



CUI INC

a bel group

date 04/26/2023

page 1 of 9

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

FEATURES

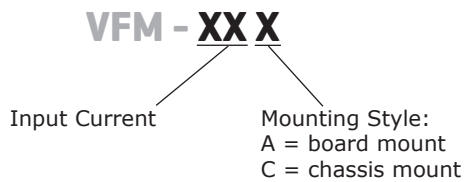
- compact size
- suitable for use with wide range of dc-dc converters
- reduces common and differential mode noise



| MODEL | input voltage | input surge voltage ¹ | input current | isolation voltage ² |
|---------|---------------|----------------------------------|---------------|--------------------------------|
| | 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 ⁷ | | | 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

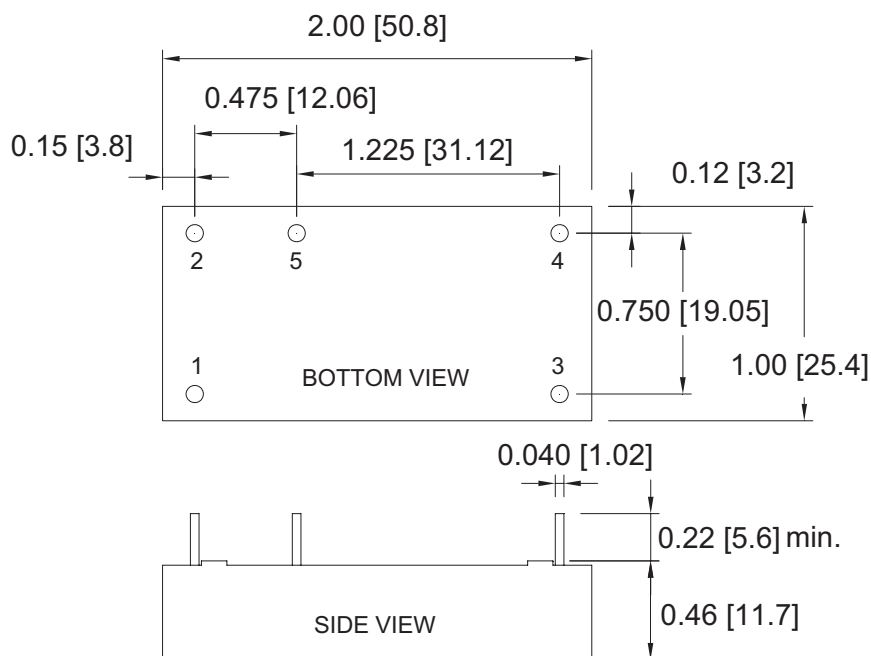
units: inch [mm]

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

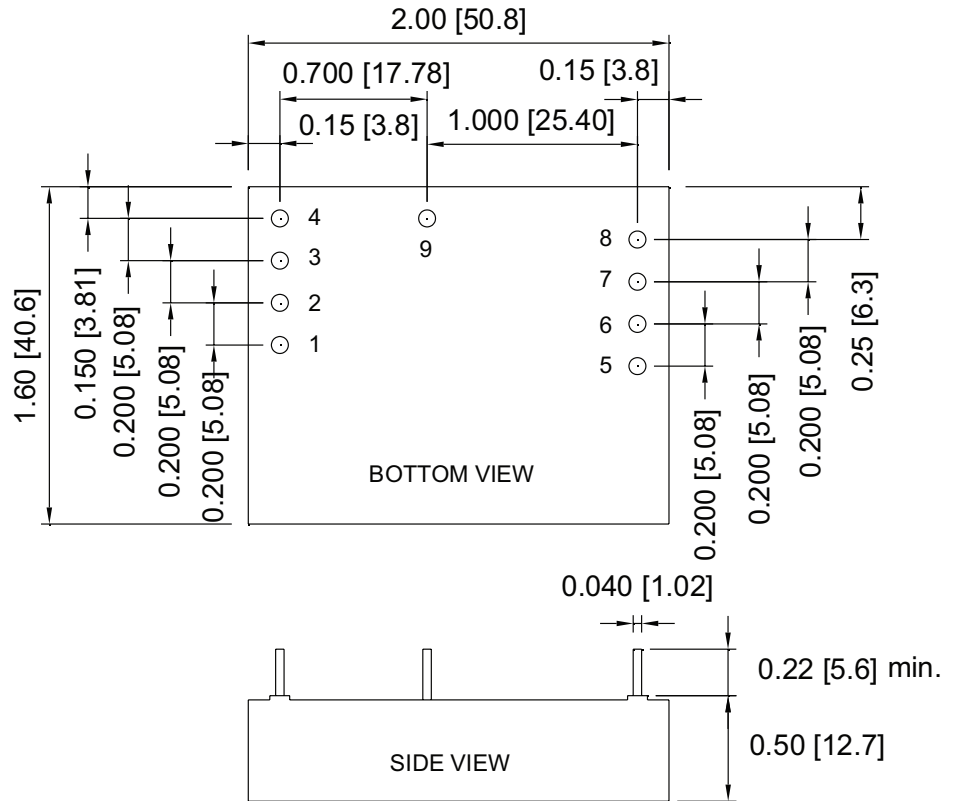
units: inch [mm]

