



**THE DATASHEET OF  
SMBT3906SE6327HTSA1**



**PNP Silicon Switching Transistors**

- High DC current gain: 0.1 mA to 100 mA
- Low collector-emitter saturation voltage
- For SMBT3906S and SMBT3906U:  
Two (galvanic) internal isolated transistor with good matching in one package
- Complementary types:  
SMBT3904...MMBT3904 (NPN)
- SMBT3906S/ U: for orientation in reel  
see package information below
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



Type	Marking	Pin Configuration						Package
		1=B	2=E	3=C	-	-	-	
SMBT3906/ MMBT3906	s2A	1=B	2=E	3=C	-	-	-	SOT23
SMBT3906S	s2A	1=E1	2=B1	3=C2	4=E2	5=B2	6=C1	SOT363
SMBT3906U	s2A	1=E1	2=B1	3=C2	4=E2	5=B2	6=C1	SC74

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CEO}$	40	V
Collector-base voltage	$V_{CBO}$	40	
Emitter-base voltage	$V_{EBO}$	6	
Collector current	$I_C$	200	mA
Total power dissipation-	$P_{tot}$		mW
$T_S \leq 71^\circ\text{C}$ , SOT23, MMBT3906		330	
$T_S \leq 115^\circ\text{C}$ , SOT363, MMBT3906S		250	
$T_S \leq 107^\circ\text{C}$ , SC74, MMBT3906U		330	
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-65 ... 150	

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>1)</sup> SMBT3906/ MMBT3906	$R_{thJS}$	$\leq 240$	mW
SMBT3906S		$\leq 140$	
SMBT3906U		$\leq 130$	

<sup>1</sup>For calculation of  $R_{thJA}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

**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 $I_C = 1 \text{ mA}, I_B = 0$	$V_{(BR)CEO}$	40	-	-	V
Collector-base breakdown voltage $I_C = 10 \mu\text{A}, I_E = 0$	$V_{(BR)CBO}$	40	-	-	
Emitter-base breakdown voltage $I_E = 10 \mu\text{A}, I_C = 0$	$V_{(BR)EBO}$	6	-	-	
Collector-base cutoff current $V_{CB} = 30 \text{ V}, I_E = 0$	$I_{CBO}$	-	-	50	nA
DC current gain <sup>1)</sup> $I_C = 100 \mu\text{A}, V_{CE} = 1 \text{ V}$ $I_C = 1 \text{ mA}, V_{CE} = 1 \text{ V}$ $I_C = 10 \text{ mA}, V_{CE} = 1 \text{ V}$ $I_C = 50 \text{ mA}, V_{CE} = 1 \text{ V}$ $I_C = 100 \text{ mA}, V_{CE} = 1 \text{ V}$	$h_{FE}$	60 80 100 60 30	- - - - -	- - 300 - -	-
Collector-emitter saturation voltage <sup>1)</sup> $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$ $I_C = 50 \text{ mA}, I_B = 5 \text{ mA}$	$V_{CEsat}$	- -	- -	0.25 0.4	V
Base emitter saturation voltage <sup>1)</sup> $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$ $I_C = 50 \text{ mA}, I_B = 5 \text{ mA}$	$V_{BEsat}$	0.65 -	- -	0.85 0.95	

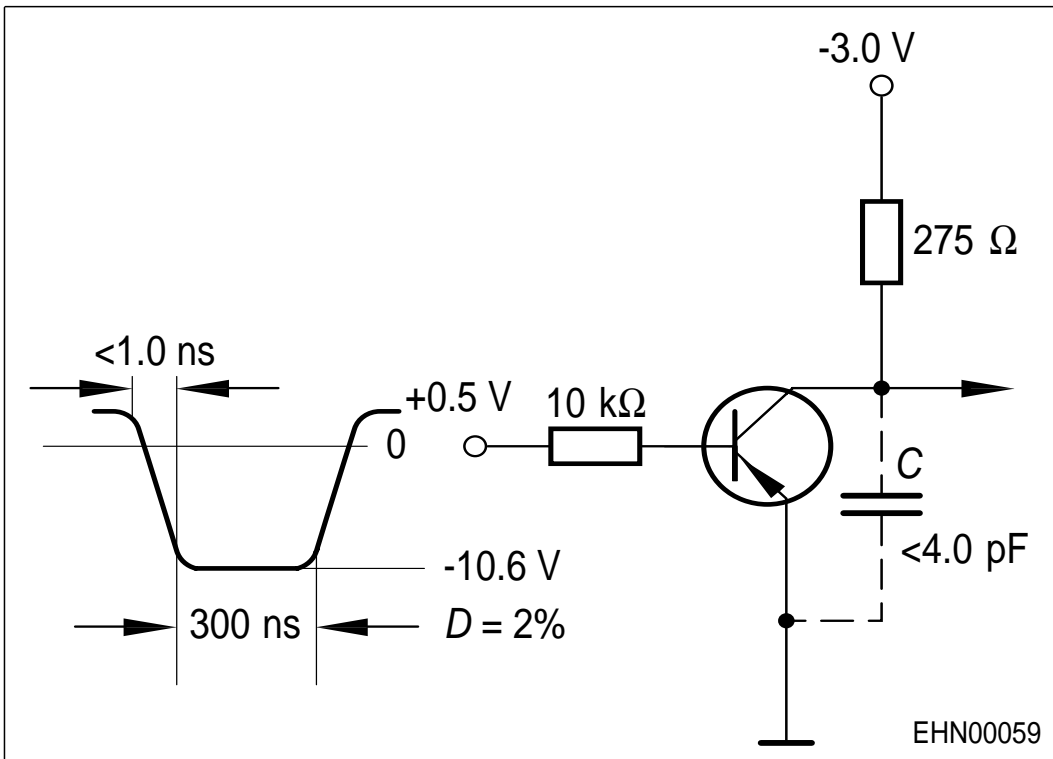
<sup>1</sup>Pulse test:  $t < 300\mu\text{s}$ ;  $D < 2\%$

