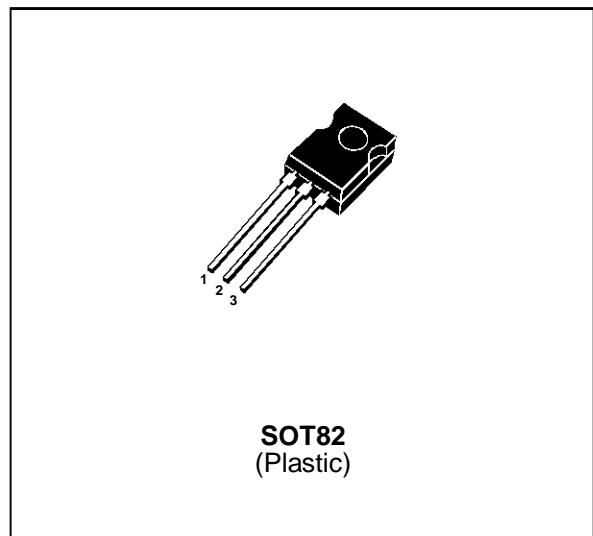


**FEATURES**

- SPACE SAVING : MONOLITHIC FIRE LIGHTER FUNCTION INTEGRATION
- DEDICATED THYRISTOR STRUCTURE FOR CAPACITANCE DISCHARGE IGNITION OPERATION
- HIGH PULSE CURRENT CAPABILITY  
150A @ tp = 10µs



**DESCRIPTION**

- The FLC02 is a high performance planar dif-fused technology adapted to high temperature and rugged environmental conditions.
- It has been developed especially for capacitance discharge operation. The main applications are ignitor circuits such as :  
fuel ignitors / gas boilers...

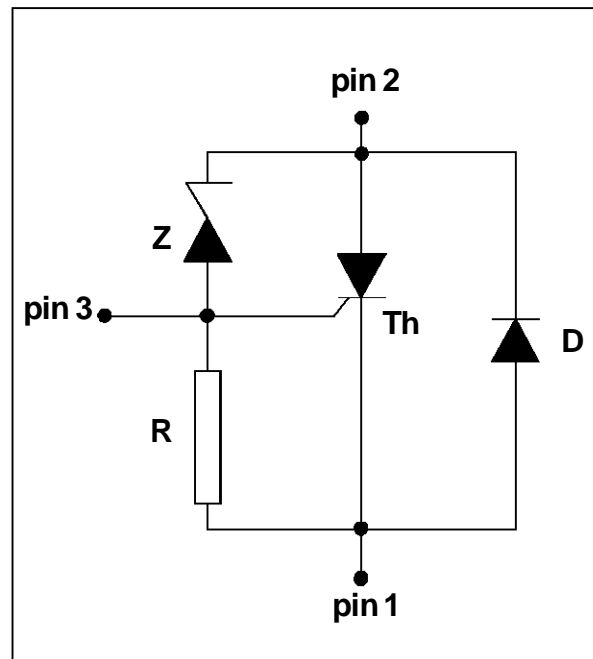
Th : Thyristor for switching operation.

Z : Zener diode to set the threshold voltage.

D : Diode for reverse conduction.

R : 2 kOhm resistor.

**FUNCTIONAL DIAGRAM**

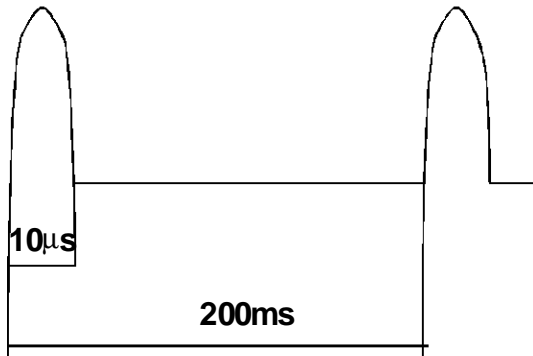


## FLC02-200D

**ABSOLUTE RATINGS** (limiting values) :  $0^{\circ}\text{C} < T_{\text{amb}} < 90^{\circ}\text{C}$

Symbol	Parameter	Value	Unit
$I_{\text{TRM}}$	Repetitive surge peak on state current for thyristor	150	A
$I_{\text{FRM}}$	Repetitive surge peak on state current for diode		
$I_{\text{TSM}}$	Non repetitive surge peak on state current	5	A
di/dt	Critical rate of rise time on state current	120	A/ $\mu\text{s}$
$T_{\text{stg}}$ $T_{\text{j}}$	Storage junction temperature range Maximum junction temperature	- 40 to + 150 + 125	$^{\circ}\text{C}$
$T_{\text{oper}}$	Operating temperature range	0 + 90	$^{\circ}\text{C}$
$T_{\text{L}}$	Maximum lead temperature for soldering during 10s	260	$^{\circ}\text{C}$

