

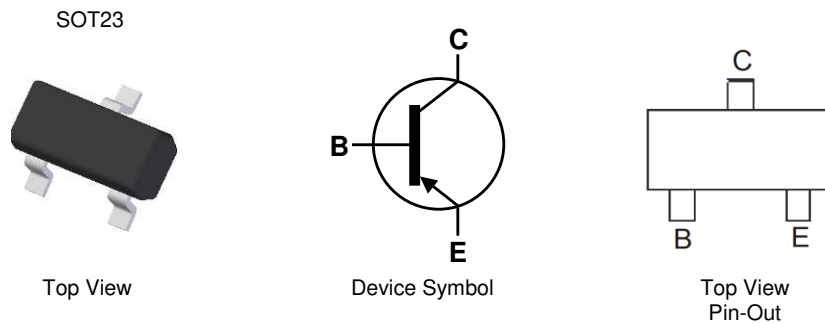
Features

- Ideally Suited for Automatic Insertion
- Complementary NPN Types: BC846 – BC848 Family
- For Switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The BC856AQ – BC857BQ 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

- Case: SOT23
- 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: 0.008 grams (Approximate)

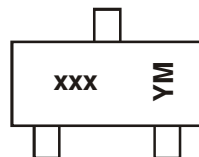


Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
BC856AQ-7-F	Automotive	K3A	7	8	3,000
BC856BQ-7-F	Automotive	K3B	7	8	3,000
BC856BQ-13-F	Automotive	K3B	13	8	10,000
BC857BQ-7-F	Automotive	K3B	7	8	3,000

- 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
(Please see Ordering Information)
YM = Date Code Marking
Y or \bar{Y} = Year (ex: G = 2019)
M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2019	2020	2021	2022	2023	2024	2025	2026
Code	G	H	I	J	K	L	M	N

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	BC856	V _{CB0}	-80	V
	BC857		-50	
Collector-Emitter Voltage	BC856	V _{CE0}	-65	V
	BC857		-45	
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.)

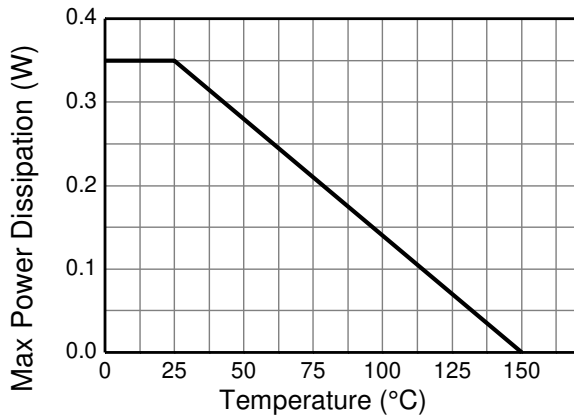
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P _D	310	mW
	(Note 6)		350	
Thermal Resistance, Junction to Ambient	(Note 5)	R _{θJA}	403	°C/W
	(Note 6)		357	
Thermal Resistance, Junction to Leads	(Note 7)	R _{θJL}	350	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-65 to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

ESD Ratings (Note 8)

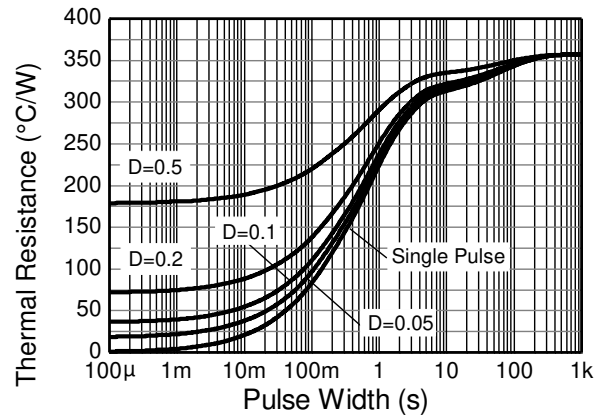
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- 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 (5), except the device is mounted on 15 mm × 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.

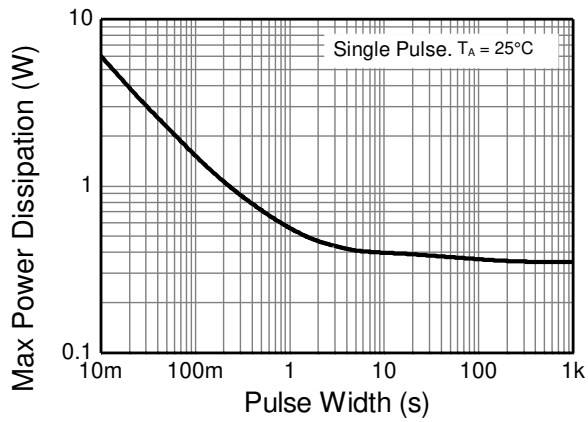
Thermal Characteristics and Derating Information



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	BC856	BV _{CB0}	-80	—	—	V	I _C = -10μA	
	BC857		-50	—	—	V		
Collector-Emitter Breakdown Voltage (Note 9)	BC856	BV _{CEO}	-65	—	—	V	I _C = -10mA	
	BC857		-45	—	—	V		
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	BC856	I _{CES}	—	—	-15	nA	V _{CE} = -80V	
	BC857				-15	nA	V _{CE} = -50V	
Emitter-Base Cutoff Current		I _{EBO}	—	—	-100	nA	V _{EB} = -5V	
Small Signal Current Gain	BC856A	h _{fe}	—	200	—	—	I _C = -2.0mA, V _{CE} = -5V f = 1.0kHz	
	BC856B / BC857B			330				
Input Impedance	BC856A	h _{ie}	—	2.7	—	kΩ		
	BC856B / BC857B			4.5				
Output Admittance	BC856A	h _{oe}	—	18	—	μS		
	BC856B / BC857B			30				
Reverse Voltage Transfer Ratio	BC856A	h _{re}	—	1.5x10 ⁻⁴	—	—		
	BC856B / BC857B			2x10 ⁻⁴				
DC Current Gain (Note 9)	BC856A	h _{FE}	125	180	250	—		I _C = -2.0mA, V _{CE} = -5V
	BC856B / BC857B		220	290	475			
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	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°C, unless otherwise specified.)

