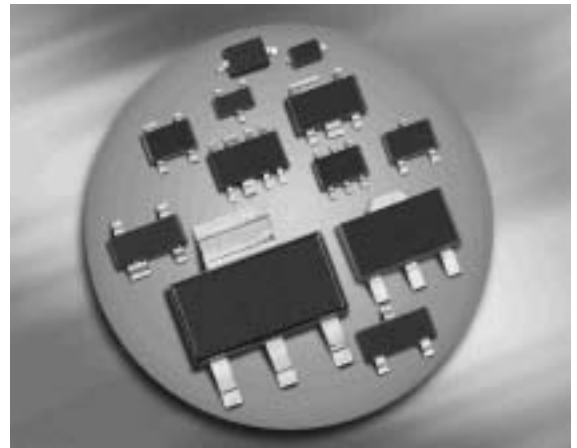


PNP Silicon AF Transistor

- 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
		1=B	2=E	3=C	-	-	-	
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
$T_S \leq 71 \text{ }^\circ\text{C}$, BC856-BC860		330	
$T_S \leq 128 \text{ }^\circ\text{C}$, BC857BF-BC860BF		250	
$T_S \leq 135 \text{ }^\circ\text{C}$, BC857BL3, BC860BL3		250	
$T_S \leq 109 \text{ }^\circ\text{C}$, BC857BT, BC858BT		250	
$T_S \leq 124 \text{ }^\circ\text{C}$, BC856W-BC860W		250	
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

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

¹For 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	μA
DC current gain ¹⁾ $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$, h_{FE} -grp.A $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$, h_{FE} -grp.B $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$, h_{FE} -grp.C $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, h_{FE} -grp.A $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, h_{FE} -grp.B $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, h_{FE} -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	

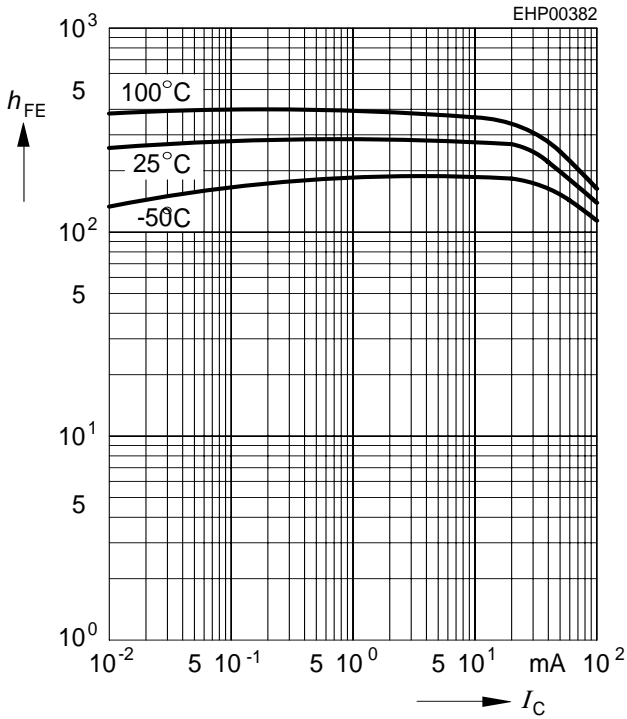
¹⁾Pulse test: $t < 300\mu\text{s}$; $D < 2\%$

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} -grp.A $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, h_{FE} -grp.B $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, h_{FE} -grp.C	h_{11e}	-	2.7 4.5 8.7	-	k Ω
Open-circuit reverse voltage transf. ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, h_{FE} -grp.A $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, h_{FE} -grp.B $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, h_{FE} -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} -grp.A $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, h_{FE} -grp.B $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, h_{FE} -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} -grp.A $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, h_{FE} -grp.B $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, h_{FE} -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

