SMP80MC-270

TELECOM EQUIPMENT PROTECTION: TRISIL™

FEATURES

- Bidirectional crowbar protection
- Voltage: 270V
- Low V_{BO} / V_R ratio
- Micro capacitance 15pF typ @ 50V
- Low leakage current : I_R = 2µA max
- Holding current: I_H = 150 mA min
- Repetitive peak pulse current : I_{PP} = 80 A (10/1000µs)

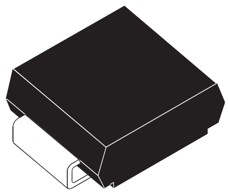
MAIN APPLICATIONS

Any sensitive equipment requiring protection against lightning strikes and power crossing:

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

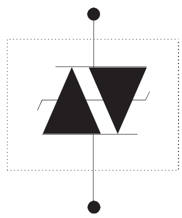
DESCRIPTION

The SMP80MC-270 is a micro capacitance transient surge arrestor designed for the protection of high debit rate communication equipment. Its micro capacitance avoids any distortion of the signal and is compatible with digital line cards (xDSL, T1/E1, ISDN...).



SMB
(JEDEC DO-214AA)

SCHEMATIC DIAGRAM



BENEFITS

Trisils are not subject to ageing and provide a fail safe mode in short circuit for a better protection. They are used to help equipment to meet main standards such as UL1950, IEC950 / CSA C22.2 and UL1459. They have UL94 V0 approved resin. SMB package is JEDEC registered (DO-214AA). Trisils are UL497B approved (file: E136224) and comply with the following standards GR-1089 Core, ITU-T-K20/K21, VDE0433, VDE0878, IEC61000-4-5 and FCC part 68.

IN COMPLIANCES WITH THE FOLLOWING STANDARDS

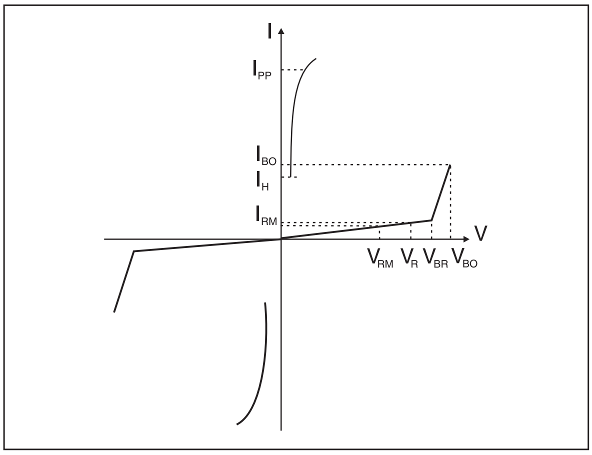
STANDARD	Peak Surge Voltage (V)	Voltage Waveform	Required peak current (A)	Current waveform	Minimum serial resistor to meet standard (Ω)
GR-1089 Core First level	2500 1000	2/10 µs 10/1000 µs	500 100	2/10 µs 10/1000 µs	5 2.5
GR-1089 Core Second level	5000	2/10 µs	500	2/10 µs	10
GR-1089 Core Intra-building	1500	2/10 µs	100	2/10 µs	0
ITU-T-K20/K21	6000 1500	10/700 µs	150 37.5	5/310 µs	10 0
ITU-T-K20 (IEC61000-4-2)	8000 15000	1/60 ns	ESD contact discharge ESD air discharge		0 0
VDE0433	4000 2000	10/700 µs	100 50	5/310 µs	0 0
VDE0878	4000 2000	1.2/50 µs	100 50	1/20 µs	0 0
IEC61000-4-5	4000 4000	10/700 µs 1.2/50 µs	100 100	5/310 µs 8/20 µs	0 0
FCC Part 68, lightning surge type A	1500 800	10/160 µs 10/560 µs	200 100	10/160 µs 10/560 µs	2.5 0
FCC Part 68, lightning surge type B	1000	9/720 µs	25	5/320 µs	0

