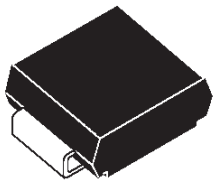
SMP100LC-xxx

TRISIL™ FOR HIGH DEBIT RATE TELECOM LINES PROTECTION

PRELIMINARY DATASHEET

FEATURES

- Bidirectional crowbar protection
- Low capacitance : C = 30 PF TYP @ 50V
- Low leakage current : I_R = 2 µA MAX
- Repetitive peak pulse current : I_{PP} = 100 A (10/1000µS)
- Holding current: I_H = 150 mA



SMB

MAIN APPLICATIONS

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

- Analog and digital line cards (xDSL, T1/ E1, ISDN...)
- Gas tube replacement
- Terminals and transmission equipment

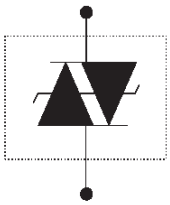
DESCRIPTION

The SMP100LC-xxx series is a very low capacitance transient surge arrestor designed for the protection of high debit rate communication equipment. Its low capacitance avoid any distorsion of the signal. It can also

BENEFITS

- No ageing and no noise
- Short circuit in failure mode, thus still ensuring protection
- Board space saving

SCHEMATIC DIAGRAM



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COMPLIES WITH THE FOLLOWING STANDARDS:	Peak Surge Voltage (V)	Voltage Waveform (µs)	Current Waveform (µs)	Admissible Ipp (A)	Necessary Resistor (note 1) (Ω)
ITU-T- K20	4000	10/700	5/310	100	-
VDE0433	4000	10/700	5/310	100	-
VDE0878	4000	1.2/50	1/20	100	-
IEC-1000-4-5	level 4 level 4	10/700 1.2/50	5/310 8/20	100 100	- -
FCC Part 68, lightning surge type A	1500 800	10/160 10/560	10/160 10/560	200 100	- -
FCC Part 68, lightning surge type B	1000	5/320	5/320	25	-
BELLCORE TR-NWT-001089 First level	2500 1000	2/10 10/1000	2/10 10/1000	500 100	- -
BELLCORE TR-NWT-001089 Second level	5000	2/10	2/10	500	-
CNET I31-24	4000	0.5/700	0.8/310	100	-

Note 1: minimum series resistance to insert on the module line to withstand the standard.

THERMAL RESISTANCES

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

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25°C, unless otherwise specified)

Symbol	Parameter		Value	Unit
I_{pp}	Repetitive peak pulse current: 10/1000 µs (open circuit voltage wave shape 1 kV 10/1000 µs) 8/20 µs (open circuit voltage wave shape 4 kV 1.2/50 µs) 5/310 µs (open circuit voltage wave shape 5 kV 10/700 µs) 2/10 µs (open circuit voltage wave shape 2.5 kV 2/10 µs)		 100 250 150 500	 A A A A
I_{FS}	Fail-safe mode : maximum current (note 2)	8/20 µs	5	kA
I_{TSM}	Non repetitive surge peak on-state current One cycle	50Hz 60Hz	50 53	A A
	Non repetitive surge peak on-state current F = 50Hz	0.2s 2s	23 10	A A
T_L	Maximum lead temperature for soldering during 10s		260	°C
T_{stg} Tj	Storage temperature range Maximum junction temperature		- 55 to + 150 150	°C °C

Note 2: in fail safe mode, the device acts as a short circuit.

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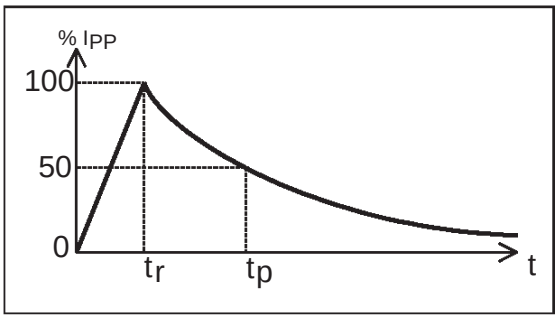
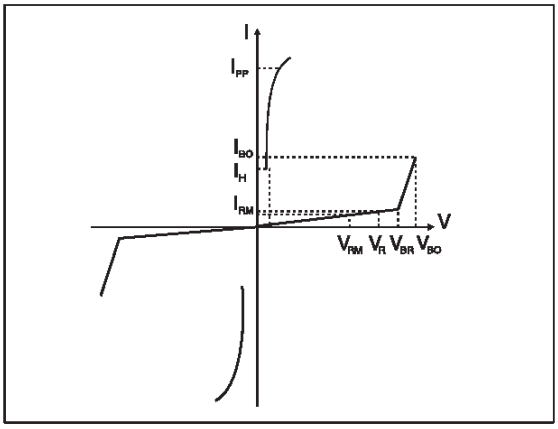
Pulse waveform:

