

HIGH RELIABILITY HYBRID EMI FILTERS

DESCRIPTION

The DVMD50 series of hybrid EMI filters are operable over the full military (-55 °C to +125 °C) temperature range with no power derating. The DVMD50 EMI filter is designed to filter conducted emissions of two SVLTR50 or one SVLFL50 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 60 Volts per MIL-STD-704
- Up to 4 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
- Meets MIL-STD-461 Revisions C, D, E, F and G Requirements for Conducted Emissions
- Meets MIL-STD-461 Revisions C, D, E, F and G Requirements for Conducted Susceptibility as detailed in the Application Note, "MIL-STD-461 Compliance for VPT DC-DC Converters and EMI Filters"
- MIL-PRF-38534 Element Evaluated Components

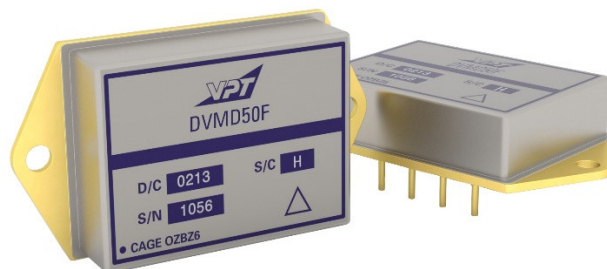


Figure 1 – DVMD50 EMI Filter
(Exact marking may differ from that shown)

SPECIFICATIONS (T_{CASE} = -55°C to +125°C, V_{IN} = +50V ± 5%, Full Load, Unless Otherwise Specified)

ABSOLUTE MAXIMUM RATINGS

Input Voltage (Continuous)	60 V _{DC}	Storage Temperature	-65°C to +150°C
Input Voltage (Transient, 1 second)	80 Volts	Lead Solder Temperature (10 seconds)	270°C
Output Current	4 Amp	Weight (Maximum) (Un-Flanged / Flanged)	(53 / 57) Grams
Power Dissipation (Full Load, T _{CASE} = +125°C)	2.4 Watt		

Parameter	Conditions	DVMD50			Units
		Min	Typ	Max	
STATIC					
INPUT Voltage ²	Continuous	0	50	60	V
	Transient, 1 sec	-	-	80	V
Current ^{1,2,3}	Continuous	0	-	4	A
OUTPUT Voltage ²	Continuous	$V_{OUT} = V_{IN} - (I_{IN} \times R_{DC})$			V
	Current ^{2,3}	Continuous	0	-	4
DC RESISTANCE	Continuous	-	90	150	mΩ
POWER DISSIPATION ²	Continuous	-	-	2.4	W
NOISE REJECTION	f = 500 kHz	40	-	-	dB
CAPACITANCE	Pin to Case	140	-	212	nF
ISOLATION	Any Pin to Case, 500 V _{DC}	100	-	-	MΩ
MTBF (MIL-HDBK-217F) ⁴	SF @ T _C = 55°C	-	10.5	-	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

