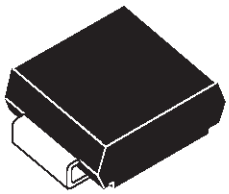
SMP100LC-xxx

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

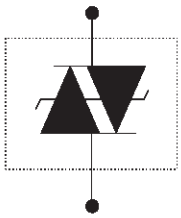
DESCRIPTION

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



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

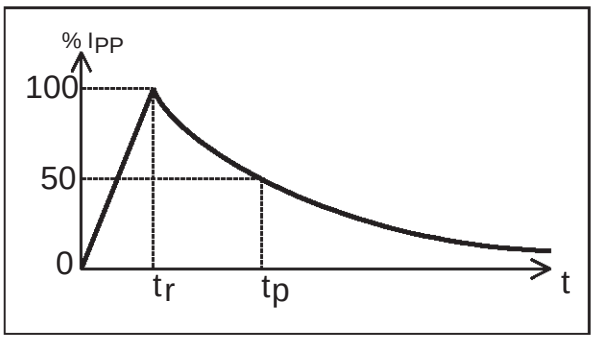
ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25°C, unless otherwise specified)

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.

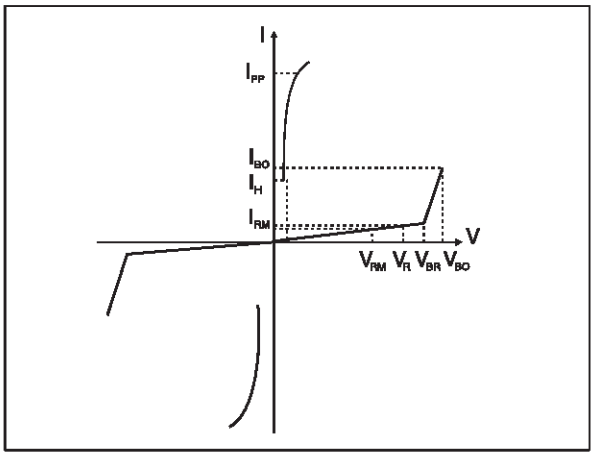
Pulse waveform:

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.

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).

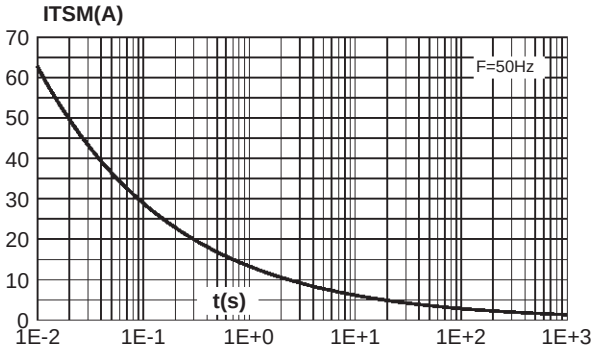


Fig 2 : On-state voltage versus on-state current (typical values).

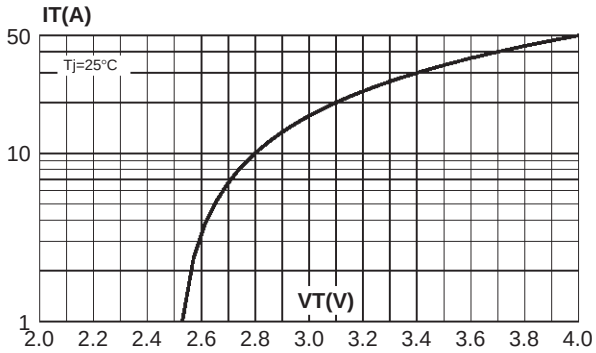


Fig 3 : Relative variation of holding current versus junction temperature .

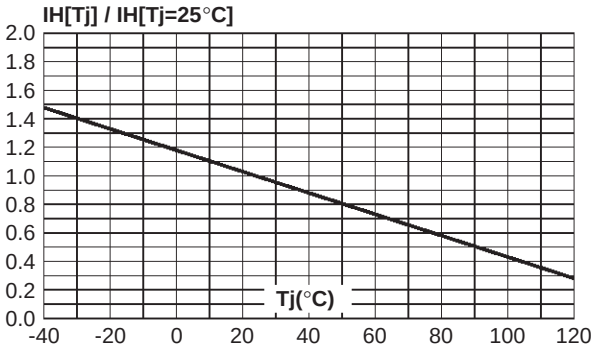


Fig 4 : Variation of thermal impedance junction to ambient versus pulse duration (Printed circuit board FR4, SCu=35µm, recommended pad lay-out).

