SGS-THOMSON MICROELECTRONICS

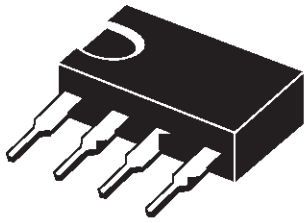
LCP150S

Application Specific Discretes
A.S.D.™

PROGRAMMABLE TRANSIENT VOLTAGE SUPPRESSOR FOR SLIC PROTECTION

FEATURES

- DUAL PROGRAMMABLE TRANSIENT SUPPRESSOR
- HIGH SURGE CURRENT CAPABILITY.
  - I_{PP} = 50A, 10/1000 µs.
  - I_{PP} = 60 A, 5/310 µs.
  - I_{PP} = 150 A, 2/10 µs.
- HOLDING CURRENT = 150 mA min.
- LOW GATE TRIGGERING CURRENT : I_{GT} = 15 mA max.



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DESCRIPTION

This device has been especially designed to protect a subscriber line card interface (SLIC) against transient overvoltage.
Positive overloads are clipped with two diodes, while negative surges are suppressed by two protection thyristors, their breakdown voltage being is referenced to the -Vbat.

This component presents a very low gate triggering current (I_{GT}) in order to reduce the current consumption on the PC board during the firing phase.

COMPLIES WITH THE FOLLOWING STANDARDS:

CCITT - K20	10/700µs	1kV
	5/310µs	25A
VDE 0433	10/700µs	2kV
	5/200µs	50A
VDE 0878	1.2/50µs	1.5kV
	1/20µs	40A
FCC part 68	2/10µs	2.5kV
	2/10µs	150A(*)
BELLCORE TR-NWT-001089 :	2/10µs	2.5kV
	2/10µs	150A(*)
	10/1000µs	1kV
	10/1000µs	50A(*)
CNET	0.5/700µs	1kV
	0.2/310µs	25A

(*) with series resistors or PTC.

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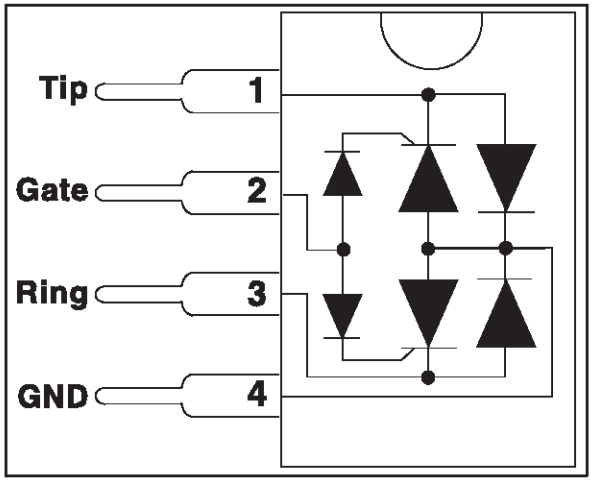
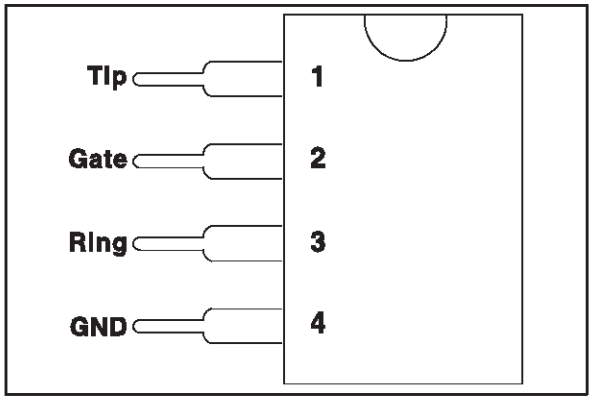
SCHEMATIC DIAGRAM



CONNECTION DIAGRAM



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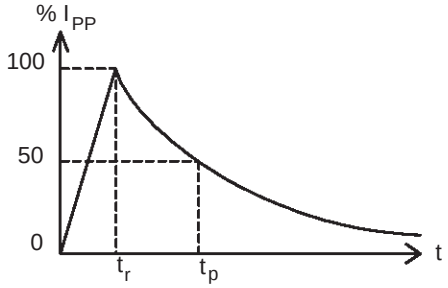
ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C)

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current (see note 1)	10/1000 µs 5/320 µs 2/10 µs	50 60 150	A
I_{TSM}	Non repetitive surge peak on-state current F = 50 Hz	tp = 10 ms t = 1 s	25 8	A
I_{GSM}	Maximum gate current (half sine wave tp = 10 ms)		2	A
V_{MLG} V_{MGL}	Maximum Voltage LINE/GND Maximum Voltage GATE/LINE		- 100 - 80	V
T_{stg} T_j	Storage temperature range Maximum operating junction temperature		- 55 to + 150 150	°C °C
T_L	Maximum lead temperature for soldering during 10s		260	°C

