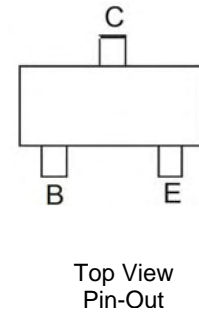
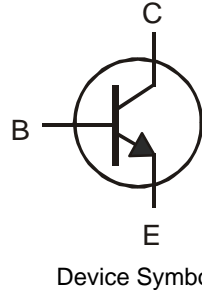


## Features

- 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)



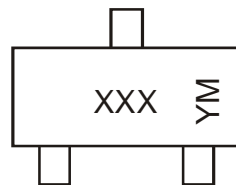
## Ordering Information (Note 3 & 4)

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	$^\circ\text{C/W}$
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	$BV_{CBO}$	80	-	-	V	$I_C = 10\mu\text{A}$
	BC847		50				
	BC848		30				
Collector-Emitter Breakdown Voltage (Note 6)	BC846	$BV_{CEO}$	65	-	-	V	$I_C = 10\text{mA}$
	BC847		45				
	BC848		30				
Emitter-Base Breakdown Voltage	BC846 / BC847	$BV_{EBO}$	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	$V_{CE} = 80\text{V}$ $V_{CE} = 50\text{V}$ $V_{CE} = 30\text{V}$
	BC847				15		
	BC848				15		
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	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5.0\text{mA}$
					200		
Base-Emitter Turn-On Voltage (Note 6)		$V_{BE(on)}$	580	660	700	mV	$I_C = 2\text{mA}, V_{CE} = 5\text{V}$ $I_C = 10\text{mA}, V_{CE} = 5\text{V}$
			-	-	770		
Base-Emitter Saturation Voltage (Note 6)		$V_{BE(sat)}$	-	-	700	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5\text{mA}$
					900		
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**