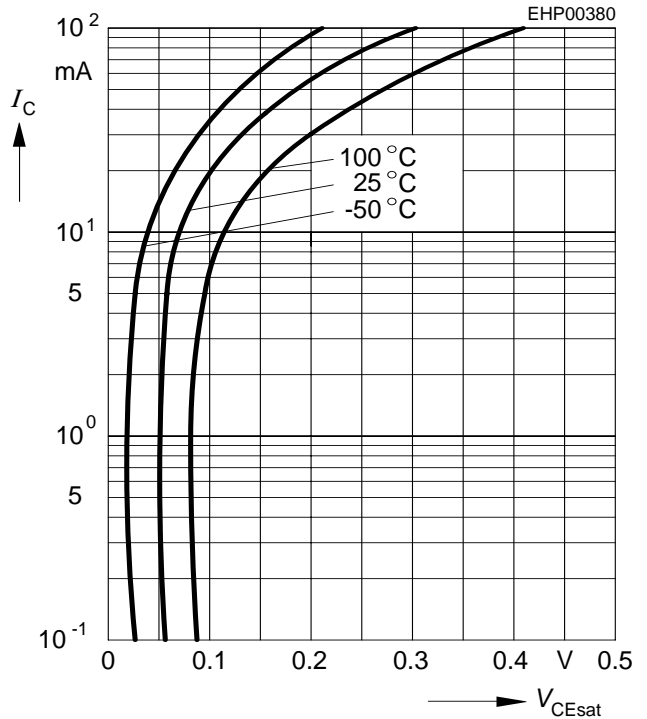
DC current gain $h_{FE} = f(I_C)$

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



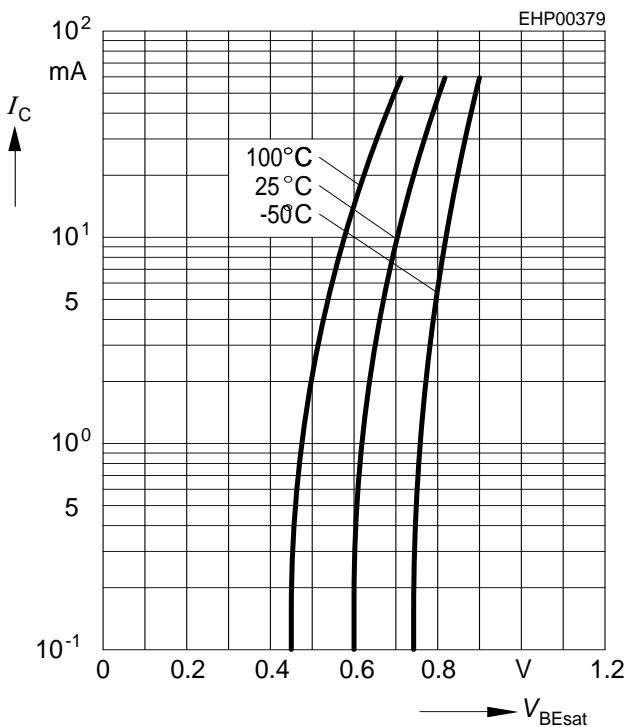
Collector-emitter saturation voltage

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



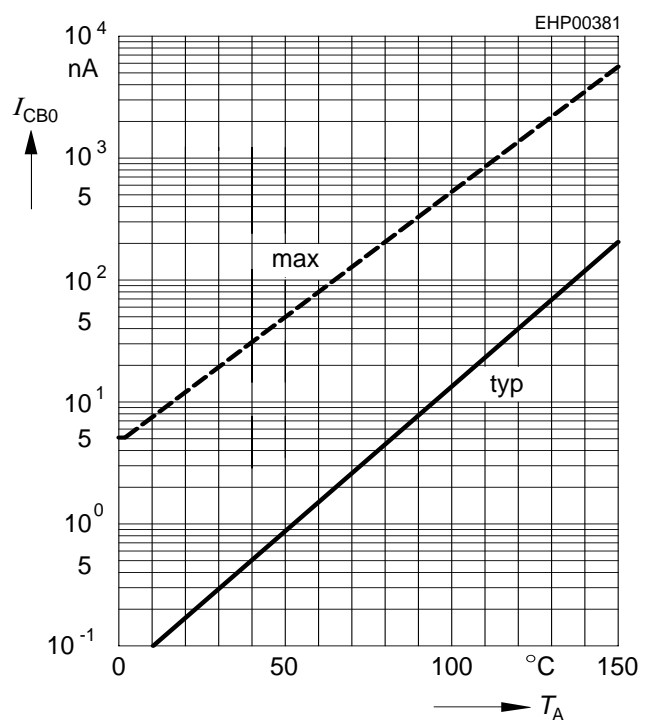
Base-emitter saturation voltage

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



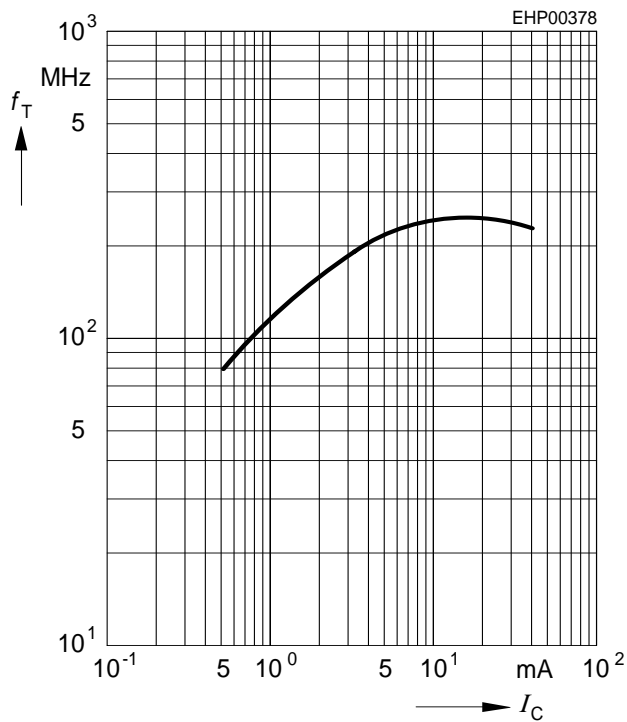
Collector cutoff current $I_{CBO} = f(T_A)$

