

Description

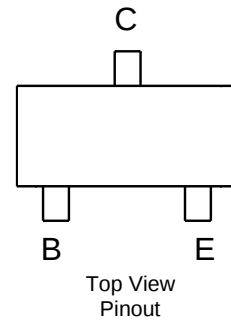
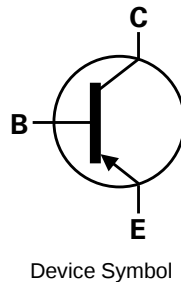
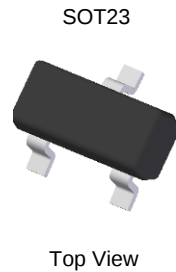
The AC857BQ-AC857CQ Bipolar Junction Transistors (BJT) are designed to meet the stringent requirements of automotive applications.

Features

- Ideally Suited for Automatic Insertion
- Complementary NPN Types: [AC847BQ-AC847CQ](#)
- For Switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- The AC857BQ and AC857CQ are suitable for automotive applications requiring specific change control; these parts are AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.
<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Package: SOT23
- 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: 0.008 grams (Approximate)

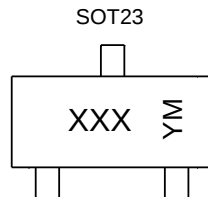


Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Packing	
				Qty.	Carrier
AC857BQ-7	SOT23	2C6	7	3,000	Reel
AC857CQ-7	SOT23	2C7	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
YM = Date Code Marking
Y or $\bar{Y}$ = Year (ex: M = 2025)
M or $\bar{M}$ = Month (ex: 9 = September)

Date Code Key

Year	2016	-	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	D	-	M	N	P	R	S	T	U	V	W	X

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_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	-50	V
Collector-Emitter Voltage	V _{CEO}	-45	V
Emitter-Base Voltage	V _{EB0}	-5.0	V
Continuous Collector Current	I _C	-100	mA
Peak Collector Current	I _{CM}	-200	mA
Peak Emitter Current	I _{EM}	-200	mA
Peak Base Current	I _{BM}	-200	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

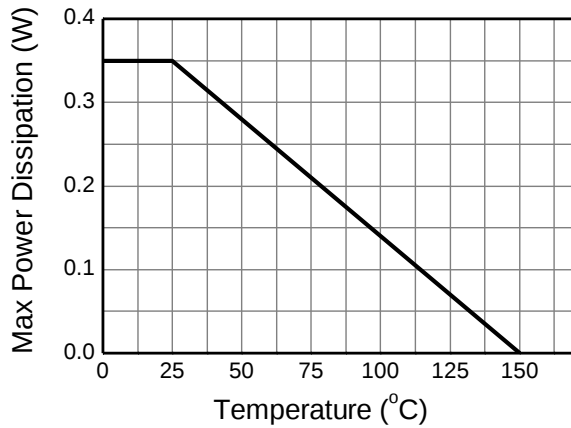
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	310	mW
(Note 5)		350	
Thermal Resistance, Junction to Ambient	R _{θJA}	403	°C/W
(Note 6)		357	
Thermal Resistance, Junction to Leads	R _{θJL}	350	°C/W
(Note 7)			
Operating and Storage Temperature Range	T _J , T _{STG}	-65 to +150	°C

ESD Ratings (Note 8)

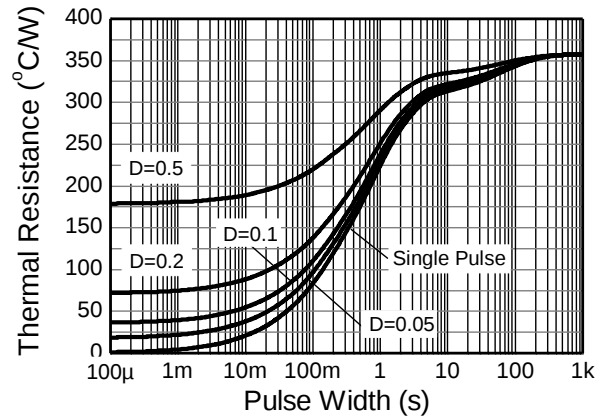
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 6. Same as Note 7, except the device is mounted on 15mm x 15mm 1oz copper.
 7. Thermal resistance from junction to solder-point (at the end of the leads).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115 and JESD22-C101.

