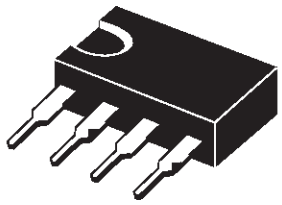
L3121B

Application Specific Discretes
A.S.D.™

PROGRAMMABLE TRANSIENT VOLTAGE SUPPRESSOR FOR SLIC PROTECTION

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



SIP4

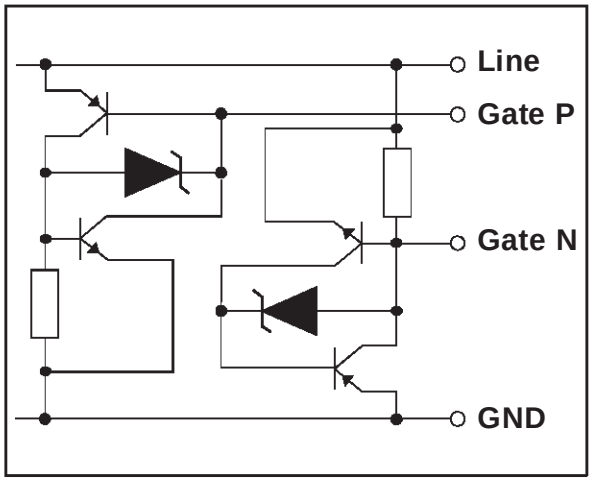
DESCRIPTION

This device has been especially designed to protect a subscriber line interface circuit (SLIC) with an integrated ring generator.

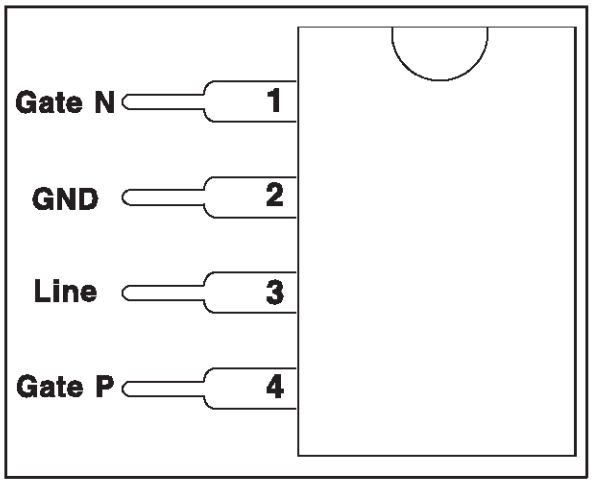
Used with the recommended application circuit, each line (TIP and RING) is protected against positive and negative surges. In the positive polarity, the breakdown voltage is referenced to the + VB , and in the negative polarity, the breakdown voltage is referenced to the -Vbat .

Its high surge current capability makes the L3121B a reliable protection device for very exposed equipment, or when series resistors are very low.

SCHEMATIC DIAGRAM



CONNECTION DIAGRAM



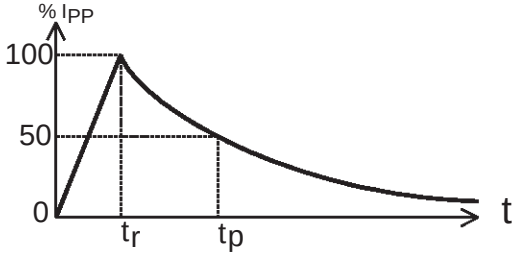
COMPLIES WITH THE FOLLOWING STANDARDS:	Peak Surge Voltage (V)	Voltage Waveform (µs)	Current Waveform (µs)	Admissible Ipp (A)	Necessary Resistor (Ω)
ITU-T K20	4000	10/700	5/310	100	-
VDE0433	4000	10/700	5/310	100	-
VDE0878	4000	1.2/50	1/20	100	-
IEC1000-4-5	level 4 level 4	10/700 1.2/50	5/310 8/20	100 100	- -
FCC Part 68, lightning surge type A	1500 800	10/160 10/560	10/160 10/560	200 100	- -
FCC Part 68, lightning surge type B	1000	9/720	5/320	25	-
BELLCORE TR-NWT-001089 First level	2500 1000	2/10 10/1000	2/10 10/1000	250 100	- -
BELLCORE TR-NWT-001089 Second level	5000	2/10	2/10	250	10

