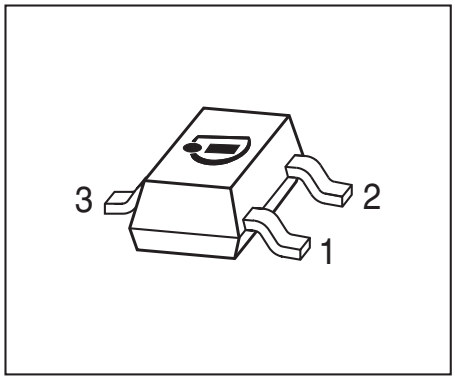
PNP Silicon Switching Transistor

- High DC current gain: 0.1 mA to 500 mA
- Low collector-emitter saturation voltage
- Complementary type:
  SMBT2222A / MMBT2222A (NPN)



Type	Marking	Pin Configuration			Package
SMBT2907A/MMBT2907A	s2F	1 = B	2 = E	3 = C	SOT23

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	60	V
Collector-base voltage	V_{CBO}	60	
Emitter-base voltage	V_{EBO}	5	
Collector current	I_C	600	mA
Total power dissipation- $T_S \leq 77$ °C	P_{tot}	330	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[1)]	R_{thJS}	≤ 220	K/W

[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 I_C = 10 mA, I_B = 0	$V_{(BR)CEO}$	60	-	-	V
Collector-base breakdown voltage I_C = 10 µA, I_E = 0	$V_{(BR)CBO}$	60	-	-	
Emitter-base breakdown voltage I_E = 10 µA, I_C = 0	$V_{(BR)EBO}$	5	-	-	
Collector-base cutoff current V_{CB} = 50 V, I_E = 0 V_{CB} = 50 V, I_E = 0 , T_A = 150 °C	I_{CBO}	 - -	 - -	 0.01 10	µA
Emitter-base cutoff current V_{EB} = 5 V, I_C = 0	I_{EBO}	-	-	10	nA
DC current gain[1)] I_C = 100 µA, V_{CE} = 10 V I_C = 1 mA, V_{CE} = 10 V I_C = 10 mA, V_{CE} = 10 V I_C = 150 mA, V_{CE} = 10 V I_C = 500 mA, V_{CE} = 10 V	h_{FE}	 75 100 100 100 50	 - - - - -	 - - - 300 -	-
Collector-emitter saturation voltage[1)] I_C = 150 mA, I_B = 15 mA I_C = 500 mA, I_B = 50 mA	V_{CEsat}	 - -	 - -	 0.4 1.6	V
Base emitter saturation voltage-[1)] I_C = 150 mA, I_B = 15 mA I_C = 500 mA, I_B = 50 mA	V_{BEsat}	 - -	 - -	 1.3 2.6	

