



LCDP1511D

Application Specific Discretes
A.S.D.TM

DUAL LINE PROGRAMMABLE TRANSIENT
VOLTAGE SUPPRESSOR FOR SLIC PROTECTION

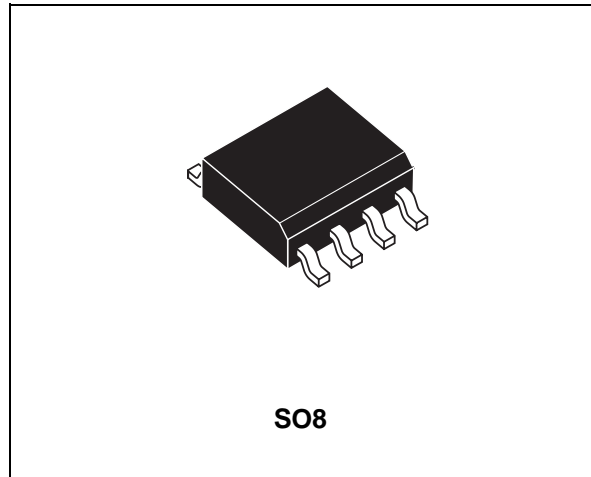
FEATURES

- Dual line programmable transient suppressor
- Wide negative firing voltage range : $V_{MGL} = -80V$
- Low dynamic switching voltages : V_{FP} and V_{DGL}
- Low gate triggering current : $I_{GT} = 5mA$ max
- Peak pulse current : $I_{PP} = 15 A$ (10/1000 μs)
- Holding current : $I_H > 150 mA$

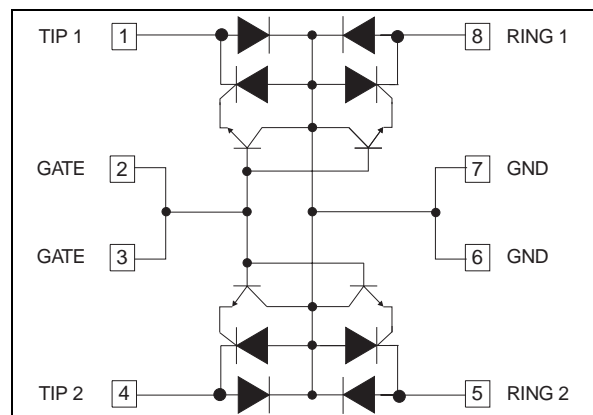
DESCRIPTION

The LCDP1511D is a dual line protector which protects subscriber line interface circuits (SLIC) against transient overvoltages.

Positive overvoltages are clamped with diodes towards GND, while negative overvoltages are suppressed by thyristors connected to GND. The breakdown voltage of the thyristors is determined by the voltage applied to the gate, generally $-V_{bat}$.



FUNCTIONAL DIAGRAM



COMPLIES WITH THE FOLLOWING STANDARDS:	Peak Surge Voltage (V)	Voltage Waveform (μs)	Current Waveform (μs)	Admissible I_{pp} (A)	Necessary Resistor (Ω)
ITU-T K20	1000	10/700	5/310	25	-
VDE0433	2000	10/700	5/310	25	40
VDE0878	1500	1.2/50	1/20	40	-
IEC1000-4-5	level 2 level 2	10/700 1.2/50	5/310 8/20	25 25	- -
FCC Part 68	1500 800	10/160 10/560	10/160 10/560	30 20	- 5
BELLCORE NWT-001089-CORE	2500 1000	2/10 10/1000	2/10 10/1000	70 15	25 45

LCDP1511D

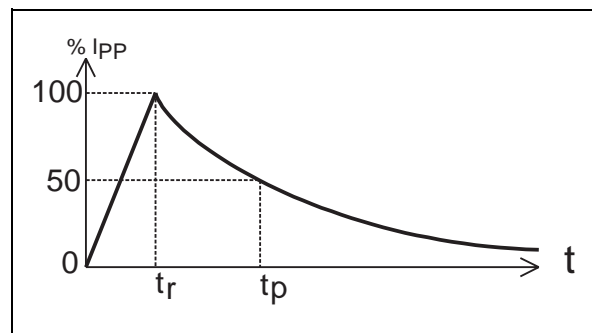
ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^{\circ}\text{C}$).