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

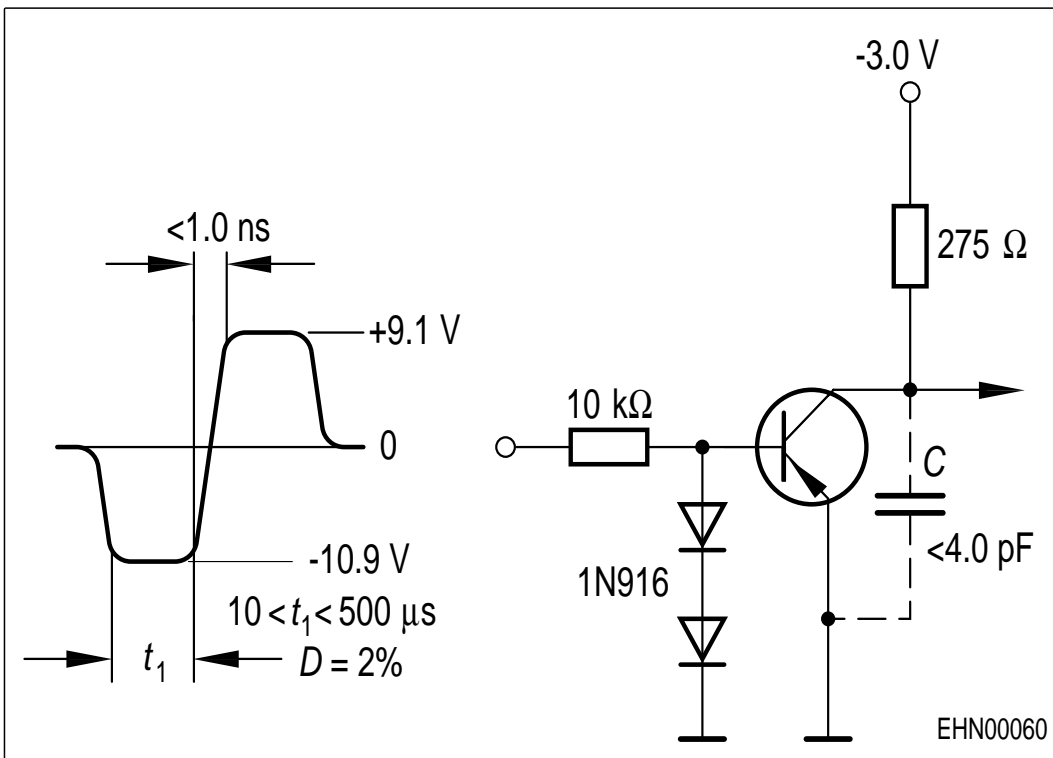
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics</b>					
Transition frequency $I_C = 10\text{ mA}$ , $V_{CE} = 20\text{ V}$ , $f = 100\text{ MHz}$	$f_T$	250	-	-	MHz
Collector-base capacitance $V_{CB} = 5\text{ V}$ , $f = 1\text{ MHz}$	$C_{cb}$	-	-	3.5	pF
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$	$C_{eb}$	-	-	10	
Delay time $V_{CC} = 3\text{ V}$ , $I_C = 10\text{ mA}$ , $I_{B1} = 1\text{ mA}$ , $V_{BE(off)} = 0.5\text{ V}$	$t_d$	-	-	35	ns
Rise time $V_{CC} = 3\text{ V}$ , $I_C = 10\text{ mA}$ , $I_{B1} = 1\text{ mA}$ , $V_{BE(off)} = 0.5\text{ V}$	$t_r$	-	-	35	
Storage time $V_{CC} = 3\text{ V}$ , $I_C = 10\text{ mA}$ , $I_{B1} = I_{B2} = 1\text{ mA}$	$t_{stg}$	-	-	225	
Fall time $V_{CC} = 3\text{ V}$ , $I_C = 10\text{ mA}$ , $I_{B1} = I_{B2} = 1\text{ mA}$	$t_f$	-	-	75	
Noise figure $I_C = 100\text{ }\mu\text{A}$ , $V_{CE} = 5\text{ V}$ , $f = 1\text{ kHz}$ , $\Delta f = 200\text{ Hz}$ , $R_S = 1\text{ k}\Omega$	$F$	-	-	4	dB

