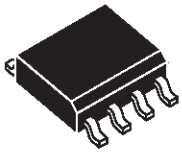
THBT7011D

Application Specific Discretes
A.S.D.™

DUAL OVERVOLTAGE
PROTECTION FOR TELECOM LINE

FEATURES

- BIDIRECTIONAL CROWBAR PROTECTION.
- PEAK PULSE CURRENT :
  I_{PP} = 30A for 10/1000µs surge.
- HOLDING CURRENT :
  I_H = 150mA.
- BREAKDOWN VOLTAGE: 70V Min.
- LOW DYNAMIC BREAKOVER VOLTAGE.



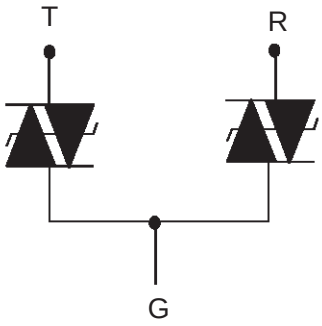
SO-8

DESCRIPTION

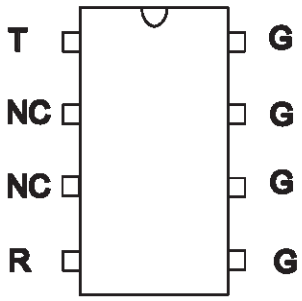
Dedicated to telecommunication equipment protection, this device provides a dual bidirectional protection function.

Dynamic characteristics have been defined for several types of surges, in order to meet the SLIC maximum ratings.

FUNCTIONAL DIAGRAM



PINOUT CONFIGURATION



TM: ASD is trademarks of STMicroelectronics.

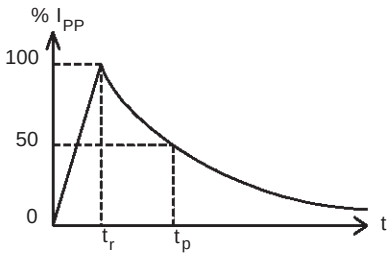
COMPLIES WITH THE FOLLOWING STANDARDS:	Peak Surge Voltage (V)	Voltage Waveform (µs)	Current Waveform (µs)	Admissible Ipp (A)	Necessary Resistor (Ω)
CCITT K20	4000	10/700	5/310	25	-
VDE0433	4000	10/700	5/310	40	10
VDE0878	4000	1.2/50	1/20	50	-
IEC-1000-4-5	level 4 level 4	10/700 1.2/50	5/310 8/20	25 50	- -
FCC Part 68, lightning surge type A	1500 800	10/160 10/560	10/160 10/560	47 35	25 15.5
FCC Part 68, lightning surge type B	100	9/720	5/320	25	-
BELLCORE TR-NWT-001089 First level	2500 1000	2/10 10/1000	2/10 10/1000	90 30	23 24
BELLCORE TR-NWT-001089 Second level	5000	2/10	2/10	90	50
CNET I31-24	4000	0.5/700	0.8/310	25	-

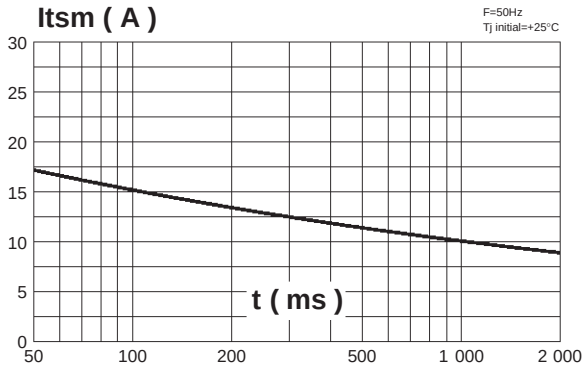
ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25°C)

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current (see note 1)	10/1000 µs	30	A
I_{TSM}	Non repetitive surge peak on-state current (F=50Hz)	tp = 100 ms t = 1s	15.5 9	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		260	°C

