

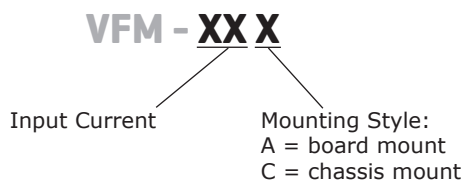
**SERIES: VFM-XX | DESCRIPTION: DC EMI FILTER**
**FEATURES**

- 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<br>VFM-15C & VFM-25C: black coated steel |     |     |     |       |

## MECHANICAL DRAWING

### VFM-10A

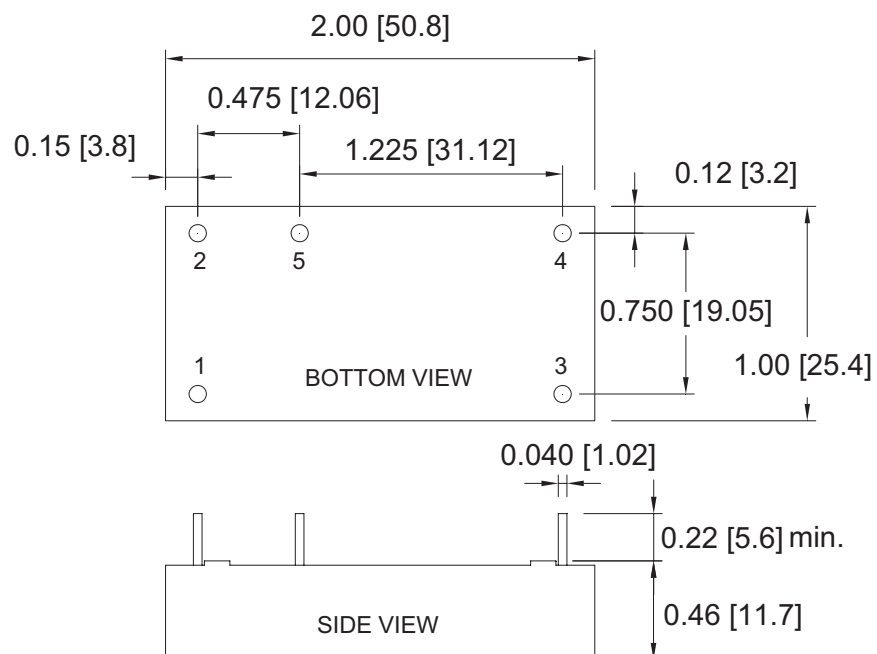
units: inch [mm]

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

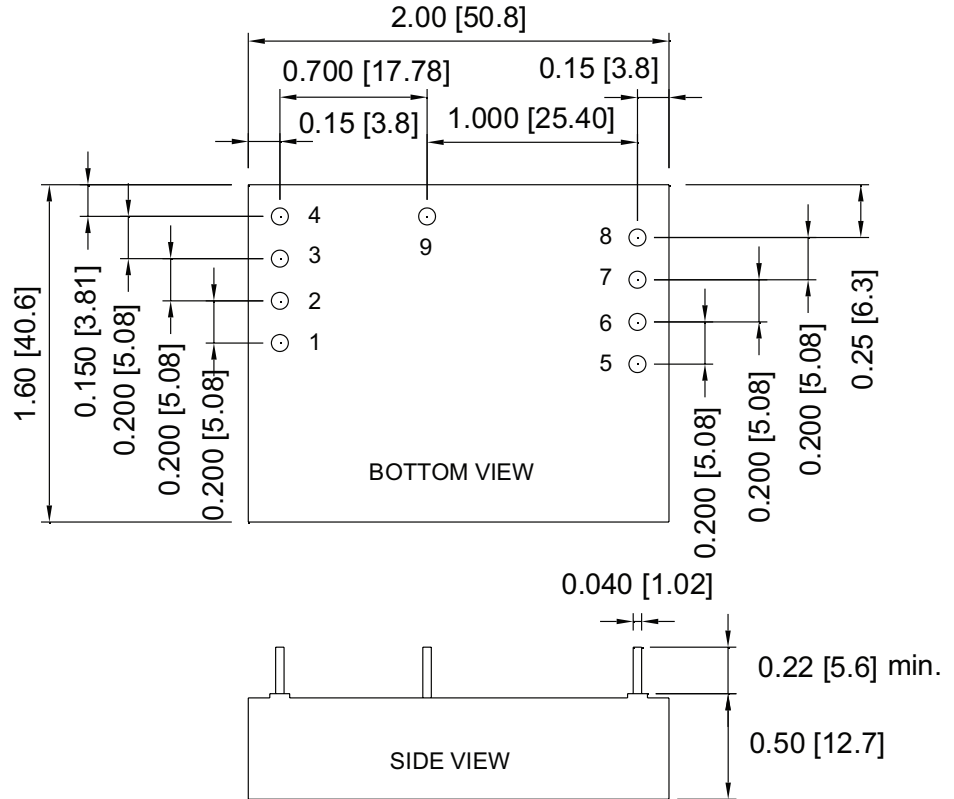
units: inch [mm]