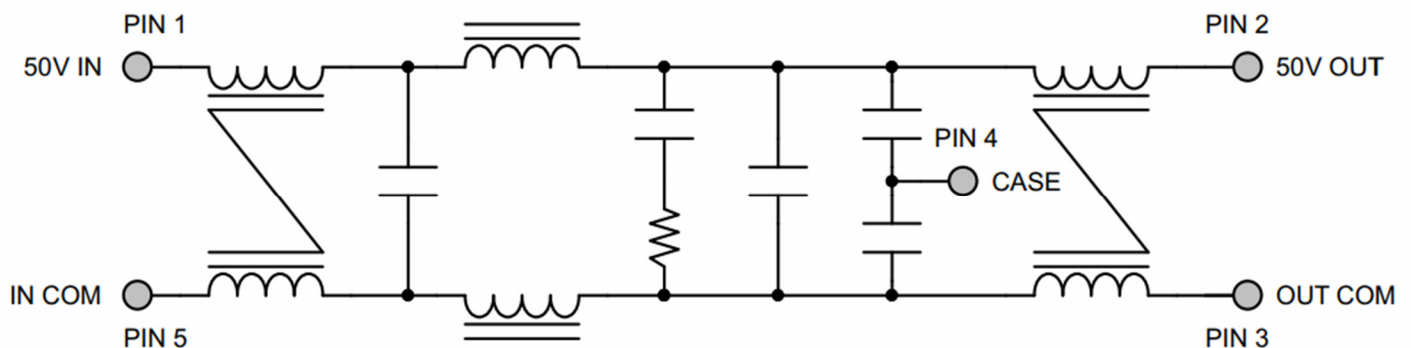


Figure 2

CONNECTION DIAGRAMS

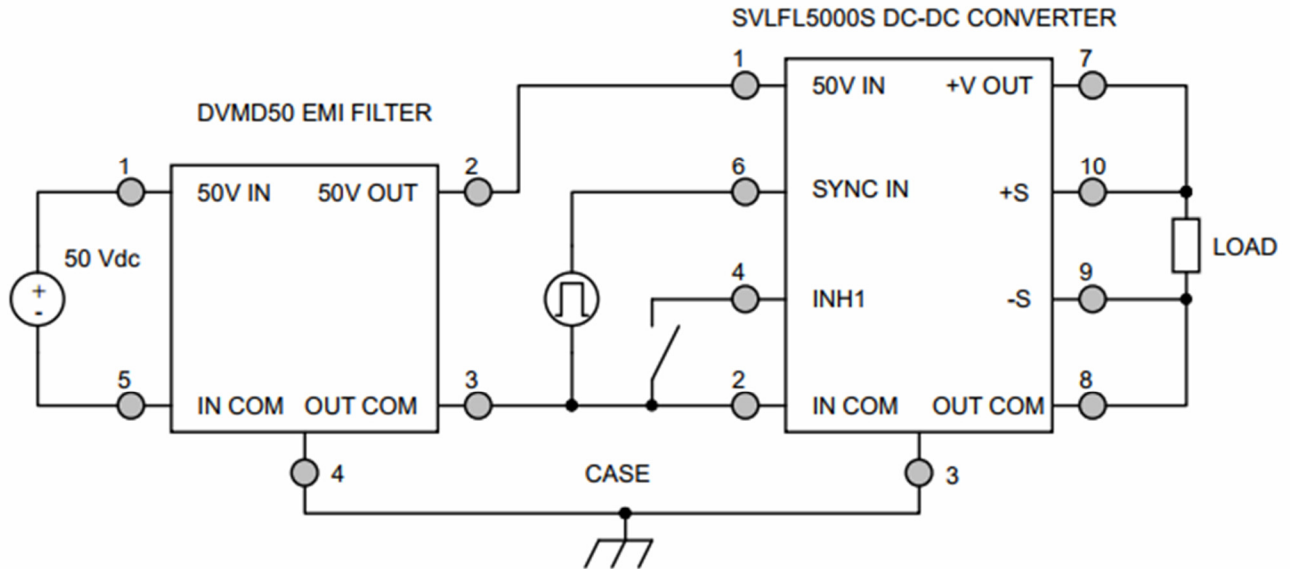


Figure 3 – DVMD50 EMI Filter Hookup with Single Converter

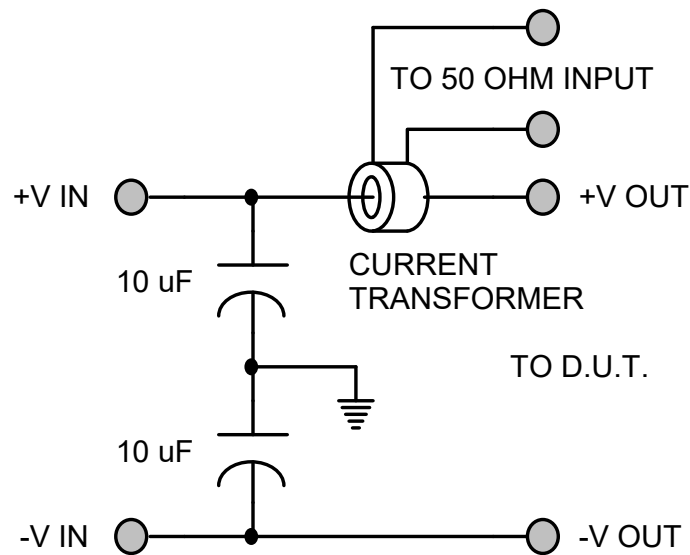
EMI MEASUREMENT METHODS CONNECTION DIAGRAMS


