



DVHF2800S Series

VPT Inc.
2801 Commerce Street
Blacksburg, VA 24060
Sales Info: (425) 337-2482 FAX: (603) 297-1160
WEB: <http://www.vpt-inc.com>
E-mail: mbosmann@worldnet.att.net

Description

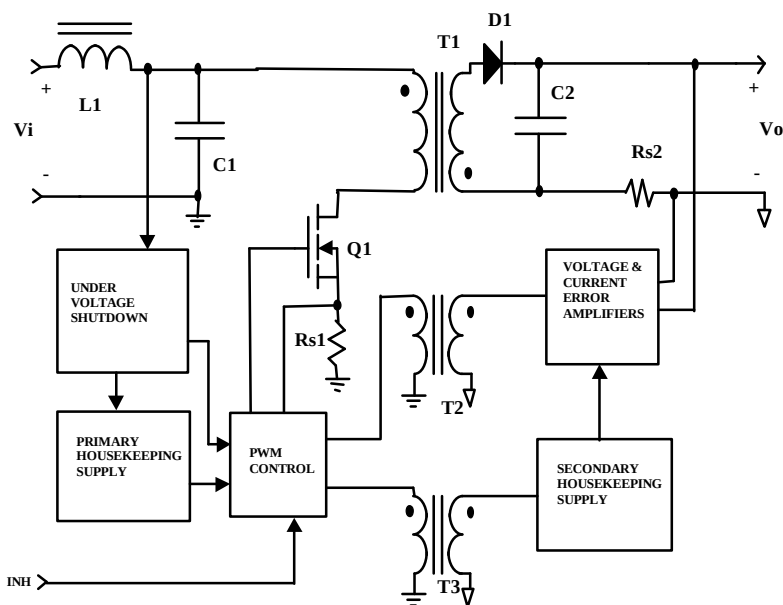
The DVHF series of hybrid DC to DC converters is able to operate at the full military (-55 °C to +125 °C) temperature range with no power derating. Unique to the DVHF series is a patented magnetic feedback circuit that is fault tolerant and radiation immune. Operating at a nominal fixed frequency of 450kHz the regulated, isolated units utilize well controlled undervoltage lock out circuitry to eliminate slow start-up problems.

Features

- Very low output noise
- High Reliability
- Wide input voltage range : 15 to 50 Volts / MIL-STD-704
- Up to 20 Watts output power
- Patented, fault tolerant feedback circuit
- NO optoisolator
- Undervoltage Lockout
- Standard Pinout
- High input transient voltage : 80 Volts for 1 Sec MIL-STD-704A
- Radiation hardened version available
- Precision projection welded hermetic package
- High power density, >37 W/in³
- Custom Versions Available
- Environmental Screening Available
- Meets MIL-STD-461C and MIL-STD-461D EMC requirements when used with a DVMH28 EMI filter

Block Diagram

DVHF2800S BLOCK DIAGRAM



Specifications

Absolute Maximum Ratings	
Input Voltage (Continuous)	50 Vdc
Input Voltage (Transient)	80 V (1sec)
Output Power ¹	20 Watts
Power Dissipation, Full Load, T _{CASE} = +125°C	6 Watts
Junction Temperature rise to case	+12°C
Storage Temperature	-65°C to +150°C
Lead Solder Temperature for 10 seconds	270°C
Weight	24 grams

