



Power Your Critical Mission Today

# DVHF2800S SERIES

## HIGH RELIABILITY HYBRID DC-DC CONVERTERS



DVHF2800S - Exact marking may differ from that shown

### Models Available

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 Input: 15 V to 50 V continuous, 80V transient
 

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 Single output: 1.9 V, 3.3 V, 5 V, 5.2 V, 5.7 V, 12 V, 15 V, 18 V, or 28 V
 

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 Wattage: 8 – 20 W
 

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 MIL-PRF-38534: Class H and Class K
 

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### 1.0 DESCRIPTION

The DVHF series of high-reliability DC-DC converters provide decades of successful critical mission support. Operable over the full military (-55 °C to +125 °C) temperature range with no power derating, the DVHF's unique input, and output filters dramatically reduce input and output noise performance. While operating at a nominal fixed frequency of 450 kHz, these regulated, isolated units utilize a high-speed magnetic feedback design and well-controlled under-voltage lockout circuitry to eliminate slow start-up problems.

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

### 1.1 FEATURES

- Output Voltage: 1.9 V to 28 V
- Wide input voltage range: 15 V to 50 V per MIL-STD-704A
- High input transient per MIL-STD-704A
- Fault tolerant magnetic feedback circuit
- No use of optoisolators
- Undervoltage lockout
- Current limit protection / short circuit protection
- High power density
- Additional Environmental Screening Available

### 1.1 SPACE LEVEL CHARACTERIZATIONS

- For space applications, please see VPT's "S" Series of Radiation Tolerant Power Conversion Devices. Contact VPT for details.

### 1.3 MANUFACTURING AND COMPLIANCE

- Qualified to MIL-PRF-38534 Class H and Class K, DLA SMD # 5962-03243
- MIL-PRF-38534 element evaluated components
- MIL-STD-461 EMC when used with appropriate VPT EMI filters
- Manufactured in a MIL-PRF-38534 Class H and Class K facility
- MIL-STD-883
- ISO-9001

### 1.4 PACKAGING

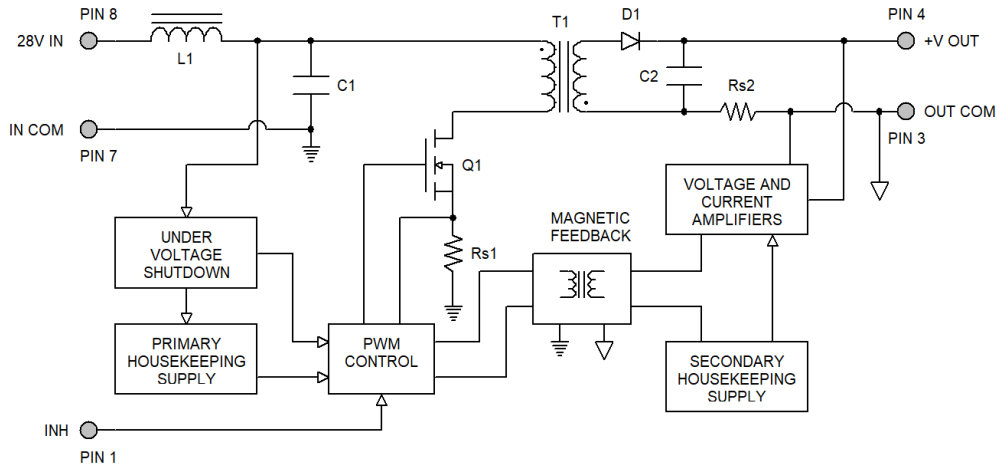
- Low-profile: 2.000" x 1.130" x 0.355"
- Max weight: 28 g
- Industry standard pinout
- Precision projection-welded hermetic metal case
- Flanged and Non-flanged versions available

### 1.5 SIMILAR PRODUCTS AND ACCESSORIES

- [SVHF2800S](#) 20 W space qualified DC-DC converter, 30 krad(Si)
- [SVLHF2800S](#) 20 W space qualified DC-DC converter, 60 krad(Si)
- [SVRHF2800S](#) 15 W space qualified DC-DC converter, 100 krad(Si)
- Custom versions available
- [EMI filters](#)
- Non-isolated, space qualified [point of load converters](#)
- Use with Thermal Pad [TP-002](#) or [TP2-002](#)

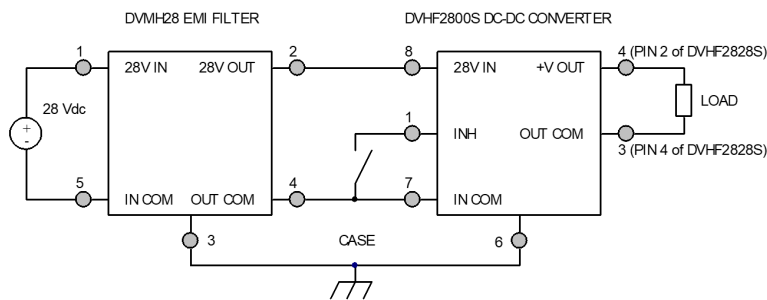
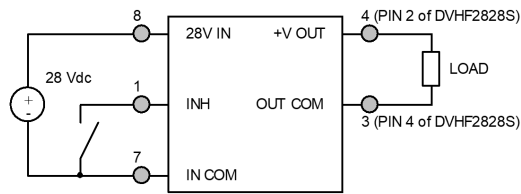
## 2.0 DIAGRAMS

### 2.1 BLOCK DIAGRAM



Note: Not applicable to DVHF2828S.

### 2.2 CONNECTION DIAGRAM



## 3.0 SPECIFICATIONS

### 3.1 ABSOLUTE MAXIMUM RATINGS

Absolute Maximum Ratings			
Input Voltage (Continuous):	-0.5 V to 50 V	Operating Temperature (Full Load):	-55 °C to +125 °C
Input Voltage (Transient, 1 second):	-0.5 V to 80 V	Storage Temperature:	-65 °C to +150 °C
ESD Rating per MIL-PRF-38534:	3A	Lead Solder Temperature (10 seconds):	270 °C

## 3.2 PERFORMANCE SPECIFICATIONS – DVHF281R9S

T<sub>case</sub> = -55 °C to +125 °C, V<sub>in</sub> = +28 V ± 5%, Full Load, Unless Otherwise Specified

