COMPLEMENTARY PAIR SMALL SIGNAL TRANSISTOR IN SOT563

Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of automotive applications.

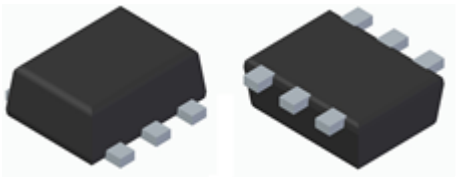
Features

- 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)**
- **The BC847BVNQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

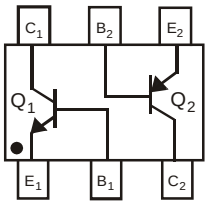
Mechanical Data

- Package: SOT563
- Package 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 Lead-Frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.003 grams (Approximate)

SOT563



Top View Bottom View



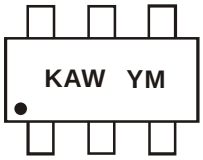
Device Schematic
Top View

Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
BC847BVNQ-7	SOT563	KAW	7	8	3,000	Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



KAW = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: L = 2024)
M = Month (ex: 9 = September)

Date Code Key

Year	2021	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	I	-	L	M	N	P	R	S	T	U	V	W

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_1) (@ 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
Collector Current	I_C	100	mA
Peak Pulse Collector Current (Single Pulse)	I_{CM}	200	mA
Peak Pulse Emitter Current (Single Pulse)	I_{EM}	200	mA

Maximum Ratings: PNP, BC857B Type (Q_2) (@ T_A = +25°C, unless otherwise specified.)

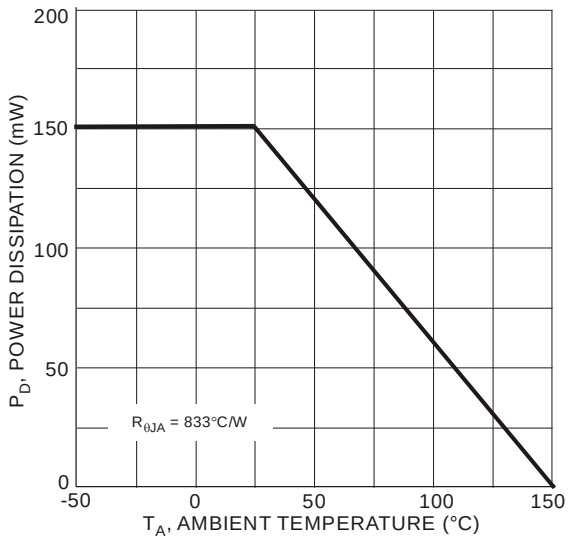
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-50	V
Collector-Emitter Voltage	V_{CEO}	-45	V
Emitter-Base Voltage	V_{EBO}	-6	V
Collector Current	I_C	-100	mA
Peak Pulse Collector Current (Single Pulse)	I_{CM}	-200	mA
Peak Pulse Emitter Current (Single Pulse)	I_{EM}	-200	mA

Thermal Characteristics – Total Device (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5) Total Device	P_D	150	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	833	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 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