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

mm: x.x = ±0.5, x.xx = ±0.25

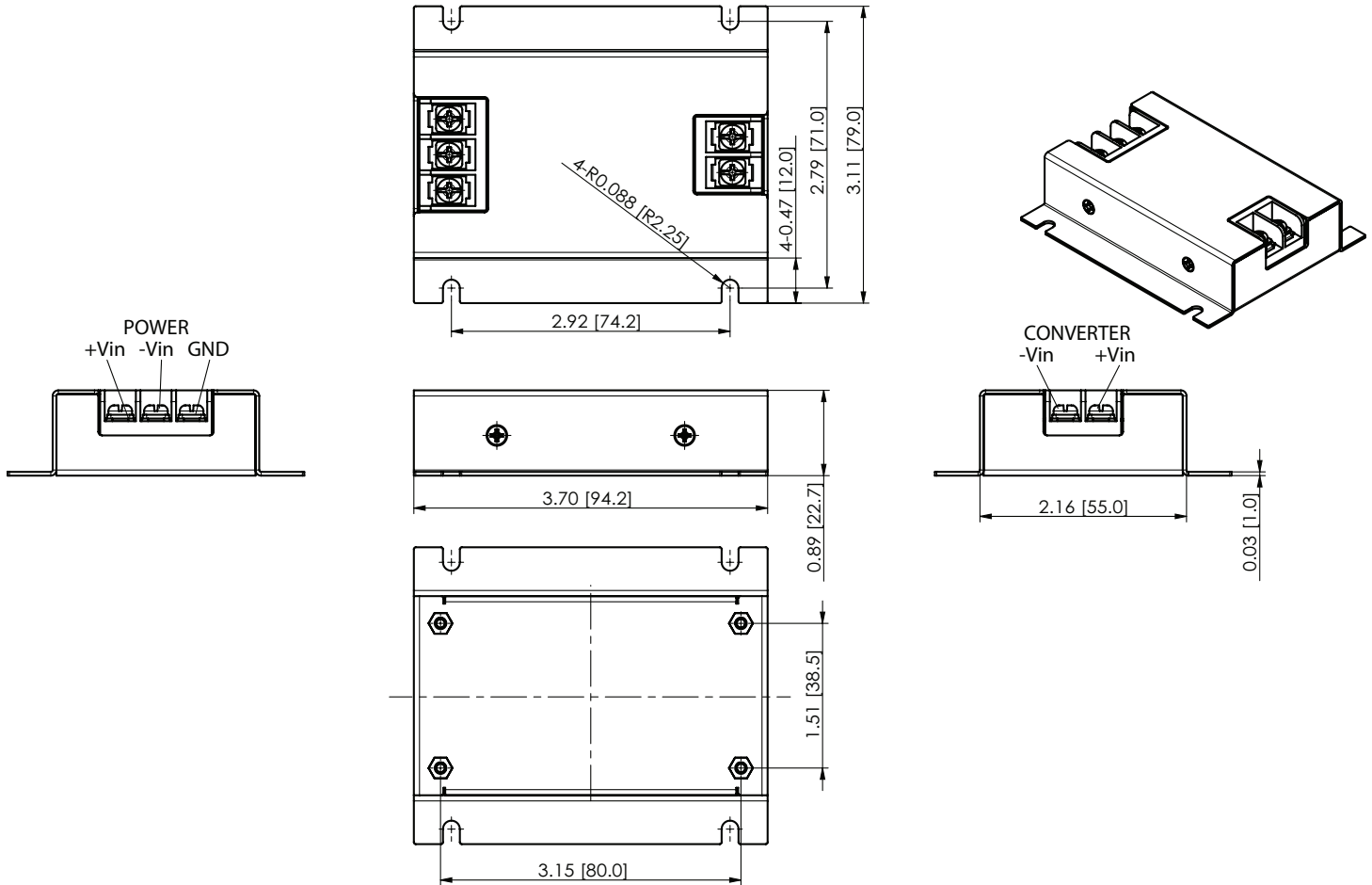
pin size: 0.04 [1.02]

