

Description

The BC846BFSWQ, BC847BFSWQ, and BC847CFSWQ bipolar junction transistors (BJT) are designed to meet the stringent requirements of automotive applications.

Features

- $BV_{CEO} > 65V$ (BC846)
- $BV_{CEO} > 45V$ (BC847)
- $I_C = 100mA$ 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 BC846BFSWQ, BC847BFSWQ, and BC847CFSWQ are suitable for automotive applications requiring specific change control; these parts are AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**
<https://www.diodes.com/quality/product-definitions/>

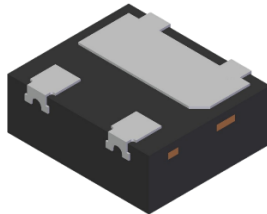
Mechanical Data

- Package: U-DFN1412-3/SWP (Type A)
- Package Material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu, Solderable per MIL-STD-202, Method 208 (E4)
- Weight: 0.0050 grams (Approximate)

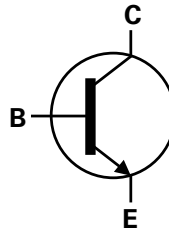
Application

- Switching and amplification

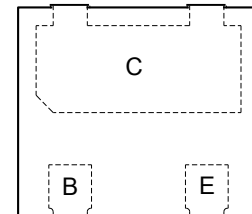
U-DFN1412-3/SWP



Bottom View



Device Symbol



Top View
Pin-Out

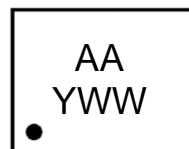
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
BC846BFSWQ-7	U-DFN1412-3/SWP (Type A)	4L	7	8	5,000	Reel
BC847BFSWQ-7	U-DFN1412-3/SWP (Type A)	4W	7	8	5,000	Reel
BC847CFSWQ-7	U-DFN1412-3/SWP (Type A)	4X	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-DFN1412-3/SWP



AA = Product type Marking Code
 YWW = Date Code Marking
 Y = Last Digit of Year (ex: 4 = 2024)
 WW = Week Code 01 to 53

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Collector-Base Voltage	BC846	V _{CBO}	80	V
	BC847		50	
Collector-Emitter Voltage	BC846	V _{CEO}	65	V
	BC847		45	
Emitter-Base Voltage		V _{EB0}	6	V
Continuous Collector Current		I _C	100	mA
Peak Pulse Collector Current		I _{CM}	200	mA
Peak Base Current		I _{BM}	100	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P _D	450	mW
	(Note 6)		1.25	W
Thermal Resistance, Junction to Ambient	(Note 5)	R _{θJA}	278	°C/W
	(Note 6)		100	
Operating and Storage Temperature Range		T _J , T _{STG}	-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:
5. For a device mounted with the exposed collector pads on minimum recommended pad layout that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 6. Same as Note (5), except the device is mounted with 1-inch square pad and 2oz. copper.
 7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

