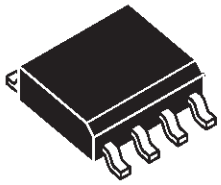
LCP3121

Application Specific Discretes
A.S.D.™

OVERVOLTAGE AND OVERCURRENT PROTECTION FOR TELECOM LINE

FEATURES AND BENEFITS

- UNIDIRECTIONAL OVERVOLTAGE SUPPRESSOR PROGRAMMABLE BY VOLTAGE AND CURRENT:
- PROGRAMMABLE BREAKDOWN VOLTAGE UP TO 100 V.
- PROGRAMMABLE CURRENT LIMITATION FROM 120 mA TO 600 mA.
- MULTI-LINE PROTECTION MODE : ONE DEVICE CAN PROTECT SEVERAL LINES.
- HIGH SURGE CURRENT CAPABILITY : I_{PP} = 100A for 10/1000 µs.



SO8

DESCRIPTION

Dedicated to the protection of sensitive telecom equipment, 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.

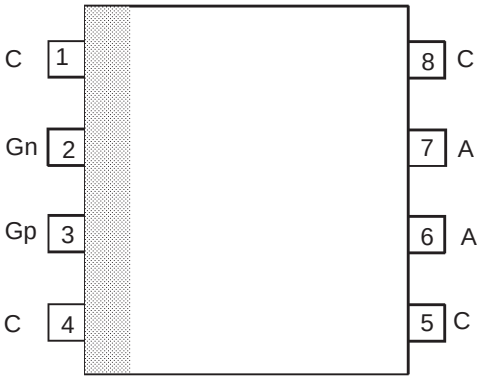
If desired, a bidirectional protection function can be achieved by the use of two LCP3121.

COMPLIES WITH THE FOLLOWING STANDARDS :

CCITT K20 :	10/700µs	1kV
	5/310µs	25A
VDE 0433 :	10/700µs	2kV
	5/310µs	50A
VDE 0878 :	1.2/50µs	1.5kV
	1/20µs	40A
FCC part 68 :	2/10µs	2.5kV
	2/10µs	200A (*)
BELLCORE TR-NWT-001089 :	2/10µs	2.5kV
	2/10µs	200A (*)
BELLCORE TR-NWT-000974 :	10/1000µs	1kV
	10/1000µs	100A

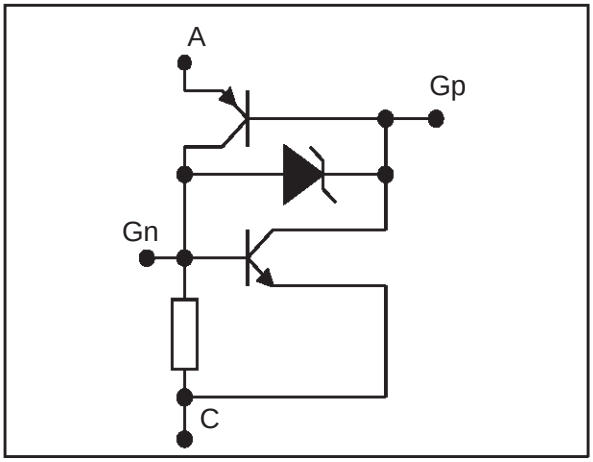
(*) with series resistors or PTC.

PIN-OUT CONFIGURATION



All cathod pins must be externally connected

FUNCTIONAL DIAGRAM

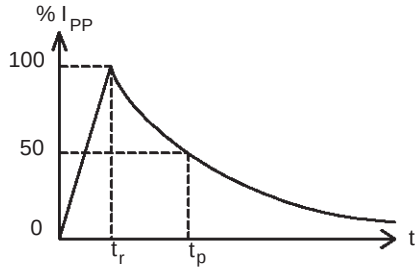


ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25°C)

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 = 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
T_L	Maximum lead temperature for soldering during 10s		260	°C

Note 1 : Pulse waveform :

