DVTR2800S Series

HIGH RELIABILITY HYBRID DC-DC CONVERTERS

DESCRIPTION

The DVTR series of high reliability DC-DC converters is operable over the full military (-55 °C to +125 °C) temperature range with no power derating. Unique to the DVTR series are robust and effective input and output filters which provide dramatically reduced input and output noise performance when compared to other manufacturers competing devices. Operating at a nominal fixed frequency of 475 kHz, these regulated, isolated units utilize a high speed magnetic feedback design and well controlled undervoltage 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.

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
- Very Low Output Noise
- Wide Input Voltage Range: 15 to 50 Volts per MIL-STD-704
- Up to 40 Watts Output Power
- Fault Tolerant Magnetic Feedback Circuit
- Output Voltage Trim Up +10%
- NO Use of Optoisolators
- Undervoltage Lockout
- Indefinite Short Circuit Protection
- Current Limit Protection
- Industry Standard Pinout
- High Input Transient Voltage: 80 Volts for 1 sec per MIL-STD-704A
- Precision Seam Seal Hermetic Package
- High Power Density: > 40 W/in^3
- Custom Versions Available
- Additional Environmental Screening Available
- Meets MIL-STD-461 Revisions C, D, E and F EMC Requirements When Used With VPT's EMI Filters
- Flanged and Non-flanged Versions Available
- MIL-PRF-38534 Element Evaluated Components
- Space Applications should consider VPT's "S" Series of Radiation Tolerant Power Conversion Devices. Contact VPT for details.

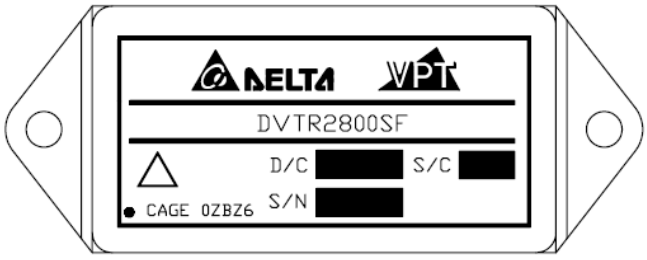

Figure 1 – DVTR2800S / DVTR2800SF DC-DC Converter
(Exact marking may differ from that shown)

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SPECIFICATIONS (T_{CASE} = -55°C to +125°C, V_{IN} = +28V ± 5%, Full Load, Unless Otherwise Specified)

ABSOLUTE MAXIMUM RATINGS			
Input Voltage (Continuous)	50 V_{DC}	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	80 Volts	Storage Temperature	-65°C to +150°C
Output Power[1]	40 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, T_{CASE} = +125°C)	13 Watts	Weight (Maximum) (Un-Flanged / Flanged)	(52 / 55) Grams
ESD Rating per MIL-PRF-38534	3A		

Parameter	Conditions	DVTR282R5S			DVTR283R3S			Units
		Min	Typ	Max	Min	Typ	Max	
STATIC								
INPUT Voltage[4]	Continuous	15	28	50	15	28	50	V
	Transient, 1 sec	-	-	80	-	-	80	V
Current	Inhibited	-	4	6	-	4	6	mA
	No Load	-	50	90	-	50	90	mA
Ripple Current	Full Load, 20Hz to 10MHz	-	15	50	-	20	50	mA_{p-p}
Inhibit Pin Input[4]		0	-	1.5	0	-	1.5	V
Inhibit Pin Open Circuit Voltage[4]		9.0	11.0	13.0	9.0	11.0	13.0	V
UVLO Turn On		12.0	-	14.8	12.0	-	14.8	V
UVLO Turn Off[4]		11.0	-	14.5	11.0	-	14.5	V
OUTPUT Voltage V_{OUT}	T_{CASE} = 25°C	2.47	2.5	2.53	3.25	3.3	3.35	V
V_{OUT}	T_{CASE} = -55°C to +125°C	2.46	2.5	2.54	3.2	3.3	3.4	V
Power[3]		0	-	15	0	-	20	W
Current[3] V_{OUT}		0	-	6.0	0	-	6.06	A
Ripple Voltage V_{OUT}	Full Load, 20Hz to 10MHz	-	20	50	-	25	50	mV_{p-p}
Line Regulation V_{OUT}	V_{IN} = 15V to 50V	-	2	20	-	2	20	mV
Load Regulation V_{OUT}	No Load to Full Load	-	2	50	-	2	50	mV
EFFICIENCY		63	66	-	65	70	-	%
LOAD FAULT POWER DISSIPATION[4]	Overload	-	-	18	-	-	16	W
	Short Circuit	-	-	18	-	-	16	W
CAPACITIVE LOAD[4]		-	-	1000	-	-	1000	µF
SWITCHING FREQUENCY		400	475	550	400	475	550	kHz
SYNC FREQUENCY RANGE	V_H - V_L = 5V, DC = 20-80%	500	-	600	500	-	600	kHz
ISOLATION	500 V_{DC}	100	-	-	100	-	-	MΩ
MTBF (MIL-HDBK-217F)	AIF @ T_C = 55°C	-	413	-	-	413	-	kHrs
DYNAMIC								
Load Step Output Transient V_{OUT}	Half Load to Full Load	-	90	400	-	180	500	mV_{PK}
Load Step Recovery[2]		-	280	500	-	260	500	µSec
Line Step Output Transient[4] V_{OUT}	V_{IN} = 16V to 40V	-	300	450	-	300	600	mV_{PK}
Line Step Recovery[2, 4]		-	300	450	-	300	500	µSec
Turn On Delay V_{OUT}	V_{IN} = 0V to 28V	-	10	20	-	10	20	mSec
Turn On Overshoot		-	0	15	-	0	15	mV_{PK}

Notes: 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 qualification testing.

SPECIFICATIONS (T_{CASE} = -55°C to +125°C, V_{IN} = +28V ± 5%, Full Load, Unless Otherwise Specified)

ABSOLUTE MAXIMUM RATINGS			
Input Voltage (Continuous)	50 V_{DC}	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	80 Volts	Storage Temperature	-65°C to +150°C
Output Power[1]	40 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, T_{CASE} = +125°C)	13 Watts	Weight (Maximum) (Un-Flanged / Flanged)	(52 / 55) Grams
ESD Rating per MIL-PRF-38534	3A		

Parameter		Conditions	DVTR2805S			DVTR285R2S			Units
			Min	Typ	Max	Min	Typ	Max	
STATIC									
INPUT Voltage[4]		Continuous	15	28	50	15	28	50	V
		Transient, 1 sec	-	-	80	-	-	80	V
Current		Inhibited	-	4	6	-	4	6	mA
		No Load	-	55	90	-	55	90	mA
Ripple Current		Full Load, 20Hz to 10MHz	-	30	50	-	30	50	mA_{p-p}
Inhibit Pin Input[4]			0	-	1.5	0	-	1.5	V
Inhibit Pin Open Circuit Voltage[4]			9.0	11.0	13.0	9.0	11.0	13.0	V
UVLO Turn On			12.0	-	14.8	12.0	-	14.8	V
UVLO Turn Off[4]			11.0	-	14.5	11.0	-	14.5	V
OUTPUT Voltage	V_{OUT}	T_{CASE} = 25°C	4.95	5	5.05	5.14	5.2	5.26	V
	V_{OUT}	T_{CASE} = -55°C to +125°C	4.875	5	5.125	5.07	5.2	5.33	V
Power[3]			0	-	30	0	-	30	W
Current[3]	V_{OUT}		0	-	6	0	-	6	A
Ripple Voltage	V_{OUT}	Full Load, 20Hz to 10MHz	-	20	50	-	20	50	mV_{p-p}
Line Regulation	V_{OUT}	V_{IN} = 15V to 50V	-	2	20	-	2	20	mV
Load Regulation	V_{OUT}	No Load to Full Load	-	2	50	-	2	50	mV
EFFICIENCY			72	78	-	72	78	-	%
LOAD FAULT POWER DISSIPATION[4]		Overload	-	-	16	-	-	16	W
		Short Circuit	-	-	16	-	-	16	W
CAPACITIVE LOAD[4]			-	-	1000	-	-	1000	µF
SWITCHING FREQUENCY			400	475	550	400	475	550	kHz
SYNC FREQUENCY RANGE		V_H - V_L = 5V, DC = 20-80%	500	-	600	500	-	600	kHz
ISOLATION		500 V_{DC}	100	-	-	100	-	-	MΩ
MTBF (MIL-HDBK-217F)		AIF @ T_C = 55°C	-	413	-	-	413	-	kHrs
DYNAMIC									
Load Step Output Transient	V_{OUT}	Half Load to Full Load	-	170	500	-	170	500	mV_{PK}
Load Step Recovery[2]			-	60	500	-	60	500	µSec
Line Step Output Transient[4]	V_{OUT}	V_{IN} = 16V to 40V	-	300	600	-	300	600	mV_{PK}
Line Step Recovery[2, 4]			-	300	500	-	300	500	µSec
Turn On Delay	V_{OUT}	V_{IN} = 0V to 28V	-	10	20	-	10	20	mSec
Turn On Overshoot			-	0	25	-	0	25	mV_{PK}

