

## Description

The BC846BFHWQ bipolar junction transistor (BJT) is designed to meet the stringent requirements of automotive applications.

## Features

- $BV_{CEO} > 65V$
- $I_C = 100mA$  High Continuous Collector Current
- Low-Profile, 0.6mm-High Package for Thin Applications
- Sidewall Tin Plating for Wettable Flanks in AOI
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The BC846BFHWQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

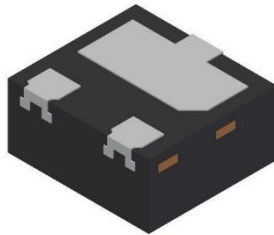
## Mechanical Data

- Package: U-DFN1110-3
- Package Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 <sup>(3)</sup>
- Weight: 0.001714 grams (Approximate)

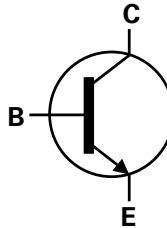
## Application

- Switching and amplification

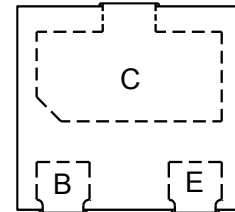
U-DFN1110-3/SWP (Type A)



Bottom View



Device Symbol



Top View  
Pin-Out

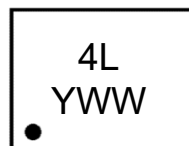
## Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
BC846BFHWQ-7	U-DFN1110-3/SWP (Type A)	4L	7	8	5,000	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

U-DFN1110-3/SWP (Type A)



4L = Product Type Marking Code  
YWW = Date Code Marking  
Y = Last Digit of Year (ex: 5 = 2025)  
WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	80	V
Collector-Emitter Voltage	V <sub>CEO</sub>	65	V
Emitter-Base Voltage	V <sub>EB0</sub>	6	V
Continuous Collector Current	I <sub>C</sub>	100	mA
Peak Pulse Collector Current	I <sub>CM</sub>	200	mA
Peak Base Current	I <sub>BM</sub>	100	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	420	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	298	°C/W
Thermal Resistance, Junction to Case (Note 6)	R <sub>θJC</sub>	109	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

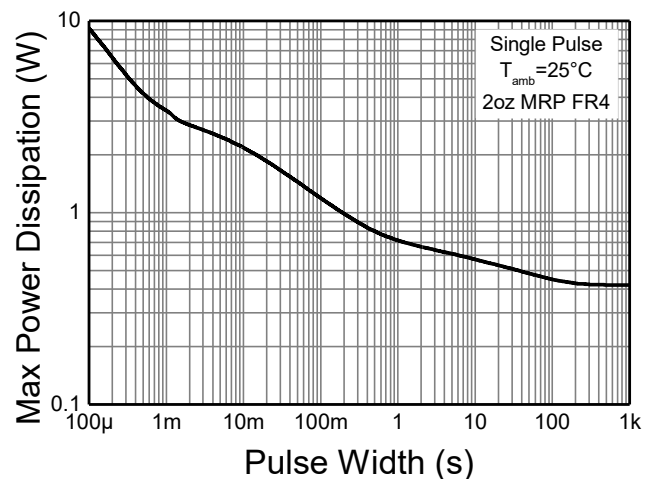
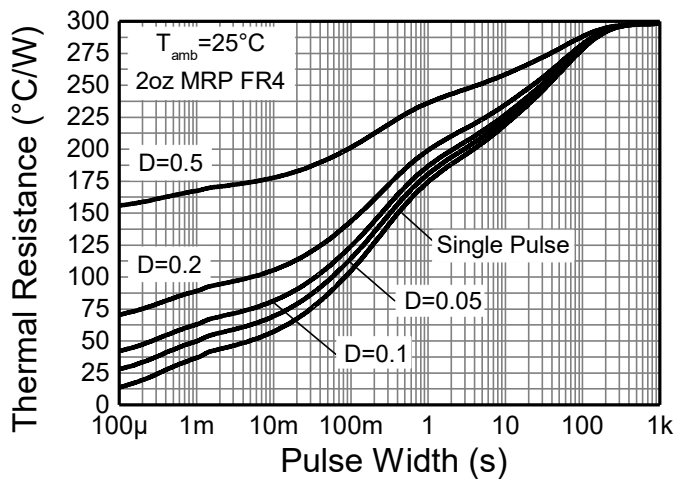
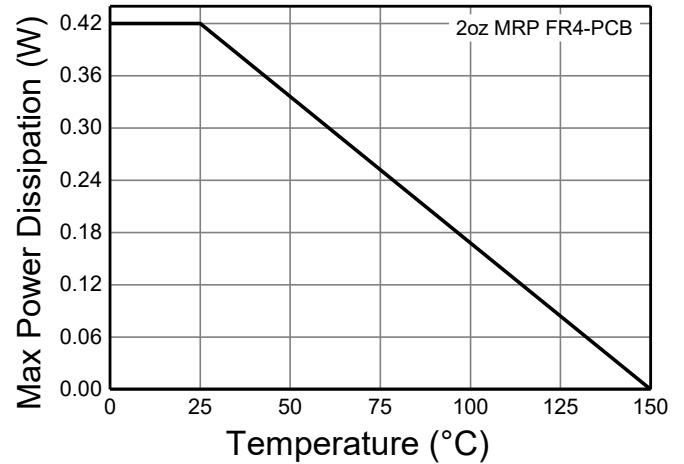
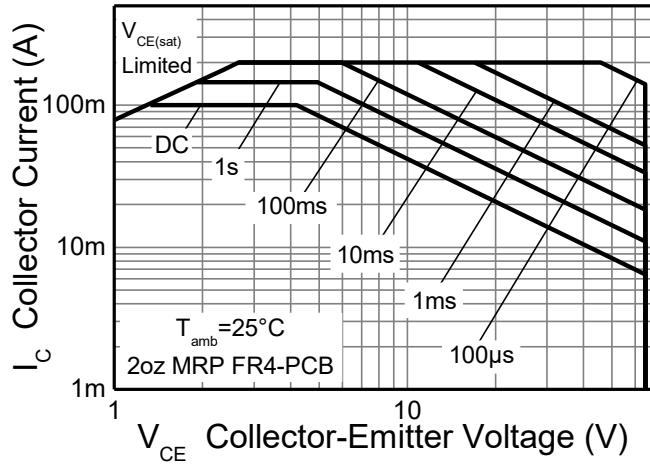
## ESD Ratings (Note 7)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge – Charged Device Model	ESD CDM	1000	V	C3