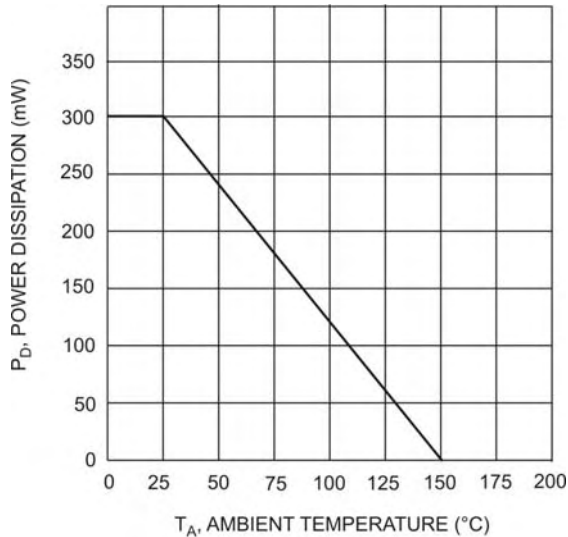


Fig. 1, Max Power Dissipation vs Ambient Temperature

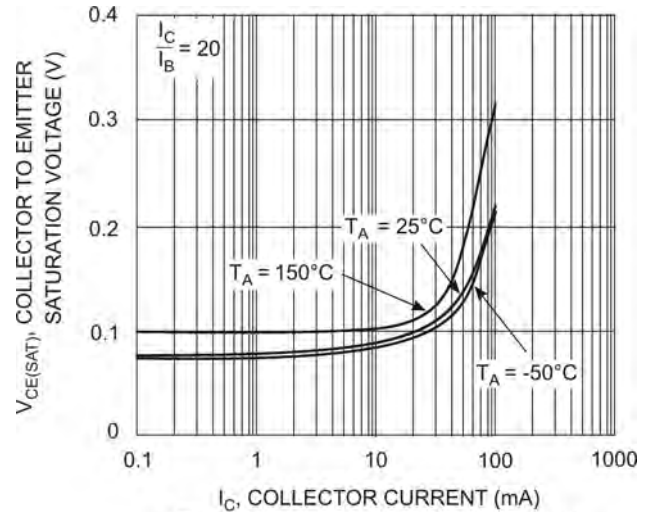


Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current

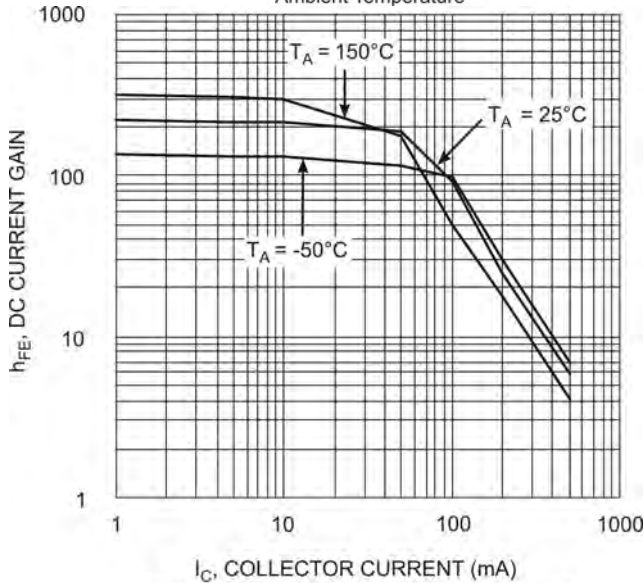


Fig. 3, DC Current Gain vs. Collector Current

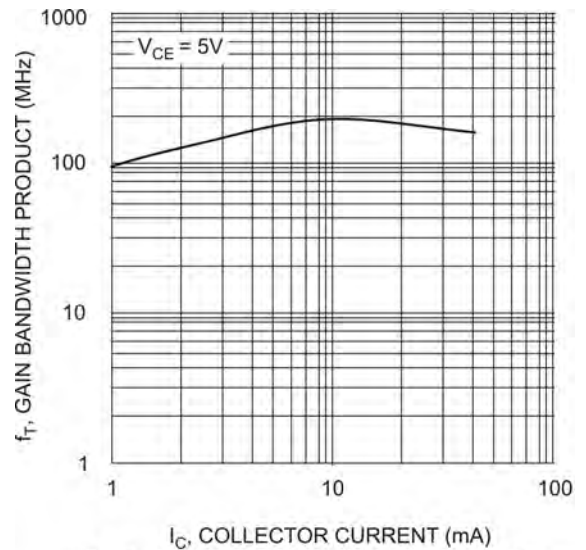
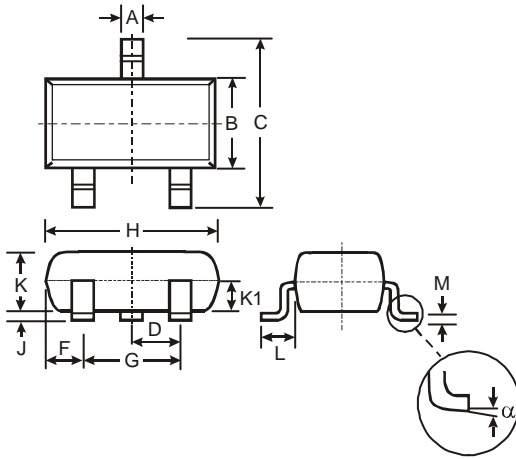


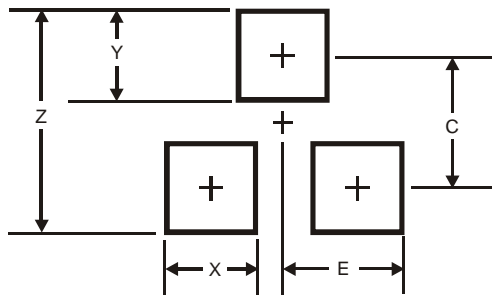
Fig. 4, Gain Bandwidth Product vs Collector Current

**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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