



Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at

www.onsemi.com

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

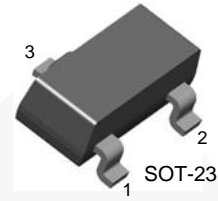


August 2015

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



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 $T_A = 25^\circ\text{C}$ 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	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-65 to +150	$^\circ\text{C}$	

Thermal Characteristics⁽²⁾

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

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

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 $T_A = 25^\circ\text{C}$ unless otherwise noted.

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

Note:3. Pulse test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$ **h_{FE} Classification**

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

Typical Performance Characteristics

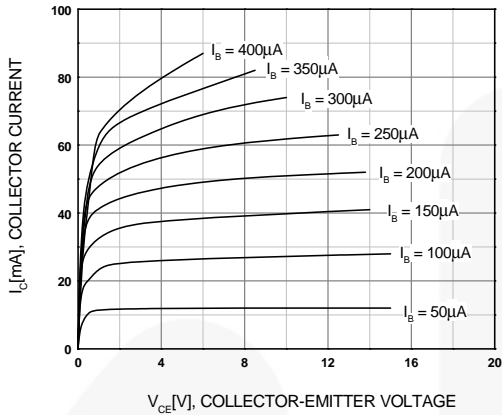


Figure 1. Static Characteristic

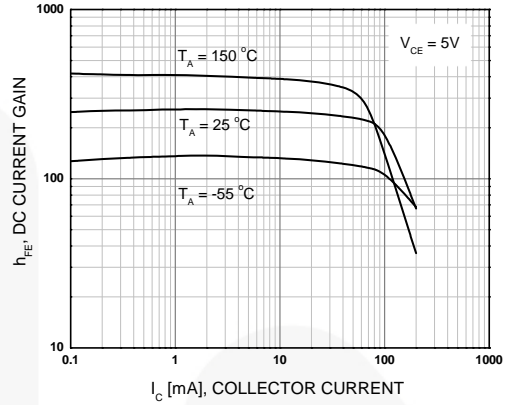


Figure 2. DC Current Gain

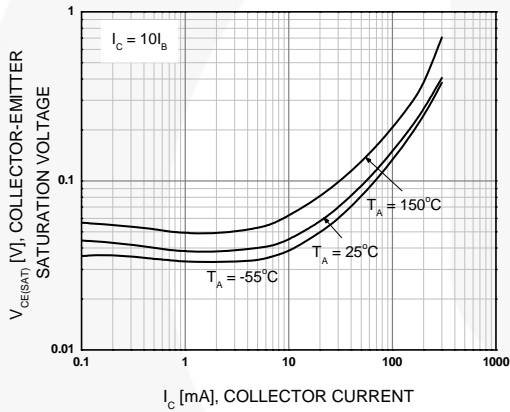


Figure 3. Collector-Emitter Saturation Voltage

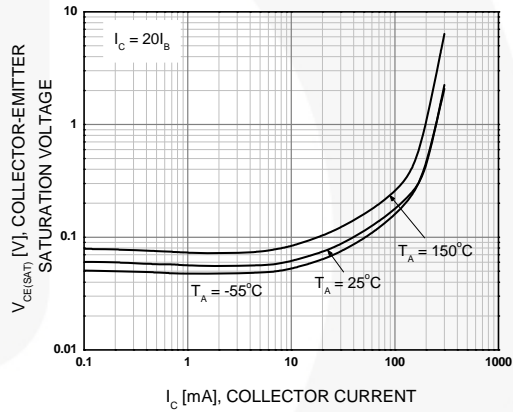


Figure 4. Collector-Emitter Saturation Voltage

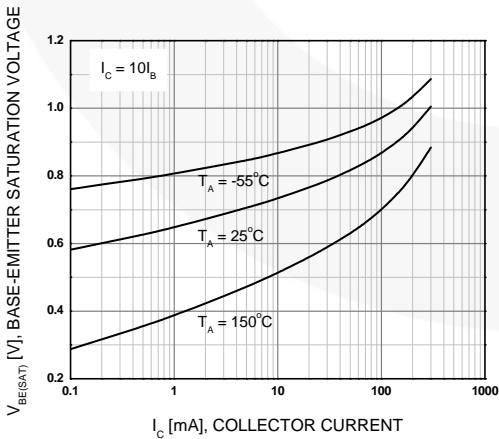


Figure 5. Base-Emitter Saturation Voltage

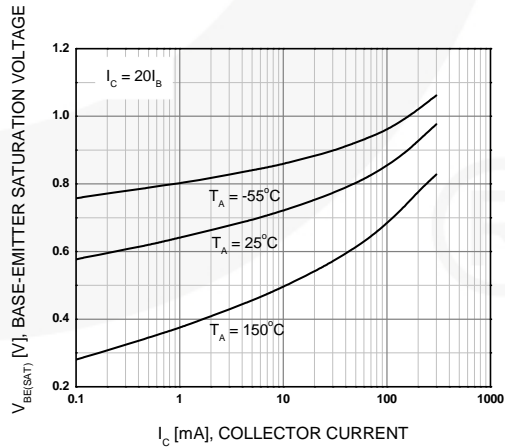


Figure 6. Base-Emitter Saturation Voltage

Typical Performance Characteristics (Continued)