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

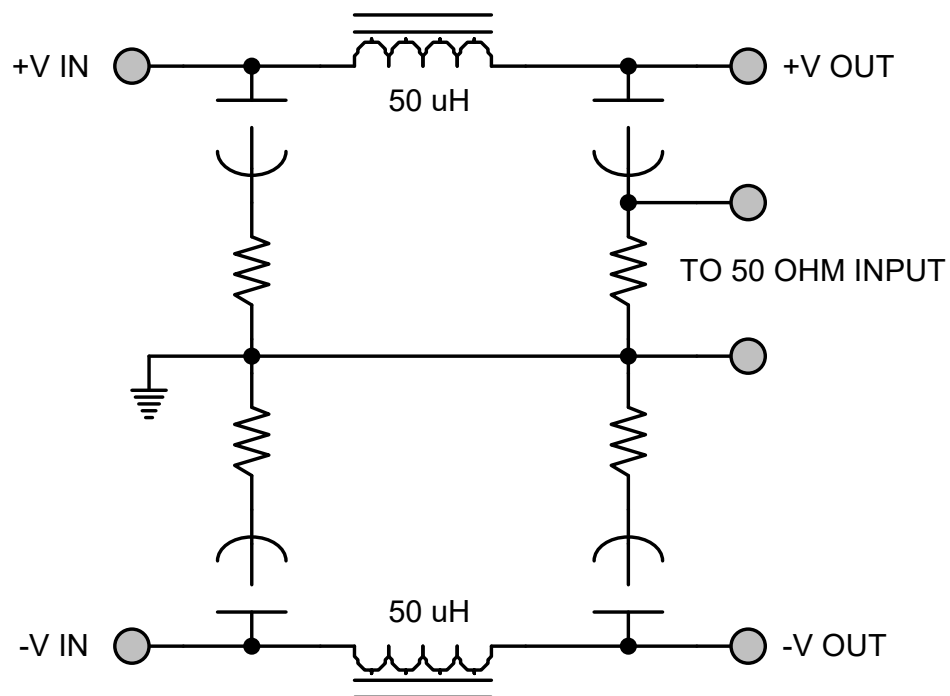


Figure 6 – MIL-STD-461D Measurement Method (LISN)

EMI PERFORMANCE CURVES

($T_{CASE} = 25^{\circ}C$, $V_{IN} = +50V \pm 5\%$, Full Load, Unless Otherwise Specified)

