



**THE DATASHEET OF  
BC858CW-7-F**

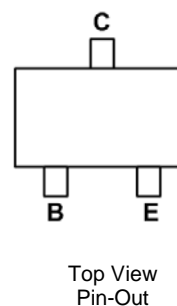
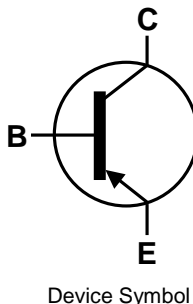


## Features

- Ideally Suited for Automatic Insertion
- Complementary NPN Types Available (BC846AW - BC848CW)
- 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)



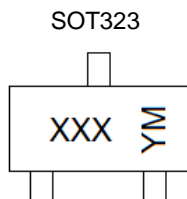
## Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel Size (inches)	Quantity per Reel
BC856AW-7-F	AEC-Q101	K3A	7	3000
BC856BW-7-F	AEC-Q101	K3B	7	3000
BC856BW-13-F	AEC-Q101	K3B	13	10,000
BC857AW-7-F	AEC-Q101	K3A	7	3000
BC857BW-7-F	AEC-Q101	K3B	7	3000

Product	Compliance	Marking	Reel Size (inches)	Quantity per Reel
BC857BWQ-13-F	Automotive	K3B	13	10,000
BC857CW-7-F	AEC-Q101	K3G	7	3000
BC858AW-7-F	AEC-Q101	K3A	7	3000
BC858BW-7-F	AEC-Q101	K3B	7	3000
BC858CW-7-F	AEC-Q101	K3G	7	3000

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q10x and standard products are electrically and thermally the same, except where specified. For more information, please refer to <https://www.diodes.com/quality/>.
  5. Tape width is 8mm. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



XXX = Product Type Marking Code (See Ordering Information)  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: F = 2018)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	F	G	H	I	J	K	L	M	N	O	P	Q

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	BC856	V <sub>CBO</sub>	-80	V
	BC857		-50	
	BC858		-30	
Collector-Emitter Voltage	BC856	V <sub>CEO</sub>	-65	V
	BC857		-45	
	BC858		-30	
Emitter-Base Voltage		V <sub>EBO</sub>	-5.0	V
Continuous Collector Current		I <sub>C</sub>	-100	mA
Peak Collector Current		I <sub>CM</sub>	-200	mA
Peak Emitter Current		I <sub>EM</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

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-Base Breakdown Voltage	BC856	BV <sub>CBO</sub>	-80	—	—	V	I <sub>C</sub> = -100nA	
	BC857		-50					
	BC858		-30					
Collector-Emitter Breakdown Voltage (Note 7)	BC856	BV <sub>CEO</sub>	-65	—	—	V	I <sub>C</sub> = -10mA	
	BC857		-45					
	BC858		-30					
Emitter-Base Breakdown Voltage		BV <sub>EBO</sub>	-5	—	—	V	I <sub>E</sub> = -100nA	
DC Current Gain (Note 7)	Current Gain Group	h <sub>FE</sub>	A	125	180	250	—	V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA
			B	220	290	475		
			C	420	520	800		
Collector Cutoff Current		I <sub>CBO</sub>	—	—	-15	nA	V <sub>CB</sub> = -30V	
					-4	μA	V <sub>CB</sub> = -30V, T <sub>A</sub> = +150°C	
Collector-Emitter Saturation Voltage (Note 7)		V <sub>CE(sat)</sub>	—	-75	-300	mV	I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA	
				-250	-650		I <sub>C</sub> = -100mA, I <sub>B</sub> = -5.0mA	
Base-Emitter Turn-On Voltage (Note 7)		V <sub>BE(on)</sub>	-600	-650	-750	mV	I <sub>C</sub> = -2mA, V <sub>CE</sub> = -5V	
			—	—	-820		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	
				-850	-950		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	200	—	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	

- Notes:
6. For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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

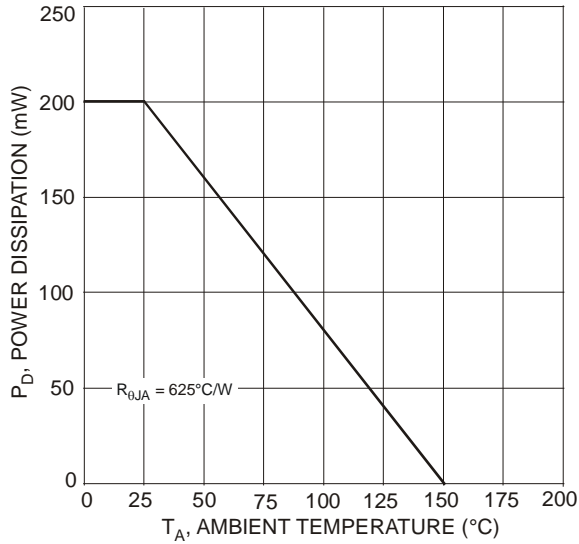


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 5)

