



# DVMSA28 Series

## HIGH RELIABILITY HYBRID EMI FILTERS

### DESCRIPTION

The DVMSA28 series of hybrid EMI filters is operable over the full military (-55 °C to +125 °C) temperature range with no power derating. The DVMSA28 EMI filter is designed to filter conducted emissions of DVSA series DC-DC converters.

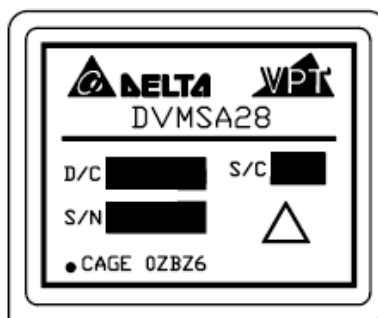
These filters are designed and manufactured in a facility qualified to ISO9001 and certified to MIL-PRF-38534 and MIL-STD-883.

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 0.8 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 Projection 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
- MIL-PRF-38534 Element Evaluated Components



**Figure 1 – DVMSA28 EMI Filter**  
(Exact marking may differ from that shown)

## SPECIFICATIONS (T<sub>CASE</sub> = -55°C to +125°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	-65°C to +150°C
Input Voltage (Transient, 1 second)	80 Volts	Lead Solder Temperature (10 seconds)	300°C
Output Current	0.8 Amps	Weight (Maximum)	12 Grams
Power Dissipation (Full Load, T <sub>CASE</sub> = +125°C)	0.18 Watts		

Parameter	Conditions	DVMSA28			Units
		Min	Typ	Max	
<b>STATIC</b>					
INPUT Voltage <sup>2</sup>	Continuous	0	28	50	V
	Transient, 1 sec	-	-	80	V
Current <sup>1,2,3</sup>	Continuous	0	-	0.8	A
OUTPUT Voltage <sup>2</sup>	Continuous	$V_{OUT} = V_{IN} - (I_{IN} \times R_{DC})$			V
Current <sup>2,3</sup>	Continuous	0	-	0.8	A
DC RESISTANCE	Continuous	-	-	280	mΩ
POWER DISSIPATION <sup>2</sup>	Continuous	-	-	0.18	W
NOISE REJECTION	f = 500 kHz	40	-	-	dB
CAPACITANCE	Pin to Case	10	-	30	nF
ISOLATION	Any Pin to Case, 500 V <sub>DC</sub>	100	-	-	MΩ
MTBF (MIL-HDBK-217F) <sup>4</sup>	AIF @ T <sub>C</sub> = 55°C	-	11.3	-	MHrs

- Notes:
1. Derate linearly to 0 at 135°C.
  2. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.
  3. Rated current applies at any voltage.
  4. Correction factor of 0.12 added to ceramic capacitors.

