



**CUI INC**

a bel group

**date** 04/26/2023

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**SERIES:** VFM-XX | **DESCRIPTION:** DC EMI FILTER

**FEATURES**

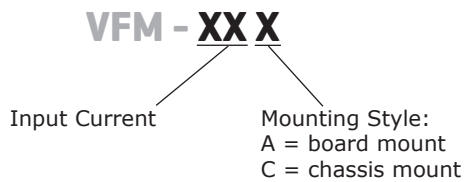
- compact size
- suitable for use with wide range of dc-dc converters
- reduces common and differential mode noise



MODEL	input voltage	input surge voltage <sup>1</sup>	input current	isolation voltage <sup>2</sup>
	range (Vdc)	nominal (Vdc)	max (A)	min (Vdc)
VFM-10A	0 ~ 75	100	10	1,500
VFM-15C	0 ~ 75	100	15	1,500
VFM-20A	0 ~ 75	100	20	1,500
VFM-25C	0 ~ 36	50	25	1,500

Note: 1. For 100 ms.  
2. Input to ground, output to ground.

**PART NUMBER KEY**



## SPECIFICATIONS

parameter	conditions/description	min	nom	max	units
isolation voltage	input to ground, output to ground	1,500			Vdc
isolation resistance	input to ground, output to ground	10 <sup>7</sup>			Ω
dc resistance	total for two legs		16		mΩ

## ENVIRONMENTAL

parameter	conditions/description	min	nom	max	units
operating temperature		-40		100	°C
case temperature				100	°C
storage temperature		-40		100	°C
cooling	natural convection				

## MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	VFM-10A: 2.00 x 1.00 x 0.46 [50.8 x 25.4 x 11.7 mm]				inch
	VFM-15C: 4.06 x 3.11 x 0.89 [103.2 x 79 x 22.7 mm]				inch
	VFM-20A: 2.00 x 1.60 x 0.50 [50.8 x 40.6 x 12.7 mm]				inch
	VFM-25C: 4.06 x 3.11 x 0.89 [103.2 x 79 x 22.7 mm]				inch
case material	VFM-10A & VFM-20A: black plastic VFM-15C & VFM-25C: black coated steel				

## MECHANICAL DRAWING

### VFM-10A

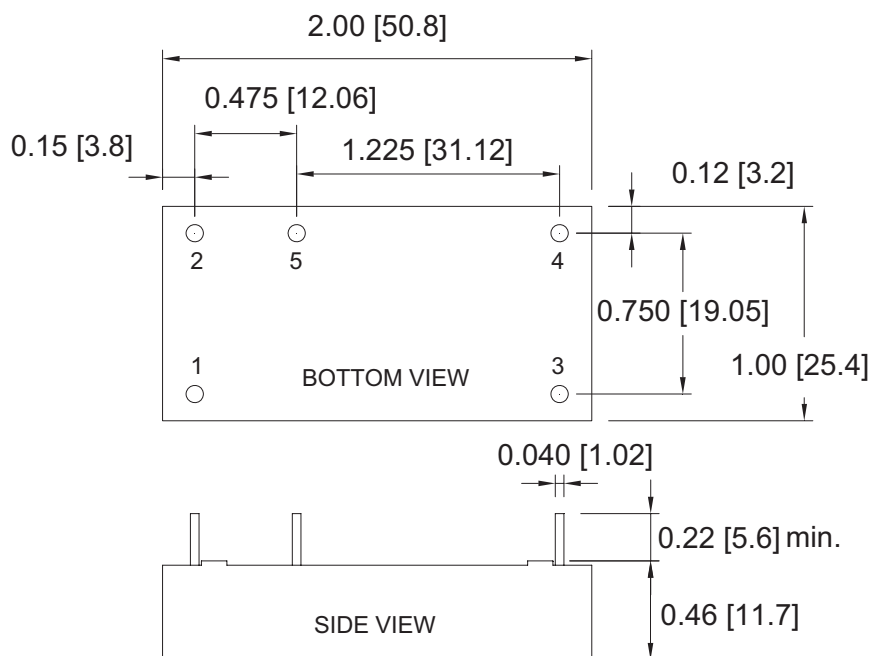
units: inch [mm]

tolerance: inches: x.xx = ±0.02, x.xxx = ±0.010

mm: x.x = ±0.5, x.xx = ±0.25

pin size: 0.04 [1.02]

