



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: $I_R = 2\mu\text{A}$ max.
- Holding current: $I_H = 150$ mA min.
- Repetitive peak pulse current:
 $I_{PP} = 50$ A (10/1000 μs)

MAIN APPLICATIONS

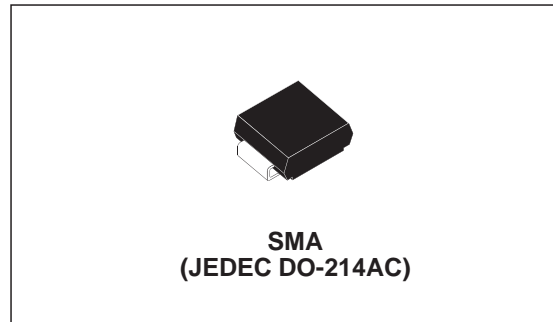
Telecommunication equipment such as

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

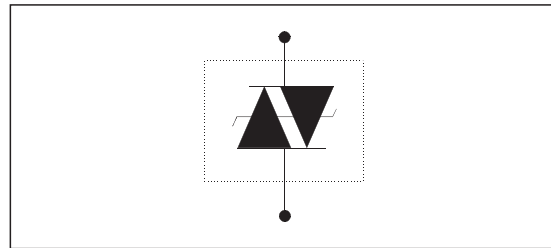
DESCRIPTION

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.



SCHEMATIC DIAGRAM



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 registered. (Trisils are UL 497B approved - file: E136224).

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IN COMPLIANCES WITH THE FOLLOWING STANDARDS

Standard	Peak Surge Voltage (V)	Voltage Waveform (μ s)	Required peak current (A)	Current Waveform (μ s)	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

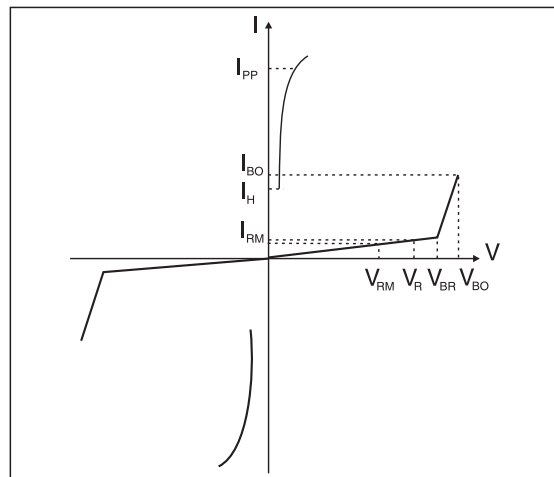
THERMAL RESISTANCES

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

ELECTRICAL CHARACTERISTICS

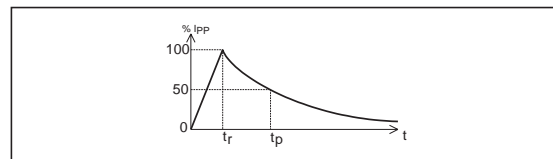
($T_{amb} = 25^{\circ}\text{C}$)

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

Symbol	Parameter	Value	Unit	
I_{PP}	Repetitive peak pulse current:	10/1000 μs	50	A
		8/20 μs	100	
		10/560 μs	55	
		5/310 μs	65	
		10/160 μs	75	
		1/20 μs	100	
		2/10 μs	150	
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)	$t = 20\text{ms}$	25	A
		$t = 16.6\text{ms}$	28	
		$t = 0.2\text{s}$	16	
		$t = 2\text{s}$	8.5	
I^2t	I^2t value for fusing	$t = 16.6\text{ms}$	6.5	A^2s
		$t = 20\text{ms}$	6.3	
T_L	Maximum lead temperature for soldering during 10 s.	260	$^{\circ}\text{C}$	
T_{stg} T_j	Storage temperature range	- 55 to + 150	$^{\circ}\text{C}$	
	Maximum junction temperature	150	$^{\circ}\text{C}$	

Repetitive peak pulse currenttr: rise time (μs)tp: pulse duration time (μs)ex: Pulse waveform 10/1000 μs tr = 10 μs tp = 1000 μs 

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ELECTRICAL PARAMETERS (Tamb = 25°C)

Type	I _{RM} @ V _{RM} max		I _R @ V _R MAX		DYNAMIC V _{BO} @ I _{BO} max		STATIC V _{BO} @ I _{BO} max		I _H min	C typ.	C typ.
	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} ≥ 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, V_{RMS} = 1V, F = 1MHz.

