



# LCP3121

Application Specific Discretes  
A.S.D.<sup>TM</sup>

## 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<sub>PP</sub> = 100A for 10/1000 μs.

### 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.

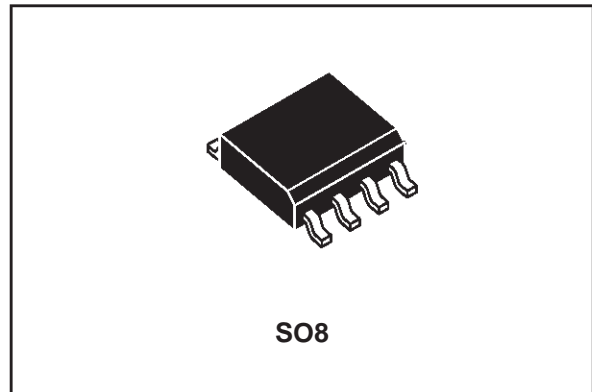
### COMPLIES WITH THE FOLLOWING STANDARDS :

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

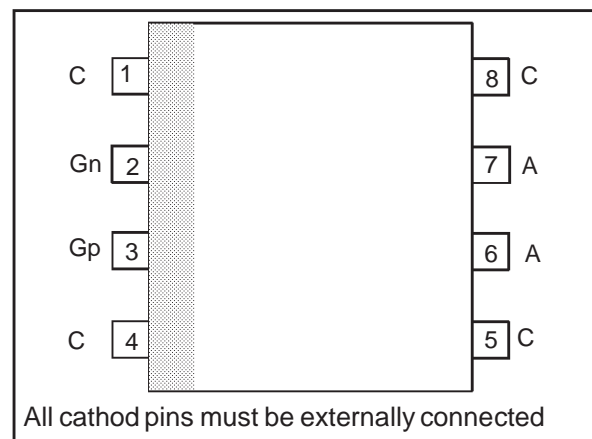
(\*) with series resistors or PTC.

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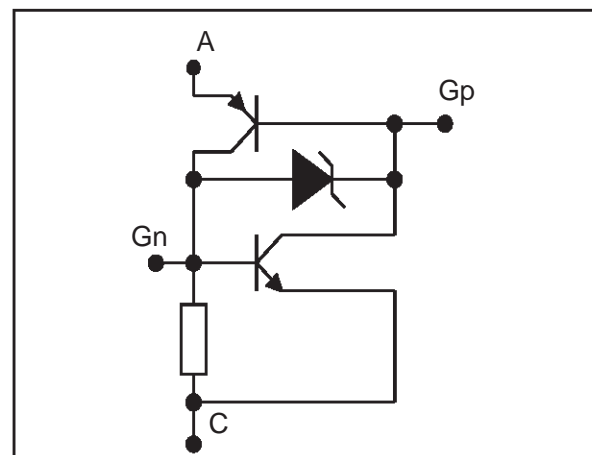
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### PIN-OUT CONFIGURATION



### FUNCTIONAL DIAGRAM



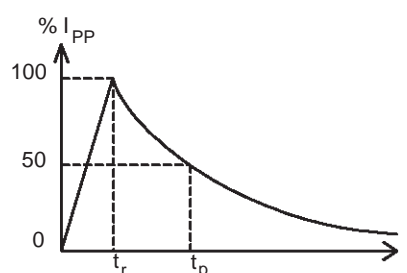
## LCP3121

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^{\circ}\text{C}$ )

Symbol	Parameter	Value	Unit
$I_{PP}$	Peak pulse current (see note 1)	10/1000 $\mu\text{s}$	A
$I_{TSM}$	Non repetitive surge peak on-state current (F = 50 Hz)	$t_p = 10\text{ms}$ $t = 1\text{s}$	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	$^{\circ}\text{C}$
$T_L$	Maximum lead temperature for soldering during 10s	260	$^{\circ}\text{C}$