Notes: 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 qualification testing.

SPECIFICATIONS (T_{CASE} = -55°C to +125°C, V_{IN} = +28V ± 5%, Full Load, Unless Otherwise Specified)

ABSOLUTE MAXIMUM RATINGS			
Input Voltage (Continuous)	50 V_{DC}	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	80 Volts	Storage Temperature	-65°C to +150°C
Output Power[1]	40 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, T_{CASE} = +125°C)	13 Watts	Weight (Maximum) (Un-Flanged / Flanged)	(52 / 55) Grams
ESD Rating per MIL-PRF-38534	3A		

Parameter	Conditions	DVTR2807S			DVTR2808S			Units
		Min	Typ	Max	Min	Typ	Max	
STATIC								
INPUT Voltage[4]	Continuous	15	28	50	15	28	50	V
	Transient, 1 sec	-	-	80	-	-	80	V
Current	Inhibited	-	4	6	-	4	6	mA
	No Load	-	65	90	-	65	90	mA
Ripple Current	Full Load, 20Hz to 10MHz	-	30	50	-	30	50	mA_{p-p}
Inhibit Pin Input[4]		0	-	1.5	0	-	1.5	V
Inhibit Pin Open Circuit Voltage[4]		9.0	11.0	13.0	9.0	11.0	13.0	V
UVLO Turn On		12.0	-	14.8	12.0	-	14.8	V
UVLO Turn Off[4]		11.0	-	14.5	11.0	-	14.5	V
OUTPUT Voltage V_{OUT}	T_{CASE} = 25°C	6.93	7	7.07	7.92	8	8.08	V
V_{OUT}	T_{CASE} = -55°C to +125°C	6.895	7	7.105	7.88	8	8.12	V
Power[3]		0	-	35	0	-	35	W
Current[3] V_{OUT}		0	-	5	0	-	4.4	A
Ripple Voltage V_{OUT}	Full Load, 20Hz to 10MHz	-	30	50	-	30	50	mV_{p-p}
Line Regulation V_{OUT}	V_{IN} = 15V to 50V	-	2	20	-	2	20	mV
Load Regulation V_{OUT}	No Load to Full Load	-	2	50	-	2	50	mV
EFFICIENCY		72	76	-	75	79	-	%
LOAD FAULT POWER DISSIPATION[4]	Overload	-	-	16	-	-	16	W
	Short Circuit	-	-	16	-	-	16	W
CAPACITIVE LOAD[4]		-	-	1000	-	-	1000	µF
SWITCHING FREQUENCY		400	475	550	400	475	550	kHz
SYNC FREQUENCY RANGE	V_H - V_L = 5V, DC = 20-80%	500	-	600	500	-	600	kHz
ISOLATION	500 V_{DC}	100	-	-	100	-	-	MΩ
MTBF (MIL-HDBK-217F)	AIF @ T_C = 55°C	-	413	-	-	413	-	kHrs
DYNAMIC								
Load Step Output Transient V_{OUT}	Half Load to Full Load	-	150	300	-	110	250	mV_{PK}
Load Step Recovery[2]		-	100	250		60	250	µSec
Line Step Output Transient[4] V_{OUT}	V_{IN} = 16V to 40V	-	250	500	-	250	500	mV_{PK}
Line Step Recovery[2, 4]		-	250	400		250	500	µSec
Turn On Delay V_{OUT}	V_{IN} = 0V to 28V	-	10	20	-	10	20	mSec
Turn On Overshoot		-	0	25	-	0	25	mV_{PK}

Notes: 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 qualification testing.

SPECIFICATIONS (T_{CASE} = -55°C to +125°C, V_{IN} = +28V ± 5%, Full Load, Unless Otherwise Specified)

ABSOLUTE MAXIMUM RATINGS			
Input Voltage (Continuous)	50 V_{DC}	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	80 Volts	Storage Temperature	-65°C to +150°C
Output Power[1]	40 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, T_{CASE} = +125°C)	13 Watts	Weight (Maximum) (Un-Flanged / Flanged)	(52 / 55) Grams
ESD Rating per MIL-PRF-38534	3A		

Parameter	Conditions	DVTR2812S			DVTR2815S			Units
		Min	Typ	Max	Min	Typ	Max	
STATIC								
INPUT Voltage[4]	Continuous	15	28	50	15	28	50	V
	Transient, 1 sec	-	-	80	-	-	80	V
Current	Inhibited	-	4	6	-	4	6	mA
	No Load	-	60	90	-	60	90	mA
Ripple Current	Full Load, 20Hz to 10MHz	-	30	50	-	30	50	mA_{p-p}
Inhibit Pin Input[4]		0	-	1.5	0	-	1.5	V
Inhibit Pin Open Circuit Voltage[4]		9.0	11.0	13.0	9.0	11.0	13.0	V
UVLO Turn On		12.0	-	14.8	12.0	-	14.8	V
UVLO Turn Off[4]		11.0	-	14.5	11.0	-	14.5	V
OUTPUT Voltage V_{OUT}	T_{CASE} = 25°C	11.88	12	12.12	14.85	15	15.15	V
V_{OUT}	T_{CASE} = -55°C to +125°C	11.7	12	12.3	14.625	15	15.375	V
Power[3]		0	-	40	0	-	40	W
Current[3] V_{OUT}		0	-	3.33	0	-	2.67	A
Ripple Voltage V_{OUT}	Full Load, 20Hz to 10MHz	-	20	50	-	20	50	mV_{p-p}
Line Regulation V_{OUT}	V_{IN} = 15V to 50V	-	2	20	-	2	20	mV
Load Regulation V_{OUT}	No Load to Full Load	-	10	50	-	10	50	mV
EFFICIENCY		76	84	-	77	84	-	%
LOAD FAULT POWER DISSIPATION[4]	Overload	-	-	14	-	-	14	W
	Short Circuit	-	-	14	-	-	14	W
CAPACITIVE LOAD[4]		-	-	500	-	-	500	µF
SWITCHING FREQUENCY		400	475	550	400	475	550	kHz
SYNC FREQUENCY RANGE	V_H - V_L = 5V, DC = 20-80%	500	-	600	500	-	600	kHz
ISOLATION	500 V_{DC}	100	-	-	100	-	-	MΩ
MTBF (MIL-HDBK-217F)	AIF @ T_C = 55°C	-	413	-	-	413	-	kHrs
DYNAMIC								
Load Step Output Transient V_{OUT}	Half Load to Full Load	-	450	700	-	500	700	mV_{PK}
Load Step Recovery[2]		-	200	500	-	150	500	µSec
Line Step Output Transient[4] V_{OUT}	V_{IN} = 16V to 40V	-	500	900	-	500	900	mV_{PK}
Line Step Recovery[2, 4]	P_{OUT} = 30W	-	300	500	-	300	500	µSec
Turn On Delay V_{OUT}	V_{IN} = 0V to 28V	-	10	20	-	10	20	mSec
Turn On Overshoot		-	0	50	-	0	50	mV_{PK}

Notes: 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 qualification testing.

