



Micro Commercial Components  
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# BC846A THRU BC848C

## NPN Small Signal Transistor 310mW

### Features

- Ideally Suited for Automatic Insertion
- 150°C Junction Temperature
- For Switching and AF Amplifier Applications

### Mechanical Data

- Case: SOT-23, Molded Plastic
- Terminals: Solderable per MIL-STD-202, Method 208
- Polarity: See Diagram
- Weight: 0.008 grams ( approx.)

Marking Code (Note 2)			
Type	Marking	Type	Marking
BC846A	1A	BC847C	1G
BC846B	1B	BC848A	1J
BC847A	1E	BC848B	1K
BC847B	1F	BC848C	1L

Maximum Ratings @ 25°C Unless Otherwise Specified

Charateristic	Symbol	Value	Unit	
Collector-Base Voltage	BC846 BC847 BC848	$V_{CBO}$	V	
				80
				50
Collector-Emitter Voltage	BC846 BC847 BC848	$V_{CEO}$	V	
				65
				45
Emitter-Base Voltage	BC846, BC847 BC848	$V_{EBO}$	V	
				6.0
				5.0
Collector Current	$I_C$	100	mA	
Peak Collector Current	$I_{CM}$	200	mA	
Peak Emitter Current	$I_{EM}$	200	mA	
Power Dissipation @ $T_s=50^\circ\text{C}$ (Note 1)	$P_d$	310	mW	
Operating & Storage Temperature	$T_j, T_{STG}$	-55~150	°C	

- Note:**
1. Package mounted on ceramic substrate  
0.7mm X 2.5cm<sup>2</sup> area.
  2. Current gain subgroup "C" is not available for BC846.

### SOT-23

DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.110	.120	2.80	3.04	
B	.083	.098	2.10	2.64	
C	.047	.055	1.20	1.40	
D	.035	.041	.89	1.03	
E	.070	.081	1.78	2.05	
F	.018	.024	.45	.60	
G	.0005	.0039	.013	.100	
H	.035	.044	.89	1.12	
J	.003	.007	.085	.180	
K	.015	.020	.37	.51	

Suggested Solder Pad Layout

# BC846A thru BC848C



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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-Base Breakdown Voltage (Note 3)	BC846 BC847 BC848 V <sub>(BR)CBO</sub>	80 50 30	— — —	— — —	V	I <sub>C</sub> = 10μA, I <sub>B</sub> = 0	
Collector-Emitter Breakdown Voltage (Note 3)	BC846 BC847 BC848 V <sub>(BR)CEO</sub>	65 45 30	— — —	— — —	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0	
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 B C	h <sub>fe</sub> h <sub>fe</sub> h <sub>fe</sub>	— — —	220 330 600	— — —	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA, f = 1.0kHz	
Input Impedance	Current Gain Group A B C	h <sub>ie</sub> h <sub>ie</sub> h <sub>ie</sub>	— — —	2.7 4.5 8.7	— — —		
Output Admittance	Current Gain Group A B C	h <sub>oe</sub> h <sub>oe</sub> h <sub>oe</sub>	— — —	18 30 60	— — —		
Reverse Voltage Transfer Ratio	A B C	h <sub>re</sub> h <sub>re</sub> h <sub>re</sub>	— — —	1.5x10 <sup>-4</sup> 2x10 <sup>-4</sup> 3x10 <sup>-4</sup>	— — —		
DC Current Gain	Current Gain Group A B (Note 3) C	— — —	110 200 420	180 290 520	220 450 800		V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA
Thermal Resistance, Junction to Substrate Backside	R <sub>θS</sub>	—	—	320	°C/W		Note 1
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	—	—	400	°C/W		Note 1
Collector-Emitter Saturation Voltage (Note 3)	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 3)	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 3)	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 3)	BC846 BC847 BC848 I <sub>CES</sub> I <sub>CES</sub> I <sub>CES</sub> I <sub>CBO</sub> I <sub>CBO</sub>	— — — — —	— — — — —	— — — 15 15 5.0	nA nA nA nA μA	V <sub>CE</sub> = 80V V <sub>CE</sub> = 50V V <sub>CE</sub> = 30V V <sub>CB</sub> = 40V 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:
1. Package mounted on ceramic substrate 0.7mm x 2.5cm<sup>2</sup> area.
  2. Current gain subgroup "C" is not available for BC846.
  3. Short duration pulse test to minimize self-heating effect.