Lead-free Green

BC847BLD

SMALL SIGNAL NPN TRANSISTOR WITH CONTROLLED BASE-EMITTER VOLTAGE

NEW PRODUCT

Features

- Low Deviation in Base-Emitter Voltage
- Surface Mount Package
- Ideally Suited for Automated Assembly Processes
- **Lead Free by Design/RoHS Compliant (Note 2)**
- **"Green" Device (Note 2)**

Mechanical Data

- Case: SOT-23
- Case material: Molded Plastic. "Green Molding" Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Marking Type Code Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.008 grams (approximate)

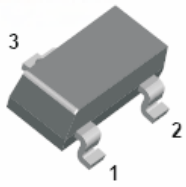

Fig. 1 SOT-23

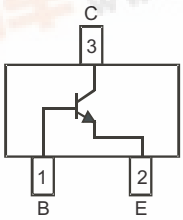

Fig. 2 : Schematic and Pin Configuration

Maximum Ratings @ T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	6	V
Output Current - Continuous (Note 3)	I_C	200	mA
Peak Collector Current	I_{CM}	200	mA
Peak Emitter Current	I_{EM}	200	mA
Power Dissipation (Note 3)	P_d	300	mW
Power Deration	P_{der}	2.4	mW/°C

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Operating and Storage Junction Temperature Range	T_j, T_{STG}	-55 to +150	°C
Thermal Resistance, Junction to Ambient Air (Note 3)	$R_{\theta JA}$	417	°C/W

Notes:
1. No purposefully added Lead
2. Diodes Inc.'s "Green" policy can be found on our website at http:/www.diodes.com/products/lead_free/index.php.
3. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on page 4 or on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

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Electrical Characteristics:

NPN Transistor

@ $T_A = 25°C$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 4)						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	50	—	—	V	$I_C = 10\mu A$, $I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	45	—	—	V	$I_C = 1.0mA$, $I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6	—	—	V	$I_E = 10\mu A$, $I_C = 0$
Collector Cutoff Current	I_{CEX}	—	—	15	nA	$V_{CE} = 50V$, $V_{EB(OFF)} = 3.0V$
Base Cutoff Current (I_{BEX})	I_{BL}	—	—	15	nA	$V_{CE} = 40V$, $V_{EB(OFF)} = 3.0V$
Collector-Base Cut Off Current	I_{CBO}	—	—	15	nA	$V_{CB} = 40V$, $I_E = 0$
				5	μA	$V_{CB} = 30V$, $T_A = 150°C$
Collector-Emitter Cut Off Current, $I_{O(OFF)}$	I_{CEO}	—	—	50	nA	$V_{CE} = 40V$, $I_B = 0$
Emitter-Base Cut Off Current	I_{EBO}	—	—	50	nA	$V_{EB} = 5V$, $I_C = 0$
ON CHARACTERISTICS (Note 4)						
DC Current Gain	h_{fe}	180	—	—	—	$V_{CE} = 5V$, $I_C = 100\mu A$
		150	—	—	—	$V_{CE} = 5V$, $I_C = 500\mu A$
		220	—	—	—	$V_{CE} = 5V$, $I_C = 1mA$
		220	—	—	—	$V_{CE} = 5V$, $I_C = 2mA$
		150	—	—	—	$V_{CE} = 5V$, $I_C = 5mA$
		150	—	—	—	$V_{CE} = 5V$, $I_C = 10mA$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.09	0.18	V	$I_C = 10mA$, $I_B = 0.5mA$
		—	0.2	0.4	V	$I_C = 100mA$, $I_B = 5mA$
Base-Emitter Turn-On Voltage	$V_{BE(ON)}$	647	657	667	mV	$V_{CE} = 5V$, IC = 2mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	—	0.8	V	$I_C = 10mA$, $I_B = 0.5mA$
		—	—	0.9	V	$I_C = 100mA$, $I_B = 5mA$
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{OBO}	—	3	—	pF	$V_{CB} = 5.0V$, f = 1.0 MHz, $I_E = 0$
Input Impedance	h_{ie}	—	4.5	—	KΩ	$V_{CE} = 5.0V$, $I_C = 2mA$, f = 1.0KHz
Voltage Feedback Ratio	h_{re}	—	2	—	x 10E-4	
Small Signal Current Gain	h_{fe}	—	200	—	—	
Output Admittance	h_{oe}	—	30	—	μS	
Current Gain-Bandwidth Product	f_T	100	—	—	MHz	$V_{CE} = 20V$, $I_C = 10$ mA, f = 100 MHz
Noise Figure	NF	—	—	10	dB	$V_{CE} = 5V$, $I_C = 100\mu A$, $R_S = 1K\Omega$, f = 1kHz