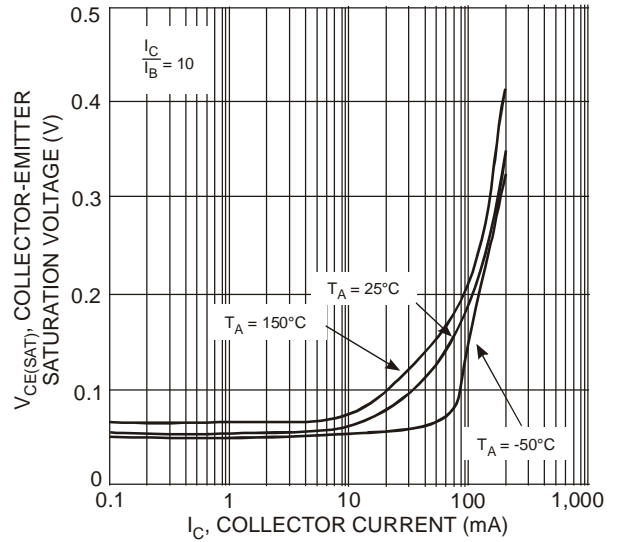


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

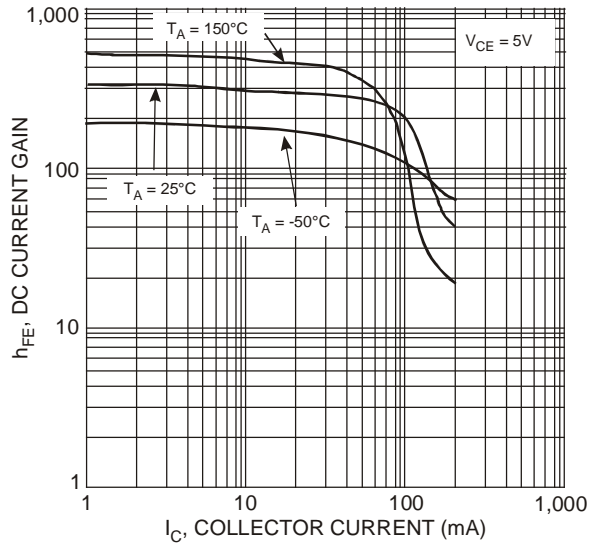


Fig. 3 Typical DC Current Gain (Group B) vs. Collector Current

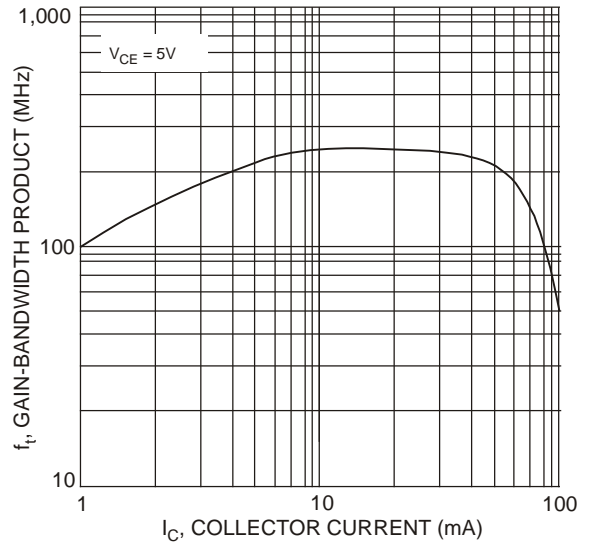
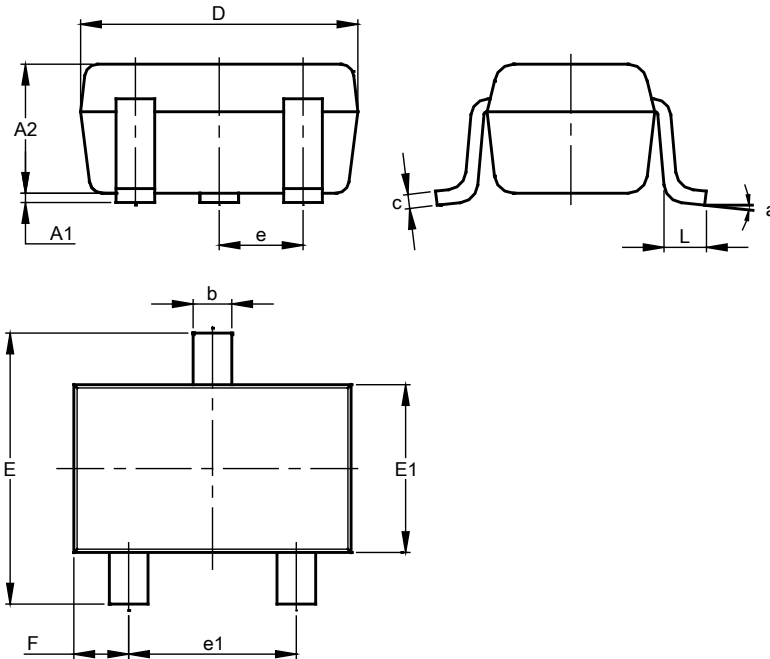


Fig. 4 Typical Gain-Bandwidth Product vs. Collector Current

## Package Outline Dimensions

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

SOT323

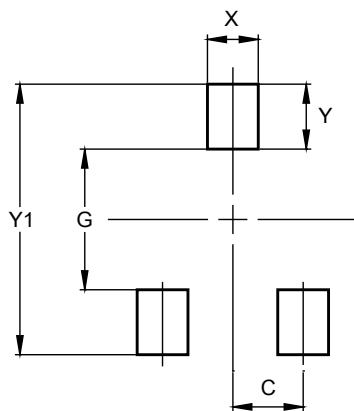


SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

## 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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