



# LS5018B LS5060B/LS5120B

TRISIL™

## FEATURES

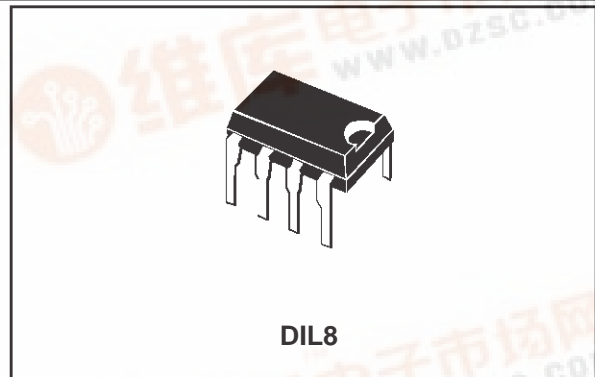
- BIDIRECTIONAL CROWBAR PROTECTION.
- BREAKDOWN VOLTAGES RANGE:  
18V, 60V and 120V.
- HOLDING CURRENT = 200mA min.
- HIGH SURGE CURRENT CAPABILITY  
 $I_{PP} = 100A$  10/1000 $\mu s$

## DESCRIPTION

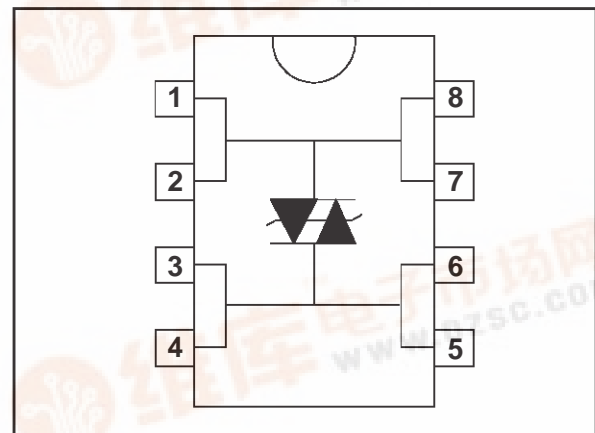
The LS50xxB series has been designed to protect telecommunication equipment against lightning and transients induced by AC power lines. Its high surge current capability makes the LS50xxB a reliable protection device for very exposed equipment, or when series resistors are very low.

## COMPLIES WITH THE FOLLOWING STANDARDS:

|                 |         |         |        |
|-----------------|---------|---------|--------|
| CCITT K17 - K20 | 10/700  | $\mu s$ | 1.5 kV |
|                 | 5/310   | $\mu s$ | 38 A   |
| VDE 0433        | 10/700  | $\mu s$ | 2 kV   |
|                 | 5/200   | $\mu s$ | 50 A   |
| CNET            | 0.5/700 | $\mu s$ | 1.5 kV |
|                 | 0.2/310 | $\mu s$ | 38 A   |



## SCHEMATIC DIAGRAM



## ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^{\circ}C$ )

| Symbol             | Parameter   |                                 | Value                | Unit                       |
|--------------------|---|---------------------------------|----------------------|----------------------------|
| $I_{PP}$           | Peak pulse current                                | 10/1000 $\mu s$<br>8/20 $\mu s$ | 100<br>250           | A                          |
| $I_{TSM}$          | Non repetitive surge peak on-state current        | $t_p = 20$ ms                   | 50                   | 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        | $V_{RM}$                        | 5                    | kV/ $\mu s$                |
| $T_{stg}$<br>$T_j$ | Storage and operating junction temperature range  |                                 | - 40 to + 150<br>150 | $^{\circ}C$<br>$^{\circ}C$ |
| $T_L$              | Maximum lead temperature for soldering during 10s |                                 | 230                  | $^{\circ}C$                |