ABSOLUTE MAXIMUM RATINGS (Tamb = 25°C)

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current	10/1000 µs 2/10 µs	100 250	A
I_{TSM}	Non repetitive surge peak on-state current	tp = 10 ms	50	A
V_{MLG} V_{MGL}	Maximum voltage LINE/GND. Maximum voltage GATE/LINE.		100 80	V V
T_{stg} T_j	Storage temperature range Maximum operating junction temperature		- 40 to + 150 + 150	°C °C
T_L	Maximum lead temperature for soldering during 10s		260	°C
Top	Operating temperature range (see note 1)		- 40 to + 85	°C

Note 1: Variation of electrical parameters is given by curves.

Pulse waveform 10/1000µs

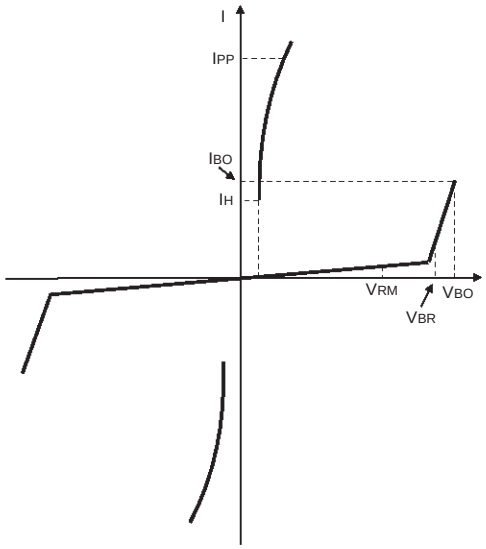


THERMAL RESISTANCE

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

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C)

Symbol	Parameter
V_{RM}	Stand-off voltage
I_{RM}	Reverse leakage current
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
I_{BO}	Breakover current
I_{PP}	Peak pulse current
V_{GN}	Gate voltage
I_{GN}, I_{GP}	Triggering gate current
C	Capacitance



1- OPERATION WITHOUT GATE

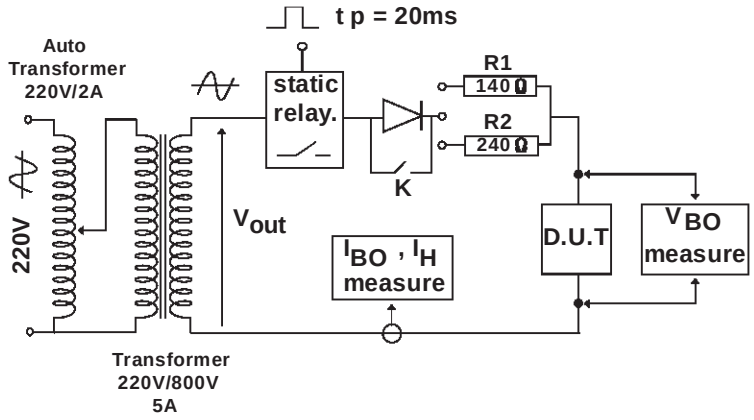
Type	I_{RM} @ V_{RM} max.		V_{BR} @ I_R min.		V_{BO} max.	@ typ. note 1	I_{BO} max.	I_H min. note 1	C max. note 2
	µA	V	V	mA	V	mA	mA	mA	pF
L3121B	5 8	60 90	100	1	180	200	500	150	200

2- OPERATION WITH GATE

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

Note 1 : See the reference test circuits for I_H, I_{BO} and V_{BO} parameters.
Note 2 : V_R = 5 V, F = 1MHz.

