



## TRISIL™ FOR TELECOM EQUIPMENT PROTECTION

### FEATURES

- Bidirectional crowbar protection
- Voltage: 8V
- Low leakage current :  $I_R = 2\mu\text{A}$  max
- Holding current:  $I_H = 150$  mA min
- Repetitive peak pulse current :  
 $I_{PP} = 75$  A (10/1000 $\mu\text{s}$ )

### MAIN APPLICATIONS

Any sensitive equipment requiring protection against lightning strikes and power crossing:

- Ethernet, T1/E1

### DESCRIPTION

The SMP75-8 is a very low voltage transient surge arrester especially designed to protect sensitive telecommunication equipment against lightning strikes and other transients. Its low voltage makes it suitable to protect low voltage transformer in T1/E1, ethernet links without saturation of the transformer.

### BENEFITS

Trisils are not subject to ageing and provide a fail safe mode in short circuit for a better protection. They are used to help equipment to meet main standards such as UL1950, IEC950 / CSA C22.2 and UL1459. They have UL94 V0 approved resin. SMB package is JEDEC registered (DO-214AA). Trisils comply with the following standards GR-1089 Core, ITU-T-K20/K21, VDE0433, VDE0878, IEC61000-4-5 and FCC part 68.



Table 1: Order Code

Part Number	Marking
SMP75-8	L08

Figure 1: Schematic Diagram

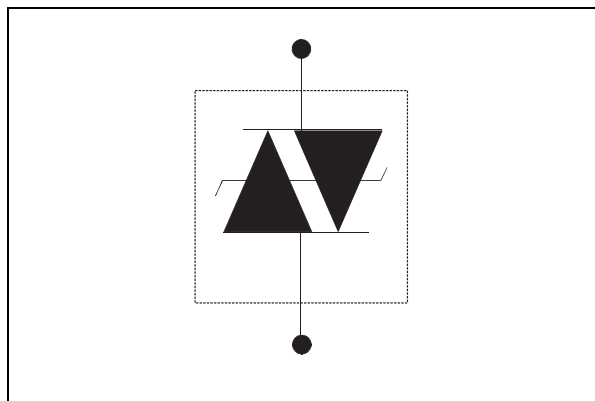


Table 2: In compliances with the following standards

STANDARD	Peak Surge Voltage (V)	Waveform Voltage	Required peak current (A)	Current waveform	Minimum serial resistor to meet standard ( $\Omega$ )
GR-1089 Core First level	2500	2/10 $\mu$ s	500	2/10 $\mu$ s	5
	1000	10/1000 $\mu$ s	100	10/1000 $\mu$ s	3.3
GR-1089 Core Second level	5000	2/10 $\mu$ s	500	2/10 $\mu$ s	10
GR-1089 Core Intra-building	1500	2/10 $\mu$ s	100	2/10 $\mu$ s	0
ITU-T-K20/K21	6000	10/700 $\mu$ s	150	5/310 $\mu$ s	10
	1500		37.5		0
ITU-T-K20 (IEC61000-4-2)	8000	1/60 ns	ESD contact discharge		0
	15000		ESD air discharge		0
VDE0433	4000	10/700 $\mu$ s	100	5/310 $\mu$ s	0
	2000		50		0
VDE0878	4000	1.2/50 $\mu$ s	100	1/20 $\mu$ s	0
	2000		50		0
IEC61000-4-5	4000	10/700 $\mu$ s	100	5/310 $\mu$ s	0
	4000	1.2/50 $\mu$ s	100	8/20 $\mu$ s	0
FCC Part 68, lightning surge type A	1500	10/160 $\mu$ s	200	10/160 $\mu$ s	2.5
	800	10/560 $\mu$ s	100	10/560 $\mu$ s	0
FCC Part 68, lightning surge type B	1000	9/720 $\mu$ s	25	5/320 $\mu$ s	0

Table 3: Absolute Ratings ( $T_{amb} = 25^{\circ}\text{C}$ )