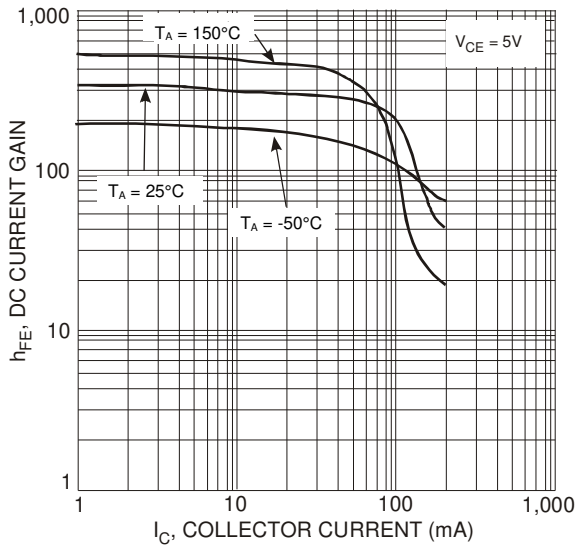


Figure 1 Typical DC Current Gain vs. Collector Current

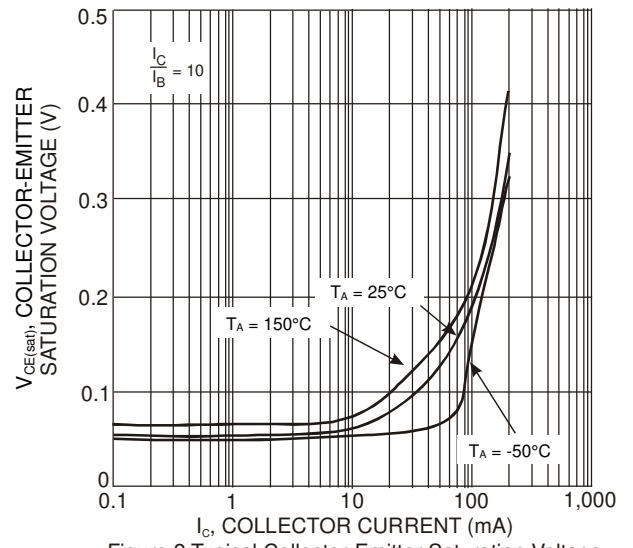


Figure 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

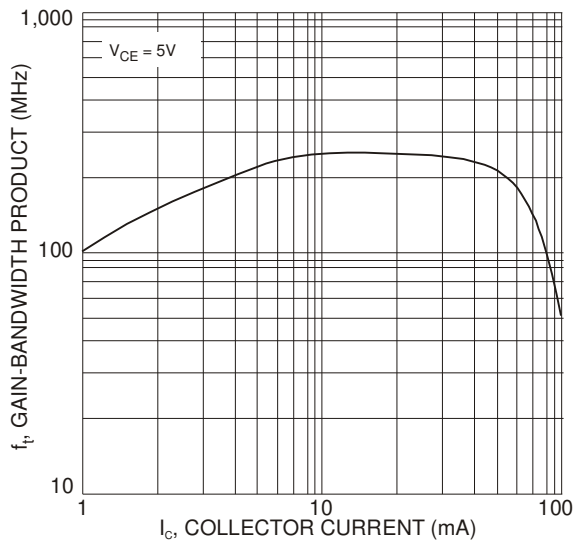
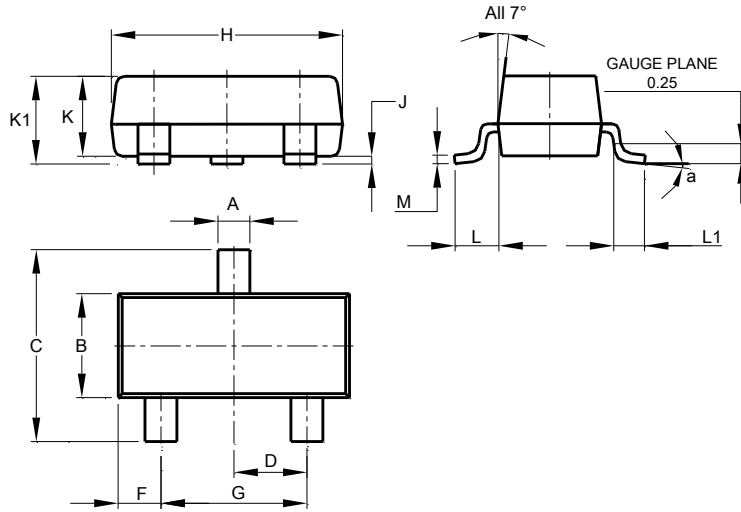


Figure 3 Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT23

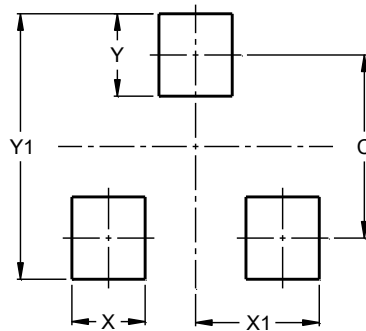


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2019, Diodes Incorporated

www.diodes.com