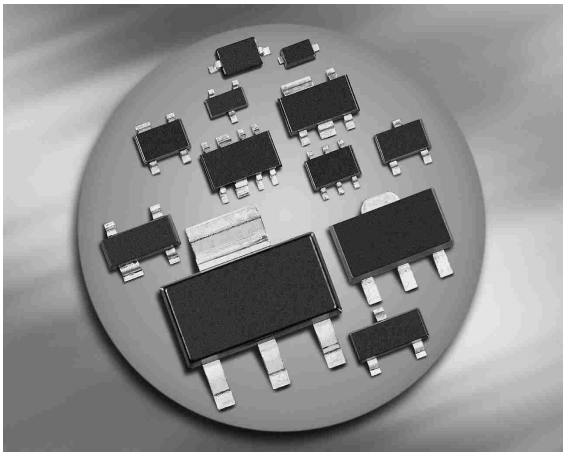
NPN Silicon AF Transistors

- For AF input stages and driver applications
- High current gain
- Low collector-emitter saturation voltage
- Low noise between 30 Hz and 15 kHz
- Complementary types:
  BC857...-BC860...(PNP)
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101[1)]



AEC Qualified RoHS

[1]BC847BL3 is not qualified according AEC Q101

Type	Marking	Pin Configuration						Package
BC847A	1Es	1=B	2=E	3=C	-	-	-	SOT23
BC847B	1Fs	1=B	2=E	3=C	-	-	-	SOT23
BC847BL3*	1F	1=B	2=E	3=C	-	-	-	TSLP-3-1
BC847BW	1Fs	1=B	2=E	3=C	-	-	-	SOT323
BC847C	1Gs	1=B	2=E	3=C	-	-	-	SOT23
BC847CW	1Gs	1=B	2=E	3=C	-	-	-	SOT323
BC848A	1Js	1=B	2=E	3=C	-	-	-	SOT23
BC848B	1Ks	1=B	2=E	3=C	-	-	-	SOT23
BC848BL3	1K	1=B	2=E	3=C	-	-	-	TSLP-3-1
BC848BW	1Ks	1=B	2=E	3=C	-	-	-	SOT323
BC848C	1Ls	1=B	2=E	3=C	-	-	-	SOT23
BC848CW	1Ls	1=B	2=E	3=C	-	-	-	SOT323
BC849B	2Bs	1=B	2=E	3=C	-	-	-	SOT23
BC849C	2Cs	1=B	2=E	3=C	-	-	-	SOT23
BC849CW	2Cs	1=B	2=E	3=C	-	-	-	SOT323
BC850B	2Fs	1=B	2=E	3=C	-	-	-	SOT23
BC850BW	2Fs	1=B	2=E	3=C	-	-	-	SOT323
BC850C	2Gs	1=B	2=E	3=C	-	-	-	SOT23
BC850CW	2Gs	1=B	2=E	3=C	-	-	-	SOT323

* Not qualified according AEC Q101

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}		V
BC847..., BC850...		45	
BC848..., BC849...		30	
Collector-emitter voltage	V_{CES}		
BC847..., BC850...		50	
BC848..., BC849...		30	
Collector-base voltage	V_{CBO}		
BC847..., BC850...		50	
BC848..., BC849...		30	
Emitter-base voltage	V_{EBO}		
BC847..., BC850...		6	
BC848..., BC849...		6	
Collector current	I_C	100	mA
Peak collector current, $t_p \leq 10$ ms	I_{CM}	200	
Total power dissipation-	P_{tot}		mW
$T_S \leq 71$ °C, BC847-BC850		330	
$T_S \leq 135$ °C, BC847BL3-BC848BL3		250	
$T_S \leq 124$ °C, BC847W-BC850W		250	
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[1)]	R_{thJS}		K/W
BC847-BC850		≤ 240	
BC847BL3-BC848BL3		≤ 60	
BC847W-BC850W		≤ 105	

[1]For calculation of R_{thJA} please refer to Application Note AN077 (Thermal Resistance Calculation)

Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage	$V_{(BR)CEO}$				V
I_C = 10 mA, I_B = 0 , BC847..., BC850...		45	-	-	
I_C = 10 mA, I_B = 0 , BC848..., BC849...		30	-	-	
Collector-base breakdown voltage	$V_{(BR)CBO}$				
I_C = 10 µA, I_E = 0 , BC847..., BC850...		50	-	-	
I_C = 10 µA, I_E = 0 , BC848..., BC849...		30	-	-	
Emitter-base breakdown voltage	$V_{(BR)EBO}$	-	6	-	
I_E = 0 , I_C = 10 µA					
Collector-base cutoff current	I_{CBO}				µA
V_{CB} = 45 V, I_E = 0		-	0.015	-	
V_{CB} = 30 V, I_E = 0 , T_A = 150 °C		-	5	-	
DC current gain[1)]	h_{FE}				-
I_C = 10 µA, V_{CE} = 5 V, h_{FE}-grp.A		-	140	-	
I_C = 10 µA, V_{CE} = 5 V, h_{FE}-grp.B		-	250	-	
I_C = 10 µA, V_{CE} = 5 V, h_{FE}-grp.C		-	480	-	
I_C = 2 mA, V_{CE} = 5 V, h_{FE}-grp.A		110	180	220	
I_C = 2 mA, V_{CE} = 5 V, h_{FE}-grp.B		200	290	450	
I_C = 2 mA, V_{CE} = 5 V, h_{FE}-grp.C		420	520	800	
Collector-emitter saturation voltage[1)]	V_{CEsat}				mV
I_C = 10 mA, I_B = 0.5 mA		-	90	250	
I_C = 100 mA, I_B = 5 mA		-	200	600	
Base emitter saturation voltage[1)]	V_{BEsat}				
I_C = 10 mA, I_B = 0.5 mA		-	700	-	
I_C = 100 mA, I_B = 5 mA		-	900	-	
Base-emitter voltage[1)]	$V_{BE(ON)}$				
I_C = 2 mA, V_{CE} = 5 V		580	660	700	
I_C = 10 mA, V_{CE} = 5 V		-	-	770	

