NPN SURFACE MOUNT SMALL SIGNAL TRANSISTOR IN SOT23

Features

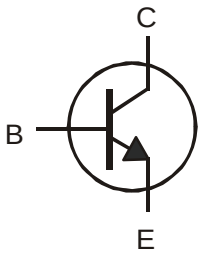
- Ideally Suited for Automatic Insertion
- Complementary PNP Types Available (BC856 – BC858)
- For switching and AF Amplifier Applications
- **Lead Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

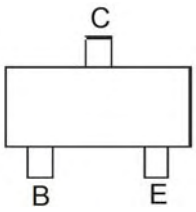
- Case: SOT-23
- UL Flammability Rating 94V-0
- Case material: molded Plastic "Green" Compound
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.008 grams (Approximate)

SOT23

Top View



Device Symbol



Top View
Pin-Out

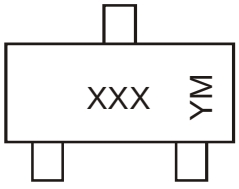
Ordering Information (Note 3 & 4)

Product	Marking	Reel size (inches)	Quantity per reel
BC846A-7-F	K1Q	7	3,000
BC846B-7-F	K1R	7	3,000
BC846BQ-7-F	K1R	7	3,000
BC846B-13-F	K1R	13	10,000
BC847A-7-F	K1Q	7	3,000
BC847AQ-7-F	K1Q	7	3,000
BC847A-13-F	K1Q	13	10,000
BC847B-7-F	K1R	7	3,000
BC847BQ-7-F	K1R	7	3,000
BC847B-13-F	K1R	13	10,000

Product	Marking	Reel size (inches)	Quantity per reel
BC847C-7-F	K1M	7	3,000
BC847C-13-F	K1M	13	10,000
BC848A-7-F	K1Q	7	3,000
BC848B-7-F	K1R	7	3,000
BC848B-13-F	K1R	13	10,000
BC848C-7-F	K1M	7	3,000
BC848CQ-7-F	K1M	7	3,000

Notes:
1. No purposefully added lead.
2. Diodes Inc.`s "Green" Policy can be found on our website at http://www.diodes.com
3. Tape width is 8mm. For more packaging details, go to our website at http://www.diodes.com.
4. Products with Q-suffix are automotive grade. All other products are commercial grade.

Marking Information



XXX = Product Type Marking Code,
YM = Date Code Marking
Y = Year ex: X = 2010
M = Month ex: 9 = September

Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017
Code	X	Y	Z	A	B	C	D	E

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

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Collector-Base Voltage	BC846	V_{CBO}	80	V
	BC847		50	
	BC848		30	
Collector-Emitter Voltage	BC846	V_{CEO}	65	V
	BC847		45	
	BC848		30	
Emitter-Base Voltage	BC846, BC847	V_{EBO}	6.0	V
	BC848		5.0	
Continuous Collector Current		I_C	100	mA
Peak Collector Current		I_{CM}	200	mA
Peak Emitter Current		I_{EM}	200	mA

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	300	mW
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	417	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-65 to +150	°C

Notes: 5. For a device surface mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper in still air conditions; the device is measured when operating in a steady-state condition.

