



# BC847PN

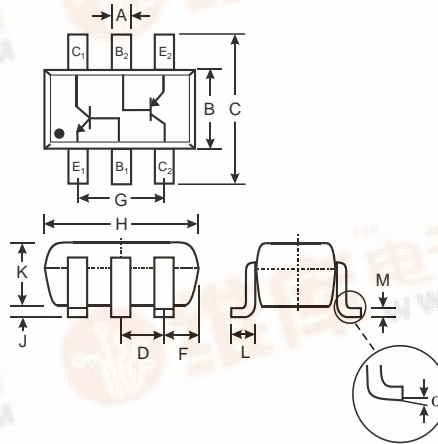
## COMPLEMENTARY PAIR SMALL SIGNAL SURFACE MOUNT TRANSISTOR

### Features

- Epitaxial Die Construction
- Two Internally Isolated NPN/PNP Transistors in one package
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

### Mechanical Data

- Case: SOT-363
- 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).
- Terminal Connections: See Diagram
- Marking (See Page 3): K7P
- Ordering Information: See Page 2
- Weight: 0.006 grams (approximate)



SOT-363		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
F	0.30	0.40
H	1.80	2.20
J	0.10	
K	0.90	1.00
L	0.25	0.40
M	0.10	0.25
8°		
All Dimensions in mm		

### Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified **NPN BC847B Section**

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	45	V
Emitter-Base Voltage	V <sub>EB0</sub>	6.0	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

### Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified **PNP BC857B Section**

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-45	V
Emitter-Base Voltage	V <sub>EB0</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

### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 1) @ T <sub>A</sub> = 25°C Total Device	P <sub>d</sub>	200	mW
Thermal Resistance, Junction to Ambient (Note 1) @ T <sub>A</sub> = 25°C	R <sub>JA</sub>	625	°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. No purposefully added lead.





**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified **NPN BC847B Section**

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage (Note 3)	$V_{(BR)CBO}$	50	—	—	V	$I_C = 10\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage (Note 3)	$V_{(BR)CEO}$	45	—	—	V	$I_C = 10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage (Note 3)	$V_{(BR)EBO}$	6	—	—	V	$I_E = 1\mu\text{A}, I_C = 0$
DC Current Gain (Note 3)	$h_{FE}$	200	290	450	—	$V_{CE} = 5.0\text{V}, I_C = 2.0\text{mA}$
Collector-Emitter Saturation Voltage (Note 3)	$V_{CE(SAT)}$	—	90 200	250 600	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Saturation Voltage (Note 3)	$V_{BE(SAT)}$	—	700 900	—	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Voltage (Note 3)	$V_{BE(ON)}$	580 —	660 —	700 720	mV	$V_{CE} = 5.0\text{V}, I_C = 2.0\text{mA}$ $V_{CE} = 5.0\text{V}, I_C = 10\text{mA}$
Collector-Cutoff Current (Note 3)	$I_{CBO}$ $I_{CBO}$	— —	— —	15 5.0	nA $\mu\text{A}$	$V_{CB} = 30\text{V}$ $V_{CB} = 30\text{V}, T_A = 150^\circ\text{C}$
Gain Bandwidth Product	$f_T$	100	300	—	MHz	$V_{CE} = 5.0\text{V}, I_C = 10\text{mA},$ $f = 100\text{MHz}$
Collector-Base Capacitance	$C_{CBO}$	—	3.5	6.0	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$
Noise Figure	NF	—	2.0	10	dB	$V_{CE} = 5\text{V}, I_C = 200\mu\text{A},$ $R_G = 2.0\text{k}\Omega,$ $f = 1.0\text{kHz}, f = 200\text{Hz}$

**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified **PNP BC857B Section**

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage (Note 3)	$V_{(BR)CBO}$	-50	—	—	V	$I_C = 10\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage (Note 3)	$V_{(BR)CEO}$	-45	—	—	V	$I_C = 10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage (Note 3)	$V_{(BR)EBO}$	-5	—	—	V	$I_E = 1\mu\text{A}, I_C = 0$
DC Current Gain (Note 3)	$h_{FE}$	220	290	475	—	$V_{CE} = 5.0\text{V}, I_C = 2.0\text{mA}$
Collector-Emitter Saturation Voltage (Note 3)	$V_{CE(SAT)}$	—	-75 -250	-300 -650	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Saturation Voltage (Note 3)	$V_{BE(SAT)}$	—	-700 -850	— -950	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Voltage (Note 3)	$V_{BE(ON)}$	-600 —	-650 —	-750 -820	mV	$V_{CE} = 5.0\text{V}, I_C = 2.0\text{mA}$ $V_{CE} = 5.0\text{V}, I_C = 10\text{mA}$
Collector-Cutoff Current (Note 3)	$I_{CBO}$ $I_{CBO}$	— —	— —	-15 -4.0	nA $\mu\text{A}$	$V_{CB} = 30\text{V}$ $V_{CB} = 30\text{V}, T_A = 150^\circ\text{C}$
Gain Bandwidth Product	$f_T$	100	200	—	MHz	$V_{CE} = 5.0\text{V}, I_C = 10\text{mA},$ $f = 100\text{MHz}$
Collector-Base Capacitance	$C_{CBO}$	—	3	4.5	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$
Noise Figure	NF	—	—	10	dB	$V_{CE} = 5\text{V}, I_C = 200\mu\text{A},$ $R_G = 2.0\text{k}\Omega,$ $f = 1.0\text{kHz}, f = 200\text{Hz}$

