GENERAL DESCRIPTION

This data sheet will show how to remove Phantom Power. It may not be necessary to use CM02 and an equivalent circuit has been provided in the data sheet. The Phantom Power due to EMI discharge resistor can be removed by a pretty simple circuit as describe in the block diagram. However, CM02 could be cost-effective choice for designing zero no load consumption.

CM02, Magic D, it behaves like a magic diode or a low-pass filter. Magic D allows DC passes and AC is blocked. Magic D is a low pass filter. It allows frequency ~> 20 Hz to pass with ~ Zero Input Power. When frequency <~ 20Hz, Magic D is on.

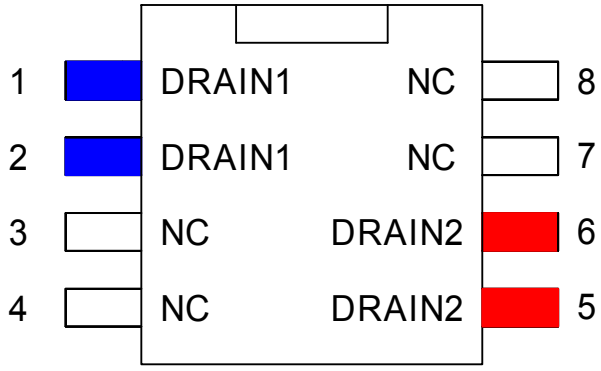
Magic D power consumption is approaching to 0 when line voltage appears.

FEATURES

- 4 terminal with > 5 mm space on package and PCB
- BV~1KV, Design for lightning surge sensitive environment
- CM02, one product works with any EMI filter design
- Remove Phantom Power
- A cost effective solution
- SOP8 package
- The package is polarity insensitive.

PIN CONFIGURATION

SOP8
TOP View



ORDERING INFORMATION

Part Number	Temperature Range	Package
CM02XIS*	-55℃ to 150℃	SOP-8
CM02XISTR*	-55℃ to 150℃	SOP-8

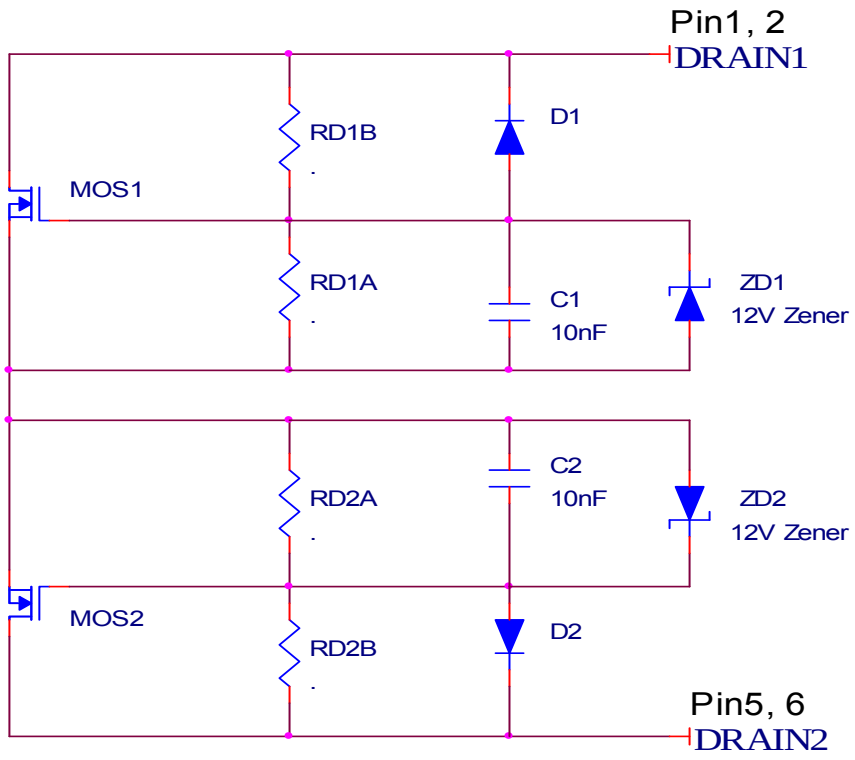
***Note:** X : Suffix for Halogen Free and PB Free Product
TR : Package is Typing Reel

ABSOLUTE MAXIMUM RATINGS (TA=25℃, unless otherwise specified)