**Note 1 :** Pulse waveform :

10/1000 $\mu\text{s}$      $t_r=10\mu\text{s}$      $t_p=1000\mu\text{s}$

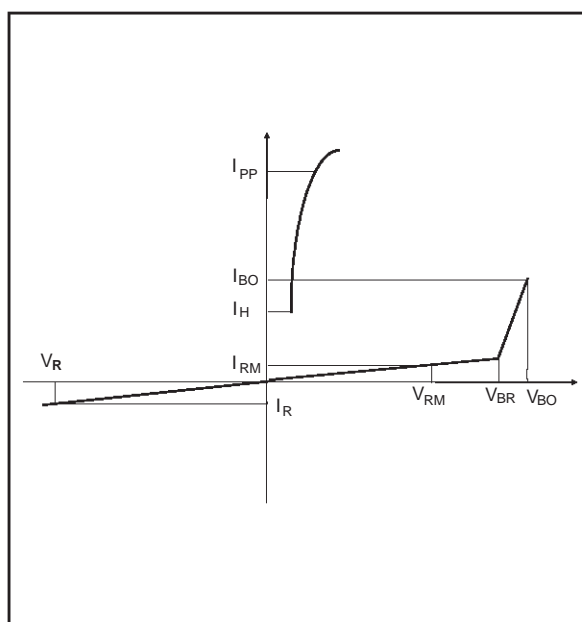


### THERMAL RESISTANCE

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

### ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25^{\circ}\text{C}$ )

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** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )

Symbol	Test conditions	Min.	Max.	Unit
$I_{RM}$	$V_{RM} = 60V$ $V_{RM} = 90V$		5 8	$\mu A$
$I_R$	at $V_R = 180V$		50	$\mu A$
$V_{BR}$	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** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )

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

**Note 1 :**  $V_G = V_{GN}$ , measured between  $G_n$  and cathode

$V_G = V_{GP}$ , measured between  $G_p$  and anode

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

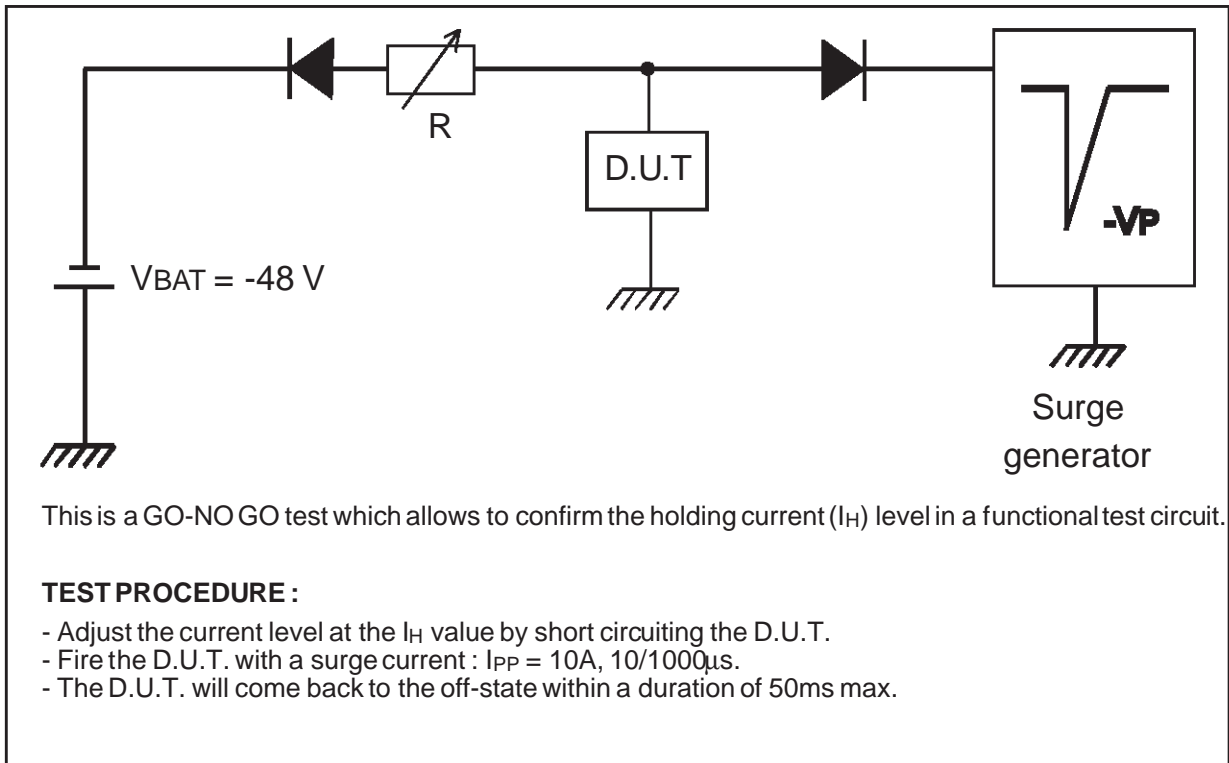


Fig. 1 : Maximum non repetitive surge peak-on-state current versus overload duration.

