SGS-THOMSON MICROELECTRONICS

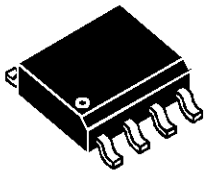
LCP3121

Application Specific Discretes
A.S.D.™

UNIDIRECTIONAL TRANSIENT SUPPRESSOR PROGRAMMED BY VOLTAGE & CURRENT

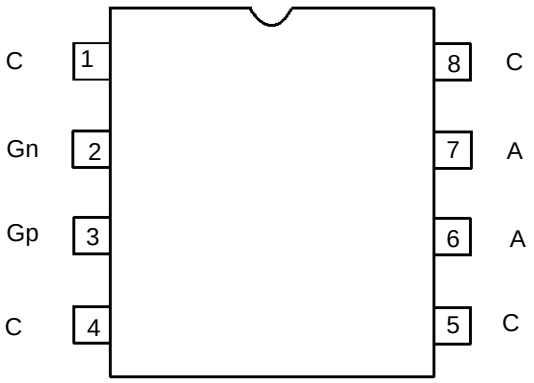
FEATURES AND BENEFITS

- UNIDIRECTIONAL OVERVOLTAGE SUPPRESSOR PROGRAMMED BY VOLTAGE AND CURRENT: CROWBAR OCCURS AT THE DESIRED LEVEL.
- MULTI-LINE PROTECTION MODE : ONE DEVICE CAN PROTECT SEVERAL LINES, ENABLING SPACE SAVING ON THE BOARD.
- HIGH CURRENT CAPABILITY :
  I_{PP} = 100A for 10/1000µs,
  ENSURING AN EXCELLENT PROTECTION AGAINST HIGH ENERGY TRANSIENTS.



SO8
(Plastic)

PIN-OUT CONFIGURATION



All cathod pins must be externally connected

DESCRIPTION

Dedicated to sensitive telecom equipment protection, the LCP3121 provides protection which can be programmed by both voltage and current.

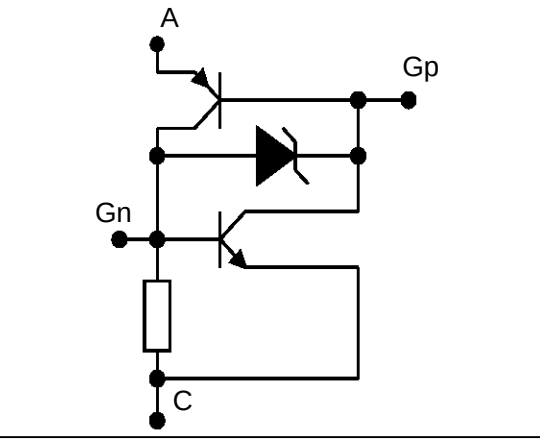
The breakdown voltage can be easily programmed by using an external zener diode.

The protection function programmed by the current is achieved with the use of a resistor between the gate and the cathode. The value of the resistor will determine the level of the desired current before the triggering of the device.

A multiple protection mode is also performed when using several diodes providing each line interface with an optimized protection level.

If desired, a bidirectional protection function can be achieved by the use of two LCP3121.

FUNCTIONAL DIAGRAM



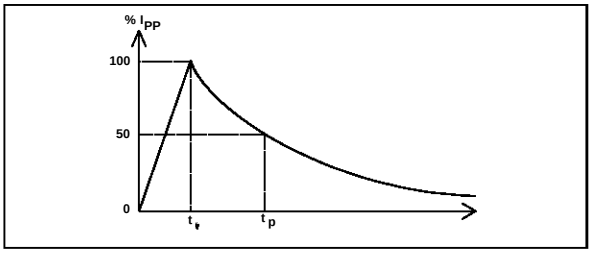
COMPLIES WITH FOLLOWING STANDARDS :

CCITT K20 :	10/700µs	1.5kV
	5/310µs	
VDE 0433 :	10/700µs	2kV
	5/310µs	
VDE 0878 :	1.2/50µs	1.5kV
	1/20µs	
FCC part 68 :	2/10µs	2.5kV
BELLCORE TR-NWT-001089 :	2/10µs	

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25°C)

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current (see note 1)	10/1000µs	100	A
I_{TSM}	Non repetitive surge peak on-state current (F = 50 Hz)	t_p = 10ms t_p = 1s	16 8	A
V_{AC} V_{GA}	Maximum voltage between A and C Maximum voltage between G (Gn or Gp) and A		100 80	V
T_{stg} T_j	Storage temperature range Maximum junction temperature		- 40 to + 150 150	°C