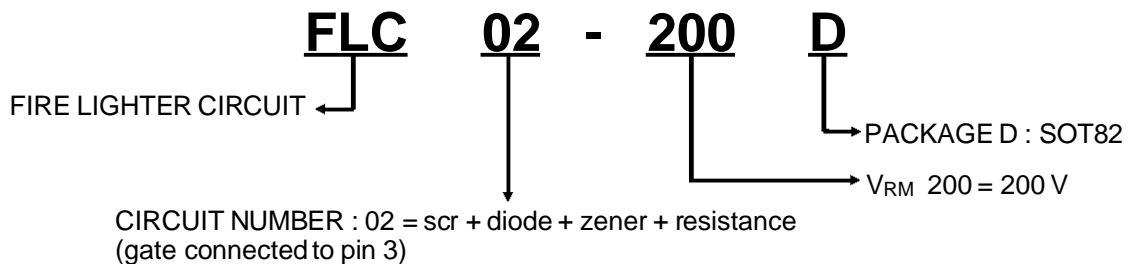
**Note 1** : Test current waveform



## THERMAL RESISTANCE

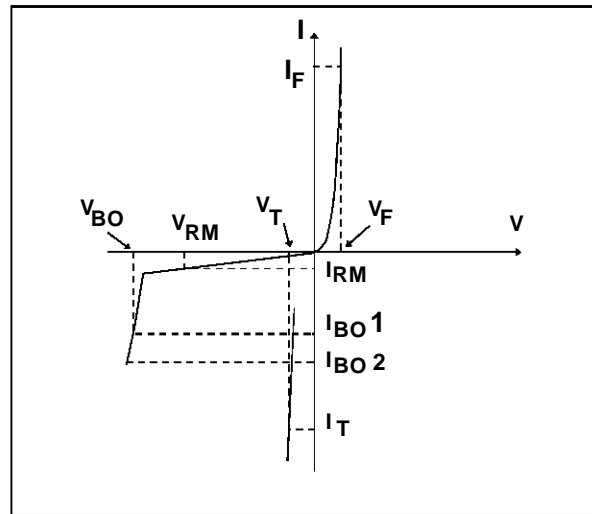
Symbol	Parameter	Value	Unit
$R_{\text{th(j-a)}}$	Thermal resistance junction to ambient	100	$^{\circ}\text{C}/\text{W}$

## ORDERING INFORMATION



**ELECTRICAL CHARACTERISTICS**

Symbol	Parameters
$V_{RM}$	Stand-off voltage
$V_{BO}$	Breakover voltage
$V_T$	On-state voltage drop
$V_F$	Diode voltage drop
$I_{RM}$	Leakage current
$I_{BO}$	Breakover current



