

Dual line programmable transient voltage suppressor for SLIC protection

Datasheet - production data



Features

- Dual line programmable transient voltage suppressor with separated gates
- Wide negative firing voltage range: V_{Gn} = -175 V max.
- Low dynamic switching voltages: VFP and VDGL
- 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).

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.



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This is information on a product in full production.

1 **Characteristics**

Standard	Standard Peak surge voltage (V)		Required peak current (A)	Current waveform	Minimum serial resistor to meet standard (Ω)	
GR-1089 Core	2500	2/10 µs	500	2/10 µs	20	
First level	1000	10/1000 µs	100	10/1000 µs	30	
GR-1089 Core Second level	5000	2/10 µs	500	2/10 µs	40	
GR-1089 Core Intra-building	1500	2/10 µs	100	2/10 µs	0	
ITU-T-K20/K21	6000	10/700	150	E/210 He	110	
110-1-K20/K21	1500	10/700 µs	37.5	5/310 µs	0	
ITU-T-K20 (IEC	8000	1/60 ns	ESD contact	0		
61000-4-2)	15000	1/60 115	ESD air d	0		
IEC 61000-4-5	4000	10/700 µs	100	5/310 µs	60	
IEC 01000-4-5	4000	1.2/50 µs	100	8/20 μs	5	
TIA-968-A,	1500	10/160 µs	100	10/160 µs	26	
lightning surge type A	800	10/560 μs	200	10/560 μs	19	
TIA-968-A, lightning surge type B	1000	9/720 µs	25	5/320 µs	0	

Table 1: Standards compliance

Table 2: Thermal resistances

Symbol	Parameter	Value	Unit
Rth(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			
		Telcordia GR-1089- CORE Issue 6, May 2011, section 4	10/1000 µs	25			
		TIA-968-A, lightning surge type A	10/560 µs	30			
		ITU-T K20/21/44/45, (10/700 μs open circuit 5/310 μs voltage waveshape)		40			
I _{pp}	Peak pulse current ⁽¹⁾	TIA-968-A, lightning surge type A	10/160 µs	45	A		
		IEC 61000-4-5, (1.2/50 μs open circuit waveshape) with 10 Ω	2/40 µs	85			
		ITU-T K20/21/44/45, (1.2/50 µs open circuit voltage waveshape)	8/20 µs	90			
		Telcordia GR-1089- CORE Issue 6, (2/10 µs open circuit waveshape)	2/10 µs	100			
			t = 0.2 s	5			
I	Non repetitive surge		t = 1 s	3.5	А		
Ітѕм	peak on-state current (50 Hz sinusoidal) ⁽¹⁾		t = 2 s	3			
			t = 15 mn	1.3			
$V_{\sf GN}$	Negative battery voltage range-40 °C < T_{amb} < +85 °C		-175	V			
T _{stg}	Storage junction tempe	FE 12 1 450					
Tj	Maximum operating jur	-55 to + 150	°C				
T∟	Maximum temperature	for soldering during 10 s		260	°C		

Notes:

⁽¹⁾The rated current values may be applied either to the Ring to GND or to the Tip to GND terminal pairs. Additionally, the four terminal pairs may have their rated current values applied simultaneously (in this case the GND terminal current will be four times the rated current value of an individual terminal pair)





Figure 3: Pulse waveform





Characteristics

Table 4: Parameters (T _j = 25 °C unless otherwise specified)						
Symbol	Test conditions		Min.	Тур.	Max.	Unit
lgт	V _{LINE} = -48 V		0.05		5	mA
Ін	V _{Gn} = -48 V		150			mA
Vgt	at I _{GT}				2.5	V
I _{RG}	V _{RG} = -175 V V _{RG} = -175 V			5 50	μA	
Vdgl ⁽¹⁾	V_{Gn} = -48 V, 10/700 µs, 1.5 kV, R _S = 0 Ω, I	_{PP} = 37.5 A			5	V
VF	I _F = 1 A			2	V	
VFP	10/700 μs, 1.5 kV, Rs = 0 Ω, I _{PP} = 37.5 A				8	V
IR	$\label{eq:VGn/LINE} \begin{split} V_{Gn/LINE} &= -1 \ V, \ V_{LINE} = -175 \ V \\ V_{Gn/LINE} &= -1 \ V, \ V_{LINE} = -175 \ V \end{split}$			5 50	μA	
С	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

Notes:

 $^{(1)}\mbox{The oscillations}$ with a time duration lower than 50 ns are not taken into account.

Table 5: Recommended gate capacitance

Symbol	Component	Min.	Тур.	Max.	Unit
CG	Gate decoupling capacitance		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: "Protection of high voltage SLICs"* shows the topologies most frequently used for these applications.











3 Package information

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.

3.1 SO-8 package information



	Dimensions								
Ref.		Millimeters		Inches					
	Min.	Тур.	Max.	Min.	Тур.	Max.			
A			1.75			0.069			
A1	0.1		0.25	0.004		0.010			
A2	1.25			0.049					
b	0.31		0.51	0.012		0.020			
с	0.10		0.25	0.004		0.010			
D	4.80	4.90	5.00	0.189	0.193	0.197			
E	5.80	6.00	6.20	0.228	0.236	0.244			
E1	3.80	3.90	4.00	0.150	0.154	0.157			
е		1.27			0.050				
h	0.25		0.50	0.010		0.020			
L	0.40		1.27	0.016		0.05			
L1		1.04			0.041				
k°	0		8	0		8			
ccc			0.10			0.004			

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	Dimensions Millimeters					
Ref.						
	Min.	Тур.	Max.			
P0	3.9	4	4.1			
P1	7.9	8	8.1			
P2	1.95	2	2.05			
ØD0	1.45	1.5	1.6			
ØD1	1.6					
F	5.45	5.5	5.55			
K0	2.5	2.6	2.7			
W	11.7	12	12.3			

Table 7: Tape and reel mechanical data





Figure 15: ST ECOPACK[®] recommended soldering reflow profile for PCB mounting



Minimize air convection currents in the reflow oven to avoid component movement. Maximum soldering profile corresponds to the latest IPC/JEDEC J-STD-020.



4 Ordering information

Figure 16: Ordering information scheme



Table 8: Ordering information						
Order code Marking Package Weight Base qty. Delivery mod					Delivery mode	
LCDP1521SRL	DP152S	SO-8	0.08 g	2500	Tape and reel	

5 Revision history

Table 9: Document revision history

Date	Revision Changes	
24-Sep-2009	1	First issue.
23-Feb-2012	2	Standardized nomenclature for Gn and Gp.
20-May-2015	3	Updated Table 3 and package view.
02-Jul-2015	4	Updated package information.
08-Jul-2015	5	Updated Figure 7.
01-Oct-2016	6	Updated Section 6: "Characteristics" and Section 8.1: "SO-8 package information". Minor format changes.
09-Feb-2017	7	Updated Figure 7: "SO-8 package outline".



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