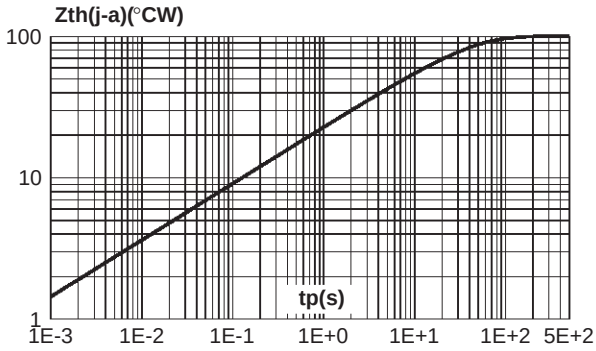
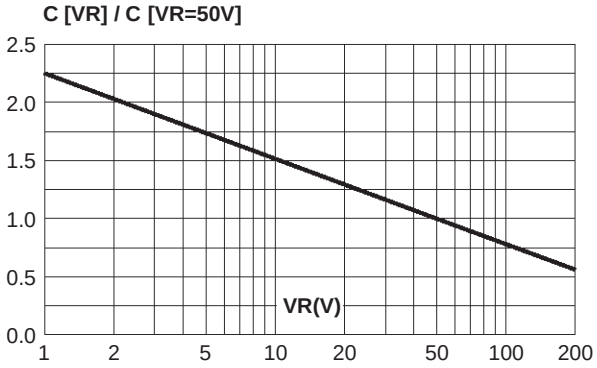
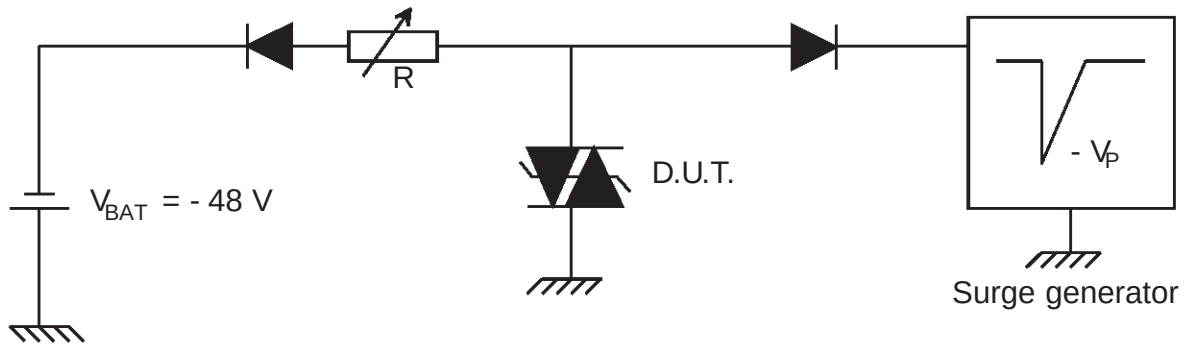


Fig 5 : Variation of junction capacitance versus reverse voltage applied (typical values).



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

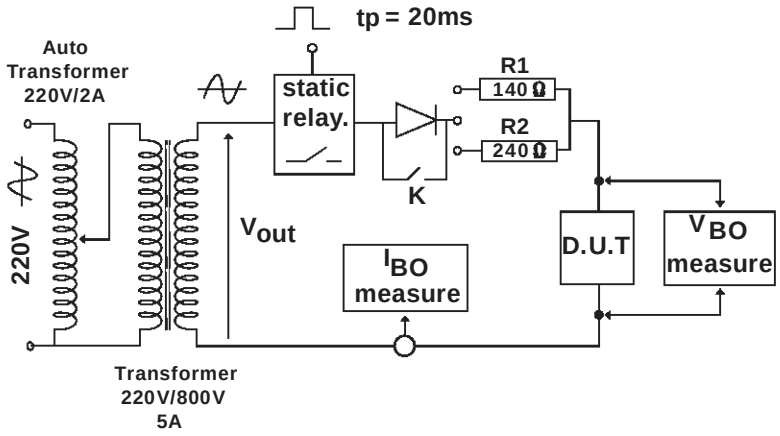


This is a GO-NO GO test which allows to confirm the holding current (I_H) level in a functional test circuit.

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.

