



FLC21/22 FAMILY

LOW POWER FIRE LIGHTER CIRCUIT

Application Specific Discretets
A.S.D.™

PRELIMINARY DATASHEET

BENEFITS

- SPACE SAVING THANKS TO MONOLITHIC FUNCTION INTEGRATION
- HIGH RELIABILITY WITH PLANAR TECHNOLOGY

FEATURES

- DEDICATED THYRISTOR STRUCTURE FOR FAST CAPACITIVE DISCHARGE
- HIGH PULSE CURRENT CAPABILITY
 $I_{FRM} = 75A @ t_p = 10\mu S$
- AC OR DC OPERATION CAPABILITY WITH SUPPLY FROM THE AC MAINS OR A DC BATTERY.

DESCRIPTION

The FLC21 / FLC22 is a high performance planar diffused technology device adapted to high temperature in rugged environmental conditions.

The typical supply of the FLC2x fire lighter circuit is a DC battery or the AC mains.

They have been developed especially for capacitance discharge operation. The main applications are: fuel ignitor, fuel or gas heater, gas range, cook top, barbecue, water heater, HVAC, portable ignitor, insect killers.

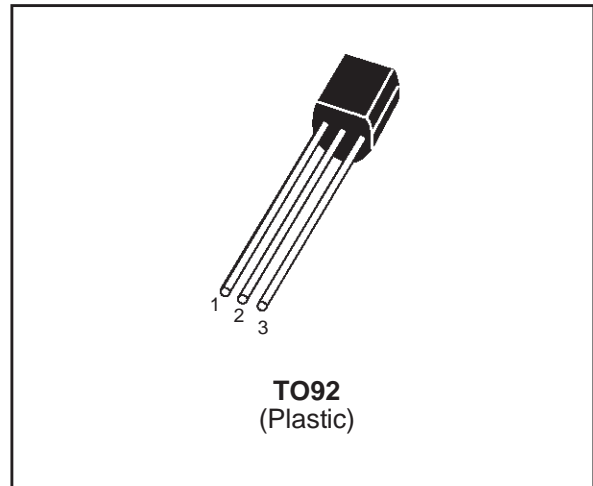
Th: Thyristor for the switching operation.

Z: Zener diode to set the igniting threshold voltage.

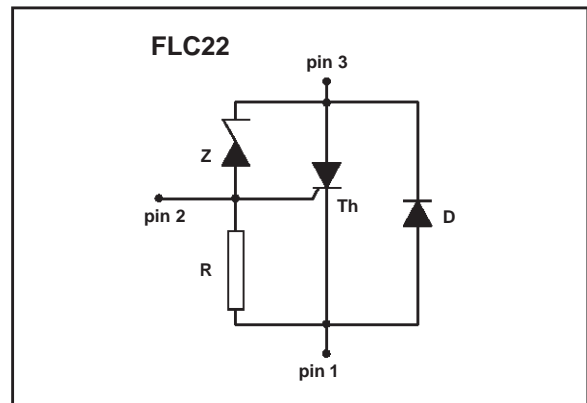
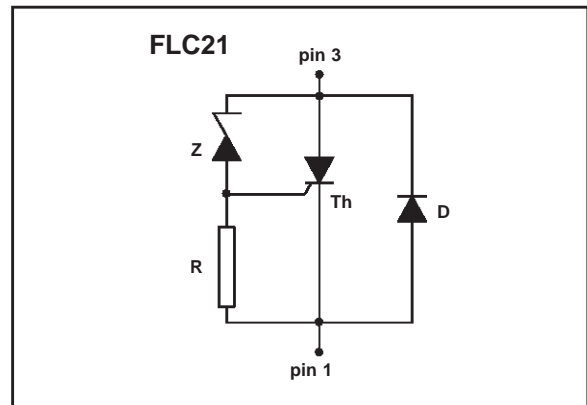
D: Diode for the reverse conduction.

R: 2 kΩ resistor.