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

mm: x.x = ±0.5, x.xx = ±0.25

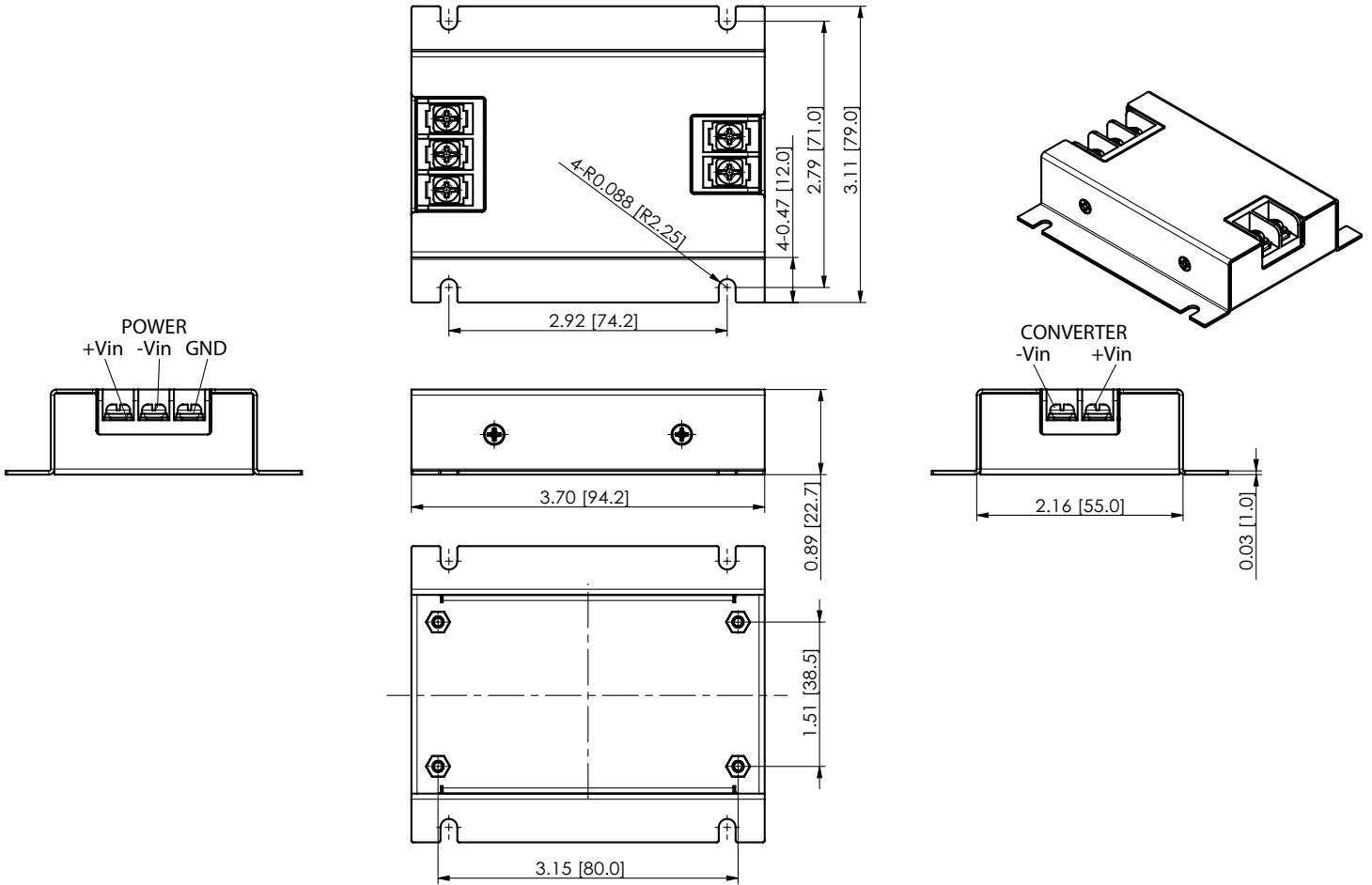
pin size: 0.04 [1.02]

