



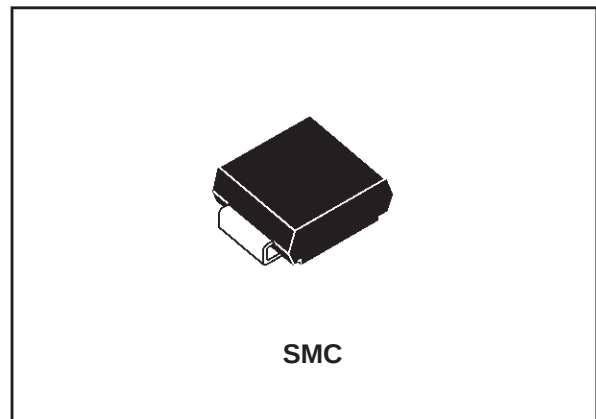
# SMTHDTxx

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

TRISIL<sup>TM</sup>  
DISCRETE SOLUTION FOR ISDN PROTECTION

## FEATURES

- UNIDIRECTIONAL CROWBAR PROTECTION.
- PEAK PULSE CURRENT:  
IPP = 75 A , 10/1000  $\mu$ s.
- HOLDING CURRENT = 150mA.
- BREAKDOWN VOLTAGE:  
SMTHDT58 = 58V.  
SMTHDT80 = 80V.  
SMTHDT120 = 120V.
- PACKAGES:  
SMTHDTxx = SURFACE MOUNT PACKAGE.



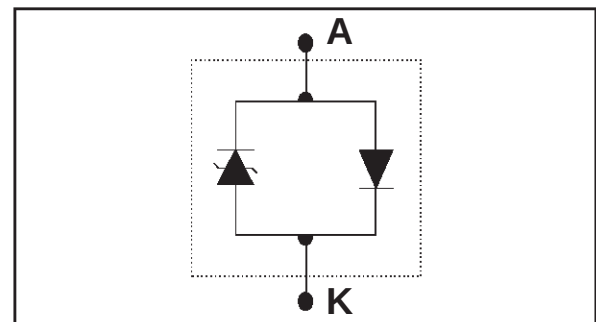
## DESCRIPTION: TRIBALANCED PROTECTION

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 :  $\Delta C = 30$  pF.

## FUNCTIONAL DIAGRAM.



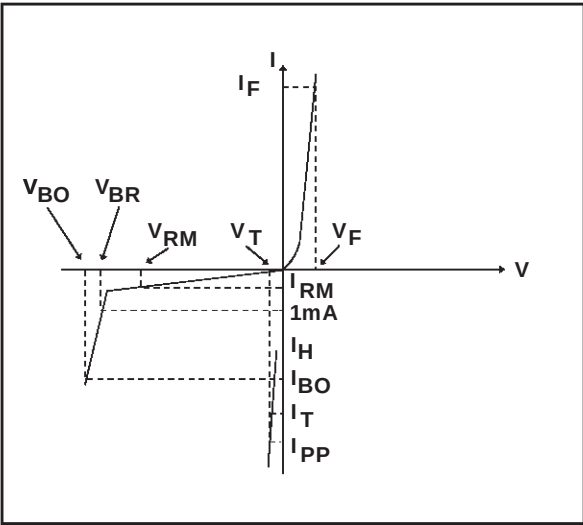
## ABSOLUTE RATINGS (limiting values) ( $-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +85^{\circ}\text{C}$ )

| Symbol     | Parameter                                        |                                 | Value                  | Unit                                     |
|------------|--------------------------------------------------|---------------------------------|------------------------|------------------------------------------|
| IPP        | Peak pulse current                               | 10/1000 $\mu$ s<br>8/20 $\mu$ s | 75<br>150              | A                                        |
| ITSM       | 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/ $\mu$ s                               |
| dv/dt      | Critical rate of rise of off-state voltage       | 67% VBR                         | 5                      | KV/ $\mu$ s                              |
| Tstg<br>Tj | Storage and operating junction temperature range |                                 | - 40 to + 150<br>+ 150 | $^{\circ}\text{C}$<br>$^{\circ}\text{C}$ |