| 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

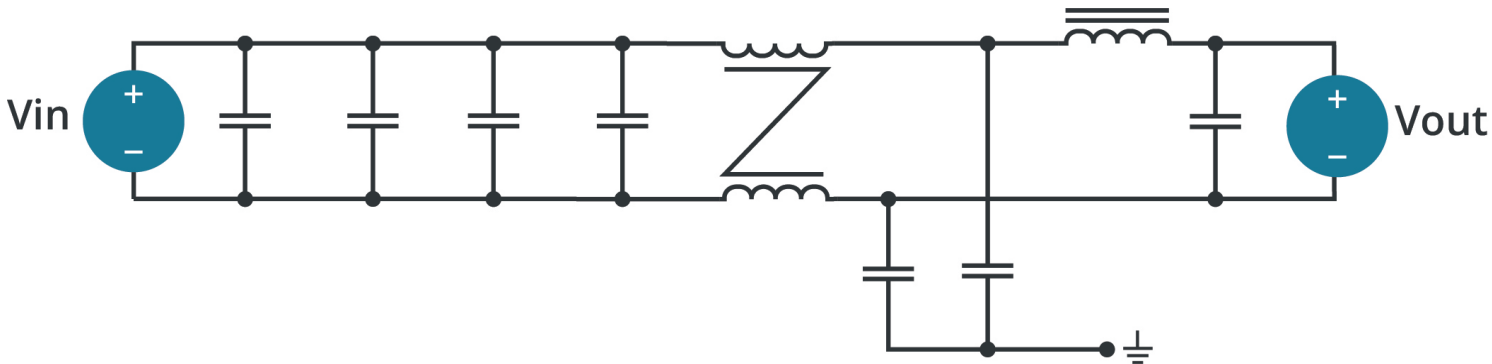


Figure 2
VFM-20A

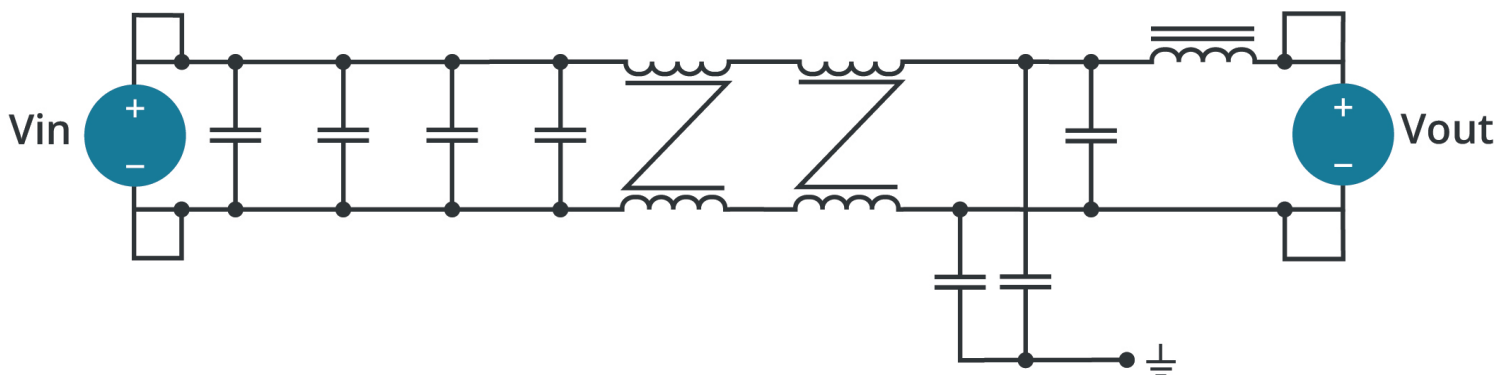