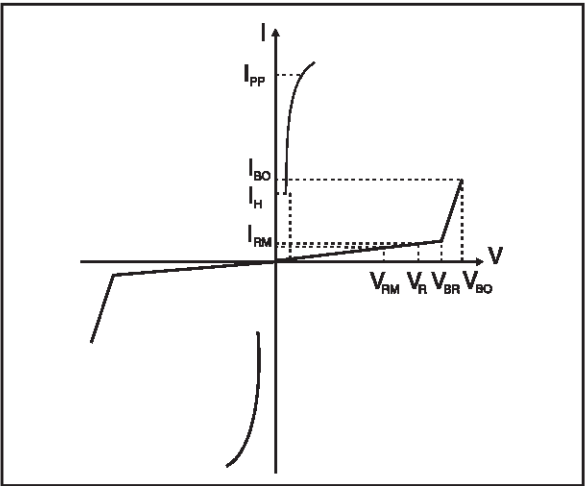
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THERMAL RESISTANCE

| Symbol                | Parameter  | Value | Unit |
|-----------------------|--|-------|------|
| R <sub>th</sub> (j-a) | Junction to ambient on printed circuit with recommended pad layout | 80    | °C/W |

ELECTRICAL CHARACTERISTICS (T<sub>amb</sub> =25°C)

| Symbol          | Parameter                            |
|-----------------|--------------------------------------|
| I <sub>RM</sub> | Leakage current at stand-off voltage |
| V <sub>RM</sub> | Stand-off voltage                    |
| V <sub>BR</sub> | Breakdown voltage                    |
| V <sub>BO</sub> | Breakover voltage                    |
| I <sub>H</sub>  | Holding current                      |
| I <sub>BO</sub> | Breakover current                    |
| I <sub>PP</sub> | Peak pulse current                   |
| C               | Capacitance                          |

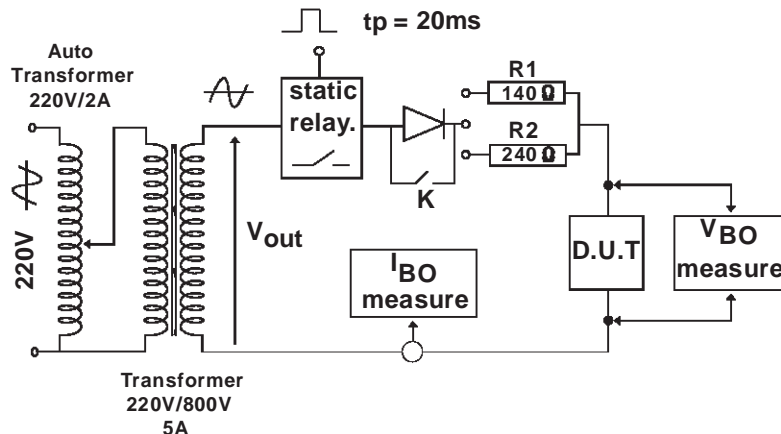


| Type    | I <sub>RM</sub> @ V <sub>RM</sub><br>max. |     | V <sub>BR</sub> @ I <sub>R</sub><br>min. |    | V <sub>BO</sub> @ I <sub>BO</sub><br>max.      typ.<br>note 1 |      | I <sub>H</sub><br>min.<br>note 2 | C<br>max.<br>note 3 |
|---------|---|-----|--|----|---|------|----------------------------------|---------------------|
|         | μA  | V   | V  | mA | V   | mA   | mA                               | pF                  |
| LS5018B | 5   | 16  | 17                                       | 1  | 22  | 1300 | 200                              | 150                 |
| LS5060B | 10  | 50  | 60                                       | 1  | 85  | 1000 | 200                              | 150                 |
| LS5120B | 20  | 100 | 120                                      | 1  | 180   | 1250 | 250                              | 150                 |

