



**THE DATASHEET OF  
BC857BFA-7B**

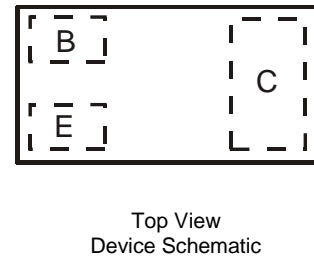
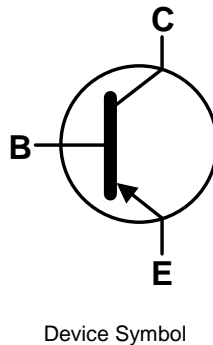
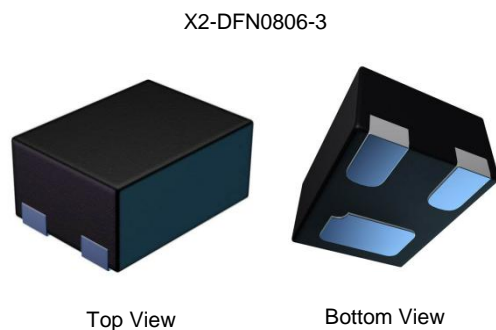


## Features

- $BV_{CEO} > -45V$
- $I_C = -100mA$  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 NPN Type BC847BFA
- **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**

## 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 @4
- Weight: 0.0008 grams (Approximate)

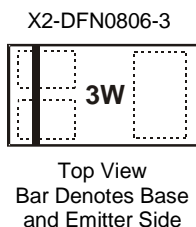


## Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
BC857BFA-7B	3W	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



3W = Product Type Marking Code

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

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
Continuous Collector Current	$I_C$	-100	mA
Peak Pulse Collector Current	$I_{CM}$	-200	mA

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

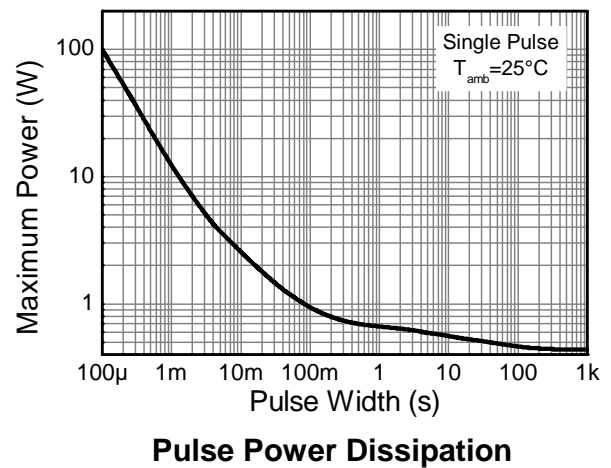
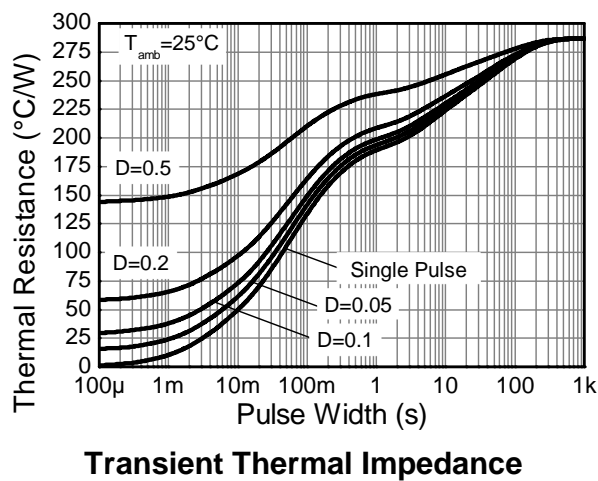
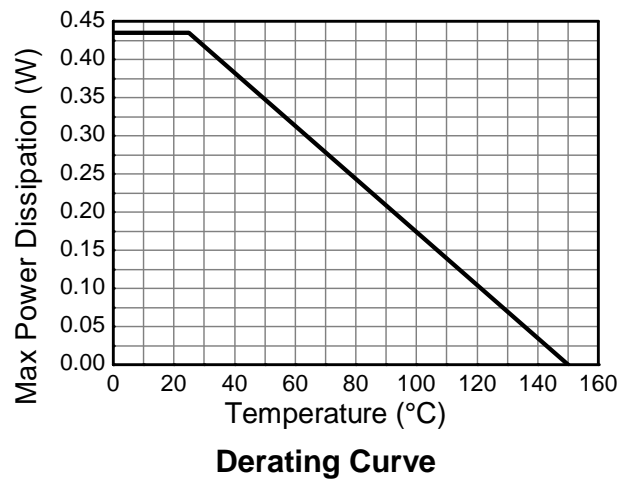
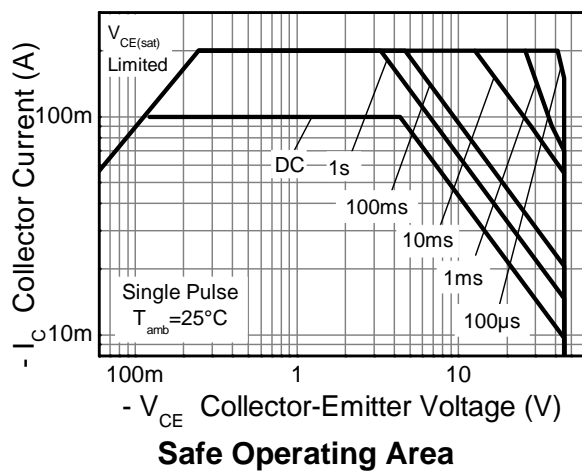
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	435	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	287	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Lead (Note 6)	$R_{\theta JL}$	150	$^\circ\text{C}/\text{W}$
Operating and Storage and Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

