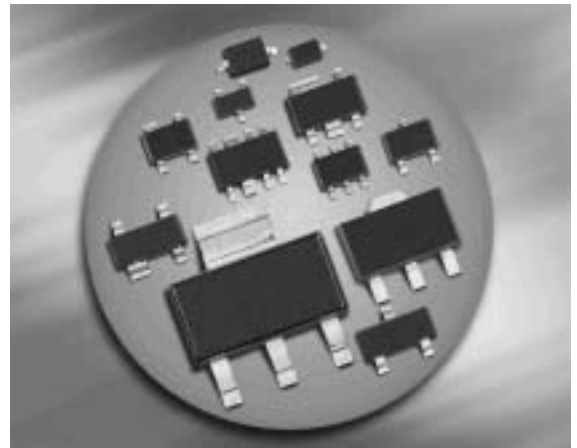


PNP Silicon AF Transistor

- 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)
- Pb-free (RoHS compliant) package¹⁾
- Qualified according AEC Q101



¹Pb-containing package may be available upon special request

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

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ¹⁾ BC856-BC860 BC857BF-BC860BF BC857BL3, BC858BL3 BC857BT, BC858BT BC856W-BC860W	R_{thJS}	≤ 240 ≤ 90 ≤ 60 ≤ 165 ≤ 105	K/W

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

Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage $I_C = 10\text{ mA}$, $I_B = 0$, BC856... $I_C = 10\text{ mA}$, $I_B = 0$, BC857..., BC860... $I_C = 10\text{ mA}$, $I_B = 0$, BC858..., BC859...	$V_{(BR)CEO}$	65 45 30	- - -	- - -	V
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$, $I_E = 0$, BC856... $I_C = 10\text{ }\mu\text{A}$, $I_E = 0$, BC857..., BC860... $I_C = 10\text{ }\mu\text{A}$, $I_E = 0$, BC858..., BC859...	$V_{(BR)CBO}$	80 50 30	- - -	- - -	
Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$, $I_C = 0$	$V_{(BR)EBO}$	5	-	-	
Collector-base cutoff current $V_{CB} = 45\text{ V}$, $I_E = 0$ $V_{CB} = 30\text{ V}$, $I_E = 0$, $T_A = 150\text{ }^\circ\text{C}$	I_{CBO}	- -	- -	0.015 5	
DC current gain ¹⁾ $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$, $h_{FE}\text{-grp.A}$ $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$, $h_{FE}\text{-grp.B}$ $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$, $h_{FE}\text{-grp.C}$ $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $h_{FE}\text{-grp.A}$ $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $h_{FE}\text{-grp.B}$ $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $h_{FE}\text{-grp.C}$	h_{FE}	- - - 125 220 420	140 250 480 180 290 520	- - - 250 475 800	-
Collector-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$	V_{CEsat}	- -	75 250	300 650	mV
Base emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$, $I_B = 0.5\text{ mA}$	V_{BEsat}	- -	700 850	- -	
Base-emitter voltage ¹⁾ $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$, $V_{CE} = 5\text{ V}$	$V_{BE(ON)}$	600 -	650 -	750 820	

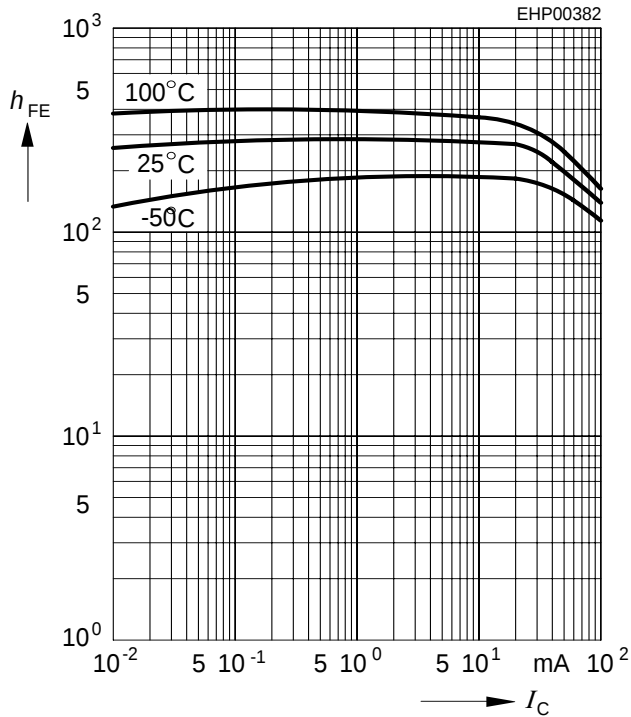
¹⁾Pulse test: $t < 300\mu\text{s}$; $D < 2\%$

Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

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

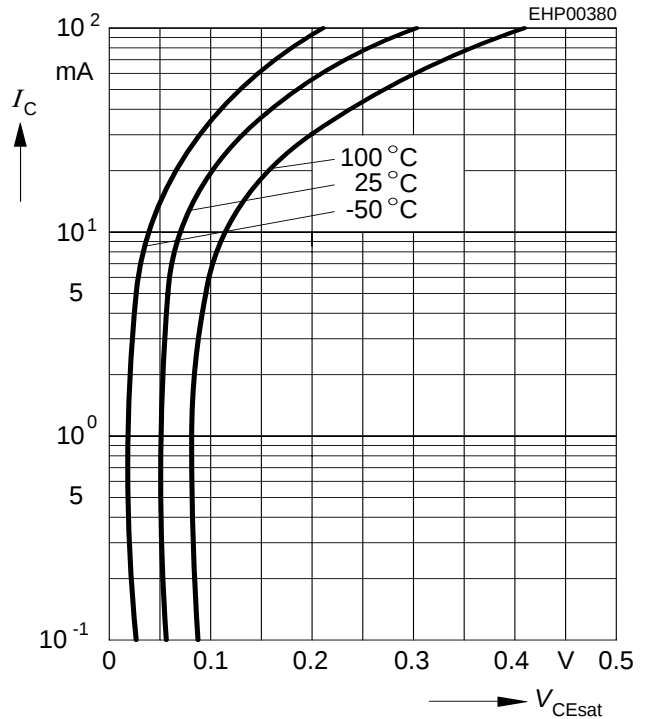
DC current gain $h_{FE} = f(I_C)$

$V_{CE} = 1 \text{ V}$



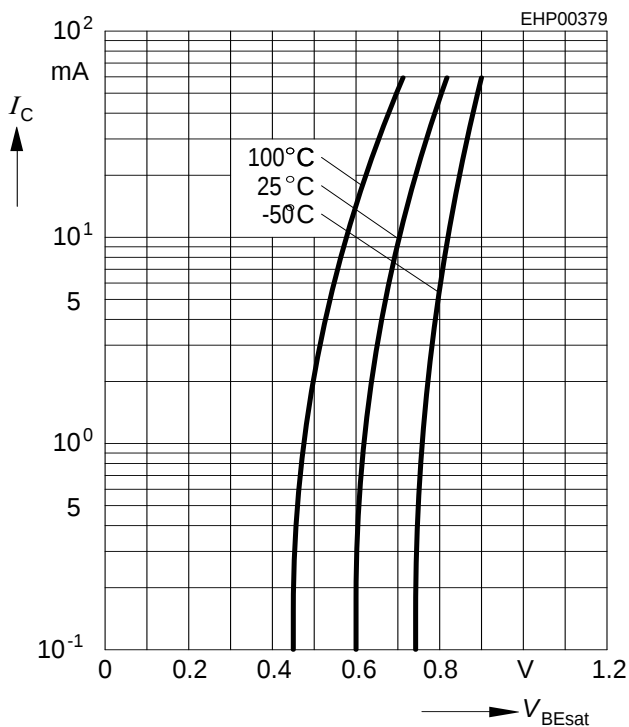
Collector-emitter saturation voltage

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



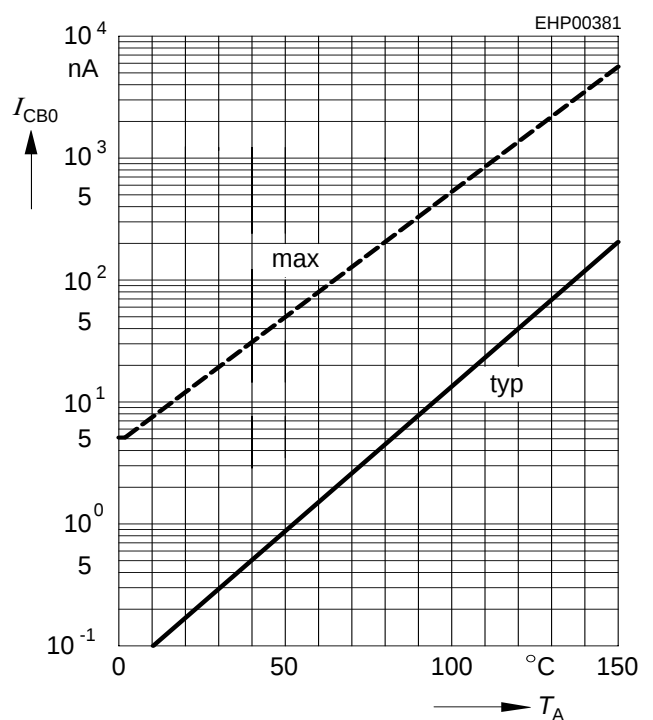
Base-emitter saturation voltage

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



