Trisil™ for telecom equipment protection

Features

- bidirectional crowbar protection
- voltage: 8 V
- low leakage current: I_R = 2 µA max
- holding current: I_H = 150 mA min
- repetitive peak pulse current: I_{PP} = 75 A (10/1000 µs)

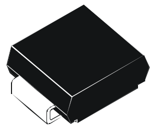
Benefits

- 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

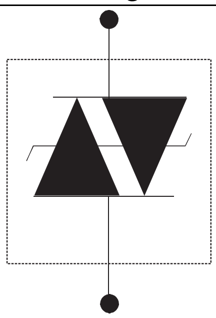
Any sensitive equipment requiring protection against lightning strikes and power crossing:

- Ethernet,
- T1/E1



SMB
(JEDEC DO-214AA)

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.

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 (Ω)
GR-1089 Core First level	2500 1000	2/10 µs 10/1000 µs	500 100	2/10 µs 10/1000 µs	5 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 1500	10/700 µs	150 37.5	5/310 µs	10 0
ITU-T-K20 (IEC61000-4-2)	8000 15000	1/60 ns	ESD contact discharge ESD air discharge		0 0
VDE0433	4000 2000	10/700 µs	100 50	5/310 µs	0 0
VDE0878	4000 2000	1.2/50 µs	100 50	1/20 µs	0 0
IEC61000-4-5	4000 4000	10/700 µs 1.2/50 µs	100 100	5/310 µs 8/20 µs	0 0
FCC Part 68, lightning surge type A	1500 800	10/160 µs 10/560 µs	200 100	10/160 µs 10/560 µs	2.5 0
FCC Part 68, lightning surge type B	1000	9/720 µs	25	5/320 µs	0

Table 2. Absolute ratings (T_{amb} = 25 °C)

Symbol	Parameter		Value	Unit
I_{PP}	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	75 250 100 120 150 250 250	A
I_{FS}	Fail-safe mode : maximum current (1)	8/20 µs	5	kA
I_{TSM}	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	A
I^2t	I^2t value for using	t = 16.6 ms t = 20 ms	12 12.2	A^2s
T_{stg}	Storage temperature range		-55 to + 150	°C
Tj	Maximum junction temperature		150	°C
T_L	Maximum lead temperature for soldering during 10 s.		260	°C

1. *In fail safe mode, the device acts as a short circuit.*

Table 3. 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 4. Electrical characteristics - definitions (T_{amb} = 25 °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

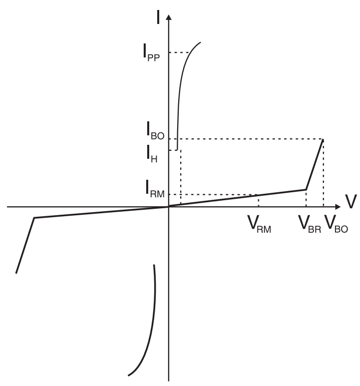


Table 5. Electrical characteristics - values (T_{amb} = 25 °C)

Order code	I_{RM} @ V_{RM}		I_R (1) @ V_R		Dynamic V_{BO}	Static V_{BO} @ I_{BO}		I_H	C(2)
	max.		max.		max.	max.	max.	typ.	max.
	µA	V	µA	V	V	V	mA	mA	pF
SMP75-8	2	6	5	8	20	15	800	50	60

1. I_R measured at V_R guaranteed V_{BR} min ≥ V_R
2. V_R = 2 V bias, V_{RMS} = 1 V, F = 1 MHz

Figure 2. Pulse waveform

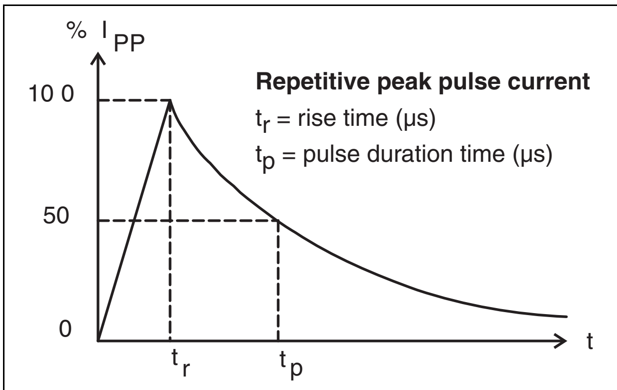


Figure 3. Non repetitive surge peak on-state current versus overload duration

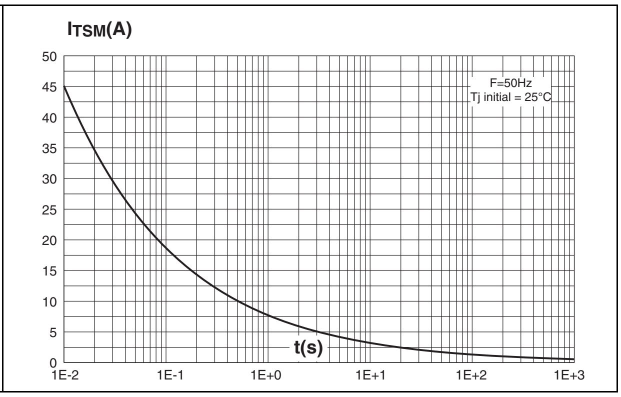


Figure 4. On-state voltage versus on-state current (typical values)