PIN CONNECTIONS	
PIN	Function
1	+Vin
2	-Vin
3	+Vout
4	-Vout
5	GND



## MECHANICAL DRAWING (CONTINUED)

### VFM-20A

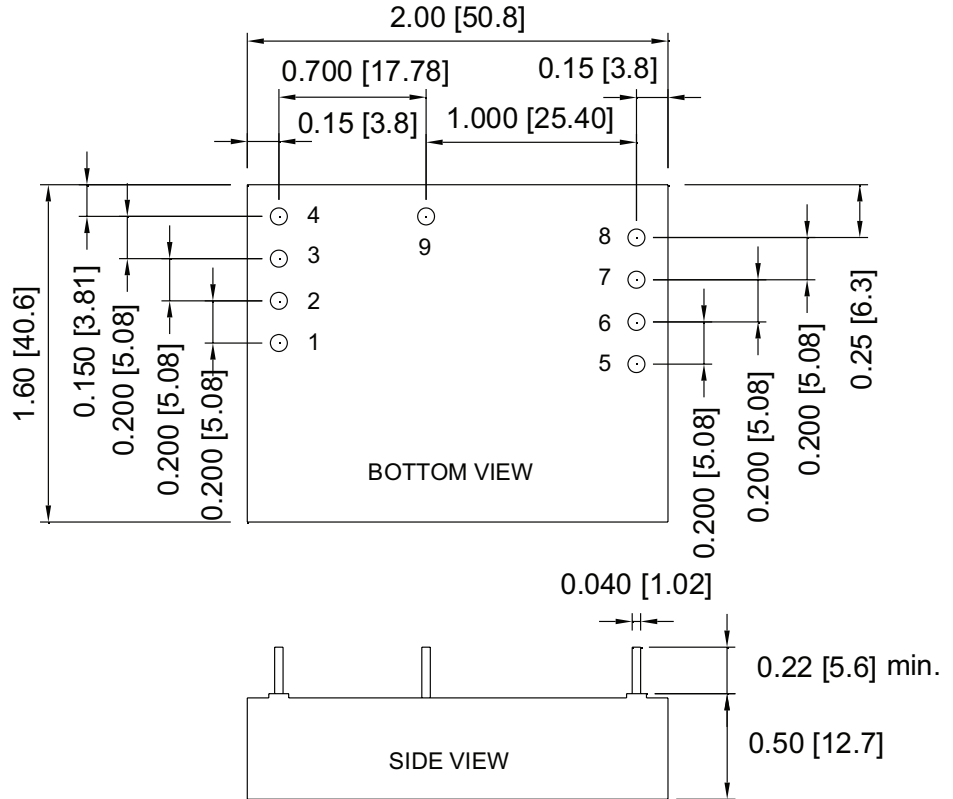
units: inch [mm]