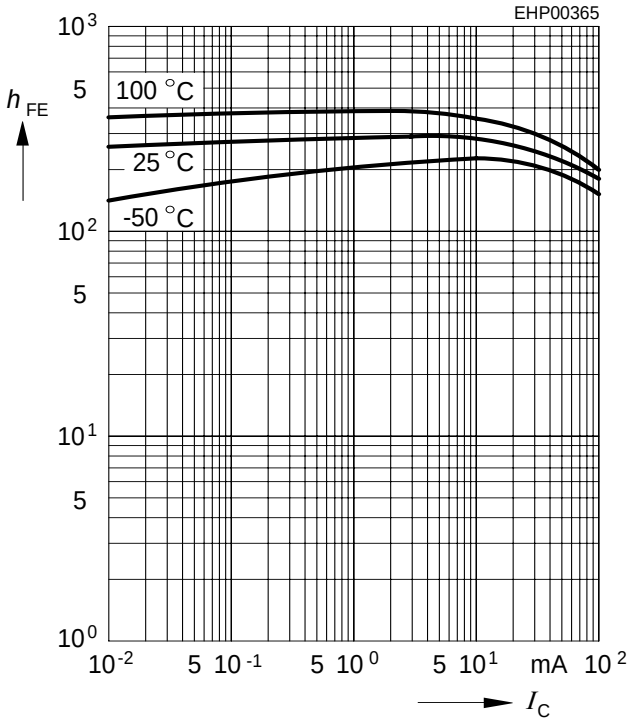
[1]Pulse test: t < 300µs; D < 2%

Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Transition frequency I_C = 10 mA, V_{CE} = 5 V, f = 100 MHz	f_T	-	250	-	MHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz	C_{cb}	-	0.95	-	pF
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	9	-	
Short-circuit input impedance	h_{11e}				kΩ
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.A		-	2.7	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.B		-	4.5	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.C		-	8.7	-	
Open-circuit reverse voltage transf. ratio	h_{12e}				10^{-4}
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.A		-	1.5	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.B		-	2	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.C		-	3	-	
Short-circuit forward current transf. ratio	h_{21e}				
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.A		-	200	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.B		-	330	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.C		-	600	-	
Open-circuit output admittance	h_{22e}				µS
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.A		-	18	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.B		-	30	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.C		-	60	-	
Noise figure I_C = 200 µA, V_{CE} = 5 V, f = 1 kHz, Δf = 200 Hz, R_S = 2 kΩ, BC849..., BC850...	F	-	1.2	4	dB
Equivalent noise voltage I_C = 200 µA, V_{CE} = 5 V, R_S = 2 kΩ, f = 10 ... 50 Hz , BC850...	V_n	-	-	0.135	µV

