

## Description

AC847BWQ and AC847CWQ Bipolar Junction Transistors (BJT) are designed to meet the stringent requirements of Automotive Applications.

## Features

- Ideally Suited for Automatic Insertion
- Complementary PNP Types: AC857BWQ – AC857CWQ
- 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)**

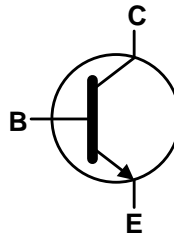
## Mechanical Data

- 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  $\text{\textcircled{3}}$
- Weight: 0.006 grams (Approximate)

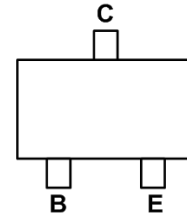
SOT323



Top View



Device Symbol



Top View  
Pin-Out

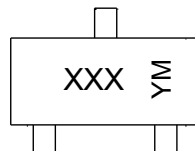
## Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel Size (inches)	Quantity Per Reel
AC847BWQ-7	Automotive	2D6	7	3,000
AC847BWQ-13	Automotive	2D6	13	10,000
AC847CWQ-7	Automotive	2D3	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. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

SOT323



XXX = Product Type Marking Code  
(Please see Ordering Information)  
YM = Date Code Marking  
Y or  $\bar{Y}$  = Year (ex: E = 2017)  
M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

Year	2017	2018	2019	2020	2021	2022	2023	2024
Code	E	F	G	H	I	J	K	L

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	V <sub>CB0</sub>	50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	45	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	V
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 FR-4 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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-Base Breakdown Voltage		BV <sub>CBO</sub>	50	—	—	V	I <sub>C</sub> = 100μA	
Collector-Emitter Breakdown Voltage (Note 8)		BV <sub>CEO</sub>	45	—	—	V	I <sub>C</sub> = 10mA	
Emitter-Base Breakdown Voltage		BV <sub>EBO</sub>	6	—	—	V	I <sub>E</sub> = 100μA	
DC Current Gain (Note 8)	Current Gain Group	h <sub>FE</sub>	B	200	290	450	—	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA
			C	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 8)		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 8)		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 8)		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: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

