



# DVME28 Series

## HIGH RELIABILITY HYBRID EMI FILTERS

### DESCRIPTION

The DVME series of hybrid EMI filters is operable over the full military (-55 °C to +125 °C) temperature range with no power derating. The DVME EMI filter is designed to filter conducted emissions of two 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 15.0 Amps 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
- MIL-PRF-38534 Element Evaluated Components

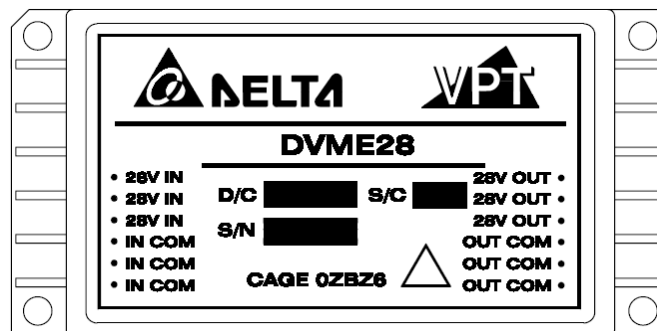


Figure 1 – DVME28 EMI Filter  
(Exact marking may differ from that shown)

## 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	15.0 Amps	Weight (Maximum) – without Pin Extensions	83 grams

Parameter	Conditions	DVME28			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	-	15.0	A
	Continuous	$V_{OUT} = V_{IN} - (I_{IN} \times R_{DC})$			V
OUTPUT Voltage <sup>2</sup>	Continuous				V
Current <sup>2,3</sup>	Continuous	0	-	15.0	A
DC RESISTANCE	Continuous	-	-	70	mΩ
POWER DISSIPATION <sup>2</sup>	Continuous	-	-	15.75	W
NOISE REJECTION	f = 500 kHz	40	-	-	dB
CAPACITANCE	Pin to Case	60	-	100	nF
ISOLATION	Any Pin to Case, 500 V <sub>DC</sub>	100	-	-	MΩ
MTBF (MIL-HDBK-217F)	AIF @ T <sub>C</sub> = 55°C	-	0.957	-	MHrs