tolerance: inches: x.xx = ±0.02, x.xxx = ±0.010

mm: x.x = ±0.5, x.xx = ±0.25

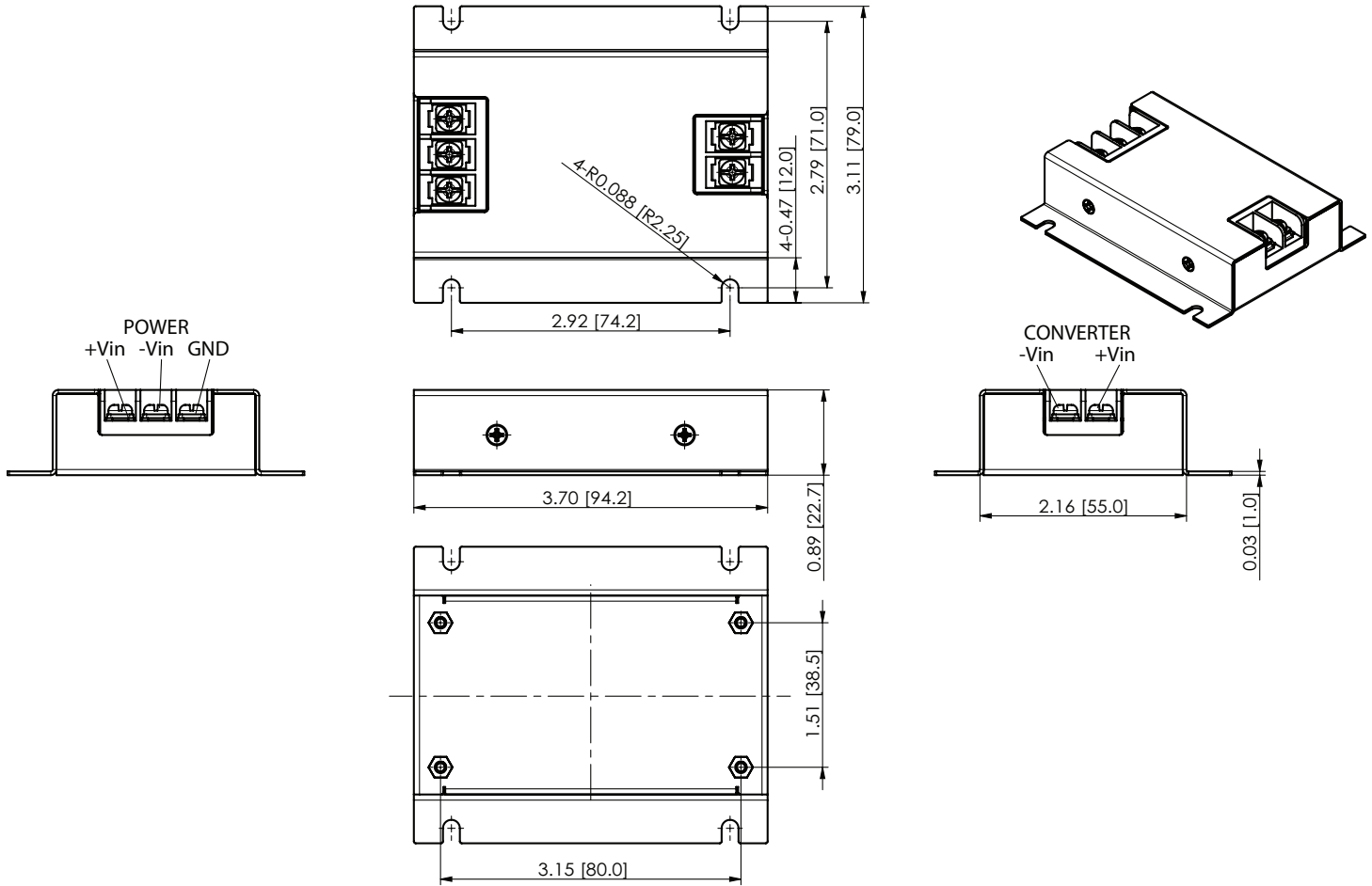
pin size: 0.04 [1.02]

PIN CONNECTIONS	
PIN	Function
1	+Vin
2	+Vin
3	-Vin
4	-Vin
5	+Vout
6	+Vout
7	-Vout
8	-Vout
9	GND



