



DVMC28 Series

HIGH RELIABILITY HYBRID EMI FILTERS

DESCRIPTION

The DVMC series of hybrid EMI filters is operable over the full military (-55 °C to +125 °C) temperature range with no power derating. The DVMC EMI filter is designed to filter conducted emissions of two DVTR or one DVFL series DC-DC converters.

These filters are designed and manufactured in a facility qualified to ISO9001 and certified to MIL-PRF-38534 and MIL-STD-883.

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
- Wide Input Voltage Range: 0 to 50 Volts per MIL-STD-704
- Up to 4.0 Amp Maximum Current
- 40 dB Minimum Attenuation at 500 kHz
- Industry Standard Pinout
- High Input Transient Voltage: 80 Volts for 1 sec per MIL-STD-704A
- Precision Seam Welded Hermetic Package
- Custom Versions Available
- Additional Environmental Screening Available
- Meets MIL-STD-461C and MIL-STD-461D EMC Requirements
- Protects Against Conducted Susceptibility Specified in MIL-STD-461C, CS01 and CS02
- Flanged and Non-flanged Versions Available
- MIL-PRF-38534 Element Evaluated Components

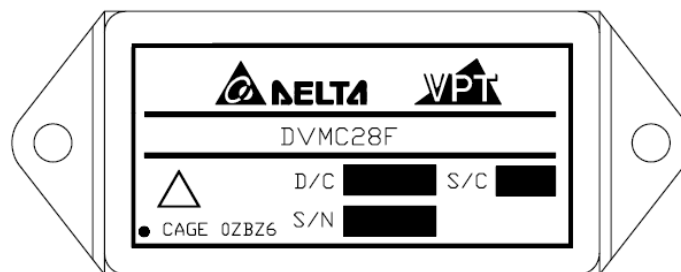


Figure 1 – DVMC28 / DVMC28F EMI Filter
(Exact marking may differ from that shown)

SPECIFICATIONS (T_{CASE} = -55°C to +125°C, V_{IN} = +28V ± 5%, Full Load, Unless Otherwise Specified)

ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	50 V _{DC}	Storage Temperature	-65°C to +150°C
Input Voltage (Transient, 1 second)	80 Volts	Lead Solder Temperature (10 seconds)	300°C
Output Current	4.0 Amps	Weight (Maximum) (Un-Flanged / Flanged)	(49 / 52) Grams
Power Dissipation (Full Load, T _{CASE} = +125°C)	2.4 Watts		

Parameter	Conditions	DVMC28			Units
		Min	Typ	Max	
STATIC					
INPUT Voltage ²	Continuous	0	28	50	V
	Transient, 1 sec	-	-	80	V
Current ^{1,2,3}	Continuous	0	-	4.0	A
OUTPUT Voltage ²	Continuous	V _{OUT} = V _{IN} – (I _{IN} x R _{DC})			V
Current ^{2,3}	Continuous	0	-	4.0	A
DC RESISTANCE	Continuous	-	-	150	mΩ
POWER DISSIPATION ²	Continuous	-	-	2.4	W
NOISE REJECTION	f = 500 kHz	40	-	-	dB
CAPACITANCE	Pin to Case	30	-	50	nF
ISOLATION	Any Pin to Case, 500 V _{DC}	100	-	-	MΩ
MTBF (MIL-HDBK-217F)	AIF @ T _C = 55 °C	-	2.20	-	MHrs

Notes: 1. Derate linearly to 0 at 135°C.
2. Verified by qualification testing.
3. Rated current applies at any voltage.

