



# SMP30-xxx

## TELECOM EQUIPMENT PROTECTION: TRISIL™

### FEATURES

- Bidirectional crowbar protection
- Voltage range from 62V to 270V
- Low capacitance from 12pF to 20pF typ. @ 50V
- Low leakage current:  $I_R = 2\mu\text{A}$  max.
- Holding current:  $I_H = 150$  mA min.
- Repetitive peak pulse current:  
 $I_{PP} = 30$  A (10/1000  $\mu\text{s}$ )

### MAIN APPLICATIONS

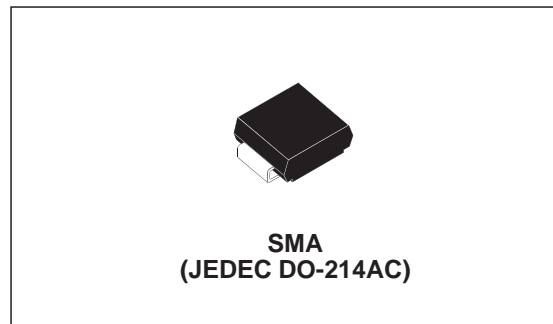
Telecommunication equipment such as

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

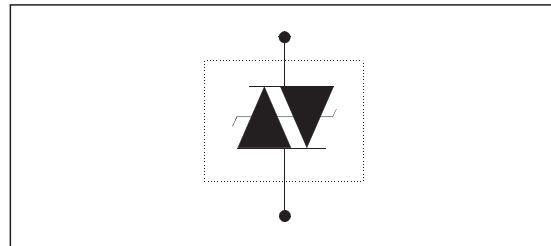
### DESCRIPTION

The SMP30-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).

## SMP30-xxx

### IN COMPLIANCES WITH THE FOLLOWING STANDARDS

Standard	Peak Surge Voltage (V)	Voltage Waveform ( $\mu$ s)	Required peak current (A)	Current Waveform ( $\mu$ s)	Minimum serial resistor to meet standard ( $\Omega$ )
<b>GR-1089 Core First level</b>	2500 1000	2/10 10/1000	500 100	2/10 10/1000	20 24
<b>GR-1089 Core Second level</b>	5000	2/10	500	2/10	40
<b>GR-1089 Core Intra-building</b>	1500	2/10	100	2/10	0
<b>ITU-T-K20 / K21</b>	6000 1500	10/700	150 37.5	5/310	110 0
<b>ITU-T-K20 (IEC61000-4-2)</b>	6000 8000	1/60 ns	ESD contact discharge ESD air discharge		0 0
<b>VDE0433</b>	4000 2000	10/700	100 50	5/310	60 10
<b>VDE0878</b>	4000 2000	1.2/50	100 50	1/20	18 0
<b>IEC61000-4-5</b>	4000 4000	10/700 1.2/50	100 100	5/310 8/20	60 18
<b>FCC Part 68, lightning surge type A</b>	1500 800	10/160 10/560	200 100	10/160 10/560	26 15
<b>FCC Part 68, lightning surge type B</b>	1000	9/720	25	5/320	0

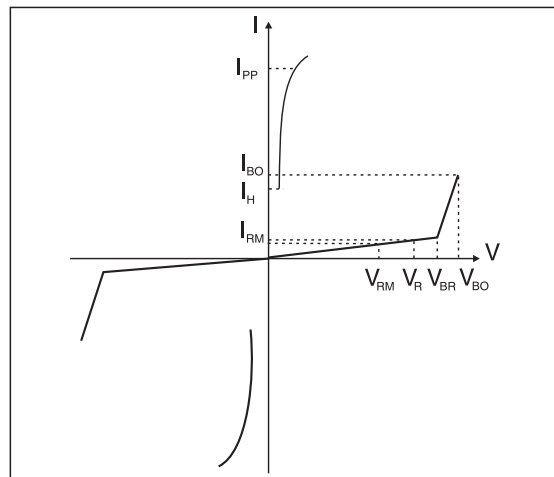
### THERMAL RESISTANCES

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

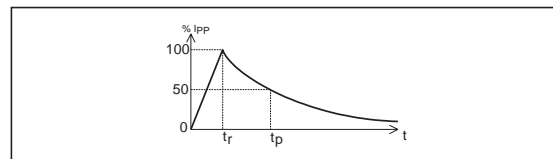
( $T_{amb} = 25^{\circ}\text{C}$ )