10 / 1000 µs	tr = 10 µs	tp = 1000 µs
8 / 20 µs	tr = 8 µs	tp = 20 µs
5 / 310 µs	tr = 5 µs	tp = 310 µs
1 / 20 µs	tr = 1 µs	tp = 20 µs
2 / 10 µs	tr = 2 µs	tp = 10 µs



ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C)

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



DYNAMIC PARAMETERS

Type	I_{RM} @ V_{RM} max.		I_R @ V_R max. Note 1		V_{BO} @ I_{BO} max. Note 2		I_H min. Note 3	C typ. Note 4
	µA	V	µA	V	V	mA	mA	pF
SMP100LC-140	2	120	50	140	185	800	150	30
SMP100LC-200	2	170	50	200	265	800	150	30
SMP100LC-270	2	230	50	262	350	800	150	30

Note 1: I_R measured at V_R guarantee $V_{BR} > V_R$

Note 2: V_{RISE} = 100V/µS, di/dt < 10 A/µs, I_{PP} = 100A
V_{RISE} = 1kV/µS, di/dt < 10 A/µs, I_{PP} = 10A
V_{BO} parameters are given by a KeyTek "System 2" generator with PN2461 module.
See test circuits 3 for V_{BO} dynamic parameters

Note 3: See functional holding current test circuit 1

Note 4: V_R=50V bias, V_{RMS}=1V, F=1MHz.

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STATIC PARAMETERS

Symbol	Type	Test conditions	Max.	Unit
V_{BO}	SMP100LC-140	Measured at 50Hz, see test circuit 2. In any case $V_{BOmin} \geq V_{BR}$	190	V
	SMP100LC-200		275	
	SMP100LC-270		370	

Fig 1 : Non repetitive surge peak on-state current versus overload duration (T_j initial = 25 °C).

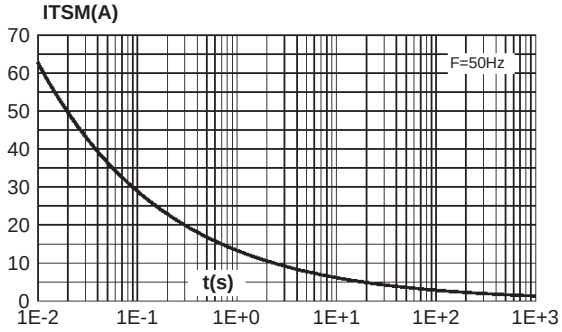

Fig 2 : On-state voltage versus on-state current (typical values).

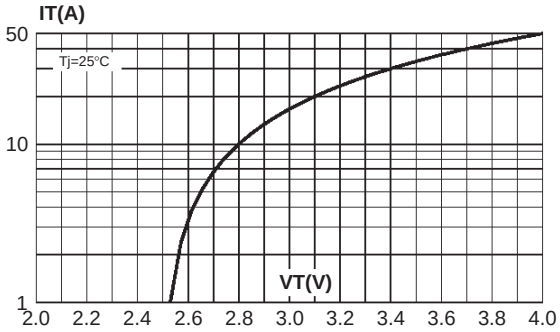

Fig 3 : Relative variation of holding current versus junction temperature .

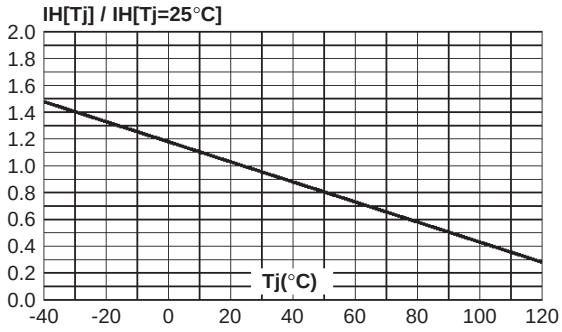

Fig 4 : Variation of thermal impedance junction to ambient versus pulse duration (Printed circuit board FR4, SCu=35µm, recommended pad lay-out).

