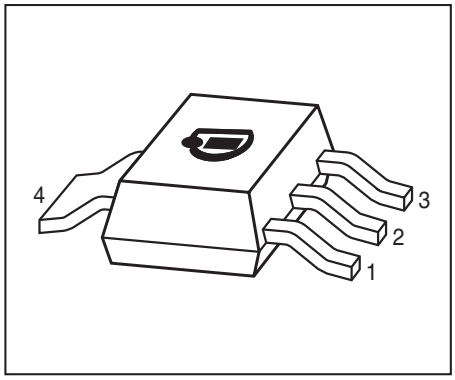
NPN Silicon Darlington Transistors



- High collector current
- Low collector-emitter saturation voltage
- Complementary types: BSP60 - BSP62 (PNP)
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101

Type	Marking	Pin Configuration						Package
BSP50	BSP50	1=B	2=C	3=E	4=C	-	-	SOT223
BSP51	BSP51	1=B	2=C	3=E	4=C	-	-	SOT223
BSP52	BSP52	1=B	2=C	3=E	4=C	-	-	SOT223

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}		V
BSP50		45	
BSP51		60	
BSP52		80	
Collector-base voltage	V_{CBO}		
BSP50		60	
BSP51		80	
BSP52		90	
Emitter-base voltage	V_{EBO}	5	
Collector current	I_C	1	A
Peak collector current, $t_p \leq 10$ ms	I_{CM}	2	
Base current	I_B	100	mA
Total power dissipation- $T_S \leq 124$ °C	P_{tot}	1.5	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[1)]	R_{thJS}	≤ 17	K/W

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 , BSP50		45	-	-	
I_C = 10 mA, I_B = 0 , BSP51		60	-	-	
I_C = 10 mA, I_B = 0 , BSP52		80	-	-	
Collector-base breakdown voltage	$V_{(BR)CBO}$				
I_C = 100 µA, I_E = 0 , BSP50		60	-	-	
I_C = 100 µA, I_E = 0 , BSP51		80	-	-	
I_C = 100 µA, I_E = 0 , BSP52		90	-	-	
Emitter-base breakdown voltage	$V_{(BR)EBO}$	5	-	-	
I_E = 100 µA, I_C = 0					
Collector-emitter cutoff current	I_{CES}	-	-	10	µA
V_{CE} = V_{CE0max}, V_{BE} = 0					
Emitter-base cutoff current	I_{EBO}	-	-	10	µA
V_{EB} = 4 V, I_C = 0					
DC current gain[2)]	h_{FE}				-
I_C = 150 mA, V_{CE} = 10 V		1000	-	-	
I_C = 500 mA, V_{CE} = 10 V		2000	-	-	
Collector-emitter saturation voltage[2)]	V_{CEsat}				V
I_C = 500 mA, I_B = 0.5 mA		-	-	1.3	
I_C = 1 A, I_B = 1 mA		-	-	1.8	
Base emitter saturation voltage[2)]	V_{BEsat}				
I_C = 500 mA, I_B = 0.5 mA		-	-	1.9	
I_C = 1 mA, I_B = 1 A		-	-	2.2	