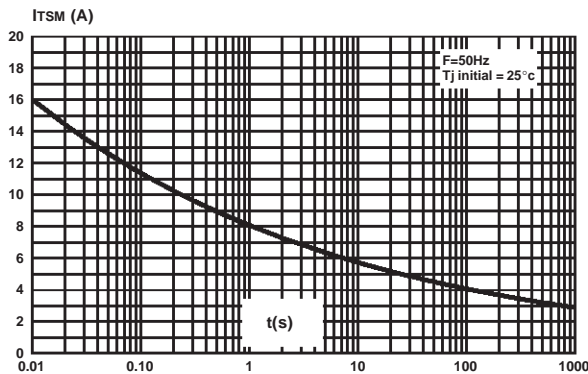
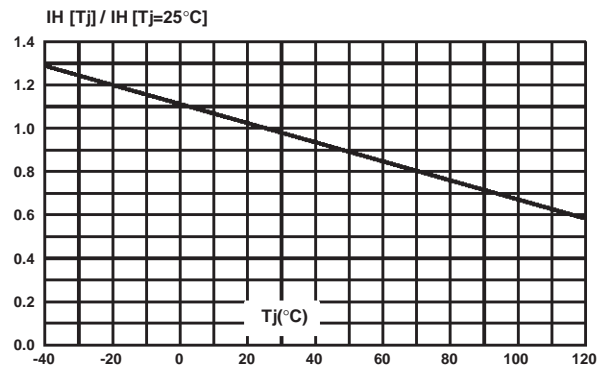
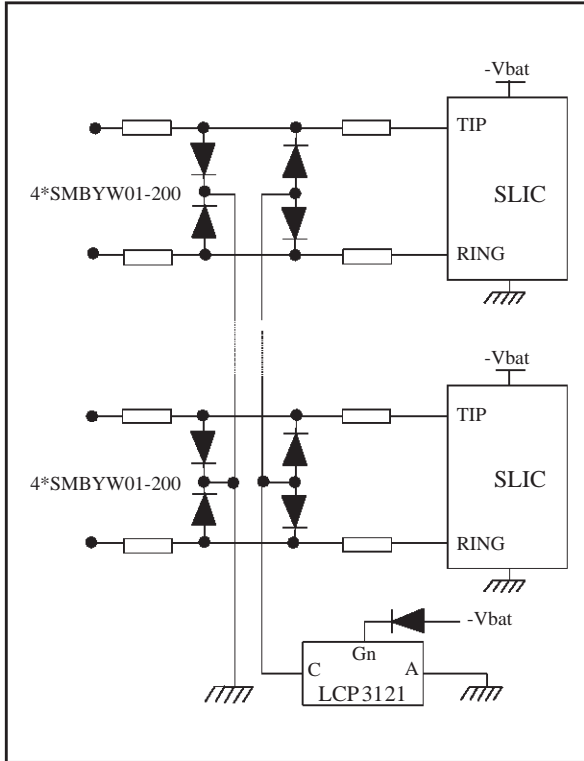


Fig. 2 : Relative variation of holding current versus junction temperature (typical values).