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current (see note1)	10/1000 μs 5/310 μs 2/10 μs	15 25 70	A
I_{FSM}	Non repetitive surge peak on-state current (see note2)	$t_p = 10\text{ms}$ $t_p = 1\text{s}$	5 3.5	A
V_{MLG} V_{MGL}	Maximum voltage LINE/GND Maximum voltage GATE/LINE		80 80	V
T_{stg}	Storage temperature range		- 55 to + 150	$^{\circ}\text{C}$
T_L	Lead temperature for soldering during 10s		260	$^{\circ}\text{C}$

Note 1: Pulse waveform

10 / 1000 μs	$t_r = 10 \mu\text{s}$	$t_p = 1000 \mu\text{s}$
5 / 310 μs	$t_r = 5 \mu\text{s}$	$t_p = 310 \mu\text{s}$
2 / 10 μs	$t_r = 2 \mu\text{s}$	$t_p = 10 \mu\text{s}$

Note 2 : Maximum current flowing through the 4 wires together.

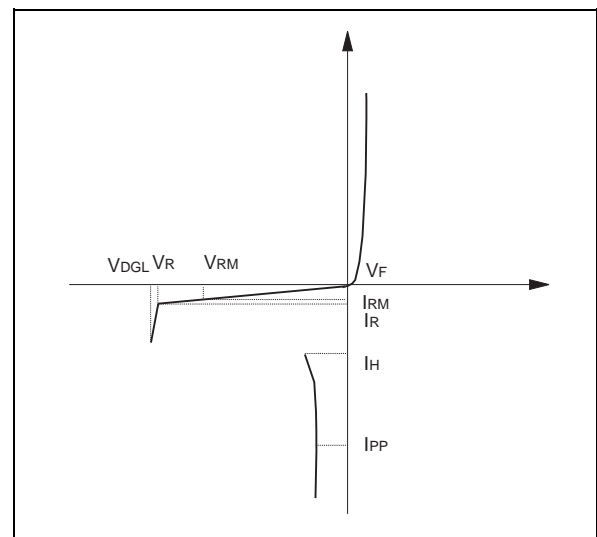


THERMAL RESISTANCE

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
I_{GT}	Gate triggering current
I_H	Holding current
I_{RM}	Reverse leakage current LINE / GND
I_{RG}	Reverse leakage current GATE / LINE
V_{RM}	Reverse voltage LINE / GND
V_{GT}	Gate triggering voltage
V_F	Forward drop voltage LINE / GND
V_{FP}	Peak forward voltage
V_{DGL}	Dynamic switching voltage GATE / LINE
V_{GATE}	GATE / GND voltage
V_{RG}	Reverse voltage GATE / LINE
C	Capacitance LINE / GND



PARAMETERS RELATED TO THE DIODE LINE / GND ($T_{amb} = 25^{\circ}\text{C}$)

Symbol	Test conditions	Max	Unit
V_F	Square pulse : $t_p = 500\mu\text{s}$ $I_F = 1\text{A}$	2	V
V_{FP} (note 1)	<div> <div>10/700μs</div> <div>1kV</div> <div>$R_P = 60\Omega$</div> <div>$I_{PP} = 10\text{A}$</div> </div> <div> <div>1.2/50μs</div> <div>1.5kV</div> <div>$R_P = 60\Omega$</div> <div>$I_{PP} = 15\text{A}$</div> </div> <div> <div>2/10μs</div> <div>2.5kV</div> <div>$R_P = 245\Omega$</div> <div>$I_{PP} = 10\text{A}$</div> </div>	<div>5</div> <div>10</div> <div>20</div>	V

note 1 : see test circuit for VFP, R_P is the protection resistor located on the line card

PARAMETERS RELATED TO THE PROTECTION THYRISTOR ($T_{amb} = 25^{\circ}\text{C}$)