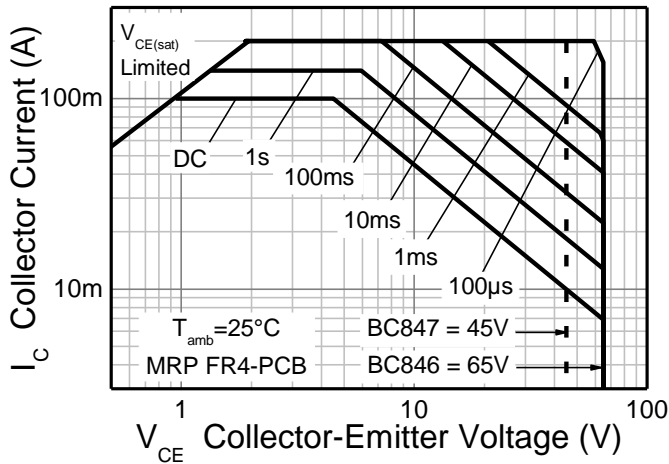


Fig.1 Safe Operating Area

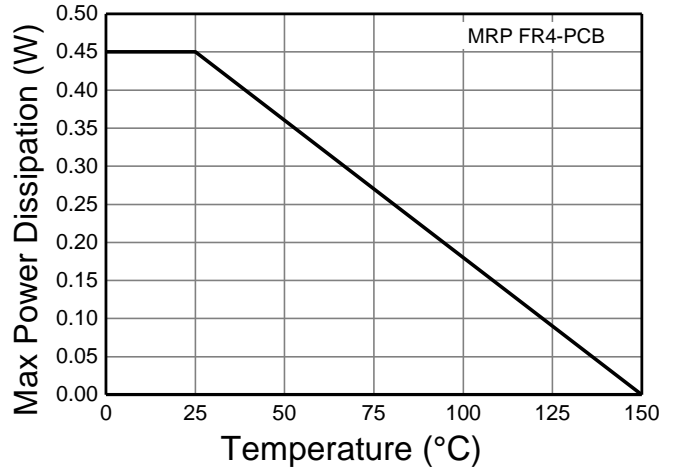


Fig.2 Derating Curve

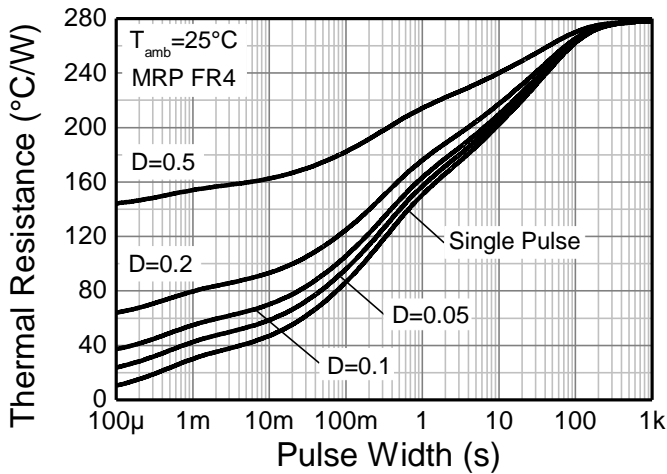


Fig.3 Transient Thermal Impedance

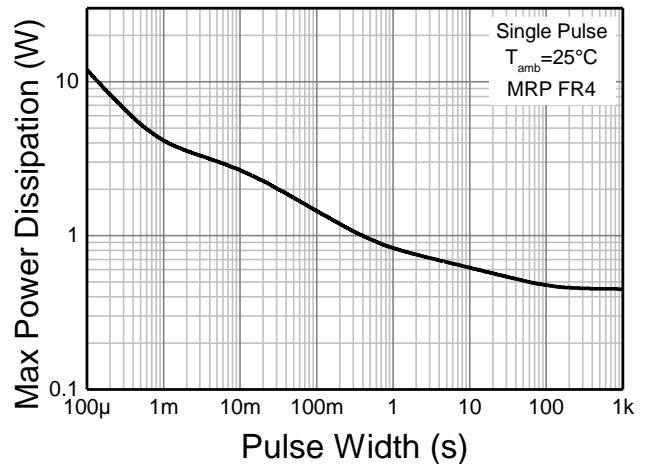


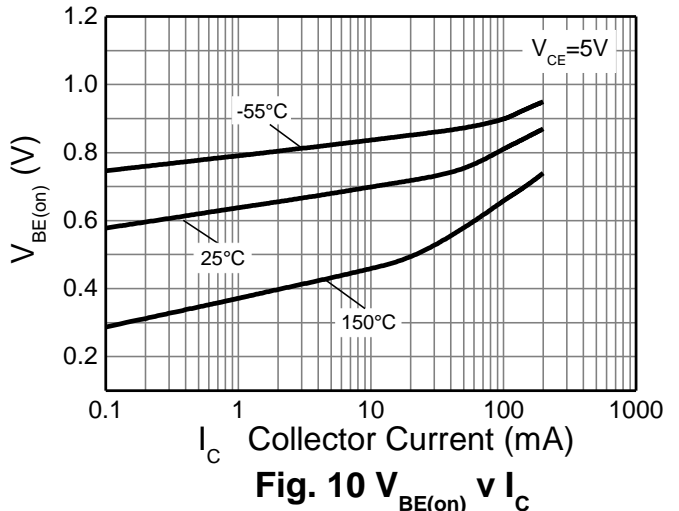
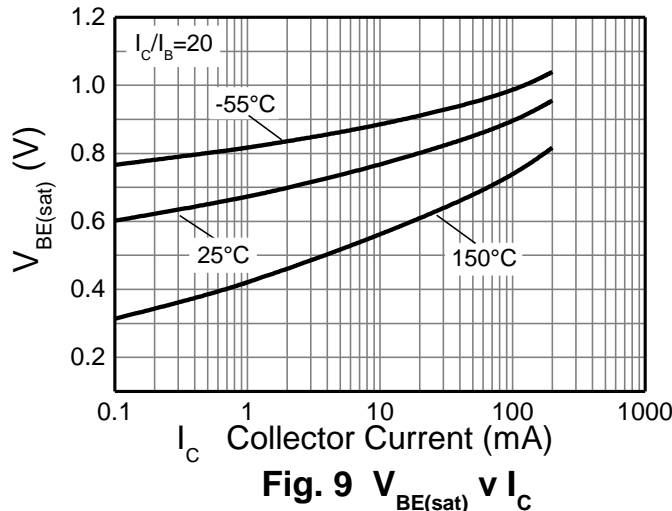
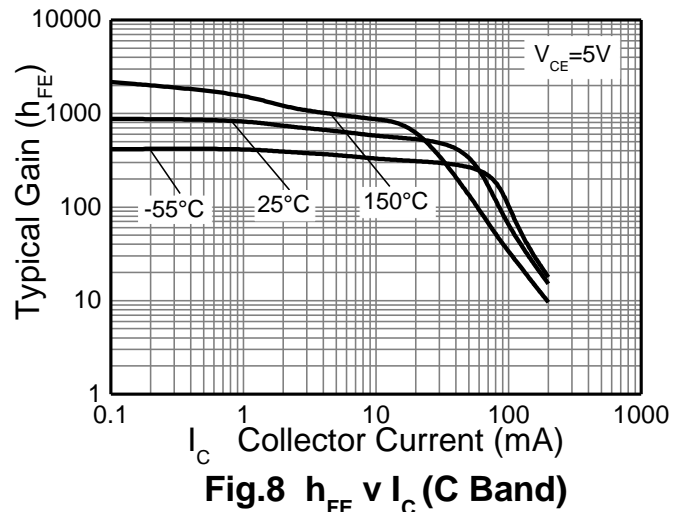
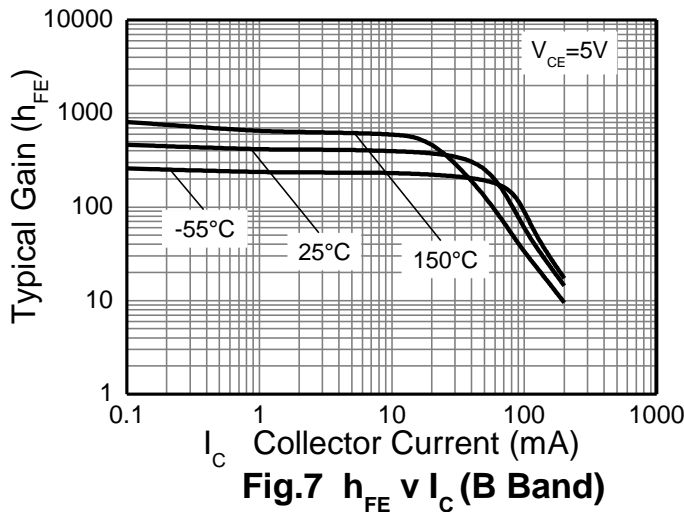
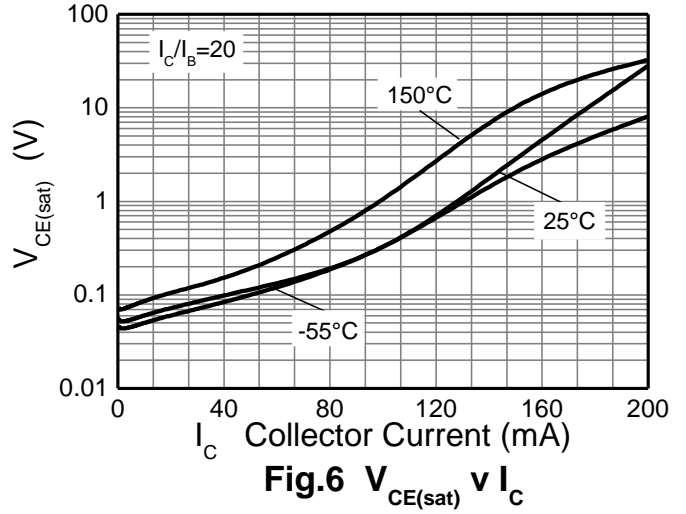
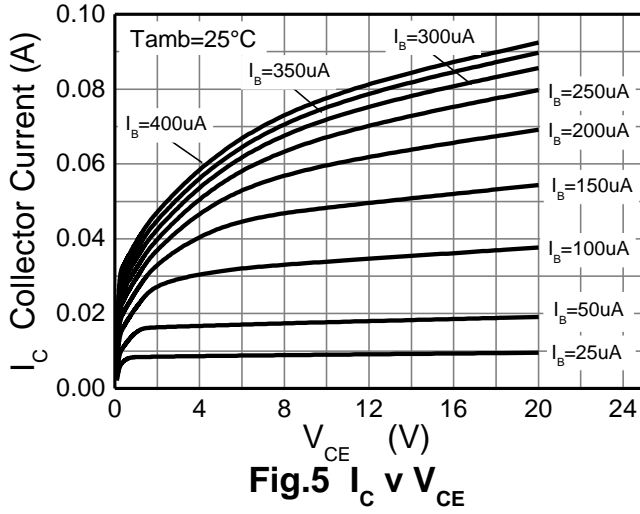
Fig.4 Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	BC846	80	—	—	V	I _C = 100μA