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 $\mu\text{s}$	30	A
		8/20 $\mu\text{s}$	70	
		10/560 $\mu\text{s}$	35	
		5/310 $\mu\text{s}$	40	
		10/160 $\mu\text{s}$	45	
		1/20 $\mu\text{s}$	70	
		2/10 $\mu\text{s}$	100	
$I_{FS}$	Fail safe mode: maximum current	8/20 $\mu\text{s}$	2.5	kA
$I_{TSM}$	Non repetitive surge peak on-state current (Sinusoidal)	$t = 20\text{ms}$	15	A
		$t = 16.6\text{ms}$	17	
		$t = 0.2\text{s}$	8.5	
		$t = 2\text{s}$	4.5	
$I^2t$	$I^2t$ value for fusing	$t = 16.6\text{ms}$	2.1	$\text{A}^2\text{s}$
		$t = 20\text{ms}$	2.25	
$T_L$	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 current**tr: rise time ( $\mu\text{s}$ )tp: pulse duration time ( $\mu\text{s}$ )ex: Pulse waveform 10/1000 $\mu\text{s}$ tr = 10 $\mu\text{s}$     tp = 1000 $\mu\text{s}$ 

## SMP30-xxx

### ELECTRICAL PARAMETERS (Tamb = 25°C)

Type	I <sub>RM</sub> @ V <sub>RM</sub> max		I <sub>R</sub> @ V <sub>R</sub> MAX		DYNAMIC V <sub>Bo</sub> @ I <sub>Bo</sub> max		STATIC V <sub>Bo</sub> @ I <sub>Bo</sub> max		I <sub>H</sub> min	C typ.	C typ.
	μA	V	μA	V	V	mA	V	mA	mA	pF	pF
SMP30-62	2	56	50	62	85	800	82	800	150	20	40
SMP30-68		61		68	93		90		150	20	40
SMP30-100		90		100	135		133		150	16	35
SMP30-120		108		120	160		160		150	16	30
SMP30-130		117		130	173		173		150	14	30
SMP30-180		162		180	235		240		150	14	25
SMP30-200		180		200	262		267		150	12	25
SMP30-220		198		220	285		293		150	12	25
SMP30-240		216		240	300		320		150	12	25
SMP30-270		243		270	350		360		150	12	25

**Note 1:** I<sub>R</sub> measured at V<sub>R</sub> guarantee V<sub>BRmin</sub> ≥ V<sub>R</sub>

**Note 2:** See functional breakover voltage test circuit 1.

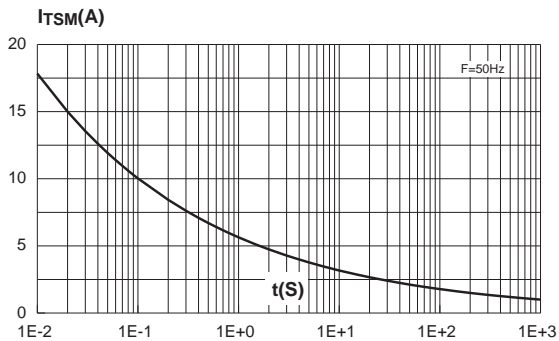
**Note 3:** See test circuit 2.

**Note 4:** See functional holding current test circuit 3.

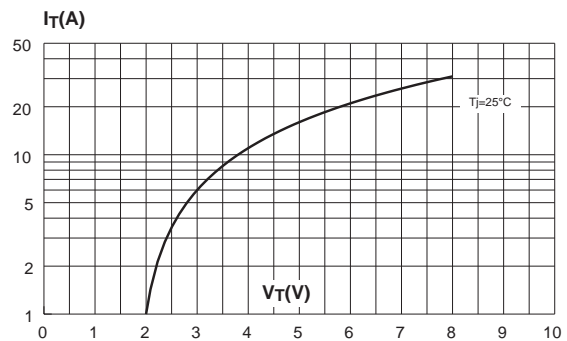
**Note 5:** V<sub>R</sub> = 50V bias, V<sub>RMS</sub> = 1V, F = 1MHz.

