

#### Automatic X Capacitor Discharge IC

#### **General Description**

The ME8701 is an automatic discharge IC for X capacitors. When AC voltage is applied, ME8701 blocks current flow in the X capacitor safety discharge resistors, reducing the power loss to less than 5mW at 230VAC. When AC voltage is disconnected, ME8701 automatically discharges the X capacitor by connecting the series discharge resistors. This operation allows total flexibility in the choice of the X capacitor to optimize differential mode EMI filtering and reduce inductor costs, with no change in power consumption.

Designing with ME8701 is simply a matter of selecting the appropriate external resistor values for the X capacitor value being used to achieve the necessary time constant. The simplicity and ruggedness of the two terminals ME8701 IC makes it an ideal choice in systems designed to meet safety standards.

## Applications

- The power supply of household appliances
- All converters requiring very low standby power

#### **Features**

- Internal 1000V MOSFETs
- Blocks current through X capacitor discharge resistors when AC voltage is connected
- Automatically discharges X capacitors through discharge resistors when AC is disconnected
- <5mW consumption at 230VAC
- Simplifies EMI filter design
- Self supplied no external bias required
- Internal limit maximum discharge current

### Package

• 8-pin SOP8

# **Typical Application Circuit**



## **Selection Guide**



# **Pin Configuration**



## **Pin Assignment**

Pin No.	Symbol	Description
1,4,5,8	NC	No connection
2,3	D1	AC voltage input
6,7	D2	AC voltage input

## **Block Diagram**



## **Absolute Maximum Ratings**

Parameter		Symbol	Ratings	Unit
D1,D2 Voltage		$V_{D1}, V_{D2}$	-0.3~1000	V
Thermal resistance (Junction to ambient)		θ <sub>JA</sub>	80	°C/W
Power Dissipation	SOP8	P <sub>D</sub>	1.56	W
Operating ambient temperature Range		T <sub>A</sub>	-40~+85	°C
Storage Temperature Range		T <sub>stg</sub>	-55~+150	°C
Maximum junction tem	perature	TJ	-40~+150 °C	
Welding Temperature			260ºC, 10s	

Note:

1. Absolute maximum rating is the maximum physical damage limit that the product can withstand. Please do not exceed this rating under any circumstances.

2. The maximum allowable power dissipation is a function of the maximum junction temperature  $T_{J (MAX)}$ , the junction-to-ambient thermal resistance  $\theta_{JA}$ , and the ambient temperature  $T_A$ . The maximum allowable continuous power dissipation at any ambient temperature is calculated by  $P_{D(MAX)}=(T_{J(MAX)}-T_A)/\theta_{JA}$ .

3. The  $\theta_{JA}$  values given in this table are for comparison with other packages only and cannot be used for design purposes. They do not represent the performance achieved in real-world applications.

Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit
AC Removal Detection Time	T <sub>DETECT</sub>	Line Cycle Frequency 47-63 Hz		28	35	ms
Supply Current	I <sub>SUPPLY</sub>			20		uA
Current Limited	I <sub>DSAT</sub>				4.5	mA
Breakdown Voltage	BVDss	I <sub>D1</sub> -I <sub>D2</sub> =250uA	1000			V

#### Electrical Characteristics (T<sub>A</sub> = 25°C, unless otherwise noted)

### **Operation Description**

The ME8701 is an automatic discharge IC for X capacitors. When AC voltage is applied, ME8701 blocks current flow in the X capacitor safety discharge resistors, reducing the power loss to less than 5mW at 230 VAC. When AC voltage is disconnected, ME8701 automatically discharges the X capacitor by connecting the series discharge resistors. Designing with ME8701 is simply a matter of selecting the appropriate external resistor values for the X capacitor value being used to achieve the necessary time constant. The total resistance of the series resistor should meet the requirements of the safety regulations for the discharge time constant should be less than 1s.

The typical X capacitor capacity and common series resistance can be referred to the following tab	The typical	X capacitor	capacity and	common series	resistance can l	be referred to	the following table
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X Capacitor	Total resistance (R1+R2)	X Capacitor	Total resistance (R1+R2)
0.1uF	3.9MΩ+3.9MΩ	1uF	390kΩ+390kΩ
0.22uF	2.0ΜΩ+2.0ΜΩ	2.2uF	200kΩ+200kΩ
0.33uF	1.2ΜΩ+1.2ΜΩ	3.3uF	120kΩ+120kΩ
0.47uF	910kΩ+910kΩ	4.7uF	91kΩ+91kΩ
0.68uF	620kΩ+620kΩ	5.6uF	75kΩ+75kΩ
0.82uF	510kΩ+510kΩ	6.8uF	62kΩ+62kΩ

#### Note:

1. The necessary MOV device should be used at the input end to reduce the X Cap and ME8701 voltage stress.

2. The ME8701 should place behind the system MOV to reduce the ME8701 voltage stress when the differential surge voltage occurred.

### Package Quantity

Package Type	Minimum Packing QTY	UNITS	Small Box	Large BOX
SOP8	3000	Tape & Reel	6K	48K

# Package Information

## • Package Type: SOP8



	Millin	neters	Inches		
DIN.	Min.	Max.	Min.	Max.	
А	1.3	1.8	0.0512	0.0709	
A1	0.05	0.25	0.002	0.0098	
A2	1.25	1.65	0.0492	0.065	
A3	0.5	0.7	0.0197	0.0276	
b	0.3	0.51	0.0118	0.0201	
С	0.17	0.25	0.0067	0.0098	
D	4.7	5.1	0.185	0.2008	
E	5.8	6.2	0.2283	0.2441	
E1	3.8	4	0.1496	0.1575	
е	1.27(TYP)		0.05(	TYP)	
h	0.25	0.5	0.0098	0.0197	
L	0.4	1.27	0.0157	0.05	
L1	1.04(TYP)		0.0409	9(TYP)	
θ	0	8°	0	8°	
c1	0.25(TYP)		0.0098	B(TYP)	

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