LCDP1521S

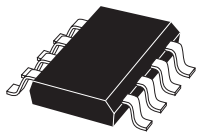
Dual line programmable transient voltage suppressor for SLIC protection

Features

- Dual line programmable transient voltage suppressor with separated gates
- Wide negative firing voltage range: V_{Gn} = -175 V max.
- Low dynamic switching voltages: V_{FP} and V_{DGL}
- Low gate triggering current: I_{GT} = 5 mA max
- Peak pulse current: I_{PP} = 40 A (5/310 µs)
- Holding current: I_H = 150 mA min.

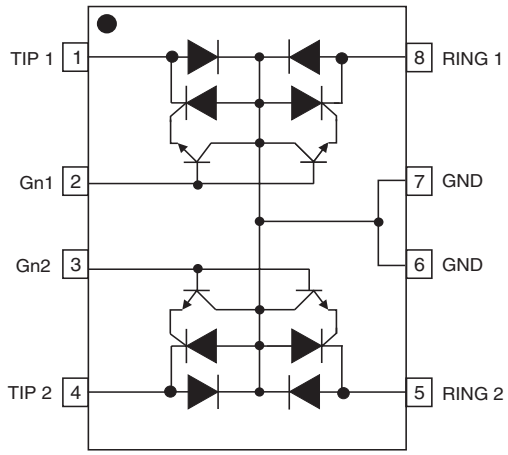
Benefits

- A Trisil™ is not subject to ageing and provides a fail safe mode in short circuit for a better protection.
- Trisils are used to help equipment to meet various standards such as UL1950, IEC 60950 / CSA C22.2, UL1459 and TIA-968-A (formerly FCC part 68).
- Trisils have UL94 V0 resin approved (Trisils are UL497B approved - file: E136224).



SO-8

Figure 1. Functional diagram



Description

This device has been especially designed to protect 2 new high voltage, as well as classical SLICs, against transient overvoltages.

Positive overvoltages are clamped by 2 diodes. Negative surges are suppressed by 2 thyristors, their breakdown voltage being referenced to $-V_{BAT}$ through the gate. Separated gates allow the SLICs to be supplied by two different voltages.

TM: Trisil ,is a trademark of STMicroelectronics

1 Characteristics

Table 1. Compliant with the following standards

STANDARD	Peak Surge Voltage (V)	Voltage Waveform	Required peak current (A)	Current Waveform	Minimum serial resistor to meet standard (Ω)
GR-1089 Core First level	2500 1000	2/10 µs 10/1000 µs	500 100	2/10 µs 10/1000 µs	23 30
GR-1089 Core Second level	5000	2/10 µs	500	2/10 µs	46
GR-1089 Core Intra-building	1500	2/10 µs	100	2/10 µs	2
ITU-T-K20/K21	6000 1500	10/700 µs	150 37.5	5/310 µs	110 0
ITU-T-K20 (IEC61000-4-2)	8000 15000	1/60 ns	ESD contact discharge ESD air discharge		0 0
IEC61000-4-5	4000 4000	10/700 µs 1.2/50 µs	100 100	5/310 µs 8/20 µs	60 27
TIA-968-A, lightning surge type A	1500 800	10/160 µs 10/560 µs	200 100	10/160 µs 10/560 µs	36 24
TIA-968-A, lightning surge type B	1000	9/720 µs	25	5/320 µs	0

Table 2. Thermal resistance

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

Table 3. Absolute ratings (0 °C < T_j < 70 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current	10/1000 µs 8/20 µs 10/560 µs 5/310 µs 10/160 µs 1/20 µs 2/10 µs	25 60 25 40 35 60 90	A
I_{TSM}	Non repetitive surge peak on-state current (50 Hz sinusoidal)	t = 0.2 s t = 1 s t = 2 s t = 15 mn	5 3.5 3 1.3	A
V_{Gn1}, V_{Gn2}	Negative battery voltage range	-40 °C < T_{amb} < +85 °C	-175	V
T_{stg}	Storage temperature range		- 55 to + 150	°C
T_j	Operating junction temperature range		- 55 to + 150	°C
T_L	Maximum lead temperature for soldering during 10 s		260	°C