| 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

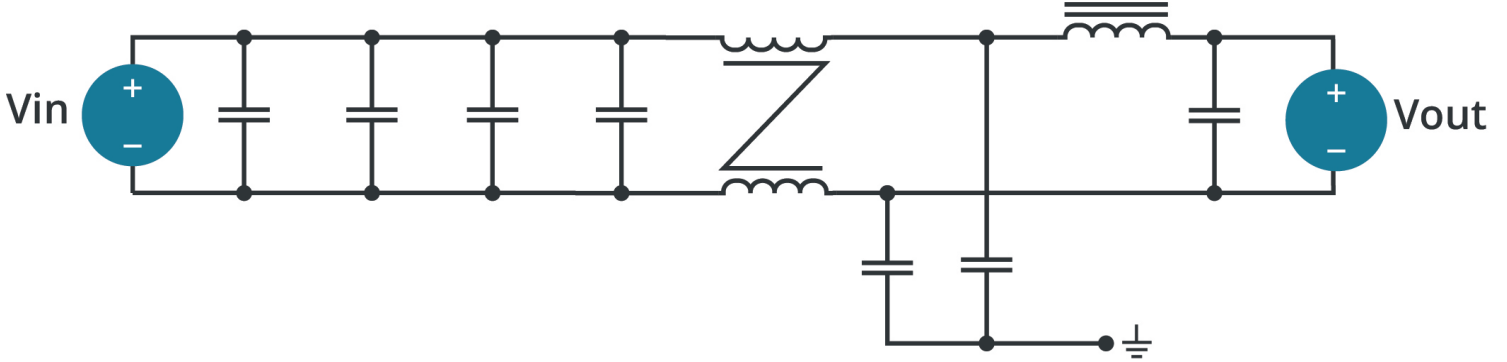


Figure 2  
VFM-20A