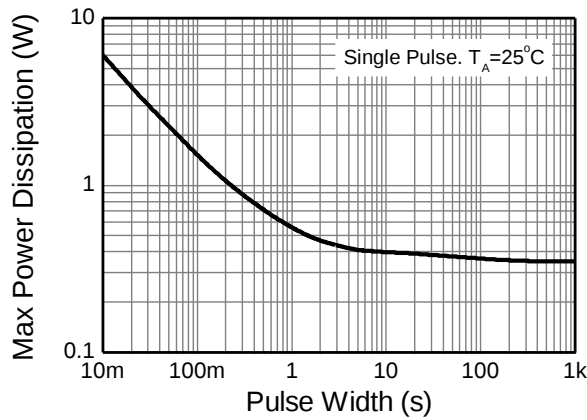
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage		BV _{CBO}	-50	—	—	V	I _C = -10μA
Collector-Emitter Breakdown Voltage (Note 9)		BV _{CEO}	-45	—	—	V	I _C = -10mA
Emitter-Base Breakdown Voltage		BV _{EBO}	-5	—	—	V	I _E = -1μA
Collector Cutoff Current		I _{CBO}	—	—	-15	nA	V _{CB} = -30V
					-4	μA	V _{CB} = -30V, T _J = +150°C
Collector Emitter Cutoff Current		I _{CES}	—	—	-15	nA	V _{CE} = -50V
Emitter-Base Cutoff Current		I _{EBO}	—	—	-100	nA	V _{EB} = -5V
Small-Signal Current Gain (Note 9)	AC857BQ	h _{fe}	—	330	—	—	I _C = -2.0mA, V _{CE} = -5V f = 1.0kHz
	AC857CQ		—	600	—		
Input Impedance (Note 9)	AC857BQ	h _{ie}	—	4.5	—	kΩ	
	AC857CQ		—	8.7	—		
Output Admittance (Note 9)	AC857BQ	h _{oe}	—	30	—	μS	
	AC857CQ		—	60	—		
Reverse Voltage Transfer Ratio (Note 9)	AC857BQ	h _{re}	—	2x10 ⁻⁴	—	—	
	AC857CQ		—	3x10 ⁻⁴	—		
DC Current Gain (Note 9)	AC857BQ	h _{FE}	220	290	475	—	I _C = -2.0mA, V _{CE} = -5V
	AC857CQ		420	520	800		
Collector-Emitter Saturation Voltage (Note 9)		V _{CE(sat)}	—	-75	-300	mV	I _C = -10mA, I _B = -0.5mA
				-250	-650		I _C = -100mA, I _B = -5.0mA
Base-Emitter Turn-On Voltage (Note 9)		V _{BE(on)}	-600	-650	-750	mV	I _C = -2mA, V _{CE} = -5V
			—	—	-820		I _C = -10mA, V _{CE} = -5V
Base-Emitter Saturation Voltage (Note 9)		V _{BE(sat)}	—	-700	—	mV	I _C = -10mA, I _B = -0.5mA
				-850	-1100		I _C = -100mA, I _B = -5mA
Output Capacitance		C _{obo}	—	3	—	pF	V _{CB} = -10V, f = 1.0MHz
Transition Frequency		f _T	100	200	—	MHz	V _{CE} = -5V, I _C = -10mA, f = 100MHz
Noise Figure		NF	—	2	10	dB	V _{CE} = -5V, I _C = -200μA R _S = 2kΩ, f = 1kHz Δf = 200Hz