### 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:
- 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.
  - Thermal resistance from junction to solder-point (on the exposed collector pad).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

### Thermal Characteristics and Derating Information



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

Characteristic	Symbol	Min	Typical	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	$BV_{CBO}$	-50	-100	—	V	$I_C = -50\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage	$BV_{CES}$	-50	-90	—		$I_C = -50\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage (Note 8)	$BV_{CEO}$	-45	-65	—	V	$I_C = -1\text{mA}, I_B = 0$
Collector-Base Breakdown Voltage	$BV_{EBO}$	-6.0	-8.5	—	V	$I_E = -50\mu\text{A}, I_C = 0$
Collector-Base Cut-Off Current	$I_{CBO}$	—	—	-15	nA	$V_{CB} = -40\text{V}$
Collector-Emitter Cut-Off Current	$I_{CES}$	—	—	-15	nA	$V_{CE} = -40\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
DC Current Gain	$h_{FE}$	200	340 330	— 470	—	$I_C = -10\mu\text{A}, V_{CE} = -5.0\text{V}$ $I_C = -2.0\text{mA}, V_{CE} = -5.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	-70 -300	-175 -500	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	$V_{BE(sat)}$	—	-760 -885	-1,000 -1,100	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	-670 -715	-780 -850	mV	$I_C = -2.0\text{mA}, V_{CE} = -5\text{V}$ $I_C = -10\text{mA}, V_{CE} = -5\text{V}$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Output Capacitance	$C_{obo}$	—	2.0	—	pF	$V_{CB} = -10.0\text{V}, f = 1.0\text{MHz}, I_E = 0$
Current Gain-Bandwidth Product	$f_T$	100	340	—	MHz	$V_{CE} = -5\text{V}, I_C = -10\text{mA}, f = 100\text{MHz}$

Notes: 8. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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

