

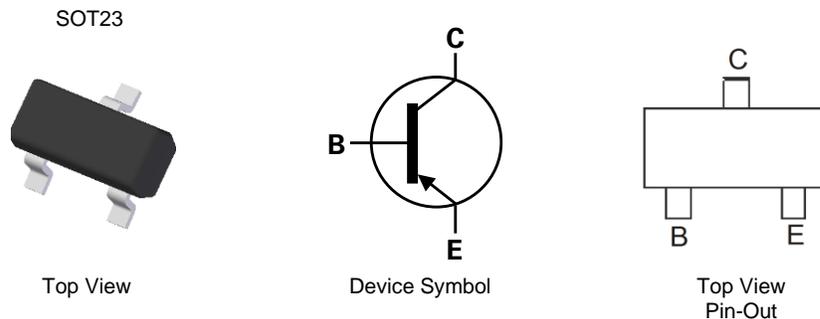
Features

- 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

- 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 ③
- Weight: 0.008 grams (Approximate)

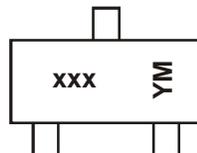


Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
BC856AQ-7-F	SOT23	K3A	7	8	3,000	Reel
BC856BQ-7-F	SOT23	K3B	7	8	3,000	Reel
BC856BQ-13-F	SOT23	K3B	13	8	10,000	Reel
BC857BQ-7-F	SOT23	K3B	7	8	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
(Please see Ordering Information)
YM = Date Code Marking
Y or \bar{Y} = Year (ex: L = 2024)
M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2019	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	G	-	L	M	N	P	R	S	T	U	V	W

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

Characteristic		Symbol	Value	Unit
Collector-Base Voltage	BC856AQ/BQ	V_{CBO}	-80	V
	BC857BQ		-50	
Collector-Emitter Voltage	BC856AQ/BQ	V_{CEO}	-65	V
	BC857BQ		-45	
Emitter-Base Voltage		V_{EBO}	-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 (@ $T_A = +25^\circ\text{C}$, 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)	$R_{\theta JA}$	403	$^\circ\text{C/W}$
	(Note 6)		357	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	350	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-65 to +150	$^\circ\text{C}$

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 15mm × 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

