



**THE DATASHEET OF  
AC857CWQ-7**



## Description

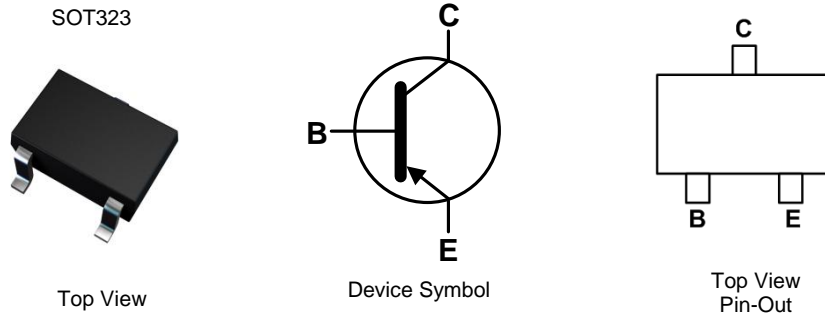
AC857CWQ Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

## Features

- Ideally Suited for Automatic Insertion
- Complementary NPN Types Available (AC847CWQ)
- 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<sup>(3)</sup>
- Weight: 0.006 grams (Approximate)

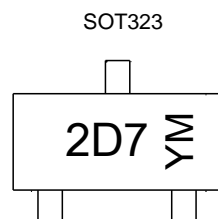


## Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel Size (inches)	Quantity per Reel
AC857CWQ-7	Automotive	2D7	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/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



2D7 = Product Type Marking Code (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	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>	-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	BV <sub>CB0</sub>	-50	-	-	V	I <sub>C</sub> = -100nA
Collector-Emitter Breakdown Voltage (Note 7)	BV <sub>CEO</sub>	-45	-	-	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-5	-	-	V	I <sub>E</sub> = -100nA
DC Current Gain (Note 7)	h <sub>FE</sub>	420	520	800	-	V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA
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.)

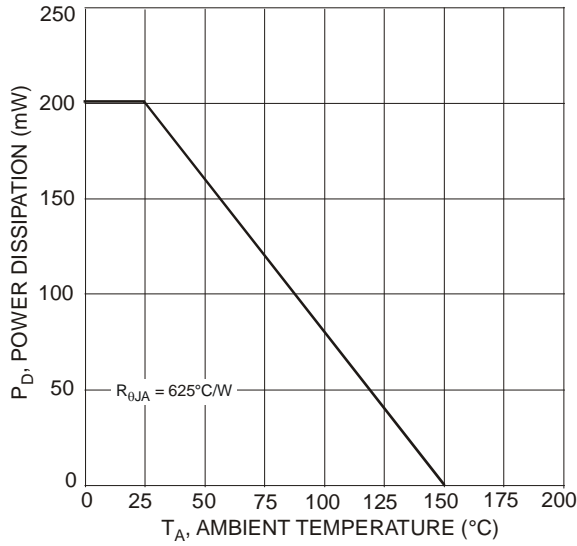


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 5)