T_{case} = -55°C to +125°C, Vin = +28V ±5%, Full Load unless otherwise specified

Parameter		Conditions -55°C≤TC≤125°C, VIN = 28 VDC ±5%, Full Load Unless otherwise specified	DVHF283R3S			DVHF2805S			DVHF2812S			Units
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Static												
INPUT												
Voltage			15	28	50	15	28	50	15	28	50	V
Current ³		Inhibited No Load		3.5 45	5 65		3.5 45	5 65		3.5 45	5 65	mA mA
Ripple Current		Full Load, 20Hz to 10MHz		30	50		30	50		30	50	mA _{p-p}
Inhibit Pin Input			0		1.5	0		1.5	0		1.5	V
Inhibit Pin Open Circuit Voltage			9.0	11.0	13.0	9.0	11.0	13.0	9.0	11.0	13.0	V
UVLO Turn On			11.5		15.0	11.5		15.0	11.5		15.0	V
UVLO Turn Off			11.0		14.5	11.0		14.5	11.0		14.5	V
OUTPUT												
Voltage	V _{OUT}	Tcase = 25°C	3.27	3.30	3.33	4.95	5.00	5.05	11.88	12.0	12.12	V
	V _{OUT}	-55°C ≤ Tcase ≤ +125°C	3.20	3.30	3.40	4.85	5.00	5.15	11.64	12.0	12.36	V
Power			0		10	0		15	0		20	W
Current	V _{OUT}		0		3.0	0		3.0	0		1.67	A
Ripple Voltage	V _{OUT}	Full Load, 20Hz to 10MHz		10	30		10	30		15	40	mV _{p-p}
Line Regulation	V _{OUT}	Vin = 15V to 50V		10	20		10	20		10	20	mV
Load Regulation	V _{OUT}	No Load to Full Load		25	60		25	60		25	50	mV
EFFICIENCY			65	70		73	77		78	82		%
LOAD FAULT POWER DISSIPATION		Overload Short Circuit			6 5			6 5			6 5	W W
CAPACITIVE LOAD					1000			1000			500	μF
SWITCHING FREQUENCY			400	450	525	400	450	525	400	450	525	kHz
ISOLATION		500Vdc	100			100			100			MΩ
THERMAL RESISTANCE		Case to Ambient (θCA)		25			25			25		°C/W
MTBF		MIL-HDBK-217F, A1F @ Tc = 55°C		427			427			427		kHrs
Dynamic												
LOAD STEP		Half Load to Full Load										
Output Transient Recovery ²	V _{OUT}			300 200	400 400		200 200	400 400		300 200	600 400	mV _{PK} μSec
LINE STEP		V _{IN} = 15V to 50V										
Output Transient Recovery ²	V _{OUT}			400 200	600 400		400 200	600 400		400 200	600 400	mV _{PK} μSec
TURN ON		V _{IN} = 0V to 28V										
Delay	V _{OUT}			10 0	15 33		10 0	15 50		10 0	15 120	mSec mV _{PK}
Overshoot ²												

NOTES:

- Dependent on output voltage.
- Time for output voltage to settle within 1% of its nominal value
- Derate linearly to 0 at 135°C.

Specifications

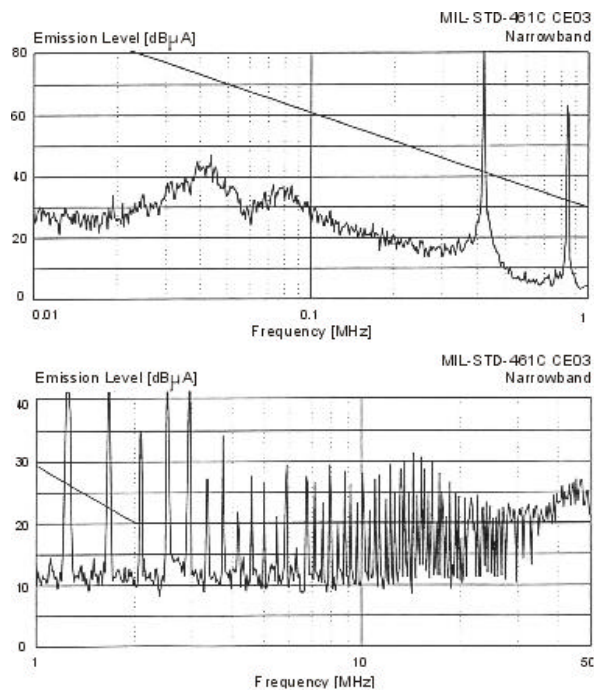
Absolute Maximum Ratings	
Input Voltage (Continuous)	50 Vdc
Input Voltage (Transient)	80 V (1sec)
Output Power ¹	20 Watts
Power Dissipation, Full, TCASE = +125°C	6 Watts
Junction Temperature rise to case	+12°C
Storage Temperature	-55°C to +125°C
Lead Solder Temperature for 10 seconds	270°C
Weight	24 grams