Notes:

- For a device mounted with the exposed collector pads on minimum recommended pad layout and 2oz. copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady state.
- Thermal resistance from junction to the top of the case.
- Refer to JEDEC specifications JESD22-A114 and JESD22-C101.

## Thermal Characteristics and Derating Information

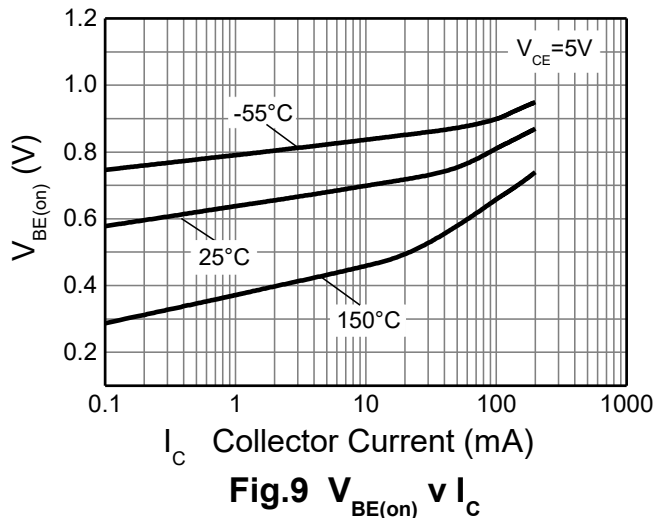
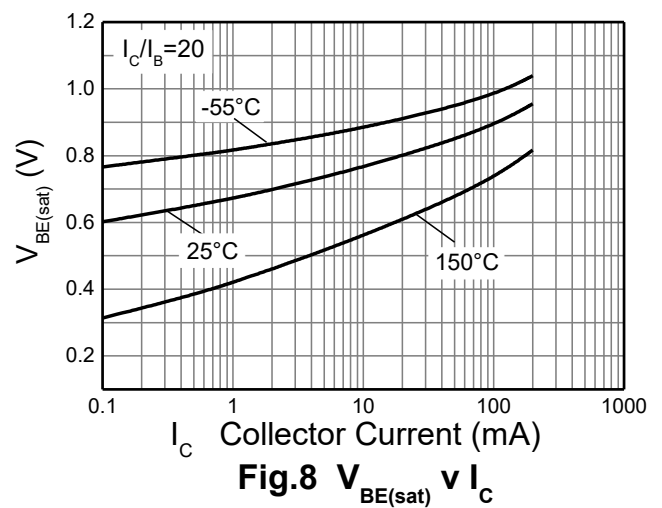
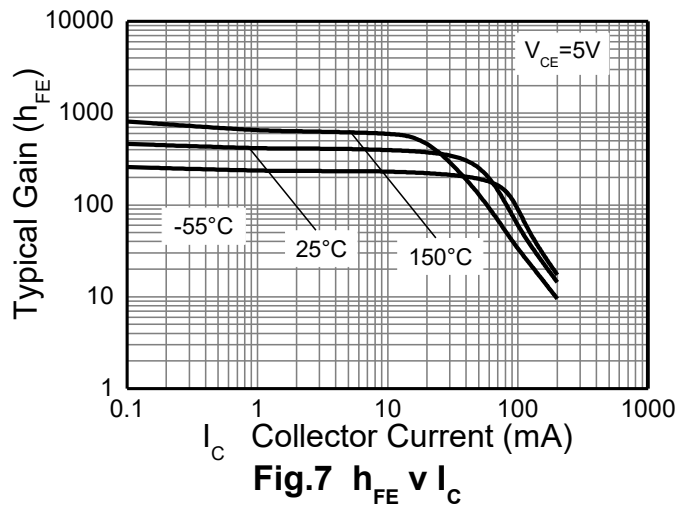
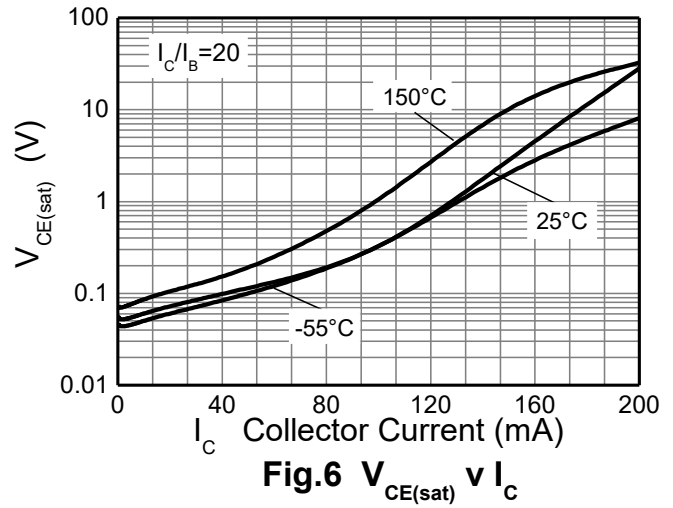
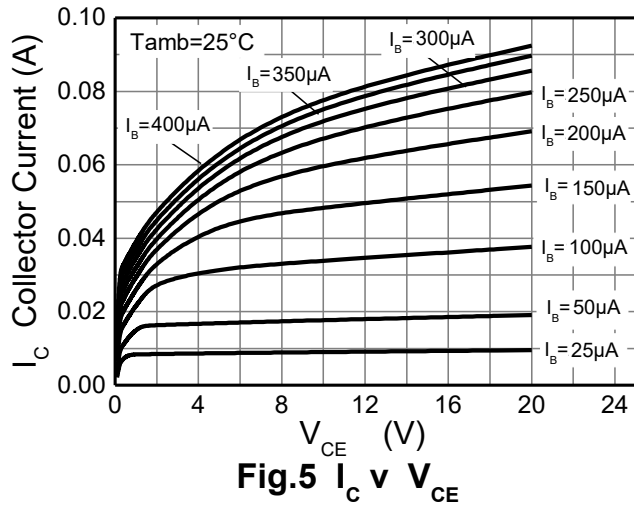


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	80	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV <sub>CEO</sub>	65	—	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	6	—	—	V	I <sub>E</sub> = 100μA
Collector-Base Cutoff Current	I <sub>CBO</sub>	—	—	15	nA	V <sub>CB</sub> = 30V, I <sub>E</sub> = 0
		—	—	5	μA	V <sub>CB</sub> = 30V, I <sub>E</sub> = 0, T <sub>A</sub> = +150°C
Emitter-Base Cutoff Current	I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 6V, I <sub>C</sub> = 0