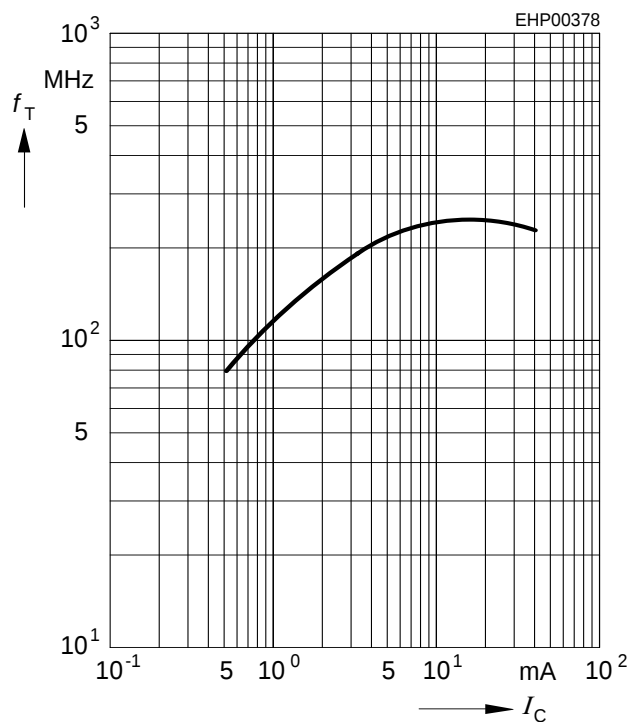
Collector cutoff current $I_{CBO} = f(T_A)$

$V_{CBO} = 30 \text{ V}$



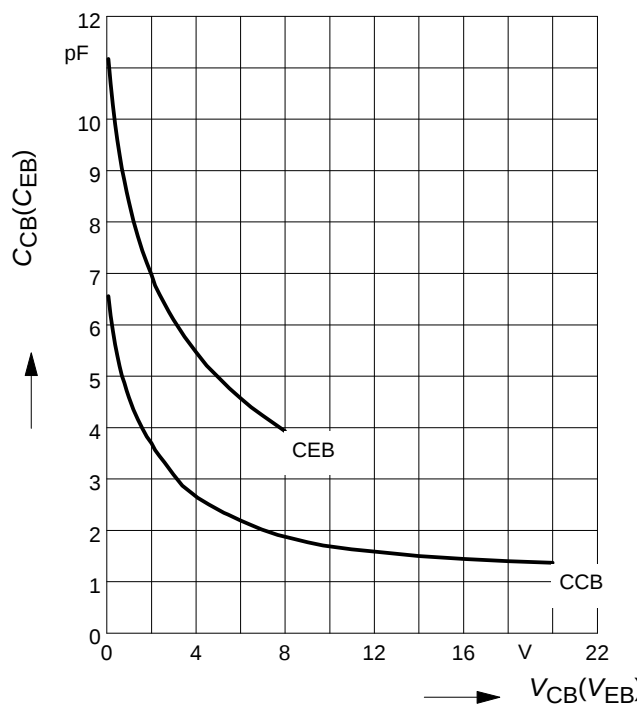
Transition frequency $f_T = f(I_C)$

$V_{CE} = 5 \text{ V}$



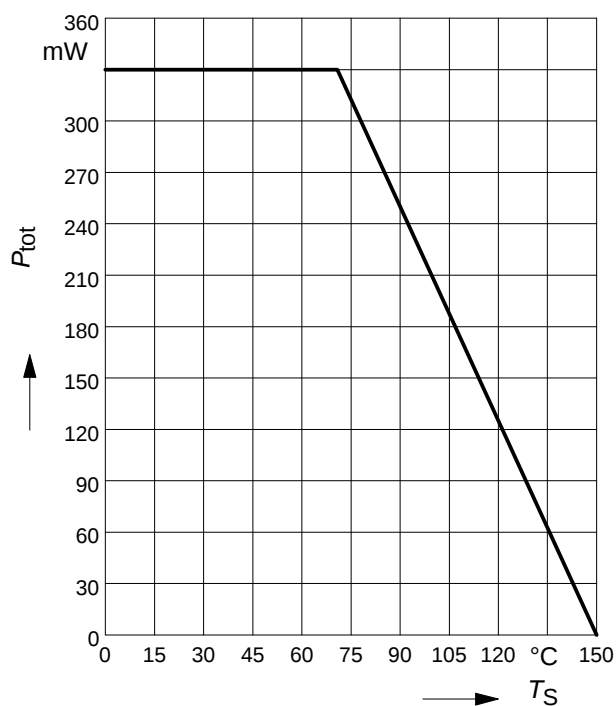
Collector-base capacitance $C_{cb} = f(V_{CB})$

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



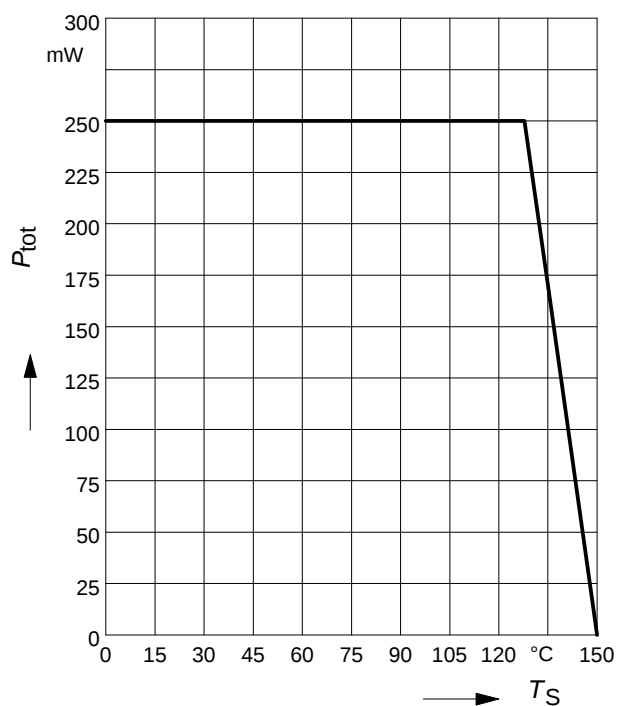
Total power dissipation $P_{tot} = f(T_S)$