DEVICE TYPE	APPLICATION	MODE
FLC21-135	BATTERY OPERATION	Ignition
FLC22-135		Ignition/Blanking by Pin 2
FLC21-65	100V Mains	Ignition
FLC22-65		Ignition/Blanking by Pin 2



FUNCTIONAL DIAGRAM

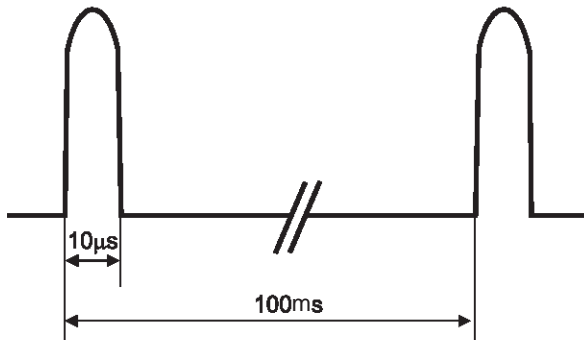


FLC21 / 22 FAMILY

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{TRM}	Repetitive surge peak on state current for thyristor	$t_p = 10\mu s$ (note 1)	75	A
I_{FRM}	Repetitive surge peak on state current for diode			
di/dt	Critical rate of rise on state current		50	A/ μs
T_{stg} T_j	Storage junction temperature range Operating junction temperature range		- 40 to + 150 - 30 to + 125	$^{\circ}C$
T_{amb}	Operating temperature range	FLC21	- 30 to + 120	$^{\circ}C$
		FLC22	- 30 to + 90	
T_L	Maximum lead temperature for soldering during 10s		260	$^{\circ}C$

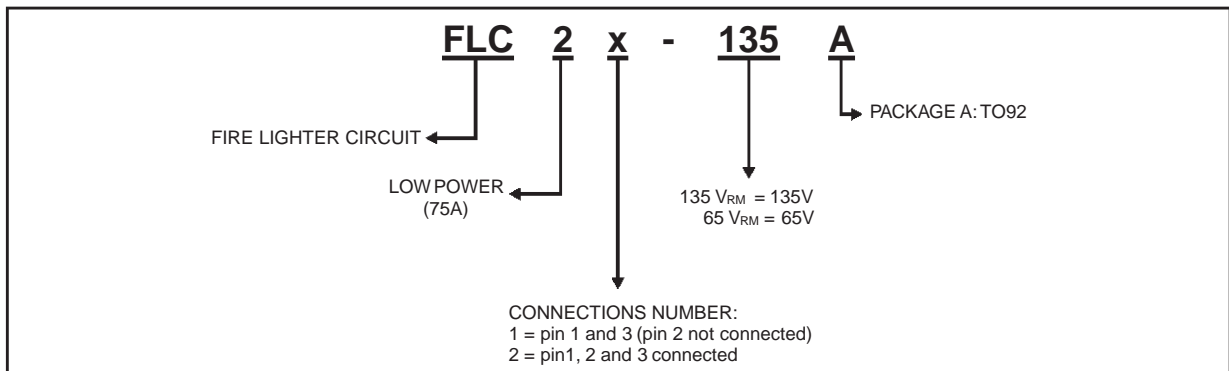
Note 1 : Test current waveform



THERMAL RESISTANCE

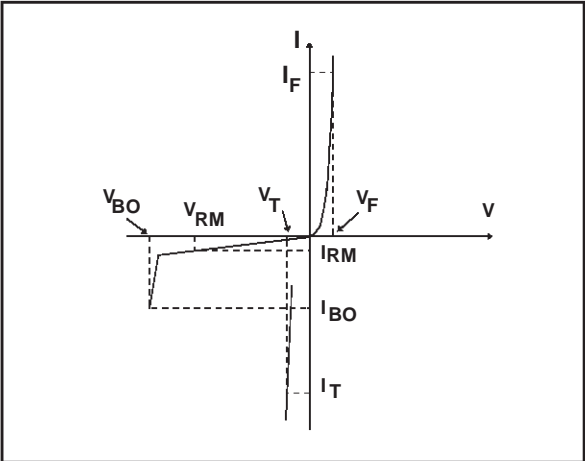
Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction to ambient	150	$^{\circ}C/W$

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
α_t	Thermal coefficient for V_{BO}