PARAMETER		Symbol	RATINGS	Unit
Drain1 to Drain2 Voltage		V_{DSS}	1000	V
Package Power Dissipation @ $T_A \leq 25^oC$		P_D	1.0	W
Junction Temperature	SOP-8	T_J	+150	℃
Storage Temperature	SOP-8	T_{STG}	-65~+150	℃
Junction to Ambient *	SOP-8	θ_{JA}	145.7	℃/W

* : Surface Mounted on $1in^2$ pad area, t≦10sec

SIMPLIFIED BLOCK DIAGRAM : Equivalent Circuit (Sop8)



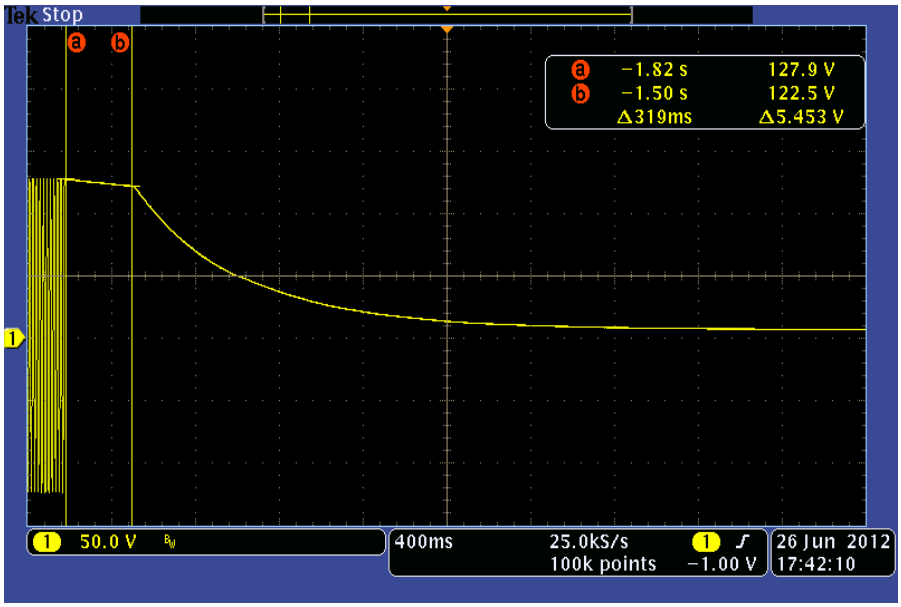
ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_A = 25℃.

PARAMETER	SYMBOL	TEST CONDITIONS	CM02			
			Min	Typ	Max	Unit
Breakdown Voltage						
Drain1 to Drain2	BV_{DSS}			1		KV
1000V MOSFET On delay time						
1000V MOSFET On delay time	Ton delay	Vd1d2 = 50V, Rd1=Rd2= 250K		385	550	mS
1000V MOSFET On delay time	Ton delay	Vd1d2 = 127V, Rd1=Rd2= 250K (Figure1)			350	mS
1000V MOSFET Rdson						
1000V MOSFET Rdson	Rdson	Vgs = 12V @ room temp		60		Kohm
Turn on ID current	(Rd1+Rd2>264VAC*1.414/2mA=186Kohm)				2	mA
Discharge Time for 400V discharged to 60V						
400V to 60V discharging time	Tdischarging	Rd1=Rd2=250K ; Cx=0.47uF		0.5		S
CM02 supply current without turning on 1000V MOSFET						
current @ line Frequency =47 Hz	Isupply ac	Vin = 230 Vac and Frequency =47 Hz			20	uA

Note for 1KV Mosfet On delay time: Ton delay is inversely proportional to Vd1d2, Ton delay is around 25~40ms in Vd1d2=380V

Delay Timer (Figure1 : cursor a to cursor b)



Description

CM02, Magic D is designed to replace the discharging resistor of EMI filter. CM02, Magic D is one product to fit for any EMI design.

CM02, Magic D is a low-pass filter. When the input frequency is lower than 20Hz, the two-integrated 1000V MOSFET will be turned on and when the input frequency is higher than ~ 20Hz, the two-integrated 1000V MOSFET will be off.

CM02, Magic D only has 4 terminals. CM02's 2 1000V MOSFET connects 2 external discharging resistor when input frequency < 20Hz. CM02's 2 1000V MOSFET disconnects 2 external discharging resistor when input frequency is > 20Hz.

