



**THE DATASHEET OF  
BC846BW-7-F**



## Features

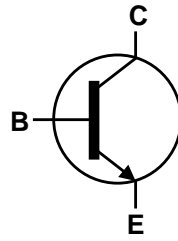
- Ideally Suited for Automatic Insertion
- Complementary PNP Types: BC856W–BC858W
- For Switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

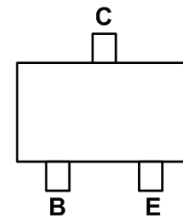
- Package: SOT323
- Package Material: Molded Plastic, "Green" Molding Compound  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (Ⓔ)
- Weight: 0.006 grams (Approximate)



Top View



Device Symbol



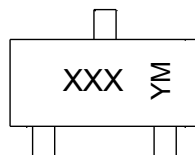
Top View  
Pin-Out

## Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Packing	
				Qty.	Carrier
BC846AW-7-F	SOT323	K1Q	7	3,000	Reel
BC846BW-7-F	SOT323	K1R	7	3,000	Reel
BC846BW-13-F	SOT323	K1R	13	10,000	Reel
BC847AW-7-F	SOT323	K1Q	7	3,000	Reel
BC847BW-7-F	SOT323	K1R	7	3,000	Reel
BC847BW-13-F	SOT323	K1R	13	10,000	Reel
BC847CW-7-F	SOT323	K1M	7	3,000	Reel
BC847CW-13-F	SOT323	K1M	13	10,000	Reel
BC848AW-7-F	SOT323	K1Q	7	3,000	Reel
BC848BW-7-F	SOT323	K1R	7	3,000	Reel
BC848CW-7-F	SOT323	K1M	7	3,000	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



XXX = Product Type Marking Code  
(Please See *Ordering Information*)  
YM = Date Code Marking  
Y or  $\bar{Y}$  = Year (ex: L = 2024)  
M or  $\bar{M}$  = Month (ex: 2 = February)

### Date Code Key

Year	2001	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	M	-	L	M	N	P	R	S	T	U	V	W

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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Collector-Base Voltage	BC846AW/BW	V <sub>CBO</sub>	80	V
	BC847AW/BW/CW		50	
	BC848AW/BW/CW		30	
Collector-Emitter Voltage	BC846AW/BW	V <sub>CEO</sub>	65	V
	BC847AW/BW/CW		45	
	BC848AW/BW/CW		30	
Emitter-Base Voltage	BC846AW/BW	V <sub>EBO</sub>	6	V
	BC847AW/BW/CW		5	
	BC848AW/BW/CW		5	
Continuous Collector Current		I <sub>C</sub>	100	mA
Peak Collector Current		I <sub>CM</sub>	200	mA
Peak Base Current		I <sub>BM</sub>	200	mA

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

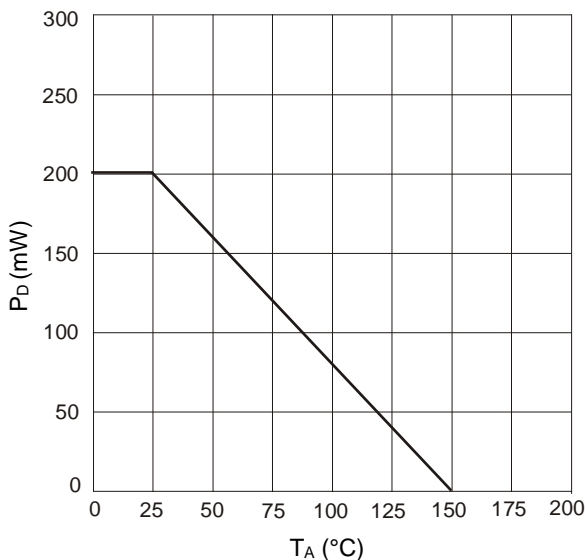
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	625	°C/W
Thermal Resistance, Junction to Case	(Note 5)	R <sub>θJC</sub>	115	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

**ESD Ratings** (Note 6)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Charged Device Model	ESD CDM	1,000	V	C3
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted on minimum recommended pad layout 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  6. Refer to JEDEC specification JESD22-A114, JESD22-C101 and JESD22-A115.