Symbol	Test conditions	Min	Max	Unit
I_{GT}	$V_{GND/LINE} = -48\text{V}$		5	mA
I_H	$V_{GATE} = -48\text{V}$ (see note 2)	150		mA
V_{GT}	at I_{GT}		2.5	V
I_{RG}	$V_{RG} = -75\text{V}$		5	μA
V_{DGL}	$V_{GATE} = -48\text{V}$ (see note 3) <div> <div>10/700μs</div> <div>1kV</div> <div>$R_P = 60\Omega$</div> <div>$I_{PP} = 10\text{A}$</div> </div> <div> <div>1.2/50μs</div> <div>1.5kV</div> <div>$R_P = 60\Omega$</div> <div>$I_{PP} = 15\text{A}$</div> </div> <div> <div>2/10μs</div> <div>2.5kV</div> <div>$R_P = 245\Omega$</div> <div>$I_{PP} = 10\text{A}$</div> </div>		<div>7</div> <div>15</div> <div>20</div>	V

note 2 : see functional holding current test circuit

note 3 : See test circuit for VDGL

The oscillations with a time duration lower than 50ns are not taken into account

PARAMETERS RELATED TO LINE / GND ($T_{amb} = 25^{\circ}\text{C}$)

Symbol	Test conditions	Max	Unit
I_{RM}	$V_{GATE/LINE} = -1\text{V}$ $V_{RM} = -75\text{V}$	5	μA
C	$V_R = -3\text{V}$ $F = 1\text{MHz}$ $V_R = -48\text{V}$ $F = 1\text{MHz}$	<div>200</div> <div>100</div>	pF

Fig. 1: Surge peak current versus overload duration.

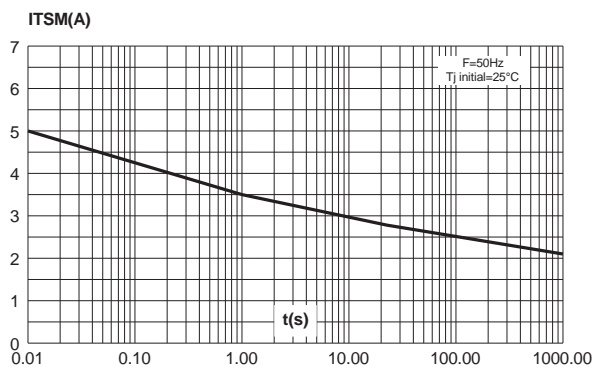
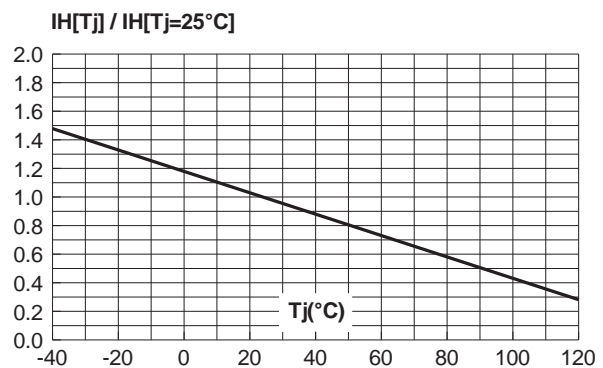
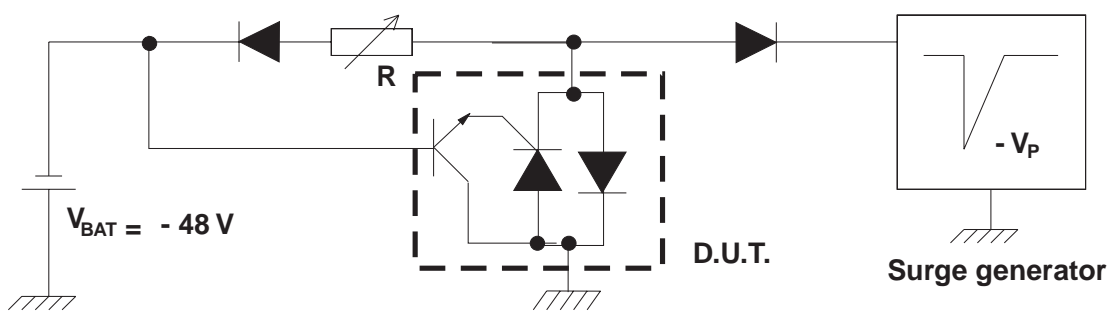


Fig. 2: Relative variation of holding current versus junction temperature.