Note 1: Pulse waveform

10/1000 µs	tr = 10 µs	tp = 1000 µs
5/320 µs	tr = 5 µs	tp = 320 µs
2/10 µs	tr = 2 µs,	tp = 10 µs

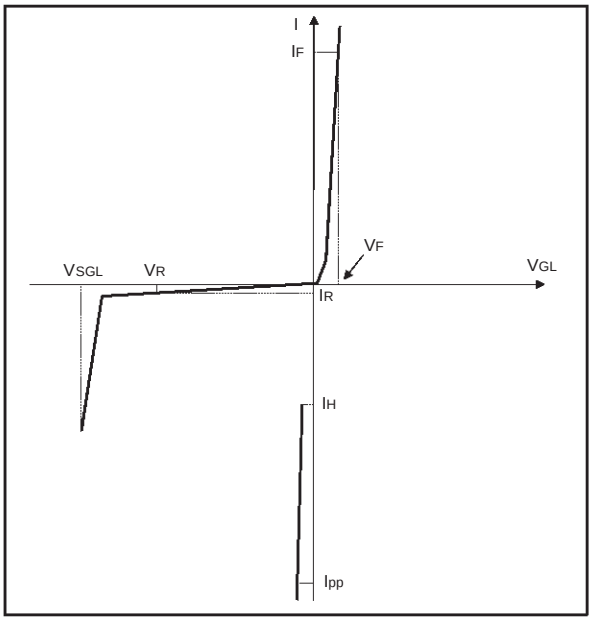


THERMAL RESISTANCE

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

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

Symbol	Parameter
I_{GT}	Gate Trigger Current
I_H	Holding Current
I_R	Reverse Leakage Current LINE/GND
I_{RG}	Reverse Leakage Current GATE/LINE
V_R	Reverse Voltage LINE/GND
V_F	Forward Voltage LINE/GND
V_{GT}	Gate Trigger Voltage
V_{FP}	Peak Forward Voltage LINE/GND
V_{SGL}	Dynamic Switching Voltage GND/LINE
V_{gate}	GATE/GND Voltage
V_{LG}	LINE/GND Voltage
C	Off State Capacitance LINE/GND



1 - PARAMETERS RELATED TO THE DIODE LINE/GND

Symbol	Test Conditions	Max.	Unit
V_F	Square pulse, Tp = 500 µs, I_F = 5 A	3	V
V_{FP}	Ipp = 40 A, 10/1000 µs.	15	V

2 - PARAMETERS RELATED TO PROTECTION THYRISTOR

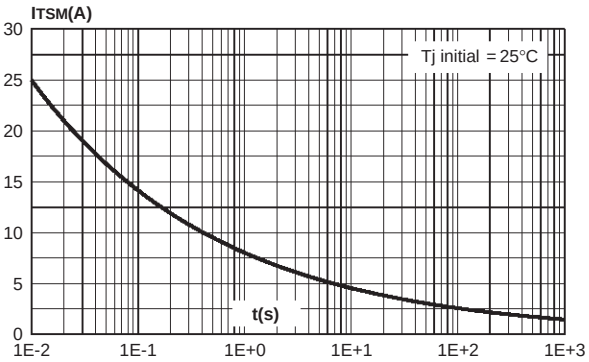
Symbol	Tests Conditions		Min.	Max.	Unit
I_{GT}	$V_{GND/LINE}$ = -48 V		0.2	15	mA
I_H	V_{GATE}= -48 V	Note 2	150		mA
V_{GT}	at I_{GT}			2.5	V
I_{RG}	Tc = 25°C Tc = 70°C	V_{RG} = -75 V V_{RG} = -75 V		5 50	µA µA
V_{SGL}	V_{GATE}= -48 V	Note 2		- 63	V

