SGS-THOMSON MICROELECTRONICS

TPUxx/SMTHDTxx

TRISIL
DISCRETE SOLUTION FOR ISDN PROTECTION

FEATURES

- UNDIRECTIONAL CROWBAR PROTECTION.
- PEAK PULSE CURRENT : I_{PP} = 75 A , 10/1000 µs.
- HOLDING CURRENT = 150mA.
- BREAKDOWN VOLTAGE:
  TPU58/SMTHDT58 = 58V.
  TPU80/SMTHDT80 = 80V.
  TPU120/SMTHDT120 = 120V.
- PACKAGES:
  TPUxx = AXIAL DIODE.
  SMTHDTxx = SURFACE MOUNT PACKAGE.

CB429
(Plastic)

SOD15
(Plastic)

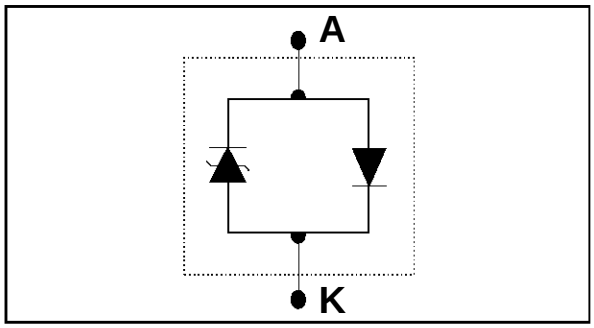
DESCRIPTION: TRIBALANCED PROTECTION

Dedicated protection devices for ISDN LINE CARD and high speed data telecom lines.

Used with the recommended configuration using 3 components, they will provide =

- Dual bidirectionnal protection, with fixed breakdown voltage in both common and differential modes.
- Low capacitances from lines to ground.
- Very good capacitance balance : ΔC= 30 pF.

FUNCTIONAL DIAGRAM.



ABSOLUTE RATINGS (limiting values) (-40°C ≤ T_{amb} ≤ +85°C)

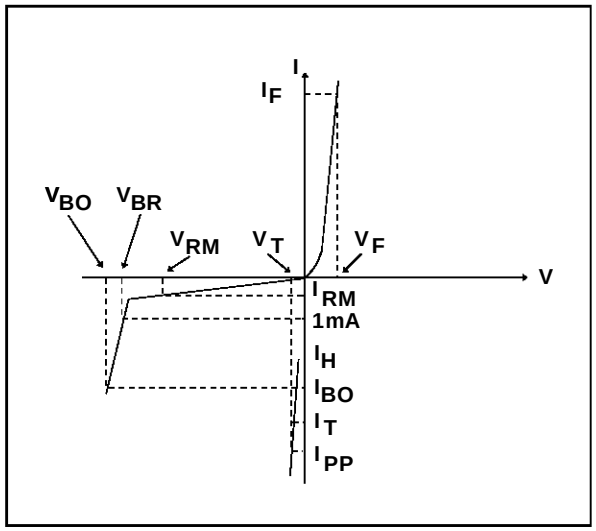
Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current	10/1000 µs 8/20 µs	75 150	A
I_{TSM}	Non repetitive surge peak on-state current	tp = 20 ms	30	A
di/dt	Critical rate of rise of on-state current	Non repetitive	100	A/µs
dv/dt	Critical rate of rise of off-state voltage	67% V_{BR}	5	KV/µs
T_{stg} T_j	Storage and operating junction temperature range		- 40 to + 150 + 150	°C °C

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
R_{th} (j-l)	Junction-leads Thermal Resistance	CB429 SOD15	20 20	°C/W °C/W

ELECTRICAL CHARACTERISTICS

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
V_T	On-state voltage
VF	Forward Voltage Drop
I_{BO}	Breakover current
I_{PP}	Peak pulse current



PARAMETERS RELATED TO THE DIODE.