DC Current Gain (Note 8)	h <sub>FE</sub>	200	—	450	—	V <sub>CE</sub> = 5V, I <sub>C</sub> = 2mA
Collector-Emitter Saturation Voltage (Note 8)	V <sub>CE(sat)</sub>	—	—	200	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA
		—	—	400		I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA
Base-Emitter Turn-on Voltage (Note 8)	V <sub>BE(on)</sub>	580	—	700	mV	V <sub>CE</sub> = 5V, I <sub>C</sub> = 2mA
		—	—	770		V <sub>CE</sub> = 5V, I <sub>C</sub> = 10mA
Base-Emitter Saturation Voltage (Note 8)	V <sub>BE(sat)</sub>	—	760	—	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA
		—	900	—		I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA
Transition Frequency	f <sub>T</sub>	100	—	—	MHz	V <sub>CE</sub> = 5V, I <sub>C</sub> = 10mA, f = 100MHz
Output (Collector) Capacitance	C <sub>obc</sub>	—	—	3	pF	V <sub>CB</sub> = 10V, f = 1MHz
Output (Emitter) Capacitance	C <sub>oec</sub>	—	11	—	pF	V <sub>EB</sub> = 0.5V, f = 1MHz
Noise Figure	NF	—	—	10	dB	V <sub>CE</sub> = 5V, I <sub>C</sub> = 200μA, R <sub>S</sub> = 2kΩ, f = 1kHz, B <sub>w</sub> = 200Hz