### BLOCK DIAGRAM

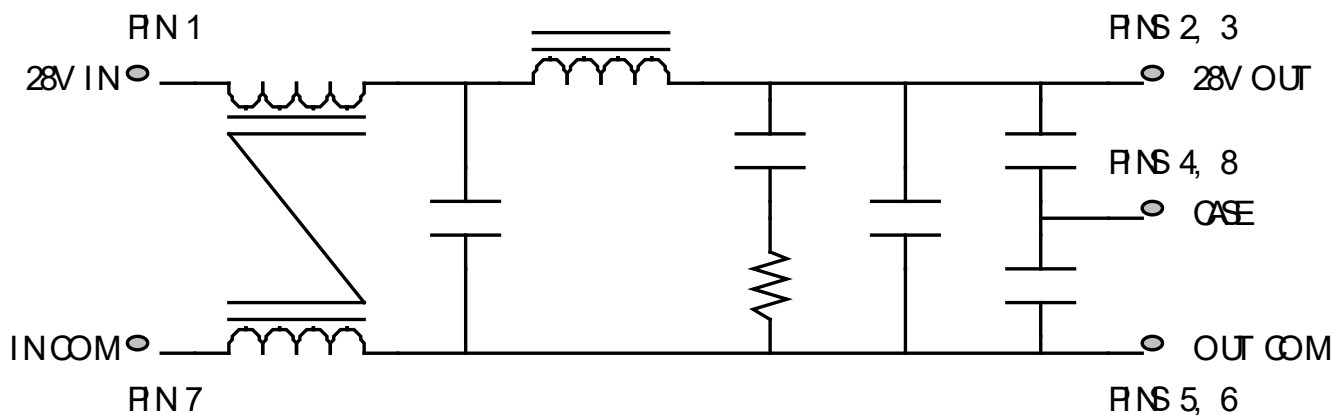


Figure 2

**CONNECTION DIAGRAM**

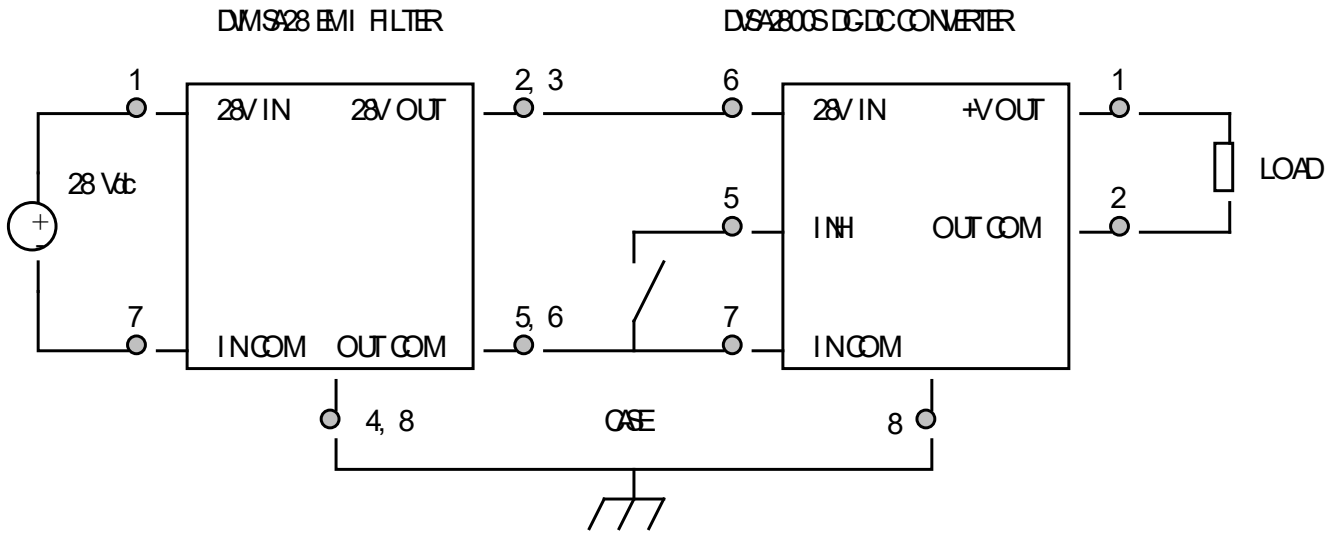


Figure 3 – DVMSA28 EMI Filter Hookup with Single Converter

**EMI PERFORMANCE CURVES**

(T<sub>CASE</sub> = 25°C, V<sub>IN</sub> = +28V ± 5%, Full Load, Unless Otherwise Specified)

