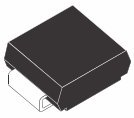
SMP50-xxx

TELECOM EQUIPMENT PROTECTION: TRISIL™

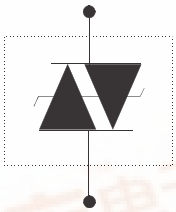
FEATURES

- Bidirectional crowbar protection
- Voltage range from 62V to 270V
- Low capacitance from 15pF to 30pF typ.@ 50V
- Low leakage current: I_R = 2µA max.
- Holding current: I_H = 150 mA min.
- Repetitive peak pulse current: I_{PP} = 50 A (10/1000 µs)



SMA
(JEDEC DO-214AC)

SCHEMATIC DIAGRAM



MAIN APPLICATIONS

Telecommunication equipment such as

- Analog and digital line cards (xDSL, T1/E1, ISDN...).
- Terminals (phone, fax, modem...) and central office equipment.

DESCRIPTION

The SMP50-xxx series has been designed to protect telecommunication equipment against lightning and transient induced by AC power lines.

The package / die size ratio has been optimized by using the SMA package.

BENEFITS

Trisils are not subject to ageing and provide a fail safe mode in short circuit for a better protection. Trisils are used to help equipment to meet various standards such as UL1950, IEC950 / CSA C22.2, UL1459 and FCC part 68. Trisils have UL94 V0 resin approved. SMA package is JEDEC registred. (Trisils are UL 497B approved - file: E136224).

IN COMPLIANCES WITH THE FOLLOWING STANDARDS

Standard	Peak Surge Voltage (V)	Voltage Waveform (µs)	Required peak current (A)	Current Waveform (µs)	Minimum serial resistor to meet standard (Ω)
GR-1089 Core First level	2500 1000	2/10 10/1000	500 100	2/10 10/1000	12 10
GR-1089 Core Second level	5000	2/10	500	2/10	24
GR-1089 Core Intra-building	1500	2/10	100	2/10	0
ITU-T-K20 / K21	6000 1500	10/700	150 37.5	5/310	53 0
ITU-T-K20 (IEC61000-4-2)	6000 8000	1/60 ns	ESD contact discharge ESD air discharge		0 0
VDE0433	4000 2000	10/700	100 50	5/310	21.5 0
VDE0878	4000 2000	1.2/50	100 50	1/20	0 0
IEC61000-4-5	4000 4000	10/700 1.2/50	100 100	5/310 8/20	21.5 0
FCC Part 68, lightning surge type A	1500 800	10/160 10/560	200 100	10/160 10/560	12.5 6.5
FCC Part 68, lightning surge type B	1000	9/720	25	5/320	0

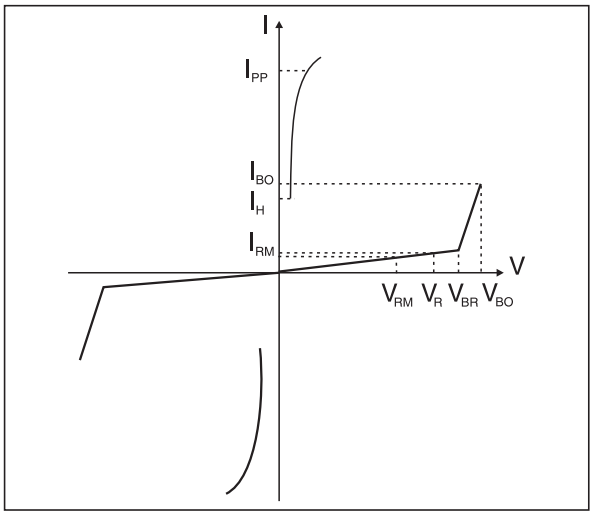
THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
R_{th} (j-a)	Junction to ambient with recommended footprint	120	°C/W
R_{th} (j-l)	Junction to leads	30	°C/W

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
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
I_{BO}	Breakover current
I_{PP}	Peak pulse current
C	Capacitance