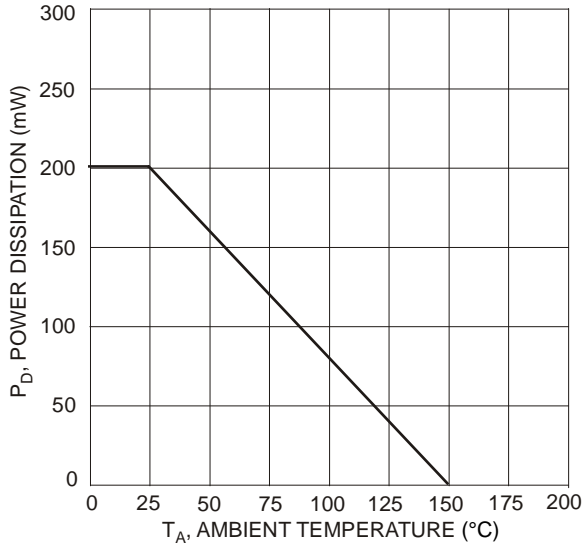


Figure 1 Power Dissipation vs. Ambient Temperature

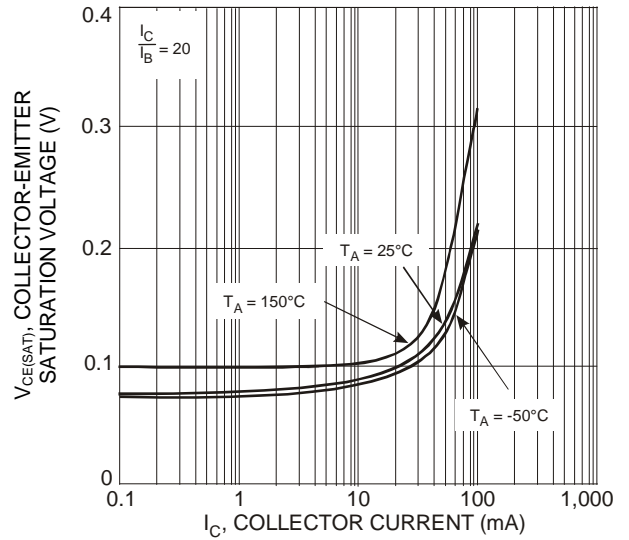


Figure 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

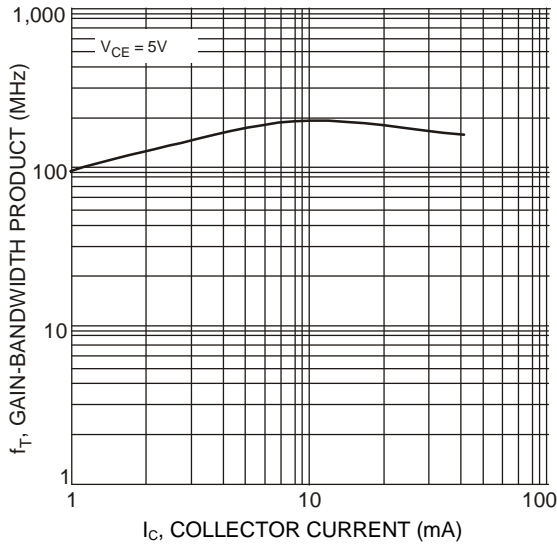


Figure 3 Typical Gain-Bandwidth Product vs. Collector Current

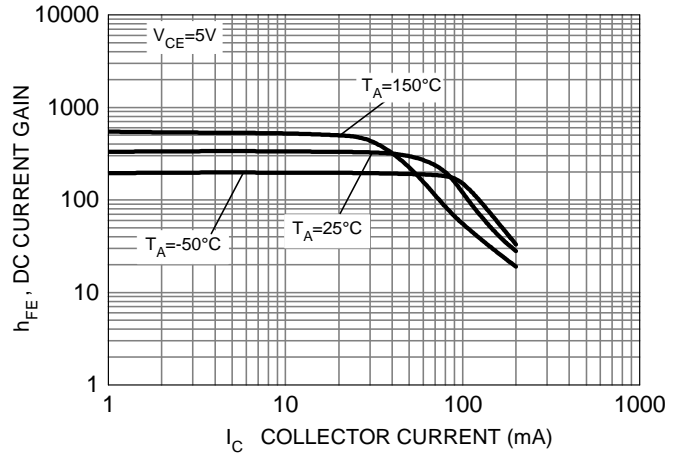


Figure 4 Typical DC Current Gain vs. Collector Current (Band B Group Gain)

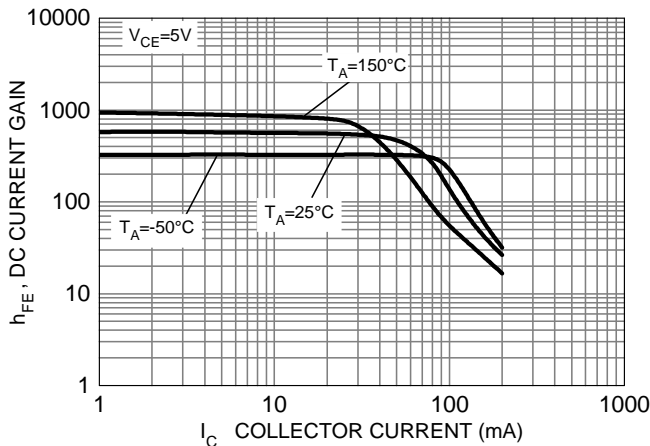
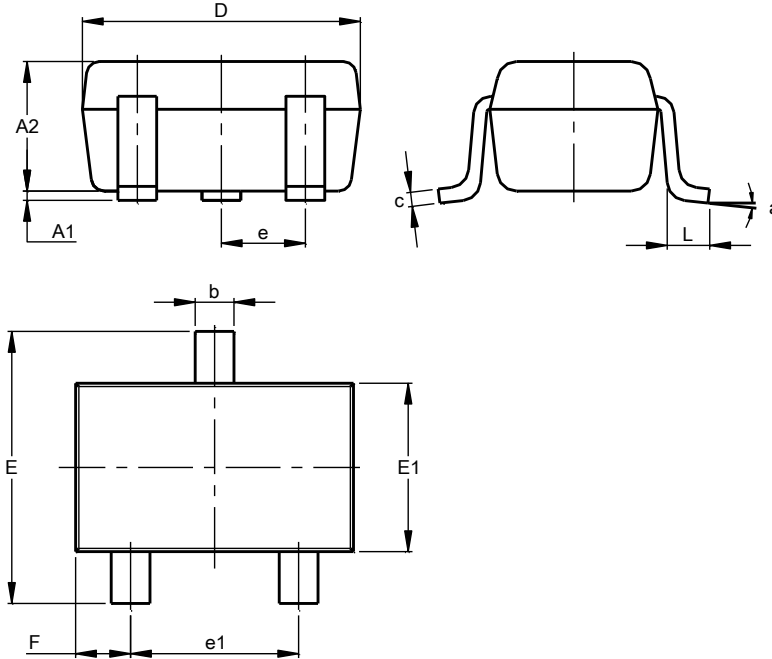


Figure 5 Typical DC Current Gain vs. Collector Current (Band C Group Gain)

**Package Outline Dimensions**

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

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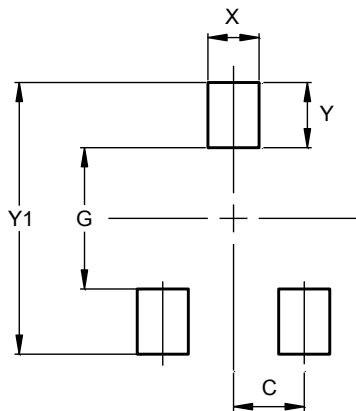


SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

**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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