Parameter	Conditions	DVHF281R9S			Units
		Min	Typ	Max	
<b>INPUT</b>					
Voltage <sup>4</sup>	Continuous	15	28	50	V
	Transient, 1 sec	-	-	80	V
Current	Inhibited	-	4	6	mA
	No Load	-	45	65	mA
Ripple Current	Full Load, 20 Hz to 10 MHz	-	20	80	mApp
Undervoltage Lockout	Turn-On	12	-	14.8	V
	Turn-Off <sup>4</sup>	11	-	14.5	V
<b>OUTPUT STATIC</b>					
Voltage	T <sub>case</sub> = 25 °C	1.87	1.9	1.93	V
	T <sub>case</sub> = -55 °C to +125 °C	1.86	1.9	1.94	V
Power <sup>3</sup>		0	-	8	W
Current <sup>3</sup>		0	-	4	A
Ripple Voltage	Full Load, 20 Hz to 10 MHz	-	10	40	mVpp
Line Regulation	V <sub>in</sub> = 15 V to 50 V	-	2	20	mV
Load Regulation	No Load to Full Load	-	25	75	mV
Load Fault Power Dissipation	Overload <sup>4</sup>	-	-	8	W
	Short Circuit	-	-	8	W
<b>OUTPUT DYNAMIC</b>					
Load Step, Half to Full Load	Output Transient	-	100	250	mVpk
	Recovery <sup>2</sup>	-	450	800	µs
Line Step <sup>4</sup> , V <sub>in</sub> = 16V to 40 V	Output Transient	-	100	400	mVpk
	Recovery <sup>2</sup>	-	200	700	µs
Turn-On, V <sub>in</sub> = 0 to 28 V	Delay	-	10	20	ms
	Overshoot	-	0	15	mVpk
<b>FUNCTION</b>					
INH Pin Input <sup>4</sup>	Output Inhibited	0	-	1.5	V
INH Pin Open Circuit Voltage <sup>4</sup>	Output Enabled	9	11	13	V
<b>GENERAL</b>					
Efficiency		57	61	-	%
Capacitive Load <sup>4</sup>		-	-	1000	µF
Switching Frequency		350	450	500	kHz
Isolation	500 V DC, T <sub>case</sub> = 25 °C	100	-	-	MΩ
Weight	Non-flanged package option	-	-	24	g
	Flanged package option	-	-	28	g
MTBF (MIL-HDBK-217F)	AIF @ T <sub>case</sub> = 55 °C	-	427	-	kHrs

1. Dependant on output voltage.
2. Time for output voltage to settle within 1% of its nominal value.
3. Derate linearly to 0 at 135°C.
4. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.

## 3.2 PERFORMANCE SPECIFICATIONS – DVHF283R3S

T<sub>case</sub> = -55 °C to +125 °C, V<sub>in</sub> = +28 V ± 5%, Full Load, Unless Otherwise Specified

Parameter	Conditions	DVHF283R3S			Units
		Min	Typ	Max	
<b>INPUT</b>					
Voltage <sup>4</sup>	Continuous	15	28	50	V
	Transient, 1 sec	-	-	80	V
Current	Inhibited	-	4	6	mA
	No Load	-	45	65	mA
Ripple Current	Full Load, 20 Hz to 10 MHz	-	25	80	mApp
Undervoltage Lockout	Turn-On	12	-	14.8	V
	Turn-Off <sup>4</sup>	11	-	14.5	V
<b>OUTPUT STATIC</b>					
Voltage	T <sub>case</sub> = 25 °C	3.267	3.3	3.333	V
	T <sub>case</sub> = -55 °C to +125 °C	3.25	3.3	3.35	V
Power <sup>3</sup>		0	-	10	W
Current <sup>3</sup>		0	-	3	A
Ripple Voltage	Full Load, 20 Hz to 10 MHz	-	10	40	mVpp
Line Regulation	V <sub>in</sub> = 15 V to 50 V	-	2	20	mV
Load Regulation	No Load to Full Load	-	20	50	mV
Load Fault Power Dissipation	Overload <sup>4</sup>	-	-	8	W
	Short Circuit	-	-	8	W
<b>OUTPUT DYNAMIC</b>					
Load Step, Half to Full Load	Output Transient	-	160	400	mVpk
	Recovery <sup>2</sup>	-	350	500	µs
Line Step <sup>4</sup> , V <sub>in</sub> = 16V to 40 V	Output Transient	-	400	700	mVpk
	Recovery <sup>2</sup>	-	300	500	µs
Turn-On, V <sub>in</sub> = 0 to 28 V	Delay	-	10	20	ms
	Overshoot	-	0	15	mVpk
<b>FUNCTION</b>					
INH Pin Input <sup>4</sup>	Output Inhibited	0	-	1.5	V
INH Pin Open Circuit Voltage <sup>4</sup>	Output Enabled	9	11	13	V
<b>GENERAL</b>					
Efficiency		65	71	-	%
Capacitive Load <sup>4</sup>		-	-	1000	µF
Switching Frequency		350	450	500	kHz
Isolation	500 V DC, T <sub>case</sub> = 25 °C	100	-	-	MΩ
Weight	Non-flanged package option	-	-	24	g
	Flanged package option	-	-	28	g
MTBF (MIL-HDBK-217F)	AIF @ T <sub>case</sub> = 55 °C	-	427	-	kHrs

1. Dependant on output voltage.
2. Time for output voltage to settle within 1% of its nominal value.
3. Derate linearly to 0 at 135°C.
4. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.

## 3.2 PERFORMANCE SPECIFICATIONS – DVHF2805S

Tcase = -55 °C to +125 °C, Vin = +28 V ± 5%, Full Load, Unless Otherwise Specified

Parameter	Conditions	DVHF2805S			Units
		Min	Typ	Max	
<b>INPUT</b>					
Voltage <sup>4</sup>	Continuous	15	28	50	V
	Transient, 1 sec	-	-	80	V
Current	Inhibited	-	4	6	mA
	No Load	-	45	65	mA
Ripple Current	Full Load, 20 Hz to 10 MHz	-	30	80	mApp
Undervoltage Lockout	Turn-On	12	-	14.8	V
	Turn-Off <sup>4</sup>	11	-	14.5	V
<b>OUTPUT STATIC</b>					
Voltage	Tcase = 25 °C	4.95	5	5.05	V
	Tcase = -55 °C to +125 °C	4.925	5	5.075	V
Power <sup>3</sup>		0	-	15	W
Current <sup>3</sup>		0	-	3	A
Ripple Voltage	Full Load, 20 Hz to 10 MHz	-	15	40	mVpp
Line Regulation	Vin = 15 V to 50 V	-	2	20	mV
Load Regulation	No Load to Full Load	-	25	50	mV
Load Fault Power Dissipation	Overload <sup>4</sup>	-	-	8	W
	Short Circuit	-	-	8	W
<b>OUTPUT DYNAMIC</b>					
Load Step, Half to Full Load	Output Transient	-	250	600	mVpk
	Recovery <sup>2</sup>	-	450	600	µs
Line Step <sup>4</sup> , Vin = 16V to 40 V	Output Transient	-	400	800	mVpk
	Recovery <sup>2</sup>	-	300	700	µs
Turn-On, Vin = 0 to 28 V	Delay	-	10	20	ms
	Overshoot	-	0	25	mVpk
<b>FUNCTION</b>					
INH Pin Input <sup>4</sup>	Output Inhibited	0	-	1.5	V
INH Pin Open Circuit Voltage <sup>4</sup>	Output Enabled	9	11	13	V
<b>GENERAL</b>					
Efficiency		72	77	-	%
Capacitive Load <sup>4</sup>		-	-	1000	µF
Switching Frequency		350	450	500	kHz
Isolation	500 V DC, Tcase = 25 °C	100	-	-	MΩ
Weight	Non-flanged package option	-	-	24	g
	Flanged package option	-	-	28	g
MTBF (MIL-HDBK-217F)	AIF @ Tcase = 55 °C	-	427	-	kHrs

1. Dependant on output voltage.
2. Time for output voltage to settle within 1% of its nominal value.
3. Derate linearly to 0 at 135°C.
4. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.

