

### DESCRIPTION

The VPTF10 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 VPTF10 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 VPTF10 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

### FEATURES

- High Reliability at Low Cost
- Up to 10.0 Amp Maximum Current
- Up to 200W 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
- 45 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 Package with Integral Metalized EMI shield that is fully compatible with aqueous cleaning processes
- Meets MIL-STD-461C/D/E Conducted Emissions Requirements When Used With a VPT Series DC-DC Converter
- Meets Conducted Susceptibility Requirements of MIL-STD-461C, CS01 and CS02, and MIL-STD-461D/E when used with a VPT Series DC-DC Converter



**Figure 1** – VPTF10-28 EMI Filter  
Standard Metal Package



**Figure 2** – VPTF10-28W EMI Filter  
Optional Epoxy Encapsulated Package

(Not to Scale)

## SPECIFICATIONS (T<sub>CASE</sub> = -55°C to +100°C, V<sub>IN</sub> = +28V ± 5%, Full Load, Unless Otherwise Specified)

### ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	50 V <sub>DC</sub>	Storage Temperature	-55°C to +125°C
Input Voltage (Transient, 1 second)	80 Volts	Lead Solder Temperature (10 seconds)	300°C
Output Current	10.0 Amps	Weight (Maximum)	40 Grams
Power Dissipation (Full Load, T <sub>CASE</sub> = +100°C)	8 Watt		

Parameter	Conditions	VPTF10-28			Units
		Min	Typ	Max	
<b>STATIC</b>					
INPUT Voltage	Continuous	0	28	50	V
	Transient, 1 sec <sup>2</sup>	-	-	80	V
OUTPUT Voltage		$V_{OUT} = V_{IN} - (I_{IN} \times R_{DC})$			V
Current <sup>1</sup>		0	-	10.0	A
Power <sup>1</sup>		0	-	200	W
DC RESISTANCE		-	45	80	mΩ
POWER DISSIPATION <sup>2</sup>		-	-	8	W
NOISE REJECTION	f = 500 kHz	45	-	-	dB
CAPACITANCE	Any Pin to Case	70	-	130	nF
ISOLATION	Any Pin to Case, 500 VDC	100	-	-	MΩ
MTBF (MIL-HDBK-217F)	GM @ TC = 55°C	-	802	-	kHrs

