



# BC856A - BC858C

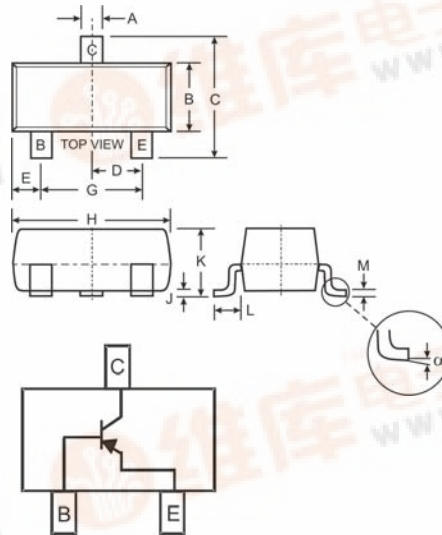
PNP SURFACE MOUNT SMALL SIGNAL TRANSISTOR

## Features

- Ideally Suited for Automatic Insertion
- Complementary NPN Types Available (BC846-BC848)
- For Switching and AF Amplifier Applications
- **Lead Free/RoHS Compliant (Note 3)**

## 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 Codes: See Table Below & Diagram on Page 4
- Ordering & Date Code Information: See Page 4
- Weight: 0.008 grams (approximate)



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
BC856A	3A, K3A	BC857C	3G, K3G
BC856B	3B, K3B	BC858A	3J, K3J, K3A, K3V
BC857A	3E, K3V, K3A	BC858B	3K, K3K, K3B, K3W
BC857B	3F, K3W, K3B	BC858C	3L, K3L, K3G

## Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	BC856 -80	V
		BC857 -50	
		BC858 -30	
Collector-Emitter Voltage	V <sub>CEO</sub>	BC856 -65	V
		BC857 -45	
		BC858 -30	
Emitter-Base Voltage	V <sub>EBO</sub>	-5.0	V
Collector Current	I <sub>C</sub>	-100	mA
Peak Collector Current	I <sub>CM</sub>	-200	mA
Peak Emitter Current	I <sub>EM</sub>	-200	mA
Power Dissipation (Note 1)	P <sub>d</sub>	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	R <sub>θJA</sub>	417	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°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 BC856.
  3. No purposefully added lead.



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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-Base Breakdown Voltage (Note 4)	BC856	V <sub>(BR)CBO</sub>	-80	—	—	V	I <sub>C</sub> = 10μA, I <sub>B</sub> = 0	
	BC857		-50	—	—			
	BC858		-30	—	—			
Collector-Emitter Breakdown Voltage (Note 4)	BC856	V <sub>(BR)CEO</sub>	-65	—	—	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0	
	BC857		-45	—	—			
	BC858		-30	—	—			
Emitter-Base Breakdown Voltage (Note 4)		V <sub>(BR)EBO</sub>	-5	—	—	V	I <sub>E</sub> = 1μA, I <sub>C</sub> = 0	
H-Parameters								
Small Signal Current Gain	Current Gain Group A	h <sub>ie</sub>	—	200	—	—	V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA, f = 1.0kHz	
		B	h <sub>ie</sub>	—	330	—		—
		C	h <sub>ie</sub>	—	600	—		—
Input Impedance	Current Gain Group A	h <sub>ie</sub>	—	2.7	—	kΩ		
		B	h <sub>ie</sub>	—	4.5	—		kΩ
		C	h <sub>ie</sub>	—	8.7	—		kΩ
Output Admittance	Current Gain Group A	h <sub>oe</sub>	—	18	—	μS		
		B	h <sub>oe</sub>	—	30	—		μS
		C	h <sub>oe</sub>	—	60	—		μS
Reverse Voltage Transfer Ratio	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 (Note 4)	Current Gain Group A		125	180	250	—	V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA	
		B	220	290	475			
		C	420	520	800			
Collector-Emitter Saturation Voltage (Note 4)		V <sub>CE(SAT)</sub>	—	-75 -250	-300 -650	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 4)		V <sub>BE(SAT)</sub>	— —	-700 -850	—	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 4)		V <sub>BE(ON)</sub>	-600 —	-650 —	-750 -820	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 4)	BC856	I <sub>CES</sub>	—	—	-15	nA	V <sub>CE</sub> = -80V	
	BC857	I <sub>CES</sub>	—	—	-15	nA	V <sub>CE</sub> = -50V	
	BC858	I <sub>CES</sub>	—	—	-15	nA	V <sub>CE</sub> = -30V	
		I <sub>CBO</sub>	—	—	-15	nA	V <sub>CB</sub> = -30V	
		I <sub>CBO</sub>	—	—	-4.0	μA	V <sub>CB</sub> = -30V, T <sub>A</sub> = 150°C	
Gain Bandwidth Product		f <sub>T</sub>	100	200	—	MHz	V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -10mA, f = 100MHz	
Collector-Base Capacitance		C <sub>CBO</sub>	—	3	—	pF	V <sub>CB</sub> = -10V, f = 1.0MHz	
Noise Figure		NF	—	2	10	dB	V <sub>CE</sub> = -5.0V, I <sub>C</sub> = 200μA, R <sub>S</sub> = 2kΩ, f = 1kHz, Δf = 200Hz	

Notes: 4. Short duration pulse test used to minimize self-heating effect.