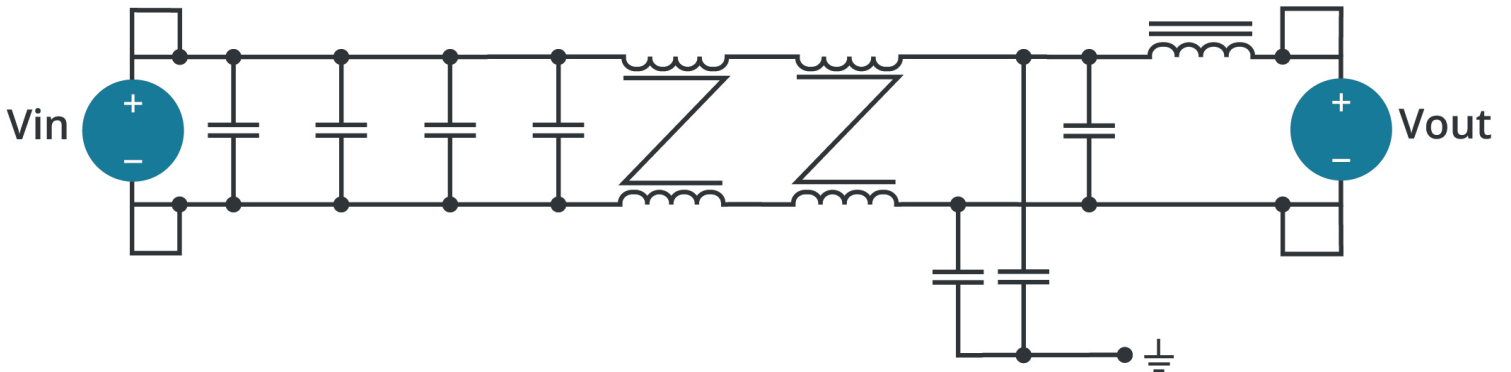
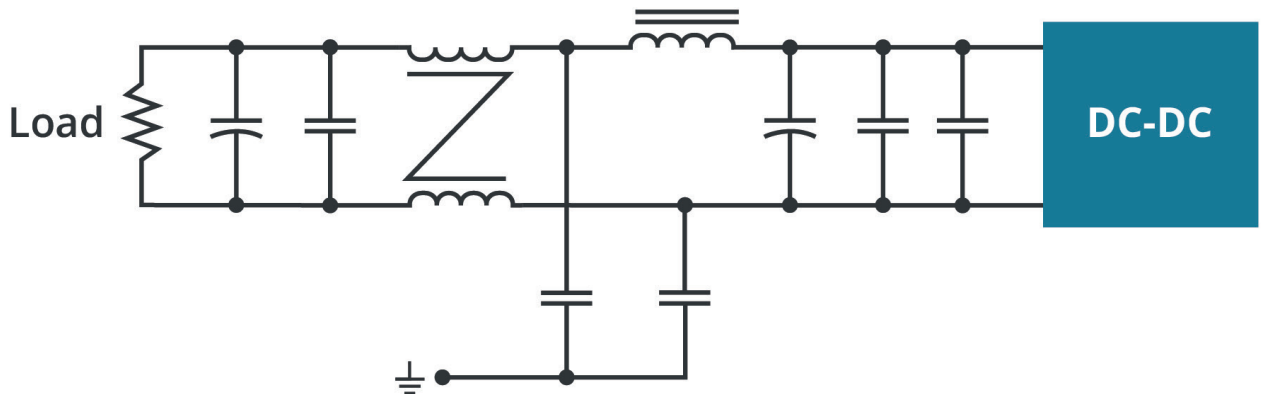
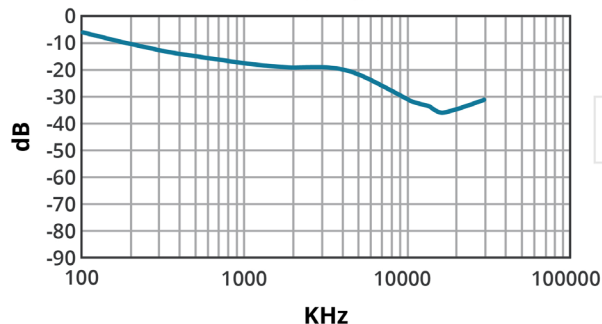