## 3.2 PERFORMANCE SPECIFICATIONS – DVHF285R2S

T<sub>case</sub> = -55 °C to +125 °C, V<sub>in</sub> = +28 V ± 5%, Full Load, Unless Otherwise Specified

Parameter	Conditions	DVHF285R2S			Units
		Min	Typ	Max	
<b>INPUT</b>					
Voltage <sup>4</sup>	Continuous	15	28	50	V
	Transient, 1 sec	-	-	80	V
Current	Inhibited	-	4	6	mA
	No Load	-	45	65	mA
Ripple Current	Full Load, 20 Hz to 10 MHz	-	30	80	mApp
Undervoltage Lockout	Turn-On	12	-	14.8	V
	Turn-Off <sup>4</sup>	11	-	14.5	V
<b>OUTPUT STATIC</b>					
Voltage	T <sub>case</sub> = 25 °C	5.148	5.2	5.252	V
	T <sub>case</sub> = -55 °C to +125 °C	5.122	5.2	5.278	V
Power <sup>3</sup>		0	-	15	W
Current <sup>3</sup>		0	-	3	A
Ripple Voltage	Full Load, 20 Hz to 10 MHz	-	15	40	mVpp
Line Regulation	V <sub>in</sub> = 15 V to 50 V	-	2	20	mV
Load Regulation	No Load to Full Load	-	25	50	mV
Load Fault Power Dissipation	Overload <sup>4</sup>	-	-	8	W
	Short Circuit	-	-	8	W
<b>OUTPUT DYNAMIC</b>					
Load Step, Half to Full Load	Output Transient	-	250	600	mVpk
	Recovery <sup>2</sup>	-	450	600	µs
Line Step <sup>4</sup> , V <sub>in</sub> = 16V to 40 V	Output Transient	-	400	800	mVpk
	Recovery <sup>2</sup>	-	300	700	µs
Turn-On, V <sub>in</sub> = 0 to 28 V	Delay	-	10	20	ms
	Overshoot	-	0	25	mVpk
<b>FUNCTION</b>					
INH Pin Input <sup>4</sup>	Output Inhibited	0	-	1.5	V
INH Pin Open Circuit Voltage <sup>4</sup>	Output Enabled	9	11	13	V
<b>GENERAL</b>					
Efficiency		72	77	-	%
Capacitive Load <sup>4</sup>		-	-	1000	µF
Switching Frequency		350	450	500	kHz
Isolation	500 V DC, T <sub>case</sub> = 25 °C	100	-	-	MΩ
Weight	Non-flanged package option	-	-	24	g
	Flanged package option	-	-	28	g
MTBF (MIL-HDBK-217F)	AIF @ T <sub>case</sub> = 55 °C	-	427	-	kHrs

1. Dependant on output voltage.
2. Time for output voltage to settle within 1% of its nominal value.
3. Derate linearly to 0 at 135°C.
4. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.

## 3.2 PERFORMANCE SPECIFICATIONS – DVHF285R7S

T<sub>case</sub> = -55 °C to +125 °C, V<sub>in</sub> = +28 V ± 5%, Full Load, Unless Otherwise Specified

Parameter	Conditions	DVHF285R7S			Units
		Min	Typ	Max	
<b>INPUT</b>					
Voltage <sup>4</sup>	Continuous	15	28	50	V
	Transient, 1 sec	-	-	80	V
Current	Inhibited	-	4	6	mA
	No Load	-	45	65	mA
Ripple Current	Full Load, 20 Hz to 10 MHz	-	30	80	mApp
Undervoltage Lockout	Turn-On	12	-	14.8	V
	Turn-Off <sup>4</sup>	11	-	14.5	V
<b>OUTPUT STATIC</b>					
Voltage	T <sub>case</sub> = 25 °C	5.643	5.7	5.757	V
	T <sub>case</sub> = -55 °C to +125 °C	5.615	5.7	5.786	V
Power <sup>3</sup>		0	-	15	W
Current <sup>3</sup>		0	-	2.63	A
Ripple Voltage	Full Load, 20 Hz to 10 MHz	-	15	40	mVpp
Line Regulation	V <sub>in</sub> = 15 V to 50 V	-	2	20	mV
Load Regulation	No Load to Full Load	-	25	50	mV
Load Fault Power Dissipation	Overload <sup>4</sup>	-	-	8	W
	Short Circuit	-	-	8	W
<b>OUTPUT DYNAMIC</b>					
Load Step, Half to Full Load	Output Transient	-	150	400	mVpk
	Recovery <sup>2</sup>	-	150	400	µs
Line Step <sup>4</sup> , V <sub>in</sub> = 16V to 40 V	Output Transient	-	250	450	mVpk
	Recovery <sup>2</sup>	-	300	700	µs
Turn-On, V <sub>in</sub> = 0 to 28 V	Delay	-	10	20	ms
	Overshoot	-	0	25	mVpk
<b>FUNCTION</b>					
INH Pin Input <sup>4</sup>	Output Inhibited	0	-	1.5	V
INH Pin Open Circuit Voltage <sup>4</sup>	Output Enabled	9	11	13	V
<b>GENERAL</b>					
Efficiency		72	77	-	%
Capacitive Load <sup>4</sup>		-	-	1000	µF
Switching Frequency		350	450	500	kHz
Isolation	500 V DC, T <sub>case</sub> = 25 °C	100	-	-	MΩ
Weight	Non-flanged package option	-	-	24	g
	Flanged package option	-	-	28	g
MTBF (MIL-HDBK-217F)	AIF @ T <sub>case</sub> = 55 °C	-	427	-	kHrs

1. Dependant on output voltage.
2. Time for output voltage to settle within 1% of its nominal value.
3. Derate linearly to 0 at 135°C.
4. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.