**Thermal Characteristic and Derating Information**



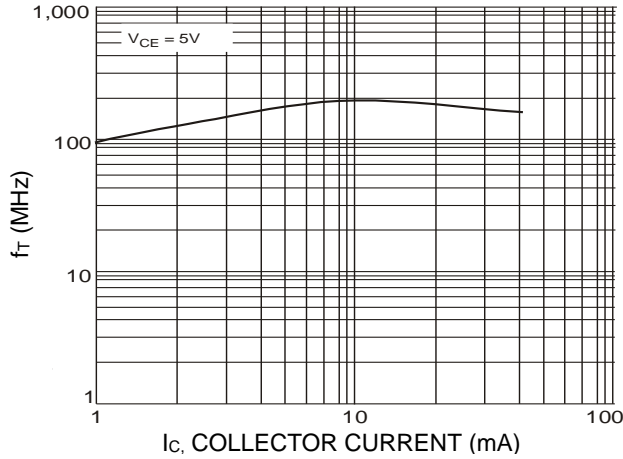
**Figure 1. P<sub>D</sub> v T<sub>A</sub>**

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

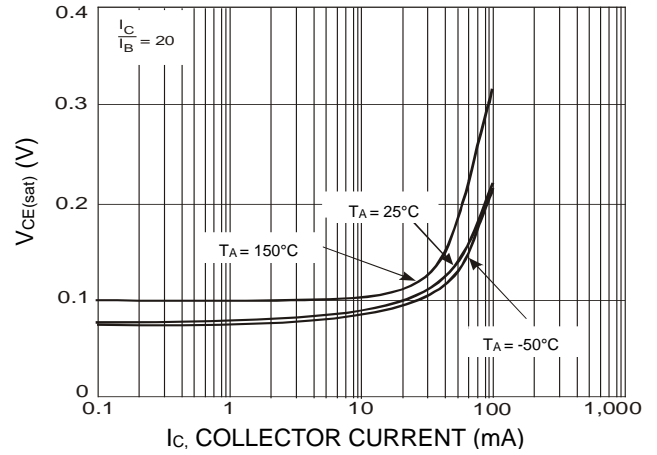
Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BC846AW/BW	BV <sub>CBO</sub>	80	—	—	V	I <sub>C</sub> = 100μA
	BC847AW/BW/CW		50				
	BC848AW/BW/CW		30				
Collector-Emitter Breakdown Voltage (Note 7)	BC846AW/BW	BV <sub>CEO</sub>	65	—	—	V	I <sub>C</sub> = 10mA
	BC847AW/BW/CW		45				
	BC848AW/BW/CW		30				
Emitter-Base Breakdown Voltage	BC846AW/BW	BV <sub>EBO</sub>	6	—	—	V	I <sub>E</sub> = 100μA
	BC847AW/BW/CW		5				
	BC848AW/BW/CW		5				
DC Current Gain (Note 7)	Current Gain Group	BC846AW/BC847AW/BC848AW	110	180	220	—	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA
		BC846BW/BC847BW/BC848BW	200	290	450		
		BC847CW/BC848CW	420	520	800		
Collector Cutoff Current		I <sub>CBO</sub>	—	—	20	nA	V <sub>CB</sub> = 30V
					5	μA	V <sub>CB</sub> = 30V, T <sub>A</sub> = +150°C
Collector-Emitter Saturation Voltage (Note 7)		V <sub>CE(sat)</sub>	—	90	250	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA
				200	600		I <sub>C</sub> = 100mA, I <sub>B</sub> = 5.0mA
Base-Emitter Turn-on Voltage (Note 7)		V <sub>BE(on)</sub>	580	660	700	mV	I <sub>C</sub> = 2mA, V <sub>CE</sub> = 5V
			—	—	770		I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5V
Base-Emitter Saturation Voltage (Note 7)		V <sub>BE(sat)</sub>	—	700	—	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA
				900			I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA
Output Capacitance		C <sub>obo</sub>	—	3	4.5	pF	V <sub>CB</sub> = 10V, f = 1.0MHz
Transition Frequency		f <sub>T</sub>	100	300	—	MHz	V <sub>CE</sub> = 5V, I <sub>C</sub> = 10mA f = 100MHz
Noise Figure		NF	—	—	10	dB	V <sub>CE</sub> = 5V, I <sub>C</sub> = 200μA R <sub>S</sub> = 2kΩ, f = 1kHz Δf = 200Hz

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

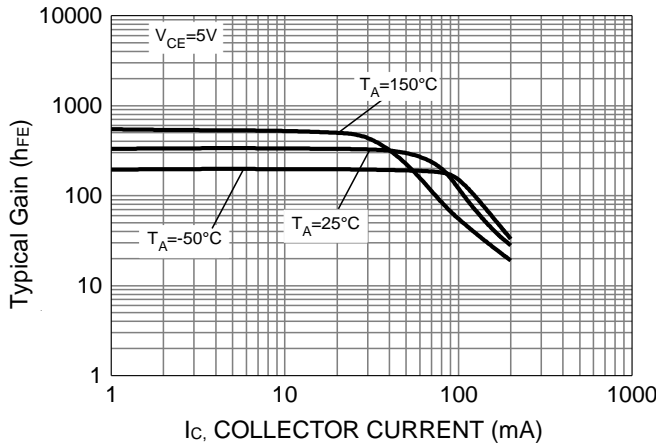
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