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

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

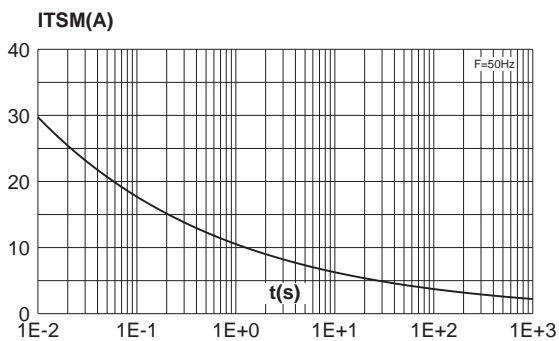


Fig. 2: On-state voltage versus on-state current (typical values).

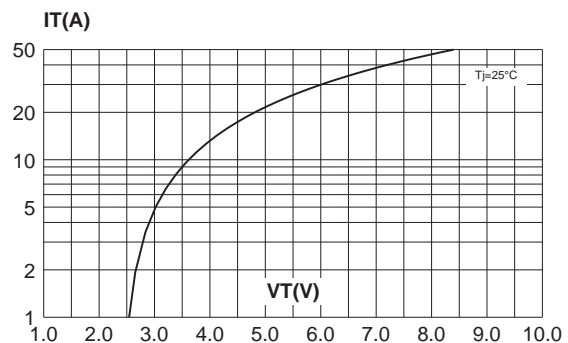


Fig. 3: Relative variation of holding current versus junction temperature.

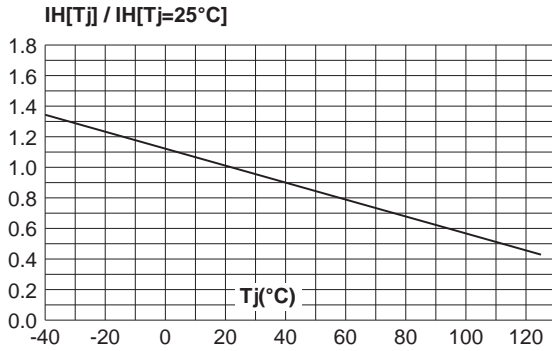


Fig. 4: Relative variation of breakover voltage versus junction temperature.

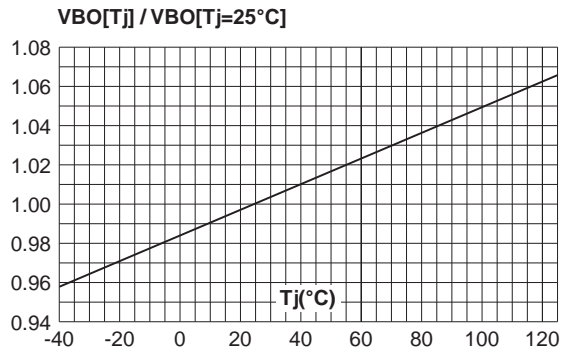


Fig. 5: Relative variation of leakage current versus junction temperature (typical values).

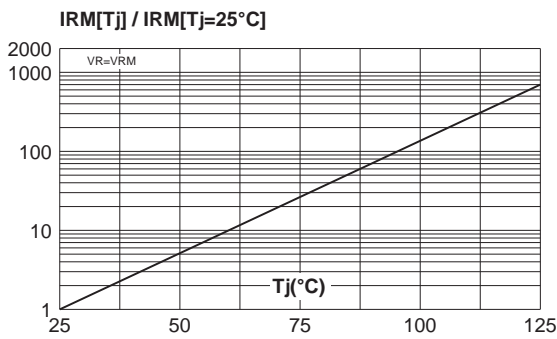


Fig. 6: Relative variation of thermal impedance versus pulse duration.