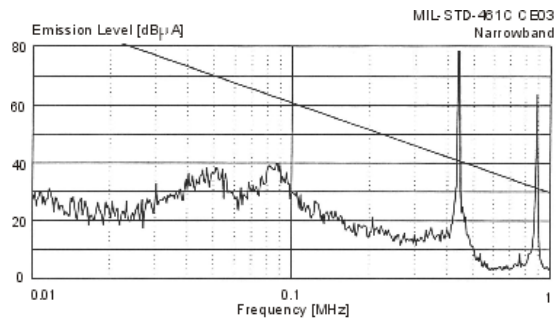


Figure 4 – MIL-STD-461C DVSA2800D Without EMI Filter

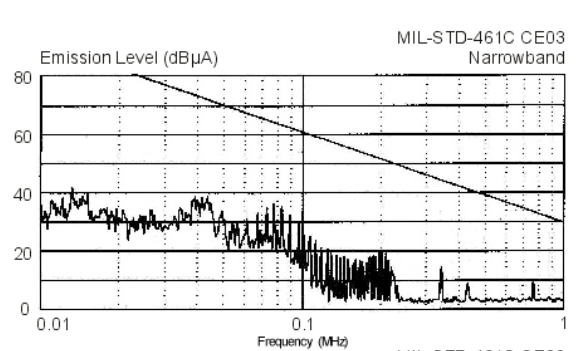


Figure 5 – MIL-STD-461C DVSA2800D With DVMSA28 EMI Filter

EMI MEASUREMENT METHODS CONNECTION DIAGRAMS

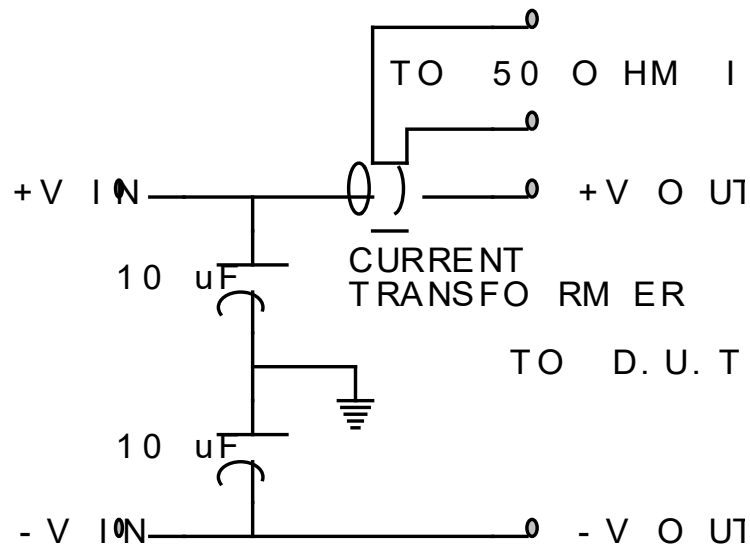


Figure 6 – MIL-STD-461C Measurement Method (Feedthrough Capacitor)

