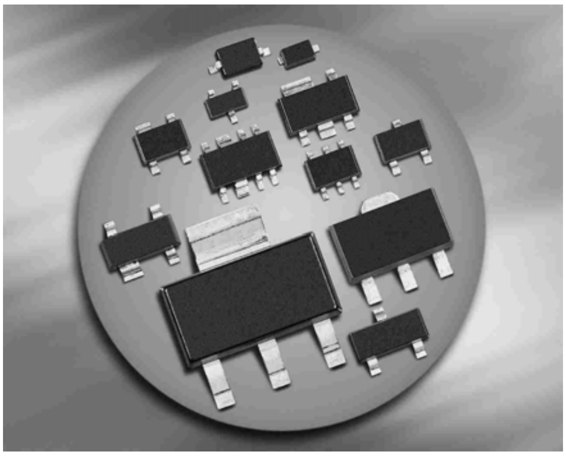
PNP Silicon AF Transistor

- 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:
  BC846...-BC850... (NPN)



Type	**Marking**	**Pin Configuration**						**Package**
BC856A	3As	1=B	2=E	3=C	-	-	-	SOT23
BC856B	3Bs	1=B	2=E	3=C	-	-	-	SOT23
BC856BW	3Bs	1=B	2=E	3=C	-	-	-	SOD323
BC857A	3Es	1=B	2=E	3=C	-	-	-	SOT23
BC857AW	3Es	1=B	2=E	3=C	-	-	-	SOT323
BC857B	3Fs	1=B	2=E	3=C	-	-	-	SOT23
BC857BF	3Fs	1=B	2=E	3=C	-	-	-	TSFP-3
BC857BL3	3F	1=B	2=E	3=C	-	-	-	TSLP-3-1
BC857BT	3F	1=B	2=E	3=C	-	-	-	SC75
BC857BW	3Fs	1=B	2=E	3=C	-	-	-	SOD323
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
BC858AT	3J	1=B	2=E	3=C	-	-	-	SC75
BC858B	3Ks	1=B	2=E	3=C	-	-	-	SOT23
BC858BF	3Ks	1=B	2=E	3=C	-	-	-	TSFP-3
BC858BL3	3K	1=B	2=E	3=C	-	-	-	TSLP-3-1
BC858BT	3K	1=B	2=E	3=C	-	-	-	SC75
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
BC859AW	4As	1=B	2=E	3=C	-	-	-	SOT323
BC859B	4Bs	1=B	2=E	3=C	-	-	-	SOT23
BC859BF	4Bs	1=B	2=E	3=C	-	-	-	TSFP-3
BC859C	4Cs	1=B	2=E	3=C	-	-	-	SOT23
BC860B	4Fs	1=B	2=E	3=C	-	-	-	SOT23
BC860BF	4Fs	1=B	2=E	3=C	-	-	-	TSFP-3
BC860BW	4Fs	1=B	2=E	3=C	-	-	-	SOT323
BC860CW	4Gs	1=B	2=E	3=C	-	-	-	SOT323

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}		V
BC856...		65	
BC857..., BC860...		45	
BC858..., BC859...		30	
Collector-base voltage	V_{CBO}		
BC856...		80	
BC857..., BC860...		50	
BC858..., BC859...		30	
Emitter-base voltage	V_{EBO}	5	
Collector current	I_{C}	100	mA
Peak collector current	I_{CM}	200	
Total power dissipation	P_{tot}		mW
$T_{\mathrm{S}} \leq 71$ °C, BC856-BC860		330	
$T_{\mathrm{S}} \leq 128$ °C, BC857BF-BC860BF		250	
$T_{\mathrm{S}} \leq 135$ °C, BC857BL3, BC860BL3		250	
$T_{\mathrm{S}} \leq 109$ °C, BC857BT, BC858BT		250	
$T_{\mathrm{S}} \leq 124$ °C, BC856W-BC860W		250	
Junction temperature	T_{j}	150	°C
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point1)	R_{thJS}		K/W
BC856-BC860		≤ 240	
BC857BF-BC860BF		≤ 90	
BC857BL3, BC858BL3		≤ 60	
BC857BT, BC858BT		≤ 165	
BC856W-BC860W		≤ 105	

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

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 , BC856...		65	-	-	
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 , BC856...		80	-	-	
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 gain1)	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 voltage1)	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 voltage1)	V_{BEsat}				
I_C = 10 mA, I_B = 0.5 mA		-	700	-	
I_C = 100 mA, I_B = 0.5 mA		-	850	-	
Base-emitter voltage1)	$V_{BE(ON)}$				
I_C = 2 mA, V_{CE} = 5 V		600	650	750	
I_C = 10 mA, V_{CE} = 5 V		-	-	820	

