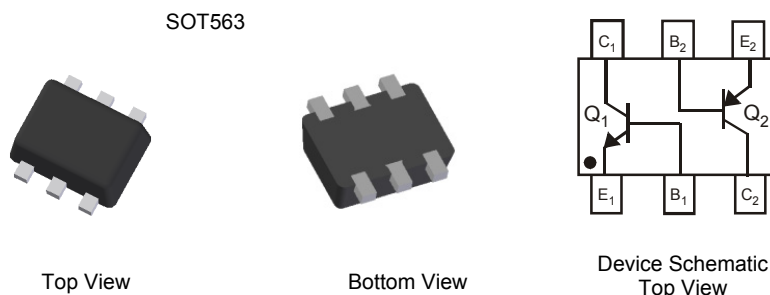


**COMPLEMENTARY PAIR SMALL SIGNAL SURFACE MOUNT TRANSISTOR**
**Features**

- 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)**

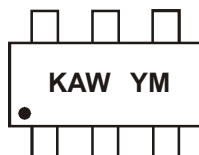
**Mechanical Data**

- 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 Finish. Solderable per MIL-STD-202, Method 208 **e3**
- Weight: 0.003 grams (approximate)


**Ordering Information** (Note 4 & 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
BC847BVN-7	AEC-Q101	KAW	7	8	3000
BC847BVNQ-7	Automotive	KAW	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](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. 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/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


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.

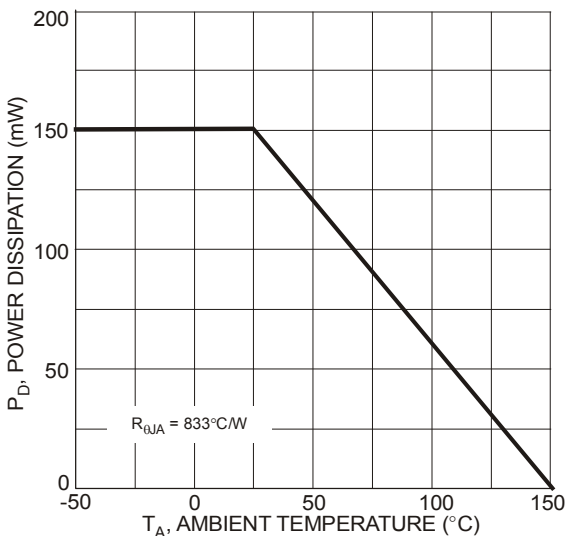
**Thermal Characteristics – Total Device**


Figure 1. Power Dissipation vs. Ambient Temperature  
Total Device

**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>CB0</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	250	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	—	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	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>CB0</sub>	—	—	15	nA	V <sub>CB</sub> = 30V
		—	—	5.0	μA	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>CB0</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.

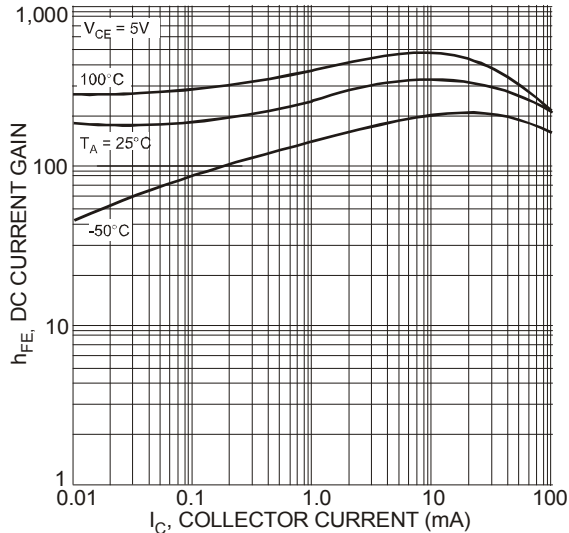


Figure 2. Typical DC Current Gain vs. Collector Current (BC847B Type)