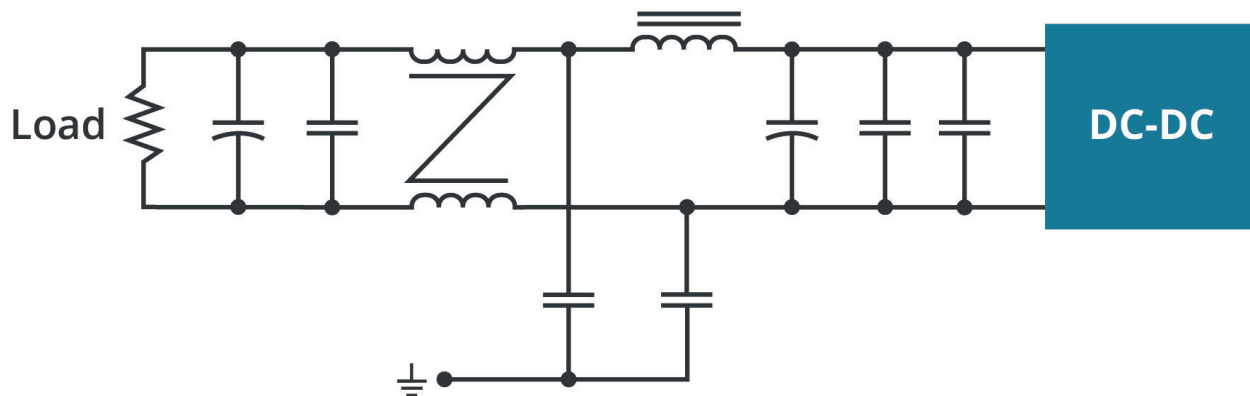
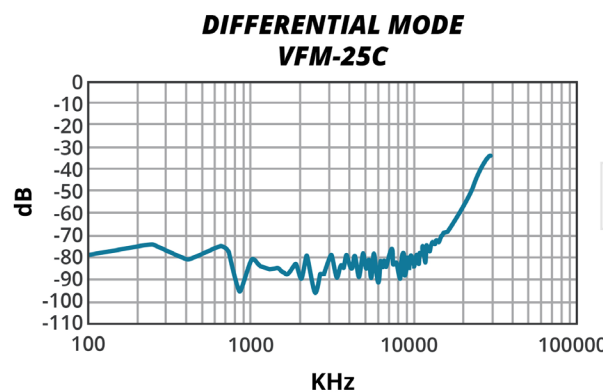
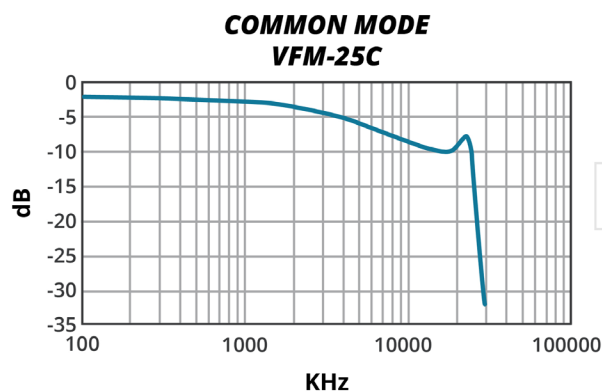
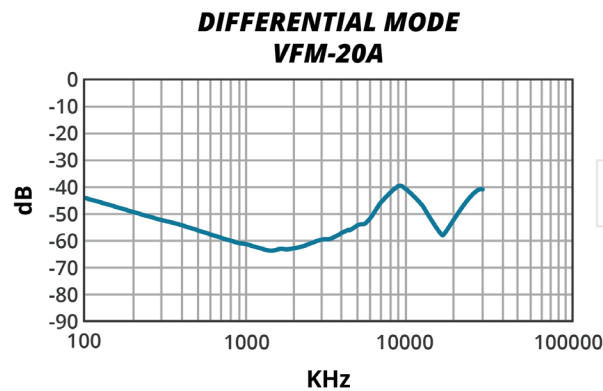
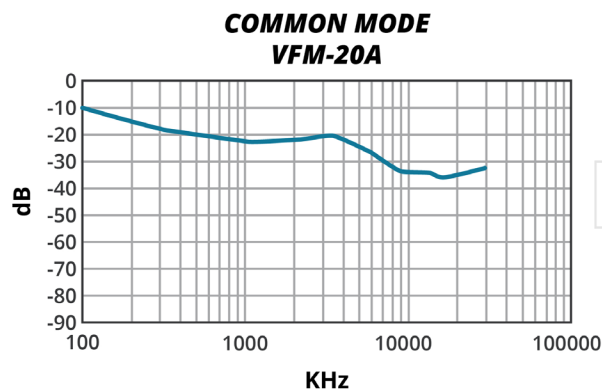