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

### BLOCK DIAGRAM

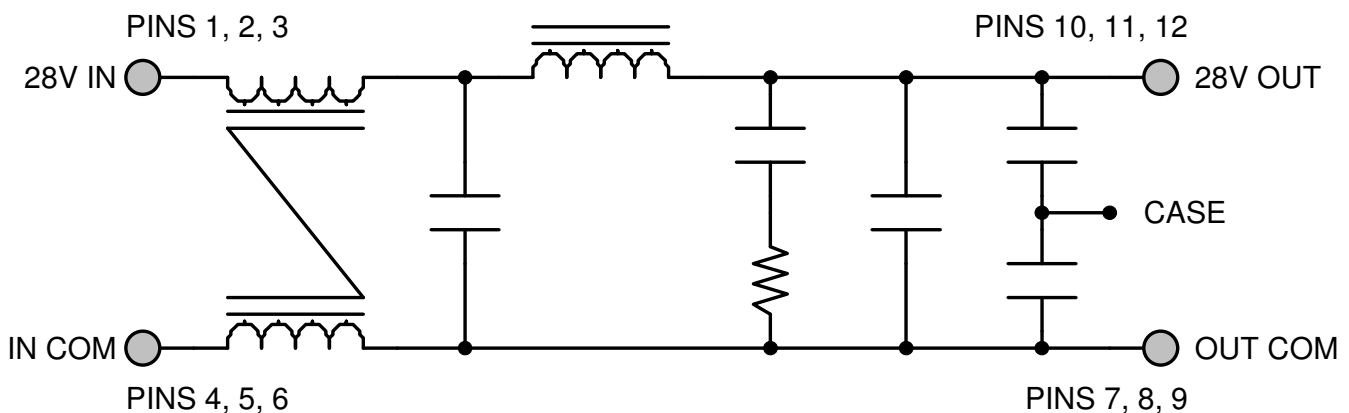


Figure 2

CONNECTION DIAGRAMS

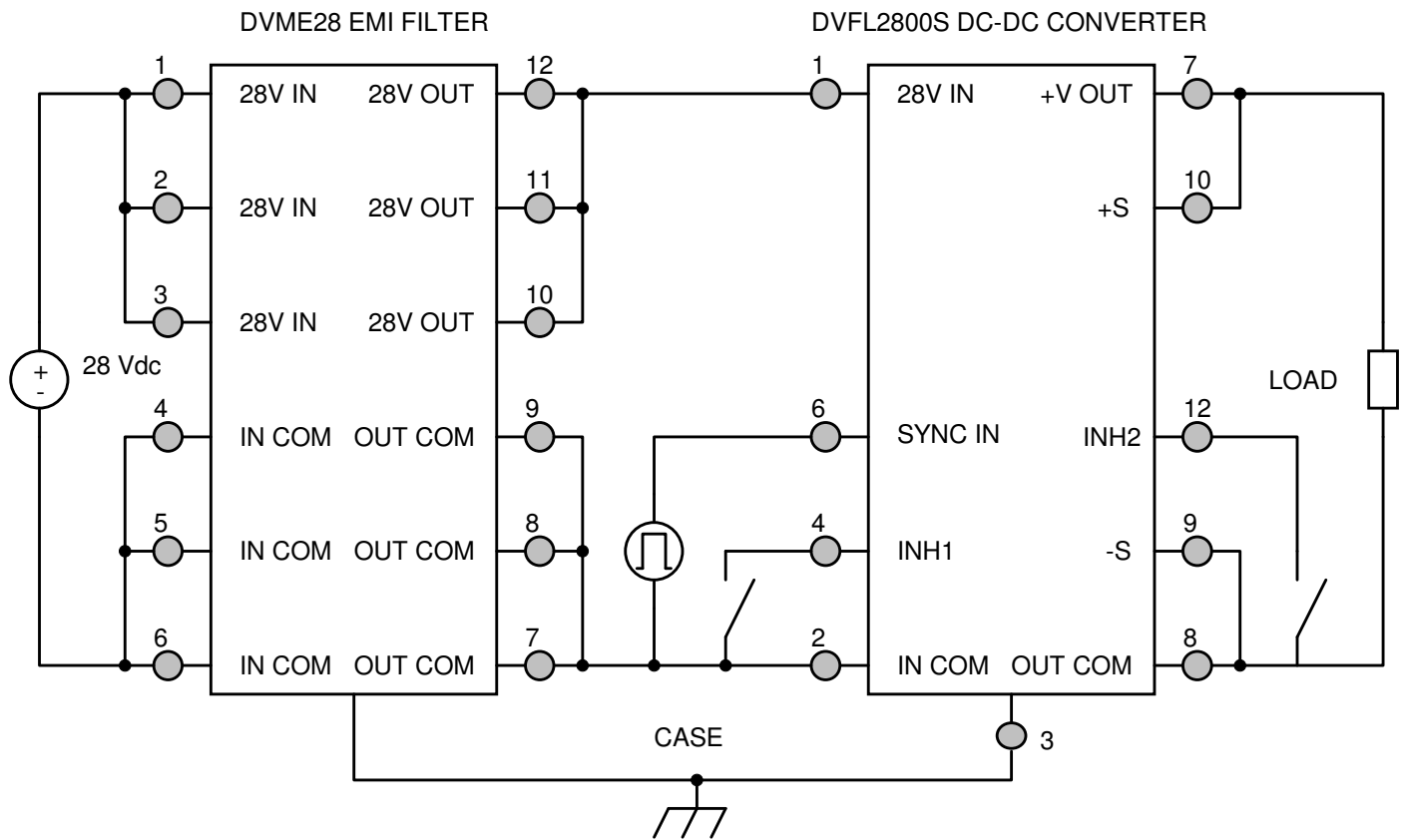


Figure 3 – DVME28 EMI Filter Hookup with Single Converter

CONNECTION DIAGRAMS

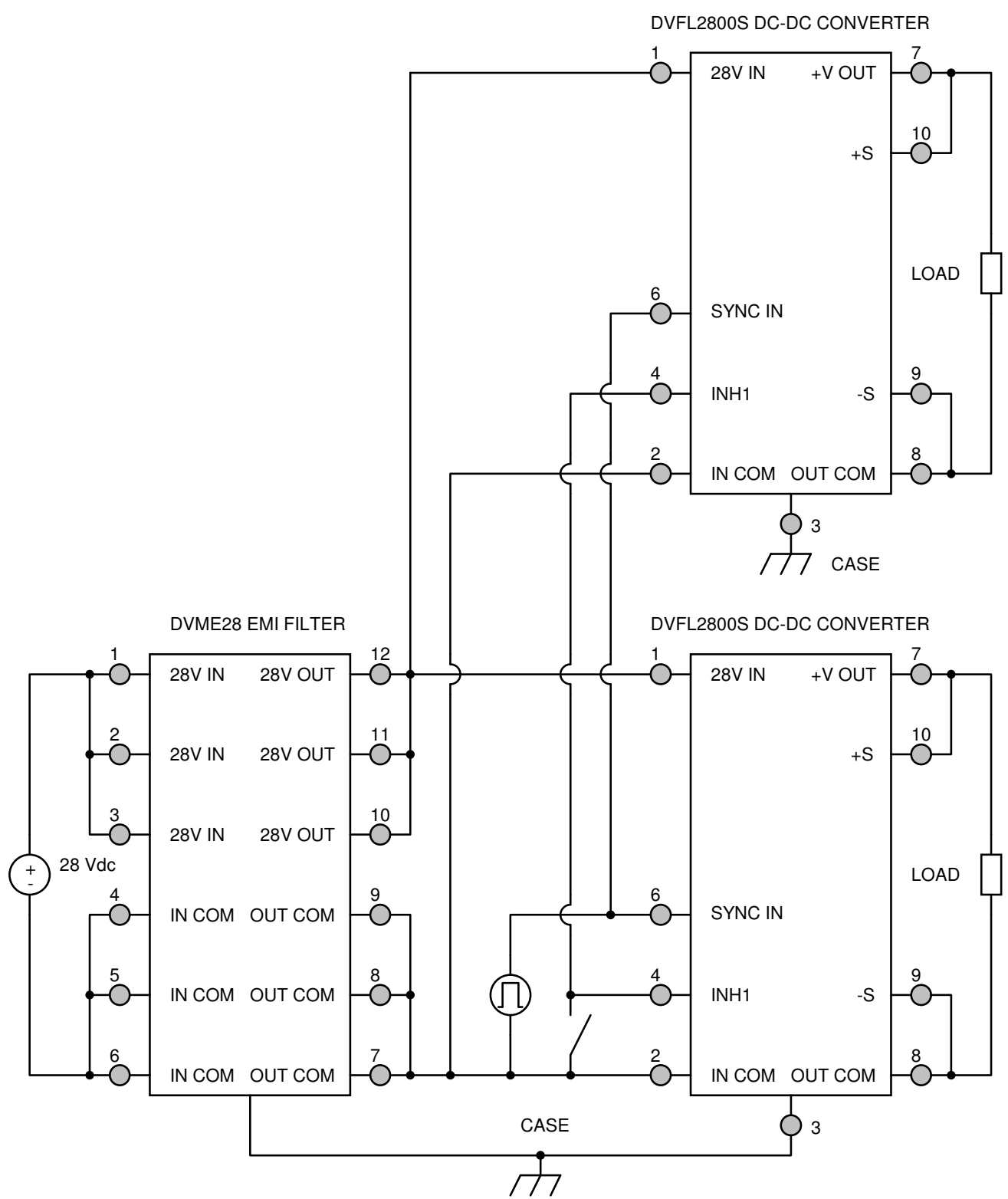


Figure 4 – DVME28 EMI Filter Hookup with Two Converters

