

Description

The bipolar junction transistors (BJT) are designed to meet the stringent requirements of automotive applications.

Features

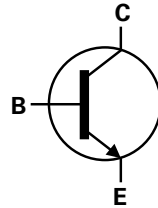
- Ideally Suited for Automatic Insertion
- Complementary PNP Types: [AC857BQ-AC857CQ](#)
- For Switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- The AC847BQ, AC847CQ and AC848BQ are suitable for automotive applications requiring specific change control; these parts are AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.
<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

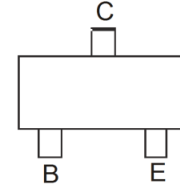
- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



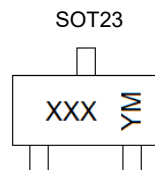
Top View
Pinout

Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
AC847BQ-7	SOT23	2D1	7	8	3000	Reel
AC847CQ-7	SOT23	2C9	7	8	3000	Reel
AC848BQ-7	SOT23	2K9	7	8	3000	Reel
AC848BQ-13	SOT23	2K9	13	8	10000	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	2017	-	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	E	-	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	AC847BQ/CQ	V _{CB0}	50	V
	AC848BQ		30	
Collector-Emitter Voltage	AC847BQ/CQ	V _{CEO}	45	V
	AC848BQ		30	
Emitter-Base Voltage	AC847BQ/CQ	V _{EBO}	6.0	V
	AC848BQ		5.0	
Continuous Collector Current		I _C	100	mA
Peak Collector Current		I _{CM}	200	mA
Peak Emitter Current		I _{EM}	200	mA

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P _D	310	mW
	(Note 6)		350	
Thermal Resistance, Junction to Ambient	(Note 5)	R _{θJA}	403	°C/W
	(Note 6)		357	
Thermal Resistance, Junction to Leads	(Note 7)	R _{θJL}	350	°C/W
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	4000	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 5 except the device is mounted on 15mm × 15mm 1oz copper.
7. Thermal resistance from junction to solder-point (at the end of the leads).
8. Refer to JEDEC specifications JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