## MECHANICAL DRAWING (CONTINUED)

### VFM-15C & VFM-25C



## INTERNAL SCHEMATICS

Figure 1  
VFM-10A

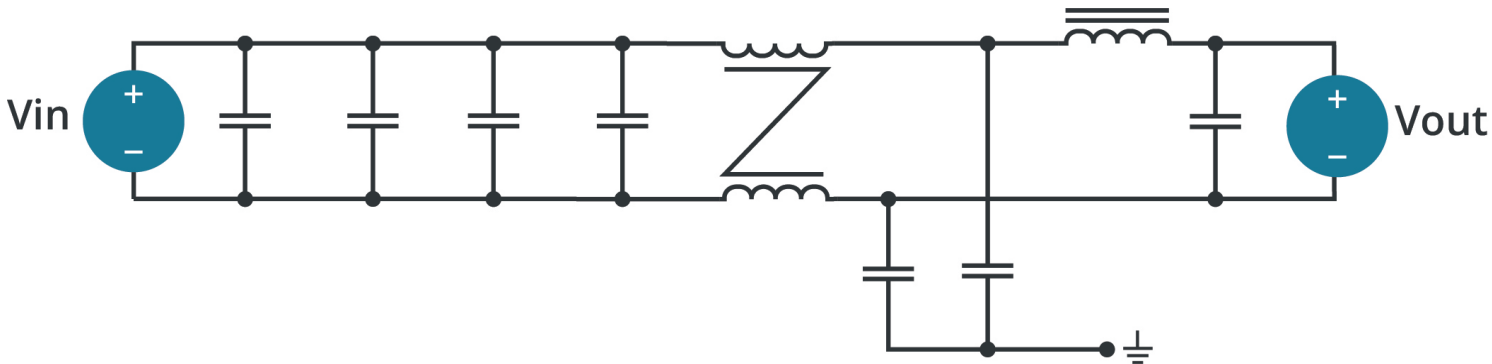


Figure 2  
VFM-20A

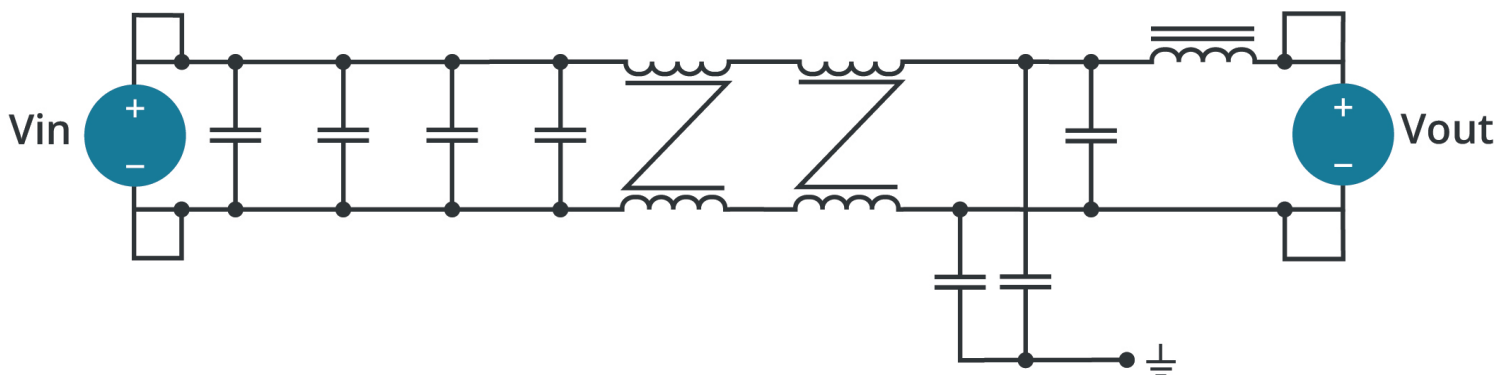
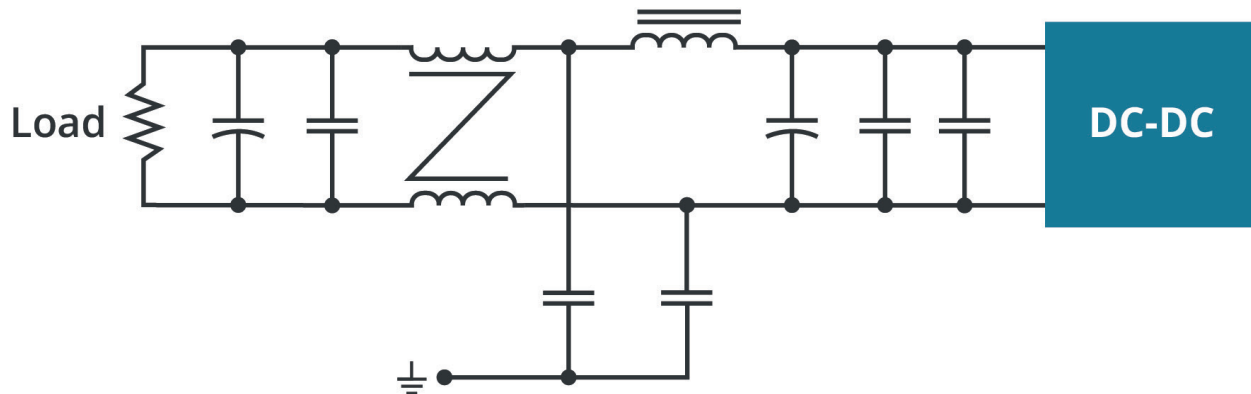
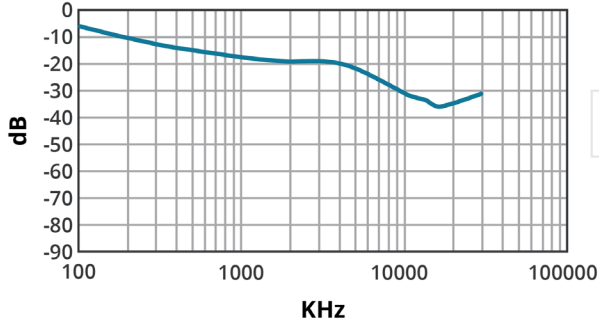


