



# VSCF1-28

## HIGH RELIABILITY COTS EMI FILTER



VSCF1-28- Exact marking may differ from that shown

### Models Available

1A output
-55°C to 105°C operation

## 1.0 DESCRIPTION

The VSCF1-28 is a commercial off the shelf EMI filter designed for the 'NewSpace' market. The VSCF1-28 EMI filter is designed to filter the conducted emissions of multiple VSC Series DC-DC converters up to its current rating, providing compliance to MIL-STD-461 C-G for conducted emissions. Testing is to JESD22, MIL-STD-810, and MIL-STD-883.

The VSCF1-28 is intended for smaller satellites in low Earth orbits (LEO), and NASA Class D missions where the balance of cost and guaranteed performance is critical. The VSCF1-28 is well suited for space applications as it is a fully passive design which is immune to radiation effects. Our proprietary packaging creates a dual side heatsinking option with very low outgassing.

## 1.1 FEATURES

- 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 105 °C
- Internally conformal coated

## 1.2 MANUFACTURING AND COMPLIANCE

- Manufactured in an ISO9001, J-STD-001, and IPC-A-610 certified facility
- MIL-STD-1275, MIL-STD-704
- Meets MIL-STD-461 C-G conducted emissions requirements when used with a VSC Series DC-DC converter
- Meets conducted susceptibility requirements of MIL-STD-461C, CS01 and CS02, and MIL-STD-461C-G when used with a VSC Series DC-DC converter

## 1.3 PACKAGING

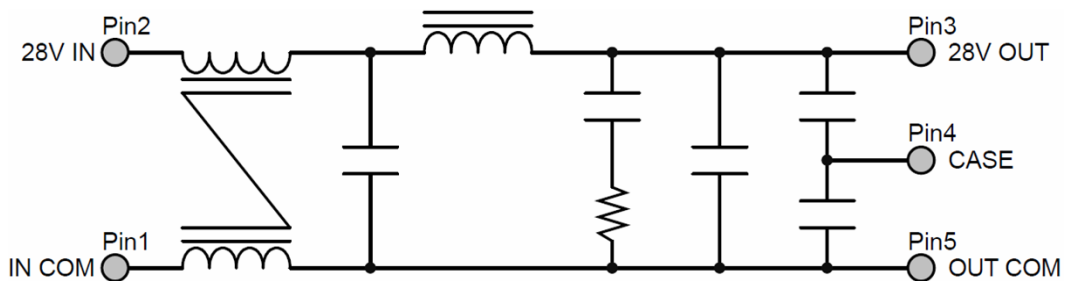
- Low-profile: 1.110" x 1.110" x 0.360"
- Max weight: 21 g

