DVETR2800S Series

HIGH RELIABILITY HYBRID DC-DC CONVERTERS WITH INTEGRAL EMI FILTER

DESCRIPTION

The DVETR 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 DVETR series is a fault tolerant magnetic feedback circuit. Operating at a nominal fixed frequency of 500 kHz per stage, these regulated, isolated units utilize 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
- 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 Solder Seal Hermetic Package
- High Power Density: > 30 W/in^3
- Custom Versions Available
- Additional Environmental Screening Available
- No External EMI Filter Required
- Meets MIL-STD-461C and MIL-STD-461D EMC Requirements
- Protects Against Conducted Susceptibility Specified in MIL-STD-461C, CS01 and CS02
- Flanged and Non-flanged Versions Available
- MIL-PRF-38534 Element Evaluated Components

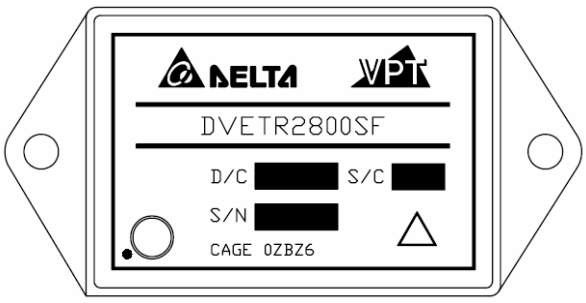


Figure 1 – DVETR2800S / DVETR2800SF DC-DC Converter
(Not To Scale)

11314 4th Avenue
West, Suite 206
Everett, WA 98204
http://www.vpt-inc.com

Sales Information:
Phone: (425) 353-3010
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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)	14 Watts	Weight (Maximum) (Un-Flanged / Flanged)	(51 / 55) Grams

Parameter		Conditions	DVETR283R3S			DVETR2805S			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	-	-	6	-	-	6	mA
		No Load	-	-	90	-	-	90	mA
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	3.267	3.30	3.333	4.95	5.00	5.05	V
	V_{OUT}	T_{CASE} = -55°C to +125°C	3.25	3.30	3.35	4.90	5.00	5.10	V
Power[3]			0	-	20	0	-	30	W
Current[3]	V_{OUT}		0	-	6.06	0	-	6.0	A
Ripple Voltage	V_{OUT}	Full Load, 20Hz to 10MHz	-	-	50	-	-	50	mV_{p-p}
Line Regulation	V_{OUT}	V_{IN} = 15V to 50V	-	-	20	-	-	20	mV
Load Regulation	V_{OUT}	No Load to Full Load	-	-	50	-	-	50	mV
EFFICIENCY			65	-	-	70	-	-	%
LOAD FAULT POWER DISSIPATION		Overload[4]	-	-	16	-	-	16	W
		Short Circuit	-	-	16	-	-	16	W
CAPACITIVE LOAD[4]			-	-	1000	-	-	1000	µF
SWITCHING FREQUENCY			400	475	550	450	500	550	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	-	-	400	-	-	500	mV_{PK}
Load Step Recovery[2]			-	-	500	-	-	500	µSec
Line Step Output Transient[4]	V_{OUT}	V_{IN} = 16V to 40V	-	150	600	-	150	600	mV_{PK}
Line Step Recovery[2, 4]			-	100	500	-	100	500	µSec
Turn On Delay	V_{OUT}	V_{IN} = 0V to 28V	-	-	20	-	-	20	mSec
Turn On Overshoot			-	-	30	-	-	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)	14 Watts	Weight (Maximum) (Un-Flanged / Flanged)	(51 / 55) Grams

Parameter		Conditions	DVETR2812S			DVETR2815S			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	-	-	6	-	-	6	mA
		No Load	-	-	90	-	-	90	mA
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	12.0	12.12	14.85	15.0	15.15	V
	V_{OUT}	T_{CASE} = -55°C to +125°C	11.72	12.0	12.18	14.775	15.0	15.225	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	-	-	50	-	-	50	mV_{p-p}
Line Regulation	V_{OUT}	V_{IN} = 15V to 50V	-	-	20	-	-	20	mV
Load Regulation	V_{OUT}	No Load to Full Load	-	-	50	-	-	50	mV
EFFICIENCY			74	-	-	75	-	-	%
LOAD FAULT POWER DISSIPATION		Overload[4]	-	-	14	-	-	14	W
		Short Circuit	-	-	14	-	-	14	W
CAPACITIVE LOAD[4]			-	-	500	-	-	500	µF
SWITCHING FREQUENCY			400	475	550	400	475	550	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	-	-	700	-	-	800	mV_{PK}
Load Step Recovery[2]			-	-	500	-	-	500	µSec
Line Step Output Transient[4]	V_{OUT}	V_{IN} = 16V to 40V	-	800	1200	-	800	1200	mV_{PK}
Line Step Recovery[2, 4]			-	300	500	-	300	500	µSec
Turn On Delay	V_{OUT}	V_{IN} = 0V to 28V	-	-	20	-	-	20	mSec
Turn On Overshoot			-	-	50	-	-	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)	14 Watts	Weight (Maximum) (Un-Flanged / Flanged)	(51 / 55) Grams