TCASE = -55°C to +125°C, VIN = +28V ±5%, Full Load unless otherwise specified

Parameter		Conditions -55°C≤TC≤125°C, VIN = 28 VDC ±5%, Full Load Unless otherwise specified	DVHF2815S			Units
			Min	Typ	Max	
Static						
INPUT						
Voltage			15	28	50	V
Current		Inhibited No Load		3.5 40	5 65	mA mA
Ripple Current		Full Load, 20Hz to 10MHz		30	50	mA _{P-P}
Inhibit Pin Input			0		1.5	V
Inhibit Pin Open Circuit Voltage			9.0	11.0	13.0	V
UVLO Turn On			11.5		15.0	V
UVLO Turn Off			11.0		14.5	V
OUTPUT						
Voltage		V _{OUT} Tcase = 25°C	14.85	15.00	15.15	V
		V _{OUT} -55°C ≤ Tcase ≤ +125°C	14.55	15.00	15.45	V
Power			0		20	W
Current		V _{OUT}	0		1.33	A
Ripple Voltage		V _{OUT} Full Load, 20Hz to 10MHz		15	40	mV _{P-P}
Line Regulation		V _{OUT} Vin = 15V to 50V		10	20	mV
Load Regulation		V _{OUT} No Load to Full Load		25	50	mV
EFFICIENCY			80	84		%
LOAD FAULT POWER DISSIPATION		Overload Short Circuit			6 5	W W
CAPACITIVE LOAD					500	μF
SWITCHING FREQUENCY			400	450	525	kHz
ISOLATION			100			MΩ
THERMAL RESISTANCE		Case to Ambient (θCA)		25		°C/W
MTBF		MIL-HDBK-217F, A1F @ Tc = 55°C		427		kHrs
Dynamic						
LOAD STEP		Half Load to Full Load				
Output Transient Recovery2		V _{OUT}		300 200	600 400	mV _{PK} μSec
LINE STEP		V _{IN} = 15V to 50V				
Output Transient Recovery2		V _{OUT}		400 200	600 400	mV _{PK} μSec
TURN ON		V _{IN} = 0V to 28V				
Delay		V _{OUT}		10 0	15 150	mSec mV _{PK}
Overshoot2						

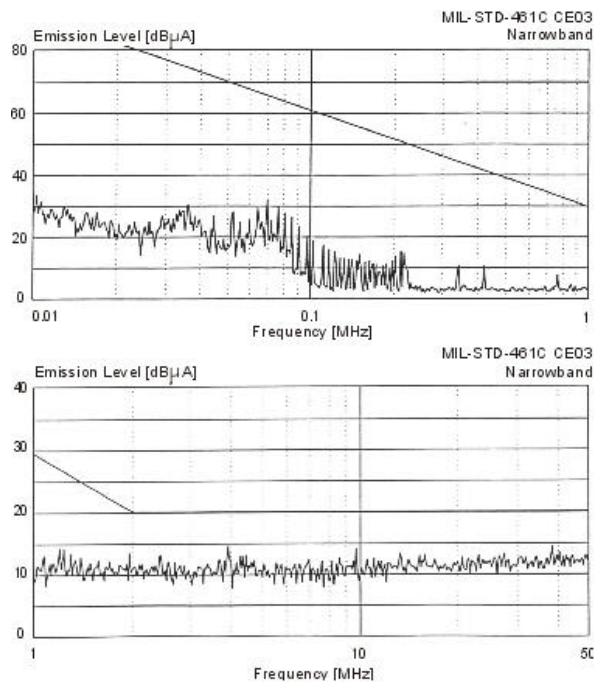
NOTES:

- Dependent on output voltage.
- Time for output voltage to settle within 1% of its nominal value



