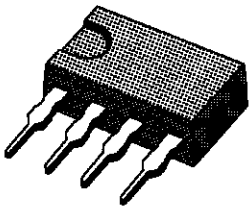
SGS-THOMSON MICROELECTRONICS

L3121B

PROGRAMMABLE TRANSIENT VOLTAGE SUPPRESSOR

FEATURES

- BIDIRECTIONAL FUNCTION WITH VOLTAGE PROGRAMMABILITY IN BOTH POSITIVE AND NEGATIVE POLARITIES.
- PROGRAMMABLE BREAKDOWN VOLTAGE UP TO 100 V.
- HOLDING CURRENT = 150 mA min.
- HIGH SURGE CURRENT CAPABILITY.
  I_{PP} = 100A , 10/1000 µs



SIP 4
(Plastic)

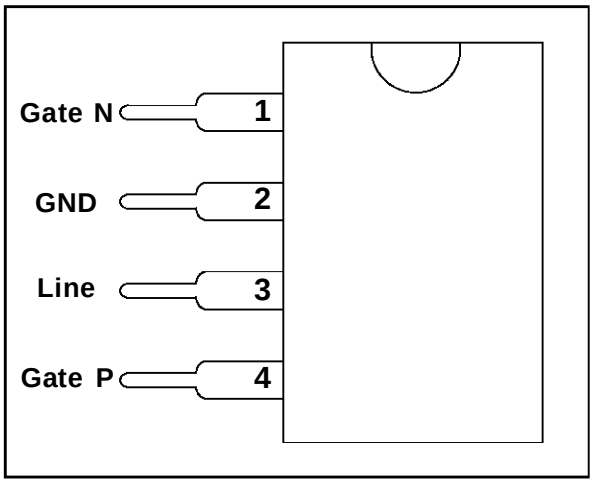
DESCRIPTION

This device has been especially designed to protect a subscriber line card interface (SLIC) with a integrated ring generator.
Used with the recommended application circuit, each line (TIP and RING) is protected against positive and negative surges. In the positive polarity, the breakdown voltage is referenced to the + VB , and in the negative polarity, the breakdown voltage is referenced to the -Vbat .
Its high surge current capability makes the L3121B a reliable protection device for very exposed equipment, or when series resistors are very low.

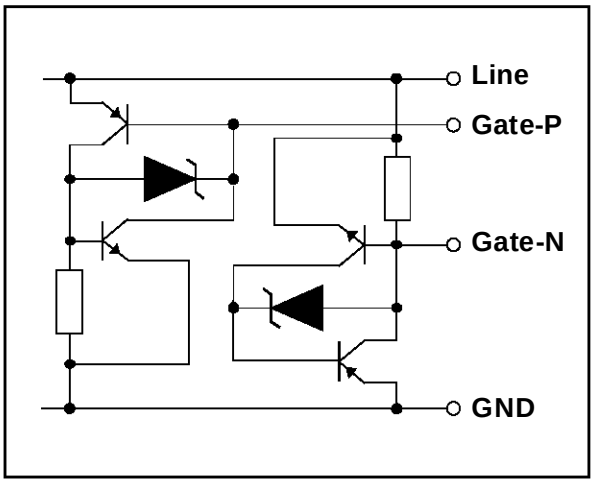
IN ACCORDANCE WITH FOLLOWING STANDARDS :

CCITT K17 - K20	10/700 µs	1.5 kV
	5/310 µs	38 A
VDE 0433	10/700 µs	2 kV
	5/200 µs	50 A
CNET	0.5/700 µs	1.5 kV
	0.2/310 µs	38 A

CONNECTION DIAGRAM

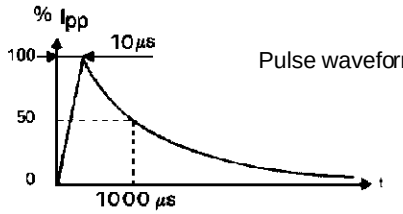


SCHEMATIC DIAGRAM



ABSOLUTE RATINGS (limiting values) (- 40°C ≤ T_{amb} ≤ +85°C)