Parameter		Conditions	DVETR285R2S			Units
			Min	Typ	Max	
STATIC						
INPUT Voltage[4]		Continuous	15	28	50	V
		Transient, 1 sec	-	-	80	V
Current		Inhibited	-	-	6	mA
		No Load	-	-	90	mA
Inhibit Pin Input[4]			0	-	1.5	V
Inhibit Pin Open Circuit Voltage[4]			9.0	11.0	13.0	V
UVLO Turn On			12.0	-	14.8	V
UVLO Turn Off[4]			11.0	-	14.5	V
OUTPUT Voltage	V_{OUT}	T_{CASE} = 25°C	5.14	5.20	5.26	V
	V_{OUT}	T_{CASE} = -55°C to +125°C	5.09	5.20	5.31	V
Power[3]			0	-	30	W
Current[3]	V_{OUT}		0	-	6.0	A
Ripple Voltage	V_{OUT}	Full Load, 20Hz to 10MHz	-	-	50	mV_{p-p}
Line Regulation	V_{OUT}	V_{IN} = 15V to 50V	-	-	20	mV
Load Regulation	V_{OUT}	No Load to Full Load	-	-	50	mV
EFFICIENCY			70	-	-	%
LOAD FAULT POWER DISSIPATION		Overload[4]	-	-	16	W
		Short Circuit	-	-	16	W
CAPACITIVE LOAD[4]			-	-	1000	µF
SWITCHING FREQUENCY			400	500	550	kHz
ISOLATION		500 V_{DC}	100	-	-	MΩ
MTBF (MIL-HDBK-217F)		AIF @ T_C = 55°C	-	413	-	kHrs
DYNAMIC						
Load Step Output Transient	V_{OUT}	Half Load to Full Load	-	-	500	mV_{PK}
Load Step Recovery[2]			-	-	500	µSec
Line Step Output Transient[4]	V_{OUT}	V_{IN} = 16V to 40V	-	150	600	mV_{PK}
Line Step Recovery[2, 4]			-	100	500	µSec
Turn On Delay	V_{OUT}	V_{IN} = 0V to 28V	-	-	20	mSec
Turn On Overshoot			-	-	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