BLOCK DIAGRAM

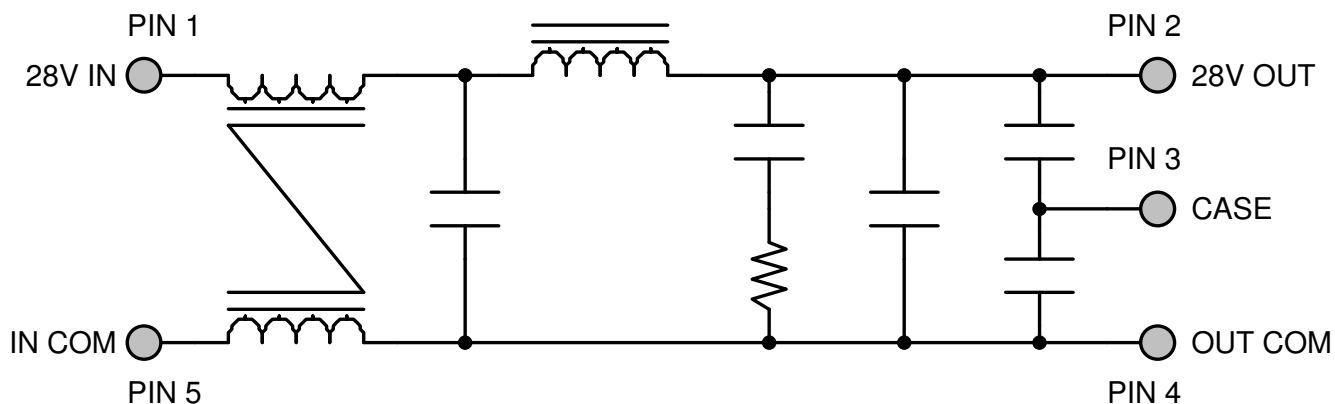


Figure 2

CONNECTION DIAGRAMS

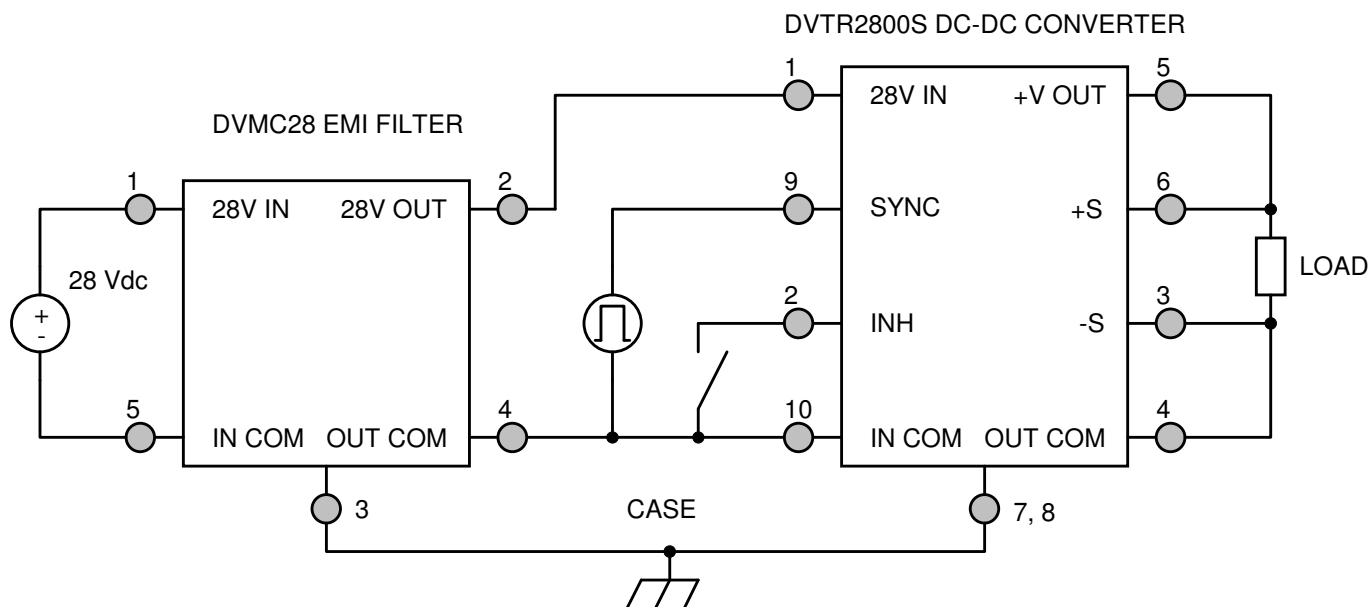


Figure 3 – DVMC28 EMI Filter Hookup with Single Converter

The diagram illustrates the electrical connections for a 28VDC power supply system. It includes the following components and their connections:

