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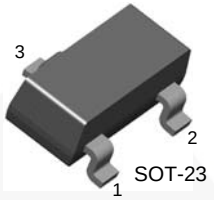
August 2015

BC846 / BC847 / BC848 / BC850
NPN Epitaxial Silicon Transistor

Features

- Switching and Amplifier Applications
- Suitable for Automatic Insertion in Thick and Thin-film Circuits
- Low Noise: BC850
- Complement to BC856, BC857, BC858, BC859, and BC860



SOT-23

1. Base 2. Emitter 3. Collector

Ordering Information(1)

Part Number	Marking	Package	Packing Method
BC846AMTF	8AA	SOT-23 3L	Tape and Reel
BC846BMTF	8AB	SOT-23 3L	Tape and Reel
BC846CMTF	8AC	SOT-23 3L	Tape and Reel
BC847AMTF	8BA	SOT-23 3L	Tape and Reel
BC847BMTF	8BB	SOT-23 3L	Tape and Reel
BC847CMTF	8BC	SOT-23 3L	Tape and Reel
BC848BMTF	8CB	SOT-23 3L	Tape and Reel
BC848CMTF	8CC	SOT-23 3L	Tape and Reel
BC850AMTF	8EA	SOT-23 3L	Tape and Reel
BC850CMTF	8EC	SOT-23 3L	Tape and Reel

Note:

1. Affix “-A,-B,-C” means h_{FE} classification. Affix “-M” means SOT-23 package. Affix “-TF” means the tape and reel type packing.

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter		Value	Unit
V_{CBO}	Collector-Base Voltage	BC846	80	V
		BC847 / BC850	50	
		BC848	30	
V_{CEO}	Collector-Emitter Voltage	BC846	65	V
		BC847 / BC850	45	
		BC848	30	
V_{EBO}	Emitter-Base Voltage	BC846 / BC847	6	V
		BC848 / BC850	5	
I_C	Collector Current (DC)		100	mA
T_J	Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-65 to +150	°C

Thermal Characteristics[2]

Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Value	Unit
P_D	Power Dissipation	310	mW
	Derate Above 25°C	2.48	mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	403	°C/W

Note:

2. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

Electrical Characteristics[3]

Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter		Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-Off Current		V_{CB} = 30 V, I_E = 0			15	nA
h_{FE}	DC Current Gain		V_{CE} = 5 V, I_C = 2 mA	110		800	
V_{CE}(sat)	Collector-Emitter Saturation Voltage		I_C = 10 mA, I_B = 0.5 mA		90	250	mV
			I_C = 100 mA, I_B = 5 mA		200	600	
V_{BE}(sat)	Collector-Base Saturation Voltage		I_C = 10 mA, I_B = 0.5 mA		700		mV
			I_C = 100 mA, I_B = 5 mA		900		
V_{BE}(on)	Base-Emitter On Voltage		V_{CE} = 5 V, I_C = 2 mA	580	660	700	mV
			V_{CE} = 5 V, I_C = 10 mA			720	
f_T	Current Gain Bandwidth Product		V_{CE} = 5 V, I_C = 10 mA, f = 100 MHz		300		MHz
C_{ob}	Output Capacitance		V_{CB} = 10 V, I_E = 0, f = 1 MHz		3.5	6.0	pF
C_{ib}	Input Capacitance		V_{EB} = 0.5 V, I_C = 0, f = 1 MHz		9		pF
NF	Noise Figure	BC846 / BC847 / BC848	V_{CE} = 5 V, I_C = 200 µA, R_G = 2 kΩ, f = 1 kHz		2.0	10.0	dB
		BC850			1.2	4.0	
		BC850	V_{CE} = 5 V, I_C = 200 µA, R_G = 2 kΩ, f = 30 to 15000 Hz		1.4	3.0	

Note:

3. Pulse test: pulse width ≤ 300 µs, duty cycle ≤ 2%

h_{FE} Classification

Classification	A	B	C
h_{FE}	110 ~ 220	200 ~ 450	420 ~ 800

Typical Performance Characteristics

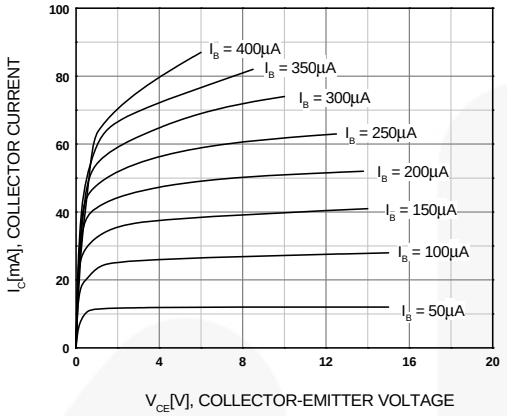


Figure 1. Static Characteristic

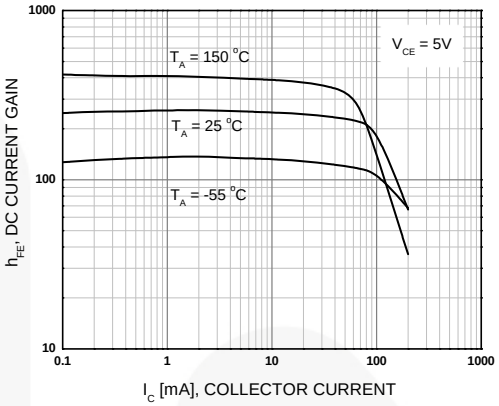


Figure 2. DC Current Gain

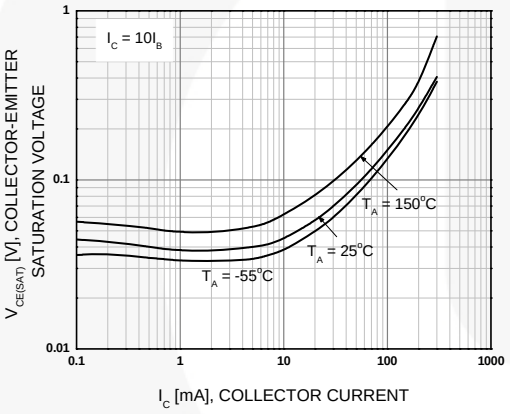


Figure 3. Currector-Emitter Saturation Voltage

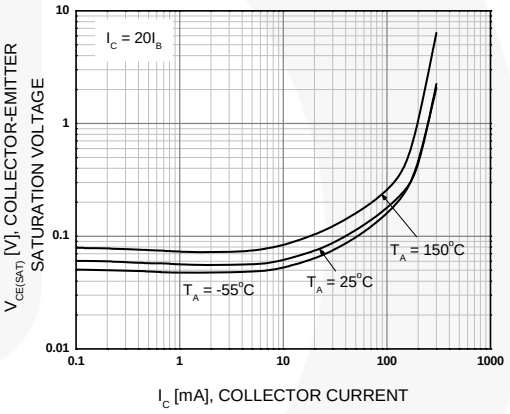


Figure 4. Currector-Emitter Saturation Voltage

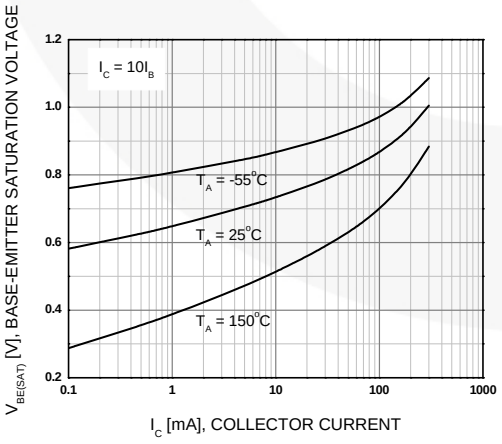


Figure 5. Base-Emitter Saturation Voltage

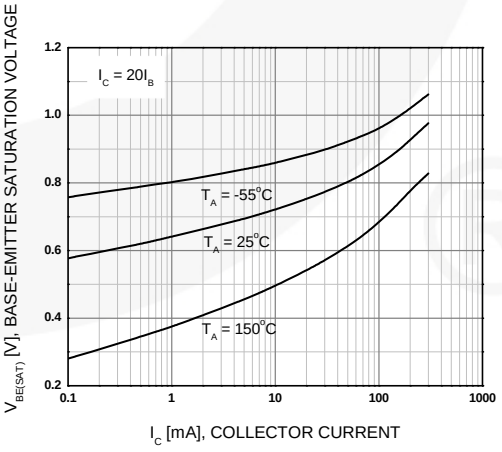


Figure 6. Base-Emitter Saturation Voltage

Typical Performance Characteristics (Continued)