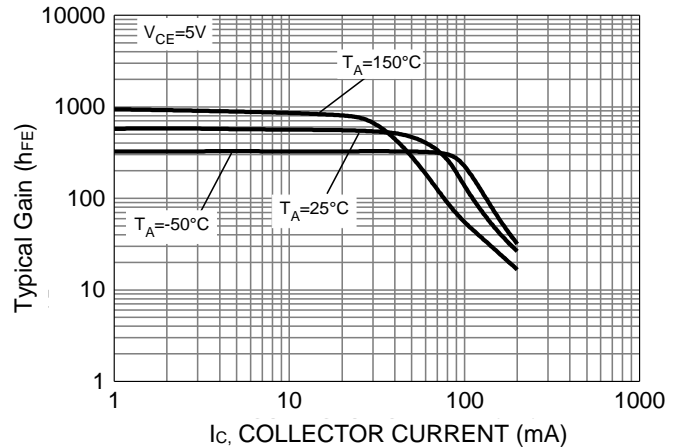
**Figure 2.  $f_T$  v  $I_C$**



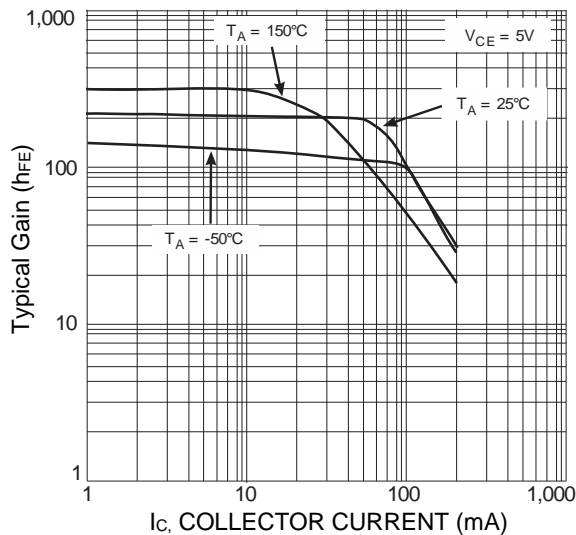
**Figure 3.  $V_{CE(sat)}$  v  $I_C$**



**Figure 4.  $h_{FE}$  v  $I_C$**   
(Band B Group Gain)



**Figure 5.  $h_{FE}$  v  $I_C$**   
(Band C Group Gain)

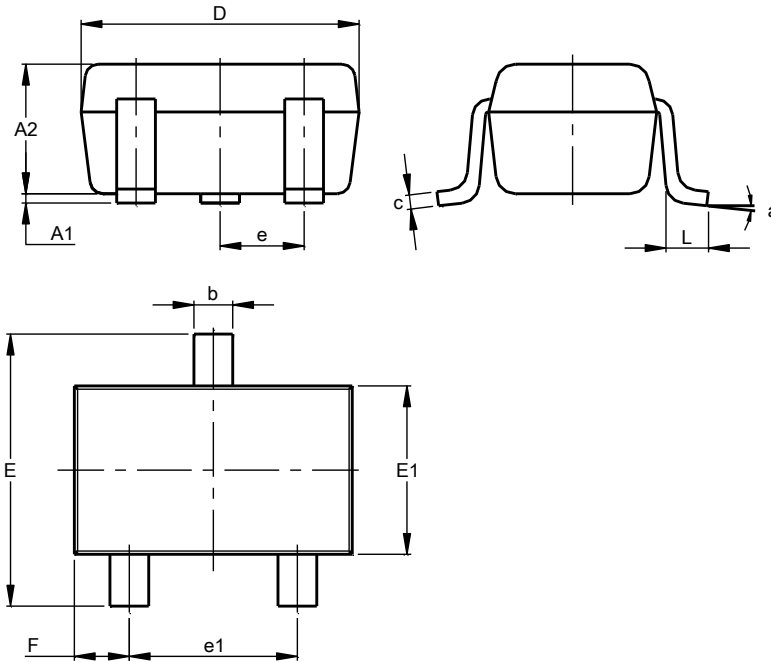


**Figure 6.  $h_{FE}$  v  $I_C$**   
(Band A Group Gain)

## Package Outline Dimensions

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

SOT323

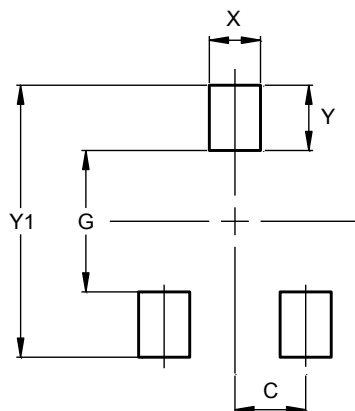


SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

## Suggested Pad Layout

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

SOT323



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.470
Y	0.600
Y1	2.500

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