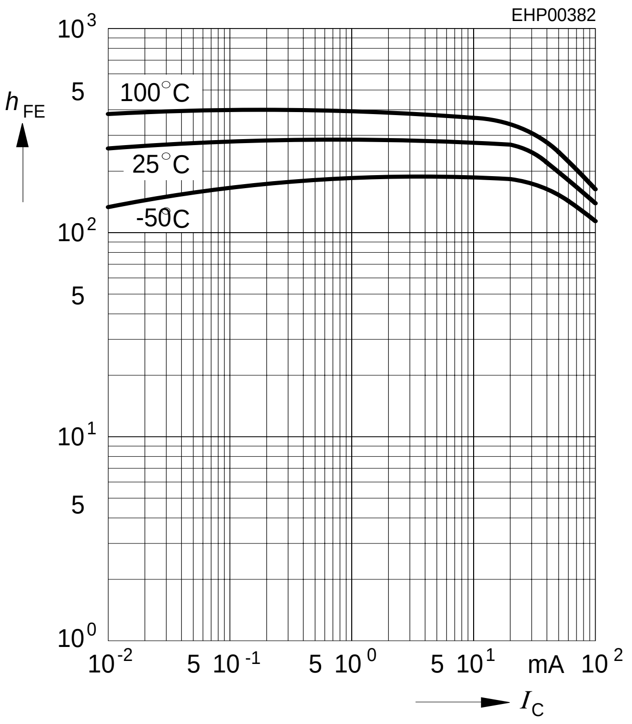
[1] Pulse test: t < 300µs; D < 2%

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Transition frequency	f_T	-	250	-	MHz
I_C = 20 mA, V_{CE} = 5 V, f = 100 MHz					
Collector-base capacitance	C_{cb}	-	1.5	-	pF
V_{CB} = 10 V, f = 1 MHz					
Emitter-base capacitance	C_{eb}	-	8	-	
V_{EB} = 0.5 V, f = 1 MHz					
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 = 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