Figure 2. Electrical characteristics - definitions (T_{amb} = 25 °C)

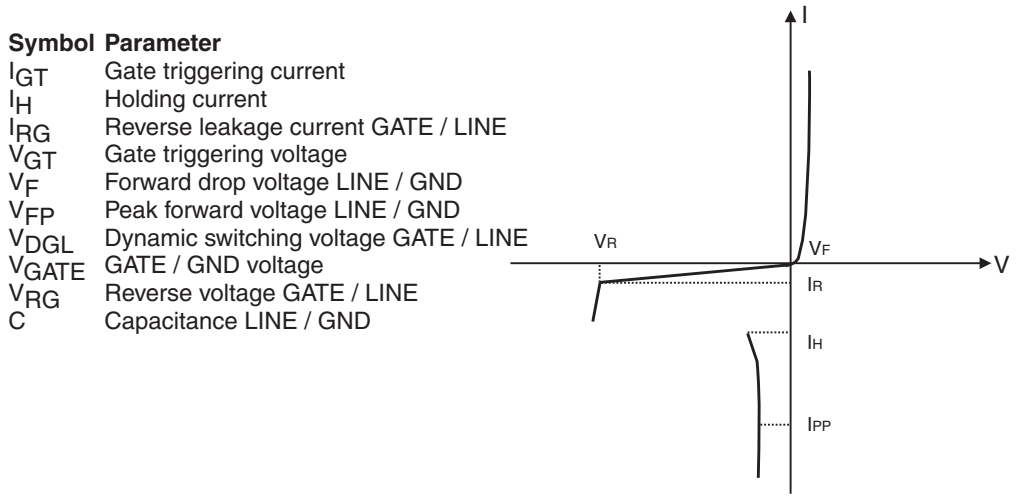
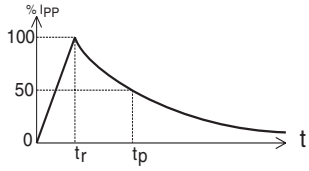


Figure 3. Repetitive peak pulse current



t_r: rise time (µs)
t_p: pulse duration (µs)
ex: Pulse waveform 10/1000 µs
t_r = 10 µs t_p = 1000 µs

Table 4. Parameters (T_j = 25°C unless otherwise specified)

Symbol	Test conditions				Min.	Typ.	Max.	Unit
I_{GT}	V_{LINE} = -48 V				0.05		5	mA
I_H	V_{Gn} = -48 V				150			mA
V_{GT}	at I_{GT}						2.5	V
I_{RG}	V_{RG} = -175 V V_{RG} = -175 V			T_j = 25 °C T_j = 85 °C			5 50	µA
V_{DGL}	V_{Gn} = -48 V 10/700 µs	1.5 kV	R_S = 0 Ω	I_{PP} = 37.5 A			5	V
V_F	I_F = 1 A		t = 500 µs				2	V
V_{FP}	10/700 µs	1.5 kV	R_S = 0 Ω	I_{PP} = 37.5 A			8	V
I_R	$V_{Gn / LINE}$ = -1V, V_{LINE} = -175 V $V_{Gn / LINE}$ = -1V, V_{LINE} = -175 V			T_j = 25 °C T_j = 85 °C			5 50	µA
C	V_{LINE} = -50 V, V_{RMS} = 1 V, F = 1 MHz V_{LINE} = -2 V, V_{RMS} = 1 V, F = 1 MHz					18 35		pF

Table 5. Recommended gate capacitance

Symbol	Component	Min.	Typ.	Max.	Unit
C_G	Gate decoupling capacitance	100	220		nF

2 Technical information

The LCDP1521S is particularly optimized for the new telecom applications such as the fiber in the loop, the WLL, the remote central office. In this case, the operating voltages are smaller than in the classical system. This makes the high voltage SLICs particularly suitable. The schematics of *Figure 4* shows the topologies most frequently used for these applications.