DVHF2800S Without EMI filter

Figure 1



DVHF2800S With EMI filter

Figure 2

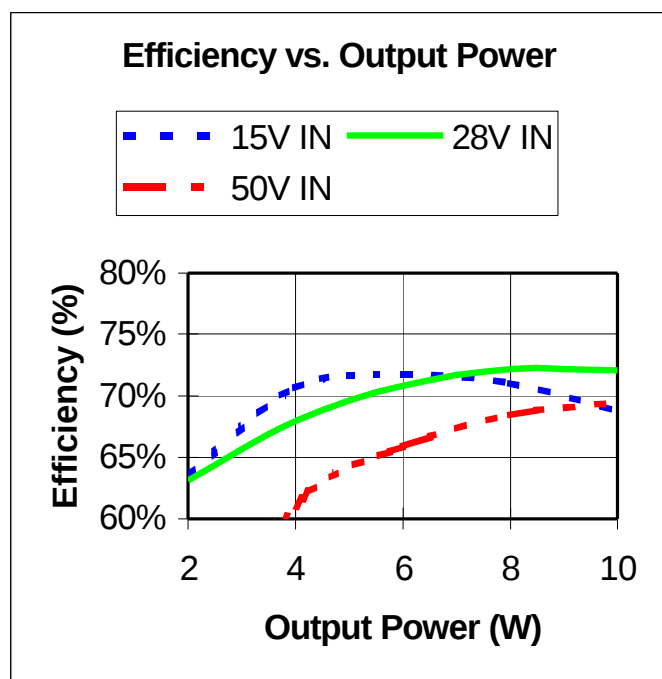


Figure 3.
EFFICIENCY vs. LOAD DVHF283R3S

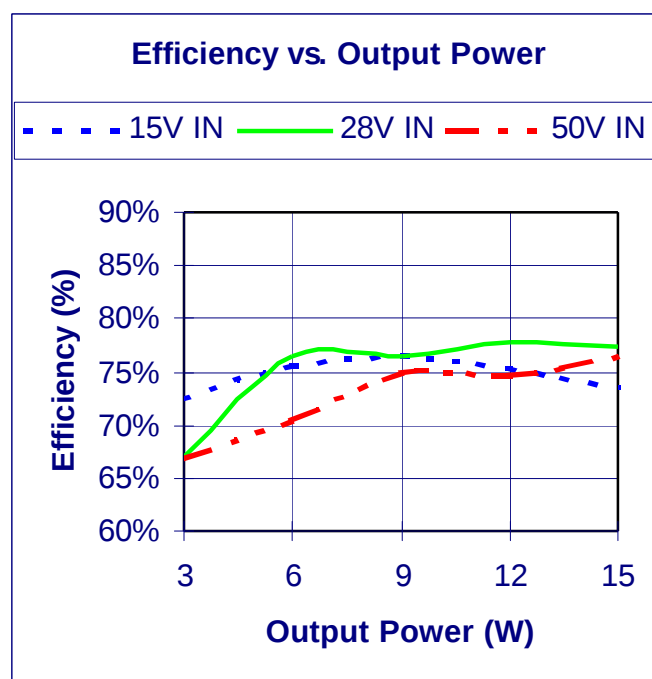


Figure 4.