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BC846	BV_{CBO}	80	-	-	V	I_C = 10µA
	BC847		50				
	BC848		30				
Collector-Emitter Breakdown Voltage (Note 6)	BC846	BV_{CEO}	65	-	-	V	I_C = 10mA
	BC847		45				
	BC848		30				
Emitter-Base Breakdown Voltage	BC846 / BC847	BV_{EBO}	6	-	-	V	I_E = 1µA
	BC848		5				
Collector Cutoff Current		I_{CBO}	-	-	15	µA	V_{CB} = 40V
					5		V_{CB} = 30V, T_A=150°C
Collector Emitter Cutoff Current	BC846	I_{CES}	-	-	15	nA	V_{CE}= 80V
	BC847				15		V_{CE}= 50V
	BC848				15		V_{CE}= 30V
Small Signal Current Gain (Note 6)	BC846A / BC847A / BC848A	h_{fe}	-	200	-	-	I_C = 2.0mA, V_{CE} = 5V f=1.0kHz
	BC846B / BC847B / BC848B			330			
	BC847C / BC848C			600			
Input Impedance (Note 6)	BC846A / BC847A / BC848A	h_{ie}	-	2.7	-	kΩ	
	BC846B / BC847B / BC848B			4.5			
	BC847C / BC848C			8.7			
Output Admittance (Note 6)	BC846A / BC847A / BC848A	h_{oe}	-	18	-	µS	
	BC846B / BC847B / BC848B			30			
	BC847C / BC848C			60			
Reverse Voltage Transfer Ratio (Note 6)	BC846A / BC847A / BC848A	h_{re}	-	$1.5x10^{-4}$	-	-	
	BC846B / BC847B / BC848B			$2x10^{-4}$			
	BC847C / BC848C			$3x10^{-4}$			
DC Current Gain (Note 6)	BC846A / BC847A / BC848A	h_{FE}	110	180	220	-	I_C = 2.0mA, V_{CE} = 5V
	BC846B / BC847B / BC848B		200	290	450		
	BC847C / BC848C		420	520	800		
Collector-Emitter Saturation Voltage (Note 6)		$V_{CE(sat)}$	-	90	250	mV	I_C = 10mA, I_B = 0.5mA
				200	600		I_C = 100mA, I_B = 5.0mA
Base-Emitter Turn-On Voltage(Note 6)		$V_{BE(on)}$	580	660	700	mV	I_C = 2mA, V_{CE} = 5V
			-	-	770		I_C = 10mA, V_{CE} = 5V
Base-Emitter Saturation Voltage(Note 6)		$V_{BE(sat)}$	-	700	-	mV	I_C = 10mA, I_B = 0.5mA
				900			I_C = 100mA, I_B = 5mA
Output Capacitance		C_{obo}	-	3	-	pF	V_{CB} = 10V, f = 1.0MHz
Transition Frequency		f_T	100	300	-	MHz	V_{CE} = 5V, I_C = 10mA, f = 100MHz
Noise Figure		NF	-	2	10	dB	V_{CE}=5V, I_C =200µA R_S =2kΩ, f=1kHz Δf=200Hz

Note: 6. Short duration pulse test used to minimize self-heating effect.