## 1.4 ACCESSORIES

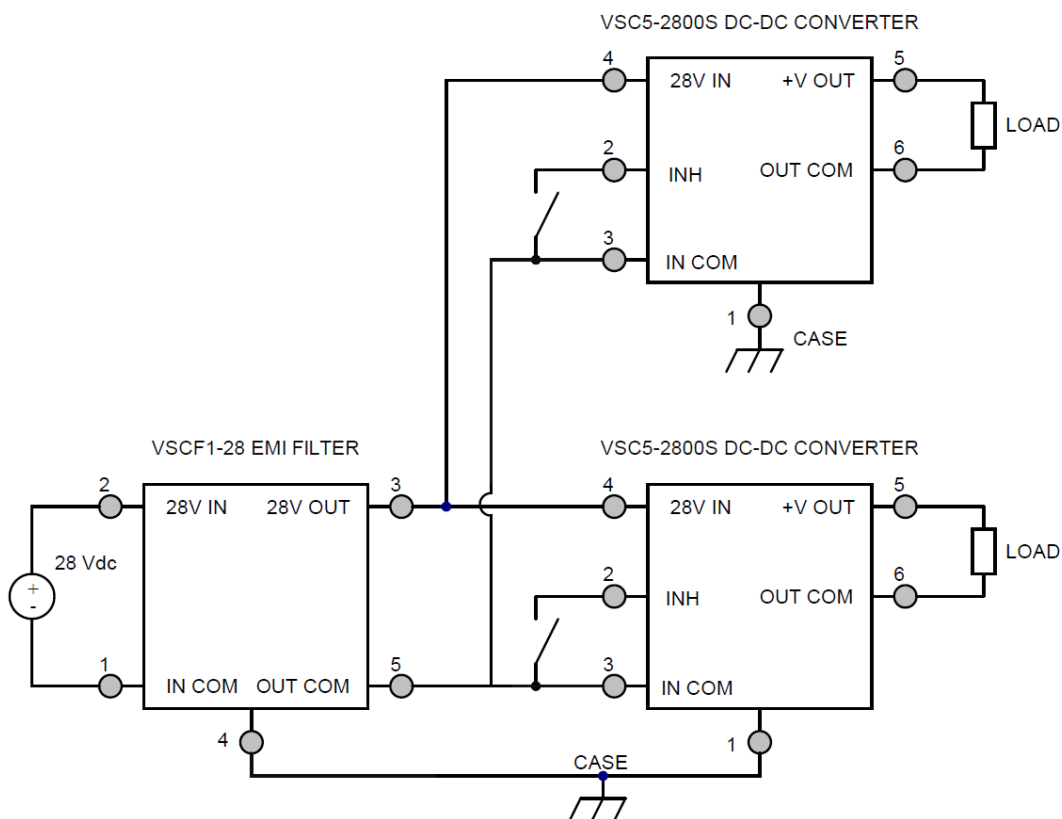
- Thermal Pads TP-008 or TP2-008

## 2.0 DIAGRAMS

### 2.1 BLOCK DIAGRAM



### 2.2 CONNECTION DIAGRAM



### 3.0 SPECIFICATIONS

#### 3.1 ABSOLUTE MAXIMUM RATINGS

Absolute Maximum Ratings			
Input Voltage (Continuous):	50 V	Operating Temperature (Full Load):	-55 °C to +105 °C
Input Voltage (Transient, 1 second):	80 V	Storage Temperature:	-55 °C to +125 °C
		Lead Solder Temperature (10 seconds):	300 °C

#### 3.2 PERFORMANCE SPECIFICATIONS

Tcase = -55 °C to +105 °C, Vin = +28 V ± 5%, Full Load, Unless Otherwise Specified

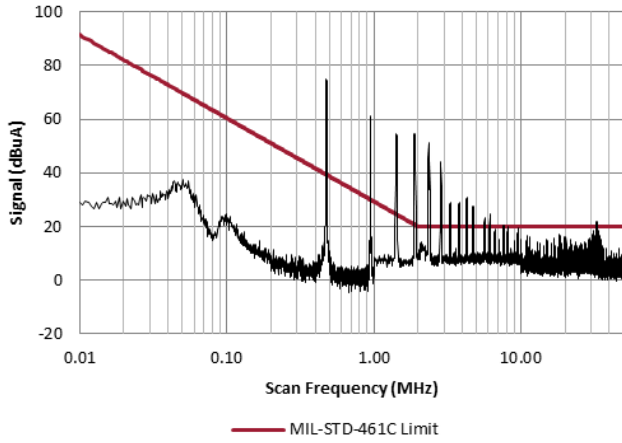
Parameter	Conditions	VSCF1-28			Units
		Min	Typ	Max	
<b>INPUT</b>					
Voltage	Continuous	0	28	50	V
	Transient, 1 sec <sup>2</sup>	-	-	80	V
<b>OUTPUT STATIC</b>					
Voltage		$V_{OUT} = V_{IN} - (I_{IN} \times R_{DC})$			V
Current <sup>1</sup>		0	-	1	A
Power <sup>1</sup>		0	-	25	W
<b>GENERAL</b>					
DC Resistance		-	-	250	mΩ
Power Dissipation		-	-	0.25	W
Noise Rejection		55	-	-	dB
Capacitance		10	-	30	nF
Isolation	500 V DC, Tcase = 25 °C	100	-	-	MΩ
Weight		-	-	21	g
MTBF (MIL-HDBK-217F)	SF @ Tcase = 55 °C	-	172	-	MHr

1. Derate linearly to 0 at 115°C.

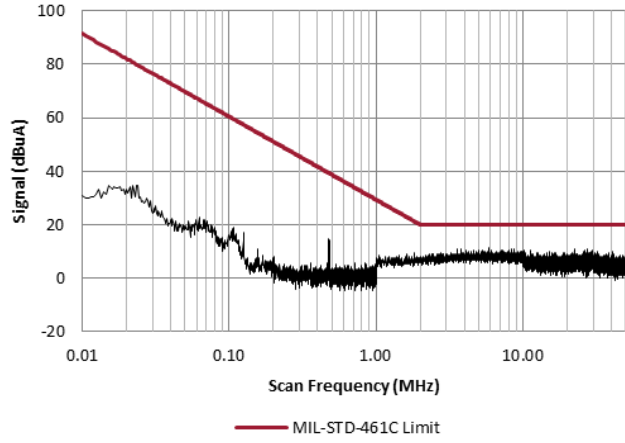
2. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.