Parameter	Test conditions	Value	Unit
V_F	I_F = 5A, T_P = 500 µs	5	V

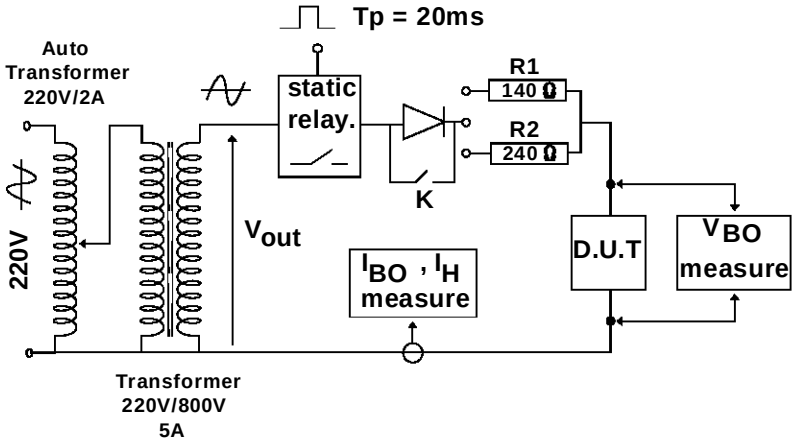
PARAMETERS RELATED TO THE PROTECTION TRISIL.

Types	I_R @ V_{RM} max		V_{BR} @ I_R min		V_{BO} max note1	I_{BO} min note1	I_{BO} max note1	IH min note1	VT max note2	C max note3
	µA	V	V	mA	V	mA	mA	mA	V	pF
TPU58/SMTHDT58	10	56	58	1	80	150	800	150	5	400
TPU80/SMTHDT80	10	68	80	1	120	150	800	150	5	250
TPU120/SMTHDT120	10	102	120	1	180	150	800	150	5	200

All parameters tested at 25 °C, except where indicated.

Note 1 : See the reference test circuit for I_H, I_{BO} and V_{BO} parameters.
Note 2 : Square pulse Tp = 500 µs - I_T = 5A.
Note 3 : V_R = 1V, F = 1MHz.

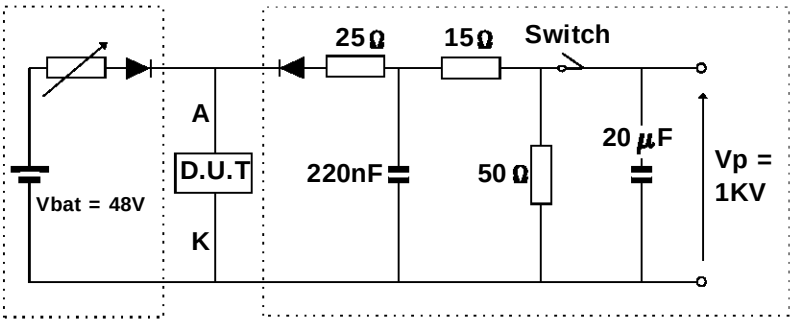
REFERENCE TEST CIRCUIT FOR I_H, I_{BO} and V_{BO} parameters :



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 $V_{BR} \leq 150$ Volt
    - $V_{OUT} = 250\ V_{RMS}$, $R_1 = 140\ \Omega$.
  - Device with $V_{BR} \geq 150$ Volt
    - $V_{OUT} = 480\ V_{RMS}$, $R_2 = 240\ \Omega$.

