



COMMUNICATION EQUIPMENT PROTECTION: TRISIL™

FEATURES

- BIDIRECTIONAL CROWBAR PROTECTION
- VOLTAGE RANGE : FROM 8V to 270V
- REPETITIVE PEAK PULSE CURRENT:
I_{PP} = 100 A (10/1000µs)
- HOLDING CURRENT: I_H = 150mA or 225mA
- LOW LEAKAGE CURRENT: I_R = 2 µA max

DESCRIPTION

The SMP100 series are transient surge arrestors used for the protection of sensitive telecom equipment.

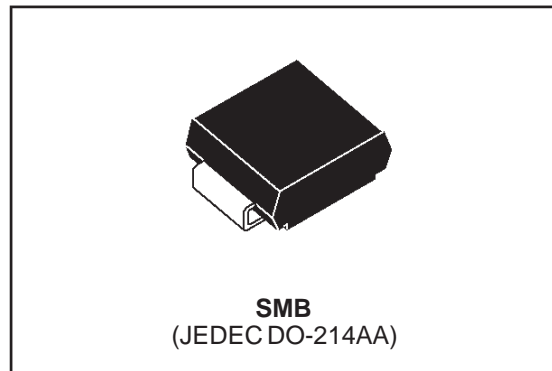
MAIN APPLICATIONS

Any sensitive equipment requiring protection against lightning strikes :

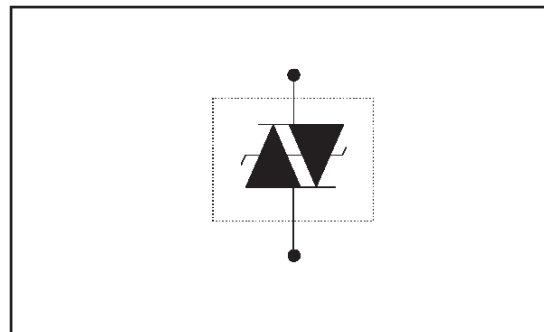
- ANALOG AND DIGITAL LINE CARDS
- MAIN DISTRIBUTION FRAMES
- TERMINALS AND TRANSMISSION EQUIPMENT
- GAS-TUBE REPLACEMENT

BENEFITS

- NO AGEING AND NO NOISE
- IF DESTROYED, THE SMP100 FALLS INTO SHORT CIRCUIT, STILL ENSURING PROTECTION
- BOARD SPACE SAVING



SCHEMATIC DIAGRAM



COMPLIES WITH THE FOLLOWING STANDARDS:	Peak Surge Voltage (V)	Voltage Waveform (µs)	Current Waveform (µs)	Admissible I _{pp} (A)	Necessary Resistor (Ω)
ITU 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	10/700	5/310	100	-
	level 4	1.2/50	8/20	100	-
FCC Part 68, lightning surge type A	1500	10/160	10/160	200	-
	800	10/560	10/560	100	-
FCC Part 68, lightning surge type B	100	9/720	5/320	25	-
BELLCORE TR-NWT-001089 First level	2500	2/10	2/10	500	-
	1000	10/1000	10/1000	100	-
BELLCORE TR-NWT-001089 Second level	5000	2/10	2/10	500	-
CNET I31-24	4000	0.5/700	0.8/310	100	-

SMP100-xxx

THERMAL RESISTANCES

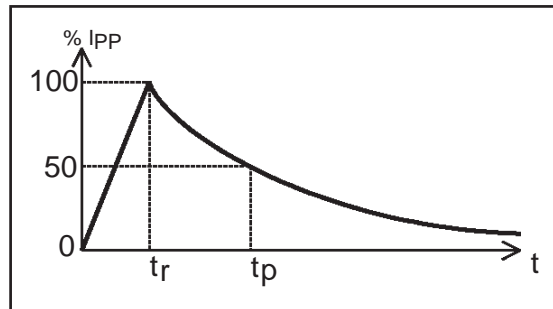
Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to leads	20	°C/W
$R_{th(j-a)}$	Junction to ambient on printed circuit (with standard footprint dimensions)	100	°C/W

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^{\circ}\text{C}$)