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current	10/1000 µs 8/20 µs	100 250	A
I_{TSM}	Non repetitive surge peak on-state current	tp = 10 ms	50	A
di/dt	Critical rate of rise of on-state current	Non repetitive	100	A/µs
V_{MLG} V_{MGL}	Maximum voltage LINE/GND. Maximum voltage GATE/LINE.		100 80	V V
T_{stg} T_j	Storage and operating junction temperature range		- 40 to + 150 150	°C °C



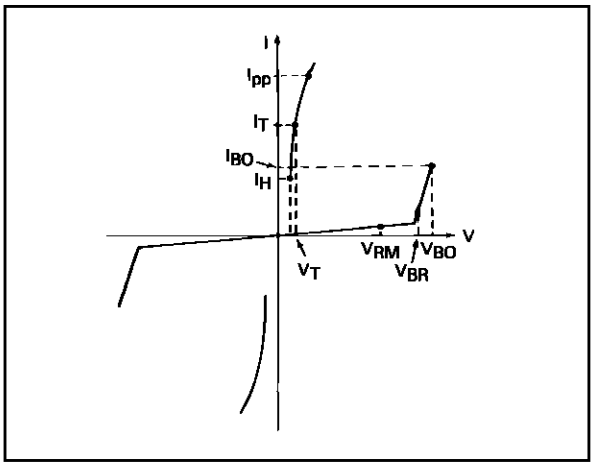
Pulse waveform 10/1000µs

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
R_{th} (j-a)	Junction-to-ambient	80	°C/W

ELECTRICAL CHARACTERISTICS.

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
V_T	On-state voltage @ I_T
I_{BO}	Breakover current
I_{PP}	Peak pulse current
V_G	Gate voltage
I_G	Firing gate current



OPERATION WITHOUT GATE.

Type	I_{RM} @ V_{RM} max		V_{BR} @ I_R min		V_{BO} max	@ Typ note 1	I_{BO} max	I_H min note 1	V_T max note 2	C max note 3
	µA	V	V	mA	V	mA	mA	mA	V	pF
L3121B	5 8	60 90	100	1	180	200	500	150	2	200

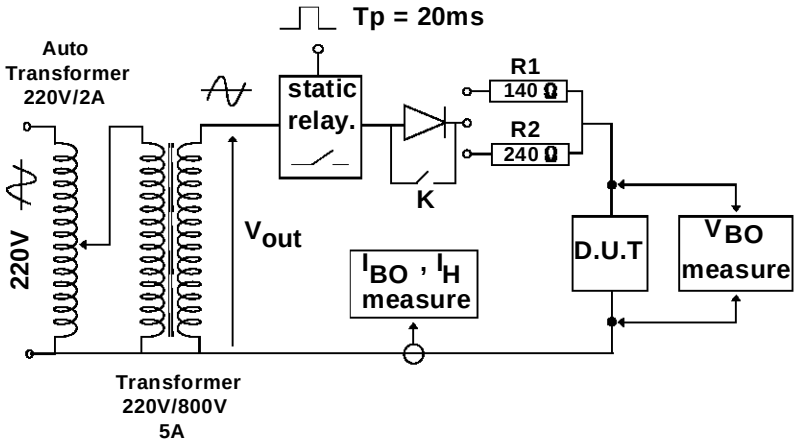
OPERATION WITH GATES.

Type	V_{GN} @ I_{GN} = 200mA		I_{GN} @ V_{AC} = 60V		I_{GP} @ V_{AC} = 60V
	min	max	min	max	max
	V	V	mA	mA	mA
L3121B	0.6	1.8	80	200	180

All parameters tested at 25°C, except where indicated.

Note 1 : See the reference test circuit for I_H, I_{BO} and V_{BO} parameters.
Note 2 : Square pulse T_P= 500µs - I_T = 1A.
Note 3 : V_R = 5 V, F = 1MHz.