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



Surge Generator
10/700 µsec
Vp =1KV / Ipp = 25A

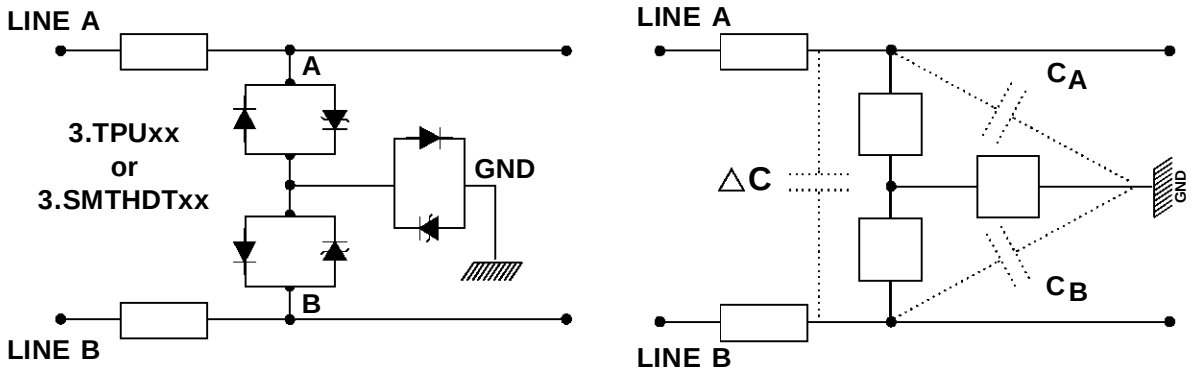
This is a GO-NOGO Test which allows to confirm the holding current (I_H) level in a functional test circuit. This test can be performed if the reference test circuit can't be implemented.

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 = 25A , 10/700 µs.
  3) The D.U.T will come back to the OFF-State within a duration of 50 ms max.

APPLICATION NOTE

ISDN PROTECTION.



TRIPOLE PROTECTION

FULL BALANCED PROTECTION

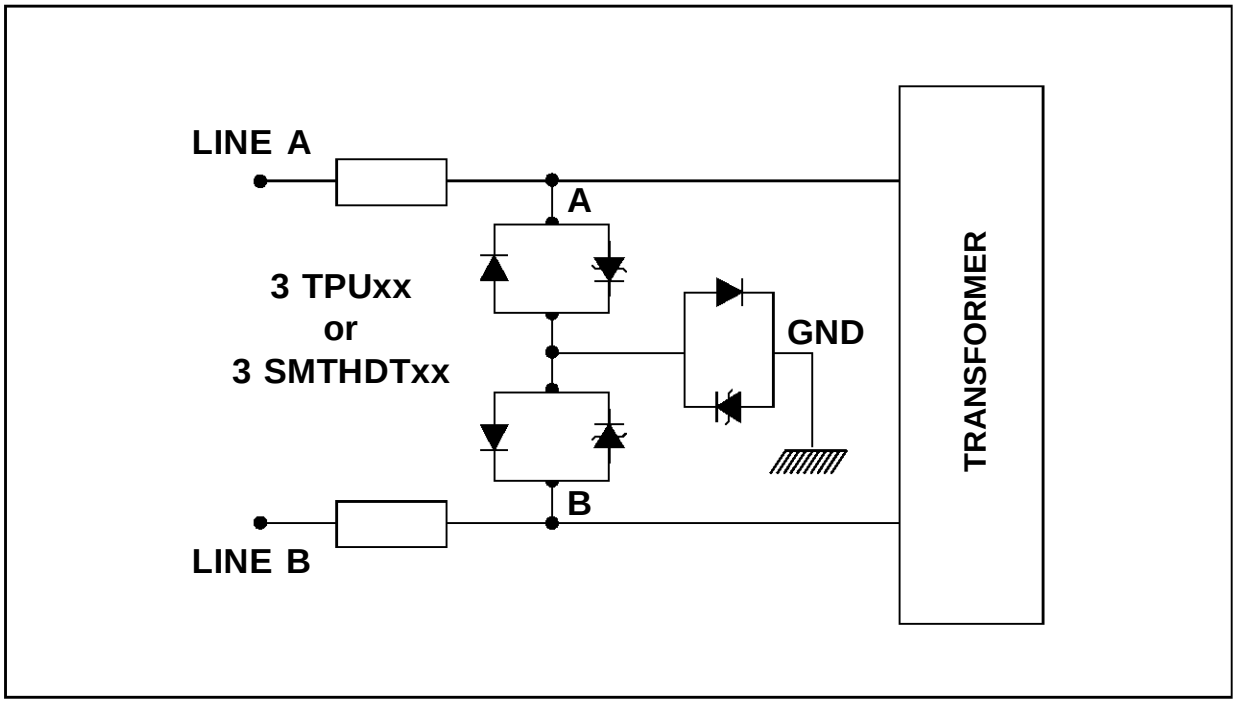
RECOMMENDED CONFIGURATION FOR TRIBALANCED PROTECTION MODE.