EFFICIENCY vs. LOAD DVHF2805S

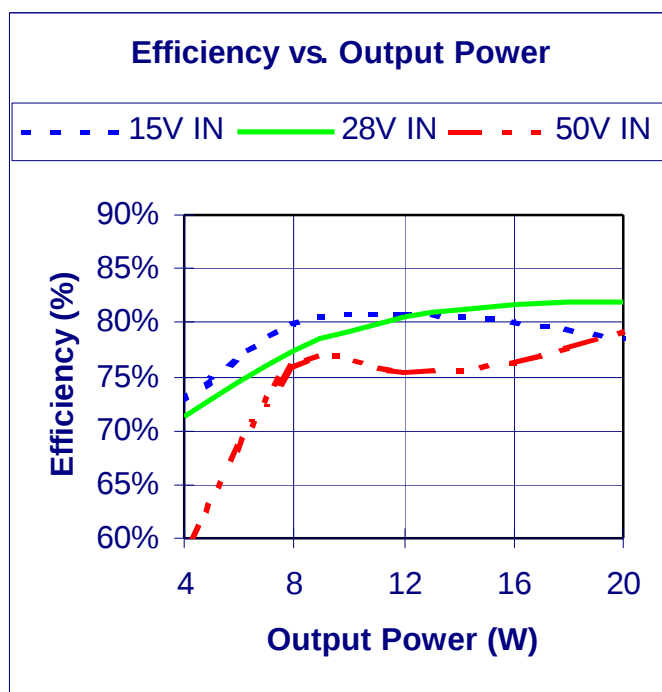


Figure 5.
EFFICIENCY vs. LOAD DVHF2812S

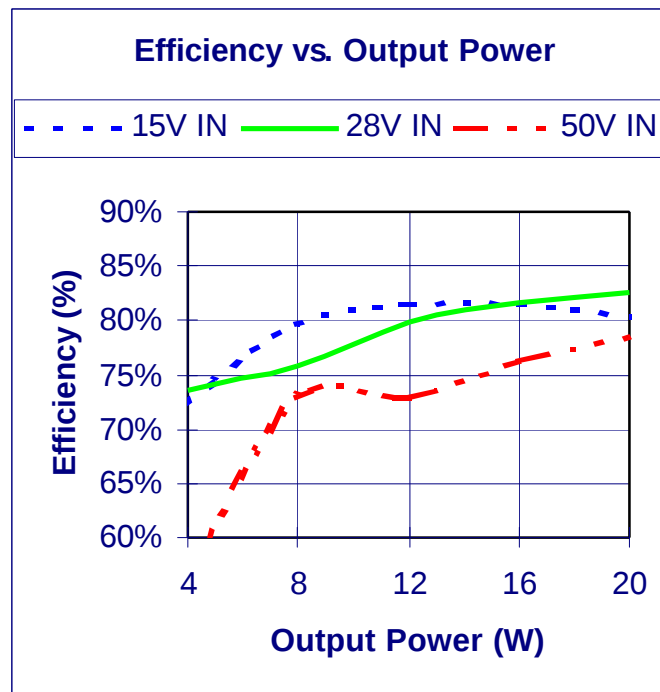
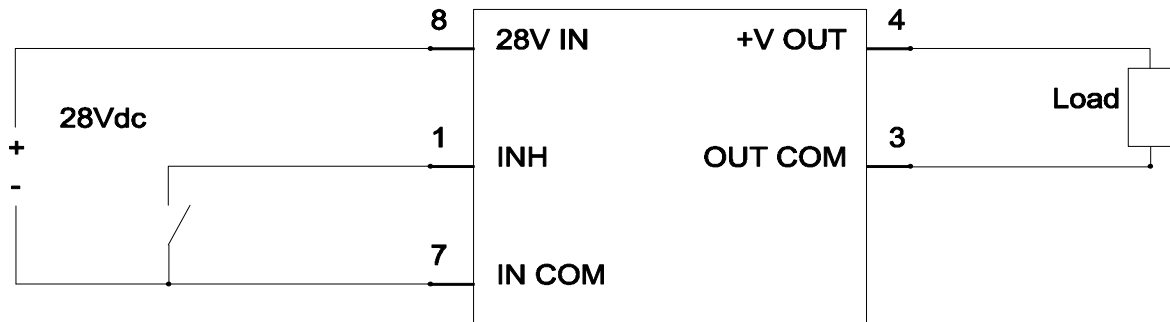
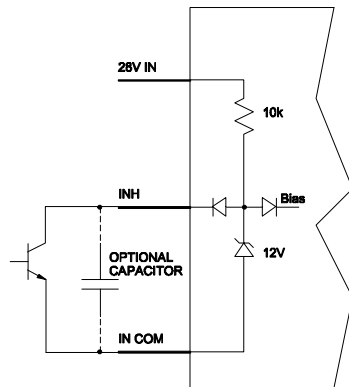