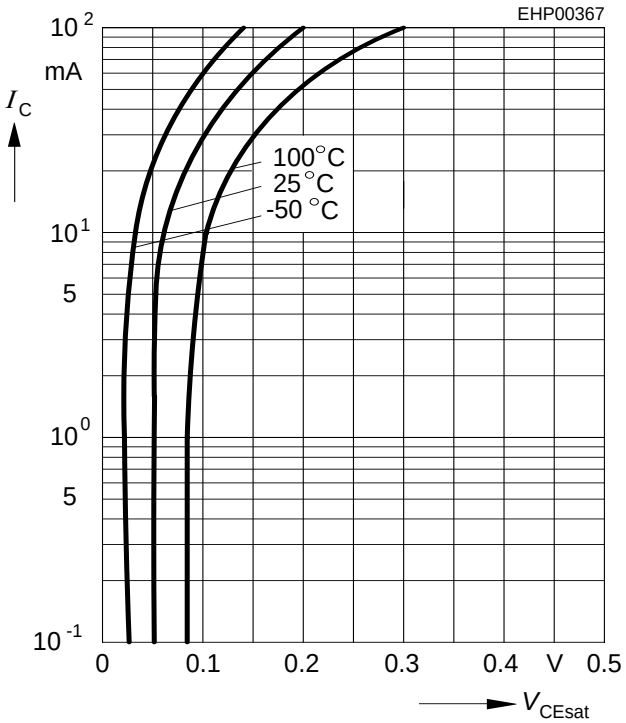
DC current gain $h_{FE} = f(I_C)$

V_{CE} = 5 V



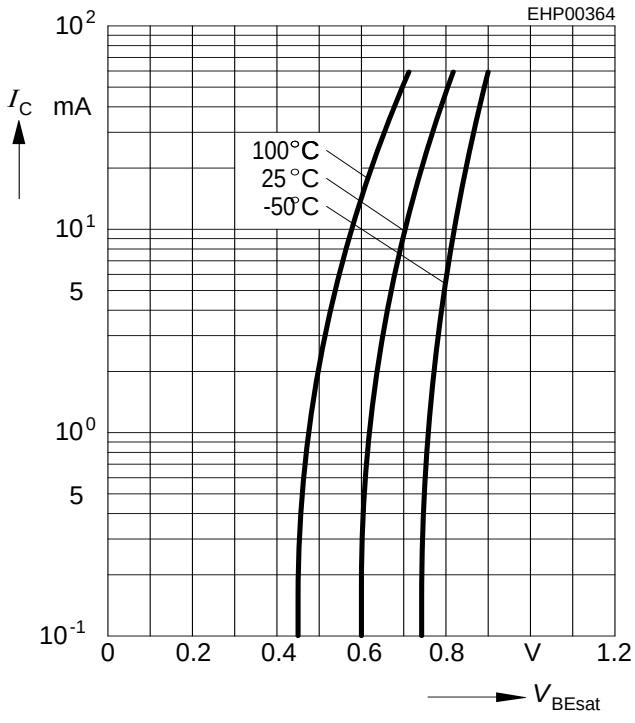
Collector-emitter saturation voltage

$I_C = f(V_{CEsat})$, h_{FE} = 20



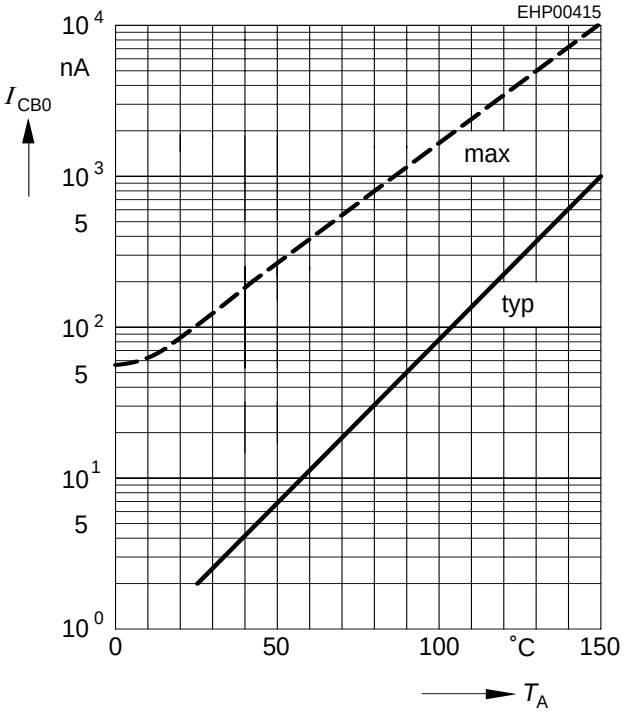
Base-emitter saturation voltage

$I_C = f(V_{BEsat})$, h_{FE} = 20



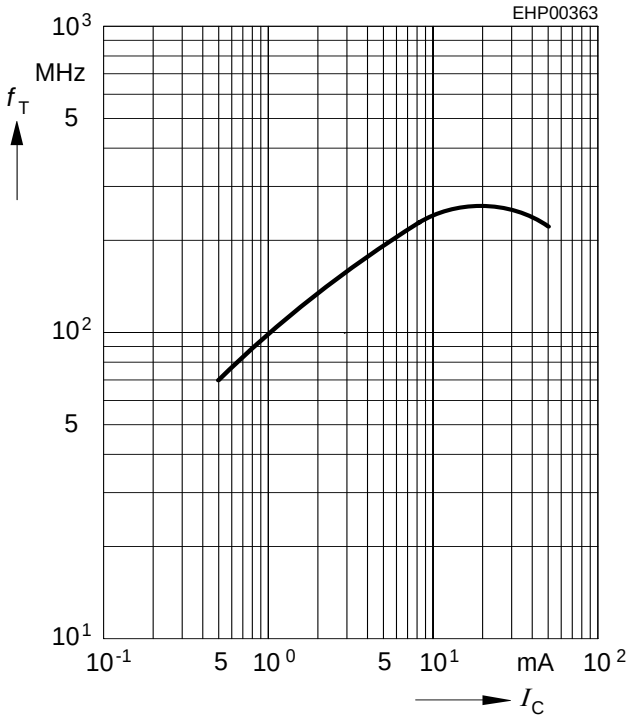
Collector cutoff current $I_{CBO} = f(T_A)$