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

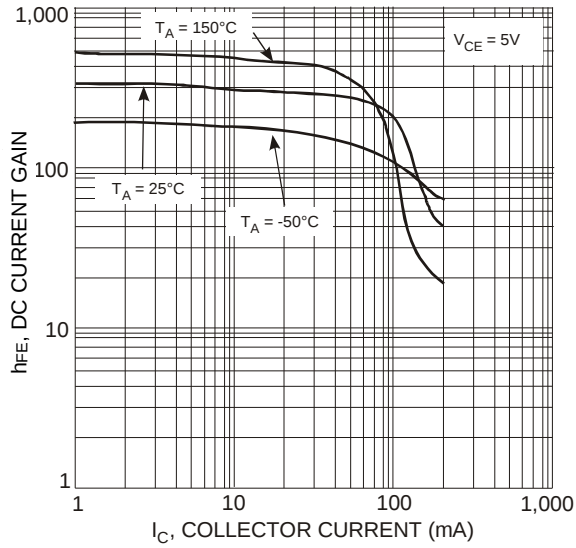


Figure 1 Typical DC Current Gain vs. Collector Current

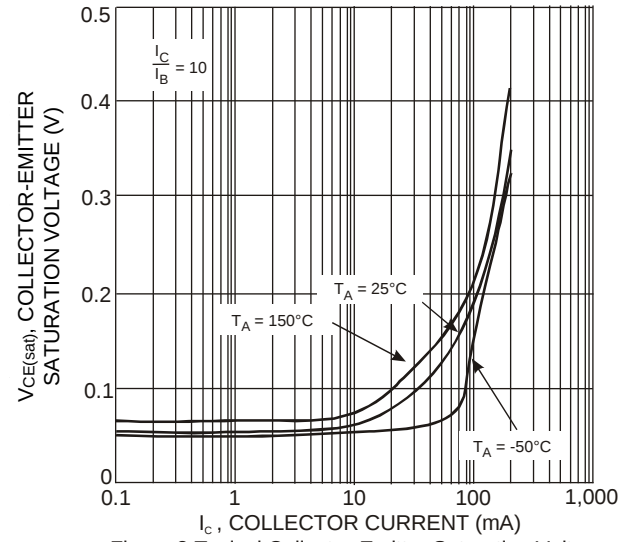


Figure 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

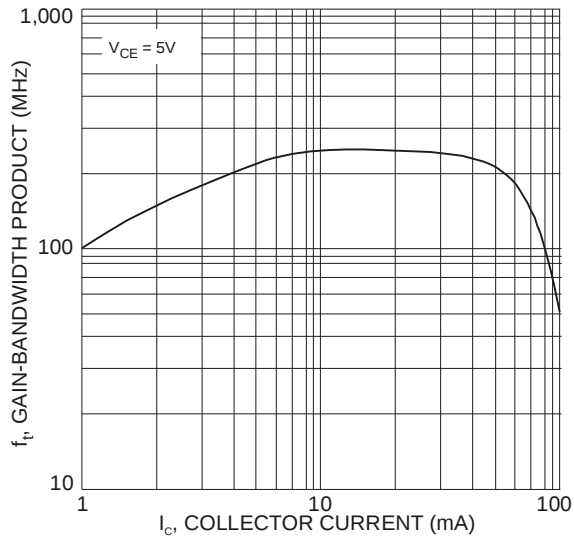
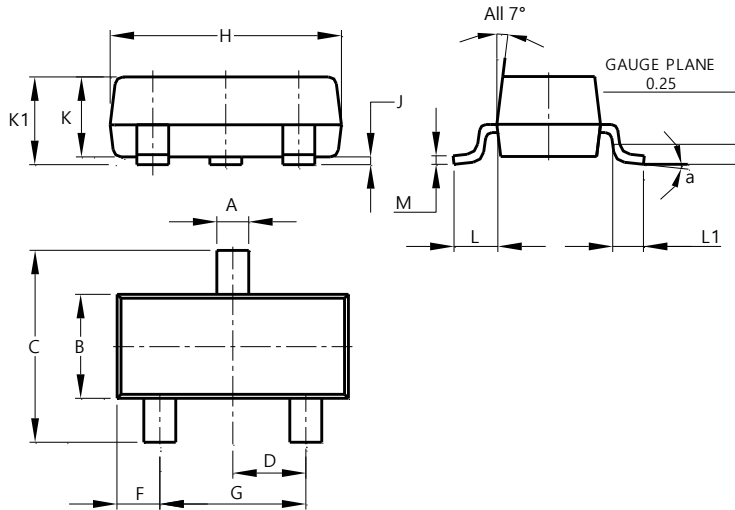


Figure 3 Gain-Bandwidth Product vs Collector Current

Package Outline Dimensions

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

SOT23

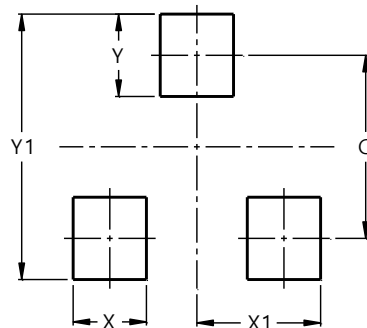


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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