



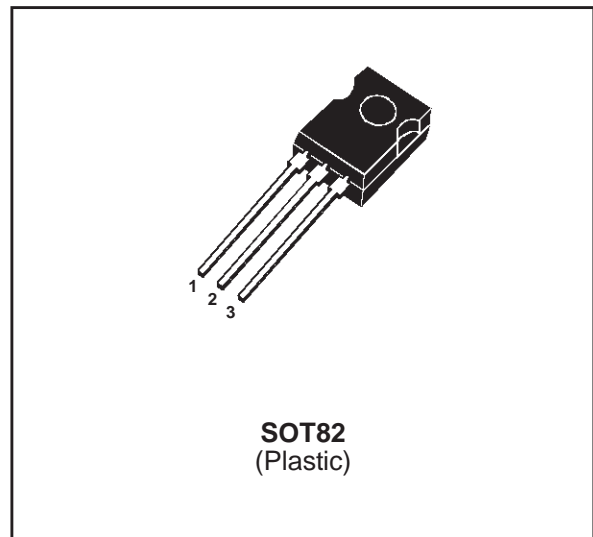
## FLC10-200D

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

### FIRE LIGHTER CIRCUIT

#### FEATURES

- SPACE SAVING : MONOLITHIC FIRE LIGHTER FUNCTION INTEGRATION
- DEDICATED THYRISTOR STRUCTURE FOR CAPACITANCE DISCHARGE IGNITION OPERATION
- HIGH PULSE CURRENT CAPABILITY  
240A @  $t_p = 10\mu s$
- 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.

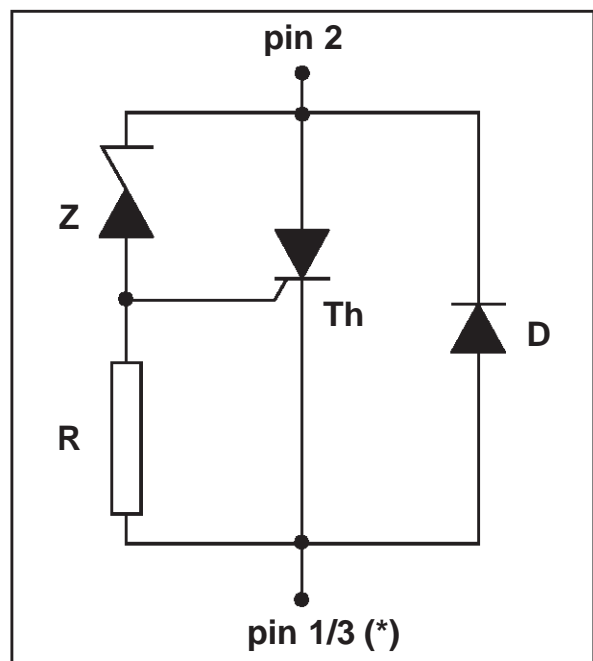
Z : Zener diode to set the threshold voltage.

D : Diode for reverse conduction.

R : 2 k $\Omega$  resistor.

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

#### FUNCTIONAL DIAGRAM

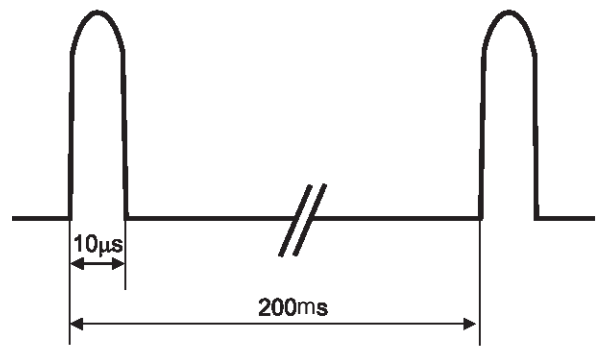


FLC10-200D

ABSOLUTE RATINGS (limiting values) : -30°C < T<sub>amb</sub> < 120°C

Symbol	Parameter		Value	Unit
I <sub>TRM</sub>	Repetitive surge peak on state current for thyristor	tp = 10μs ( note 1)	240	A
I <sub>FRM</sub>	Repetitive surge peak on state current for diode			
di/dt	Critical rate of rise time on state current		200	A/μs
T <sub>stg</sub> T <sub>j</sub>	Storage junction temperature range Maximum junction temperature		- 40 to + 150 + 125	°C
T <sub>oper</sub>	Operating temperature range		-30 + 120	°C
T <sub>L</sub>	Maximum lead temperature for soldering during 10s		260	°C