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

## BLOCK DIAGRAM

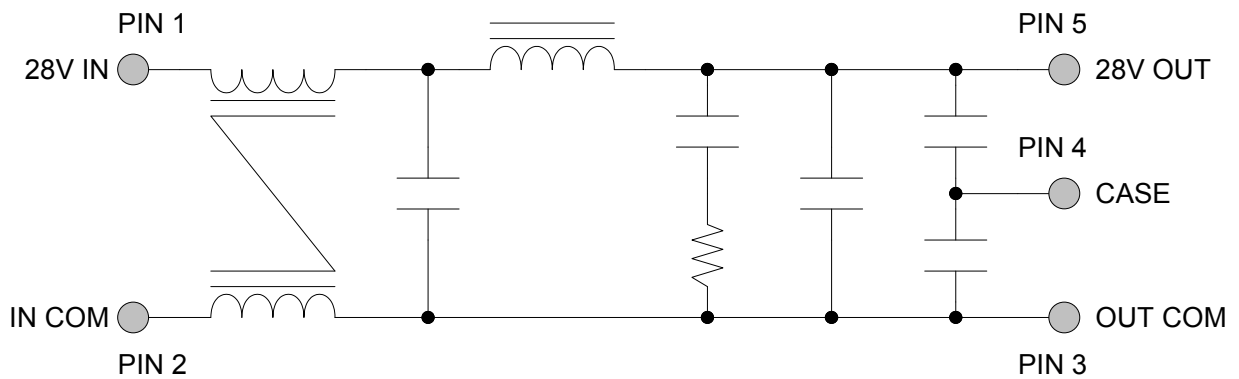


Figure 3

## CONNECTION DIAGRAM

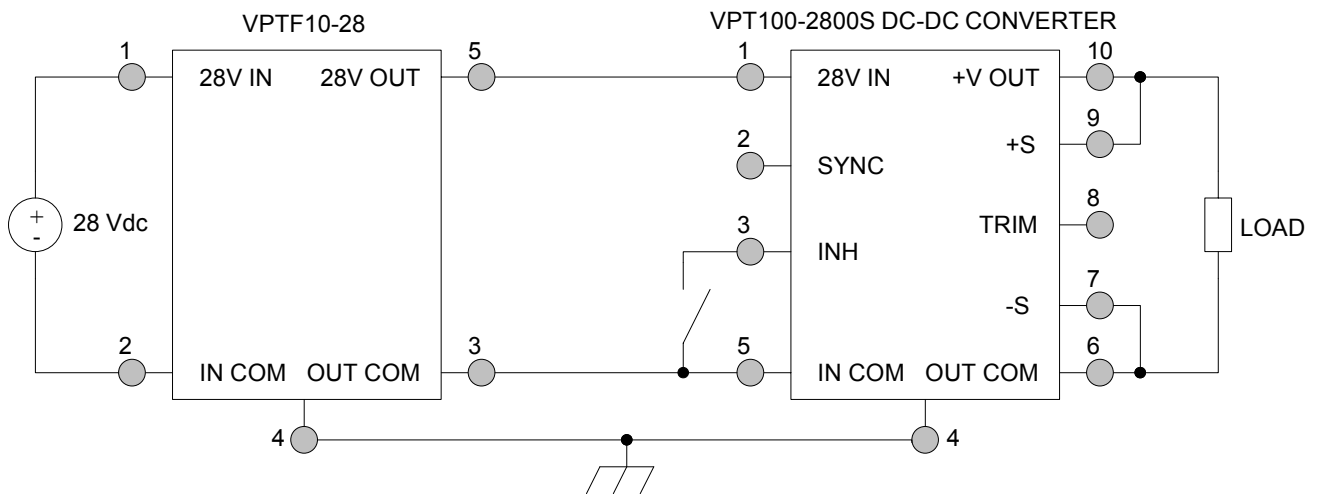


Figure 4 - (Shown with VPT100-2800S Series DC-DC Converters)

