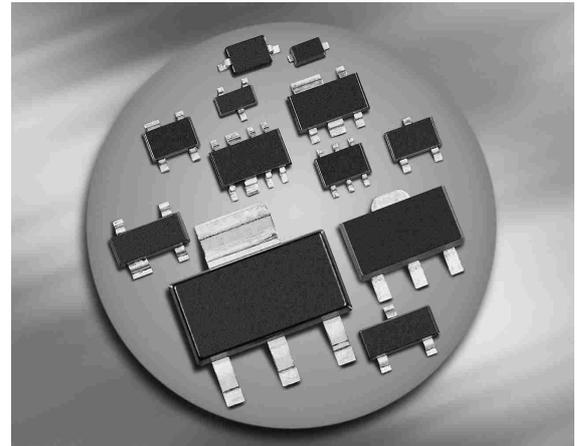**PNP Silicon AF Transistor**

- 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:

  BC847...-BC850... (NPN)

- Pb-free (RoHS compliant) package

- Qualified according AEC Q101[1]

[1]BC857BL3 is not qualified according AEC Q101

Type	Marking	Pin Configuration						Package
BC857A	3Es	1=B	2=E	3=C	-	-	-	SOT23
BC857B	3Fs	1=B	2=E	3=C	-	-	-	SOT23
BC857BL3*	3F	1=B	2=E	3=C	-	-	-	TSLP-3-1
BC857BW	3Fs	1=B	2=E	3=C	-	-	-	SOT323
BC857C	3Gs	1=B	2=E	3=C	-	-	-	SOT23
BC857CW	3Gs	1=B	2=E	3=C	-	-	-	SOT323
BC858A	3Js	1=B	2=E	3=C	-	-	-	SOT23
BC858B	3Ks	1=B	2=E	3=C	-	-	-	SOT23
BC858BW	3Ks	1=B	2=E	3=C	-	-	-	SOT323
BC858C	3Ls	1=B	2=E	3=C	-	-	-	SOT23
BC858CW	3Ls	1=B	2=E	3=C	-	-	-	SOT323
BC859C	4Cs	1=B	2=E	3=C	-	-	-	SOT23
BC860B	4Fs	1=B	2=E	3=C	-	-	-	SOT23
BC860BW	4Fs	1=B	2=E	3=C	-	-	-	SOT323
BC860CW	4Gs	1=B	2=E	3=C	-	-	-	SOT323

* Not qualified according AEC Q101

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Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}		V
BC857..., BC860...		45	
BC858..., BC859...		30	
Collector-base voltage	V_{CBO}		
BC857..., BC860...		50	
BC858..., BC859...		30	
Emitter-base voltage	V_{EBO}	5	
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, BC857-BC860		330	
$T_S \leq 135$ °C, BC857BL3		250	
$T_S \leq 124$ °C, BC857W-BC860W		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
BC857-BC860		≤ 240	
BC857BL3		≤ 60	
BC857W-BC860W		≤ 105	

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

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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 , BC857..., BC860...		45	-	-	
I_C = 10 mA, I_B = 0 , BC858..., BC859...		30	-	-	
Collector-base breakdown voltage	$V_{(BR)CBO}$				
I_C = 10 µA, I_E = 0 , BC857..., BC860...		50	-	-	
I_C = 10 µA, I_E = 0 , BC858..., BC859...		30	-	-	
Emitter-base breakdown voltage	$V_{(BR)EBO}$	5	-	-	
I_E = 1 µA, I_C = 0					
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		125	180	250	
I_C = 2 mA, V_{CE} = 5 V, h_{FE}-grp.B		220	290	475	
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		-	75	300	
I_C = 100 mA, I_B = 5 mA		-	250	650	
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		-	850	-	
Base-emitter voltage[1]	$V_{BE(ON)}$				
I_C = 2 mA, V_{CE} = 5 V		600	650	750	
I_C = 10 mA, V_{CE} = 5 V		-	-	820	