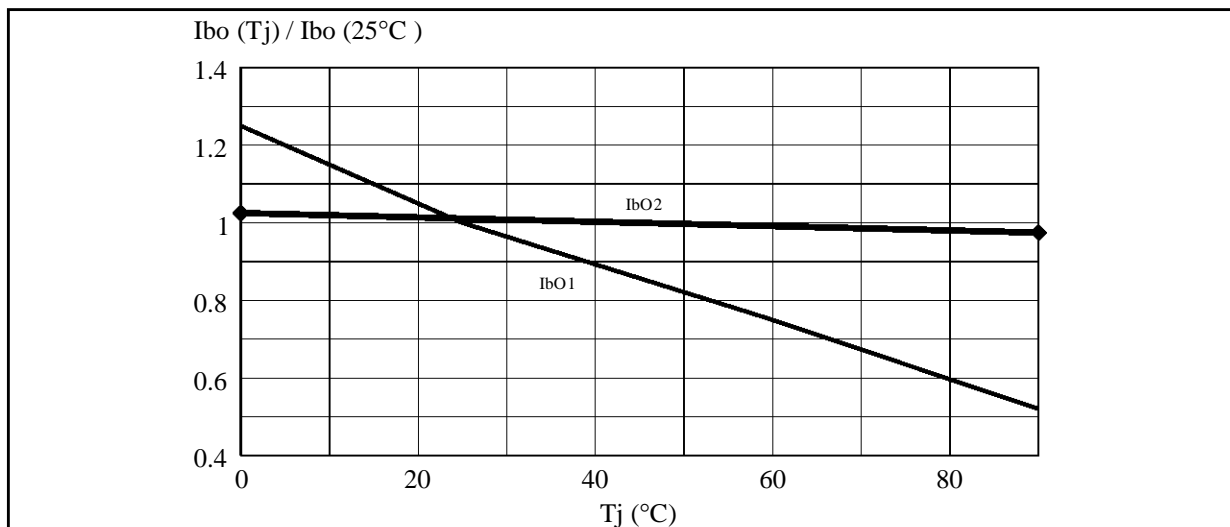
**DIODE (D) PARAMETER**

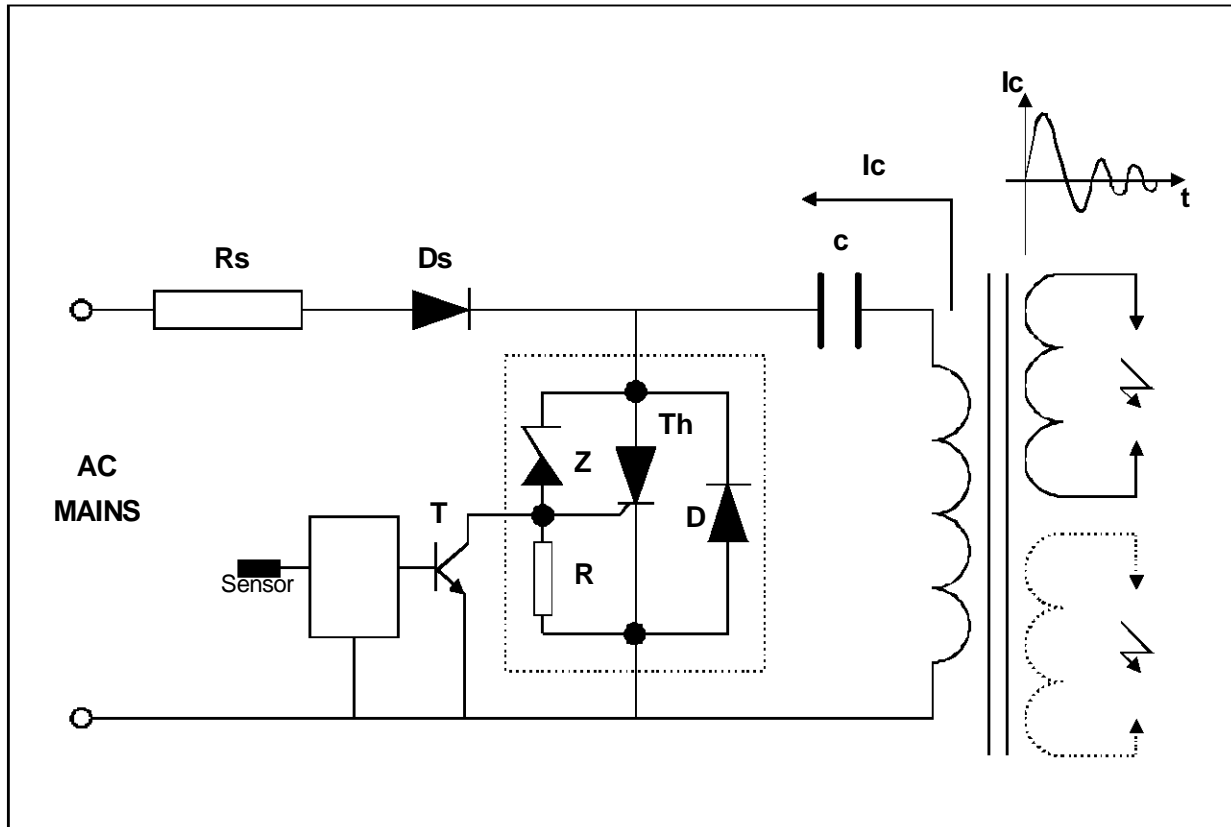
Symbol	Test Conditions				Value	Unit
$V_F$	$I_F = 2A$	$tp \leq 1 ms$	$T_j = 25^\circ C$	MAX	1.7	V