Test circuit

Delay and rise time

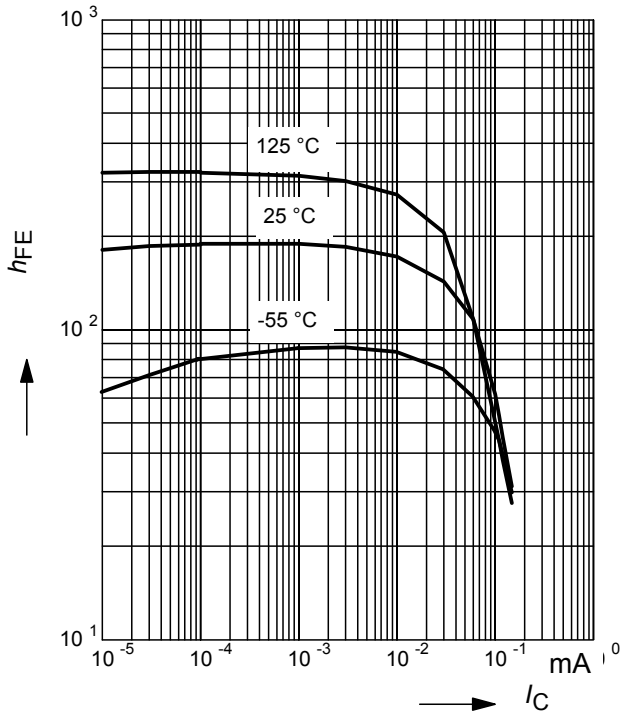


Storage and fall time



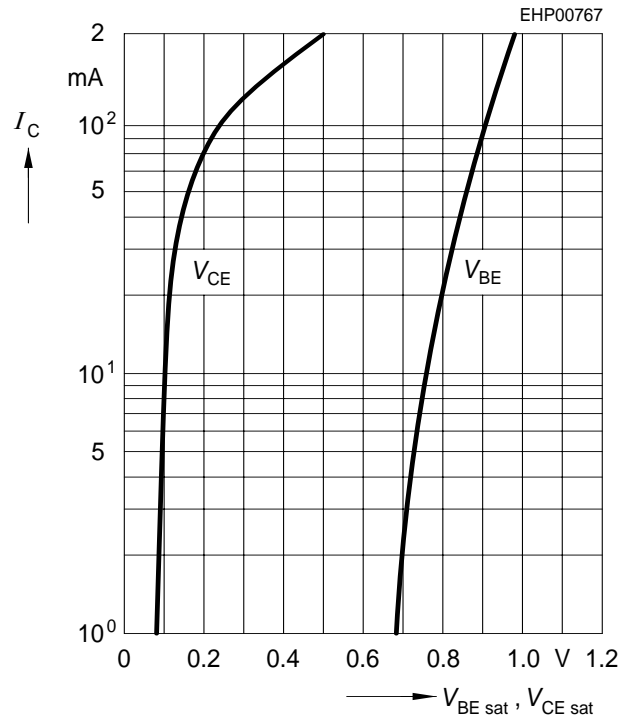
**DC current gain  $h_{FE} = f(I_C)$**

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



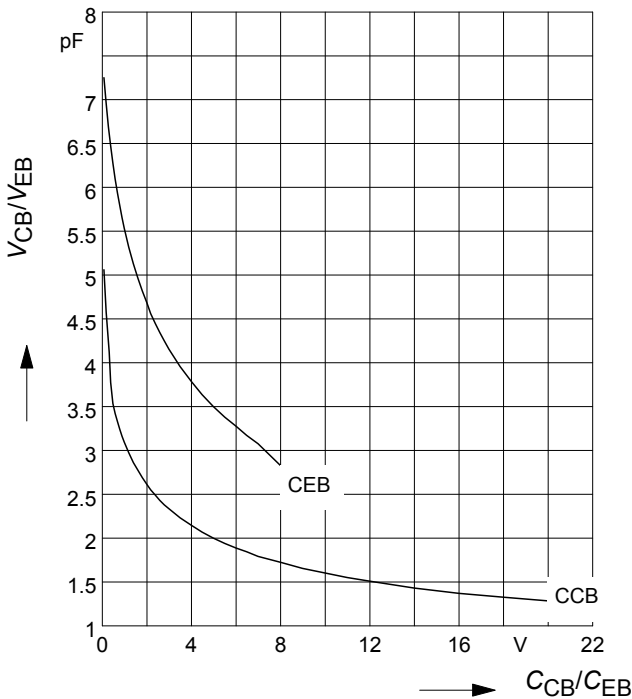
**Saturation voltage  $I_C = f(V_{BEsat}; V_{CEsat})$**