EMI MEASUREMENT METHODS CONNECTION DIAGRAMS

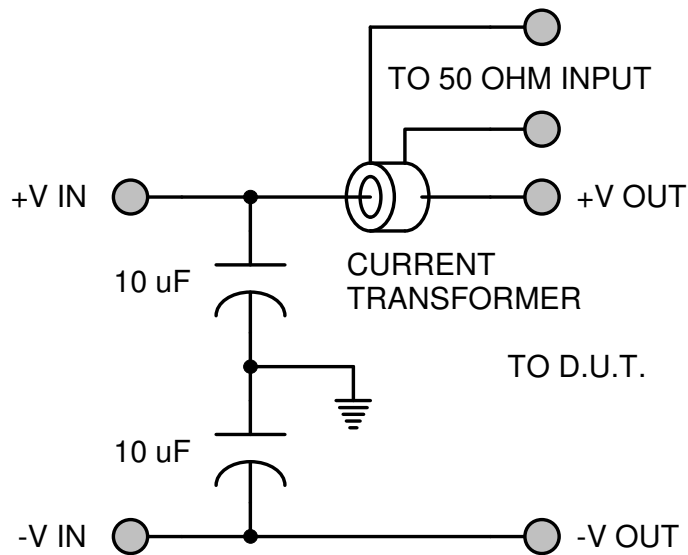


Figure 5 – MIL-STD-461C Measurement Method (Feedthrough Capacitor)

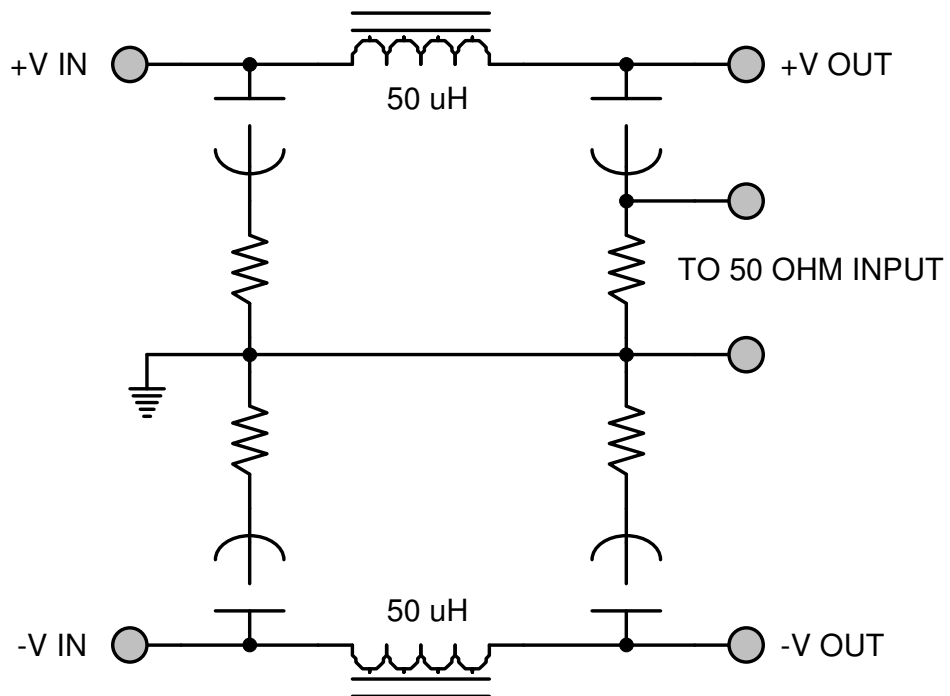
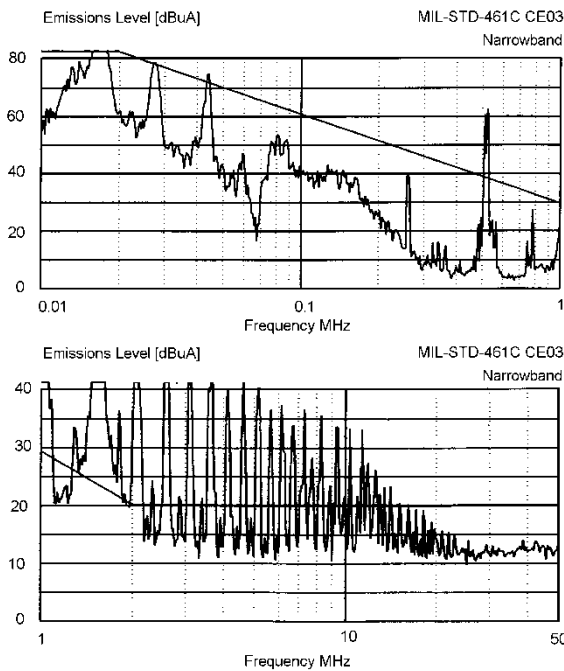


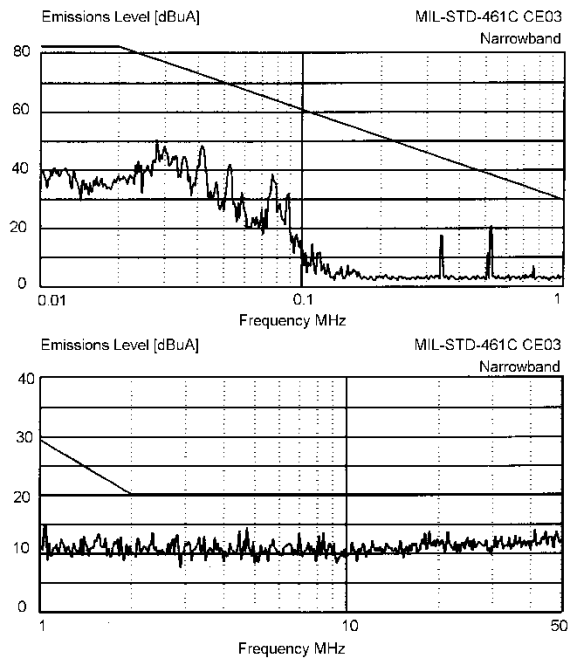
Figure 6 – MIL-STD-461D Measurement Method (LISN)

