

### Trisil™ for telecom equipment protection

#### **Features**

- bidirectional crowbar protection
- voltage: 8 V
- low leakage current: I<sub>R</sub> = 2 µA max
- holding current: I<sub>H</sub> = 150 mA min
- repetitive peak pulse current: I<sub>PP</sub> = 75 A (10/1000 µs)

#### **Benefits**

- Trisils are not subject to ageing and provide a fail safe mode in short circuit for a better protection.
- This device can be used to help equipment to meet main standards such as UL1950, IEC 950 / CSA C22.2 and UL1459.
- Trisils 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
  - IEC 61000-4-5
  - FCC part 68

### **Applications**

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

- Ethernet,
- T1/E1

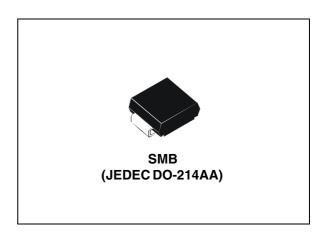
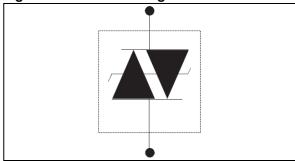


Figure 1. Device configuration



#### **Description**

The SMP75 is a very low voltage transient surge arrestor 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 and Ethernet links without saturation of the transformer.

TM: Trisil is a trademark of STMicroelectronics.

Characteristics SMP75

## 1 Characteristics

Table 1. In compliance 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	2500	2/10 µs	500	2/10 µs	5
First level	1000	10/1000 μs	100	10/1000 μs	3.3
GR-1089 Core Second level	5000	2/10 µs	500	2/10 µs	10
GR-1089 Core Intra-building	1500	2/10 µs	100	2/10 µs	0
ITU-T-K20/K21	6000	10/700 μs	150	5/310 µs	10
11U-1-N2U/N21	1500	10/700 μs	37.5	5/5 10 μ5	0
ITU-T-K20	8000	1/60 ns	ESD contact discharge ESD air discharge		0
(IEC61000-4-2)	15000	1/00 115			0
VDE0433	VDE0433 4000 10/700 µ		100	5/310 µs	0
VDE0433	2000	10/700 μ5	50	5/510 μ5	0
VDE0878	4000	1.2/50 µs	100	1/20 µs	0
VDE0070	2000	1.2/30 μ8	50	1/20 μ5	0
IEC61000-4-5	4000	10/700 μs	100	5/310 µs	0
12001000-4-5	4000	1.2/50 µs	100	8/20 μs	0
FCC Part 68, lightning	1500	10/160 μs	200	10/160 µs	2.5
surge type A	800	10/560 μs	100	10/560 μs	0
FCC Part 68, lightning surge type B	1000	9/720 µs	25	5/320 µs	0

SMP75 Characteristics

Table 2. Absolute ratings ( $T_{amb} = 25 \,^{\circ}C$ )

Symbol	Parameter	Value	Unit	
I <sub>PP</sub>	Repetitive peak pulse current	10/1000 µs 8/20 µs 10/560 µs 5/310 µs 10/160 µs 1/20 µs 2/10 µs	75 250 100 120 150 250	Α
I <sub>FS</sub>	Fail-safe mode : maximum current (1)	5	kA	
I <sub>TSM</sub>	Non repetitive surge peak on-state current (sinusoidal)	t = 0.2 s t = 1 s t = 2 s t = 15 mn	14 8 6.5 2	А
l²t	I <sup>2</sup> t value for using	12 12.2	A²s	
T <sub>stg</sub>	Storage temperature range	-55 to + 150	°C	
Tj	Maximum junction temperature	150	°C	
T <sub>L</sub>	Maximum lead temperature for soldering during 10 s.	260	°C	

<sup>1.</sup> In fail safe mode, the device acts as a short circuit.

Table 3. Thermal resistances

Symbol	Parameter	Value	Unit
R <sub>th(j-a)</sub>	Junction to ambient (with recommended footprint)	100	°C/W
R <sub>th(j-l)</sub>	Junction to leads	20	°C/W

Table 4. Electrical characteristics - definitions ( $T_{amb} = 25$  °C)

Symbol	Parameter			
$V_{RM}$	Stand-off voltage			
$V_{BR}$	Breakdown voltage	I <sub>PP</sub> ···/		
$V_{BO}$	Breakover voltage			
I <sub>RM</sub>	Leakage current	I <sub>BO</sub>		
I <sub>PP</sub>	Peak pulse current	I <sub>BM</sub>		
I <sub>BO</sub>	Breakover current	V <sub>RM</sub> V <sub>BR</sub> V <sub>BO</sub>		
I <sub>H</sub>	Holding current	/		
$V_{R}$	Continuous reverse voltage			
I <sub>R</sub>	Leakage current at V <sub>R</sub>	]		
С	Capacitance			

**Characteristics SMP75** 

Table 5.	Elect	Electrical characteristics - values (T <sub>amb</sub> = 25 °C)						
		I <sub>RM</sub> @ V <sub>RM</sub>	I <sub>R</sub> <sup>(1)</sup> @ V <sub>R</sub>	Dynamic V <sub>BO</sub>	Static V <sub>BO</sub> @ I <sub>BO</sub>	I <sub>H</sub>		