$h_{FE} = 10$



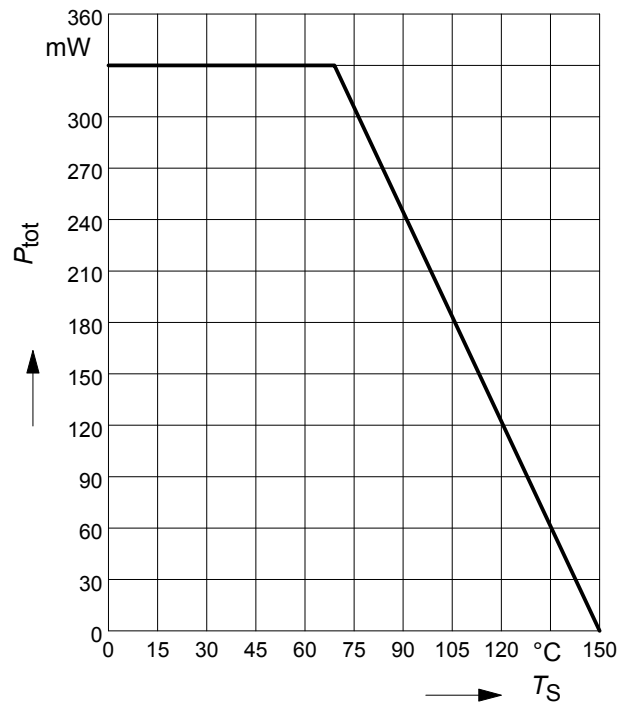
**Collector-base capacitance  $C_{cb} = f(V_{CB})$**

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



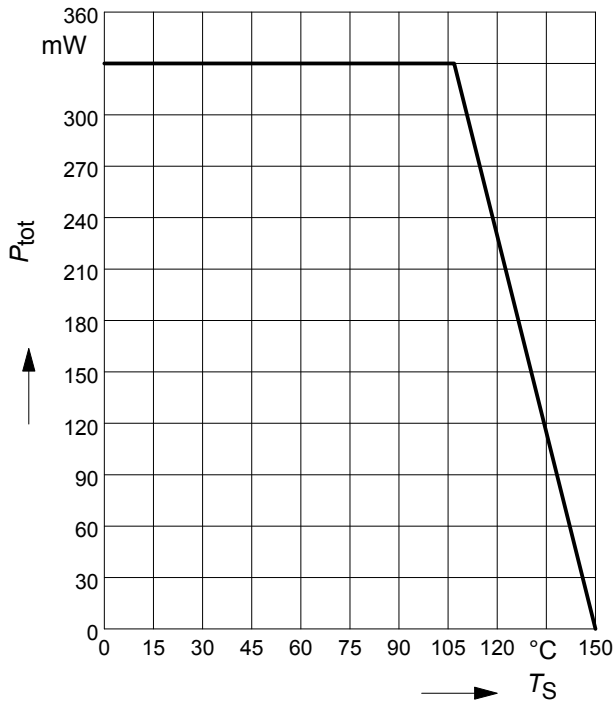
**Total power dissipation  $P_{tot} = f(T_S)$**

SMBT3906



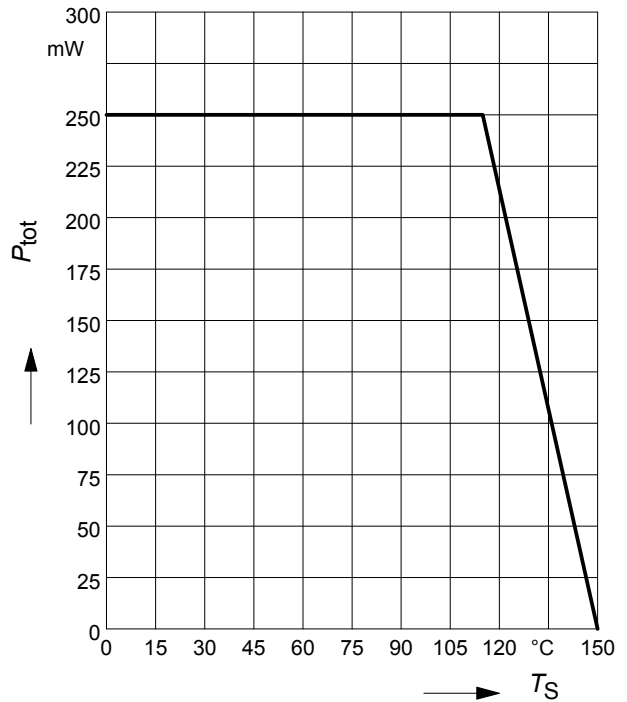
**Total power dissipation  $P_{tot} = f(T_S)$**

SMBT3906U



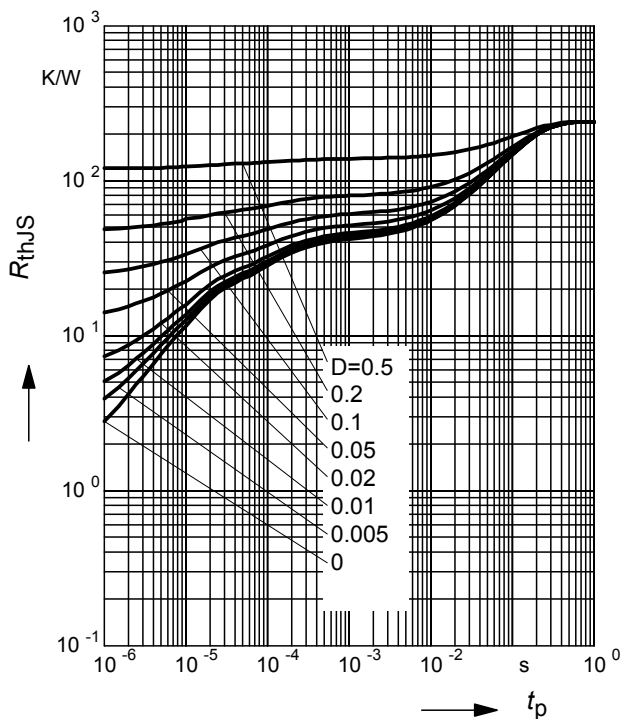
**Total power dissipation  $P_{tot} = f(T_S)$**