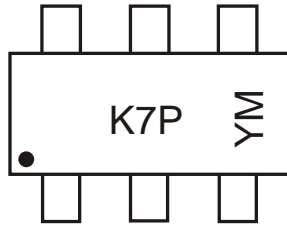
**Ordering Information** (Note 4)

Device	Packaging	Shipping
BC847PN-7-F	SOT-363	3000/Tape & Reel

Notes: 3. Short duration pulse test used to minimize self-heating effect.

4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



K7P = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: T = 2006  
 M = Month ex: 9 = September

### Date Code Key

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	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

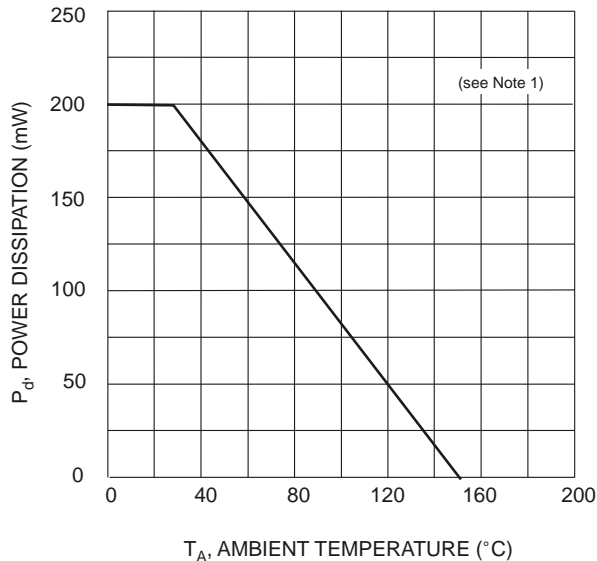


Fig. 1, Power Derating Curve (Total Device)

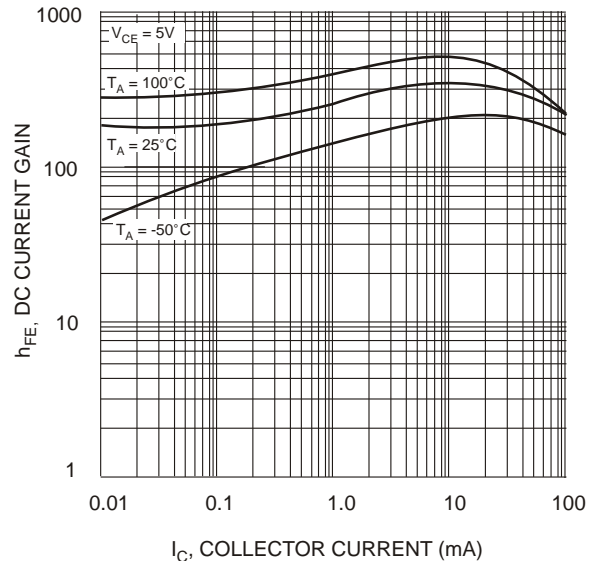


Fig. 2, DC Current Gain vs. Collector Current (BC847B)

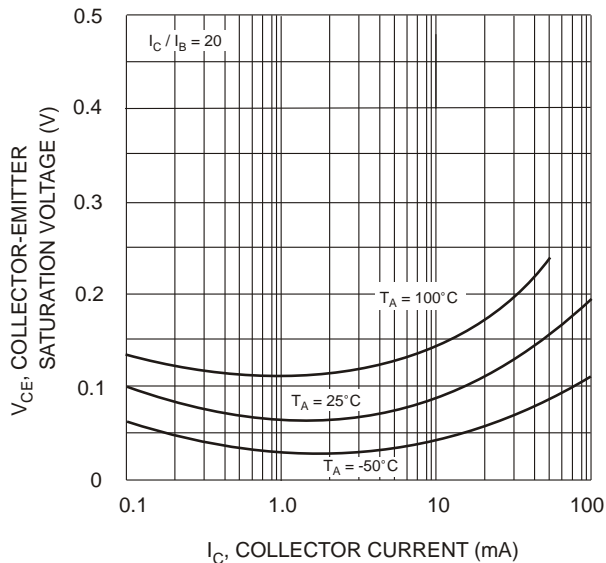


Fig. 3, Collector Saturation Voltage vs. Collector Current (BC847B)

