



# SSRP130B1

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

DUAL ASYMMETRICAL OVERVOLTAGE  
PROTECTION FOR TELECOM LINE

## MAIN APPLICATIONS

Where asymmetrical protection against lightning strikes and other transient overvoltages is required :

- Solid-State relays
- SLIC with integrated ring generator

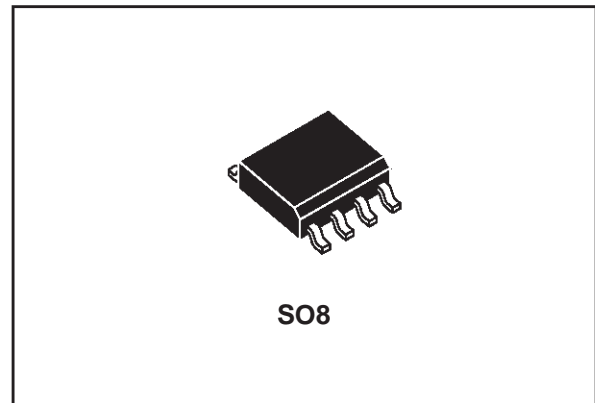
## DESCRIPTION

The SSRP130B1 is a dual asymmetrical transient voltage suppressor designed to protect a solid-state ring relay or SLICs with integrated ring generator from overvoltages.

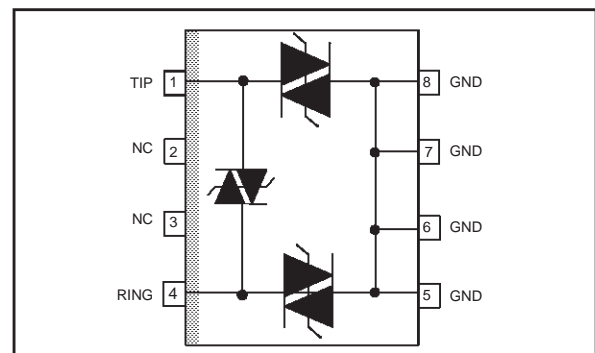
The asymmetrical protection configuration is necessary to allow the use of all different types of ringing schemes.

## FEATURES

- Dual bidirectional asymmetrical protection :  
Stand-off voltages :  
+ 130V for positive voltages  
- 185V for negative voltages
- Peak pulse current :  $I_{PP} = 2 * 25A$  (5 / 310  $\mu s$ )
- Holding current : 150mA



## FUNCTIONAL DIAGRAM

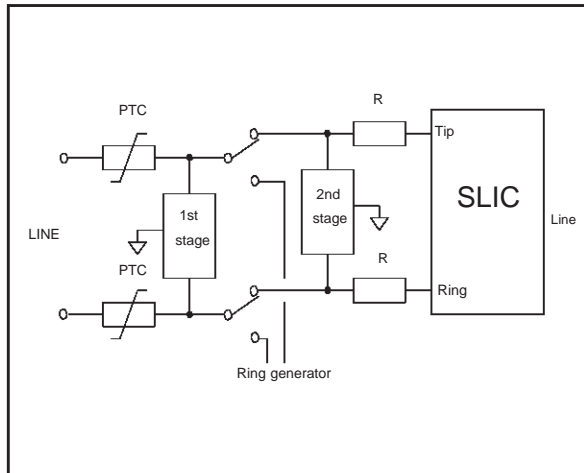


COMPLIES WITH THE FOLLOWING STANDARDS:	Peak Surge Voltage (V)	Voltage Waveform ( $\mu s$ )	Current Waveform ( $\mu s$ )	Admissible $I_{PP}$ (A)	Necessary Resistor ( $\Omega$ )
ITU-T K20	1000	10/700	5/310	25	-
VDE0433	2000	10/700	5/310	25	40
VDE0878	1500	1.2/50	1/20	35	3
IEC 1000-4-5	Level 2	10/700 1.2/50	5/310 8/20	25 25	- -
FCC Part 68	1500 800	10/160 10/560	10/160 10/560	29 21	45 30
BELLCORE TR-NWT-001089	2500 1000	2/10 10/1000	2/10 10/1000	70 15	30 57

