

## Features

- Epitaxial Die Construction
- Two Internally Isolated NPN/PNP Transistors in One Package
- 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
- PPAP Capable (Note 4)

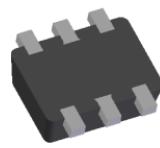
## Mechanical Data

- Case: SOT563
- Case Material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.003 grams (Approximate)

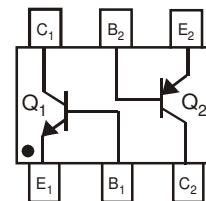
SOT563



Top View



Bottom View



Device Schematic  
Top View

## Ordering Information (Notes 4 & 5)

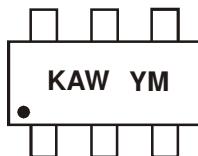
Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
BC847BVN-7	AEC-Q101	KAW	7	8	3,000
BC847BVNQ-7	Automotive	KAW	7	8	3,000

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See [http://www.diodes.com/quality/lead\\_free.html](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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
- For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information

SOT563



KAW = Product Type Marking Code  
YM = Date Code Marking  
Y = Year (ex: Y = 2011)  
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: NPN, BC847B Type (Q<sub>1</sub>)** (@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	I <sub>C</sub>	100	mA
Peak Collector Current	I <sub>CM</sub>	200	mA
Peak Emitter Current	I <sub>EM</sub>	200	mA

**Maximum Ratings: PNP, BC857B Type (Q<sub>2</sub>)** (@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	I <sub>C</sub>	-100	mA
Peak Collector Current	I <sub>CM</sub>	-200	mA
Peak Emitter Current	I <sub>EM</sub>	-200	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6) Total Device	P <sub>D</sub>	150	mW
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	833	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

Note: 6. 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.

**Electrical Characteristics: NPN, BC847B Type (Q<sub>1</sub>)** (@T<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic (Note 7)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <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 <sub>C</sub> = 10mA, I <sub>B</sub> = 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>	200	290	450	—	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	90 200	250 600	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA I <sub>C</sub> = 100mA, I <sub>B</sub> = 5.0mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	700 900	—	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA I <sub>C</sub> = 100mA, I <sub>B</sub> = 5.0mA
Base-Emitter Voltage	V <sub>BE(on)</sub>	580	660	700 720	mV	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 10mA
Collector-Cutoff Current	I <sub>CBO</sub>	—	—	15 5.0	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	300	—	MHz	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 10mA, f = 100MHz
Collector-Base Capacitance	C <sub>CBO</sub>	—	3.5	6.0	pF	V <sub>CB</sub> = 10V, f = 1.0MHz

Note: 7. Short duration pulse test used to minimize self-heating effect.

**Electrical Characteristics: PNP, BC857B Type (Q<sub>2</sub>) (@T<sub>A</sub> = +25°C unless otherwise specified.)**

Characteristic (Note 8)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <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 <sub>C</sub> = -10mA, I <sub>B</sub> = 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>	220	290	475	—	V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	-75 -250	-300 -650	mV	I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA I <sub>C</sub> = -100mA, I <sub>B</sub> = -5.0mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	-700 -850	— -950	mV	I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.5mA I <sub>C</sub> = -100mA, I <sub>B</sub> = -5.0mA
Base-Emitter Voltage	V <sub>BE(on)</sub>	-600 —	-650 —	-750 -820	mV	V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -2.0mA V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -10mA
Collector-Cutoff Current	I <sub>CBO</sub>	—	—	-15 -4.0	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	200	—	MHz	V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -10mA, f = 100MHz
Collector-Base Capacitance	C <sub>CBO</sub>	—	3	4.5	pF	V <sub>CB</sub> = -10V, f = 1.0MHz

Note: 8. Short duration pulse test used to minimize self-heating effect.

