SSRP130B1

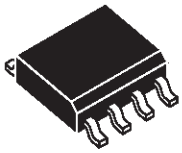
Application Specific Discretes
A.S.D.™

DUAL ASYMMETRICAL OVERVOLTAGE PROTECTION FOR TELECOM LINE

MAIN APPICATIONS

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

- Solid-State relays
- SLIC with integrated ring generator



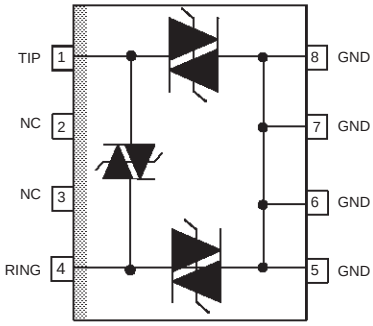
SO8

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.

FUNCTIONAL DIAGRAM



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 µs)
- Holding current : 150mA

COMPLIES WITH THE FOLLOWING STANDARDS:	Peak Surge Voltage (V)	Voltage Waveform (µs)	Current Waveform (µs)	Admissible Ipp (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	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

July 1998 - Ed: 4A

APPLICATION INFORMATION

Fig 1 : Topology of the classical line card protection.

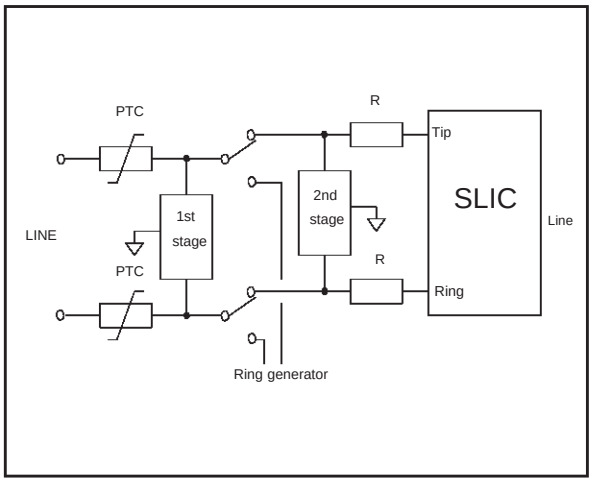
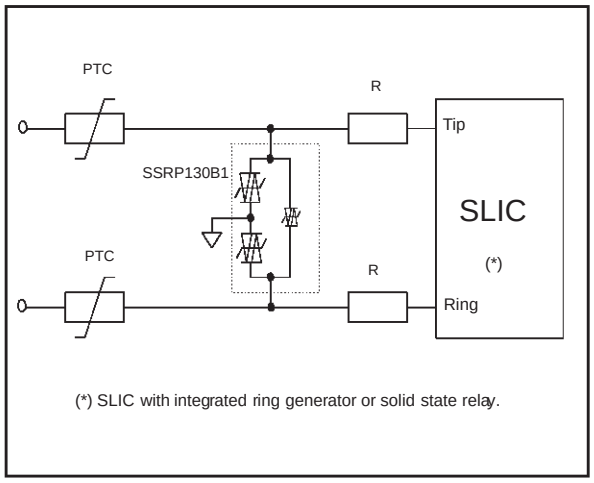


Fig 2 : Classical use of the SSRP130B1.

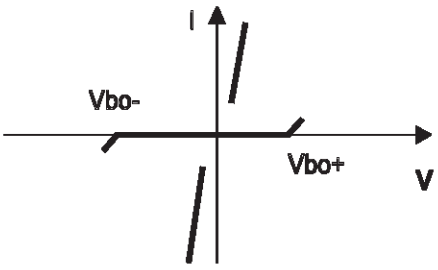


The classical line card requires protection before the ring relay and a second one for the SLIC (fig.1). The use of new SLICs with integrated ring generator or board based on solid state ring relay suppresses this second protection (Fig. 2). Then the only remaining stage, located between the line and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

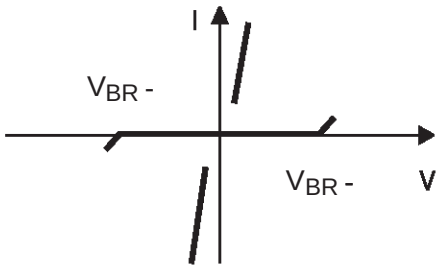
The SSRP130B1 device takes into account this fact and is based on asymmetrical voltage characteristics (Fig.3a). The ring signal being shifted back by the battery voltage, the SSRP130B1 negative breakover value Vbo- is greater than the positive one Vbo+. This point guarantees a protection operation very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

Fig 3 : SSRP130B1 electrical characteristics.

a : Line to ground characteristics.



b : Line to line characteristics.