SPECIFICATIONS (T_{CASE} = -55°C to +125°C, V_{IN} = +28V ± 5%, Full Load, Unless Otherwise Specified)

ABSOLUTE MAXIMUM RATINGS			
Input Voltage (Continuous)	50 V_{DC}	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	80 Volts	Storage Temperature	-65°C to +150°C
Output Power[1]	40 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, T_{CASE} = +125°C)	13 Watts	Weight (Maximum) (Un-Flanged / Flanged)	(52 / 55) Grams
ESD Rating per MIL-PRF-38534	3A		

Parameter	Conditions	DVTR2818S			DVTR2828S			Units
		Min	Typ	Max	Min	Typ	Max	
STATIC								
INPUT Voltage[4]	Continuous	15	28	50	15	28	50	V
	Transient, 1 sec	-	-	80	-	-	80	V
Current	Inhibited	-	4	6	-	4	6	mA
	No Load	-	60	90	-	60	90	mA
Ripple Current	Full Load, 20Hz to 10MHz	-	30	50	-	30	50	mA_{p-p}
Inhibit Pin Input[4]		0	-	1.5	0	-	1.5	V
Inhibit Pin Open Circuit Voltage[4]		9.0	11.0	13.0	9.0	11.0	13.0	V
UVLO Turn On		12.0	-	14.8	12.0	-	14.8	V
UVLO Turn Off[4]		11.0	-	14.5	11.0	-	14.5	V
OUTPUT Voltage V_{OUT}	T_{CASE} = 25°C	17.82	18	18.18	27.72	28	28.28	V
V_{OUT}	T_{CASE} = -55°C to +125°C	17.55	18	18.45	27.30	28	28.70	V
Power[3]		0	-	40	0	-	40	W
Current[3] V_{OUT}		0	-	2.22	0	-	1.43	A
Ripple Voltage V_{OUT}	Full Load, 20Hz to 10MHz	-	20	50	-	30	150	mV_{p-p}
Line Regulation V_{OUT}	V_{IN} = 15V to 50V	-	2	20	-	2	150	mV
Load Regulation V_{OUT}	No Load to Full Load	-	10	50	-	20	150	mV
EFFICIENCY		77	84	-	79	84	-	%
LOAD FAULT POWER DISSIPATION[4]	Overload	-	-	14	-	-	14	W
	Short Circuit	-	-	14	-	-	14	W
CAPACITIVE LOAD[4]		-	-	500	-	-	500	µF
SWITCHING FREQUENCY		400	475	550	400	450	550	kHz
SYNC FREQUENCY RANGE	V_H - V_L = 5V, DC = 20-80%	500	-	600	500	-	600	kHz
ISOLATION	500 V_{DC}	100	-	-	100	-	-	MΩ
MTBF (MIL-HDBK-217F)	AIF @ T_C = 55°C	-	413	-	-	413	-	kHrs
DYNAMIC								
Load Step Output Transient V_{OUT}	Half Load to Full Load	-	450	700	-	850	1200	mV_{PK}
Load Step Recovery[2]		-	200	400		250	400	µSec
Line Step Output Transient[4] V_{OUT}	V_{IN} = 16V to 40V	-	1000	1600	-	1500	2800	mV_{PK}
Line Step Recovery[2, 4]		-	350	550		350	600	µSec
Turn On Delay V_{OUT}	V_{IN} = 0V to 28V	-	10	20	-	10	20	mSec
Turn On Overshoot		-	0	50	-	0	50	mV_{PK}

Notes: 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 qualification testing.