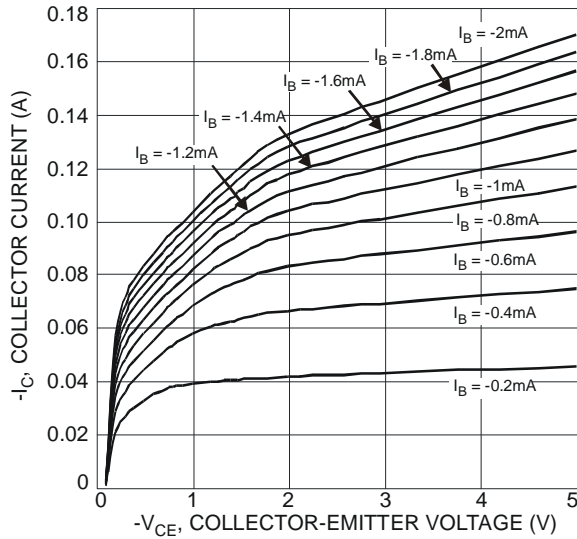


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

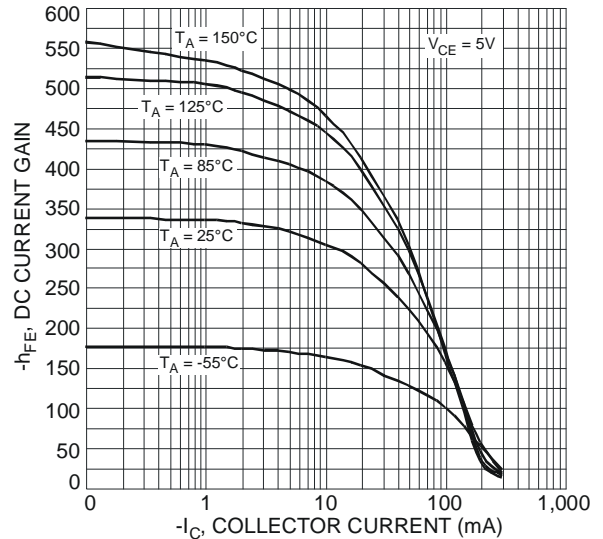


Fig. 5 Typical DC Current Gain vs. Collector Current

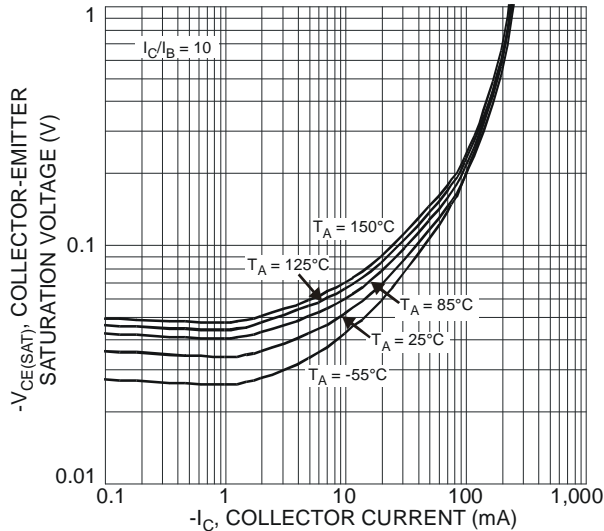


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

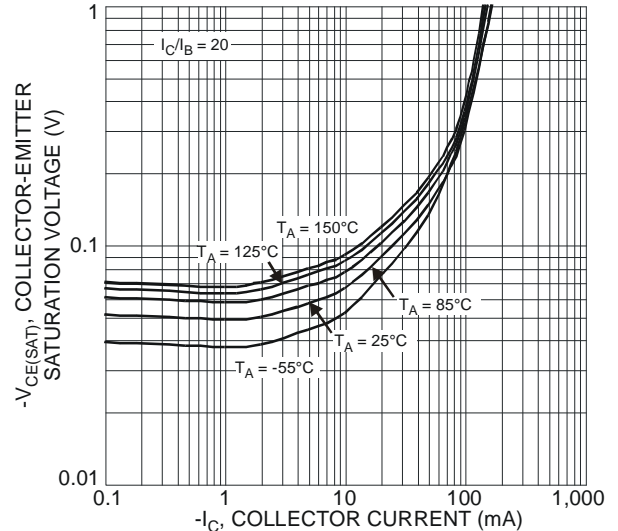


Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current

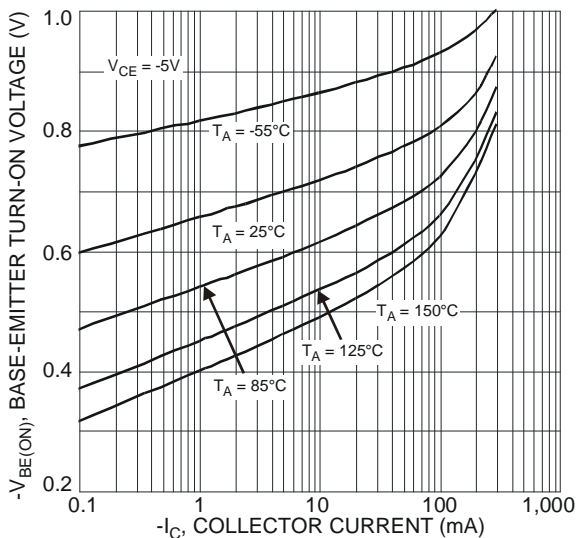