BC856-BC860



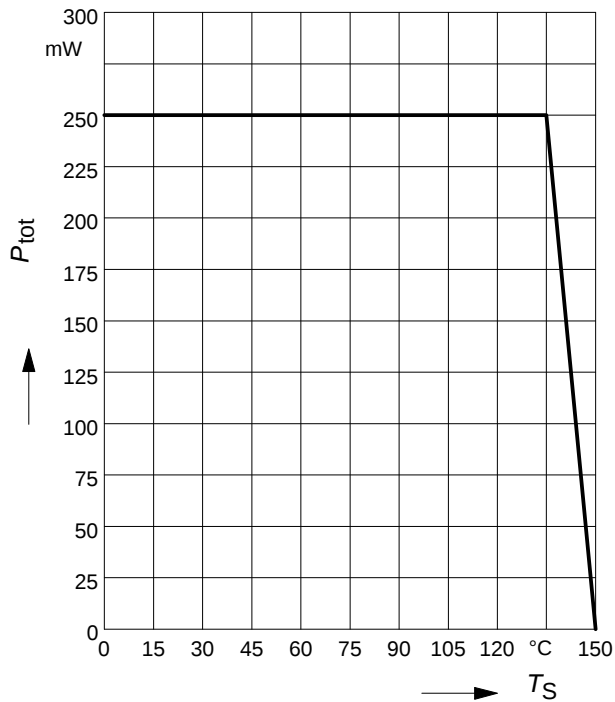
Total power dissipation $P_{tot} = f(T_S)$

BC857BF-BC860BF



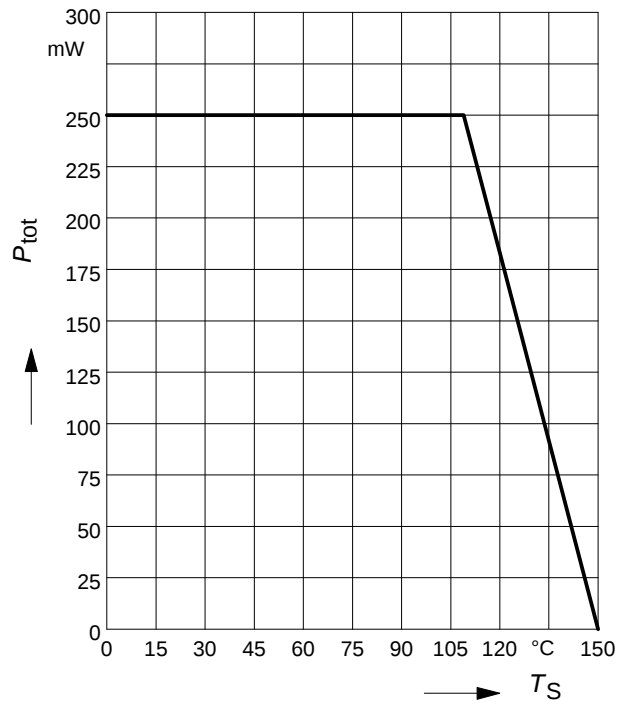
Total power dissipation $P_{\text{tot}} = f(T_S)$

BC857BL3, BC858BL3



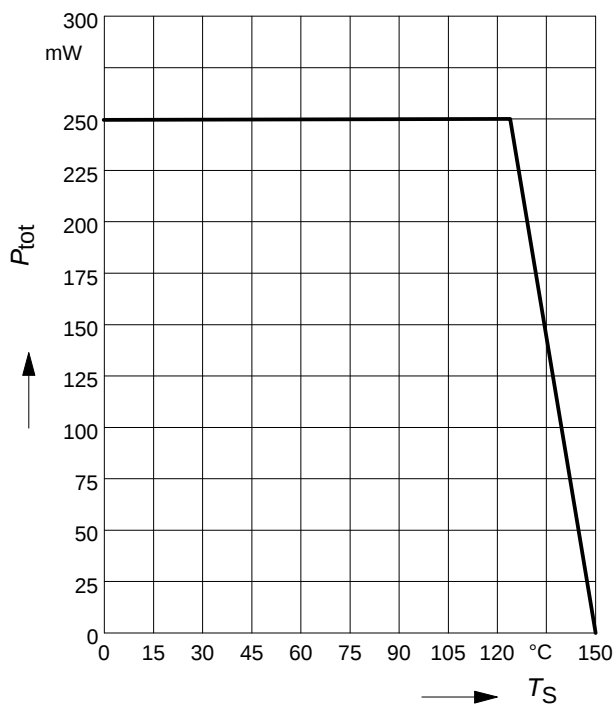
Total power dissipation $P_{\text{tot}} = f(T_S)$