Figure 3  
VFM-15C & VFM-25C

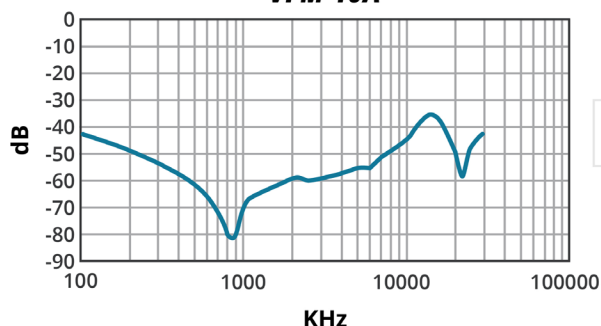


## INTERNAL SCHEMATICS

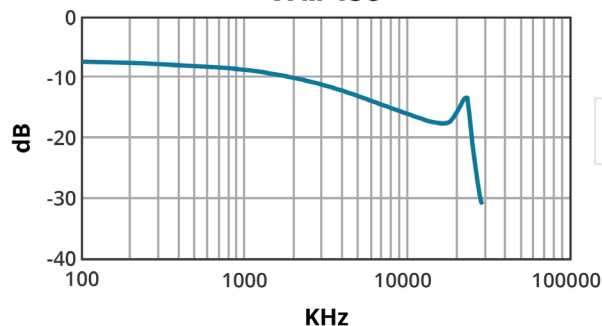
**COMMON MODE  
VFM-10A**



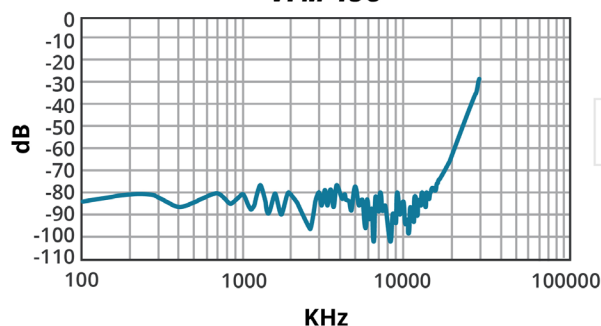
**DIFFERENTIAL MODE  
VFM-10A**



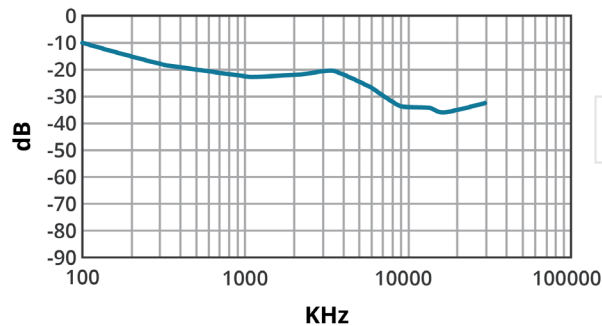
**COMMON MODE  
VFM-15C**



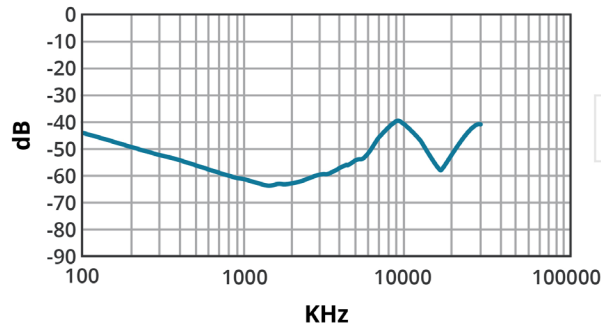
**DIFFERENTIAL MODE  
VFM-15C**



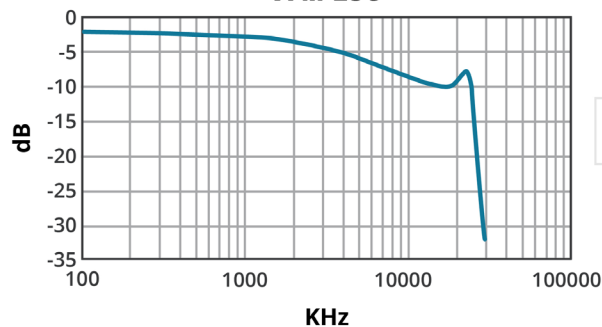