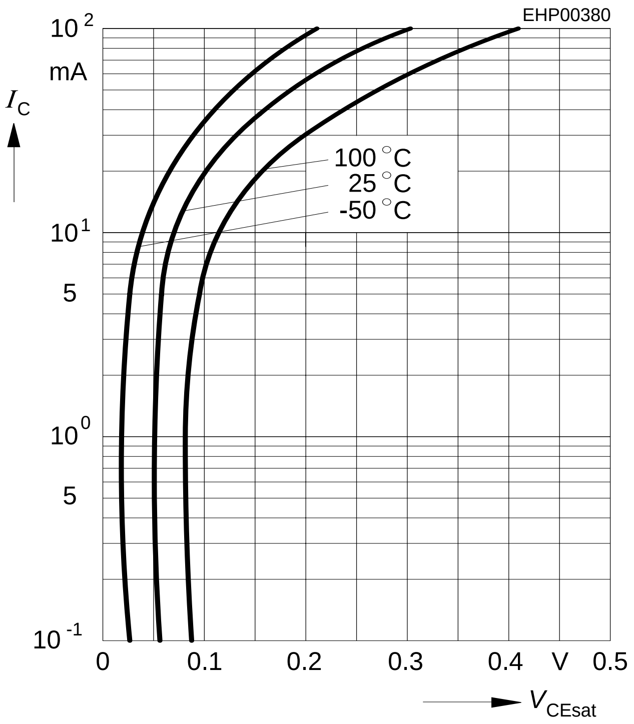
DC current gain $h_{FE} = f(I_C)$

V_{CE} = 1 V



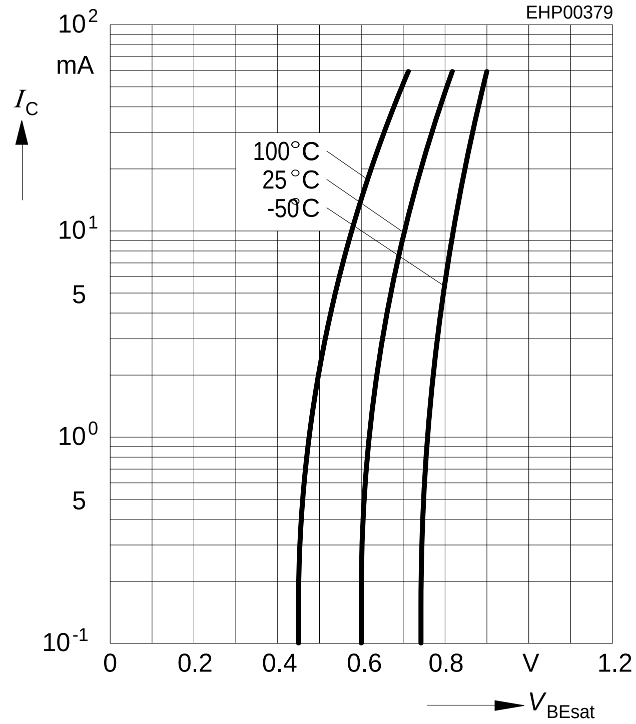
Collector-emitter saturation voltage

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



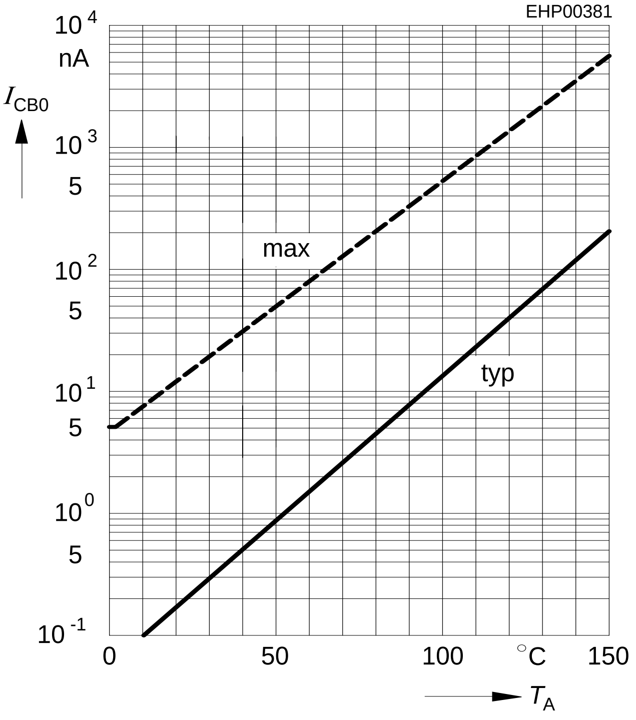
Base-emitter saturation voltage

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



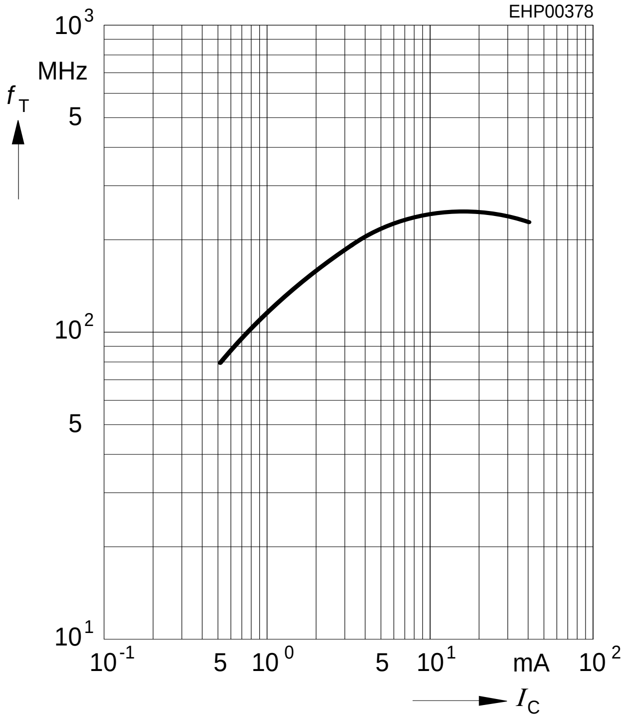
Collector cutoff current $I_{CBO} = f(T_A)$

V_{CBO} = 30 V



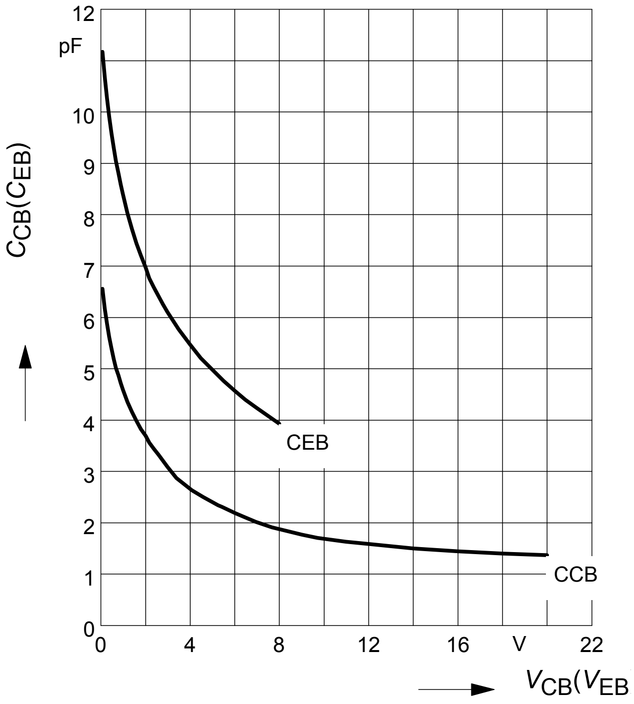
Transition frequency $f_T = f(I_C)$

$V_{CE} = 5$ V



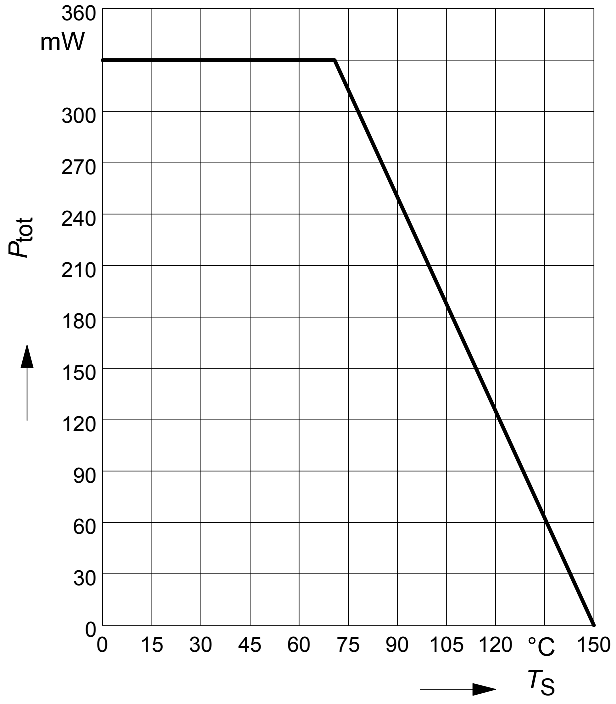
Collector-base capacitance $C_{cb} = f(V_{CB})$