- 28Vdc Source:** A DC voltage source connected to the input of the DVMC28 EMI filter.
- DVMC28 EMI FILTER:**
 - 28V IN (Pin 1):** Connected to the positive terminal of the 28Vdc source.
 - IN COM (Pin 5):** Connected to the negative terminal of the 28Vdc source.
 - 28V OUT (Pin 2):** Connected to the positive input of the top DVTR2800S DC-DC converter.
 - OUT COM (Pin 4):** Connected to the common input of the bottom DVTR2800S DC-DC converter.
 - Pin 3:** Connected to the common ground (CASE).
- DVTR2800S DC-DC CONVERTER (Top):**
 - 28V IN (Pin 1):** Connected to the 28V OUT of the EMI filter.
 - IN COM (Pin 10):** Connected to the common input of the bottom converter.
 - SYNC (Pin 9):** Connected to a pulse generator.
 - INH (Pin 2):** Connected to a switch.
 - +V OUT (Pin 5):** Connected to the positive output terminal.
 - +S (Pin 6):** Connected to the positive output terminal.
 - S (Pin 3):** Connected to the negative output terminal.
 - OUT COM (Pin 4):** Connected to the common input of the bottom converter.
 - Pin 7, 8:** Connected to the common ground (CASE).
- DVTR2800S DC-DC CONVERTER (Bottom):**
 - 28V IN (Pin 1):** Connected to the positive input of the top converter.
 - IN COM (Pin 10):** Connected to the common input of the top converter.
 - SYNC (Pin 9):** Connected to a pulse generator.
 - INH (Pin 2):** Connected to a switch.
 - +V OUT (Pin 5):** Connected to the positive output terminal.
 - +S (Pin 6):** Connected to the positive output terminal.
 - S (Pin 3):** Connected to the negative output terminal.
 - OUT COM (Pin 4):** Connected to the common input of the top converter.
 - Pin 7, 8:** Connected to the common ground (CASE).
- Common Ground (CASE):** The common ground for all components, connected to pins 3, 7, 8, and 10 of the respective components.
- LOAD:** Connected across the output terminals (+V OUT and -S) of both DC-DC converters.

DVMC28-4.0

EMI MEASUREMENT METHODS CONNECTION DIAGRAMS

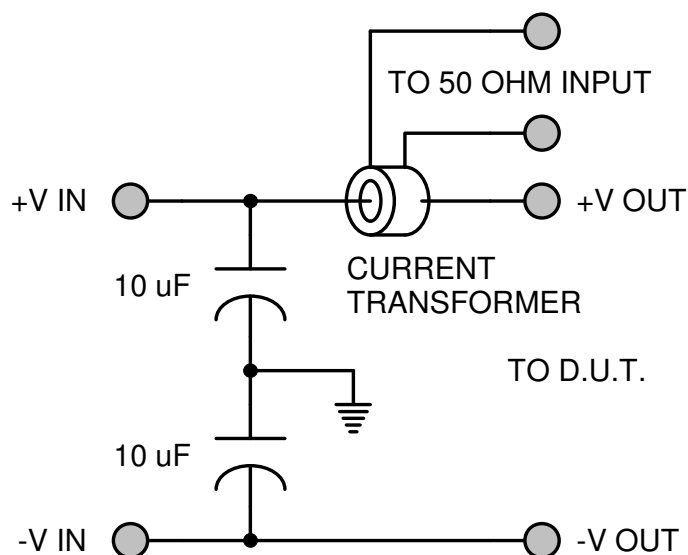


Figure 5 – MIL-STD-461C Measurement Method (Feedthrough Capacitor)