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



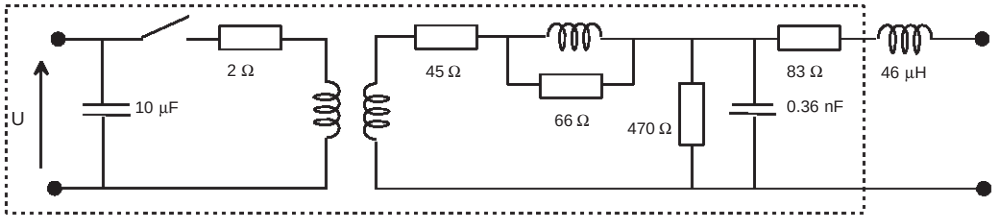
TEST PROCEDURE :

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.

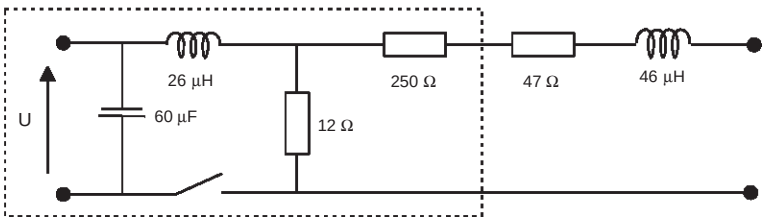
TEST CIRCUITS 3 FOR V_{BO} DYNAMIC PARAMETERS

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



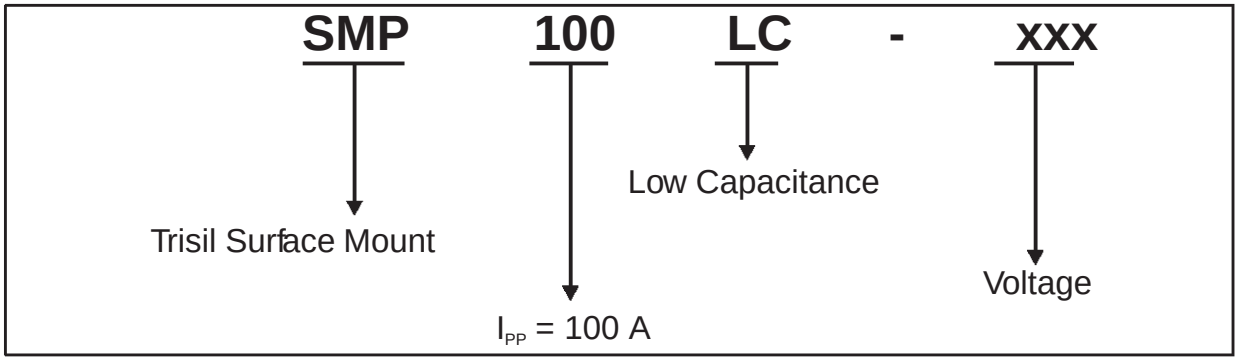
KeyTek'System 2' generator with PN246I module

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



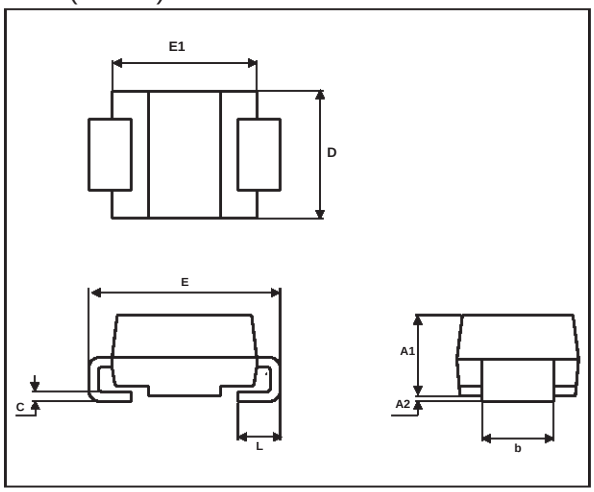
KeyTek'System 2' generator with PN246I module

ORDER CODE



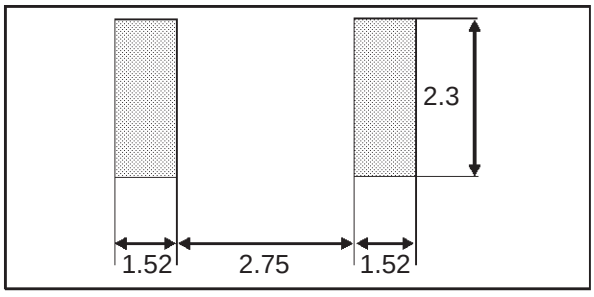
PACKAGE MECHANICAL DATA

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