
|-----------------------|--------------|--------|-------------------|
| Type                  | Marking      | Type   | Marking           |
| BC856A                | 3A, K3A      | BC857C | 3G, K3G           |
| BC856B                | 3B, K3B      | BC858A | 3J, K3J, K3A, K3V |
| BC857A                | 3E, K3V, K3A | BC858B | 3K, K3K, K3B, K3W |
| BC857B                | 3F, K3W, K3B | BC858C | 3L, K3L, K3G      |

### Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic                                   | Symbol          | Value             | Unit               |
|--------------------------------------------------|-----------------|-------------------|--------------------|
| Collector-Base Voltage                           | $V_{CBO}$       | -80<br>-50<br>-30 | V                  |
| Collector-Emitter Voltage                        | $V_{CEO}$       | -65<br>-45<br>-30 | 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                 |
| Power Dissipation (Note 1)                       | $P_d$           | 300               | mW                 |
| Thermal Resistance, Junction to Ambient (Note 1) | $R_{\theta JA}$ | 417               | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range          | $T_j, T_{STG}$  | -65 to +150       | $^\circ\text{C}$   |

- 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. Current gain subgroup "C" is not available for BC856.

## Electrical Characteristics @ T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                |                                | Symbol                                                                                           | Min                   | Typ                                                              | Max                              | Unit                       | Test Condition                                                                                                                                         |
|-----------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------|----------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage (Note 3)     | BC856<br>BC857<br>BC858        | V <sub>(BR)CBO</sub>                                                                             | -80<br>-50<br>-30     | —<br>—<br>—                                                      | —<br>—<br>—                      | V                          | I <sub>C</sub> = 10μA, I <sub>B</sub> = 0                                                                                                              |
| Collector-Emitter Breakdown Voltage (Note 3)  | BC856<br>BC857<br>BC858        | V <sub>(BR)CEO</sub>                                                                             | -65<br>-45<br>-30     | —<br>—<br>—                                                      | —<br>—<br>—                      | V                          | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0                                                                                                              |
| Emitter-Base Breakdown Voltage (Note 3)       |                                | V <sub>(BR)EBO</sub>                                                                             | -5                    | —                                                                | —                                | V                          | I <sub>E</sub> = 1μA, I <sub>C</sub> = 0                                                                                                               |
| H-Parameters                                  |                                |                                                                                                  |                       |                                                                  |                                  |                            |                                                                                                                                                        |
| Small Signal Current Gain                     | Current Gain Group A<br>B<br>C | h <sub>fe</sub><br>h <sub>fe</sub><br>h <sub>fe</sub>                                            | —<br>—<br>—           | 200<br>330<br>600                                                | —<br>—<br>—                      | —<br>—<br>—                | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA,<br>f = 1.0kHz                                                                                        |
| Input Impedance                               | Current Gain Group A<br>B<br>C | h <sub>ie</sub><br>h <sub>ie</sub><br>h <sub>ie</sub>                                            | —<br>—<br>—           | 2.7<br>4.5<br>8.7                                                | —<br>—<br>—                      | kΩ<br>kΩ<br>kΩ             |                                                                                                                                                        |
| Output Admittance                             | Current Gain Group A<br>B<br>C | h <sub>oe</sub><br>h <sub>oe</sub><br>h <sub>oe</sub>                                            | —<br>—<br>—           | 18<br>30<br>60                                                   | —<br>—<br>—                      | μS<br>μS<br>μS             |                                                                                                                                                        |
| Reverse Voltage Transfer Ratio                | Current Gain Group A<br>B<br>C | h <sub>re</sub><br>h <sub>re</sub><br>h <sub>re</sub>                                            | —<br>—<br>—           | 1.5x10 <sup>-4</sup><br>2x10 <sup>-4</sup><br>3x10 <sup>-4</sup> | —<br>—<br>—                      | —<br>—<br>—                |                                                                                                                                                        |
| DC Current Gain (Note 3)                      | Current Gain Group A<br>B<br>C | h <sub>FE</sub>                                                                                  | 125<br>220<br>420     | 180<br>290<br>520                                                | 250<br>475<br>800                | —                          |                                                                                                                                                        |
| Collector-Emitter Saturation Voltage (Note 3) |                                | V <sub>CE(SAT)</sub>                                                                             | —                     | -75<br>-250                                                      | -300<br>-650                     | mV                         |                                                                                                                                                        |
| Base-Emitter Saturation Voltage (Note 3)      |                                | V <sub>BE(SAT)</sub>                                                                             | —                     | -700<br>-850                                                     | —                                | mV                         |                                                                                                                                                        |
| Base-Emitter Voltage (Note 3)                 |                                | V <sub>BE(ON)</sub>                                                                              | -600<br>—             | -650<br>—                                                        | -750<br>-820                     | mV                         |                                                                                                                                                        |
| Collector-Cutoff Current (Note 3)             | BC856<br>BC857<br>BC858        | I <sub>CES</sub><br>I <sub>CES</sub><br>I <sub>CES</sub><br>I <sub>CBO</sub><br>I <sub>CBO</sub> | —<br>—<br>—<br>—<br>— | —<br>—<br>—<br>—<br>—                                            | -15<br>-15<br>-15<br>-15<br>-4.0 | nA<br>nA<br>nA<br>nA<br>μA | V <sub>CE</sub> = -80V<br>V <sub>CE</sub> = -50V<br>V <sub>CE</sub> = -30V<br>V <sub>CB</sub> = -30V<br>V <sub>CB</sub> = -30V, T <sub>A</sub> = 150°C |
| Gain Bandwidth Product                        |                                | f <sub>T</sub>                                                                                   | 100                   | 200                                                              | —                                | MHz                        | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -10mA,<br>f = 100MHz                                                                                         |
| Collector-Base Capacitance                    |                                | C <sub>CBO</sub>                                                                                 | —                     | 3                                                                | —                                | pF                         | V <sub>CB</sub> = -10V, f = 1.0MHz                                                                                                                     |
| Noise Figure                                  |                                | NF                                                                                               | —                     | 2                                                                | 10                               | dB                         | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = 200μA,<br>R <sub>S</sub> = 2kΩ, f = 1kHz,<br>Δf = 200Hz                                                      |

Notes: 3. Short duration pulse test used to minimize self-heating effect.

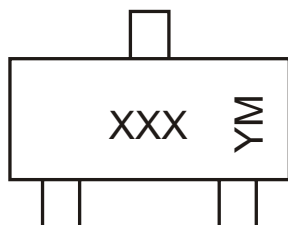
## Ordering Information (Note 4)

| Device    | Packaging | Shipping         |
|-----------|-----------|------------------|
| BC85xx-7* | SOT-23    | 3000/Tape & Reel |

Notes: 4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

\*xx = device type, e.g. BC856A-7.

## Marking Information



XXX = Product Type Marking Code (See Page 1), e.g. K3A = BC856A

YM = Date Code Marking

Y = Year ex: N = 2002

M = Month ex: 9 = September

### Date Code Key

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|------|------|------|------|------|------|------|------|
| Code | J    | K    | L    | M    | N    | P    | R    |

| 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   |