Note 1 : Test current waveform



THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
R <sub>th(j-a)</sub>	Thermal resistance junction to ambient	100	°C/W

ORDERING INFORMATION

FLC

FIRE LIGHTER CIRCUIT

10

CIRCUIT NUMBER :10 = scr + diode + zener + resistance  
High Power Version

-

200

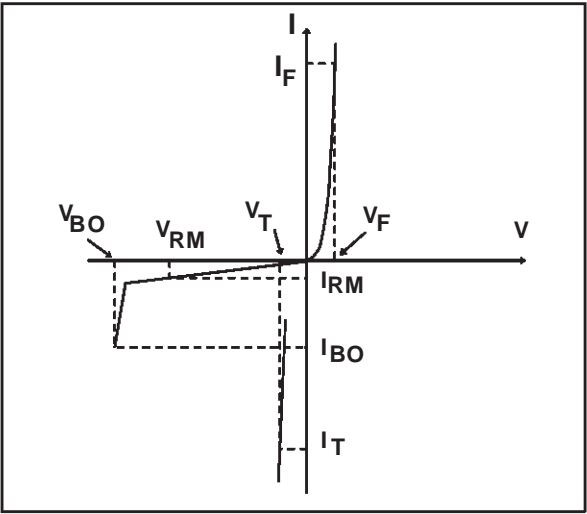
V<sub>RM</sub> 200 = 200 V

D

PACKAGE :  
D : SOT82

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
$\alpha T$	Thermal coefficient for $V_{BO}$



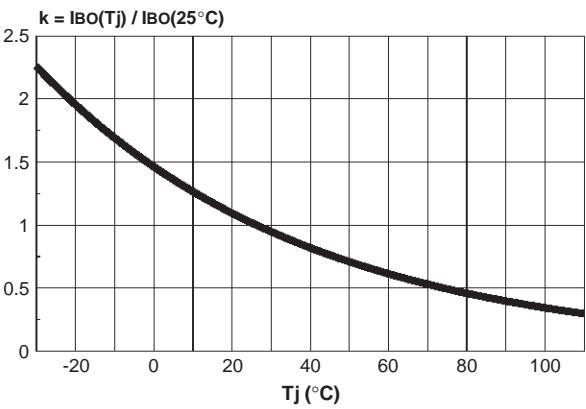
DIODE (D) PARAMETER

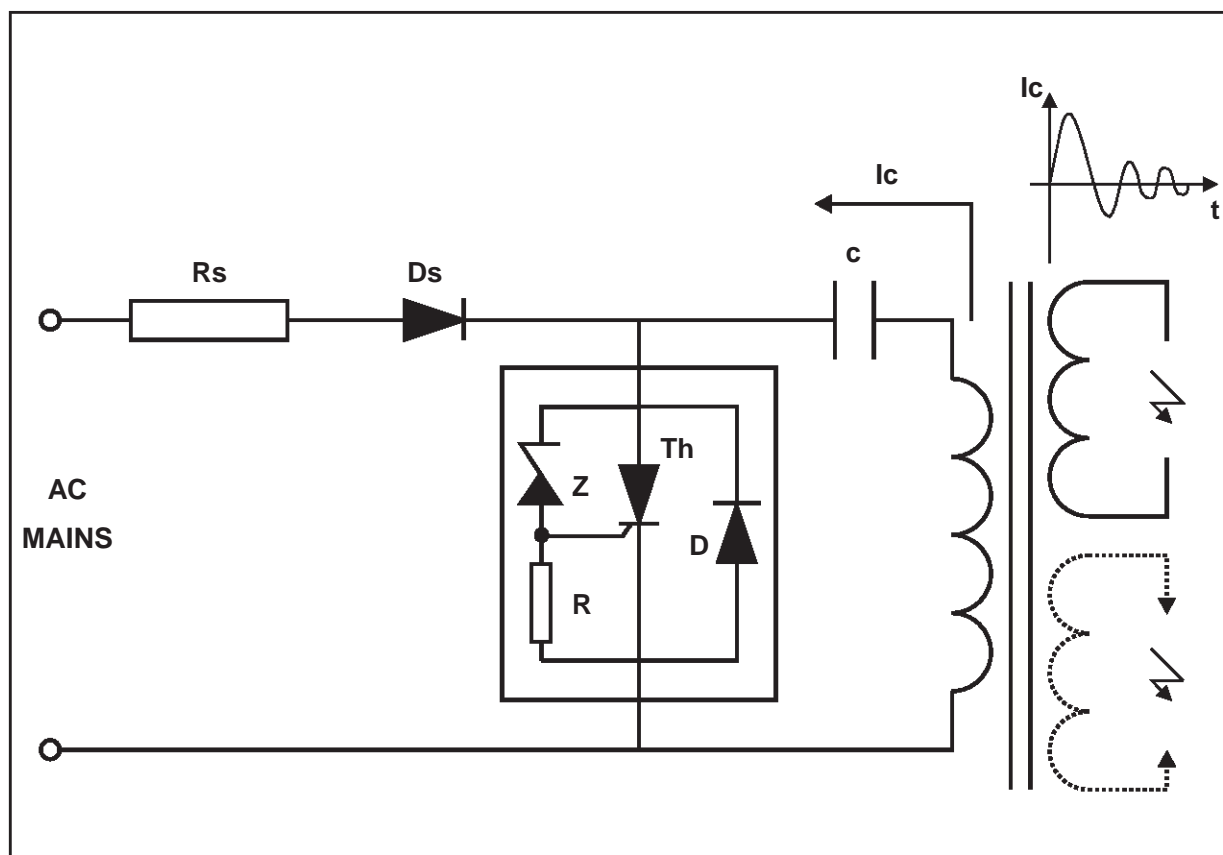
Symbol	Test Conditions				Value	Unit
$V_F$	$I_F = 2A$	$t_p \leq 1\text{ ms}$	$T_j = 25^\circ C$	MAX	1.7	V