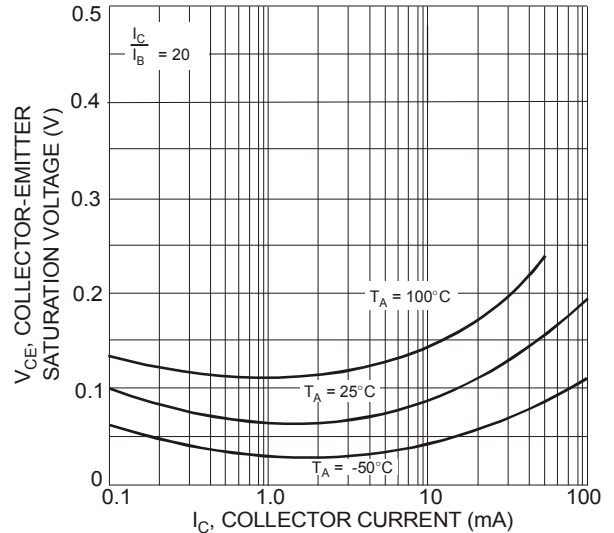


Figure 3. Typical Collector-Emitter Saturation Voltage vs. Collector Current (BC847B Type)

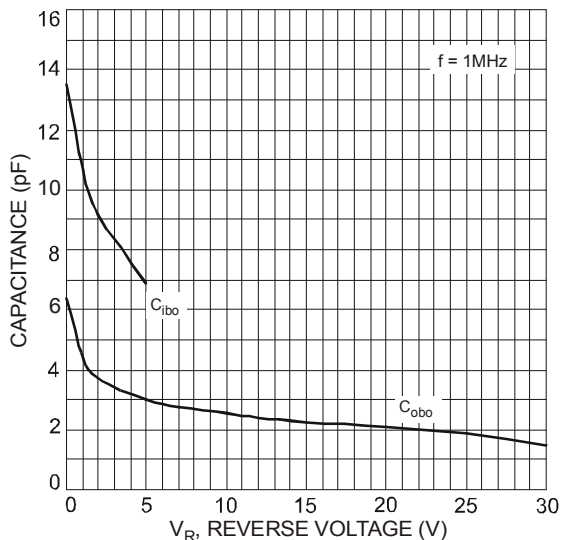


Figure 4. Typical Capacitance Characteristics (BC847B Type)

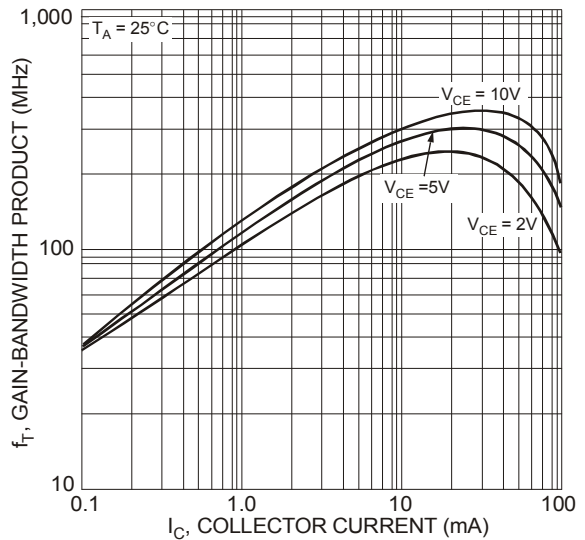


Figure 5. Typical Gain-Bandwidth Product vs. Collector Current (BC847B Type)

**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>CB0</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>CB0</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.

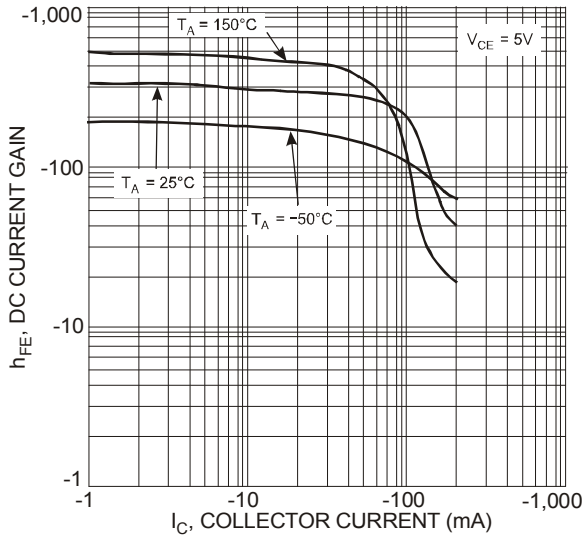


Figure 6. Typical DC Current Gain vs. Collector Current (BC857B Type)