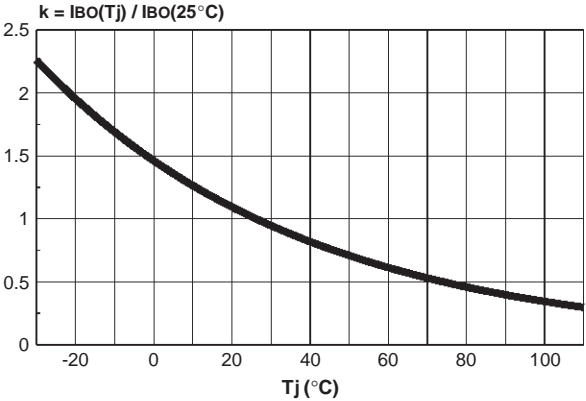
DIODE (D) PARAMETER

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

THYRISTOR (Th) and ZENER (Z) PARAMETERS

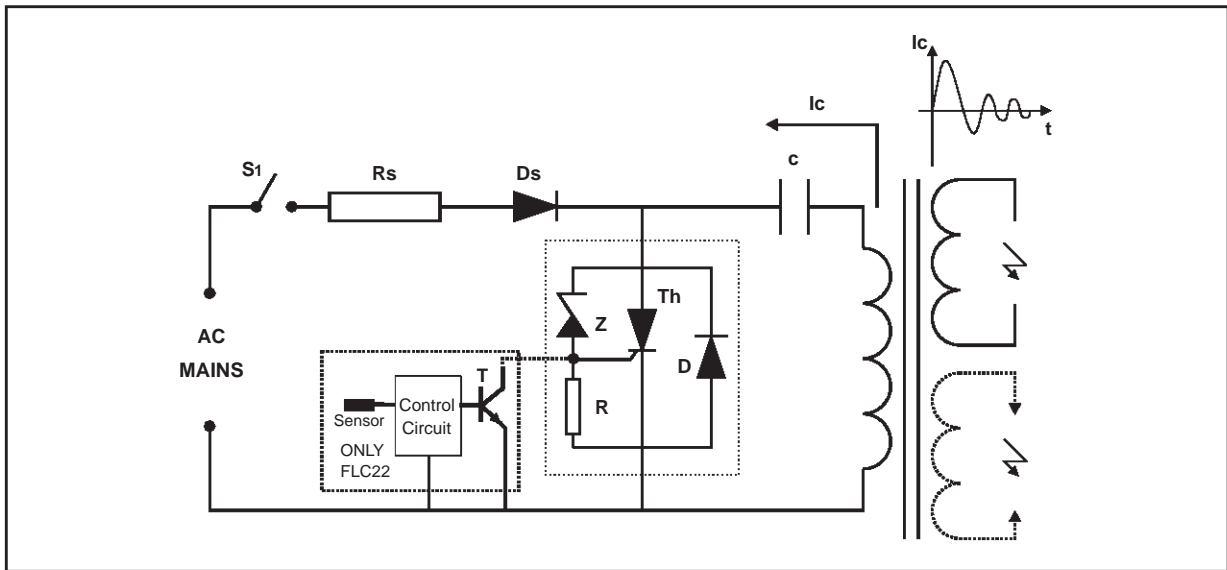
Symbol	Test conditions		Value						Unit
			FLC2x65			FLC2x135			
			Min.	Typ.	Max.	Min.	Typ.	Max.	
I_{RM}	$V_{RM} = V_{BO} min$	$T_j = 25^\circ C$			10			10	μA
		$T_j = 125^\circ C$			100			100	μA
V_{BO}	at I_{BO}	$T_j = 25^\circ C$	65		85	135		165	V
I_{BO}	at V_{BO} Without external R_{GK}	$T_j = 25^\circ C$			500			500	μA
V_T	$I_T = 2A$ $t_p \leq 1ms$	$T_j = 25^\circ C$			1.7			1.7	V
α_t				0.07			0.16		$V/^\circ C$

