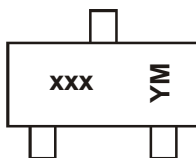


## Marking Information



xxx = Product Type Marking Code  
 (Please see Ordering Information)  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: G = 2019)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

| Year | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|------|------|------|------|------|------|------|------|------|
| Code | G    | H    | I    | J    | K    | L    | M    | N    |

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

## Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                        | Symbol    | Value | Unit |
|---------------------------------------|-----------|-------|------|
| Collector-Base Voltage                | $V_{CBO}$ | -80   | V    |
|                                       |           | -50   |      |
|                                       |           | -30   |      |
| Collector-Emitter Voltage             | $V_{CEO}$ | -65   | V    |
|                                       |           | -45   |      |
|                                       |           | -30   |      |
| Emitter-Base Voltage                  | $V_{EBO}$ | -5.0  | V    |
| Continuous Collector Current          | $I_C$     | -100  | mA   |
| Peak Collector Current (Single Pulse) | $I_{CM}$  | -200  | mA   |
| Peak Emitter Current                  | $I_{EM}$  | -200  | mA   |
| Peak Base Current (Single Pulse)      | $I_{BM}$  | -200  | mA   |

## Thermal Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                          | Symbol          | Value       | Unit               |
|-----------------------------------------|-----------------|-------------|--------------------|
| Power Dissipation                       | $P_D$           | 310         | mW                 |
|                                         |                 | 350         |                    |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 403         | $^\circ\text{C/W}$ |
|                                         |                 | 357         |                    |
| Thermal Resistance, Junction to Leads   | $R_{\theta JL}$ | 350         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

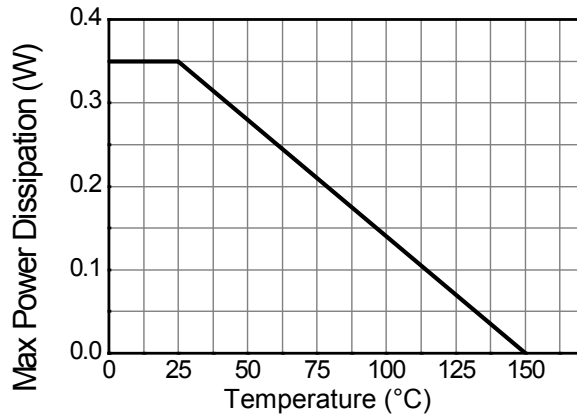
## ESD Ratings (Note 8)

| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--------------------------------------------|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model    | ESD MM  | 400   | V    | C           |

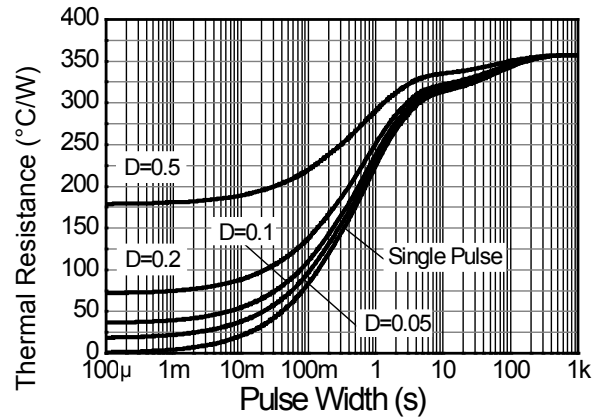
Notes:

- For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
- Same as Note 5, except the device is mounted on 15mm × 15mm 1oz copper.
- Thermal resistance from junction to solder-point (at the end of the leads).
- Refer to JEDEC specification JESD22-A114 and JESD22-A115.

