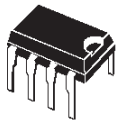
L3100B
L3100B1

Application Specific Discretes
A.S.D.™

OVERVOLTAGE AND OVERCURRENT PROTECTION FOR TELECOM LINE

FEATURES

- UNIDIRECTIONAL FUNCTION
- PROGRAMMABLE BREAKDOWN VOLTAGE UP TO 265 V
- PROGRAMMABLE CURRENT LIMITATION FROM 50 mA TO 550 mA
- HIGH SURGE CURRENT CAPABILITY
  I_{PP} = 100A 10/1000 µs



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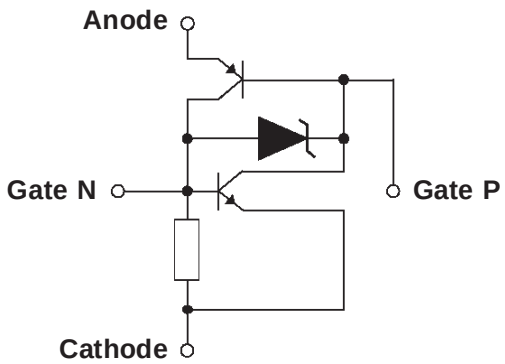
DESCRIPTION

Dedicated to sensitive telecom equipment protection, this device can provide both voltage protection and current limitation with a very tight tolerance.
Its high surge current capability makes the L3100B a reliable protection device for very exposed equipment, or when series resistors are very low.
The breakdown voltage can be easily programmed by using an external zener diode.
A multiple protection mode can also be performed when using several zener diodes, providing each line interface with an optimized protection level.
The current limiting function is achieved with the use of a resistor between the gate N and the cathode. The value of the resistor will determine the level of the desired current.

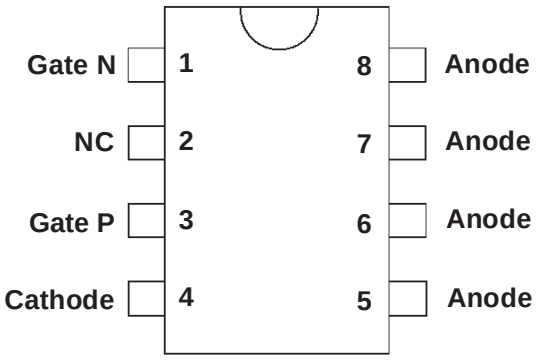
SCHEMATIC DIAGRAM



COMPLIES WITH THE FOLLOWING STANDARDS :

CCITT K17 - K20	10/700	µs	1.5	kV
	5/310	µs	38	A
VDE 0433	10/700	µs	2	kV
	5/200	µs	50	A
CNET	0.5/700	µs	1.5	kV
	0.2/310	µs	38	A

CONNECTION DIAGRAM



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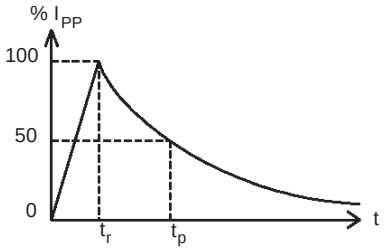
ABSOLUTE MAXIMUM RATINGS (T_{amb}= 25 °C)

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current (see note 1)	10/1000 µs 8/20 µs	100 250	A
I_{TSM}	Non repetitive surge peak on-state current	tp = 10 ms	50	A
T_{stg} T_j	Storage temperature range Maximum operating junction temperature		- 40 to + 150 + 150	°C °C
T_L	Maximum lead temperature for soldering during 10s		230	°C