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



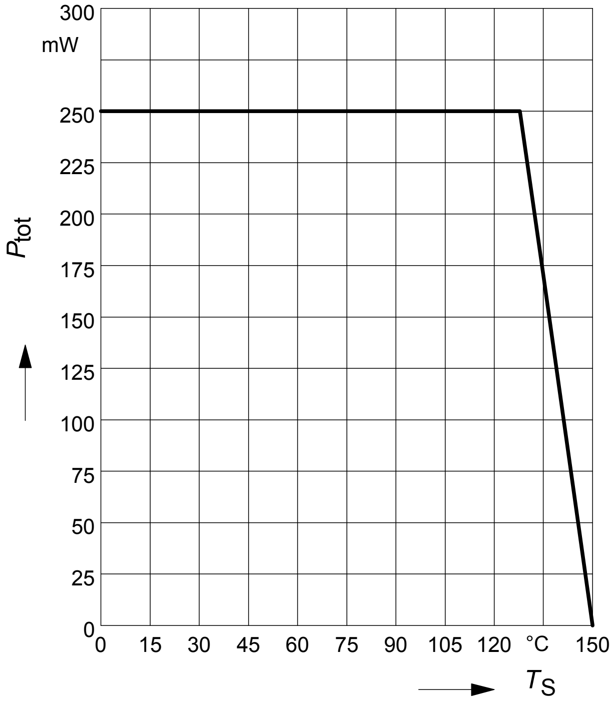
Total power dissipation $P_{tot} = f(T_S)$

BC856-BC860



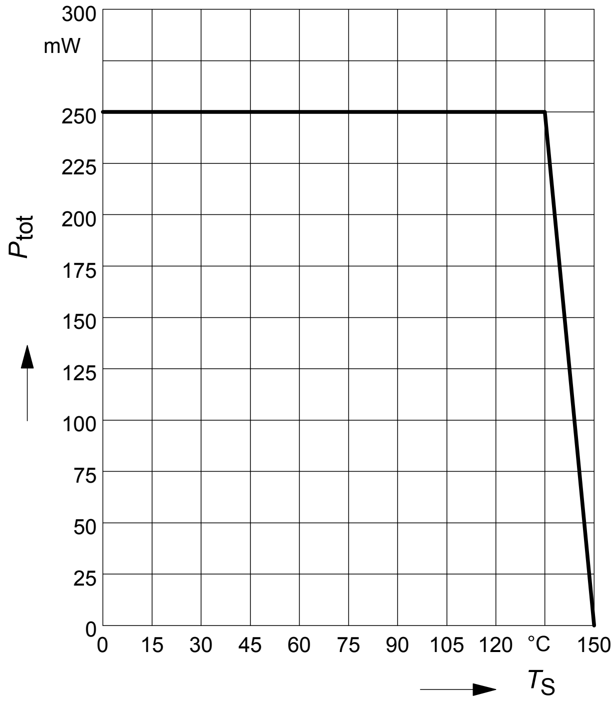
Total power dissipation $P_{tot} = f(T_S)$

BC857BF-BC860BF



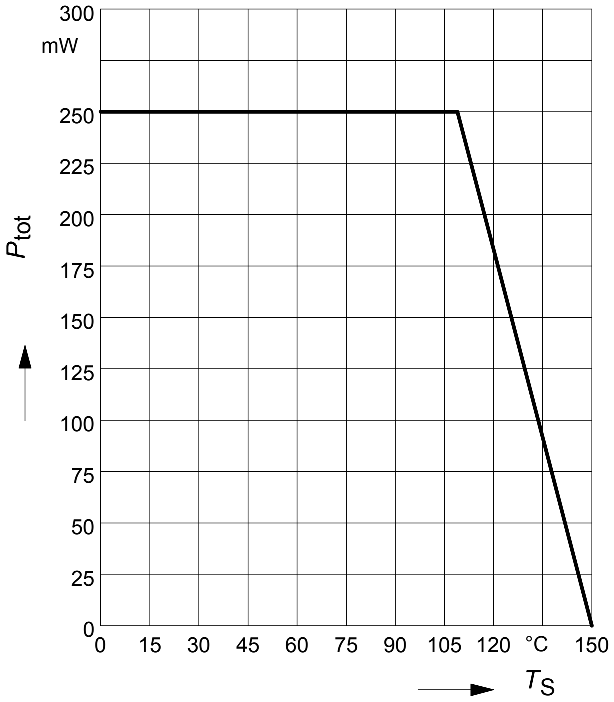
Total power dissipation $P_{tot} = f(T_S)$

BC857BL3, BC858BL3



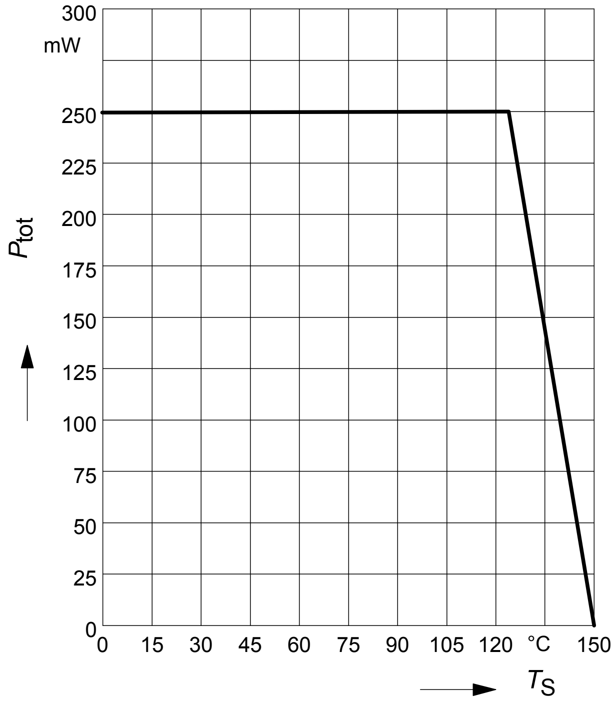
Total power dissipation $P_{tot} = f(T_S)$

