SMP100LC

TRISIL™ FOR TELECOM EQUIPMENT PROTECTION

FEATURES

■ Bidirectional crowbar protection

■ Voltage range from 8V to 400V

■ Low capacitance from 20pF to 45pF @ 50V

■ Low leakage current : $I_R = 2\mu A$ max

■ Holding current: $I_H = 150$ mA min

■ Repetitive peak pulse current:
$I_{PP} = 100$ A (10/1000µs)

MAIN APPLICATIONS

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

These devices are dedicated to central office protection as they comply with the most stressfull standards.

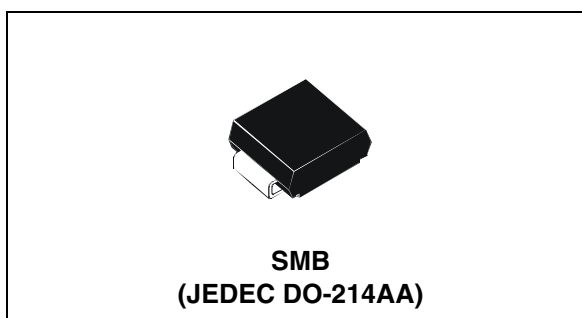Their Low Capacitances make them suitable for ADSL.

DESCRIPTION

The SMP100LC is a series of low capacitance transient surge arrestors designed for the protection of high debit rate communication equipment. Its low capacitance avoids any distortion of the signal and is compatible with digital transmission line cards (xDSL, ISDN...).

SMP100LC series tested and confirmed compatible with Cooper Bussmann Telecom Circuit Protector TCP 1.25A.
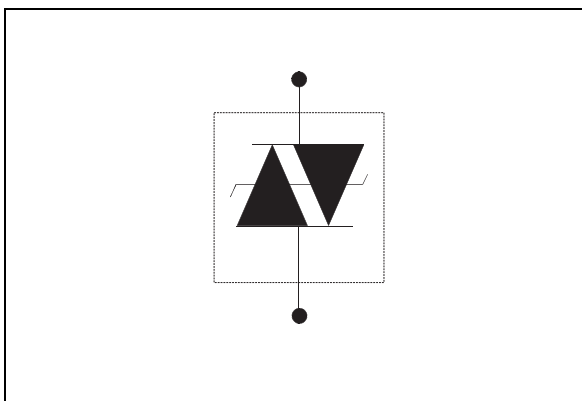
BENEFITS

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 UL60950, 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.

**SMB
(JEDEC DO-214AA)**

Table 1: Order Codes

Part Number	Marking
SMP100LC-8	PL8
SMP100LC-25	L25
SMP100LC-35	L35
SMP100LC-65	L06
SMP100LC-90	L09
SMP100LC-120	L12
SMP100LC-140	L14
SMP100LC-160	L16
SMP100LC-200	L20
SMP100LC-230	L23
SMP100LC-270	L27
SMP100LC-320	L32
SMP100LC-360	L36
SMP100LC-400	L40

Figure 1: Schematic Diagram

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Table 2: 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	0 0
GR-1089 Core Second level	5000	2/10 µs	500	2/10 µs	0
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	0 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	0 0
FCC Part 68, lightning surge type B	1000	9/720 µs	25	5/320 µs	0

Table 3: Absolute Ratings ($T_{amb} = 25°C$)

Symbol	Parameter		Value	Unit
I_{PP}	Repetitive peak pulse current (see figure 2)	10/1000 µs 8/20 µs 10/560 µs 5/310 µs 10/160 µs 1/20 µs 2/10 µs	100 400 140 150 200 400 500	A
I_{FS}	Fail-safe mode : maximum current (note 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	24 15 12 4	A
I^2t	I^2t value for fusing	t = 16.6 ms t = 20 ms	20 21	A^2s
T_{stg} T_j	Storage temperature range Maximum junction temperature		-55 to 150 150	°C
T_L	Maximum lead temperature for soldering during 10 s.		260	°C

