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MIL-COTS Filter
MF028AMFPT

DC front-end module with EMI filtering & transient protection

Size:
1.91 x 1.09 x 0.37 in
48,6 x 27,7 x 9,5 mm

Features

- –55°C to 100°C baseplate operation
- Vin range: 16.5 – 50 Vdc
- EMI filtering: MIL-STD-461E/F
- Transient protection MIL-STD-1275 A/B/D and MIL-STD-704A/E/F
- Height above board: 0.37 in (9.5 mm)
- Low weight: 1.07 oz (30.4g)
- Typical efficiency: 99%
- Architectural flexibility

Product Overview

The MIL-COTS filter is a DC front-end module that provides EMI filtering and transient protection. The filter enables designers using Vicor's MIL-COTS PRM®, VI Bricks™ and VI Chips® to meet conducted emission / conducted susceptibility per MIL-STD-461E; and input transients per MIL-STD-704A/E/F and MIL-STD-1275A/B/D. The MIL-COTS PRM filter accepts an input voltage of 16.5 –50 Vdc and delivers output power up to 120 W.

Absolute Maximum Ratings

Parameter	Values	Unit	Notes
+In to -In	-1.0 to 60.0	Vdc	Continuous
+Out to -Out	-1.0 to 60.0	Vdc	Continuous
Continuous output power	120	W	
Operating temperature	-55 to +100	°C	M-Grade; baseplate
Storage temperature	-65 to +125	°C	M-Grade

Note: Stresses in excess of the maximum ratings can cause permanent damage to the device. Operation of the device is not implied at these or any other conditions in excess of those given in the specification. Exposure to absolute maximum ratings can adversely affect device reliability.

SPECIFICATIONS

PART NUMBERING

MF	028	A	M	F	P	T
VI BRICK Filter	Input Voltage Designator	Package Size				

Product Grade Temperatures (°C)

Grade	Operating	Storage
M =	-55 to +100	-65 to +125

Baseplate

F = Slotted flange
P = Pin Fin heat sink[a]
[a] Contact Factory

Pin Style

P = Through hole

Input Specifications *(Conditions are at 28 Vin, full load, and 25°C baseplate unless otherwise specified)*

Parameter	Min	Typ	Max	Unit	Notes
Input voltage range	16.5	28	50	Vdc	Operation to 13.5 V after start up ≥ 16.5 V
Input current			8	Adc	
Inrush limiting			0.01	A/µF	
Recommended external input capacitance		10		µF	C1 Figure 7
Transient Immunity			100	Vdc	50 ms per MIL-STD-1275A/B/D continuous operation
			250	Vdc	70 µs per MIL-STD-1275A/B/D continuous operation
			70	Vdc	20 ms per MIL-STD-704A continuous operation
			80	Vdc	100 ms per D0-160 E, sec.16, Cat. z cont. operation
			50	Vdc	12.5 ms per MIL-STD-704E/F continuous operation

Output Specifications *(Conditions are at 28 Vin, full load, and 25°C baseplate unless otherwise specified)*

Parameter	Min	Typ	Max	Unit	Note
Output voltage range	16.0	28	49.6	Vdc	
Internal voltage drop		0.4	0.85	Vdc	
Output current	0		8	Adc	Over input range
Efficiency					
Full load		99		%	
External output capacitance		1000		µF	Figure 7 C_{IN}

Safety Specifications

Parameter	Min	Typ	Max	Unit	Note
Dielectric withstand			None	Vrms	Input / Output
			707	Vdc	Input / Output to Base / EMI Pin

EMI

Standard	Test Procedure	Notes
MIL-STD-461E/F		
Conducted Emissions	CE101-4	Navy ASW & Army Aircraft, Curve #2 (28 Vdc)
	CE102-1	Basic curve, for all applications
Conducted Susceptability	CS101-1	Curve #2, for all applications (28 Vdc)
	CS114-1	Conducted suceptibility, bulk cable injection, 10 KHz - 200 MHz, Curve #4
	CS115-1	Conducted suceptibility, bulk cable injection, impulse excition, all applications

SPECIFICATIONS (CONT.)

