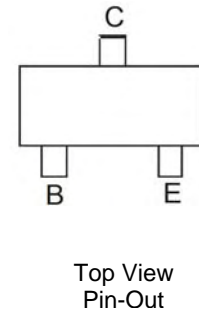
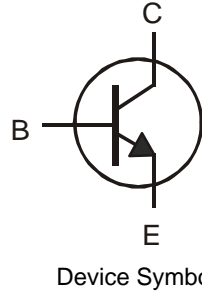


## Features

- Ideally Suited for Automatic Insertion
- Complementary PNP Types Available (BC856 – BC858)
- For switching and AF Amplifier Applications
- **Lead Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

- Case: SOT-23
- UL Flammability Rating 94V-0
- Case material: molded Plastic "Green" Compound
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.008 grams (Approximate)



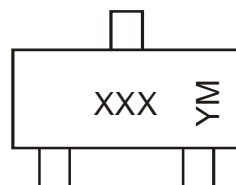
## Ordering Information (Note 3 & 4)

Product	Marking	Reel size (inches)	Quantity per reel
BC846A-7-F	K1Q	7	3,000
BC846B-7-F	K1R	7	3,000
BC846BQ-7-F	K1R	7	3,000
BC846B-13-F	K1R	13	10,000
BC847A-7-F	K1Q	7	3,000
BC847AQ-7-F	K1Q	7	3,000
BC847A-13-F	K1Q	13	10,000
BC847B-7-F	K1R	7	3,000
BC847BQ-7-F	K1R	7	3,000
BC847B-13-F	K1R	13	10,000

Product	Marking	Reel size (inches)	Quantity per reel
BC847C-7-F	K1M	7	3,000
BC847C-13-F	K1M	13	10,000
BC848A-7-F	K1Q	7	3,000
BC848B-7-F	K1R	7	3,000
BC848B-13-F	K1R	13	10,000
BC848C-7-F	K1M	7	3,000
BC848CQ-7-F	K1M	7	3,000

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" Policy can be found on our website at <http://www.diodes.com>
  3. Tape width is 8mm. For more packaging details, go to our website at <http://www.diodes.com>.
  4. Products with Q-suffix are automotive grade. All other products are commercial grade.

## Marking Information



XXX = Product Type Marking Code,  
 YM = Date Code Marking  
 Y = Year ex: X = 2010  
 M = Month ex: 9 = September

### Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017
Code	X	Y	Z	A	B	C	D	E

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

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

Characteristic		Symbol	Value	Unit
Collector-Base Voltage	BC846	$V_{CBO}$	80	V
	BC847		50	
	BC848		30	
Collector-Emitter Voltage	BC846	$V_{CEO}$	65	V
	BC847		45	
	BC848		30	
Emitter-Base Voltage	BC846, BC847	$V_{EBO}$	6.0	V
	BC848		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** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	$P_D$	300	mW
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range		$T_J, T_{STG}$	-65 to +150	$^\circ\text{C}$

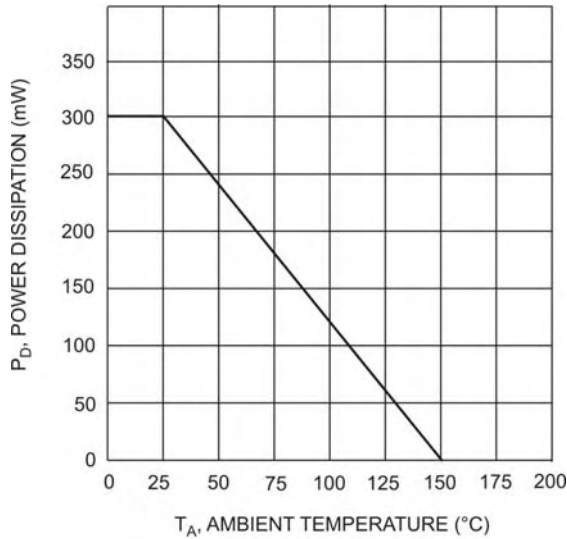
Notes: 5. For a device surface mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper in still air conditions; the device is measured when operating in a steady-state condition.