Symbol	Parameter	Value	Unit
I_{pp}	Peak pulse current: 10/1000 μs (open circuit voltage waveform 1 kV 10/1000 μs)	100	A
	5/310 μs (open circuit voltage waveform 4 kV, 10/700 μs)	150	A
	8/20 μs (open circuit voltage waveform 4 kV 1.2/50 μs)	250	A
	2/10 μs (open circuit voltage waveform 2.5kV 2/10 μs)	500	A
I_{FS}	Fail-safe mode 8/20 μs	5	kA
I_{TSM}	Non repetitive surge peak on-state current One cycle 50Hz	55	A
	60Hz	60	A
	Non repetitive surge peak on-state current F = 50Hz 0.2s	25	A
	2s	12	A
T_L	Maximum lead temperature for soldering during 10s	260	°C
T_{stg}	Storage temperature range	- 55 to + 150	°C
T_j	Maximum junction temperature	150	°C

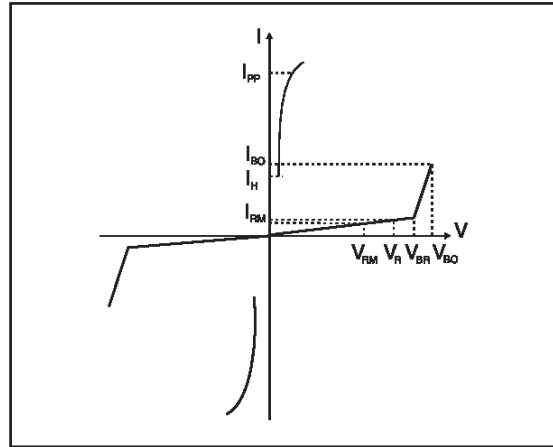
Note 1: Pulse waveform

10 / 1000 μs	$t_r = 10 \mu\text{s}$	$t_p = 1000 \mu\text{s}$
8 / 20 μs	$t_r = 8 \mu\text{s}$	$t_p = 20 \mu\text{s}$
5 / 310 μs	$t_r = 5 \mu\text{s}$	$t_p = 310 \mu\text{s}$
1 / 20 μs	$t_r = 1 \mu\text{s}$	$t_p = 20 \mu\text{s}$
2 / 10 μs	$t_r = 2 \mu\text{s}$	$t_p = 10 \mu\text{s}$



ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}\text{C}$)

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

**STATIC 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
SMP100-8	2	6	50	8	20	800	50(typ)	100
SMP100LC-35	2	32	50	35	55	800	150	90
SMP100-65	2	55	50	65	80	800	150	160
SMP100-120	2	110	50	120	160	800	150	140
SMP100-140	2	120	50	140	200	800	150	140
SMP100-200	2	170	50	200	265	800	150	130
SMP100-230	2	200	50	230	300	800	150	120
SMP100-270	2	230	50	270	350	800	150	120
SMP100-140H225	2	120	50	140	200	800	225	140
SMP100-200H225	2	170	50	200	265	800	225	130
SMP100-230H225	2	200	50	230	300	800	225	130
SMP100-270H225	2	230	50	270	350	800	225	120

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

Note 2 : Measured at 50Hz, see test circuit 1. In any case $V_{BOmin} \geq V_{BR}$