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



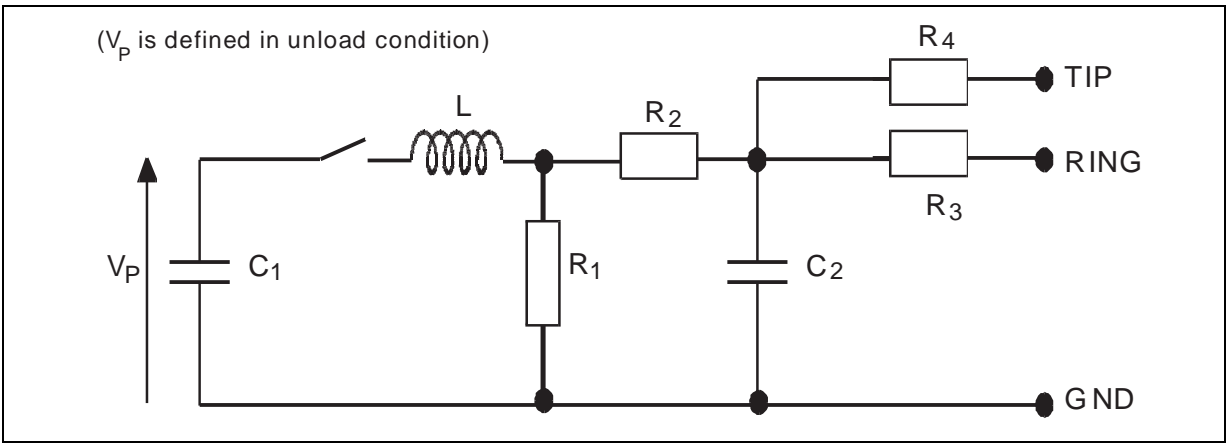
The diagram shows a test circuit for the Functional Holding Current (I_H) test. A battery labeled V_{BAT} = -48 V is connected to a diode and a variable resistor R. The other end of R is connected to the D.U.T. (Device Under Test), which is represented by a dashed box containing a diode symbol. The D.U.T. is also connected to a surge generator, which is shown as a box with a V-shaped waveform and labeled -V_p. The surge generator is grounded. The D.U.T. is also grounded.

This is a GO-NO GO test which allows to confirm the holding current (I_H) level in a functional test circuit.

TEST PROCEDURE :

