

# Design your EMC Filter - 744998

An easier way to investigate, experiment and solve your daily EMC challenges



## What are our EMC filters made of?

### X-Capacitor

- Increases the differential mode attenuation

### Discharge Resistor

- Discharge of X-Capacitor
- Important for safety

### SMD Power Elements

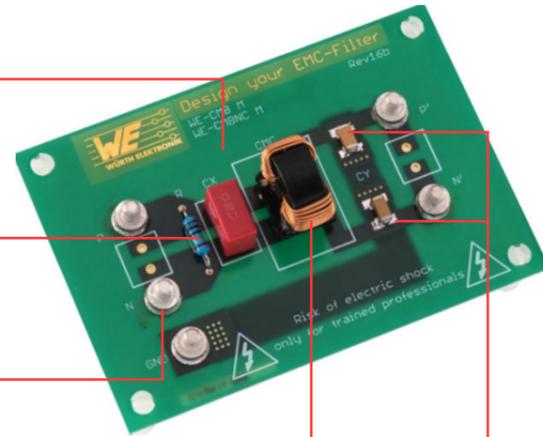
- High current connection in SMD assembling

### Common Mode Choke

- High common mode and partly differential mode attenuation

### Y-Capacitors

- Strongly increases common mode and partly differential mode attenuation, driving some leakage current to ground



Effect of the single components to the filter behaviour

## Additionally available – Different kind of filter boards – to evaluate which is the best filter for your application



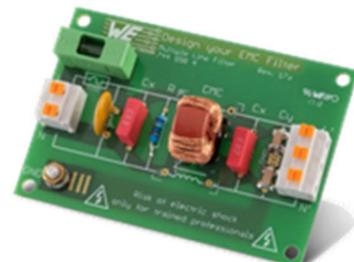
Line Filter 250 V  
Order Code: : 7449981



Differential Filter 250 V;  
Order Code: : 7449982



DC Filter 80 V, for SMD parts  
Order Code: : 7449983

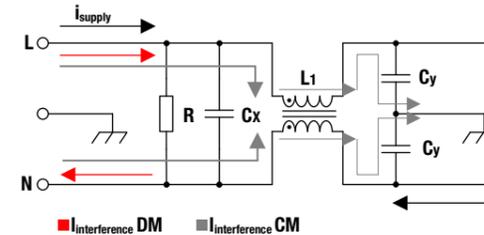


Multiple Line Filter 250 V, with overvoltage protection  
Order Code: : 7449984

## How does an EMC Filter work?

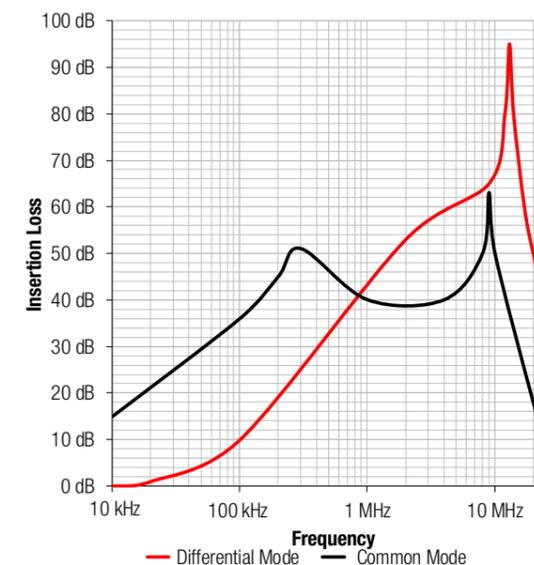
### Low-pass filter for differential mode noise (diff)

At differential signal noise current flows in through line L and returns through line N. Basically, in this situation the inductance of the common mode choke ( $L_{diff}$ ) and the X-Capacitor ( $C_x$ ) build a low pass filter for this current. The loop of this low pass filter is closed via X-Capacitor. The high frequency interference current ( $I_{interference}$ ) is filtered. Meanwhile the supply current ( $I_{supply}$ ), which has typically a much lower frequency, will pass the filter.



### Low-pass filter for common mode noise

At common mode noise the inductance of the common mode choke is very high. This inductance ( $L_{comm}$ ) and the Y-Capacitors build a low-pass for high frequency common mode noise. The Y-Capacitors create a conductor for high frequency noise to internal ground, so common mode noise can be diverted. Because of the high common mode impedance of the common mode choke at high frequencies, the interference current will be attenuated and leakage currents will be reduced. Cut-off frequency depends only on inductance ( $L_{comm}$ ) and parasitic winding capacitance ( $C_w$ ) of the common mode choke.



Measured example with  
 $C_x$ : WCAP-FTX2 150 nF

CMC: WE-CMB S 10mH  
 $C_y$ : WCAP-CSSA MLCC 2.2 nF

## Everything you need in one kit

Order Code	Article	Value	Quantity
<b>Common Mode Power Line Choke</b>			
744 824 101	WE-CMB L	1 mH	2
744 824 622	WE-CMB L	2.2 mH	2
744 824 433	WE-CMB L	3.3 mH	2
744 824 310	WE-CMB L	10 mH	2
744 824 220	WE-CMB L	20 mH	2
744 823 601	WE-CMB M	1 mH	2
744 823 422	WE-CMB M	2.2 mH	2
744 823 305	WE-CMB M	5 mH	2
744 823 210	WE-CMB M	10 mH	2
744 823 220	WE-CMB M	20 mH	2
744 822 301	WE-CMB S	1 mH	2
744 822 222	WE-CMB S	2.2 mH	2
744 822 233	WE-CMB S	3.3 mH	2
744 822 110	WE-CMB S	10 mH	2
744 822 120	WE-CMB S	20 mH	2
744 803 050 9	WE-CMBNC M	9 mH	1
744 804 070 7	WE-CMBNC L	7 mH	1
744 662 400 07	WE-LF SH	0.7 mH	1
744 662 200 2	WE-LF SH	2.2 mH	1
744 662 100 7	WE-LF SH	6.8 mH	1
744 662 002 7	WE-LF SH	27 mH	1
<b>Film Capacitors</b>			
890 324 023 025	WCAP-FTX2	150 nF	5
890 324 022 007	WCAP-FTX2	15 nF	5
890 324 023 006	WCAP-FTX2	10 nF	5
<b>Ceramic Capacitors (SMD)</b>			
885 352 211 002	WCAP-CSSA MLCCs	680 pF	10
885 352 211 003	WCAP-CSSA MLCCs	1 nF	10
885 352 213 011	WCAP-CSSA MLCCs	1 nF	10
885 352 213 015	WCAP-CSSA MLCCs	2.2 nF	10
<b>5.00 mm Horizontal Cable Entry with Pressure Clamp</b>			
691 134 710 002	WR-TBL Serie 1347		10
<b>Self-Retaining Space</b>			
702 936 000	WA-SNSR		20
<b>SMD External thread with Pins</b>			
746 611 3	WP-SMSH	M3	10
746 611 4	WP-SMSH	M4	10
	Resistor THT	1 MΩ	10
<b>With these included PCBs you can set up several filters</b>			
Order Code	PCB for	Quantity	
L-744998-4	WE-CMB L, WE-CMBNC L, WE-ExB	3	
L-744998-3	WE-CMB M, WE-CMBNC M	3	
L-744998-2	WE-CMB S, WE-CMB NC S, WE-CMB NiZn S	2	
L-744998-1	WE-LF SH	2	



Order your Design Kit today!