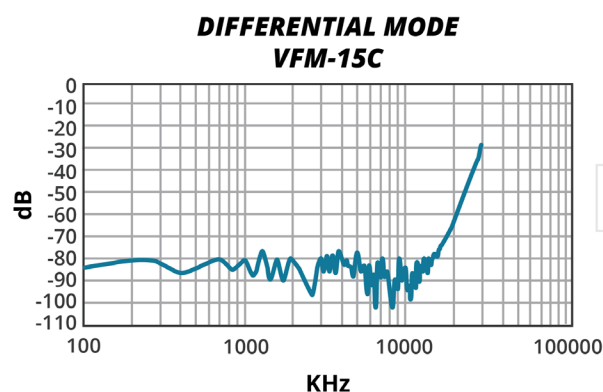
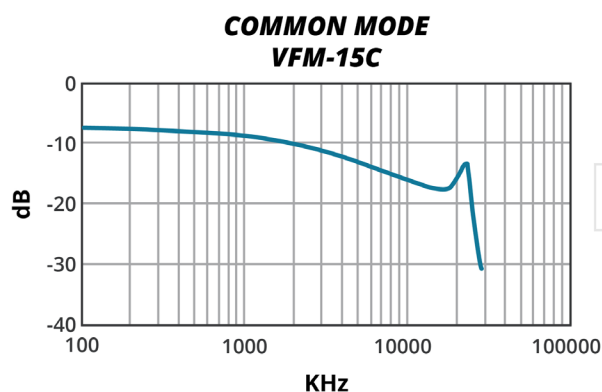
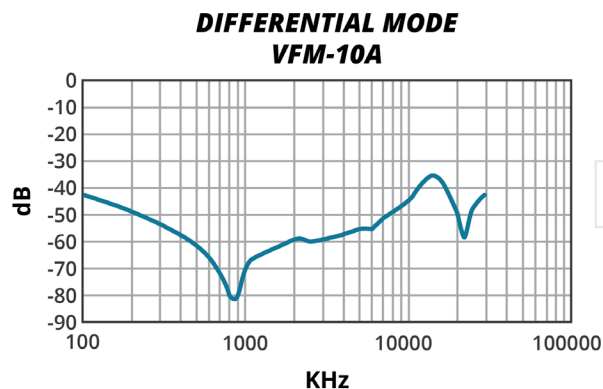
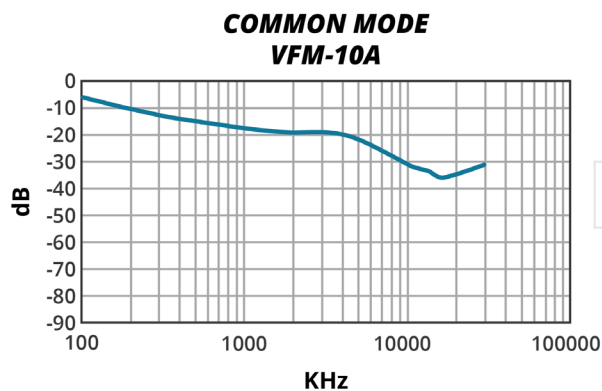