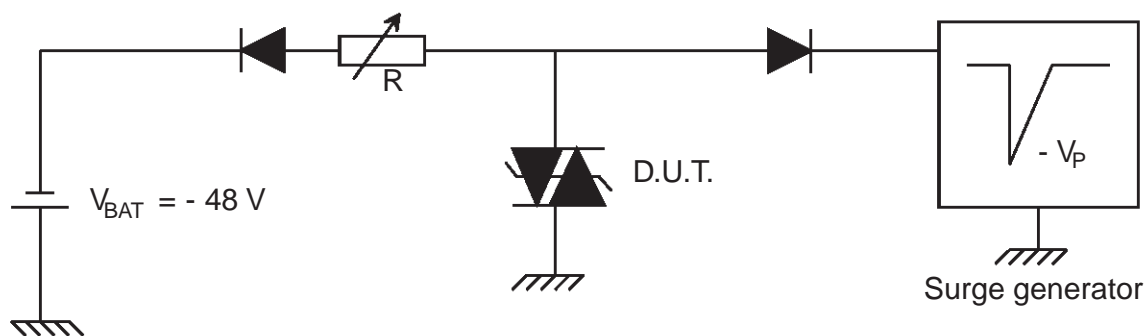
Note 1 : Measured at 50Hz (1 cycle)

Note 2 : See test circuit

Note 3 : V<sub>R</sub> = 5 V, F = 1MHz.

**TEST CIRCUIT 1 FOR  $I_{BO}$  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  $V_{BO} < 200\text{ Volt}$ 
    - $V_{OUT} = 250\text{ V}_{RMS}$ ,  $R_1 = 140\ \Omega$ .
  - Device with  $V_{BO} \geq 200\text{ Volt}$ 
    - $V_{OUT} = 480\text{ V}_{RMS}$ ,  $R_2 = 240\ \Omega$ .

**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 :  $I_{pp} = 10\text{ A}$  ,  $10/1000\ \mu\text{s}$ .
- 3) The D.U.T will come back off-state within 50 ms max.

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Figure 1 : Non repetitive surge peak current versus overload duration

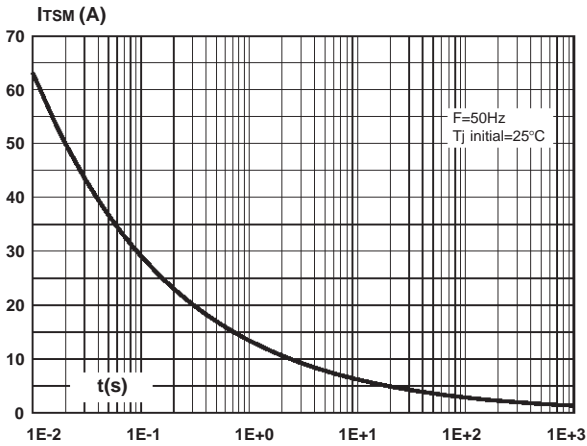


Figure 2 : Relative variation of holding current versus junction temperature.

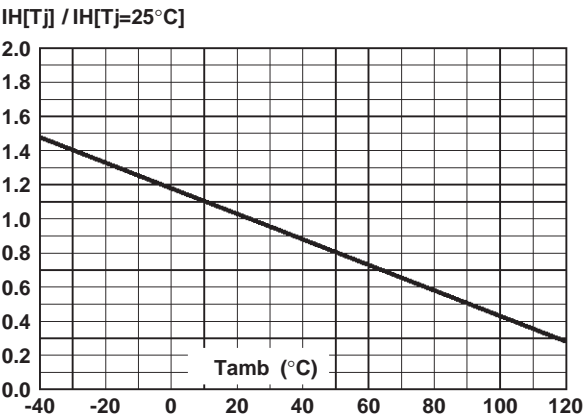


Figure 3 : Relative variation of breakdown voltage versus ambient temperature.