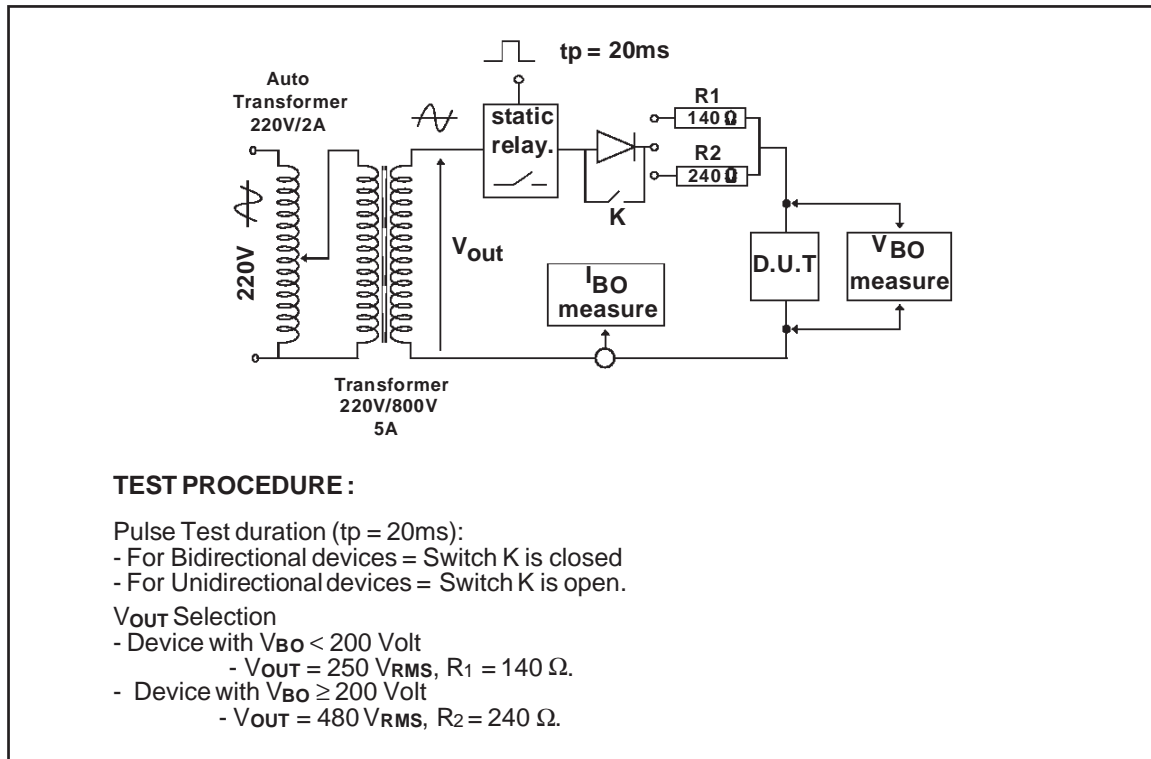
Note 3 : See functional holding current test circuit 2.

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

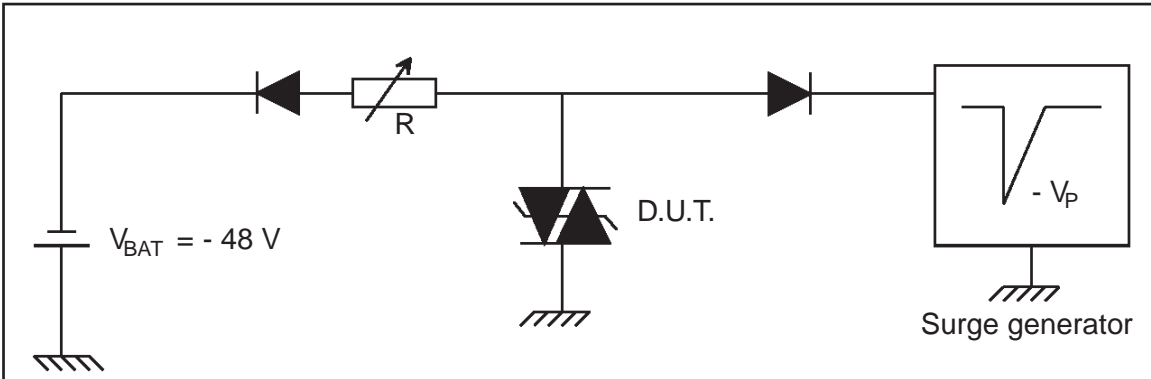
DYNAMIC PARAMETERS

Symbol	Test conditions (see note 5)	Type	Max.	Unit
V_{BO}	<p>Test conditions 1 $dV/dt = 100 \text{ V}/\mu\text{s}$, $di/dt < 10 \text{ A}/\mu\text{s}$, $I_{PP} = 100 \text{ A}$</p> <p>Test conditions 2 $dV/dt = 1 \text{ kV}/\mu\text{s}$, $di/dt < 10 \text{ A}/\mu\text{s}$, $I_{PP} = 10 \text{ A}$</p>	SMP100-8	25	V
		SMP100LC-35	55	
		SMP100-65	95	
		SMP100-120	200	
		SMP100-140	220	
		SMP100-200	285	
		SMP100-230	320	
		SMP100-270	370	
		SMP100-140H225	220	
		SMP100-200H225	285	
		SMP100-230H225	320	
		SMP100-270H225	370	

Note 5 : V_{BO} parameters are given by a KeyTek 'System 2' generator with PN2461 module.
See test circuits 3 for V_{BO} dynamic parameters.