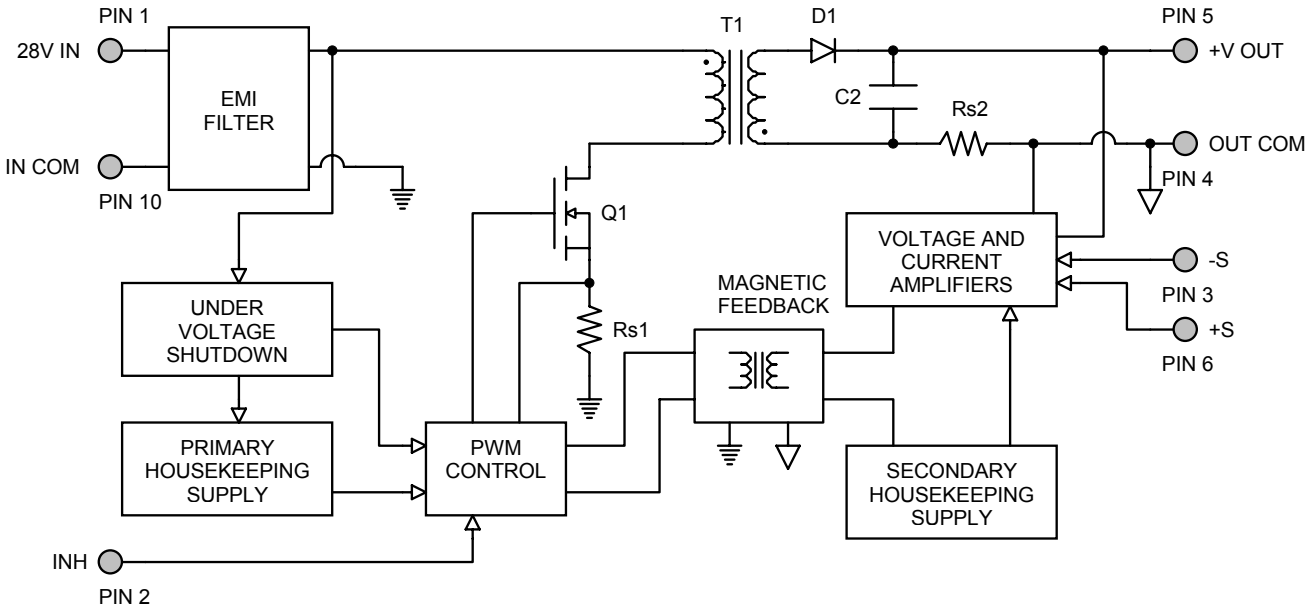


Figure 2

CONNECTION DIAGRAM

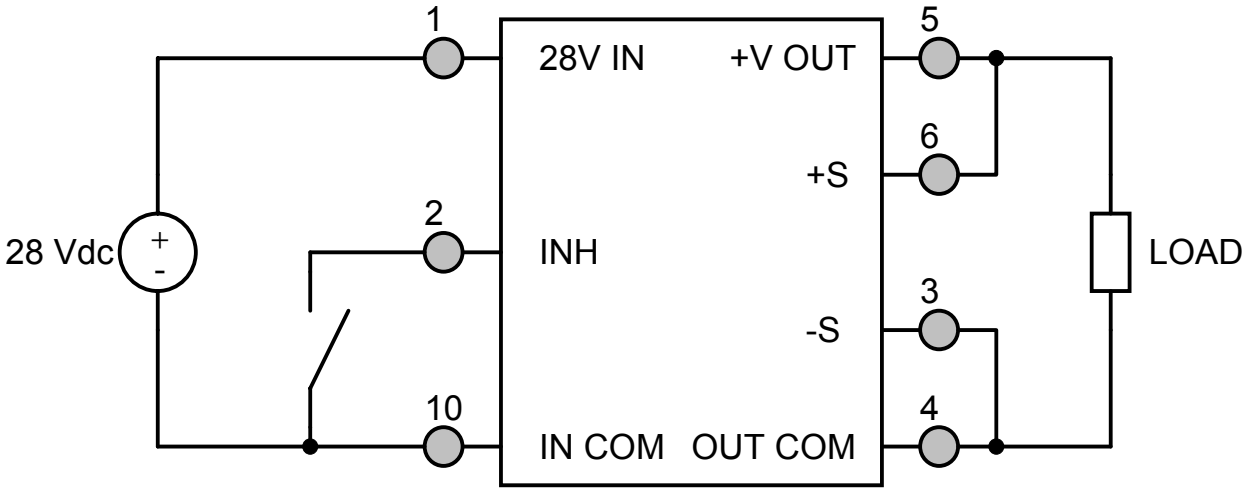


Figure 3

INHIBIT DRIVE CONNECTION DIAGRAMS

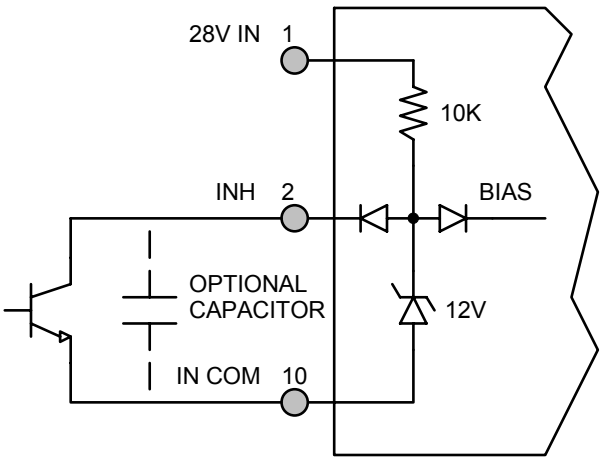


Figure 4 – Internal Inhibit Circuit and Recommended Drive
(Shown with optional capacitor for turn-on delay)