BC857BT, BC858BT



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

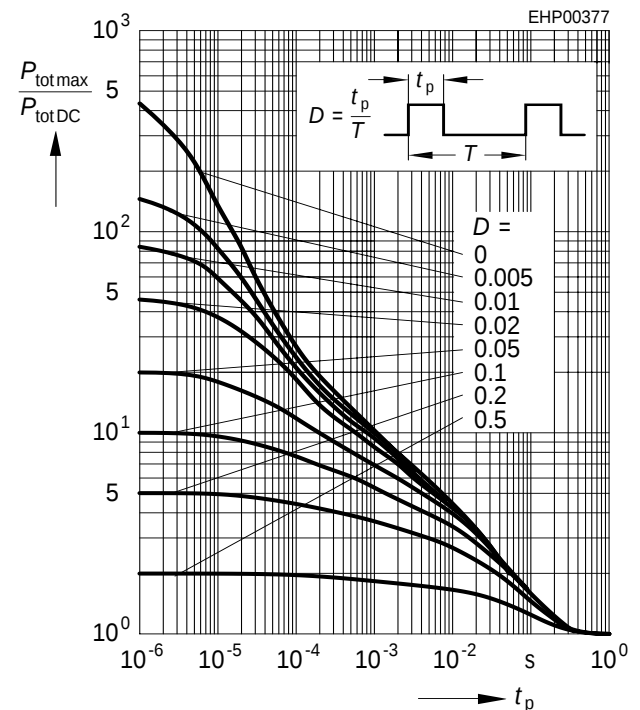
BC856W-BC860W



Permissible Pulse Load

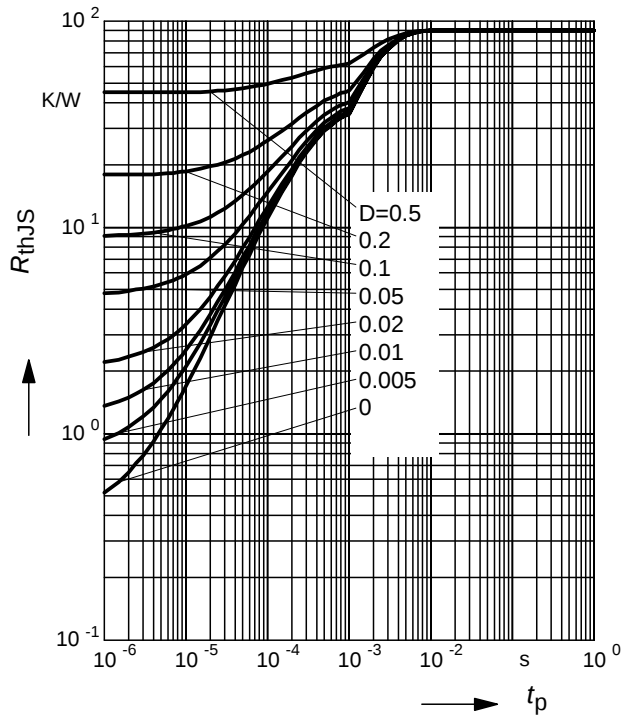
$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$

