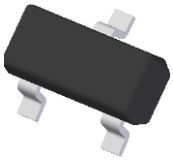
Features

- Ideally Suited for Automatic Insertion
- Complementary PNP Types: BC856AQ–BC858CQ
- For Switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The BC846AQ–BC848CQ 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/

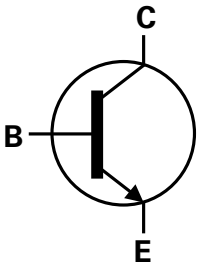
Mechanical Data

- 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 e3
- Weight: 0.008 grams (Approximate)

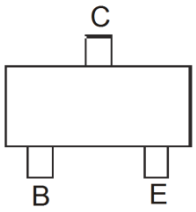
SOT23



Top View



Device Symbol



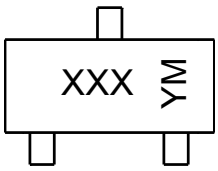
Top View
Pin-Out

Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Packing	
				Qty.	Carrier
BC846AQ-7-F	SOT23	K1Q	7	3,000	Reel
BC846BQ-7-F	SOT23	K1R	7	3,000	Reel
BC846BQ-13-F	SOT23	K1R	13	10,000	Reel
BC847AQ-7-F	SOT23	K1Q	7	3,000	Reel
BC847BQ-7-F	SOT23	K1R	7	3,000	Reel
BC847CQ-7-F	SOT23	K1M	7	3,000	Reel
BC848CQ-7-F	SOT23	K1M	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 $\underline{Y}$ = Year (ex: L = 2024)
M or $\underline{M}$ = Month (ex: 9 = September)

Date Code Key

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Code	L	M	N	P	R	S	T	U	V	W	X	Y

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	BC846AQ/BQ	V_{CBO}	80	V
	BC847AQ/BQ/CQ		50	
	BC848CQ		30	
Collector-Emitter Voltage	BC846AQ/BQ	V_{CEO}	65	V
	BC847AQ/BQ/CQ		45	
	BC848CQ		30	
Emitter-Base Voltage	BC846AQ/BQ BC847AQ/BQ/CQ	V_{EBO}	6.0	V
	BC848CQ		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)	$R_{\theta JA}$	403	°C/W
	(Note 6)		357	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	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 FR4 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 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.

