

## Features

- $BV_{CEO} > 45V$
- $I_C = 100mA$  Collector Current
- Epitaxial Planar Die Construction
- Ultra-Small Surface Mount Package
- Complementary PNP Type: MMBT3906T
- **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**

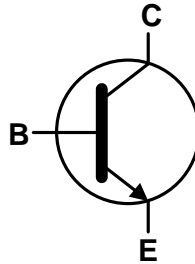
## Mechanical Data

- Case: SOT523
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208③
- Weight: 0.002 grams (Approximate)

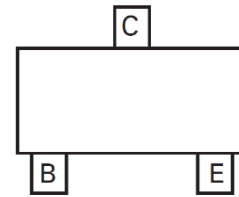
SOT523



Top View



Device Symbol



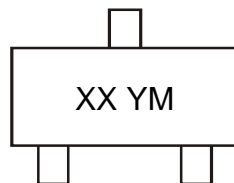
Pin-Out Top View

## Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
BC847AT-7-F	AEC-Q101	1E	7	8	3,000
BC847BT-7-F	AEC-Q101	1F	7	8	3,000
BC847CT-7-F	AEC-Q101	1M	7	8	3,000

- 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



XX = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: D = 2016)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	C	D	E	F	G	H	I	J	K	L	M

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

### Absolute 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>	6.0	V
Collector Current	I <sub>C</sub>	100	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	150	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	833	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 6)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

- Notes:
- For a device mounted with the collector lead on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

### Thermal Characteristics and Derating Information

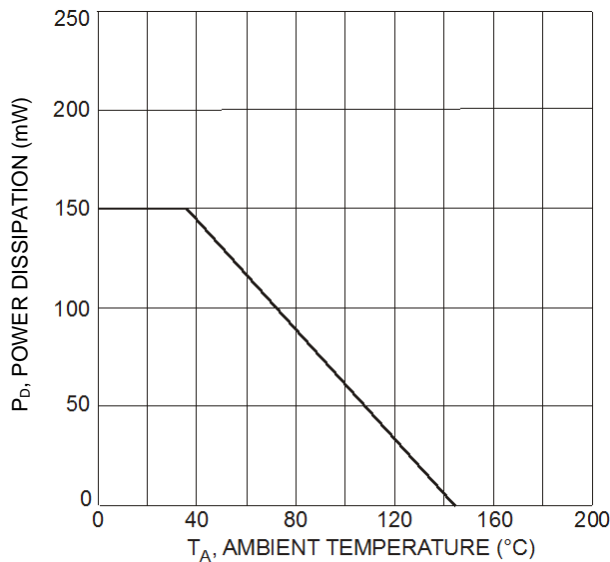


Fig. 1, Power Derating Curve

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>							
Collector-Base Breakdown Voltage		BV <sub>CBO</sub>	50	—	—	V	I <sub>C</sub> = 10μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage		BV <sub>CEO</sub>	45	—	—	V	I <sub>C</sub> = 1mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage		BV <sub>EBO</sub>	6.0	—	—	V	I <sub>E</sub> = 10μA, I <sub>C</sub> = 0
<b>ON CHARACTERISTICS (Note 7)</b>							
DC Current Gain	Current Gain A	h <sub>FE</sub>	110	—	220	—	V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 2.0mA
	B		200	290	450		
	C		420	520	800		
Collector-Emitter Saturation Voltage		V <sub>CE(SAT)</sub>	—	—	250 600	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA
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> = 5mA
Base-Emitter Voltage		V <sub>BE</sub>	580 —	660 —	700 770	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-Emitter 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
<b>SMALL SIGNAL CHARACTERISTICS</b>							
Output Capacitance		C <sub>OBO</sub>	—	—	4.5	pF	V <sub>CB</sub> = 10V, f = 1.0MHz
Current Gain-Bandwidth Product		f <sub>T</sub>	100	—	—	MHz	V <sub>CE</sub> = 5V, I <sub>C</sub> = 10mA, f = 100MHz
Noise Figure	BC847BT	NF	—	—	1.0	dB	V <sub>CE</sub> = 5V, R <sub>S</sub> = 2kΩ, f = 1MHz, BW = 200Hz
	BC847CT				4.0		