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

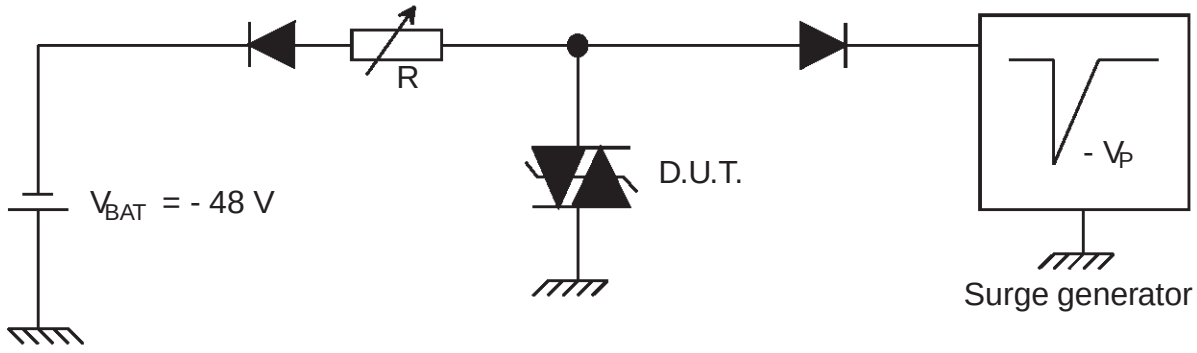


TEST PROCEDURE :

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
  - $V_{OUT} = 480\ V_{RMS}$, $R_2 = 240\ \Omega$.

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



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 IH value by short circuiting the line and GND pins of the D.U.T.
2) Fire the D.U.T with a surge Current : Ipp = 10A , 10/1000 µs.
3) The D.U.T will come back to the OFF-State within a duration of 50 ms max.

Fig. 1: Surge peak current versus overload duration (typical values).

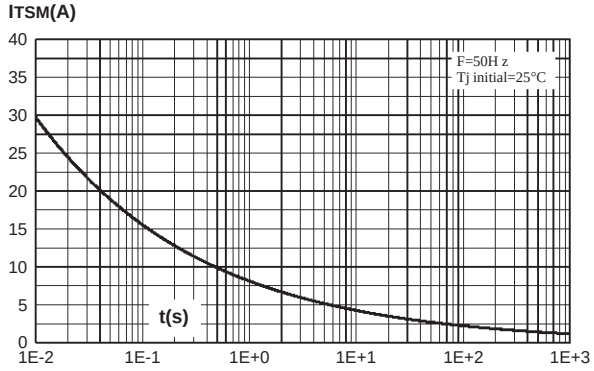


Fig. 2: Typical relative variation of holding current versus ambient temperature.

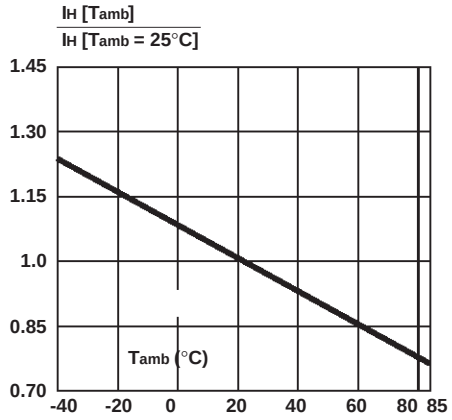


Fig. 3: Typical relative variation of breakdown voltage versus ambient temperature.

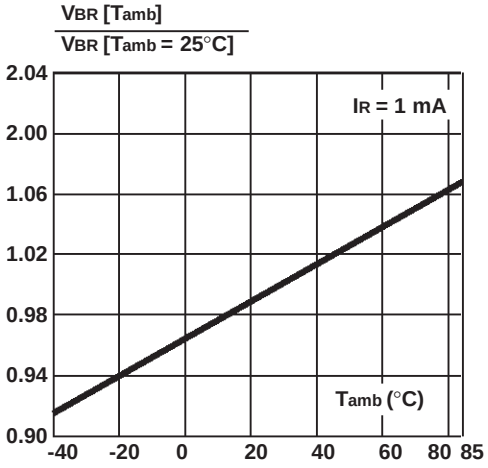


Fig. 4: Junction capacitance versus reverse applied voltage.