Thermal Characteristics and Derating Information

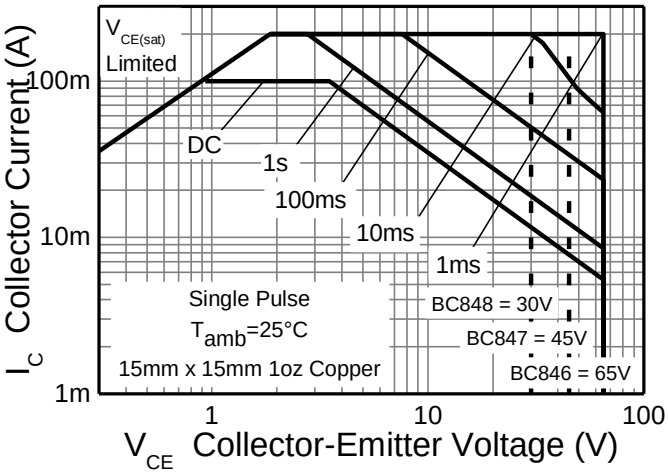


Figure 1. Safe Operating Area

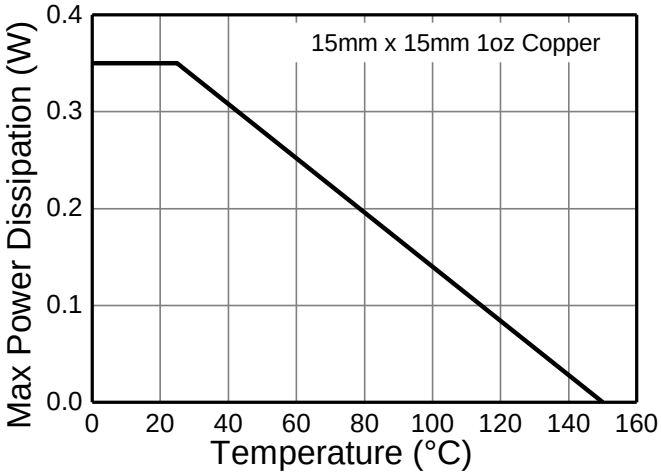


Figure 2. Derating Curve

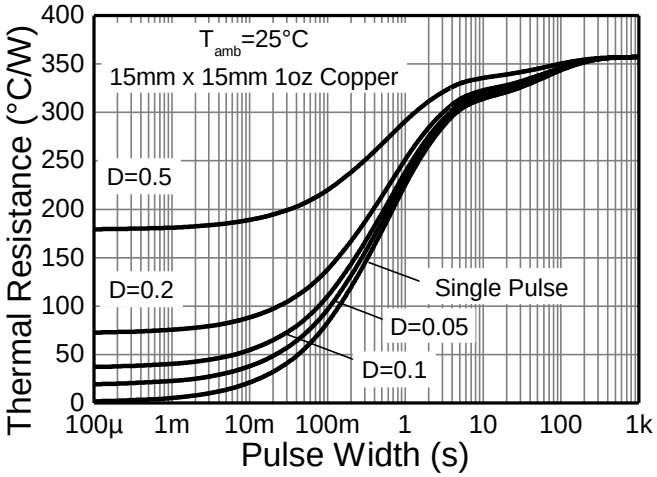


Figure 3. Transient Thermal Impedance

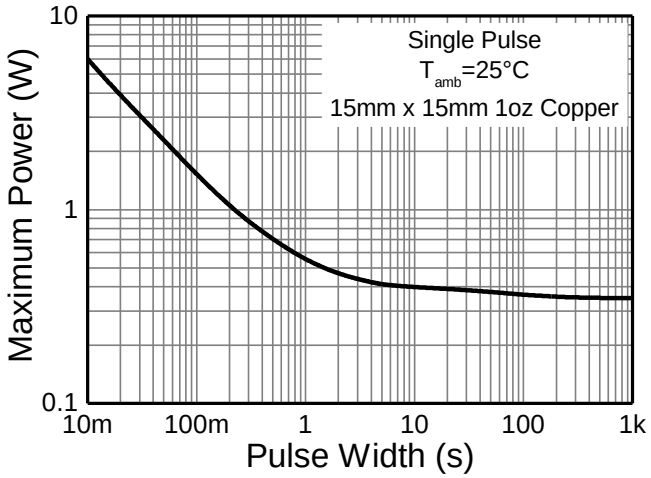


Figure 4. Pulse Power Dissipation

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BC846AQ/BQ	BV_{CBO}	80	—	—	V	I_C = 10µA
	BC847AQ/BQ/CQ		50				
	BC848CQ		30				
Collector-Emitter Breakdown Voltage (Note 9)	BC846AQ/BQ	BV_{CEO}	65	—	—	V	I_C = 10mA
	BC847AQ/BQ/CQ		45				
	BC848CQ		30				
Emitter-Base Breakdown Voltage	BC846AQ/BQ BC847AQ/BQ/CQ	BV_{EBO}	6	—	—	V	I_E = 1µA
	BC848CQ		5				
Collector Cutoff Current		I_{CBO}	—	—	15	nA	V_{CB} = 30V
					5	µA	V_{CB} = 30V, T_J = +150°C
Collector Emitter Cutoff Current	BC846AQ/BQ	I_{CES}	—	—	15	nA	V_{CE} = 80V
	BC847AQ/BQ/CQ				15		V_{CE} = 50V
	BC848CQ				15		V_{CE} = 30V
Emitter Base Cutoff Current		I_{EBO}	—	—	100	nA	V_{EB} = 5V
Small Signal Current Gain (Note 9)	BC846AQ/BC847AQ	h_{FE}	—	200	—	—	I_C = 2.0mA, V_{CE} = 5V f = 1.0kHz
	BC846BQ/BC847BQ			330			
	BC847CQ/BC848CQ			600			
Input Impedance (Note 9)	BC846AQ/BC847AQ	h_{ie}	—	2.7	—	kΩ	
	BC846BQ/BC847BQ			4.5			
	BC847CQ/BC848CQ			8.7			
Output Admittance (Note 9)	BC846AQ/BC847AQ	h_{oe}	—	18	—	µS	
	BC846BQ/BC847BQ			30			
	BC847CQ/BC848CQ			60			
Reverse Voltage Transfer Ratio (Note 9)	BC846AQ/BC847AQ	h_{re}	—	1.5×10^{-4}	—	—	
	BC846BQ/BC847BQ			2×10^{-4}			
	BC847CQ/BC848CQ			3×10^{-4}			
DC Current Gain (Note 9)	BC846AQ/BC847AQ	h_{FE}	110	180	220	—	I_C = 2.0mA, V_{CE} = 5V
	BC846BQ/BC847BQ		200	290	450		
	BC847CQ/BC848CQ		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 = 1.0MHz
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°C, unless otherwise specified.)