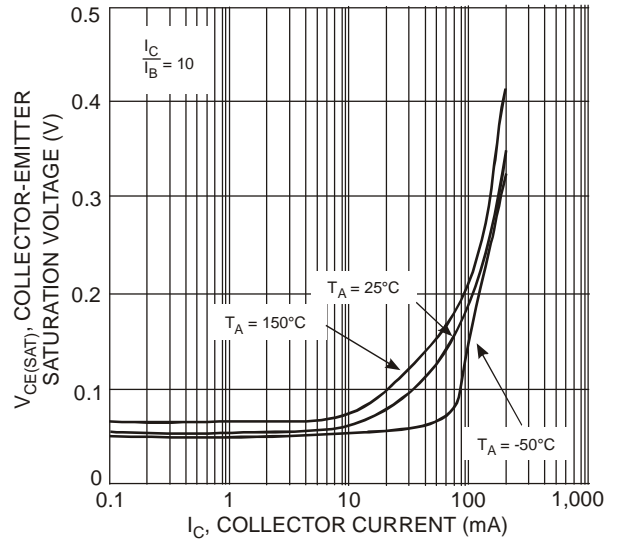


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

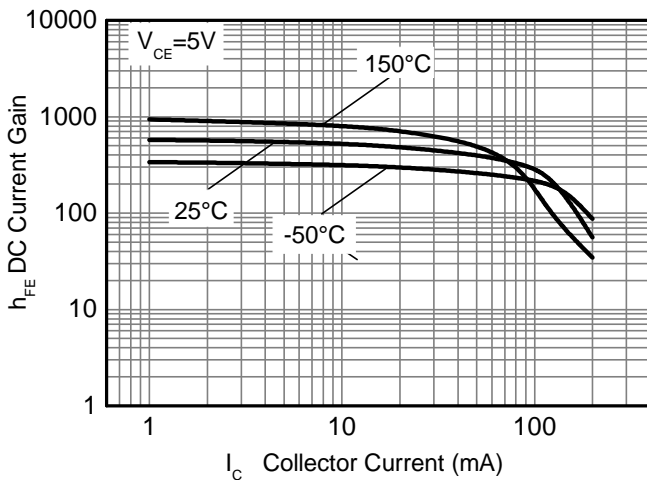


Fig. 3 Typical DC Current Gain (Group C) vs Collector Current (mA)

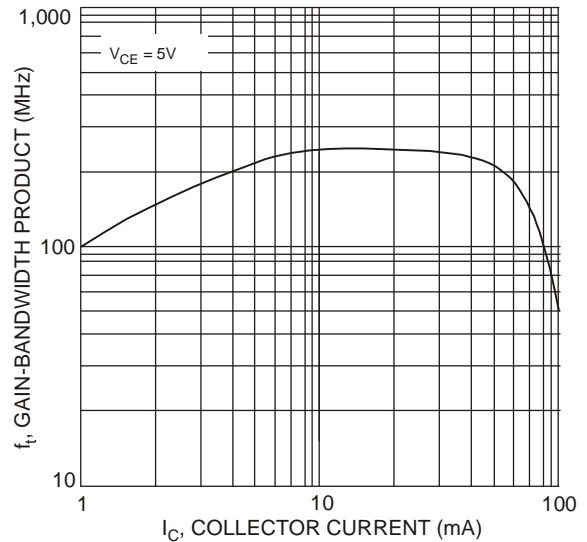
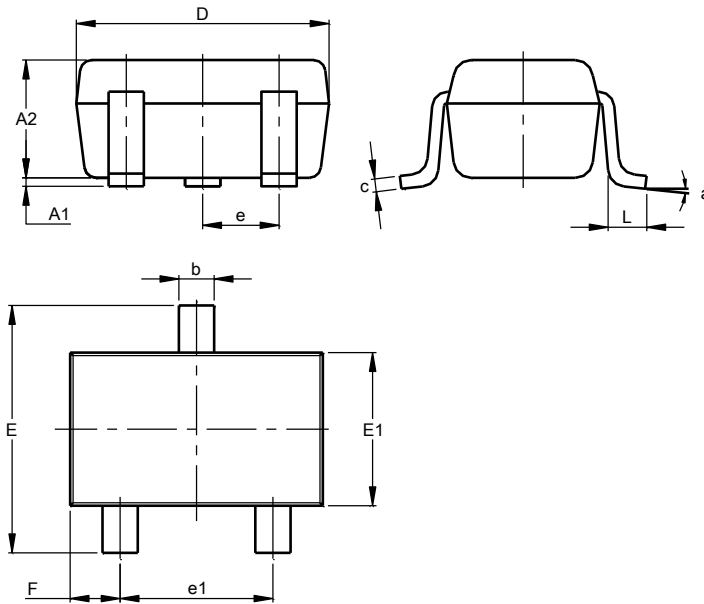


Fig. 4 Typical Gain-Bandwidth Product vs. Collector Current

## Package Outline Dimensions

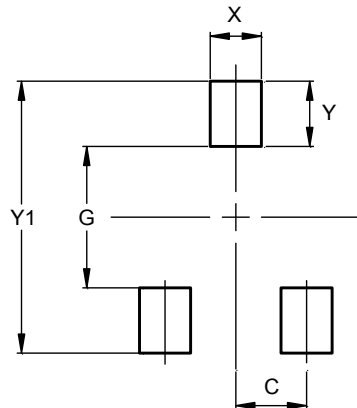
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT323			
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.



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

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