**COMMON MODE  
VFM-20A**



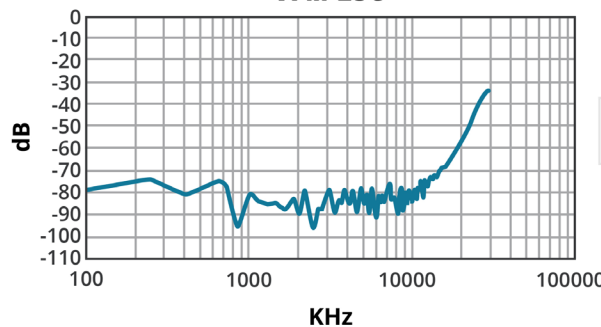
**DIFFERENTIAL MODE  
VFM-20A**



**COMMON MODE  
VFM-25C**



**DIFFERENTIAL MODE  
VFM-25C**



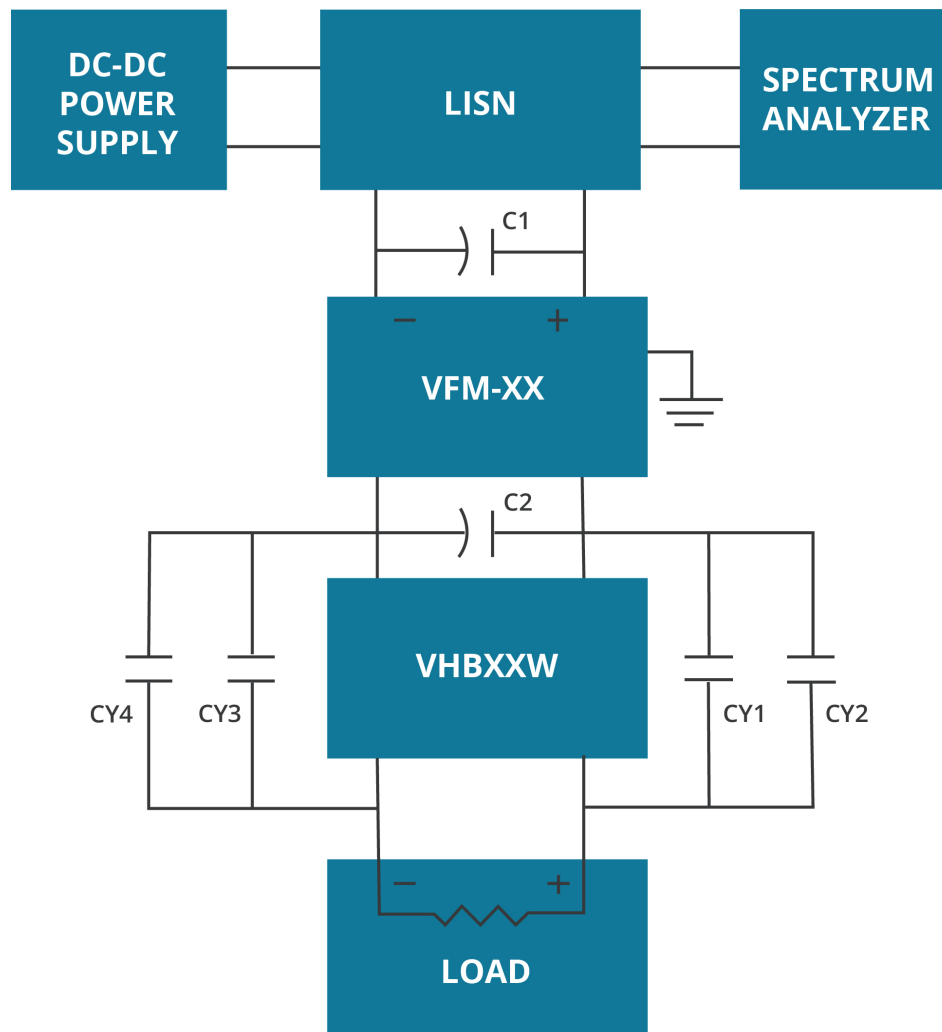
## APPLICATION CIRCUIT

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                        | ...                 | ...                  | ...            | ... | ...            | ...         |