## 3.2 PERFORMANCE SPECIFICATIONS – DVHF2812S

T<sub>case</sub> = -55 °C to +125 °C, V<sub>in</sub> = +28 V ± 5%, Full Load, Unless Otherwise Specified

Parameter	Conditions	DVHF2812S			Units
		Min	Typ	Max	
<b>INPUT</b>					
Voltage <sup>4</sup>	Continuous	15	28	50	V
	Transient, 1 sec	-	-	80	V
Current	Inhibited	-	4	6	mA
	No Load	-	45	65	mA
Ripple Current	Full Load, 20 Hz to 10 MHz	-	40	80	mApp
Undervoltage Lockout	Turn-On	12	-	14.8	V
	Turn-Off <sup>4</sup>	11	-	14.5	V
<b>OUTPUT STATIC</b>					
Voltage	T <sub>case</sub> = 25 °C	11.88	12	12.12	V
	T <sub>case</sub> = -55 °C to +125 °C	11.82	12	12.18	V
Power <sup>3</sup>		0	-	20	W
Current <sup>3</sup>		0	-	1.67	A
Ripple Voltage	Full Load, 20 Hz to 10 MHz	-	10	40	mVpp
Line Regulation	V <sub>in</sub> = 15 V to 50 V	-	2	20	mV
Load Regulation	No Load to Full Load	-	10	50	mV
Load Fault Power Dissipation	Overload <sup>4</sup>	-	-	8	W
	Short Circuit	-	-	8	W
<b>OUTPUT DYNAMIC</b>					
Load Step, Half to Full Load	Output Transient	-	350	500	mVpk
	Recovery <sup>2</sup>	-	250	500	µs
Line Step <sup>4</sup> , V <sub>in</sub> = 16V to 40 V	Output Transient	-	500	900	mVpk
	Recovery <sup>2</sup>	-	300	500	µs
Turn-On, V <sub>in</sub> = 0 to 28 V	Delay	-	10	20	ms
	Overshoot	-	0	50	mVpk
<b>FUNCTION</b>					
INH Pin Input <sup>4</sup>	Output Inhibited	0	-	1.5	V
INH Pin Open Circuit Voltage <sup>4</sup>	Output Enabled	9	11	13	V
<b>GENERAL</b>					
Efficiency		77	84	-	%
Capacitive Load <sup>4</sup>		-	-	500	µF
Switching Frequency		350	450	500	kHz
Isolation	500 V DC, T <sub>case</sub> = 25 °C	100	-	-	MΩ
Weight	Non-flanged package option	-	-	24	g
	Flanged package option	-	-	28	g
MTBF (MIL-HDBK-217F)	AIF @ T <sub>case</sub> = 55 °C	-	427	-	kHrs

1. Dependant on output voltage.
2. Time for output voltage to settle within 1% of its nominal value.
3. Derate linearly to 0 at 135°C.
4. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.



## 3.2 PERFORMANCE SPECIFICATIONS – DVHF2815S

Tcase = -55 °C to +125 °C, Vin = +28 V ± 5%, Full Load, Unless Otherwise Specified

Parameter	Conditions	DVHF2815S			Units
		Min	Typ	Max	
<b>INPUT</b>					
Voltage <sup>4</sup>	Continuous	15	28	50	V
	Transient, 1 sec	-	-	80	V
Current	Inhibited	-	4	6	mA
	No Load	-	45	65	mA
Ripple Current	Full Load, 20 Hz to 10 MHz	-	40	80	mApp
Undervoltage Lockout	Turn-On	12	-	14.8	V
	Turn-Off <sup>4</sup>	11	-	14.5	V
<b>OUTPUT STATIC</b>					
Voltage	Tcase = 25 °C	14.85	15	15.15	V
	Tcase = -55 °C to +125 °C	14.775	15	15.225	V
Power <sup>3</sup>		0	-	20	W
Current <sup>3</sup>		0	-	1.34	A
Ripple Voltage	Full Load, 20 Hz to 10 MHz	-	10	40	mVpp
Line Regulation	Vin = 15 V to 50 V	-	2	20	mV
Load Regulation	No Load to Full Load	-	10	50	mV
Load Fault Power Dissipation	Overload <sup>4</sup>	-	-	8	W
	Short Circuit	-	-	8	W
<b>OUTPUT DYNAMIC</b>					
Load Step, Half to Full Load	Output Transient	-	350	500	mVpk
	Recovery <sup>2</sup>	-	250	500	µs
Line Step <sup>4</sup> , Vin = 16V to 40 V	Output Transient	-	500	900	mVpk
	Recovery <sup>2</sup>	-	300	500	µs
Turn-On, Vin = 0 to 28 V	Delay	-	10	20	ms
	Overshoot	-	0	50	mVpk
<b>FUNCTION</b>					
INH Pin Input <sup>4</sup>	Output Inhibited	0	-	1.5	V
INH Pin Open Circuit Voltage <sup>4</sup>	Output Enabled	9	11	13	V
<b>GENERAL</b>					
Efficiency		78	85	-	%
Capacitive Load <sup>4</sup>		-	-	500	µF
Switching Frequency		350	450	500	kHz
Isolation	500 V DC, Tcase = 25 °C	100	-	-	MΩ
Weight	Non-flanged package option	-	-	24	g
	Flanged package option	-	-	28	g
MTBF (MIL-HDBK-217F)	AIF @ Tcase = 55 °C	-	427	-	kHrs

1. Dependant on output voltage.
2. Time for output voltage to settle within 1% of its nominal value.
3. Derate linearly to 0 at 135°C.
4. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.

## 3.2 PERFORMANCE SPECIFICATIONS – DVHF2818S

Tcase = -55 °C to +125 °C, Vin = +28 V ± 5%, Full Load, Unless Otherwise Specified

Parameter	Conditions	DVHF2818S			Units
		Min	Typ	Max	
<b>INPUT</b>					
Voltage <sup>4</sup>	Continuous	15	28	50	V
	Transient, 1 sec	-	-	80	V
Current	Inhibited	-	4	6	mA
	No Load	-	45	65	mA
Ripple Current	Full Load, 20 Hz to 10 MHz	-	40	80	mApp
Undervoltage Lockout	Turn-On	12	-	14.8	V
	Turn-Off <sup>4</sup>	11	-	14.5	V
<b>OUTPUT STATIC</b>					
Voltage	Tcase = 25 °C	17.82	18	18.18	V
	Tcase = -55 °C to +125 °C	17.73	18	18.27	V
Power <sup>3</sup>		0	-	20	W
Current <sup>3</sup>		0	-	1.11	A
Ripple Voltage	Full Load, 20 Hz to 10 MHz	-	10	40	mVpp
Line Regulation	Vin = 15 V to 50 V	-	2	20	mV
Load Regulation	No Load to Full Load	-	10	50	mV
Load Fault Power Dissipation	Overload <sup>4</sup>	-	-	8	W
	Short Circuit	-	-	8	W
<b>OUTPUT DYNAMIC</b>					
Load Step, Half to Full Load	Output Transient	-	500	700	mVpk
	Recovery <sup>2</sup>	-	200	500	µs
Line Step <sup>4</sup> , Vin = 16V to 40 V	Output Transient	-	800	1200	mVpk
	Recovery <sup>2</sup>	-	500	700	µs
Turn-On, Vin = 0 to 28 V	Delay	-	10	20	ms
	Overshoot	-	0	50	mVpk
<b>FUNCTION</b>					
INH Pin Input <sup>4</sup>	Output Inhibited	0	-	1.5	V
INH Pin Open Circuit Voltage <sup>4</sup>	Output Enabled	9	11	13	V
<b>GENERAL</b>					
Efficiency		78	84	-	%
Capacitive Load <sup>4</sup>		-	-	500	µF
Switching Frequency		350	450	500	kHz
Isolation	500 V DC, Tcase = 25 °C	100	-	-	MΩ
Weight	Non-flanged package option	-	-	24	g
	Flanged package option	-	-	28	g
MTBF (MIL-HDBK-217F)	AIF @ Tcase = 55 °C	-	427	-	kHrs

1. Dependant on output voltage.

2. Time for output voltage to settle within 1% of its nominal value.

3. Derate linearly to 0 at 135°C.

4. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.

