

NPN Silicon Epitaxial Transistor

Feature

- AEC-Q101 Qualified
- High reliability
- General-purpose transistors
- SMD plastic package
- Halogen and Antimony Free(HAF), RoHS compliant



1. Base 2. Emitter 3. Collector
SOT-23 Plastic Package

Applications

- General-purpose switching and amplification

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Value	Unit
Collector Base Voltage	BC846 V_{CBO}	80	V
	BC847, BC850 V_{CBO}	50	V
	BC848, BC849 V_{CBO}	30	V
Collector Emitter Voltage	BC846 V_{CEO}	65	V
	BC847, BC850 V_{CEO}	45	V
	BC848, BC849 V_{CEO}	30	V
Emitter Base Voltage	BC846, BC847 V_{EBO}	6	V
	BC848, BC849, BC850 V_{EBO}	5	V
Collector Current	I_C	100	mA
Peak Collector Current	I_{CM}	200	mA
Power Dissipation	P_{tot}	300	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	- 65 to + 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction to Ambient ¹⁾	$R_{\theta JA}$	417	$^\circ\text{C/W}$

¹⁾ Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.

Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $V_{CE} = 5\text{ V}$, $I_C = 2\text{ mA}$	Current Gain Group A B C	h_{FE} h_{FE} h_{FE}	110 200 420	- - -	- - -
Collector Base Cutoff Current at $V_{CB} = 30\text{ V}$	I_{CBO}	-	-	15	nA
Collector Base Breakdown Voltage at $I_C = 100\text{ }\mu\text{A}$	BC846 BC847, BC850 BC848, BC849	$V_{(BR)CBO}$ $V_{(BR)CBO}$ $V_{(BR)CBO}$	80 50 30	- - -	V V V
Collector Emitter Breakdown Voltage at $I_C = 2\text{ mA}$	BC846 BC847, BC850 BC848, BC849	$V_{(BR)CEO}$ $V_{(BR)CEO}$ $V_{(BR)CEO}$	65 45 30	- - -	V V V
Emitter Base Breakdown Voltage at $I_C = 100\text{ }\mu\text{A}$	BC846, BC847 BC848, BC849, BC850	$V_{(BR)EBO}$ $V_{(BR)EBO}$	6 5	- -	V V
Collector Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ at $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$	$V_{CE(sat)}$ $V_{CE(sat)}$	- -	- -	0.25 0.6	V V
Base Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ at $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$	$V_{BE(sat)}$ $V_{BE(sat)}$	- -	0.7 -	- 1	V V
Base Emitter On Voltage at $V_{CE} = 5\text{ V}$, $I_C = 2\text{ mA}$ at $V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$	$V_{BE(on)}$ $V_{BE(on)}$	0.58 -	- -	0.7 0.72	V V
Transition Frequency at $V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$, $f = 100\text{ MHz}$	f_T	-	300	-	MHz
Output Capacitance at $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{ob}	-	-	6	pF
Input Capacitance at $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$	C_{ib}	-	9	-	pF