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	50 100 55 65 75 100 150	A
I_{FS}	Fail safe mode: maximum current (note 1)	8/20 µs	2.5	kA
I_{TSM}	Non repetitive surge peak on-state current (Sinusoidal)	t = 20ms t = 16.6ms t = 0.2s t = 2s	25 28 16 8.5	A
I^2t	I^2t value for fusing	t = 16.6ms t = 20ms	6.5 6.3	A^2s
T_L	Maximum lead temperature for soldering during 10 s.		260	°C
T_{stg} T_j	Storage temperature range Maximum junction temperature		- 55 to + 150 150	°C °C

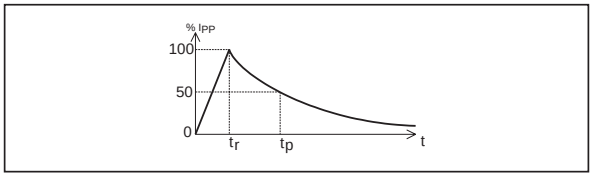
Repetitive peak pulse current

tr: rise time (µs)

tp: pulse duration time (µs)

ex: Pulse waveform 10/1000µs

tr = 10µs tp = 1000µs



ELECTRICAL PARAMETERS (Tamb = 25°C)

Type	I_{RM} @ V_{RM} max		I_R @ $V_{R\ MAX}$ Note 1		DYNAMIC V_{BO} @ I_{BO} max Note 2		STATIC V_{BO} @ I_{BO} max Note 3		I_H min Note 4	C typ. Note 5	C typ. Note 6
	µA	V	µA	V	V	mA	V	mA	mA	pF	pF
SMP50-62	2	56	50	62	85	800	82	800	150	30	50
SMP50-68		61		68	93		90		150	30	45
SMP50-100		90		100	135		133		150	20	40
SMP50-120		108		120	160		160		150	20	40
SMP50-130		117		130	173		173		150	20	35
SMP50-180		162		180	235		240		150	15	30
SMP50-200		180		200	262		267		150	15	30
SMP50-220		198		220	285		293		150	15	30
SMP50-240		216		240	300		320		150	15	30
SMP50-270		243		270	350		360		150	15	30

Note 1: I_R measured at V_R guarantee $V_{BRmin} \geq V_R$
Note 2: See functional breakover voltage test circuit 1.
Note 3: See test circuit 2.
Note 4: See functional holding current test circuit 3.
Note 5: V_R = 50V bias,VRMS = 1V, F = 1MHz.
Note 6: V_R = 2V bias, VRMS = 1V, F = 1MHz

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

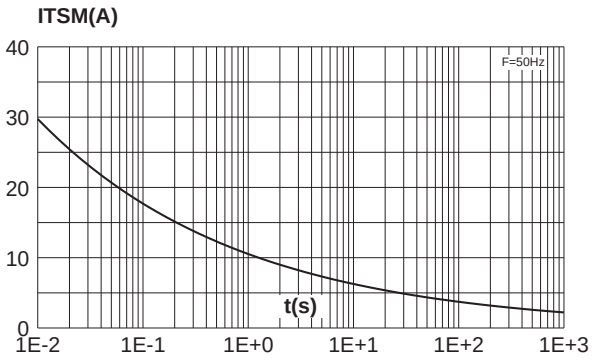


Fig. 2: On-state voltage versus on-state current (typical values).

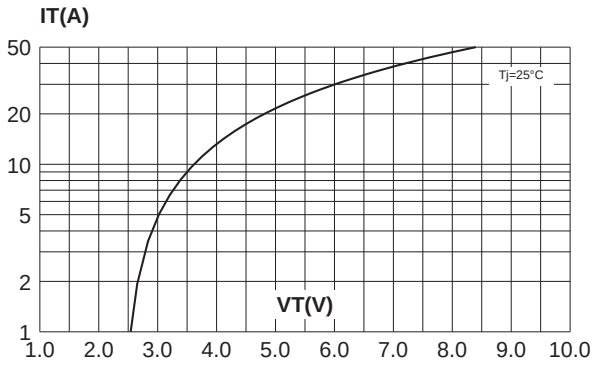


Fig. 3: Relative variation of holding current versus junction temperature.