## 4.0 PERFORMANCE CURVES

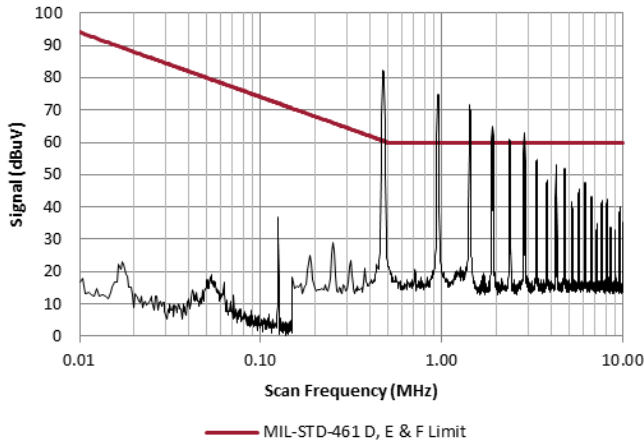
4.1.1 Two VSC5-2800S without VSCF1-28 EMI Filter



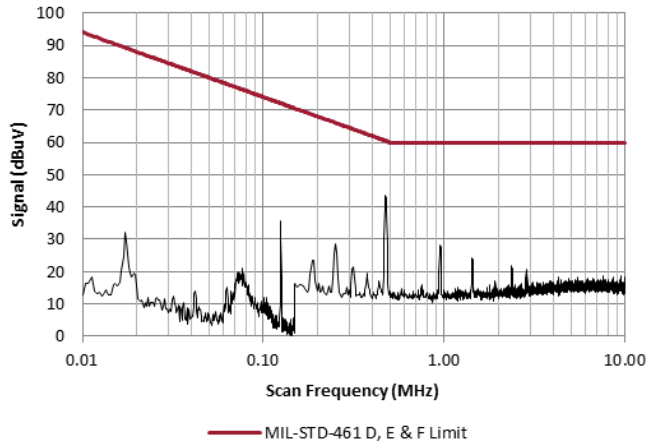
4.1.2 Two VSC5-2800S with VSCF1-28 EMI Filter