SMBT3906S



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

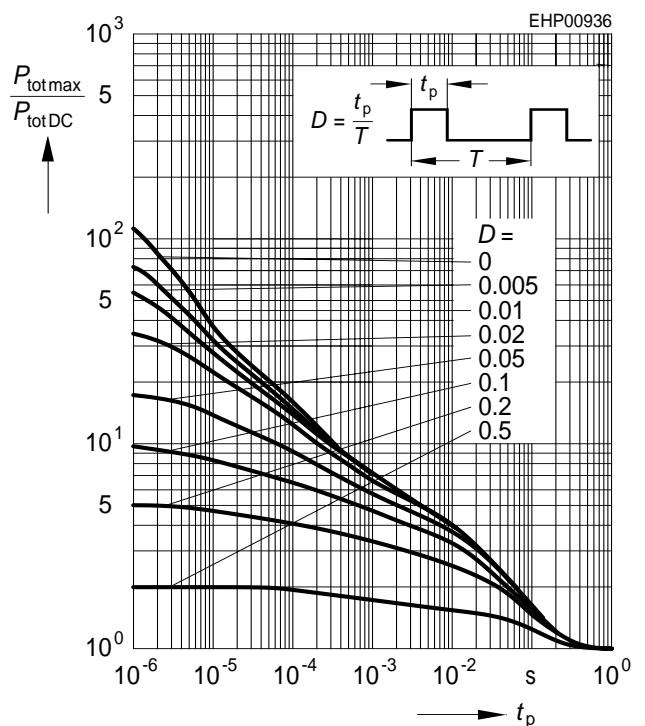
SMBT3906



**Permissible Pulse Load**

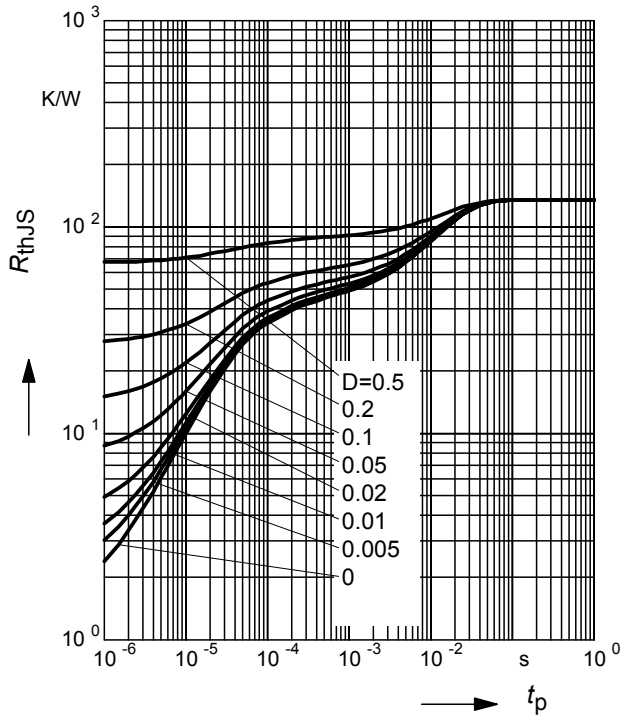
$P_{totmax}/P_{totDC} = f(t_p)$

SMBT3906



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