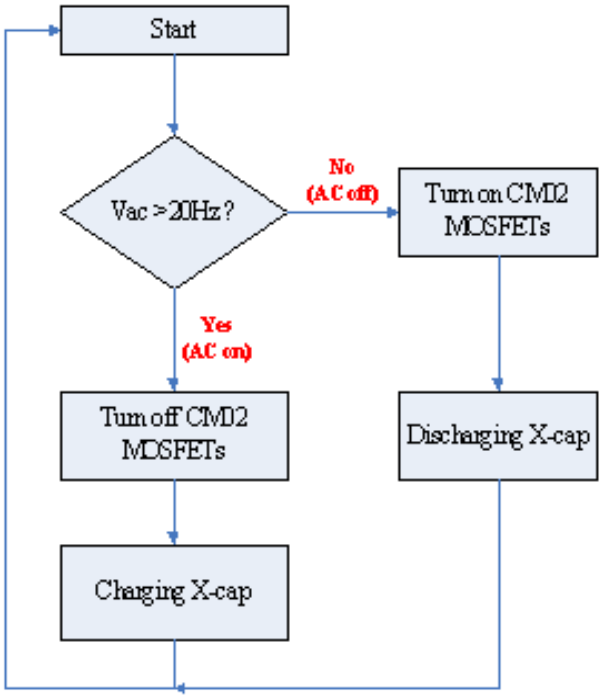
The total value of 2 external resistor value should be determined by the time constant, Tdischarge ~ 0.5S. Therefore, Tdischarge = (Rd1+Rd2) x Cx < 0.5S. Cx is the EMI x capacitor. A Csurge ~ 47pF capacitor should be added to parallel with CM02 for strenuous lightning surge test. The Csurge is added to suppress the voltage across CM02.

CM02's 4 terminal package provides minimum 50 mm space for PCB layout. CM02 is designed for lightning surge sensitive environment.

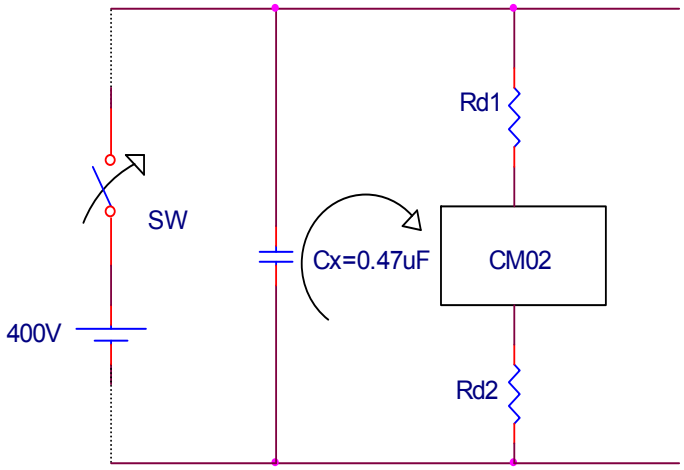
Without CM02, the equivalent circuit on the simplified block figure has been provided and it will have the similar good performance. However, CM02 is more cost-effective.

CM02 + CM03 or CM02 + CM05 helps No Load consumption approaches zero possible.