Figure 3  
VFM-15C & VFM-25C



## INSERTION LOSS GRAPHS

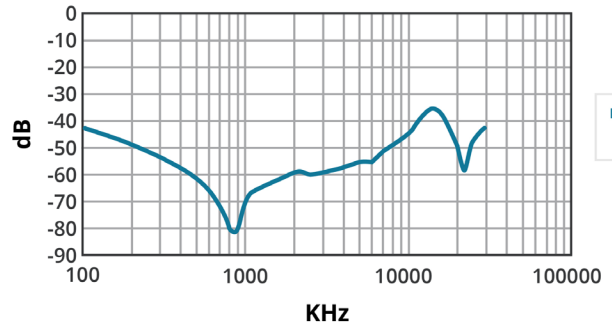
**COMMON MODE  
VFM-10A**



Key

Gain

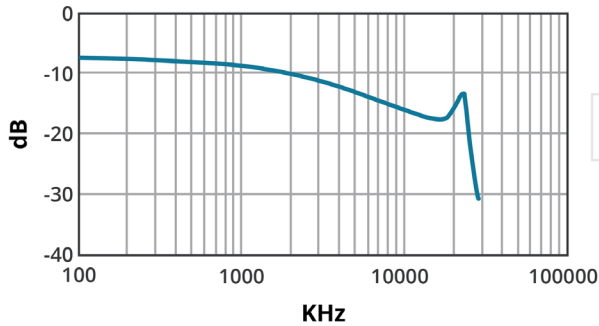
**DIFFERENTIAL MODE  
VFM-10A**



Key

Gain

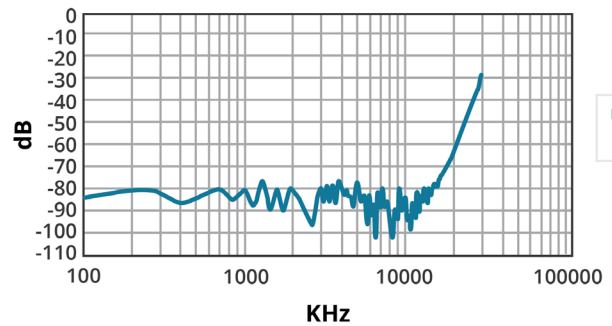
**COMMON MODE  
VFM-15C**



Key

Gain

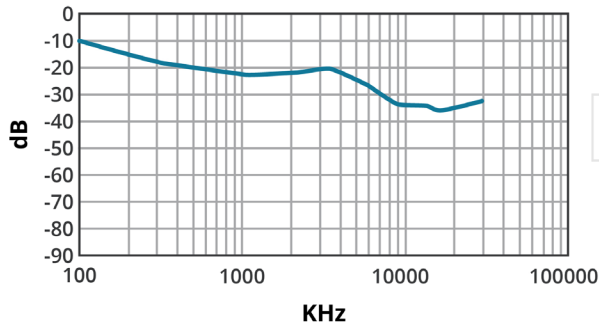
**DIFFERENTIAL MODE  
VFM-15C**



Key

Gain

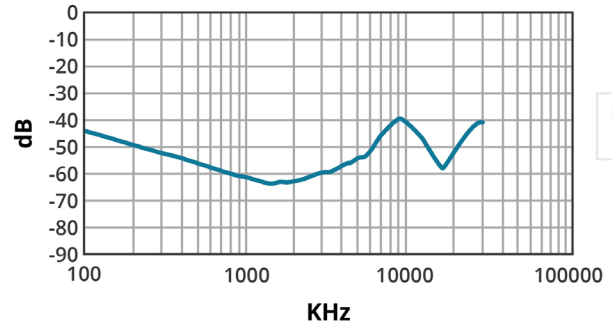
**COMMON MODE  
VFM-20A**



Key

Gain

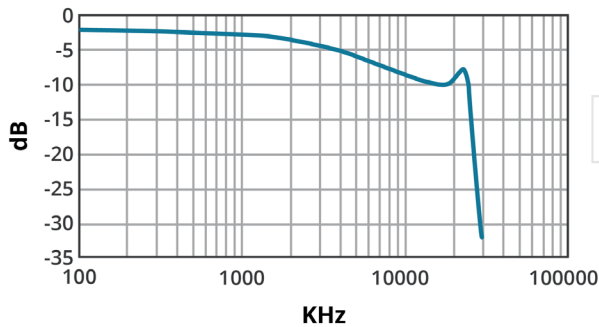