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

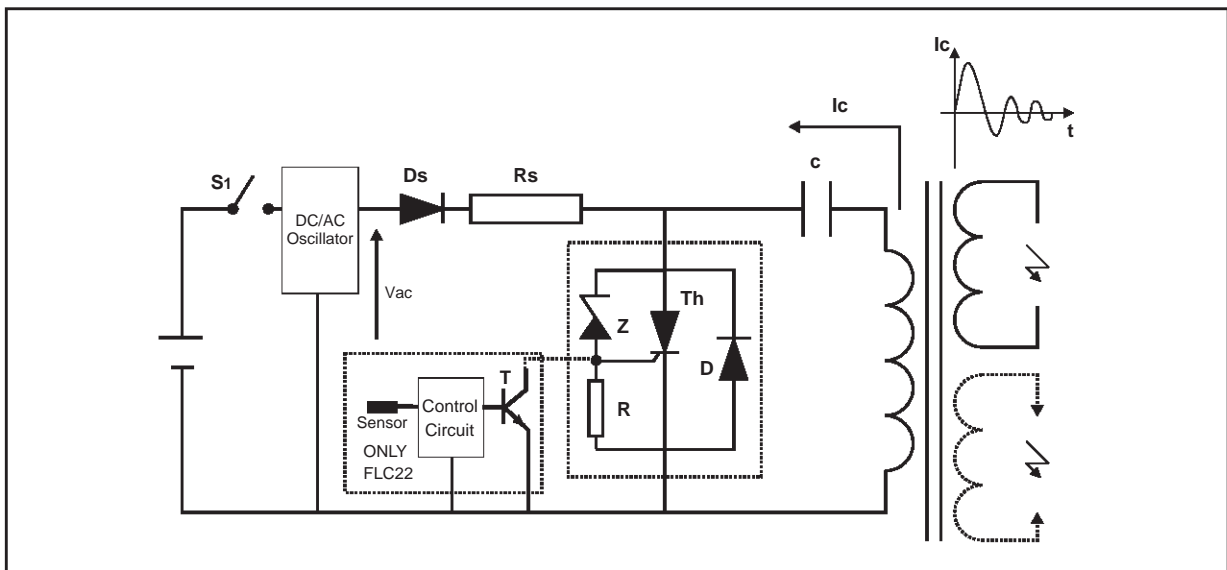


FLC21 / 22 FAMILY

BASIC AC MAINS APPLICATION



BASIC DC APPLICATION



When S1 is ON, the FLC21 works in ignition mode. The FLC22 works in ignition mode when the transistor T is OFF and stays in blanking mode when the Transistor T is ON.

1/IGNITION MODE

PHASE 1

The AC voltage is rectified by the diode Ds. The ignition energy is supplied by the mains and stored into the capacitor C.

PHASE 2

At the end of the phase 1, the voltage across the capacitor C reaches the avalanche threshold of the Zener diode Z. Then, a current flows through this Zener diode into the gate of the thyristor Th which is triggered.

The thyristor turn on generates an alternating current through the capacitor C. Its positive parts flow through the capacitor C, the primary of the HV transformer and the thyristor Th. Its negative parts flow through C, the primary of the HV transformer and the diode D.

RS RESISTANCE CALCULATION

The Rs resistance allows, in addition with the capacitance C, to adjust the spark frequency and to limit the current supplied by the mains. This resistance allows the thyristor triggering in any requested cases. In worst cases, the system must

fire when the a.c. line voltage is minimum while the breakdown voltage V_{BO} and the current I_{BO} of the FLC are maximum.

The maximum Rs value is equal to :

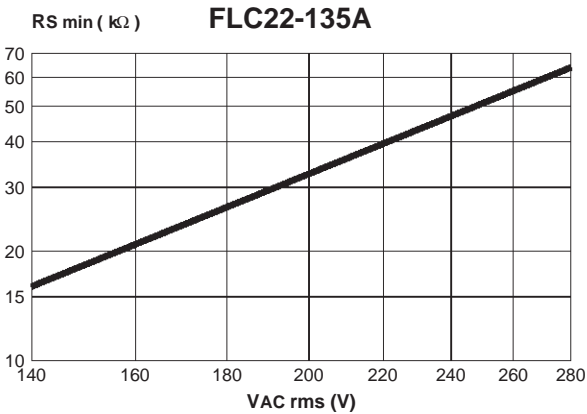
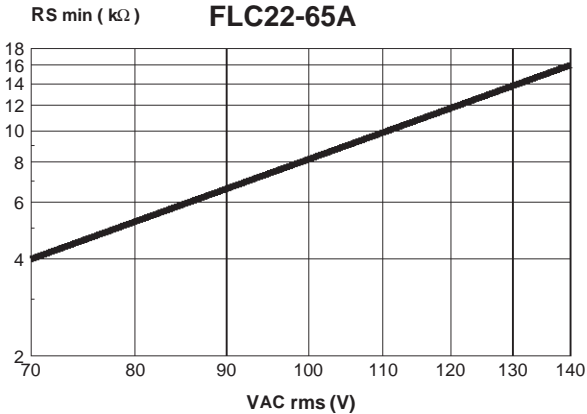
$$R_{smax} = \frac{(V_{AC \text{ min.}} \cdot \sqrt{2}) - [V_{BO \text{ max.}} \cdot (1 + \alpha T \cdot (T_{amb} - 25))] }{k \cdot I_{BO} *}$$