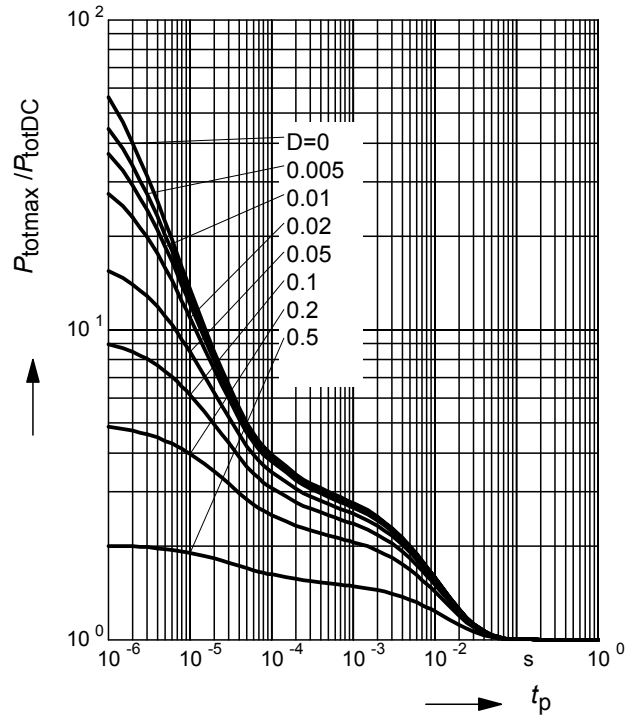
SMBT3906U



**Permissible Pulse Load**

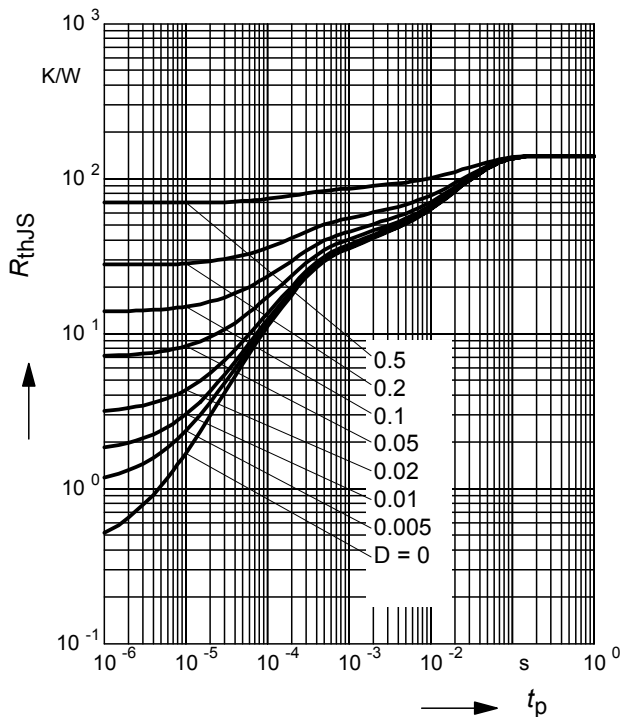
$P_{totmax}/P_{totDC} = f(t_p)$

SMBT3906U



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

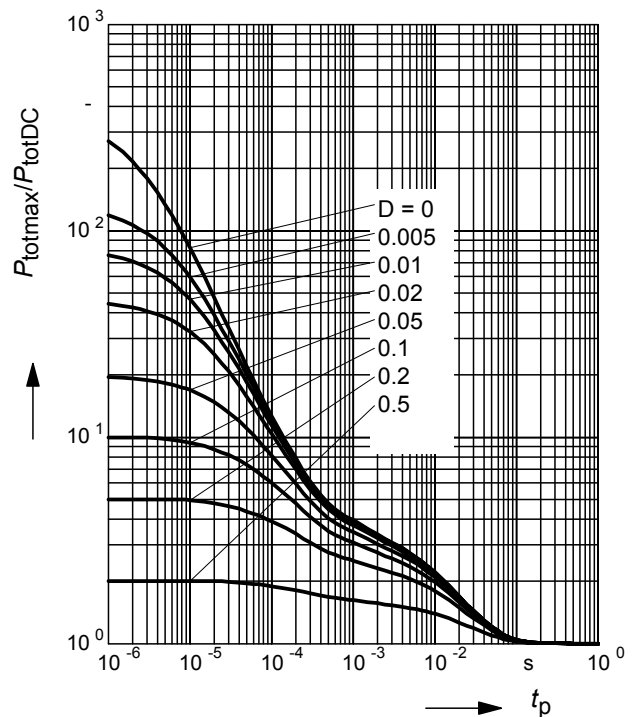
SMBT3906S