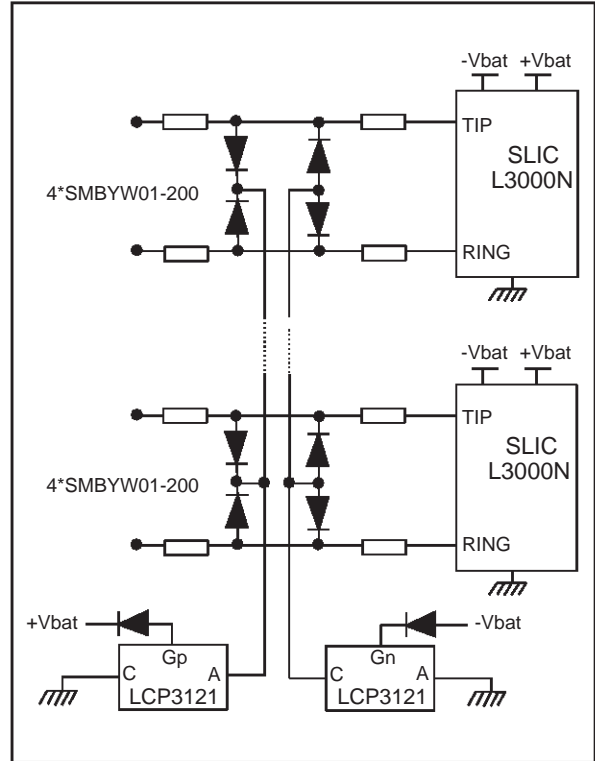


**APPLICATION EXAMPLES**

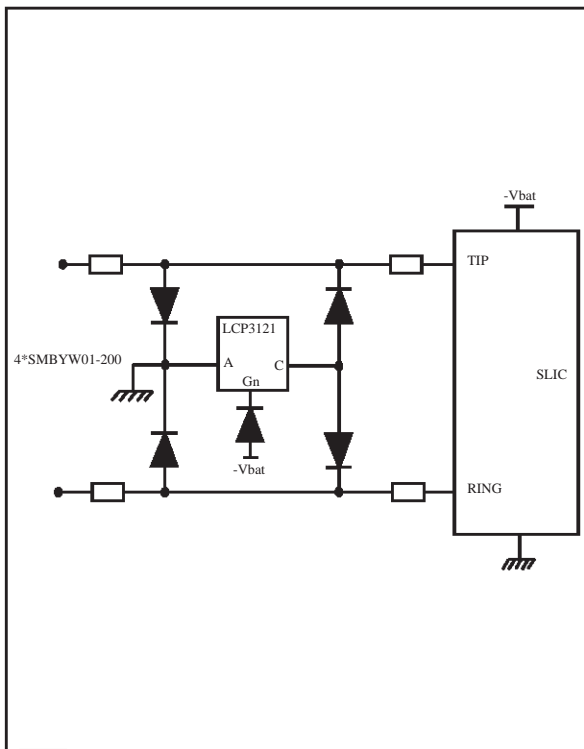
**Application 1 :** Common protection for SLIC without integrated ring generator



**Application 2 :** Common protection for SLIC with integrated ring generator



**Application 3 :** Typical SLIC protection



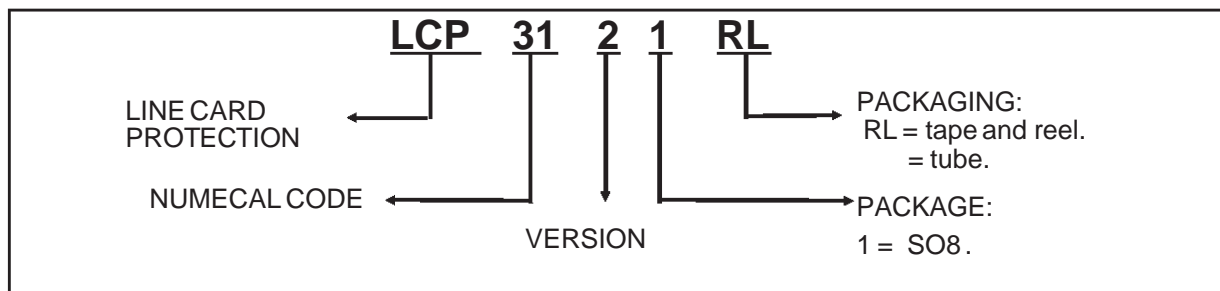
**Application 4 :** Protection programmed by current

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

CURRENT TOLERANCE		
$R_a$ $\Omega$ (+/-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

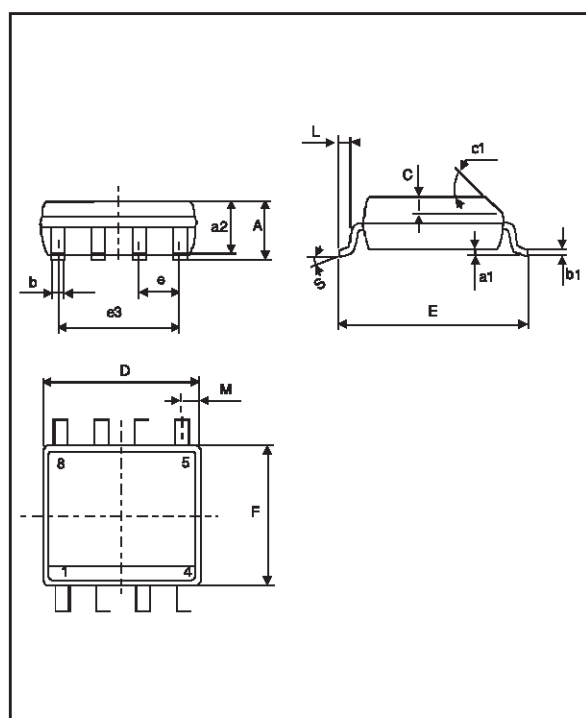
# LCP3121

## 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.

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