Note 1 : Pulse waveform 10/1000 µs

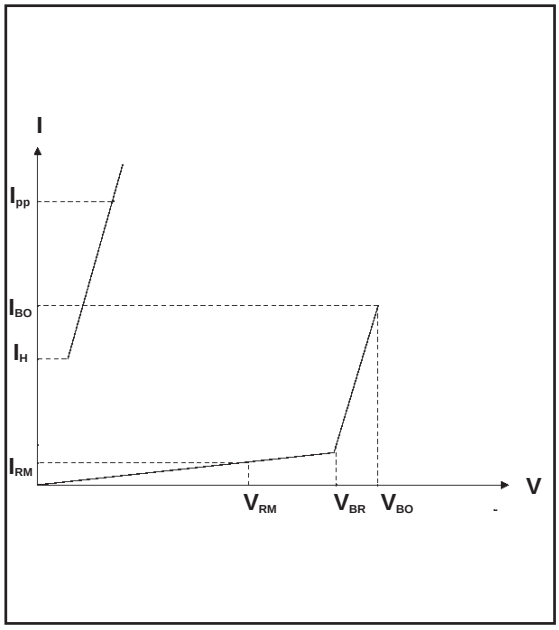


THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-to-ambient	80	°C/W

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C)

Symbol	Parameter
V_{RM}	Stand-off voltage
I_{RM}	Reverse leakage current
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
I_{BO}	Breakover current
I_{PP}	Peak pulse current
V_{GN}	Gate voltage
I_{GN}, I_{GP}	Triggering gate current
V_{RGN}	Reverse gate voltage
C	Capacitance



OPERATION WITHOUT GATE

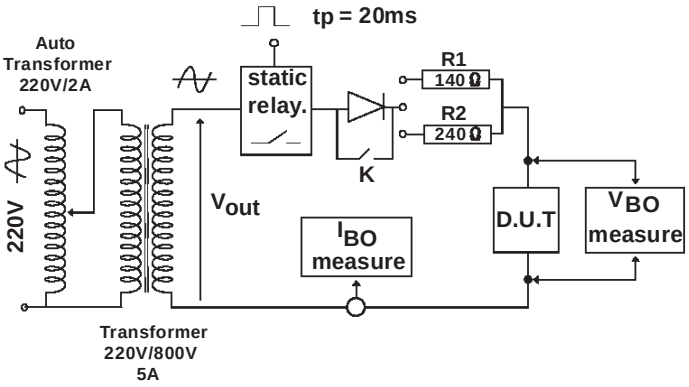
Type	I_{RM} @ V_{RM} max.		V_{BR} @ I_R min.		V_{BO} max.	@ min. note 1	I_{BO} max.	I_H min. note 1	C max. note 2
	µA	V	V	mA	V	mA	mA	mA	pF
L3100B	6 40	60 250	265	1	350	200	500	280	100
L3100B1	6 40	60 250	255	1	350	200	500	210	100

OPERATION WITH GATES

Type	V_{GN} @ I_{GN} = 200 mA min.	max.	I_{GN} @ V_{AC} = 100V min.	max.	V_{RGN} @ I_G = 1mA min.	I_{GP} @ V_{AC} = 100V max.
	V	V	mA	mA	V	mA
L3100B/B1	0.6	1.8	30	200	0.7	150

Note 1 : See the reference test circuits for I_H, I_{BO} and V_{BO} parameters.
Note 2 : V_R = 5 V, F = 1MHz.

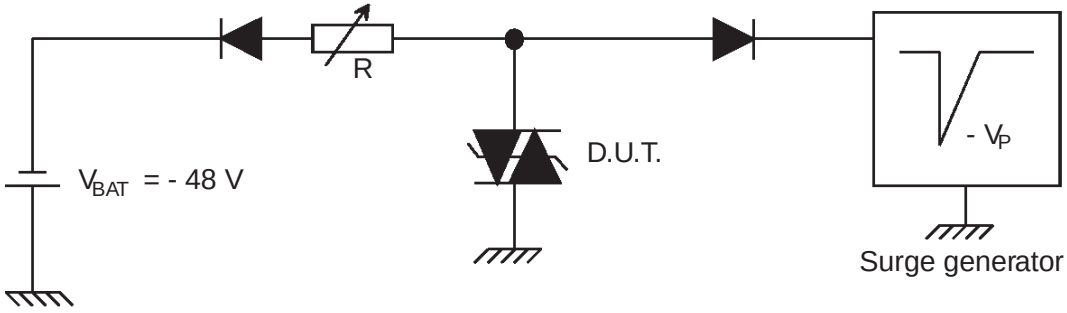
REFERENCE TEST CIRCUIT FOR I_{BO} and V_{BO} parameters :



TEST PROCEDURE :

- Pulse Test duration (tp = 20ms):
  - For Bidirectional devices = Switch K is closed
  - For Unidirectional devices = Switch K is open.
- V_{OUT} Selection
  - Device with $V_{BO} < 200$ Volt
    - $V_{OUT} = 250\ V_{RMS}$, $R_1 = 140\ \Omega$.
  - Device with $V_{BO} \geq 200$ Volt
    - $V_{OUT} = 480\ V_{RMS}$, $R_2 = 240\ \Omega$.