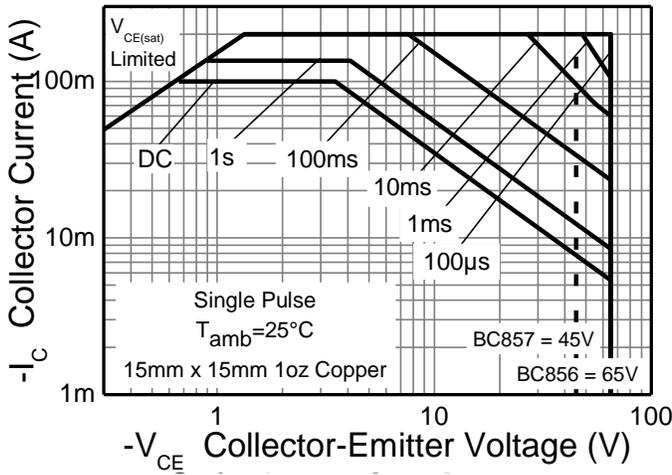


Figure 1. Safe Operating Area

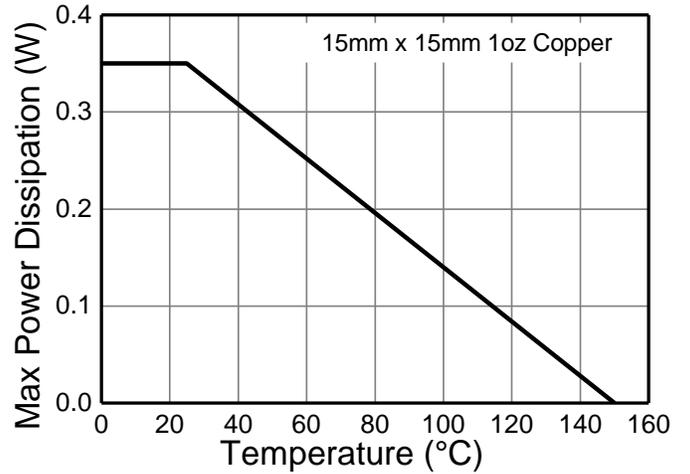


Figure 2. Derating Curve

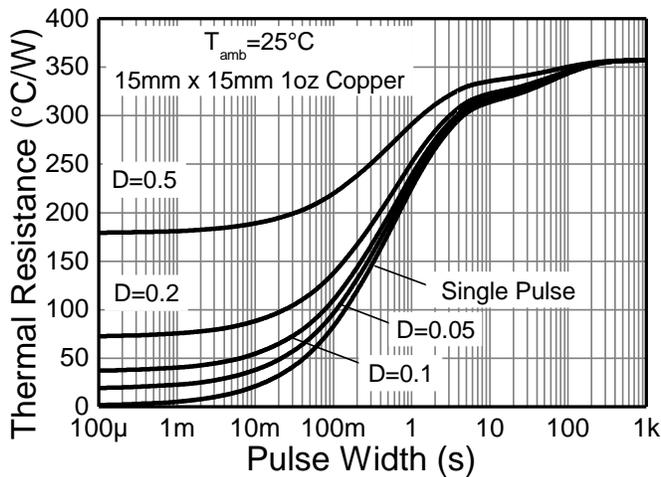


Figure 3. Transient Thermal Impedance

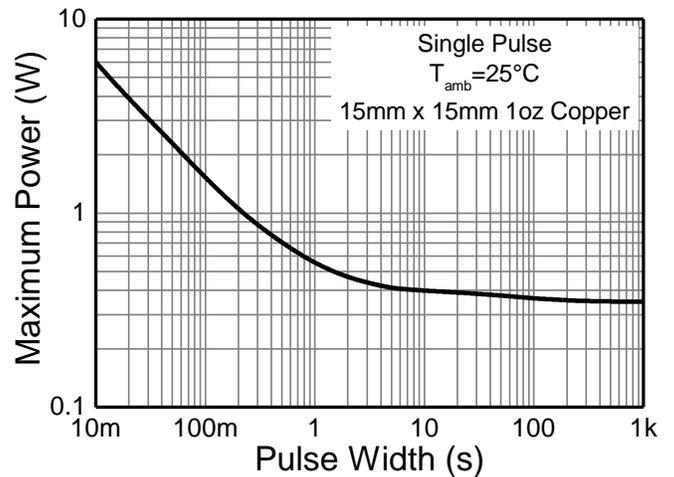


Figure 4. Pulse Power Dissipation

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-Base Breakdown Voltage	BC856AQ/BQ	BV _{CB0}	-80	—	—	V	I _C = -10μA	
	BC857BQ		-50					
Collector-Emitter Breakdown Voltage (Note 9)	BC856AQ/BQ	BV _{CEO}	-65	—	—	V	I _C = -10mA	
	BC857BQ		-45					
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	BC856AQ/BQ	I _{CES}	—	—	-15	nA	V _{CE} = -80V	
	BC857BQ				-15		V _{CE} = -50V	
Emitter-Base Cutoff Current		I _{EBO}	—	—	-100	nA	V _{EB} = -5V	
Small Signal Current Gain	BC856AQ	h _{fe}	—	200	—	—	I _C = -2.0mA, V _{CE} = -5V f = 1.0kHz	
	BC856BQ/BC857BQ			330				
Input Impedance	BC856AQ	h _{ie}	—	2.7	—	kΩ		
	BC856BQ/BC857BQ			4.5				
Output Admittance	BC856AQ	h _{oe}	—	18	—	μS		
	BC856BQ/BC857BQ			30				
Reverse Voltage Transfer Ratio	BC856AQ	h _{re}	—	1.5x10 ⁻⁴	—	—		
	BC856BQ/BC857BQ			2x10 ⁻⁴				
DC Current Gain (Note 9)	BC856AQ	h _{FE}	125	180	250	—		I _C = -2.0mA, V _{CE} = -5V
	BC856BQ/BC857BQ		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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