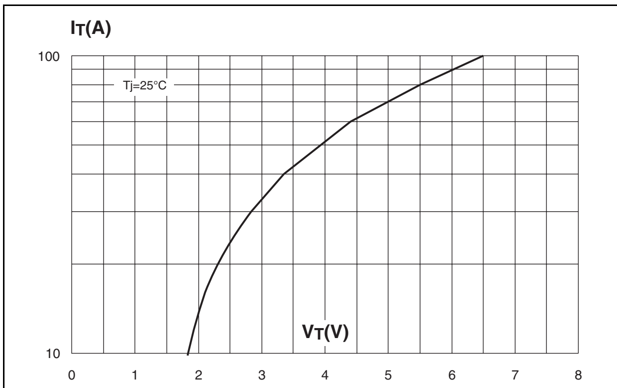


Figure 5. Relative variation of holding current versus junction temperature

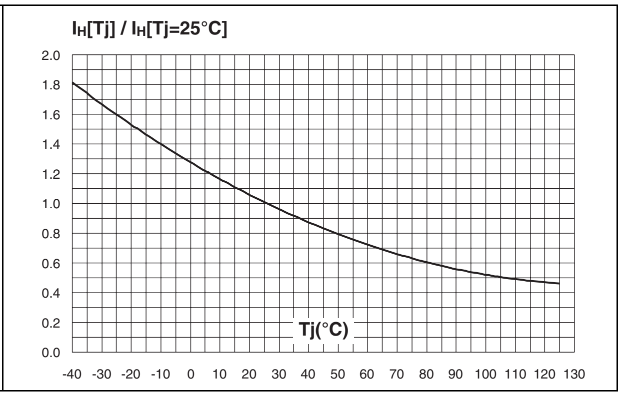


Figure 6. Relative variation of breakover voltage versus junction temperature

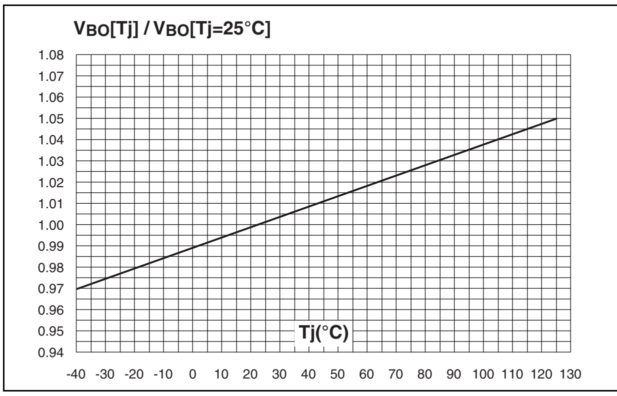


Figure 7. Relative variation of leakage current versus reverse voltage applied (typical values)

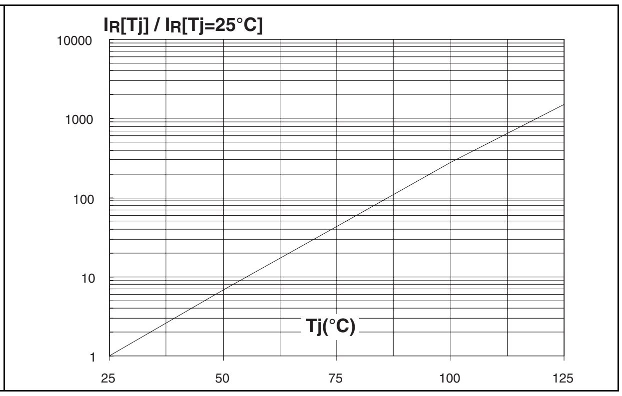


Figure 8. Variation of thermal impedance junction to ambient versus pulse duration