V_{CB} = 30 V



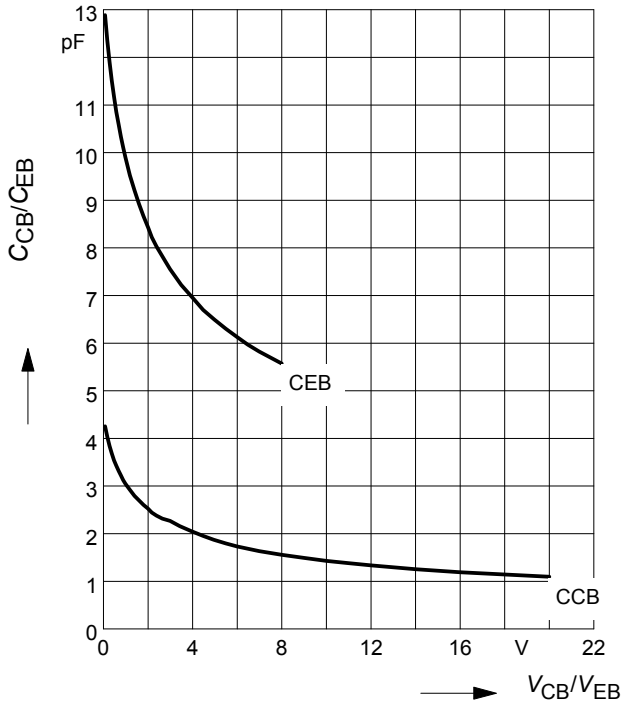
Transition frequency $f_T = f(I_C)$

V_{CE} = 5 V



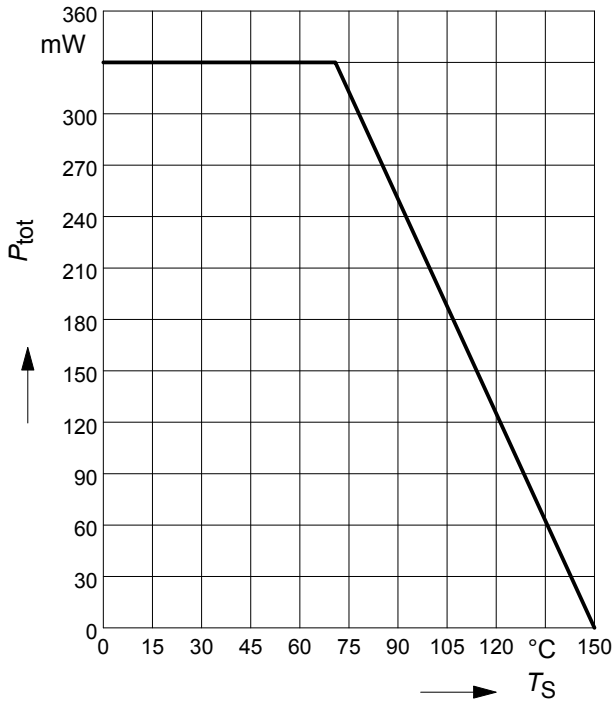
Collector-base capacitance $C_{cb} = f(V_{CB})$

Emitter-base capacitance $C_{eb} = f(V_{EB})$



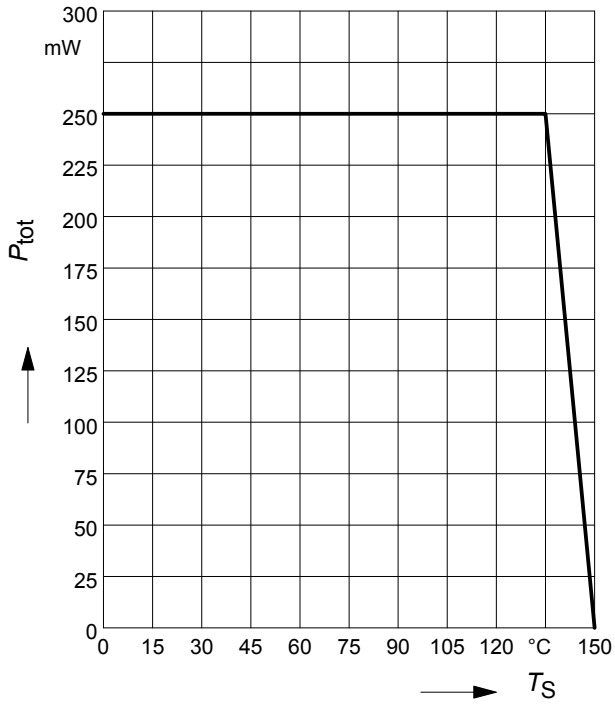
Total power dissipation $P_{tot} = f(T_S)$