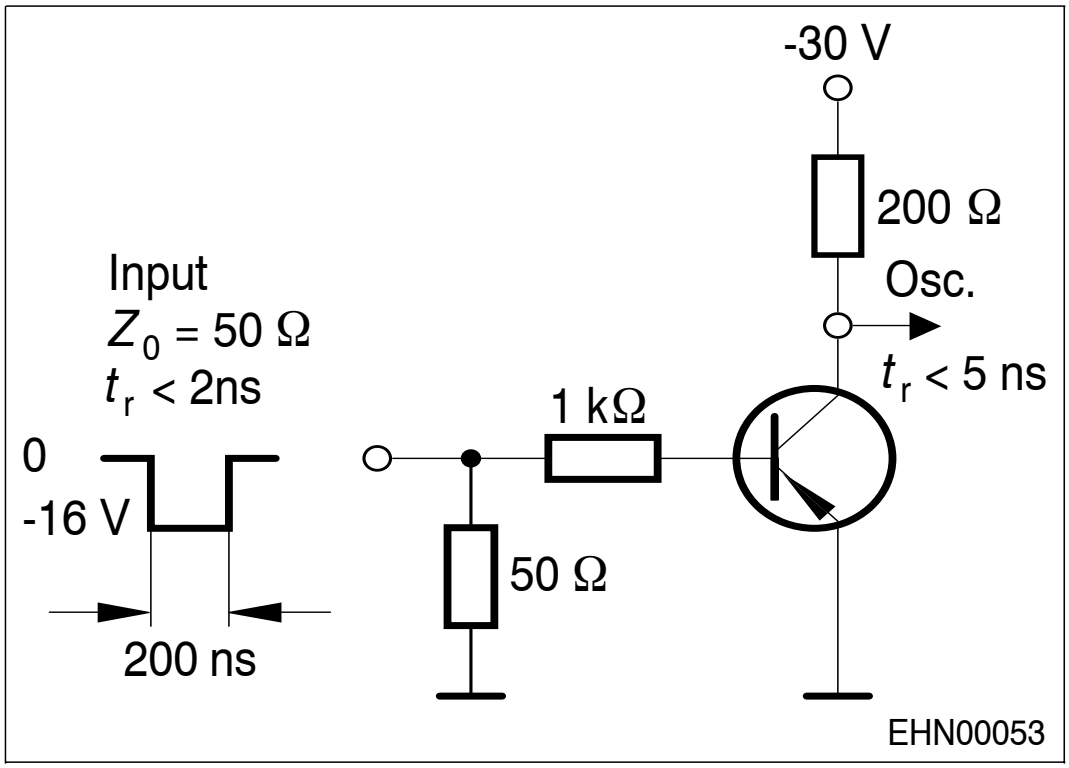
[1]Puls test: t ≤ 300µs, D = 2%

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

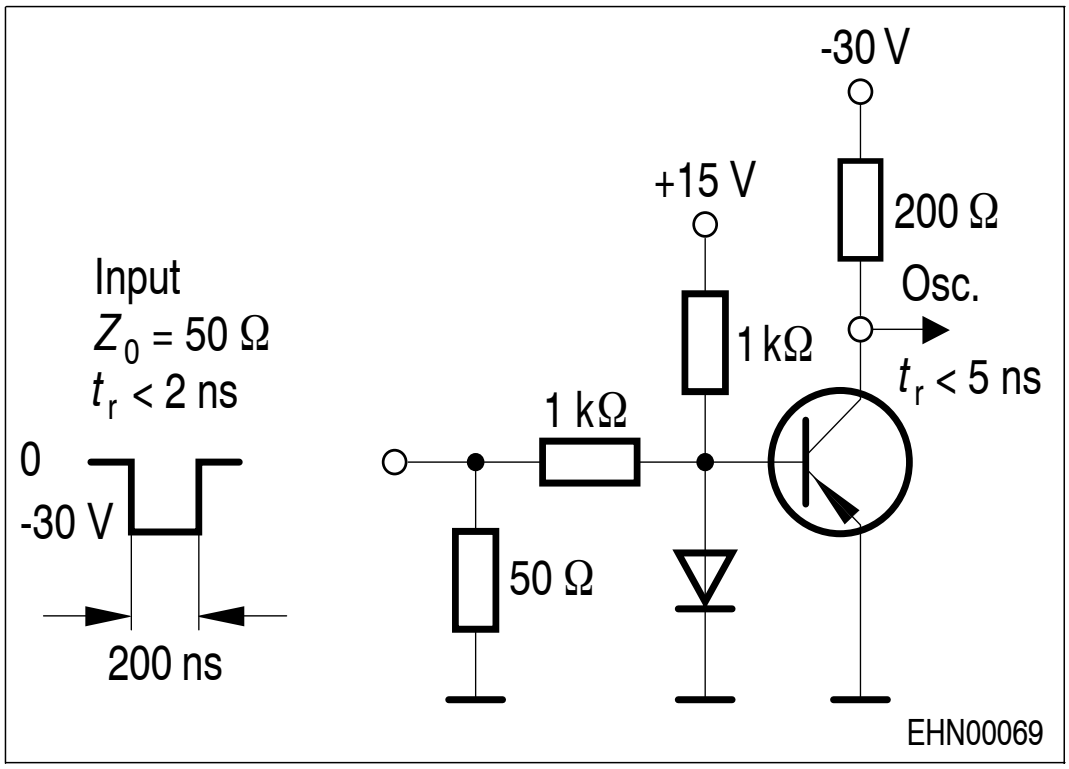
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Transition frequency I_C = 20 mA, V_{CE} = 20 V, f = 100 MHz	f_T	200	-	-	MHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz	C_{cb}	-	-	8	pF
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	-	30	
Delay time V_{CC} = 30 V, I_C = 150 mA, I_{B1} = 15 mA, $V_{BE(off)}$ = 0.5 V	t_d	-	-	10	ns
Rise time V_{CC} = 30 V, I_C = 150 mA, I_{B1} = 15 mA, $V_{BE(off)}$ = 0.5 V	t_r	-	-	40	
Storage time V_{CC} = 30 V, I_C = 150 mA, I_{B1} = I_{B2} = 15mA	t_{stg}	-	-	80	
Fall time V_{CC} = 30 V, I_C = 150 mA, I_{B1} = I_{B2} = 15mA	t_f	-	-	30	