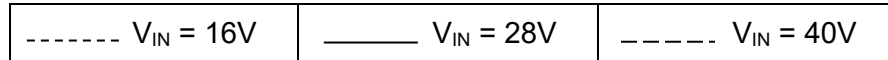
## 3.2 PERFORMANCE SPECIFICATIONS – DVHF2828S

T<sub>case</sub> = -55 °C to +125 °C, V<sub>in</sub> = +28 V ± 5%, Full Load, Unless Otherwise Specified

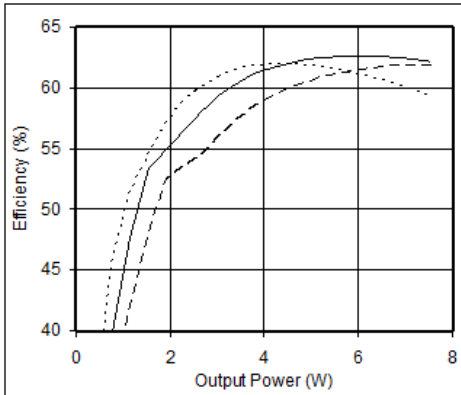
Parameter	Conditions	DVHF2828S			Units
		Min	Typ	Max	
<b>INPUT</b>					
Voltage <sup>4</sup>	Continuous	15	28	50	V
	Transient, 1 sec	-	-	80	V
Current	Inhibited	-	4	6	mA
	No Load	-	45	65	mA
Ripple Current	Full Load, 20 Hz to 10 MHz	-	40	100	mApp
Undervoltage Lockout	Turn-On	12	-	14.8	V
	Turn-Off <sup>4</sup>	11	-	14.5	V
<b>OUTPUT STATIC</b>					
Voltage	T <sub>case</sub> = 25 °C	27.70	28	28.30	V
	T <sub>case</sub> = -55 °C to +125 °C	27.25	28	28.75	V
Power <sup>3</sup>		0	-	20	W
Current <sup>3</sup>		0	-	0.714	A
Ripple Voltage	Full Load, 20 Hz to 10 MHz	-	45	120	mVpp
Line Regulation	V <sub>in</sub> = 15 V to 50 V	-	45	150	mV
Load Regulation	No Load to Full Load	-	25	150	mV
Load Fault Power Dissipation	Overload <sup>4</sup>	-	-	8	W
	Short Circuit	-	-	8	W
<b>OUTPUT DYNAMIC</b>					
Load Step, Half to Full Load	Output Transient	-	630	900	mVpk
	Recovery <sup>2</sup>	-	250	400	µs
Line Step <sup>4</sup> , V <sub>in</sub> = 16V to 40 V	Output Transient	-	900	1300	mVpk
	Recovery <sup>2</sup>	-	400	700	µs
Turn-On, V <sub>in</sub> = 0 to 28 V	Delay	-	10	20	ms
	Overshoot	-	0	50	mVpk
<b>FUNCTION</b>					
INH Pin Input <sup>4</sup>	Output Inhibited	0	-	1.5	V
INH Pin Open Circuit Voltage <sup>4</sup>	Output Enabled	9	11	13	V
<b>GENERAL</b>					
Efficiency		79	85	-	%
Capacitive Load <sup>4</sup>		-	-	500	µF
Switching Frequency		350	450	500	kHz
Isolation	500 V DC, T <sub>case</sub> = 25 °C	100	-	-	MΩ
Weight	Non-flanged package option	-	-	24	g
	Flanged package option	-	-	28	g
MTBF (MIL-HDBK-217F)	AIF @ T <sub>case</sub> = 55 °C	-	427	-	kHrs

1. Dependant on output voltage.
2. Time for output voltage to settle within 1% of its nominal value.
3. Derate linearly to 0 at 135°C.
4. Verified by initial electrical design verification. Post design verification, parameter shall be guaranteed to the limits specified.

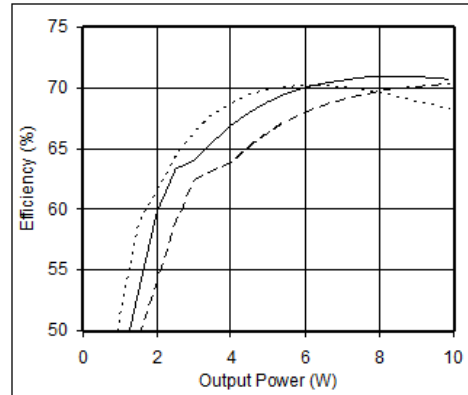
## 4.0 PERFORMANCE CURVES



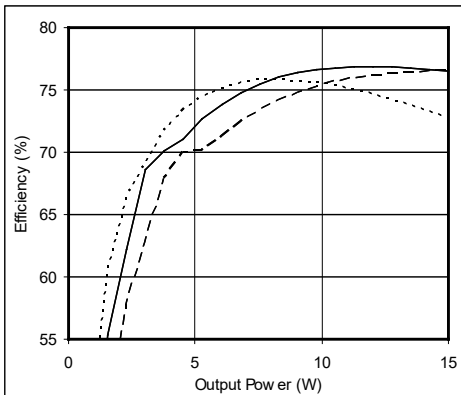
**4.1.1 DVHF281R9S Efficiency (Typical, 25 °C)**



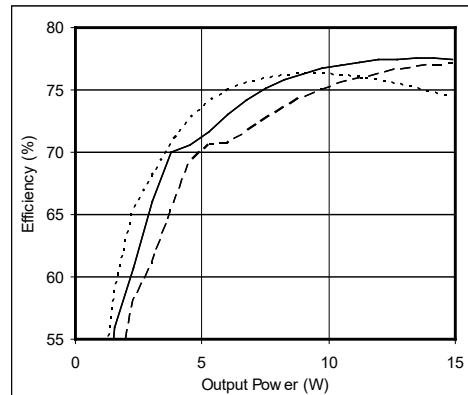
**4.1.2 DVHF283R3S Efficiency (Typical, 25 °C)**



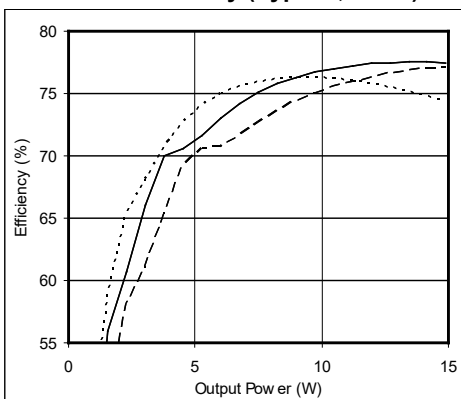
**4.1.3 DVHF2805S Efficiency (Typical, 25 °C)**