BC847-BC850



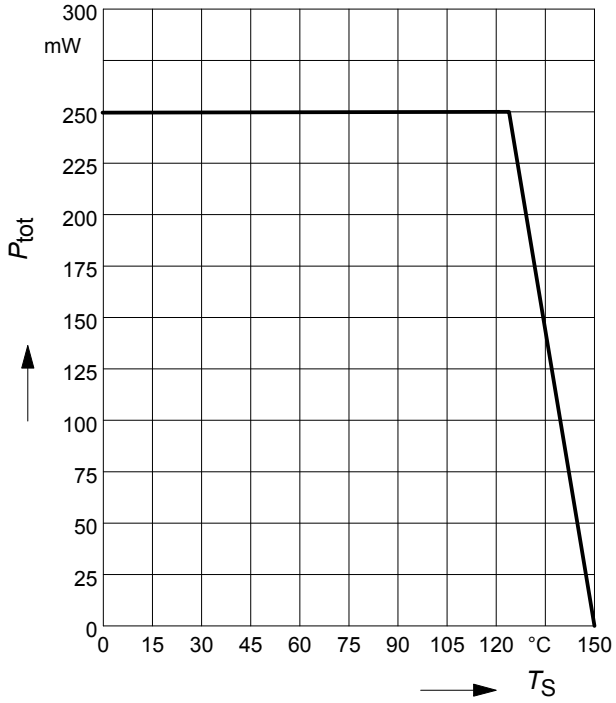
Total power dissipation $P_{tot} = f(T_S)$