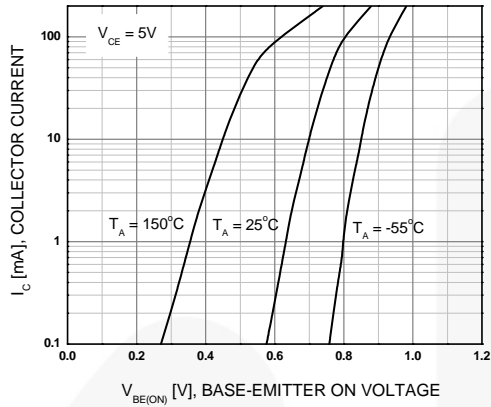


Figure 7. Base-Emitter On Voltage

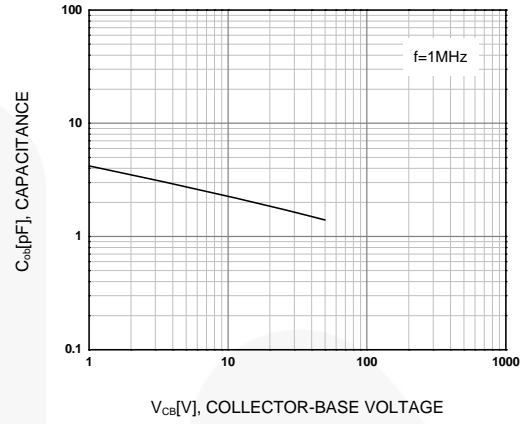


Figure 8. Collector Output Capacitance

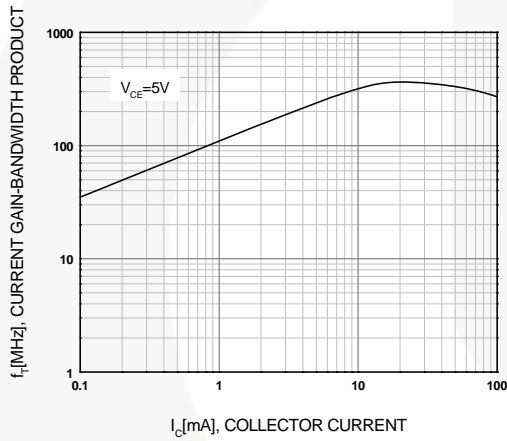
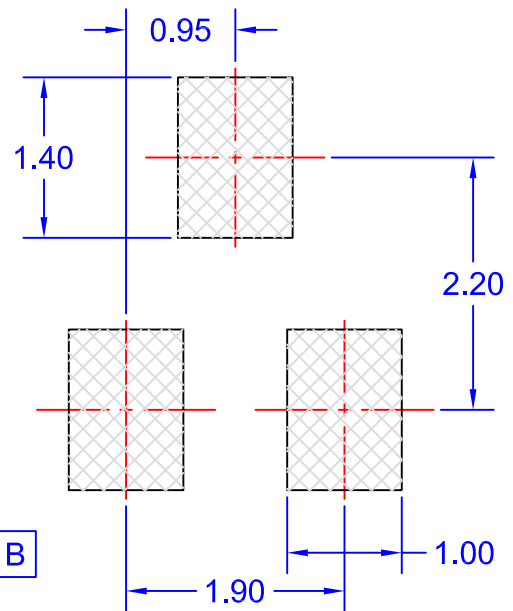
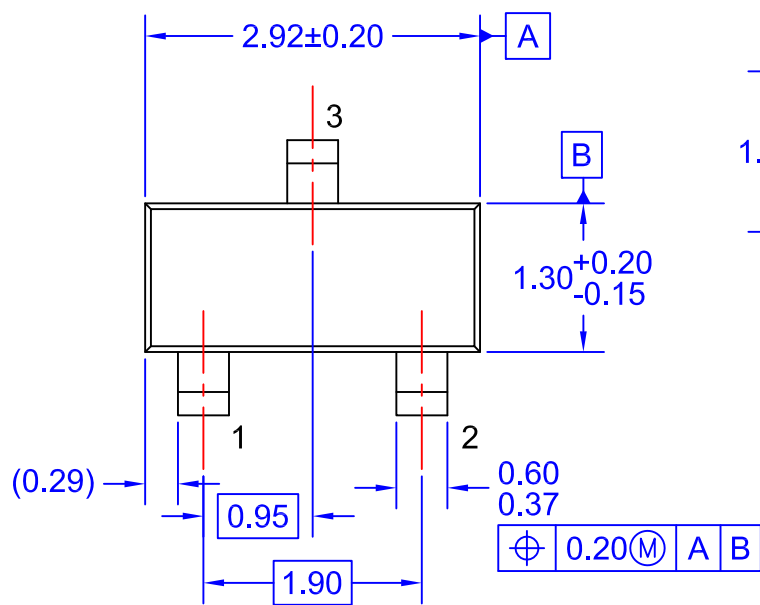
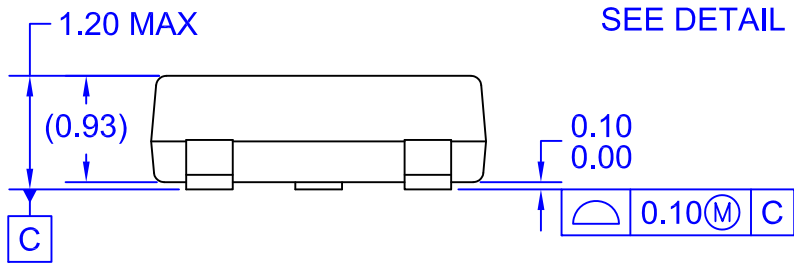


Figure 9. Current Gain Bandwidth Product

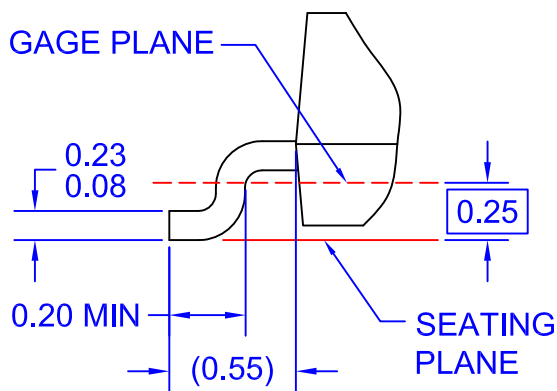
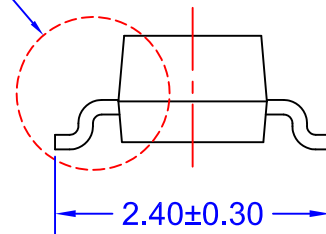




LAND PATTERN
RECOMMENDATION



SEE DETAIL A



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



ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local
Sales Representative