



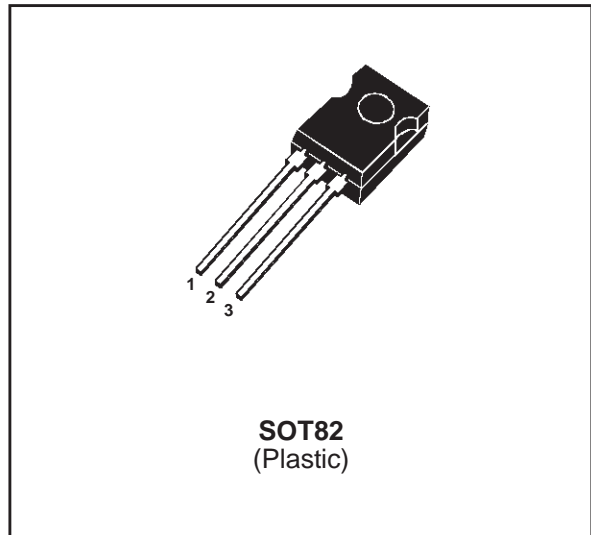
FLC10-200D

Application Specific Discretés
A.S.D.TM

FIRE LIGHTER CIRCUIT

FEATURES

- SPACE SAVING : MONOLITHIC FIRE LIGHTER FUNCTION INTEGRATION
- DEDICATED THYRISTOR STRUCTURE FOR CAPACITANCE DISCHARGE IGNITION OPERATION
- HIGH PULSE CURRENT CAPABILITY
240A @ tp= 10µs
- AVAILABLE IN THROUGH HOLE PACKAGE



DESCRIPTION

- The FLC10-200D is a high performance planar diffused technology adapted to high temperature and rugged environmental conditions.
- It has been developed especially for capacitance discharge operation. The main applications are gas lighter or ignitor such as :
cookers / gas boilers / gas hobs...

Th : Thyristor for switching operation.

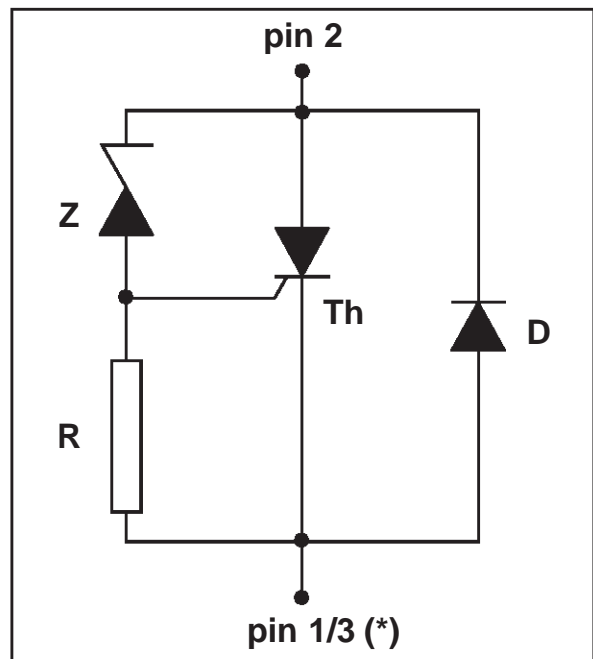
Z : Zener diode to set the threshold voltage.

D : Diode for reverse conduction.

R : 2 kΩ resistor.

(*) Pin1 and Pin3 must be shorted together in the application circuit layout.

FUNCTIONAL DIAGRAM

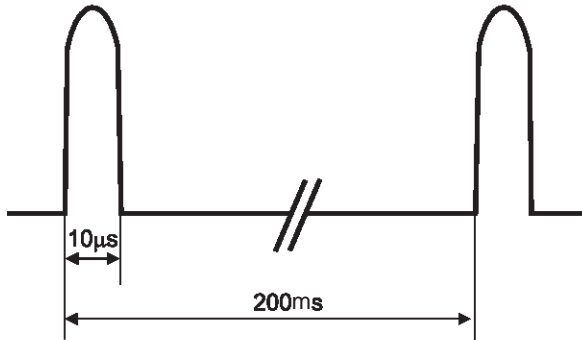


FLC10-200D

ABSOLUTE RATINGS (limiting values) : $-30^{\circ}\text{C} < T_{\text{amb}} < 120^{\circ}\text{C}$