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



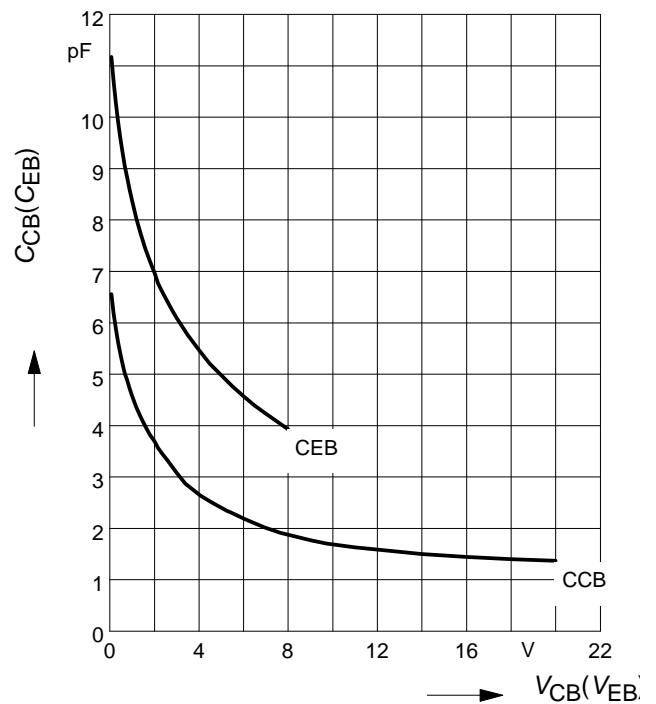
Transition frequency $f_T = f(I_C)$

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



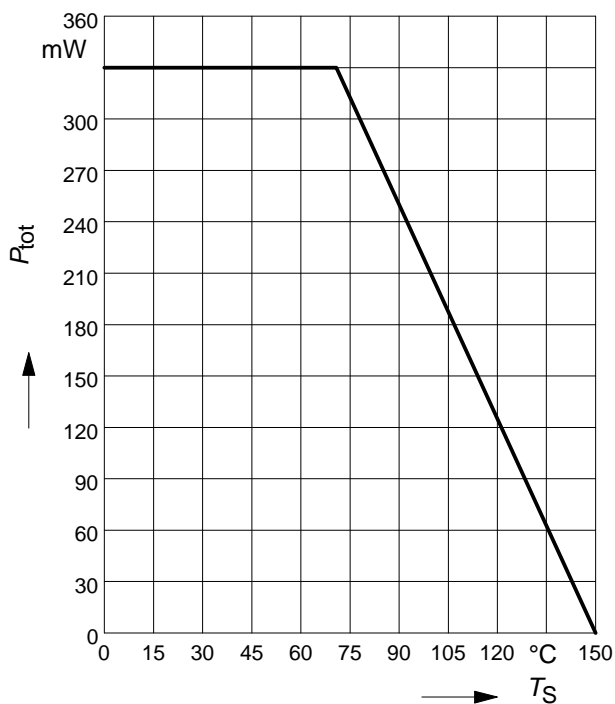
Collector-base capacitance $C_{cb} = f(V_{CB})$

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



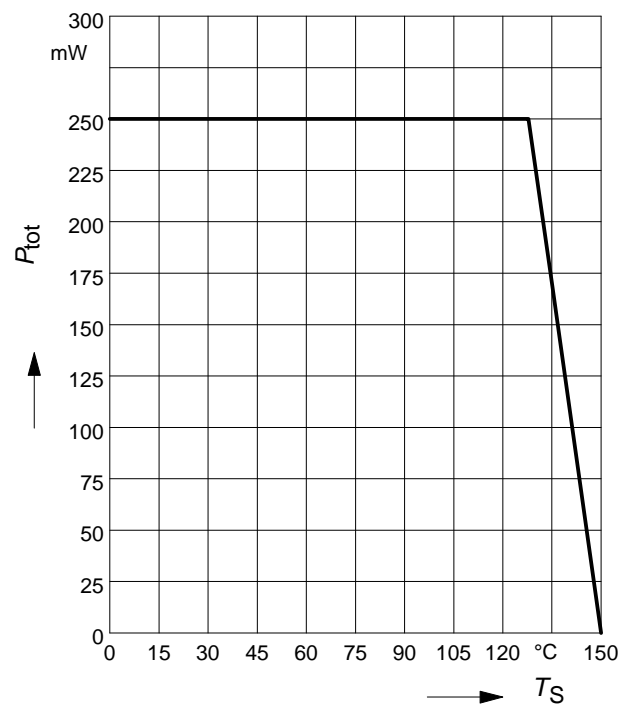
Total power dissipation $P_{tot} = f(T_S)$