## THERMAL RESISTANCES

| Symbol    | Parameter                         |     | Value | Unit                        |
|-----------|-----------------------------------|-----|-------|-----------------------------|
| Rth (j-l) | Junction-leads Thermal Resistance | SMC | 200   | $^{\circ}\text{C}/\text{W}$ |

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



PARAMETERS RELATED TO THE DIODE.

| Parameter | Test conditions                | Value | Unit |
|-----------|--------------------------------|-------|------|
| $V_F$     | $I_F = 5A$ , $T_P = 500 \mu s$ | 5     | V    |

PARAMETERS RELATED TO THE PROTECTION TRISIL.

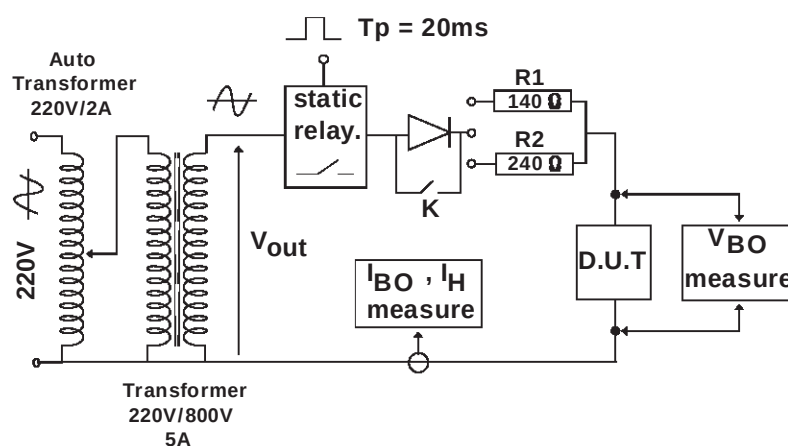
| Types     | $I_R$ @ $V_{RM}$ |     | $V_{BR}$ @ $I_R$ |    | $V_{BO}$ | $I_{BO}$ |       | $I_H$ | $V_T$ | $C$   |
|-----------|------------------|-----|------------------|----|----------|----------|-------|-------|-------|-------|
|           | max              |     | min              |    | max      | min      | max   | min   | max   | max   |
|           | $\mu A$          | V   | V                | mA | V        | note1    | note1 | note1 | note2 | note3 |
| SMTHDT58  | 10               | 56  | 58               | 1  | 80       | 150      | 800   | 150   | 5     | 400   |
| SMTHDT80  | 10               | 68  | 80               | 1  | 120      | 150      | 800   | 150   | 5     | 250   |
| SMTHDT120 | 10               | 102 | 120              | 1  | 180      | 150      | 800   | 150   | 5     | 200   |

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

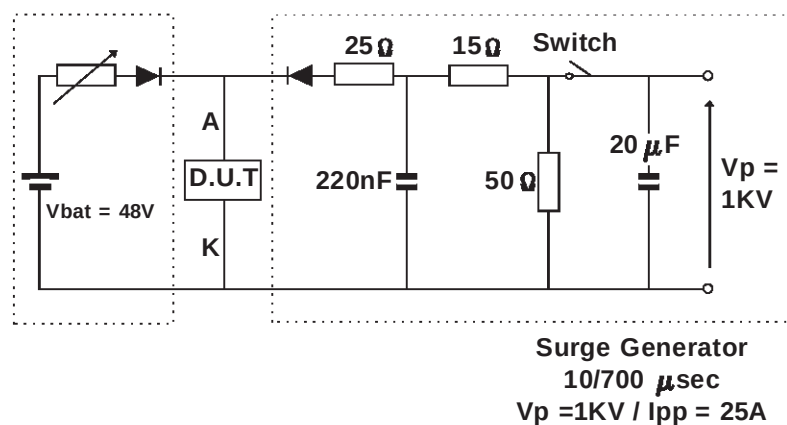
**Note 1 :** See the reference test circuit for  $I_H$ ,  $I_{BO}$  and  $V_{BO}$  parameters.