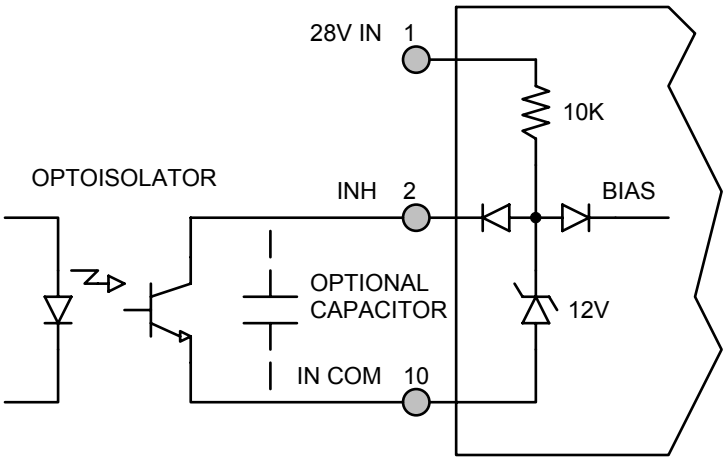
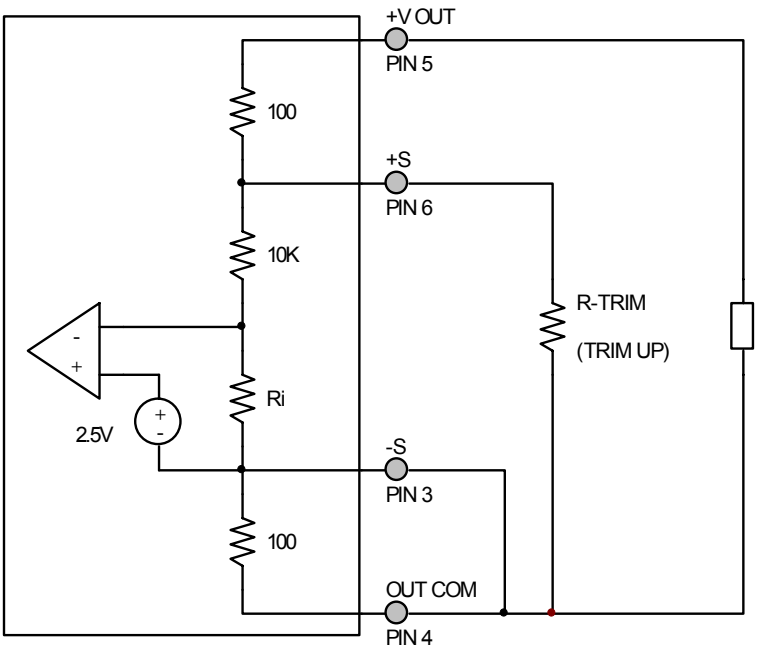


Figure 5 – Isolated Inhibit Drive
(Shown with optional capacitor for turn-on delay)

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 6 – Output Voltage Trim

DVETR283R3S		DVETR2805S		DVETR285R2S		DVETR2812S		DVETR2815S	
$+V_{OUT}$ (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)
3.60	1.13k	5.50	1.05k	5.70	1.09k	13.2	1.09k	16.50	1.09k
3.55	1.36k	5.45	1.18k	5.65	1.22k	13.1	1.19k	16.40	1.18k
3.50	1.72k	5.40	1.33k	5.60	1.39k	13.0	1.33k	16.30	1.28k
3.45	2.32k	5.35	1.54k	5.55	1.60k	12.9	1.49k	16.20	1.4k
3.40	3.59k	5.30	1.82k	5.50	1.89k	12.8	1.7k	16.10	1.54k
3.35	7.87k	5.25	2.22k	5.45	2.31k	12.7	1.98k	16.00	1.71k
3.30	-	5.20	2.86k	5.40	2.97k	12.6	2.38k	15.90	1.94k
		5.15	4k	5.35	4.16k	12.5	2.96k	15.80	2.22k
		5.10	6.67k	5.30	6.93k	12.4	3.94k	15.70	2.61k
		5.05	20k	5.25	20.8k	12.3	5.86k	15.60	3.16k
		5.00	-	5.20	-	12.2	11.4k	15.50	4k
						12.1	242k	15.40	5.46k
						12.0	-	15.30	8.57k
								15.20	20k
								15.10	Note 1
								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