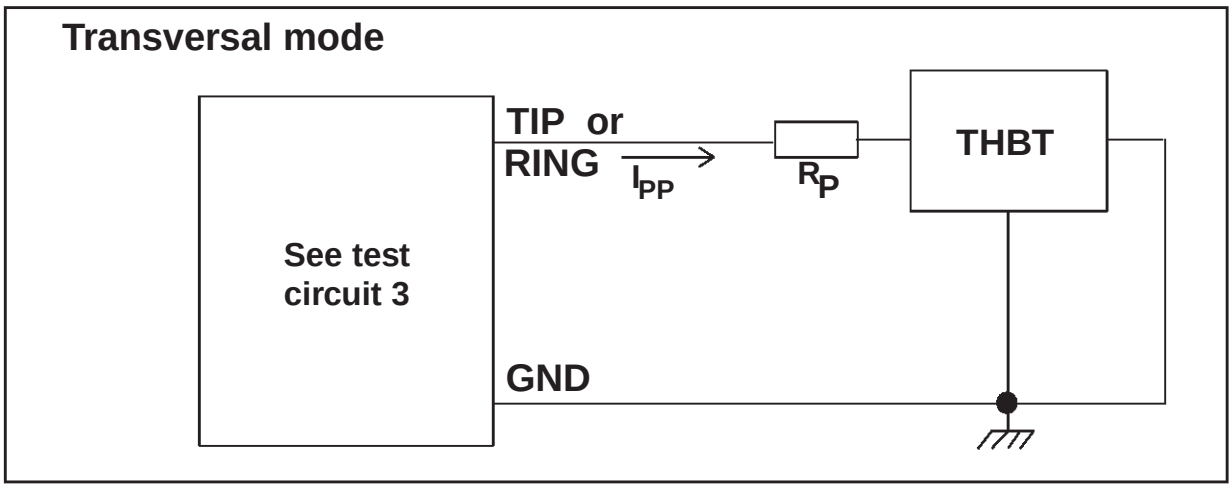
Note 1 : Pulse waveform :

10/1000µs t_r=10µs t_p=1000µs





TEST CIRCUITS FOR I_{PP}

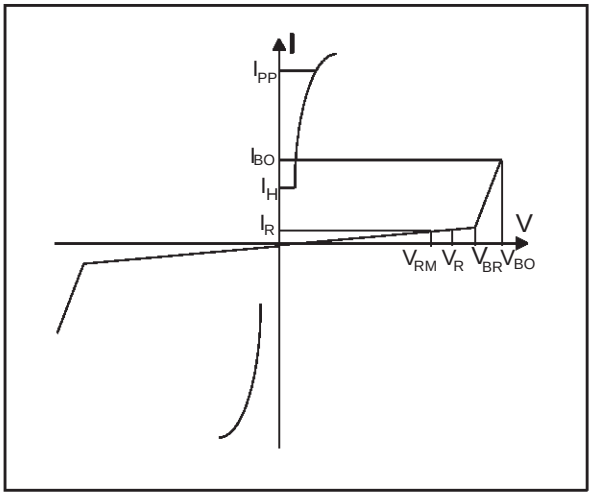


THERMAL RESISTANCES

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

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

Symbol	Parameter
V_{RM}	Stand-off voltage
I_{RM}	Leakage current at stand-off voltage
V_R	Continuous Reverse voltage
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
I_{BO}	Breakover current
I_{PP}	Peak pulse current
C	Capacitance



STATIC PARAMETERS BETWEEN TIP AND GND, RING AND GND

Type	I_{RM} @ V_{RM}		I_R @ V_R		V_{BO} @ I_{BO}			I_H	C
	max.		max. note 1		max. note 2	min.	max.	min note 3	max note 4
	µA	V	µA	V	V	mA	mA	mA	pF
THBT7011D	5	66	50	70	89	50	400	150	80