10/1000µs t_r=10µs t_p=1000µs

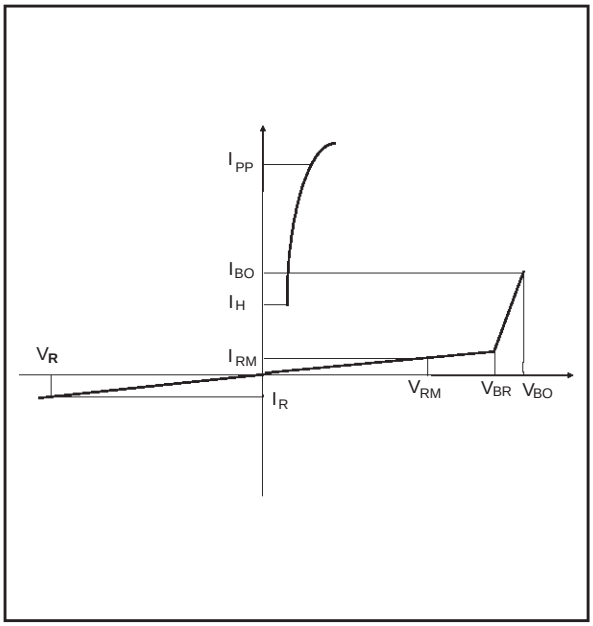


THERMAL RESISTANCE

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

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

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
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	Continuous reverse voltage
C_{off}	Off-state capacitance
V_G	Gate voltage
I_{GP}	Gp triggering current
I_{GN}	Gn triggering current



1 - OPERATION WITHOUT GATE (T_{amb} = 25 °C)

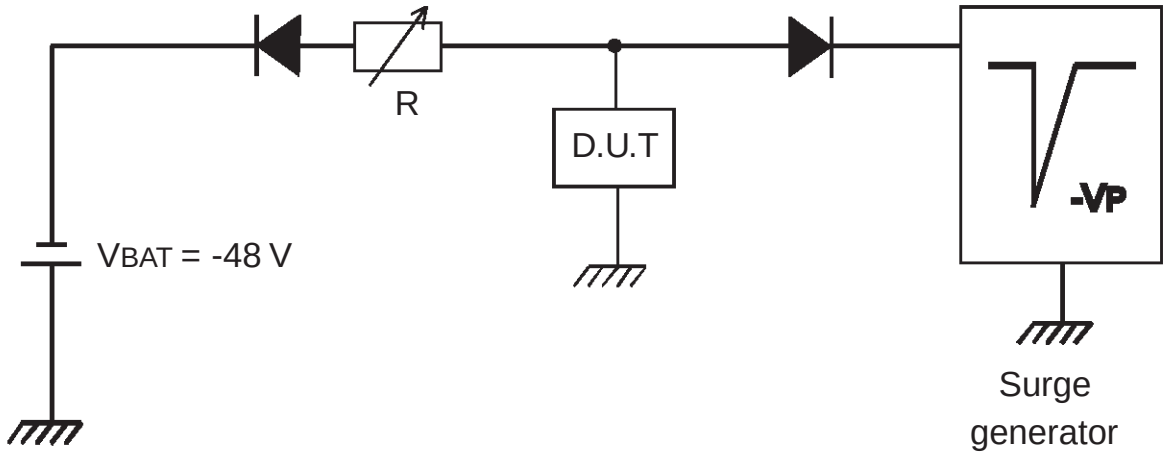
Symbol	Test conditions	Min.	Max.	Unit
I_{RM}	V_{RM} = 60V V_{RM} = 90V		5 8	µA
I_R	at VR = 180V		50	µA
V_{BR}	at 1mA	100		V
I_{BO}		80	500	mA
V_{BO}	Measured at 50Hz		180	V
I_H	See the functional test circuit	100		mA
C	V_R =-5V F=1MHz		100	pF

2 - OPERATION WITH GATE (T_{amb} = 25 °C)

Symbol	Test conditions	Min.	Max.	Unit
V_G note1	IGATE = 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.