**EMI PERFORMANCE CURVES**

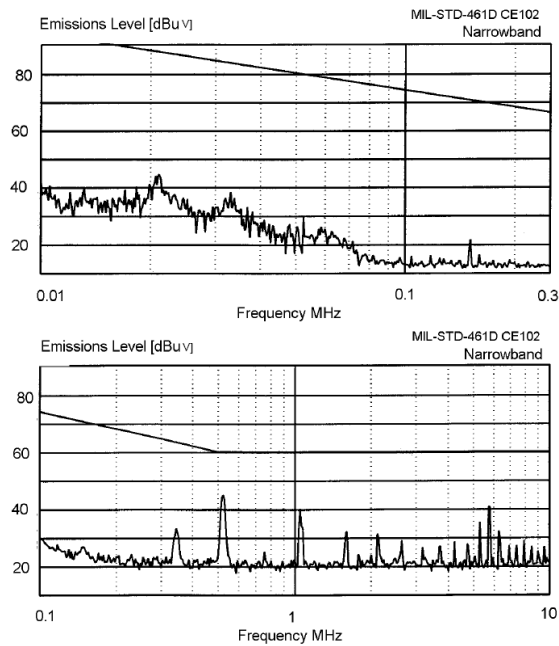
( $T_{CASE} = 25^{\circ}C$ ,  $V_{IN} = +28V \pm 5\%$ , Full Load, Unless Otherwise Specified)