STATIC PARAMETERS BETWEEN TIP AND RING

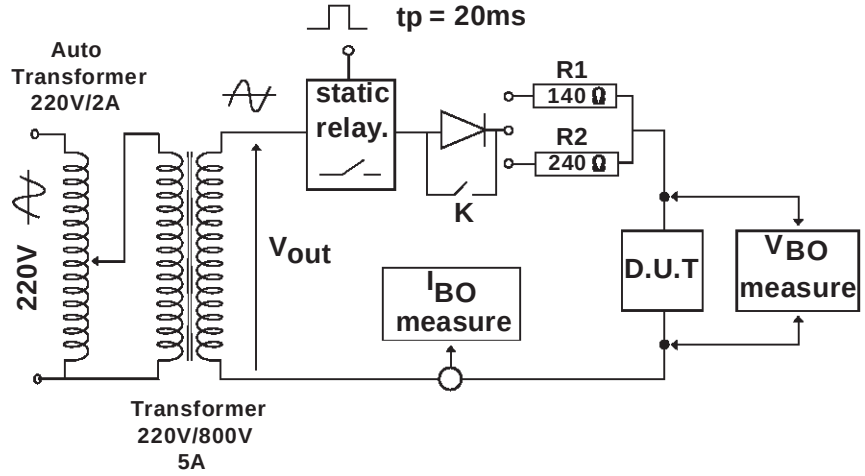
Type	I_{RM} @ V_{RM}		I_R @ V_R		C
	max.	note 6	max.	note 6	max note 4
	µA	V	µA	V	pF
THBT7011D	5	132	50	140	40

Note 1: I_R measured at V_R guarantees $V_{BR} > V_R$
Note 2: Measured at 50 Hz (1 cycle) test circuit 1.
Note 3: See the reference test circuit 2.
Note 4: V_R = 1V, F = 1MHz.
Note 5 : See test circuit 3 for V_{BO} dynamic parameters; R_p is the protection resistor located on the line card.
Note 6: Ground not connected or $|V_{TIP}| = |V_{RING}|$ versus Ground

DYNAMIC BREAKOVER VOLTAGES (Transversal mode)

Type	Symbol	Test conditions (see note 5)				Maximum	Unit
THBT7011D	V_{BO}	10/700µs	1.5kV	R_p=10Ω	I_{PP}=30A	90	V
		1.2/50µs	1.5kV	R_p=10Ω	I_{PP}=30A	95	
		2/10µs	2.5kV	R_p=62Ω	I_{PP}=38A	150	

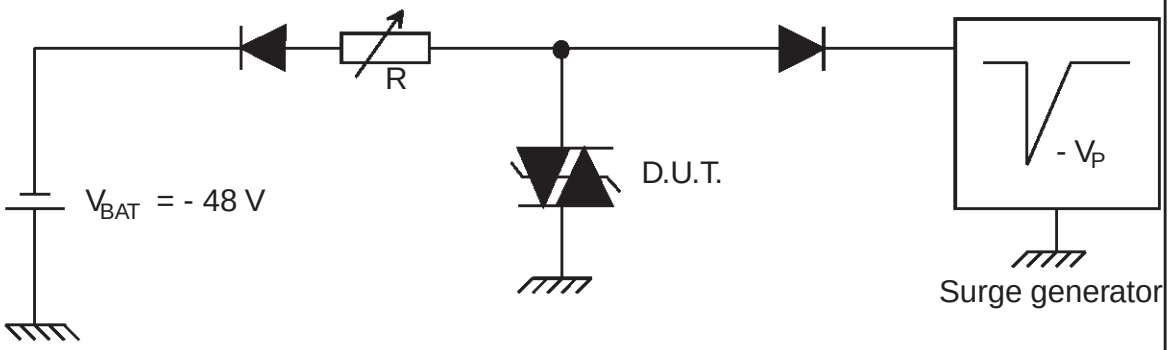
TEST CIRCUIT 1 for I_{BO} and V_{BO} parameters :



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 Ω.
  - Device with V_{BO} ≥ 200 Volt
    - V_{OUT} = 480 V_{RMS}, R_2 = 240 Ω.

TEST CIRCUIT 2 for I_H parameter.