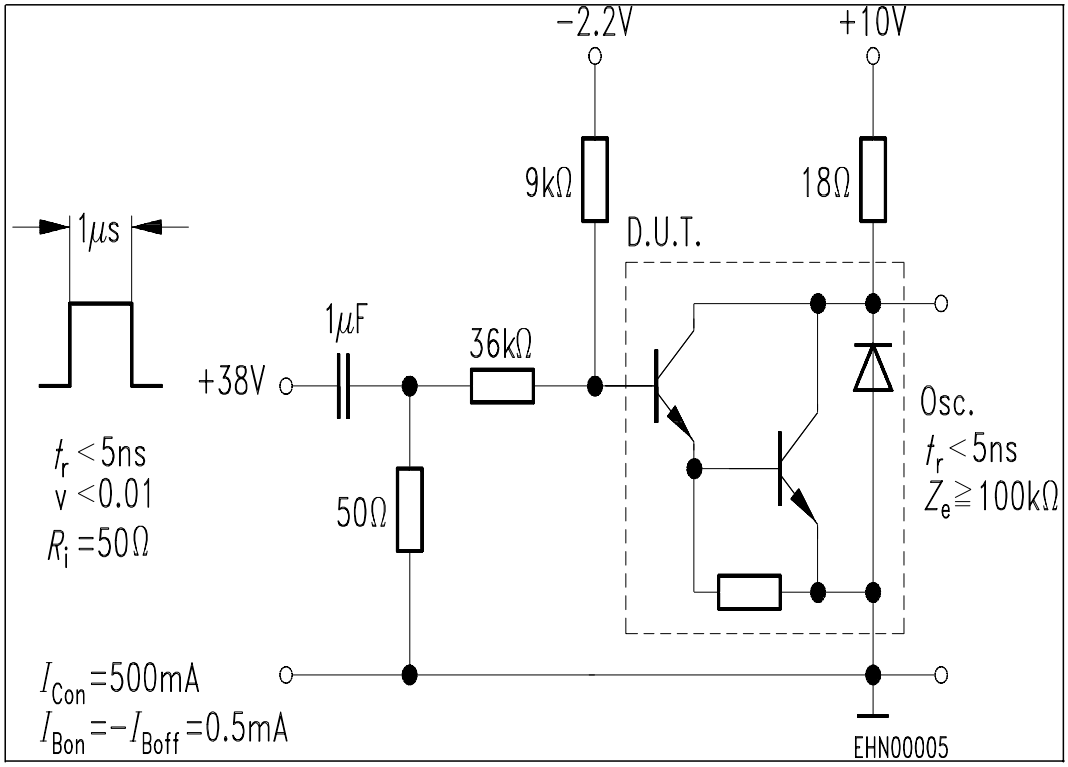
[1]For calculation of R_{thJA} please refer to Application Note AN077 (Thermal Resistance Calculation)

[2]Pulse test: t < 300µs; D < 2%

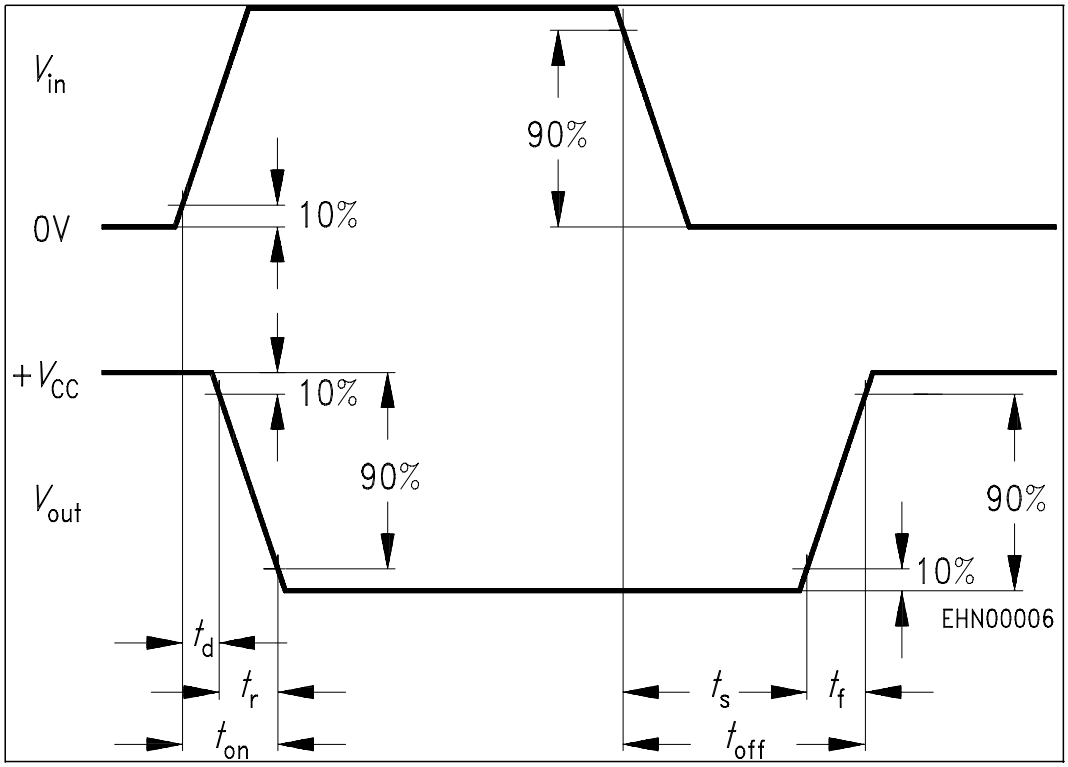
Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Transition frequency I_C = 100 mA, V_{CE} = 5 V, f = 100 MHz	f_T	-	200	-	MHz
Tum-on time I_C = 500 mA, I_{B1} = I_{B2} = 0.5 mA	$t_{(on)}$	-	400	-	ns
Tum-off time I_C = 500 mA, I_{B1} = I_{B2} = 0.5 mA	$t_{(off)}$	-	1500	-	