Symbol	Parameter	Value	Unit	
$I_{PP}$	Repetitive peak pulse current	10/1000 $\mu$ s	75	A
		8/20 $\mu$ s	250	
		10/560 $\mu$ s	100	
		5/310 $\mu$ s	120	
		10/160 $\mu$ s	150	
		1/20 $\mu$ s	250	
		2/10 $\mu$ s	250	
$I_{FS}$	Fail-safe mode : maximum current (note 1)	8/20 $\mu$ s	5	kA
$I_{TSM}$	Non repetitive surge peak on-state current (sinusoidal)	t = 0.2 s	14	A
		t = 1 s	8	
		t = 2 s	6.5	
		t = 15 mn	2	
$I^2t$	$I^2t$ value for fusing	t = 16.6 ms	12	$A^2s$
		t = 20 ms	12.2	
$T_{stg}$	Storage temperature range	-55 to 150	$^{\circ}\text{C}$	
$T_j$	Maximum junction temperature			
$T_L$	Maximum lead temperature for soldering during 10 s.	260	$^{\circ}\text{C}$	

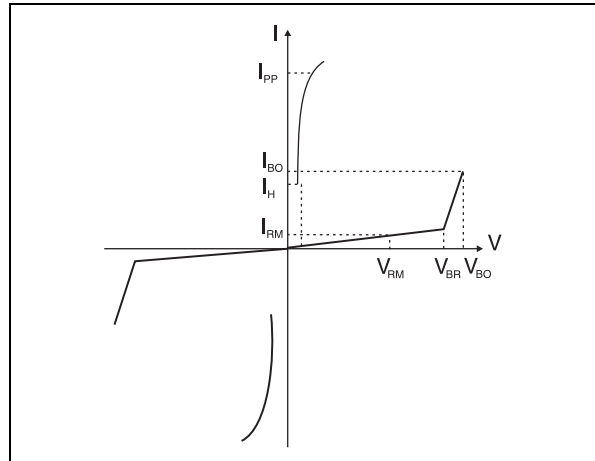
Note 1: in fail safe mode, the device acts as a short circuit

**Table 4: Thermal Resistances**

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction to ambient (with recommended footprint)	100	°C/W
$R_{th(j-l)}$	Junction to leads	20	°C/W

**Table 5: Electrical Characteristics** ( $T_{amb} = 25^{\circ}C$ )

Symbol	Parameter
$V_{RM}$	Stand-off voltage
$V_{BR}$	Breakdown voltage
$V_{BO}$	Breakover voltage
$I_{RM}$	Leakage current
$I_{PP}$	Peak pulse current
$I_{BO}$	Breakover current
$I_H$	Holding current
$V_R$	Continuous reverse voltage
$I_R$	Leakage current at $V_R$
C	Capacitance



Types	$I_{RM} @ V_{RM}$		$I_R @ V_R$		Dynamic $V_{BO}$	Static $V_{BO} @ I_{BO}$		$I_H$	C
	max.		max. note 1		max. note 2	max.	max.	typ. note 4	max. note 5
	$\mu A$	V	$\mu A$	V	V	V	mA	mA	pF
SMP75-8	2	6	5	8	20	15	800	50	60

**Note 1:**  $I_R$  measured at  $V_R$  guarantee  $V_{BR} \min \geq V_R$

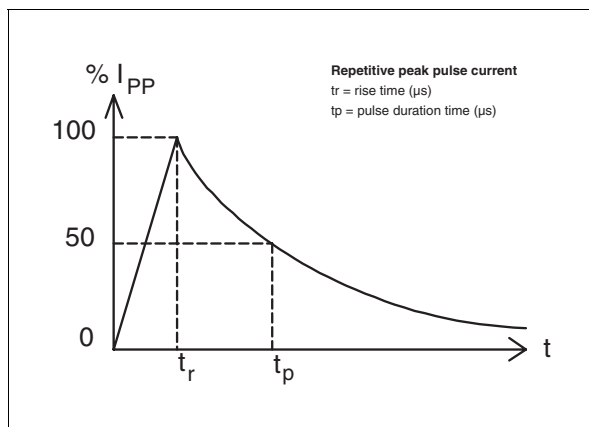
**Note 2:** see functional test circuit 1