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

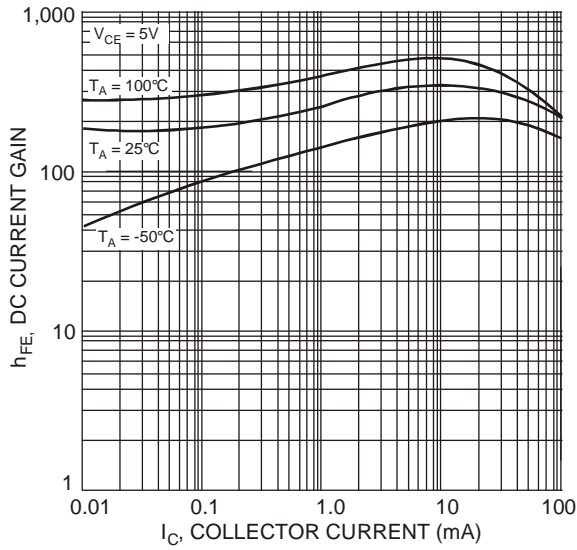


Fig. 2, DC Current Gain vs Collector Current

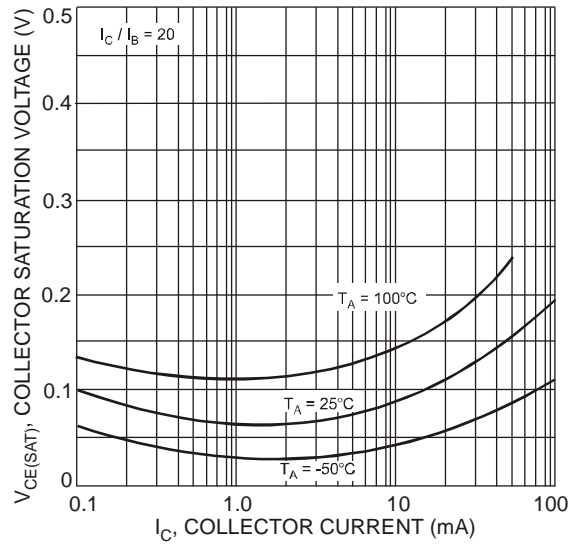


Fig. 3, Collector Saturation Voltage vs Collector Current

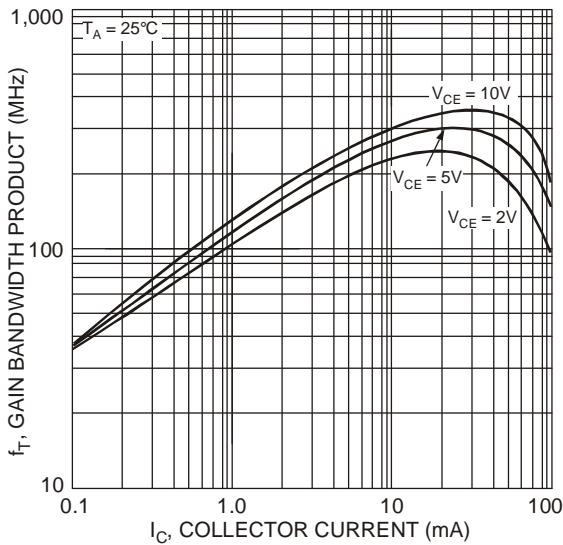
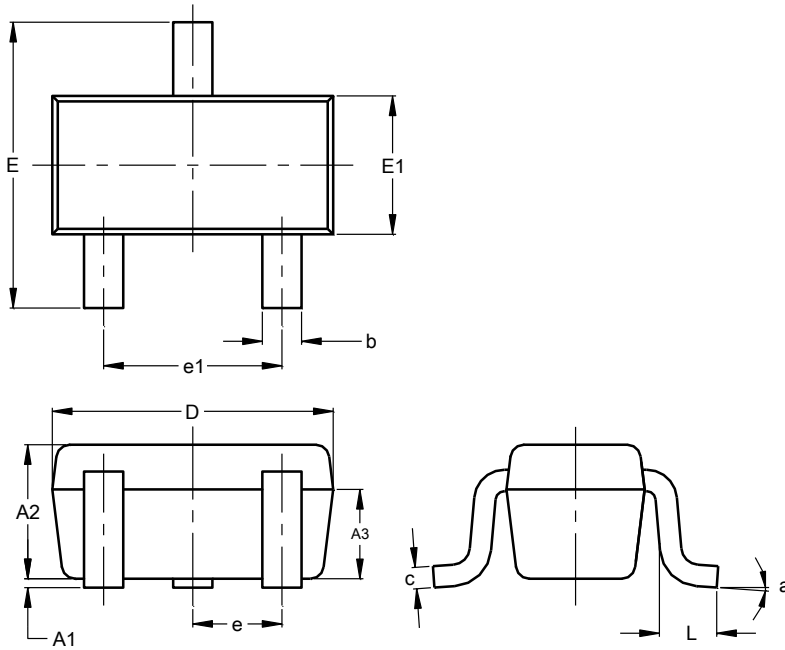


Fig. 4, Gain Bandwidth Product vs Collector Current

**Package Outline Dimensions**

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

**SOT523**

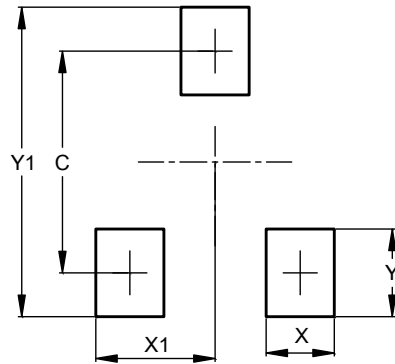


SOT523			
Dim	Min	Max	Typ
A	0.60	0.80	0.75
A1	0.00	0.10	0.05
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT523**



Dimensions	Value
C	1.29
X	0.40
X1	0.70
Y	0.51
Y1	1.80

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