BC847BL3/BC848BL3



Total power dissipation $P_{tot} = f(T_S)$

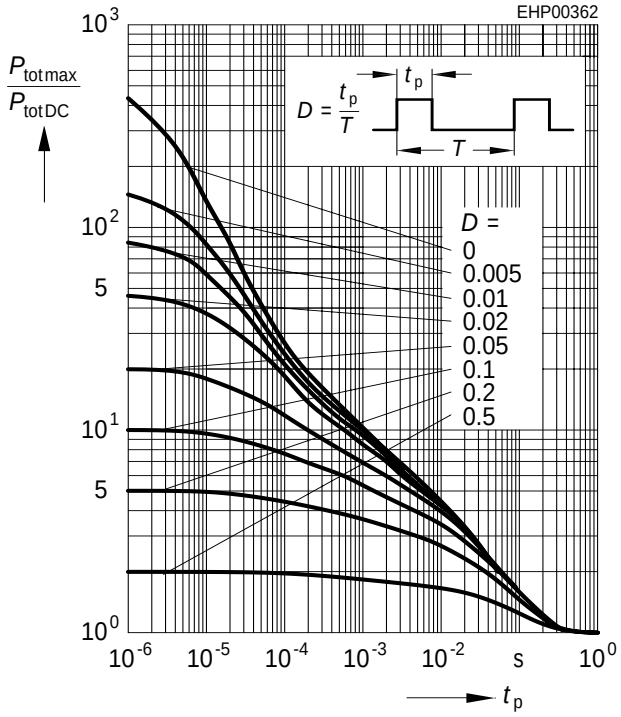
BC847W-BC850W



Permissible Pulse Load

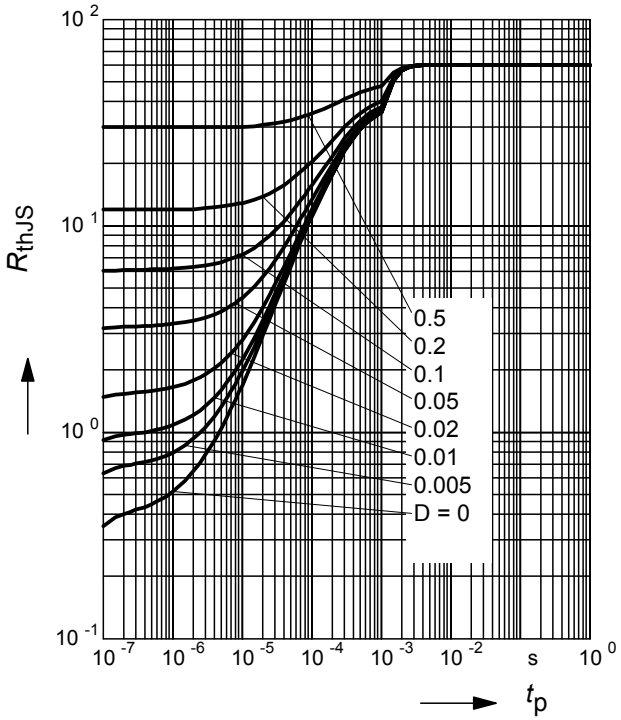
$P_{totmax}/P_{totDC} = f(t_p)$

BC847/W-BC850/W



Permissible Puls Load $R_{thJS} = f(t_p)$

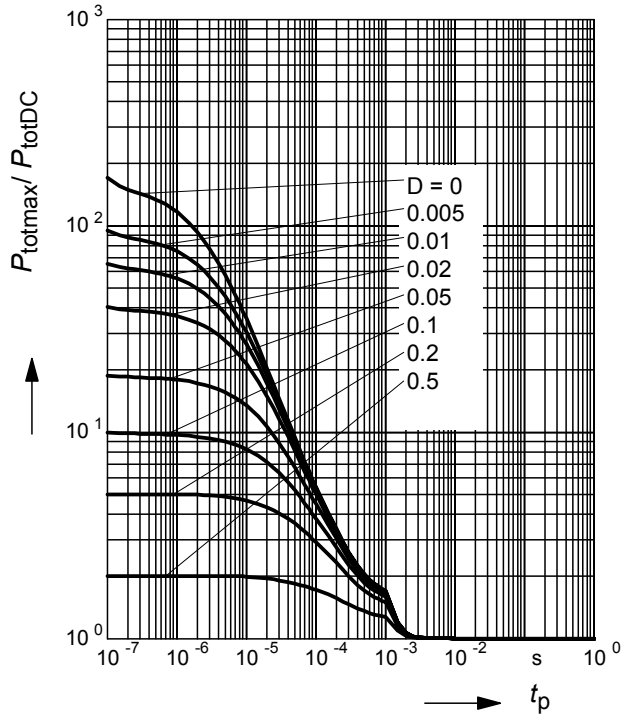
BC847BL3, BC848BL3



Permissible Pulse Load

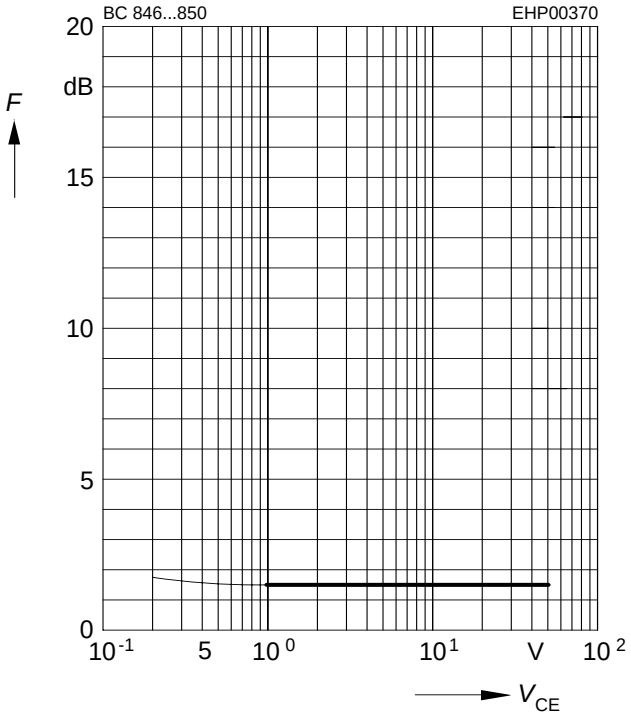
$P_{totmax}/P_{totDC} = f(t_p)$

BC847BL3, BC848BL3



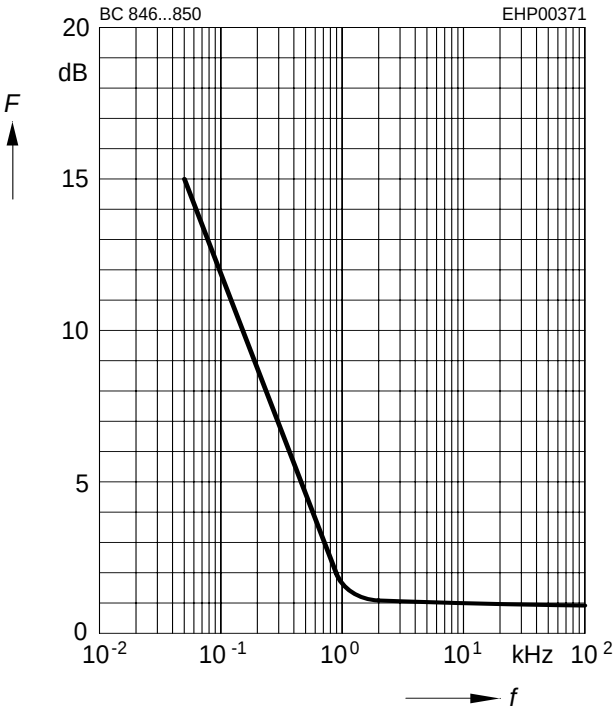
Noise figure $F = f(V_{CE})$

I_C = 0.2mA, R_S = 2kΩ , f = 1kHz



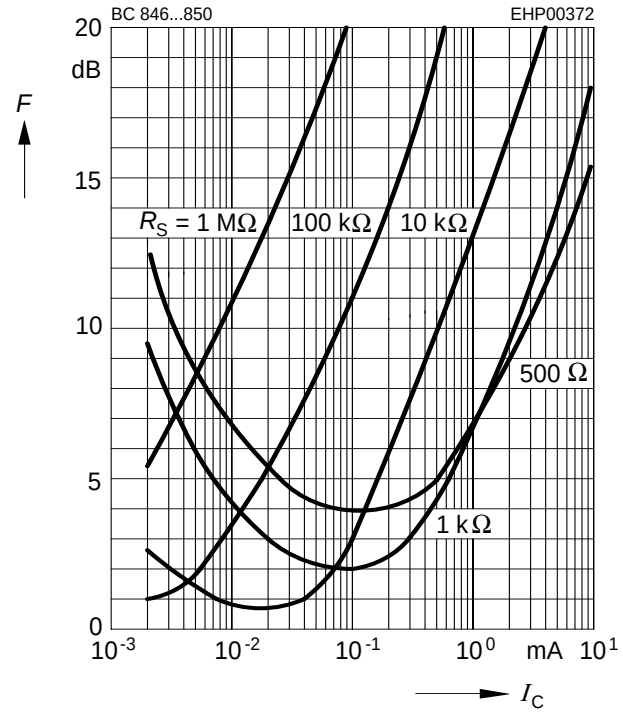
Noise figure $F = f(f)$

I_C = 0.2 mA, V_{CE} = 5V, R_S = 2 kΩ



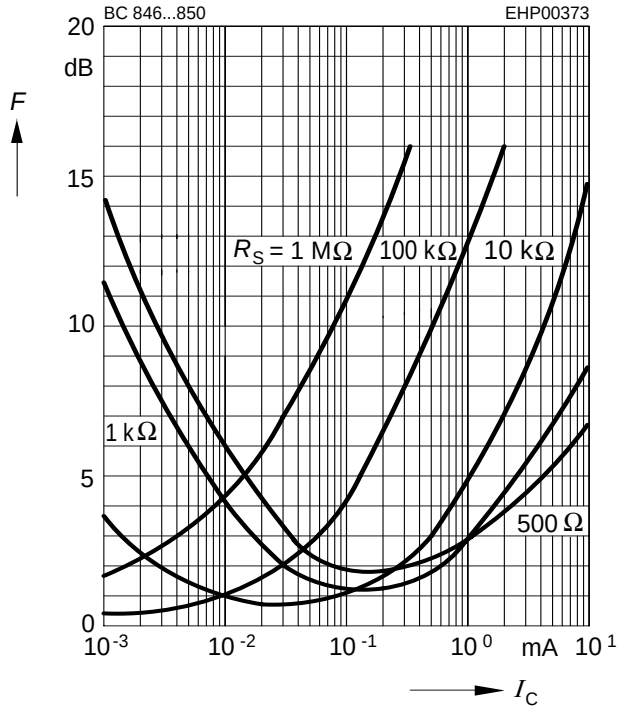
Noise figure $F = f(I_C)$

