




**THE DATASHEET OF  
BC846AW-7-F**



**Features**

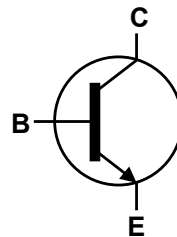
- Ideally Suited for Automatic Insertion
- Complementary PNP Types: BC856W – BC858W
- For Switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

**Mechanical Data**

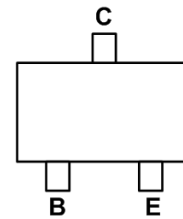
- Case: SOT323
- Case material: molded plastic, "Green" molding compound  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per  
MIL-STD-202, Method 208 
- Weight: 0.006 grams (Approximate)



Top View



Device Symbol



Top View  
Pin-Out

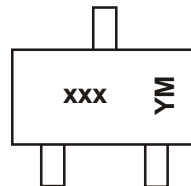
**Ordering Information** (Notes 4 & 5)

Product	Compliance	Marking	Reel Size (inches)	Quantity per Reel
BC846AW-7-F	AEC-Q101	K1Q	7	3,000
BC846BW-7-F	AEC-Q101	K1R	7	3,000
BC846BWQ-7-F	Automotive	K1R	7	3,000
BC846BW-13-F	AEC-Q101	K1R	13	10,000
BC847AW-7-F	AEC-Q101	K1Q	7	3,000
BC847BW-7-F	AEC-Q101	K1R	7	3,000
BC847BW-13-F	AEC-Q101	K1R	13	10,000

Product	Compliance	Marking	Reel Size (inches)	Quantity per Reel
BC847BWQ-13-F	Automotive	K1R	13	10,000
BC847CW-7-F	AEC-Q101	K1M	7	3,000
BC847CW-13-F	AEC-Q101	K1M	13	10,000
BC847CWQ-7-F	Automotive	K1M	7	3,000
BC848AW-7-F	AEC-Q101	K1Q	7	3,000
BC848BW-7-F	AEC-Q101	K1R	7	3,000
BC848CW-7-F	AEC-Q101	K1M	7	3,000

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  5. Tape width is 8mm. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

**Marking Information**



xxx = Product Type Marking Code  
(Please see Ordering Information)  
YM = Date Code Marking  
Y or  $\bar{Y}$  = Year (ex: A = 2013)  
M or  $\bar{M}$  = Month (ex: 9 = September)

Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017
Code	X	Y	Z	A	B	C	D	E

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	BC846	V <sub>CBO</sub>	80	V
	BC847		50	
	BC848		30	
Collector-Emitter Voltage	BC846	V <sub>CEO</sub>	65	V
	BC847		45	
	BC848		30	
Emitter-Base Voltage	BC846, BC847	V <sub>EBO</sub>	6	V
	BC848		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 6)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient	(Note 6)	R <sub>θJA</sub>	625	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-65 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	400	V	C

- Notes:
6. 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.
  7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BC846	$BV_{CBO}$	80	—	—	V	$I_C = 100\mu\text{A}$
	BC847		50				
	BC848		30				
Collector-Emitter Breakdown Voltage (Note 8)	BC846	$BV_{CEO}$	65	—	—	V	$I_C = 10\text{mA}$
	BC847		45				
	BC848		30				
Emitter-Base Breakdown Voltage	BC846, BC847	$BV_{EBO}$	6	—	—	V	$I_E = 100\mu\text{A}$
	BC848		5				
DC Current Gain (Note 8)	Current Gain Group	A	110	180	220	—	$V_{CE} = 5.0\text{V}, I_C = 2.0\text{mA}$
		B	200	290	450		
		C	420	520	800		
Collector Cutoff Current		$I_{CBO}$	—	—	20	nA	$V_{CB} = 30\text{V}$
					5	$\mu\text{A}$	$V_{CB} = 30\text{V}, T_A = +150^\circ\text{C}$
Collector-Emitter Saturation Voltage (Note 8)		$V_{CE(sat)}$	—	90	250	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$
				200	600		$I_C = 100\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Turn-On Voltage (Note 8)		$V_{BE(on)}$	580	660	700	mV	$I_C = 2\text{mA}, V_{CE} = 5\text{V}$
			—	—	770		$I_C = 10\text{mA}, V_{CE} = 5\text{V}$
Base-Emitter Saturation Voltage (Note 8)		$V_{BE(sat)}$	—	700	—	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$
				900			$I_C = 100\text{mA}, I_B = 5\text{mA}$
Output Capacitance		$C_{obo}$	—	3	4.5	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$
Transition Frequency		$f_T$	100	300	—	MHz	$V_{CE} = 5\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$
Noise Figure		NF	—	—	10	dB	$V_{CE} = 5\text{V}, I_C = 200\mu\text{A}$ $R_S = 2\text{k}\Omega, f = 1\text{kHz}$ $\Delta f = 200\text{Hz}$

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.)