[1]Pulse test: t < 300µs; D < 2%

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

| Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Transition frequency I_C = 20 mA, V_{CE} = 5 V, f = 100 MHz	f_T	-	250	-	MHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz	C_{cb}	-	1.5	-	pF
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	8	-	
Short-circuit input impedance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.A I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.B I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.C	h_{11e}	 - - -	 2.7 4.5 8.7	 - - -	kΩ
Open-circuit reverse voltage transf. ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.A I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.B I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.C	h_{12e}	 - - -	 1.5 2 3	 - - -	10^{-4}
Short-circuit forward current transf. ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.A I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.B I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.C	h_{21e}	 - - -	 200 330 600	 - - -	-
Open-circuit output admittance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.A I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.B I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz, h_{FE}-grp.C	h_{22e}	 - - -	 18 30 60	 - - -	µS
Noise figure I_C = 0.2 mA, V_{CE} = 5 V, f = 1 kHz, Δf = 200 Hz, R_S = 2 kΩ, BC859, BC850	F	-	1	4	dB
Equivalent noise voltage I_C = 200 mA, V_{CE} = 5 V, R_S = 2 kΩ, f = 10...50 Hz, BC860	V_n	-	-	0.11	µV

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DC current gain $h_{FE} = f(I_C)$
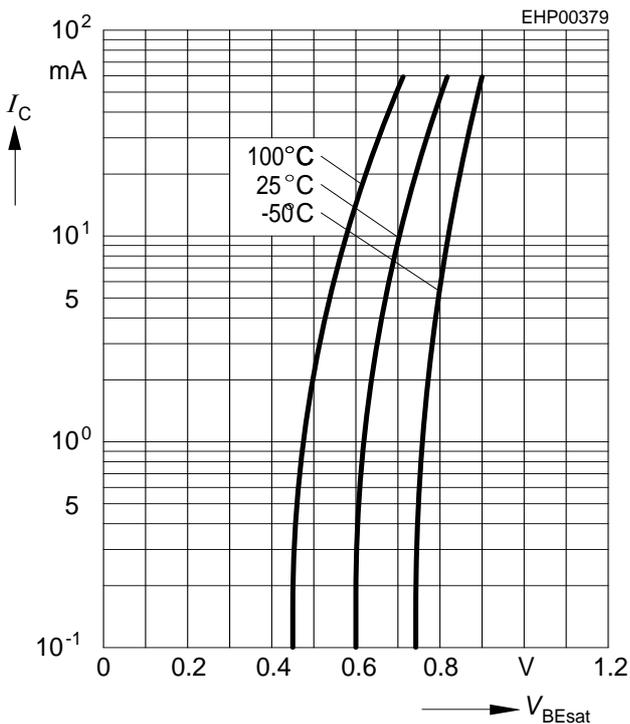
$V_{CE} = 1$ V
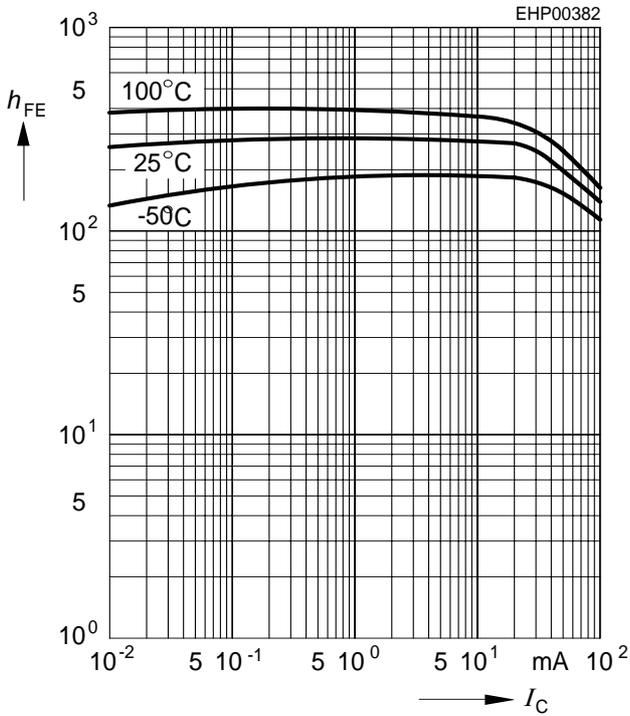
Collector-emitter saturation voltage