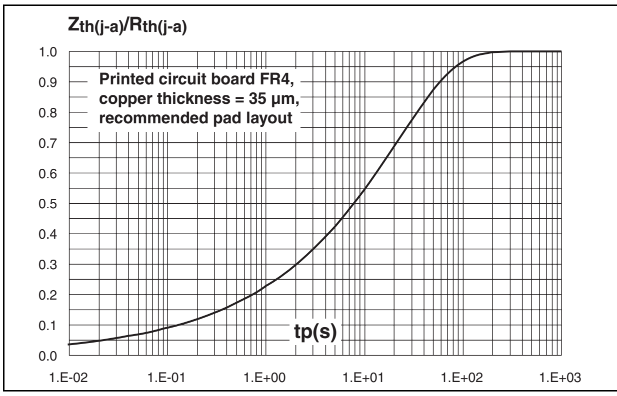
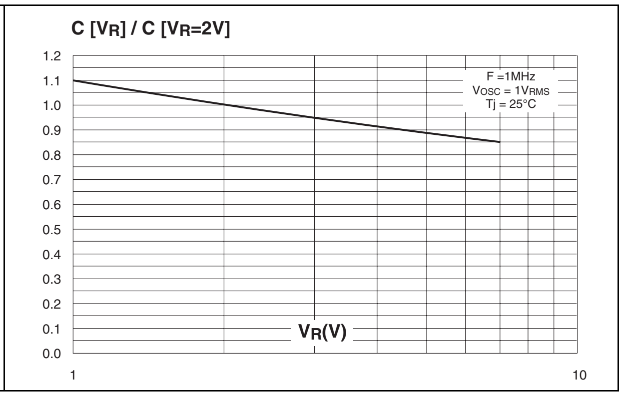
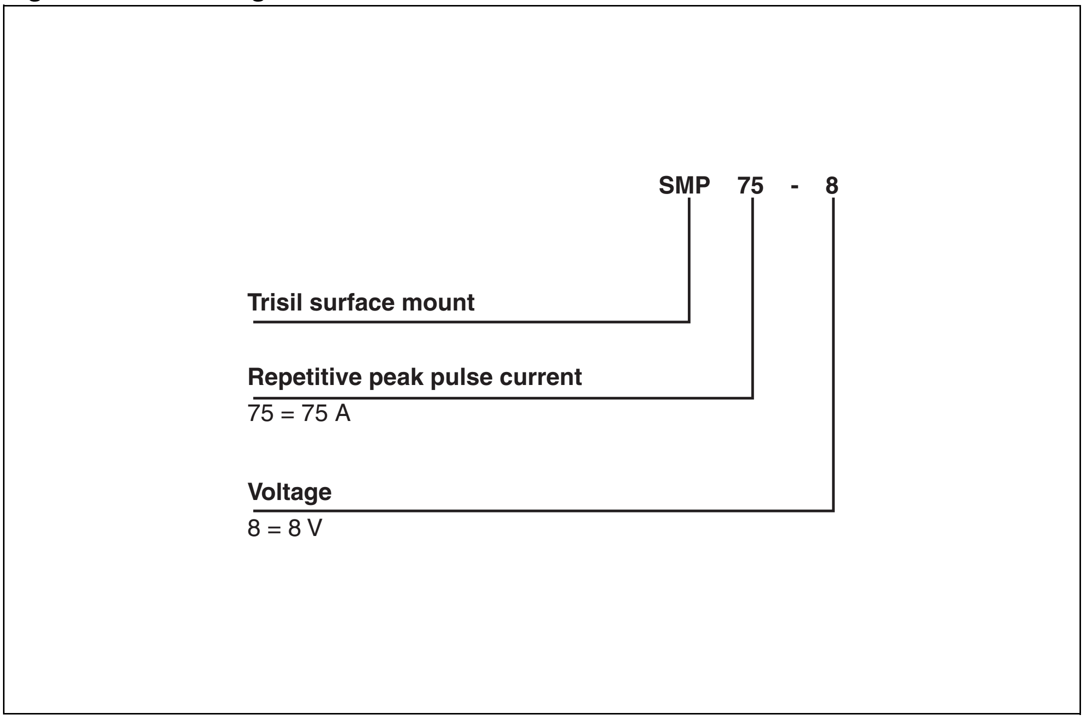


Figure 9. Relative variation of junction capacitance versus reverse voltage applied (typical values)



2 Ordering information scheme

Figure 10. Ordering information scheme

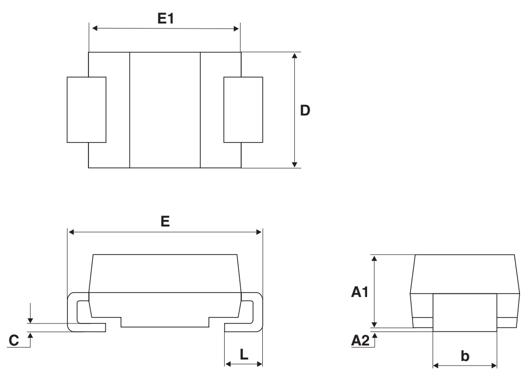


3 Package information

- Epoxy meets UL94, V0
- Lead-free package

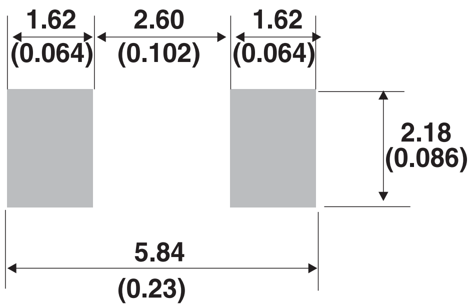
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 6. SMB Dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	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
c	0.15	0.40	0.006	0.016
D	3.30	3.95	0.130	0.156
E	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)



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 *Figure 11*. Removed Section 2 Test circuits.