THYRISTOR (Th) and ZENER (Z) PARAMETERS

Symbol	Test conditions		Min	Typ	Max	Unit
$I_{RM}$	$V_{RM} = 200\text{ V}$	$T_j = 25^\circ C$			10	$\mu A$
		$T_j = 125^\circ C$			100	$\mu A$
$V_{BO}$	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
$V_T$	$I_T = 2A$	$t_p \leq 1\text{ ms}$			1.7	V
$\alpha T$				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 Ds.

#### 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.

#### COMPONENT CHOICE

##### RS RESISTOR CALCULATION

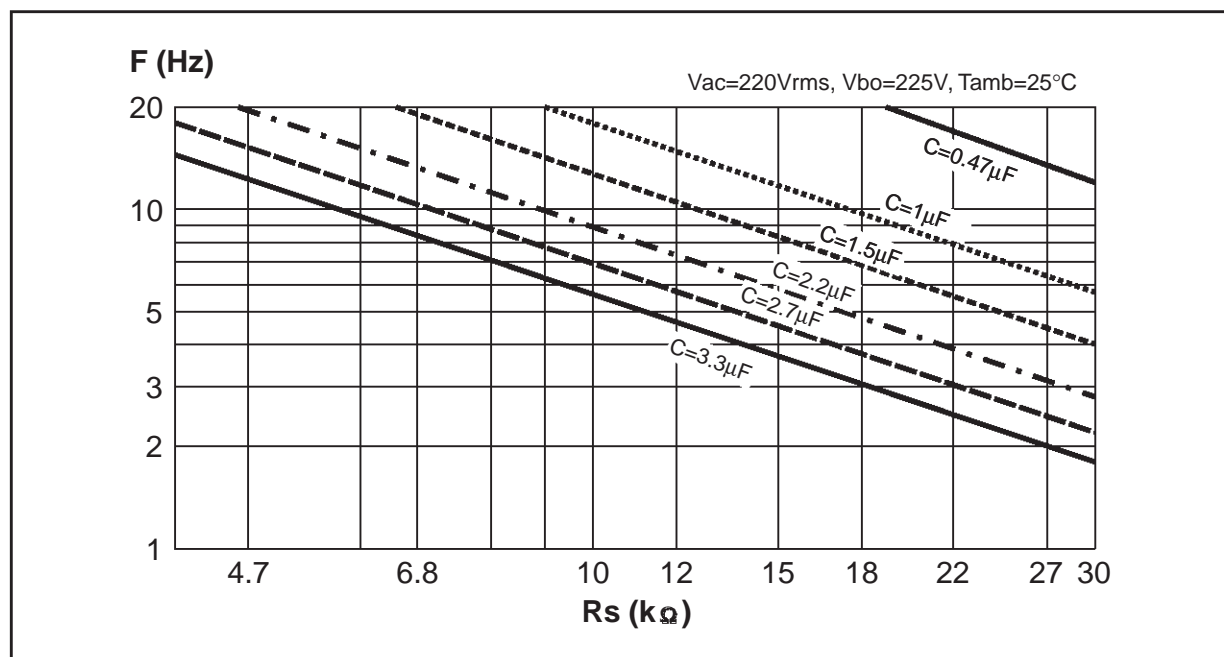
The Rs resistor allows, in addition with the capacitor C, to adjust the spark frequency and to limit the current from the mains. Its value shall allow the thyristor Th to fire even in worst case conditions. In this borderline case, the system must fire with the lowest value of RMS mains voltage while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