Switching time test circuit

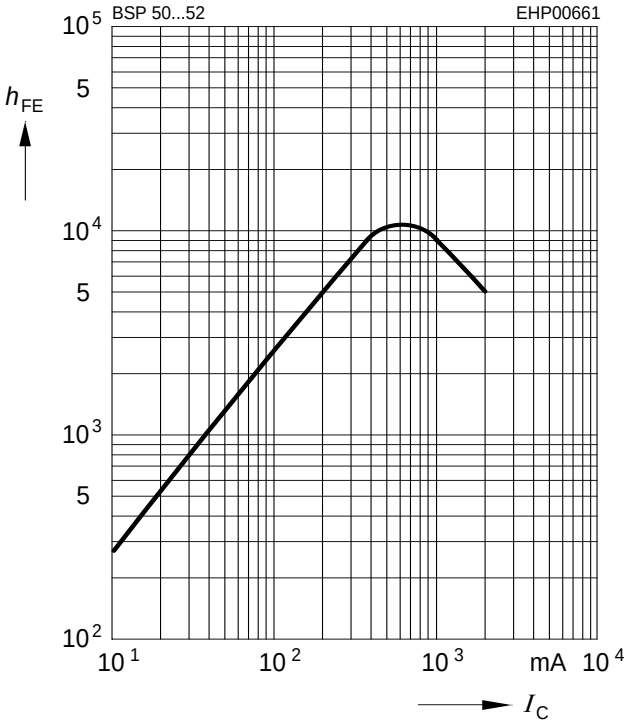


Switching time waveform



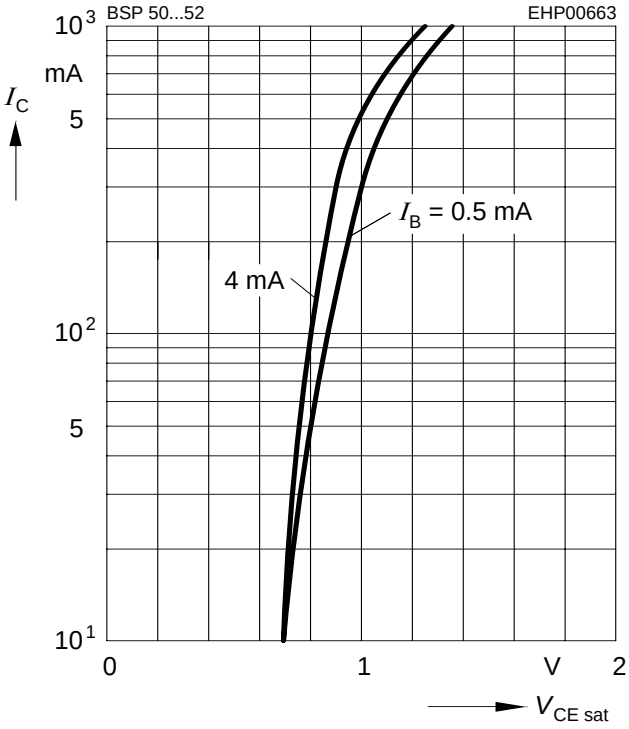
DC current gain $h_{FE} = f(I_C)$

V_{CE} = 10 V



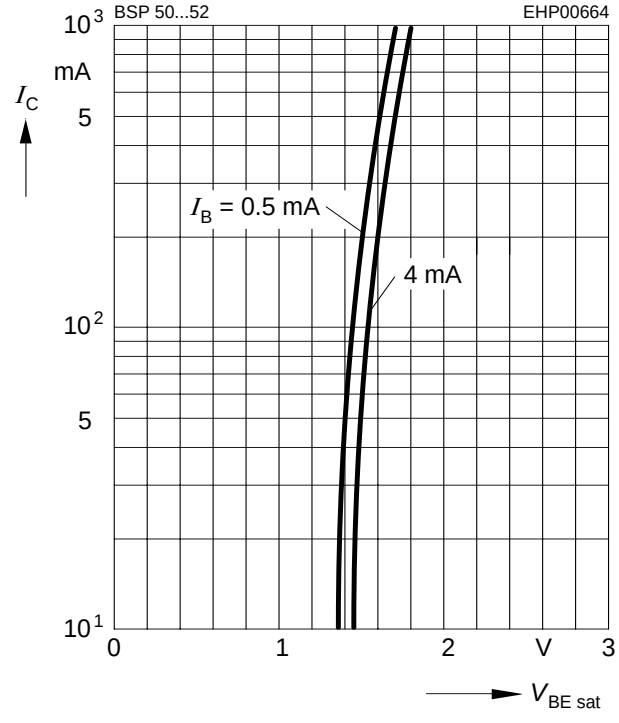
Collector-emitter saturation voltage

$I_C = f(V_{CEsat})$, I_B = Parameter