3 - PARAMETERS RELATIVE TO DIODE AND PROTECTION THYRISTOR

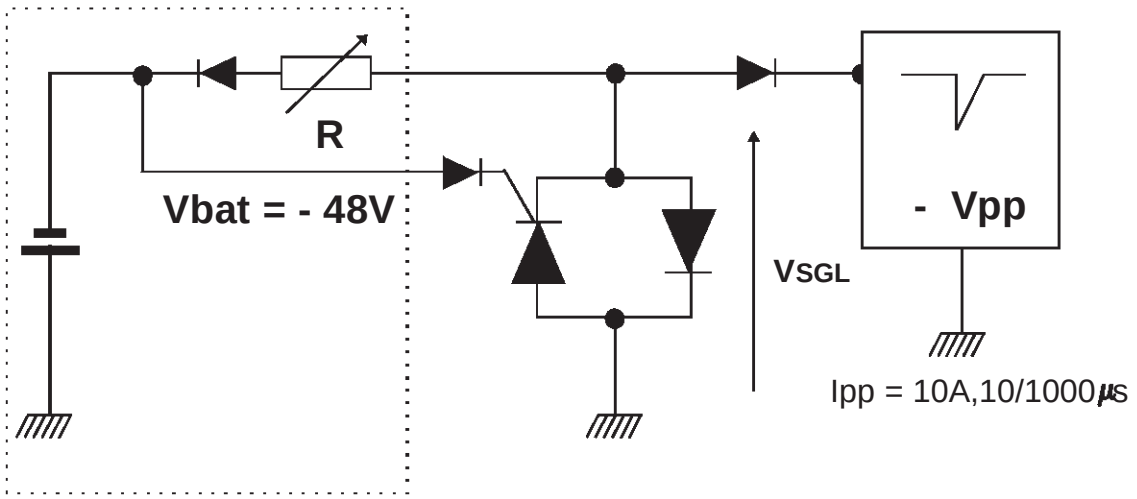
Symbol	Tests Conditions		Min.	Max.	Unit
I_R	Tc = 25°C Tc = 70°C	-1 < V_{GL} < -Vbat V_R = - 85 V -1 < V_{GL} < -Vbat V_R = - 85 V		5 50	µA µA
C	V_R = - 3 V V_R = - 48 V	F < 1MHz F < 1MHz		150 80	pF pF

Note 2 : See test circuit for I_H and V_{SGL}.

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



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



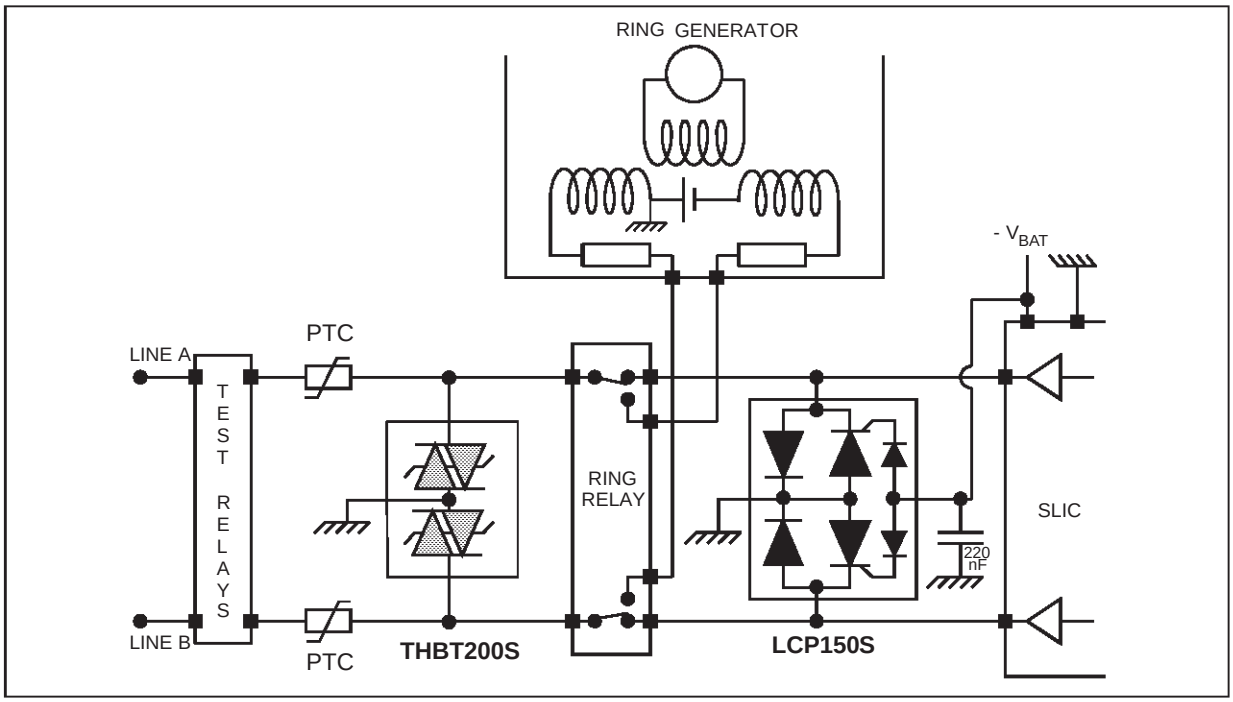
This is a GO-NOGO Test which allows to confirm the holding current (I_H) level in a functional test circuit.
This test can be performed if the reference test circuit can't be implemented.

