

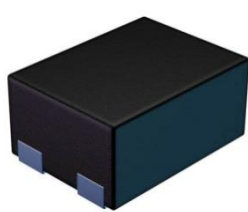
## Features

- $BV_{CEO} > 45V$
- $I_C = 100mA$  High Collector Current
- $P_D = 435mW$  Power Dissipation
- $0.48mm^2$  Package Footprint, 16 times smaller than SOT23
- 0.4mm Height Package Minimizing Off-Board Profile
- Complementary PNP Type BC857BFA
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([BC847BFAQ](#))**

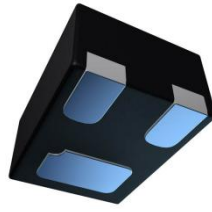
## Mechanical Data

- Case: X2-DFN0806-3
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu, Solderable per MIL-STD-202, Method 208 [e4](#)
- Weight: 0.0008 grams (Approximate)

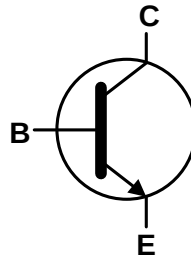
X2-DFN0806-3



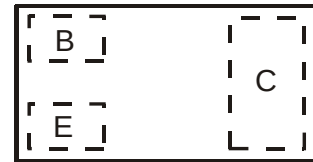
Top View



Bottom View



Device Symbol


 Top View  
 Device Schematic

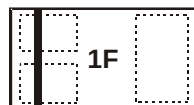
## Ordering Information (Note 4)

| Product     | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|------------|---------|--------------------|-----------------|-------------------|
| BC847BFA-7B | AEC-Q101   | 1F      | 7                  | 8mm             | 10,000            |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information

X2-DFN0806-3


 Top View  
 Bar Denotes Base  
 and Emitter Side

1F = Product Type Marking Code

### Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CBO</sub> | 50    | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | 45    | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | 6.0   | V    |
| Continuous Collector Current | I <sub>C</sub>   | 100   | mA   |
| Peak Pulse Collector Current | I <sub>CM</sub>  | 200   | mA   |

### Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

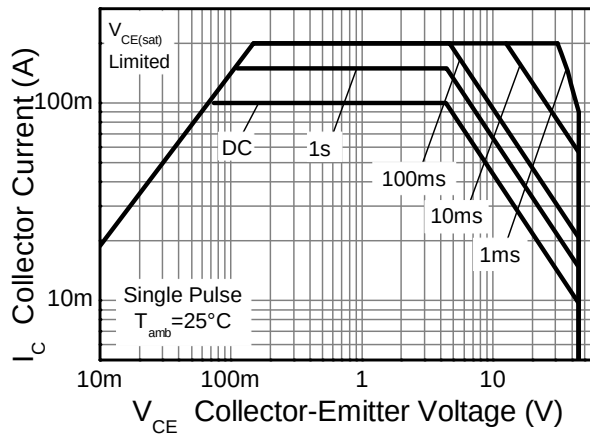
| Characteristic                                   | Symbol                            | Value       | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                       | P <sub>D</sub>                    | 435         | mW   |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 287         | °C/W |
| Thermal Resistance, Junction to Lead (Note 6)    | R <sub>θJL</sub>                  | 150         | °C/W |
| Operating and Storage and Temperature Range      | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

### ESD Ratings (Note 7)

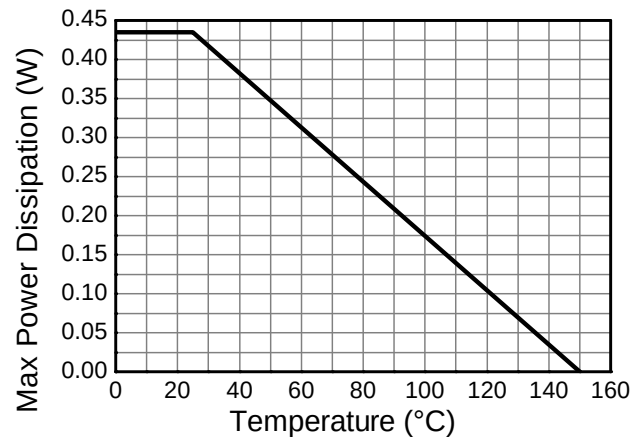
| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--------------------------------------------|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model    | ESD MM  | 200   | V    | B           |

- Notes:
5. For the device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition. The entire exposed collector pad is attached to the heatsink.
  6. Thermal resistance from junction to solder-point (on the exposed collector pad).
  7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