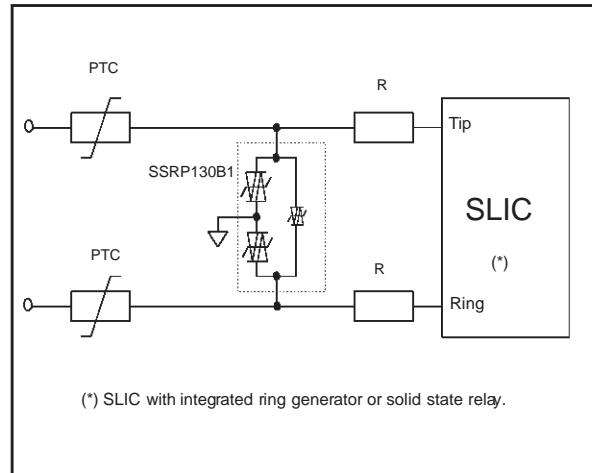
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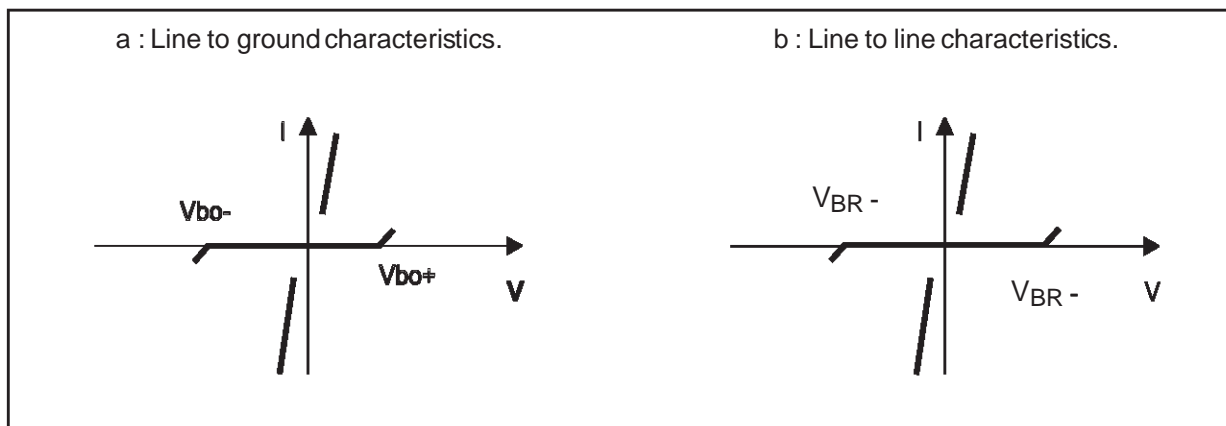
## APPLICATION INFORMATION

**Fig 1** : Topology of the classical line card protection.

The classical line card requires protection before the ring relay and a second one for the SLIC (fig.1). The use of new SLICs with integrated ring generator or board based on solid state ring relay suppresses this second protection (Fig. 2). Then the only remaining stage, located between the line and the ring relay, has to optimize the protection. The classical symmetrical first stage protector becomes not sufficient to avoid any circuit destruction during surges.

**Fig 2** : Classical use of the SSRP130B1.

The SSRP130B1 device takes into account this fact and is based on asymmetrical voltage characteristics (Fig.3a). The ring signal being shifted back by the battery voltage, the SSRP130B1 negative breakover value  $V_{bo-}$  is greater than the positive one  $V_{bo+}$ . This point guarantees a protection operation very close to the peak of the normal operating voltage without any disturbance of the ring signal.

**Fig 3** : SSRP130B1 electrical characteristics.

In addition with the 2 crowbar functions which perform the protection of both TIP and RING lines versus ground, a third cell assumes the differential mode protection of the SLIC. The breakdown voltage values of this third cell are the same for

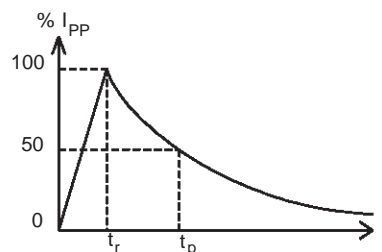
both positive and negative parts of the characteristics and are equivalent to the negative breakdown voltage value of the TIP and RING lines versus GND cells (Fig.3 b).