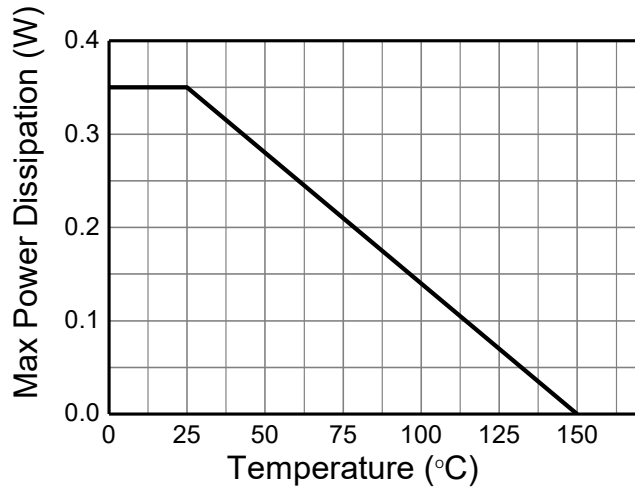


Fig.1 Derating Curve

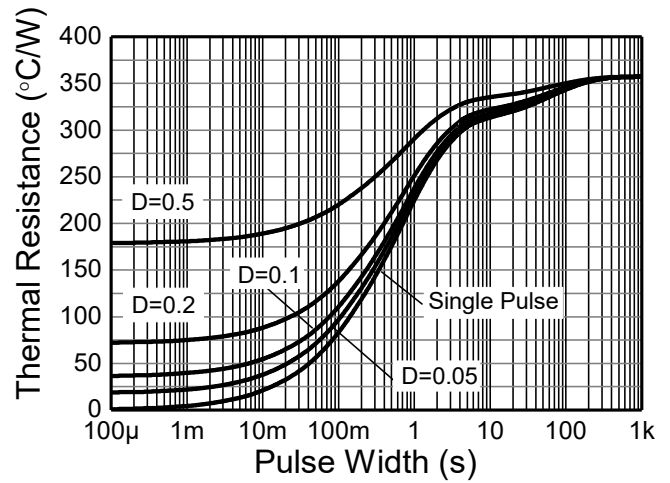


Fig.2 Transient Thermal Impedance

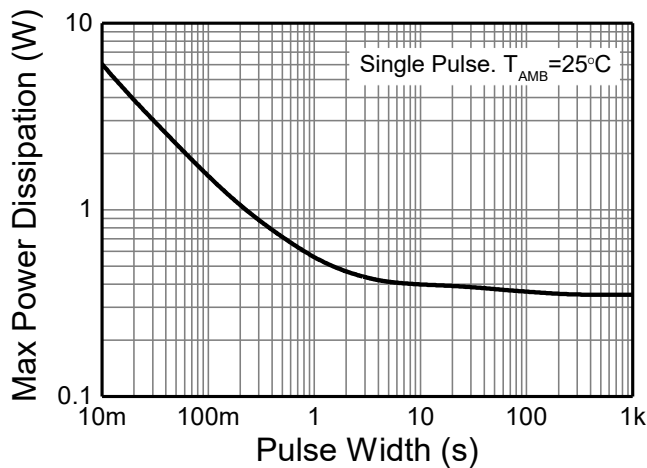


Fig.3 Pulse Power Dissipation

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	AC847BQ/CQ	BV _{CBO}	50	—	—	V	I _C = 10μA
	AC848BQ		30	—	—		—
Collector-Emitter Breakdown Voltage (Note 9)	AC847BQ/CQ	BV _{CEO}	45	—	—	V	I _C = 10mA
	AC848BQ		30	—	—		—
Emitter-Base Breakdown Voltage	AC847BQ/CQ	BV _{EBO}	6	—	—	V	I _E = 1μA
	AC848BQ		5	—	—		—
Collector Cutoff Current		I _{CBO}	—	—	15	nA	V _{CB} = 30V
					5	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)	AC847BQ/AC848BQ	h _{fe}	—	330	—	—	I _C = 2.0mA, V _{CE} = 5V f = 1.0kHz
	AC847CQ			600			
Input Impedance (Note 9)	AC847BQ/AC848BQ	h _{ie}	—	4.5	—	kΩ	
	AC847CQ			8.7			
Output Admittance (Note 9)	AC847BQ/AC848BQ	h _{oe}	—	30	—	μS	
	AC847CQ			60			
Reverse Voltage Transfer Ratio (Note 9)	AC847BQ/AC848BQ	h _{re}	—	2x10 ⁻⁴	—	—	
	AC847CQ			3x10 ⁻⁴			
DC Current Gain (Note 9)	AC847BQ/AC848BQ	h _{FE}	200	290	450	—	I _C = 2.0mA, V _{CE} = 5V
	AC847CQ		420	520	800		
Collector-Emitter Saturation Voltage (Note 9)		V _{CE(sat)}	—	90	250	mV	I _C = 10mA, I _B = 0.5mA
				200	600		I _C = 100mA, I _B = 5.0mA
Base-Emitter Turn-On Voltage (Note 9)		V _{BE(on)}	580	660	700	mV	I _C = 2mA, V _{CE} = 5V
			—	—	770		I _C = 10mA, V _{CE} = 5V
Base-Emitter Saturation Voltage (Note 9)		V _{BE(sat)}	—	700	—	mV	I _C = 10mA, I _B = 0.5mA
				900			I _C = 100mA, I _B = 5mA
Output Capacitance		C _{obo}	—	3	—	pF	V _{CB} = 10V, f = 1MHz
Transition Frequency		f _T	100	300	—	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.)