Figure 4. Protection of high voltage SLICs

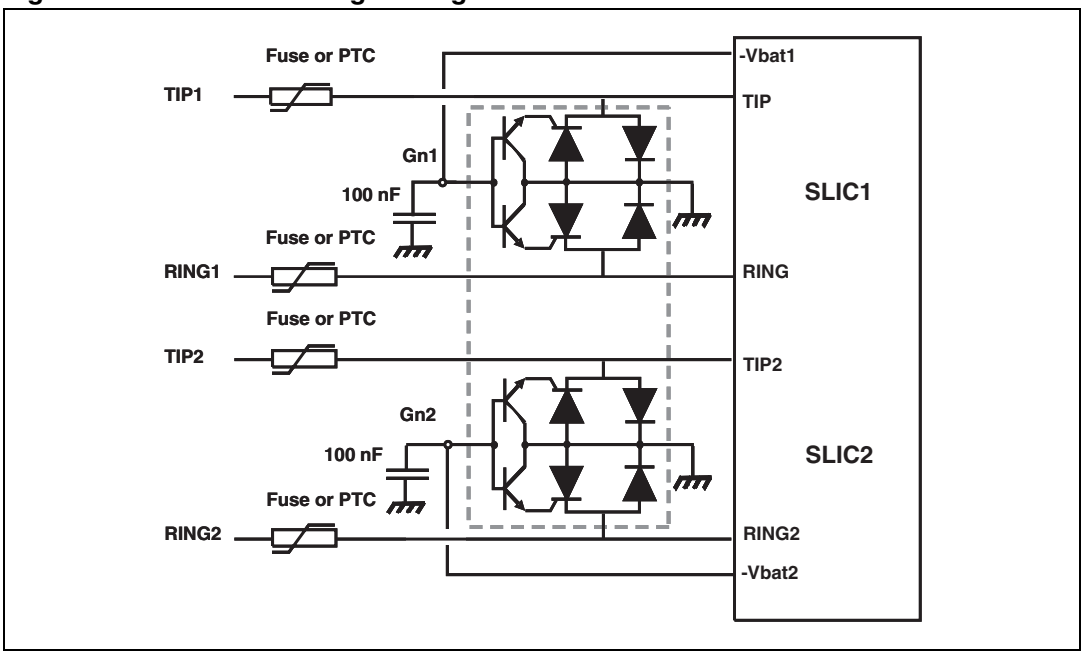


Figure 5. Non repetitive surge peak on-state current versus pulse duration