**THYRISTOR (Th) and ZENER (Z) PARAMETERS**

Symbol	Test conditions				Value	Unit
$I_{RM}$	$V_{RM} = 200 V$	$T_j = 25^\circ C$	MAX	10	$\mu A$	
		$T_j = 120^\circ C$	MAX	100	$\mu A$	
$V_{BO}$	at $I_{BO1}$ Pin 3 (gate) open	$T_j = 25^\circ C$	MAX	250	V	
$I_{BO 1}$	at $V_{BO}$ Pin 3 (gate) open	$T_j = 25^\circ C$	MAX	0.5	mA	
$I_{BO 2}$	at $V_{BO}$ Pin 1 (cathode) and pin 3 (gate) in c/c	$T_j = 25^\circ C$	MIN	40	mA	
$V_T$	$I_T = 2A$ $tp \leq 1 ms$	$T_j = 25^\circ C$	MAX	1.7	V	

**Fig.1 : Relative variation of breakover current ( $I_{BO}$ ) versus junction temperature**





The applications of the FLC02 using the capacitance discharge topology operate in 2 modes :

- Ignition mode : Transistor T is OFF
- Blanking mode : Transistor T is ON

### 1) IGNITION MODE (Transistor T OFF)

#### PHASE 1:

The energy coming from the mains is stored into the capacitor C. For that, the AC voltage is rectified by the diode  $D_s$ .

#### PHASE 2 :

At the end of the phase 1, the voltage across the capacitor C reaches the avalanche threshold of the zener. Then a current flows through the gate of the thyristor  $Th$  which fires.

The firing of the thyristor causes an alternating current to flow through the capacitor C.

The positive parts of this current flow through C,  $Th$  and the primary of the HV transformer.

The negative parts of the current flow through C, D and the primary of the HV transformer.

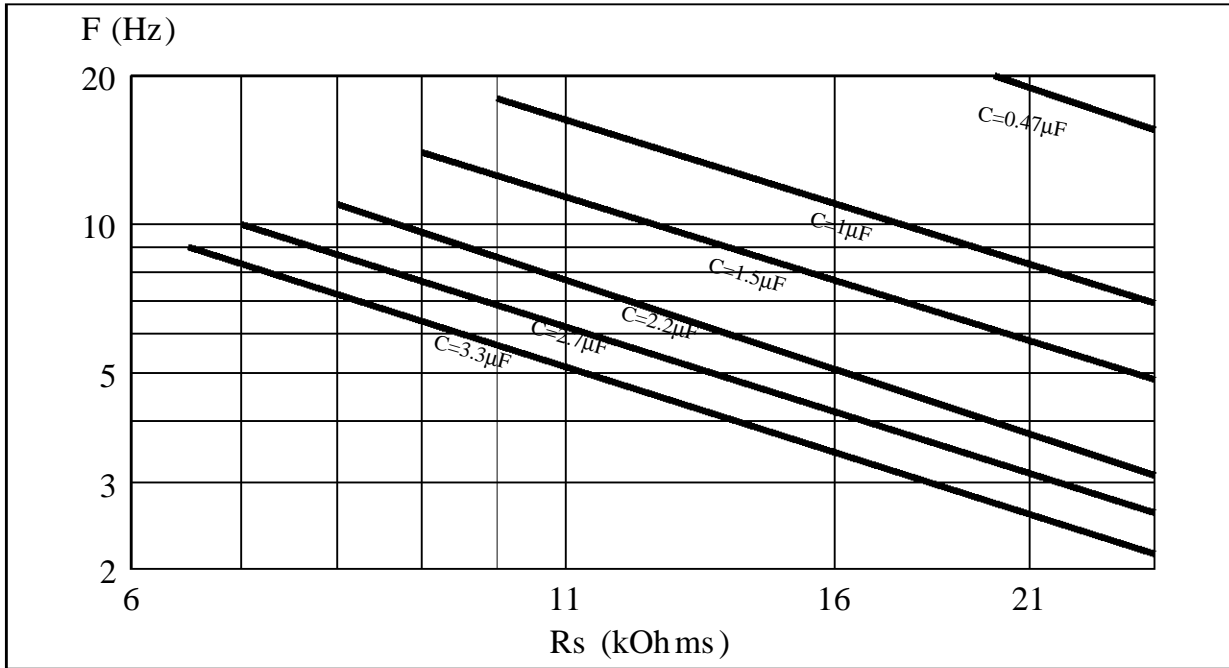
### RS RESISTOR CALCULATION

The  $R_s$  resistor allows, in addition with the capacitor C, to adjust the spark frequency and to limitate the current from the mains. Its value shall allow the thyristor  $Th$  to fire even in the worst case. In this borderline case the system must fire with the lower RMS mains voltage value while the breakdown voltage and current of the FLC are at the maximum.