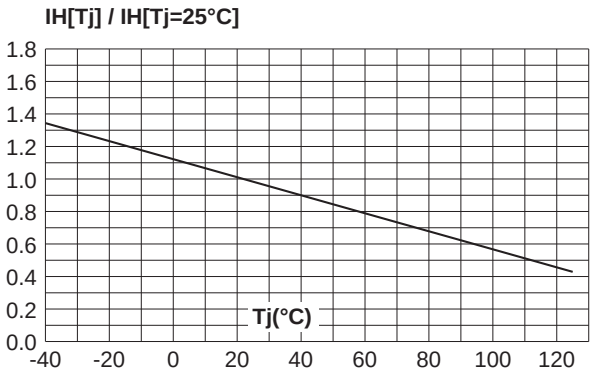


Fig. 4: Relative variation of breakover voltage versus junction temperature.

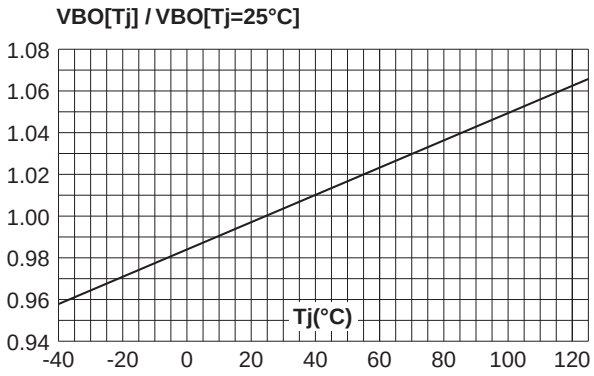


Fig. 5: Relative variation of leakage current versus junction temperature (typical values).

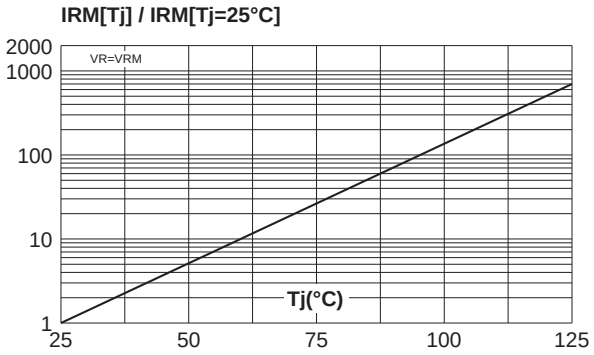


Fig. 6: Relative variation of thermal impedance versus pulse duration.

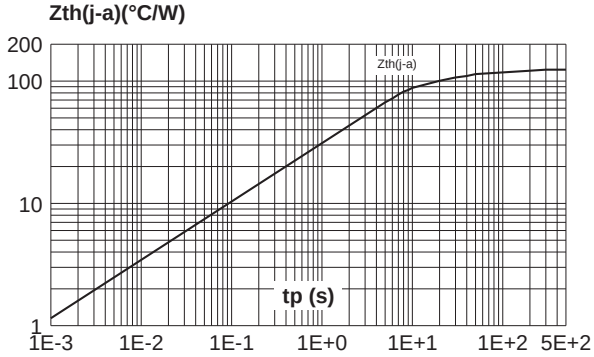
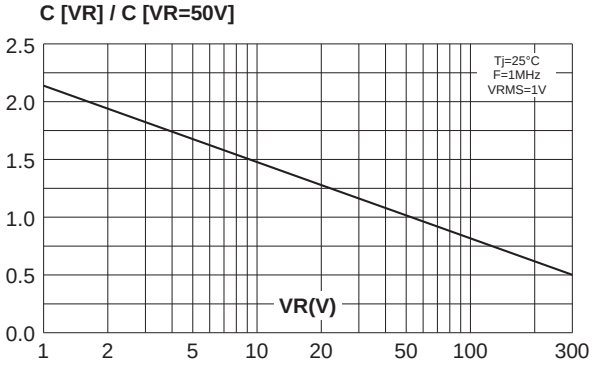
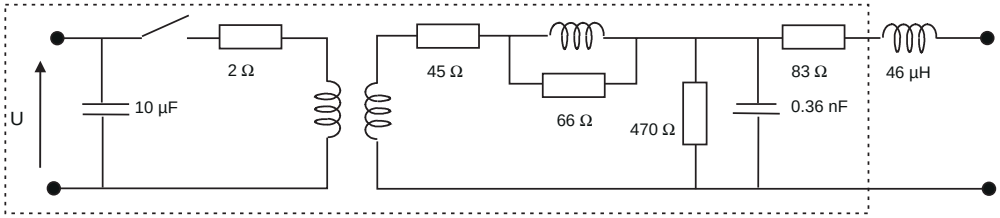