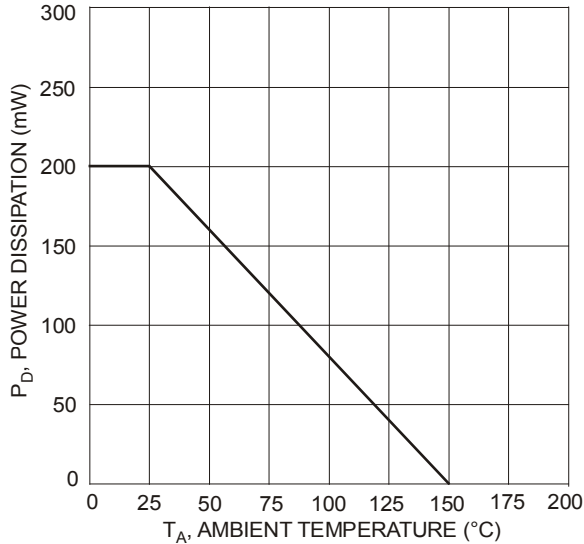


Figure 1 Power Dissipation vs. Ambient Temperature

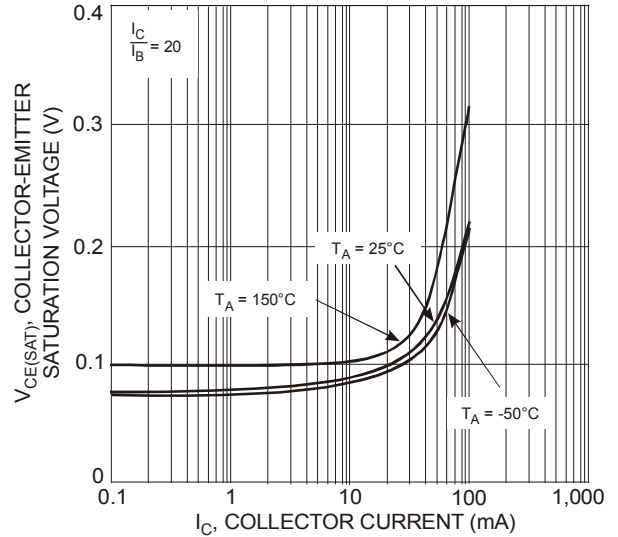


Figure 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

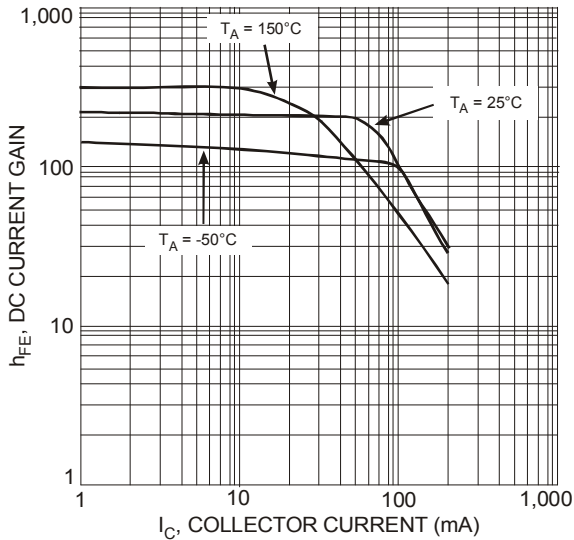


Figure 3 Typical DC Current Gain vs. Collector Current

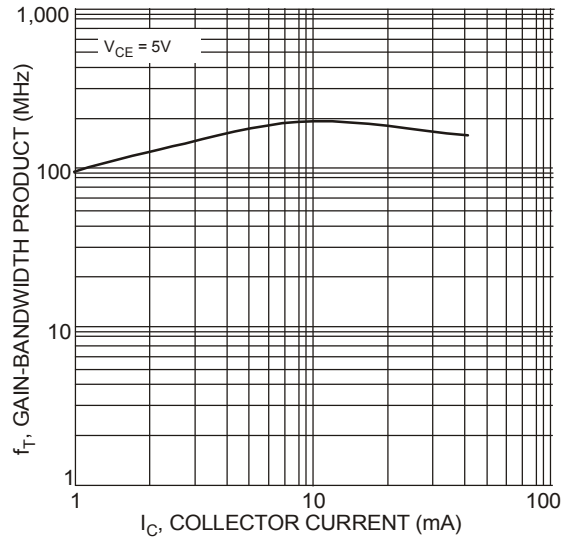
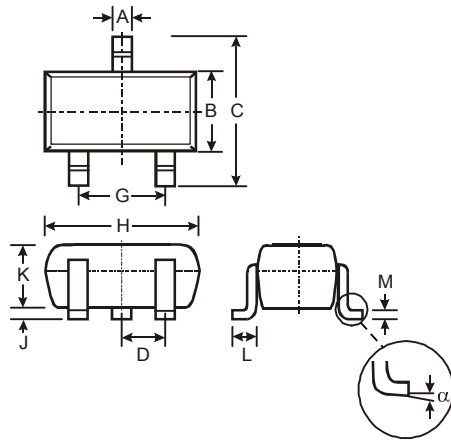


Figure 4 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

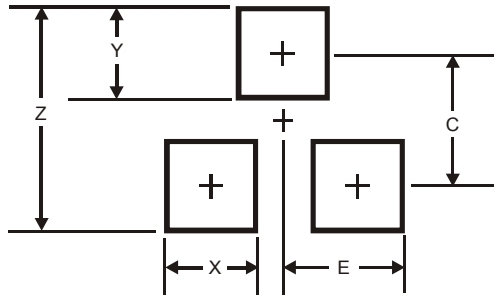
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT323			
Dim	Min	Max	Typ
A	0.25	0.40	0.30
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	—	—	0.65
G	1.20	1.40	1.30
H	1.80	2.20	2.15
J	0.0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.18	0.11
α	0°	8°	—
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
Z	2.8
X	0.7
Y	0.9
C	1.9
E	1.0

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