4.1.3 Two VSC5-2800S without VSCF1-28 EMI Filter

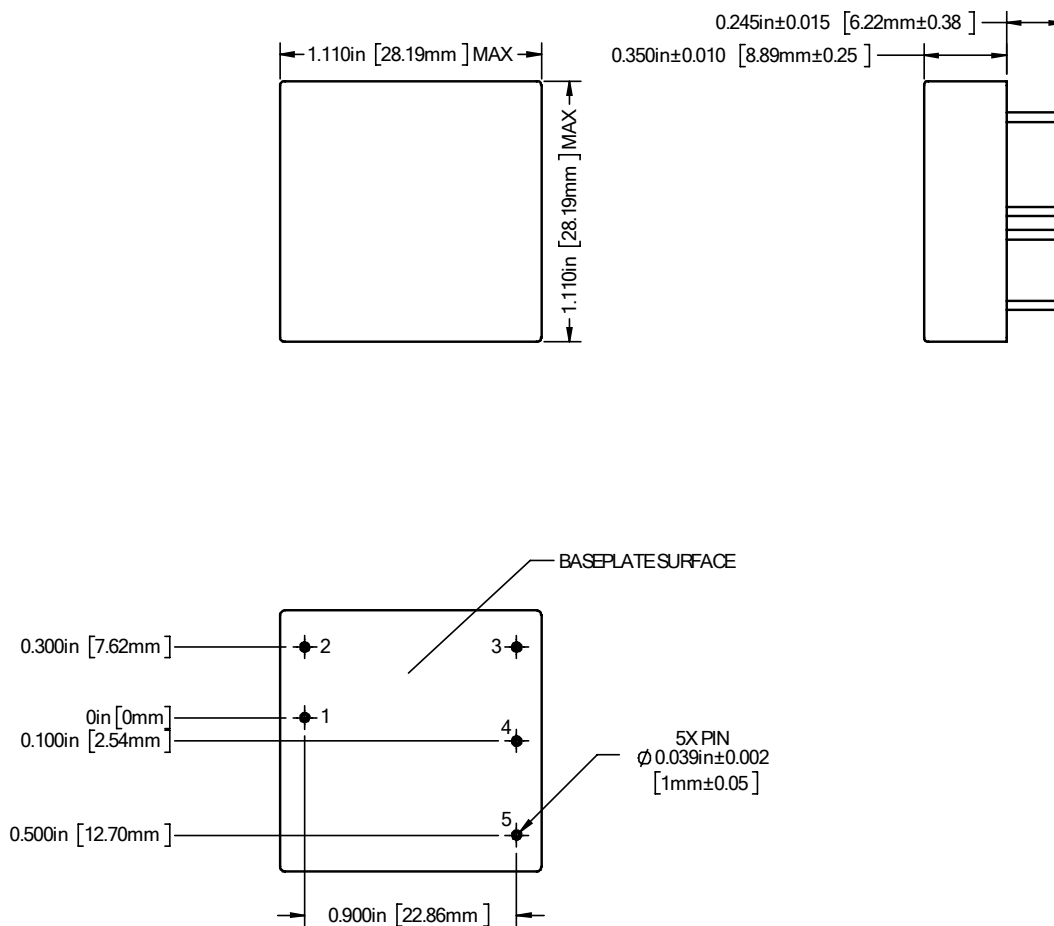


4.1.4 Two VSC5-2800S with VSCF1-28 EMI Filter



## 5.0 MECHANICAL OUTLINES AND PINOUT

Standard Package Option:



1. Tolerances are  $\pm 0.010''$  unless otherwise stated
2. Case temperature is measured on the center of the baseplate surface
3. Materials: Body (Epoxy); Pins (Tellurim Copper, alloy 145, gold over nickel plating)

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

## 6.0 THERMAL CONSIDERATIONS

The VSCF1-28 is rated for full power operation at 105 °C. Operation above 105 °C is allowed at reduced power. Specifically, the output power should be derated linearly from full power at 105 °C to half power at 110 °C and to zero power at 115 °C. The operating temperature of the filter is specified on the baseplate or the top plate of the filter. The filter is designed to be conduction-cooled, with the baseplate or the top plate mounted to a heat sink, chassis, PCB or other thermal surface.

## 7.0 COMPLIANCE

When used with VSC series converters

Specification	Compliance
MIL-STD-416 C-G	CE03
	CE102
	CS101
MIL-STD-704 A-F	Input Voltage
	Distortion spectrum
	Voltage spikes <sup>1</sup>
MIL-STD-1275 A-D	Input voltage, including starting disturbances
	Ripple <sup>2</sup>
	Voltage spikes <sup>3</sup>
DO-160 E-G, Section 16	Steady state voltage
	Ripple voltage
	Abnormal surge voltage
DO-160 E-G, Section 18	Categories B, R, K and Z <sup>4</sup>
DO-160 E-G, Section 21	Conducted RF emissions

1. Source impedance is 50 Ohms
2. Injected current limited to 1 Arms per SAEJ1113-2
3. Energy limited to 15 mJ or less
4. Baseplate temperature limited to DO-160 E-G, Table 4-1, Operating High Temp

## 8.0 ENVIRONMENTAL SCREENING

Test	/ES+
Internal Visual	IPC-A-610, Class 3
Temperature Cycling	MIL-STD-883, Method 1010, Condition B, -55 °C to +125 °C, 10 Cycles
Burn In	96 hours at +105 °C
Final Electrical <sup>1</sup>	-55 °C, 25 °C, 105 °C
External Visual	Internal Procedure

1. 100% R&R testing with all test data included in product shipment

## 9.0 ORDERING INFORMATION

<b>VSCF1-</b>	<b>28</b>	<b>/ES+</b>
1	2	3

(1) Product Series	(2) Nominal Input Voltage	(3) Screening Code
VSCF1-	28 28 Volts	/ES+

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.

## 10.0 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](mailto:vptsales@vptpower.com)

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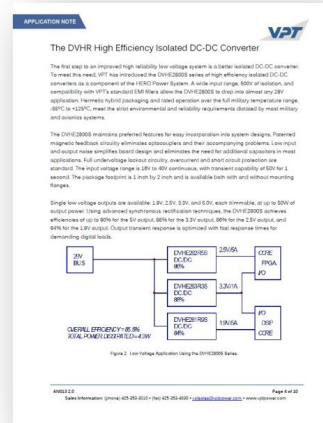
## 11.0 ADDITIONAL INFORMATION

Visit the VPT website for additional technical resources, including:

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