The maximum  $R_s$  value is equal to :

$$R_{smax} = \frac{(V_{AC \min} \times \sqrt{2}) - V_{BO \max}}{I_{BO1 \max}}$$

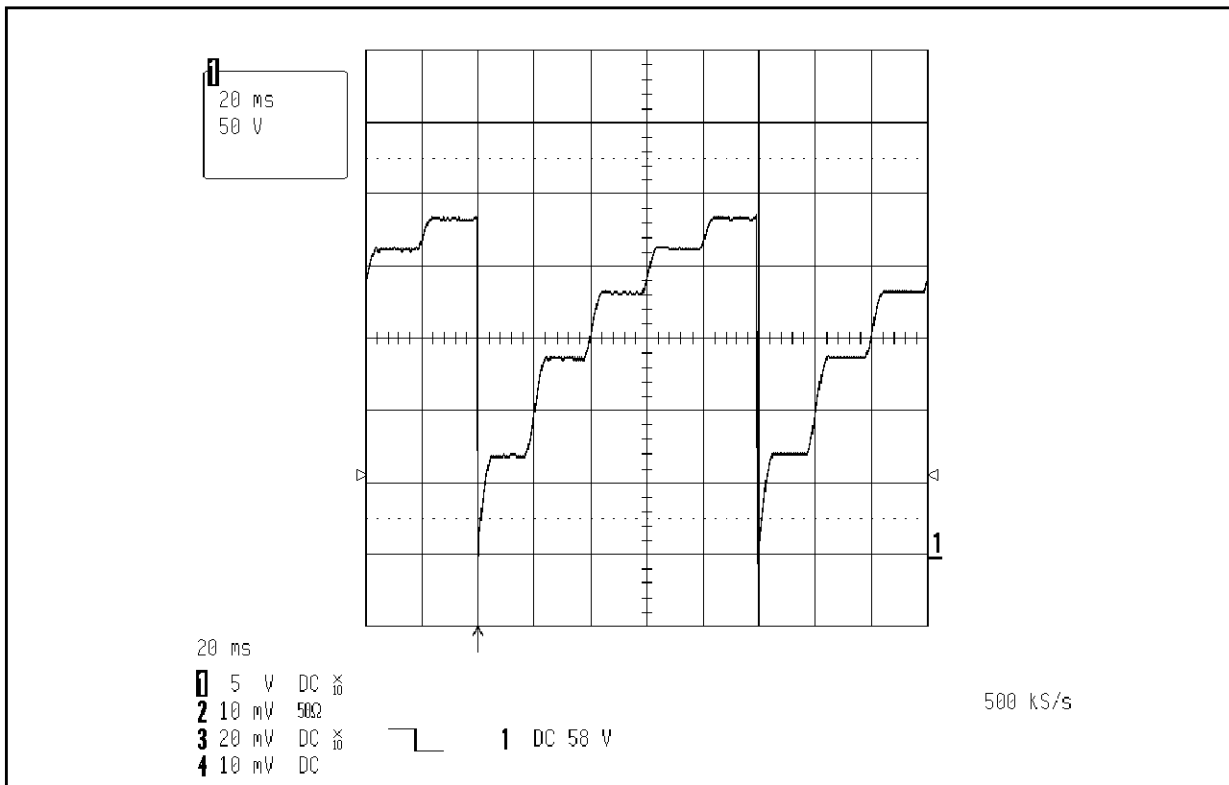
Fig 2. : Spark frequency versus Rs and C



The couple Rs/C can be chosen with the previous curve. Keep in mind the Rs maximum limit for which the system would not work when the AC

mains is minimum. The next curve shows the behavior with Rs=15kOhms and C=1µF.