**Note 3:** see test circuit 2

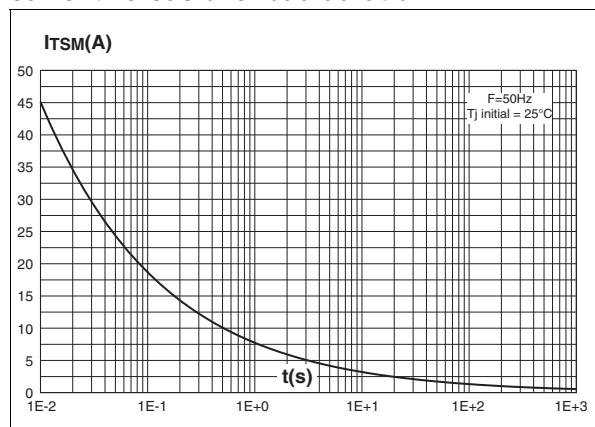
**Note 4:** see functional holding current test circuit 3

**Note 5:**  $V_R = 2V$  bias,  $V_{RMS} = 1V$ ,  $F = 1MHz$

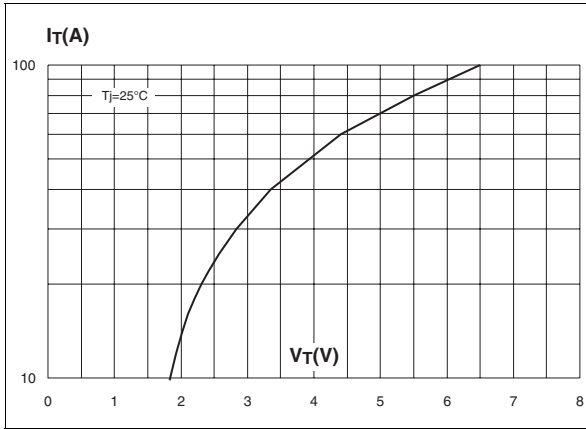
**Figure 2: Pulse waveform**



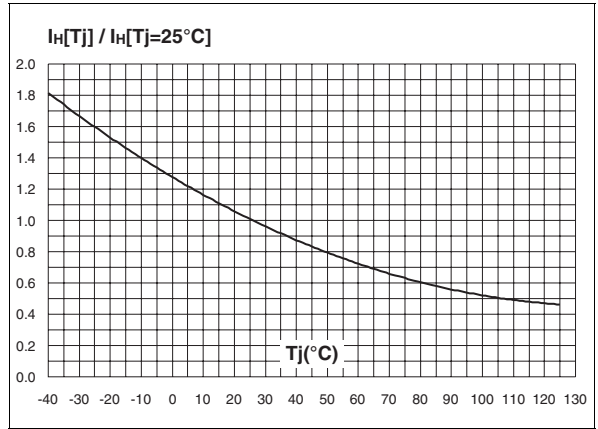
**Figure 3: Non repetitive surge peak on-state current versus overload duration**



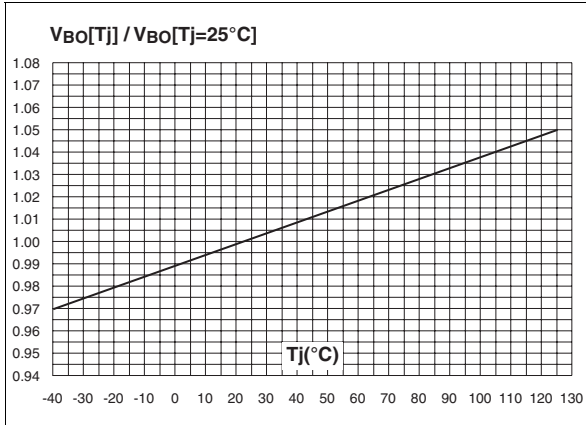
**Figure 4: On-state voltage versus on-state current (typical values)**