## CONNECTION DIAGRAM – CONTINUED

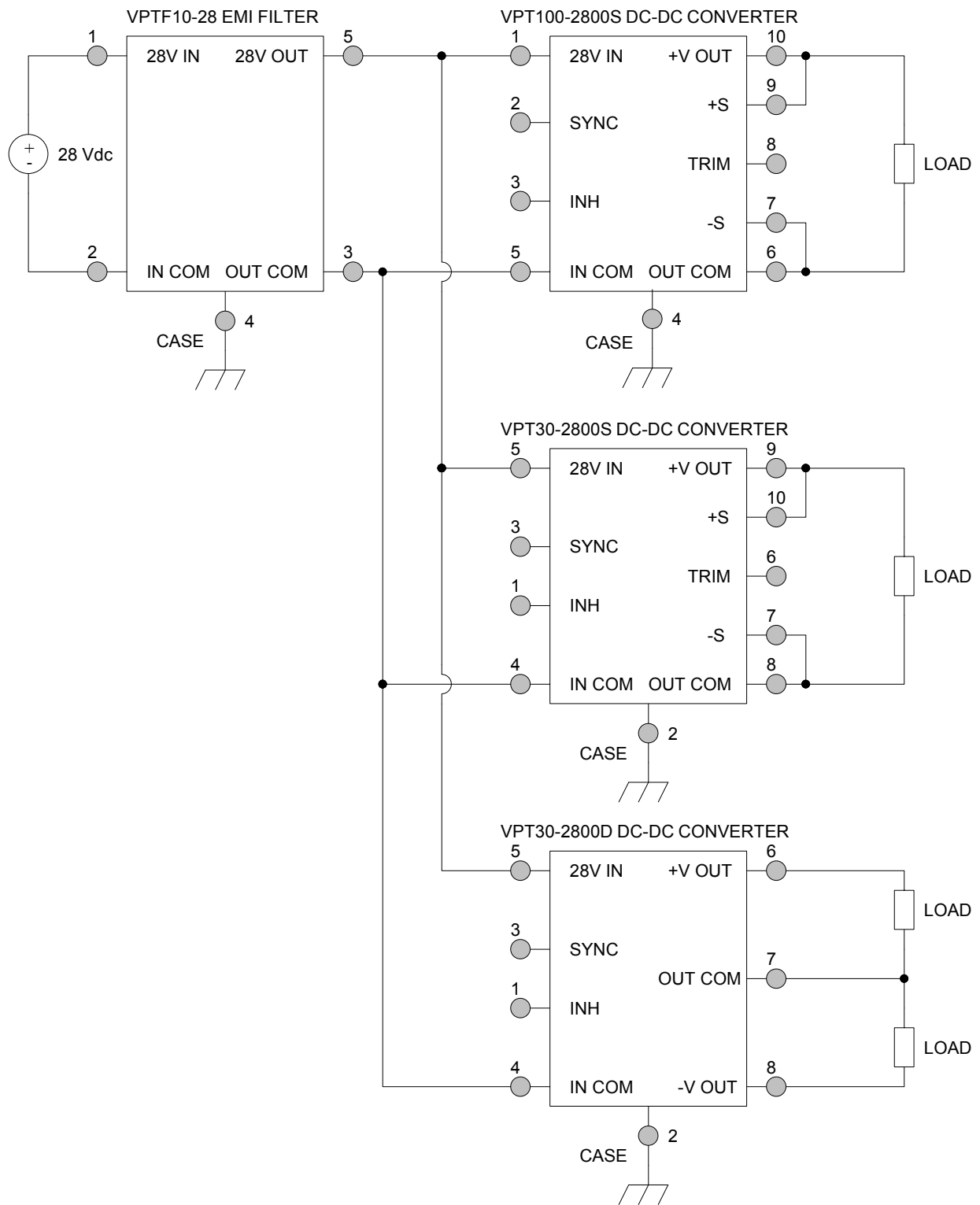
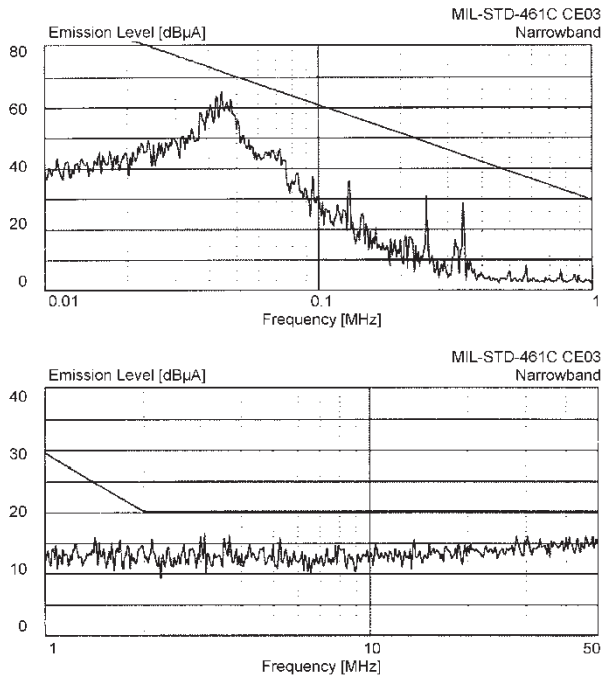