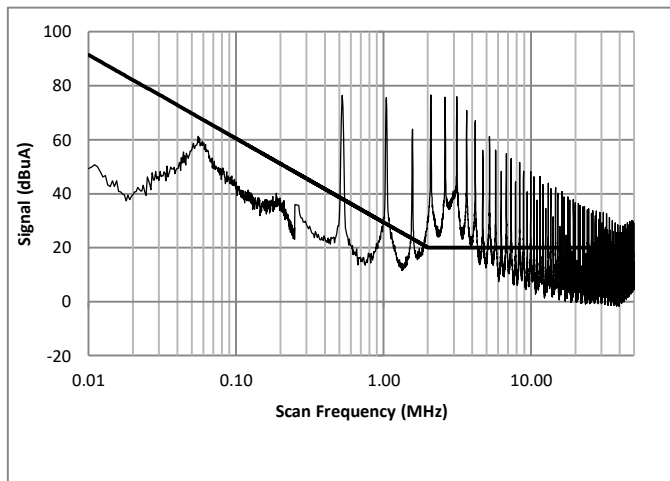


Figure 7 – MIL-STD-461C
SVLFL5000S Without EMI Filter

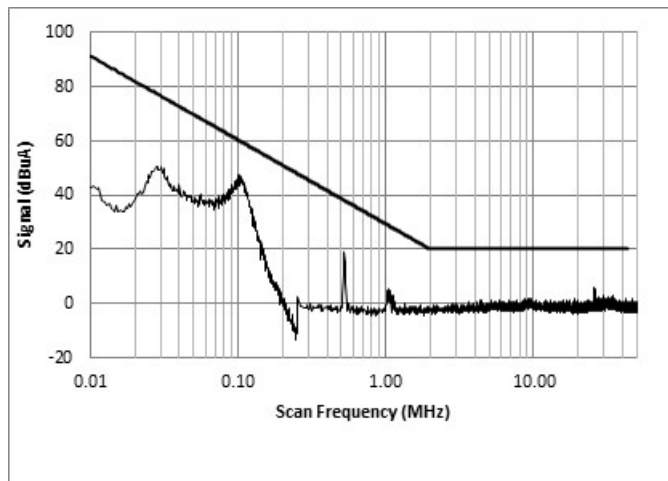


Figure 8 – MIL-STD-461C
SVLFL5000S With DVMD50 EMI Filter

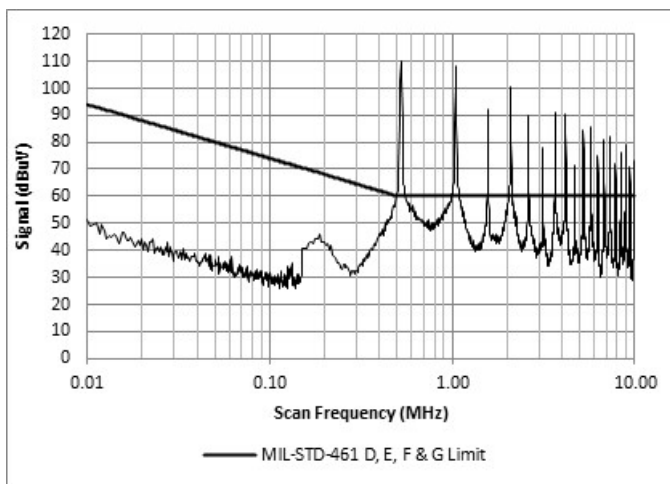


Figure 9 – MIL-STD-461D, E, F & G
SVLFL5000S Without EMI Filter

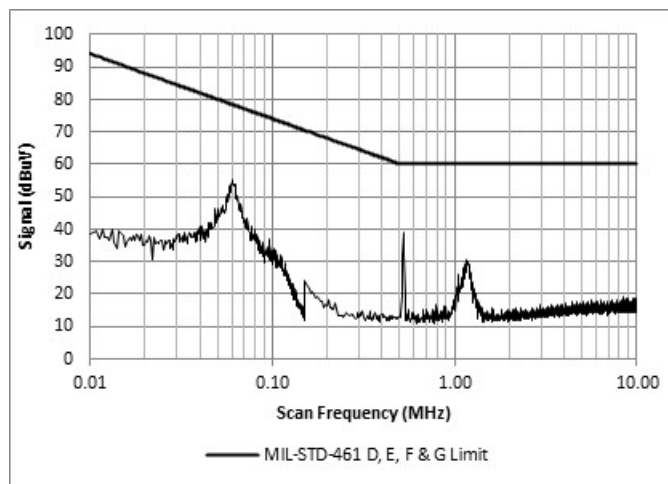
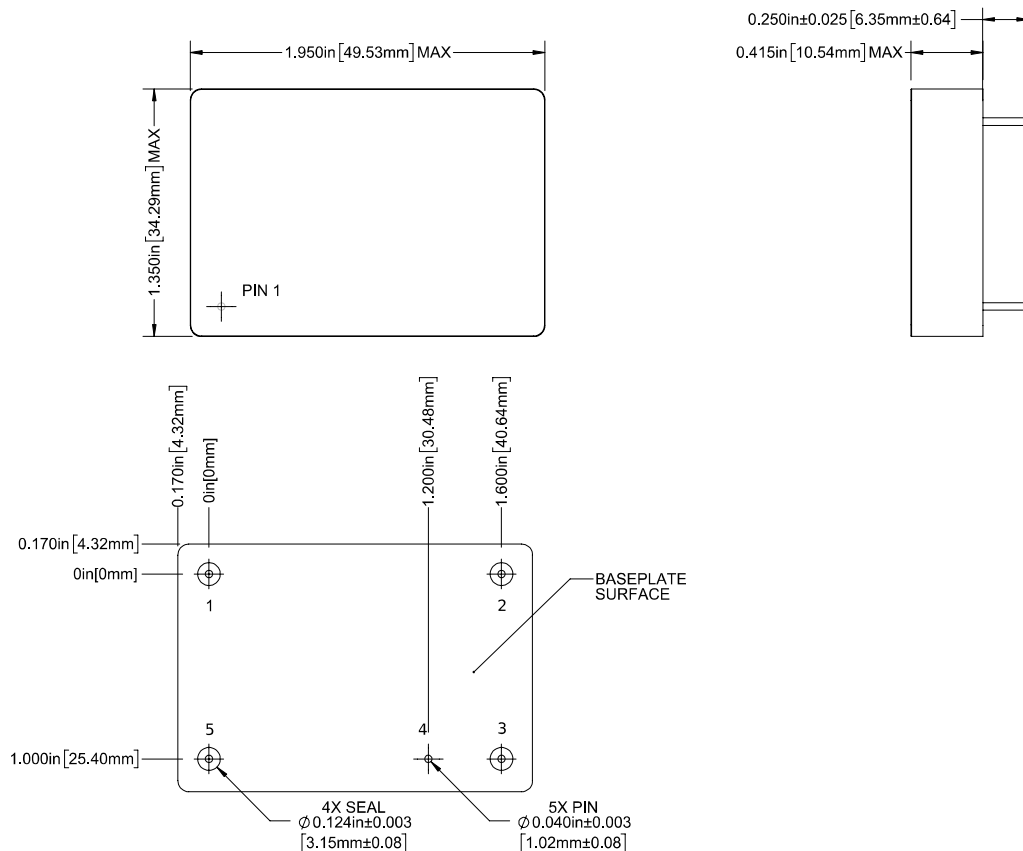