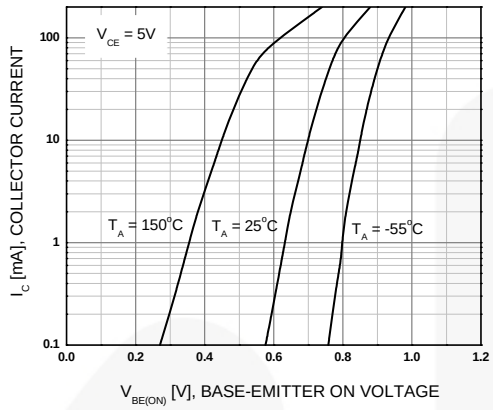


Figure 7. Base-Emitter On Voltage

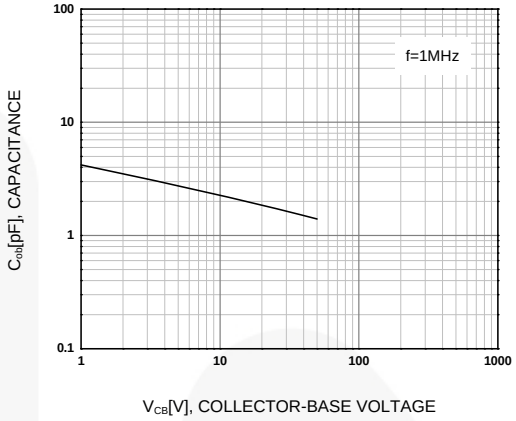


Figure 8. Collector Output Capacitance

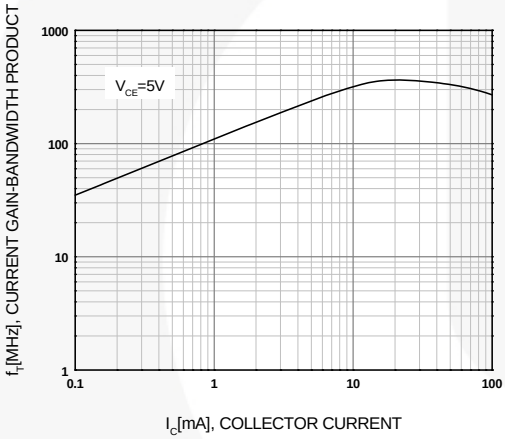
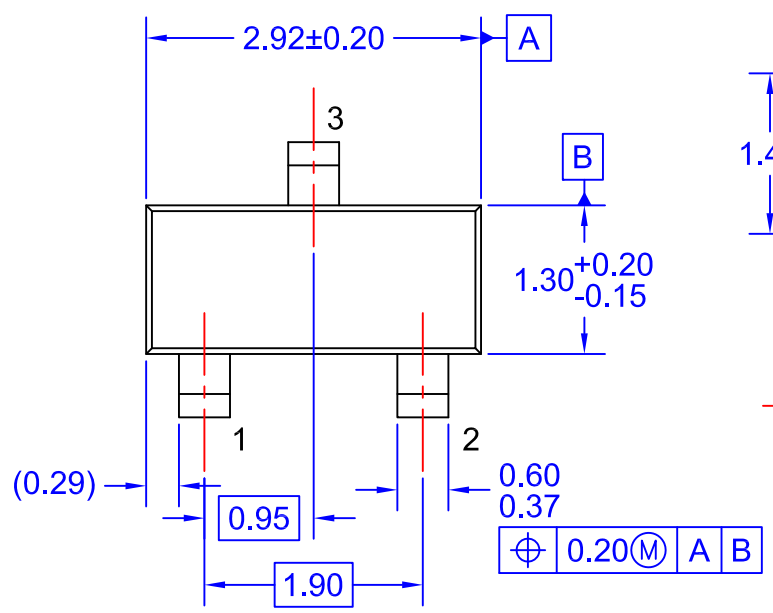
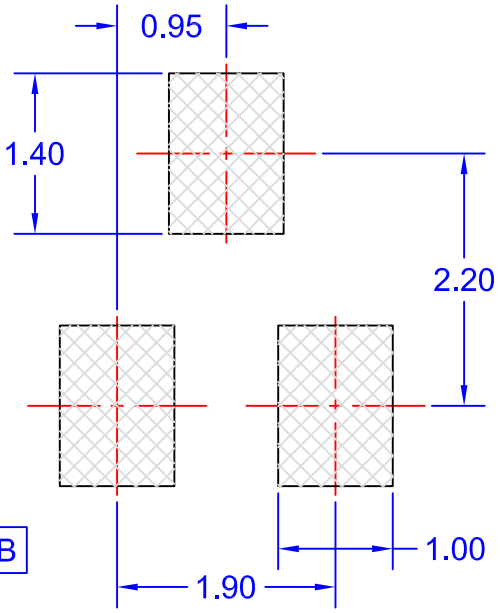
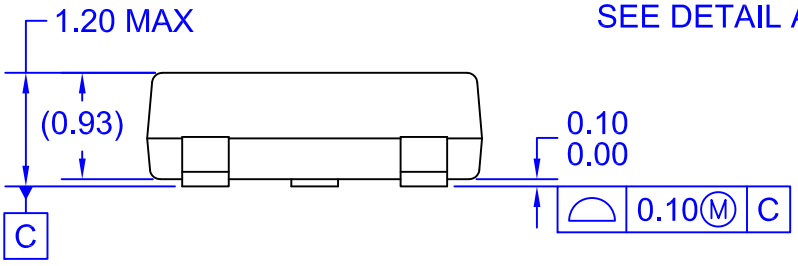