BC856/W-BC860/W



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

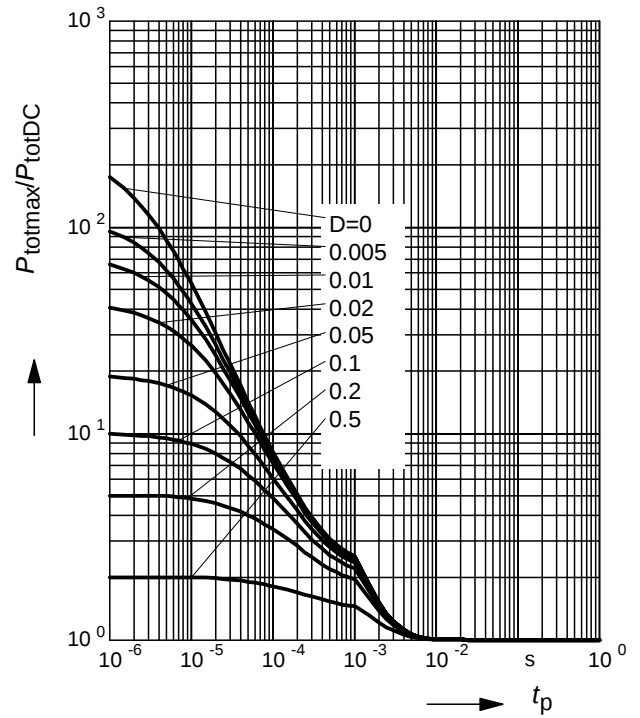
BC857BF-BC860BF



Permissible Pulse Load

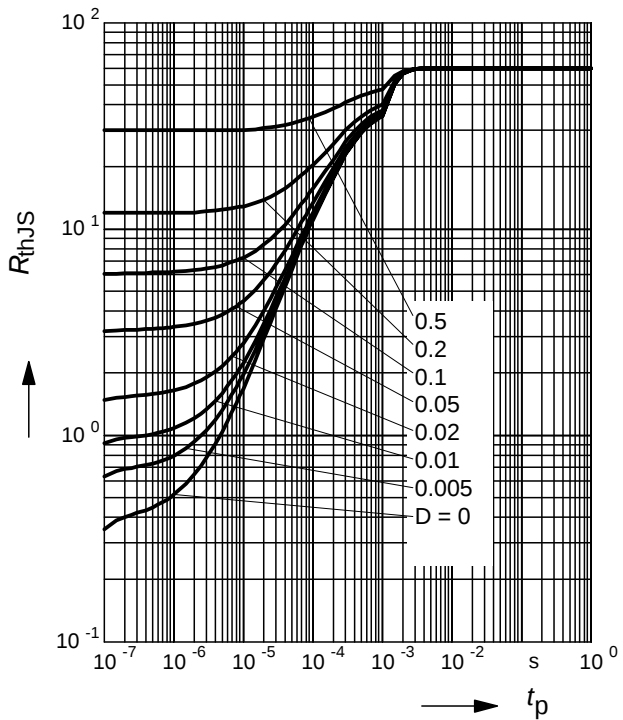
$$P_{totmax}/P_{totDC} = f(t_p)$$

BC857BF-BC860BF



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

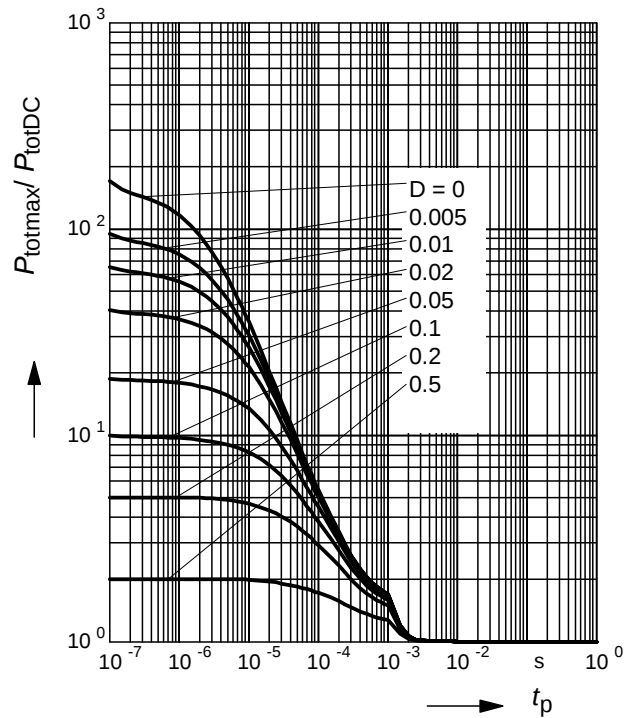
BC857BL3, BC858BL3



Permissible Pulse Load

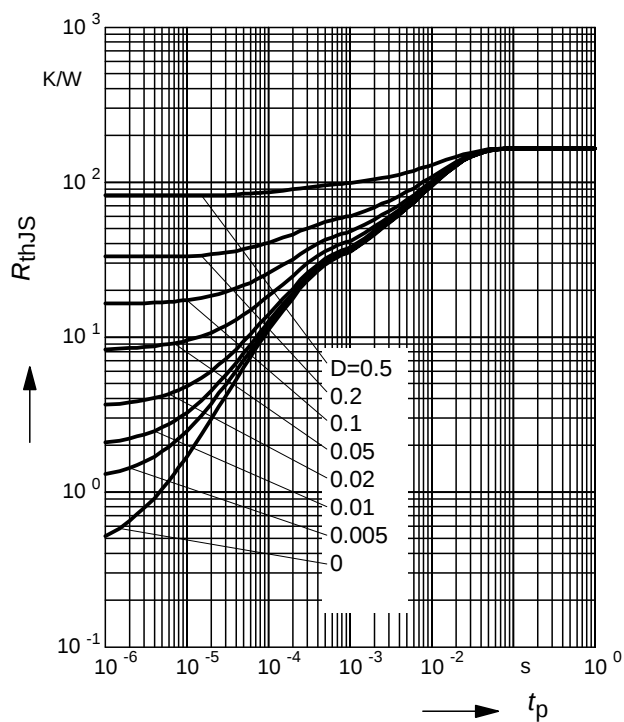
$$P_{totmax}/P_{totDC} = f(t_p)$$

BC857BL3, BC858BL3



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

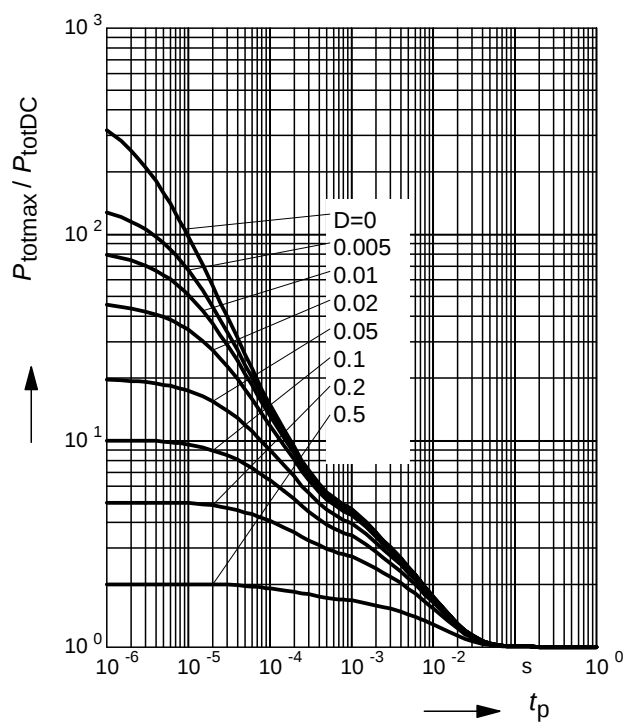
BC857BT, BC858BT



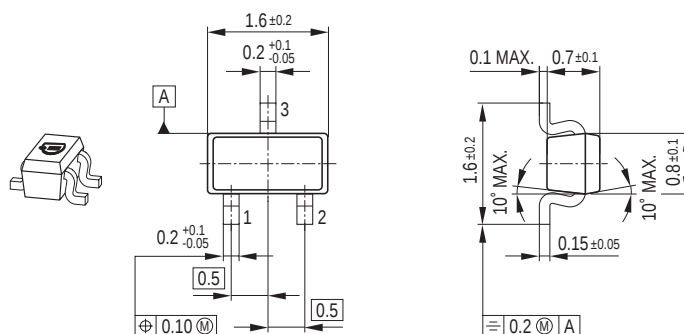
Permissible Pulse Load

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

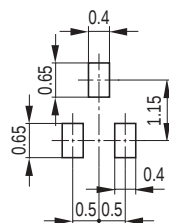