TEST CIRCUIT 1 FOR I_{BO} and V_{BO} parameters:

TEST CIRCUIT 2 for I_H parameter.

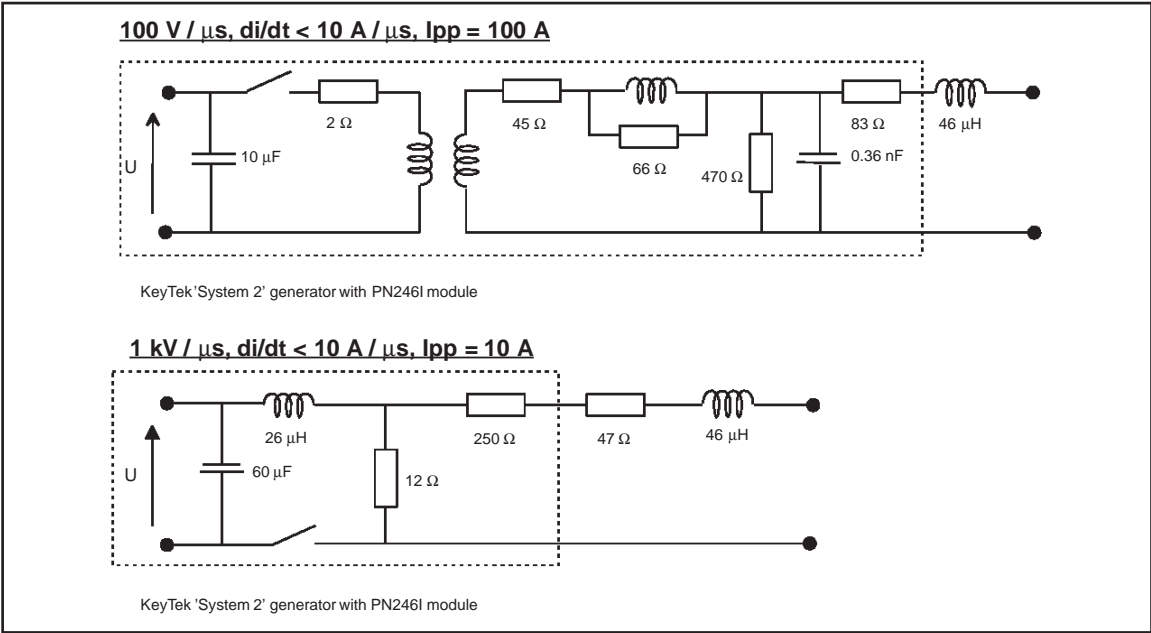


This is a GO-NO GO test which allows to confirm the holding current (I_H) level in a functional test circuit.

TEST PROCEDURE :

