



# SM6HT

## HIGH TEMPERATURE TRANSIL™ FOR AUTOMOTIVE APPLICATIONS

### FEATURES

- High performance TRANSIL designed to fit high temperature environment like automotive applications
- High reliability planar technology
- High performance in voltage regulation mode
- Very low leakage current:  
 $I_R \text{ max.} = 5\mu\text{A} @ T_{\text{amb}} = 150^\circ\text{C}$
- Peak pulse power: 600W (10/1000 $\mu\text{s}$ )
- Fast response time
- Unidirectional type
- Low clamping factor



### DESCRIPTION

This high performance Transil series has been designed to fit high temperature environment such as automotive applications, using surface mount technology. These devices are using high reliability planar technology resulting in high performances in voltage regulation mode and low leakage current at high temperature.

**Table 1: Order Codes**

Part Number	Marking
SM6HTxxx	See page 2

**Table 2: Absolute Maximum Rating** ( $T_{\text{amb}} = 25^\circ\text{C}$ )

Symbol	Parameter	Value	Unit
$P_{\text{PP}}$	Peak pulse power dissipation (see note 1)	$T_j \text{ initial} = T_{\text{amb}}$ 600	W
$P$	Power dissipation on infinite heatsink	$T_{\text{amb}} = 50^\circ\text{C}$ 5	W
$I_{\text{FSM}}$	Non repetitive surge peak forward current for unidirectional types	$t_p = 10 \text{ ms}$ $T_j \text{ initial} = T_{\text{amb}}$ 75	A
$T_{\text{stg}} / T_j$	Storage and operating junction temperature range	-65 to 175	$^\circ\text{C}$
$T_L$	Maximum lead temperature for soldering during 10 s.	260	$^\circ\text{C}$

**Note 1:** for a surge greater than the maximum values, the diode will fail in short-circuit.

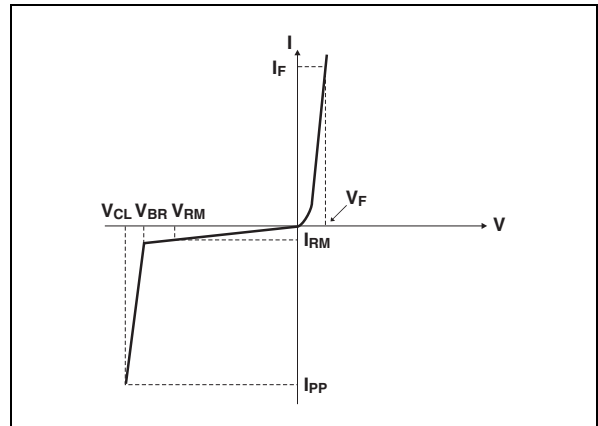
**Table 3: Thermal Resistances**

Symbol	Parameter	Value	Unit
$R_{\text{th}}(j-l)$	Junction to leads	20	$^\circ\text{C}/\text{W}$
$R_{\text{th}}(j-a)$	Junction to ambient on printed circuit on recommended pad layout	100	$^\circ\text{C}/\text{W}$

## SM6HT

**Table 4: Electrical Characteristics** ( $T_{amb} = 25^{\circ}\text{C}$ )

Symbol	Parameter
$V_{RM}$	Stand-off voltage
$V_{BR}$	Breakdown voltage
$V_{CL}$	Clamping voltage
$I_{RM}$	Leakage current
$I_{PP}$	Peak pulse current
$V_F$	Forward voltage drop



Types	Marking	$I_{RM}$ @		$V_{RM}$	$V_{BR}$ @			$I_R$	$V_{CL}$ @ $I_{PP}$		$\alpha T$ max note2
		$T_{amb}=25^{\circ}\text{C}$	$T_{amb}=150^{\circ}\text{C}$		note1				10/1000 $\mu\text{s}$		
		max	max		min	nom	max		max	A	
		$\mu\text{A}$	$\mu\text{A}$	V	V	V	V	mA	V		
SM6HT24A	EMB	2	5	20.5	22.8	24	25.2	1	33.2	18.0	9.4
SM6HT27A	EPB			23.1	25.7	27	28.4		37.5	16.0	9.6
SM6HT30A	ERB			25.6	28.5	30	31.5		41.5	14.5	9.7
SM6HT36A	EVB			30.8	34.2	36	37.8		49.9	12.0	9.9
SM6HT39A	EXB			33.3	37.1	39	41.0		53.9	11.1	10.0
SM6HT43A	EYB			36.8	40.9	43	45.2		59.3	10.1	10.1