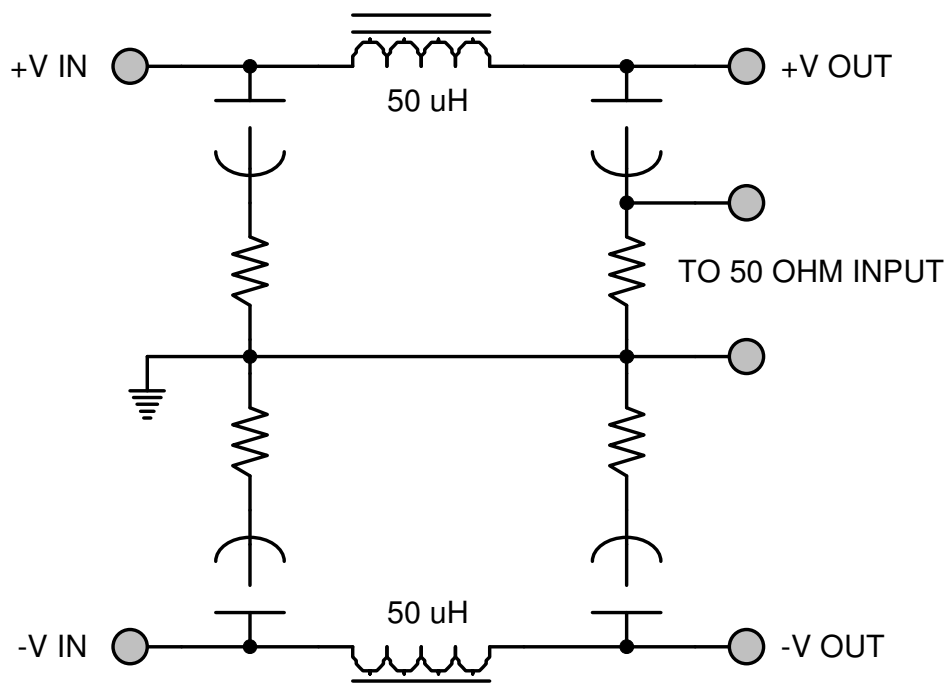


Figure 6 – MIL-STD-461D Measurement Method (LISN)