**DIFFERENTIAL MODE  
VFM-20A**



Key

Gain

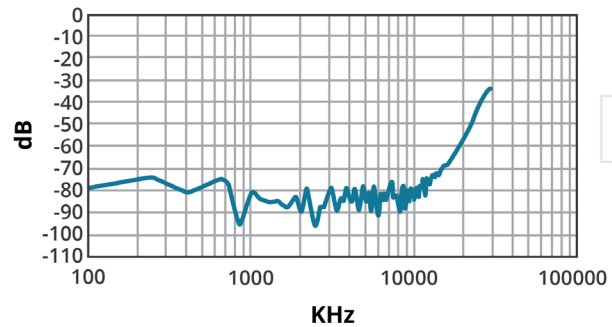
**COMMON MODE  
VFM-25C**



Key

Gain

**DIFFERENTIAL MODE  
VFM-25C**



Key

Gain

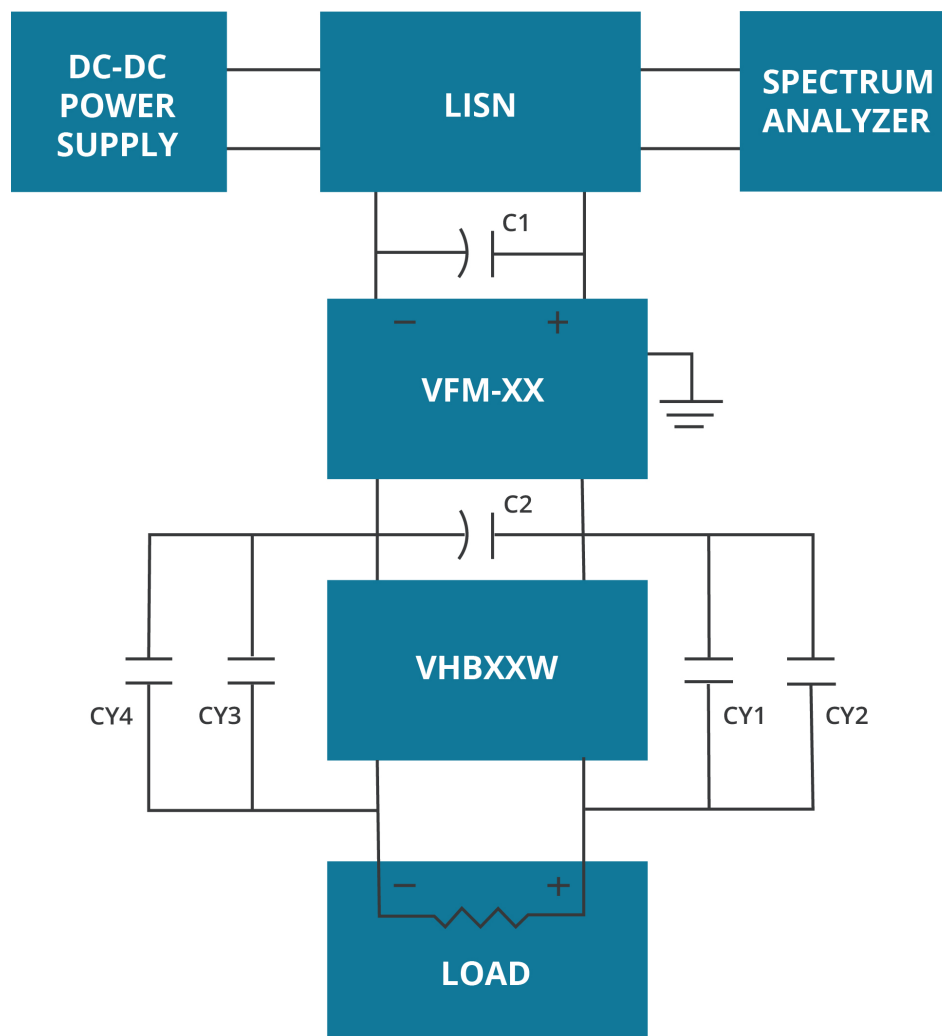
## APPLICATION CIRCUIT

The following application note shows EN 55022 class B conducted emissions tests for the VFM-XX series EMI filters in series with a VHK or VHB series DC/DC converter and a purely resistive load. This information is for example only. Actual results may vary.