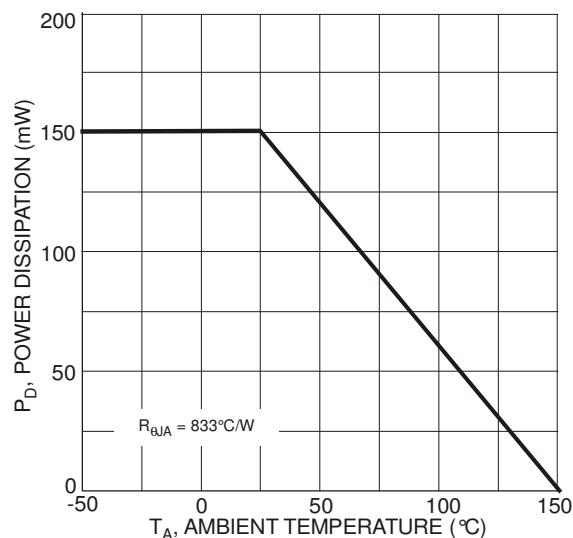
**Thermal Characteristics – Total Device**


Figure 1. Power Dissipation vs. Ambient Temperature Total Device

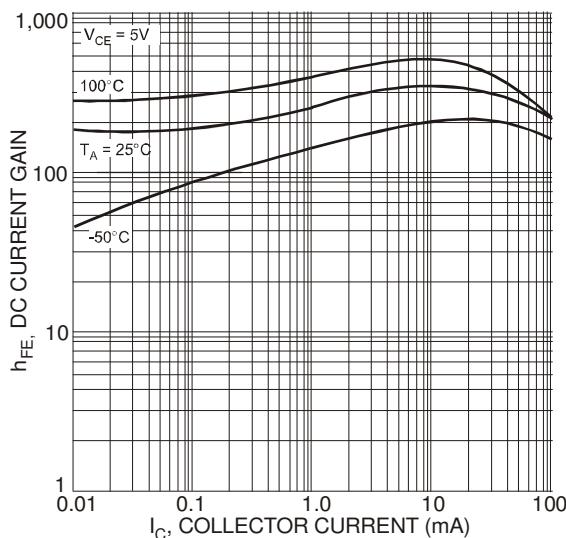


Figure 2. Typical DC Current Gain vs. Collector Current (BC847B Type)

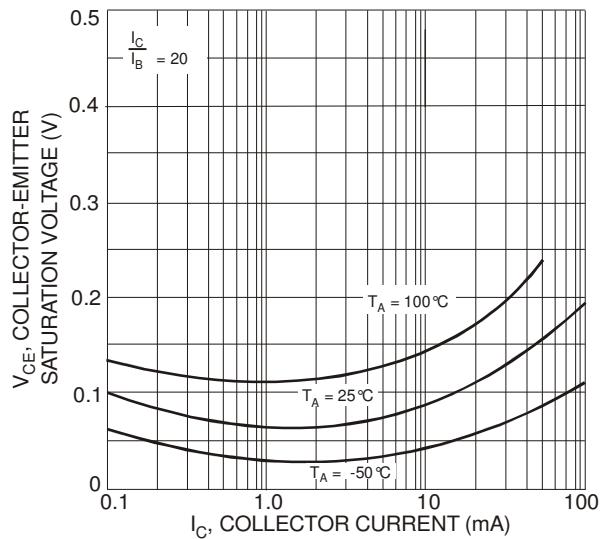


Figure 3. Typical Collector-Emitter Saturation Voltage vs. Collector Current (BC847B Type)

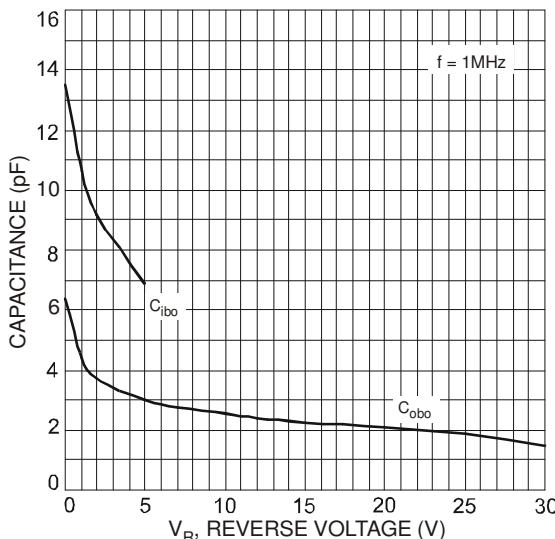


Figure 4. Typical Capacitance Characteristics (BC847B Type)