EMI PERFORMANCE CURVES

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

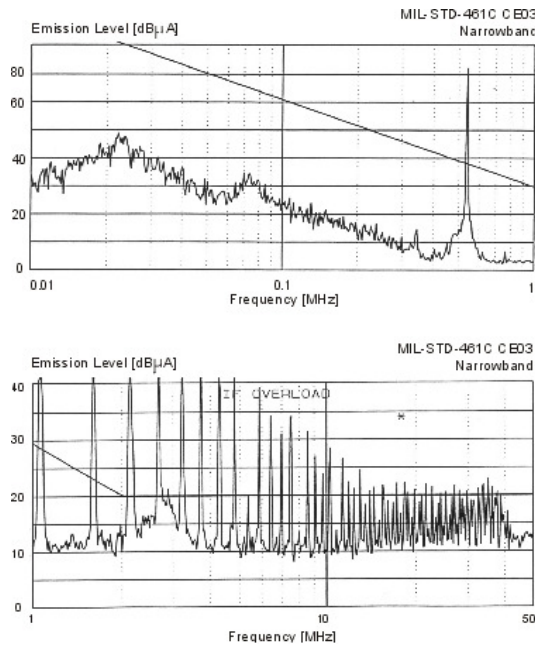


Figure 7 – MIL-STD-461C
DVTR2800D Without EMI Filter

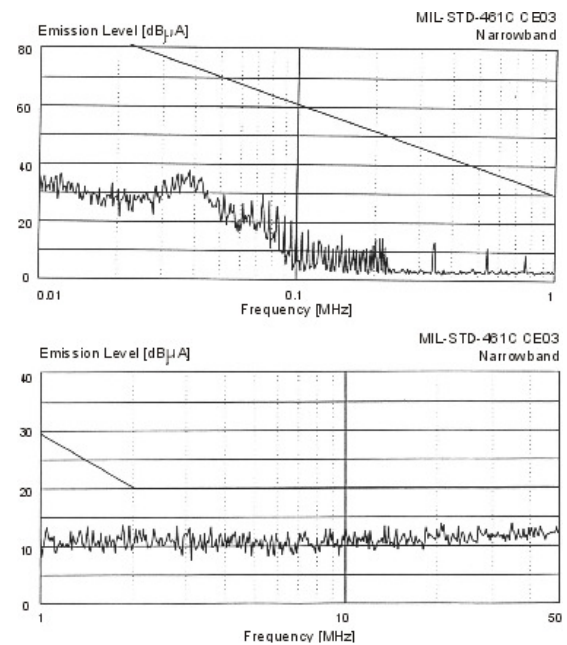


Figure 8 – MIL-STD-461C