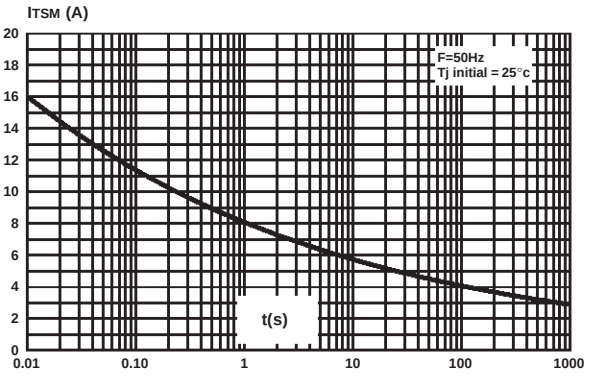
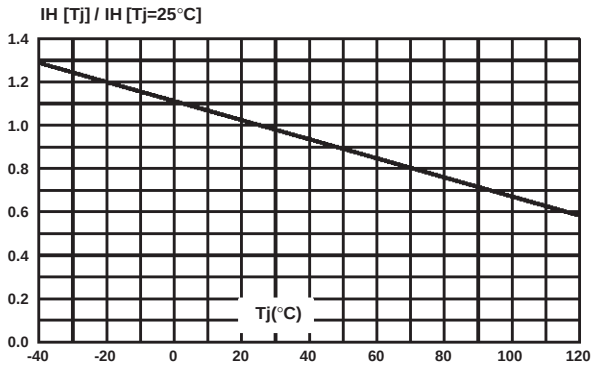
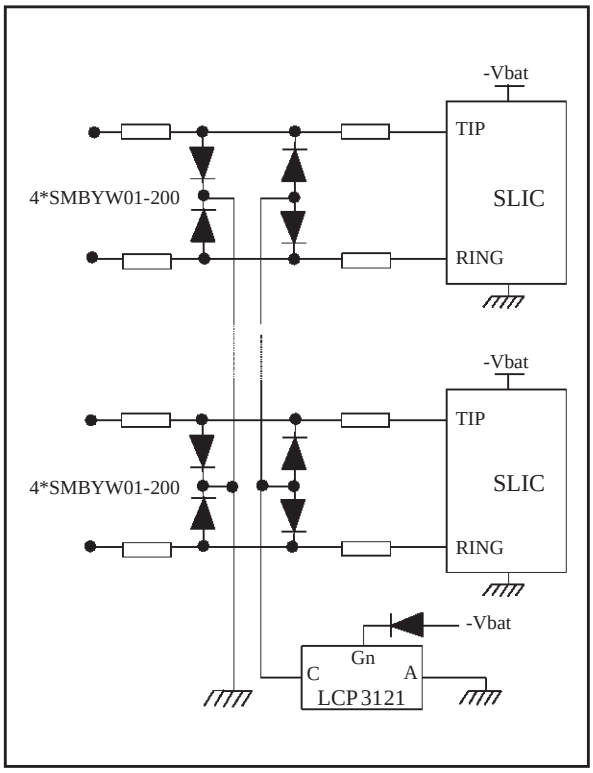


Fig. 2 : Relative variation of holding current versus junction temperature (typical values).

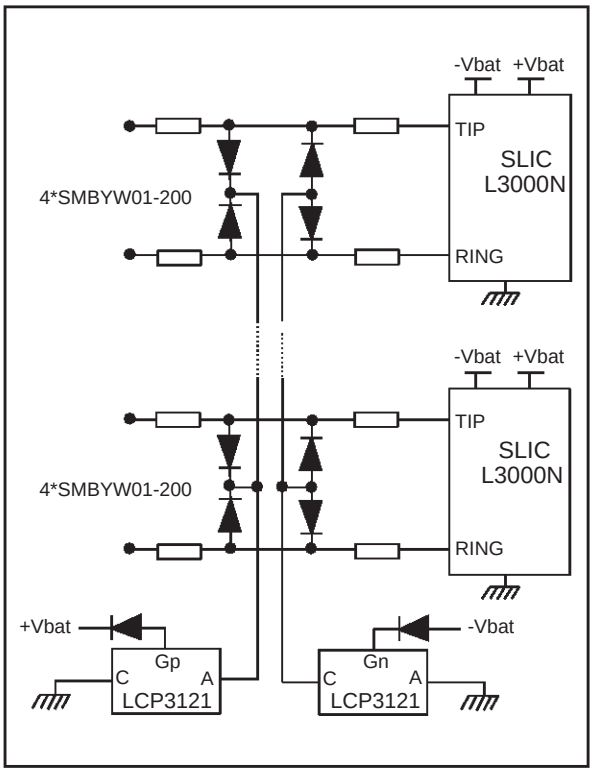


APPLICATION EXAMPLES

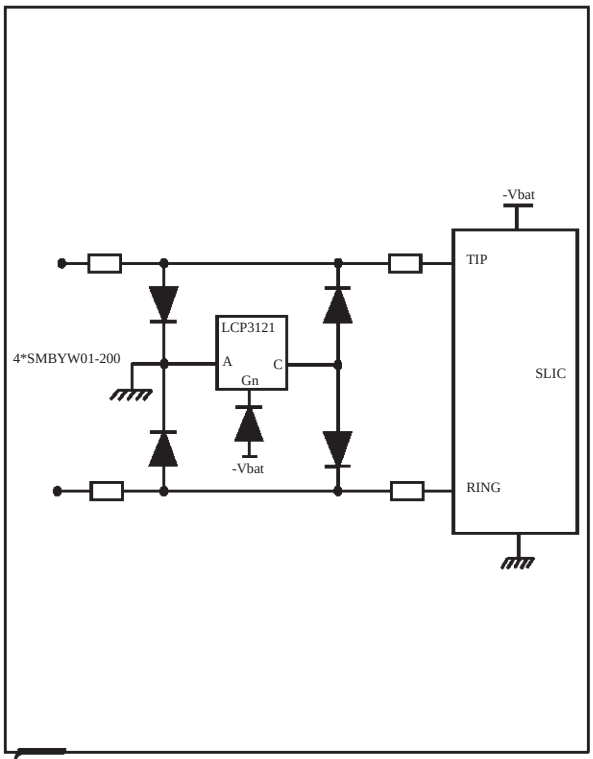
Application 1 : Common protection for SLIC without integrated ring generator