**Note 1:** Pulse test :  $t_p < 50$  ms.

**Note 2:**  $\Delta V_{BR} = \alpha T \times (T_{amb} - 25) \times V_{BR}(25^{\circ}\text{C})$ .

Figure 1: Peak power dissipation versus initial junction temperature

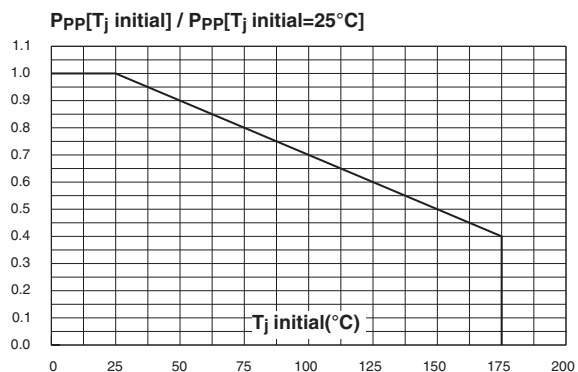


Figure 2: Continuous power dissipation versus ambient temperature

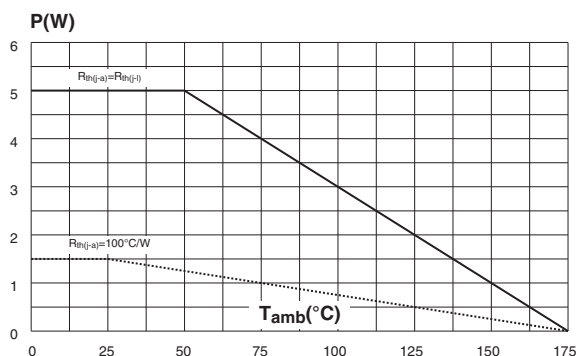


Figure 3: Peak pulse power versus exponential pulse duration ( $T_j \text{ initial}=25^\circ\text{C}$ )

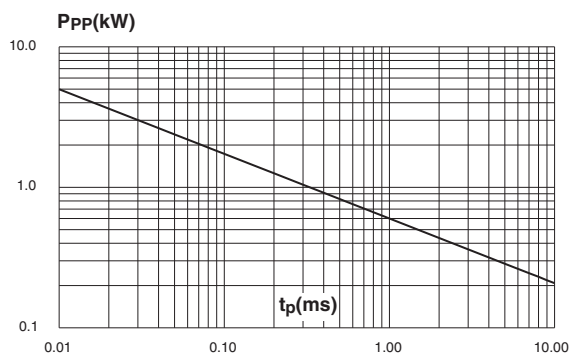


Figure 4: Clamping voltage versus peak pulse current ( $T_j \text{ initial}=25^\circ\text{C}$ )

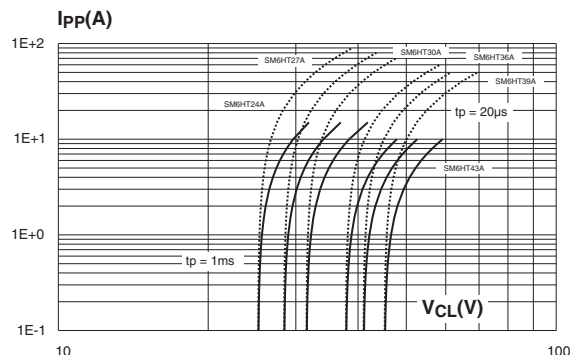


Figure 5: Junction capacitance versus reverse applied voltage (typical values)

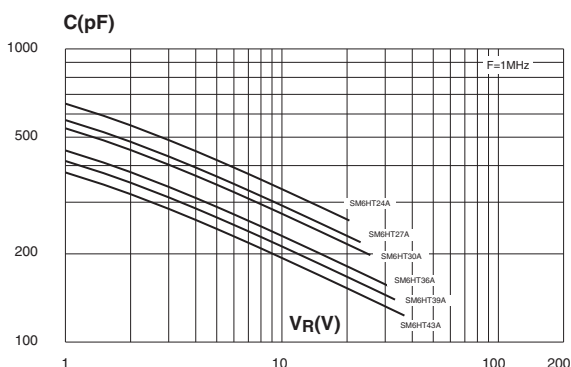


Figure 6: Peak forward voltage drop versus peak forward current (typical values)

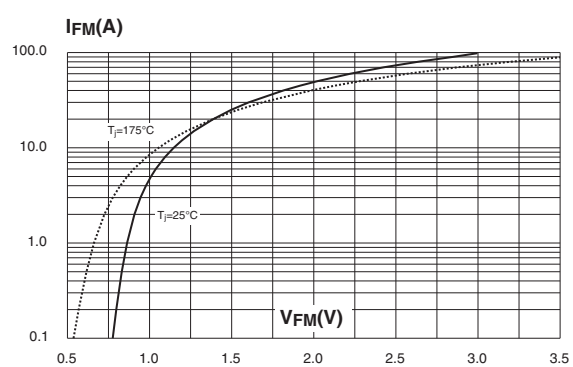


Figure 7: Variation of thermal impedance junction to ambient versus pulse duration (Printed circuit board FR4 with recommended pad layout)