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

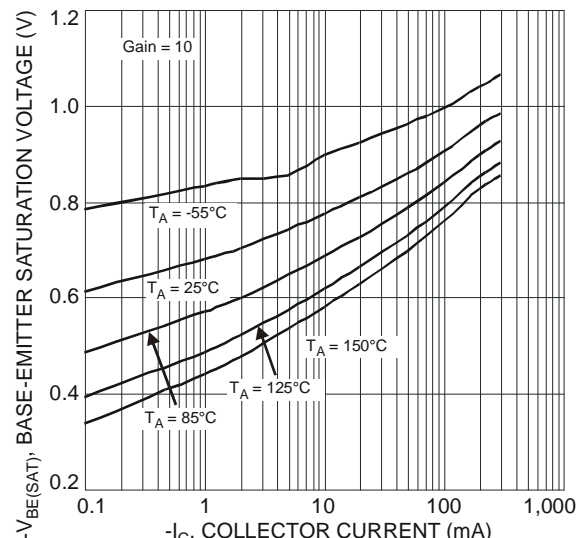
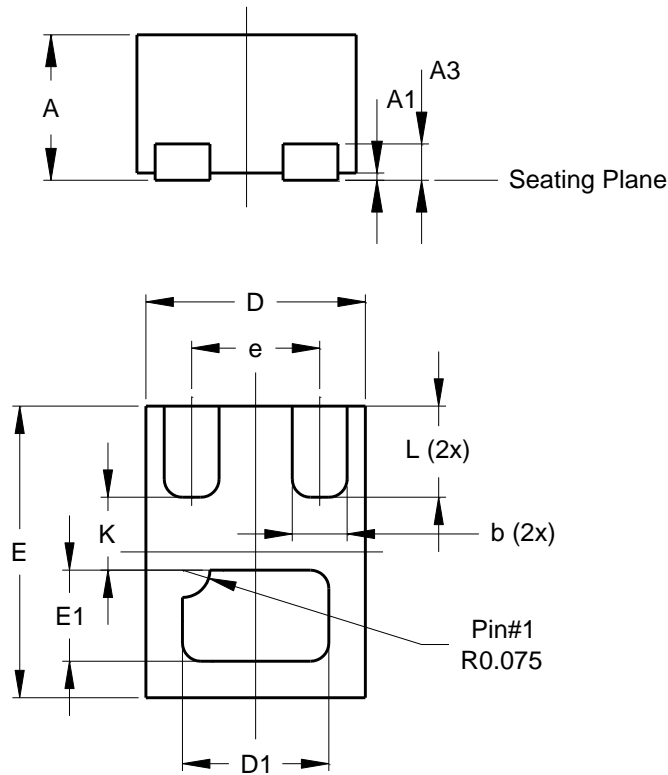


Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

**Package Outline Dimensions**

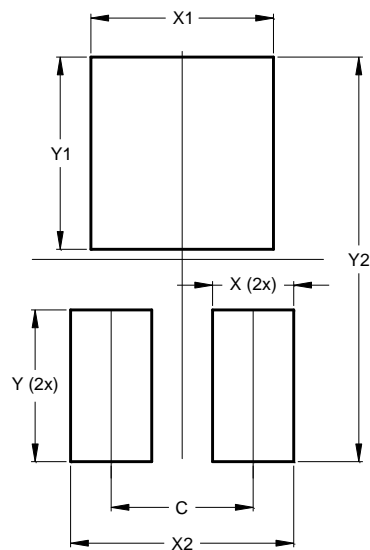
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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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