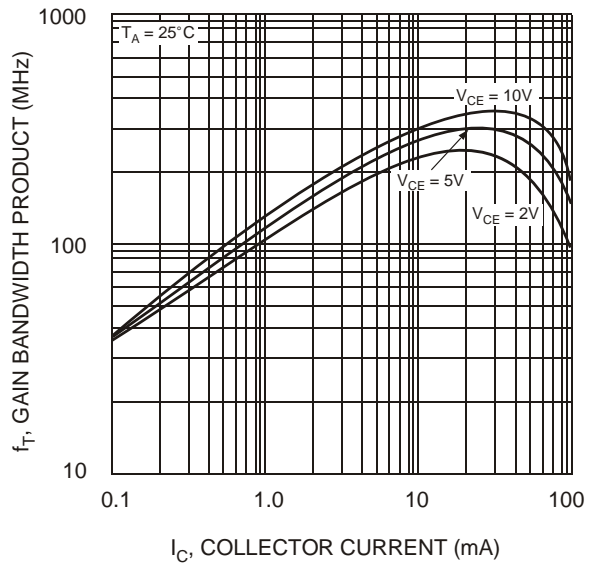


Fig. 4, Gain Bandwidth Product vs. Collector Current (BC847B)

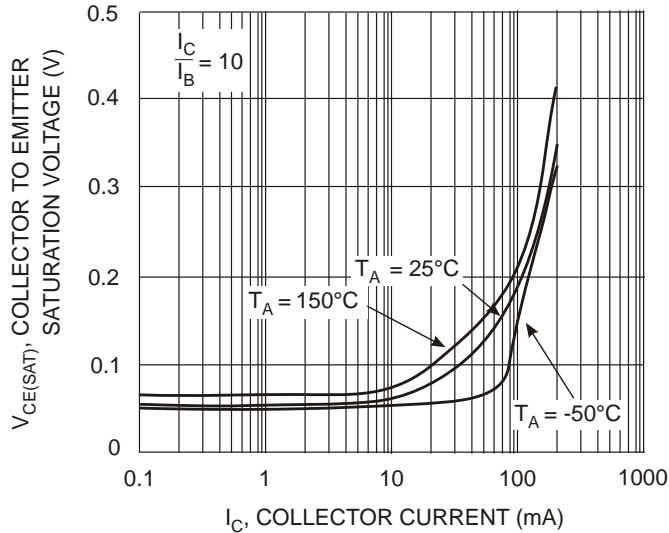


Fig. 5, Collector Emitter Saturation Voltage vs. Collector Current (BC857B)

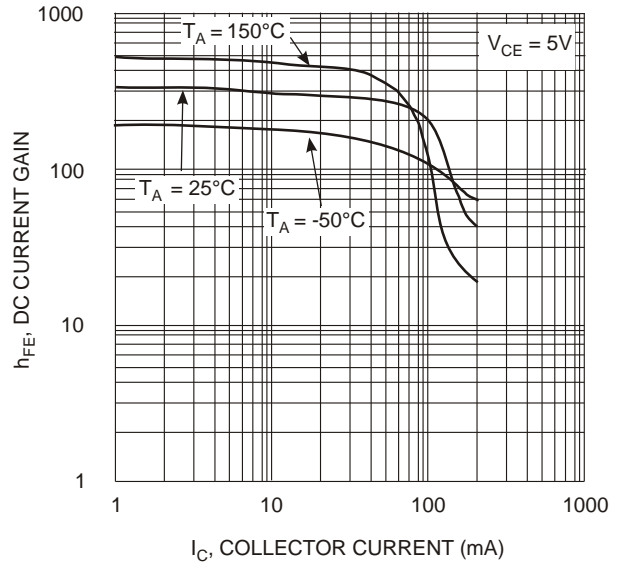


Fig. 6, DC Current Gain vs. Collector Current (BC857B)

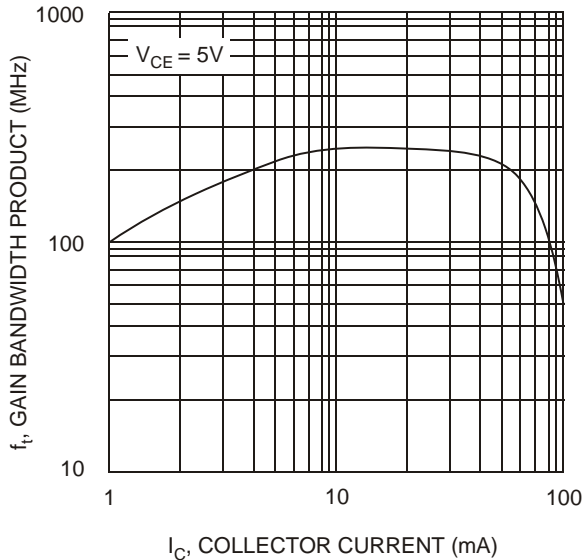


Fig. 7, Gain Bandwidth Product vs Collector Current (BC857B)

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