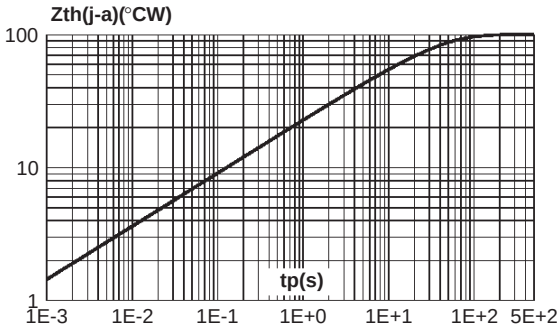

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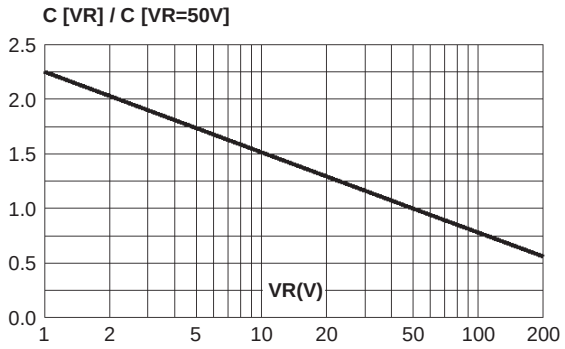
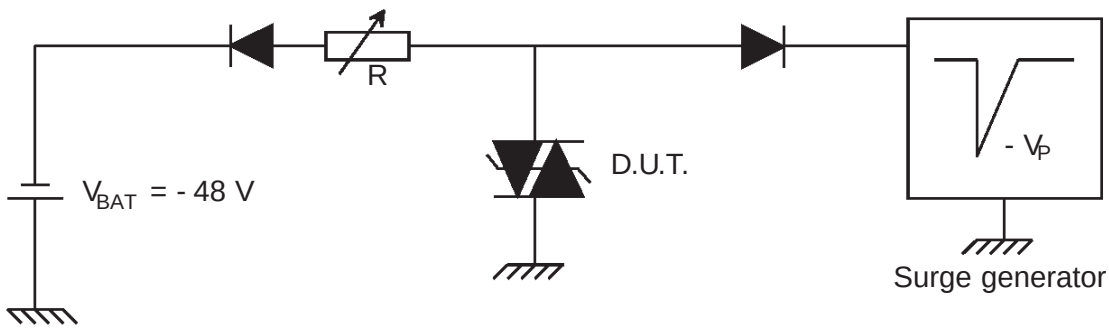
Fig 5 : Variation of junction capacitance versus reverse voltage applied (typical values).



FUNCTIONAL HOLDING CURRENT (I_H) TEST CIRCUIT 1 : GO-NO GO TEST



This is a GO-NO GO test which allows to confirm the holding current (I_H) level in a functional test circuit.

TEST PROCEDURE :

- Adjust the current level at the I_H value by short circuiting the D.U.T.
- Fire the D.U.T. with a surge current : I_{pp} = 10A, 10/1000 µs.
- The D.U.T. will come back to the off-state within 50 ms max.

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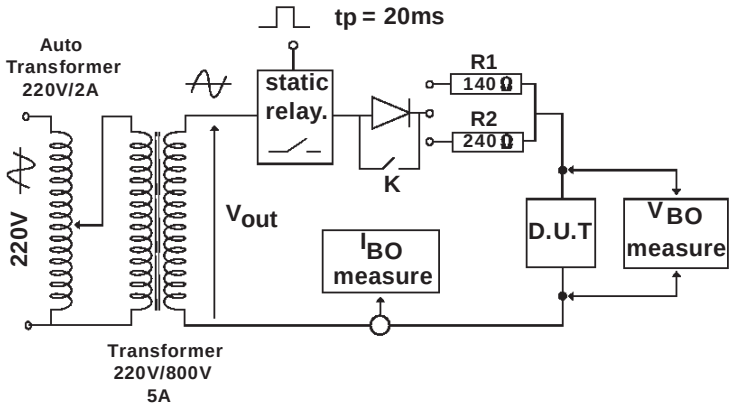
TEST CIRCUIT 2 FOR I_{BO} and V_{BO} parameters :



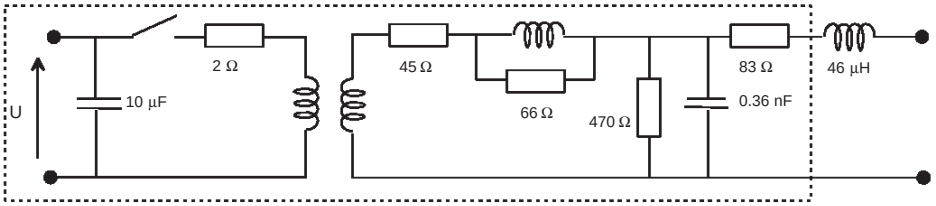
TEST PROCEDURE :

Pulse Test duration (tp = 20ms):
- For Bidirectional devices = Switch K is closed
- For Unidirectional devices = Switch K is open.