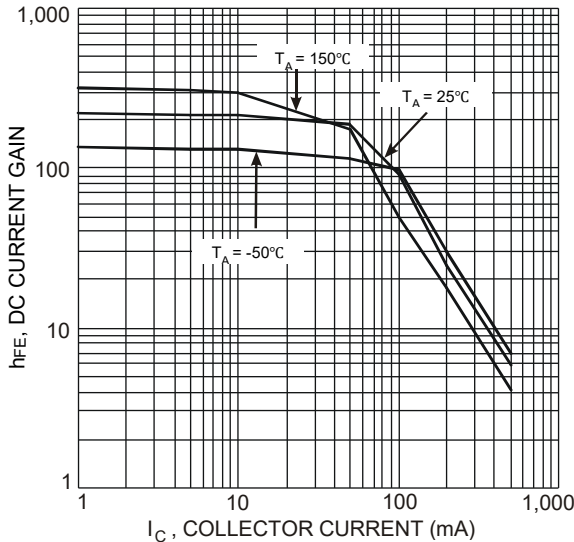


Fig.4 Typical DC Current Gain vs. Collector Current

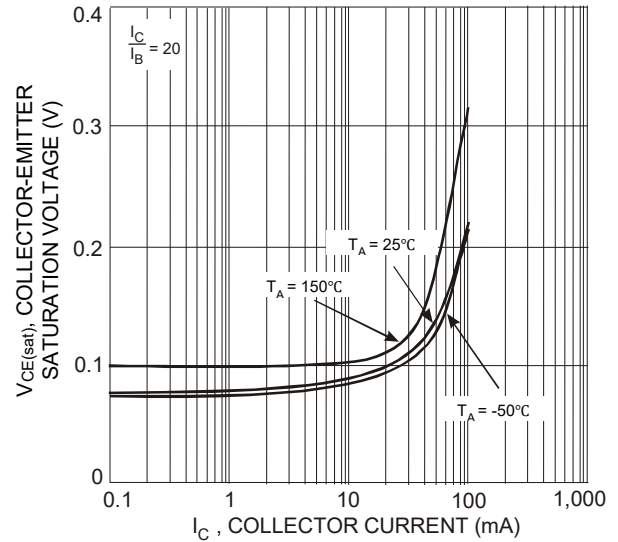


Fig.5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

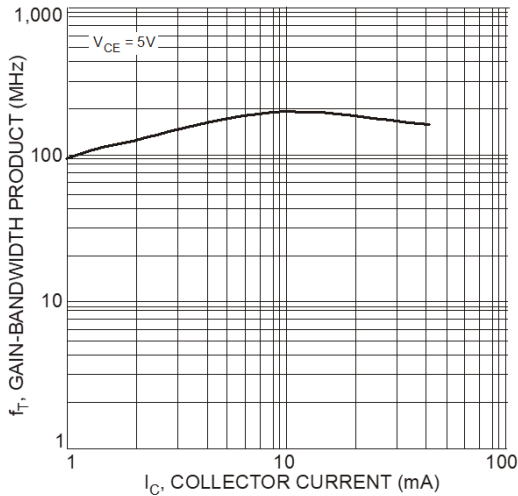


Fig.6 Typical Gain-Bandwidth Product vs. Collector Current

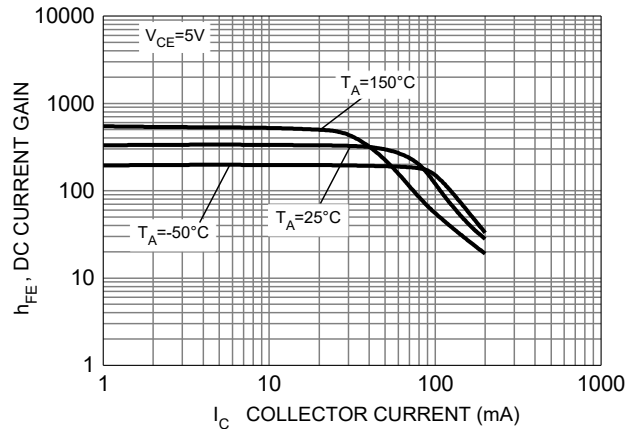


Fig.7 Typical DC Current Gain vs. Collector Current (Band B Group Gain)

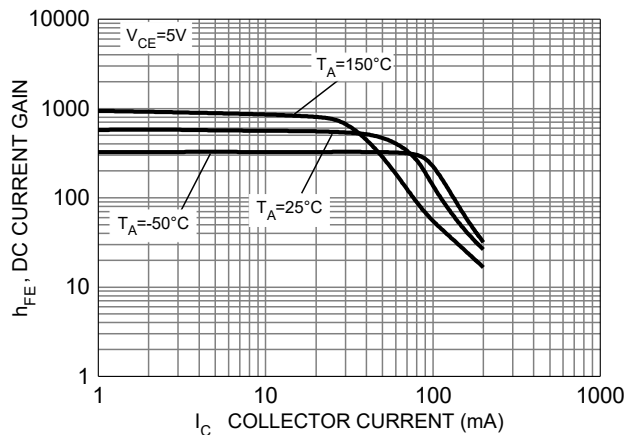
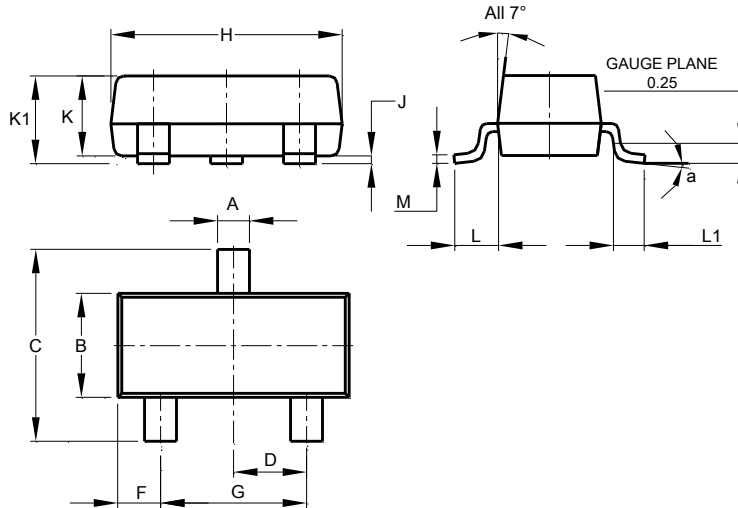


Fig.8 Typical DC Current Gain vs. Collector Current (Band C Group Gain)

Package Outline Dimensions

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

SOT23

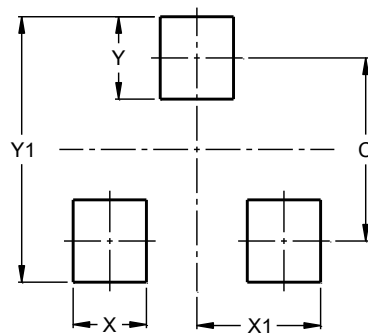


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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