BC856A – BC858C

PNP SMALL-SIGNAL TRANSISTOR IN SOT23

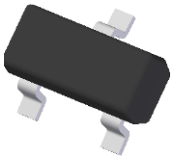
Features

- Ideally Suited for Automatic Insertion
- Complementary NPN Types: BC846 – BC848
- For Switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**
- **An automotive-compliant part is available under separate datasheet (BC856AQ – BC857BQ)**

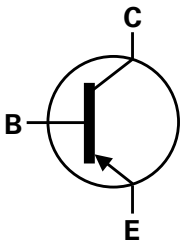
Mechanical Data

- Package: SOT23
- 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 Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (Approximate)

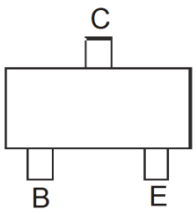
SOT23



Top View



Device Symbol



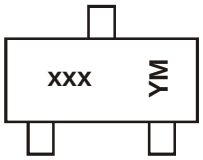
Top View
Pinout

Ordering Information (Note 4)

Part Number	Status	Package	Marking	Reel Size (Inches)	Packing	
					Qty.	Carrier
BC856A-7-F	Active	SOT23	K3A	7	3,000	Reel
BC856B-7-F	Active	SOT23	K3B	7	3,000	Reel
BC856B-13-F	Active	SOT23	K3B	13	10,000	Reel
BC857A-7-F	Active	SOT23	K3A	7	3,000	Reel
BC857B-7-F	Active	SOT23	K3B	7	3,000	Reel
BC857B-13-F	Active	SOT23	K3B	13	10,000	Reel
BC857C-7-F	Active	SOT23	K3G	7	3,000	Reel
BC857C-13-F	Active	SOT23	K3G	13	10,000	Reel
BC858A-7-F	EOL (Use BC857A-7-F)	SOT23	K3A	7	3,000	Reel
BC858B-7-F	Active	SOT23	K3B	7	3,000	Reel
BC858C-7-F	Active	SOT23	K3G	7	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



xxx = Product Type Marking Code
(Please see Ordering Information)
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: L = 2024)
M or $\overline{M}$ = Month (ex: 9 = September)

Date Code Key

Year	2007	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	U	-	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

Absolute Maximum Ratings (@ T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Collector-Base Voltage	BC856A/B	V_{CBO}	-80	V
	BC857A/B/C		-50	
	BC858A/B/C		-30	
Collector-Emitter Voltage	BC856A/B	V_{CEO}	-65	V
	BC857A/B/C		-45	
	BC858A/B/C		-30	
Emitter-Base Voltage		V_{EBO}	-5.0	V
Continuous Collector Current		I_C	-100	mA
Peak Collector Current (Single Pulse)		I_{CM}	-200	mA
Peak Emitter Current		I_{EM}	-200	mA
Peak Base Current (Single Pulse)		I_{BM}	-200	mA

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	310	mW
	(Note 6)		350	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	403	°C/W
	(Note 6)		357	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	350	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

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 on minimum recommended pad layout 1oz copper that is on a single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as Note 5, except the device is mounted on 15mm × 15mm 1oz copper.
7. Thermal resistance from junction to solder-point (at the end of the leads).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