Test circuit

Delay and rise time



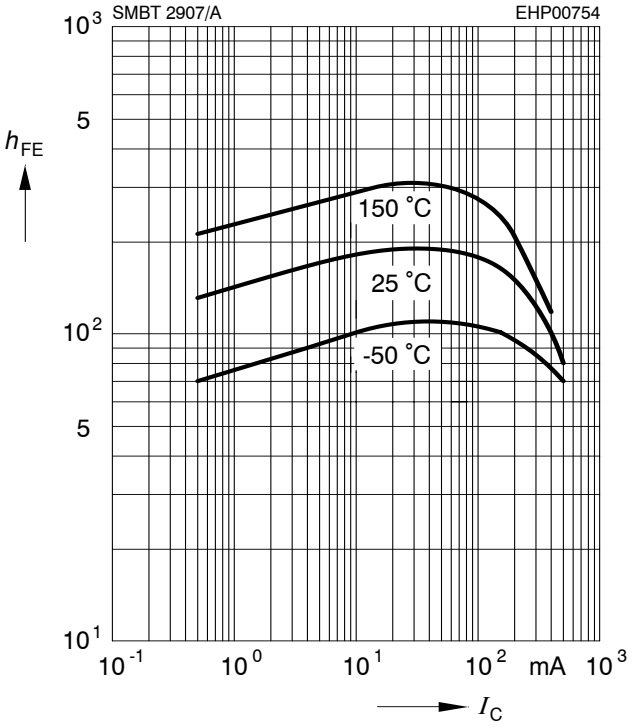
Storage and fall time



Oscillograph: R > 100, C < 12pF, t_r < 5ns

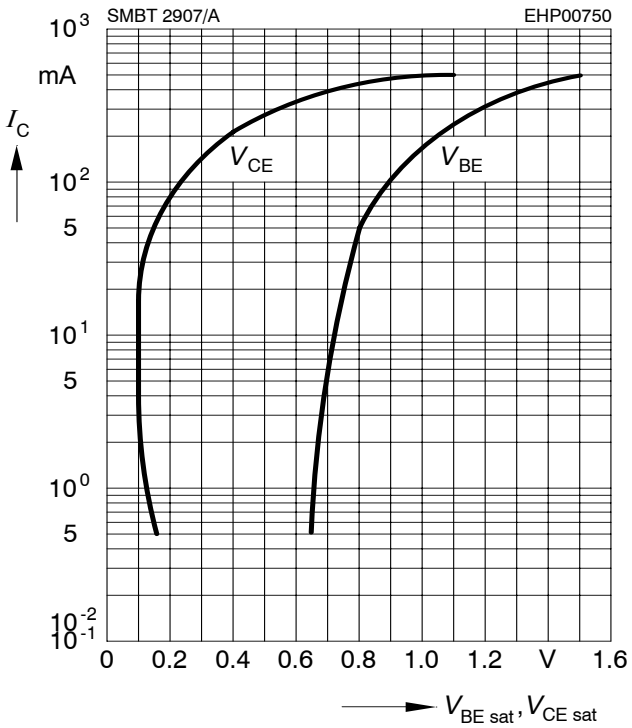
DC current gain $h_{FE} = f(I_C)$

V_{CE} = 5 V



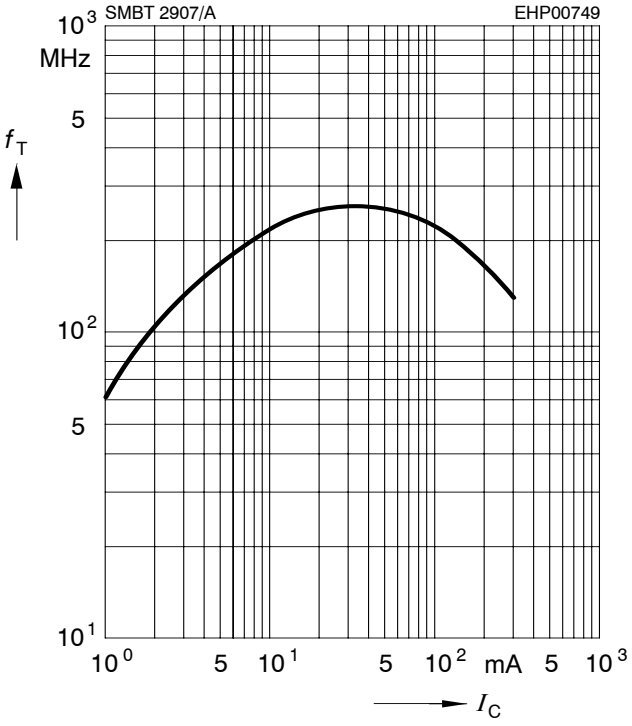
Saturation voltage $I_C = f(V_{BEsat}; V_{CEsat})$