BLOCK DIAGRAM

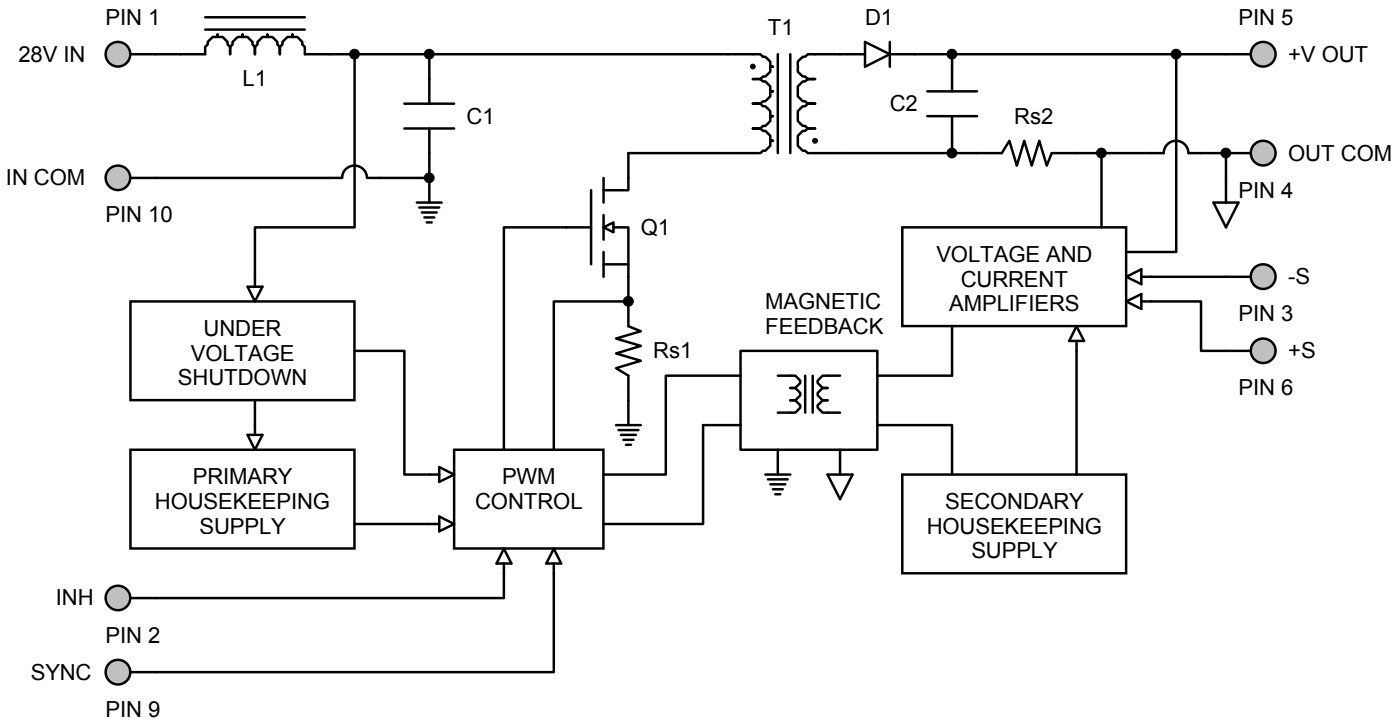


Figure 2

CONNECTION DIAGRAM

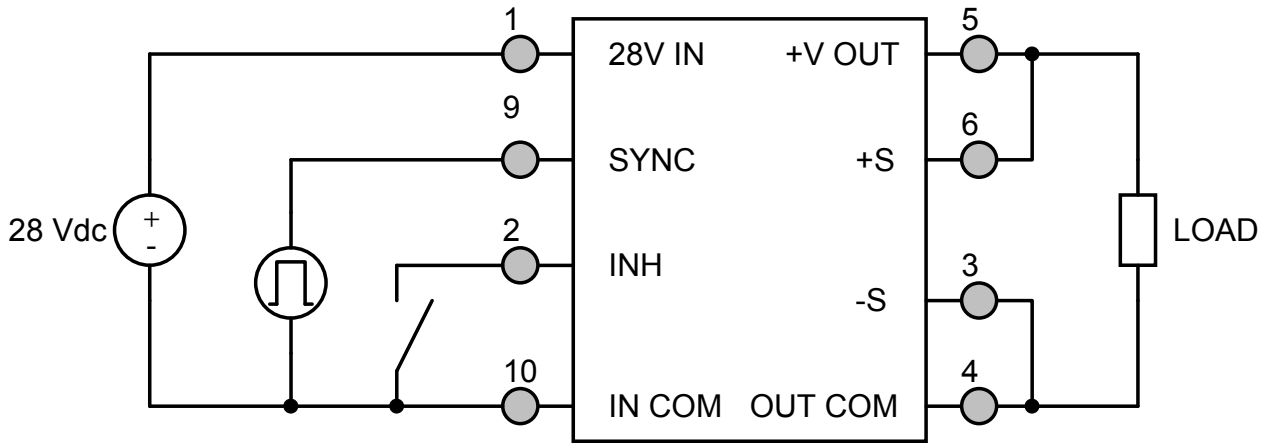


Figure 3

INHIBIT DRIVE CONNECTION DIAGRAMS

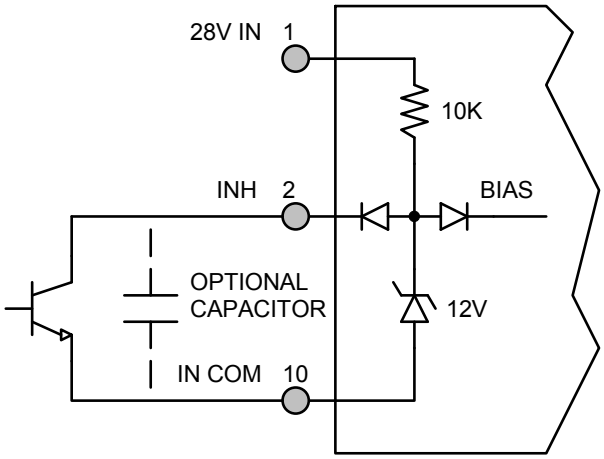


Figure 4 – Internal Inhibit Circuit and Recommended Drive
(Shown with optional capacitor for turn-on delay)

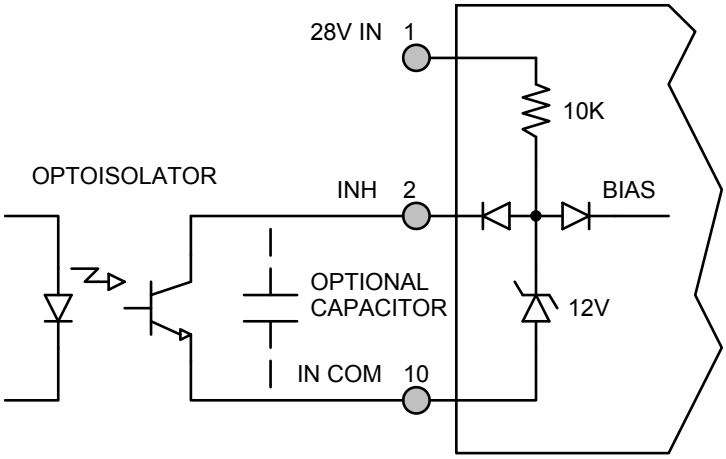


Figure 5 – Isolated Inhibit Drive
(Shown with optional capacitor for turn-on delay)

EMI FILTER HOOKUP DIAGRAM

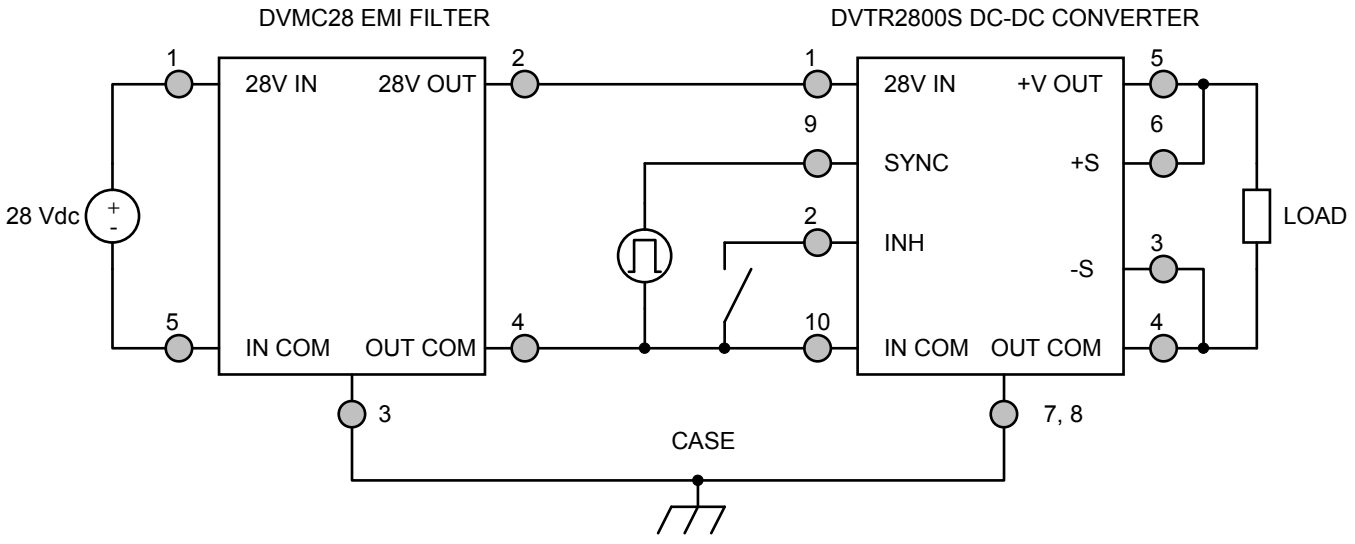
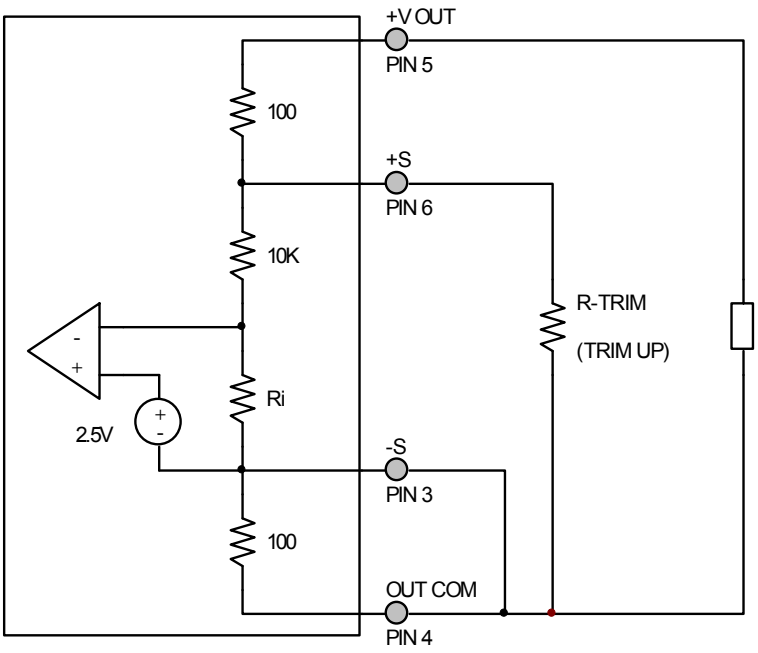


Figure 6 – Converter with EMI Filter

OUTPUT VOLTAGE TRIM



The output voltage can be trimmed up by connecting a resistor between the +S pin (PIN 6) and the OUT COM pin (PIN 4). The maximum trim range is +10%. The appropriate resistor values versus the output voltage are given in the trim table below. The –S pin should be connected to the OUT COM pin.