TEST PROCEDURE :
1) Adjust the current level at the IH value by short circuiting the AK 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.

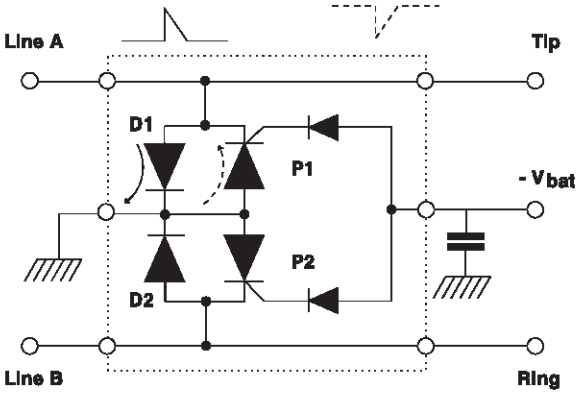
The V_{SGL} is measured just before firing

APPLICATION CIRCUIT

Typical SLIC Protection Concept.



FUNCTIONAL DESCRIPTION



LINE A PROTECTION:

- For positive surges versus GND, the diode D1 will conduct.
- For negative surges versus GND, the protection device P1 will trigger at a voltage fixed by the -VBAT reference.

LINE B PROTECTION:

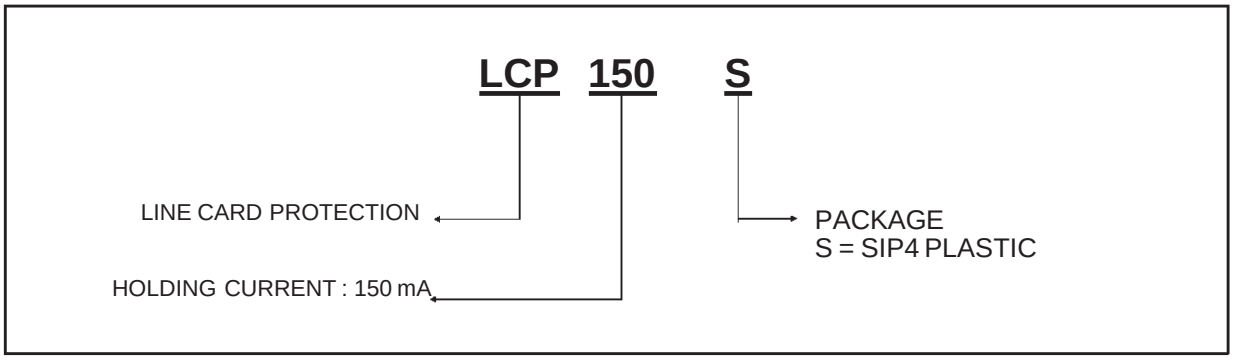
- For surges on Line B, the operating mode is the same , D2 or P2 is activated.

A capacitor (C = 220nF) can be added close to the gate of the LCP15xx, in order to speed up the triggering.

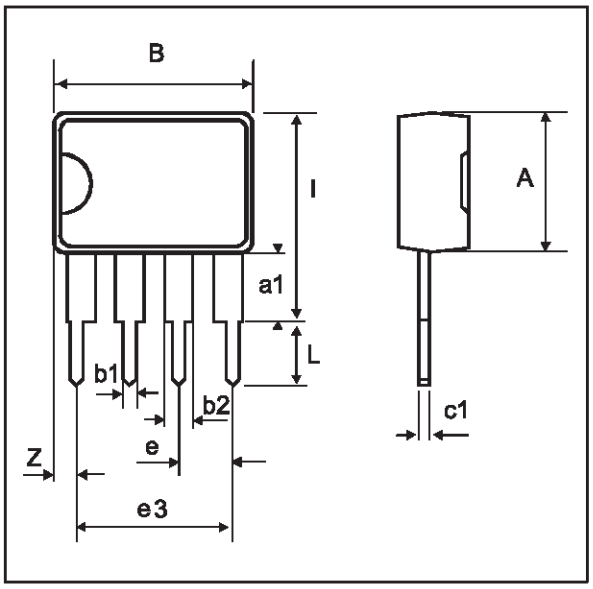
LCP150S

MARKING : Logo, Date Code, LCP150S.

ORDER CODE



PACKAGE MECHANICAL DATA
SIP 4



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
c1	0.38		0.50	0.015		0.020
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

PACKAGING : Products supplied in antistatic tubes.

WEIGHT : 0.55g