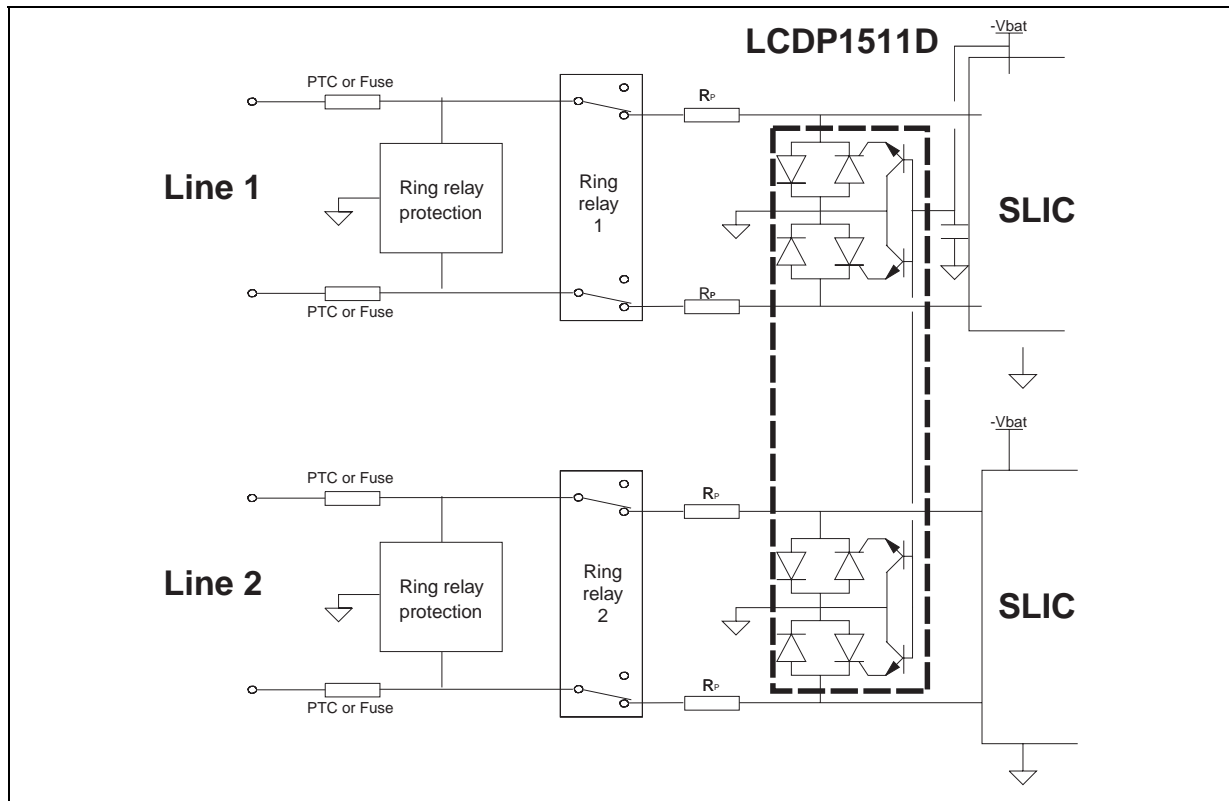
- Adjust the current level at the I_H value by short circuiting the D.U.T.
- Fire the D.U.T. with a surge current : I_{PP} = 15A, 10/1000μs.
- The D.U.T. will come back to the off-state within a duration of 50ms max.