V_{CE} = 5V, f = 120Hz



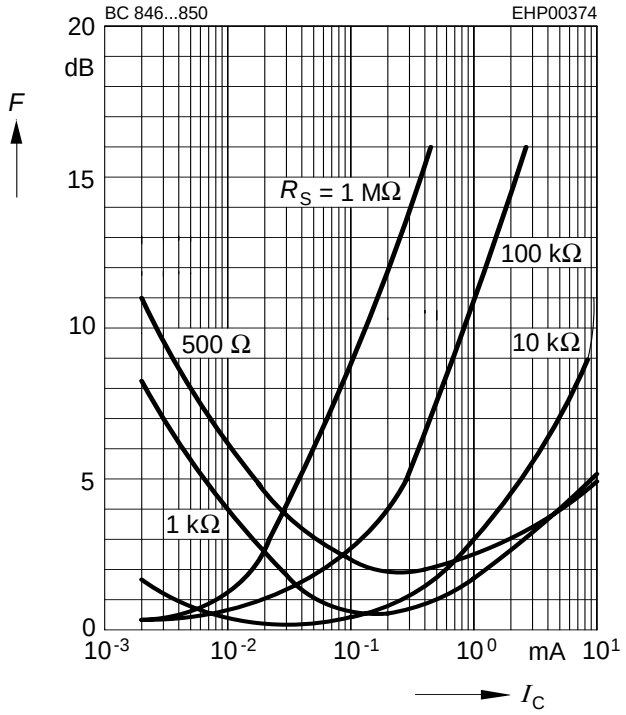
Noise figure $F = f(I_C)$

V_{CE} = 5V, f = 1kHz

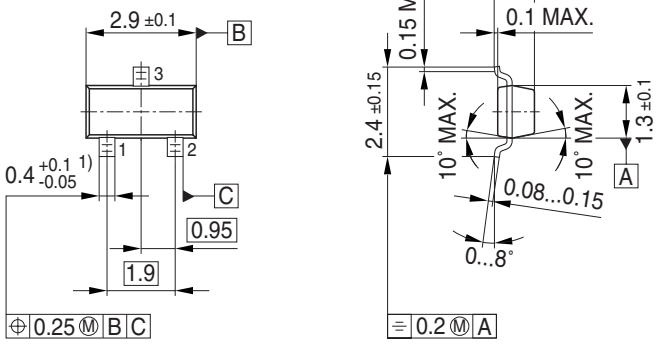


Noise figure $F = f(I_C)$

V_{CE} = 5V, f = 10kHz

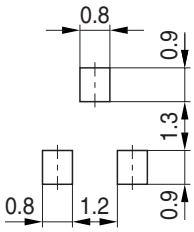


Package Outline

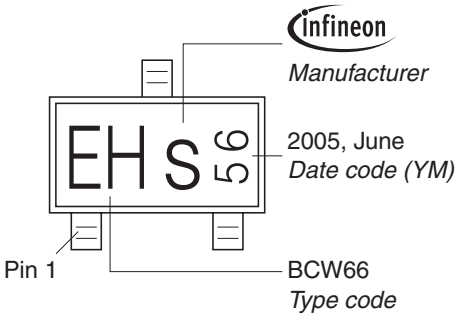


1) Lead width can be 0.6 max. in dambar area

Foot Print

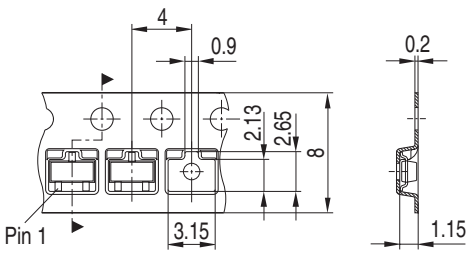


Marking Layout (Example)

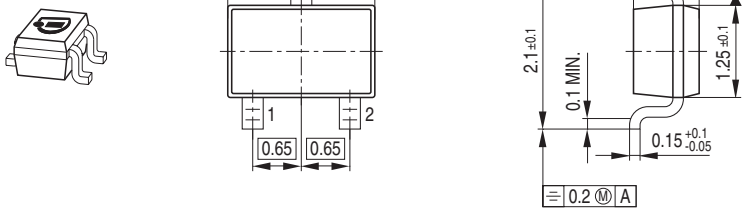


Standard Packing

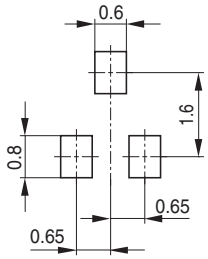
Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



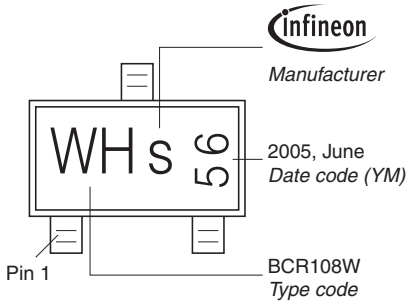
Package Outline



Foot Print

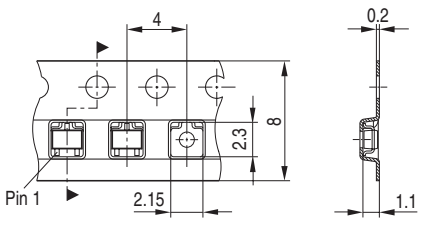


Marking Layout (Example)

