



BC847CDLP

#### **45V DUAL NPN SMALL SIGNAL TRANSISTOR**

#### **Features**

- BV<sub>CEO</sub> > 45V
- Low profile 0.4mm high package for thin applications
- Ultra-Small Surface Mount Package
- Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

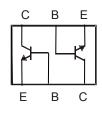
#### **Mechanical Data**

- Case: X2-DFN1310-6
- Nominal package height: 0.4mm
- Case Material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu, Solderable per MIL-STD-202, Method 208 @4
- Weight: 0.0015 grams (approximate)

X2-DFN1310-6



Top View



Device Schematic Top View

## Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
BC847CDLP-7	1M	7	8	3000

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.

2. See http://www.diodes.com/quality/lead\_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.

3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

4. For packaging details, go to our website at http"//www.diodes.com/products/packages.html.

## **Marking Information**



1M = Product Type Marking Code

(Top View)



## **Maximum Ratings** (@T<sub>A</sub> = +25°C unless otherwise specified.)

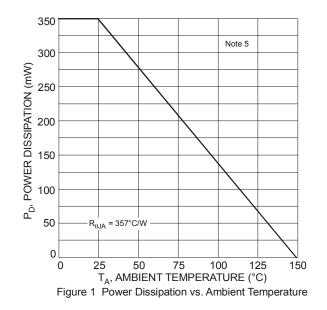
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	45	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	V
Collector Current	Ιc	100	mA

# Thermal Characteristics – Total Device (@T<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5) Total Device	PD	350	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	357	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

Note: 5. For a device surface mounted on minimum recommended pad layout FR-4 PCB with single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.

#### **Thermal Characteristics – Total Device**

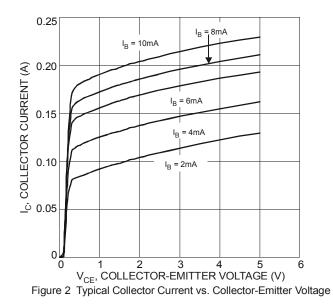


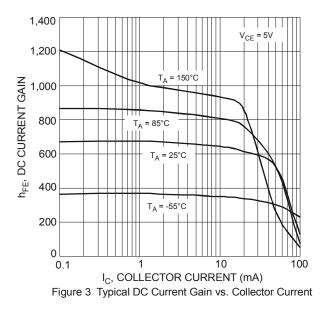


## Electrical Characteristics (@T<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic (Note 6)	Symbol	Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	<b>BV</b> <sub>CBO</sub>	50	_	_	V	I <sub>C</sub> = 100μA, I <sub>B</sub> = 0
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	45	_	_	V	$I_{\rm C} = 10 {\rm mA}, I_{\rm B} = 0$
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	6	_	_	V	I <sub>E</sub> = 100μA, I <sub>C</sub> = 0
DC Current Gain	h <sub>FE</sub>	420	650	800	—	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	_	55 130	250 600	mV	$I_{C}$ = 10mA, $I_{B}$ = 0.5mA $I_{C}$ = 100mA, $I_{B}$ = 5.0mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	_	700 900	_	mV	$I_{C}$ = 10mA, $I_{B}$ = 0.5mA $I_{C}$ = 100mA, $I_{B}$ = 5.0mA
Base-Emitter Voltage	V <sub>BE(on)</sub>	580 —	660 —	700 770	mV	$V_{CE}$ = 5.0V, I <sub>C</sub> = 2.0mA $V_{CE}$ = 5.0V, I <sub>C</sub> = 10mA
Collector-Cutoff Current	I <sub>CES</sub>			15	nA	V <sub>CE</sub> = 50V
Collector-Cutoff Current	I <sub>CBO</sub>	_	_	15 5	nA μA	V <sub>CB</sub> = 30V V <sub>CB</sub> = 30V, T <sub>A</sub> = +150°C
Gain Bandwidth Product	f <sub>T</sub>	100	_	_	MHz	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 10mA, f = 100MHz
Collector-Base Capacitance	C <sub>CBO</sub>	_	2.0	_	pF	V <sub>CB</sub> = 10V, f = 1.0MHz

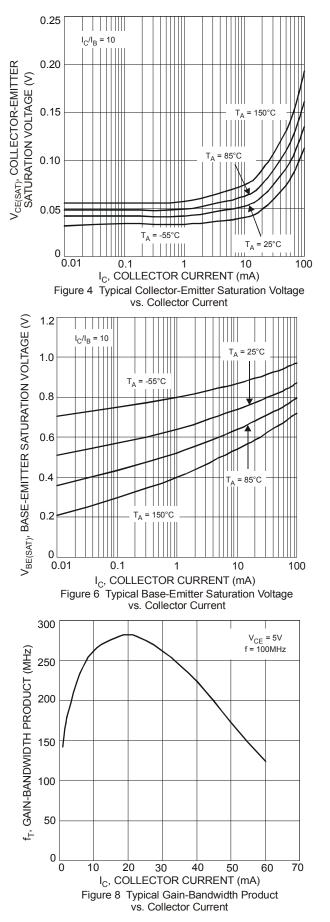
Note: 6. Measured under pulsed conditions. Pulse width  $\leq$  300µs. Duty cycle  $\leq$  2%.

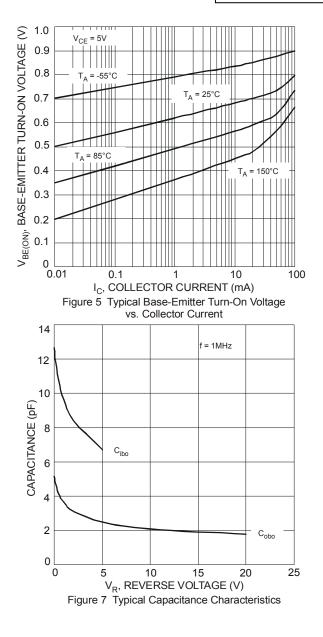








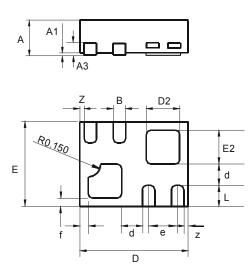






# **Package Outline Dimensions**

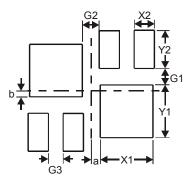
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



X2-DFN1310-6				
Dim	Min	Max	Тур	
Α		0.40		
A1	0	0.05	0.02	
A3		_	0.13	
b	0.10	0.20	0.15	
D	1.25	1.38	1.30	
d		_	0.25	
D2	0.30	0.50	0.40	
ш	0.95	1.075	1.00	
e			0.35	
E2	0.30	0.50	0.40	
f	_		0.10	
L	0.20	0.30	0.25	
Z			0.05	
All Dimensions in mm				

# **Suggested Pad Layout**

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)	
G1	0.16	
G2	0.17	
G3	0.15	
X1	0.52	
X2	0.20	
Y1	0.52	
Y2	0.375	
а	0.09	
b	0.06	



#### IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

#### LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

- A. Life support devices or systems are devices or systems which:
  - 1. are intended to implant into the body, or
  - 2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.
- B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2013, Diodes Incorporated

www.diodes.com