Electrical Characteristics Curves

Fig. 1 Output Characteristics Curve

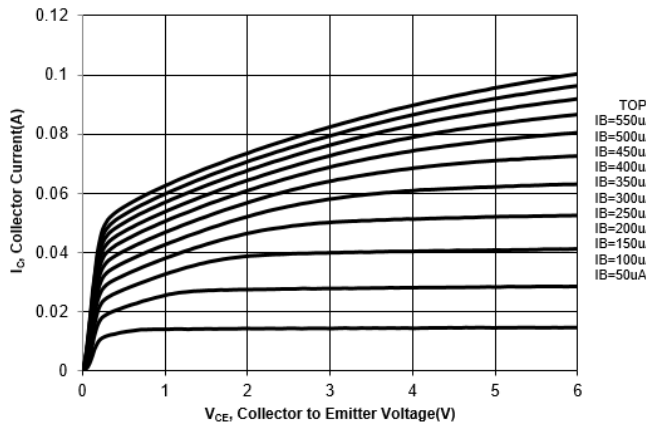


Fig. 2 Collector Current vs. Base to Emitter Voltage

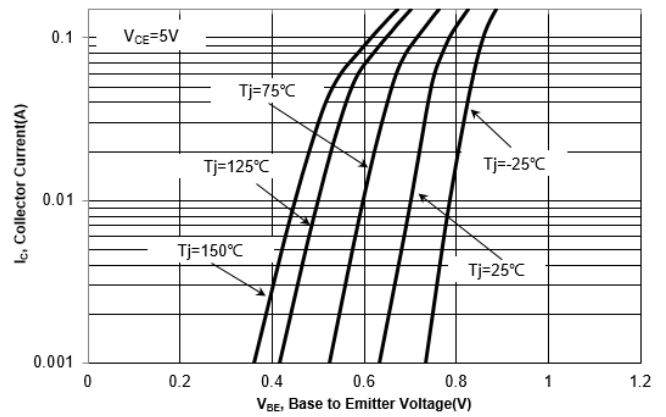


Fig. 3 DC Current Gain vs. Collector Current

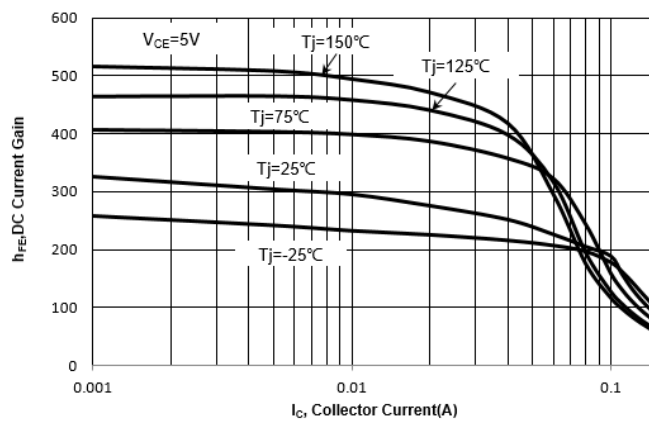
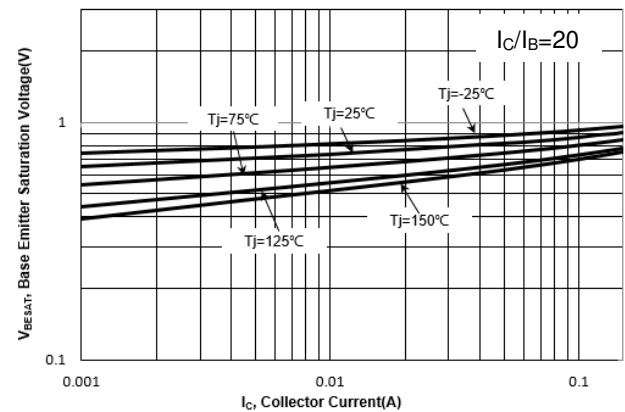