**Figure 7 – MIL-STD-461C DVFL2800D Without EMI Filter**

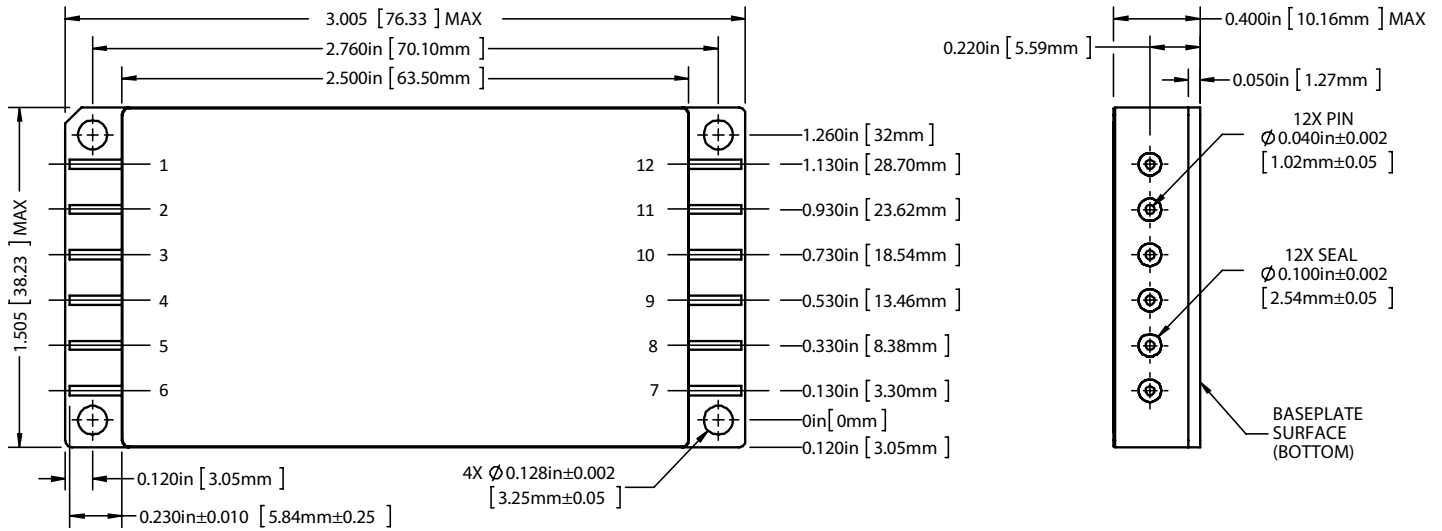


**Figure 8 – MIL-STD-461C DVFL2800D With DVME28 EMI Filter**



**Figure 9 – MIL-STD-461D DVFL2800S With DVME28 EMI Filter**

**STANDARD PACKAGE DRAWINGS**

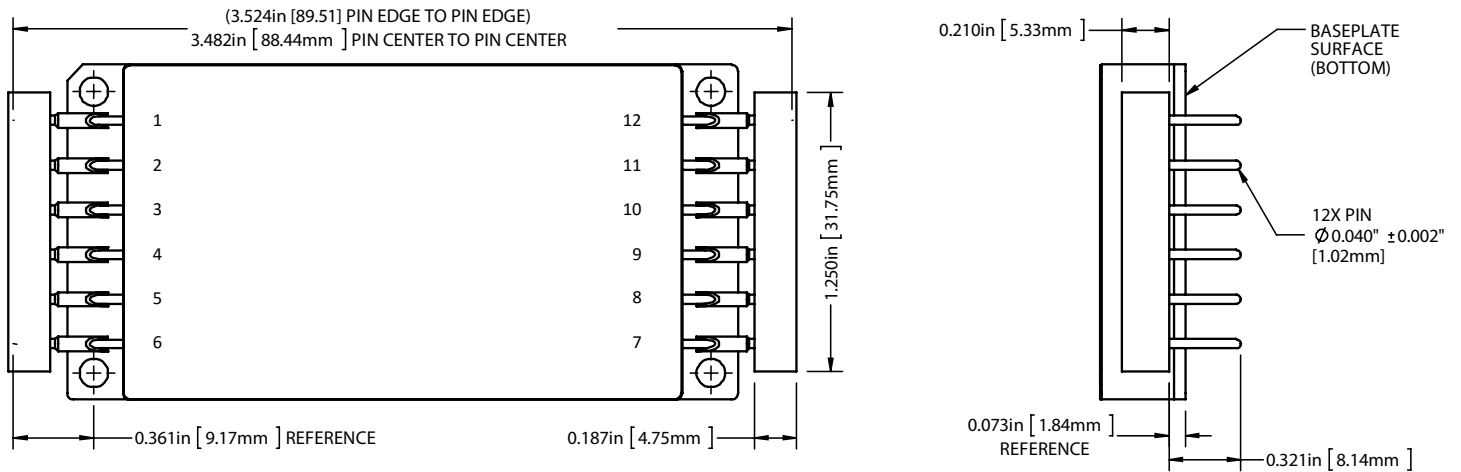


1. Tolerances are +0.005" unless otherwise stated
2. Case temperature is measured on the center of the baseplate surface
3. Mounting holes are not threaded. Recommended fastener is 4-40
4. Product Materials:  
Case (Steel, gold over nickel plated); Cover (Kovar, nickel plated); Pin (Copper-cored alloy 52, gold over nickel plated); Pin Seals (Glass)

Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	28V IN	4	IN COM	7	OUT COM	10	28V OUT
2	28V IN	5	IN COM	8	OUT COM	11	28V OUT
3	28V IN	6	IN COM	9	OUT COM	12	28V OUT

**Figure 10 – Standard Package and Pinout**

**STANDARD PACKAGE DRAWINGS**



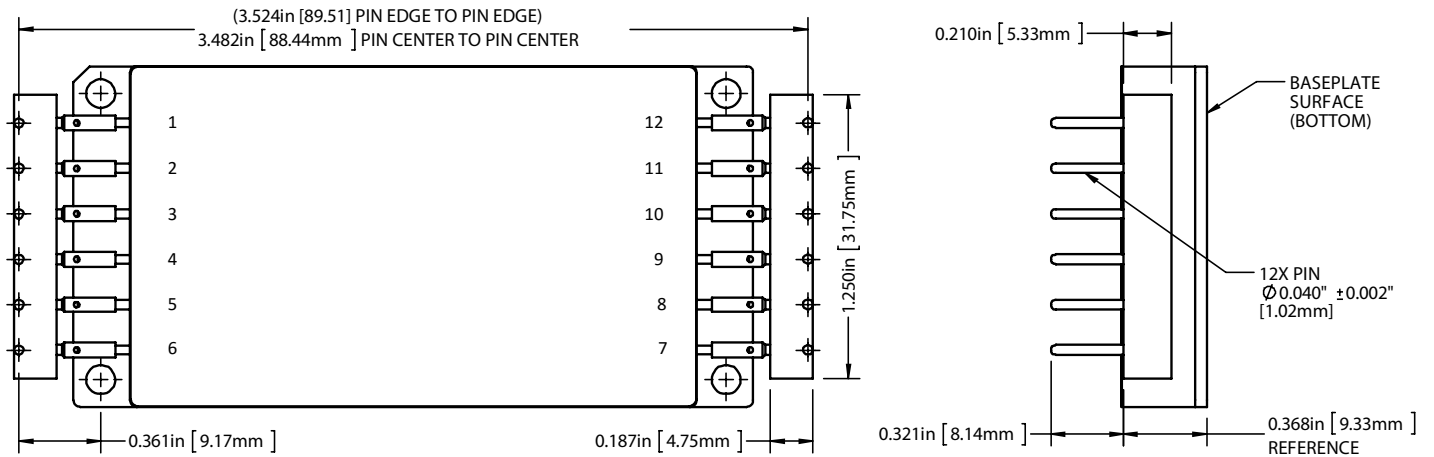
1. Tolerances are +0.005" unless otherwise stated
2. Case temperature is measured on the center of the baseplate surface
3. Mounting holes are not threaded. Recommended fastener is 4-40
4. Product Materials:  
Case (Steel, gold over nickel plated); Cover (Kovar, nickel plated); Pin (Copper-cored alloy 52, gold over nickel plated); Pin Seals (Glass)
5. Pin Extension Materials:  
Body (Diallyl-Phthalate/DAP, WH-9100-BLK F-Type or equivalent), Pins (Copper Alloy, Sn90/Pb10 solder plated)

Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	28V IN	4	IN COM	7	OUT COM	10	28V OUT
2	28V IN	5	IN COM	8	OUT COM	11	28V OUT
3	28V IN	6	IN COM	9	OUT COM	12	28V OUT