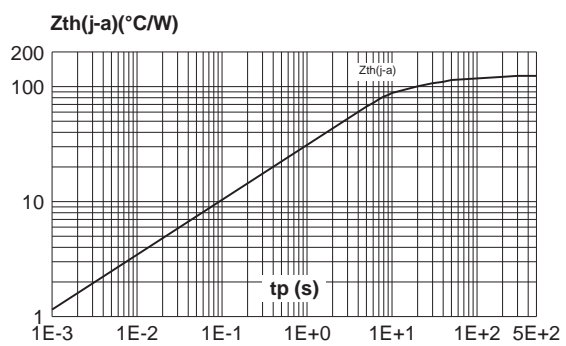
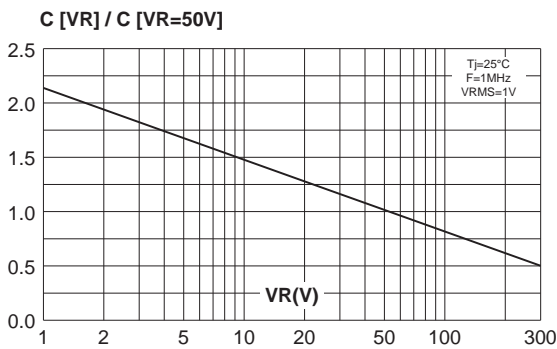
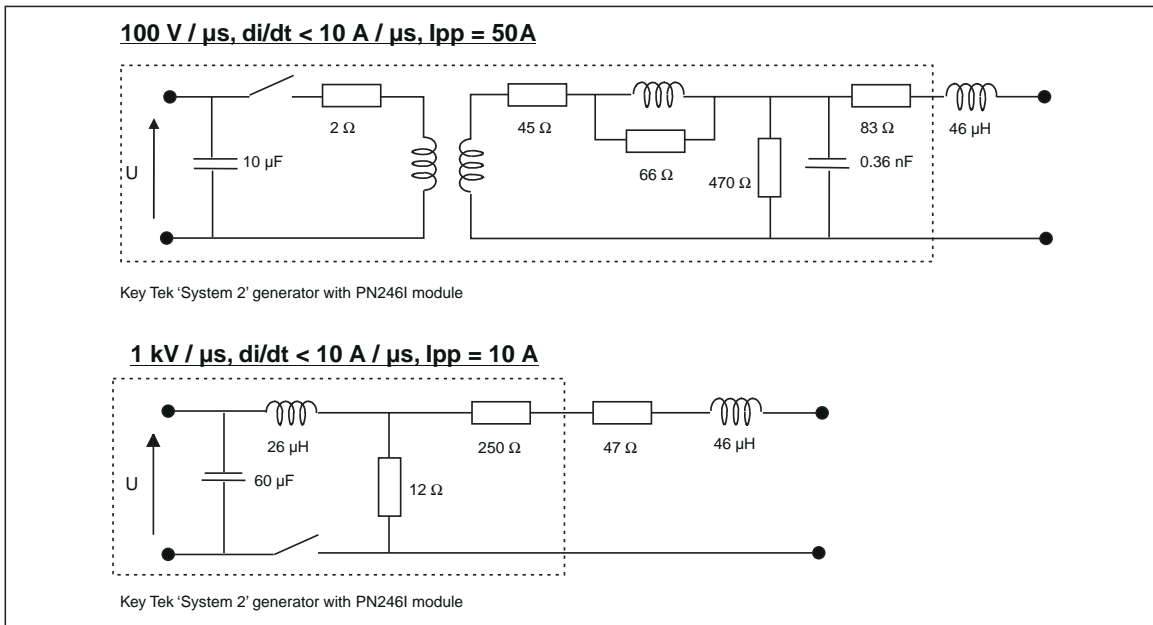


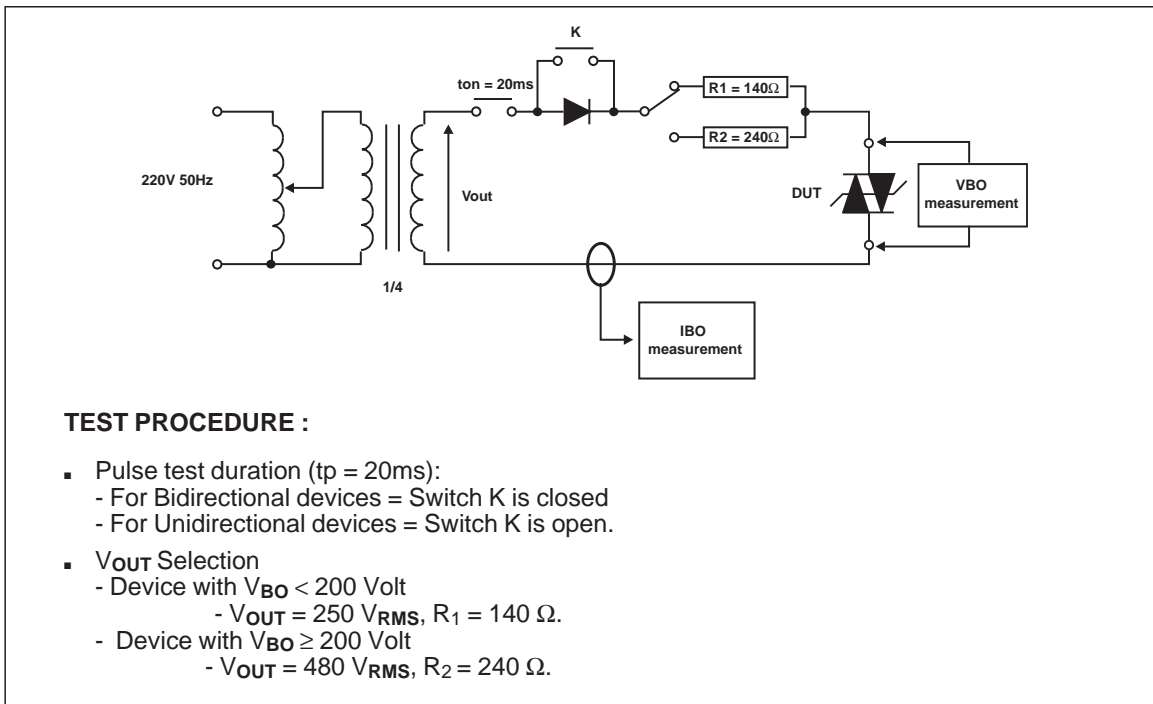
Fig. 7: Relative variation of junction capacitance versus reverse voltage applied (typical values).