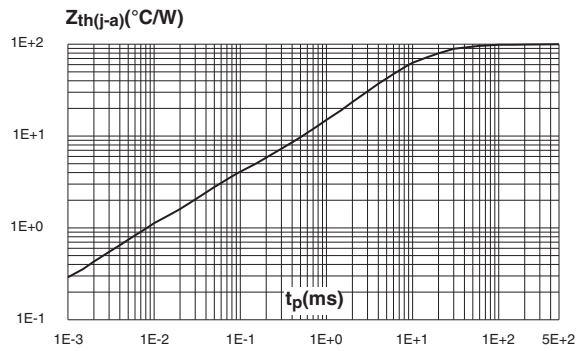


Figure 8: Thermal resistance junction to ambient versus copper surface under each lead (printed circuit board FR4, e(Cu)=35µm)

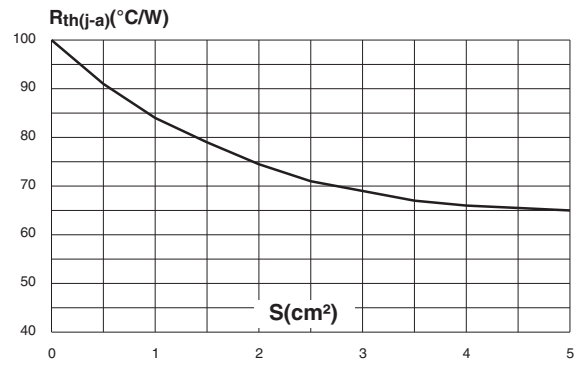


Figure 9: Variation of leakage current versus junction temperature (typical values)

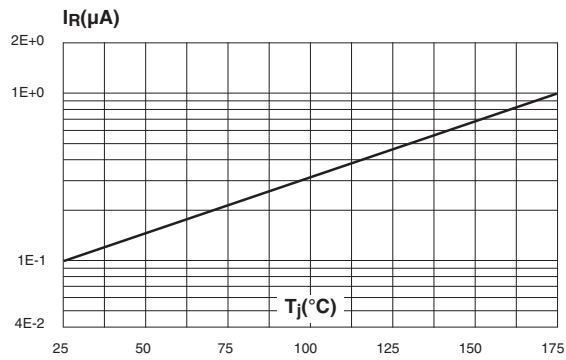


Figure 10: SMB Package Mechanical Data

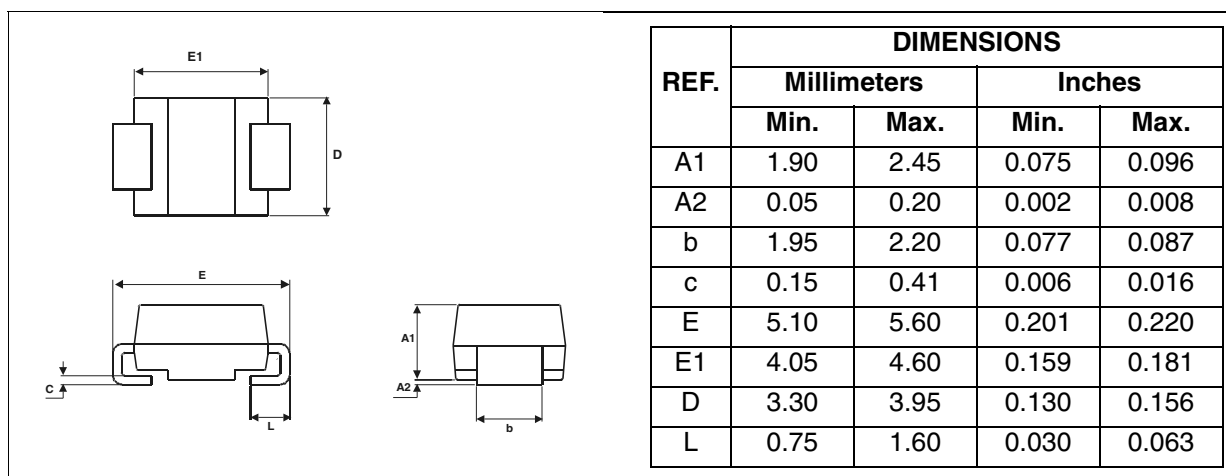


Figure 11: Foot Print Dimensions (millimeters)

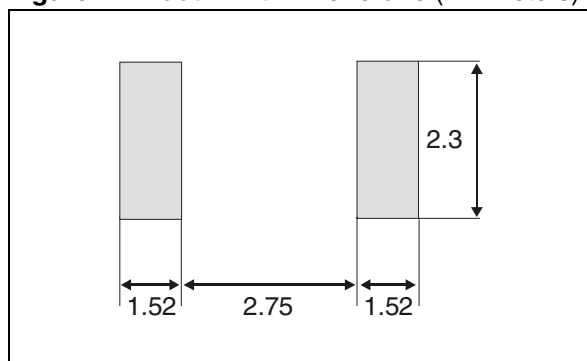


Table 5: Ordering Information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
SM6HTxxx	See page 2	SMB	0.107 g	2500	Tape & reel

Table 6: Revision History

Date	Revision	Description of Changes
Apr-1999	4A	Last update.
26-Jan-2005	5	Figure 9 on page 4: leakage current improved.

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