BC846A - BC848C

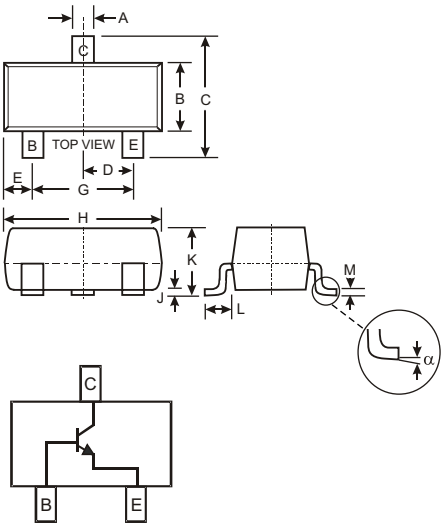
NPN SURFACE MOUNT SMALL SIGNAL TRANSISTOR

Features

- Ideally Suited for Automatic Insertion
- Complementary PNP Types Available (BC856-BC858)
- For Switching and AF Amplifier Applications
- Also Available in Lead Free Version

Mechanical Data

- Case: SOT-23, Molded Plastic
- Case material - UL Flammability Rating Classification 94V-0
- Moisture sensitivity: Level 1 per J-STD-020A
- Terminals: Solderable per MIL-STD-202, Method 208
- Also Available in Lead Free Plating (Matte Tin Finish). Please see Ordering Information, Note 5, on Page 3
- Pin Connections: See Diagram
- Marking Codes (See Table Below & Diagram on Page 3)
- Ordering & Date Code Information: See Page 3
- Approx. Weight: 0.008 grams



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
α	0°	8°
All Dimensions in mm		

Marking Code (Note 2)			
Type	**Marking**	**Type**	**Marking**
BC846A	1A, K1Q	BC847C	1G, K1M
BC846B	1B, K1R	BC848A	1J, K1J, K1E, K1Q
BC847A	1E, K1E, K1Q	BC848B	1K, K1K, K1F, K1R
BC847B	1F, K1F, K1R	BC848C	1L, K1L, K1M

Maximum Ratings @ T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Collector-Base Voltage	BC846 BC847 BC848	V_{CBO}	80 50 30	V
Collector-Emitter Voltage	BC846 BC847 BC848	V_{CEO}	65 45 30	V
Emitter-Base Voltage	BC846, BC847 BC848	V_{EBO}	6.0 5.0	V
Collector Current		I_C	100	mA
Peak Collector Current		I_{CM}	200	mA
Peak Emitter Current		I_{EM}	200	mA
Power Dissipation (Note 1)		P_d	300	mW
Thermal Resistance, Junction to Ambient Air (Note 1)		$R_{\theta JA}$	417	°C/W
Operating and Storage Temperature Range		T_j, T_{STG}	-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 BC846.