BC856-BC860



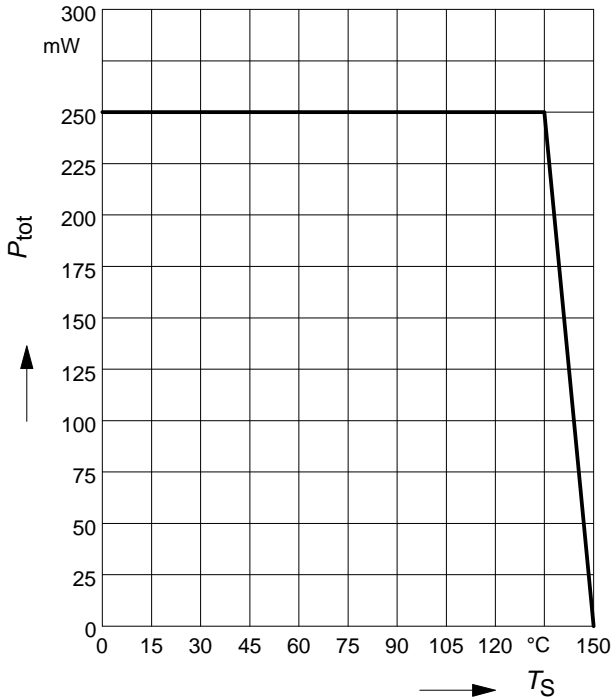
Total power dissipation $P_{tot} = f(T_S)$

BC857BF-BC860BF



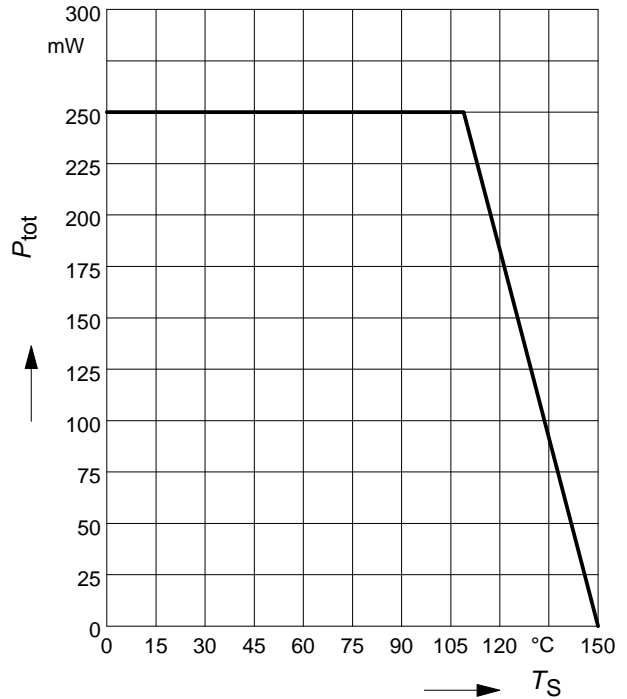
Total power dissipation $P_{tot} = f(T_S)$

BC857BL3, BC858BL3



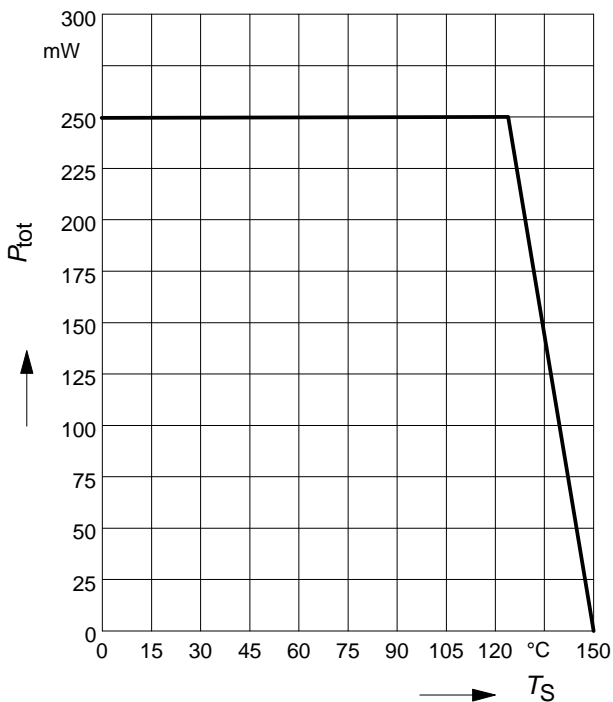
Total power dissipation $P_{tot} = f(T_S)$