	BC847	50				
Collector-Emitter Breakdown Voltage (Note 8)	BC846	65	—	—	V	I _C = 10mA
	BC847	45				
Emitter-Base Breakdown Voltage	BV _{EBO}	7	—	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CBO}	—	—	15	nA	V _{CB} = 30V, I _E = 0
		—	—	5	μA	V _{CB} = 30V, I _E = 0, T _A = +150°C
Emitter-Base Cutoff Current	I _{EBO}	—	—	100	nA	V _{EB} = 5.6V, I _C = 0
DC Current Gain	h _{FE}	200	—	450	—	V _{CE} = 5V, I _C = 2mA
		420	—	800		V _{CE} = 5V, I _C = 2mA
		—	—	200		I _C = 10mA, I _B = 0.5mA
Collector-Emitter Saturation Voltage (Note 8)	V _{CE(sat)}	—	—	400	mV	I _C = 100mA, I _B = 5mA
		—	—	700		V _{CE} = 5V, I _C = 2mA
Base-Emitter Turn-on Voltage (Note 8)	V _{BE(on)}	—	—	770	mV	V _{CE} = 5V, I _C = 10mA
		—	—	—		I _C = 10mA, I _B = 0.5mA
Base-Emitter Saturation Voltage (Note 8)	V _{BE(sat)}	—	760	—	V	I _C = 100mA, I _B = 5mA
		—	900	—		I _C = 100mA, I _B = 5mA
Transition Frequency	f _T	100	—	—	MHz	V _{CE} = 5V, I _C = 10mA, f = 100MHz
Output (Collector) Capacitance	C _{obc}	—	—	3	pF	V _{CB} = 10V, f = 1MHz
Output (Emitter) Capacitance	C _{oec}	—	11	—	pF	V _{EB} = 0.5V, f = 1MHz
Noise Figure	NF	—	—	10	dB	V _{CE} = 5V, I _C = 200μA, R _S = 2kΩ, f = 1kHz BW=200Hz