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

Symbol	Parameter		Value	Unit
$I_{PP}$	Peak pulse current (see note 1)	10/1000 $\mu\text{s}$ 5/310 $\mu\text{s}$ 1/20 $\mu\text{s}$ 2/10 $\mu\text{s}$	2x15 2x25 2x35 2x70	A
$I_{TSM}$	Non repetitive surge peak on-state current (F=50Hz)	$t_p = 0.2 \text{ s}$ $t_p = 5 \text{ s}$ $t_p = 900 \text{ s}$	7.5 4.0 1.5	A
$T_{op}$	Operating temperature range		0 to + 70	$^{\circ}\text{C}$
$T_{stg}$ $T_j$	Storage temperature range Maximum operating junction temperature		- 55 to + 150 + 150	$^{\circ}\text{C}$ $^{\circ}\text{C}$
$T_L$	Maximum lead temperature for soldering during 10s		260	$^{\circ}\text{C}$

Note 1 : Pulse waveform :

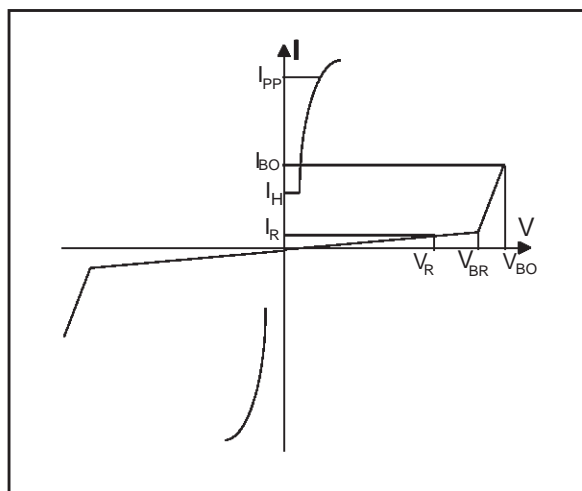
10/1000 $\mu\text{s}$	$t_r = 10 \mu\text{s}$	$t_p = 1000 \mu\text{s}$
5/310 $\mu\text{s}$	$t_r = 5 \mu\text{s}$	$t_p = 310 \mu\text{s}$
1/20 $\mu\text{s}$	$t_r = 1 \mu\text{s}$	$t_p = 20 \mu\text{s}$
2/10 $\mu\text{s}$	$t_r = 2 \mu\text{s}$	$t_p = 10 \mu\text{s}$

**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
$V_R$	Stand-off voltage
$I_R$	Leakage current at stand-off voltage
$V_{BR}$	Breakdown voltage
$V_{BO}$	Breakover voltage
$I_H$	Holding current
$I_{BO}$	Breakover current
$I_{PP}$	Peak pulse current
C	Capacitance



## SSRP130B1

### ELECTRICAL CHARACTERISTICS between TIP and GND, RING and GND ( $T_{amb}=25^{\circ}\text{C}$ )

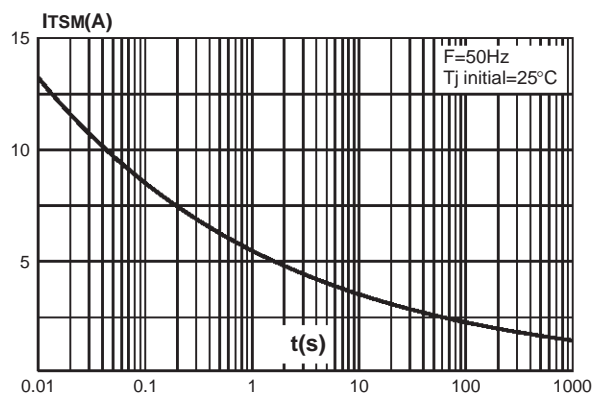
Symbol	Parameter	Test conditions (note 1)	Min	Max	Unit
$V_{BO}$	Breakover voltage (note 2)	Positive voltage 50Hz 10/700 $\mu\text{s}$ 1.2/50 $\mu\text{s}$ 2/10 $\mu\text{s}$  Negative voltage 50Hz 10/700 $\mu\text{s}$ 1.2/50 $\mu\text{s}$ 2/10 $\mu\text{s}$		200 175 180 250  280 235 240 340	V
$I_{BO}$	Breakover current	Positive voltage Negative voltage	110 110		mA
$I_H$	Holding current	Positive polarity Negative polarity	150 150		mA
$I_R$	Leakage current (note 3)	$V_R = +130\text{ V}$ $V_R = -185\text{ V}$		10 10	$\mu\text{A}$
C	Capacitance	F = 100kHz, V = 100mV, $V_R = 0\text{ V}$		100	pF

