

## X capacitor discharge IC

### General Description

PN8200 is an automatic X capacitor discharge IC with two terminals, that could get low power consumption and meet safety standards. PN8200 built-in 1000V avalanche-rugged smart VDMOSFET, protecting the IC from damage. The chip checks AC voltage through the discharge resistors; when an AC mains voltage is applied, the very low current (15uA) flows in the discharge resistors to reduce power consumption to less than 5mW at 230VAC; when an AC mains voltage is disconnected, and a high voltage remains on the X capacitor, PN8200 automatically discharges the X capacitor by the discharge resistors. The discharge resistors and X capacitor could be chosen flexibly to optimize EMI performance.

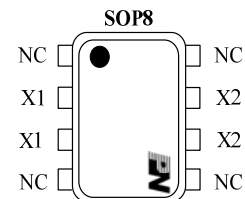
### Features

- Internal 1000 V avalanche-rugged smart VDMOSFET
- No external ground pin leads to strong interference ability
- Blocks current through X capacitor when AC voltage is applied
- Automatically discharges the X capacitor when AC voltage is disconnected
- X capacitor could be chosen flexibly to optimize EMI design
- Self supplied and doesn't need external bias
- Two terminals and meets safety standards
- Discharge current internally limited
- Compliant to IEC 62368-1:2014

### Applications

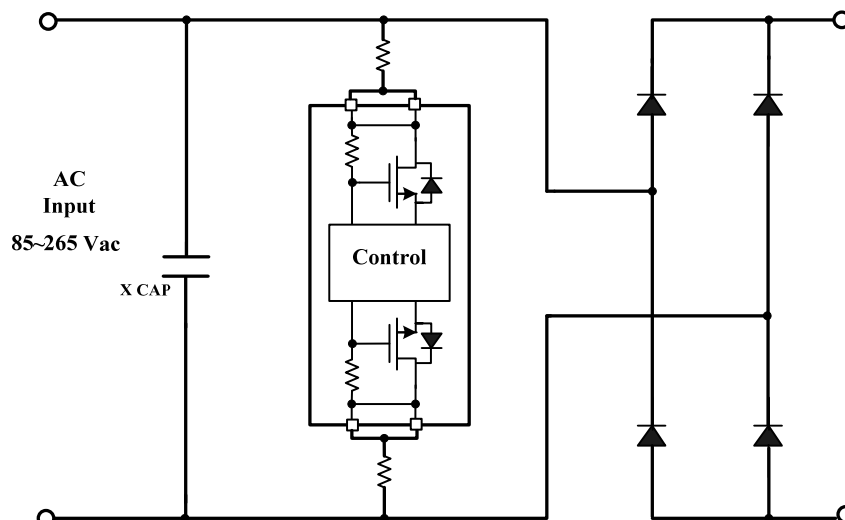
- All converters requiring very low no-load consumption or standby power
- Appliances requiring EuP Lot 6 compliance
- White Goods

### Package/Order Information



Order Code	Package
PN8200SEC-R1	SOP8

### Typical Circuit



## Pin Definitions

Pin Name	Pin Number	Pin Function Description
NC	1, 4, 5, 8	Unconnected Pin
X1	2, 3	AC Input1
X2	6, 7	AC Input2

## Absolute Maximum Ratings

Pin X1,X2 .....	-0.3~1000V
Operating Junction Temperature .....	-40~150°C
Storage Temperature Range .....	-55~150°C
Lead Temperature (Soldering, 10Secs).....	260°C
Package Thermal Resistance R <sub>θJC</sub> (SOP8) .....	80°C/W
HBM ESD Protection <sup>(1)</sup> .....	±2.5kV

Note: 1.Test standard: JEDEC JS-001-2014.