BC857BT, BC858BT



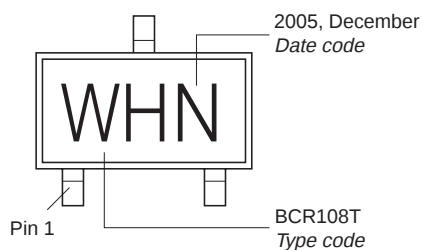
Package Outline



Foot Print

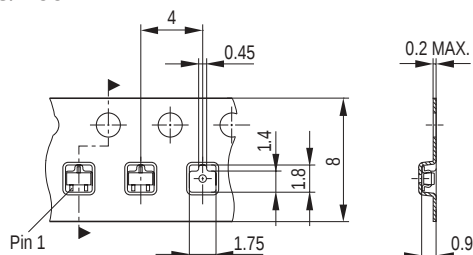


Marking Layout (Example)



Standard Packing

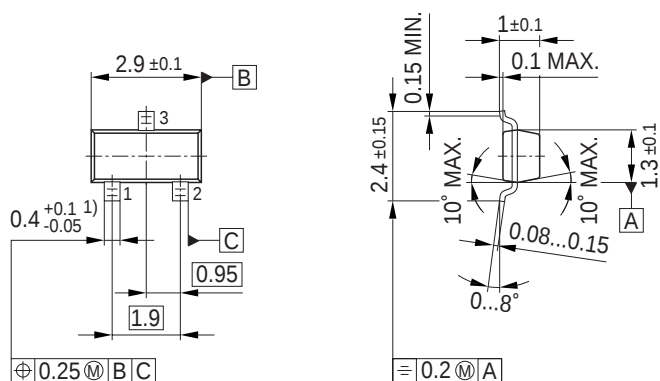
Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



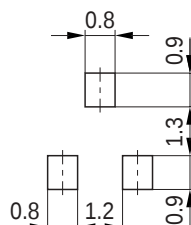
Date Code marking for discrete packages with one digit (SCD80, SC79, SC75¹⁾) CES-Code

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.



Foot Print



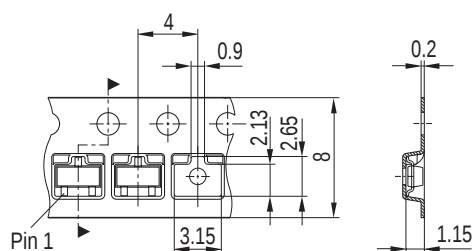
infineon
Manufacturer

2005, June
Date code (YM)

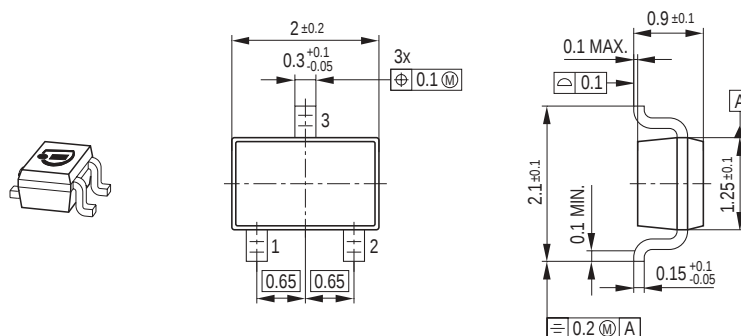
Pin 1

BCW66
Type code

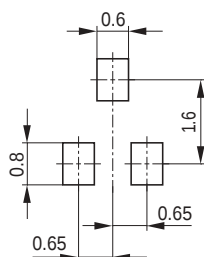
Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