**Note 2 :** Square pulse  $T_p = 500 \mu s$  -  $I_T = 5A$ .

**Note 3 :**  $V_R = 1V$ ,  $F = 1MHz$ .

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

**TEST PROCEDURE :**

- Pulse Test duration ( $T_p = 20\text{ms}$ ):
  - For Bidirectional devices = Switch K is closed
  - For Unidirectional devices = Switch K is open.
- $V_{OUT}$  Selection
  - Device with  $V_{BR} \leq 150\text{ Volt}$ 
    - $V_{OUT} = 250\text{ V}_{RMS}$ ,  $R_1 = 140\ \Omega$ .
  - Device with  $V_{BR} \geq 150\text{ Volt}$ 
    - $V_{OUT} = 480\text{ V}_{RMS}$ ,  $R_2 = 240\ \Omega$ .

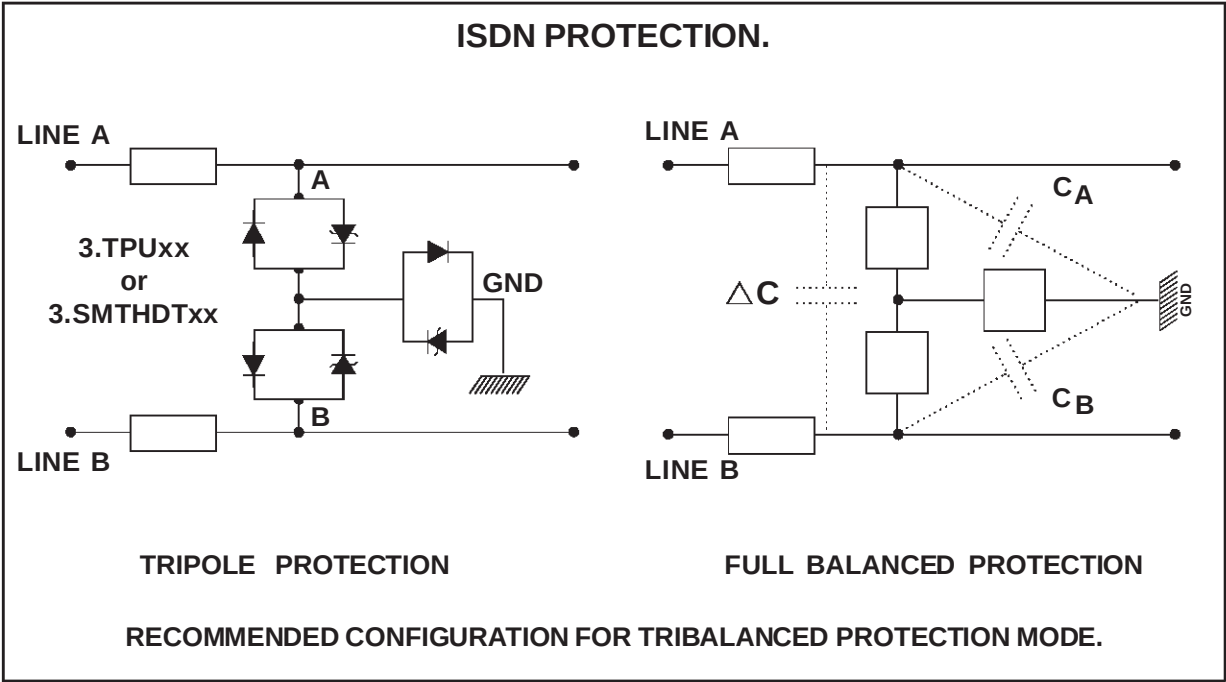
**FUNCTIONAL HOLDING CURRENT ( $I_H$ ) TEST CIRCUIT = GO - NOGO TEST.**


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 :  $I_{pp} = 25\text{A}$  ,  $10/700\ \mu\text{s}$ .
- 3) The D.U.T will come back to the OFF-State within a duration of 50 ms max.