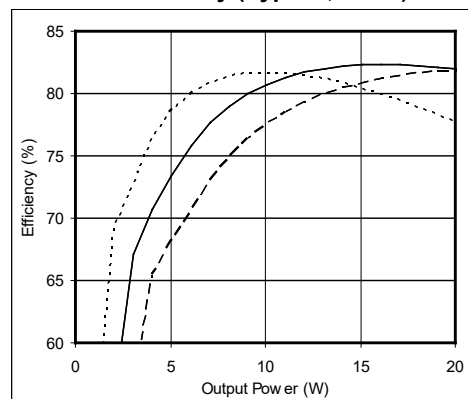
**4.1.4 DVHF285R2S Efficiency (Typical, 25 °C)**



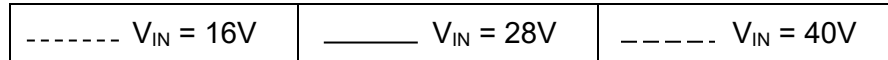
**4.1.5 DVHF285R7S Efficiency (Typical, 25 °C)**



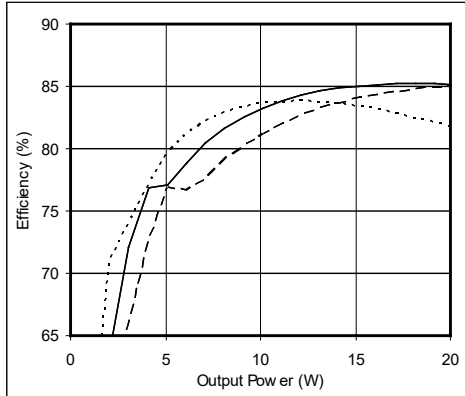
**4.1.6 DVHF2812S Efficiency (Typical, 25 °C)**



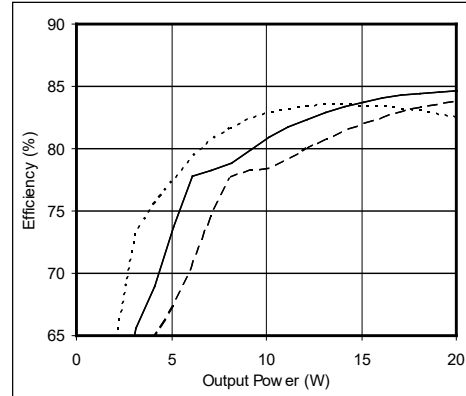
## 4.0 PERFORMANCE CURVES (CONTINUED)



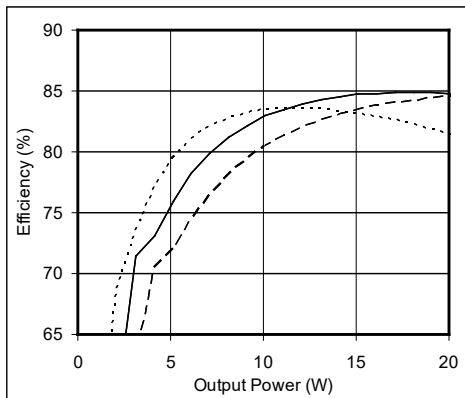
4.1.7 DVHF2815S Efficiency (Typical, 25 °C)



4.1.8 DVHF2818S Efficiency (Typical, 25 °C)



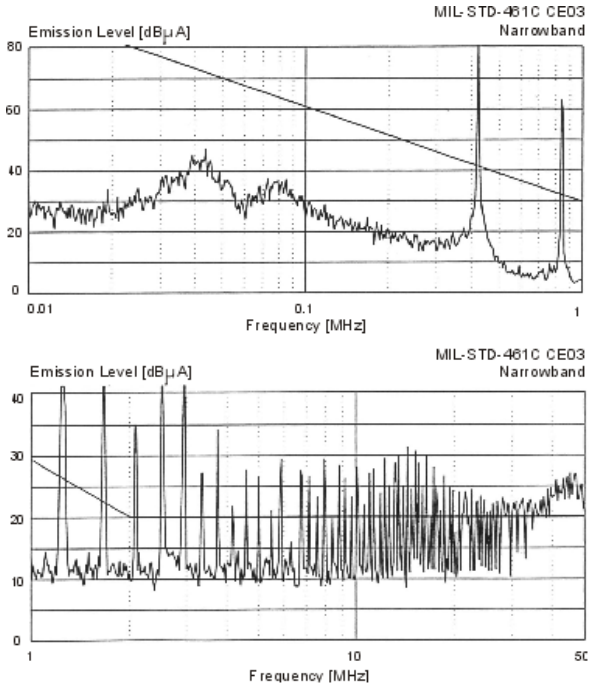
4.1.9 DVHF2828S Efficiency (Typical, 25 °C)



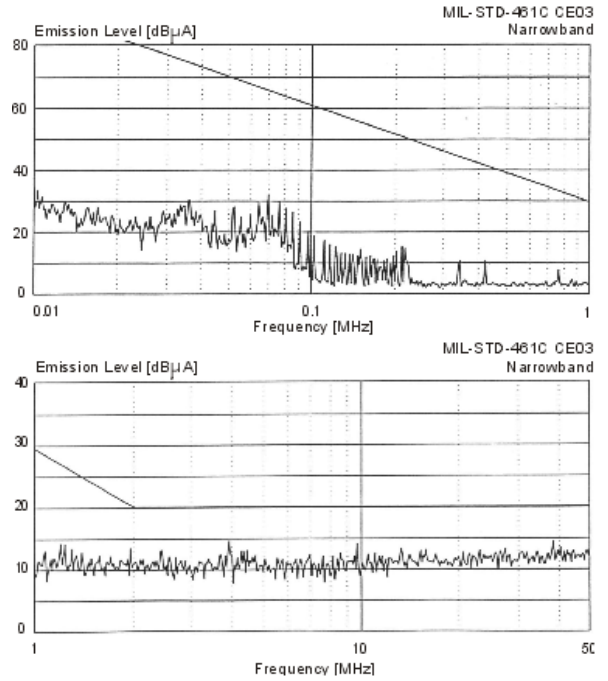
## 4.0 PERFORMANCE CURVES (CONTINUED)

T<sub>case</sub> = 25 °C, V<sub>in</sub> = +28 V ± 5%, Full Load, Unless Otherwise Specified