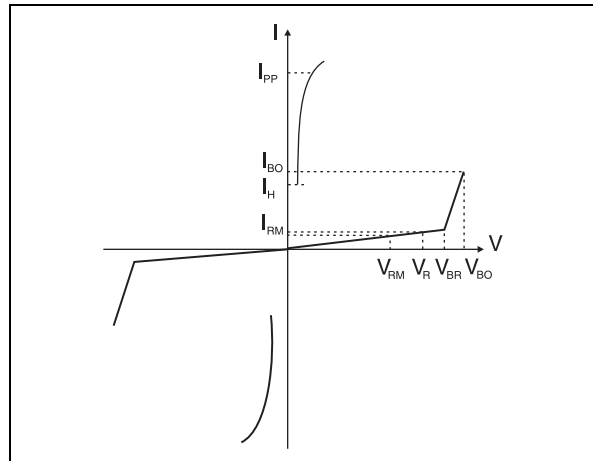**Note 1:** in fail safe mode, the device acts as a short circuit

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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°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} max.		I_R @ V_R max. note1		Dynamic V_{BO} max. note 2	Static V_{BO} @ I_{BO} max. max. note 3		I_H min. note 4	C typ. note 5	C typ. note 6
	µA	V	µA	V	V	V	V	mA	mA	pF	pF
SMP100LC-8		6		8	25	15			50 (typ.)	NA	75
SMP100LC-25		22		25	40	35				NA	65
SMP100LC-35		32		35	55	55				NA	55
SMP100LC-65		55		65	85	85				45	90
SMP100LC-90		81		90	120	125				40	80
SMP100LC-120		108		120	155	160				35	75
SMP100LC-140		120		140	185	190				30	65
SMP100LC-160	2	144	5	160	205	200				30	65
SMP100LC-200		180		200	255	250				30	60
SMP100LC-230		207		230	295	285		800	150	30	60
SMP100LC-270		243		270	345	335				30	60
SMP100LC-320		290		320	400	390				25	50
SMP100LC-360		325		360	460	450				25	50
SMP100LC-400		360		400	540	530				20	45

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

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 = 50V bias, V_{RMS}=1V, F=1MHz

Note 6: V_R = 2V bias, V_{RMS}=1V, F=1MHz

Figure 8: Variation of thermal impedance junction to ambient versus pulse duration (Printed circuit board FR4, SCu=35µm, recommended pad layout)
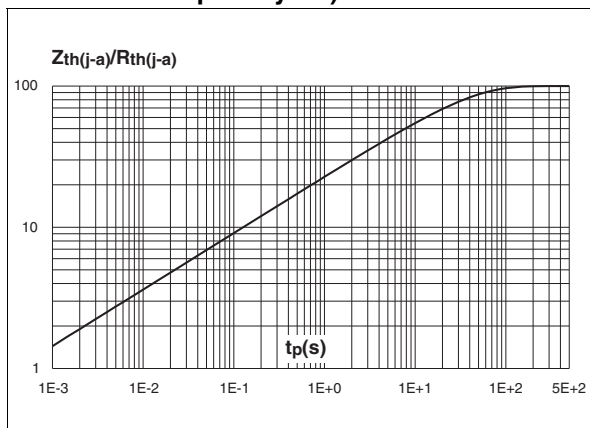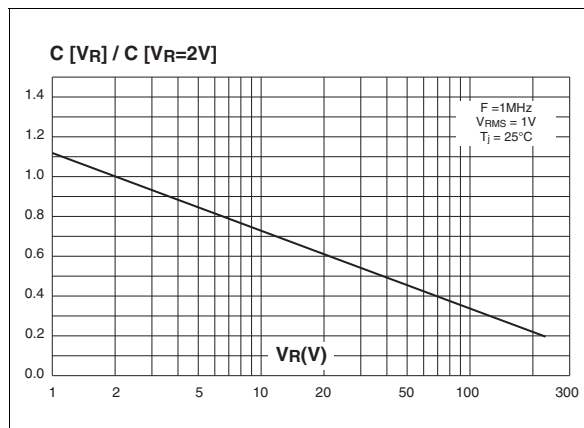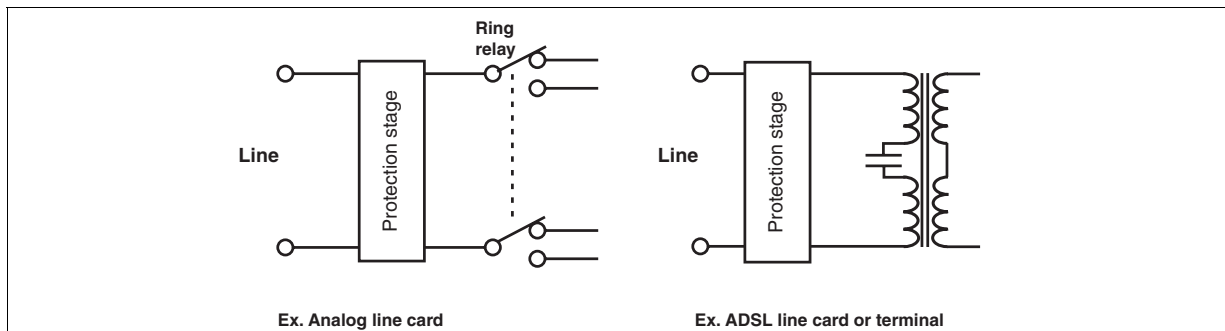
Figure 9: Relative variation of junction capacitance versus reverse voltage applied (typical values)
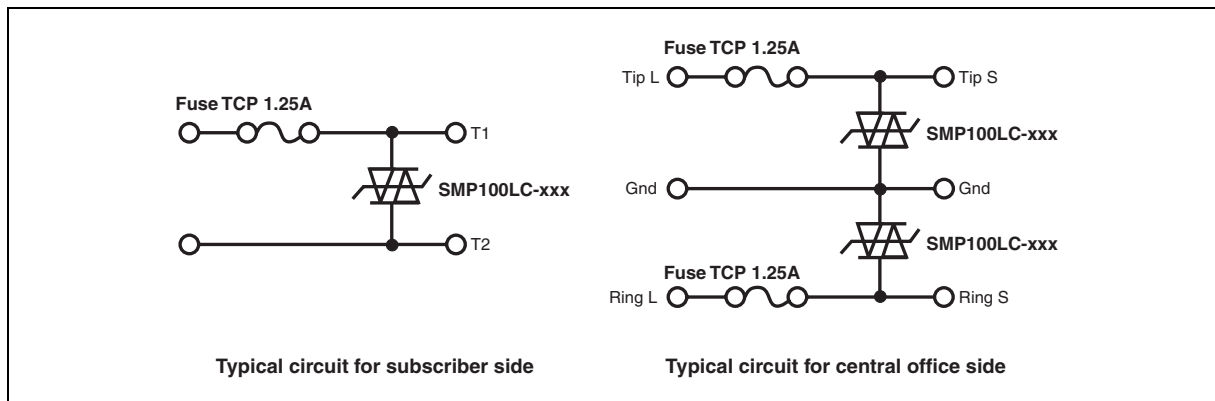