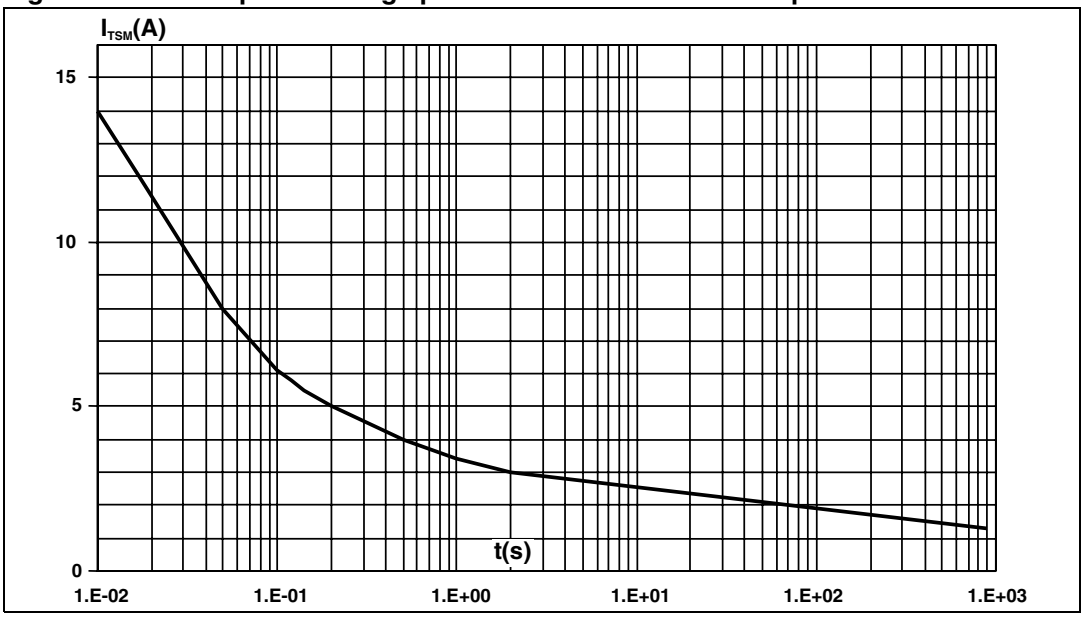
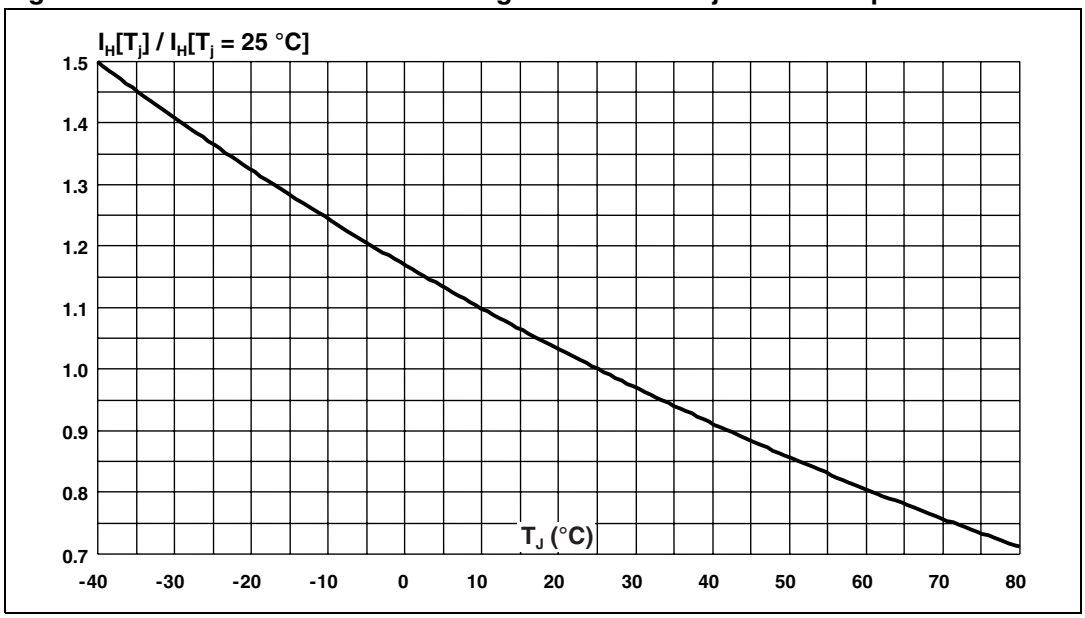
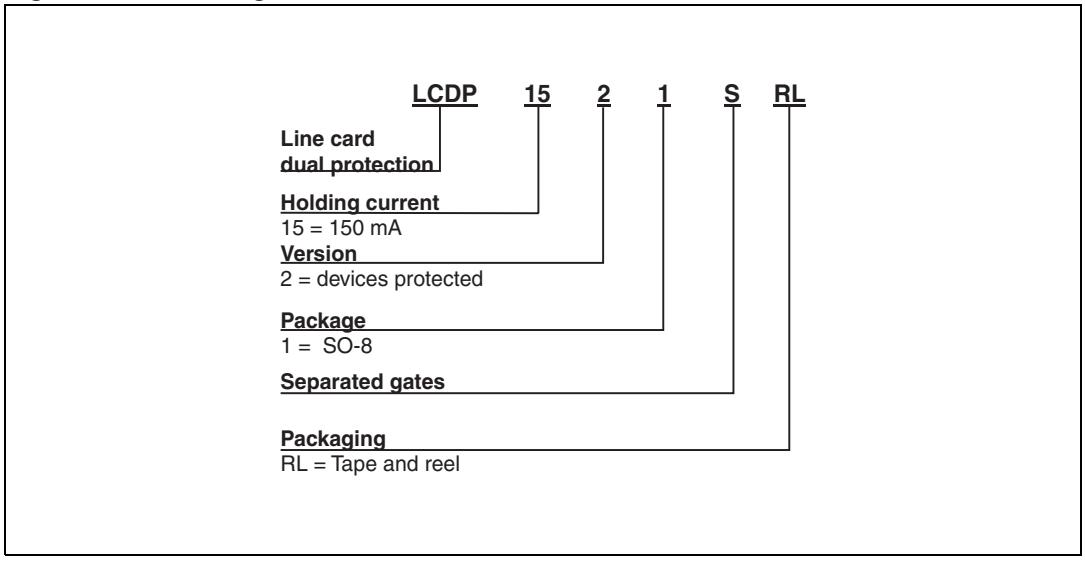