BC857BT, BC858BT



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

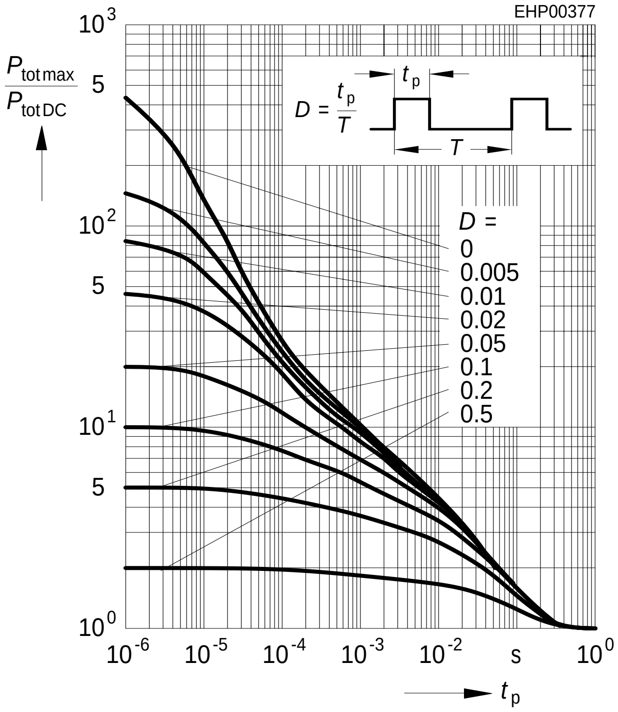
BC856W-BC860W



Permissible Pulse Load

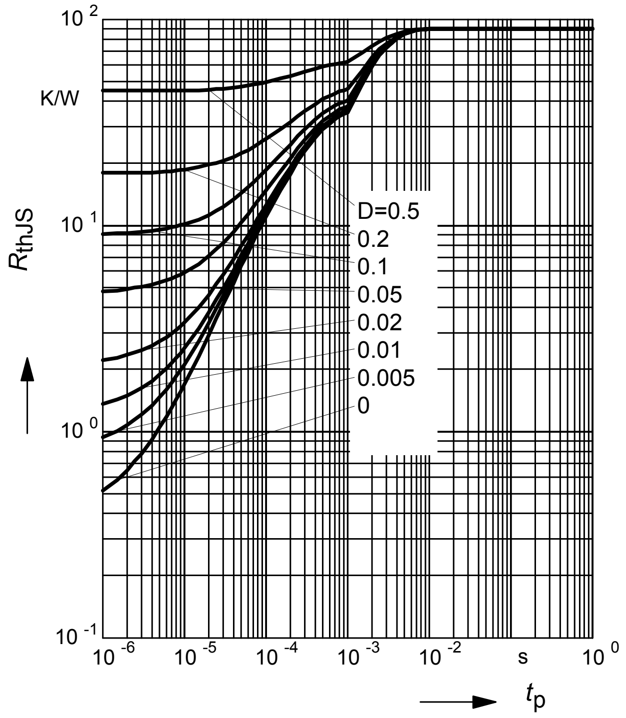
$P_{totmax}/P_{totDC} = f(t_p)$

BC856/W-BC860/W



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

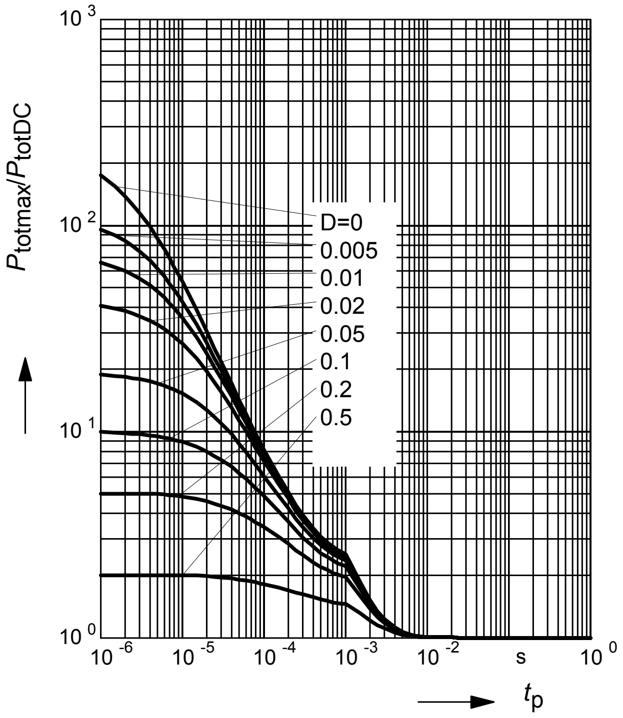
BC857BF-BC860BF



Permissible Pulse Load

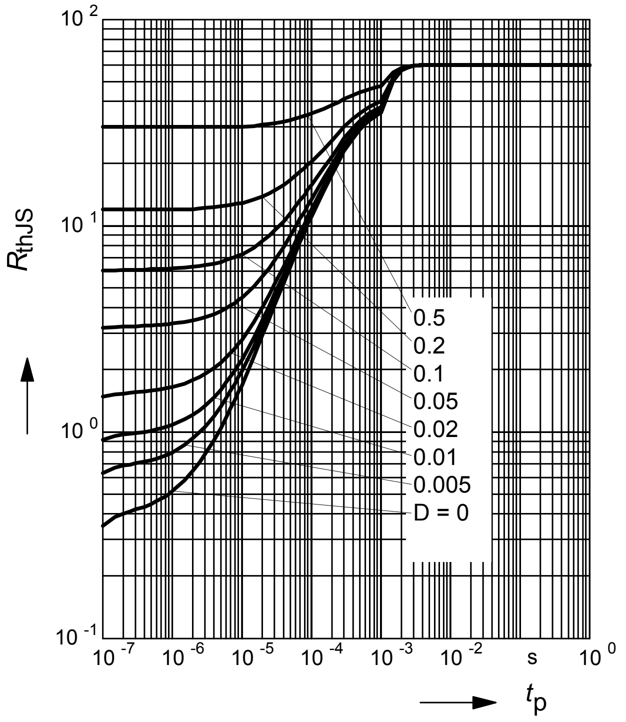
$P_{totmax}/P_{totDC} = f(t_p)$

BC857BF-BC860BF



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

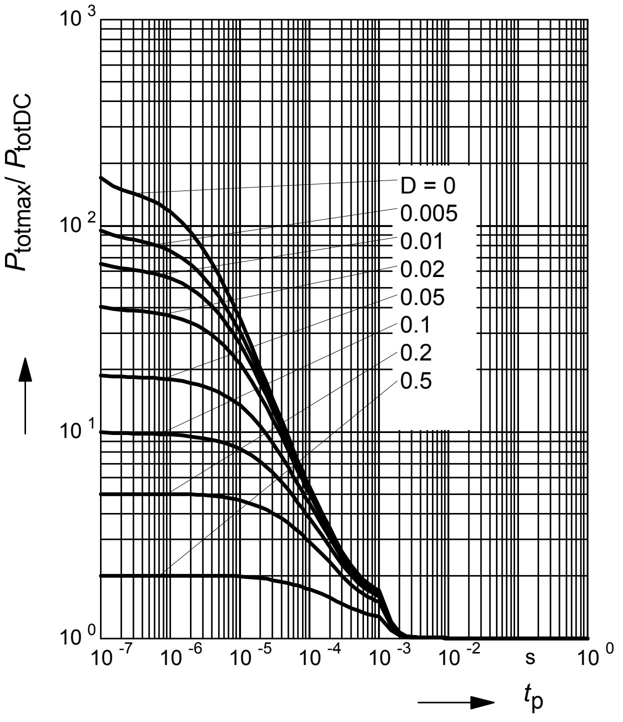
BC857BL3, BC858BL3



Permissible Pulse Load

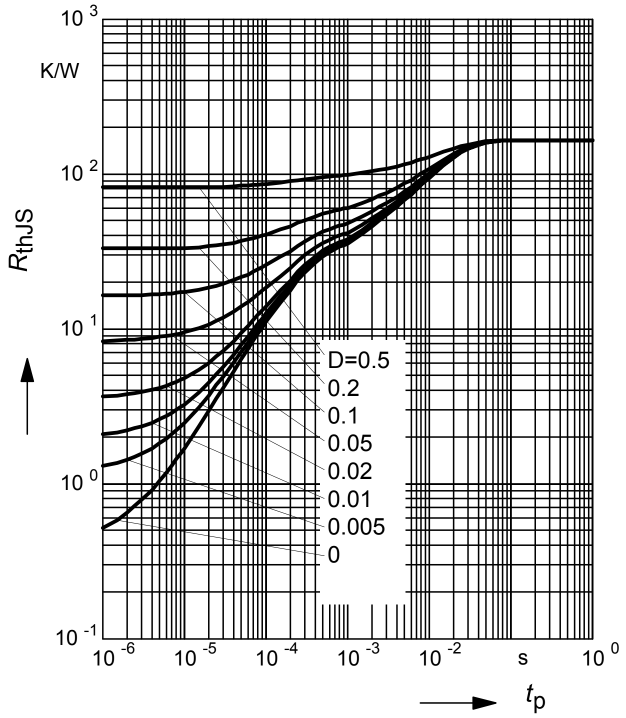
$P_{totmax}/P_{totDC} = f(t_p)$