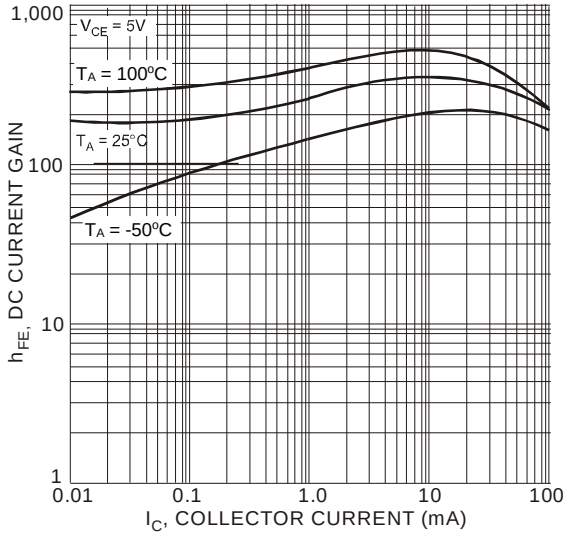


P_D v T_A

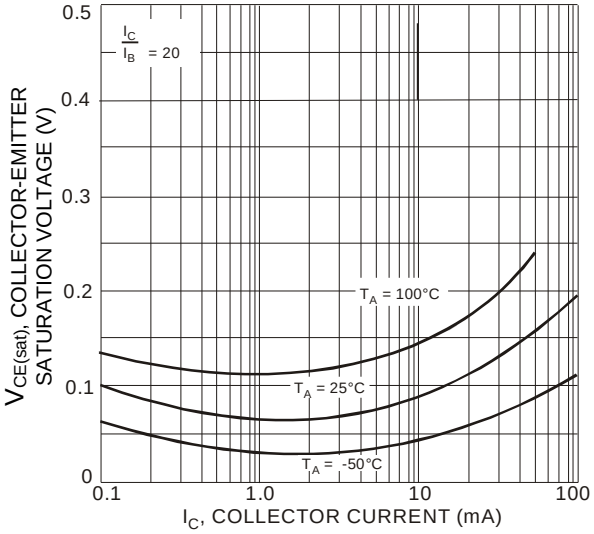
Electrical Characteristics: NPN, BC847B Type (Q_1) (@ T_A = +25°C, unless otherwise specified.)

Characteristic (Note 6)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	50	—	—	V	I_C = 100µA, I_B = 0
Collector-Emitter Breakdown Voltage	BV_{CEO}	45	—	—	V	I_C = 10mA, I_B = 0
Emitter-Base Breakdown Voltage	BV_{EBO}	6	—	—	V	I_E = 100µA, I_C = 0
DC Current Gain	h_{FE}	200	290	450	—	V_{CE} = 5.0V, I_C = 2.0mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	— —	90 200	250 600	mV	I_C = 10mA, I_B = 0.5mA I_C = 100mA, I_B = 5.0mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	700 900	—	mV	I_C = 10mA, I_B = 0.5mA I_C = 100mA, I_B = 5.0mA
Base-Emitter Voltage	$V_{BE(on)}$	580 —	660 —	700 770	mV	V_{CE} = 5.0V, I_C = 2.0mA V_{CE} = 5.0V, I_C = 10mA
Collector Cut Off Current	I_{CBO}	— —	— —	15 5.0	nA µA	V_{CB} = 30V V_{CB} = 30V, T_A = +150°C
Transition Frequency	f_T	100	300	—	MHz	V_{CE} = 5.0V, I_C = 10mA, f = 100MHz
Collector-Base Capacitance	C_{cbo}	—	3.5	6.0	pF	V_{CB} = 10V, f = 1.0MHz

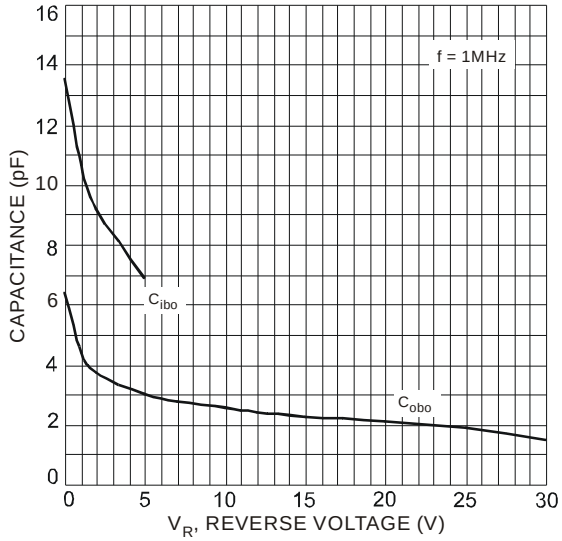
Note: 6. Short duration pulse test used to minimize self-heating effect.