BC857BT, BC858BT



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

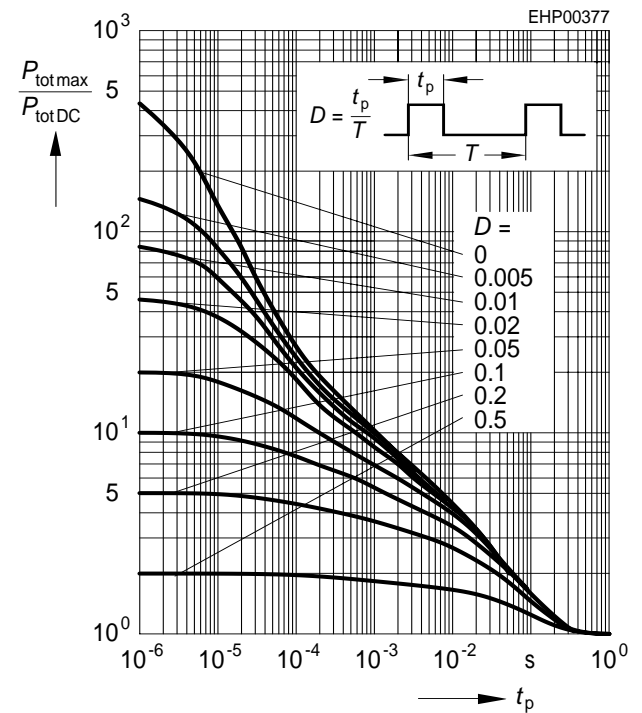
BC856W-BC860W



Permissible Pulse Load

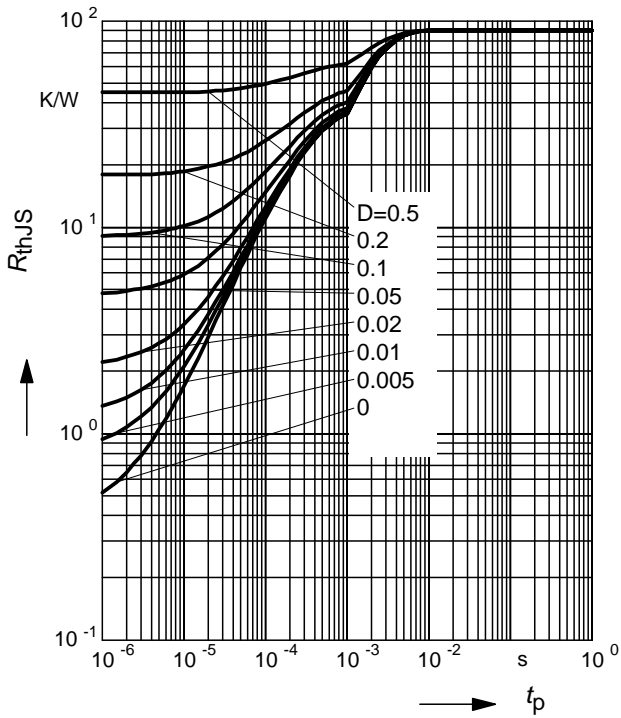
$P_{totmax}/P_{totDC} = f(t_p)$

BC856/W-BC860/W



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

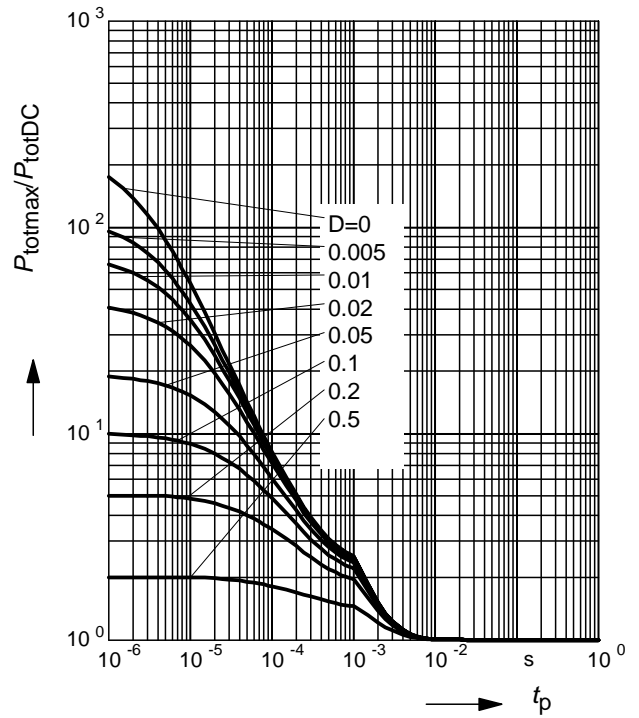
BC857BF-BC860BF



Permissible Pulse Load

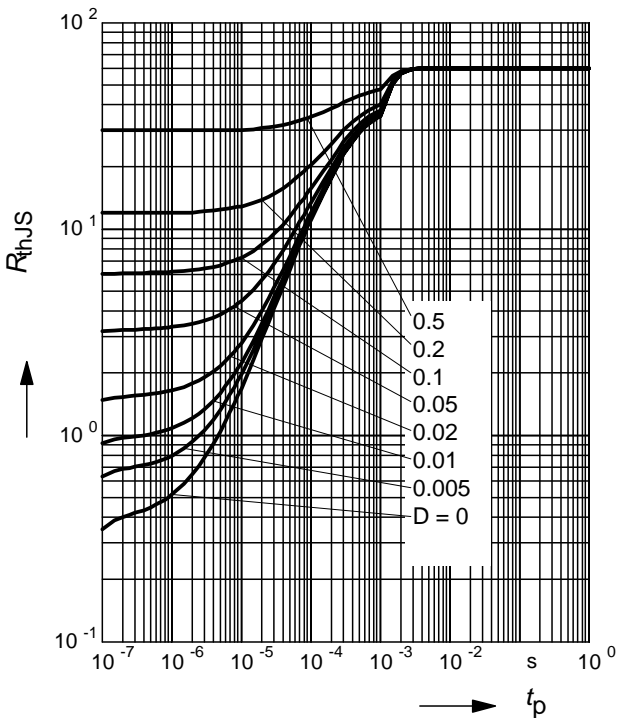
$P_{totmax}/P_{totDC} = f(t_p)$

BC857BF-BC860BF



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

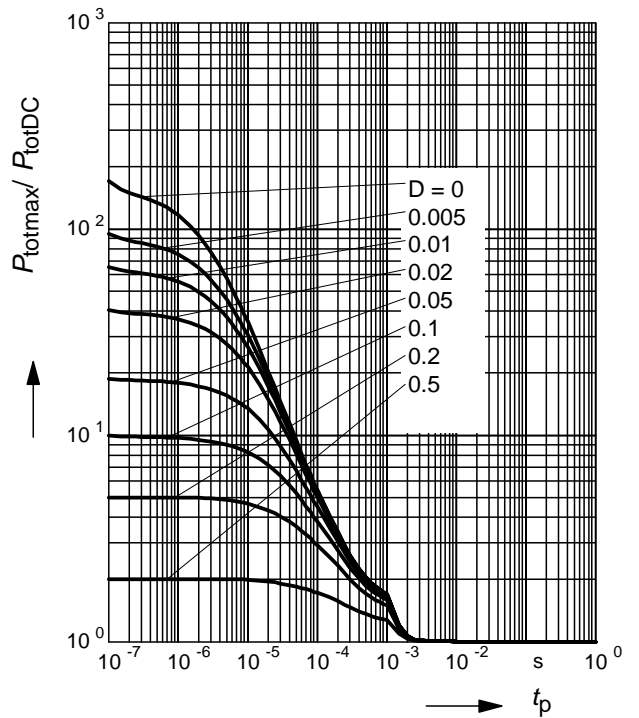