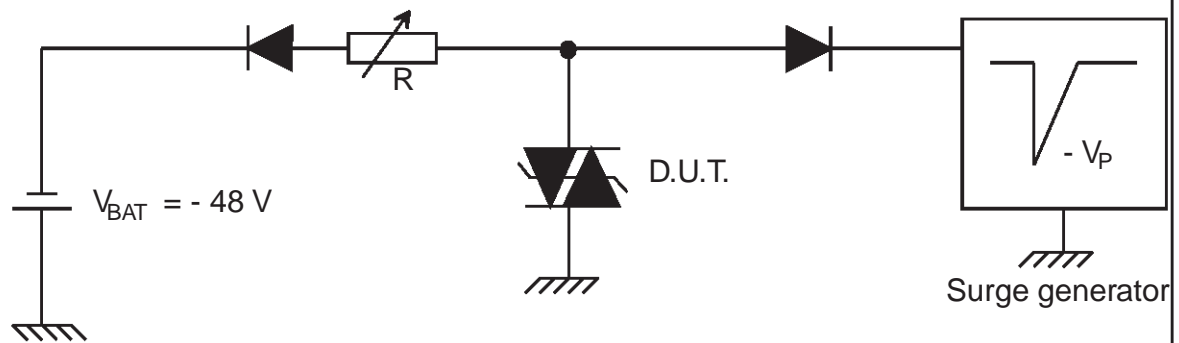
### ELECTRICAL CHARACTERISTICS between TIP and RING ( $T_{amb}=25^{\circ}\text{C}$ )

Symbol	Parameter	Test conditions	Min	Max	Unit
$I_R$	Leakage current (note 3)	$V_R = +185\text{ V}$ $V_R = -185\text{ V}$		10 10	$\mu\text{A}$
C	Capacitance	F = 100kHz, V = 100mV, $V_R = 0\text{ V}$		100	pF

Note 1 : Positive voltage means between T and G, or between R and G  
 Negative voltage means between G and T, or between G and R  
 Note 2 : See test circuit for  $V_{BO}$  parameters  
 Note 3 :  $I_R$  measured at  $V_R$  guarantees  $V_{BR} > V_R$

**Fig. 4** : Surge peak current versus overload duration (maximum values).

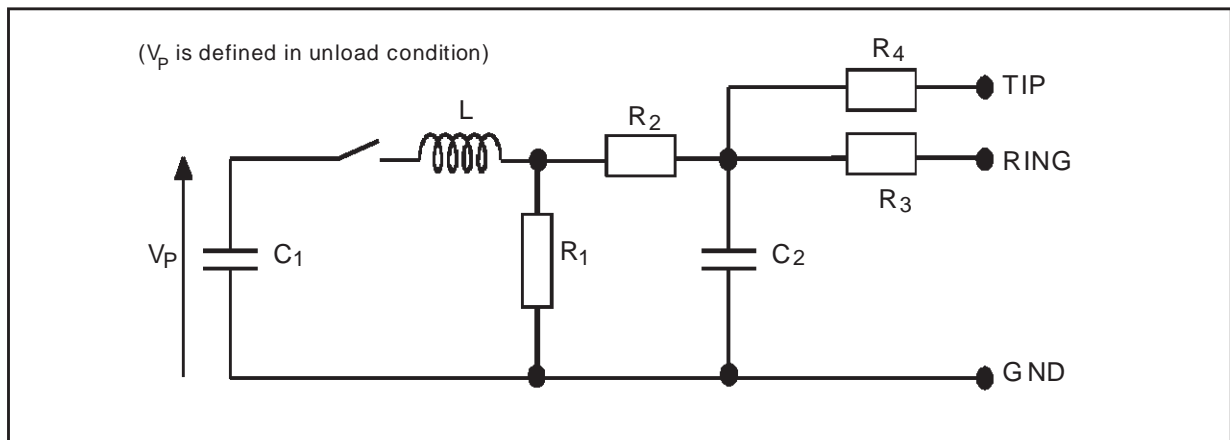


**FUNCTION HOLDING CURRENT ( $I_H$ ) TEST CIRCUIT (GO-NO GO TEST)**

This is a GO-NOGO test which allows to confirm the holding current ( $I_H$ ) level in a functional test circuit.