Symbol	Parameter	Value	Unit
I_{TRM}	Repetitive surge peak on state current for thyristor	240	A
I_{FRM}	Repetitive surge peak on state current for diode		
di/dt	Critical rate of rise time on state current	200	A/ μs
T_{stg} T_{j}	Storage junction temperature range Maximum junction temperature	- 40 to + 150 + 125	$^{\circ}\text{C}$
T_{oper}	Operating temperature range	-30 + 120	$^{\circ}\text{C}$
T_{L}	Maximum lead temperature for soldering during 10s	260	$^{\circ}\text{C}$

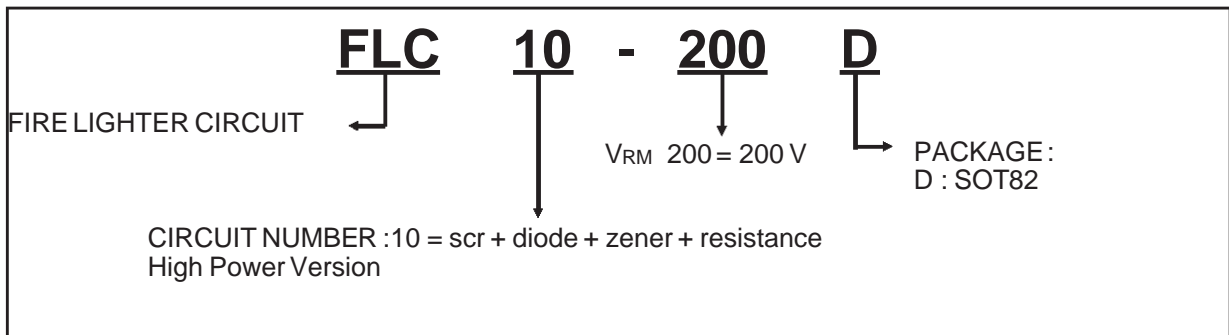
Note 1 : Test current waveform



THERMAL RESISTANCE

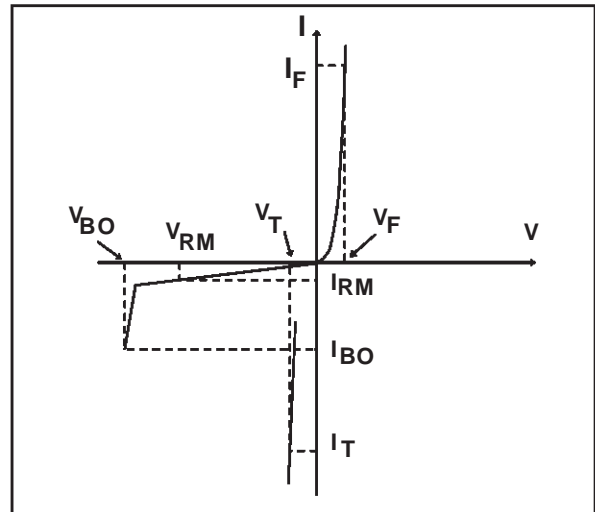
Symbol	Parameter	Value	Unit
$R_{\text{th(j-a)}}$	Thermal resistance junction to ambient	100	$^{\circ}\text{C}/\text{W}$