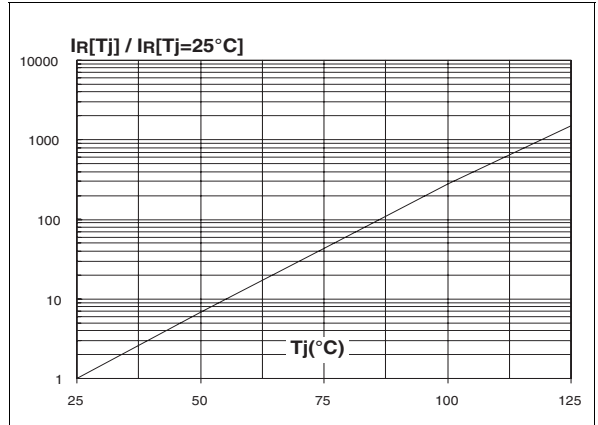
**Figure 5: Relative variation of holding current versus junction temperature**



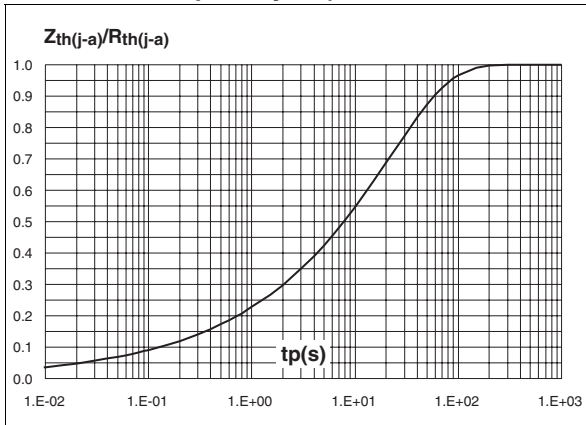
**Figure 6: Relative variation of breakover voltage versus junction temperature**



**Figure 7: Relative variation of leakage current versus reverse voltage applied (typical values)**



**Figure 8: Variation of thermal impedance junction to ambient versus pulse duration (Printed circuit board FR4, SCu=35µm, recommended pad layout)**