**Figure 11** – Standard Package with Down-Leads and Pinout



**STANDARD PACKAGE DRAWINGS**

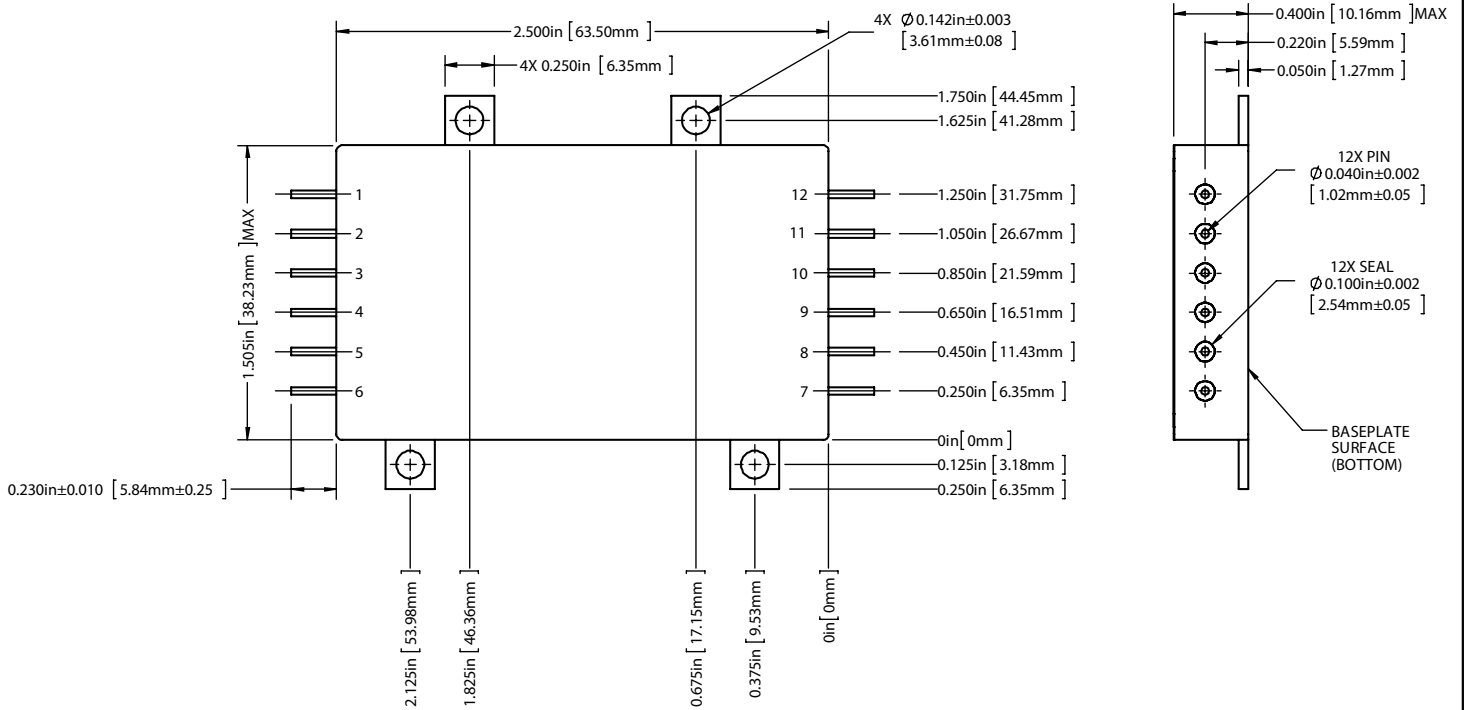


1. Tolerances are +0.005" unless otherwise stated
2. Case temperature is measured on the center of the baseplate surface
3. Mounting holes are not threaded. Recommended fastener is 4-40
4. Product Materials:  
Case (Steel, gold over nickel plated); Cover (Kovar, nickel plated); Pin (Copper-cored alloy 52, gold over nickel plated); Pin Seals (Glass)
5. Pin Extension Materials:  
Body (Diallyl-Phthalate/DAP, WH-9100-BLK F-Type or equivalent), Pins (Copper Alloy, Sn90/Pb10 solder plated)

Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	28V IN	4	IN COM	7	OUT COM	10	28V OUT
2	28V IN	5	IN COM	8	OUT COM	11	28V OUT
3	28V IN	6	IN COM	9	OUT COM	12	28V OUT