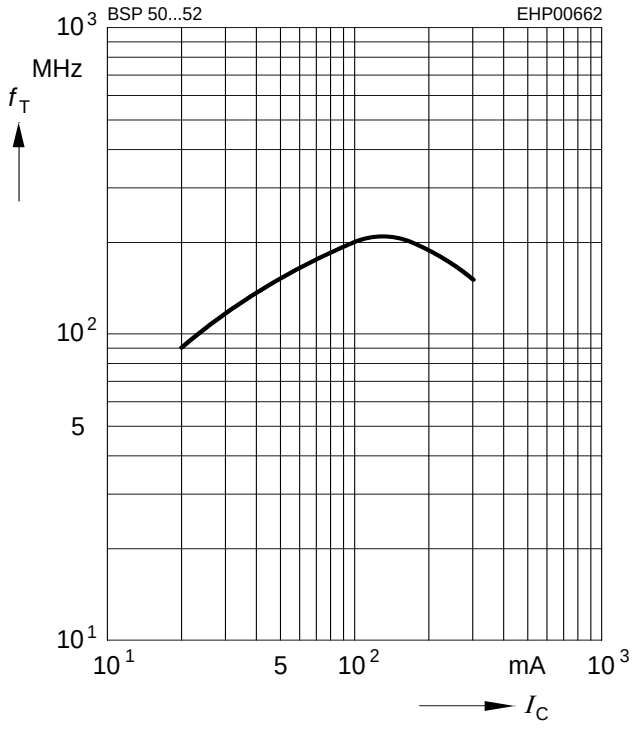
Base-emitter saturation voltage

$I_C = f(V_{BEsat})$, I_B = Parameter

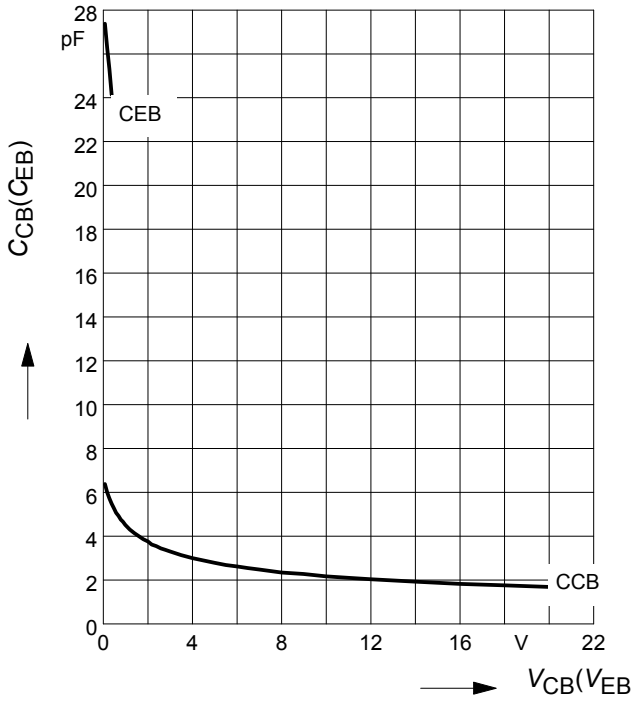


Transition frequency $f_T = f(I_C)$

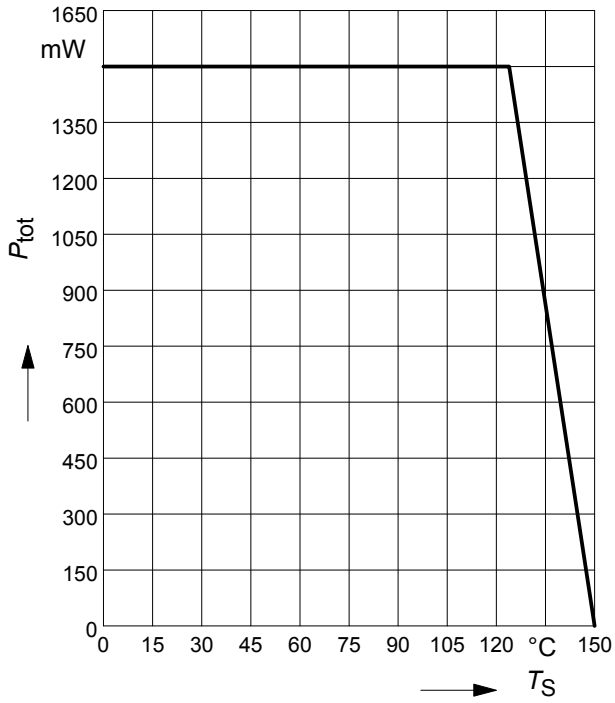
V_{CE} = 5 V, f = 100 MHz



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