### 4.2.1 DVHF2800S without EMI Filter

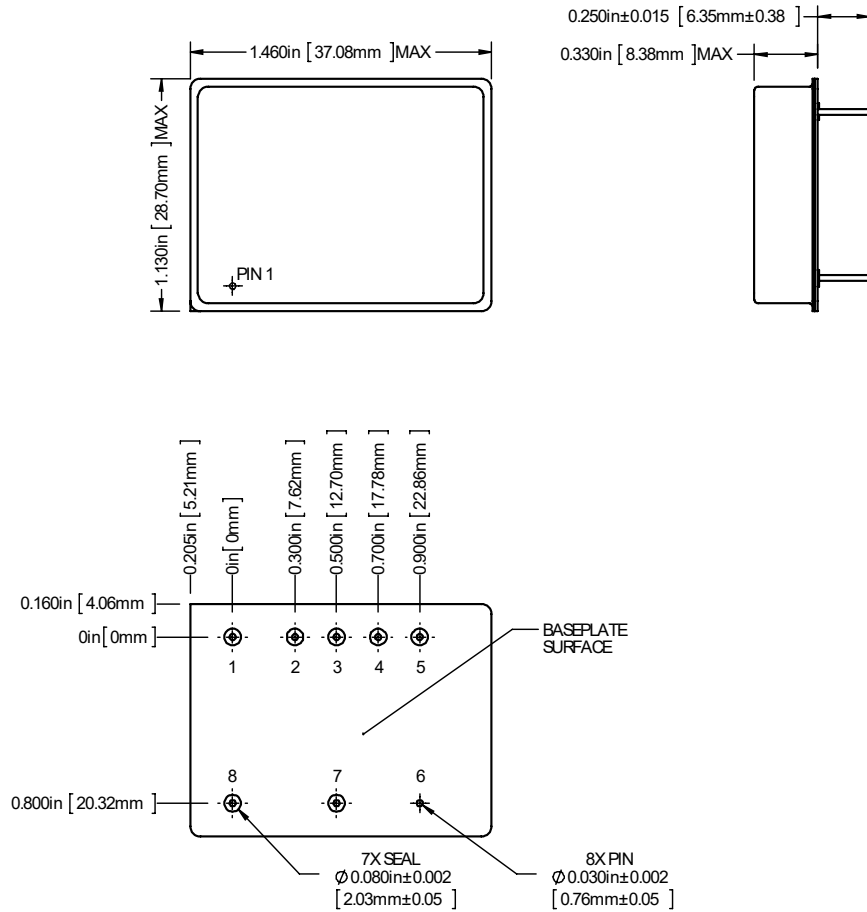


### 4.2.2 DVHF2800S with EMI Filter



## 5.0 MECHANICAL OUTLINES AND PINOUT

### Non-Flanged Package Option:



1. Tolerances are  $\pm 0.005$ " unless otherwise stated
2. Case temperature is measured on the center of the baseplate surface
3. Materials: Case (Steel, gold over nickel plated); Cover (Steel, nickel plated); Pin (Copper-cored alloy 52, gold over nickel plated); Pin Seals (Glass)

All outputs excluding the DVHF2828S

Pin	Function	Pin	Function	Pin	Function
1	INH	4	+VOUT	7	INCOM
2	NC	5	NC	8	28VIN
3	OUTCOM	6	CASE		

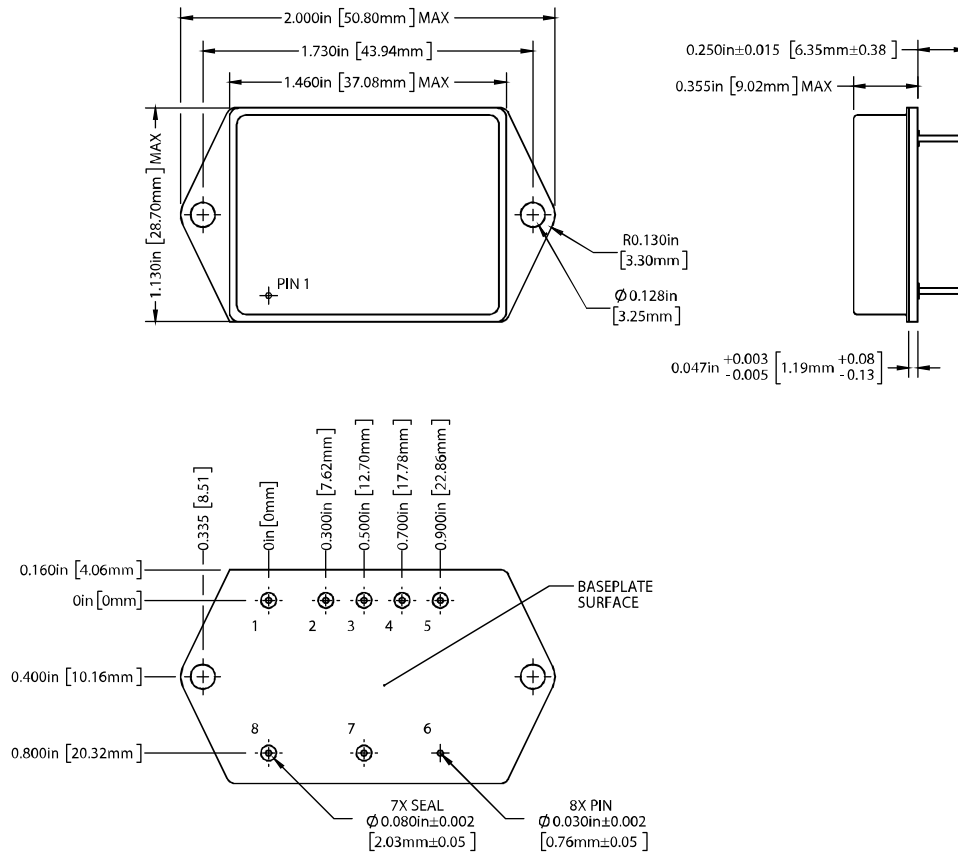
DVHF2828S (only)

Pin	Function	Pin	Function	Pin	Function
1	INH	4	OUTCOM	7	INCOM
2	+VOUT	5	N/C	8	28VIN
3	See Note 1	6	CASE		

Note 1: Pin 3 of the DVHF2828S provides a + 14 output, referenced to OUTCOM.

## 5.0 MECHANICAL OUTLINES AND PINOUT (CONTINUED)

### Flanged Package Option:



1. Tolerances are  $\pm 0.005$ " 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
3. Materials: Case (Steel, gold over nickel plated); Cover (Steel, nickel plated); Pin (Copper-cored alloy 52, gold over nickel plated); Pin Seals (Glass)

All outputs excluding the DVHF2828S

Pin	Function	Pin	Function	Pin	Function
1	INH	4	+VOUT	7	INCOM
2	NC	5	NC	8	28VIN
3	OUTCOM	6	CASE		

DVHF2828S (only)

Pin	Function	Pin	Function	Pin	Function
1	INH	4	OUTCOM	7	INCOM
2	+VOUT	5	N/C	8	28VIN
3	See Note 1	6	CASE		

Note 1: Pin 3 of the DVHF2828S provides a + 14 output, referenced to OUTCOM.



## 6.0 ENVIRONMENTAL SCREENING

100% tested per MIL-STD-883 as referenced to MIL-PRF-38534.

Contact sales for more information concerning additional environmental screening and testing options. VPT Inc. reserves the right to ship higher screened or SMD products to meet orders for lower screening levels at our sole discretion unless specifically forbidden by customer contract.