CAPACITANCE CHARACTERISTICS

Type	CONFIGURATION		C_A pF	C_B pF	ΔC pF
	LINE A	LINE B	Max	Max	Max
TPU58/SMTHDT58	48	0	80	60	30
TPU80/SMTHDT80	56	0	70	50	30
TPU120/SMTHDT120	110	0	70	50	30

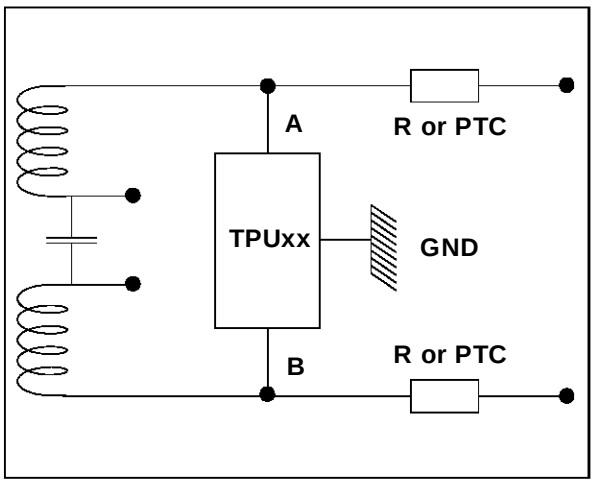
APPLICATION NOTE

Discrete ISDN Protection solution

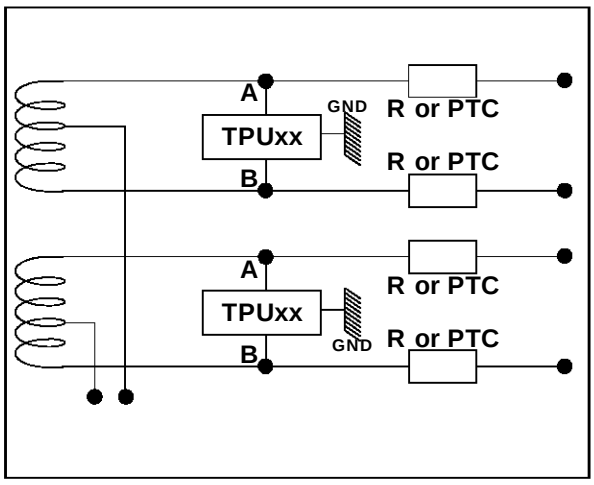


EQUIVALENT PROTECTION FUNCTION

U Interface Protection

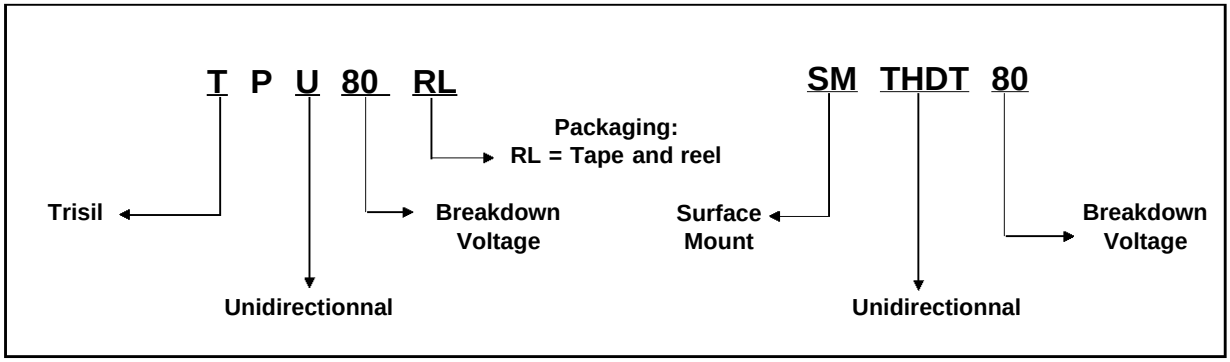


S Interface Protection



This topology assumes the same breakdown voltage level in positive and negative for differential or common mode surge.

ORDER CODE



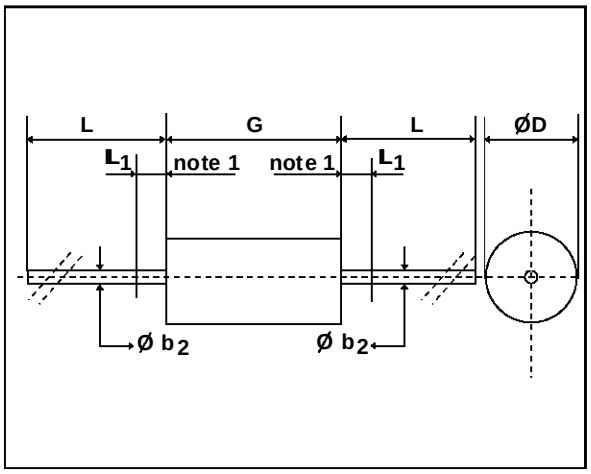
MARKING

Package	Type	Marking
CB429	TPU58 TPU80 TPU120	TPU58 TPU80 TPU120