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction to ambient with recommended footprint	100	°C/W
$R_{th(j-l)}$	Junction to leads	20	°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
I_R	Leakage current at V_R
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
I_{BO}	Breakover current
I_{PP}	Peak pulse current
C	Capacitance



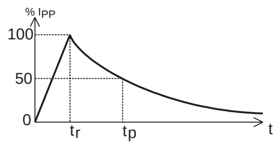
ABSOLUTE RATINGS (T_{amb} = 25°C)

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	80 250 100 120 150 250 250	A
I_{FS}	Fail-safe mode : maximum current (note 1)	8/20 µs	5	kA
I_{TSM}	Non repetitive surge peak on-state current (Sinusoidal)	t = 20ms t = 16.6ms t = 0.2s t = 2s	28 30 14 7	A
I^2t	I^2t value for fusing	t = 16.6ms t = 20ms	7.5 7.8	A^2s
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 1: in fail safe mode, the device acts as a short circuit.

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} max. Note 2	Static V_{BO} @ I_{BO} max. max Note 3		I_H min. Note 4	C typ. Note 5	C typ. Note 6
	µA	V	µA	V	V	V	mA	mA	pF	pF
SMP80MC-270	2	243	50	270	345	335	800	150	15	30

Note 1: I_R measured at V_R guarantee $V_{BR\ min} \geq V_R$
Note 2: See functional 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.

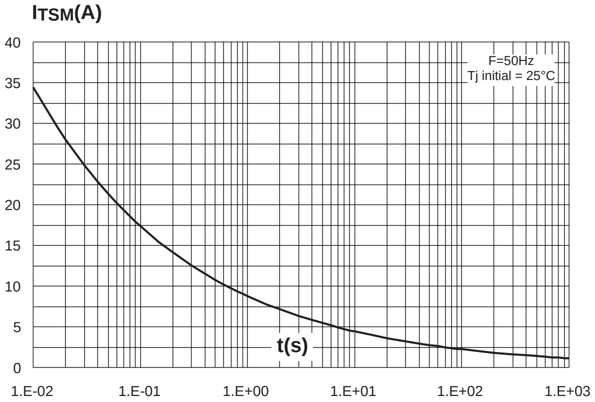


Fig. 2: On-state voltage versus on-state current (typical values)

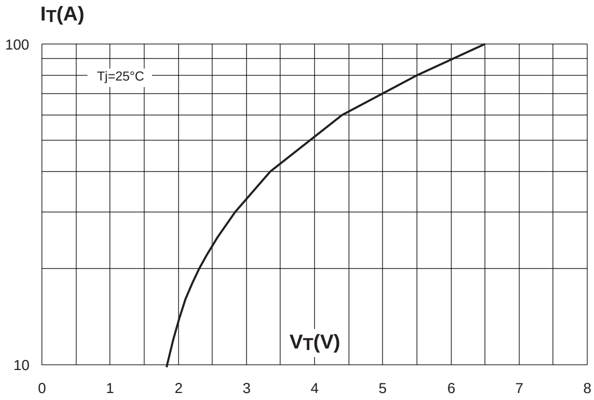


Fig. 3: Relative variation of holding current versus junction temperature .

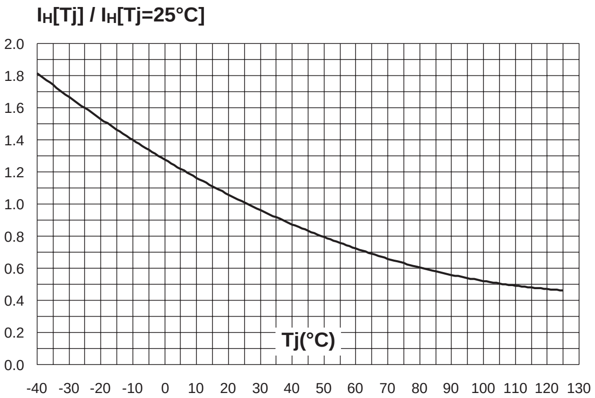


Fig. 4: Relative variation of breakover voltage versus junction temperature.