APPLICATION NOTE

In wireline applications, analog or digital, both central office and subscriber sides have to be protected. This function is assumed by a combined series / parallel protection stage.

In such a stage, parallel function is assumed by one or several Trisil, and is used to protect against short duration surge (lightning). During this kind of surges the Trisil limits the voltage across the device to be protected at its break over value and then fires. The fuse assumes the series function, and is used to protect the module against long duration or very high current mains disturbances (50/60Hz). It acts by safe circuits opening. Lightning surge and mains disturbance surges are defined by standards like GR1089, FCC part 68, ITU-T K20.

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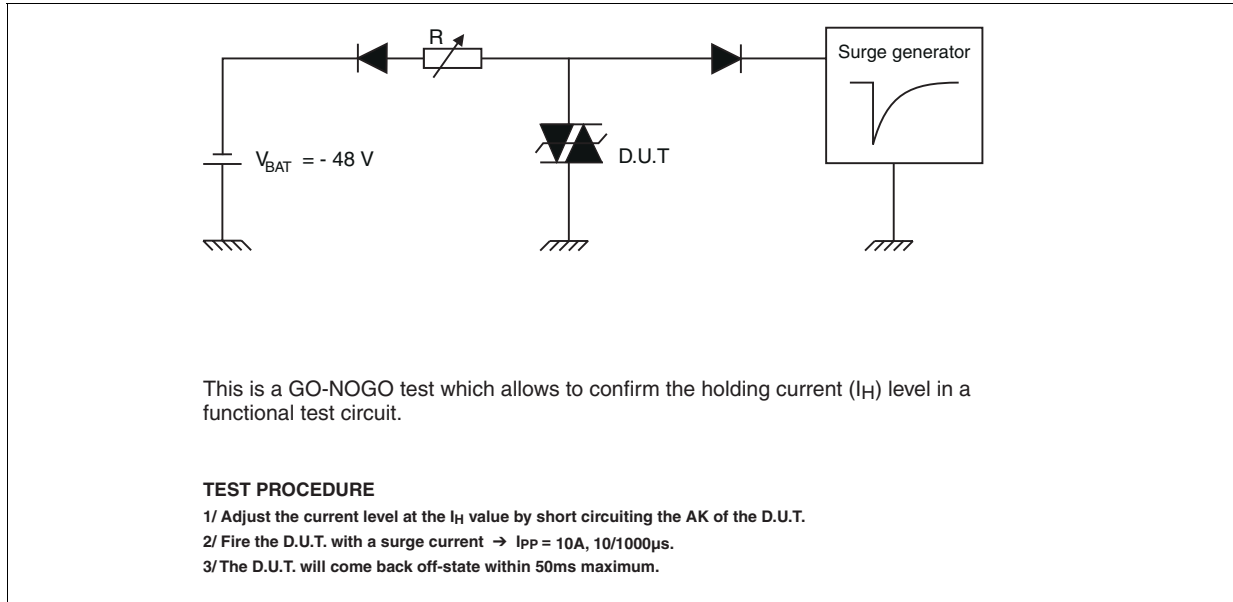**Figure 12: Test circuit 3 for dynamic I$_H$ parameter**