FUNCTIONAL HOLDING CURRENT (I_H) TEST CIRCUIT = GO - NOGO TEST.



This is a GO-NOGO Test which allows to confirm the holding current (I_H) level in a functional test circuit.
This test can be performed if the reference test circuit can't be implemented.

TEST PROCEDURE :

- 1) Adjust the current level at the I_H value by short circuiting the AK of the D.U.T.
  2) Fire the D.U.T with a surge Current : Ipp = 10A , 10/1000 µs.
  3) The D.U.T will come back to the OFF-State within a duration of 50 ms max.

Figure 1 : Surge peak current versus overload duration.

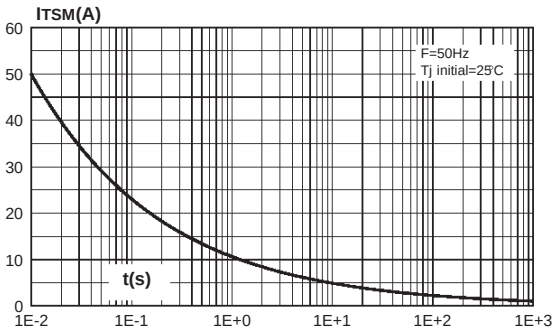


Figure 2 : Relative variation of holding current versus junction temperature.

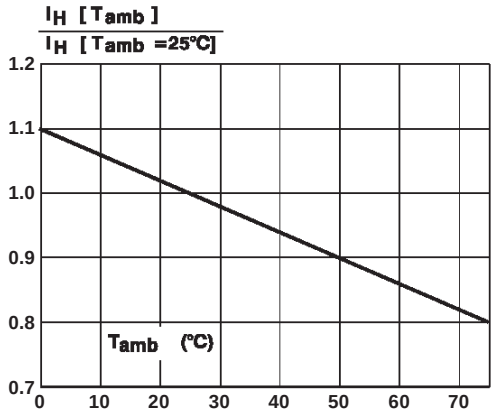


Figure 3 : Relative variation of breakdown voltage versus ambient temperature.

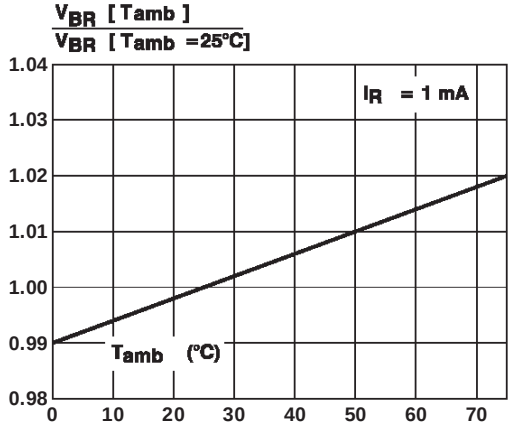
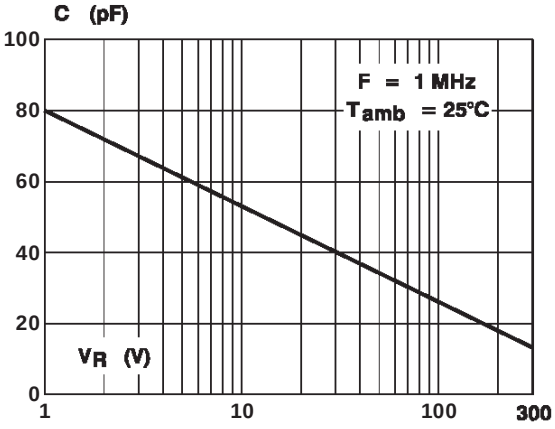


Figure 4 : Junction capacitance versus reverse applied voltage.