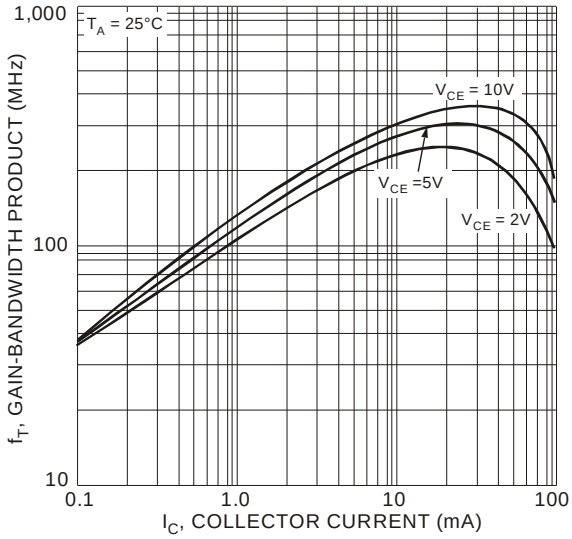
h_{FE} v I_C



$V_{CE(sat)}$ v I_C



C v V_R

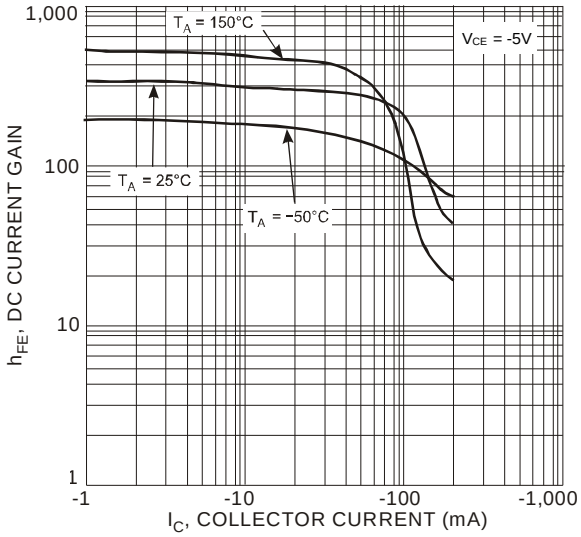


f_T v I_C

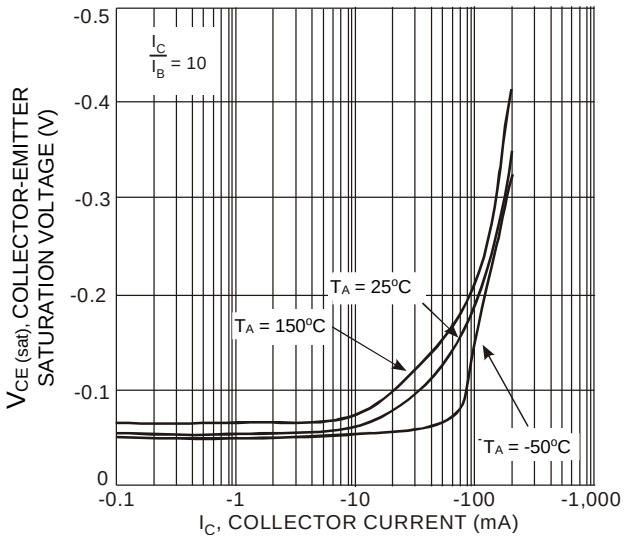
Electrical Characteristics: PNP, BC857B Type (Q_2) (@ T_A = +25°C, unless otherwise specified.)

Characteristic (Note 7)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	—	—	V	I_C = -100µA, I_B = 0
Collector-Emitter Breakdown Voltage	BV_{CEO}	-45	—	—	V	I_C = -10mA, I_B = 0
Emitter-Base Breakdown Voltage	BV_{EBO}	-6	—	—	V	I_E = -100µA, I_C = 0
DC Current Gain	h_{FE}	220	290	475	—	V_{CE} = -5.0V, I_C = -2.0mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	— —	-75 -250	-300 -650	mV	I_C = -10mA, I_B = -0.5mA I_C = -100mA, I_B = -5.0mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	-700 -850	— -950	mV	I_C = -10mA, I_B = -0.5mA I_C = -100mA, I_B = -5.0mA
Base-Emitter Voltage	$V_{BE(on)}$	-600 —	-650 —	-750 -820	mV	V_{CE} = -5.0V, I_C = -2.0mA V_{CE} = -5.0V, I_C = -10mA
Collector Cut Off Current	I_{CBO}	— —	— —	-15 -4.0	nA µA	V_{CB} = -30V V_{CB} = -30V, T_A = +150°C
Transition Frequency	f_T	100	200	—	MHz	V_{CE} = -5.0V, I_C = -10mA, f = 100MHz
Collector-Base Capacitance	C_{cbo}	—	3	4.5	pF	V_{CB} = -10V, f = 1.0MHz