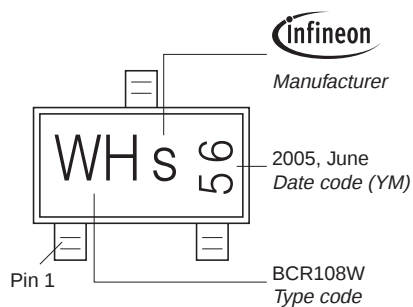
Package Outline



Foot Print

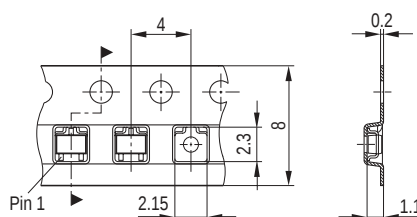


Marking Layout (Example)

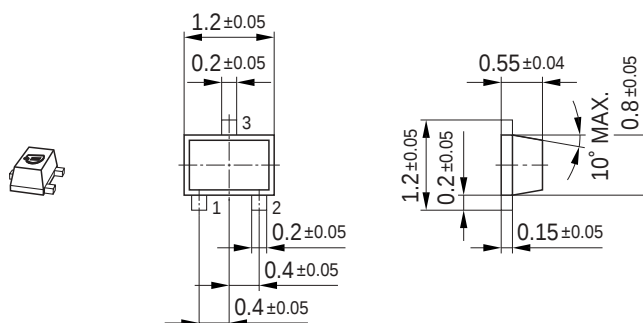


Standard Packing

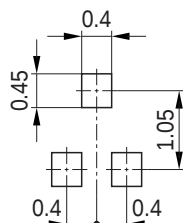
Reel ø180 mm = 3.000 Pieces/Reel
 Reel ø330 mm = 10.000 Pieces/Reel



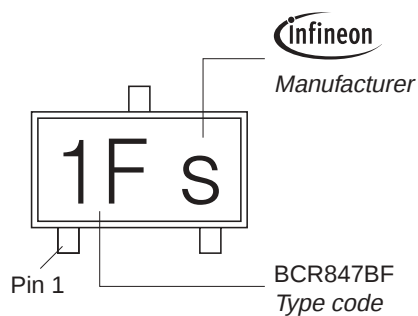
Package Outline



Foot Print

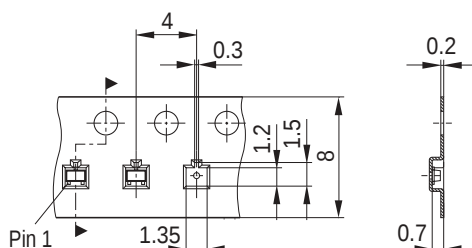


Marking Layout (Example)

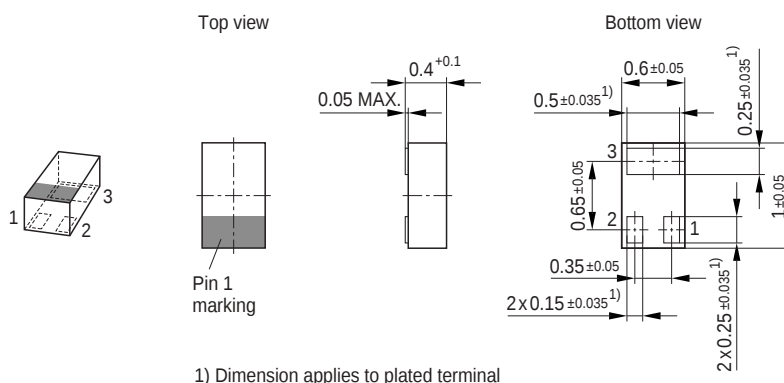


Standard Packing

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

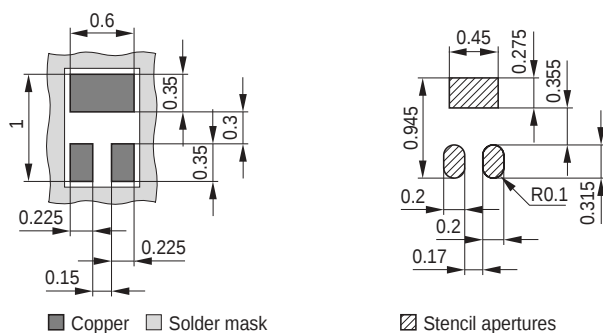


Package Outline

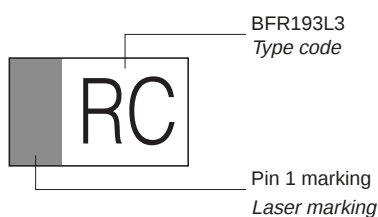


Foot Print

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

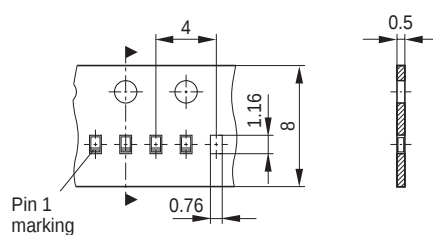


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



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