$I_C = f(V_{CEsat}), h_{FE} = 20$
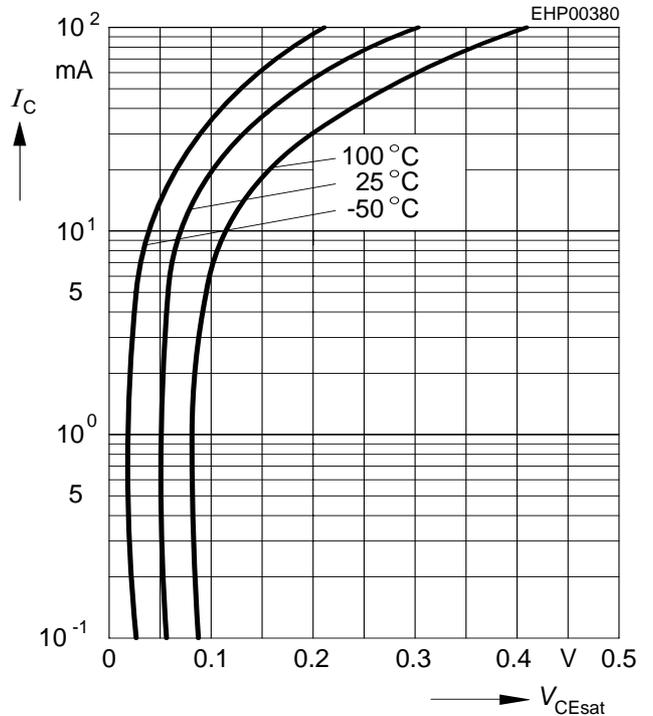
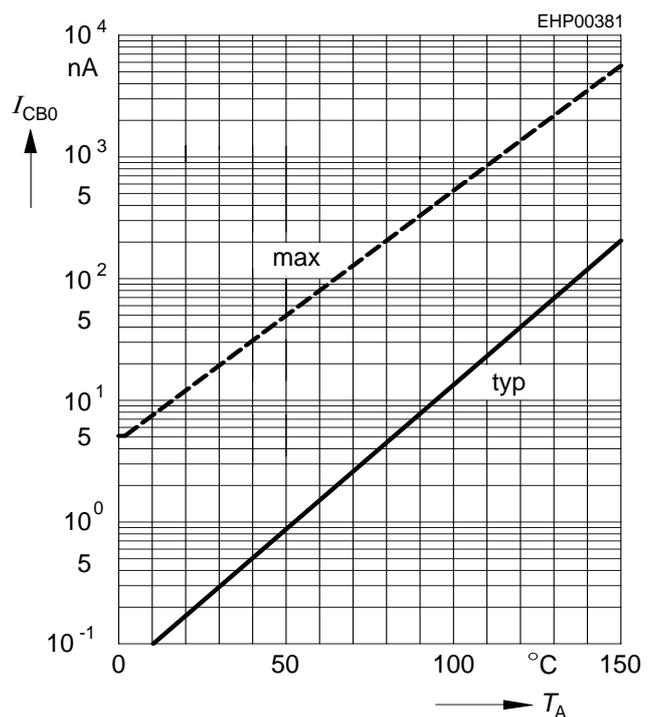**Base-emitter saturation voltage**
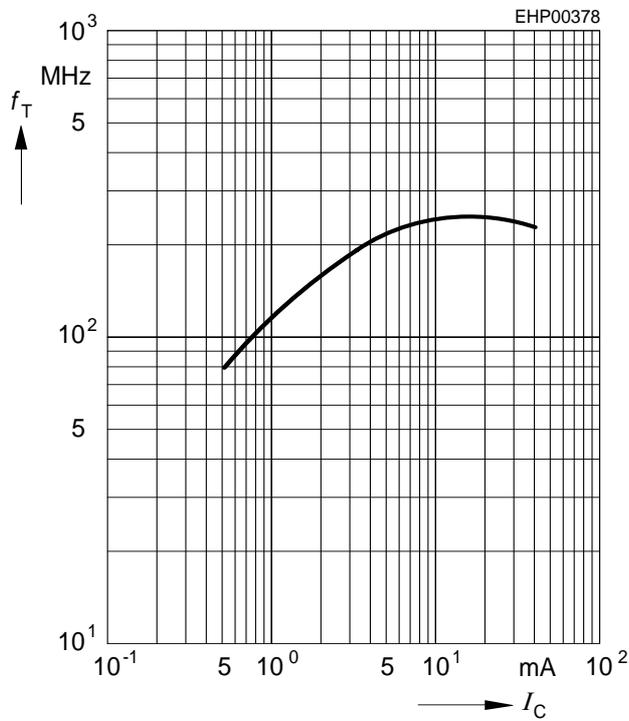
$I_C = f(V_{BEsat}), h_{FE} = 20$