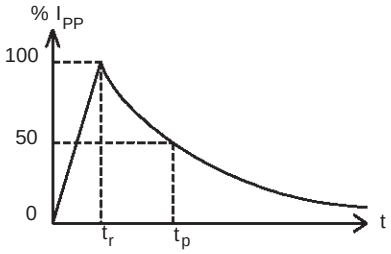
In addition with the 2 crowbar functions which perform the protection of both TIP and RING lines versus ground, a third cell assumes the differential mode protection of the SLIC. The breakdown voltage values of this third cell are the same for both positive and negative parts of the characteristics and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

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current (see note 1)	10/1000 µs 5/310µs 1/20µs 2/10µs	2x15 2x25 2x35 2x70	A
I_{TSM}	Non repetitive surge peak on-state current (F=50Hz)	tp = 0.2 s tp = 5 s tp = 900 s	7.5 4.0 1.5	A
T_{op}	Operating temperature range		0 to + 70	°C
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 :

10/1000µs	t_r=10µs	t_p=1000µs
5/310µs	t_r=5µs	t_p=310µs
1/20µs	t_r=1µs	t_p=20µs
2/10µs	t_r=2µs	t_p=10µs

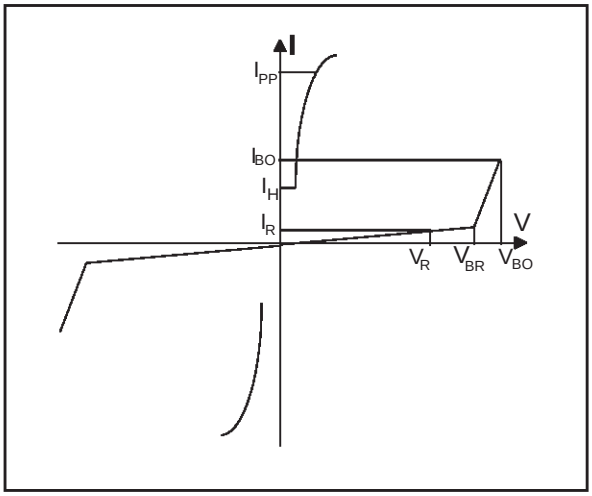


THERMAL RESISTANCE

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

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°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



ELECTRICAL CHARACTERISTICS between TIP and GND, RING and GND (T_{amb}=25°C)

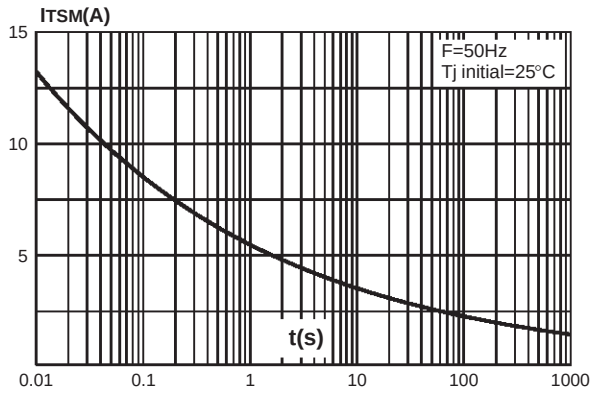
Symbol	Parameter	Test conditions (note 1)	Min	Max	Unit
V_{BO}	Breakover voltage (note 2)	Positive voltage 50Hz 10/700µs 1.2/50µs 2/10µs Negative voltage 50Hz 10/700µs 1.2/50µs 2/10µs		 200 175 180 250 280 235 240 340	V
I_{BO}	Breakover current	Positive voltage Negative voltage	110 110		mA
I_H	Holding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

ELECTRICAL CHARACTERISTICS between TIP and RING (T_{amb}=25°C)

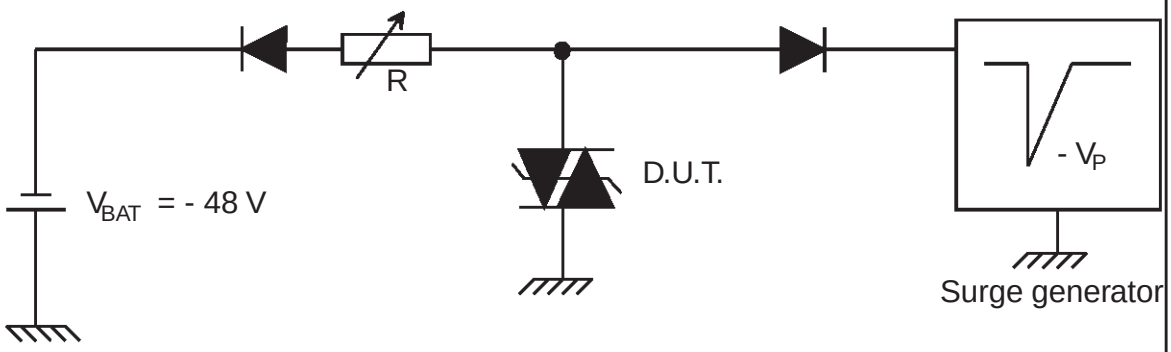
Symbol	Parameter	Test conditions	Min	Max	Unit
I_R	Leakage current (note 3)	V_R = +185 V V_R = - 185 V		10 10	µA
C	Capacitance	F = 100kHz, V = 100mV, V_R = 0V		100	pF

