

Power Your Critical Mission Today

VPTF1-28 SERIES

HIGH RELIABILITY COTS EMI FILTERS

Models Available

1 A output
-55 °C to 100 °C Operation

1.0 DESCRIPTION

The VPTF1 series of COTS EMI filters is a cost effective solution for many demanding high reliability applications. A wide input voltage range accommodates nominal 28V inputs including avionics, mobile, ground systems, and other applications. The VPTF1 EMI filter is designed to filter the conducted emissions of multiple VPT series DC-DC converters up to its current rating, providing compliance to MIL-STD-461C/D/E for conducted emissions. A proven design heritage, no optoisolators and a rugged all metal or optional epoxy encapsulated package ensure long term reliability. The VPTF1 series is intended for harsh environments including severe vibration, shock and temperature cycling. Testing is to JESD22, MIL-STD-810, and MIL-STD-883.

These converters are designed and manufactured in a facility certified to ISO9001, J-STD-001 and IPC-A-610.

This product may incorporate one or more of the following U.S. patents:

5,784,266
5,790,389
5,963,438
5,999,433
6,005,780
6,084,792
6,118,673



1.1 FEATURES

- High reliability at low cost
- Up to 1.0 Amp maximum current
- Up to 25 W output power
- Wide input voltage range: 0 to 50 Volts per MIL-STD-704 and MIL-STD-1275
- High input transient voltage: 80 Volts for 1 sec per MIL-STD-704A
- 55 dB minimum attenuation at 500 kHz
- Wide temperature range, -55 °C to 100 °C
- Internally conformal coated
- Standard six sided non-hermetic rugged metal package
- Optional six sided rugged epoxy encapsulated V-SHIELD® Package with integral metalized EMI shield that is fully compatible with aqueous cleaning processes

1.2 COMPLIANCE

- MIL-STD-1275, MIL-STD-704
- Meets MIL-STD-461C-F conducted omissions requirements when used with a VPT Series DC-DC converter
- Meets conducted susceptibility requirements of MIL-STD-461C, CS01 and CS02, and MIL-STD-461C-F when used with a VPT Series DC-DC converter
- Meets EN55022/EN55032 Class A and B when used with an appropriate VPT DC-DC Converter

1.3 PACKAGING

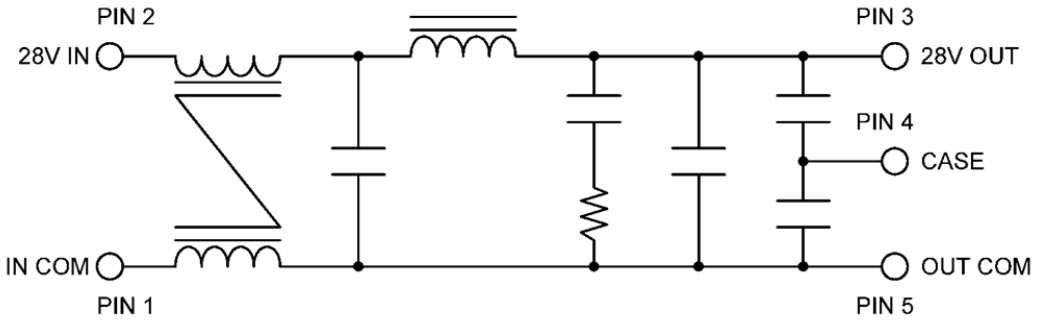
- Low-profile: 1.110” x 1.110” x 0.400”
- Optional rugged epoxy encapsulated V-SHIELD® Package
- Max weight: 21 g