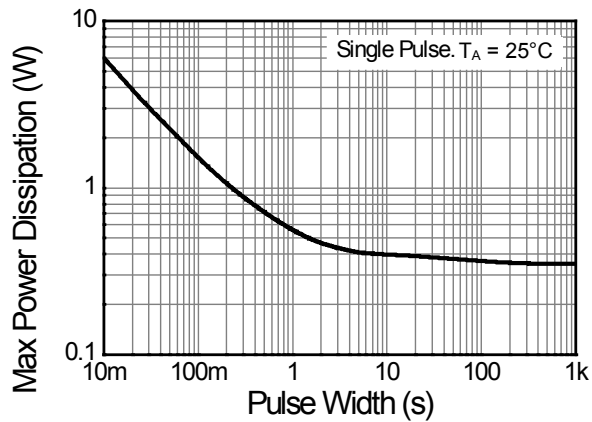
## Thermal Characteristics and Derating Information



**Derating Curve**



**Transient Thermal Impedance**



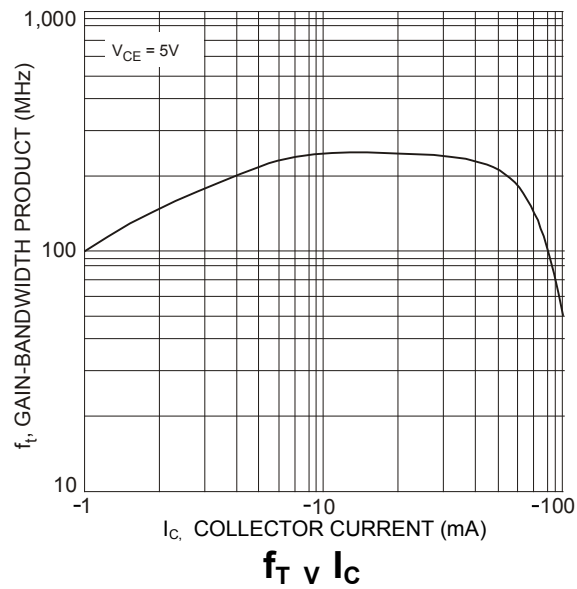
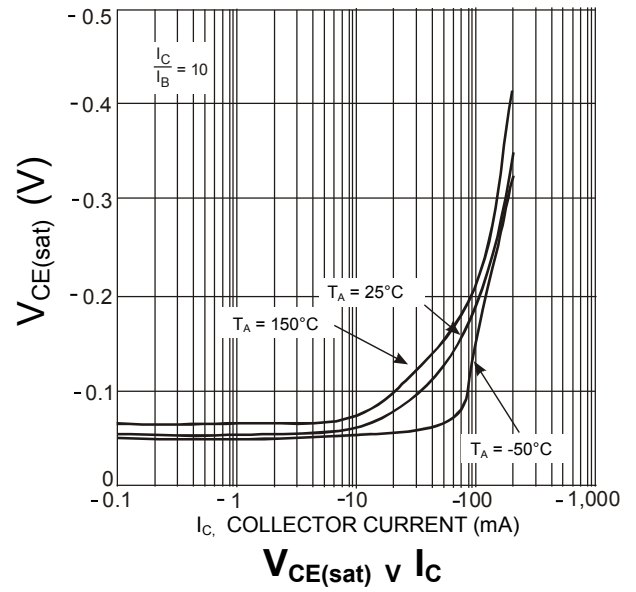
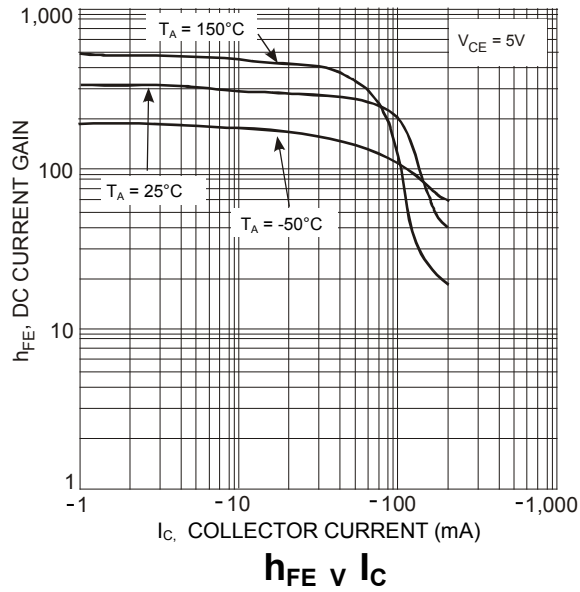
**Pulse Power Dissipation**