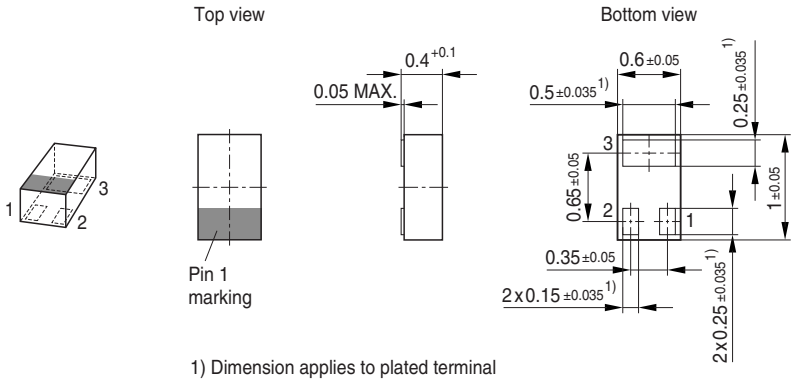


Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



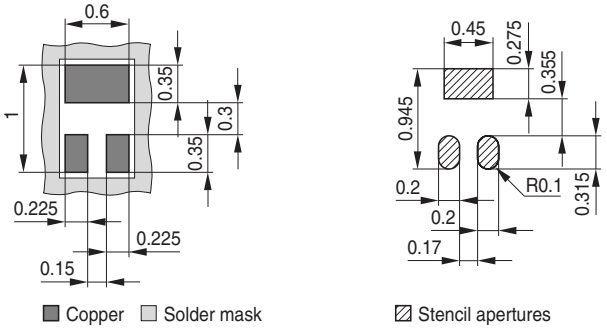
Package Outline



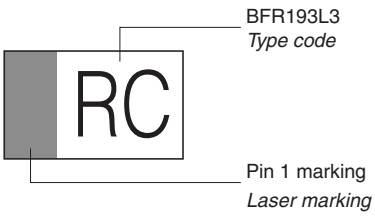
1) Dimension applies to plated terminal

Foot Print

For board assembly information please refer to Infineon website "Packages"

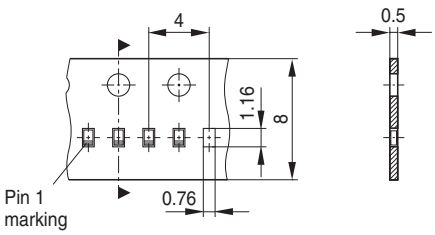


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



Edition 2009-11-16

Published by
Infineon Technologies AG
81726 Munich, Germany

© 2009 Infineon Technologies AG
All Rights Reserved.

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (<www.infineon.com>).

Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.
Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.