1.4 SIMILAR PRODUCTS AND ACCESSORIES

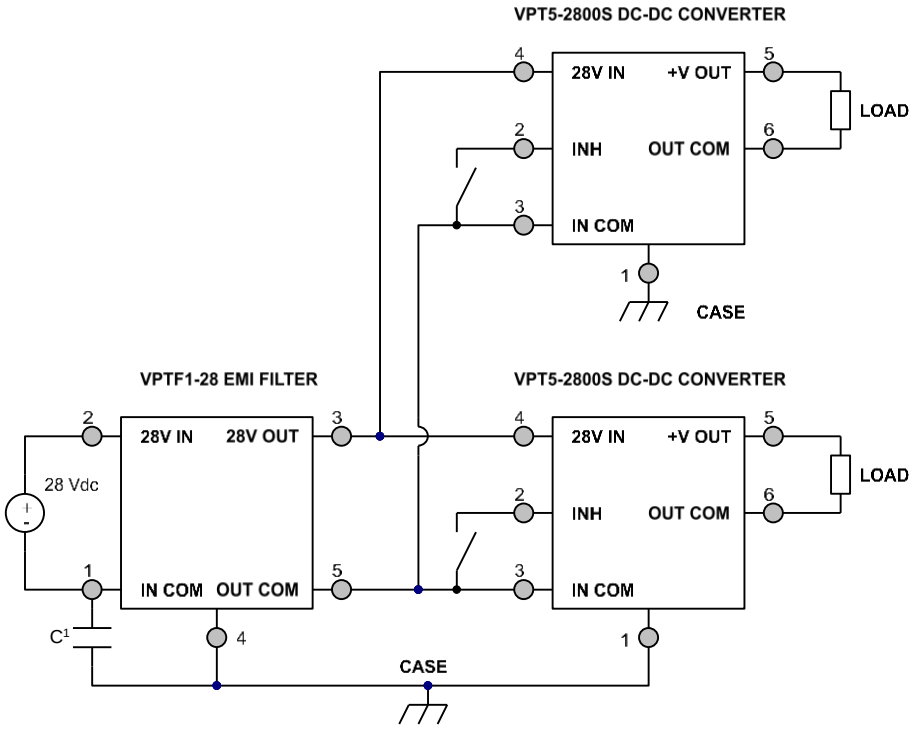
- DVMA28 1 A EMI filter for military/avionics applications
- VXRF2-28 2 A EMI filter for military/commercial applications
- VHRF1 1 A EMI filter for military/commercial applications
- EMI filters, Thermal Pads, Front-End Modules and Accessories

2.0 DESCRIPTION

2.1 BLOCK DIAGRAM



2.2 CONNECTION DIAGRAM



1. 0.47µF / 500V minimum required for EN55022 and EN55032 only

3.0 SPECIFICATIONS

3.1 ABSOLUTE MAXIMUM RATINGS

Absolute Maximum Ratings			
Input Voltage (Continuous)	50 V	Storage Temperature	-55 °C to 125 °C
Input Voltage (Transient, 1 second)	80 V	Lead Solder Temperature (10 seconds)	300 °C

3.2 PERFORMANCE SPECIFICATIONS

Tcase = -55 °C to 100 °C, Vin = +28 V ± 5%, Full Load, Unless Otherwise Specified

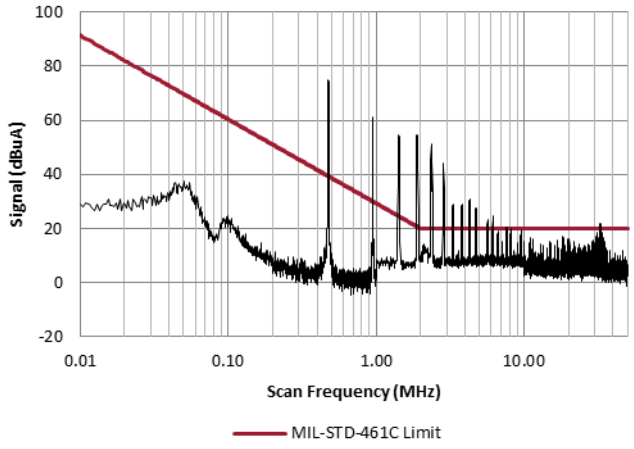
		VPTF1-28			
Parameter	**Conditions**	**Min**	**Typ**	**Max**	**Units**
INPUT					
Voltage	Continuous	0	28	50	V
	Transient, 1 sec[2]	-	-	80	V
OUTPUT STATIC					
Voltage			$V_{OUT} = V_{IN} – (I_{IN} \times R_{DC})$		V
Current[1]		0	-	1	A
Power[1]		0	-	25	W
GENERAL					
DC Resistance		-	-	250	mΩ
Power Dissipation[2]		-	-	0.25	W
Noise Rejection	f = 500 kHz	55	-	-	dB
Capacitance	Any Pin to Case	10	-	30	nF
Isolation	Any Pin to Case, 500 VDC	100	-	-	MΩ
Weight		-	-	21	g
MTBF (MIL-HDBK-217F)	GM @ T_C = 55 °C	-	1.67	-	MHr