This is a GO-NOGO test which allows to confirm the holding current (I$_H$) level in a functional test circuit.

TEST PROCEDURE
1/ Adjust the current level at the I$_H$ value by short circuiting the AK of the D.U.T.
2/ Fire the D.U.T. with a surge current → I$_{PP}$ = 10A, 10/1000μs.
3/ The D.U.T. will come back off-state within 50ms maximum.

Figure 13: Ordering Information Scheme


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                              SMP  100  LC  -  xxx
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Trisil Surface Mount

Repetitive Peak Pulse Current
100 = 100A

Capacitance
LC = Low Capacitance

Voltage
65 = 65V

Figure 14: SMB Package Mechanical data

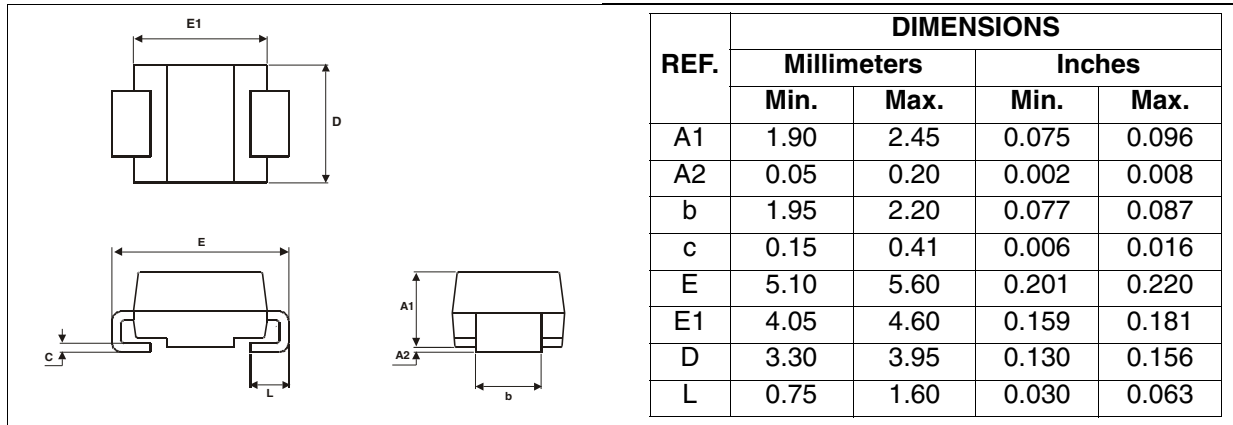| REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.41	0.006	0.016
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
D	3.30	3.95	0.130	0.156
L	0.75	1.60	0.030	0.063

Figure 15: Foot Print Dimensions (in millimeters)

Table 6: Ordering Information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
SMP100LC-8	PL8				
SMP100LC-25	L25				
SMP100LC-35	L35				
SMP100LC-65	L06				
SMP100LC-90	L09				
SMP100LC-120	L12				
SMP100LC-140	L14	SMB	0.11 g	2500	Tape & reel
SMP100LC-160	L16				
SMP100LC-200	L20				
SMP100LC-230	L23				
SMP100LC-270	L27				
SMP100LC-320	L32				
SMP100LC-360	L36				
SMP100LC-400	L40				