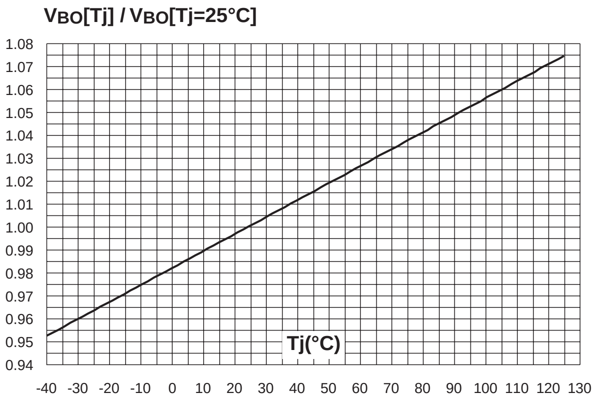


Fig. 5: Relative variation of leakage current versus reverse voltage applied (typical values).

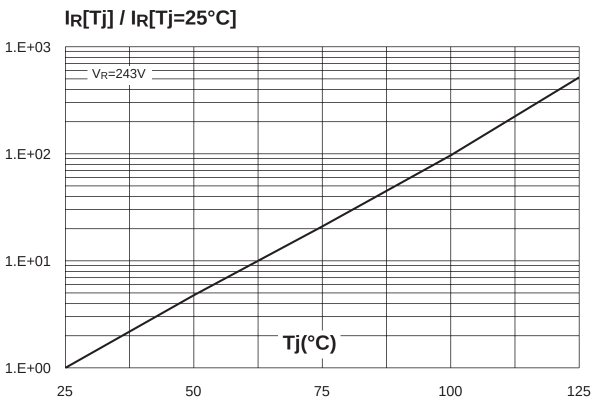


Fig. 6: Variation of thermal impedance junction to ambient versus pulse duration (Printed circuit board FR4, SCu=35µm, recommended pad layout).

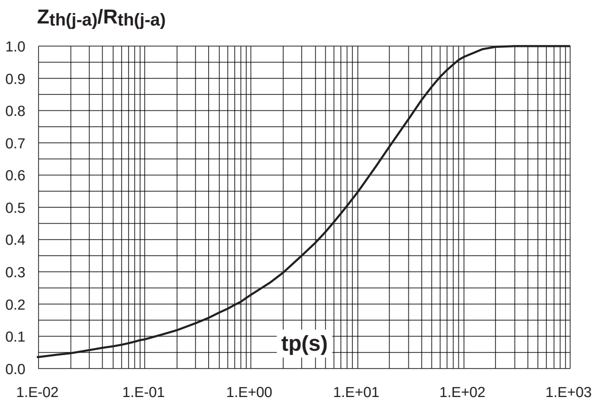
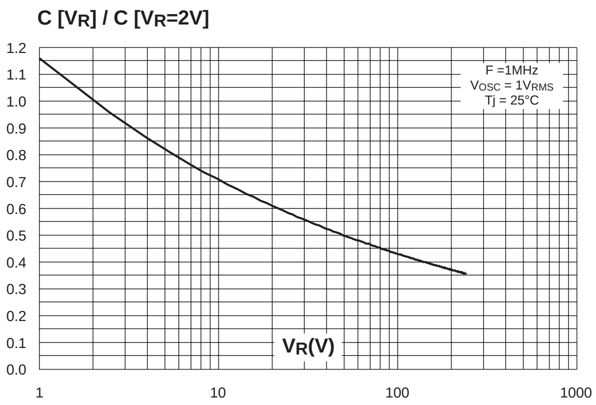
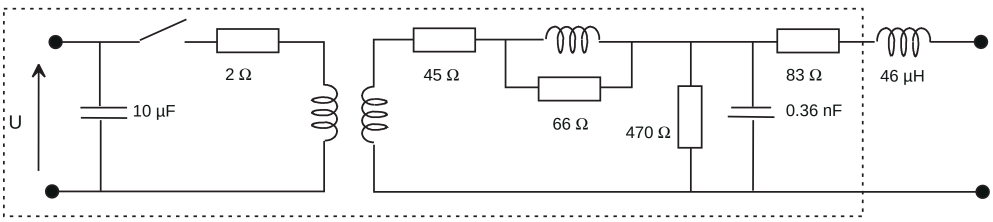