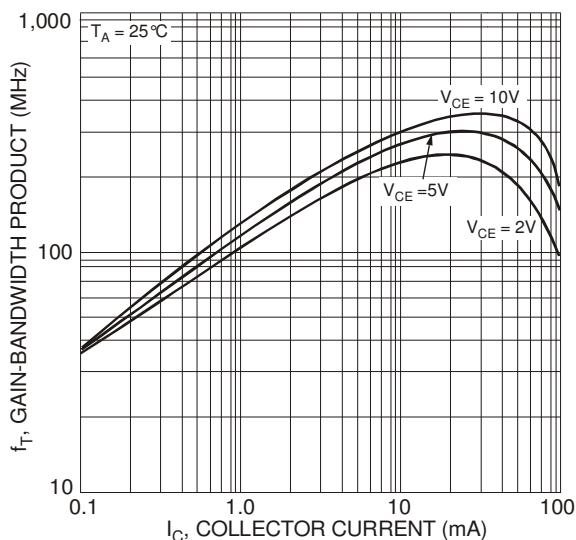


Figure 5. Typical Gain-Bandwidth Product vs. Collector Current (BC847B Type)

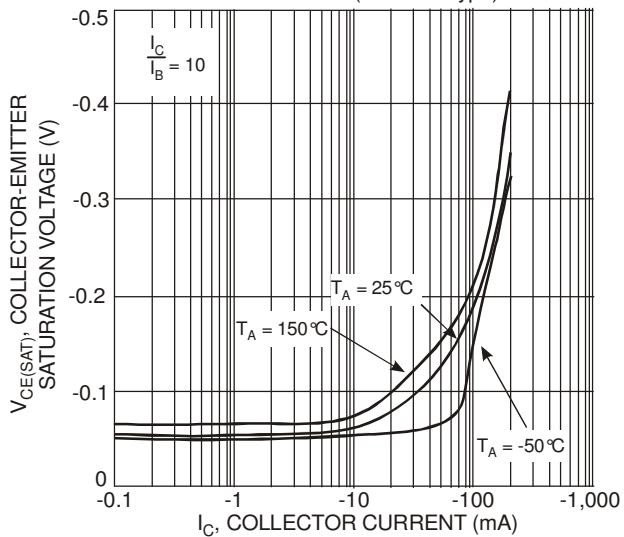


Figure 7. Typical Collector-Emitter Saturation Voltage vs. Collector Current (BC857B Type)

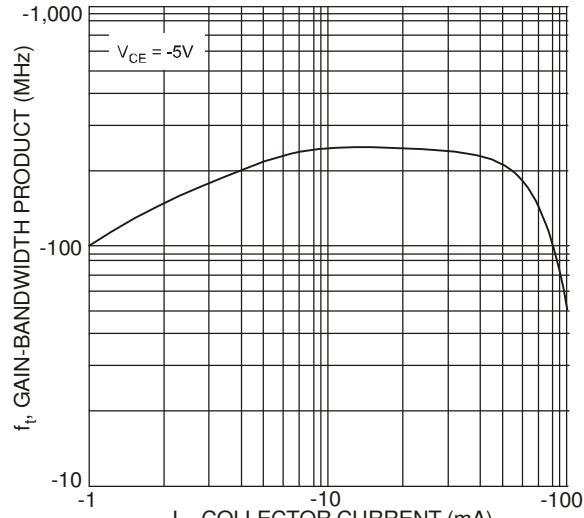


Figure 9. Typical Gain-Bandwidth Product vs. Collector Current (BC857B Type)