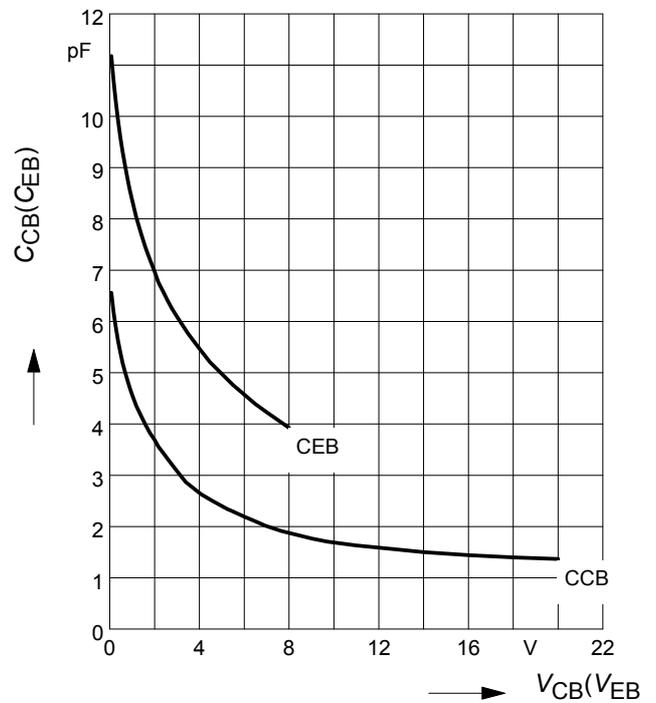**Collector cutoff current** $I_{CBO} = f(T_A)$

$V_{CBO} = 30$ V

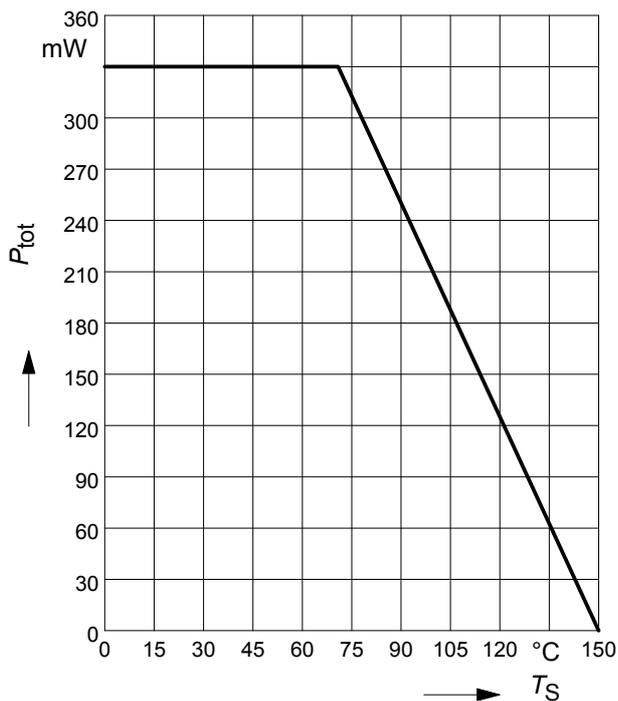2011-09-19

Transition frequency $f_T = f(I_C)$

V_{CE} = 5 V

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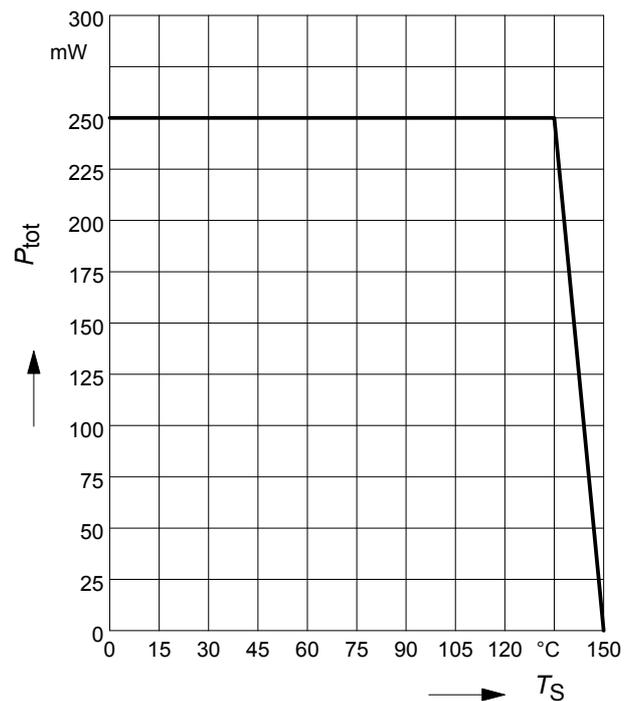
Emitter-base capacitance $C_{eb} = f(V_{EB})$