Figure 7 – Output Voltage Trim

DVTR282R5S		DVTR283R3S		DVTR2805S		DVTR285R2S		DVTR2807S	
$+V_{OUT}$ (V)	R_{TRIM} (Ω)	$+V_{OUT}$ (V)	R_{TRIM} (Ω)	$+V_{OUT}$ (V)	R_{TRIM} (Ω)	$+V_{OUT}$ (V)	R_{TRIM} (Ω)	$+V_{OUT}$ (V)	R_{TRIM} (Ω)
2.75	1.05k	3.60	1.13k	5.50	1.05k	5.70	1.09k	7.70	1.07k
2.70	1.33k	3.55	1.36k	5.45	1.18k	5.65	1.22k	7.65	1.16k
2.65	1.82k	3.50	1.72k	5.40	1.33k	5.60	1.39k	7.60	1.26k
2.60	2.86k	3.45	2.32k	5.35	1.54k	5.55	1.60k	7.55	1.39k
2.55	6.67k	3.40	3.59k	5.30	1.82k	5.50	1.89k	7.50	1.54k
2.50	-	3.35	7.87k	5.25	2.22k	5.45	2.31k	7.45	1.73k
		3.30	-	5.20	2.86k	5.40	2.97k	7.40	1.97k
				5.15	4.00k	5.35	4.16k	7.35	2.29k
				5.10	6.67k	5.30	6.93k	7.30	2.74k
				5.05	20.0k	5.25	20.8k	7.25	3.41k
				5.00	-	5.20	-	7.20	4.51k
								7.15	6.64k
								7.10	12.6k
								7.05	131k
								7.00	-

(continued on next page)

OUTPUT VOLTAGE TRIM

DVTR2808S		DVTR2812S		DVTR2815S		DVTR2818S		DVTR2828S	
$+V_{OUT}$ (V)	R_{TRIM} (Ω)	$+V_{OUT}$ (V)	R_{TRIM} (Ω)	$+V_{OUT}$ (V)	R_{TRIM} (Ω)	$+V_{OUT}$ (V)	R_{TRIM} (Ω)	$+V_{OUT}$ (V)	R_{TRIM} (Ω)
8.8	1.07k	13.2	1.09k	16.50	1.09k	19.8	1.09k	30.8	1.10k
8.7	1.24k	13.1	1.19k	16.40	1.18k	19.6	1.24k	30.6	1.19k
8.6	1.47k	13.0	1.33k	16.30	1.28k	19.4	1.43k	30.4	1.30k
8.5	1.80k	12.9	1.49k	16.20	1.40k	19.2	1.70k	30.2	1.44k
8.4	2.32k	12.8	1.70k	16.10	1.54k	19.0	2.10k	30.0	1.60k
8.3	3.27k	12.7	1.98k	16.00	1.71k	18.8	2.74k	29.8	1.81k
8.2	5.52k	12.6	2.38k	15.90	1.94k	18.6	3.94k	29.6	2.07k
8.1	17.8k	12.5	2.96k	15.80	2.22k	18.4	7.00k	29.4	2.44k
8.0	-	12.4	3.94k	15.70	2.61k	18.2	31.5k	29.2	2.95k
		12.3	5.86k	15.60	3.16k	18.0	-	29.0	3.73k
		12.2	11.4k	15.50	4.00k			28.8	5.09k
		12.1	242k	15.40	5.46k			28.6	8.00k
		12.0	-	15.30	8.57k			28.4	18.7k
				15.20	20.0k			28.2	Note 1
				15.10	Note 1			28.0	-
				15.00	-				

Notes: 1. Connect R-TRIM = 400Ω from +VOUT (PIN 5) to +S (PIN 6).

EFFICIENCY PERFORMANCE CURVES (T_{CASE} = 25°C, Full Load, Unless Otherwise Specified)

------- V_{IN} = 16V	——— V_{IN} = 28V	– – – – – V_{IN} = 40V

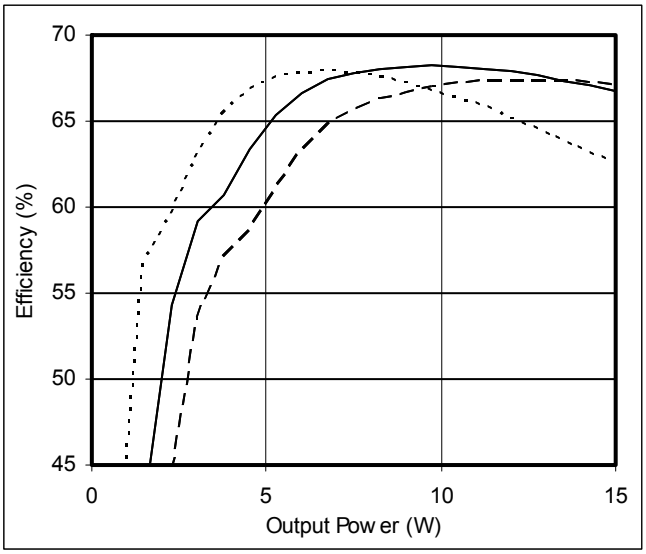


Figure 8 – DVTR282R5S
Efficiency (%) vs. Output Power (W)

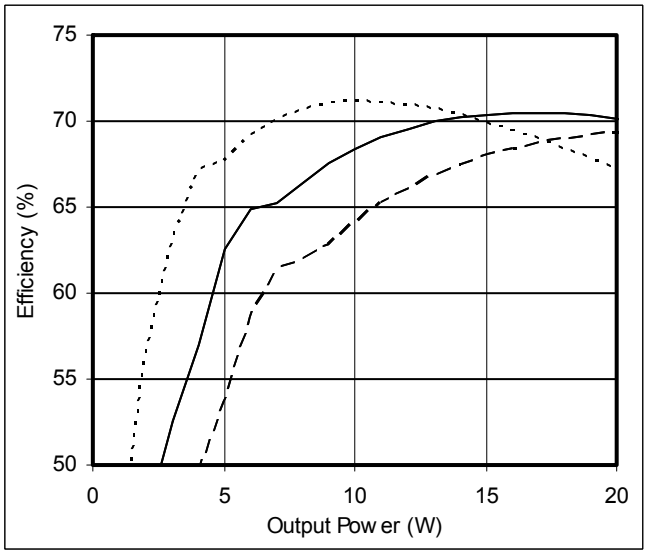


Figure 9 – DVTR283R3S
Efficiency (%) vs. Output Power (W)