APPLICATION NOTE

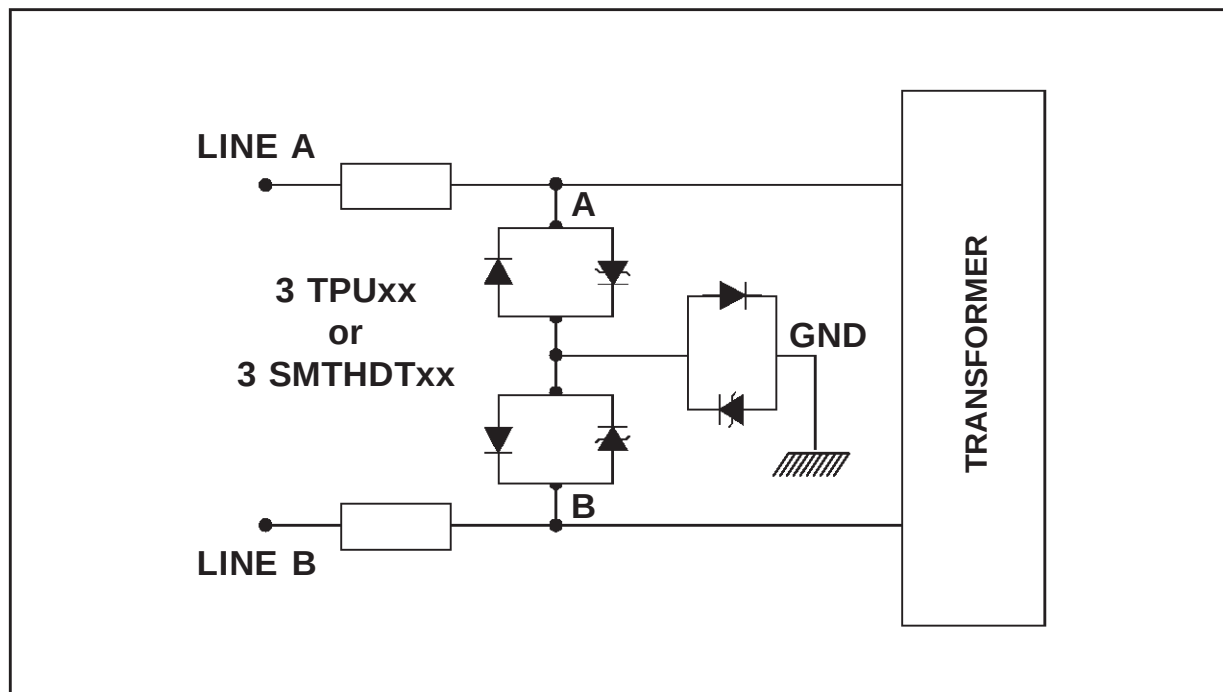


CAPACITANCE CHARACTERISTICS

| Type      | CONFIGURATION |        | C <sub>A</sub><br>pF<br>Max | C <sub>B</sub><br>pF<br>Max | ΔC<br>pF<br>Max |
|-----------|---------------|--------|-----------------------------|-----------------------------|-----------------|
|           | LINE A        | LINE B |                             |                             |                 |
| SMTHDT58  | 48            | 0      | 80                          | 60                          | 30              |
| SMTHDT80  | 56            | 0      | 70                          | 50                          | 30              |
| SMTHDT120 | 110           | 0      | 70                          | 50                          | 30              |