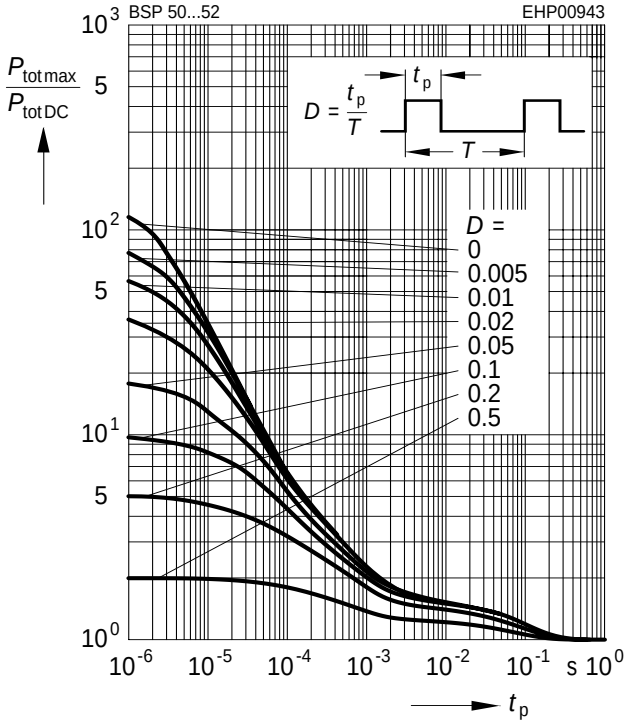


Total power dissipation $P_{tot} = f(T_S)$



Permissible Pulse Load

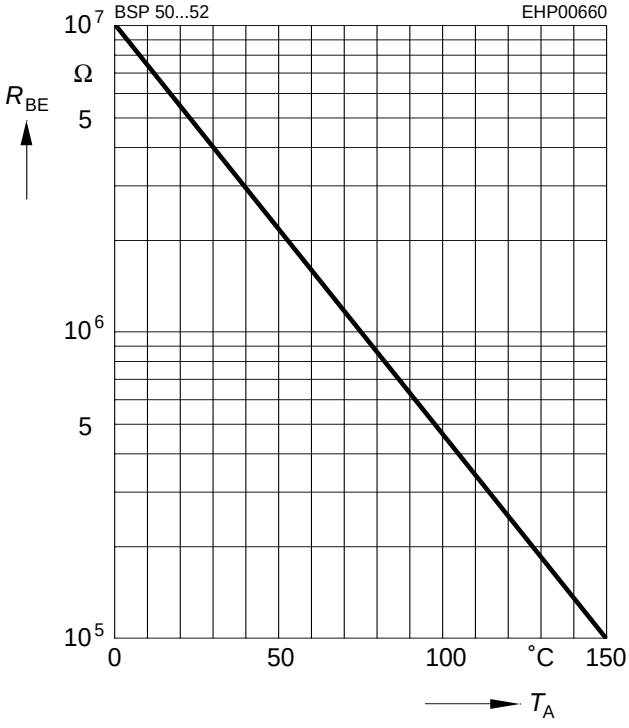
$P_{totmax}/P_{totDC} = f(t_p)$



External resistance $R_{BE} = f(T_A)$**

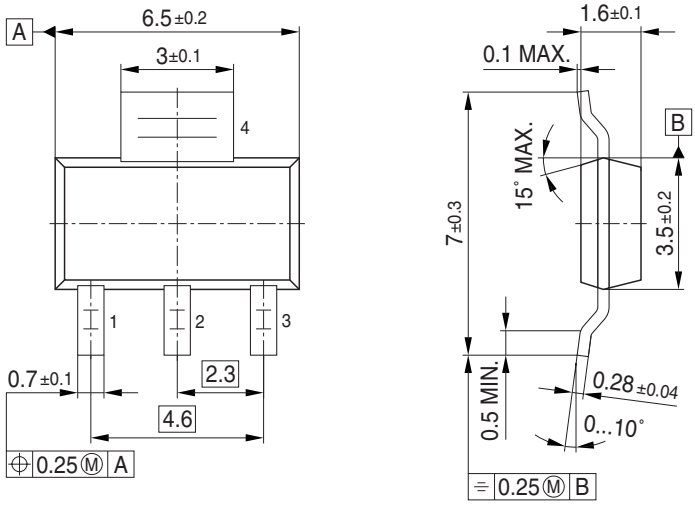
$V_{CB} = V_{CEmax}$