**Figure 12** – Standard Package with Up-Leads and Pinout

**FLANGED PACKAGE DRAWINGS**

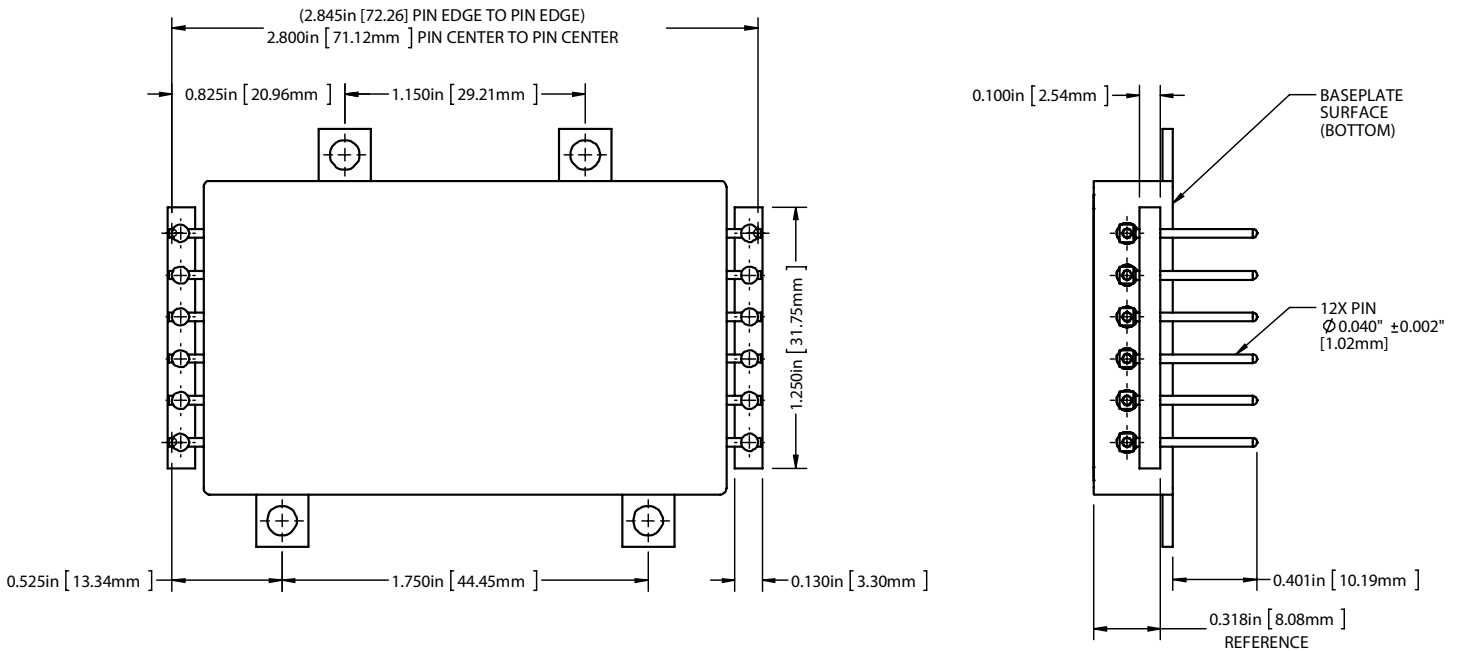


1. Tolerances are +0.005" unless otherwise stated
2. Case temperature is measured on the center of the baseplate surface
3. Mounting holes are not threaded. Recommended fastener is 4-40
4. Product Materials:  
Case (Steel, gold over nickel plated); Cover (Kovar, nickel plated); Pin (Copper-cored alloy 52, gold over nickel plated); Pin Seals (Glass)

Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	28V IN	4	IN COM	7	OUT COM	10	28V OUT
2	28V IN	5	IN COM	8	OUT COM	11	28V OUT
3	28V IN	6	IN COM	9	OUT COM	12	28V OUT

**Figure 14 – Flanged Package and Pinout**

## FLANGED PACKAGE DRAWINGS

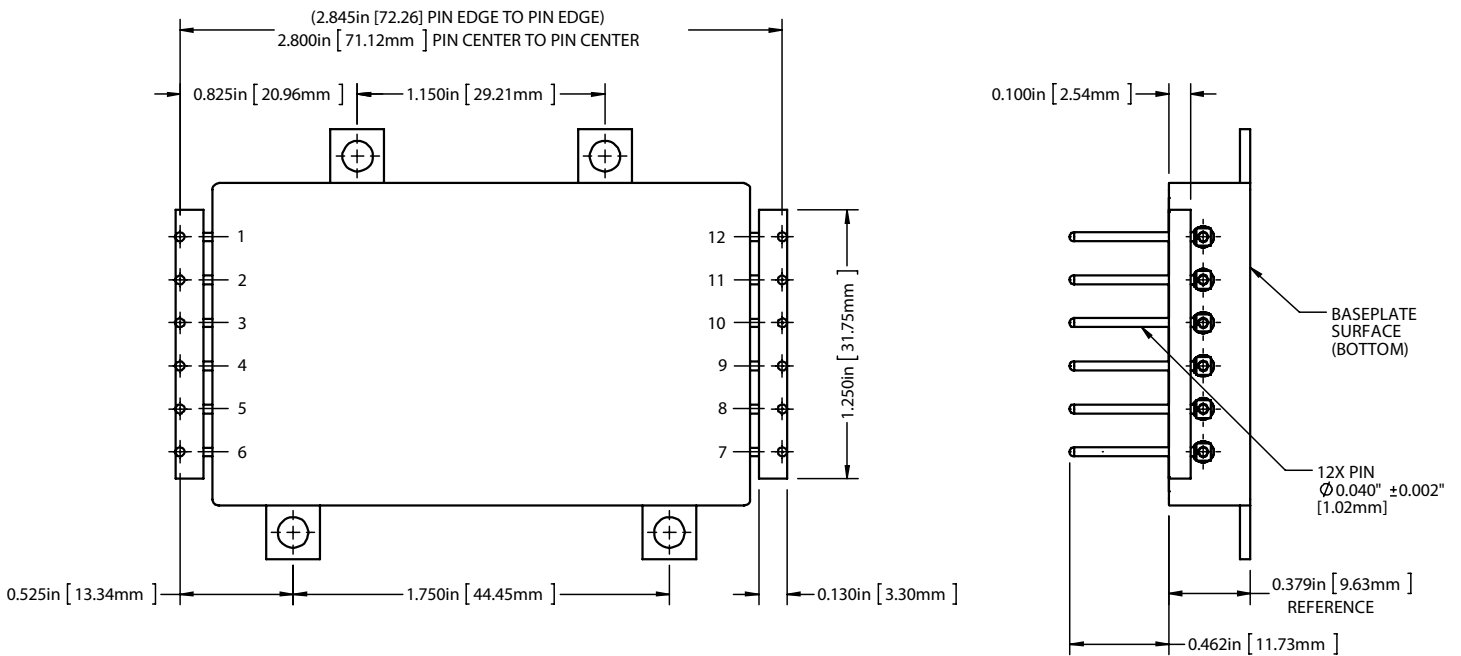


1. Tolerances are +0.005" unless otherwise stated
2. Case temperature is measured on the center of the baseplate surface
3. Mounting holes are not threaded. Recommended fastener is 4-40
4. Product Materials:  
Case (Steel, gold over nickel plated); Cover (Kovar, nickel plated); Pin (Copper-cored alloy 52, gold over nickel plated); Pin Seals (Glass)
5. Pin Extension Materials:  
Body (Diallyl-Phthalate/DAP, WH-9100-BLK F-Type or equivalent), Pins (Copper Alloy, Sn90/Pb10 solder plated)

Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	28V IN	4	IN COM	7	OUT COM	10	28V OUT
2	28V IN	5	IN COM	8	OUT COM	11	28V OUT
3	28V IN	6	IN COM	9	OUT COM	12	28V OUT