ORDERING INFORMATION



ELECTRICAL CHARACTERISTICS

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



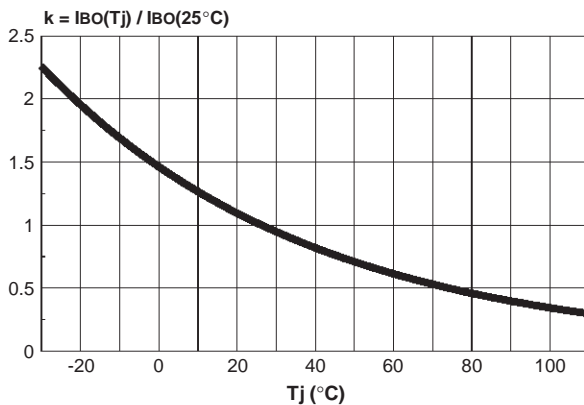
DIODE (D) PARAMETER

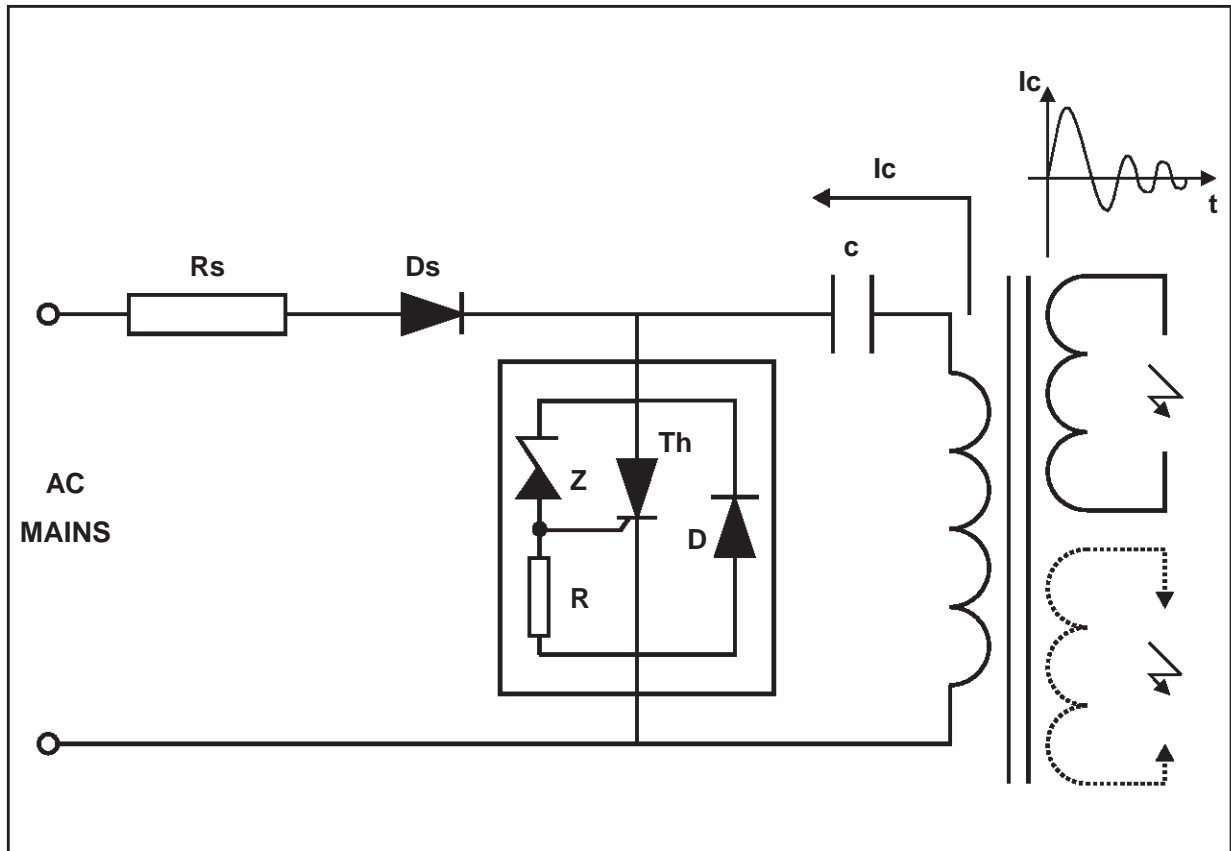
Symbol	Test Conditions			Value	Unit	
V_F	$I_F = 2A$	$t_p \leq 1ms$	$T_j = 25^\circ C$	MAX	1.7	V

THYRISTOR (Th) and ZENER (Z) PARAMETERS

Symbol	Test conditions		Min	Typ	Max	Unit
I_{RM}	$V_{RM} = 200V$	$T_j = 25^\circ C$			10	μA
		$T_j = 125^\circ C$			100	μA
V_{BO}	at I_{BO}	$T_j = 25^\circ C$	200	225	250	V
I_{BO}	at V_{BO}	$T_j = 25^\circ C$			0.5	mA
V_T	$I_T = 2A$	$t_p \leq 1ms$			1.7	V
αT				0.3		$V/^\circ C$

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





The applications of the lighter using the capacitance discharge topology operate in 2 phases :

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 T_h 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, T_h and the primary of the HV transformer.