Fig. 3 : Voltage across the capacitance with Rs = 15 kOhms and C = 1µF

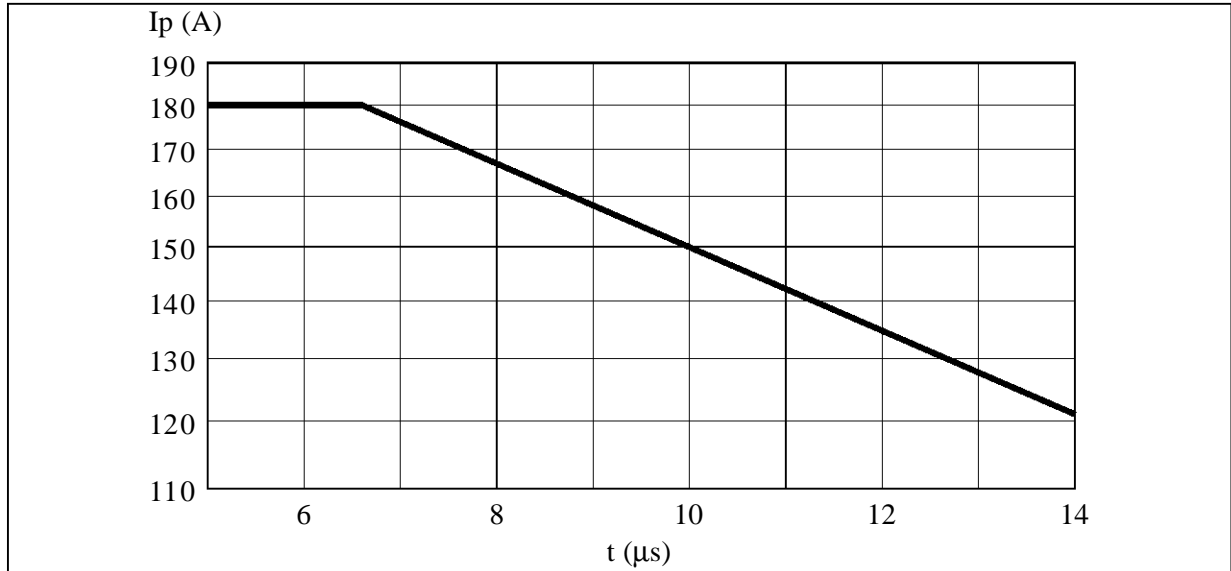


**PEAK CURRENT LIMIT**

This component is designed to withstand  $I_p = 150A$  for a pulse duration of  $10\mu s$  for an ambient temperature of  $90^\circ C$ .

The curve of peak current versus the pulse duration allows us to verify if the application is within the FLC operating limit.

**Fig. 4 : Peak current limit**



**POWER LOSSES** (For  $10\mu s$ , see note 1)

To evaluate the power losses, please use the following equations :

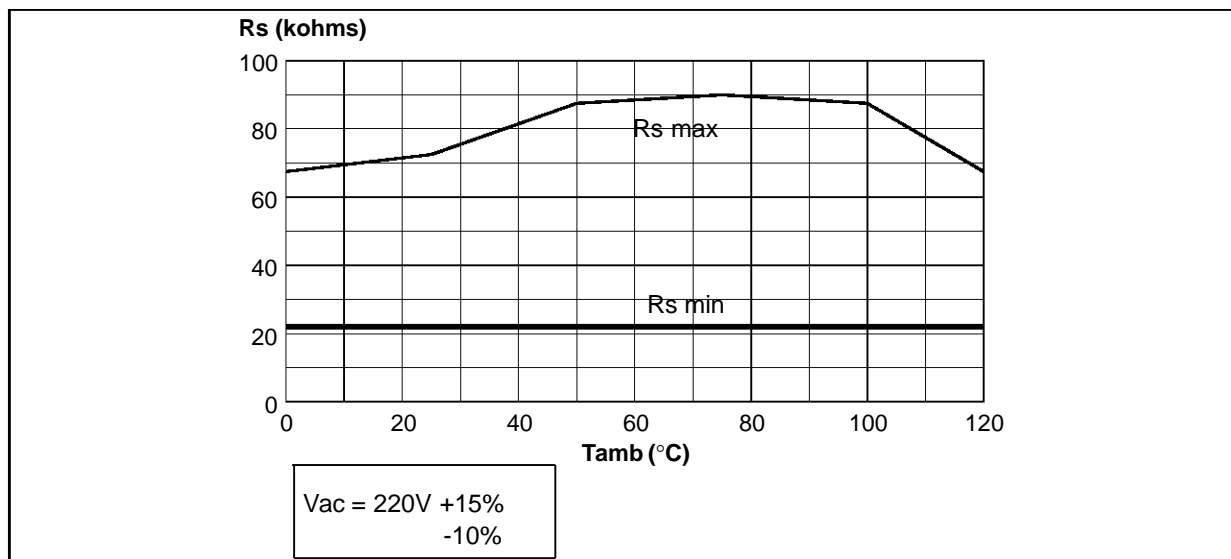
For the thyristor :  $P = 1.18 \times I_{T(AV)} + 0.035 I_{T(RMS)}^2$