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

BC856-BC860

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

BC857BL3

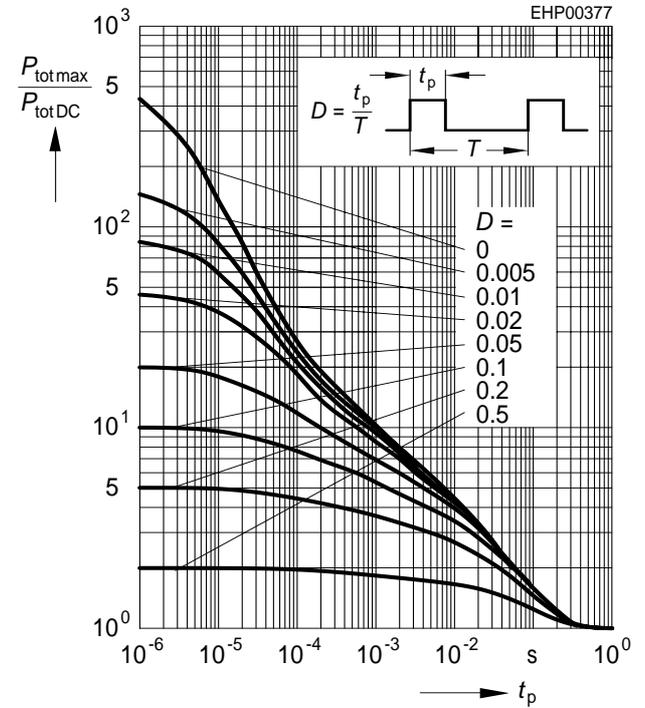6   2011-09-19
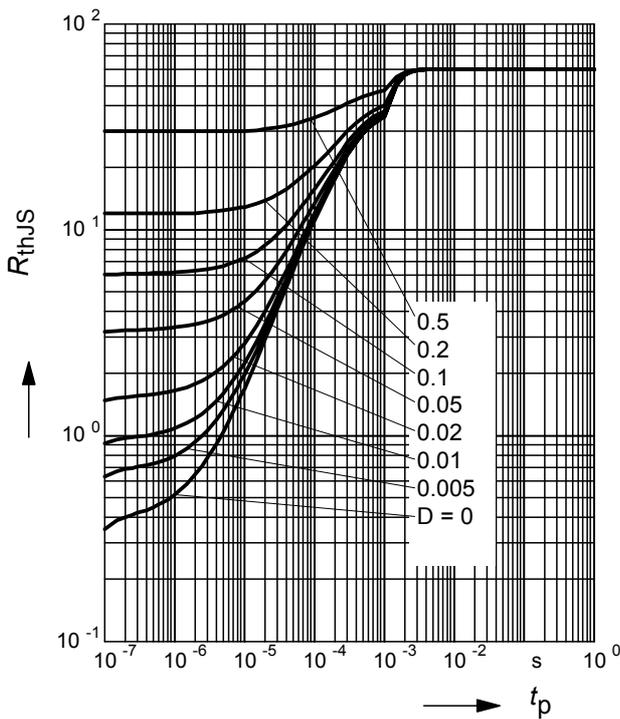
Total power dissipation $P_{tot} = f(T_S)$