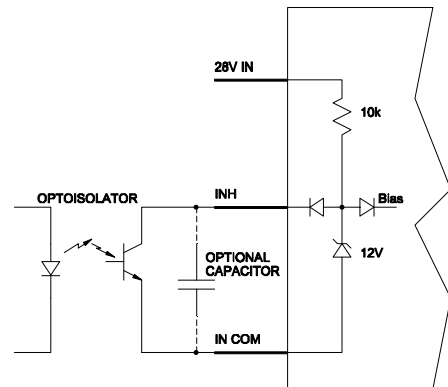
Figure 6.
EFFICIENCY vs. LOAD DVHF2815S



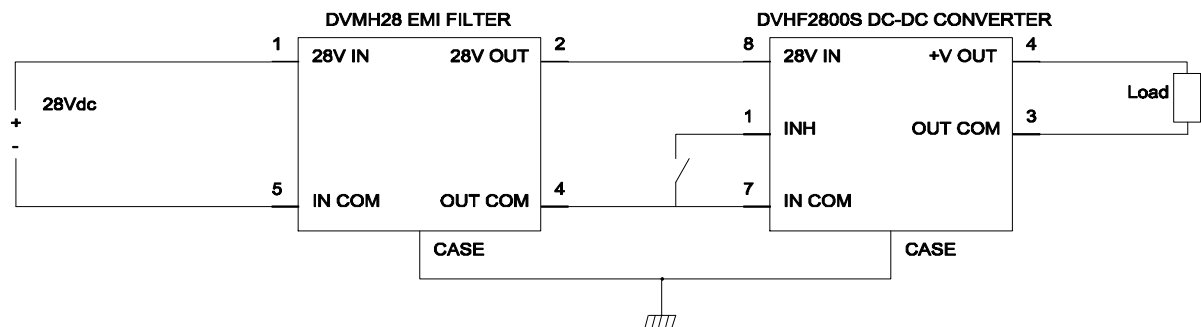
Connection Diagram
Figure 7



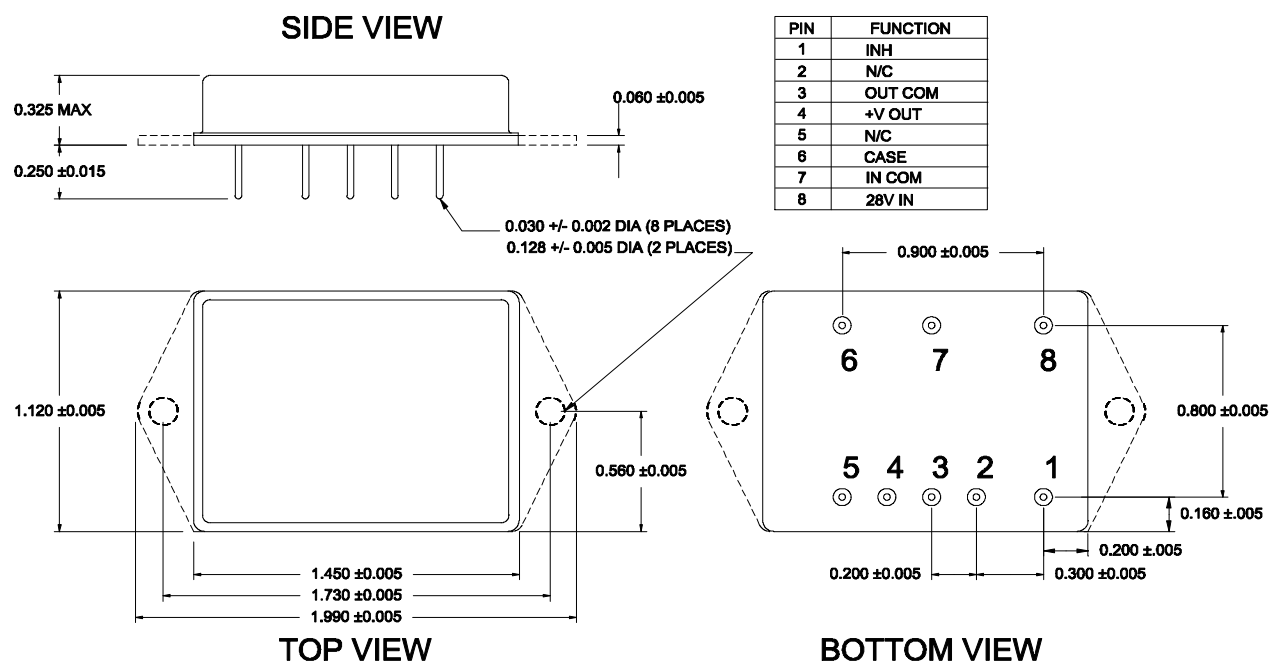
Internal Inhibit Circuit and Recommended Drive
(Shown with optional capacitor for turn on delay)
Figure 8



Isolated Inhibit Drive
(Shown with optional capacitor for turn on delay)
Figure 9



Converter with EMI Filter Hookup Diagram
Figure 10



Package Drawing and Pinout

Figure 11

Screening Action	MIL-STD-883	Standard (No Suffix)	Extended /ES Suffix	(H) /HB Suffix
Pre-cap Inspection	Method 2017, 203	•	•	•
Temperature Cycling	Method 1010, Condition C Method 1010, -55°C to +125°C		•	•
Constant Acceleration	Method 2001, 3000g Method 2001, 500g		•	•
Burn-In	Method 1015, 160 hours at 125°C 96 hours at 125°C 24 hours at 125°C	•	•	•
Hermeticity	Fine Leak, Method 1014, Condition A Gross Leak, Method 1014, Condition C	•	•	•
Final Electrical	MIL-PRF-38534, Group A 100% at 25°C	•	•	•
Final Inspection	Method 2009	•	•	•

Screening Information

Table 1

Ordering Information

Example Part Number: DVHF2805SFR/ES						
DVHF	28	05	S	F	R	/ES
Product Series	Nominal Input Voltage	Output Voltage	No. Outputs	Package Style	Rad Hard Opt.	Screening
DVHF	28 28 Volts	03R3 3.3 Volts	S Single	None No Flange	None Standard R 100kRad	None Standard
		05 5 Volts		F Flanged		/ES Extended
		12 12 Volts				/HB HB Screening
		15 15 Volts				