APPLICATION CIRCUIT

Overvoltage Protection and Current limitation

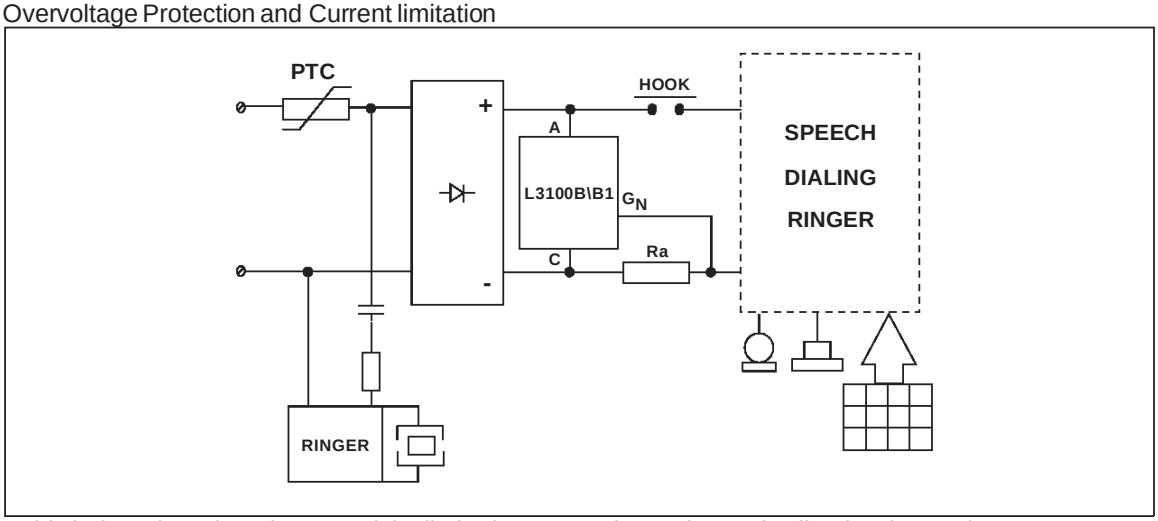
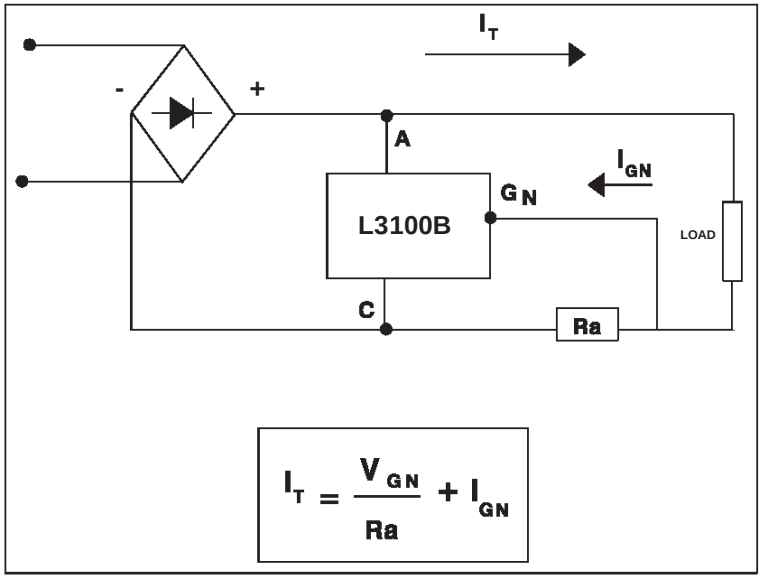


Table below gives the tolerance of the limited current I_T for each standardized resistor value.
The formula (1) has been used with V_{GN} values specified at the typical gate current level I_{GN}.