Fig. 7: Relative variation of junction capacitance versus reverse voltage applied (typical values).



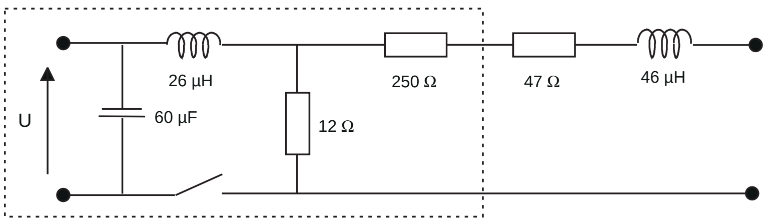
TEST CIRCUIT 1 FOR DYNAMIC I_{BO} AND V_{BO} PARAMETERS

100 V / µs, di/dt < 10 A / µs, Ipp = 80 A



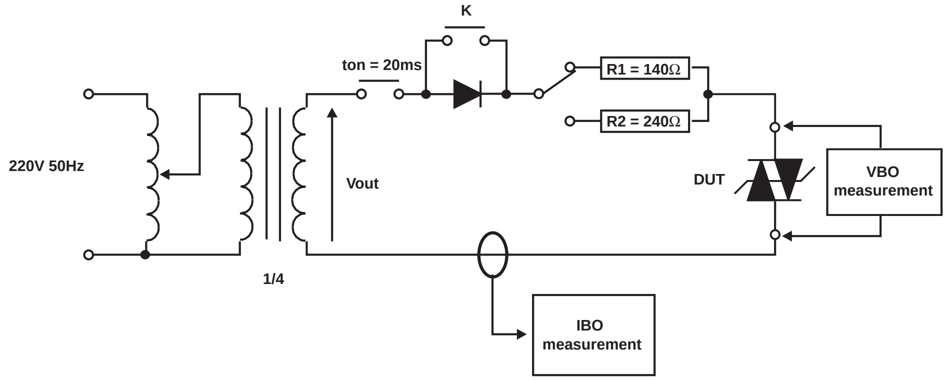
KeyTek 'System 2' generator with PN246I module

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



KeyTek 'System 2' generator with PN246I module

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

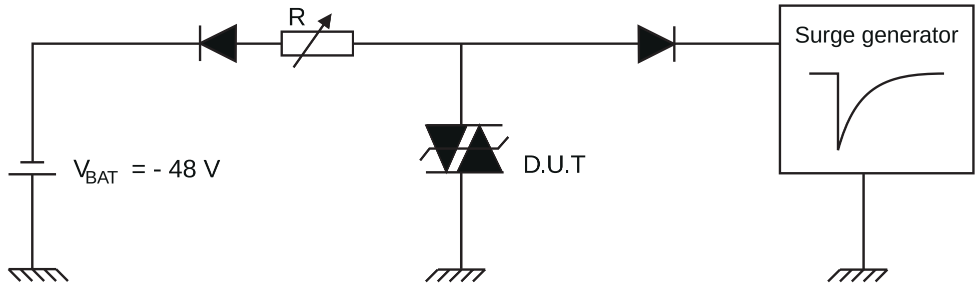


TEST PROCEDURE :

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
  - $V_{OUT} = 250\ V_{RMS}$, $R_1 = 140\ \Omega$.
- Device with $V_{BO} \geq 200$ Volt
  - $V_{OUT} = 480\ V_{RMS}$, $R_2 = 240\ \Omega$.