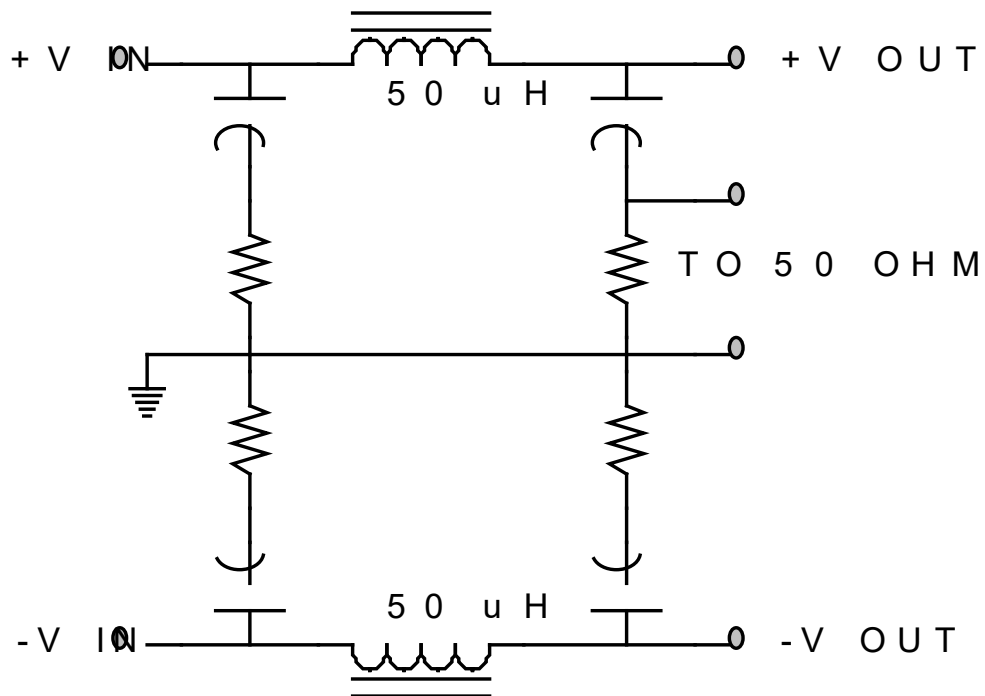
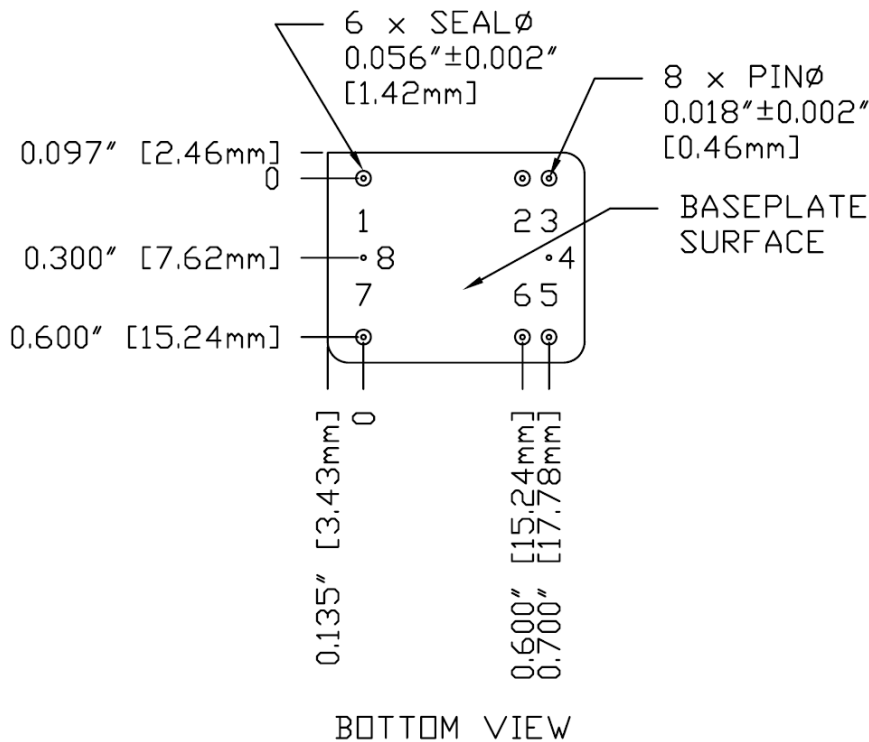
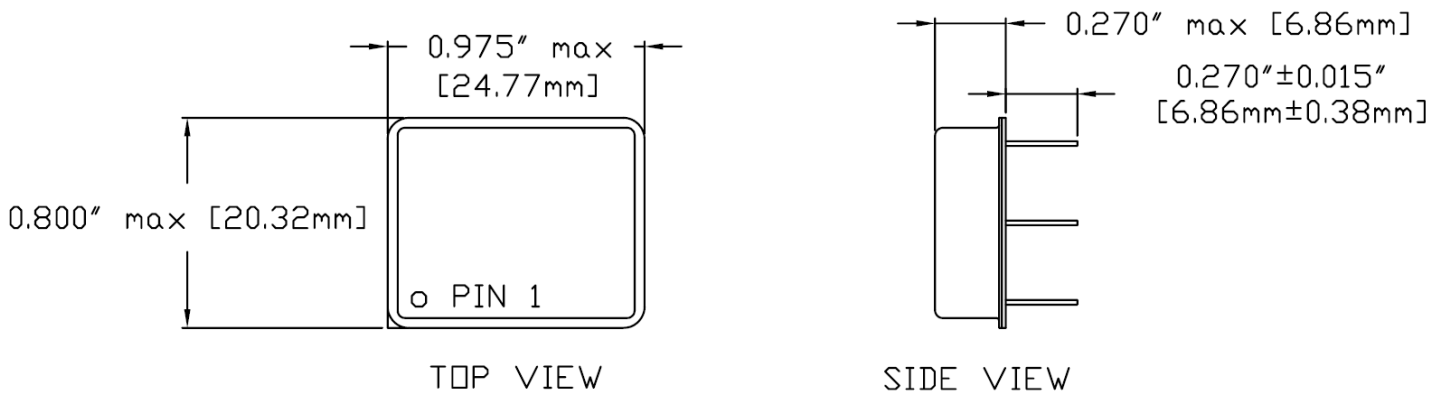


Figure 7 – MIL-STD-461D Measurement Method (LISN)

**PACKAGE SPECIFICATIONS**



- NOTES:
1. DIMENSIONAL LIMITS ARE  $\pm 0.005$ " UNLESS OTHERWISE STATED.
  2. CASE TEMPERATURE IS MEASURED ON THE CENTER OF THE BASEPLATE.
  3. MATERIALS:  
CASE: STEEL, GOLD OVER NICKEL PLATED.  
COVER: STEEL, NICKEL PLATED.  
PINS: ALLOY 52, GOLD OVER NICKEL PLATED.  
PIN SEALS: GLASS