BC857BL3, BC858BL3



Permissible Pulse Load

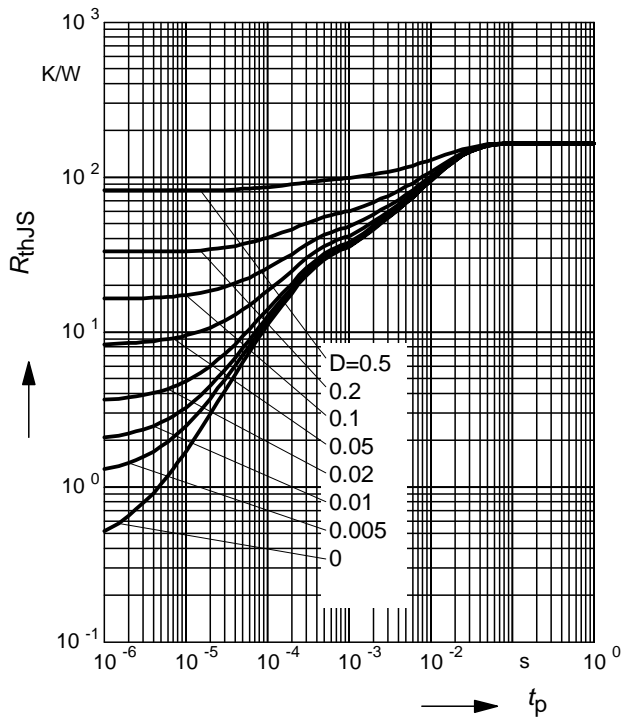
$P_{totmax}/P_{totDC} = f(t_p)$

BC857BL3, BC858BL3



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

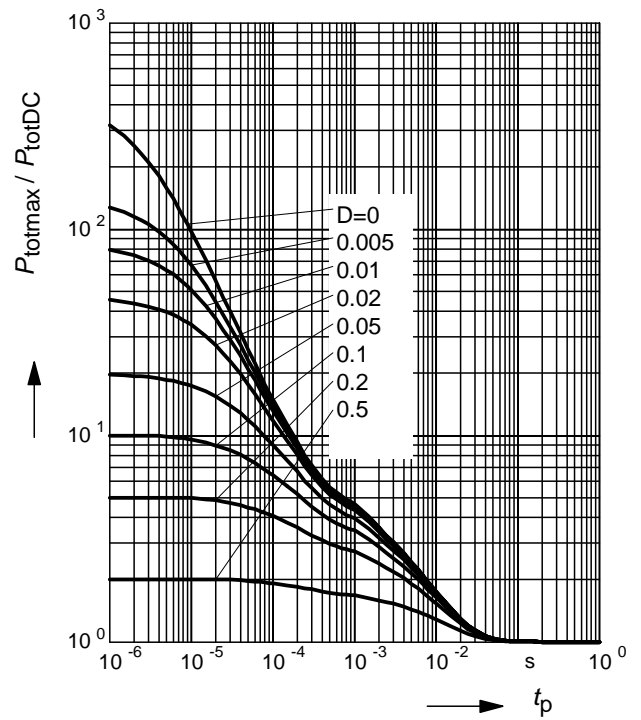
BC857BT, BC858BT



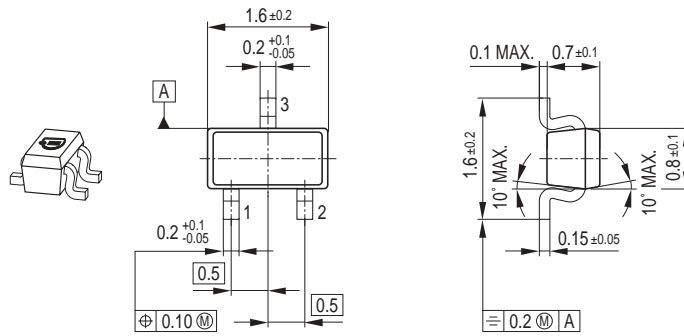
Permissible Pulse Load

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

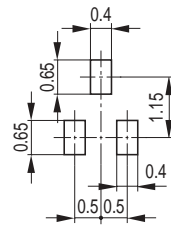
BC857BT, BC858BT



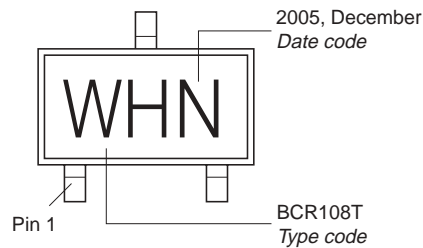
Package Outline



Foot Print

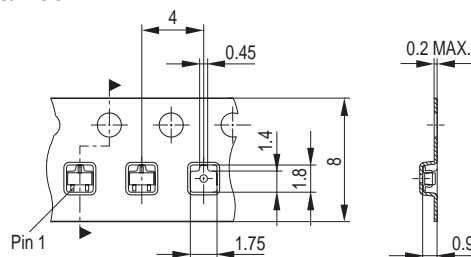