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

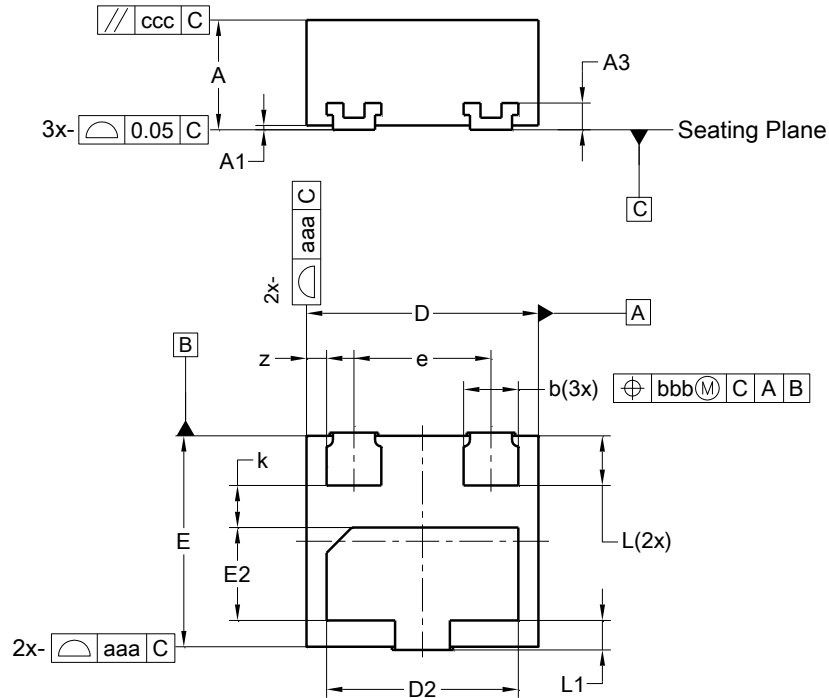
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



## Package Outline Dimensions

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

**U-DFN1110-3/SWP (Type A)**



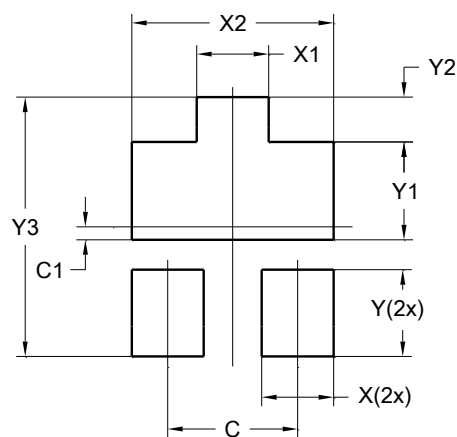
<b>U-DFN1110-3/SWP (Type A)</b>			
<b>Dim</b>	<b>Min</b>	<b>Max</b>	<b>Typ</b>
<b>A</b>	0.47	0.57	0.52
<b>A1</b>	0.00	0.05	0.03
<b>A3</b>	—	—	0.127
<b>b</b>	0.22	0.30	0.26
<b>D</b>	1.05	1.15	1.10
<b>D2</b>	0.87	0.95	0.91
<b>e</b>	0.65 BSC		
<b>E</b>	0.95	1.05	1.00
<b>E2</b>	0.40	0.48	0.44
<b>k</b>	—	—	0.20
<b>L</b>	0.20	0.27	0.23
<b>L1</b>	0.09	0.19	0.14
<b>z</b>	—	—	0.095
<b>aaa</b>	0.25		
<b>bbb</b>	0.10		
<b>ccc</b>	0.10		
<b>All Dimensions in mm</b>			

Note: Side wall tin plated package for wettable flanks in AOI.

## Suggested Pad Layout

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

**U-DFN1110-3/SWP (Type A)**



Dimensions	Value (in mm)
C	0.650
C1	0.065
X	0.360
X1	0.360
X2	1.010
Y	0.435
Y1	0.490
Y2	0.225
Y3	1.300

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