Figure 3
VFM-15C & VFM-25C



INSERTION LOSS GRAPHS



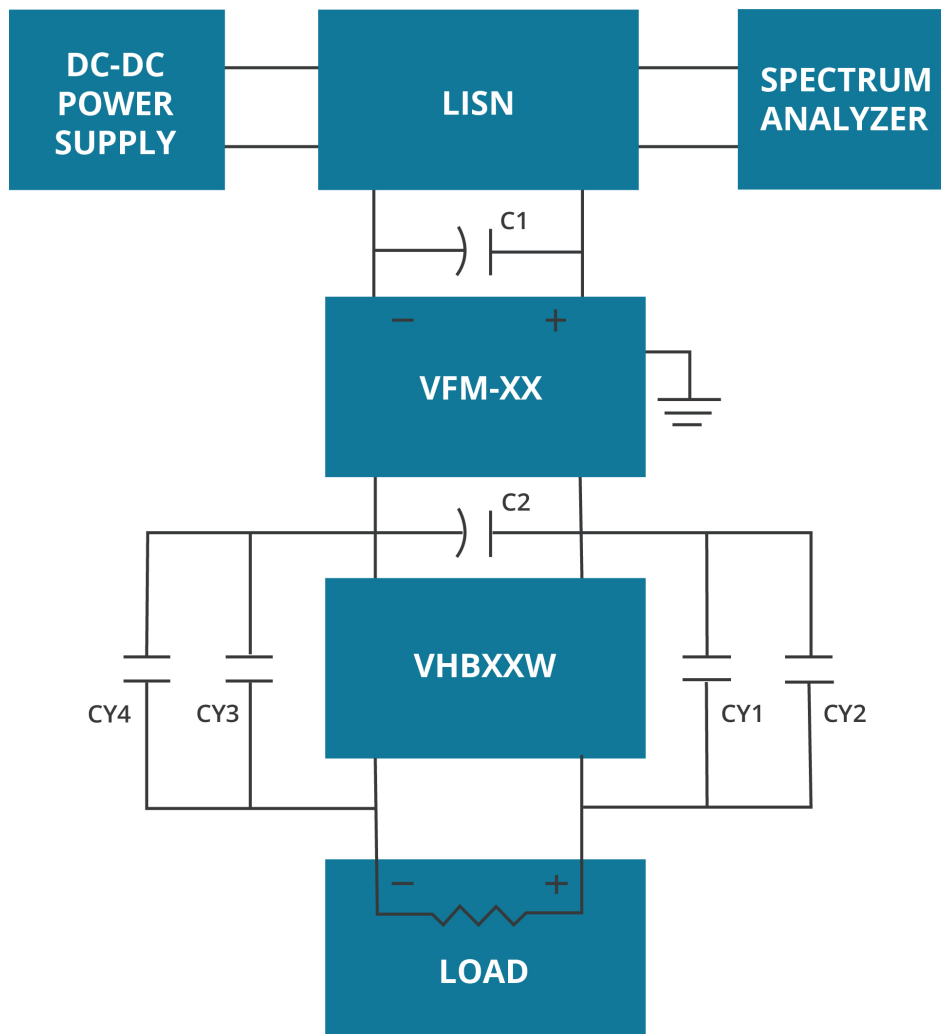
APPLICATION CIRCUIT

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 μ F/100 V KY | ... | ... | ... | ... | ... |
| | VHB50W-Q48-S5 | 47 μ F/100 V KY | ... | ... | ... | ... | ... |
| VFM-15C | VHK200W | ... | ... | ... | ... | ... | ... |
| VFM-20A | VHB150W-Q24-S5 | 47 μ F/100 V KY | 220 μ F/100 V KY | 1000 pF / 2 KV | ... | 1000 pF / 2 KV | 560 pF/2 KV |
| | VHB150W-Q48-S5 | ... | 220 μ F/100 V KY | 1000 pF / 2 KV | ... | 1000 pF / 2 KV | 560 pF/2 KV |
| VFM-25C | VHK200W | ... | ... | ... | ... | ... | ... |