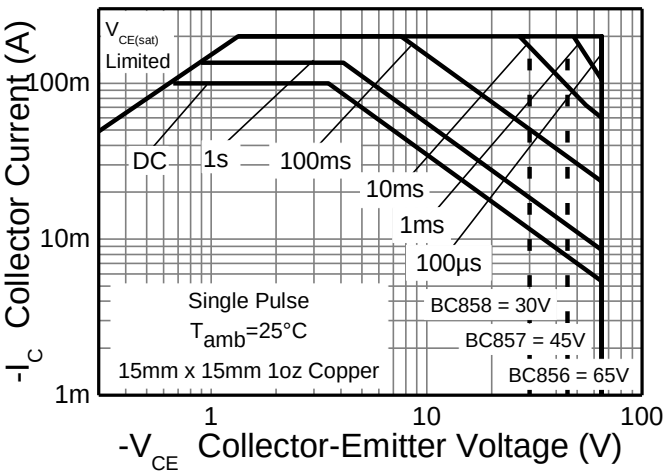


Figure 1. Safe Operating Area

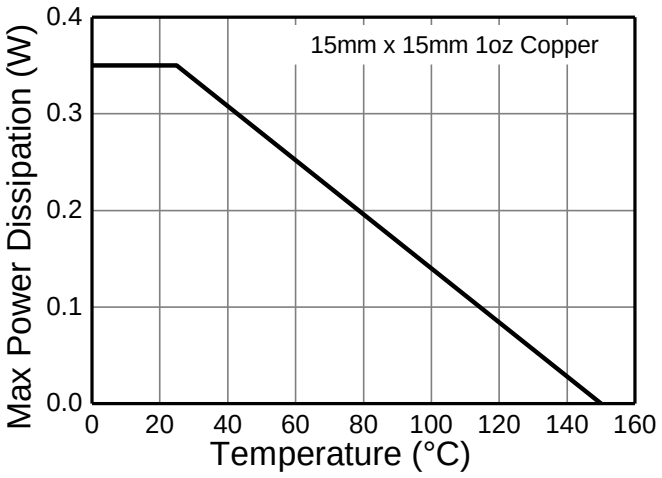


Figure 2. Derating Curve

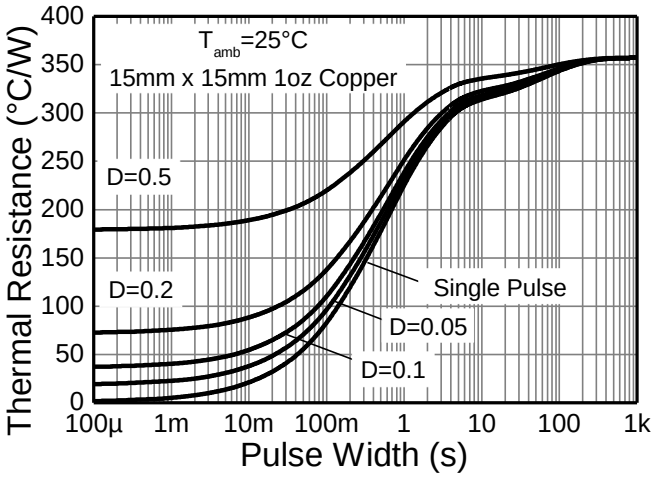


Figure 3. Transient Thermal Impedance

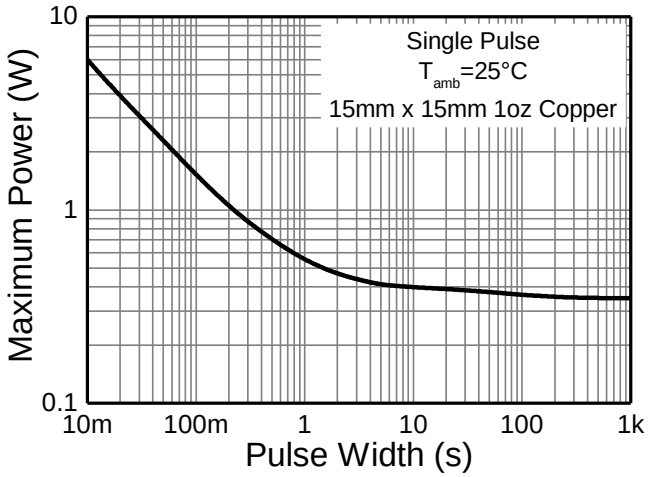


Figure 4. Pulse Power Dissipation

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BC856A/B	BV_{CBO}	-80	—	—	V	I_C = -10µA
	BC857A/B/C		-50				
	BC858A/B/C		-30				
Collector-Emitter Breakdown Voltage (Note 9)	BC856A/B	BV_{CEO}	-65	—	—	V	I_C = -10mA
	BC857A/B/C		-45				
	BC858A/B/C		-30				
Emitter-Base Breakdown Voltage		BV_{EBO}	-5	—	—	V	I_E = -1µA
Collector Cutoff Current		I_{CBO}	—	—	-15	nA	V_{CB} = -30V
					-4	µA	V_{CB} = -30V, T_J = +150°C
Collector Emitter Cutoff Current	BC856A/B	I_{CES}	—	—	-15	nA	V_{CE} = -80V
	BC857A/B/C				-15		V_{CE} = -50V
	BC858A/B/C				-15		V_{CE} = -30V
Emitter-Base Cutoff Current		I_{EBO}	—	—	-100	nA	V_{EB} = -5V
Small Signal Current Gain	BC856A/BC857A/BC858A	h_{fe}	—	200	—	—	I_C = -2.0mA, V_{CE} = -5V f = 1.0kHz
	BC856B/BC857B/BC858B			330			
	BC857C/BC858C			600			
Input Impedance	BC856A/BC857A/BC858A	h_{ie}	—	2.7	—	kΩ	
	BC856B/BC857B/BC858B			4.5			