**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                                |                          | Symbol               | Min  | Typ                  | Max   | Unit | Test Condition                                                                                 |
|-----------------------------------------------|--------------------------|----------------------|------|----------------------|-------|------|------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage              | BC856                    | BV <sub>CBO</sub>    | -80  | —                    | —     | V    | I <sub>C</sub> = -10μA                                                                         |
|                                               | BC857                    |                      | -50  |                      |       |      |                                                                                                |
|                                               | BC858                    |                      | -30  |                      |       |      |                                                                                                |
| Collector-Emitter Breakdown Voltage (Note 9)  | BC856                    | BV <sub>CEO</sub>    | -65  | —                    | —     | V    | I <sub>C</sub> = -10mA                                                                         |
|                                               | BC857                    |                      | -45  |                      |       |      |                                                                                                |
|                                               | BC858                    |                      | -30  |                      |       |      |                                                                                                |
| Emitter-Base Breakdown Voltage                |                          | BV <sub>EBO</sub>    | -5   | —                    | —     | V    | I <sub>E</sub> = -1μA                                                                          |
| Collector Cutoff Current                      |                          | I <sub>CBO</sub>     | —    | —                    | -15   | nA   | V <sub>CB</sub> = -30V                                                                         |
|                                               |                          |                      |      |                      | -4    | μA   | V <sub>CB</sub> = -30V, T <sub>J</sub> = +150°C                                                |
| Collector Emitter Cutoff Current              | BC856                    | I <sub>CES</sub>     | —    | —                    | -15   | nA   | V <sub>CE</sub> = -80V                                                                         |
|                                               | BC857                    |                      |      |                      | -15   |      | V <sub>CE</sub> = -50V                                                                         |
|                                               | BC858                    |                      |      |                      | -15   |      | V <sub>CE</sub> = -30V                                                                         |
| Emitter-Base Cutoff Current                   |                          | I <sub>EBO</sub>     | —    | —                    | -100  | nA   | V <sub>EB</sub> = -5V                                                                          |
| Small Signal Current Gain                     | BC856A / BC857A / BC858A | h <sub>fe</sub>      | —    | 200                  | —     | —    | I <sub>C</sub> = -2.0mA, V <sub>CE</sub> = -5V<br>f = 1.0kHz                                   |
|                                               | BC856B / BC857B / BC858B |                      |      | 330                  |       |      |                                                                                                |
|                                               | BC857C / BC858C          |                      |      | 600                  |       |      |                                                                                                |
| Input Impedance                               | BC856A / BC857A / BC858A | h <sub>ie</sub>      | —    | 2.7                  | —     | kΩ   |                                                                                                |
|                                               | BC856B / BC857B / BC858B |                      |      | 4.5                  |       |      |                                                                                                |
|                                               | BC857C / BC858C          |                      |      | 8.7                  |       |      |                                                                                                |
| Output Admittance                             | BC856A / BC857A / BC858A | h <sub>oe</sub>      | —    | 18                   | —     | μS   |                                                                                                |
|                                               | BC856B / BC857B / BC858B |                      |      | 30                   |       |      |                                                                                                |
|                                               | BC857C / BC858C          |                      |      | 60                   |       |      |                                                                                                |
| Reverse Voltage Transfer Ratio                | BC856A / BC857A / BC858A | h <sub>re</sub>      | —    | 1.5x10 <sup>-4</sup> | —     | —    |                                                                                                |
|                                               | BC856B / BC857B / BC858B |                      |      | 2x10 <sup>-4</sup>   |       |      |                                                                                                |
|                                               | BC857C / BC858C          |                      |      | 3x10 <sup>-4</sup>   |       |      |                                                                                                |
| DC Current Gain (Note 9)                      | BC856A / BC857A / BC858A | h <sub>FE</sub>      | 125  | 180                  | 250   | —    | I <sub>C</sub> = -2.0mA, V <sub>CE</sub> = -5V                                                 |
|                                               | BC856B / BC857B / BC858B |                      | 220  | 290                  | 475   |      |                                                                                                |
|                                               | BC857C / BC858C          |                      | 420  | 520                  | 800   |      |                                                                                                |
| Collector-Emitter Saturation Voltage (Note 9) |                          | V <sub>CE(sat)</sub> | —    | -75                  | -300  | mV   | I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA                                                |
|                                               |                          |                      |      | -250                 | -650  |      | I <sub>C</sub> = -100mA, I <sub>B</sub> = -5.0mA                                               |
| Base-Emitter Turn-On Voltage (Note 9)         |                          | V <sub>BE(on)</sub>  | -600 | -650                 | -750  | mV   | I <sub>C</sub> = -2mA, V <sub>CE</sub> = -5V                                                   |
|                                               |                          |                      |      | —                    | —     |      | -820                                                                                           |
| Base-Emitter Saturation Voltage (Note 9)      |                          | V <sub>BE(sat)</sub> | —    | -700                 | —     | mV   | I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA                                                |
|                                               |                          |                      |      | -850                 | -1100 |      | I <sub>C</sub> = -100mA, I <sub>B</sub> = -5mA                                                 |
| Output Capacitance                            |                          | C <sub>obo</sub>     | —    | 3                    | —     | pF   | V <sub>CB</sub> = -10V, f = 1.0MHz                                                             |
| Transition Frequency                          |                          | f <sub>T</sub>       | 100  | 200                  | —     | MHz  | V <sub>CE</sub> = -5V, I <sub>C</sub> = -10mA, f = 100MHz                                      |
| Noise Figure                                  |                          | NF                   | —    | 2                    | 10    | dB   | V <sub>CE</sub> = -5V, I <sub>C</sub> = -200μA<br>R <sub>S</sub> = 2kΩ, f = 1kHz<br>Δf = 200Hz |