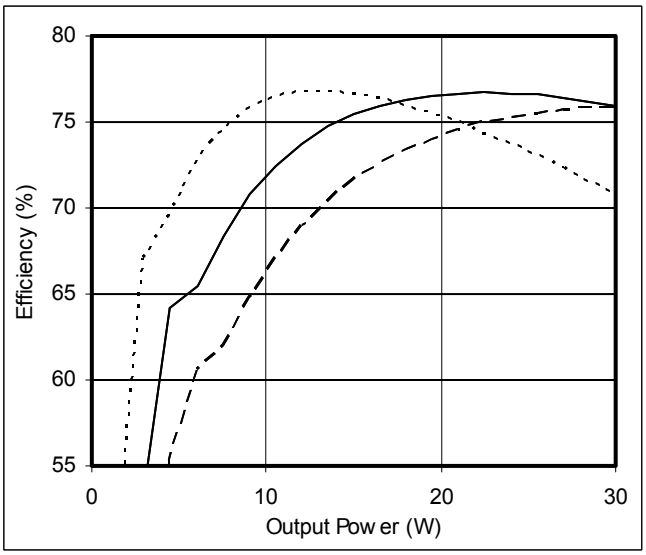


Figure 10 – DVTR2805S / DVTR285R2S
Efficiency (%) vs. Output Power (W)

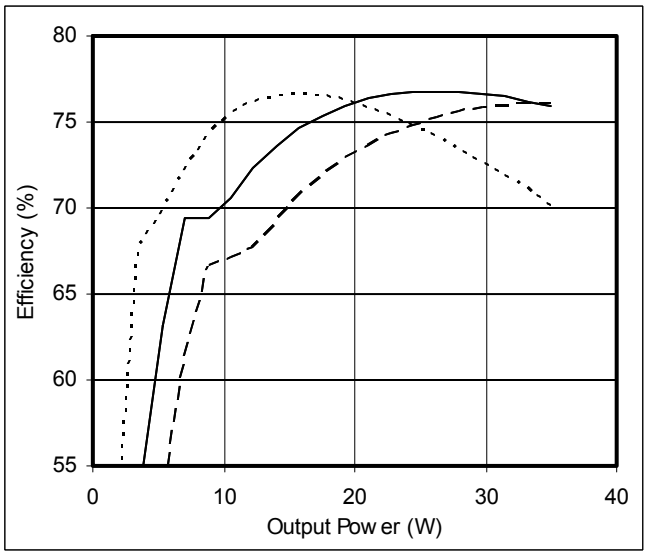


Figure 11 – DVTR2807S
Efficiency (%) vs. Output Power (W)

EFFICIENCY PERFORMANCE CURVES (T_{CASE} = 25°C, Full Load, Unless Otherwise Specified)

------- V_{IN} = 16V	——— V_{IN} = 28V	– – – – – V_{IN} = 40V

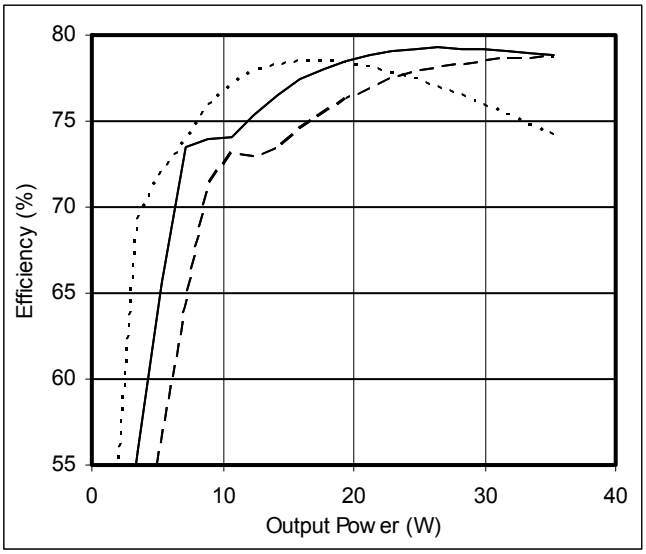


Figure 12 – DVTR2808S
Efficiency (%) vs. Output Power (W)

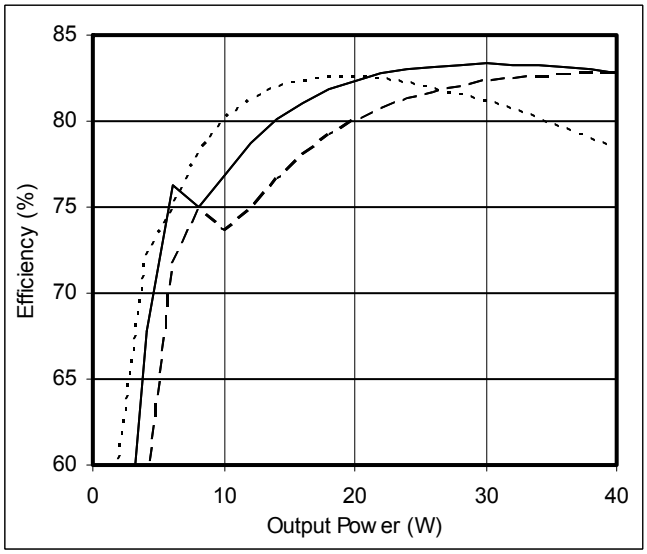


Figure 13 – DVTR2812S
Efficiency (%) vs. Output Power (W)

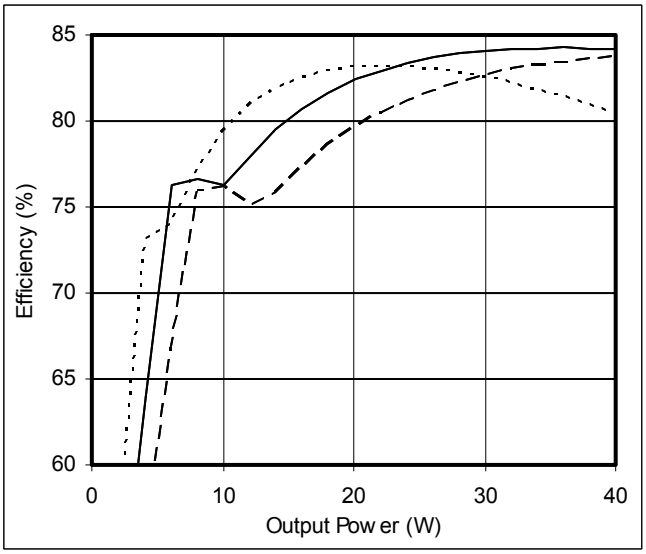


Figure 14 – DVTR2815S
Efficiency (%) vs. Output Power (W)

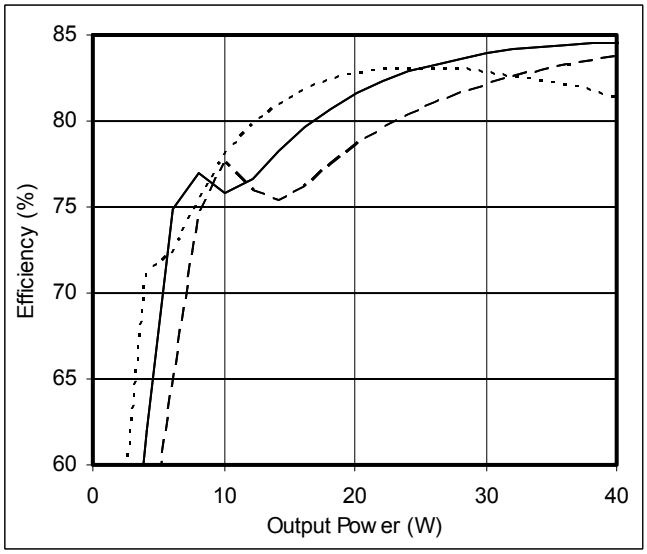


Figure 15 – DVTR2818S
Efficiency (%) vs. Output Power (W)

EFFICIENCY PERFORMANCE CURVES (T_{CASE} = 25°C, Full Load, Unless Otherwise Specified)