General Specifications

Parameter	Min	Typ	Max	Unit	Notes
MTBF					
MIL-HDBK-217F		12,933,333		hrs	25°C, GB
		2,327,752		hrs	50°C, NS
		1,823,912		hrs	65°C, AIC
Agency approvals		CE Mark			Low voltage directive (10 A external fuse required), EN60950-1
Mechanical parameters					See Mechanical Drawings, Figures 2 & 4
Weight		1.07/30,4		oz/g	
Dimensions					
Length		1.91/46,6		in/mm	
Width		1.09/27,7		in/mm	
Height		0.37/9,5		in/mm	
Thermal					
Thermal capacity		23.8		Ws/°C	
Baseplate to ambient		8.8		°C/W	
Baseplate to ambient; 1000 LFM		3.0		°C/W	
Baseplate to sink; flat, greased surface		0.40		°C/W	
Baseplate to sink; thermal pad		0.36		°C/W	

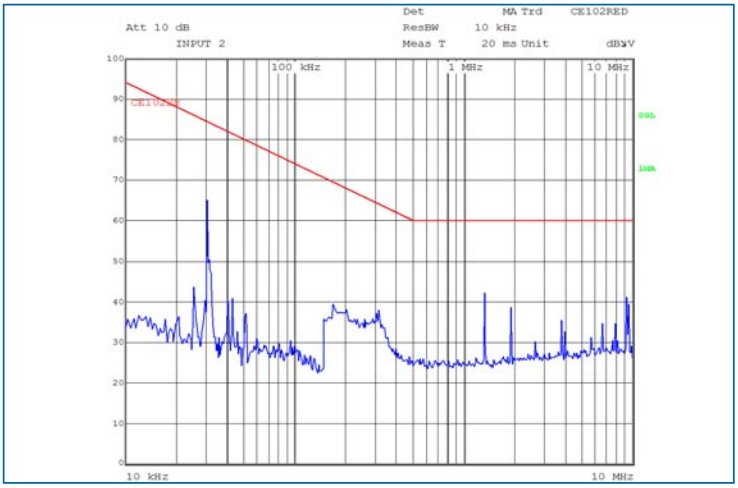


Figure 1 — Conducted Noise (CE 102); MF028AMFPT with PRM and VTM, 28 Vdc input, 12 Vdc output, 90% load.

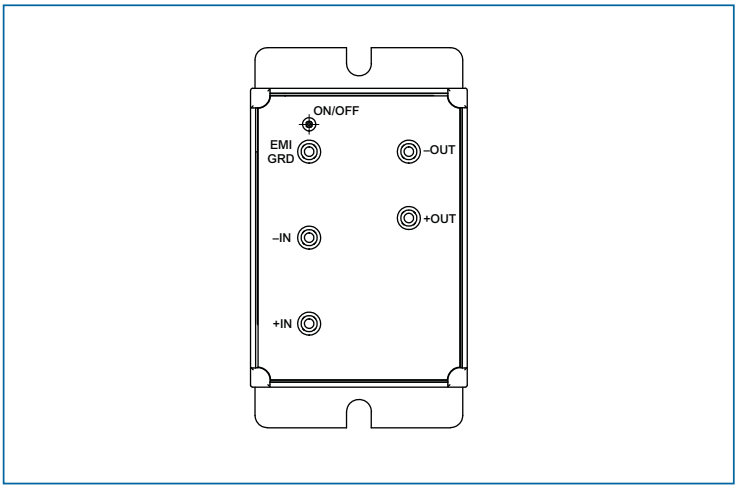


Figure 2 — MF028AMFPT pin configuration (viewed from pin side)

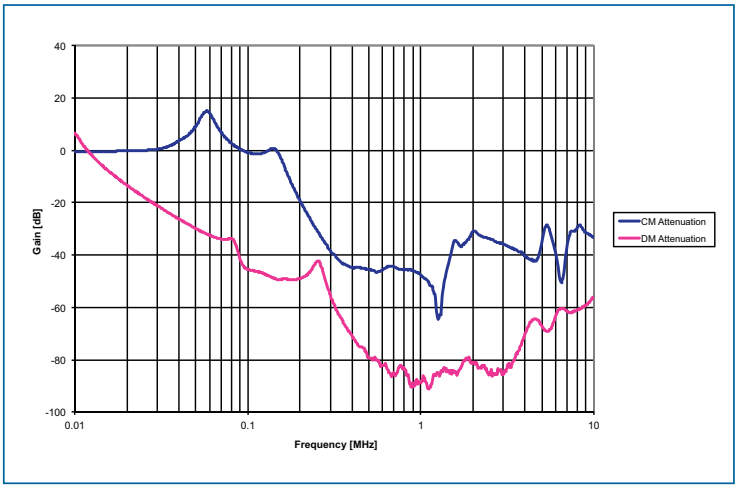


Figure 3 — MF028AMFPT insertion loss

SPECIFICATIONS (CONT.)