Note 1 : Pulse waveform :
10/1000µs t_r=10µs t_p=1000µs



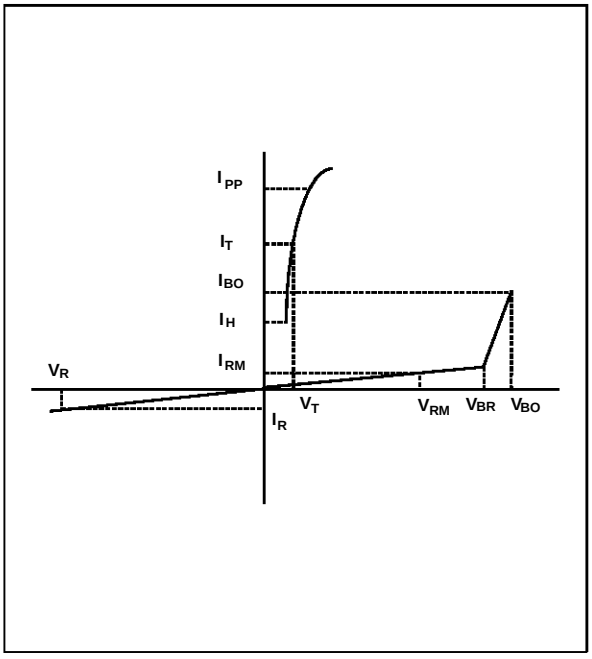
THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction to ambient (on board)	170	°C/W

ELECTRICAL CHARACTERISTICS

(T_{amb} = 25°C, unless otherwise specified)

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_{BO}	Breakover current
I_{RM}	Leakage current at V_{RM}
I_R	Leakage current at V_R
I_{PP}	Peak pulse current
V_R	Maximum reverse voltage
C_{off}	Off-state capacitance
V_G	Gate voltage
I_{GP}	Gp triggering current
I_{GN}	Gn triggering current



OPERATION WITHOUT GATES

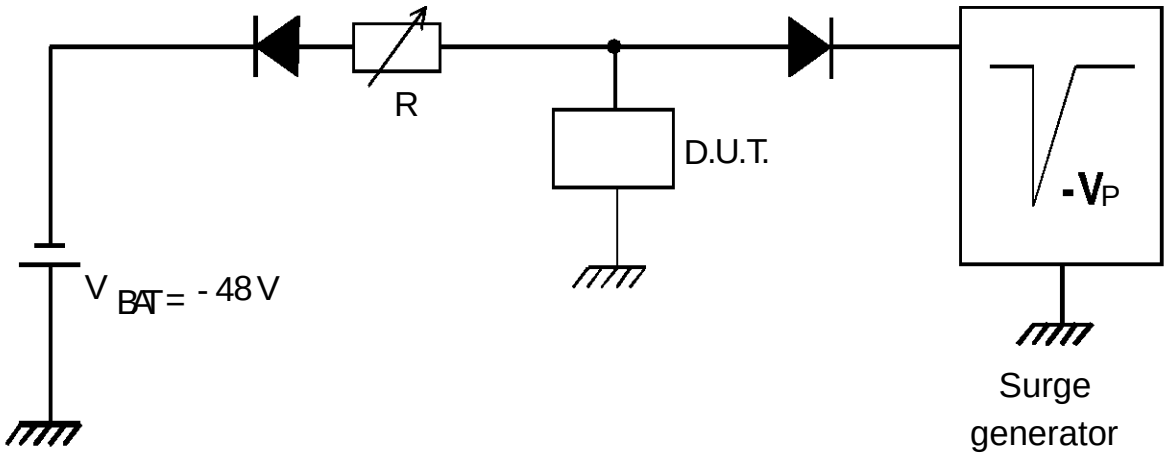
Symbol	Test conditions	Min.	Max.	Unit
I_{RM}	V_{RM} = 60V V_{RM} = 90V		5 8	µA
I_R	at V_R = 180V		50	µA
V_{BR}	at 1mA	100		V
I_{BO}		80	500	mA
V_{BO}	Measured at 50Hz		180	V
V_T	Square pulse; t_p=500µs; I_T=1A		3	V
I_H	See the functional test circuit	100		mA
C_{off}	V_R =-5V F=1MHz		100	pF

OPERATION WITH GATE

Symbol	Test conditions	Min.	Max.	Unit
V_G note1	I_{GATE} = 200mA (for eigher Gn or Gp)	0.6	1.8	V
I_{GP}	$V_{Anode\text{-}cathode}$ = 60V		180	mA
I_{GN}	$V_{Anode\text{-}cathode}$ = 60V	80	200	mA

Note 1 : $V_G = V_{GN}$, measured between Gn and cathode
$V_G = V_{GP}$, measured between Gp and anode

FUNCTIONAL HOLDING CURRENT (I_H) TEST CIRCUIT : GO-NO GO TEST



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, 10/1000µs.
- The D.U.T. will come back to the OFF-state within a duration of 50ms max.