1. Derate linearly to 0 at 110 °C
2. Verified by qualification testing

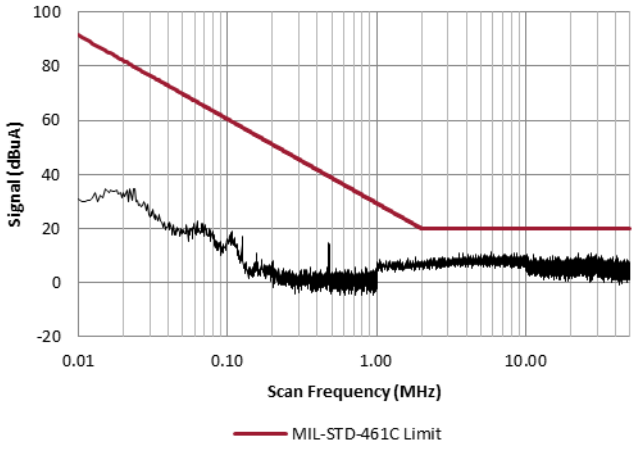
4.0 PERFORMANCE CURVES

Tcase = 25 °C, Vin = +28 V ± 5%, Full Load, Unless Otherwise Specified

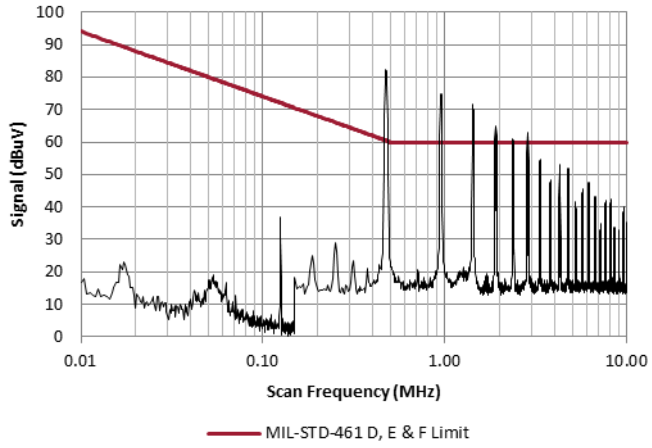
4.1.1 Two VPT5-2800S without VPTF1-28 EMI Filter



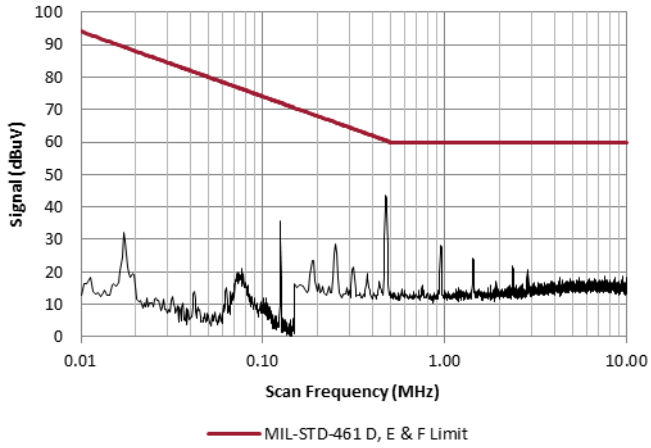
4.1.2 Two VPT5-2800S with VPTF1-28 EMI Filter



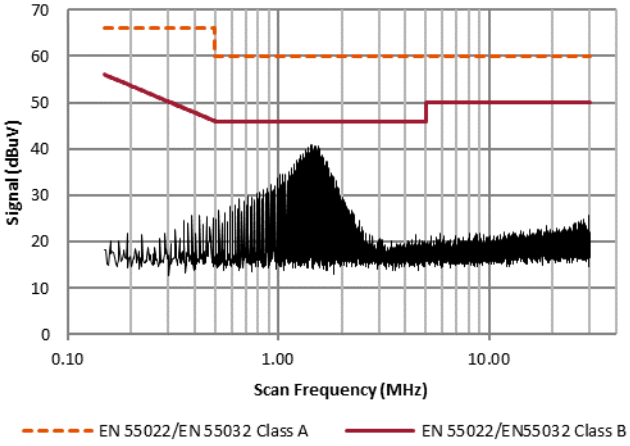
4.1.3 Two VPT5-2800S without VPTF1-28 EMI Filter