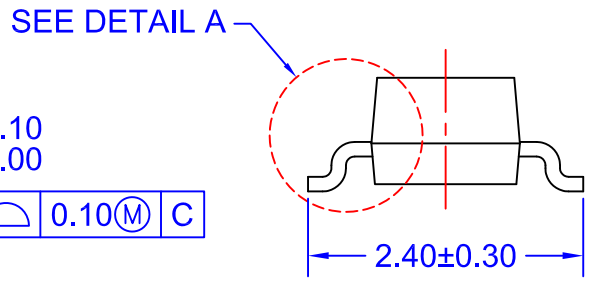
Figure 9. Current Gain Bandwidth Product

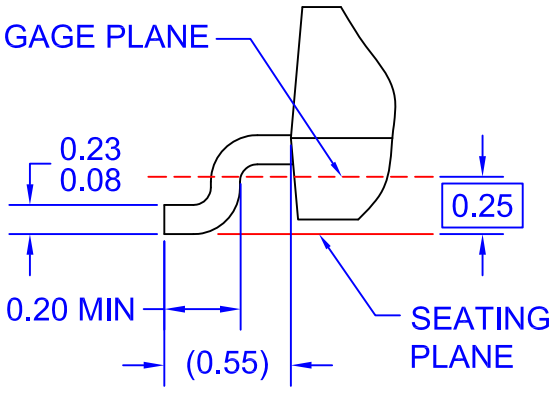




LAND PATTERN
RECOMMENDATION







DETAIL A
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 2009.
E) DRAWING FILE NAME: MA03DREV12

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