THE DATASHEET OF

BC857AT-7-F

45V PNP SMALL SIGNAL TRANSISTOR IN SOT523

Features

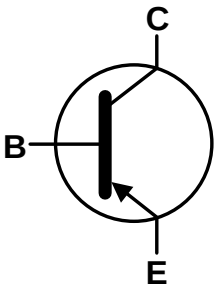
- BV_{CEO} > -45V
- I_C = -100mA Collector Current
- Epitaxial Planar Die Construction
- Ultra-Small Surface Mount Package
- Complementary NPN Type: BC847AT, BT, CT
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

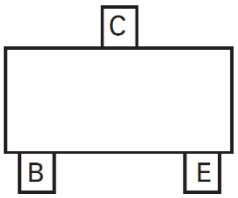
- Case: SOT523
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.002 grams (Approximate)

SOT523

Top View



Device Symbol



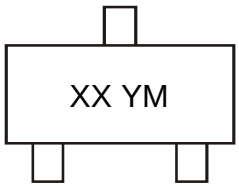
Pin-Out Top View

Ordering Information (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
BC857AT-7-F	AEC-Q101	3V	7	8	3,000
BC857BT-7-F	AEC-Q101	3W	7	8	3,000
BC857CT-7-F	AEC-Q101	3G	7	8	3,000

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



XX = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: F = 2018)
M or $\overline{M}$ = Month (ex: 9 = September)

Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Code	F	G	H	I	J	K	L	M	N	O	P

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_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

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	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

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: 5. 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.
6. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

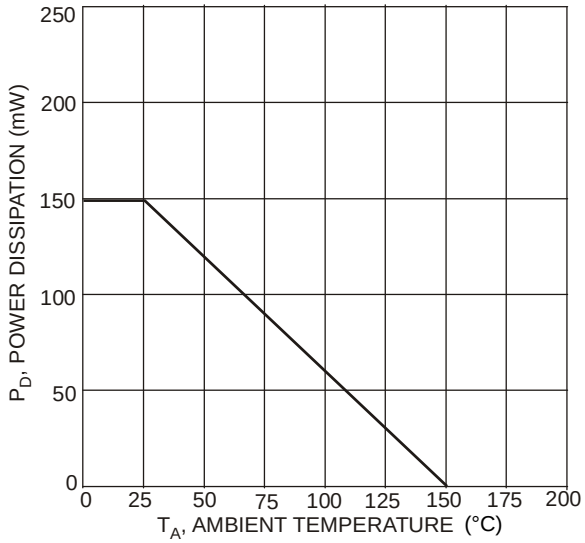


Fig. 1, Max Power Dissipation vs. Ambient Temperature

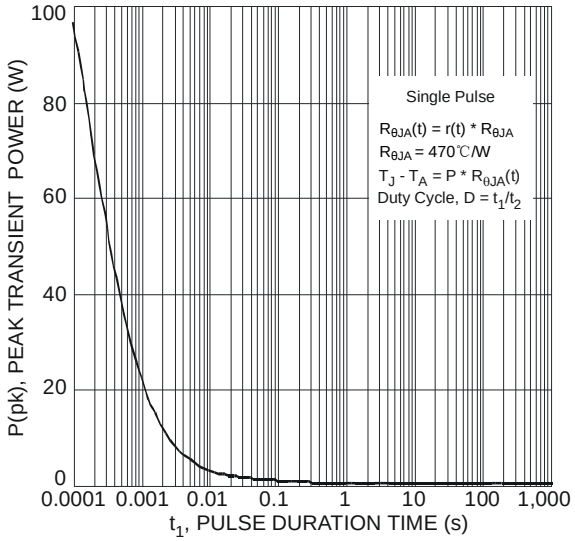


Fig. 2 Single Pulse Maximum Power Dissipation

Thermal Characteristics and Derating Information (Cont.)