## Electrical Characteristics

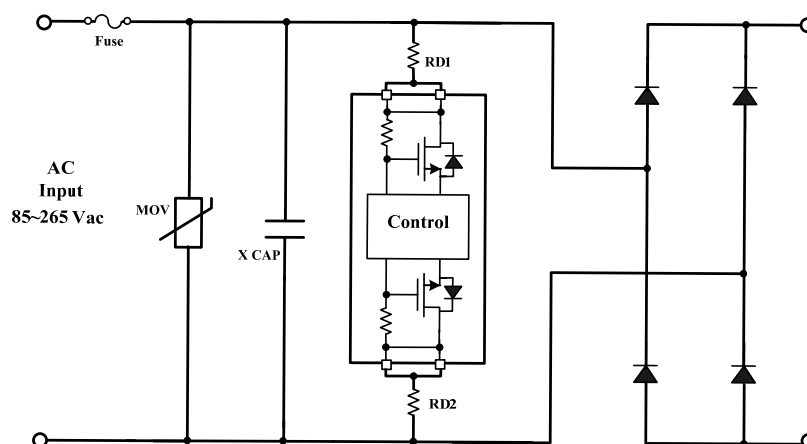
(T<sub>A</sub> = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
AC removal detection Time	T <sub>DET</sub>	Line cycle frequency 47 to 63Hz		32		ms
Supply current	I <sub>OP</sub>			15		uA
Discharge current limited	I <sub>CLP</sub>				4	mA
VDMOS breakdown voltage	BV <sub>dss</sub>	I <sub>X1-X2</sub> =250uA	1000			V

## Functional Description

PN8200 is an automatic X capacitor discharge IC with two terminals, and built-in 1000V avalanche-rugged smart VDMOSFET switch. The chip checks AC voltage through the discharge resistors, when an AC mains voltage is applied, the internal control will check the AC voltage zero crossings, and Block current through X capacitor discharge resistors; when an AC mains voltage is disconnected, PN8200 will automatically discharge the X capacitor by the series discharge resistors after Detection Time (TYP:32ms). The discharge current is determined by external discharge resistors, but the maximum discharge current is limited internally. The discharge resistors and X capacitor could be chosen flexibly, its time constant is set within 1 second normally.

## Typical Application



**Reference for matching the capacitance of X capacitor and resistance values of series resistors:**

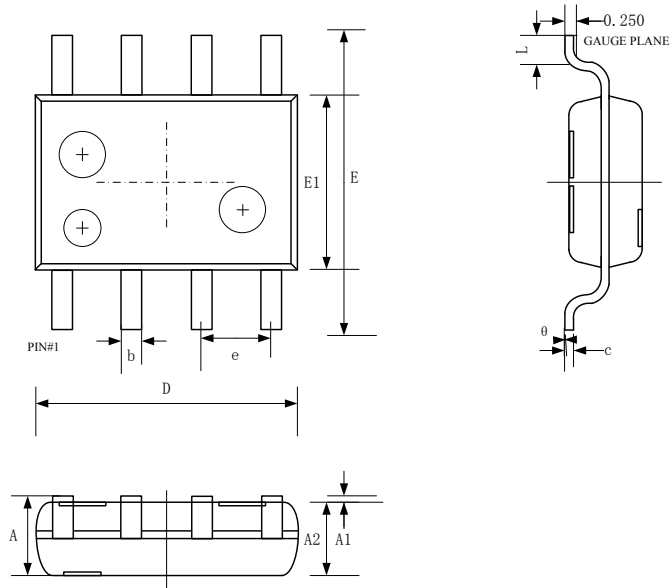
Capacitance of X capacitor	Resistance values of series resistors (RD1+RD2)	Capacitance of X capacitor	Resistance values of series resistors (RD1+RD2)
0.1uF	3.9MΩ+3.9MΩ	1uF	390kΩ+390kΩ
0.22uF	2.0MΩ+2.0MΩ	2.2uF	200kΩ+200kΩ
0.33uF	1.2MΩ+1.2MΩ	3.3uF	120kΩ+120kΩ
0.47uF	910kΩ+910kΩ	4.7uF	91kΩ+91kΩ
0.68uF	620kΩ+620kΩ	5.6uF	75kΩ+75kΩ
0.82uF	510kΩ+510kΩ	6.8uF	62kΩ+62kΩ

## **Component Parameter and Layout Considerations:**

1. The MOV is placed in the input of power supply to reduce the voltage stress of X capacitor and the IC.
2. PN8200 is placed behind the MOV in the loop of PCB layout , so that the high voltage will pass through the MOV circuit first when the surge occurs, which can reduce the voltage stress of PN8200.
3. The total discharge resistor is suggested larger than 120kΩ, that could avoid the chip overheating in discharge condition.