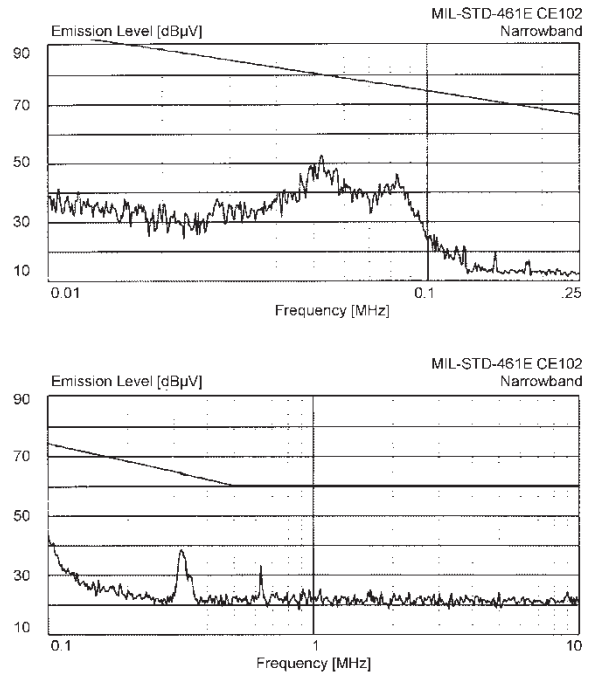
Figure 5 - (Shown with VPT100-2800S & VPT30-2800S&D Series DC-DC Converters)

## EMI PERFORMANCE CURVES

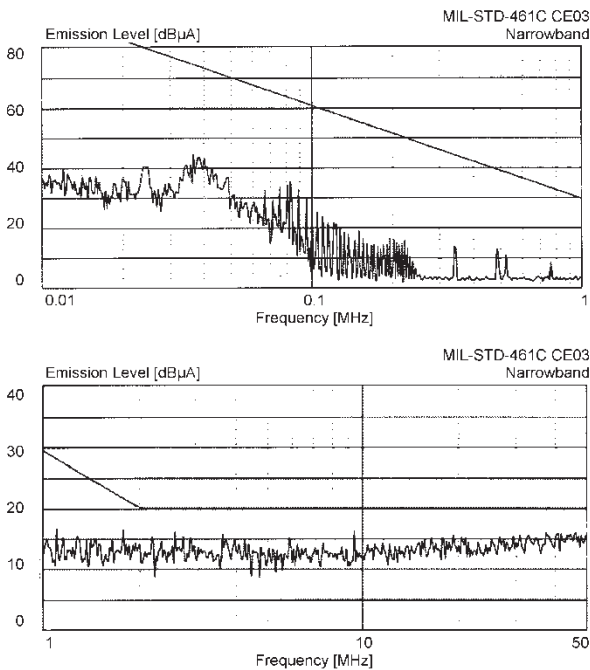
( $T_{CASE} = 25^{\circ}C$ ,  $V_{IN} = +28V \pm 5\%$ , Full Load, Unless Otherwise Specified)



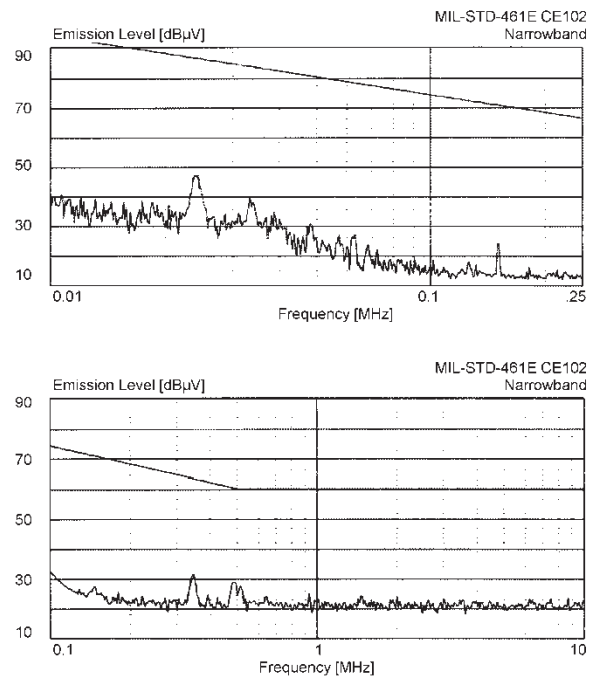
**Figure 6 – MIL-STD-461C**  
One VPT100-2800S With VPTF10-28 EMI Filter