Flow Chart

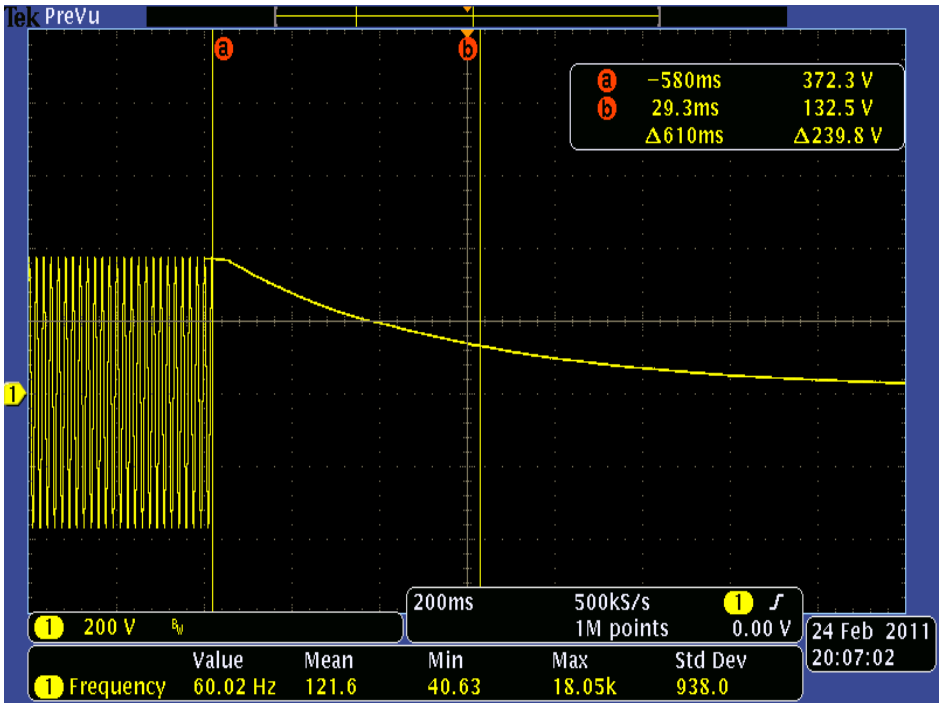


Test Equipment

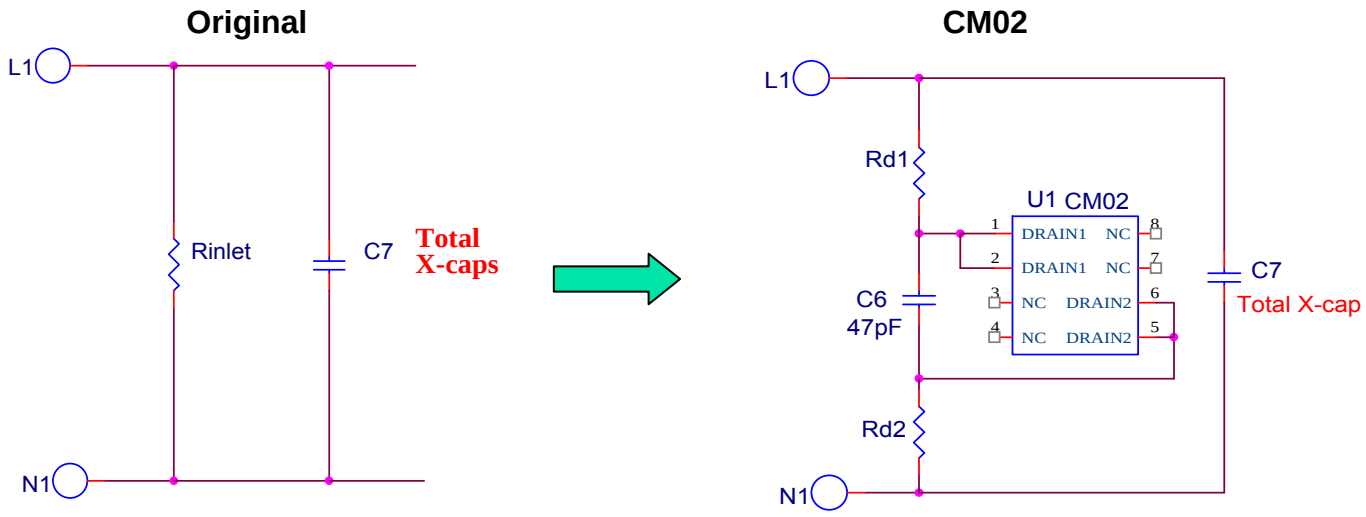


Discharge Timing

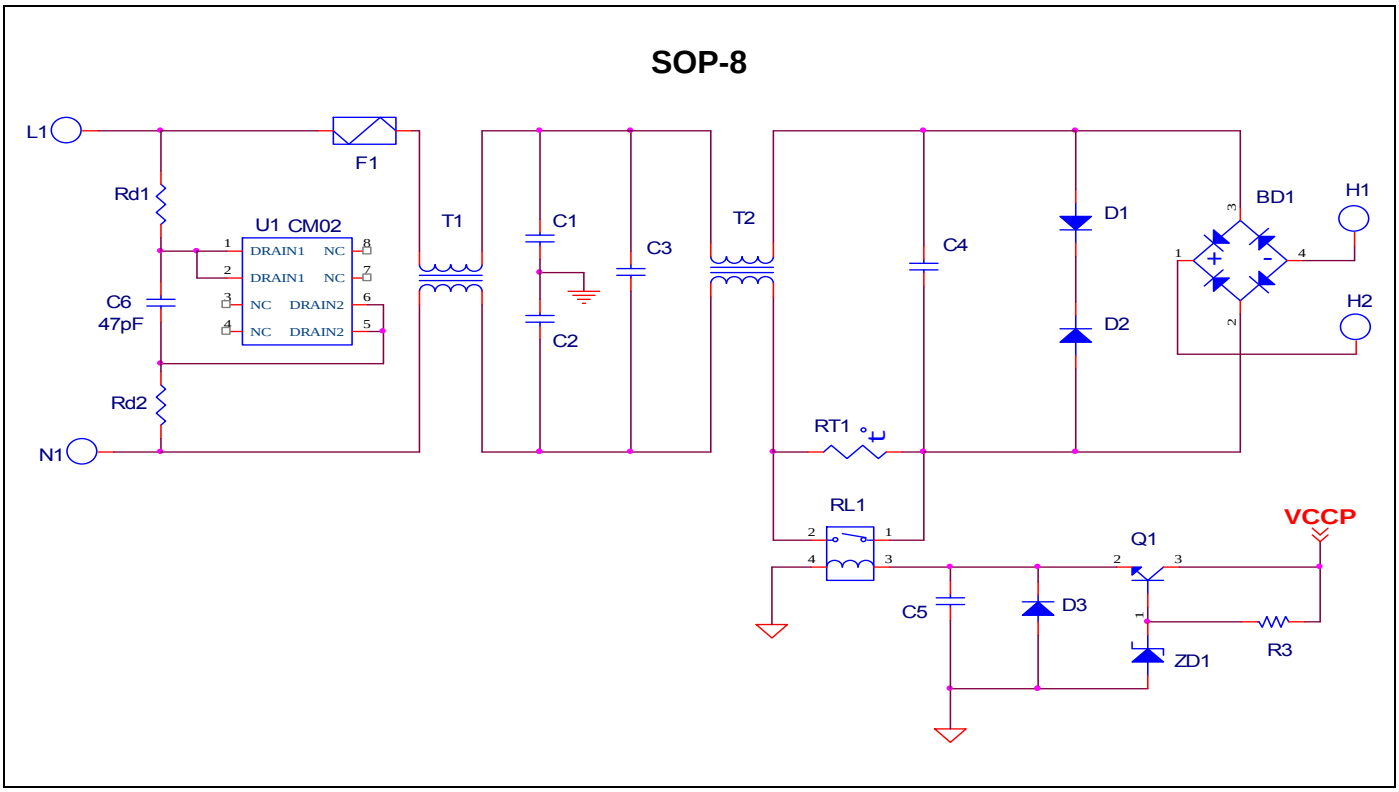
Condition : 264VAC , Cx = 0.62uF ; Rd1+Rd2 = 914K



APPLICATION CIRCUIT (Sop8)

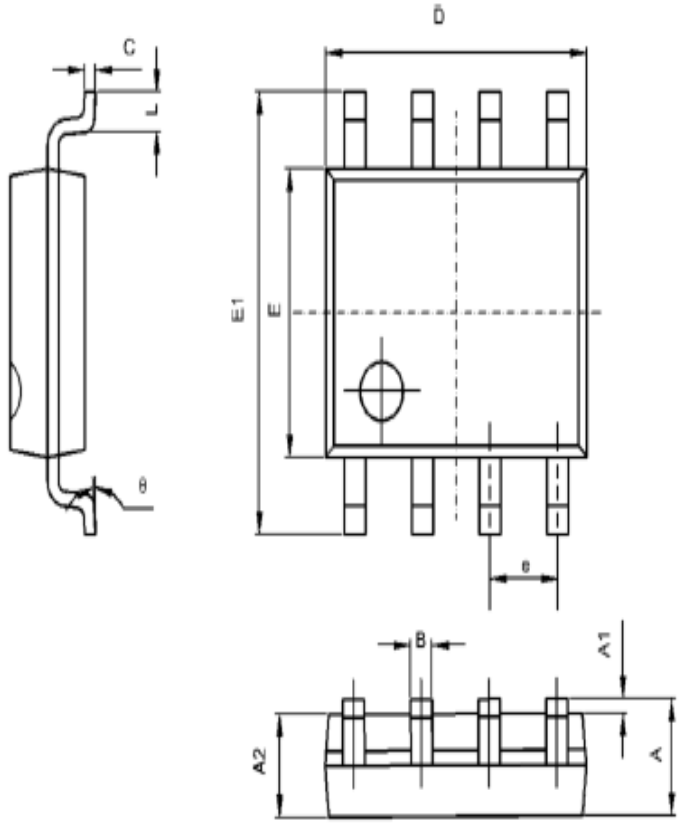


Rinlet = Rd1+Rd2
Toatal X-caps = X-cap1+X-cap2...



PACKAGE DIMENSION

8-PIN SOP (S8)



SYMBOL	DIMENSION IN MILLIMETERS		DIMENSION IN INCHES	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	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	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270 TYP		0.050 TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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