**TEST PROCEDURE :**

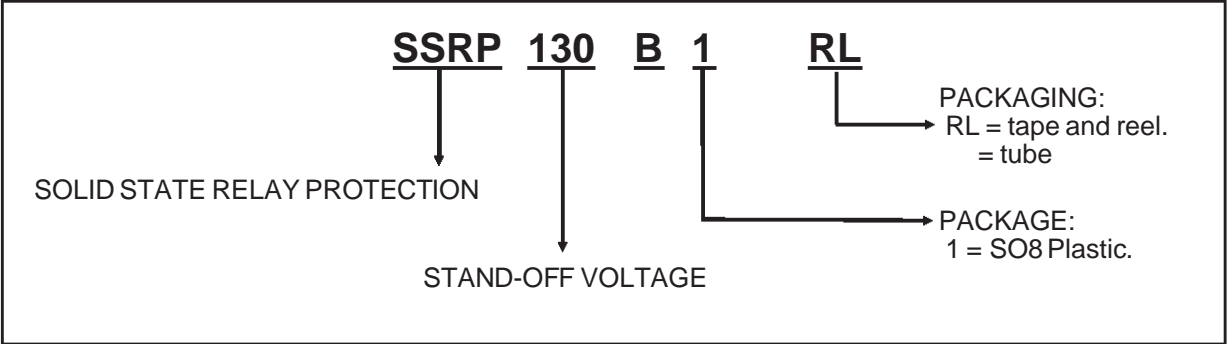
- 1) Adjust the current level at the  $I_H$  value by short circuiting the D.U.T.
- 2) Fire the D.U.T with a surge Current :  $I_{PP} = 10A$ , 10/1000 ms.
- 3) The D.U.T will come back off-state within 50 ms max.

**TEST CIRCUIT FOR  $V_{BO}$  parameters:**

Pulse ( $\mu s$ )		$V_P$ (V)	$C_1$ ( $\mu F$ )	$C_2$ (nF)	$L$ ( $\mu H$ )	$R_1$ ( $\Omega$ )	$R_2$ ( $\Omega$ )	$R_3$ ( $\Omega$ )	$R_4$ ( $\Omega$ )	$I_{PP}$ (A)	$R_p$ ( $\Omega$ )
$t_r$	$t_p$										
10	700	1000	20	200	0	50	15	25	25	25	0
1.2	50	1500	1	33	0	76	13	25	25	30	10
2	10	2500	10	0	1.1	1.3	0	3	3	38	62

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ORDER CODE

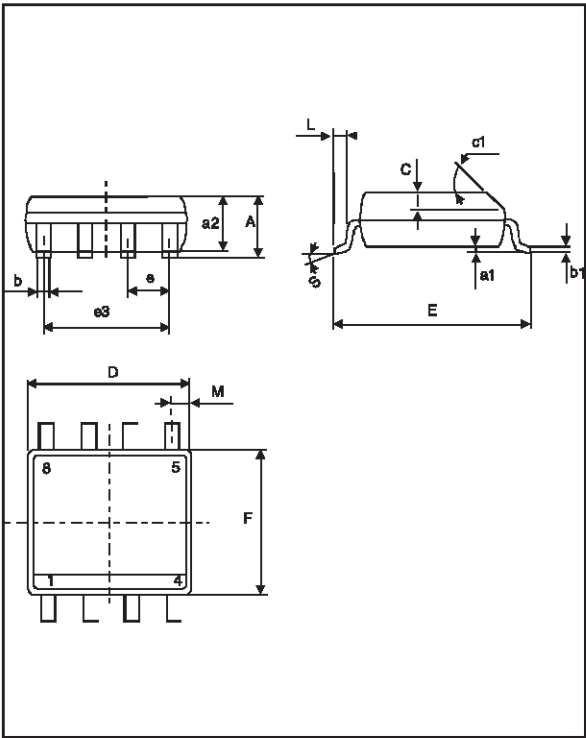


MARKING

Types	Package	Marking
SSRP130B1	SO8	SSR130

PACKAGE MECHANICAL DATA.  
SO8 Plastic

MARKING : Logo, Date Code, Part Number.



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)					

Packaging : Products supplied in antistatic tubes or tape and reel.

Weight : 0.08g



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