Fig. 4 $V_{BE(sat)}$ vs. Collector Current



Electrical Characteristics Curves

Fig. 5 V_{CESAT} vs. Collector Current

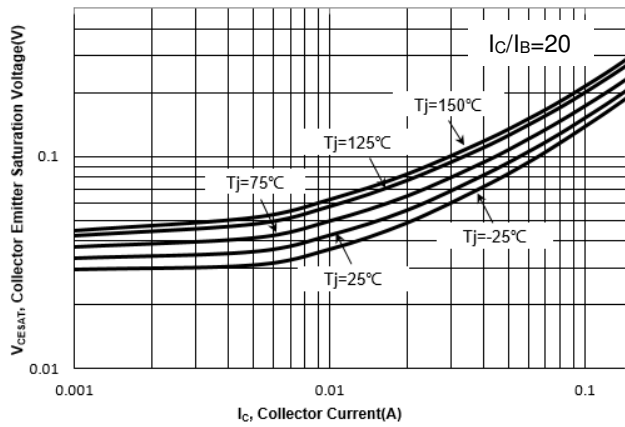


Fig. 6 Output Capacitance

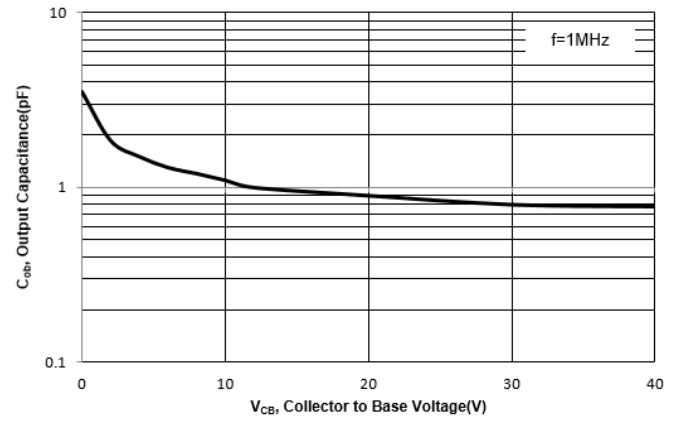
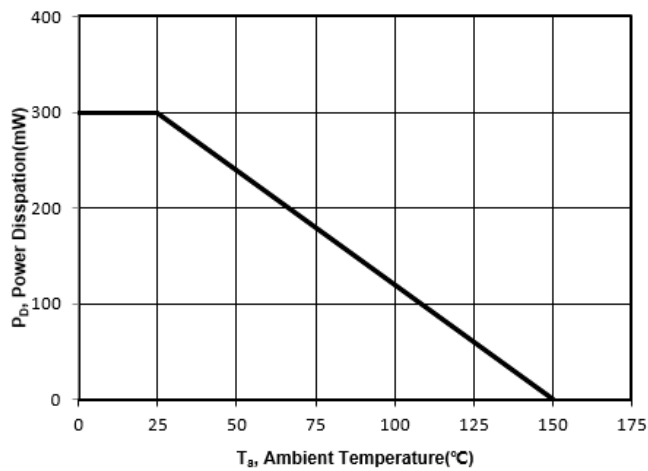
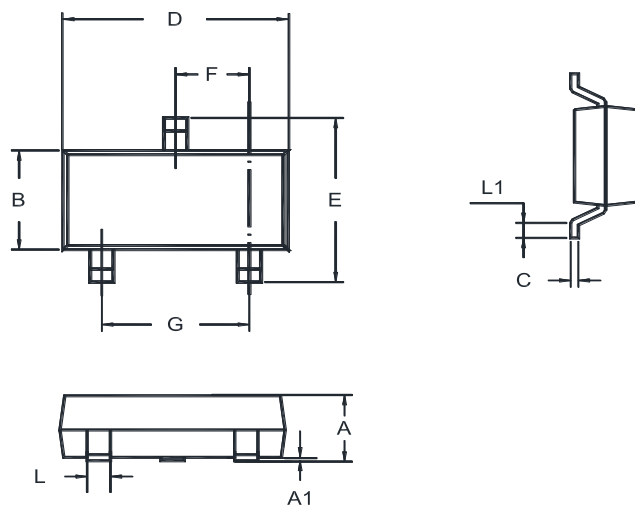


Fig. 7 Power Derating Curve



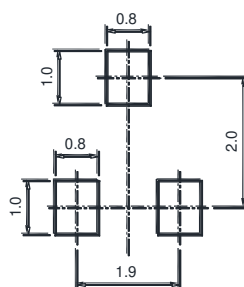
Package Outline (Dimensions in mm)

SOT-23



Unit	A	A1	B	C	D	E	F	G	L	L1
mm	1.20 0.89	0.100 0.013	1.40 1.20	0.19 0.08	3.04 2.80	2.6 2.2	1.02 0.89	2.04 1.78	0.51 0.37	0.2 MIN

Recommended Soldering Footprint



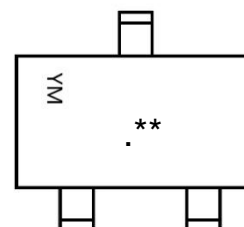
Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-23	8	4 ± 0.1	0.157 ± 0.004	178	7	3,000

Marking information

" ** " = Part No.

Type	Marking	Type	Marking
BC846A-A	1A	BC847A-A~ BC850A-A	1E
BC846B-A	1B	BC847B-A~ BC850B-A	1F
BC846C-A	1C	BC847C-A~ BC850C-A	1G



" . " = HAF (Halogen and Antimony Free)

"YM" = Date Code Marking

"Y" = Year

"M" = Month

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