BC857W-BC860W
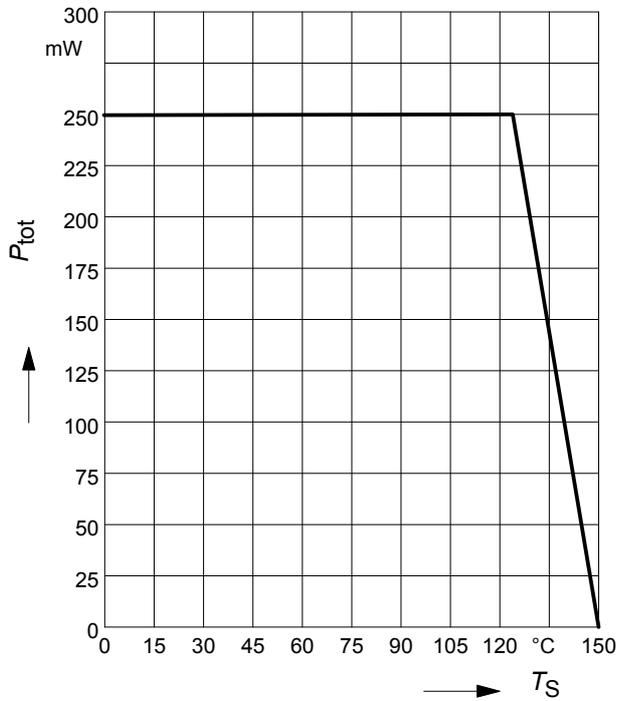
Permissible Pulse Load

$P_{totmax}/P_{totDC} = f(t_p)$
BC857/W-BC860/W

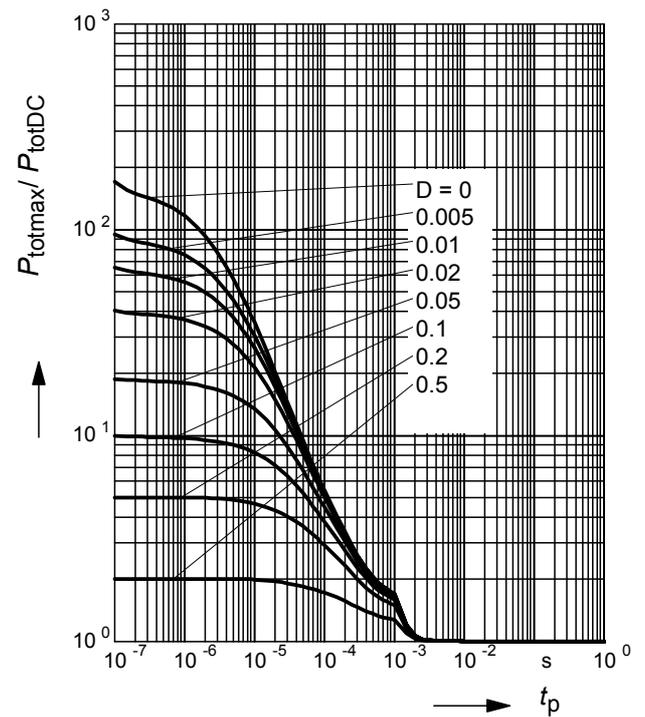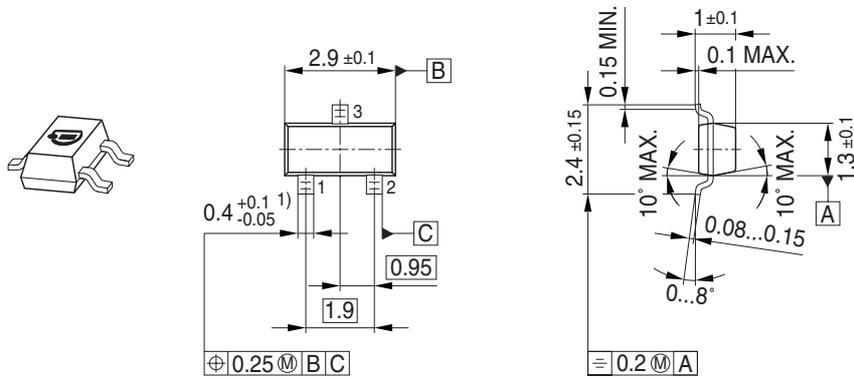**Permissible Puls Load** $R_{thJS} = f(t_p)$

BC857BL3

Permissible Pulse Load

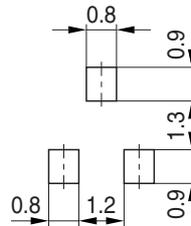$P_{totmax}/P_{totDC} = f(t_p)$
BC857BL3

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Package Outline

2.9 ±0.1   B

3

1

2

0.4 +0.1 1) −0.05

C

0.95

1.9

1 ±0.1

0.1 MAX.

0.15 MIN.

2.4 ±0.15

10° MAX.