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

Typical Characteristics

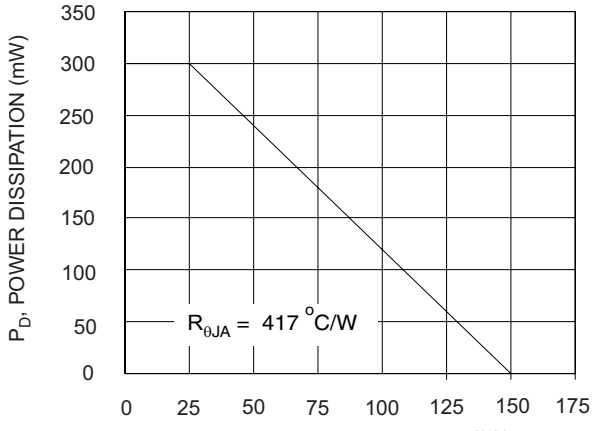

Fig. 3 Max Power Dissipation vs Ambient Temperature

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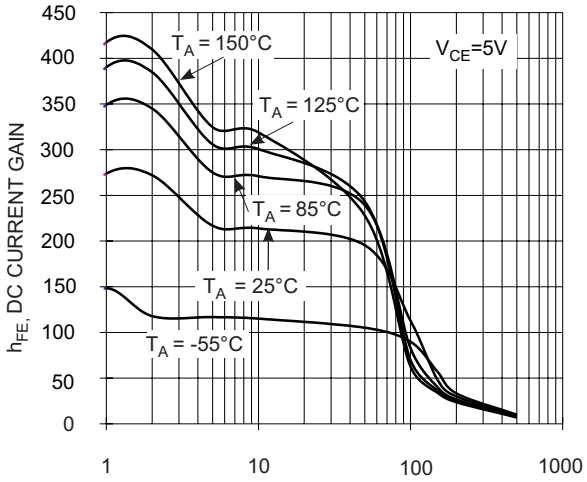
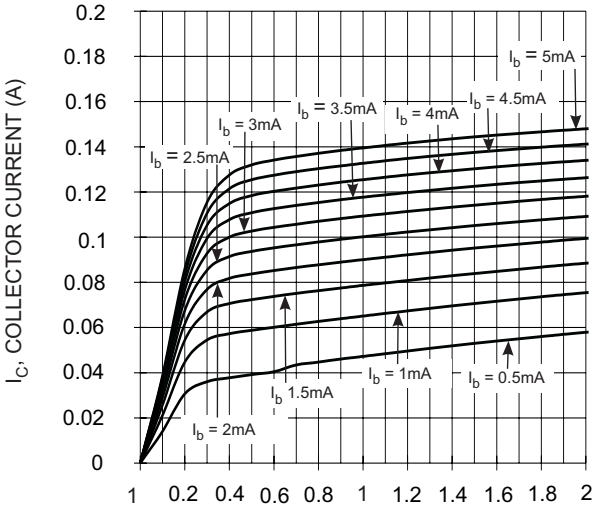


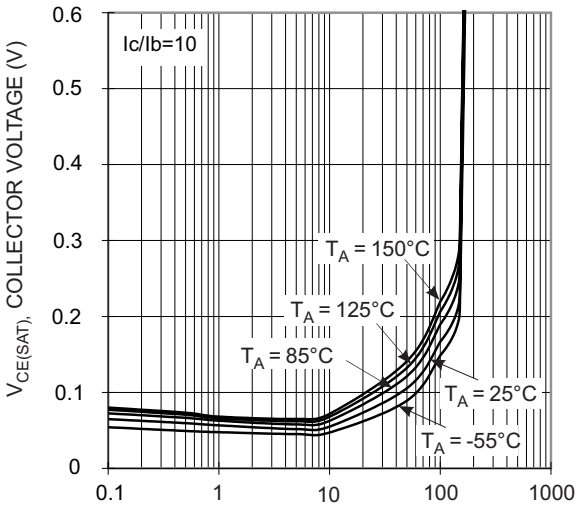
I_C, COLLECTOR CURRENT (mA)