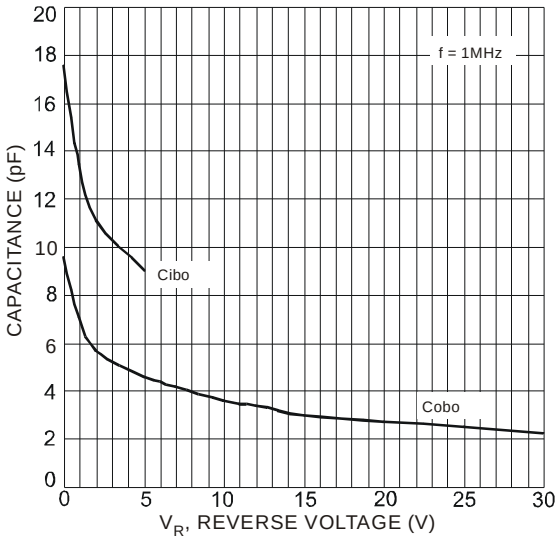
Note: 7. Short duration pulse test used to minimize self-heating effect.



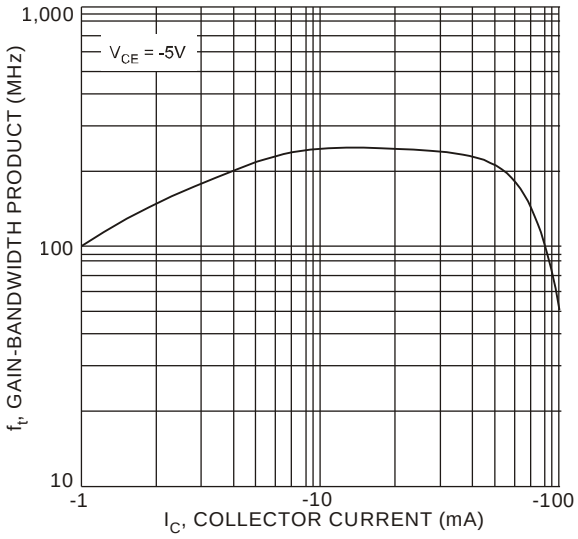
h_{FE} v I_C



$V_{CE(sat)}$ v I_C



C v V_R

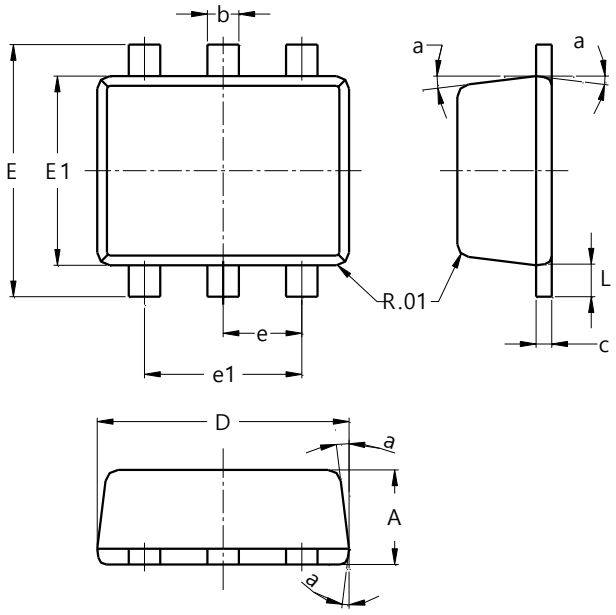


f_T v I_C

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT563

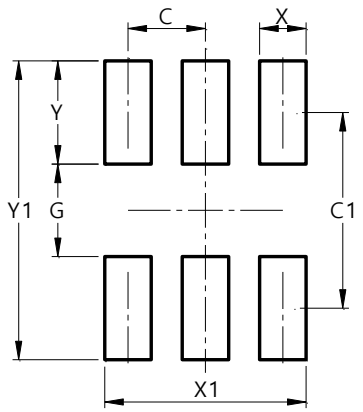


SOT563			
Dim	**Min**	**Max**	**Typ**
A	0.55	0.60	--
b	0.15	0.30	0.20
c	0.10	0.18	0.11
D	1.50	1.70	1.60
E	1.55	1.70	1.60
E1	1.10	1.25	1.20
e	--	--	0.50
e1	0.90	1.10	1.00
L	0.10	0.30	0.20
a	8°	9°	7°
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT563



Dimensions	Value (in mm)
C	0.500
C1	1.270
G	0.600
X	0.300
X1	1.300
Y	0.670
Y1	1.940

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