------- V_{IN} = 16V	——— V_{IN} = 28V	– – – – – V_{IN} = 40V

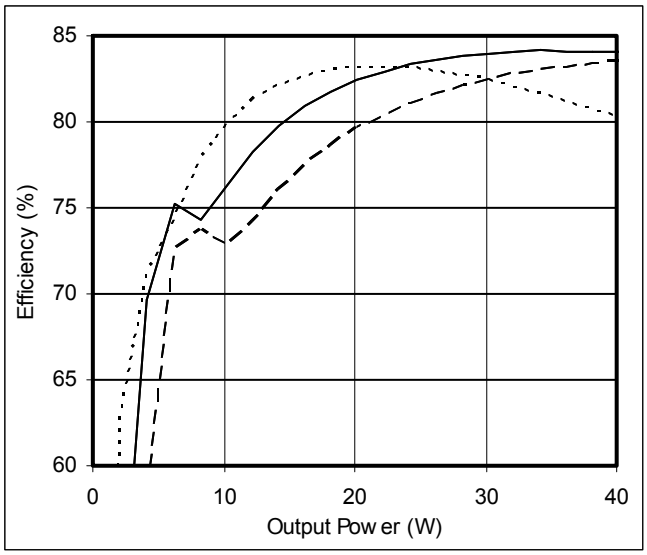


Figure 16 – DVTR2828S
Efficiency (%) vs. Output Power (W)

EMI PERFORMANCE CURVES

(T_{CASE} = 25°C, V_{IN} = +28V ± 5%, Full Load, Unless Otherwise Specified)

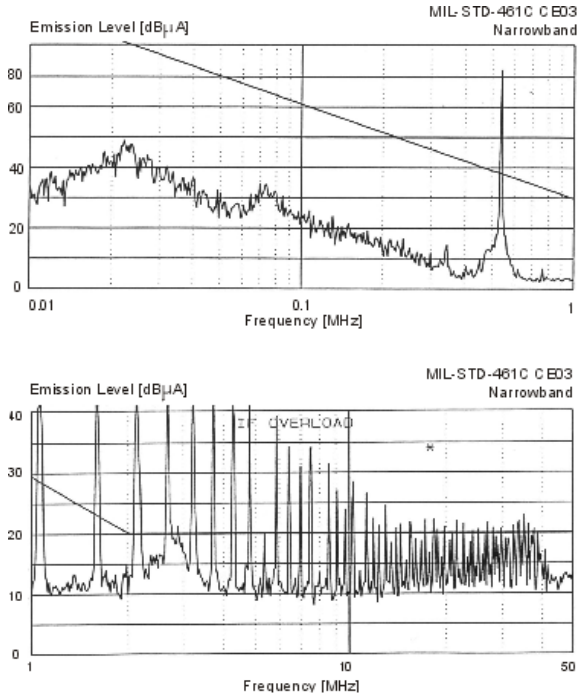


Figure 17 – DVTR2800S without EMI Filter

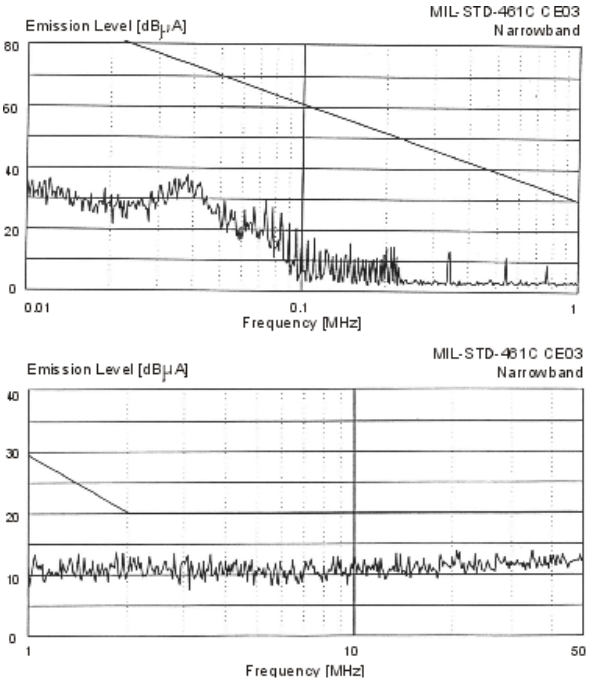
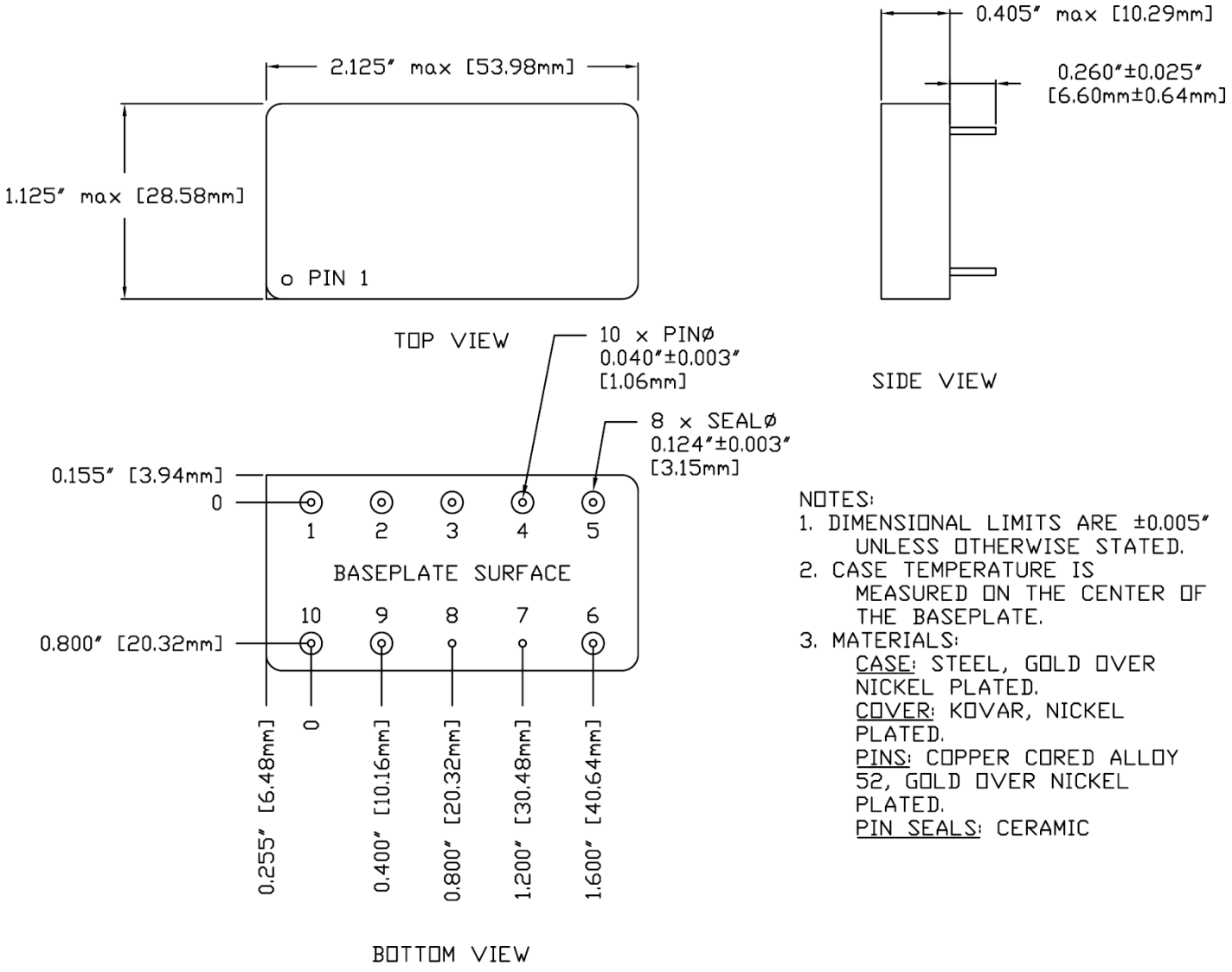