TEST CIRCUIT FOR V_{FP} AND V_{DGL} PARAMETERS

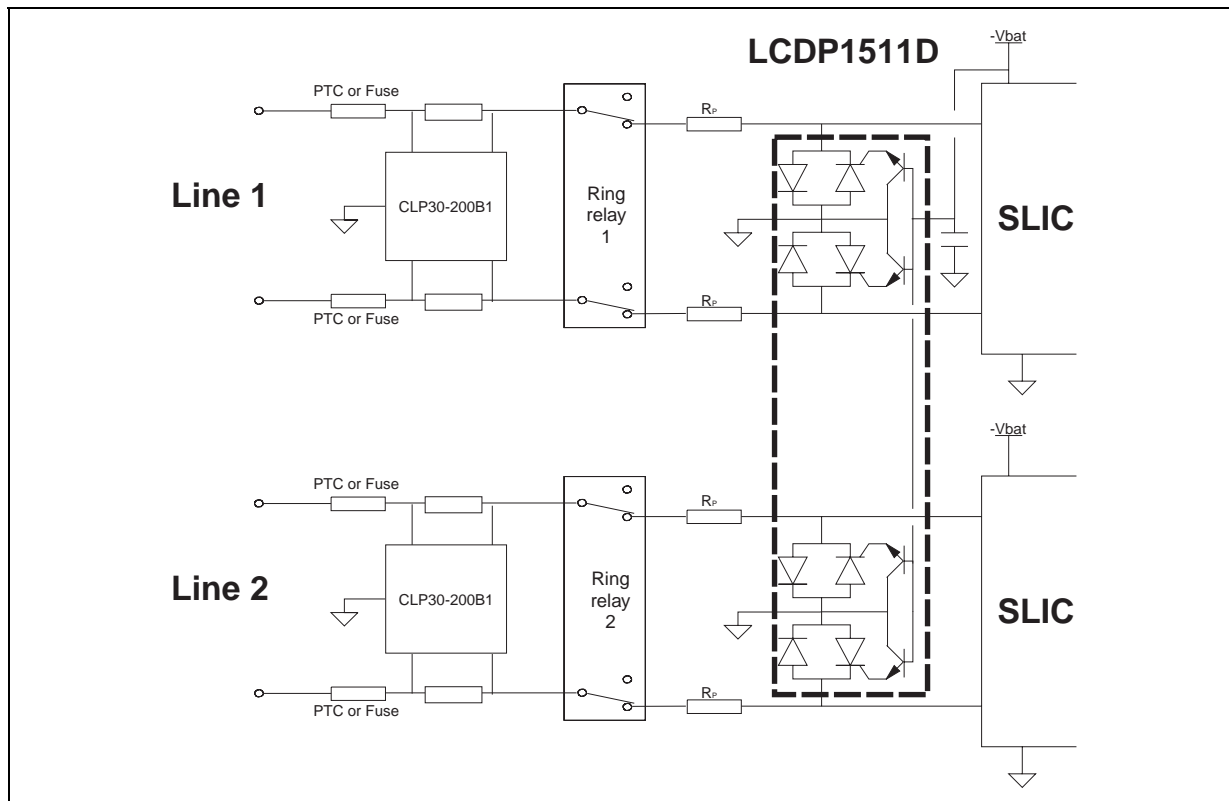


Pulse (μs)		V _p (V)	C ₁ (μF)	C ₂ (nF)	L (μH)	R ₁ (Ω)	R ₂ (Ω)	R ₃ (Ω)	R ₄ (Ω)	I _{PP} (A)	R _p (Ω)
t _r	t _p										
10	700	1000	20	200	0	50	15	25	25	10	60
1.2	50	1500	1	33	0	76	13	25	25	15	60
2	10	2500	10	0	1.1	1.3	0	3	3	10	245

APPLICATION CIRCUIT: PABX line protection

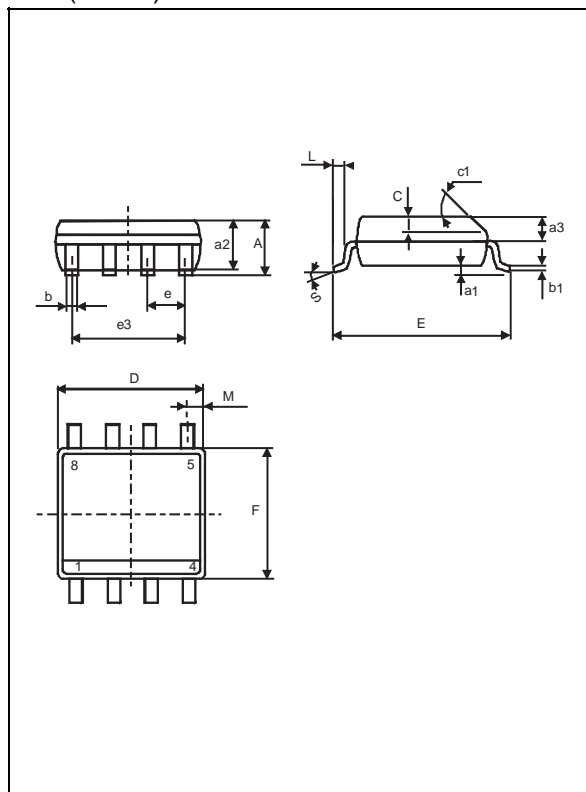


APPLICATION CIRCUIT: Line Card protection



LCDP1511D

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
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25	0.50	0.50	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)					

Ordre code	Marking	Package	Weight	Base qty	Delivery mode
LCDP1511D	LCDP15	SO8	0.077 g	100	Tube
LCDP1511DRL	LCDP15	SO8	0.077 g	2500	Tape & reel

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