Marking Layout (Example)



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, 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

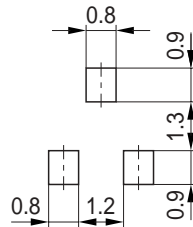
1) New Marking Layout for SC75, implemented at October 2005.

Package Outline



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

Foot Print



Marking Layout (Example)

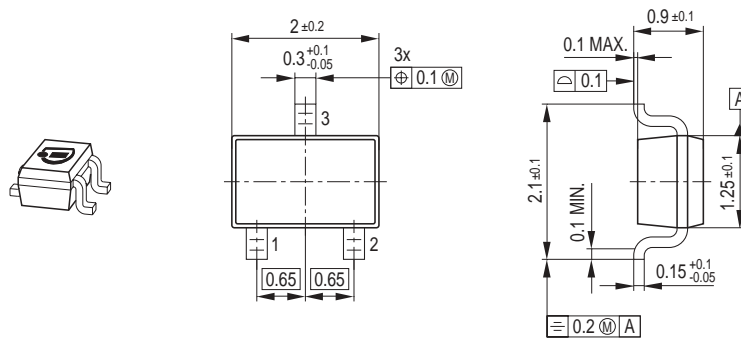


Standard Packing

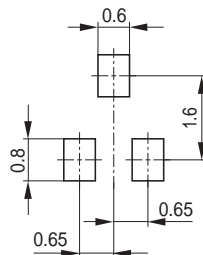
Reel \varnothing 180 mm = 3.000 Pieces/Reel
 Reel \varnothing 330 mm = 10.000 Pieces/Reel