Figure 10 – MIL-STD-461D, E, F & G
SVLFL5000S With DVMD50 EMI Filter

PACKAGE SPECIFICATIONS



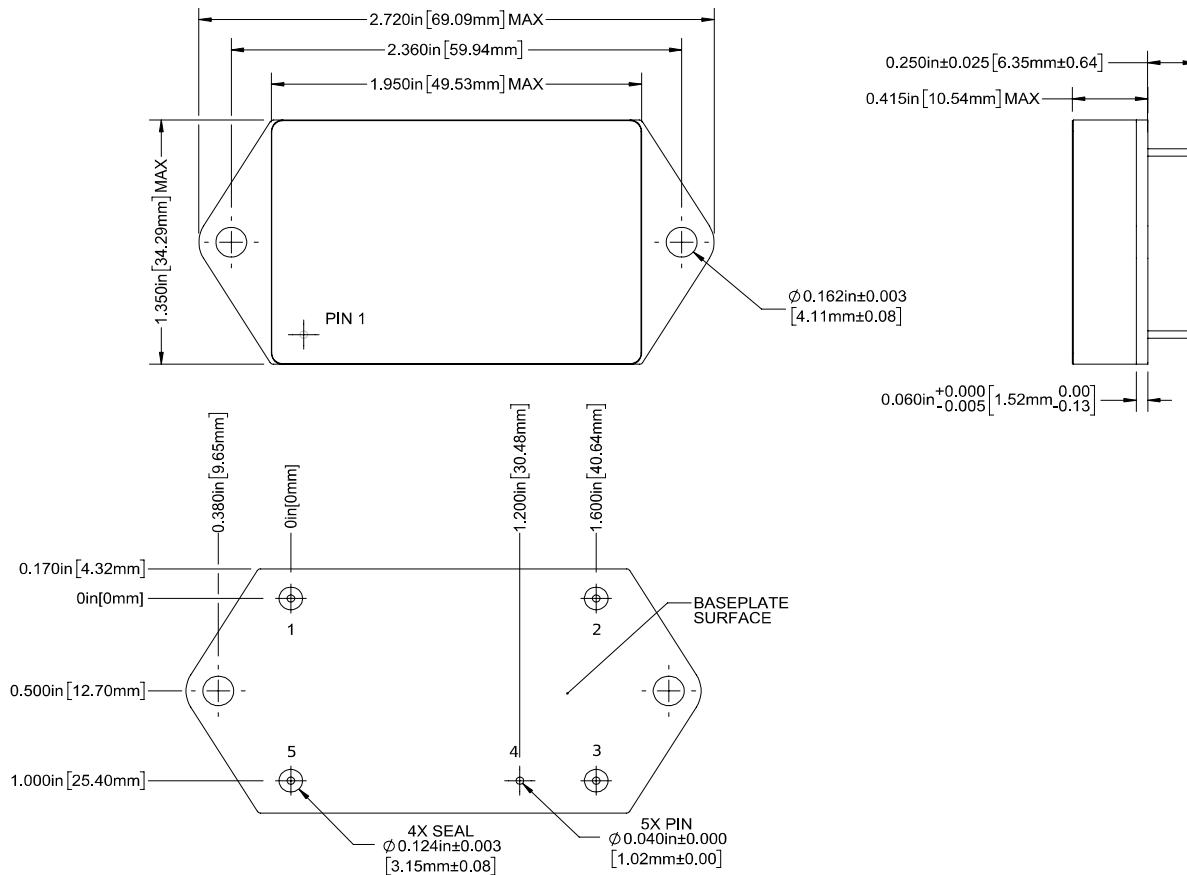
Notes:

1. Dimensional limits are $\pm 0.005"$ unless otherwise specified.
2. Case temperature is measured on the center of the baseplate.
3. Material: Case (Steel, Gold over Nickel Plated), Cover (Kovar, Nickel Plated), Pins (Copper Cored Alloy 52, Gold over Nickel Plated, Pin Seal (Ceramic)

Pin	Function	Pin	Function	Pin	Function
1	50V IN	3	OUT COM	5	IN COM
2	50V OUT	4	CASE		

Figure 11 – Package and Pinout

PACKAGE SPECIFICATIONS - CONTINUED



Notes:

1. Dimensional limits are $\pm 0.005"$ unless otherwise specified.
2. Case temperature is measured on the center of the baseplate.
3. Mounting holes are not threaded. Recommended fastener is #6-32 screw.
4. Material: Case (Steel, Gold over Nickel Plated), Cover (Kovar, Nickel Plated), Pins (Copper Cored Alloy 52, Gold over Nickel Plated), Pin Seal (Ceramic)

Pin	Function	Pin	Function	Pin	Function
1	50V IN	3	OUT COM	5	IN COM
2	50V OUT	4	CASE		

Figure 12 – Flanged Package and Pinout

PACKAGE PIN DESCRIPTION

Pin	Function	Description
1	50V IN	Positive Input Voltage Connection
2	50V OUT	Positive Output Voltage Connection
3	CASE	Case Connection
4	OUT COM	Output Common Connection
5	IN COM	Input Common Connection

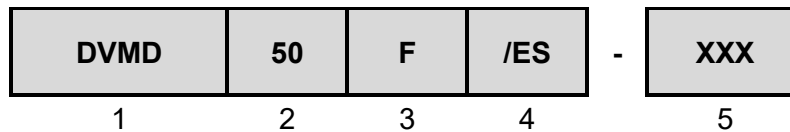
ENVIRONMENTAL SCREENING (100% Tested Per MIL-STD-883 as referenced to MIL-PRF-38534)

Test	MIL-STD-883 Test Method, Condition	No Suffix (Standard) Non-QML ⁴	/ES (Extended) Non-QML ⁴	/H (Class H)	/K and /KL1 ^{4,7} (Class K)
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 ⁵	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 ³			•	•
	MIL-PRF-38534, Group A Subgroups 1 and 4 25°C	•	•		
Hermeticity (Seal)	TM1014, Fine Leak, Condition A2 or B1		•	•	•
	TM1014, Gross Leak, Condition C1 or B2		•	•	•
	Gross Leak, No Bomb, Visual Verification	•			
Radiography ⁶	TM2012				•
External Visual	TM2009	•	•	•	•

Notes:

- 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)

(5)

Product Series	Nominal Input Voltage		Package Option		Screening Code ¹		Additional Screening Code
DVMD	50	50 Volts	None F	Non-Flanged Flanged	None /ES	Standard Extended	Contact Sales

Notes:

- VPT Inc. reserves the right to ship higher screened or DSCC Drawing 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

DLA Drawing	DVMD50Series Similar Part Number
TBD	DVMD50/H DVMD50/H-E DVMD50/K DVMD50/K-E DVMD50F/H DVMD50F/H-E DVMD50F/K DVMD50F/K-E

Do not use the DVMD50 Series similar part number for DLA Land and Maritime 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 Land and Maritime (Previously known as DSCC) website at <https://landandmaritimeapps.dla.mil/programs/defaultapps.asp>. The DLA drawing 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 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

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