Fig. 7: Relative variation of junction capacitance versus reverse voltage applied (typical values).



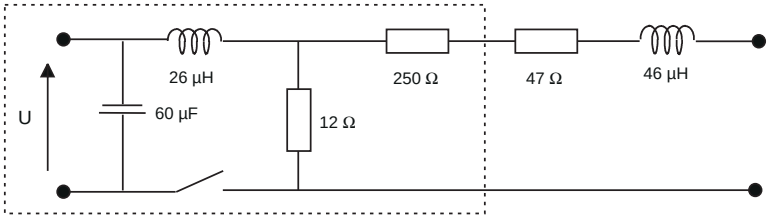
TEST CIRCUIT 1 FOR DYNAMIC I_{BO} and V_{BO} PARAMETERS

100 V / µs, di/dt < 10 A / µs, Ipp = 50A



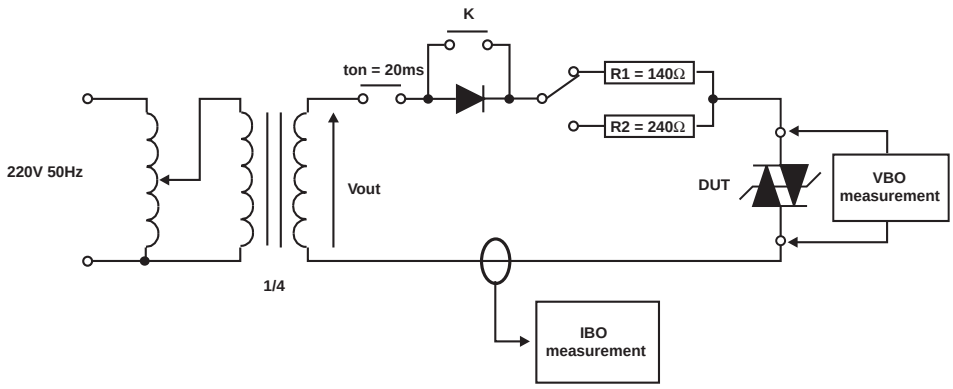
Key Tek 'System 2' generator with PN246I module

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



Key Tek 'System 2' generator with PN246I module

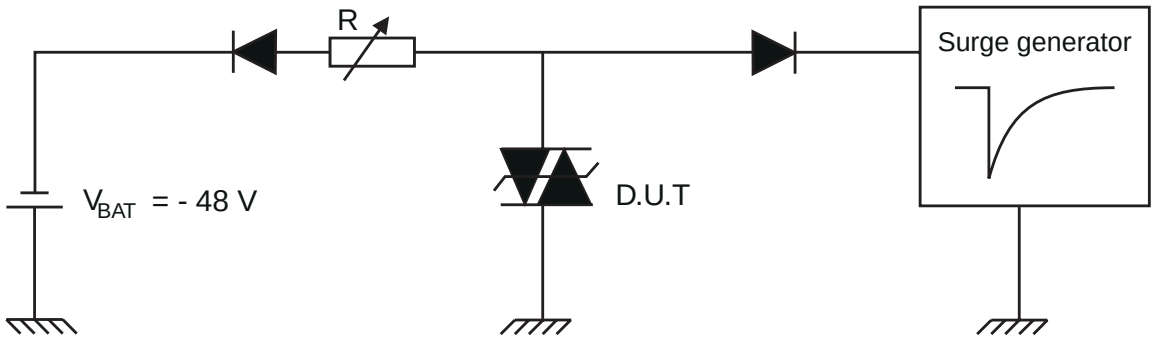
TEST CIRCUIT 2 for I_{BO} AND V_{BO} PARAMETERS.