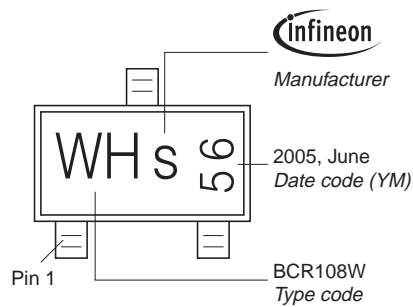
Package Outline



Foot Print

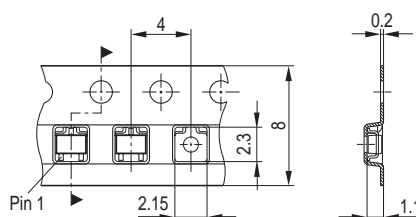


Marking Layout (Example)

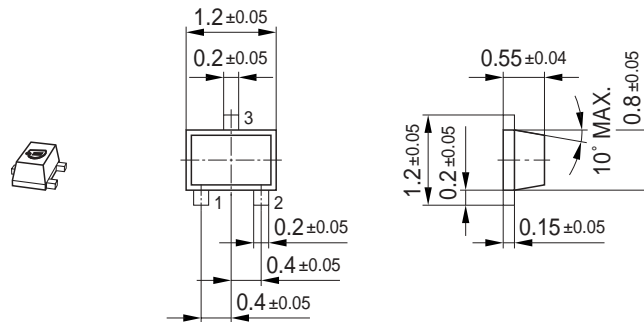


Standard Packing

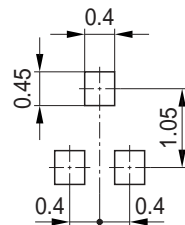
Reel \varnothing 180 mm = 3.000 Pieces/Reel
 Reel \varnothing 330 mm = 10.000 Pieces/Reel



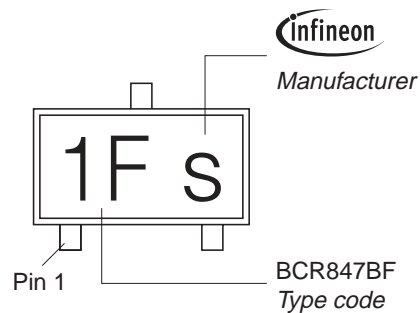
Package Outline



Foot Print

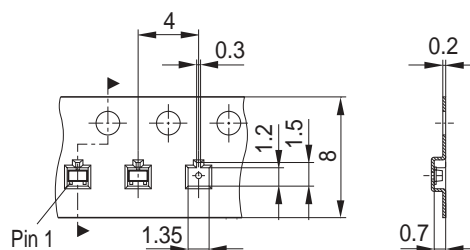


Marking Layout (Example)

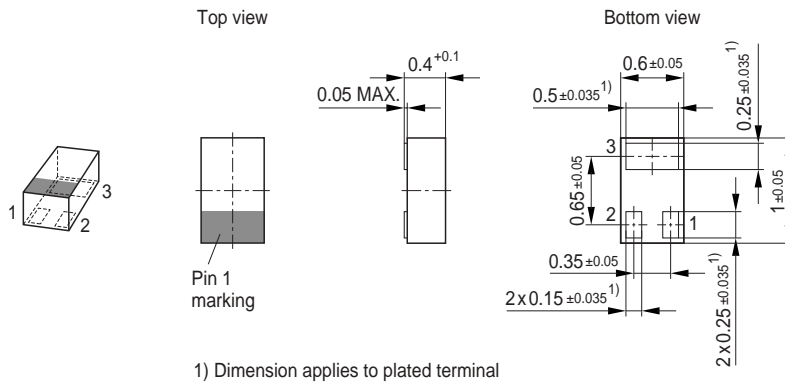


Standard Packing

Reel \varnothing 180 mm = 3.000 Pieces/Reel
 Reel \varnothing 330 mm = 10.000 Pieces/Reel

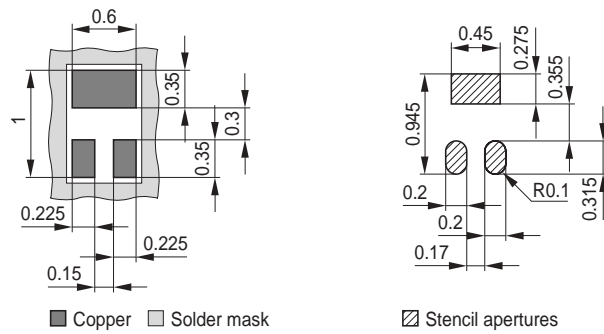


Package Outline

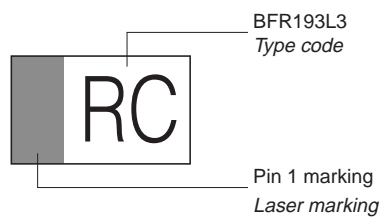


Foot Print

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

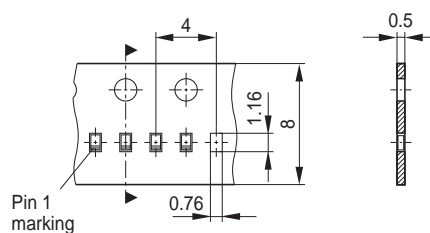


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



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