Note: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

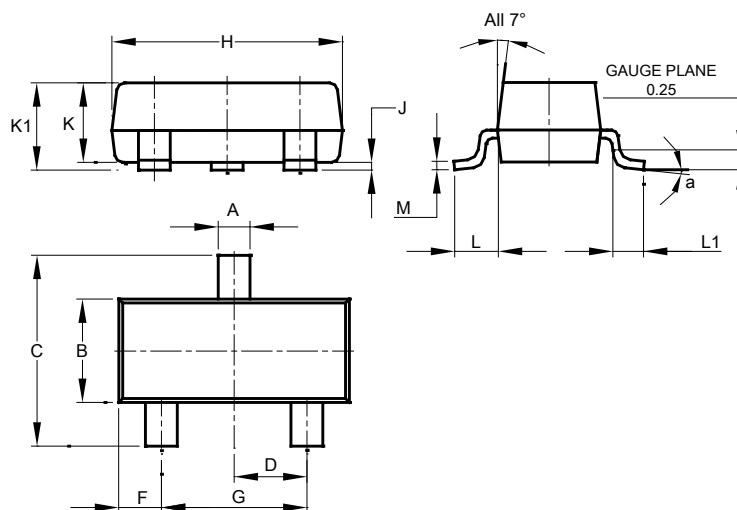
**Typical Electrical Characteristics (BC856B)** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SOT23

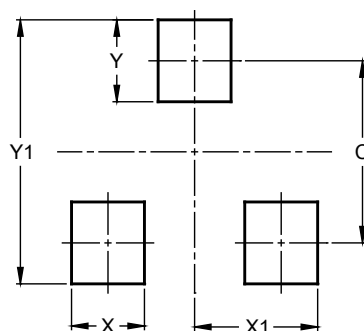


| SOT23                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.37  | 0.51  | 0.40  |
| B                    | 1.20  | 1.40  | 1.30  |
| C                    | 2.30  | 2.50  | 2.40  |
| D                    | 0.89  | 1.03  | 0.915 |
| F                    | 0.45  | 0.60  | 0.535 |
| G                    | 1.78  | 2.05  | 1.83  |
| H                    | 2.80  | 3.00  | 2.90  |
| J                    | 0.013 | 0.10  | 0.05  |
| K                    | 0.890 | 1.00  | 0.975 |
| K1                   | 0.903 | 1.10  | 1.025 |
| L                    | 0.45  | 0.61  | 0.55  |
| L1                   | 0.25  | 0.55  | 0.40  |
| M                    | 0.085 | 0.150 | 0.110 |
| a                    | 0°    | 8°    | --    |
| All Dimensions in mm |       |       |       |

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SOT23



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 2.0           |
| X          | 0.8           |
| X1         | 1.35          |
| Y          | 0.9           |
| Y1         | 2.9           |

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