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 CIRCUIT 3 for I_H PARAMETERS.



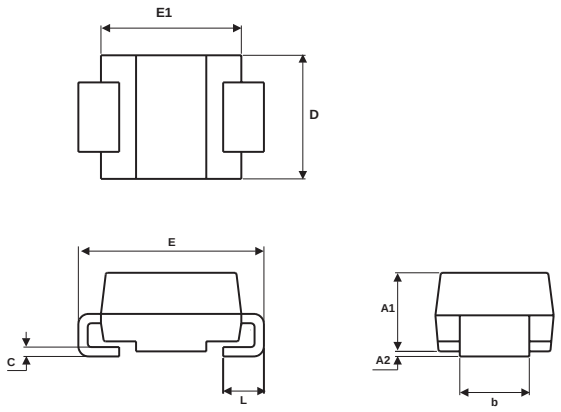
This is a GO-NO GO test which allows to confirm the holding current (I_H) level in a functional test circuit.

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.

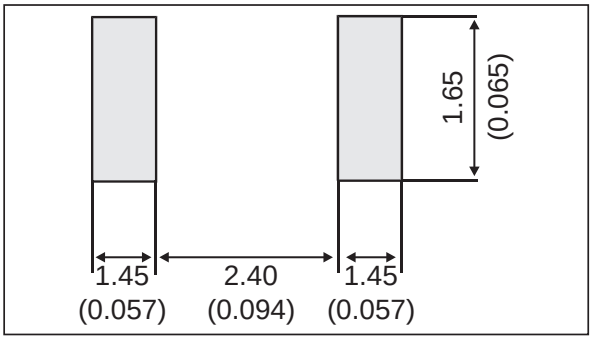
PACKAGE MECHANICAL DATA

SMA (JEDEC DO-214AC)

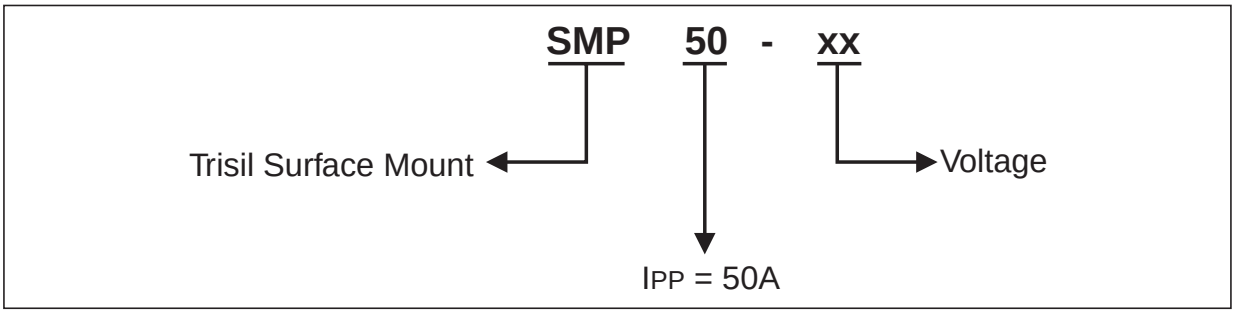


REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.70	0.075	0.106
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.41	0.006	0.016
E	4.80	5.60	0.189	0.220
E1	3.95	4.60	0.156	0.181
D	2.25	2.95	0.089	0.116
L	0.75	1.60	0.030	0.063

FOOT PRINT in millimeters (in inches)



ORDER CODE



ORDERING INFORMATION

Part number	Marking	Package	Weight	Base qty	Delivery mode
SMP50-62	V06	SMA	0.068 g	5000	Tape & reel
SMP50-68	V07				
SMP50-100	V10				
SMP50-120	V12				
SMP50-130	V13				
SMP50-180	V18				
SMP50-200	V20				
SMP50-220	V22				
SMP50-240	V24				
SMP50-270	V27				