**Figure 9: Relative variation of junction capacitance versus reverse voltage applied (typical values)**

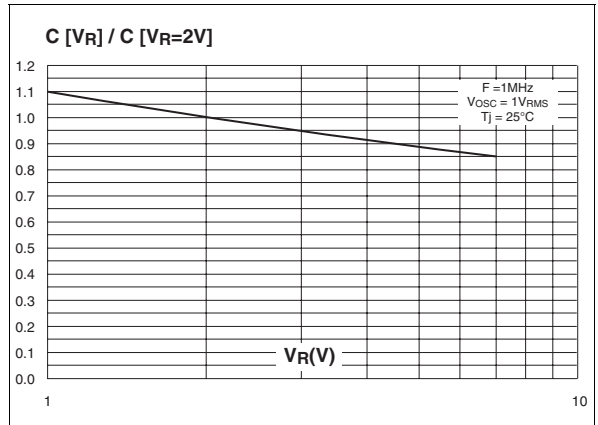


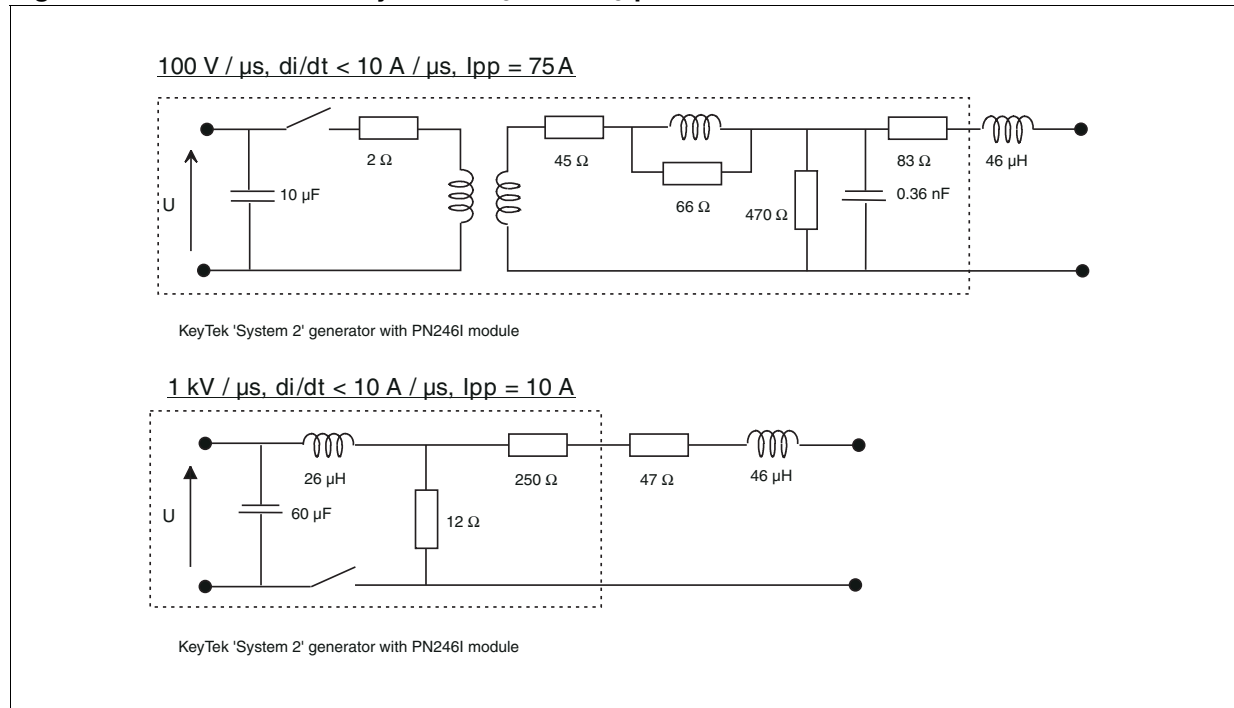
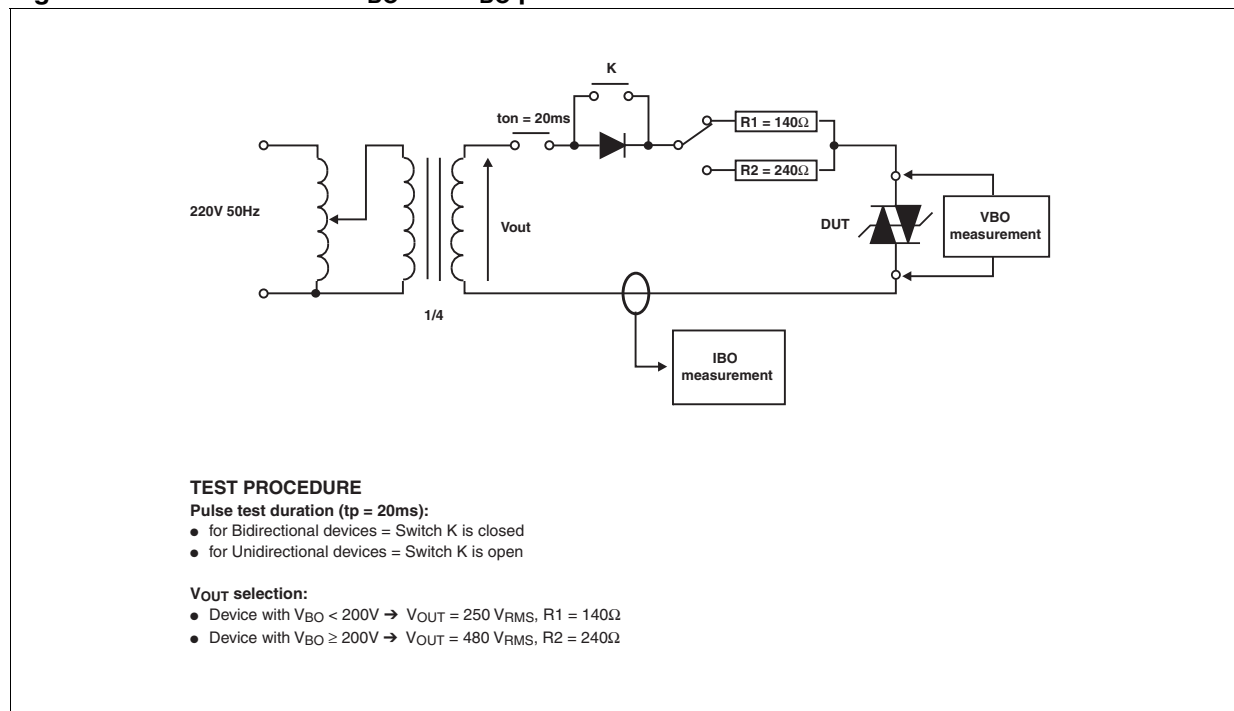
Figure 10: Test circuit 1 for dynamic  $I_{BO}$  and  $V_{BO}$  parametersFigure 11: Test circuit 2 for  $I_{BO}$  and  $V_{BO}$  parameters