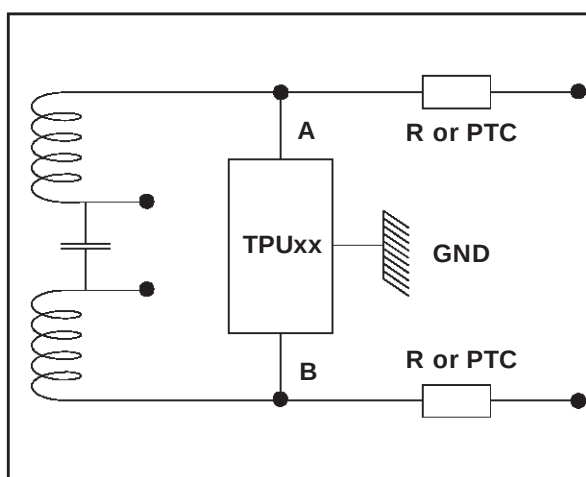
## APPLICATION NOTE

## Discrete ISDN Protection solution

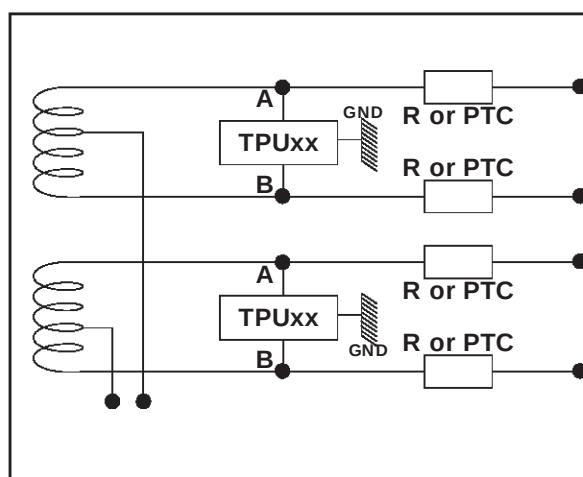


## EQUIVALENT PROTECTION FUNCTION

## U Interface Protection

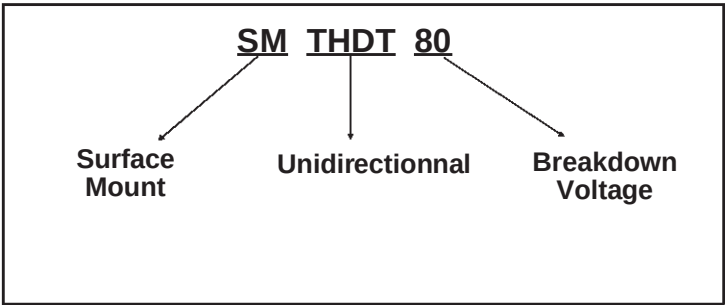


## S Interface Protection



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

ORDER CODE



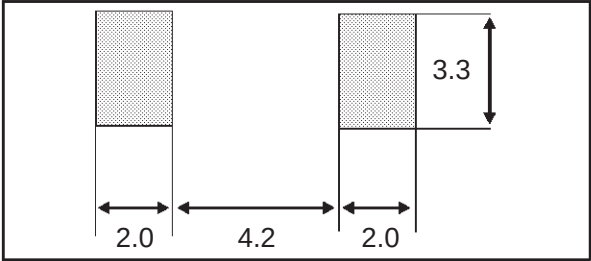
MARKING

| Package | Type                              | Marking           |
|---------|-----------------------------------|-------------------|
| SMC     | SMTHDT58<br>SMTHDT80<br>SMTHDT120 | W01<br>W03<br>W05 |

PACKAGE MECHANICAL DATA  
SMC

| REF. | DIMENSIONS  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A1   | 1.90        | 2.45 | 0.075  | 0.096 |
| A2   | 0.05        | 0.20 | 0.002  | 0.008 |
| b    | 2.90        | 3.2  | 0.114  | 0.126 |
| c    | 0.15        | 0.41 | 0.006  | 0.016 |
| E    | 7.75        | 8.15 | 0.305  | 0.321 |
| E1   | 6.60        | 7.15 | 0.260  | 0.281 |
| E2   | 4.40        | 4.70 | 0.173  | 0.185 |
| D    | 5.55        | 6.25 | 0.218  | 0.246 |
| L    | 0.75        | 1.60 | 0.030  | 0.063 |

FOOTPRINT DIMENSIONS (in millimeters)



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