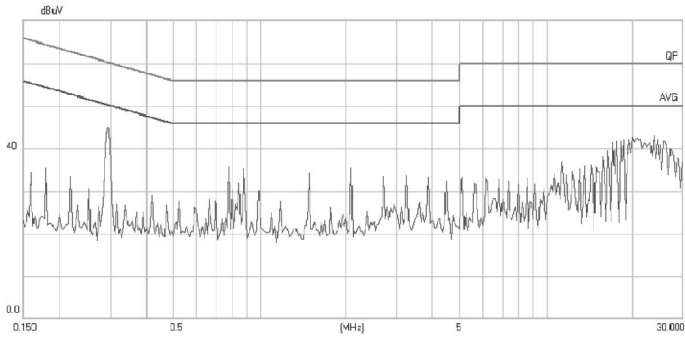
Figure 4



2) Conducted Emission Measurement

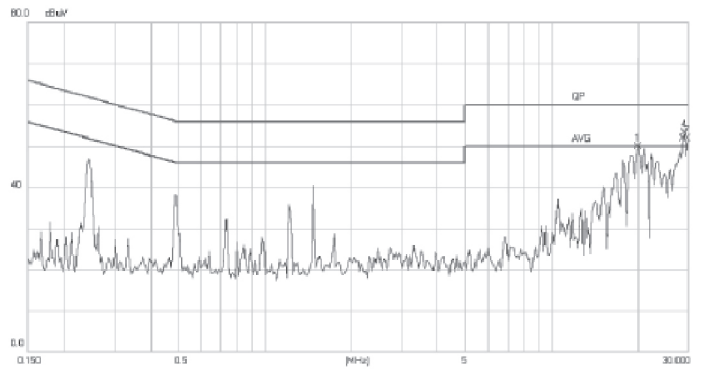
FILTER MODEL (VFM-10A)

DC-DC CONVERTER MODEL: VHB50W-Q24-S5
Vin = 12 Vdc



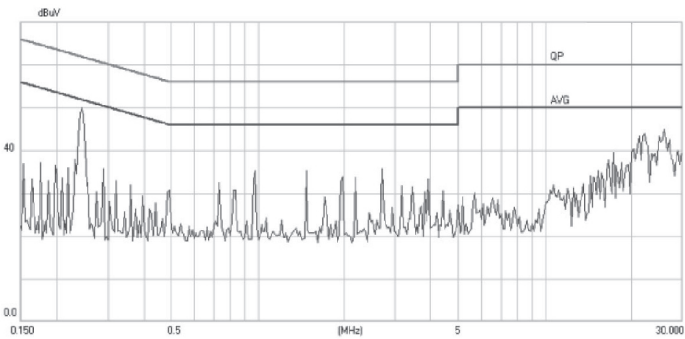
FILTER MODEL (VFM-15C)

DC-DC CONVERTER MODEL: VHK200W-Q48-S12
Vin = 48 Vdc



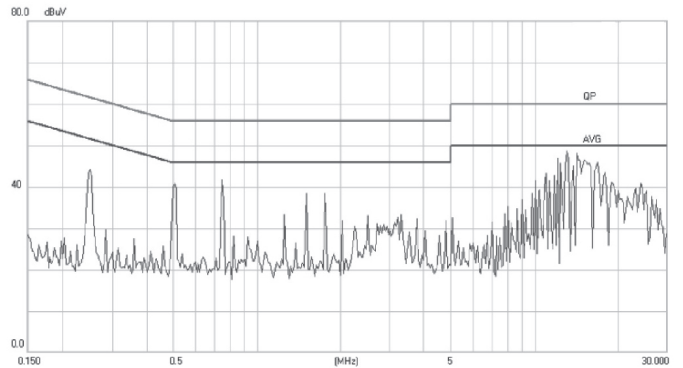
FILTER MODEL (VFM-20A)

DC-DC CONVERTER MODEL: VHB150W-Q24-S5
Vin = 12 Vdc



FILTER MODEL (VFM-25C)

DC-DC CONVERTER MODEL: VHK200W-Q24-S12
Vin = 24 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 |
| 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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