DVTR2800D With DVMC28 EMI Filter

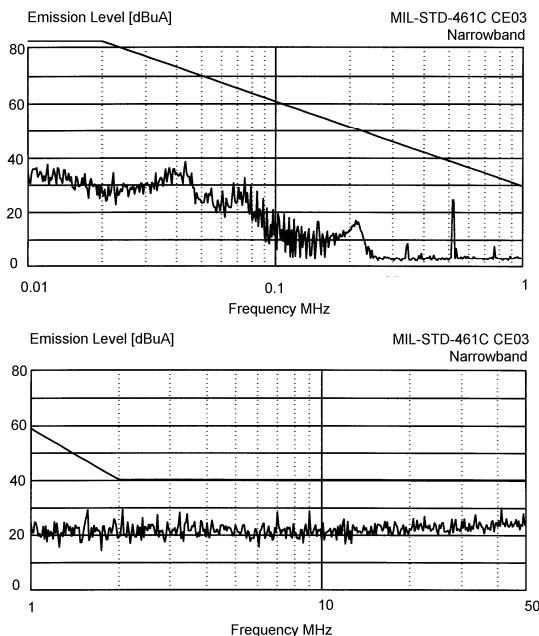


Figure 9 – MIL-STD-461C
Two DVTR2800S's With DVMC28 EMI Filter

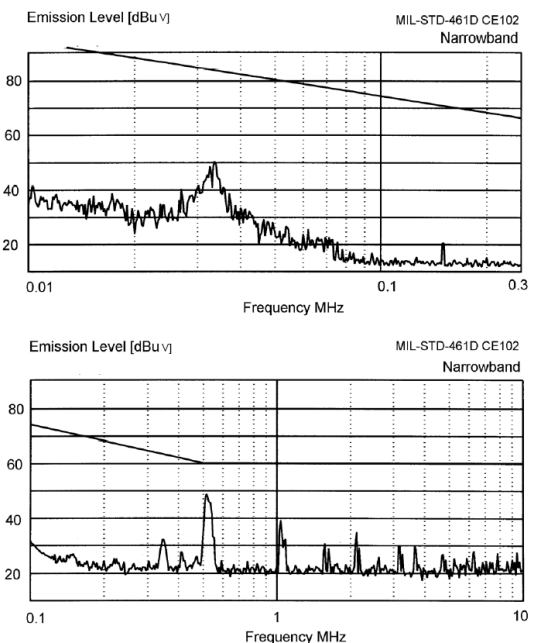
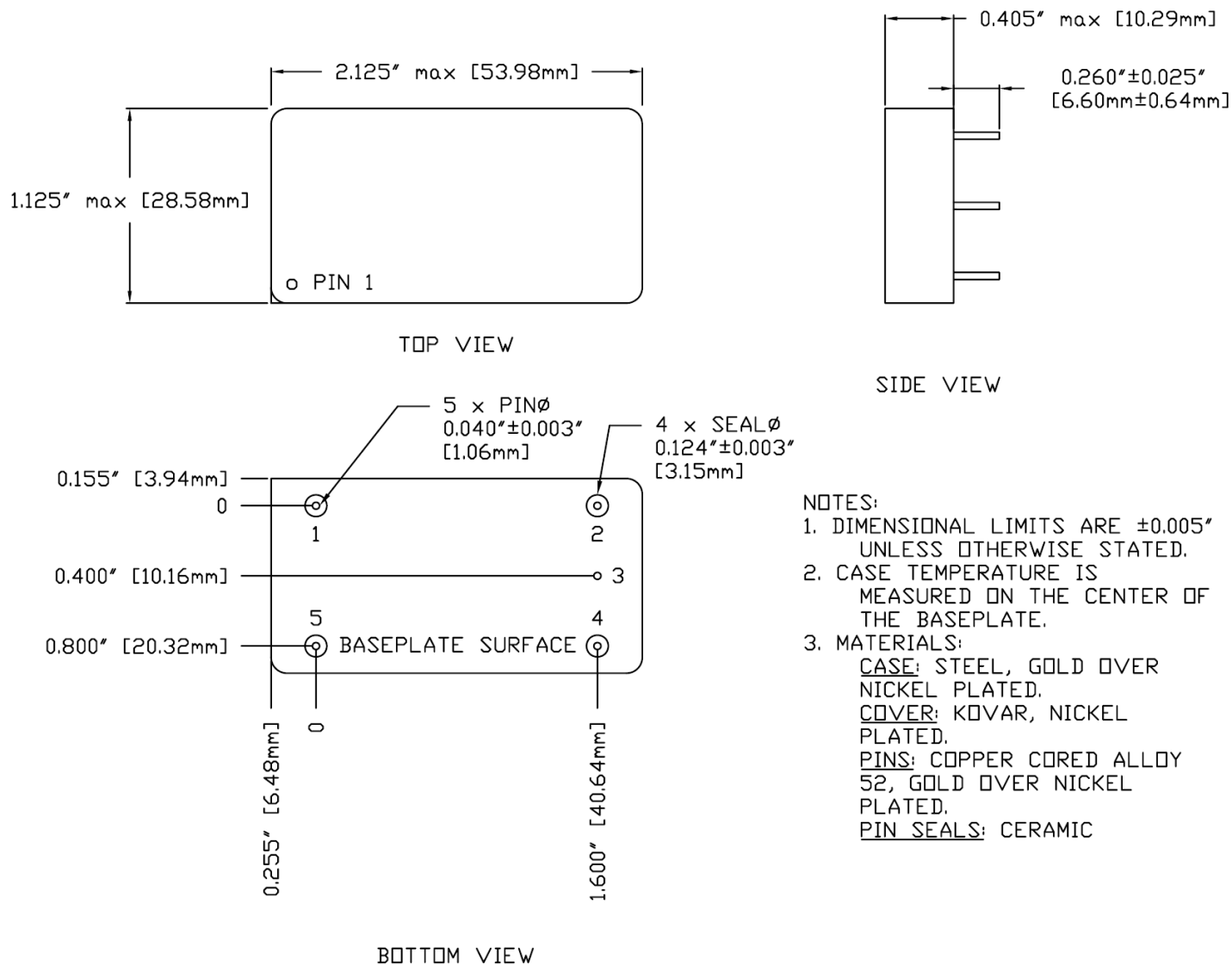