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

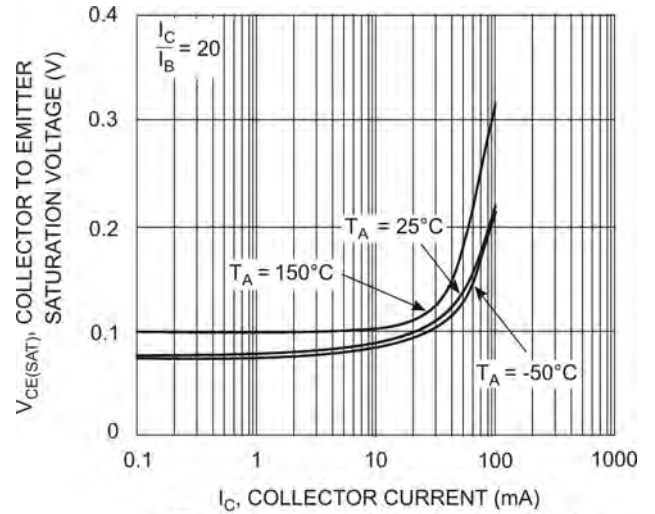
Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BC846	$V_{CB0}$	80	-	-	V	$I_C = 10\mu\text{A}$
	BC847		50				
	BC848		30				
Collector-Emitter Breakdown Voltage (Note 6)	BC846	$V_{CEO}$	65	-	-	V	$I_C = 10\text{mA}$
	BC847		45				
	BC848		30				
Emitter-Base Breakdown Voltage	BC846 / BC847	$V_{EBO}$	6	-	-	V	$I_E = 1\mu\text{A}$
	BC848		5				
Collector Cutoff Current		$I_{CBO}$	-	-	15 5	$\mu\text{A}$	$V_{CB} = 40\text{V}$ $V_{CB} = 30\text{V}, T_A = 150^\circ\text{C}$
Collector Emitter Cutoff Current	BC846	$I_{CES}$	-	-	15	nA	$V_{CE} = 80\text{V}$
	BC847				15		$V_{CE} = 50\text{V}$
	BC848				15		$V_{CE} = 30\text{V}$
Small Signal Current Gain (Note 6)	BC846A / BC847A / BC848A	$h_{fe}$	-	-	200	-	$I_C = 2.0\text{mA}, V_{CE} = 5\text{V}$ $f = 1.0\text{kHz}$
	BC846B / BC847B / BC848B				330		
	BC847C / BC848C				600		
Input Impedance (Note 6)	BC846A / BC847A / BC848A	$h_{ie}$	-	-	2.7	k $\Omega$	$I_C = 2.0\text{mA}, V_{CE} = 5\text{V}$ $f = 1.0\text{kHz}$
	BC846B / BC847B / BC848B				4.5		
	BC847C / BC848C				8.7		
Output Admittance (Note 6)	BC846A / BC847A / BC848A	$h_{oe}$	-	-	18	$\mu\text{S}$	$I_C = 2.0\text{mA}, V_{CE} = 5\text{V}$ $f = 1.0\text{kHz}$
	BC846B / BC847B / BC848B				30		
	BC847C / BC848C				60		
Reverse Voltage Transfer Ratio (Note 6)	BC846A / BC847A / BC848A	$h_{re}$	-	-	$1.5 \times 10^{-4}$	-	$I_C = 2.0\text{mA}, V_{CE} = 5\text{V}$ $f = 1.0\text{kHz}$
	BC846B / BC847B / BC848B				$2 \times 10^{-4}$		
	BC847C / BC848C				$3 \times 10^{-4}$		
DC Current Gain (Note 6)	BC846A / BC847A / BC848A	$h_{FE}$	110	180	220	-	$I_C = 2.0\text{mA}, V_{CE} = 5\text{V}$
	BC846B / BC847B / BC848B		200	290	450		
	BC847C / BC848C		420	520	800		
Collector-Emitter Saturation Voltage (Note 6)		$V_{CE(sat)}$	-	-	90	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$
					200		600
Base-Emitter Turn-On Voltage (Note 6)		$V_{BE(on)}$	580	660	700	mV	$I_C = 2\text{mA}, V_{CE} = 5\text{V}$
			-	-	770		$I_C = 10\text{mA}, V_{CE} = 5\text{V}$
Base-Emitter Saturation Voltage (Note 6)		$V_{BE(sat)}$	-	-	700	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$
					900		$I_C = 100\text{mA}, I_B = 5\text{mA}$
Output Capacitance		$C_{obo}$	-	3	-	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$
Transition Frequency		$f_T$	100	300	-	MHz	$V_{CE} = 5\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$
Noise Figure		NF	-	2	10	dB	$V_{CE} = 5\text{V}, I_C = 200\mu\text{A}$ $R_S = 2\text{k}\Omega, f = 1\text{kHz}$ $\Delta f = 200\text{Hz}$

Note: 6. Short duration pulse test used to minimize self-heating effect.