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

COMPONENT CHOICE

RS RESISTOR CALCULATION

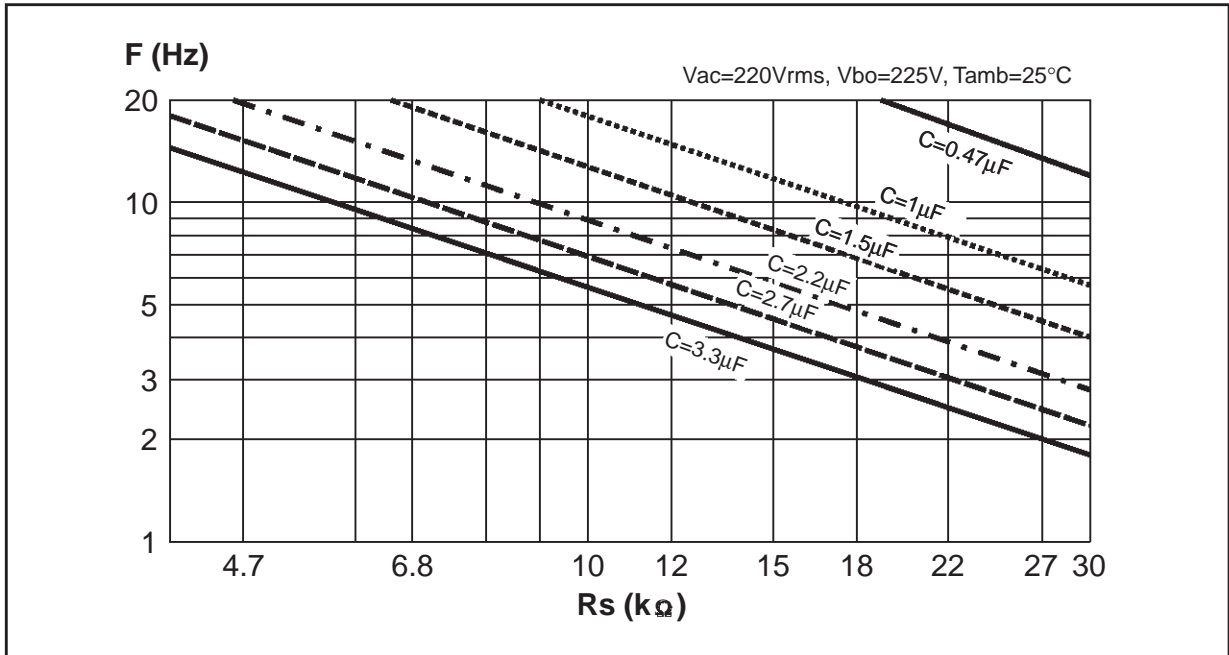
The R_s resistor allows, in addition with the capacitor C, to adjust the spark frequency and to limit the current from the mains. Its value shall allow the thyristor T_h to fire even in worst case conditions. In this borderline case, the system must fire with the lowest value of RMS mains voltage while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

The maximum R_s value is equal to :

$$R_{smax} = \frac{(V_{AC \text{ min.}} \cdot \sqrt{2}) - [V_{BO \text{ max.}} \cdot (1 + \alpha \cdot T \cdot (T_{amb} - 25))]}{k \cdot I_{BO}^*}$$