BC857BL3, BC858BL3



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

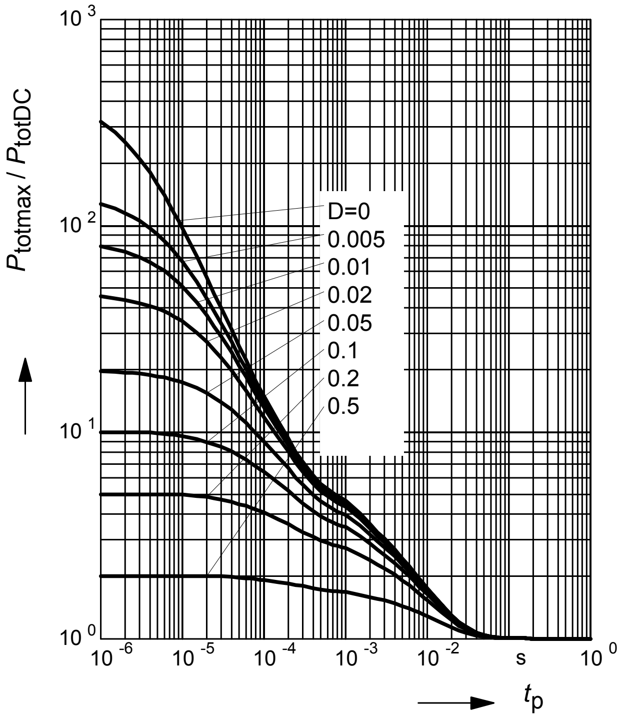
BC857BT, BC858BT



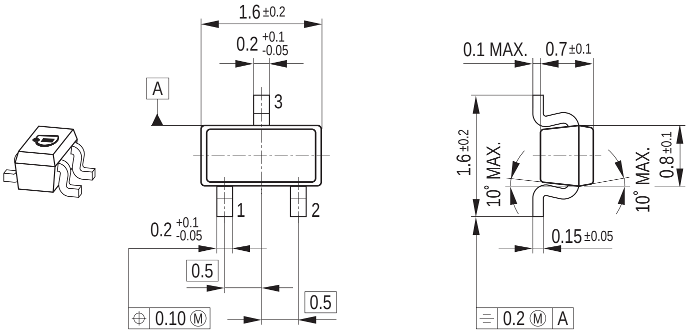
Permissible Pulse Load

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

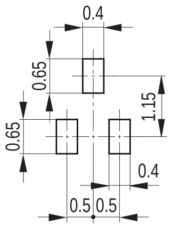
BC857BT, BC858BT



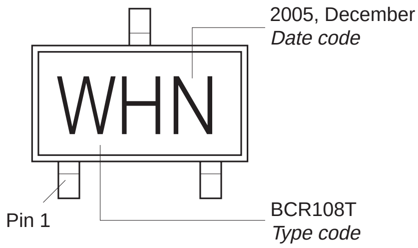
Package Outline



Foot Print

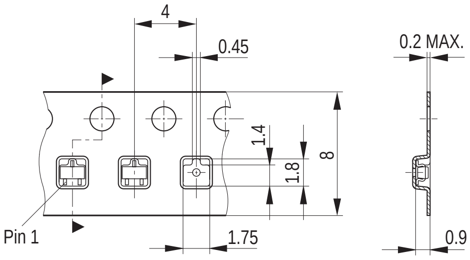


Marking Layout (Example)



Standard Packing

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

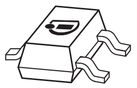


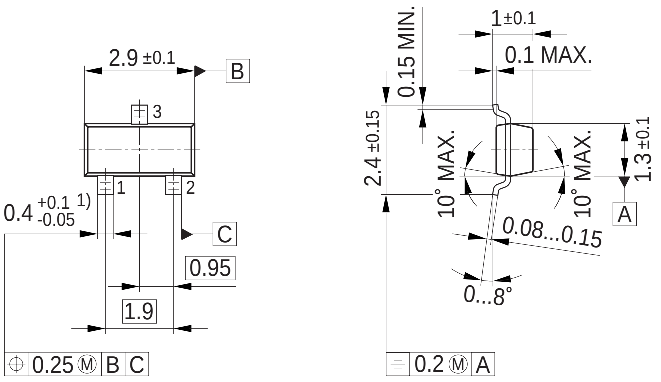
Date Code marking for discrete packages with one digit (SCD80, SC79, SC75[1])) CES-Code