Fig. 1 : Maximum non repetitive surge peak-on-state current versus overload duration.

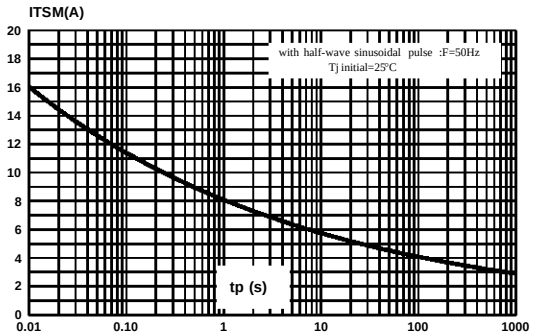
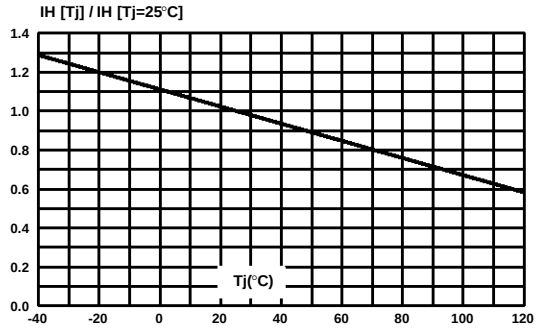
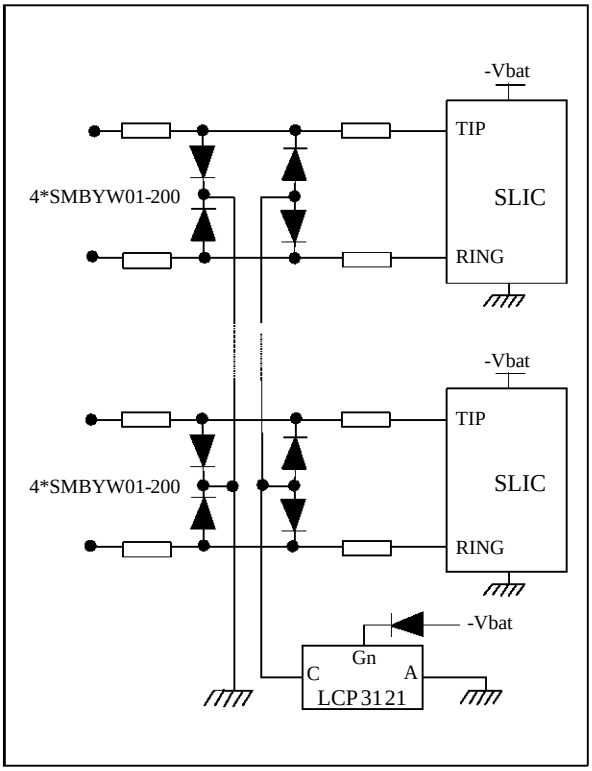


Fig. 2 : Relative variation of holding current versus junction temperature (typical values).