* : see fig 1

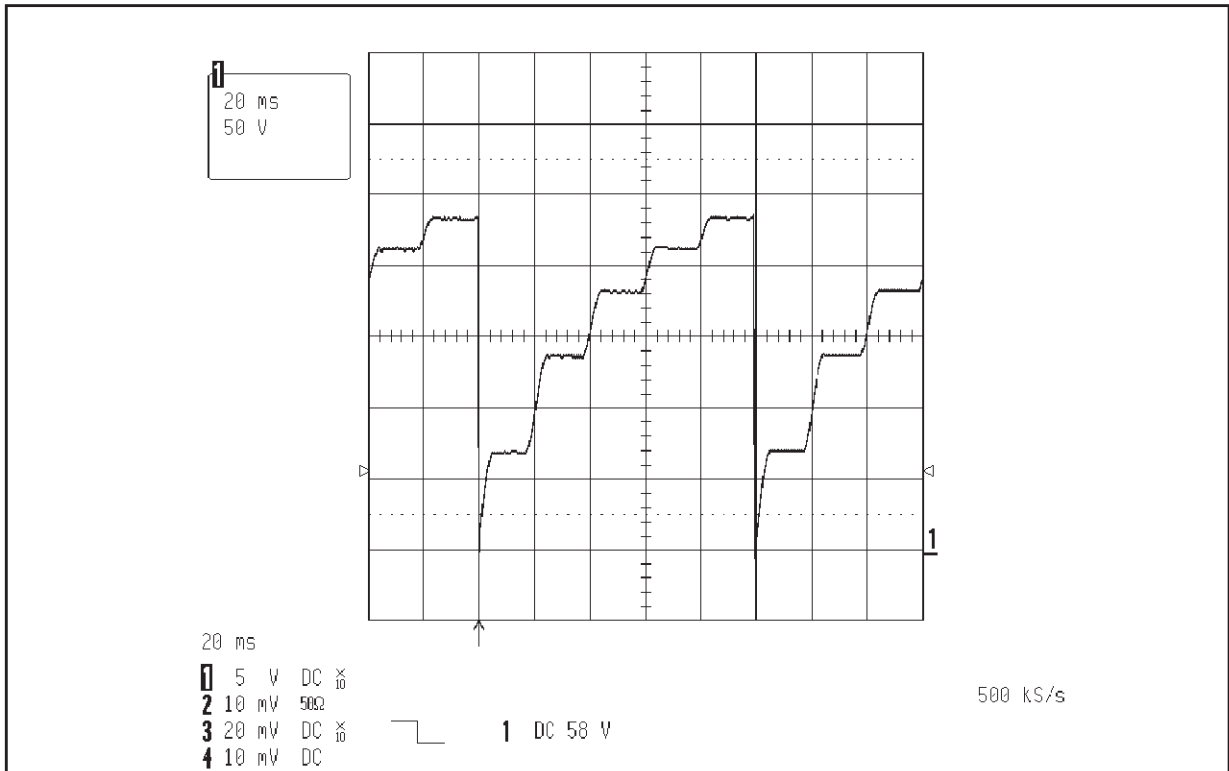
Fig. 2 : Spark frequency versus R_s and C



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

mains is minimum. The next curve shows the behavior with $R_s=15k\Omega$ and $C=1\mu F$.

Fig. 3: Voltage across the capacitance with $R_s = 15k\Omega$, $C = 1\mu F$ and $V_{BO} = 225V$.