Electrical Characteristics @ $T_A = 25°C$ unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage (Note 3)	BC846	$V_{(BR)CBO}$	80	—	—	V	$I_C = 10\mu A$, $I_B = 0$
	BC847		50	—	—		
	BC848		30	—	—		
Collector-Emitter Breakdown Voltage (Note 3)	BC846	$V_{(BR)CEO}$	65	—	—	V	$I_C = 10mA$, $I_B = 0$
	BC847		45	—	—		
	BC848		30	—	—		
Emitter-Base Breakdown Voltage (Note 3)	BC846, BC847	$V_{(BR)EBO}$	6	—	—	V	$I_E = 1\mu A$, $I_C = 0$
	BC848		5				
H-Parameters							
Small Signal Current Gain	Current Gain Group A	h_{fe}	—	220	—	—	
	B	h_{fe}	—	330	—	—	
	C	h_{fe}	—	600	—	—	
Input Impedance	Current Gain Group A	h_{ie}	—	2.7	—	kΩ	
	B	h_{ie}	—	4.5	—	kΩ	$V_{CE} = 5.0V$, $I_C = 2.0mA$,
	C	h_{ie}	—	8.7	—	kΩ	$f = 1.0kHz$
Output Admittance	Current Gain Group A	h_{oe}	—	18	—	µS	
	B	h_{oe}	—	30	—	µS	
	C	h_{oe}	—	60	—	µS	
Reverse Voltage Transfer Ratio	A	h_{re}	—	$1.5x10^{-4}$	—	—	
Current Gain Group	B	h_{re}	—	$2x10^{-4}$	—	—	
	C	h_{re}	—	$3x10^{-4}$	—	—	
DC Current Gain	Current Gain Group A	h_{FE}	110	180	220	—	$V_{CE} = 5.0V$, $I_C = 2.0mA$
	B		200	290	450		
	(Note 3) C		420	520	800		
Collector-Emitter Saturation Voltage (Note 3)		$V_{CE(SAT)}$	—	90	250	mV	$I_C = 10mA$, $I_B = 0.5mA$
				200	600		$I_C = 100mA$, $I_B = 5.0mA$
Base-Emitter Saturation Voltage (Note 3)		$V_{BE(SAT)}$	—	700	—	mV	$I_C = 10mA$, $I_B = 0.5mA$
				900			$I_C = 100mA$, $I_B = 5.0mA$
Base-Emitter Voltage (Note 3)		$V_{BE(ON)}$	580	660	700	mV	$V_{CE} = 5.0V$, $I_C = 2.0mA$
			—	—	770		$V_{CE} = 5.0V$, $I_C = 10mA$
Collector-Cutoff Current (Note 3)	BC846	I_{CES}	—	—	15	nA	$V_{CE} = 80V$
	BC847	I_{CES}	—	—	15	nA	$V_{CE} = 50V$
	BC848	I_{CES}	—	—	15	nA	$V_{CE} = 30V$
		I_{CBO}	—	—	15	nA	$V_{CB} = 40V$
		I_{CBO}	—	—	5.0	µA	$V_{CB} = 30V$, $T_A = 150°C$
Gain Bandwidth Product		f_T	100	300	—	MHz	$V_{CE} = 5.0V$, $I_C = 10mA$, $f = 100MHz$
Collector-Base Capacitance		C_{CBO}	—	3.0	—	pF	$V_{CB} = 10V$, $f = 1.0MHz$
Noise Figure		NF	—	2	10	dB	$V_{CE} = 5V$, $I_C = 200\mu A$, $R_S = 2.0k\Omega$, $f = 1.0kHz$, $\Delta f = 200Hz$

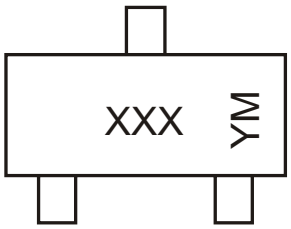
Notes: 3. Short duration pulse test used to minimize self-heating effect.

Ordering Information (Note 4)

Device	Packaging	Shipping
BC84xx-7*	SOT-23	3000/Tape & Reel

Notes: 4. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.
* xx = device type, e.g. BC846A-7.
5. For Lead Free version (with Lead Free terminal finish) part number, please add "-F" suffix to part number above. Example: BC846A-7-F.

Marking Information



XXX = Product Type Marking Code (See Page 1), e.g. K1Q or 1A = BC846A
YM = Date Code Marking
Y = Year ex: N = 2002
M = Month ex: 9 = September

Date Code Key

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Code	J	K	L	M	N	P	R	S	T	U	V	W