h_{FE} = 10



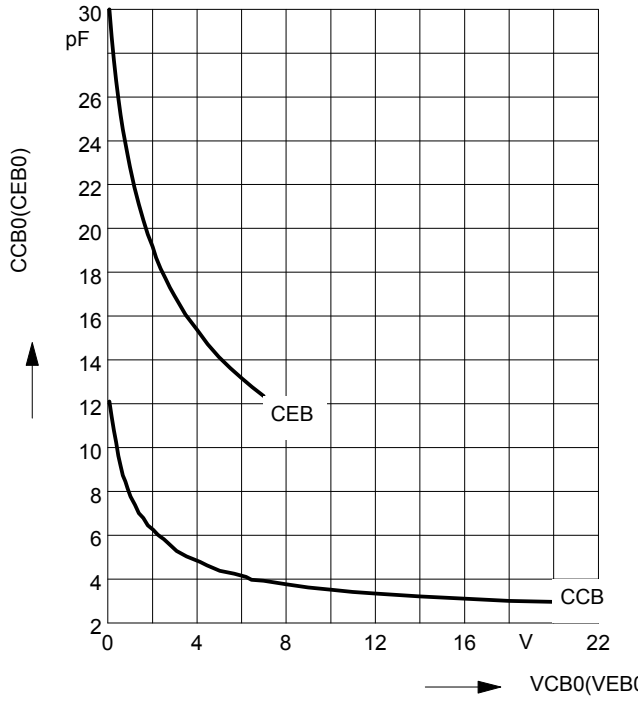
Transition frequency $f_T = f(I_C)$

V_{CE} = 5 V



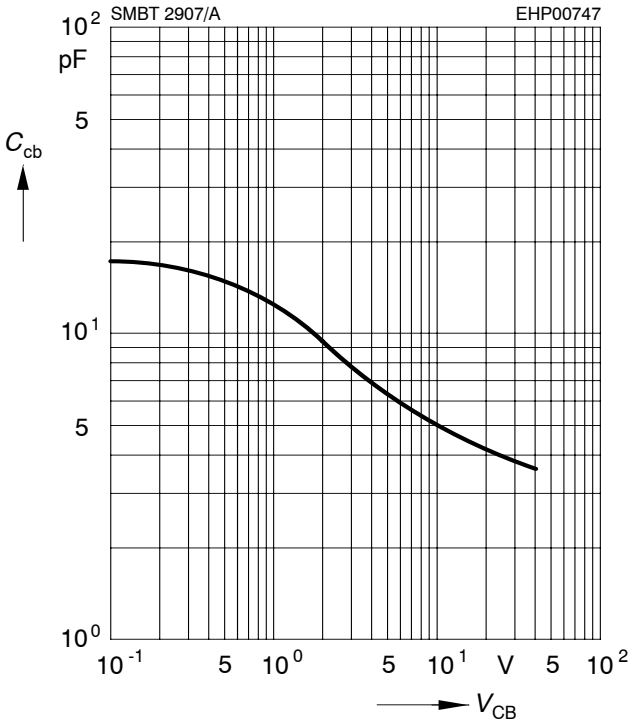
Collector-base capacitance $C_{cb} = f(V_{CB})$

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

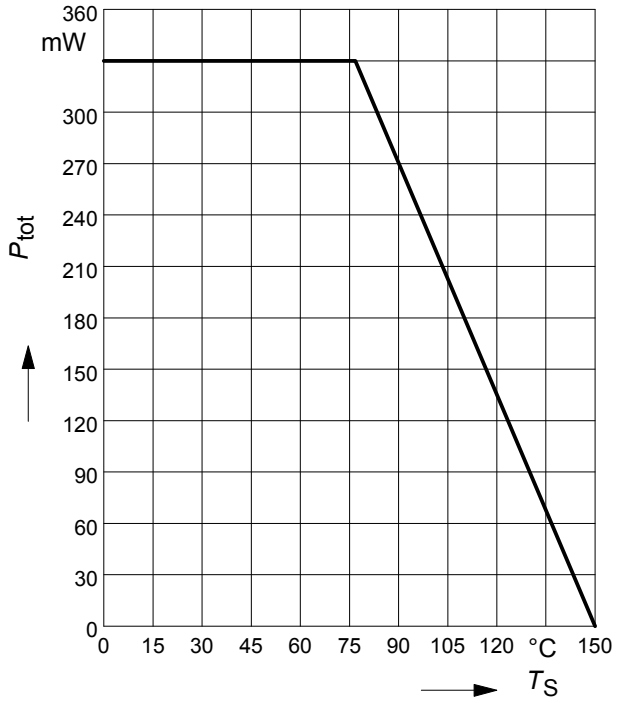


Collector-base capacitance C_{CB}= f (V_{CB})