	BC857C/BC858C			8.7			
Output Admittance	BC856A/BC857A/BC858A	h_{oe}	—	18	—	µS	
	BC856B/BC857B/BC858B			30			
	BC857C/BC858C			60			
Reverse Voltage Transfer Ratio	BC856A/BC857A/BC858A	h_{re}	—	$1.5x10^{-4}$	—	—	
	BC856B/BC857B/BC858B			$2x10^{-4}$			
	BC857C/BC858C			$3x10^{-4}$			
DC Current Gain (Note 9)	BC856A/BC857A/BC858A	h_{FE}	125	180	250	—	I_C = -2.0mA, V_{CE} = -5V
	BC856B/BC857B/BC858B		220	290	475		
	BC857C/BC858C		420	520	800		
Collector-Emitter Saturation Voltage (Note 9)		$V_{CE(sat)}$	—	-75	-300	mV	I_C = -10mA, I_B = -0.5mA
				-250	-650		I_C = -100mA, I_B = -5.0mA
Base-Emitter Turn-On Voltage (Note 9)		$V_{BE(on)}$	-600	-650	-750	mV	I_C = -2mA, V_{CE} = -5V
			—	—	-820		I_C = -10mA, V_{CE} = -5V
Base-Emitter Saturation Voltage (Note 9)		$V_{BE(sat)}$	—	-700	—	mV	I_C = -10mA, I_B = -0.5mA
				-850	-1100		I_C = -100mA, I_B = -5mA
Output Capacitance		C_{obo}	—	3	—	pF	V_{CB} = -10V, f = 1.0MHz
Transition Frequency		f_T	100	200	—	MHz	V_{CE} = -5V, I_C = -10mA, f = 100MHz
Noise Figure		NF	—	2	10	dB	V_{CE} = -5V, I_C = -200µA R_S = 2kΩ, f = 1kHz Δf = 200Hz

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (BC856B) (@ T_A = +25°C, unless otherwise specified.)