**Figure 15** – Flanged Package with Down-Leads and Pinout

**FLANGED PACKAGE DRAWINGS**



1. Tolerances are +0.005" unless otherwise stated
2. Case temperature is measured on the center of the baseplate surface
3. Mounting holes are not threaded. Recommended fastener is 4-40
4. Product Materials:  
Case (Steel, gold over nickel plated); Cover (Kovar, nickel plated); Pin (Copper-cored alloy 52, gold over nickel plated); Pin Seals (Glass)
5. Pin Extension Materials:  
Body (Diallyl-Phthalate/DAP, WH-9100-BLK F-Type or equivalent), Pins (Copper Alloy, Sn90/Pb10 solder plated)

Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	28V IN	4	IN COM	7	OUT COM	10	28V OUT
2	28V IN	5	IN COM	8	OUT COM	11	28V OUT
3	28V IN	6	IN COM	9	OUT COM	12	28V OUT

**Figure 16** – Flanged Package with Up-Leads and Pinout

**PACKAGE PIN DESCRIPTION**

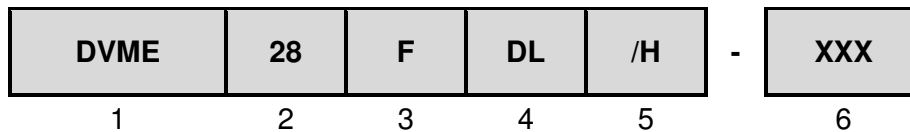
<b>Pins</b>	<b>Function</b>	<b>Description</b>
1, 2, 3	28V IN	Positive Input Voltage Connection
4, 5, 6	IN COM	Input Common Connection
7, 8, 9	OUT COM	Output Common Connection
10, 11, 12	28V OUT	Positive Output Voltage Connection

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

Test	MIL-STD-883 Test Method, Condition	No Suffix (Standard) Non-QML <sup>⑤</sup>	/ES (Extended) Non-QML <sup>⑤</sup>	/HB (HB) Non-QML <sup>⑤</sup>	/H (Class H) <sup>⑧</sup>	/KB (KB) Non-QML <sup>⑤</sup>	/K (Class K) <sup>⑧</sup>
Internal Visual	TM2010, TM2017, TM2032 (MIL-STD-750, TM2072, TM2073)	•	•	•	•	•	•
Temperature Cycling	TM1010, Condition C -65°C to 150°C, Ambient			•	•	•	•
	TM1010, Condition B -55°C to 125°C, Ambient		•				
Constant Acceleration	TM2001, 3000g, Y1 Direction			•	•	•	•
	TM2001, 500g, Y1 Direction		•				
PIND <sup>⑥</sup>	TM2020, Condition A					•	•
Pre Burn-In Electrical	25°C					•	•
Burn-In	TM1015, 320 hrs, 125°C, Case Typ					•	•
	TM1015, 160 hrs, 125°C, Case Typ			•	•		
	96 hrs, 125°C, Case Typ		•				
	24 hrs, 125°C, Case Typ	•					
Final Electrical	MIL-PRF-38534, Group A Subgroups 1-6 -55°C, 25°C, 125°C <sup>③</sup>			•	•	•	•
	MIL-PRF-38534, Group A Subgroups 1 and 4 25°C	•	•				
Hermeticity (Seal)	TM1014, Fine Leak, Condition A2 or B1		•	•	•	•	•
	TM1014, Gross Leak, Condition C or B2		•	•	•	•	•
	Gross Leak, Dip (1 x 10 <sup>-3</sup> )	•					
Radiography <sup>⑦</sup>	TM2012					•	•
External Visual	TM2009	•	•	•	•	•	•

- Notes:
- ① Contact Sales for more information concerning additional environmental screening and testing options desired.
  - 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.
  - ③ 100% R&R testing with all test data included in product shipment.
  - ④ Note intentionally not used.
  - ⑤ Non-QML products may not meet all requirements of MIL-PRF-38534.
  - ⑥ PIND test Certificate of Compliance included in product shipment.
  - ⑦ Radiographic test Certificate of Compliance and film(s) or data CD included in product shipment.
  - ⑧ QML screening levels are not available for products with Up-Leaded or Down-Leaded pin extensions added.

## ORDERING INFORMATION



(1) Product Series		(2) Nominal Input Voltage		(3) Package Option	
<b>DVME</b>	<b>28</b>	28 Volts		<b>None</b> <b>F</b>	Standard Flanged

(4) Package Lead Option		(5) Screening Code <sup>1, 2, 3</sup>		(6) Additional Screening Code
<b>None</b> <b>DL</b> <b>UL</b>	No Lead Extensions Down-Lead Up-Lead	<b>None</b> <b>/ES</b> <b>/HB</b> <b>/H</b> <b>/KB</b> <b>/K</b>	Standard Extended HB Class H KB 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.
  3. Class H and Class K not available for DL and UL Package Lead Options.

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 NUMBER

DSCC Drawing	DVME28 Series Similar Part Number
07004-01HXC 07004-01HXA 07004-01KXC 07004-01KXA	DVME28/H DVME28/H-E DVME28/K DVME28/K-E
07004-01HYC 07004-01HYA 07004-01KYC 07004-01KYA	DVME28F/H DVME28F/H-E DVME28F/K DVME28F/K-E

Do not use the DVME28 Series similar part number for SMD product acquisition. It is listed for reference only. For exact specifications for the SMD product, refer to the SMD drawing. SMDs can be downloaded from the DLA Land and Maritime (Previously known as DSCC) website at <https://landandmaritimeapps.dla.mil/programs/defaultapps.asp>. The SMD number listed above represents the Federal Stock Class, Device Type, Device Class Designator, Case Outline, Lead Finish and RHA Designator (where applicable). Please reference the SMD for other screening levels, lead finishes, and radiation levels. All SMD 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@vpt-power.com](mailto:vptsales@vpt-power.com)

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