PIN	FUNCTION	PIN	FUNCTION
1	28V IN	5	OUT COM
2	28V OUT	6	OUT COM
3	28V OUT	7	IN COM
4	CASE	8	CASE

**Figure 8 – Package and Pinout**

**PACKAGE PIN DESCRIPTION**

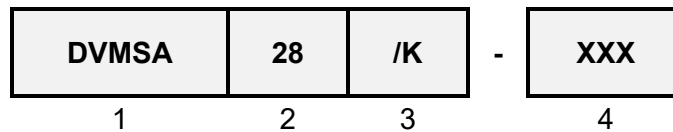
Pin	Function	Description
1	28V IN	Positive Input Voltage Connection
2, 3	28V OUT	Positive Output Voltage Connection
4, 8	CASE	Case Connection
5, 6	OUT COM	Output Common Connection
7	IN COM	Input Common Connection

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

Test	MIL-STD-883 Test Method, Condition	No Suffix <sup>4</sup> (Standard) Non-QML	/ES <sup>4</sup> (Extended) Non-QML	/H (Class H)	/K and /KL1 <sup>4,7</sup> (Class K)
Non-Destructive Bond Pull	N/A – Products do not contain Wirebonds	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 <sup>5</sup>				•
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 <sup>3</sup> 100% at 25°C	•	•	•	•
Hermeticity	Method 1014, Fine Leak, Condition A Method 1014, Gross Leak, Condition C Dip (1 x 10 <sup>-3</sup> )	•	•	•	•
Radiography	Method 2012 <sup>6</sup>				•
External Visual	Method 2009	•	•	•	•

- Contact Sales for more information concerning additional environmental screening and testing options desired.
- 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.
- 100% R&R testing with all test data included in product shipment.
- Non-QML products may not meet all requirements of MIL-PRF-38534.
- PIND test Certificate of Compliance included in product shipment.
- Radiographic test Certificate of Compliance and film(s) or data CD included in product shipment.
- KL1 products are identical in every way with Class K products in compliance with MIL-PRF-38534 revision L and later revisions except they contain elements evaluated to the requirements of MIL-PRF-38534 revision K and previous revisions. These devices are not marked with an SMD number or MIL-PRF-38534 certification mark and are marked with -KL1 screening code in place of -K.

## ORDERING INFORMATION



(1)	(2)		(3)		(4)
Product Series	Nominal Input Voltage		Screening Code <sup>1,2,3</sup>		Additional Screening Code
DVMSA	28	28 Volts	None /ES /H /K /KL1	Standard Extended Class H Class K Class K (KL1)	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.
3. -KL1 products are identical in every way with Class K products in compliance with MIL-PRF-38534 revision L and later revisions except they contain elements evaluated to the requirements of MIL-PRF-38534 revision K and previous revisions. These devices are not marked with an SMD number or MIL-PRF-38534 certification mark and are marked with -KL1 screening code in place of -K.

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.



## SMD (STANDARD MICROCIRCUIT DRAWING) NUMBERS

Standard Microcircuit Drawing (SMD)	DVMSA28 Series Similar Part Number
11016-01HXC	DVMSA28/H
11016-01HXA	DVMSA28/H-E
11016-01KXC	DVMSA28/K
11016-01KXA	DVMSA28/K-E

Do not use the DVMSA28 Series similar part number for DLA Land and Maritime Drawing (Previously known as DSCC Drawing) product acquisition. It is listed for reference only. For exact specifications for the DLA Land and Maritime Drawing product, refer to the DLA Land and Maritime Drawing. DLA Land and Maritime Drawings can be downloaded from the DLA Land and Maritime website at <https://landandmaritimeapps.dla.mil/programs/defaultapps.asp>. The DLA Land and Maritime Drawing number listed above is for MIL-PRF-38534 Class H screening, standard gold plated lead finish, and no RHA (Radiation Hardness Assurance) level. Please reference the DLA Land and Maritime Drawing for other screening levels, lead finishes, and radiation levels. All DLA Land and Maritime 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](mailto:vptsales@vptpower.com)

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