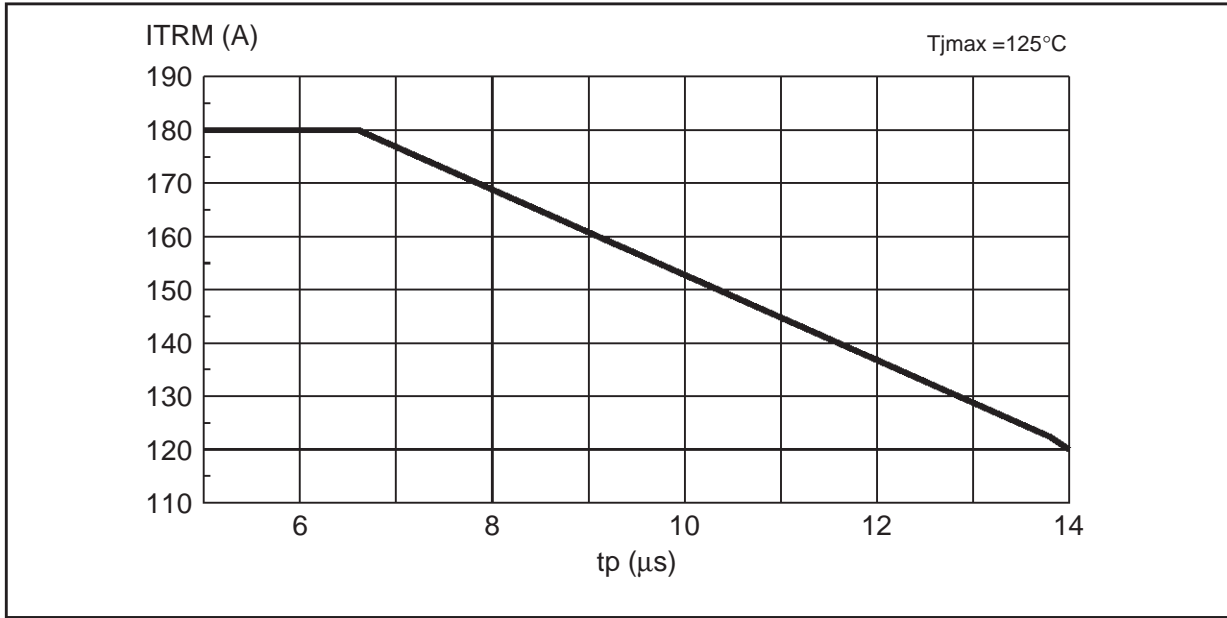


PEAK CURRENT LIMIT

This component is designed to withstand $I_{TRM} = 240A$ for a pulse duration of $10\mu s$ for an ambient temperature of $120^{\circ}C$ in repetitive surge (see note 1, page 2).

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 versus pulse duration.

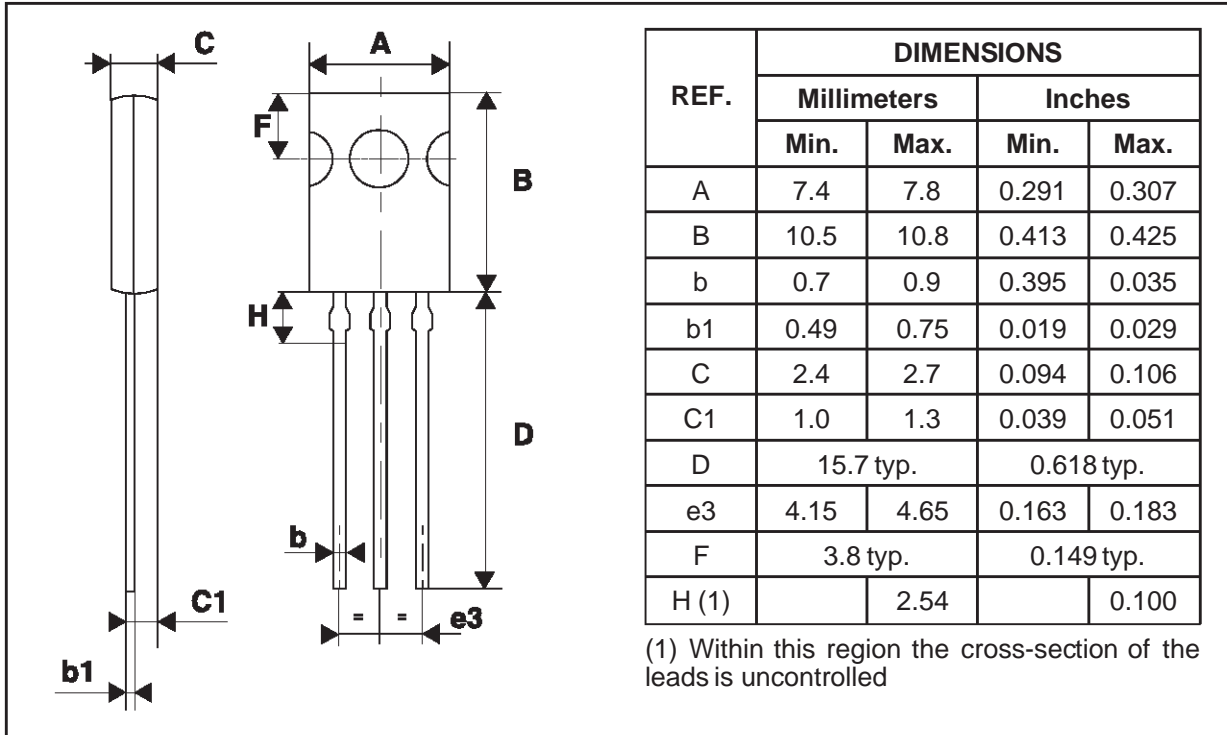
**POWER LOSSES** (For $10\mu s$, see note 1)

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

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

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

PACKAGE MECHANICAL DATA
SOT82 (Plastic)



- **Marking** : type number
- **Weight** : 0.72 g.

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