For the diode :  $P = 0.67 \times I_{F(AV)} + 0.106 I_{F(RMS)}^2$

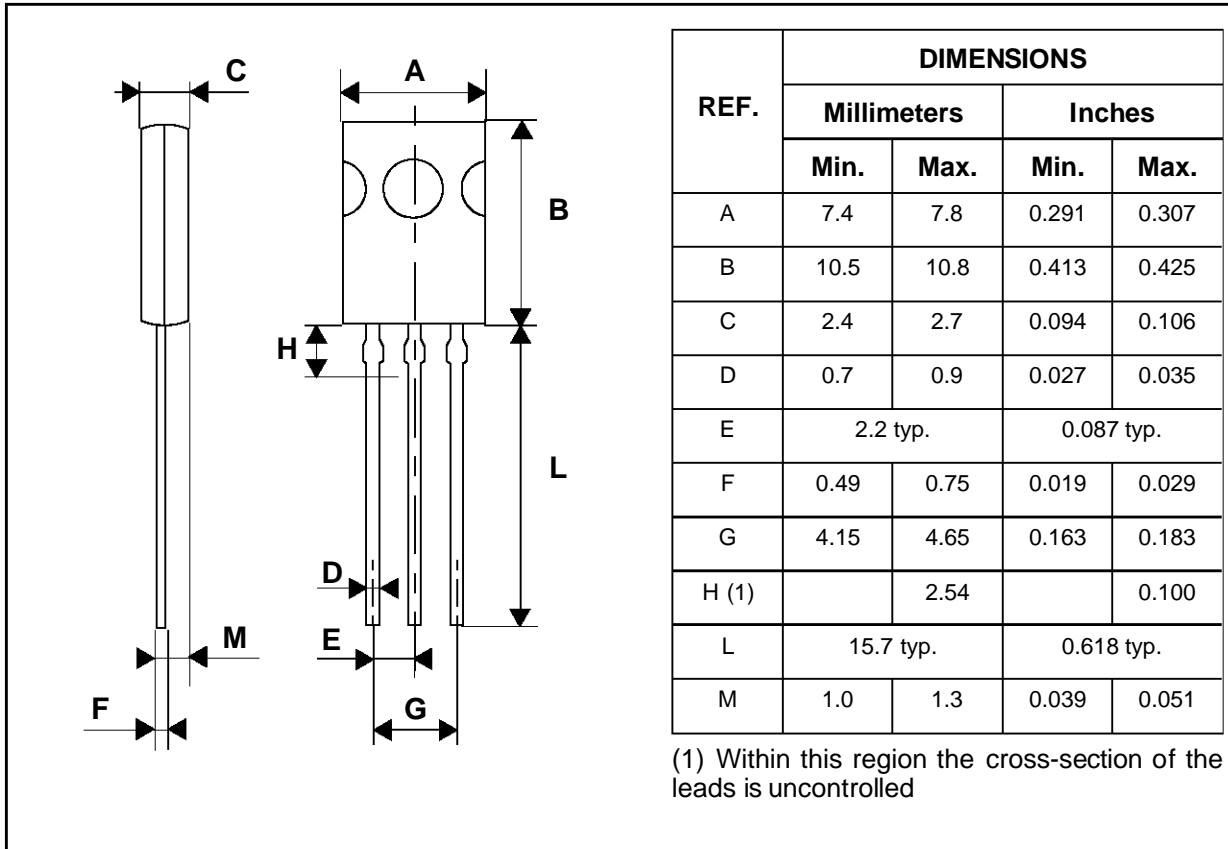
**2/ BLANKING MODE (Transistor  $T_{ON}$ )**

In this mode and transistor T is saturated and stops the spark generation.

In order to keep the thyristor Th in blanking mode and because of the power dissipation, the Resistor ( $R_s$ ) has to keep a minimum value of  $22\ k\Omega$  (see next curve) :



**PACKAGE MECHANICAL DATA**  
SOT82 (Plastic)



Marking type number

Weight : 0.72 g.

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