Figure 10 – MIL-STD-461D
DVTR2800S With DVMC28 EMI Filter

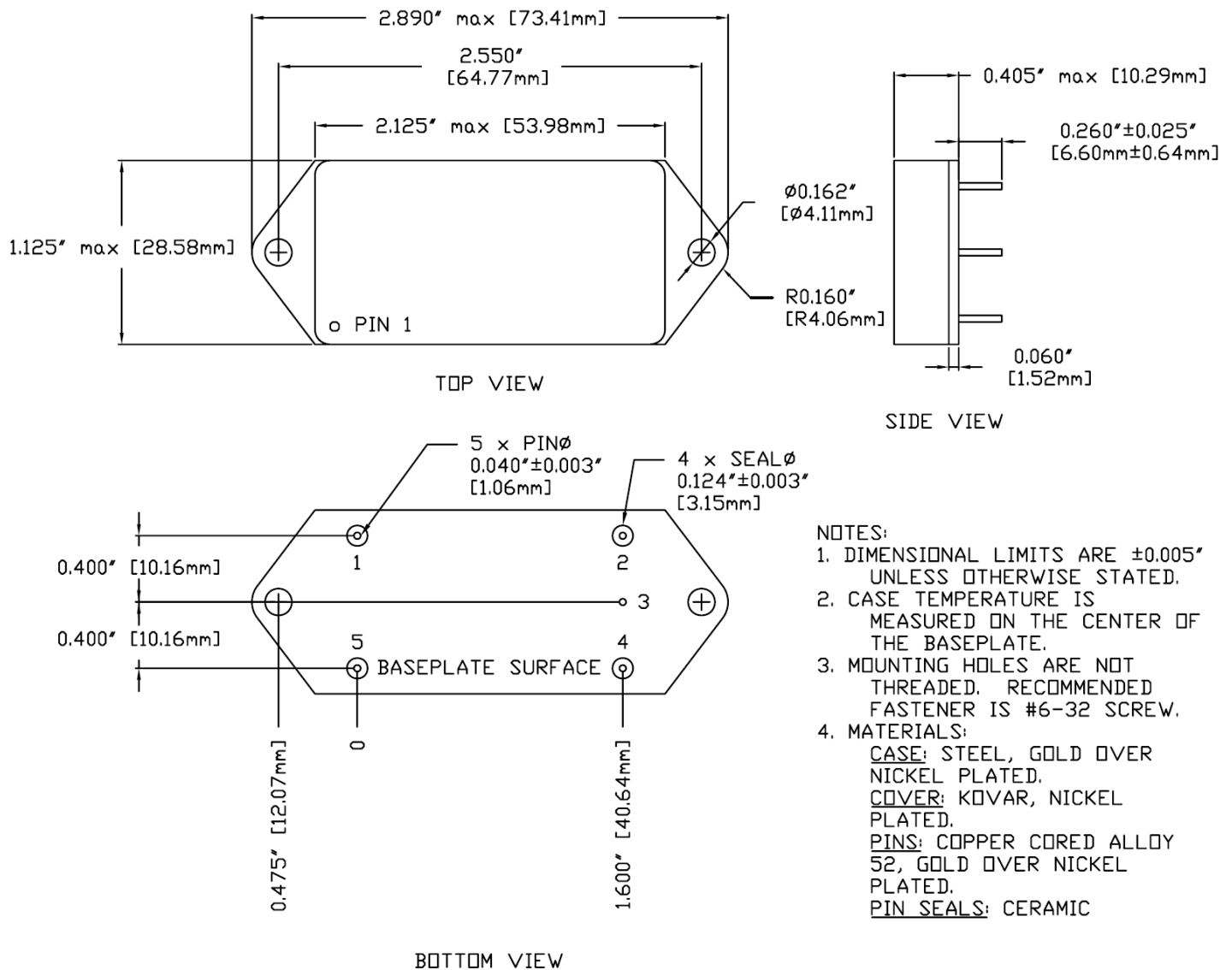
PACKAGE SPECIFICATIONS (NON-FLANGED)



Pin	Function	Pin	Function	Pin	Function
1	28V IN	3	CASE	5	IN COM
2	28V OUT	4	OUT COM		

Figure 11 – Non-Flanged, Seam Seal Package and Pinout

PACKAGE SPECIFICATIONS (FLANGED)



Pin	Function	Pin	Function	Pin	Function
1	28V IN	3	CASE	5	IN COM
2	28V OUT	4	OUT COM		