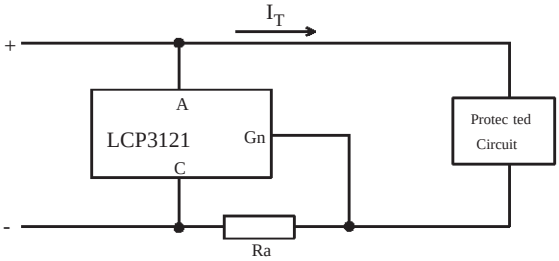
Application 2 : Common protection for SLIC with integrated ring generator



Application 3 : Typical SLIC protection



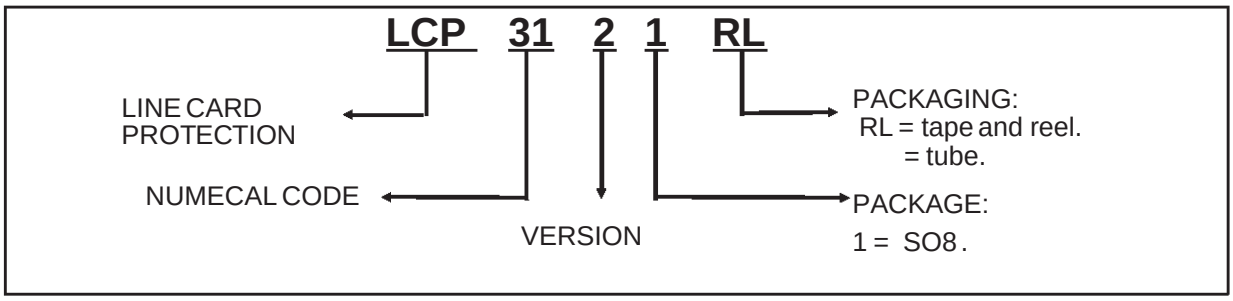
Application 4 : Protection programmed by current



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

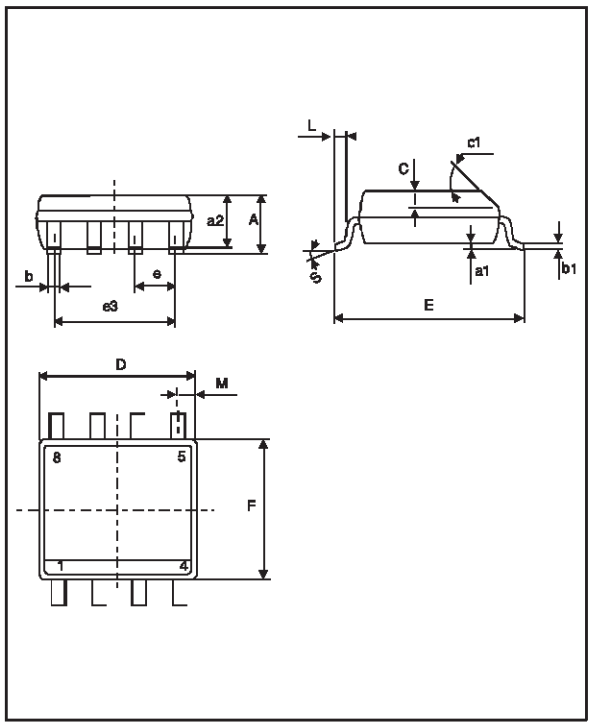
CURRENT TOLERANCE		
R_a Ω (+/-5%)	I_T mA min	I_T mA max
4.7	202	603
5.6	182	538
6.8	164	479
8.2	150	431
10	137	388
12	128	358

ORDER CODE



PACKAGE MECHANICAL DATA

SO8 Plastic



REF.	DIMENSIONS					
	Millimetres			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
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C		0.50			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

Weight = 0.08 g

Packaging : Products supplied in anti-static tubes or tape and reel.