Month	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

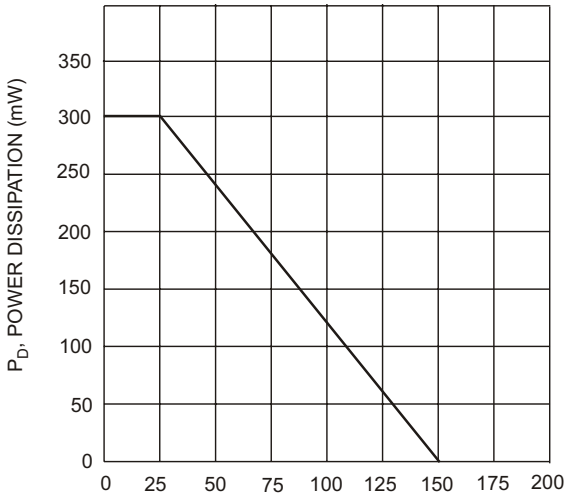


Fig. 1, Max Power Dissipation vs Ambient Temperature

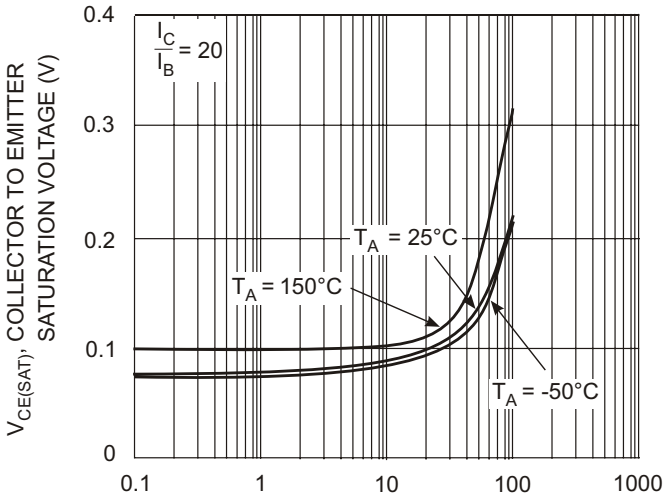


Fig. 2 Collector Emitter Saturation Voltage vs. Collector Current

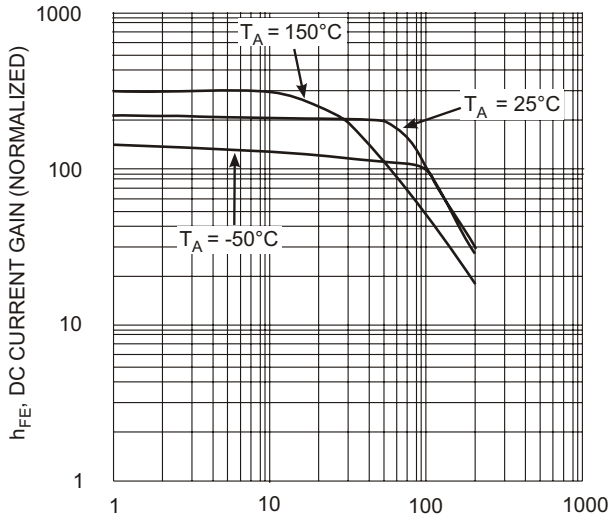


Fig. 3, DC Current Gain vs. Collector Current

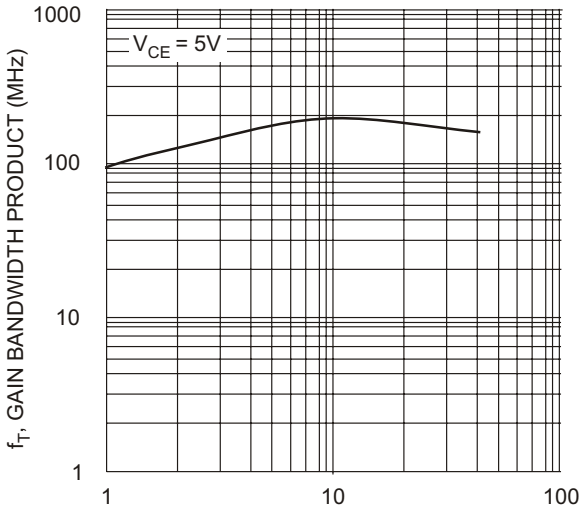


Fig. 4, Gain Bandwidth Product vs Collector Current

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