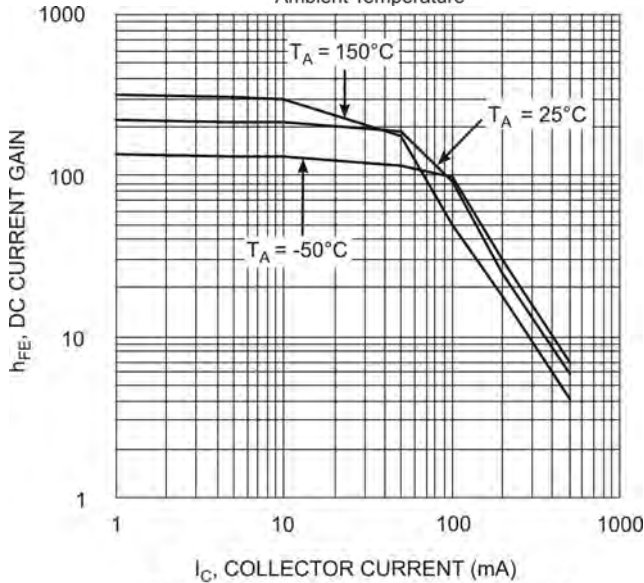
**Typical Electrical Characteristics**



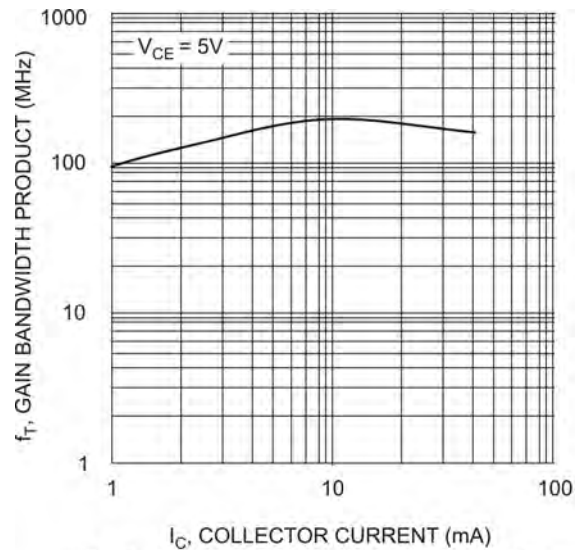
$T_A$ , AMBIENT TEMPERATURE (°C)  
Fig. 1, Max Power Dissipation vs Ambient Temperature



$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 2 Collector Emitter Saturation Voltage vs. Collector Current

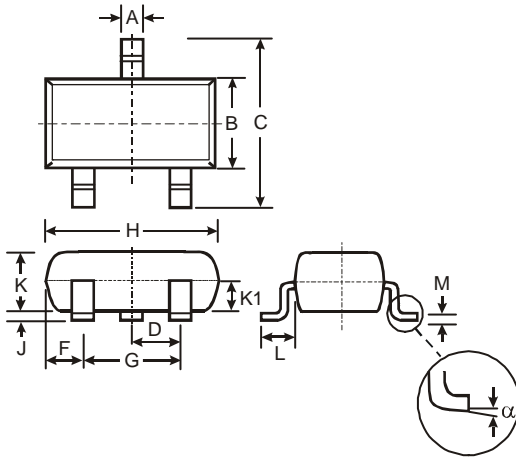


$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 3, DC Current Gain vs. Collector Current



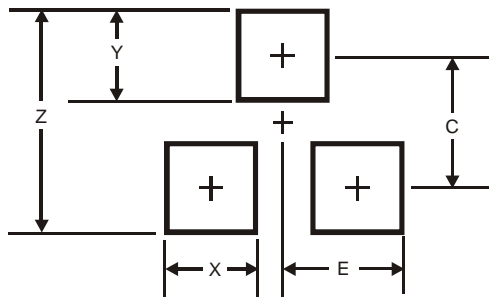
$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 4, Gain Bandwidth Product vs Collector Current

**Package Outline Dimensions**



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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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### Наши контакты:

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331