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

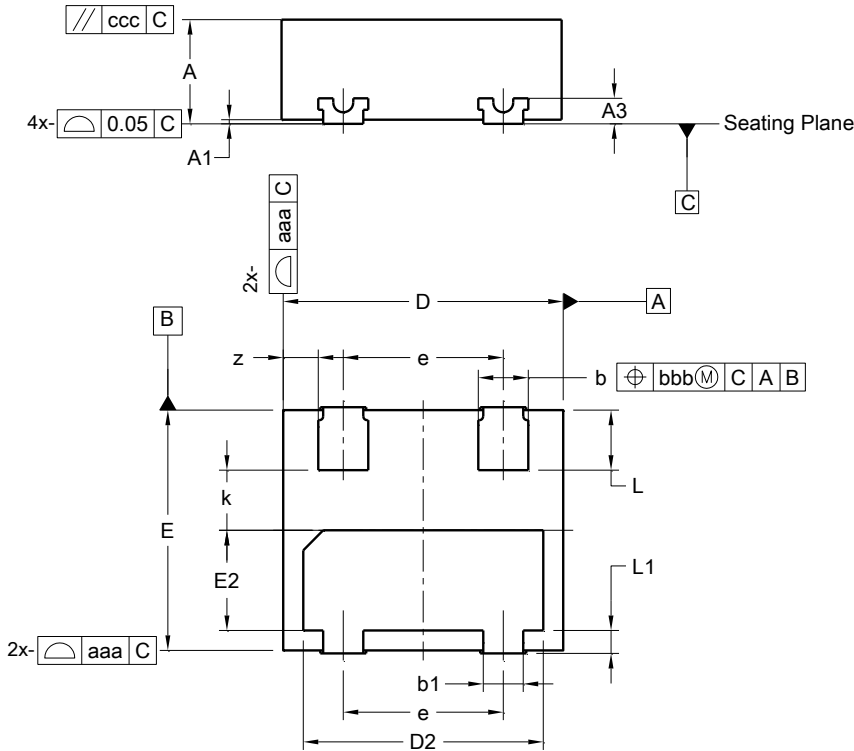
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



Package Outline Dimensions

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

U-DFN1412-3/SWP (Type A)



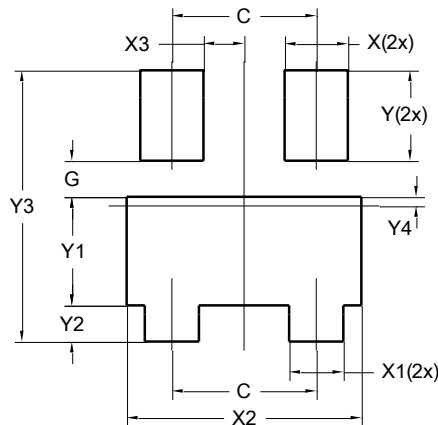
U-DFN1412-3/SWP (Type A)			
Dim	Min	Max	Typ
A	0.47	0.57	0.52
A1	0.00	0.05	0.03
A3	-	-	0.127
b	0.22	0.30	0.25
b1	0.15	0.25	0.20
D	1.35	1.45	1.40
D2	1.17	1.25	1.20
e	0.80 BSC		
E	1.15	1.25	1.20
E2	0.47	0.55	0.50
k	-	-	0.30
L	0.25	0.35	0.30
L1	0.065	0.165	0.115
z	-	-	0.175
aaa	0.25		
bbb	0.10		
ccc	0.10		
All Dimensions in mm			

Note: 9. 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-DFN1412-3/SWP (Type A)



Dimensions	Value (in mm)
C	0.800
G	0.200
X	0.350
X1	0.300
X2	1.300
X3	0.225
Y	0.500
Y1	0.600
Y2	0.200
Y3	1.500

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