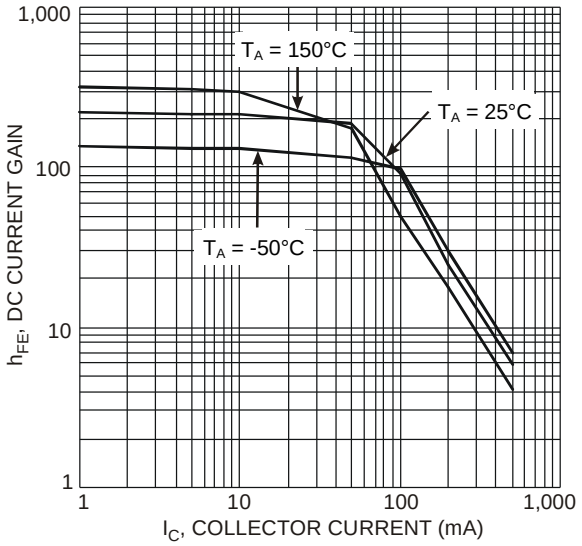


Figure 5. Typical DC Current Gain vs. Collector Current

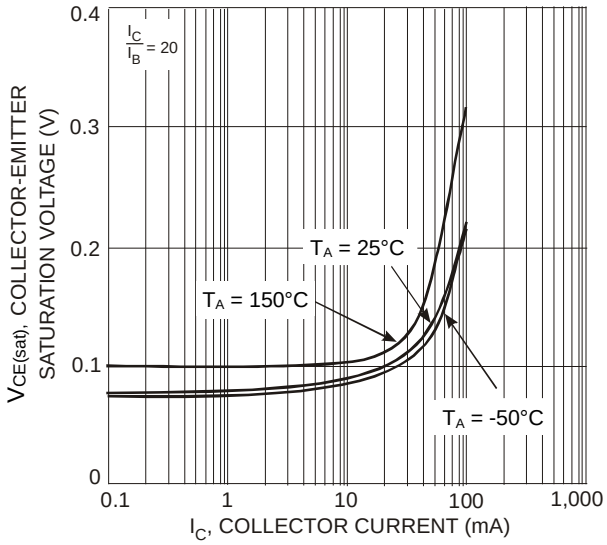


Figure 6. Typical Collector-Emitter Saturation Voltage vs. Collector Current

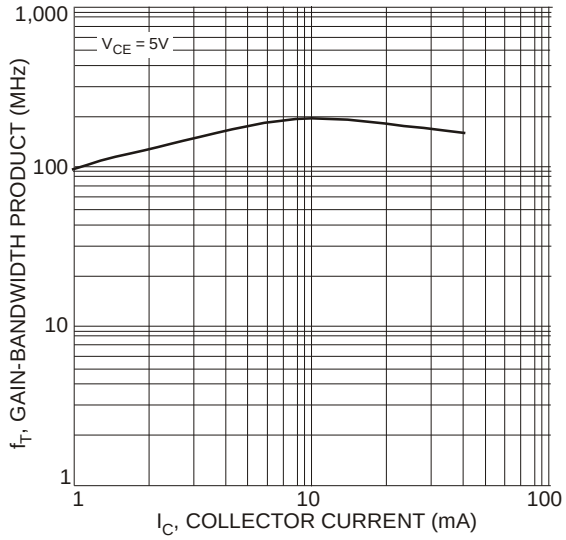
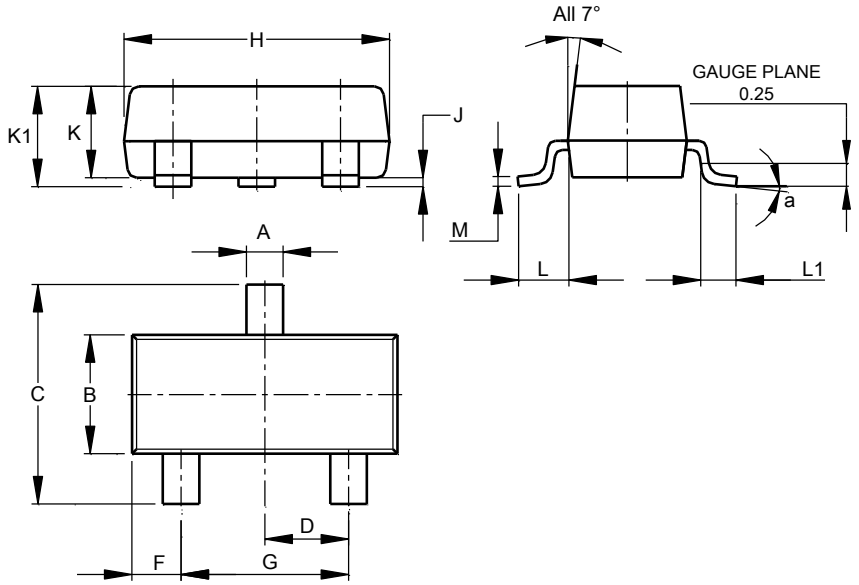


Figure 7. Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT23

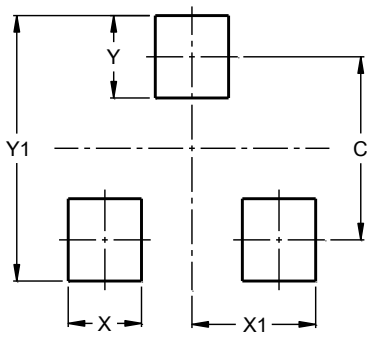


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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