4.1.4 Two VPT5-2800S with VPTF1-28 EMI Filter



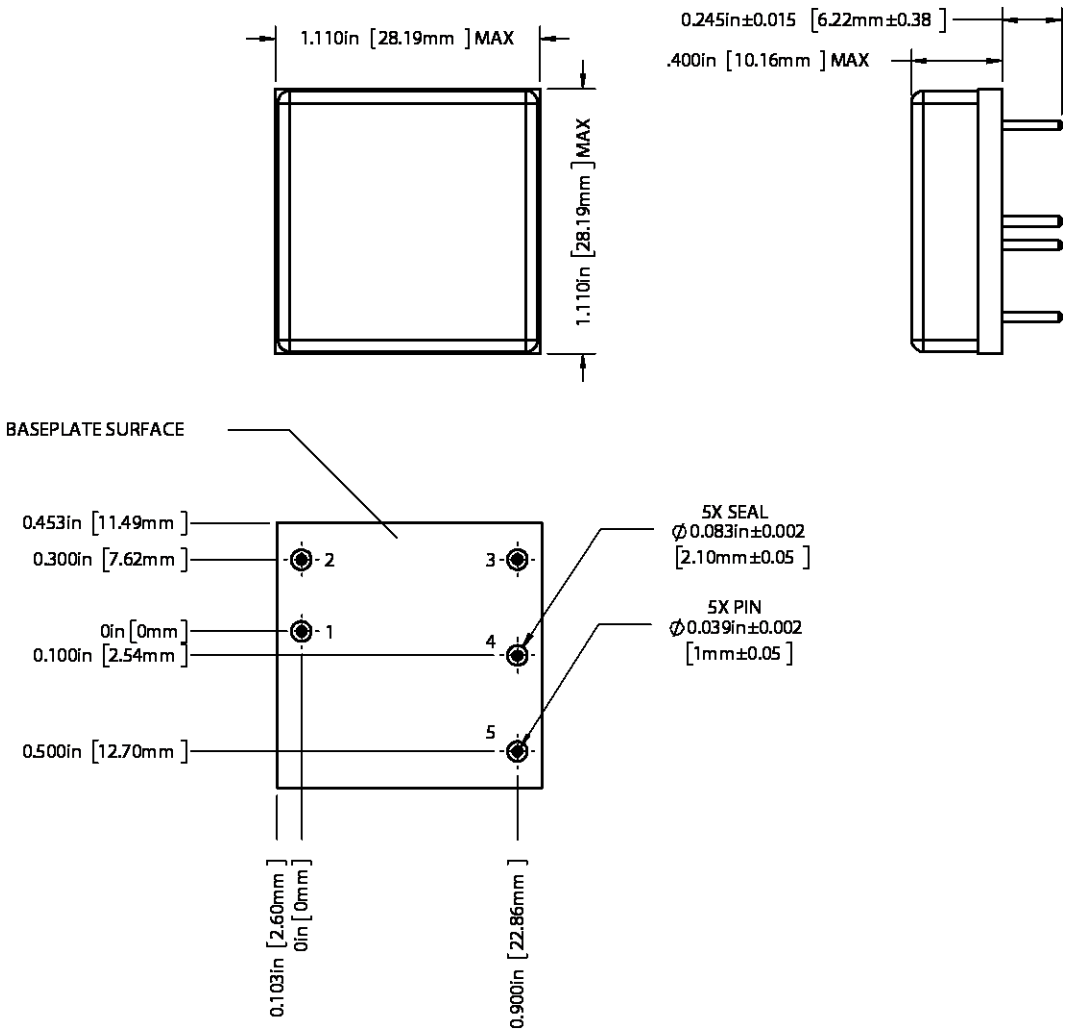
4.1.5 Two VPT5-2800S with VPTF1-28 EMI Filter [1, 2, 3]



1. Minimum 0.47 uF 500 V capacitor required as shown in Section 2.2
2. Tcase = 25 °C, Vin = +24 V ± 5%, Full Load
3. Limit lines shown are average limit

5.0 MECHANICAL OUTLINES AND PINOUT

Standard Metal Package:

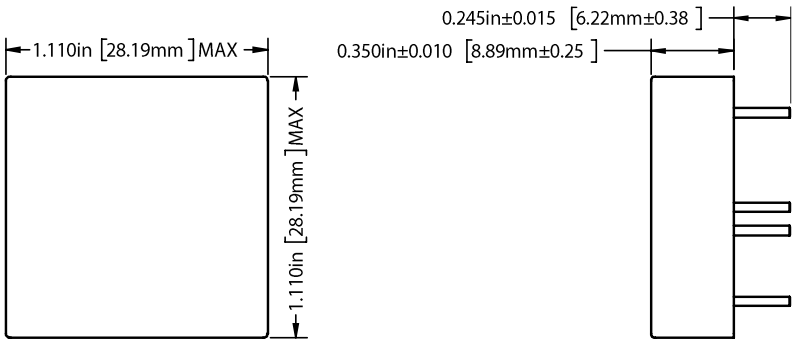


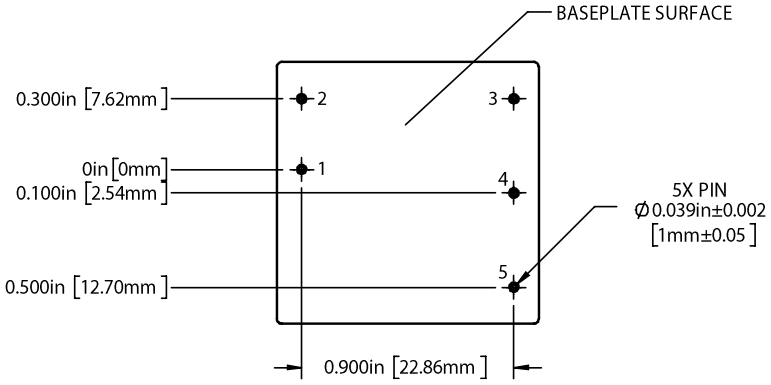
1. Case temperature is measured on the center of the baseplate surface
2. Materials: Baseplate (Aluminum, conductive conversion coating); Cover (Nickel Plated); Pins (Copper, gold over nickel plating)
3. This Package is not hermetic. VPT offers a wide range of hermetic products. Please contact VPT for details if hermetic products are required.

Pin	Function	Pin	Function
1	INCOM	4	CASE
2	28VIN	5	OUT COM
3	28VOUT		

5.0 MECHANICAL OUTLINES AND PINOUT (CONTINUED)

Optional Epoxy Encapsulated Package:





1. Case temperature is measured on the center of the baseplate surface
2. Materials: Body (Epoxy with integral metalized EMI shield); Pins (Copper, gold over nickel plating)
3. This package is highly resistant to chemical, solvent and salt environments and is fully compatible with high volume manufacturing processes including wave solder, cleaning solvents, high pressure sprays and aqueous wash processes.

Pin	Function	Pin	Function
1	INCOM	4	CASE
2	28VIN	5	OUT COM
3	28VOUT		

6.0 PACKAGE PIN DESCRIPTION

Pin	Function	Description
1	INCOM	Input Return Connection
2	28VIN	Positive Input Voltage Connection
3	28VOUT	Positive Output Voltage Connection
4	CASE	Case Connection
5	OUTCOM	Output Return Connection

7.0 ENVIRONMENTAL SCREENING

Screening	Condition
Internal Visual	IPC-A-610, Class 3
Stabilization Bake	MIL-STD-883, Method 1008, Condition B, 125°C, 24 hours
Temperature Cycling	MIL-STD-883, Method 1010, Condition B, -55°C to +125°C, 10 Cycles
Burn-In	96 hours at +100°C
Final Electrical	100% at 25 °C
External Visual	Internal Procedure

8.0 ORDERING INFORMATION

VPTF1	28
1	2

(1) Product Series	(2) Nominal Input Voltage	
VPTF1-	**28**	28 Volts

Please contact your sales representative or the VPT Inc. Sales Department for more information concerning additional environmental screening and testing, different input voltage, output voltage, power requirements, and source inspection.

9.0 CONTACT INFORMATION

To request a quotation or place orders please contact your sales representative or the VPT, Inc. Sales Department at:

Phone: (425) 353-3010
Fax: (425) 353-4030
E-mail: vptsales@vptpower.com

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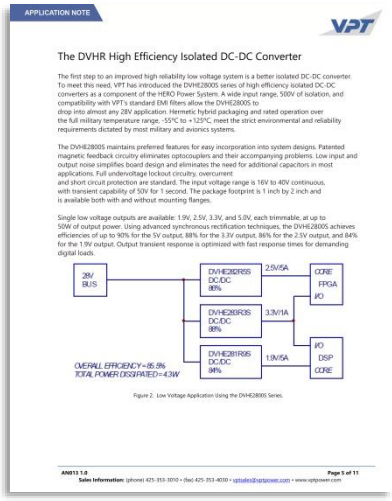
10.0 ADDITIONAL INFORMATION

Visit the **VPT website** for additional technical resources, including:

Product Literature



Application Notes and White Papers



Technical Video Labs



Additional Products For Avionics/Military, Hi-Temp, Hi-Rel COTS, and Space Applications