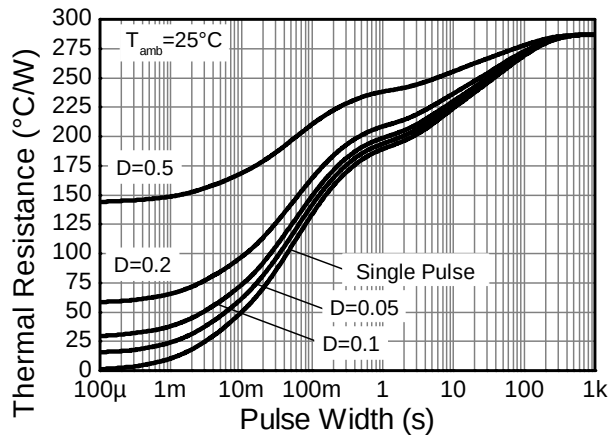
## Thermal Characteristics and Derating Information



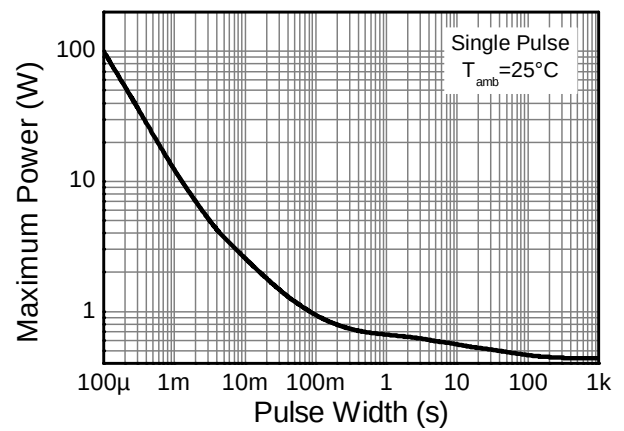
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



**Pulse Power Dissipation**

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                               | Symbol               | Min      | Typical    | Max            | Unit | Test Condition                                                                                  |
|----------------------------------------------|----------------------|----------|------------|----------------|------|-------------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS</b>                   |                      |          |            |                |      |                                                                                                 |
| Collector-Base Breakdown Voltage             | BV <sub>CBO</sub>    | 50       | 150        | —              | V    | I <sub>C</sub> = 50μA, I <sub>B</sub> = 0                                                       |
| Collector-Emitter Breakdown Voltage          | BV <sub>CES</sub>    | 50       | 150        | —              |      | I <sub>C</sub> = 50μA, I <sub>B</sub> = 0                                                       |
| Collector-Emitter Breakdown Voltage (Note 8) | BV <sub>CEO</sub>    | 45       | 65         | —              | V    | I <sub>C</sub> = 1mA, I <sub>B</sub> = 0                                                        |
| Collector-Base Breakdown Voltage             | BV <sub>EBO</sub>    | 6.0      | 8.35       | —              | V    | I <sub>E</sub> = 50μA, I <sub>C</sub> = 0                                                       |
| Collector-Base Cut-Off Current               | I <sub>CBO</sub>     | —        | —          | 15             | nA   | V <sub>CB</sub> = 40V                                                                           |
| Collector-Emitter Cut-Off Current            | I <sub>CES</sub>     | —        | —          | 15             | nA   | V <sub>CE</sub> = 40V                                                                           |
| <b>ON CHARACTERISTICS (Note 8)</b>           |                      |          |            |                |      |                                                                                                 |
| DC Current Gain                              | h <sub>FE</sub>      | —<br>200 | 220<br>260 | —<br>470       | —    | I <sub>C</sub> = 10μA, V <sub>CE</sub> = 5.0V<br>I <sub>C</sub> = 2.0mA, V <sub>CE</sub> = 5.0V |
| Collector-Emitter Saturation Voltage         | V <sub>CE(sat)</sub> | —        | 50<br>122  | 125<br>300     | mV   | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA<br>I <sub>C</sub> = 100mA, I <sub>B</sub> = 5.0mA |
| Base-Emitter Saturation Voltage              | V <sub>BE(sat)</sub> | —        | 760<br>880 | 1,000<br>1,100 | mV   | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA<br>I <sub>C</sub> = 100mA, I <sub>B</sub> = 5.0mA |
| Base-Emitter Voltage                         | V <sub>BE(on)</sub>  | 580<br>— | 650<br>725 | 750<br>800     | mV   | I <sub>C</sub> = 2.0mA, V <sub>CE</sub> = 5V<br>I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5V     |
| <b>SMALL SIGNAL CHARACTERISTICS</b>          |                      |          |            |                |      |                                                                                                 |
| Output Capacitance                           | C <sub>obo</sub>     | —        | 1.5        | —              | pF   | V <sub>CB</sub> = 10.0V, f = 1.0MHz, I <sub>E</sub> = 0                                         |
| Current Gain-Bandwidth Product               | f <sub>T</sub>       | 100      | 170        | —              | MHz  | V <sub>CE</sub> = 5V, I <sub>C</sub> = 10mA,<br>f = 100MHz                                      |