**Permissible Pulse Load**

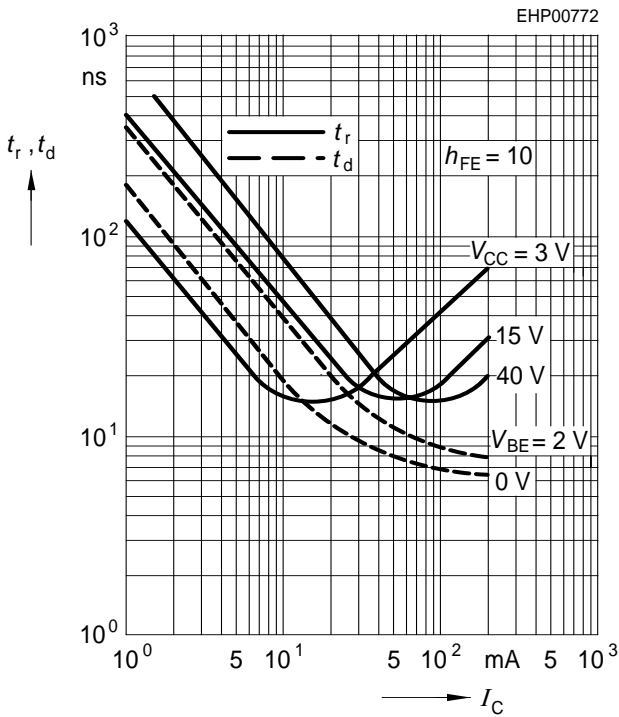
$P_{totmax}/P_{totDC} = f(t_p)$

SMBT3906S

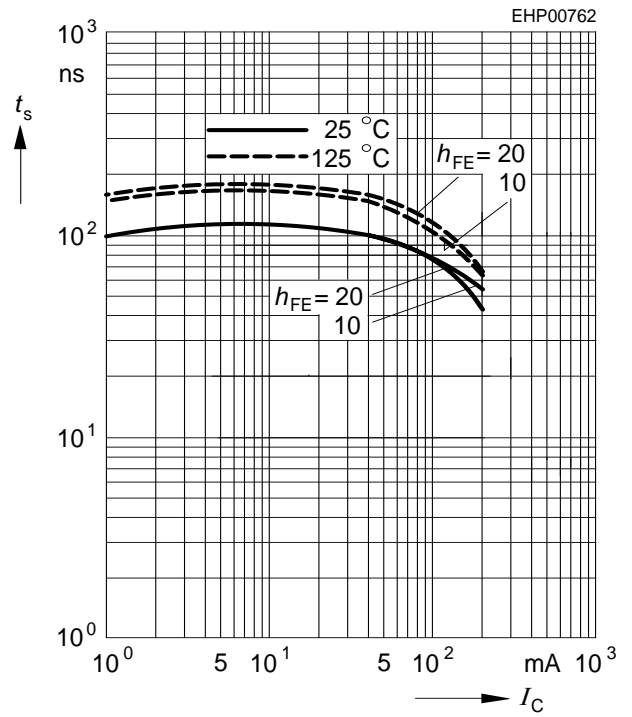


Delay time  $t_d = f(I_C)$

Rise time  $t_r = f(I_C)$

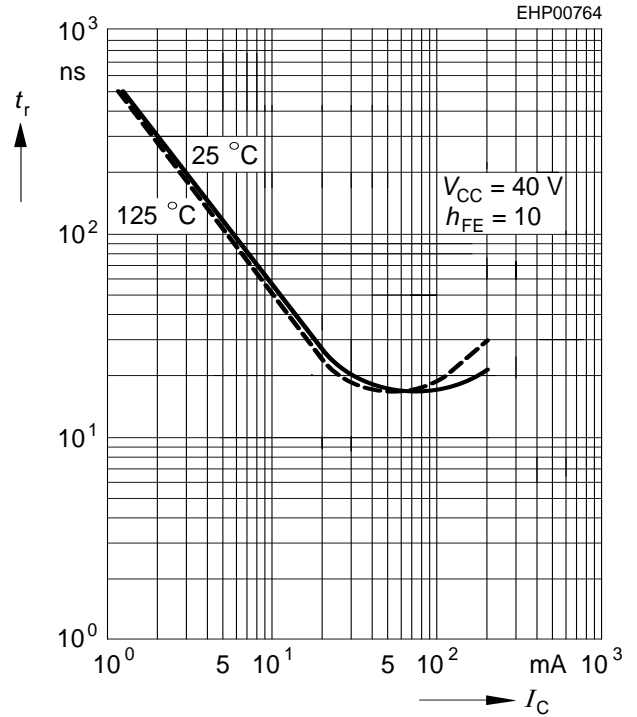
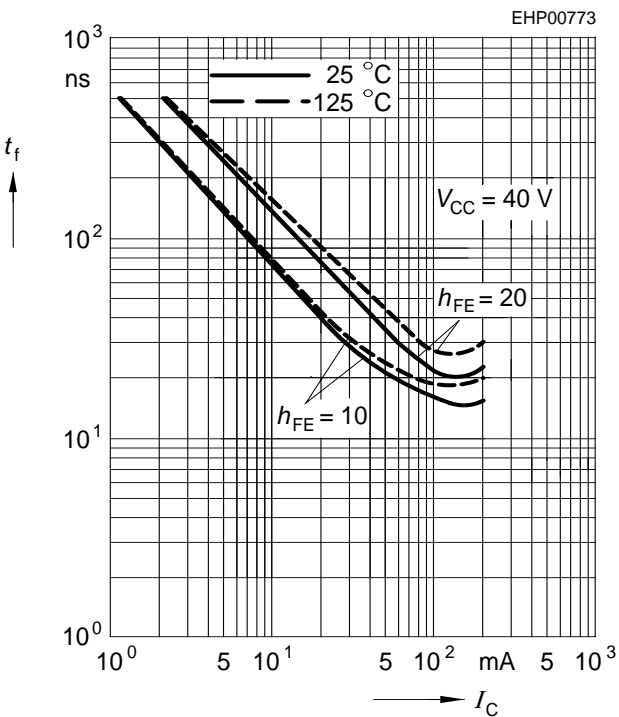