**Note 6:** V<sub>R</sub> = 2V bias, V<sub>RMS</sub> = 1V, F = 1MHz

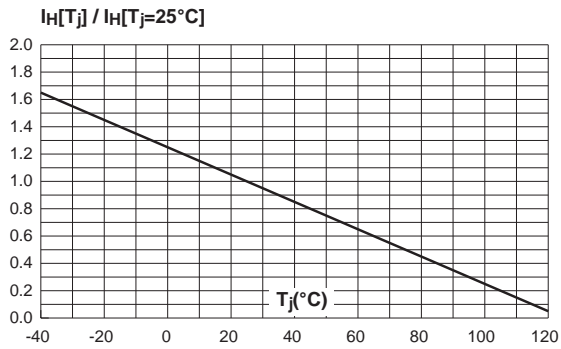
**Fig. 1:** Non repetitive surge peak on-state current versus overload duration (T<sub>j</sub> initial = 25°C)



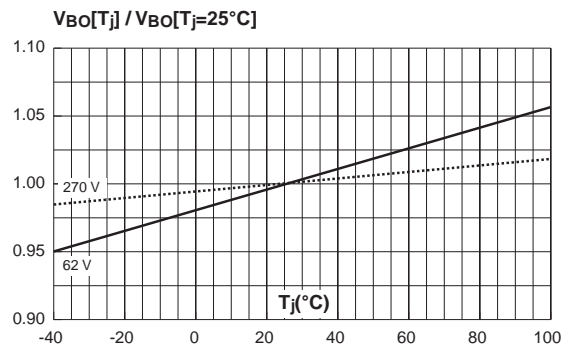
**Fig. 2:** On-state voltage versus on-state current (typical values).



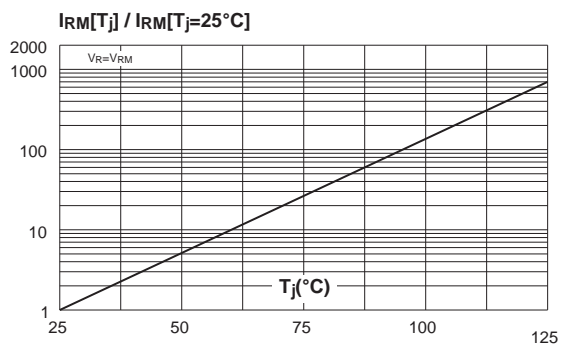
**Fig. 3:** Relative variation of holding current versus junction temperature.



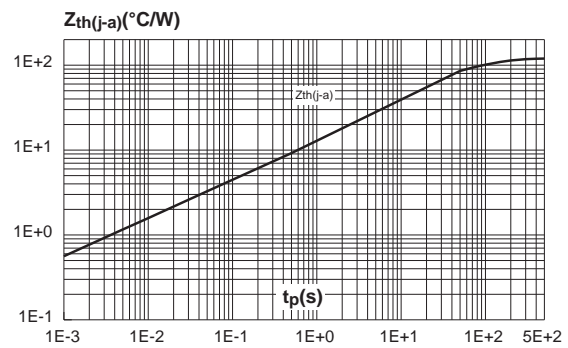
**Fig. 4:** Relative variation of breakover voltage versus junction temperature.



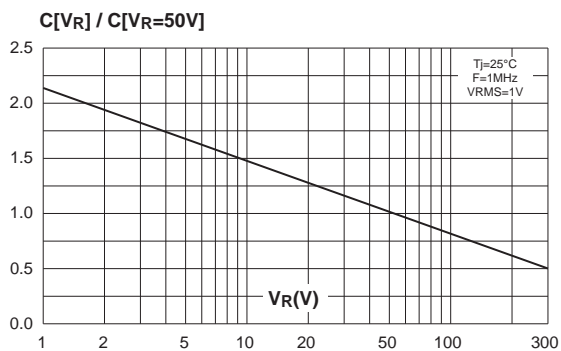
**Fig. 5:** Relative variation of leakage current versus junction temperature (typical values).