V_{OUT} Selection
- Device with V_{BO} < 200 Volt
  - V_{OUT} = 250 V_{RMS}, R_1 = 140 Ω.
- Device with V_{BO} ≥ 200 Volt
  - V_{OUT} = 480 V_{RMS}, R_2 = 240 Ω.

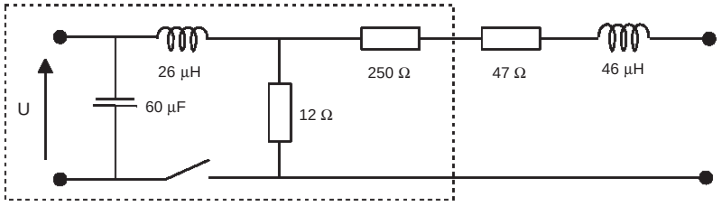
TEST CIRCUITS 3 FOR V_{BO} DYNAMIC PARAMETERS

100 V / µs, di/dt < 10 A / µs, Ipp = 100 A



KeyTek 'System 2' generator with PN246I module

1 kV / µs, di/dt < 10 A / µs, Ipp = 10 A



KeyTek 'System 2' generator with PN246I module

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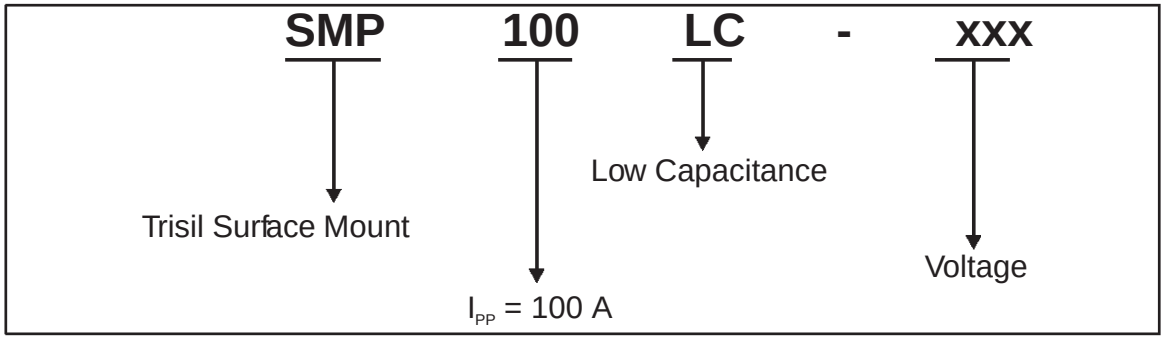
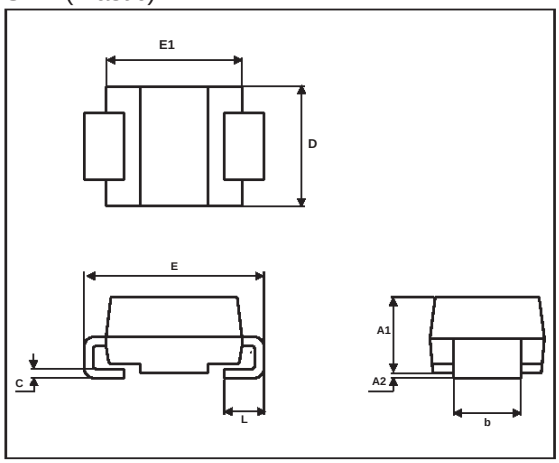
ORDER CODE



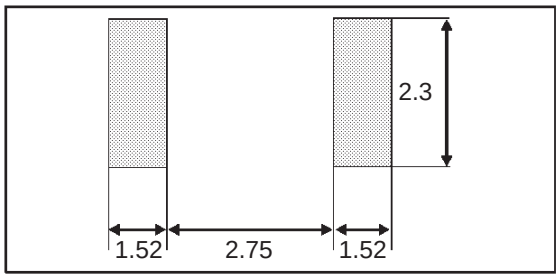
PACKAGE MECHANICAL DATA

SMB (Plastic)



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

FOOT PRINT (in millimeters)



Ordering type	Marking	Package	Weight	Base qty	Delivery mode
SMP100LC-140	L14	SMB	0.107g.	2500	Tape & Reel
SMP100LC-200	L20	SMB	0.107g	2500	Tape & Reel
SMP100LC-270	L27	SMB	0.107g	2500	Tape & Reel

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