** R_{BEmax} for thermal stability

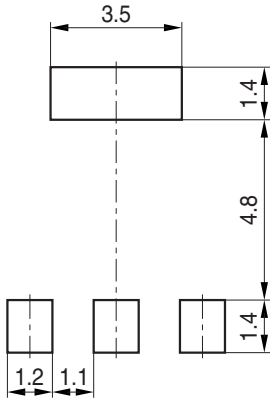


Package Outline

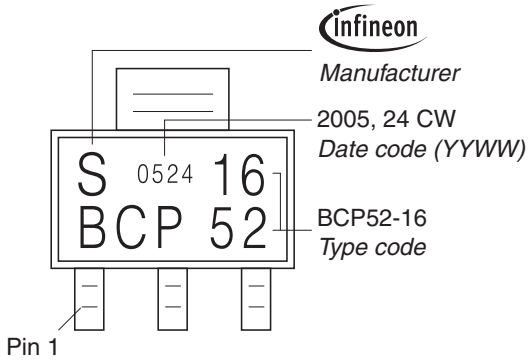




Foot Print

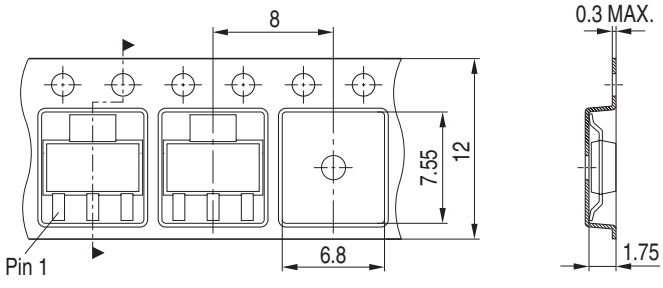


Marking Layout (Example)



Packing

Reel ø180 mm = 1.000 Pieces/Reel
Reel ø330 mm = 4.000 Pieces/Reel



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