Figure 6. Relative variation of holding current versus junction temperature



3 Ordering information scheme

Figure 7. Ordering information scheme

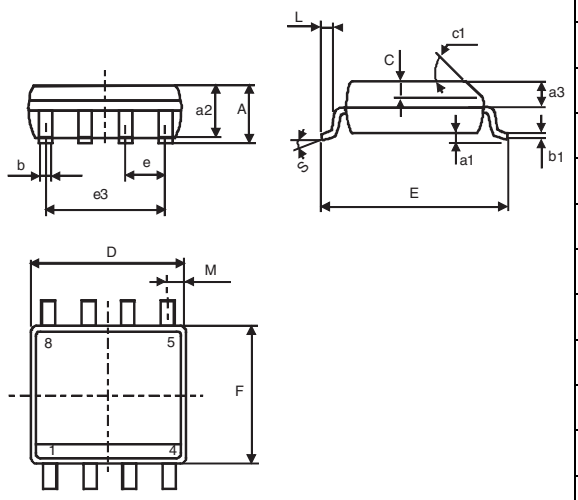


4 Package information

- Epoxy meets UL94, V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 6. SO-8 dimensions



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	0.025		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)					

Figure 8. Footprint dimensions in mm (inches)

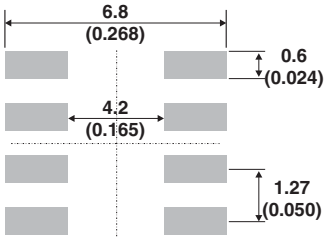
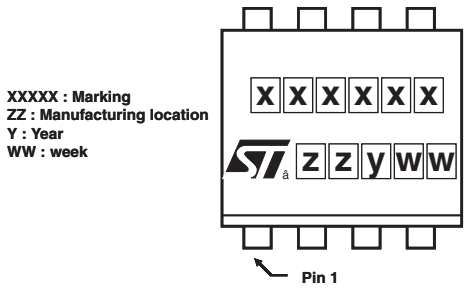


Figure 9. Marking



5 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
LCDP1521SRL	DP152S	SO-8	0.08 g	2500	Tape and reel

6 Revision history

Table 8. Document revision history

Date	Revision	Changes
24-Sep-2009	1	First issue.
23-Feb-2012	2	Standardized nomenclature for Gn and Gp.

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