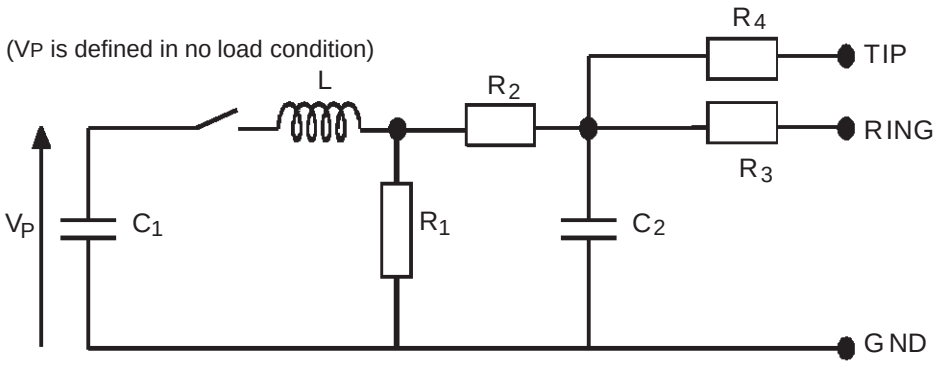


This is a GO-NOGO test which allows to confirm the holding current (I_H) level in a functional test circuit.

TEST PROCEDURE :

- 1) Adjust the current level at the I_H value by short circuiting the 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 off-state within 50 ms max.

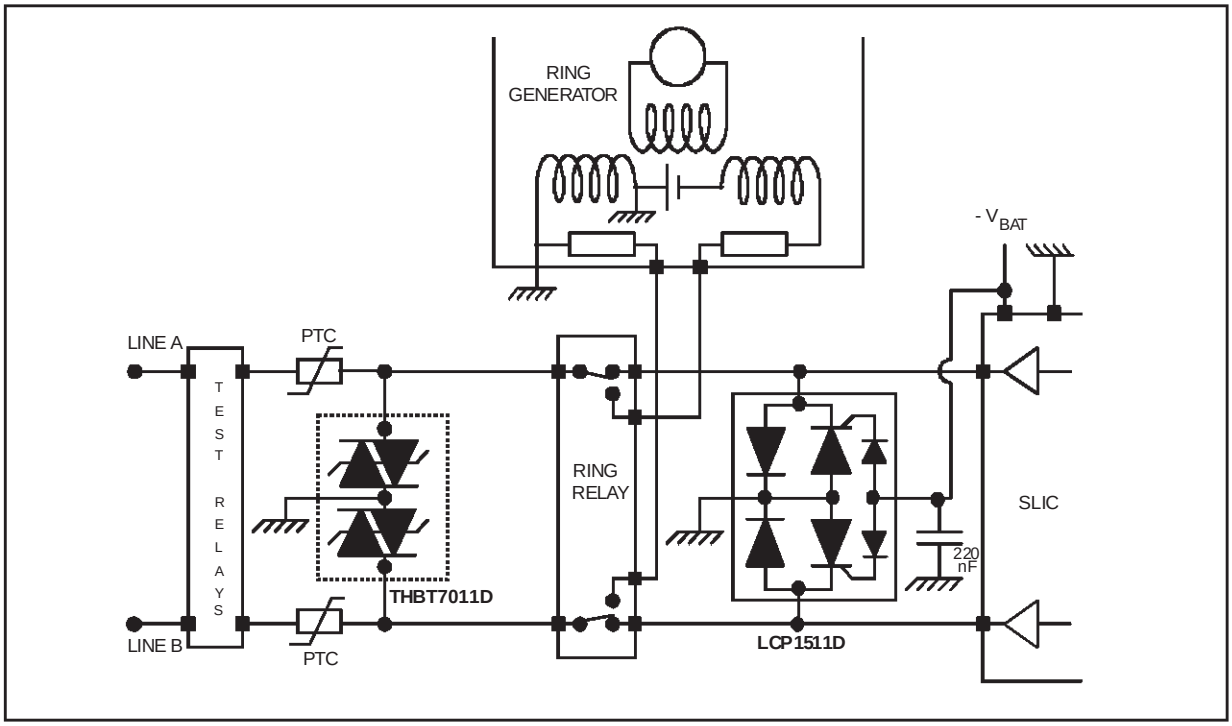
TEST CIRCUIT 3 for I_{PP} and V_{BO} parameters :