f = 1MHz

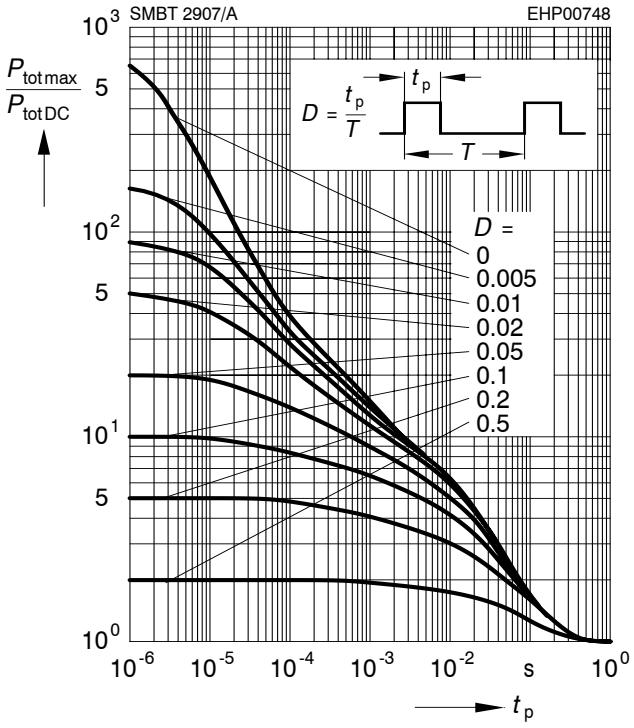


Total power dissipation P_{tot} = f(T_S)



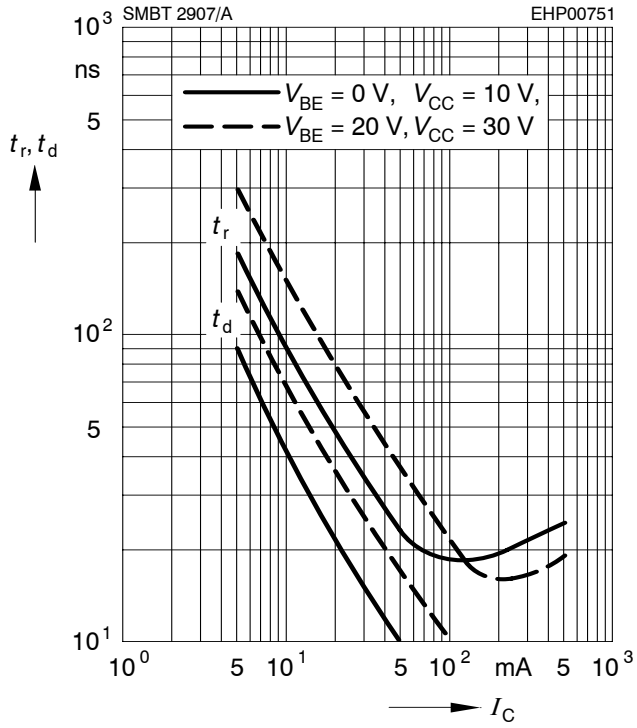
Permissible Pulse Load

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

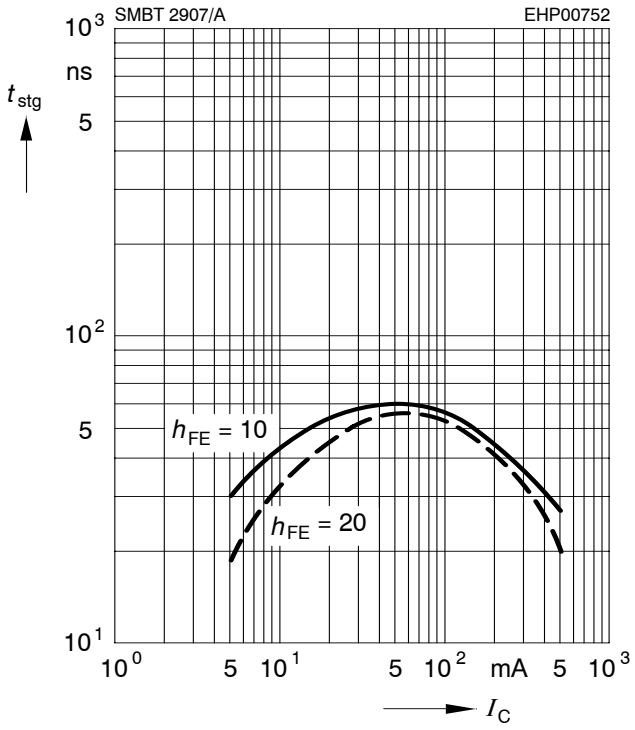


Delay time t_d = f(I_C)