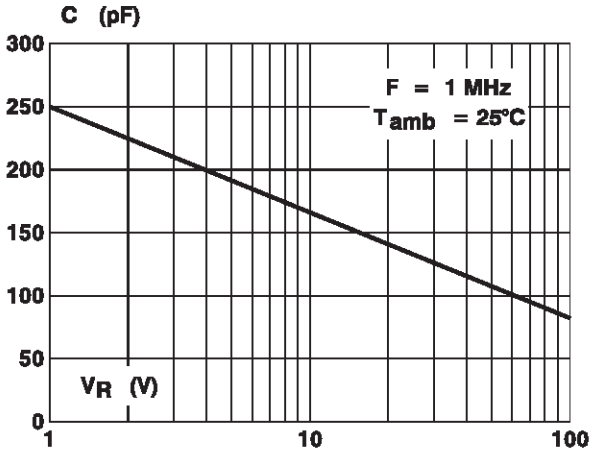


Fig. 5: Typical relative variation of leakage current versus ambient temperature.

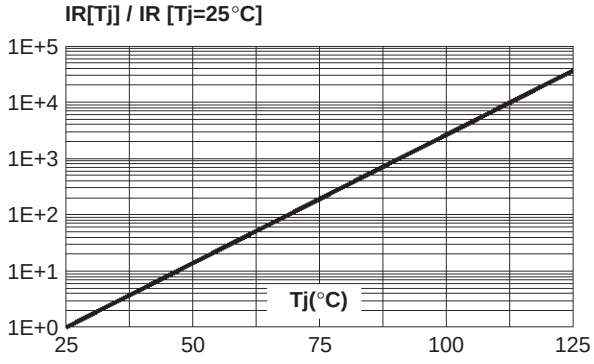
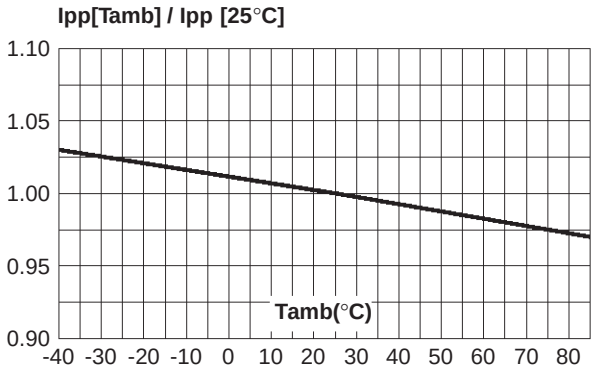
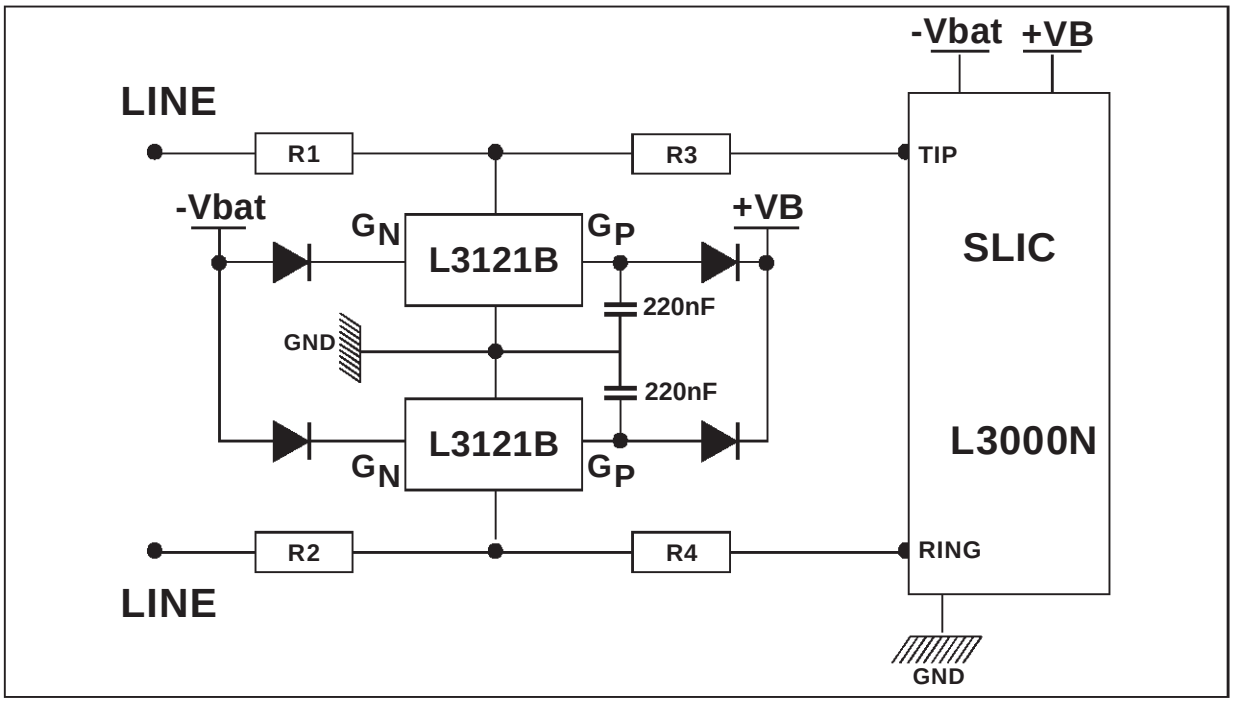