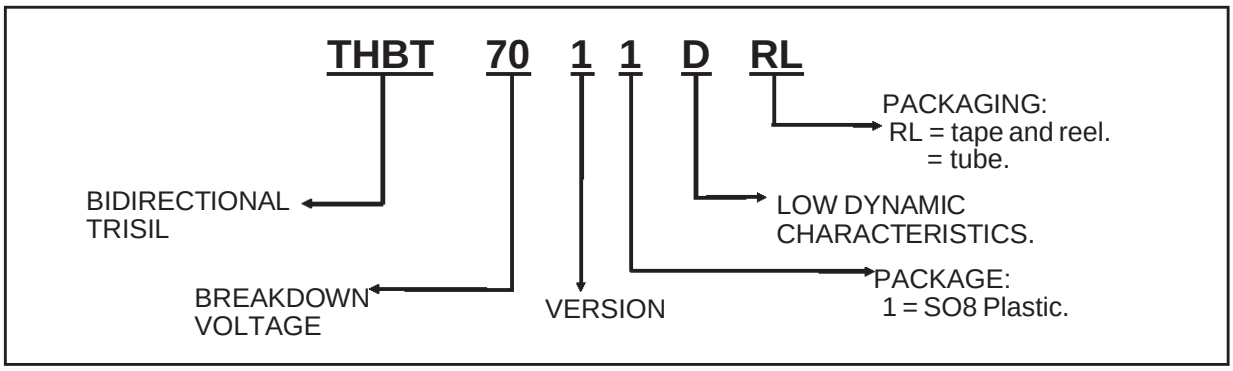
Pulse (µs)		V_p	C_1	C_2	L	R_1	R_2	R_3	R_4	I_{PP}	R_p
t_r	t_p	(V)	(µF)	(nF)	(µH)	(Ω)	(Ω)	(Ω)	(Ω)	(A)	(Ω)
10	700	1500	20	200	0	50	15	25	25	30	10
1.2	50	1500	1	33	0	76	13	25	25	30	10
2	10	2500	10	0	1.1	1.3	0	3	3	38	62

APPLICATION CIRCUIT :

1 - Line card protection



ORDER CODE



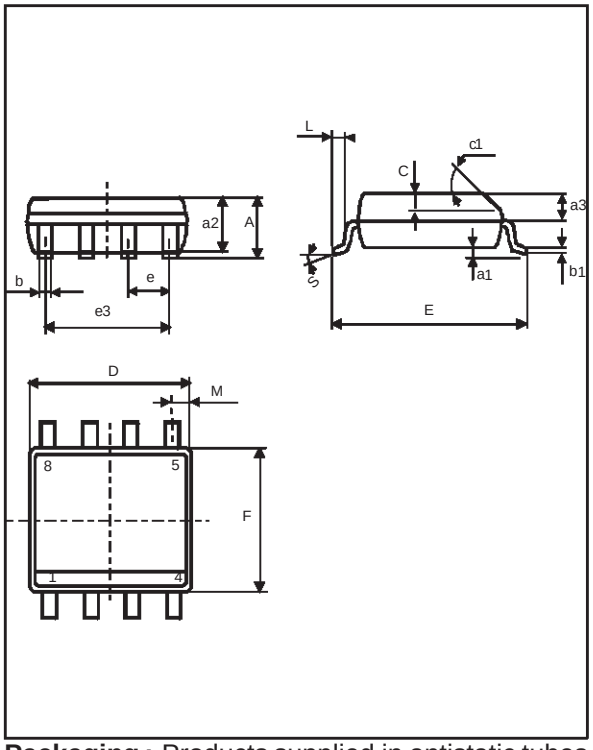
MARKING

Types	Package	Marking
THBT7011D	SO-8	BT701D

PACKAGE MECHANICAL DATA.

SO-8 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
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)					

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

Weight : 0.08g

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