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 T
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)

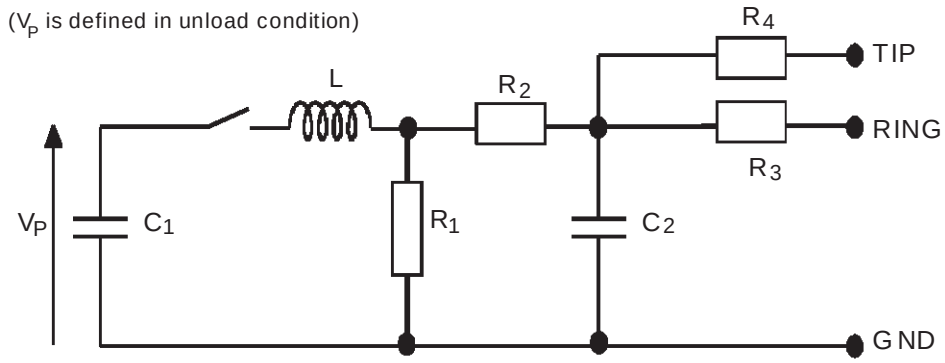


This is a GO-NOGO test which allows to confirm the holding current (I_H) level in a functional test circuit.

TEST PROCEDURE :

1) Adjust the current level at the IH value by short circuiting the D.U.T.
2) Fire the D.U.T with a surge Current : Ipp = 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 (µs)		V_p	C_1	C_2	L	R_1	R_2	R_3	R_4	I_{PP}	R_p
t_r	t_p	(V)	(µF)	(nF)	(µH)	(Ω)	(Ω)	(Ω)	(Ω)	(A)	(Ω)
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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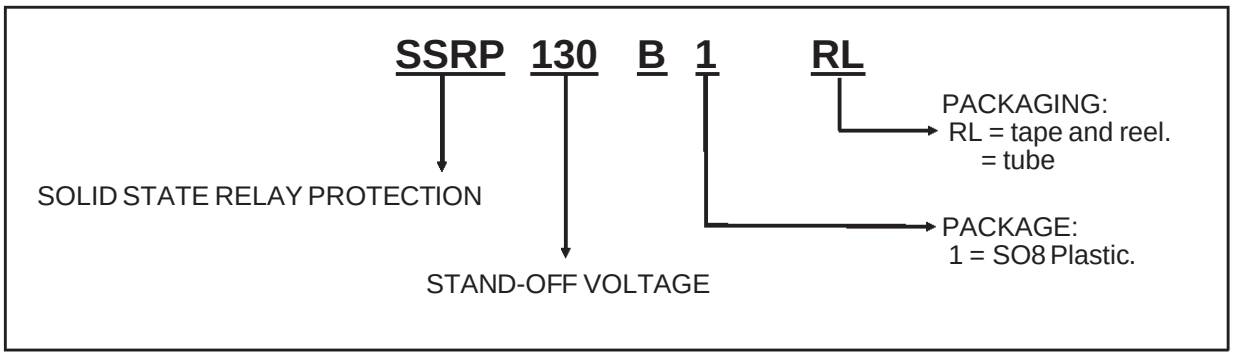
ORDER CODE



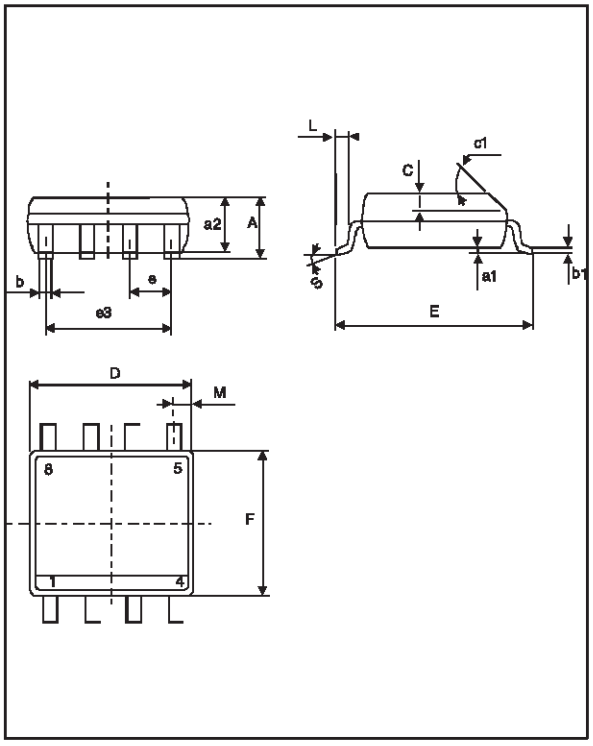
MARKING

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