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

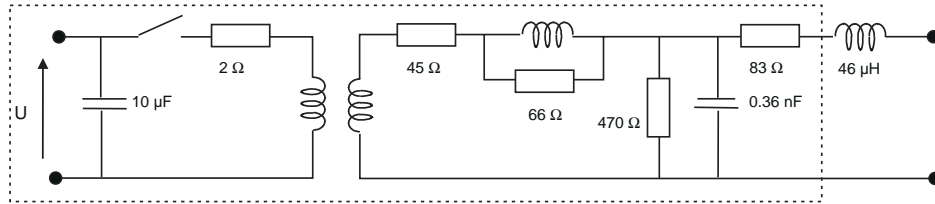


**Fig. 7:** Relative variation of junction capacitance versus reverse voltage applied (typical values).



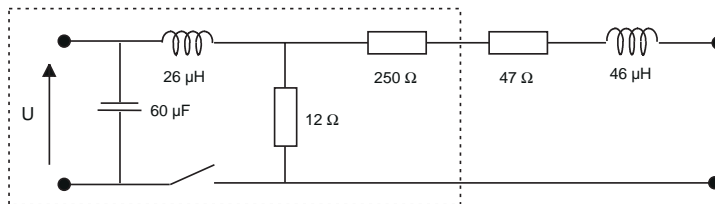
TEST CIRCUIT 1 FOR DYNAMIC  $I_{BO}$  and  $V_{BO}$  PARAMETERS