Typical Electrical Characteristics

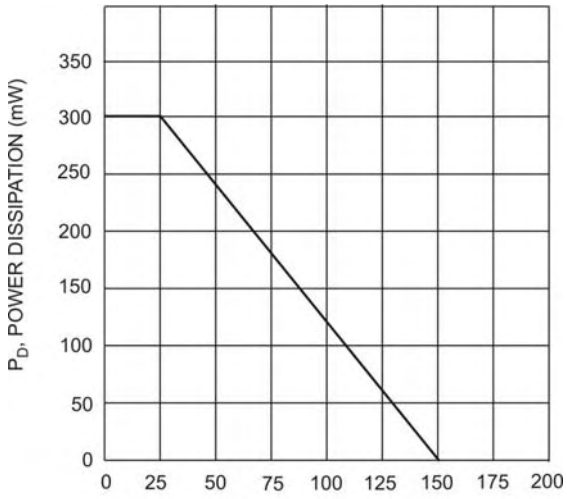


Fig. 1, Max Power Dissipation vs Ambient Temperature

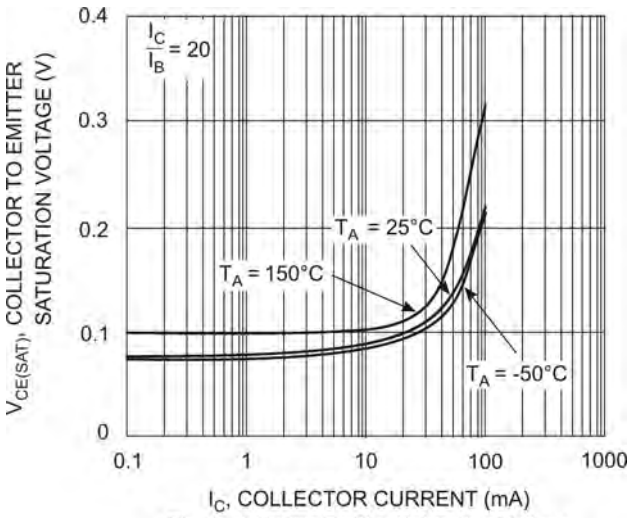


Fig. 2 Collector Emitter Saturation Voltage vs. Collector Current

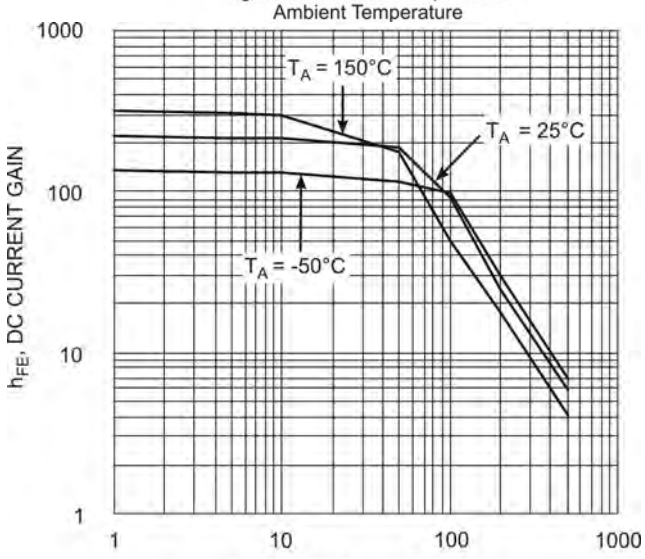


Fig. 3, DC Current Gain vs. Collector Current

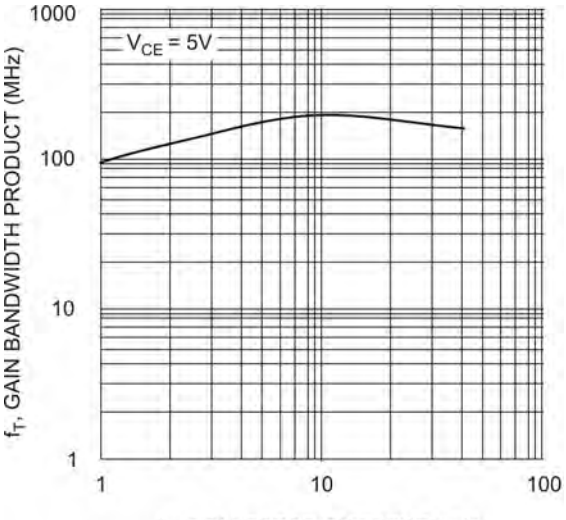
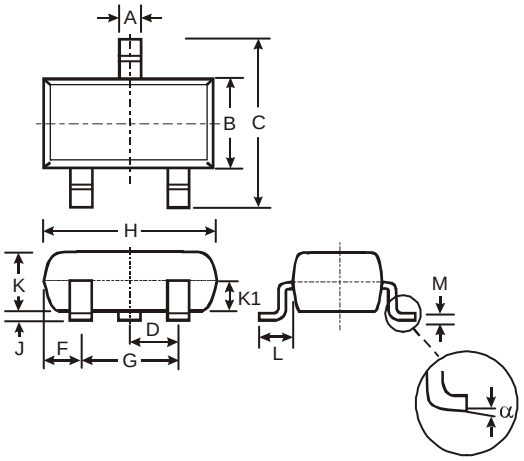


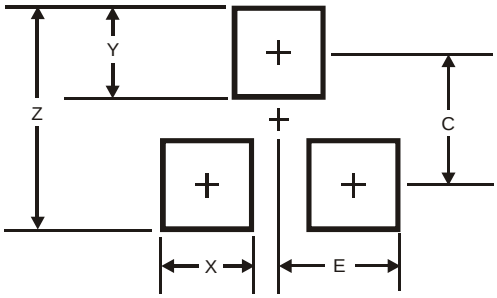
Fig. 4, Gain Bandwidth Product vs Collector Current

Package Outline Dimensions



SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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