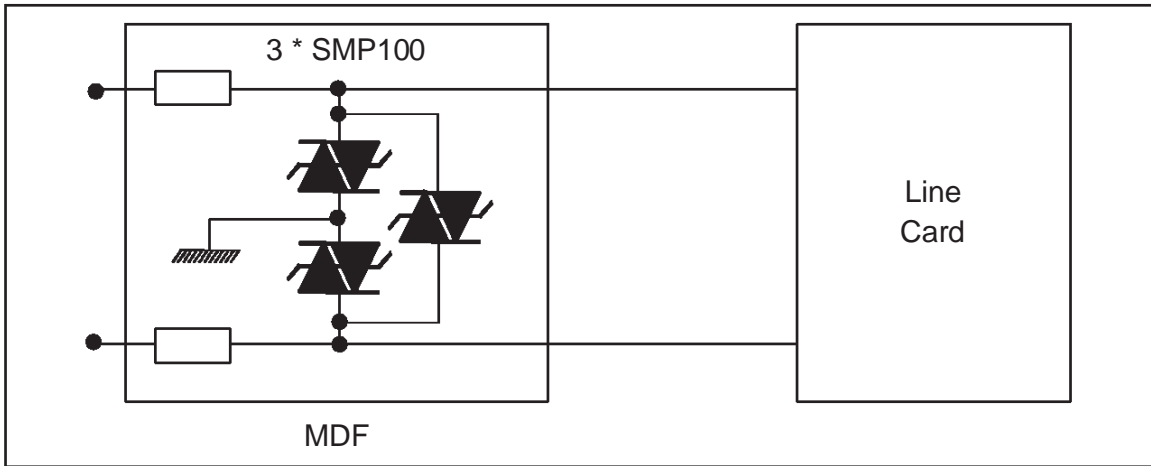
- Adjust the current level at the I_H value by short circuiting the D.U.T.
- Fire the D.U.T. with a surge current : $I_{pp} = 10A, 10/1000 \mu s$.
- The D.U.T. will come back to the off-state within 50 ms max.