	I <sub>RM</sub> @	V <sub>RM</sub>	I <sub>R</sub> <sup>(1)</sup>	@ V <sub>R</sub>	Dynamic V <sub>BO</sub>		atic @ I <sub>BO</sub>	I <sub>H</sub>	C <sup>(2)</sup>
Order code	max.		max.		max.	max.	max.	typ.	max.
	μΑ	V	μΑ	V	V	V	mA	mA	pF
SMP75-8	2	6	5	8	20	15	800	50	60

<sup>1.</sup>  $I_R$  measured at  $V_R$  guaranteed  $V_{BR}$  min  $\geq V_R$ 

Figure 2. **Pulse waveform** 

Figure 3. Non repetitive surge peak on-state current versus overload duration ITSM(A)

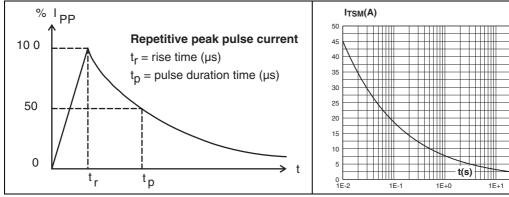
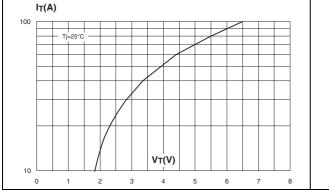
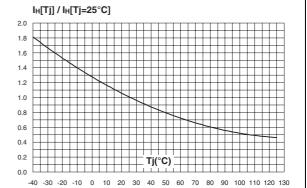


Figure 4. On-state voltage versus on-state current (typical values)

Figure 5. Relative variation of holding current versus junction temperature



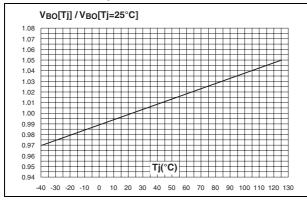


<sup>2.</sup>  $V_R = 2 V \text{ bias}, V_{RMS} = 1 V, F = 1 MHz$ 

SMP75 Characteristics

Figure 6. Relative variation of breakover voltage versus junction temperature

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



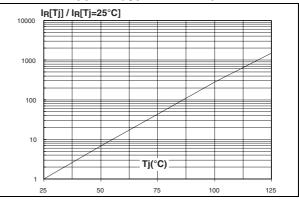
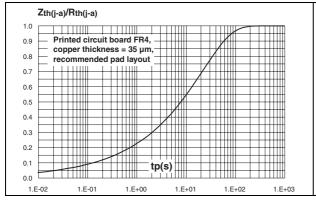
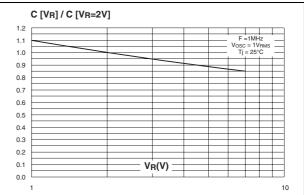


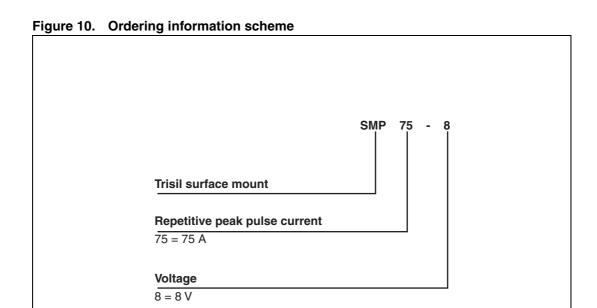
Figure 8. Variation of thermal impedance junction to ambient versus pulse duration

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





# 2 Ordering information scheme



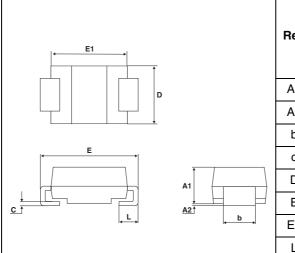
SMP75 Package information

## 3 Package information

- Epoxy meets UL94, V0
- Lead-free package

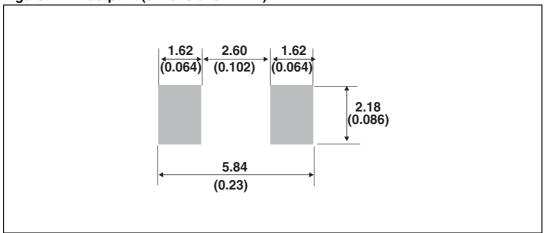
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: <a href="https://www.st.com">www.st.com</a>. ECOPACK<sup>®</sup> is an ST trademark.

Table 6. SMB Dimensions



	Dimensions					
Ref.	Millim	neters	Inc	hes		
	Min.	Max.	Min.	Max.		
A1	1.90	2.45	0.075	0.096		
A2	0.05	0.20	0.002	0.008		
b	1.95	2.20	0.077	0.087		
С	0.15	0.40	0.006	0.016		
D	3.30	3.95	0.130	0.156		
Е	5.10	5.60	0.201	0.220		
E1	4.05	4.60	0.159	0.181		
L	0.75	1.50	0.030	0.059		

Figure 11. Footprint (dimensions in mm)



Ordering information SMP75

## 4 Ordering information

 Table 7.
 Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
SMP75-8	L08	SMB	0.11 g	2500	Tape and reel

## 5 Revision history

Table 8. Document revision history

Date	Revision	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 1, 2, and 4.
19-Oct-2010	5	Updated ECOPACK statement. Updated trademark statement. Updated <i>Figure 11</i> . Removed Section 2 Test circuits.

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