Storage time  $t_{stg} = f(I_C)$

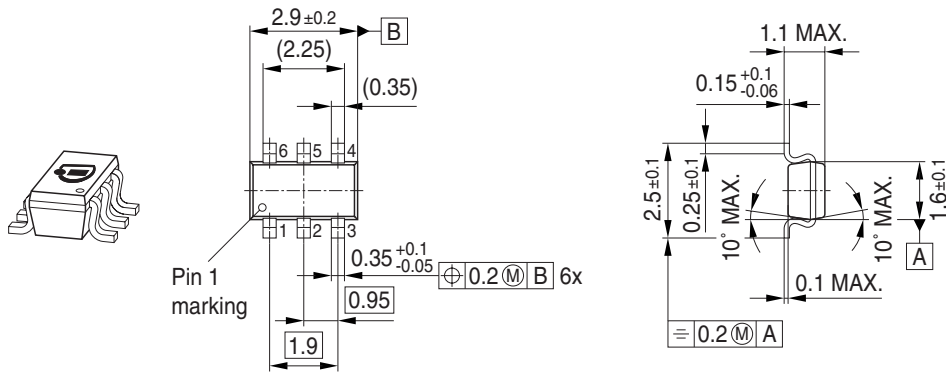


Fall time  $t_f = f(I_C)$

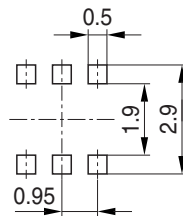
Rise time  $t_r = f(I_C)$



Package Outline

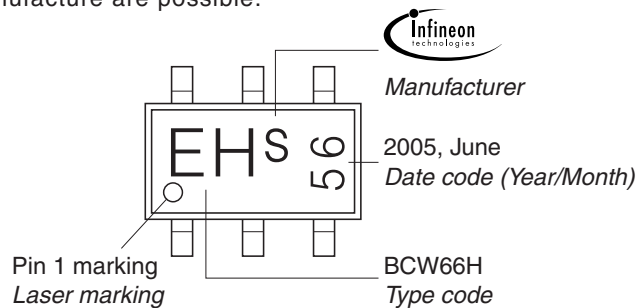


Foot Print



Marking Layout (Example)

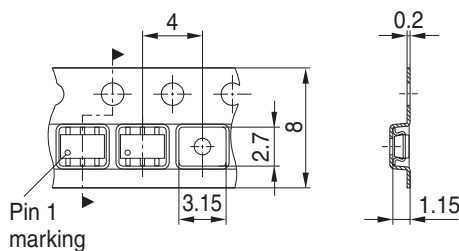
Small variations in positioning of Date code, Type code and Manufacture are possible.



Standard Packing

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

For symmetric types no defined Pin 1 orientation in reel.

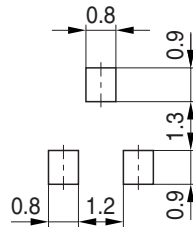


Package Outline



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

Foot Print

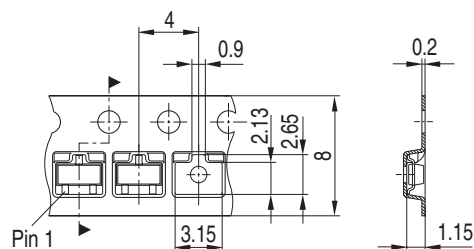


Marking Layout (Example)

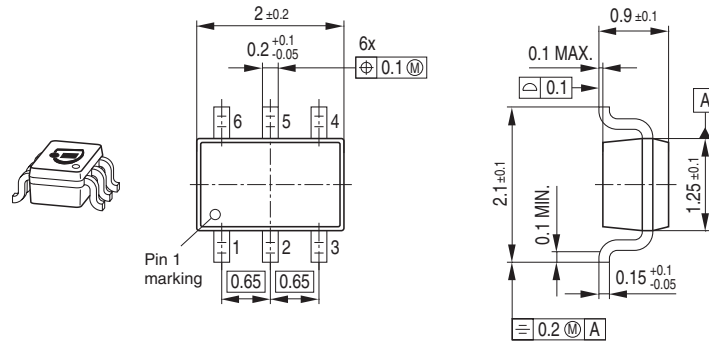


Standard Packing

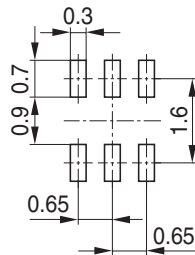
Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel



### Package Outline

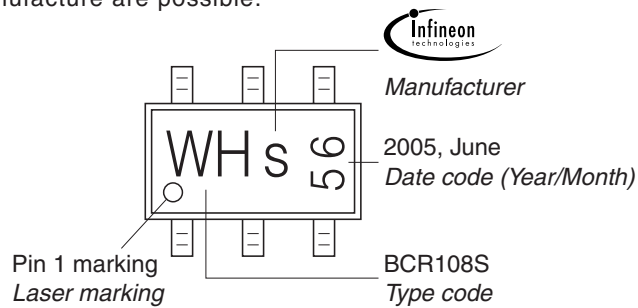


### Foot Print



### Marking Layout (Example)

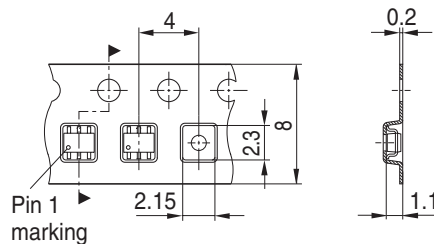
Small variations in positioning of Date code, Type code and Manufacture are possible.



### Standard Packing

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

For symmetric types no defined Pin 1 orientation in reel.



**Edition 2009-11-16**

**Published by  
Infineon Technologies AG  
81726 Munich, Germany**

**© 2009 Infineon Technologies AG  
All Rights Reserved.**

### **Legal Disclaimer**

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

### **Information**

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office ([www.infineon.com](http://www.infineon.com)).

### **Warnings**

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- ⊖ [View SMBT3906SE6327HTSA1 on WIN SOURCE](#)
- ⊖ [Infineon Technologies Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

- ✓ Global Sourcing Solution
- ✓ Obsolete Management
- ✓ Cost Control Management
- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management