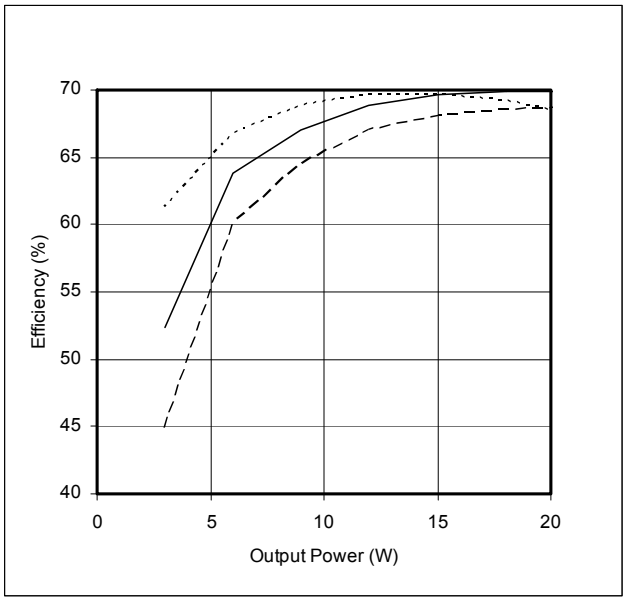


Figure 7 – DVETR283R3S
Efficiency (%) vs. Output Power (W)

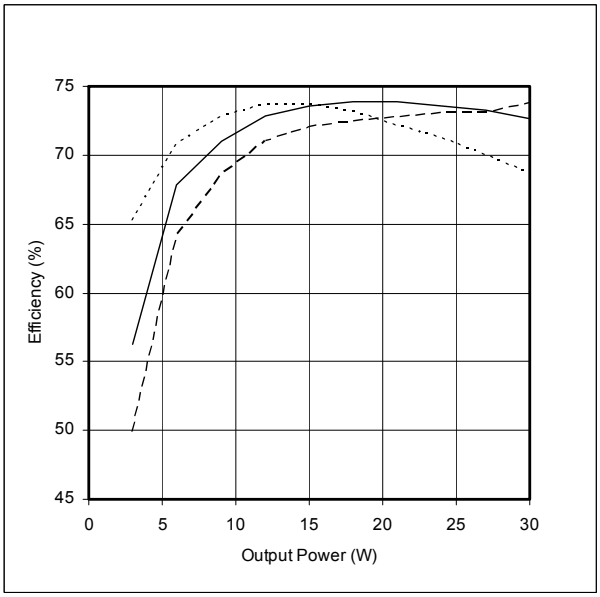


Figure 8 – DVETR2805S / DVETR285R2S
Efficiency (%) vs. Output Power (W)

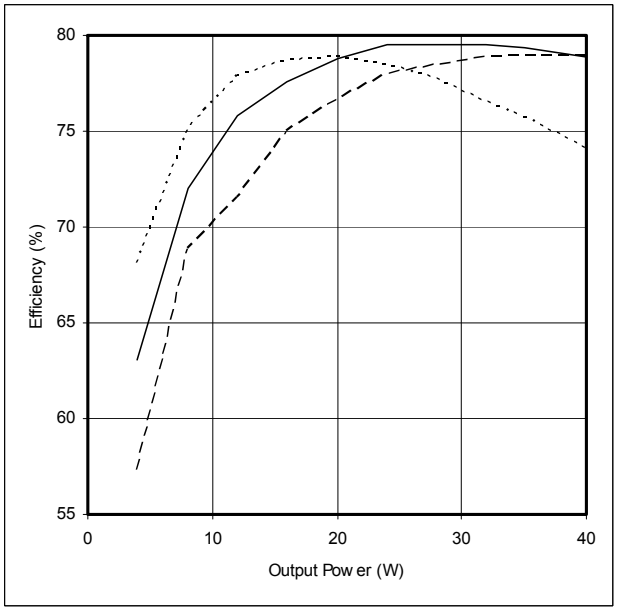


Figure 9 – DVETR2812S
Efficiency (%) vs. Output Power (W)

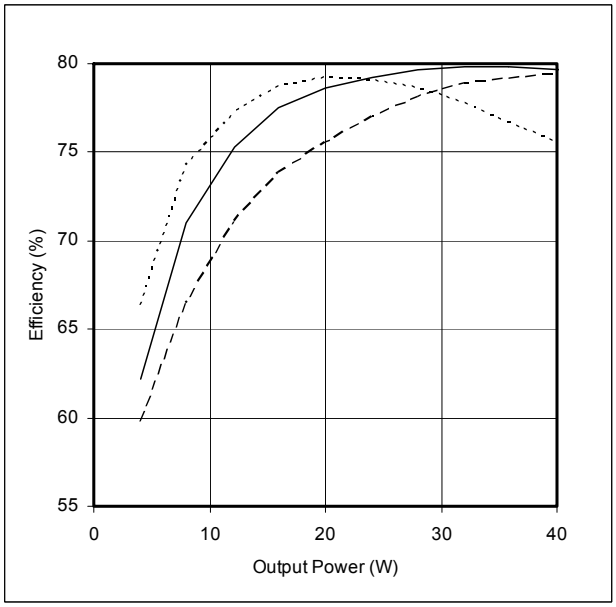


Figure 10 – DVETR2815S
Efficiency (%) vs. Output Power (W)