## Package Information

### SOP8 Package Information



symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.450	1.750	0.057	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

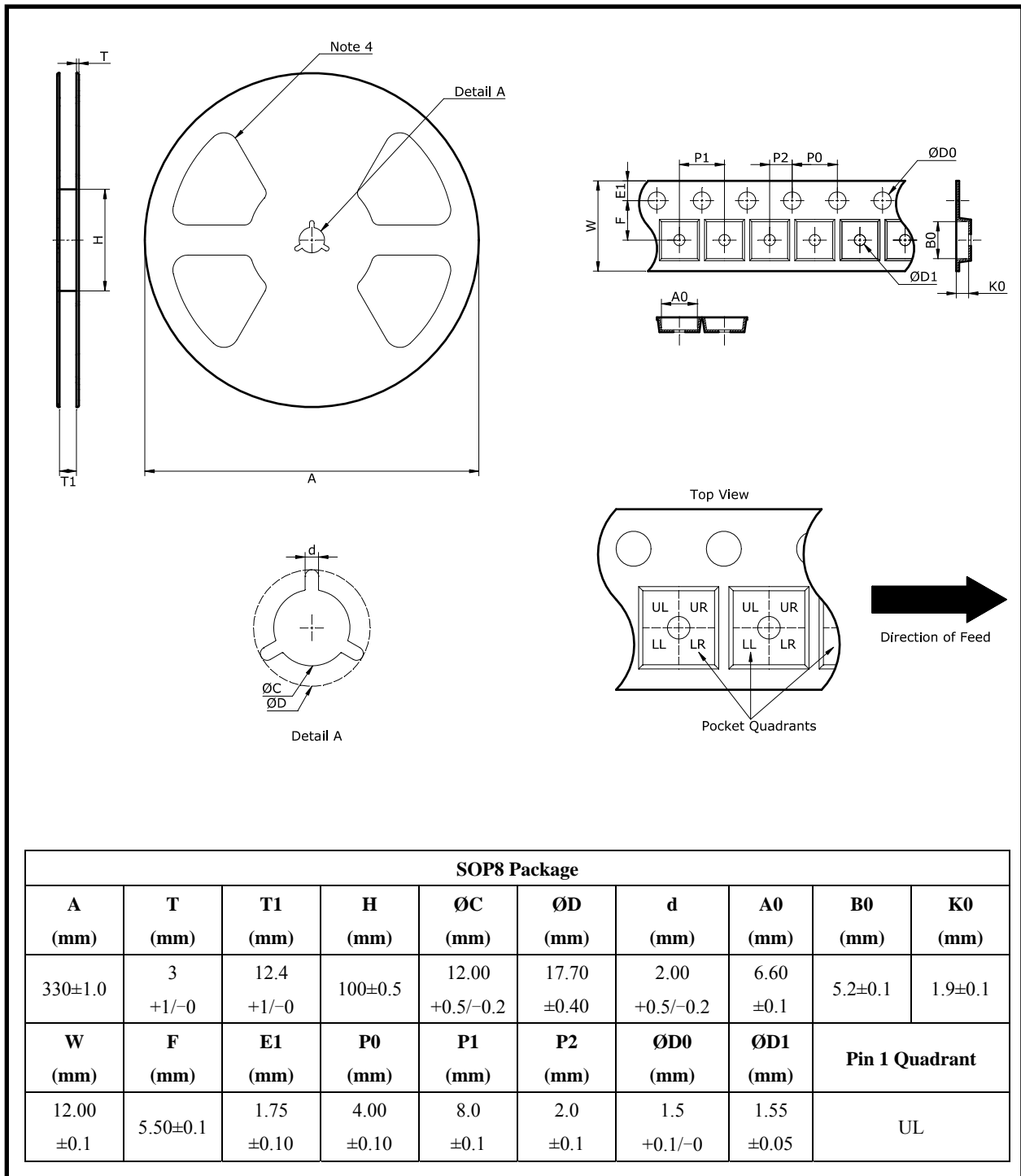
Top mark	Package
PN8200 YWWXXXXX	SOP8

Note: Y: Year Code; WW: Week Code; XXXXX: Internal Code

Notes:

1. This drawing can be adjusted without notice;
2. The device body size does not contain die flow.

## Braid Tape And Reel Information



Notes:

1. This drawing can be adjusted without notice;
2. All sizes are nominal values of mm;
3. This drawing is not strictly proportions, and is for reference only. Customers can contact Chipown sales for more details;
4. Examples here are for reference only.

## **Important Notice**

Wuxi Chipown Microelectronics Co. Ltd. reserves the right to make changes without further notice to any products or specifications herein. Wuxi Chipown Microelectronics Co. Ltd. does not assume any responsibility for use any its products for any particular purpose, nor does Wuxi Chipown Microelectronics Co. Ltd. assume any liability arising out of the application or use of any its products or circuit. Wuxi Chipown Microelectronics Co. Ltd. does not convey any license under its patent or other rights nor the rights of others.