### 1) EMI Filtering - Connection Diagram

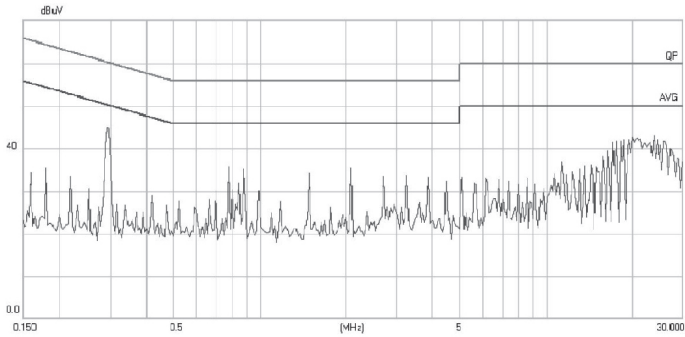
Filter Model (VFM-XX)	DC-DC Converter Model (VHXXXW)	C1	C2	CY1	CY2	CY3	CY4
VFM-10A	VHB50W-Q24-S5	47 $\mu$ F/100 V KY	...	...	...	...	...
	VHB50W-Q48-S5	47 $\mu$ F/100 V KY	...	...	...	...	...
VFM-15C	VHK200W	...	...	...	...	...	...
VFM-20A	VHB150W-Q24-S5	47 $\mu$ F/100 V KY	220 $\mu$ F/100 V KY	1000 pF / 2 KV	...	1000 pF / 2 KV	560 pF/2 KV
	VHB150W-Q48-S5	...	220 $\mu$ F/100 V KY	1000 pF / 2 KV	...	1000 pF / 2 KV	560 pF/2 KV
VFM-25C	VHK200W	...	...	...	...	...	...