Figure 12: Test circuit 3 for dynamic  $I_H$  parameter

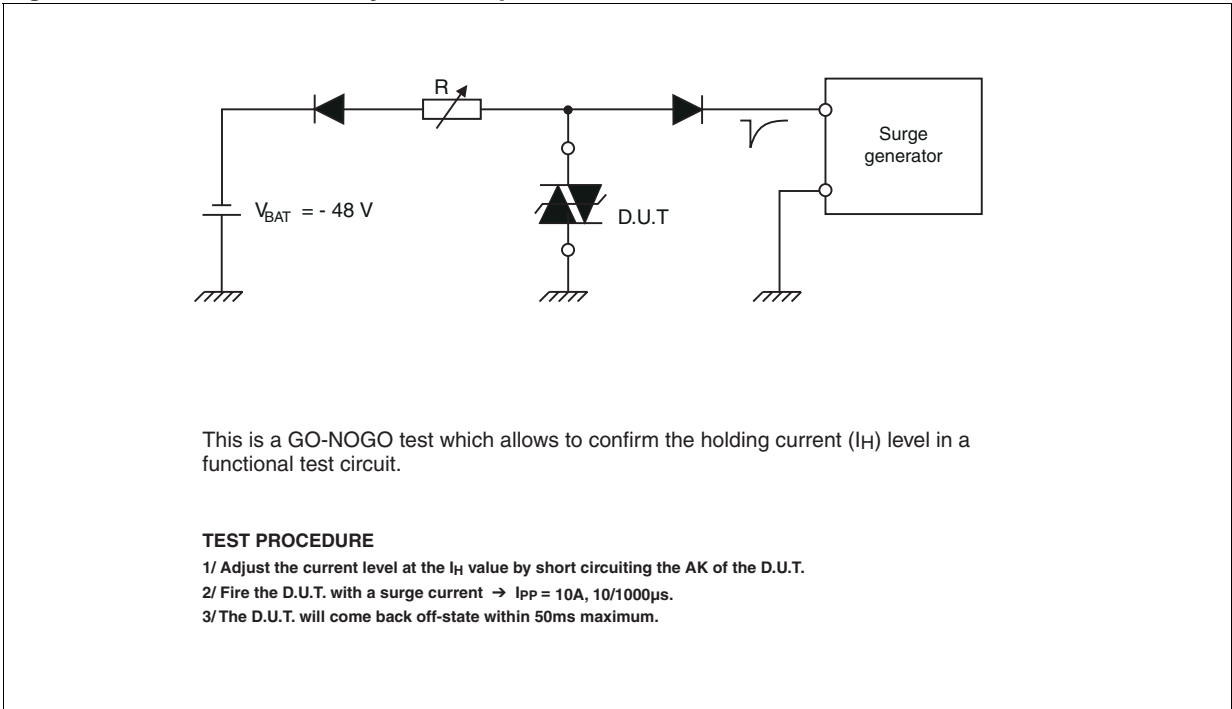


Figure 12: Ordering Information Scheme

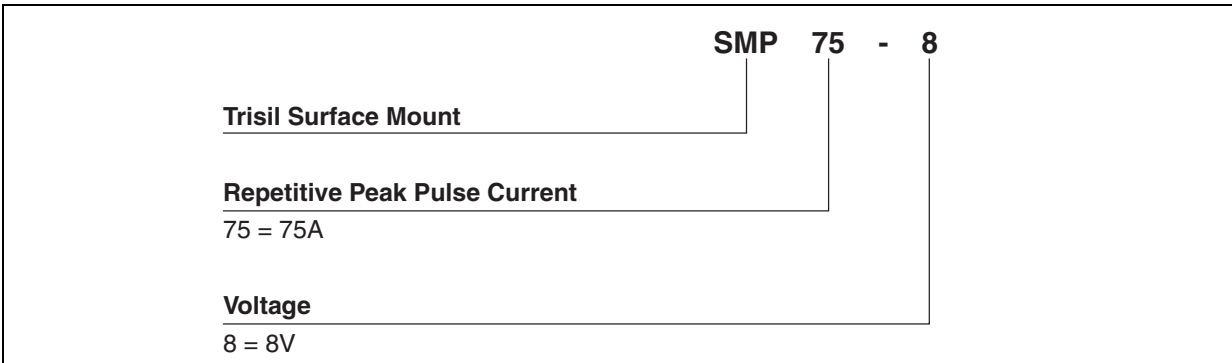


Figure 13: SMB Package Mechanical data

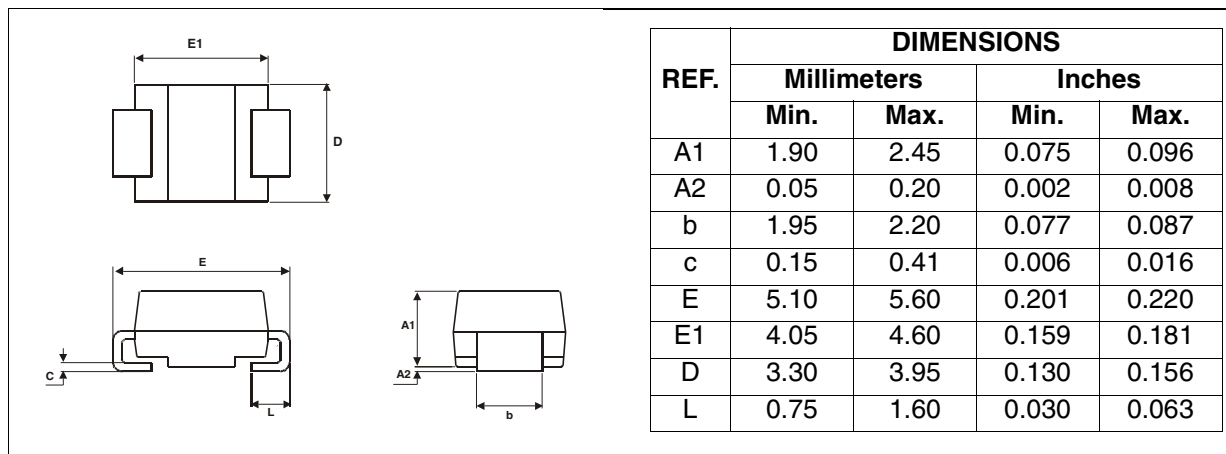
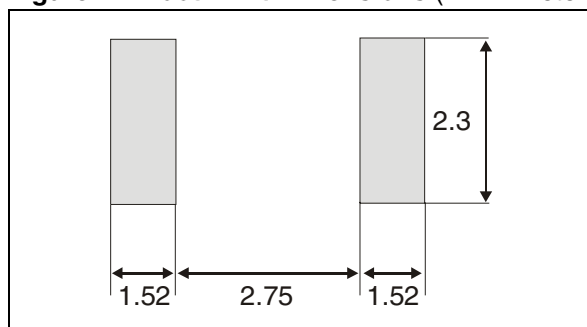


Figure 14: Foot Print Dimensions (in millimeters)



In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

Table 6: Ordering Information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
SMP75-8	L08	SMB	0.11 g	2500	Tape & reel

Table 7: Revision History

Date	Revision	Description of Changes
19-July-2005	3	Previous issue
02-Jan-2006	4	Added ECOPACK statement and changed page layout. Minor updates to technical values in Tables 2, 3, and 5.

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