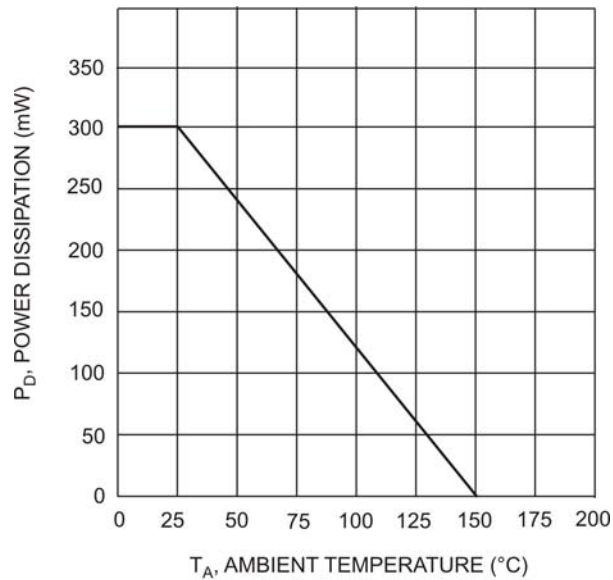


Fig. 1, Max Power Dissipation vs Ambient Temperature

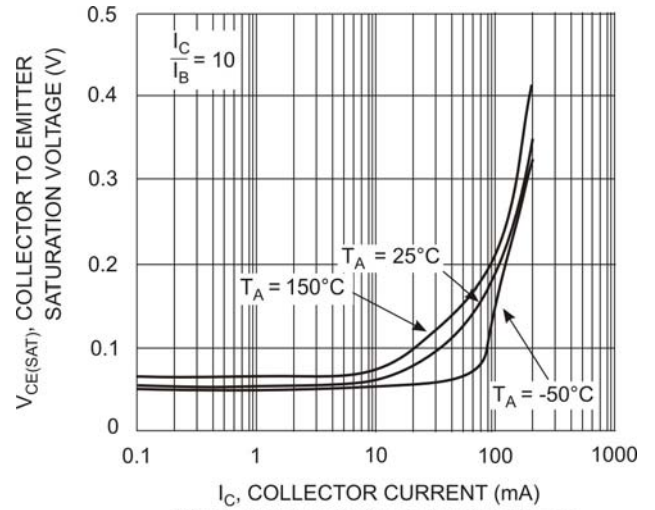


Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current

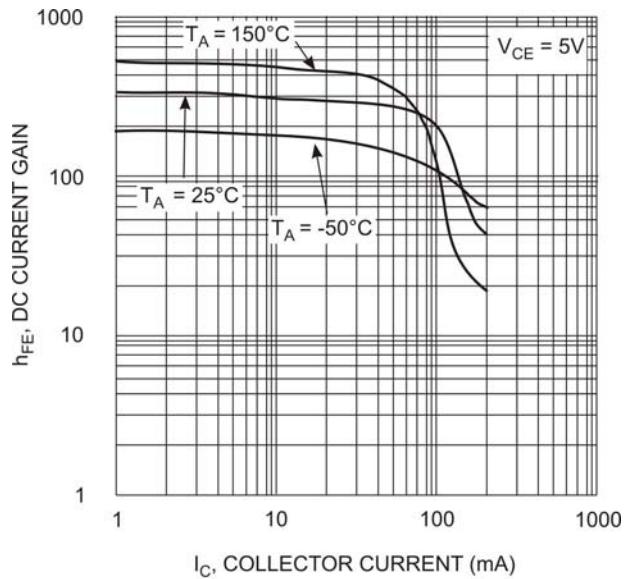


Fig. 3, DC Current Gain vs. Collector Current

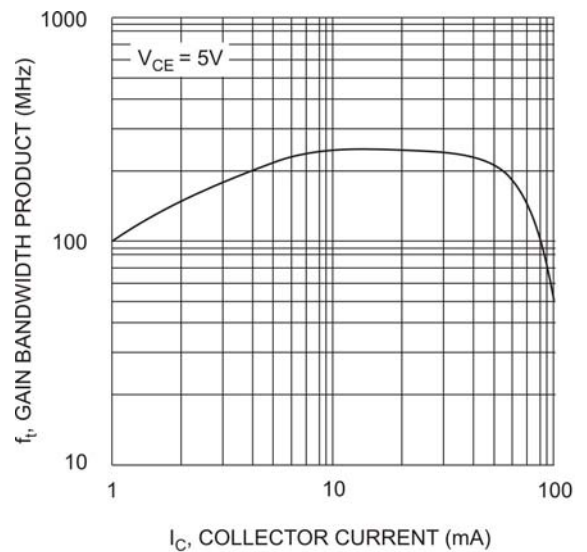


Fig. 4, Gain Bandwidth Product vs Collector Current



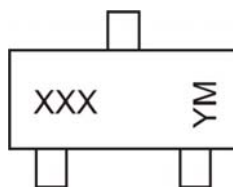
## Ordering Information (Note 5)

Device*	Packaging	Shipping
BC85xx-7-F	SOT-23	3000/Tape & Reel

\* xx = device type, e.g. BC856A-7-F.

Notes: 5. 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. K3A = BC856A  
YM = Date Code Marking  
Y = Year ex: T = 2006  
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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