**100 V /  $\mu$ s,  $di/dt < 10$  A /  $\mu$ s,  $I_{pp} = 30$  A**

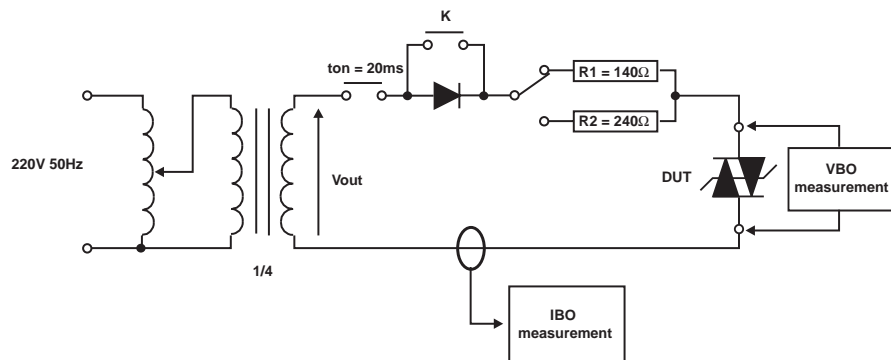


Key Tek 'System 2' generator with PN246I module

**1 kV /  $\mu$ s,  $di/dt < 10$  A /  $\mu$ s,  $I_{pp} = 10$  A**

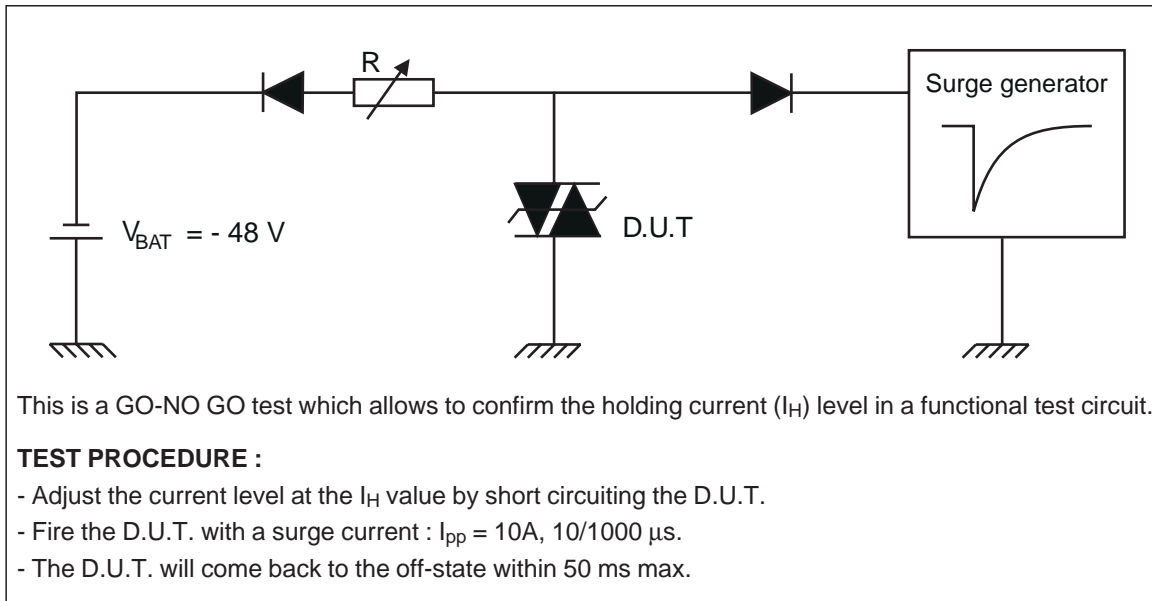


Key Tek 'System 2' generator with PN246I module

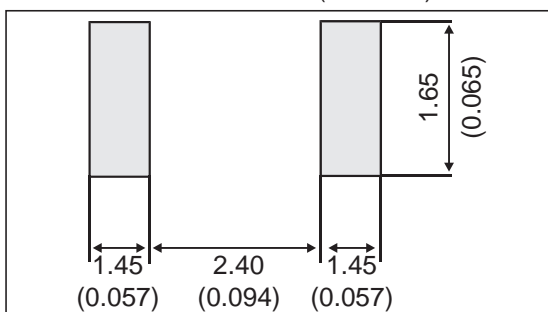
TEST CIRCUIT 2 for  $I_{BO}$  AND  $V_{BO}$  PARAMETERS.

## TEST PROCEDURE :

- Pulse test duration ( $t_p = 20$ ms):
  - For Bidirectional devices = Switch K is closed
  - For Unidirectional devices = Switch K is open.
- $V_{OUT}$  Selection
  - Device with  $V_{BO} < 200$  Volt
    - $V_{OUT} = 250 V_{RMS}$ ,  $R_1 = 140 \Omega$ .
  - Device with  $V_{BO} \geq 200$  Volt
    - $V_{OUT} = 480 V_{RMS}$ ,  $R_2 = 240 \Omega$ .

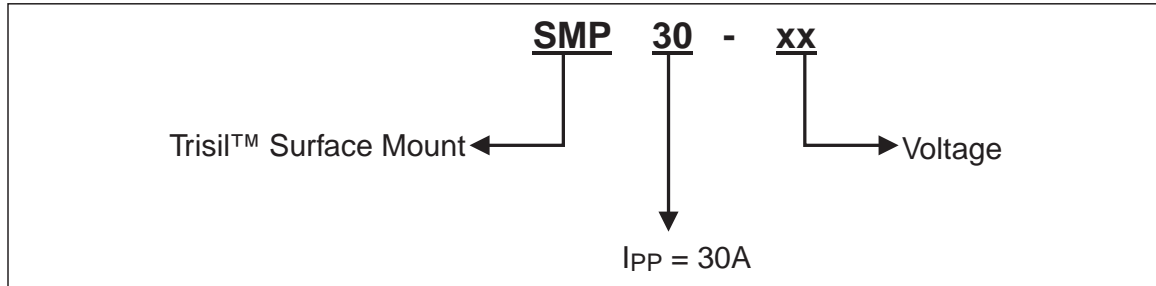
**TEST CIRCUIT 3 for  $I_H$  PARAMETERS.****PACKAGE MECHANICAL DATA**  
SMA (JEDEC DO-214AC)

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)

## SMP30-xxx

### ORDER CODE



### ORDERING INFORMATION

Part number	Marking	Package	Weight	Base qty	Delivery mode
SMP30-62	QA4	SMA	0.06 g	5000	Tape & reel
SMP30-68	QAB				
SMP30-100	QAC				
SMP30-120	QAD				
SMP30-130	QAE				
SMP30-180	QAF				
SMP30-200	QAG				
SMP30-220	QAH				
SMP30-240	QAI				
SMP30-270	QAJ				

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