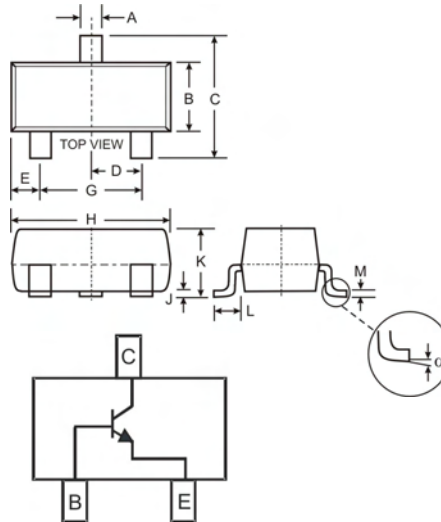


### Features

- Ideally Suited for Automatic Insertion
- Complementary PNP Types Available (BC856-BC858)
- For Switching and AF Amplifier Applications
- Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 3 and 4)
- Qualified to AEC-Q101 Standards for High Reliability

### Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Pin Connections: See Diagram
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Approximate Weight: 0.008 grams



SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
E	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
$\alpha$	0°	8°
All Dimensions in mm		

Marking Code (Note 2)			
Type	Marking	Type	Marking
BC846A	1A, K1Q	BC847C	1G, K1M
BC846B	1B, K1R	BC848A	1J, K1J, K1E, K1Q
BC847A	1E, K1E, K1Q	BC848B	1K, K1K, K1F, K1R
BC847B	1F, K1F, K1R	BC848C	1L, K1L, K1M

### Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

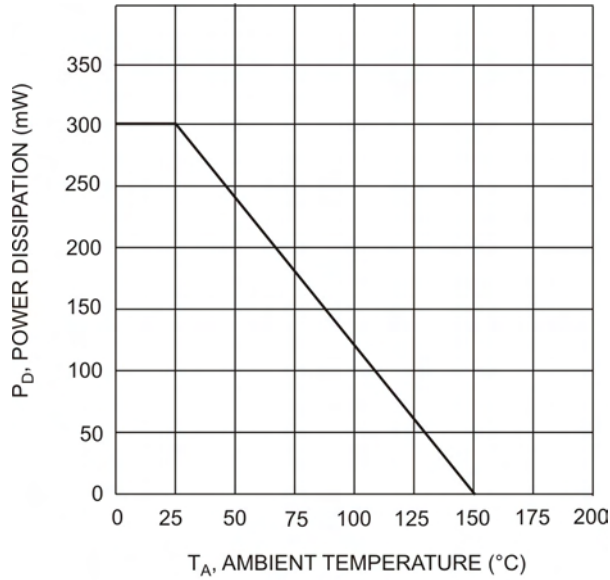
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	80 50 30	V
Collector-Emitter Voltage	$V_{CEO}$	65 45 30	V
Emitter-Base Voltage	$V_{EBO}$	6.0 5.0	V
Collector Current	$I_C$	100	mA
Peak Collector Current	$I_{CM}$	200	mA
Peak Emitter Current	$I_{EM}$	200	mA
Power Dissipation (Note 1)	$P_d$	300	mW
Thermal Resistance, Junction to Ambient Air (Note 1)	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_j, T_{STG}$	-65 to +150	$^\circ\text{C}$

- Notes:
1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  2. Current gain subgroup "C" is not available for BC846.
  3. No purposefully added lead. Halogen and Antimony Free.
  4. Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or  $\text{Sb}_2\text{O}_3$  Fire Retardants.

