BC846A - BC848C

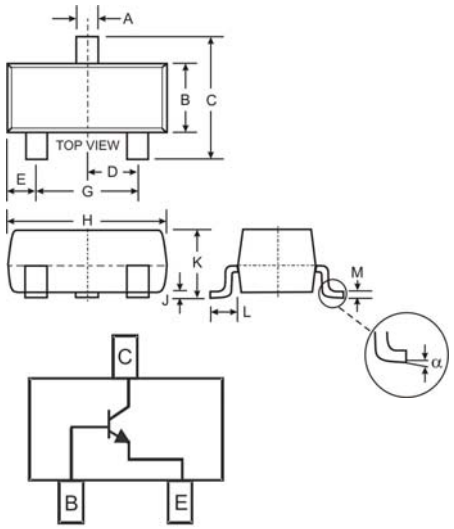
NPN SURFACE MOUNT SMALL SIGNAL TRANSISTOR

Features

- Ideally Suited for Automatic Insertion
- Complementary PNP Types Available (BC856-BC858)
- For Switching and AF Amplifier Applications
- **Lead Free/RoHS Compliant (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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 Information: See Page 4
- Ordering Information: See Page 4
- Approximate 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.
3. No purposefully added lead.

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage (Note 4)	BC846	$V_{(BR)CBO}$	80	—	—	V	I_C = 10μA, I_B = 0
	BC847		50	—	—		
	BC848		30	—	—		
Collector-Emitter Breakdown Voltage (Note 4)	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 = 1μA, 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 4) C		420	520	800		
Collector-Emitter Saturation Voltage (Note 4)		$V_{CE(SAT)}$	—	90	250	mV	I_C = 10mA, I_B = 0.5mA
				200	600		I_C = 100mA, I_B = 5.0mA
Base-Emitter Saturation Voltage (Note 4)		$V_{BE(SAT)}$	—	700	—	mV	I_C = 10mA, I_B = 0.5mA
				900			I_C = 100mA, I_B = 5.0mA
Base-Emitter Voltage (Note 4)		$V_{BE(ON)}$	580	660	700	mV	V_{CE} = 5.0V, I_C = 2.0mA
			—	—	770		V_{CE} = 5.0V, I_C = 10mA
Collector-Cutoff Current (Note 4)	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 = 200μA, R_S = 2.0kΩ, f = 1.0kHz, Δf = 200Hz

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

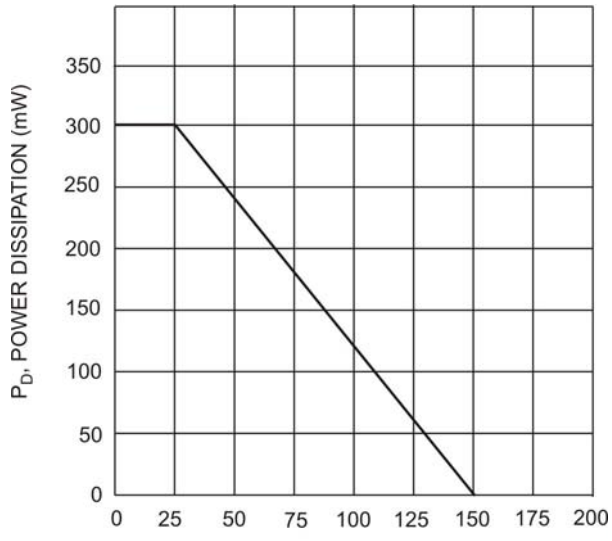


Fig. 1, Max Power Dissipation vs Ambient Temperature

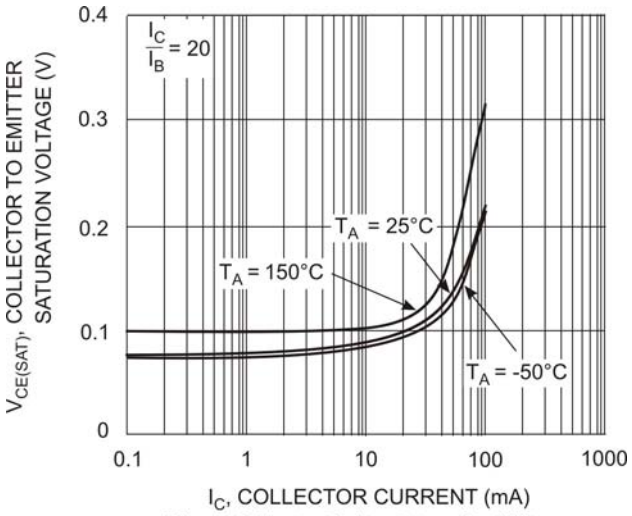


Fig. 2 Collector Emitter Saturation Voltage vs. Collector Current

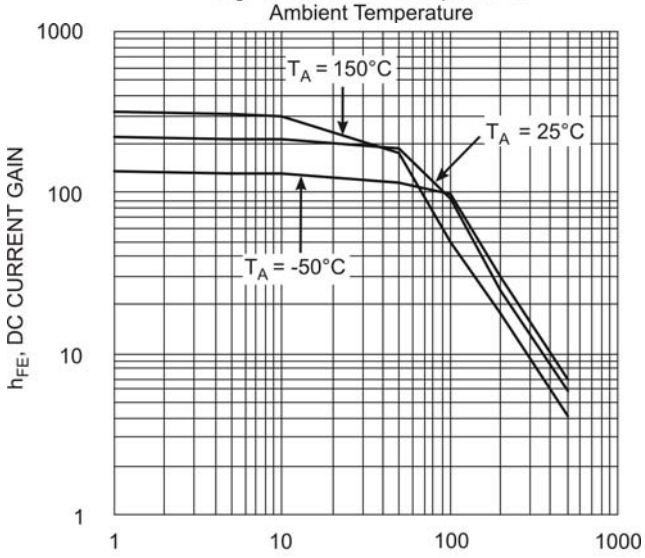


Fig. 3, DC Current Gain vs. Collector Current

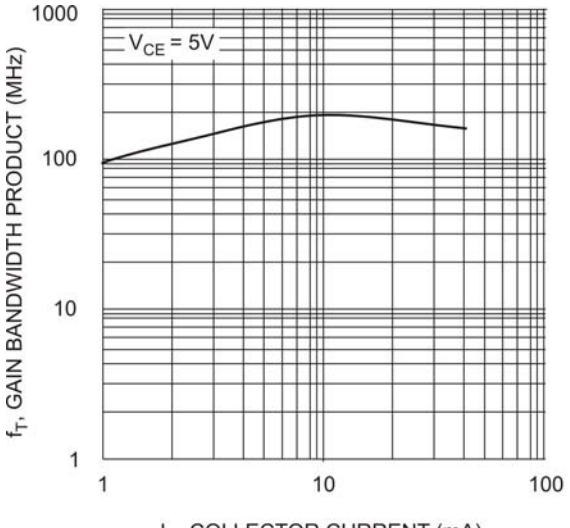


Fig. 4, Gain Bandwidth Product vs Collector Current

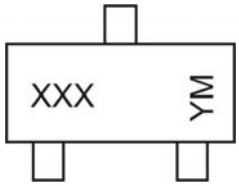
Ordering Information (Note 5)

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

* xx = device type, e.g. BC846A-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.
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	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