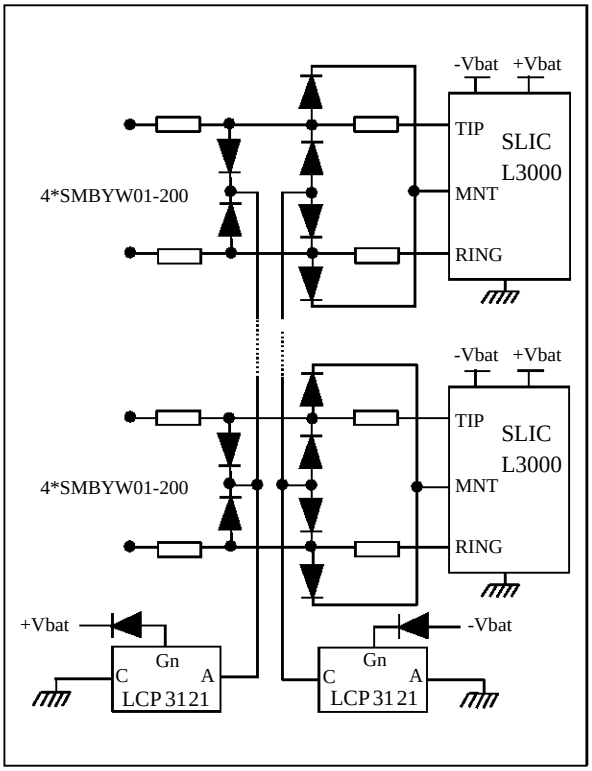


APPLICATION EXAMPLES

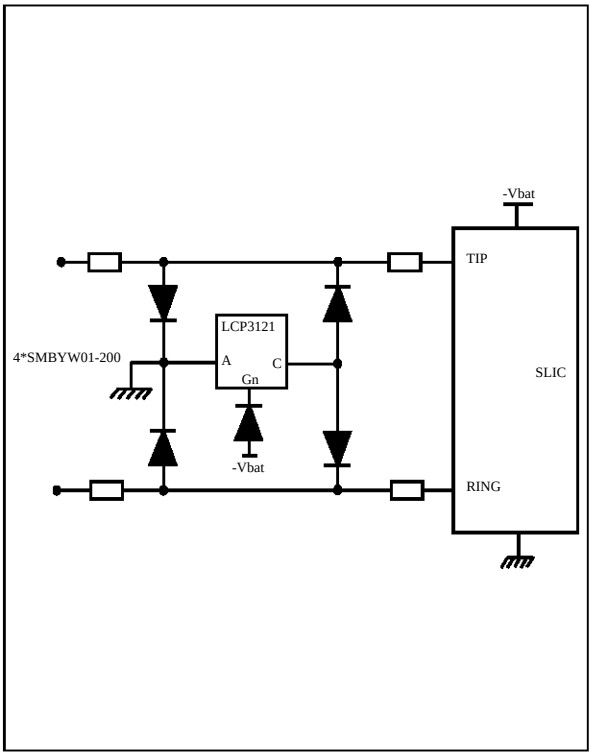
Application 1 : Common protection for SLIC without integrated ring generator



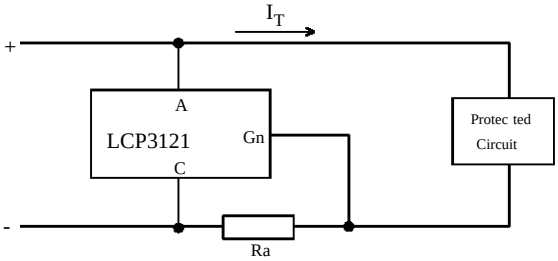
Application 2 : Common protection for SLIC with integrated ring generator



Application 3 : Typical SLIC protection



Application 4 : Protection programmed by current

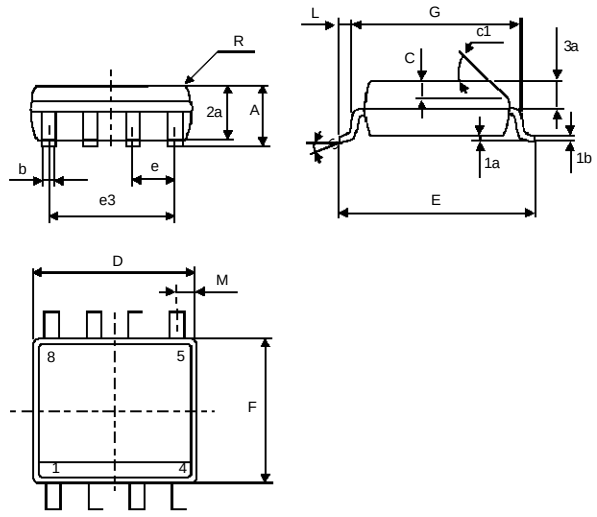


$$I_T = I_G + \frac{V_G}{Ra}$$

CURRENT TOLERANCE		
R_a Ω (+/-5%)	I_T mA min	I_T mA max
4.7	202	603
5.6	182	538
6.8	164	479
8.2	150	431
10.1	137	388
12.0	128	358

PACKAGE MECHANICAL DATA

SO8 Plastic



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.15		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max)					

MARKING

Package	Type	Marking
SO8	LCP3121	CP3121