EMI PERFORMANCE CURVES

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

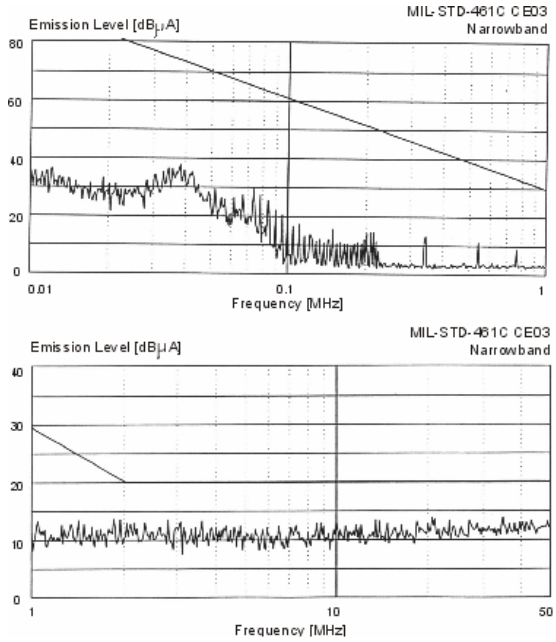


Figure 11 – MIL-STD-461C
DVETR2800S

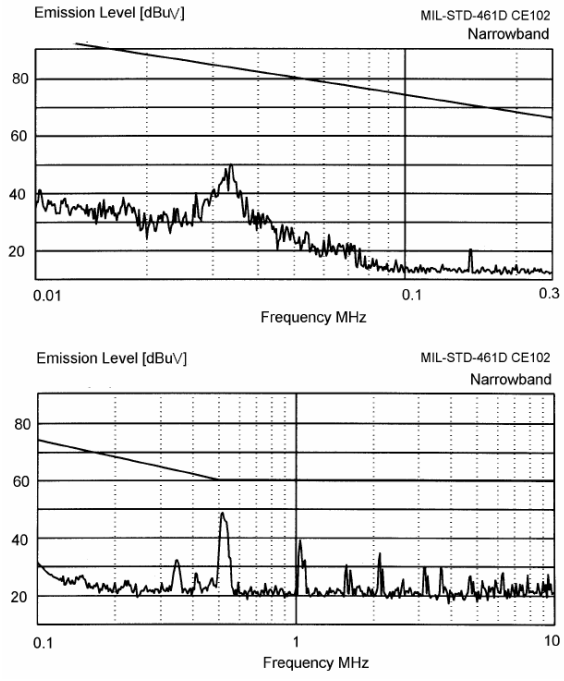