10° MAX.

1.3 ±0.1

A

0.08...0.15

0...8°

⊕ 0.25 Ⓜ B C

⊟ 0.2 Ⓜ A

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

Foot Print

0.8

0.9

1.3

0.8   1.2

0.9

Marking Layout (Example)

Ⓘnfineon
Manufacturer

EH S 56

2005, June
Date code (YM)

Pin 1

BCW66
Type code

Standard Packing

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

4

0.9

0.2

2.13

2.65

8

Pin 1

3.15

1.15

Package Outline

Foot Print

Marking Layout (Example)

Manufacturer

2005, June
Date code (YM)

BCR108W
Type code

Pin 1

Standard Packing

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

Pin 1

Package Outline

Top view

Bottom view

0.4 $^{+0.1}$

0.05 MAX.

0.6 ±0.05

0.5 ±0.035 $^{1)}$

0.25 ±0.035 $^{1)}$

3

2

1

0.65 ±0.05

1 ±0.05

0.35 ±0.05

2 x 0.15 ±0.035 $^{1)}$

2 x 0.25 ±0.035 $^{1)}$

Pin 1
marking

1) Dimension applies to plated terminal
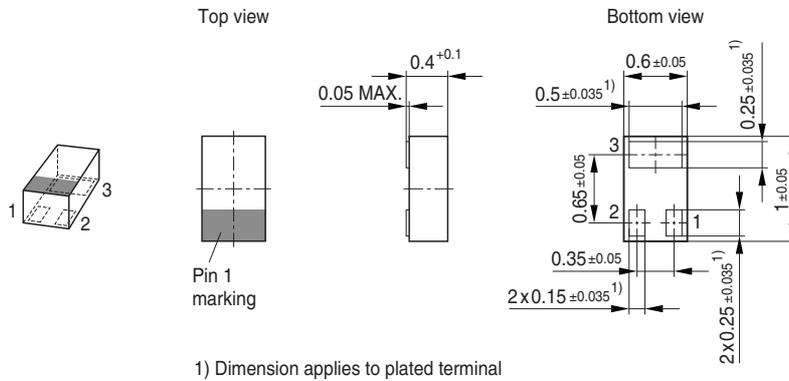
Foot Print

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

0.6

0.35

0.35

0.3

1

0.225

0.225

0.15

0.45

0.275

0.355

0.945

0.315

0.2

0.2

0.17

R0.1

☐ Copper   ☐ Solder mask   ▨ Stencil apertures

Marking Layout (Example)

BFR193L3
Type code

RC

Pin 1 marking
Laser marking
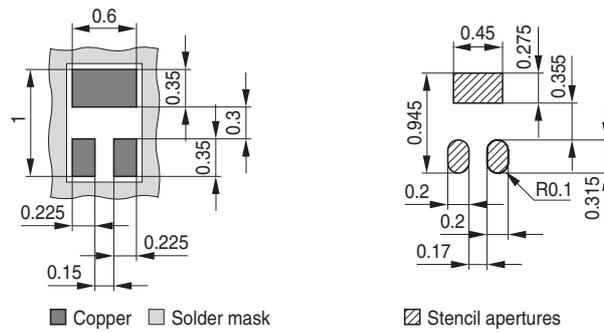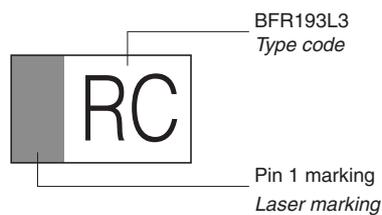
Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel
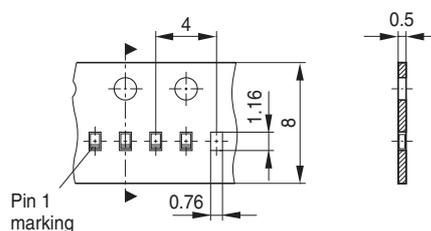
4

0.5

1.16

8

Pin 1
marking

0.76

Edition 2009-11-16

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