The maximum Rs 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

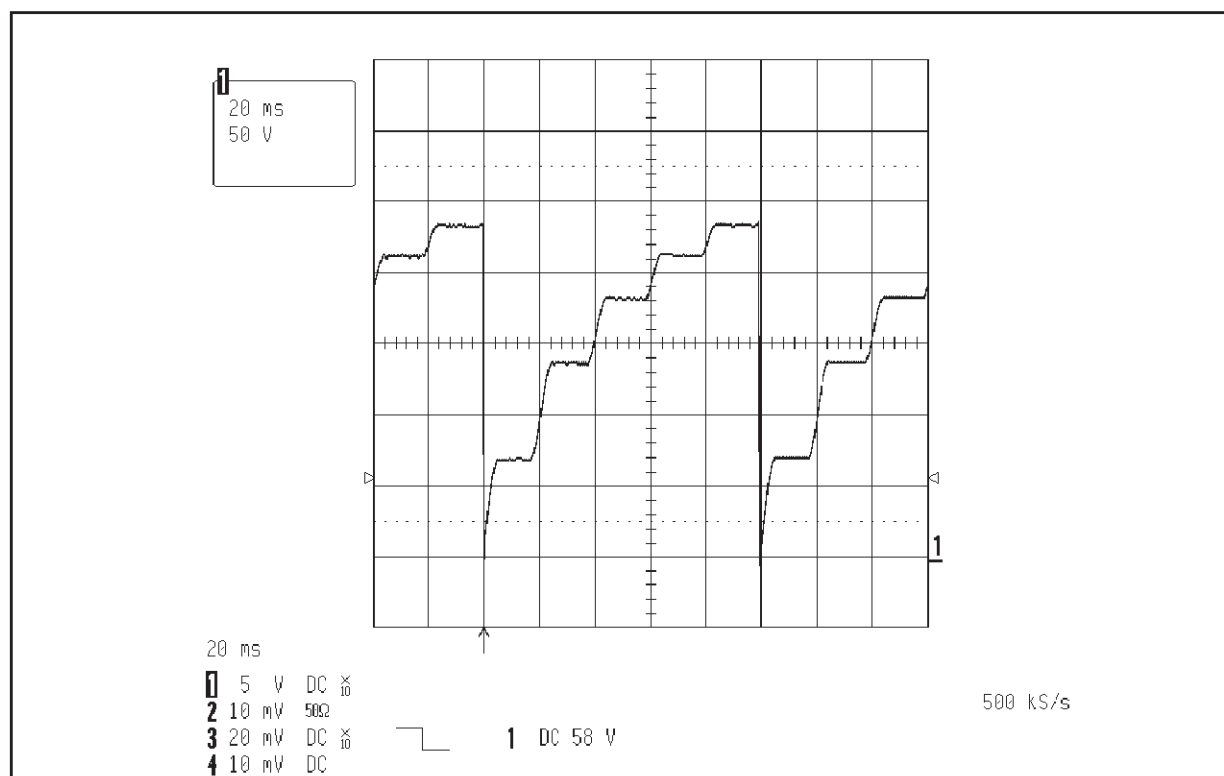
**Fig. 2 :** Spark frequency versus  $R_s$  and  $C$



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  $V_{BO} = 225V$ .