TEST CIRCUITS 3 FOR V_{BO} DYNAMIC PARAMETERS

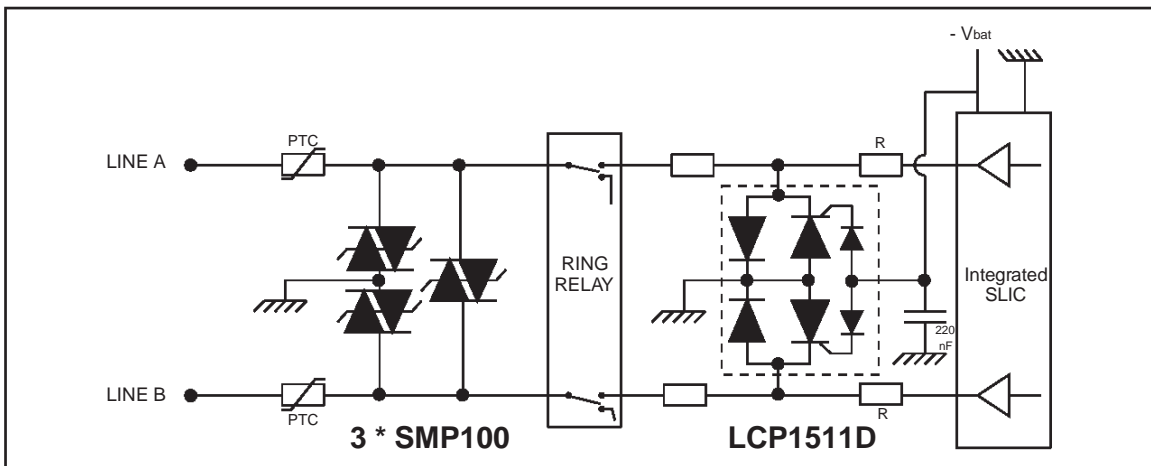


TYPICAL APPLICATIONS

1 - Primary protection module



2 - Line card protection



3 - ISDN: U interface protection

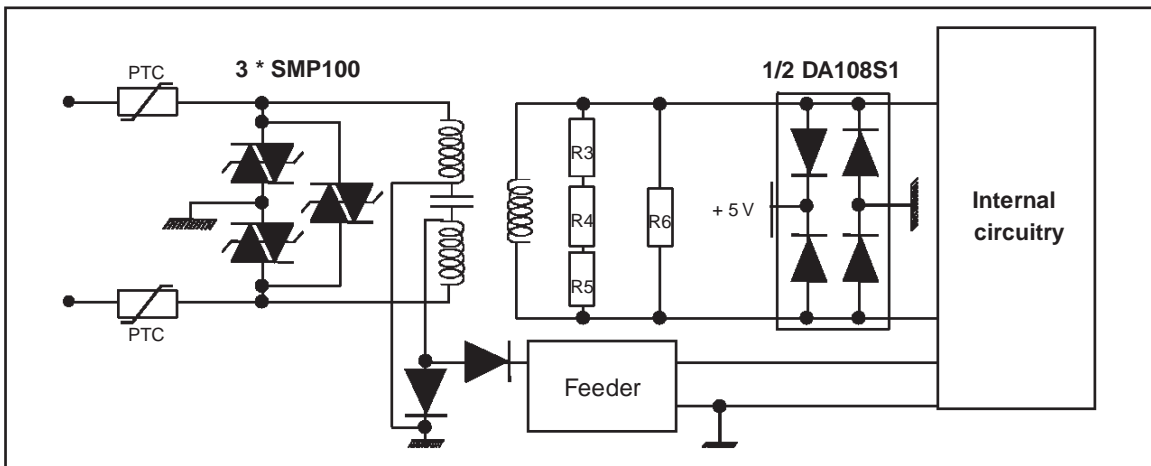


Fig 1 : Non repetitive surge peak on-state current versus overload duration (T_j initial = 25 °C).

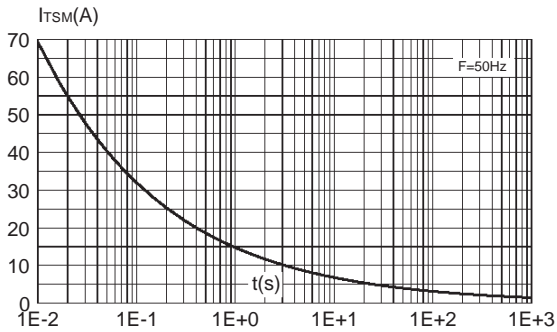


Fig 2 : On-state voltage versus on-state current (typical values).

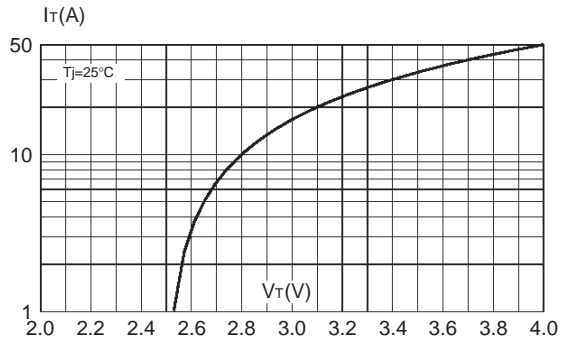


Fig 3 : Relative variation of holding current versus junction temperature.

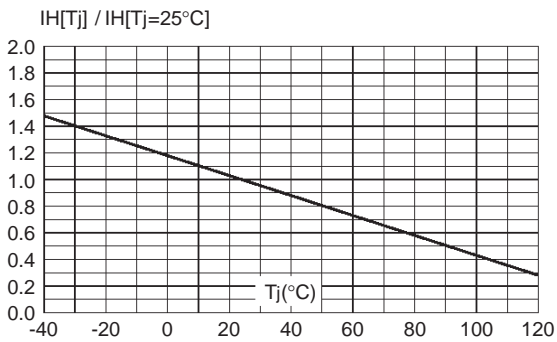


Fig 4 : Variation of thermal impedance junction to ambient versus pulse duration.

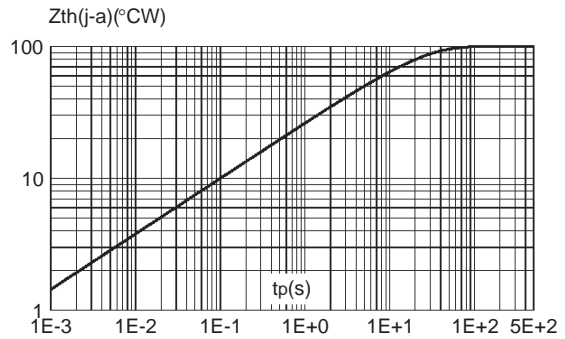
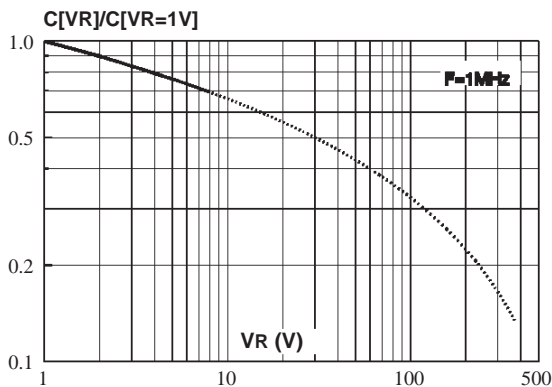


Fig 5 : Relative variation of junction capacitance versus reverse voltage applied (typical values).