* : see fig 1

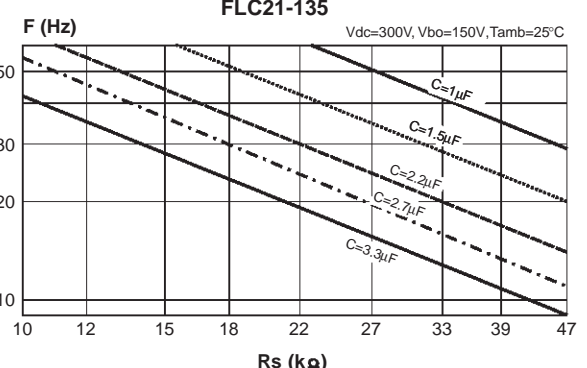
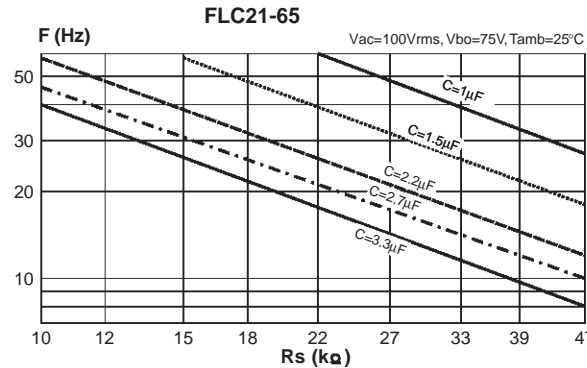
2/ BLANKING MODE (FLC22):

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

In order to keep the thyristor Th in blanking mode and limit its power dissipation, the resistance Rs has to be minimum and is defined by the curve described below.



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

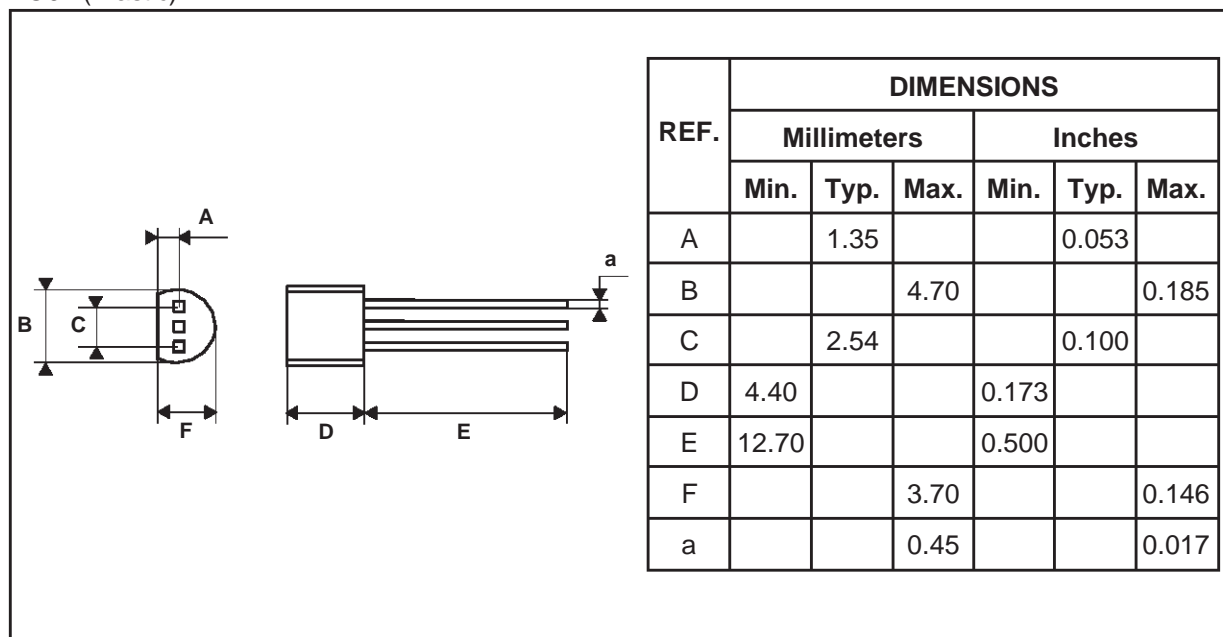
which the system would not work when the AC mains is minimum.



FLC21 / 22 FAMILY

PACKAGE MECHANICAL DATA

TO92 (Plastic)



- Marking: type number
- Weight: 0.200 g
- Epoxy meets UL94, VO at 1/8"
- Shipped 2500 units per box

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 1999 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco -
The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.

<http://www.st.com>