Fig. 4 h_{FE} vs I_C



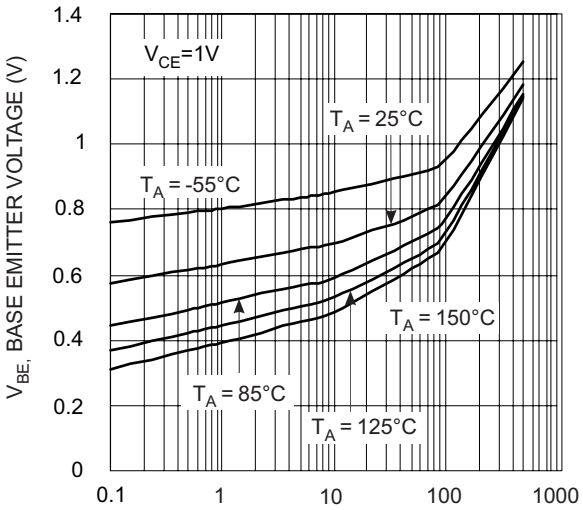
V_{CE}, COLLECTOR EMITTER VOLTAGE (V)

Fig. 5 I_C vs V_{CE}



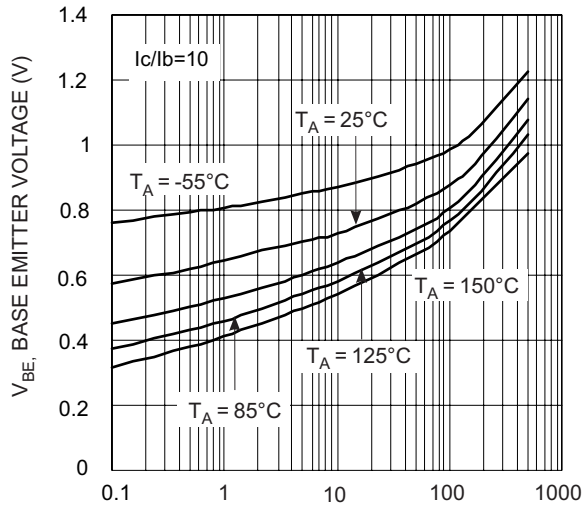
I_C, COLLECTOR CURRENT (mA)

Fig. 6 $V_{CE(SAT)}$ vs I_C



I_C, COLLECTOR CURRENT (mA)

Fig. 7 V_{BE} vs I_C



I_C, COLLECTOR CURRENT (mA)

Fig. 8 $V_{BE(SAT)}$ vs I_C

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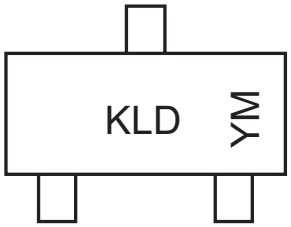
Ordering Information (Note 4)

Device	Packaging	Shipping
BC847BLD-7	SOT-23	3000/Tape & Reel

Notes: 4. For Packaging Details, please see below or go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



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

Fig. 9

Date Code Key

Year	2006	2007	2008	2009	2010	2011	2012
Code	T	U	V	W	X	Y	Z

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

Mechanical Details

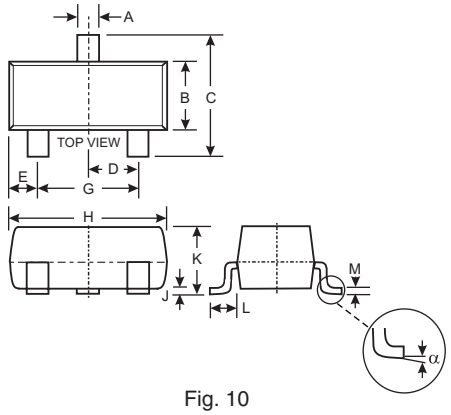


Fig. 10

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		

Suggested Pad Layout: (Based on IPC-SM-782)

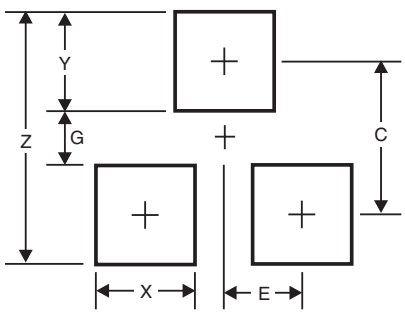


Fig. 11

Figure 11 Dimensions	SOT-23
Z	3.4
G	0.7
X	0.9
Y	1.4
C	2.0
E	0.9
All Dimensions in mm	

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