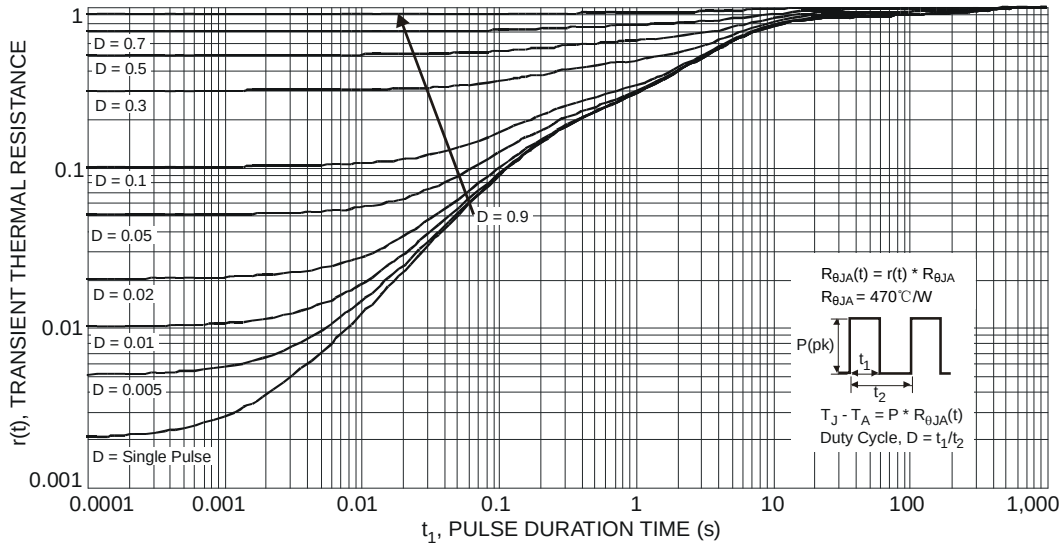


Fig. 3 Transient Thermal Response

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)							
Collector-Base Breakdown Voltage		BV_{CBO}	-50	—	—	V	I_C = -100μA, I_E = 0
Collector-Emitter Breakdown Voltage		BV_{CEO}	-45	—	—	V	I_C = -1mA, I_B = 0
Emitter-Base Breakdown Voltage		BV_{EBO}	-6	—	—	V	I_E = -100μA, I_C = 0
ON CHARACTERISTICS (Note 7)							
DC Current Gain	Current Gain A B C	h_{FE}	125 220 420	— 290 520	250 475 800	— — —	V_{CE} = -5V, I_C = -2mA
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	—	— —	-300 -650	mV	I_C = -10mA, I_B = -0.5mA I_C = -100mA, I_B = -5mA
Base-Emitter Saturation Voltage		$V_{BE(SAT)}$	—	-700 -900	— —	mV	I_C = -10mA, I_B = -0.5mA I_C = -100mA, I_B = -5mA
Base-Emitter Voltage		$V_{BE(ON)}$	-600 —	— —	-750 -820	mV	V_{CE} = -5V, I_C = -2mA V_{CE} = -5V, I_C = -10mA
Collector-Emitter Cutoff Current		I_{CBO}	— —	— —	-15 -4	nA μA	V_{CB} = -30V V_{CB} = -30V, T_A = +150°C
SMALL SIGNAL CHARACTERISTICS							
Output Capacitance		C_{OBO}	—	—	4.5	pF	V_{CB} = -10V, f = 1MHz
Current Gain-Bandwidth Product		f_T	100	—	—	MHz	V_{CE} = -5V, I_C = -10mA, f = 100MHz
Noise Figure		NF	—	—	10	dB	I_C = -0.2mA, V_{CE} = -5V, R_S = 2kΩ, f = 1MHz, BW = 200Hz