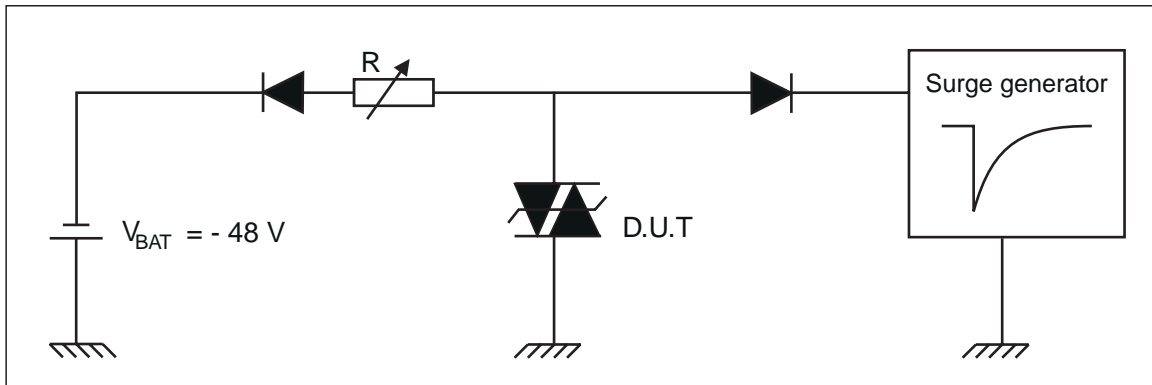


TEST CIRCUIT 1 FOR DYNAMIC I_{BO} and V_{BO} PARAMETERS



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



TEST CIRCUIT 3 for I_H PARAMETERS.

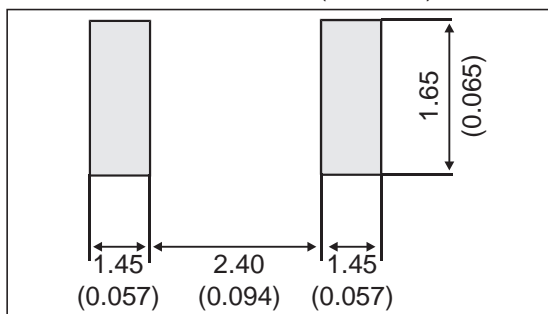
This is a GO-NO GO test which allows to confirm the holding current (I_H) level in a functional test circuit.

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 : $I_{pp} = 10A, 10/1000 \mu s$.
- The D.U.T. will come back to the off-state within 50 ms max.

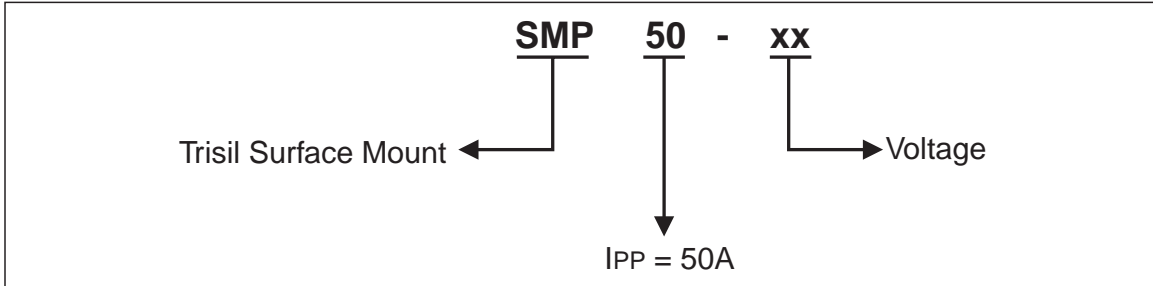
PACKAGE MECHANICAL DATA
SMA (JEDEC DO-214AC)

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)

SMP50-xxx

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				

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