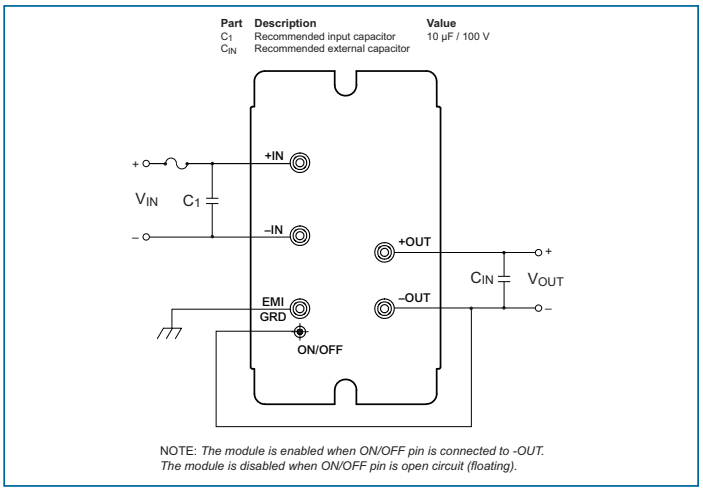


Figure 4 — Connection for filter enabled at turn on

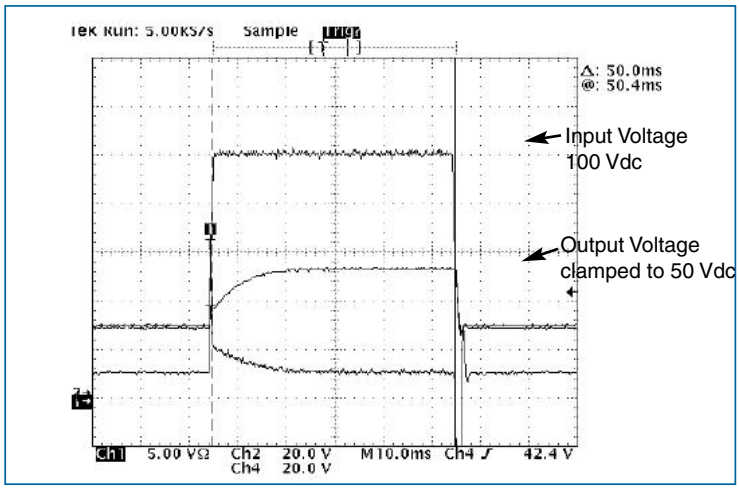


Figure 5 — Transient immunity; MF028AMFPT output response to an input transient. (28 VIN full load initial conditions, trace 1.5 A/div)