Figure 4

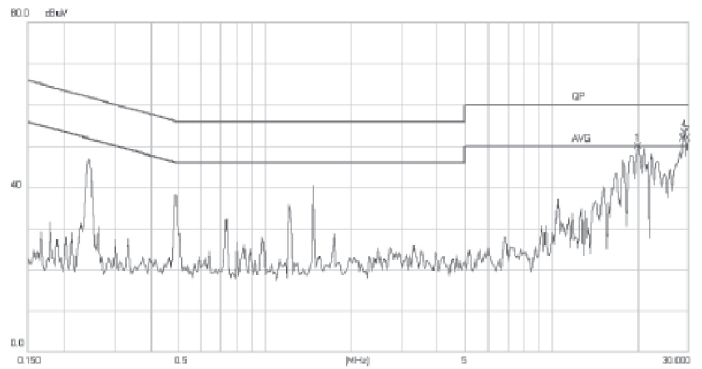


2) Conducted Emission Measurement

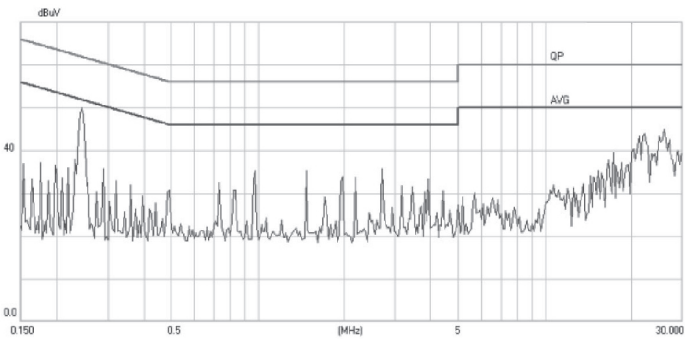
**FILTER MODEL (VFM-10A)**  
**DC-DC CONVERTER MODEL: VHB50W-Q24-S5**  
 **$V_{in} = 12\text{ Vdc}$**



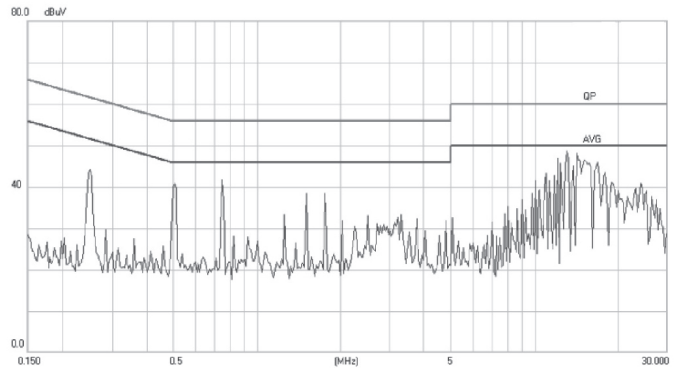
**FILTER MODEL (VFM-15C)**  
**DC-DC CONVERTER MODEL: VHK200W-Q48-S12**  
 **$V_{in} = 48\text{ Vdc}$**



**FILTER MODEL (VFM-20A)**  
**DC-DC CONVERTER MODEL: VHB150W-Q24-S5**  
 **$V_{in} = 12\text{ Vdc}$**



**FILTER MODEL (VFM-25C)**  
**DC-DC CONVERTER MODEL: VHK200W-Q24-S12**  
 **$V_{in} = 24\text{ Vdc}$**





## REVISION HISTORY

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rev.	description	date
1.0	initial release	01/01/2017
1.01	specification updated to a new CUI template	01/17/2022
1.02	pin connection table updated	05/11/2022
1.03	pin size updated in the pin connection table	06/14/2022
1.04	header updated on page 6	04/26/2023

The revision history provided is for informational purposes only and is believed to be accurate.



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