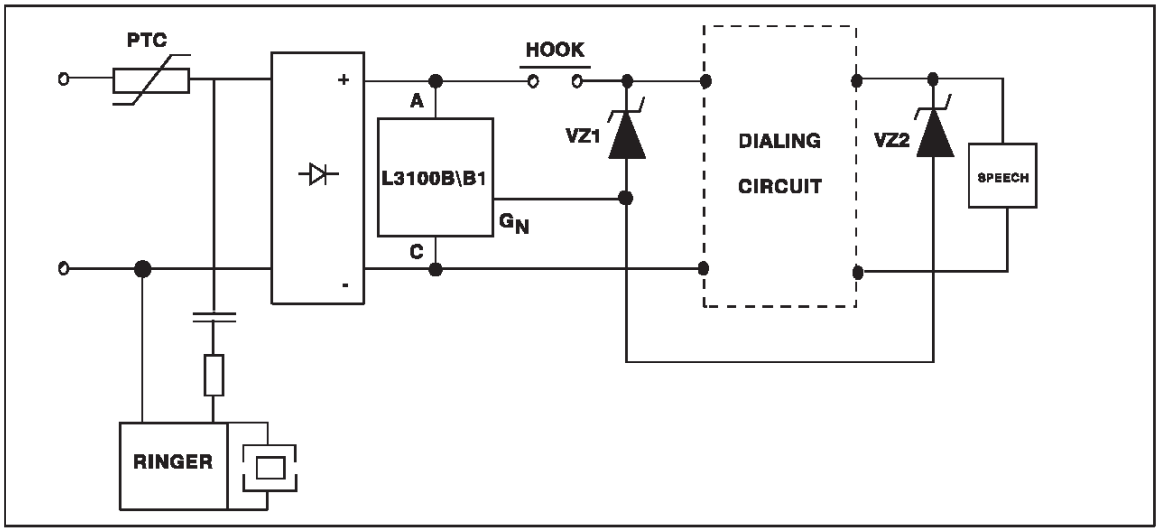
CURRENT TOLERANCE

R Ω (± 5%)	I_T mA min	I_T mA max
3.00	268	533
3.30	246	503
3.60	228	478
3.90	213	456
4.30	196	433
4.70	181	413
5.10	170	396
5.60	158	379
6.20	145	361
6.80	135	347
7.50	152	333
8.20	117	322
9.10	108	310
10.10	101	299
11.00	95	291
12.00	90	283
13.00	85	277
15.00	78	266
16.00	75	263
18.00	70	256
20.00	66	250
22.00	62	245
24.00	60	242
27.00	56	237
30.00	54	233



V_{GN} @ I_{GN}		
Min.	Max.	Typ.
V	V	mA
0.75	0.95	100

Ground key telephone set Protection



PROTECTION MODES :

ON HOOK = Ringer circuit protection is ensured with breakdown voltage at 265 V.

OFF HOOK = In dialing mode and in speech mode, the breakdown voltage of L3100B can be adapted to different levels with zener diodes.

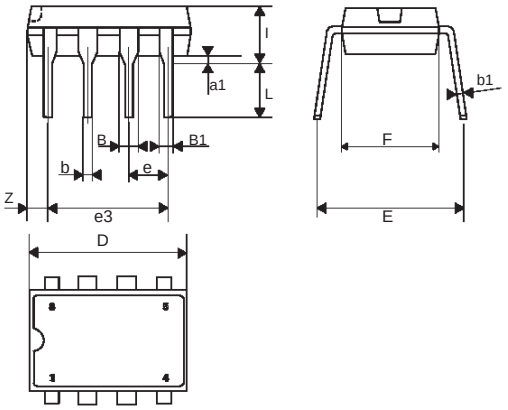
ORDER CODE

L3100 B 1

VERSION.
= VBR = 265 V
1 = VBR = 255 V

MARKING : Logo, Date Code,part Number.

PACKAGE MECHANICAL DATA.
DIL 8 (Plastic)



REF.	DIMENSIONS					
	Millimetres			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
a1	0.70			0.027		
B	1.39		1.65	0.055		0.065
B1	0.91		1.04	0.036		0.041
b		0.5			0.020	
b1	0.38		0.50	0.015		0.020
D			9.80			0.385
E		8.8			0.346	
e		2.54			0.100	
e3		7.62			0.300	
F			7.1			0.280
I			4.8			0.189
L		3.3			0.130	
Z	0.44		1.60	0.017		0.063

Weight:0.59 g

Packaging : Product supplied in antistatic tubes.