Month	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
01	a	p	A	P	a	p	A	P	a	p	A	P
02	b	q	B	Q	b	q	B	Q	b	q	B	Q
03	c	r	C	R	c	r	C	R	c	r	C	R
04	d	s	D	S	d	s	D	S	d	s	D	S
05	e	t	E	T	e	t	E	T	e	t	E	T
06	f	u	F	U	f	u	F	U	f	u	F	U
07	g	v	G	V	g	v	G	V	g	v	G	V
08	h	x	H	X	h	x	H	X	h	x	H	X
09	j	y	J	Y	j	y	J	Y	j	y	J	Y
10	k	z	K	Z	k	z	K	Z	k	z	K	Z
11	l	2	L	4	l	2	L	4	l	2	L	4
12	n	3	N	5	n	3	N	5	n	3	N	5

1) New Marking Layout for SC75, implemented at October 2005.

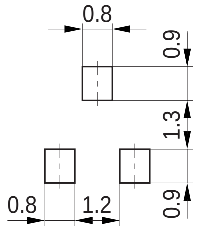
Package Outline



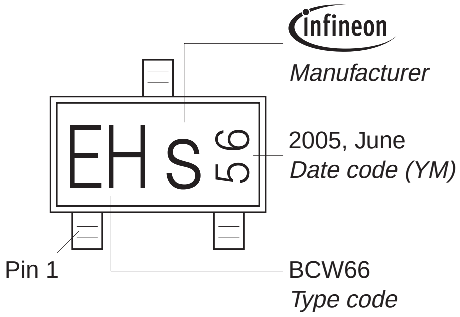


1) Lead width can be 0.6 max. in dambar area

Foot Print

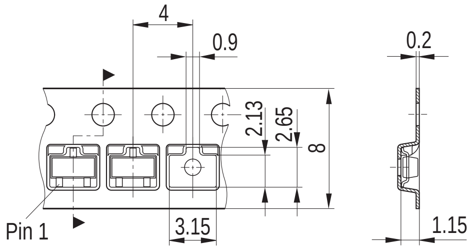


Marking Layout (Example)