A white band indicates the cathode		

Package	Type	Marking
SOD15	SMTHDT58 SMTHDT80 SMTHDT120	W01 W03 W05
A white band indicates the cathode		

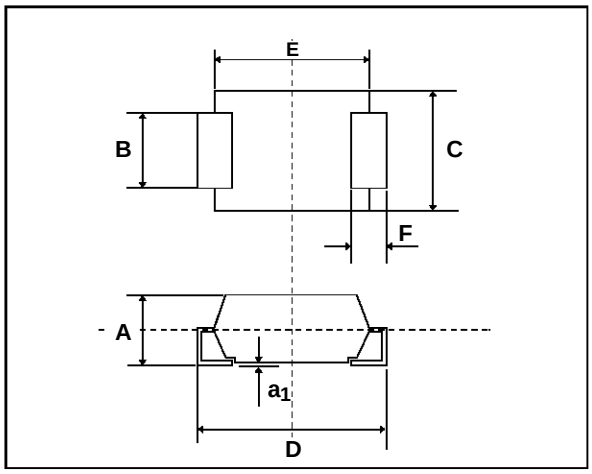
PACKAGE MECHANICAL DATA

CB429



Ref	Millimeters		Inches	
	min	max	min	max
∅ b_2	-	1.06	-	0.042
∅ D	-	5.1	-	0.20
G	-	9.8	-	0.386
L	26	-	1.024	-
L_1	-	1.27	-	0.050
note1: The diameter ∅ b_2 is not controlled over zone L_1.				

SOD15



Ref	Millimeters		Inches	
	min	max	min	max
A	2.5	3.1	0.098	0.122
a_1	-	0.2	-	0.008
B	2.9	3.1	0.114	0.122
C	4.8	5.2	0.190	0.200
D	7.6	8.0	0.300	0.315
E	6.3	6.6	0.248	0.259
F	1.3	1.7	0.051	0.067

Packaging : Axial Diode CB429 = Products Supplied in Tape and Reel.
SOD15 =Standard packaging is in Film.