Note : For other types than SMP100-8, the curve can be extrapolated (dotted line)



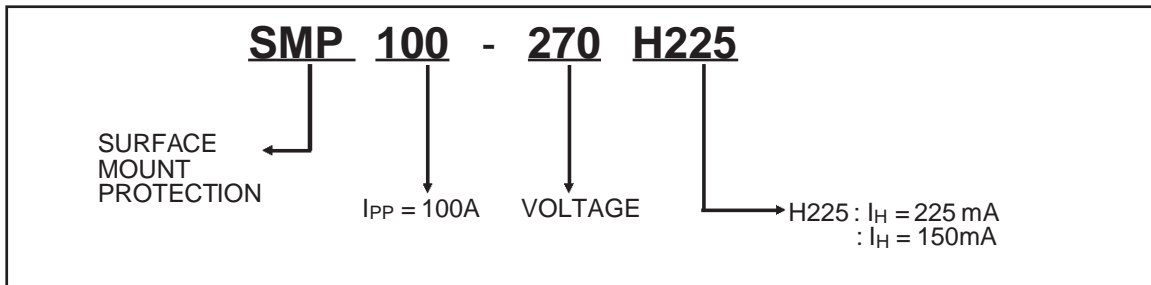
SMP100-xxx

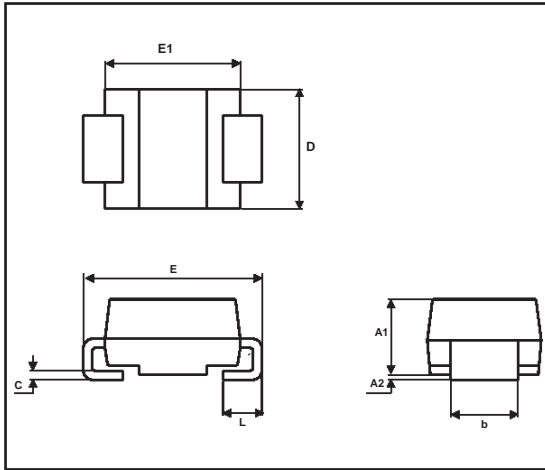
MARKING

Type	Marking	Package	Weight	Base qty	Delivery mode
SMP100-8	PL8	SMB	0.107g	2500	Tape & Reel
SMP100LC-35	L35	SMB	0.107g	2500	Tape & Reel
SMP100-65	P06	SMB	0.107g	2500	Tape & Reel
SMP100-120	P12	SMB	0.107g	2500	Tape & Reel
SMP100-140	P14	SMB	0.107g	2500	Tape & Reel
SMP100-200	P20	SMB	0.107g	2500	Tape & Reel
SMP100-230	P23	SMB	0.107g	2500	Tape & Reel
SMP100-270	P27	SMB	0.107g	2500	Tape & Reel
SMP100-140H125	P16	SMB	0.107g	2500	Tape & Reel
SMP100-200H225	P22	SMB	0.107g	2500	Tape & Reel
SMP100-230H225	P24	SMB	0.107g	2500	Tape & Reel
SMP100-270H225	P29	SMB	0.107g	2500	Tape & Reel

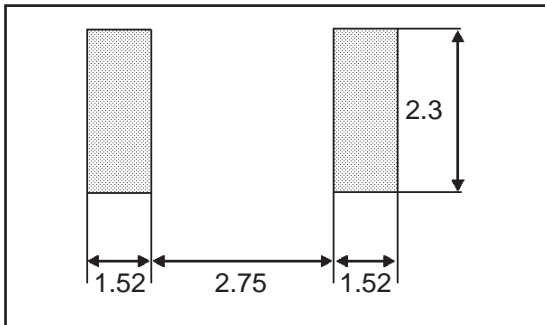
- Epoxy meets UL94, V0

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)


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