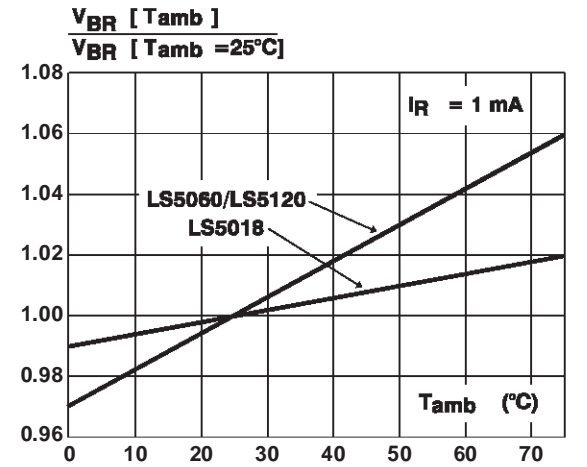
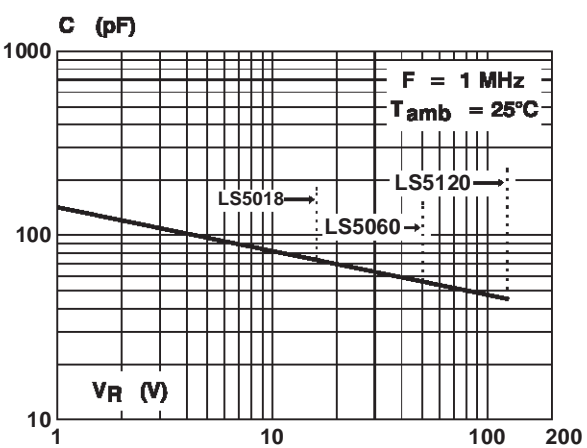
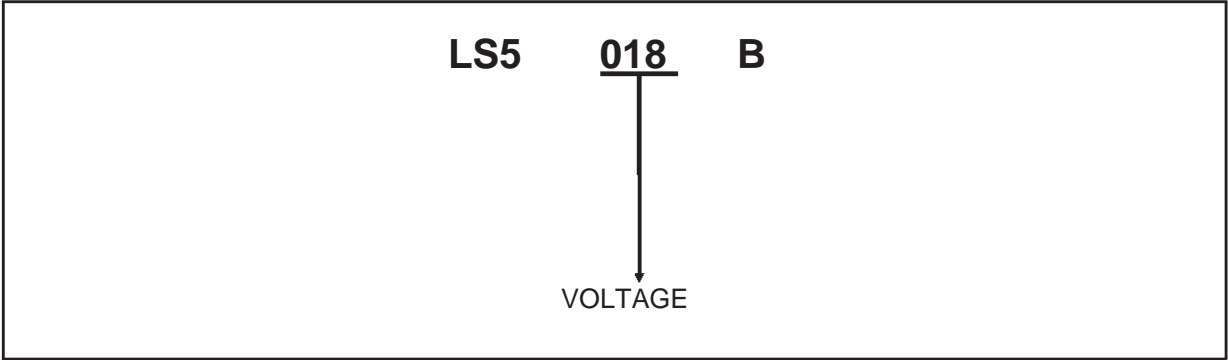


Figure 4 : Junction capacitance versus reverse applied voltage.

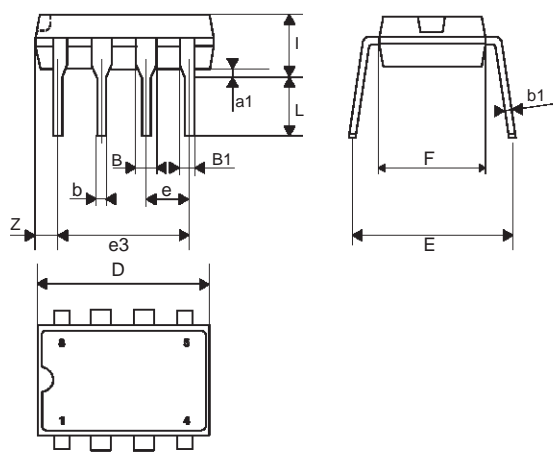


ORDER CODE



**MARKING** : Logo, Date Code, part Number.**Packaging** : Products supplied in antistatic tubes.  
**Weight** : 0.59g**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 |
| L    |             | 3.3  |      |        | 0.130 |       |
| Z    | 0.44        |      | 1.60 | 0.017  |       | 0.063 |

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