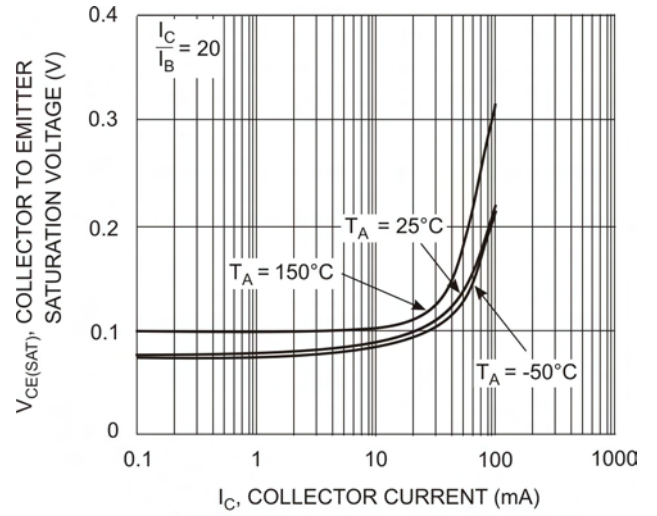
## Electrical Characteristics @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage (Note 5)	BC846	V <sub>(BR)CBO</sub>	80	—	—	V	I <sub>C</sub> = 10μA, I <sub>B</sub> = 0
	BC847		50	—	—		
	BC848		30	—	—		
Collector-Emitter Breakdown Voltage (Note 5)	BC846	V <sub>(BR)CEO</sub>	65	—	—	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0
	BC847		45	—	—		
	BC848		30	—	—		
Emitter-Base Breakdown Voltage (Note 3)	BC846, BC847 BC848	V <sub>(BR)EBO</sub>	6 5	—	—	V	I <sub>E</sub> = 1μA, I <sub>C</sub> = 0
<b>H-Parameters</b>							
Small Signal Current Gain	Current Gain Group	A	h <sub>fe</sub>	—	220	—	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA, f = 1.0kHz
		B	h <sub>fe</sub>	—	330	—	
		C	h <sub>fe</sub>	—	600	—	
Input Impedance	Current Gain Group	A	h <sub>ie</sub>	—	2.7	—	
		B	h <sub>ie</sub>	—	4.5	—	
		C	h <sub>ie</sub>	—	8.7	—	
Output Admittance	Current Gain Group	A	h <sub>oe</sub>	—	18	—	
		B	h <sub>oe</sub>	—	30	—	
		C	h <sub>oe</sub>	—	60	—	
Reverse Voltage Transfer Ratio Current Gain Group	Current Gain Group	A	h <sub>re</sub>	—	1.5x10 <sup>-4</sup>	—	
		B	h <sub>re</sub>	—	2x10 <sup>-4</sup>	—	
		C	h <sub>re</sub>	—	3x10 <sup>-4</sup>	—	
DC Current Gain	Current Gain Group	A	h <sub>FE</sub>	110	180	220	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA
		B	h <sub>FE</sub>	200	290	450	
		(Note 5) C	h <sub>FE</sub>	420	520	800	
Collector-Emitter Saturation Voltage (Note 5)		V <sub>CE(SAT)</sub>	—	90 200	250 600	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA I <sub>C</sub> = 100mA, I <sub>B</sub> = 5.0mA
Base-Emitter Saturation Voltage (Note 5)		V <sub>BE(SAT)</sub>	—	700 900	—	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA I <sub>C</sub> = 100mA, I <sub>B</sub> = 5.0mA
Base-Emitter Voltage (Note 5)		V <sub>BE(ON)</sub>	580 —	660 —	700 770	mV	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 10mA
Collector-Cutoff Current (Note 5)	BC846 BC847 BC848	I <sub>CES</sub>	—	—	15	nA	V <sub>CE</sub> = 80V
		I <sub>CES</sub>	—	—	15	nA	V <sub>CE</sub> = 50V
		I <sub>CES</sub>	—	—	15	nA	V <sub>CE</sub> = 30V
		I <sub>CBO</sub>	—	—	15	nA	V <sub>CB</sub> = 40V
		I <sub>CBO</sub>	—	—	5.0	μA	V <sub>CB</sub> = 30V, T <sub>A</sub> = 150°C
Gain Bandwidth Product		f <sub>T</sub>	100	300	—	MHz	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 10mA, f = 100MHz
Collector-Base Capacitance		C <sub>CBO</sub>	—	3.0	—	pF	V <sub>CB</sub> = 10V, f = 1.0MHz
Noise Figure		NF	—	2	10	dB	V <sub>CE</sub> = 5V, I <sub>C</sub> = 200μA, R <sub>S</sub> = 2.0kΩ, f = 1.0kHz, Δf = 200Hz