Note: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

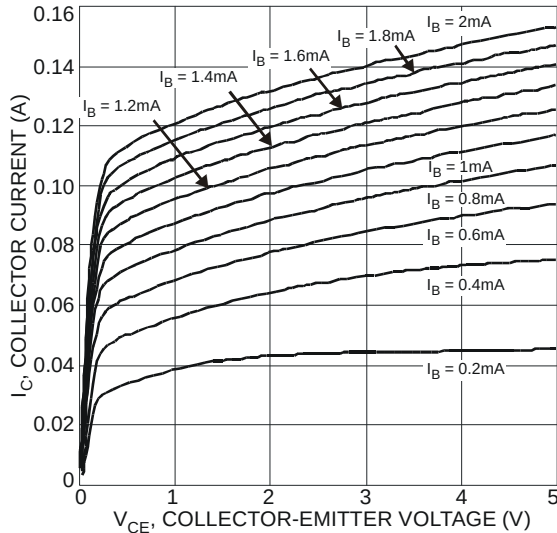


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

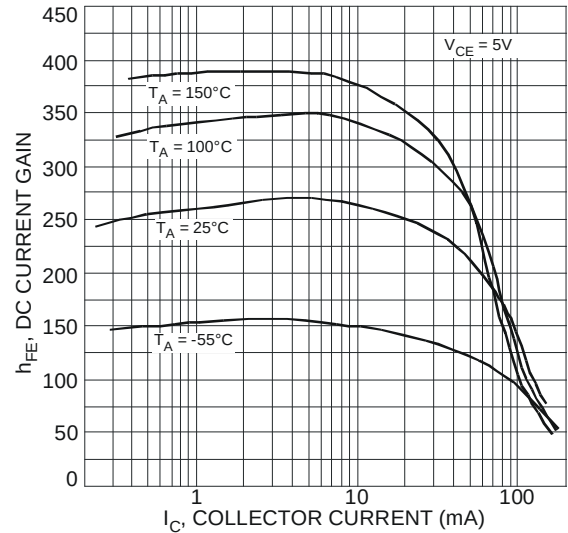


Fig. 5 Typical DC Current Gain vs. Collector Current

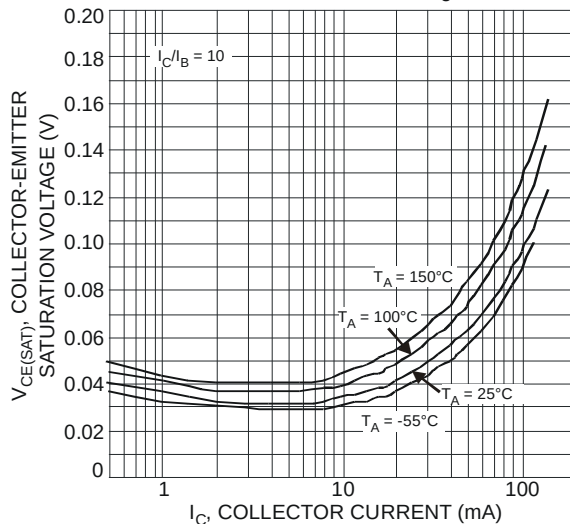


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

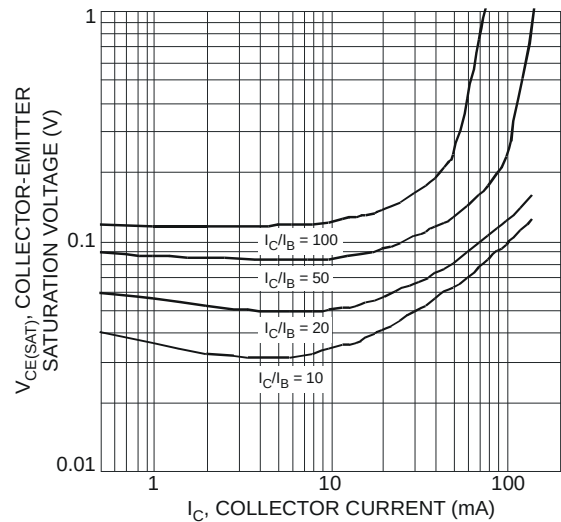


Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current

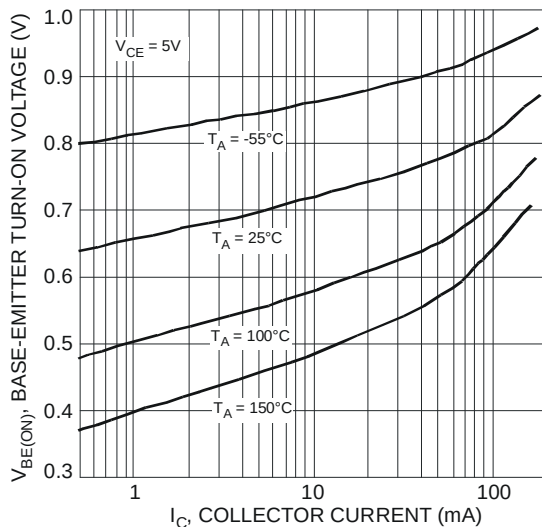


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

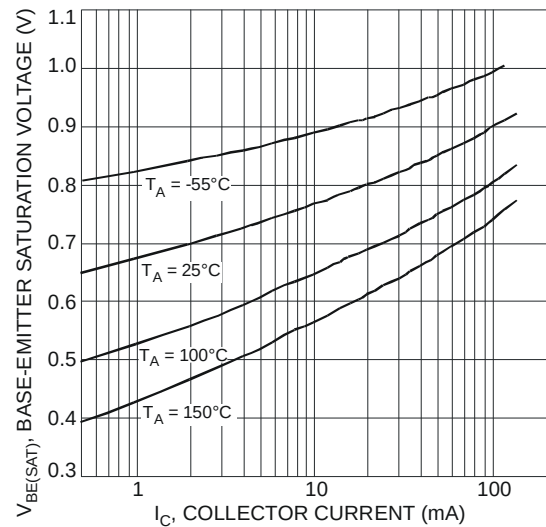
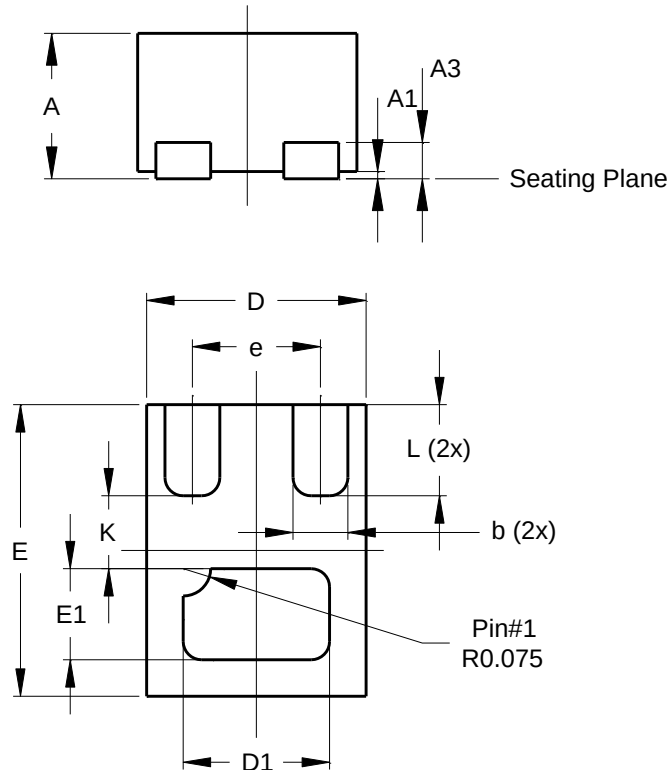


Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

## Package Outline Dimensions

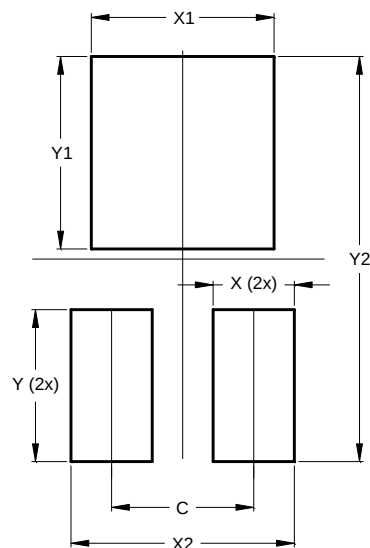
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| X2-DFN0806-3         |       |      |      |
|----------------------|-------|------|------|
| Dim                  | Min   | Max  | Typ  |
| A                    | 0.375 | 0.40 | 0.39 |
| A1                   | 0     | 0.05 | 0.02 |
| A3                   | -     | -    | 0.10 |
| b                    | 0.10  | 0.20 | 0.15 |
| D                    | 0.55  | 0.65 | 0.60 |
| D1                   | 0.35  | 0.45 | 0.40 |
| E                    | 0.75  | 0.85 | 0.80 |
| E1                   | 0.20  | 0.30 | 0.25 |
| e                    | -     | -    | 0.35 |
| K                    | -     | -    | 0.20 |
| L                    | 0.20  | 0.30 | 0.25 |
| All Dimensions in mm |       |      |      |

## Suggested Pad Layout

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



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.350         |
| X          | 0.200         |
| X1         | 0.450         |
| X2         | 0.550         |
| Y          | 0.375         |
| Y1         | 0.475         |
| Y2         | 1.000         |

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