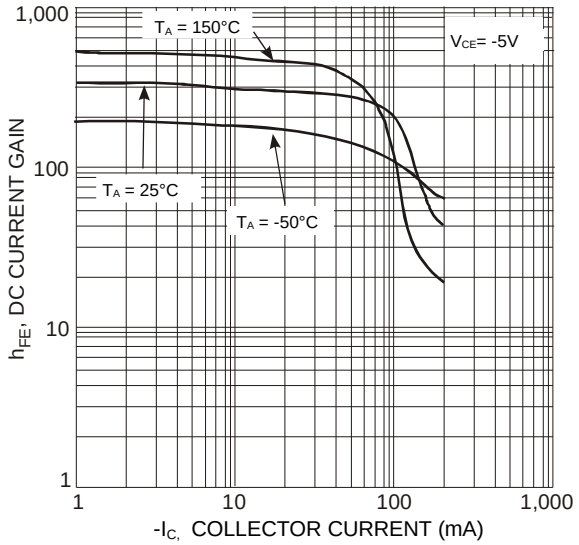


Figure 5. Typical DC Current Gain vs. Collector Current

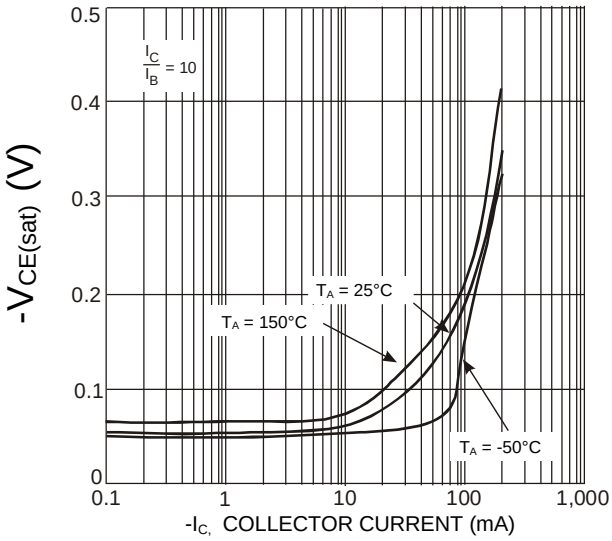


Figure 6. Typical Collector-Emitter Saturation Voltage vs. Collector Current

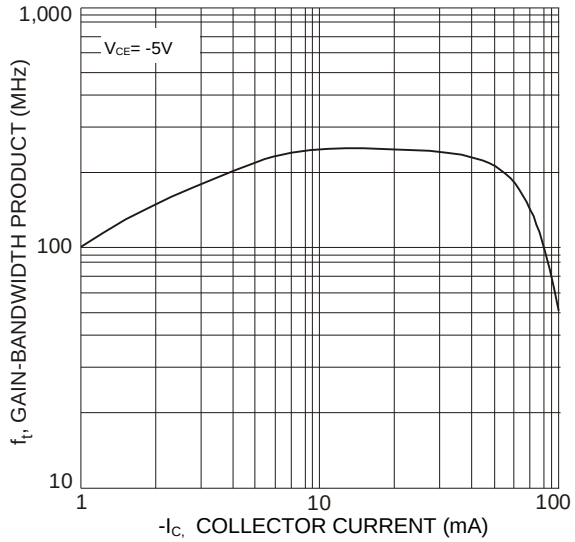
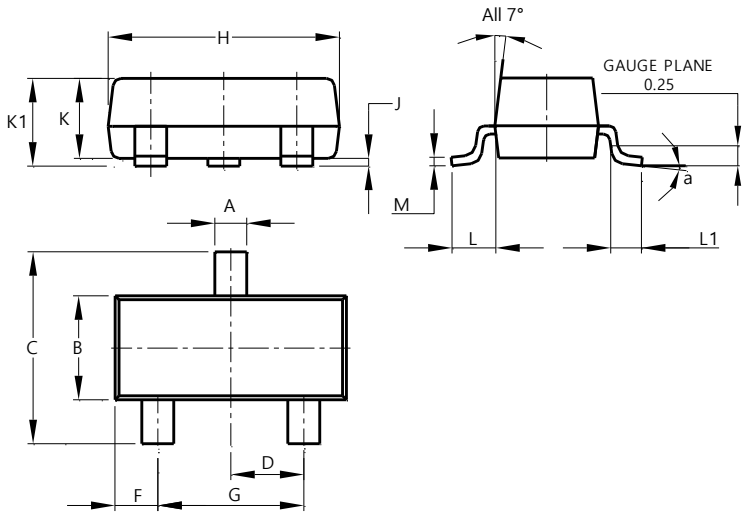


Figure 7. Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT23

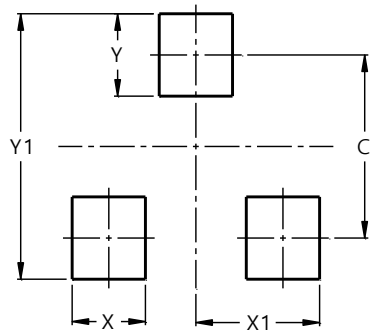


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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