Figure 12 – Flanged, Seam Seal Package and Pinout

PACKAGE PIN DESCRIPTION

Pin	Function	Description
1	28V IN	Positive Input Voltage Connection
2	28V OUT	Positive Output Voltage Connection
3	CASE	Case Connection
4	OUT COM	Output Common Connection
5	IN COM	Input Common Connection

ENVIRONMENTAL SCREENING (100% Tested Per MIL-STD-883 as referenced to MIL-PRF-38534)

Screening	MIL-STD-883	Standard (No Suffix)	Extended /ES	HB /HB	Class H /H	Class K /K
Non-Destructive Bond Pull	N/A – Products do not contain Wirebonds	N/A	N/A	N/A	N/A	N/A
Internal Visual	Method 2017, 2032 Internal Procedure	•	•	•	•	•
Temperature Cycling	Method 1010, Condition C Method 1010, -55°C to 125°C		•	•	•	•
Constant Acceleration	Method 2001, 3000g, Y1 Direction Method 2001, 500g, Y1 Direction		•	•	•	•
PIND	Method 2020, Condition A ²					•
Pre Burn-In Electrical	100% at 25°C					•
Burn-In	Method 1015, 320 hours at +125°C Method 1015, 160 hours at +125°C 96 hours at +125°C 24 hours at +125°C	•	•	•	•	•
Final Electrical	MIL-PRF-38534, Group A ¹ 100% at 25°C	•	•	•	•	•
Hermeticity	Method 1014, Fine Leak, Condition A Method 1014, Gross Leak, Condition C Dip (1 x 10 ⁻³)	•	•	•	•	•
Radiography	Method 2012 ³					•
External Visual	Method 2009	•	•	•	•	•

- Notes:
1. 100% R&R testing at -55°C, +25°C, and +125°C with all test data included in product shipment.
 2. PIND test Certificate of Compliance included in product shipment.
 3. Radiographic test Certificate of Compliance and film(s) included in product shipment.

ORDERING INFORMATION

DVMC	28	F	/HB	-	XXX
1	2	3	4		5

(1)	(2)		(3)		(4)		(5)
Product Series	Nominal Input Voltage		Package Option		Screening Code ^{1,2}		Additional Screening Code
DVMC	28	28 Volts	None F	Non-Flanged Flanged	None /ES /HB /H /K	Standard Extended HB Class H Class K	Contact Sales

- Notes:
1. Contact the VPT Inc. Sales Department for availability of Class H (/H) or Class K (/K) qualified products.
 2. VPT Inc. reserves the right to ship higher screened or SMD products to meet lower screened orders at our sole discretion unless specifically forbidden by customer contract.

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 requirement, source inspection, and/or special element evaluation for space or other higher quality applications.

DSCC DRAWING NUMBERS

DSCC Drawing	DVMC28 Series Similar Part Number
06023-01HXC 06023-01HXA 06023-01KXC 06023-01KXA	DVMC28/H DVMC28/H-E DVMC28/K DVMC28/K-E
06023-01HYC 06023-01HYA 06023-01KYC 06023-01KYA	DVMC28F/H DVMC28F/H-E DVMC28F/K DVMC28F/K-E

Do not use the DVMC28 Series similar part number for DLA Land and Maritime (Previously known as DSCC) Drawing product acquisition. It is listed for reference only. For exact specifications for the DLA Drawing product, refer to the DLA Drawing. DLA Drawings can be downloaded from the DLA website at <https://landandmaritimeapps.dla.mil/programs/defaultapps.asp>. The DLA Drawing number listed above is for standard gold finish, and no RHA (Radiation Hardness Assurance) level. Please reference the DLA Drawing for other screening levels, lead finishes, and radiation levels. All DLA Drawing products are marked with a "Q" on the cover as specified by the QML certification mark requirement of MIL-PRF-38534.

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

All information contained in this datasheet is believed to be accurate, however, no responsibility is assumed for possible errors or omissions. The products or specifications contained herein are subject to change without notice.