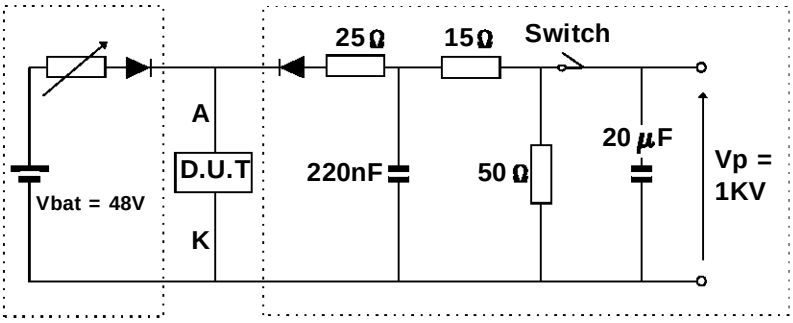
REFERENCE TEST CIRCUIT FOR I_H, I_{BO} and V_{BO} parameters :



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 $V_{BR} \leq 150$ Volt
    - $V_{OUT} = 250\ V_{RMS}$, $R_1 = 140\ \Omega$.
  - Device with $V_{BR} \geq 150$ Volt
    - $V_{OUT} = 480\ V_{RMS}$, $R_2 = 240\ \Omega$.

FUNCTIONAL HOLDING CURRENT (I_H) TEST CIRCUIT = GO - NOGO TEST.



Surge Generator
10/700 µsec
Vp =1KV / Ipp = 25A

This is a GO-NOGO Test which allows to confirm the holding current (I_H) level in a functional test circuit. This test can be performed if the reference test circuit can't be implemented.

TEST PROCEDURE :

- 1) Adjust the current level at the I_H value by short circuiting the AK of the D.U.T.
  2) Fire the D.U.T with a surge Current : Ipp = 25A , 10/700 µs.
  3) The D.U.T will come back to the OFF-State within a duration of 50 ms max.

Figure 1 : Non-repetitive surge peak on state current versus number of cycles. (with sinusoïdal pluse: F = 50 Hz).

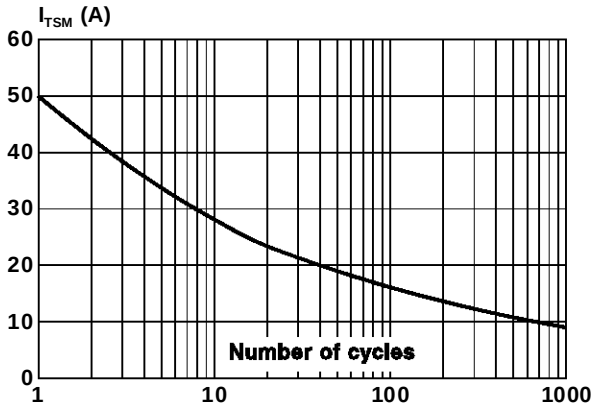


Figure 2 : Relative variation of holding current versus junction temperature.

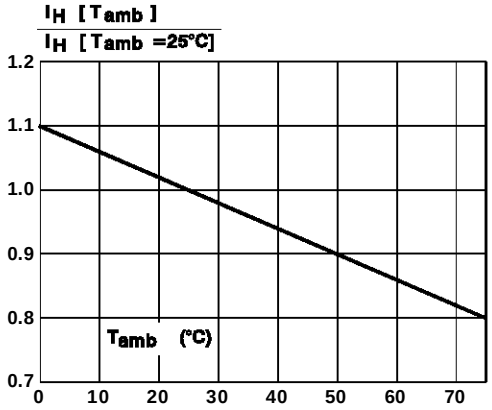


Figure 3 : Relative variation of breakdown voltage versus ambient temperature.