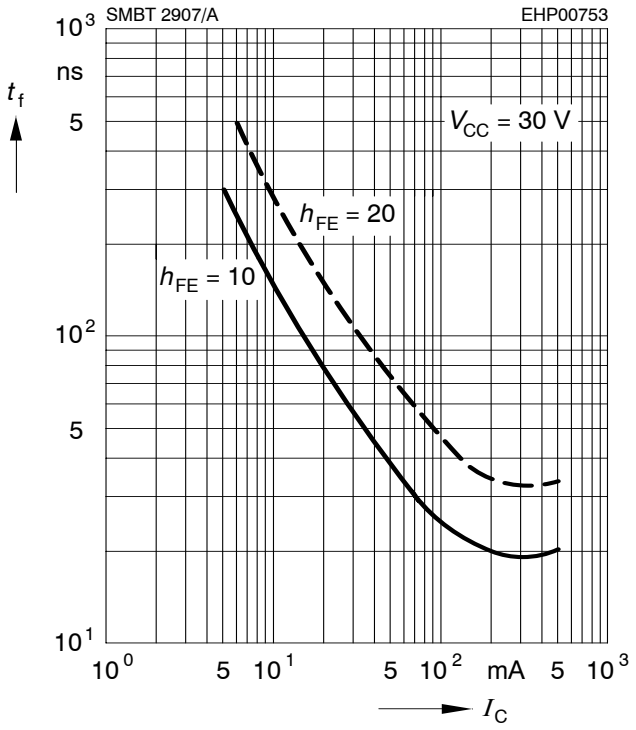
Rise time t_r = f(I_C)



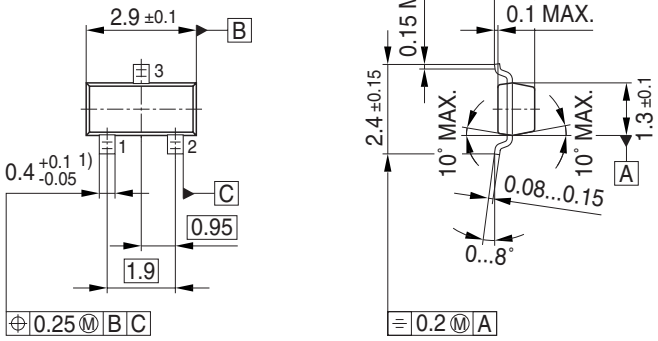
Storage time t_{stg} = $f(I_C)$



Fall time t_f = $f(I_C)$

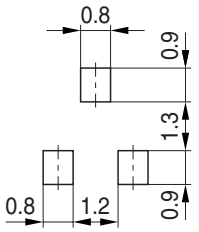


Package Outline

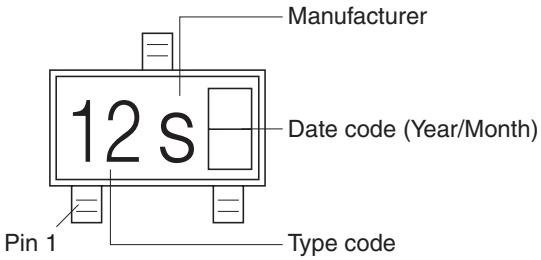


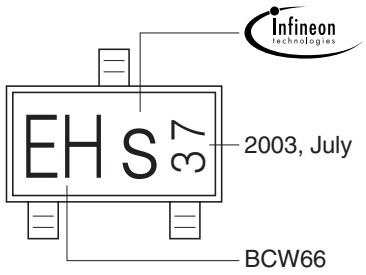
1) Lead width can be 0.6 max. in dambar area

Foot Print



Marking Layout

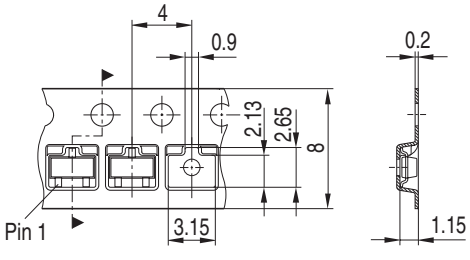




Example

Standard Packing

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



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