**Figure 7 – MIL-STD-461D/E**  
One VPT100-2800S With VPTF10-28 EMI Filter

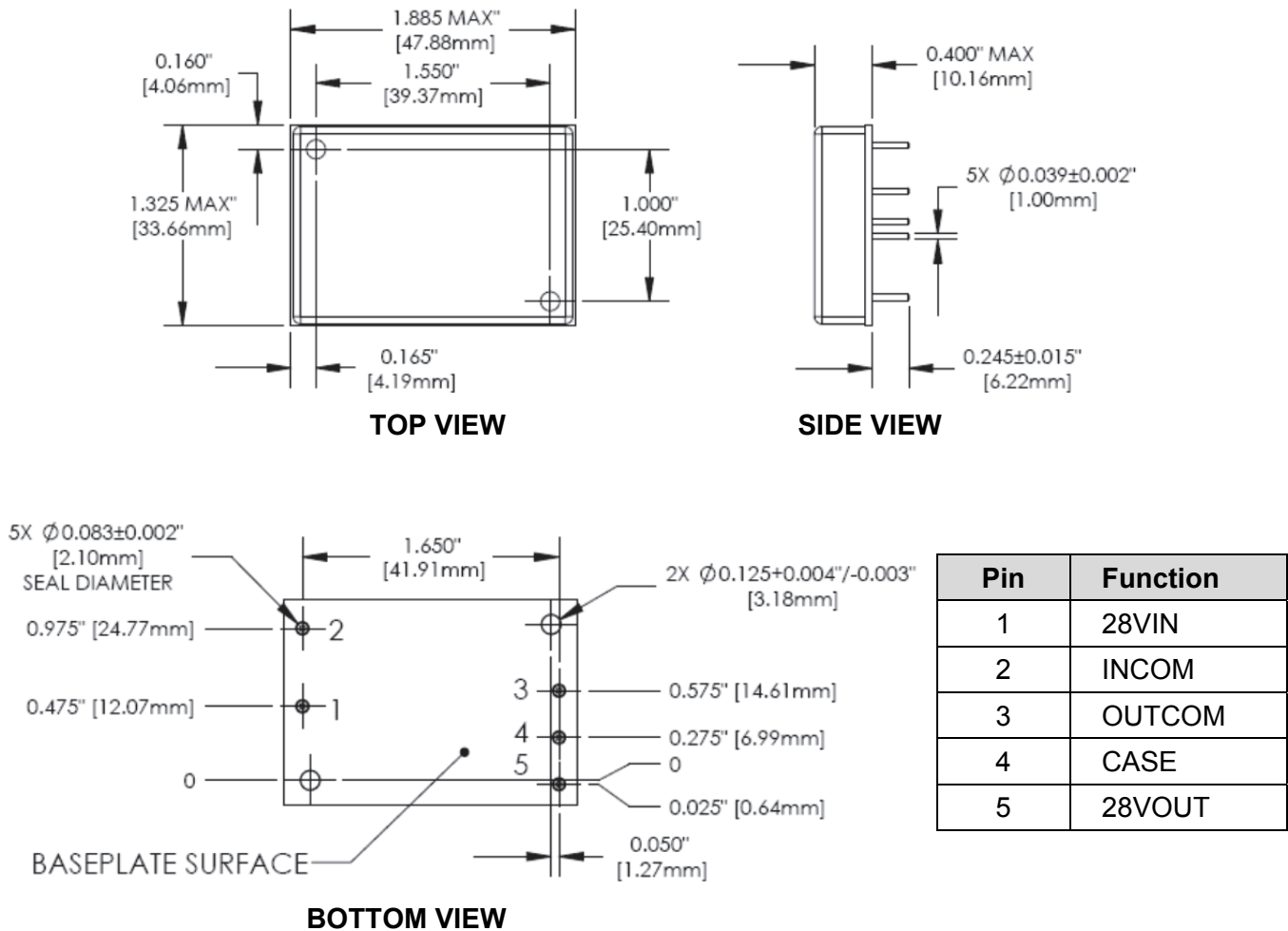


**Figure 8 – MIL-STD-461C**  
Three VPT30-2800S With VPTF10-28 EMI Filter



**Figure 9 – MIL-STD-461D/E**  
Three VPT30-2800S With VPTF10-28 EMI Filter

## STANDARD METAL PACKAGE

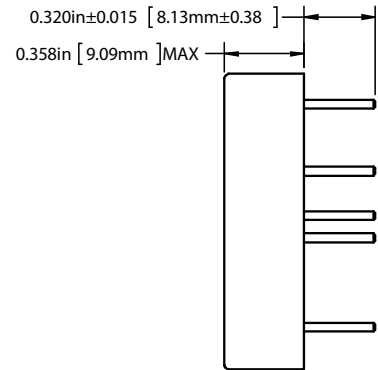
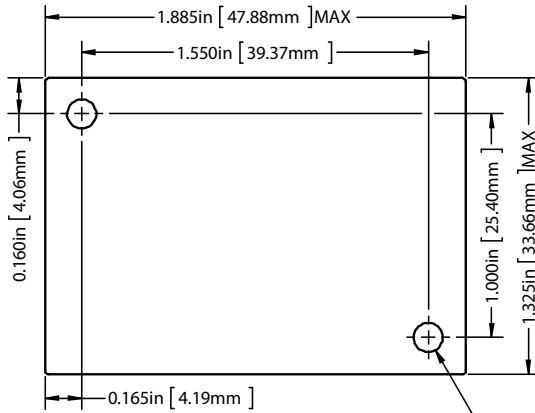


**Figure 10 – Package and Pinout**  
(Dimensional Limits are  $\pm 0.005$ " Unless Otherwise Stated)

### Package Notes

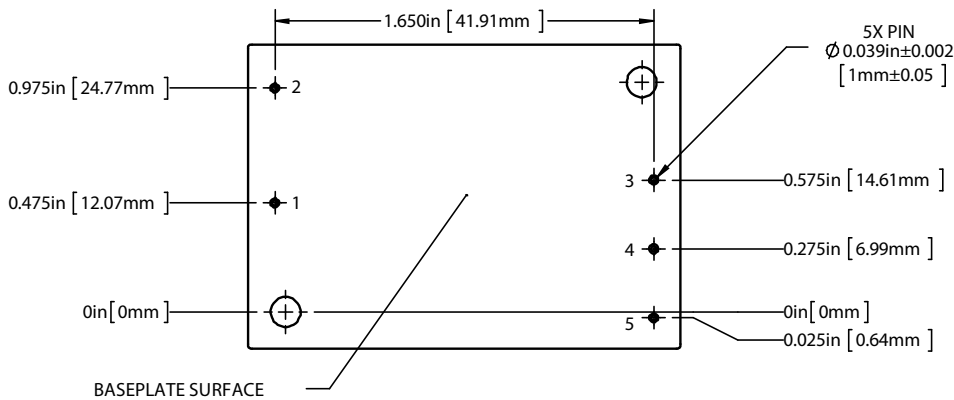
- Case temperature is measured on the center of the baseplate surface.
- Materials: Baseplate – aluminum, conductive conversion coating.  
Cover – nickel plated.  
Pins - copper, gold over nickel plating.
- Mounting holes are not threaded. Recommended fastener is 4-40.
- This Package is not hermetic. VPT offers a wide range of hermetic products. Please contact VPT for details if hermetic products are required.

## OPTIONAL EPOXY ENCAPSULATED PACKAGE



**TOP VIEW**

**SIDE VIEW**



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

**BOTTOM VIEW**

**Figure 11 –Package and Pinout**  
(Dimensional Limits are ±0.005" Unless Otherwise Stated)

### Package Notes

- Case temperature is measured on the center of the baseplate surface.
- Materials: Body - epoxy with integral metalized EMI shield.  
Pins - copper, gold over nickel plating.
- Mounting holes are not threaded. Recommended fastener is 4-40.
- 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.

**PACKAGE PIN DESCRIPTION**

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

**100% 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



## ORDERING INFORMATION

VPTF10-	28	W
1	2	3

(1)	(2)		(3)	
Product Series	Nominal Input Voltage		Package Option	
VPTF10-	28	28 Volts	None W	Standard Metal Epoxy Encapsulated

## 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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