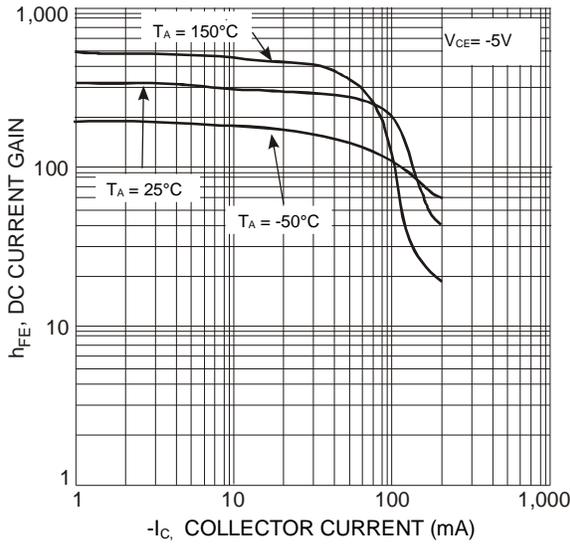


Figure 5. Typical DC Current Gain vs. Collector Current

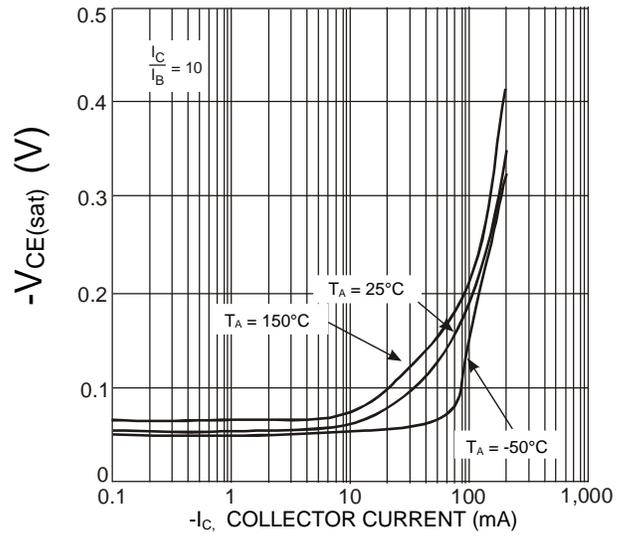


Figure 6. Typical Collector-Emitter Saturation Voltage vs. Collector Current

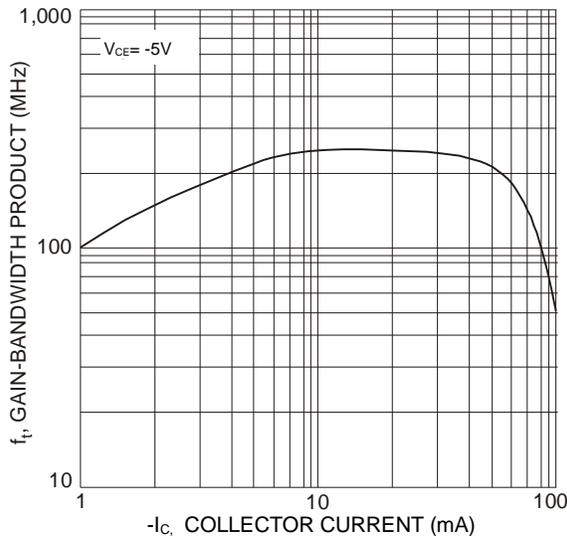
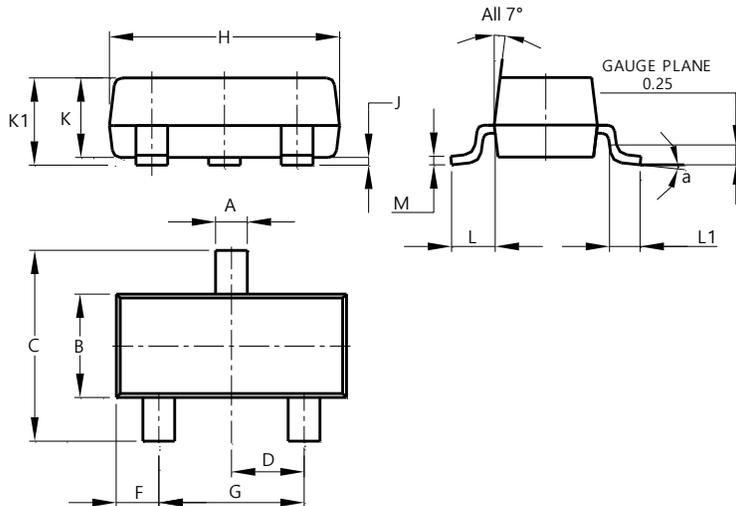


Figure 7. Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT23

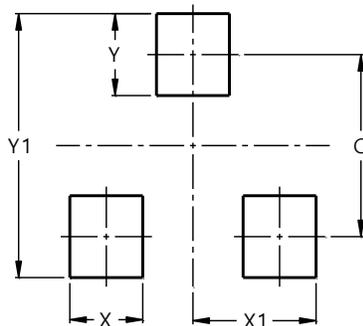


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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