TEST CIRCUIT 3 FOR I_H PARAMETER



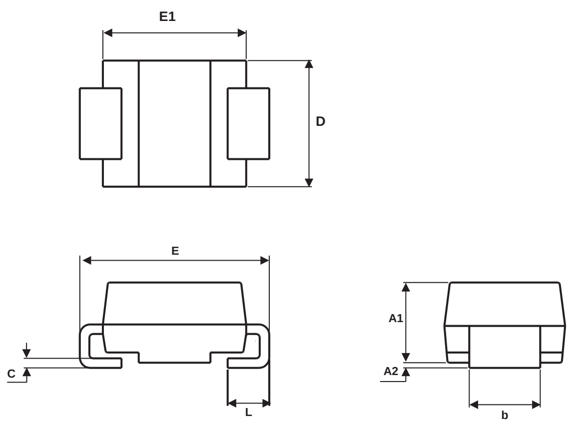
This is a GO-NO GO test which allows to confirm the holding current (I_H) level in a functional test circuit.

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 µs.
- The D.U.T. will come back to the off-state within 50 ms max.

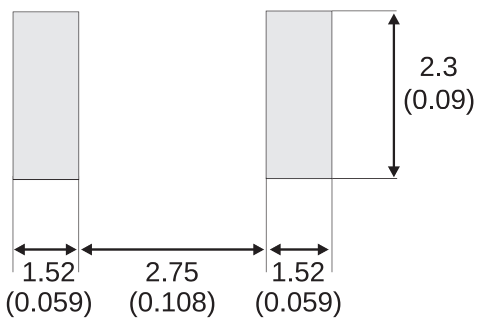
PACKAGE MECHANICAL DATA

SMB (Plastic)

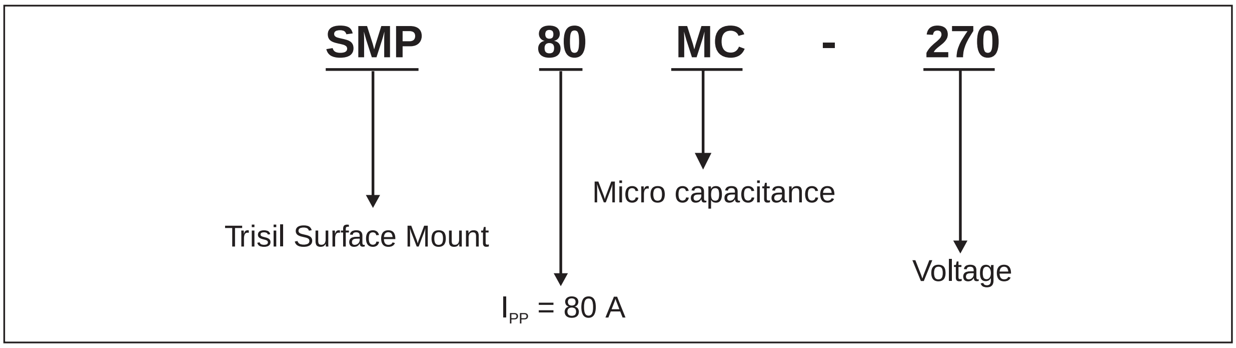


REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.41	0.006	0.016
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
D	3.30	3.95	0.130	0.156
L	0.75	1.60	0.030	0.063

FOOT PRINT in millimeters (inches)



ORDER CODE



Ordering type	Marking	Package	Weight	Base qty	Delivery mode
SMP80MC-270	TP27	SMB	0.11g	2500	Tape & Reel