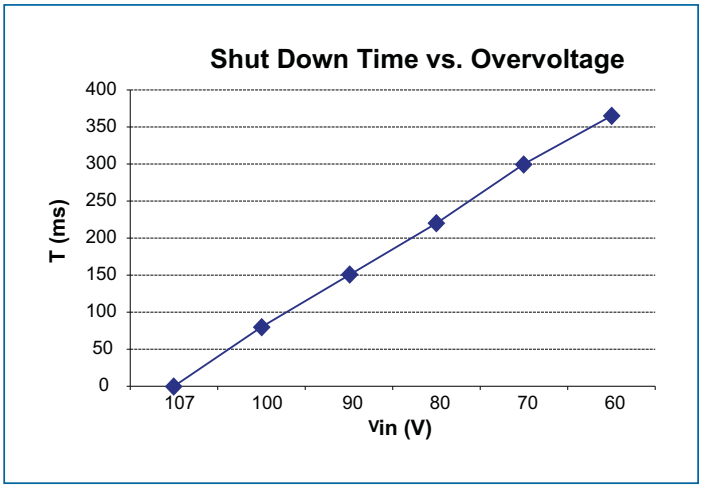


Figure 6 — Shutdown time vs. overvoltage

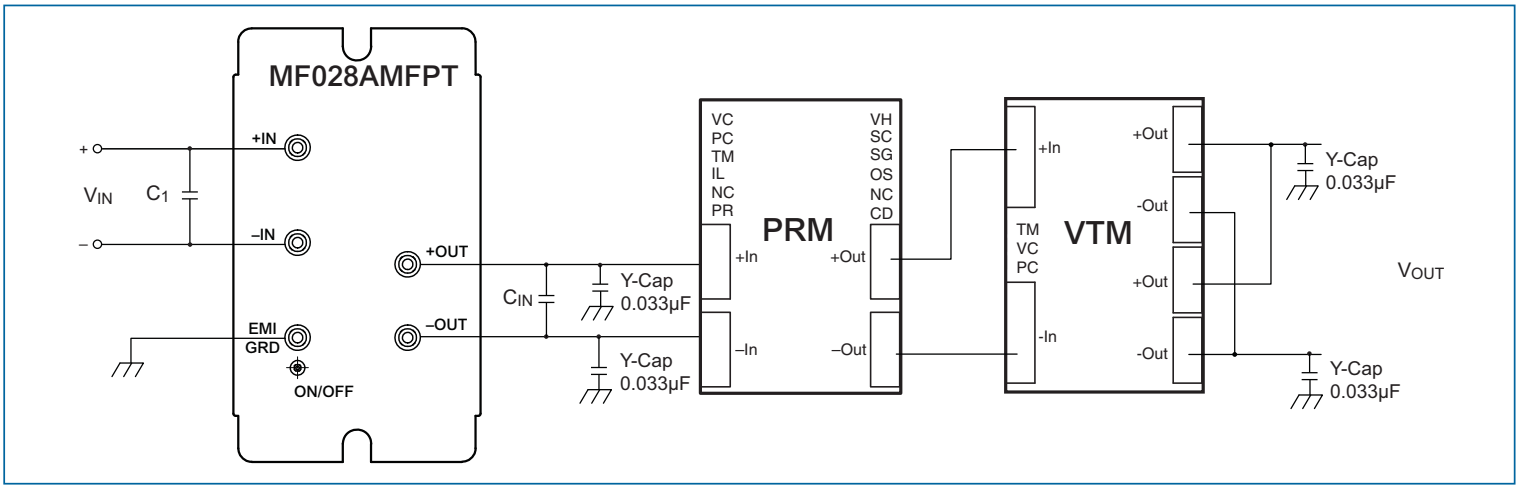


Figure 7 — Recommended circuit for EMI

MECHANICAL DRAWINGS

Baseplate - Slotted Flange

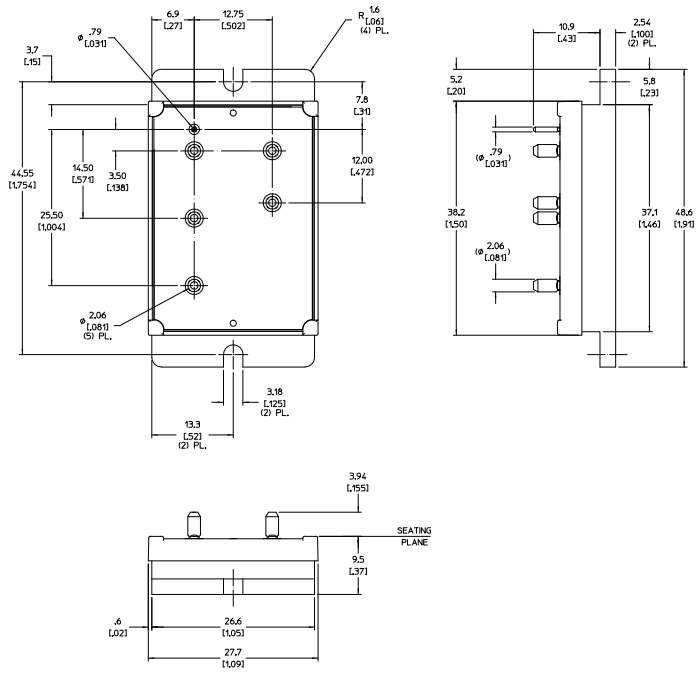
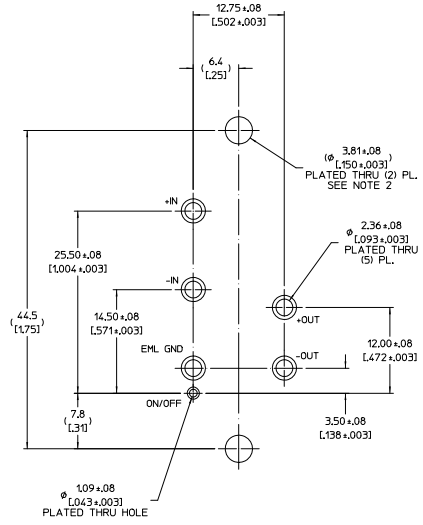


Figure 8 — *Module outline*

Recommended PCB Pattern
(Component side shown)



Note:

2. PLATED THROUGH HOLES SHALL BE USED WITH VIBRICK STANDOFF KITS TO GROUND THE BASEPLATE TO THE CUSTOMERS PCB AND/OR COLD PLATE.

Figure 9 — *PCB mounting specifications*

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