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

Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

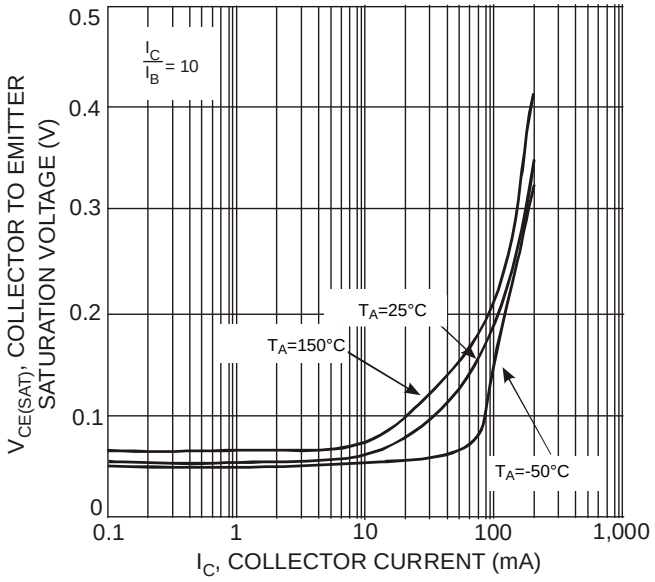


Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current

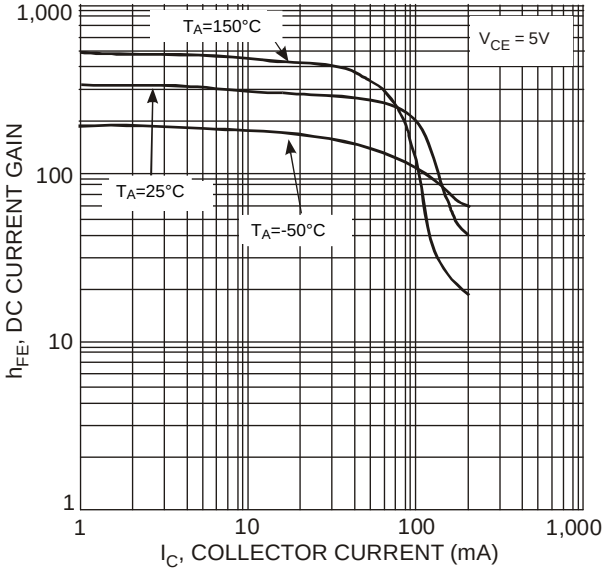


Fig. 3, DC Current Gain vs. Collector Current

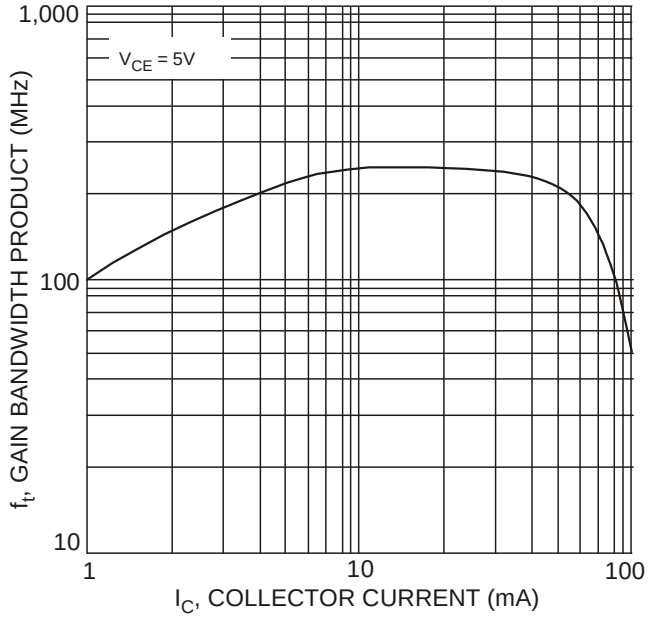
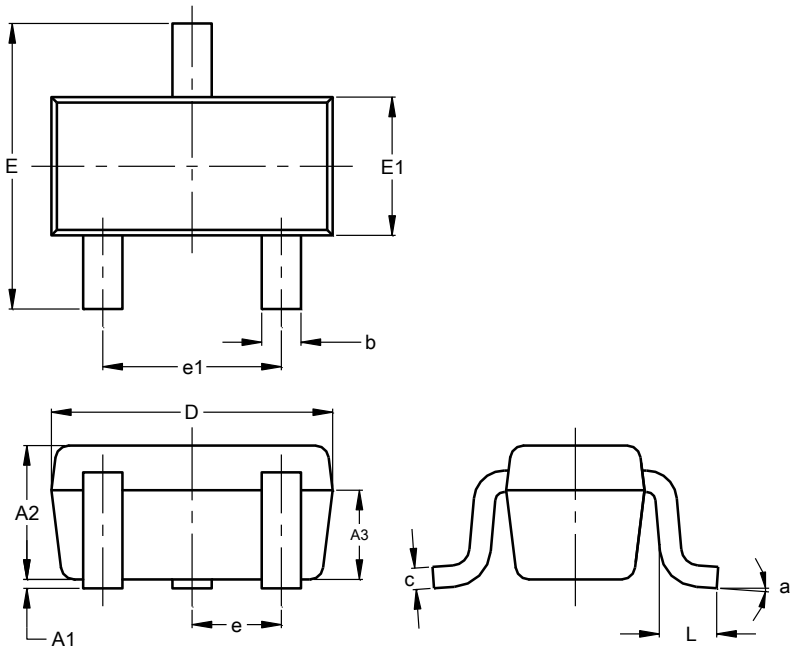


Fig. 4, Gain Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT523

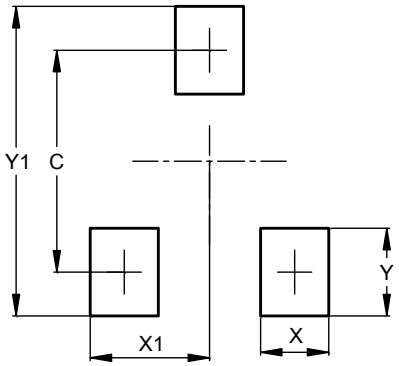


SOT523			
Dim	**Min**	**Max**	**Typ**
A	0.60	0.80	0.75
A1	0.00	0.10	0.05
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
All Dimensions in mm			

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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