Figure 18 – DVTR2800S with EMI Filter

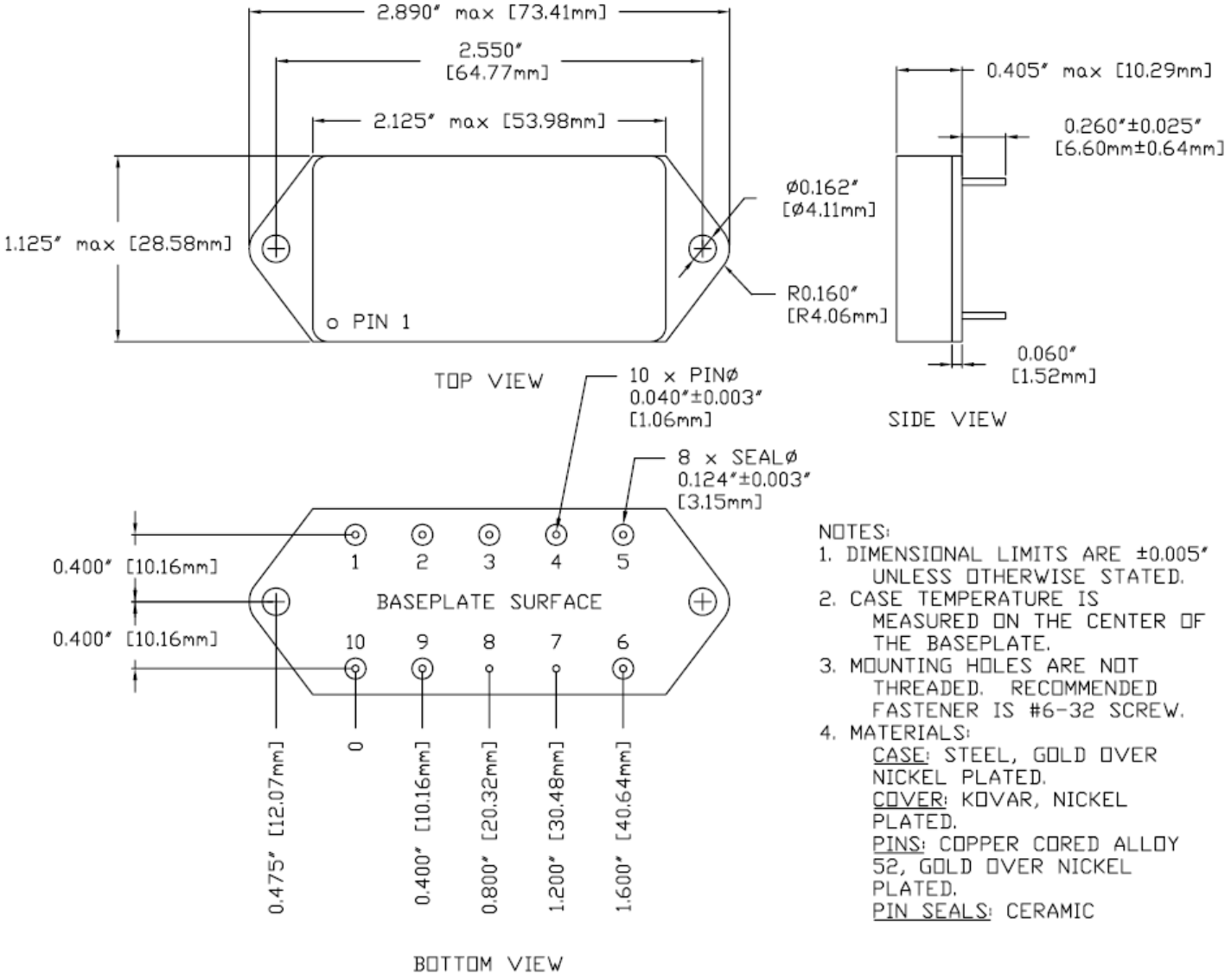
PACKAGE SPECIFICATIONS (NON-FLANGED, SEAM SEAL)



PIN	FUNCTION	PIN	FUNCTION
1	28V IN	6	+S
2	INHIBIT	7	CASE
3	-S	8	CASE
4	OUT COM	9	SYNC
5	+V OUT	10	IN COM

Figure 19 – Non-Flanged, Seam Seal Package and Pinout

PACKAGE SPECIFICATIONS (FLANGED, SEAM SEAL)



PIN	FUNCTION	PIN	FUNCTION
1	28V IN	6	+S
2	INHIBIT	7	CASE
3	-S	8	CASE
4	OUT COM	9	SYNC
5	+V OUT	10	IN COM

Figure 20 – Flanged, Seam Seal Package and Pinout

PACKAGE PIN DESCRIPTION

Pin	Function	Description
1	28V IN	Positive Input Voltage Connection
2	INHIBIT	Logic Low = Disabled Output. Connecting the inhibit pin to input common causes converter shutdown. Logic High = Enabled Output. Unconnected or open collector TTL.
3	-S	Return Sense
4	OUT COM	Output Common Connection
5	+V OUT	Positive Output Voltage Connection
6	+S	Positive Sense
7	CASE	Case Connection
8	CASE	Case Connection
9	SYNC	Synchronization Signal
10	IN COM	Input Common Connection

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

Screening	MIL-STD-883	Standard (No Suffix)	Extended /ES	HB /HB	Class H /H	Class K /K
Non-Destructive Bond Pull	Method 2023	•	•	•	•	•
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[2]					•
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[1] 100% at 25°C	•	•	•	•	•
Hermeticity	Method 1014, Fine Leak, Condition A Method 1014, Gross Leak, Condition C Dip (1 x 10^{-3})	•	• •	• •	• •	• •
Radiography	Method 2012[3]					•
External Visual	Method 2009	•	•	•	•	•

Notes:
1. 100% R&R testing at –55°C, +25°C, and +125°C with all test data included in product shipment.
2. PIND test Certificate of Compliance included in product shipment.
3. Radiographic test Certificate of Compliance and film(s) included in product shipment.

ORDERING INFORMATION

DVTR	28	05	S	F	/HB	-	XXX
1	2	3	4	5	6		7

(1)	(2)		(3)		(4)	
Product Series	**Nominal Input Voltage**		**Output Voltage**		**Number of Outputs**	
DVTR	**28**	28 Volts	**2R5** **3R3** **05** **5R2** **07** **08** **12** **15** **18** **28**	2.5 Volts 3.3 Volts 5 Volts 5.2 Volts 7 Volts 8 Volts 12 Volts 15 Volts 18 Volts 28 Volts	**S**	Single

(5)		(6)		(7)
Package Option		**Screening Code[1,2]**		**Additional Screening Code**
None **F**	Non-Flanged Flanged	**None** **/ES** **/HB** **/H** **/K**	Standard Extended HB Class H 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.

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)	DVTR2800S Series Similar Part Number
5962-1122401HXC 5962-1122401HYC	DVTR282R5S/H DVTR282R5SF/H
5962-1122402HXC 5962-1122402HYC	DVTR283R3S/H DVTR283R3SF/H
5962-1122403HXC 5962-1122403HYC	DVTR2805S/H DVTR2805SF/H
5962-1122404HXC 5962-1122404HYC	DVTR285R2S/H DVTR285R2SF/H
5962-1122405HXC 5962-1122405HYC	DVTR2812S/H DVTR2812SF/H
5962-1122406HXC 5962-1122406HYC	DVTR2815S/H DVTR2815SF/H

Do not use the DVTR2800S 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. SMD's can be downloaded from the DLA Land and Maritime (Previously known as DSCC) website at http://www.dscc.dla.mil/programs/smcr/. The SMD 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 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-inc.com