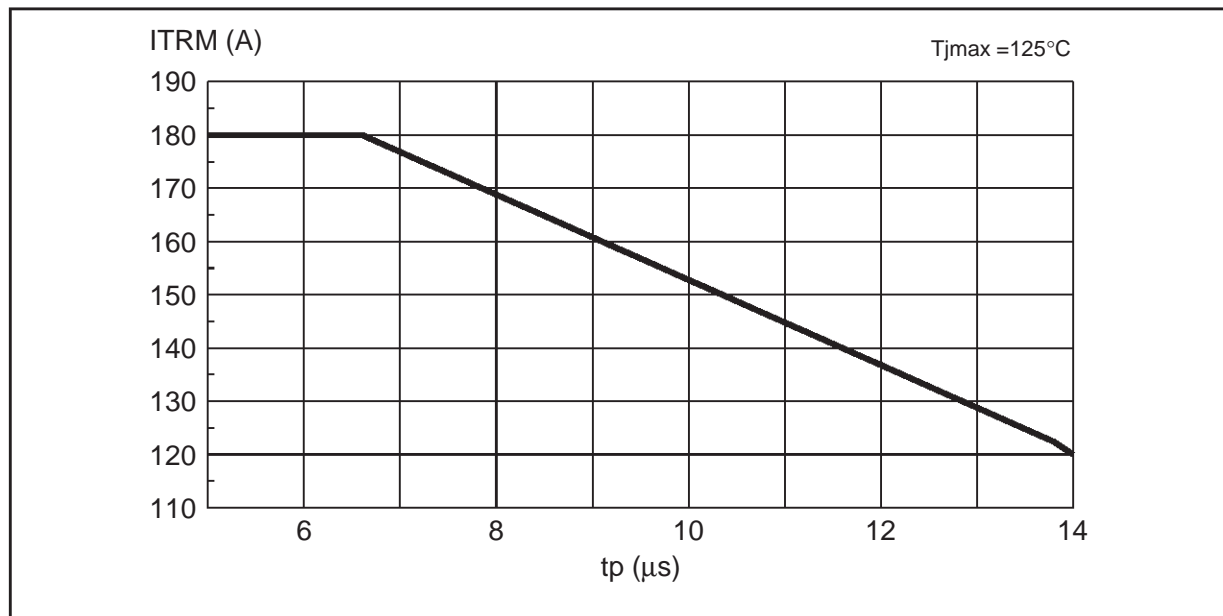


### PEAK CURRENT LIMIT

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.

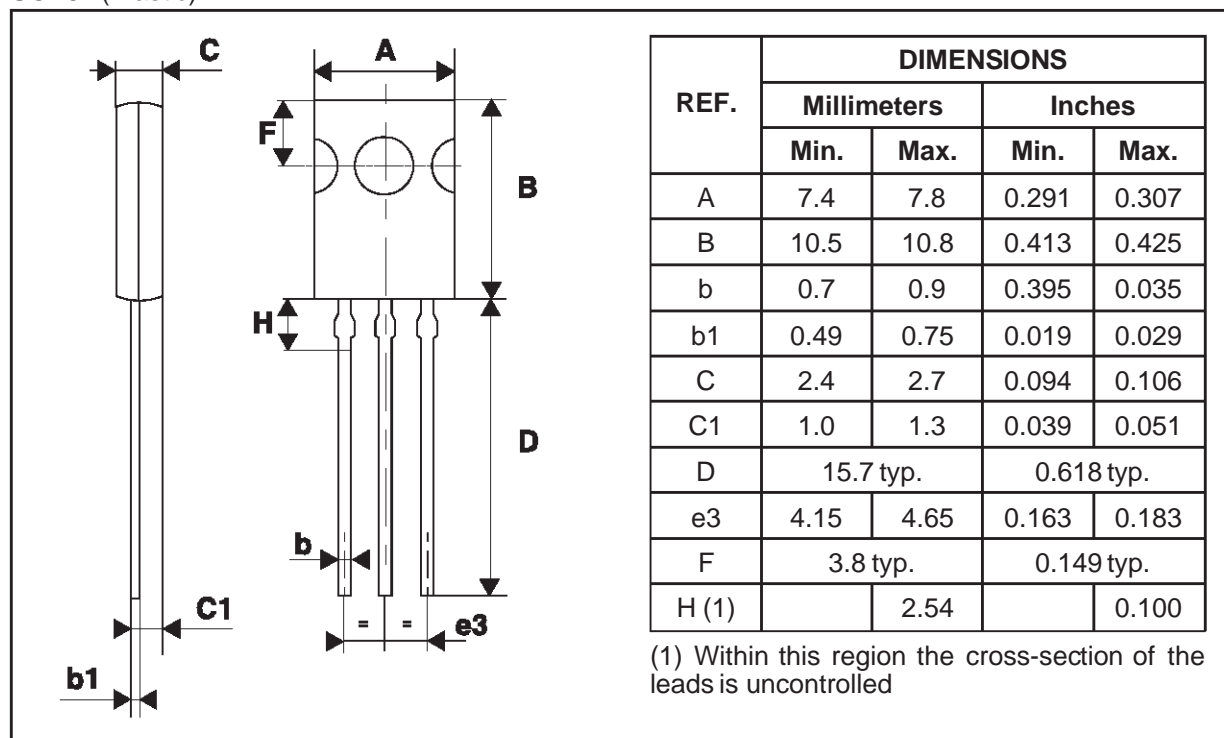


### POWER LOSSES (For $10\mu s$ , see note 1)

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

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

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

**PACKAGE MECHANICAL DATA**  
 SOT82 (Plastic)


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

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