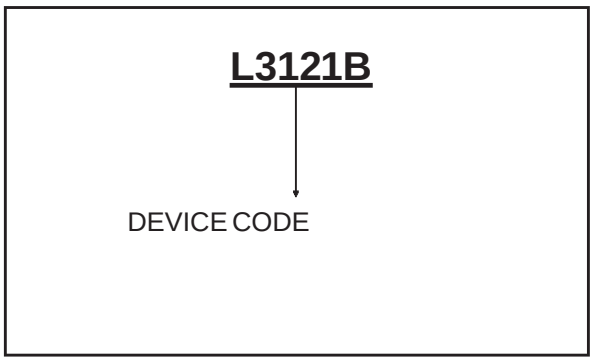
Fig. 6: Typical relative variation of peak pulse current (10/1000µs) versus ambient temperature.



Typical Slic Protection Concept.



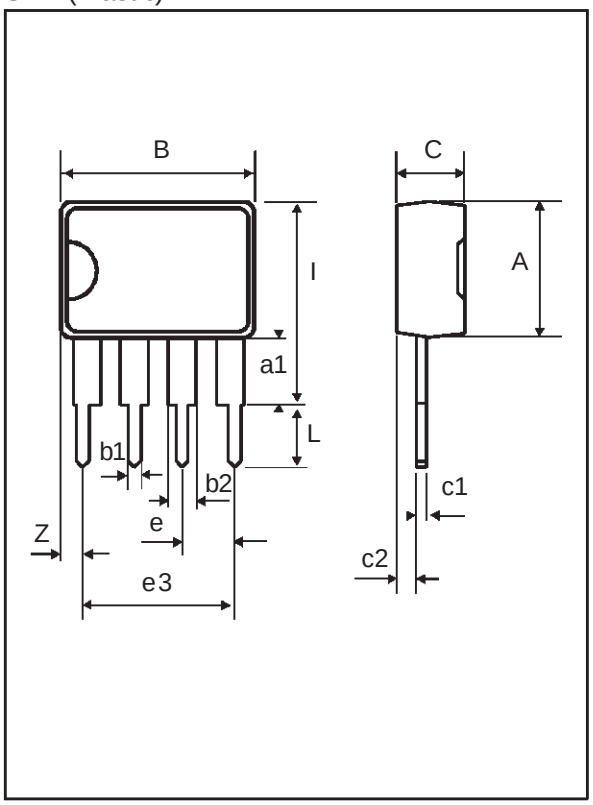
ORDER CODE



MARKING : Logo, Date Code, Part Number

PACKAGE MECHANICAL DATA

SIP4 (Plastic)



REF.	DIMENSIONS					
	Millimetres			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			7.10			0.280
a1	2.80			0.110		
B			10.15			0.400
b1		0.50			0.020	
b2	1.35		1.75	0.053		0.069
C	3.18		3.43	0.125		0.135
c1	0.38		0.50	0.015		0.020
c2		1.30			0.051	
e		2.54			0.100	
e3		7.62			0.200	
I			10.50			0.413
L		3.30			0.130	
Z			1.50			0.059

Ordre code	Marking	Package	Weight	Base qty	Delivery mode
L3121B		SIP4	0.55 g		