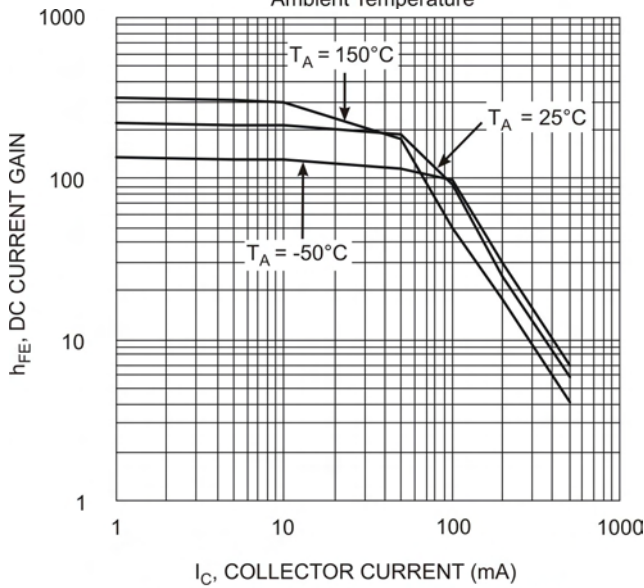
Notes: 5. Short duration pulse test used to minimize self-heating effect.



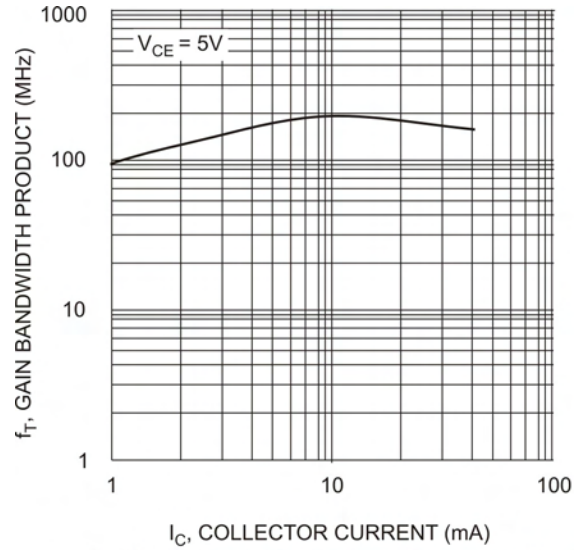
T<sub>A</sub>, AMBIENT TEMPERATURE (°C)  
Fig. 1, Max Power Dissipation vs Ambient Temperature



I<sub>C</sub>, COLLECTOR CURRENT (mA)  
Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current



I<sub>C</sub>, COLLECTOR CURRENT (mA)  
Fig. 3, DC Current Gain vs. Collector Current



I<sub>C</sub>, COLLECTOR CURRENT (mA)  
Fig. 4, Gain Bandwidth Product vs Collector Current

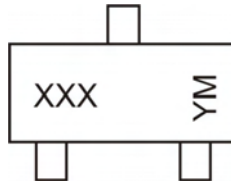
## Ordering Information (Note 6)

Device*	Packaging	Shipping
BC84xx-7-F	SOT-23	3000/Tape & Reel

\* xx = device type, e.g. BC846A-7-F.

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



XXX = Product Type Marking Code (See Page 1), e.g.  
 K1Q or 1A = BC846A  
 YM = Date Code Marking  
 Y = Year ex: N = 2002  
 M = Month ex: 9 = September

### Date Code Key

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z

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

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