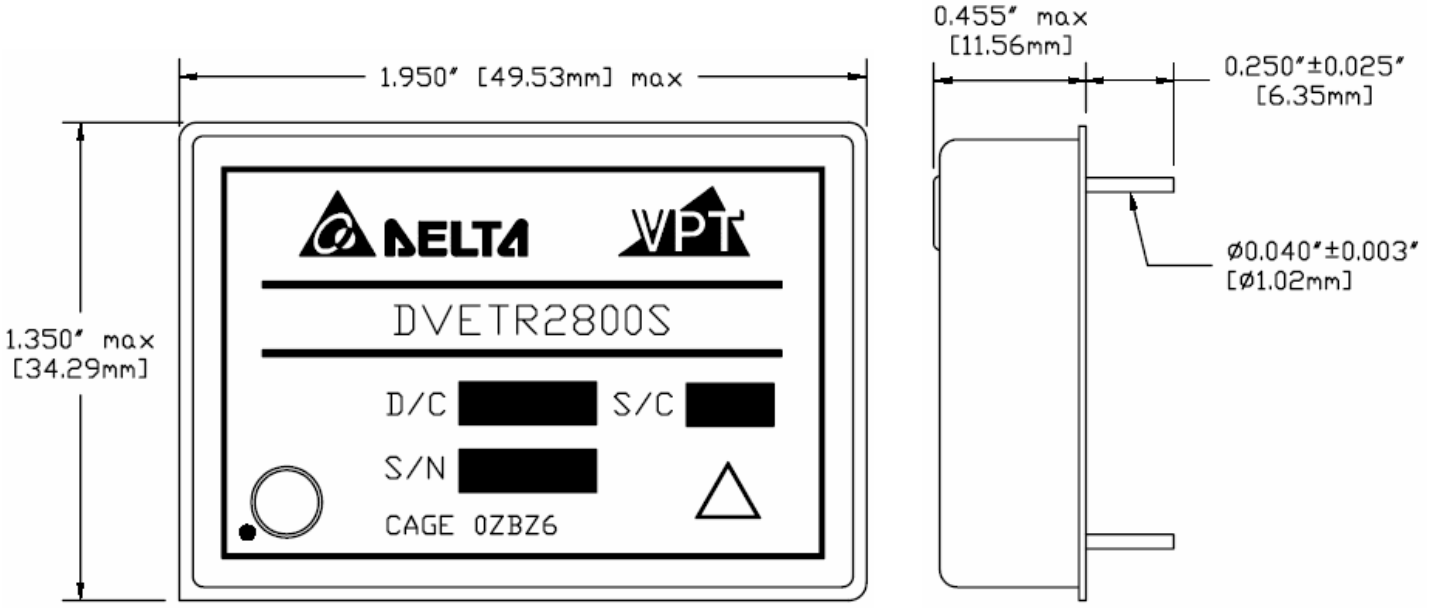
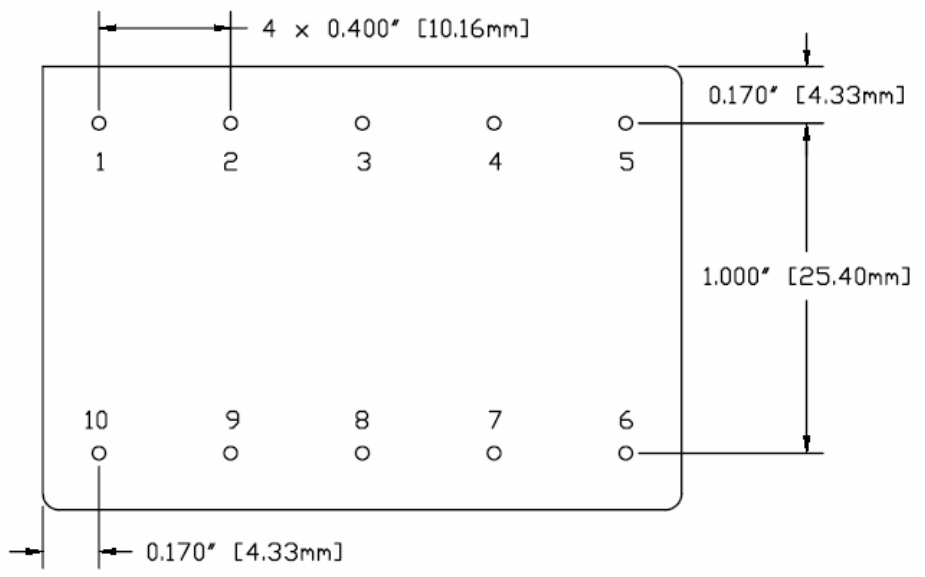


Figure 12 – MIL-STD-461D
DVETR2800S

PACKAGE SPECIFICATIONS (NON-FLANGED, SOLDER SEAL)