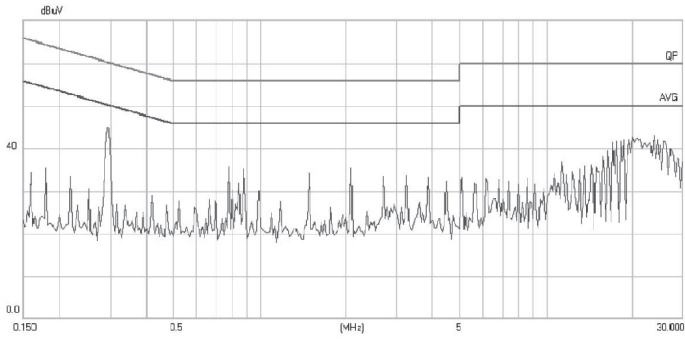
Figure 4



2) Conducted Emission Measurement

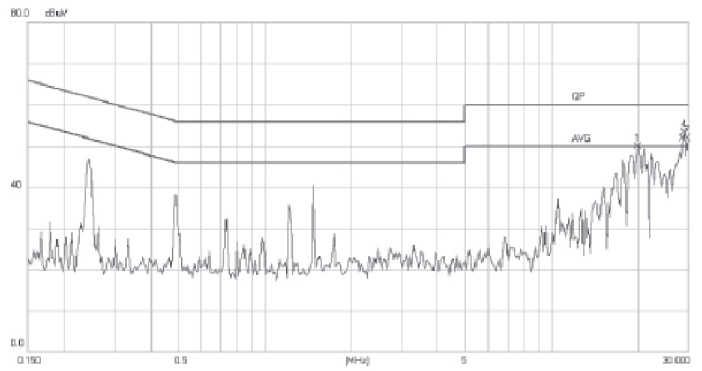
**FILTER MODEL (VFM-10A)**

**DC-DC CONVERTER MODEL: VHB50W-Q24-S5**  
 **$V_{in} = 12\text{ Vdc}$**



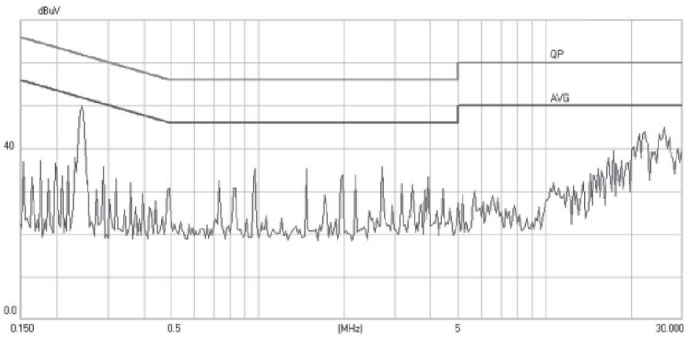
**FILTER MODEL (VFM-15C)**

**DC-DC CONVERTER MODEL: VHK200W-Q48-S12**  
 **$V_{in} = 48\text{ Vdc}$**



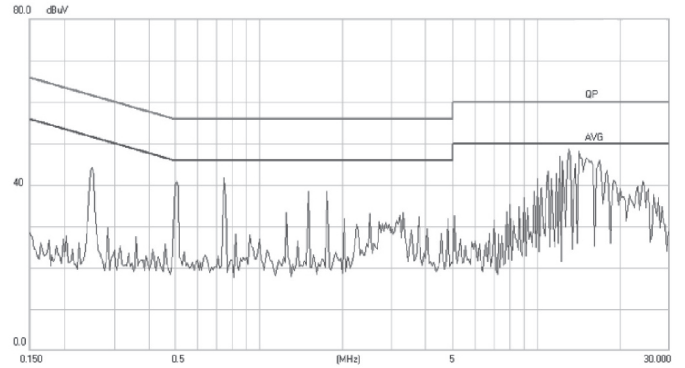
**FILTER MODEL (VFM-20A)**

**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

---

| 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 |

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



**CUI INC**  
a bel group

**Headquarters**  
20050 SW 112th Ave.  
Tualatin, OR 97062  
**800.275.4899**

Fax 503.612.2383  
**cui.com**  
techsupport@cui.com

CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

CUI reserves the right to make changes to the product at any time without notice. Information provided by CUI is believed to be accurate and reliable. However, no responsibility is assumed by CUI for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

CUI products are not authorized or warranted for use as critical components in equipment that requires an extremely high level of reliability. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.