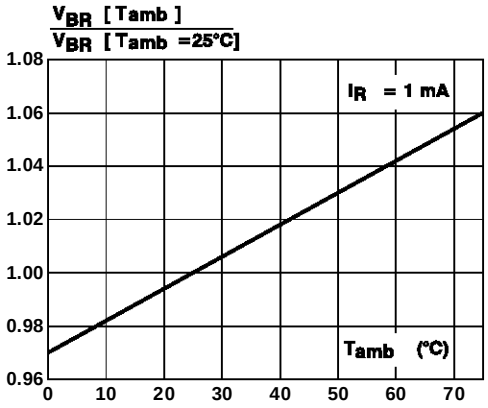
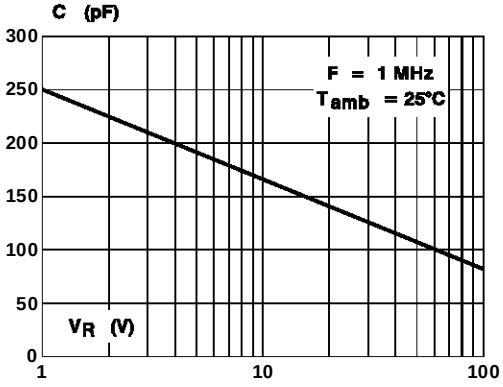
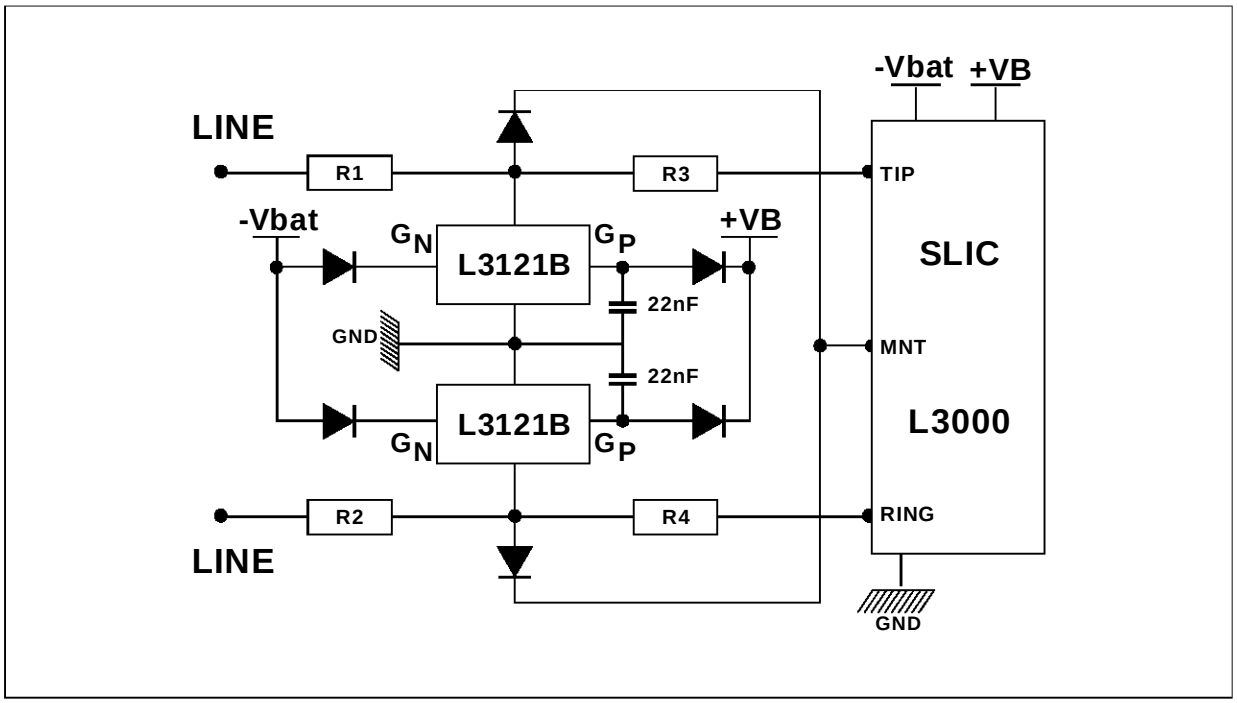


Figure 4 : Junction capacitance versus reverse applied voltage.



APPLICATION CIRCUIT

Typical Slic Protection Concept.



MARKING : Logo, Date Code,part Number.

PACKAGING : Products supplied in antistatic tubes.

PACKAGE MECHANICAL DATA (in millimeters).

SIP 4 Plastic