TOP VIEW **SIDE VIEW**

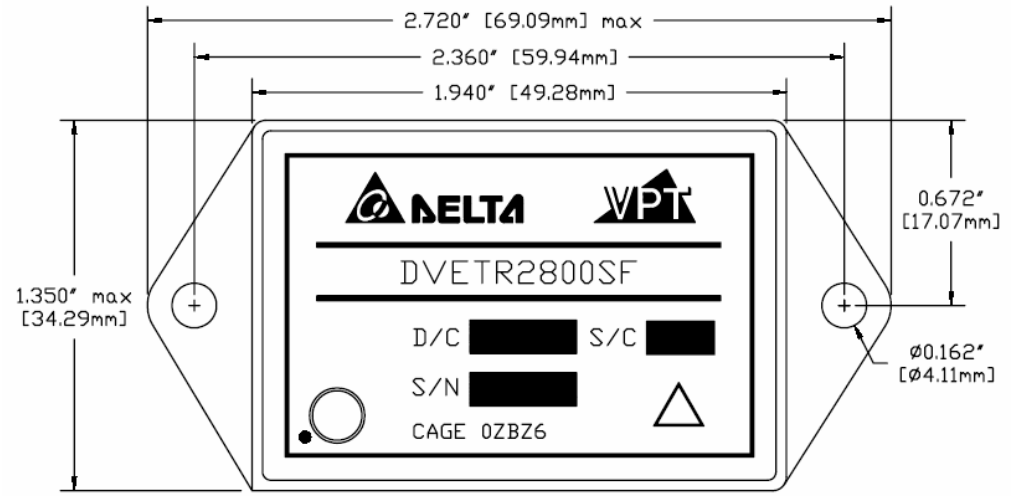


BOTTOM VIEW

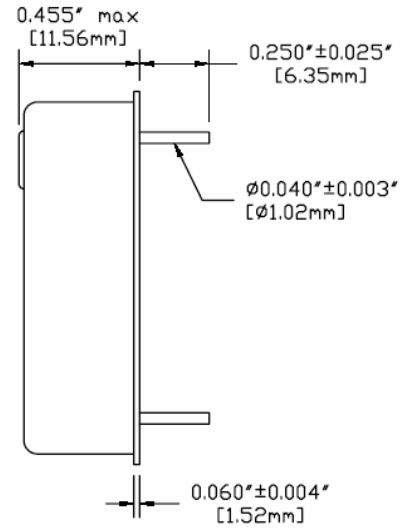
PIN	FUNCTION
1	28V IN
2	INHIBIT
3	-S
4	OUT COM
5	+V OUT
6	+S
7	CASE
8	N/C
9	N/C
10	IN COM

Figure 13 – Non-Flanged, Solder Seal Tin Plated Package and Pinout
(Dimensional Limits are ±0.005" Unless Otherwise Stated)

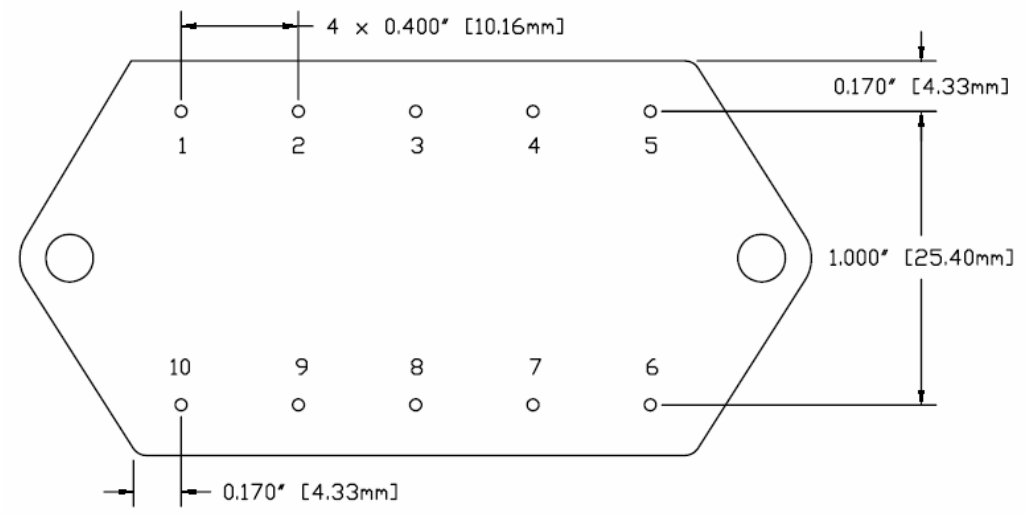
PACKAGE SPECIFICATIONS (FLANGED, SOLDER SEAL)



TOP VIEW



SIDE VIEW



BOTTOM VIEW

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

Figure 14 – Flanged, Solder Seal Tin Plated Package and Pinout
(Dimensional Limits are ±0.005" Unless Otherwise Stated)

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	N/C	No Connection
9	N/C	No Connection
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
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 (1×10^{-3})	•	• •
Radiography	Method 2012[3]		
External Visual	Method 2009	•	•

ORDERING INFORMATION

DVETR	28	05	S	F	/ES	-	XXX
1	2	3	4	5	6		7

(1)	(2)		(3)		(4)	
Product Series	**Nominal Input Voltage**		**Output Voltage**		**Number of Outputs**	
DVETR	**28**	28 Volts	**3R3** **05** **5R2** **12** **15**	3.3 Volts 5 Volts 5.2 Volts 12 Volts 15 Volts	**S**	Single

(5)		(6)		(7)
Package Option		**Screening Code**[1]		**Additional Screening Code**
None **F**	Non-Flanged Flanged	**None** **/ES**	Standard Extended	Contact Sales

Notes: 1. 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.

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

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.

Стандарт Электрон Связь

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

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