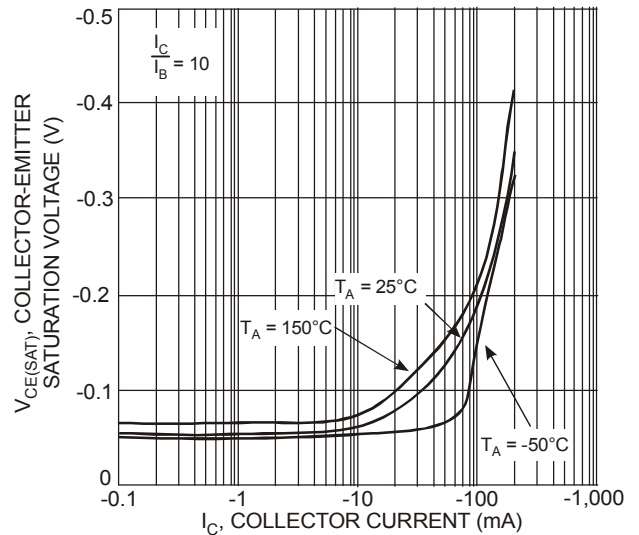


Figure 7. Typical Collector-Emitter Saturation Voltage vs. Collector Current (BC857B Type)

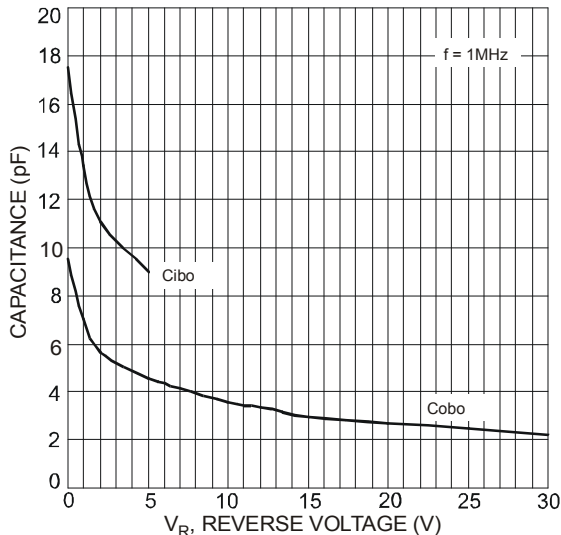


Figure 8. Typical Capacitance Characteristics (BC857B Type)

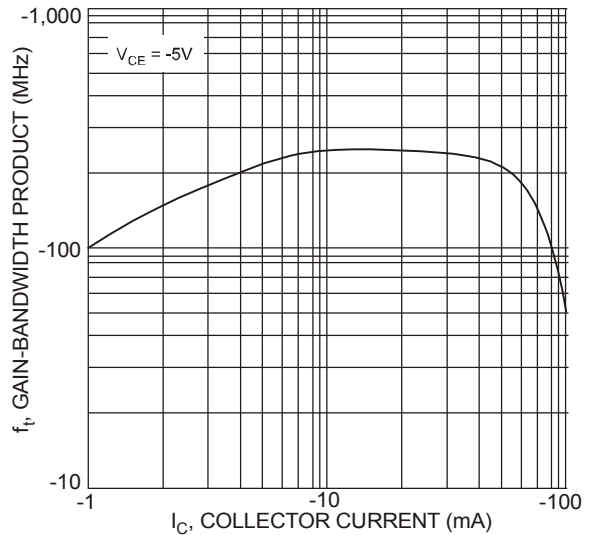
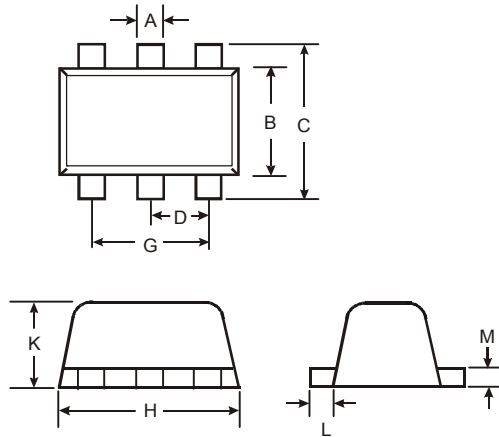


Figure 9. Typical Gain-Bandwidth Product vs. Collector Current (BC857B Type)

## Package Outline Dimensions

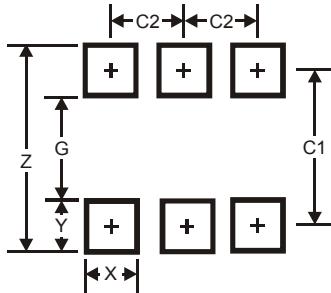
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	-	-	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.55	0.60	0.60
L	0.10	0.30	0.20
M	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)
Z	2.2
G	1.2
X	0.375
Y	0.5
C1	1.7
C2	0.5

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