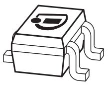


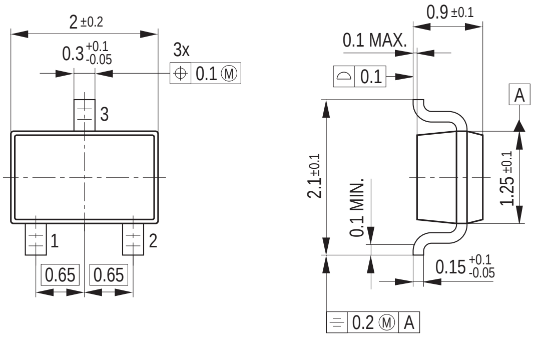
Standard Packing

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



Package Outline





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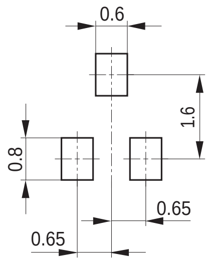
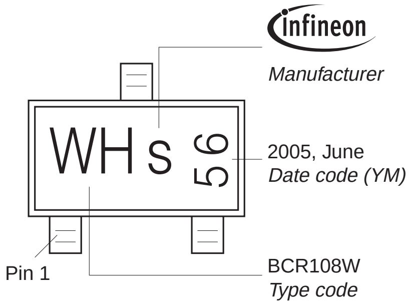


Marking Layout (Example)



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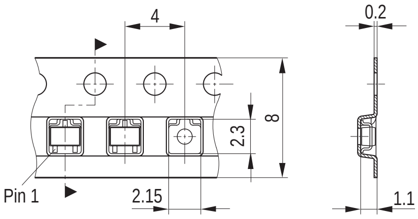
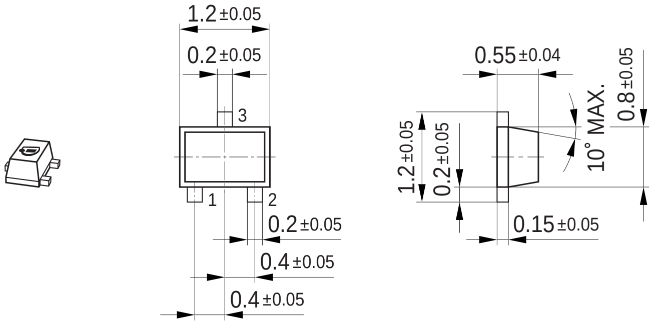


Package Outline



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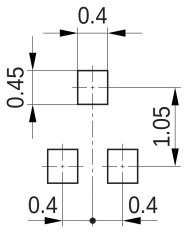
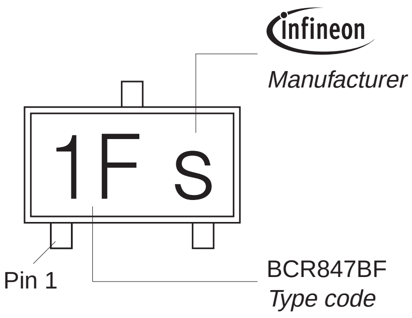


Marking Layout (Example)



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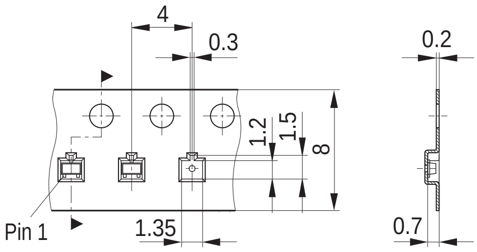
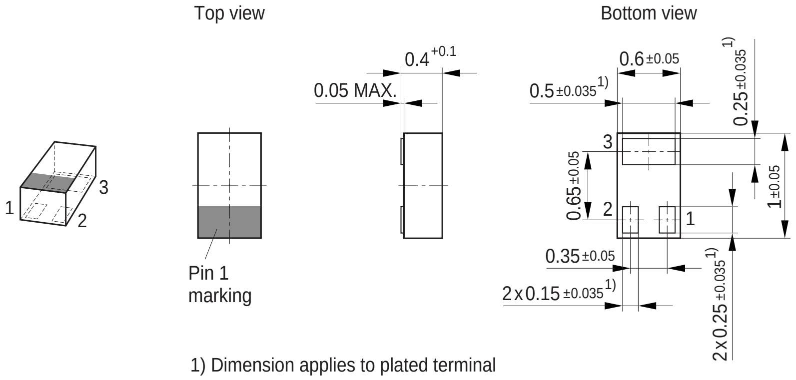
Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



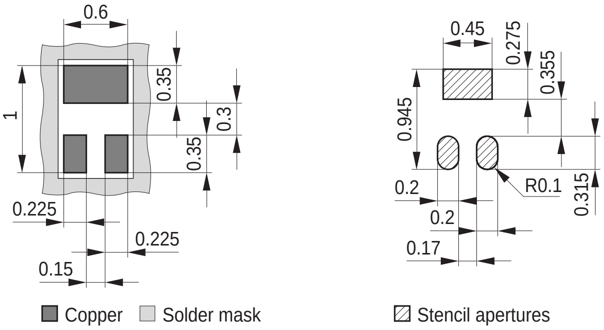
Package Outline



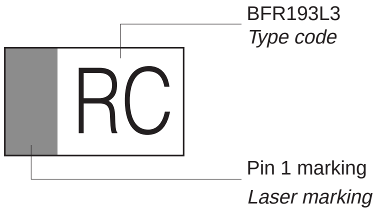
1) Dimension applies to plated terminal

Foot Print

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

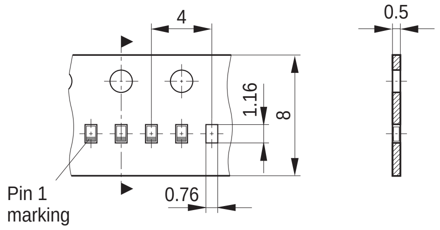


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



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