Test	MIL-STD-883 Test Method, Condition	No Suffix <sup>5</sup> (Standard, Non-QML)	/ES <sup>5</sup> (Extended, Non-QML)	/H (Class H Screening)	/K and /KL <sup>5,8</sup> (Class K Screening)
Non-Destructive Bond Pull	TM2023	• <sup>4</sup>	• <sup>4</sup>	• <sup>4</sup>	•
Internal Visual	TM2010, TM2017, TM2032 (MIL-STD-750, TM2072, TM2073)	•	•	•	•
Temperature Cycling	TM1010, Condition C -65 °C to 125 °C, Ambient			•	•
	TM1010, Condition B -55 °C to 150 °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 C1 or B2		•	•	•
	Gross Leak, Dip (No Bomb), Visual Verification	•			
Radiography <sup>7</sup>	TM2012				•
External Visual	TM2009	•	•	•	•

- 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.
- Not required per MIL-PRF-38534. Test is performed for additional product quality assurance.
- 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.

## 7.0 STANDARD MICROCIRCUIT DRAWING (SMD) NUMBERS

Standard Microcircuit Drawing Number	DVHF2800S Series Similar Part Number	Standard Microcircuit Drawing Number	DVHF2800S Series Similar Part Number
5962-0324301HXC	DVHF283R3S/H	5962-0324306HXC	DVHF281R9S/H
5962-0324301HXA	DVHF283R3S/H-E	5962-0324306HXA	DVHF281R9S/H-E
5962-0324301HYC	DVHF283R3SF/H	5962-0324306HYC	DVHF281R9SF/H
5962-0324301HYA	DVHF283R3SF/H-E	5962-0324306HYA	DVHF281R9SF/H-E
5962-0324301KXC	DVHF283R3S/K	5962-0324306KXC	DVHF281R9S/K
5962-0324301KXA	DVHF283R3S/K-E	5962-0324306KXA	DVHF281R9S/K-E
5962-0324301KYC	DVHF283R3SF/K	5962-0324306KYC	DVHF281R9SF/K
5962-0324301KYA	DVHF283R3SF/K-E	5962-0324306KYA	DVHF281R9SF/K-E
5962-0324302HXC	DVHF2805S/H	5962-0324307HXC	DVHF2828S/H
5962-0324302HXA	DVHF2805S/H-E	5962-0324307HXA	DVHF2828S/H-E
5962-0324302HYC	DVHF2805SF/H	5962-0324307HYC	DVHF2828SF/H
5962-0324302HYA	DVHF2805SF/H-E	5962-0324307HYA	DVHF2828SF/H-E
5962-0324302KXC	DVHF2805S/K	5962-0324307KXC	DVHF2828S/K
5962-0324302KXA	DVHF2805S/K-E	5962-0324307KXA	DVHF2828S/K-E
5962-0324302KYC	DVHF2805SF/K	5962-0324307KYC	DVHF2828SF/K
5962-0324302KYA	DVHF2805SF/K-E	5962-0324307KYA	DVHF2828SF/K-E
5962-0324303HXC	DVHF285R2S/H	5962-0324308HXC	DVHF285R7S/H
5962-0324303HXA	DVHF285R2S/H-E	5962-0324308HXA	DVHF285R7S/H-E
5962-0324303HYC	DVHF285R2SF/H	5962-0324308HYC	DVHF285R7SF/H
5962-0324303HYA	DVHF285R2SF/H-E	5962-0324308HYA	DVHF285R7SF/H-E
5962-0324303KXC	DVHF285R2S/K	5962-0324308KXC	DVHF285R7S/K
5962-0324303KXA	DVHF285R2S/K-E	5962-0324308KXA	DVHF285R7S/K-E
5962-0324303KYC	DVHF285R2SF/K	5962-0324308KYC	DVHF285R7SF/K
5962-0324303KYA	DVHF285R2SF/K-E	5962-0324308KYA	DVHF285R7SF/K-E
5962-0324304HXC	DVHF2812S/H	5962-0324309HXC	DVHF2818S/H
5962-0324304HXA	DVHF2812S/H-E	5962-0324309HXA	DVHF2818S/H-E
5962-0324304HYC	DVHF2812SF/H	5962-0324309HYC	DVHF2818SF/H
5962-0324304HYA	DVHF2812SF/H-E	5962-0324309HYA	DVHF2818SF/H-E
5962-0324304KXC	DVHF2812S/K	5962-0324309KXC	DVHF2818S/K
5962-0324304KXA	DVHF2812S/K-E	5962-0324309KXA	DVHF2818S/K-E
5962-0324304KYC	DVHF2812SF/K	5962-0324309KYC	DVHF2818SF/K
5962-0324304KYA	DVHF2812SF/K-E	5962-0324309KYA	DVHF2818SF/K-E
5962-0324305HXC	DVHF2815S/H		
5962-0324305HXA	DVHF2815S/H-E		
5962-0324305HYC	DVHF2815SF/H		
5962-0324305HYA	DVHF2815SF/H-E		
5962-0324305KXC	DVHF2815S/K		
5962-0324305KXA	DVHF2815S/K-E		
5962-0324305KYC	DVHF2815SF/K		
5962-0324305KYA	DVHF2815SF/K-E		

Do not use the DVHF2800S 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.

## 8.0 ORDERING INFORMATION

DVHF	28	05	S	F	/K	-	XXX
1	2	3	4	5	6		7

(1) Product Series	(2) Nominal Input Voltage	(3) Output Voltage	(4) Number of Outputs	(5) Package Option	(6) Screening Code <sup>1,2,3</sup>	(7) Additional Screening Code
DVHF	28 28 Volts	1R9 1.9 Volts	S Single	(None)	(None) Standard /ES Extended /H Class H /K Class K /KL1 Class K (KL1)	Contact Sales
		3R3 3.3 Volts		F Non-Flanged		
		05 5 Volts				
		5R2 5.2 Volts				
		5R7 5.7 Volts				
		12 12 Volts				
		15 15 Volts				
		18 18 Volts				
28 28 Volts						

1. Contact the VPT Sales Department for availability of Class H (/H), Class K (/K), or KL1 (/KL1) 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 requirements, source inspection, and/or special element evaluation for space or other higher quality applications.

## 9.0 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  
**Email:** [vptsales@vptpower.com](mailto: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.

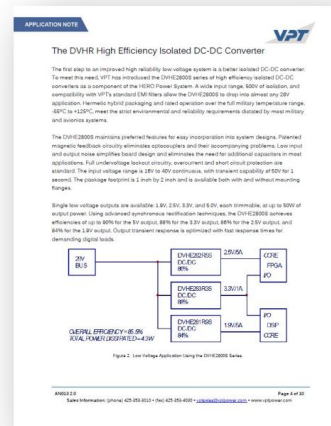
## 10.0 ADDITIONAL INFORMATION

Visit the VPT website for additional technical resources, including:

[Product Catalogs](#)



[Application Notes and White Papers](#)



[Technical Video Labs](#)



**Additional Products For [Avionics/Military](#), [Hi-Rel COTS](#), and [Space Applications](#)**