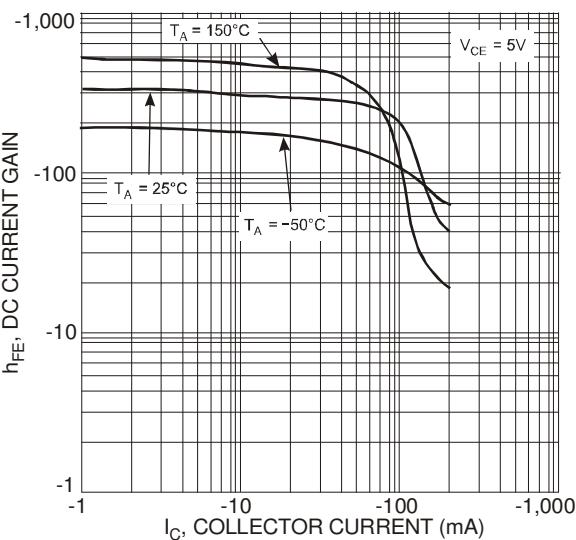


Figure 6. Typical DC Current Gain vs. Collector Current (BC857B Type)

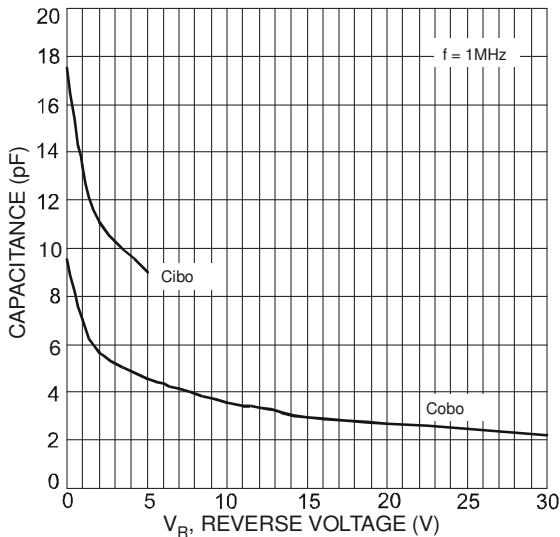
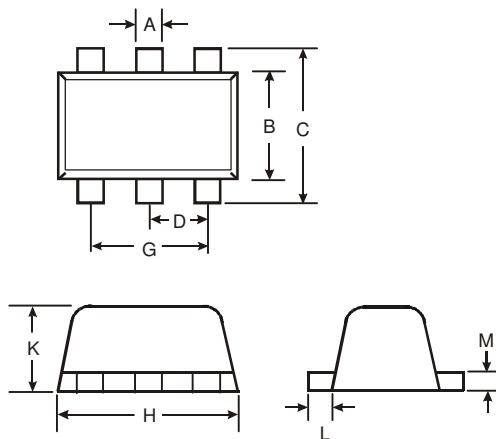


Figure 8. Typical Capacitance Characteristics (BC857B Type)

## Package Outline Dimensions

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

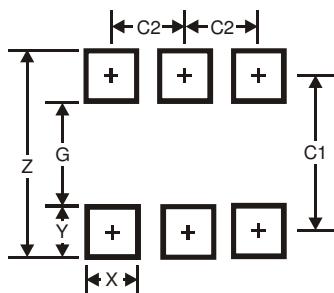


SOT563			
Dim	Min	Max	Typ
<b>A</b>	0.15	0.30	0.20
<b>B</b>	1.10	1.25	1.20
<b>C</b>	1.55	1.70	1.60
<b>D</b>	-	-	0.50
<b>G</b>	0.90	1.10	1.00
<b>H</b>	1.50	1.70	1.60
<b>K</b>	0.55	0.60	0.60
<b>L</b>	0.10	0.30	0.20
<b>M</b>	0.10	0.18	0.11

**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)
<b>Z</b>	2.2
<b>G</b>	1.2
<b>X</b>	0.375
<b>Y</b>	0.5
<b>C1</b>	1.7
<b>C2</b>	0.5

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