



DVTR2800D 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

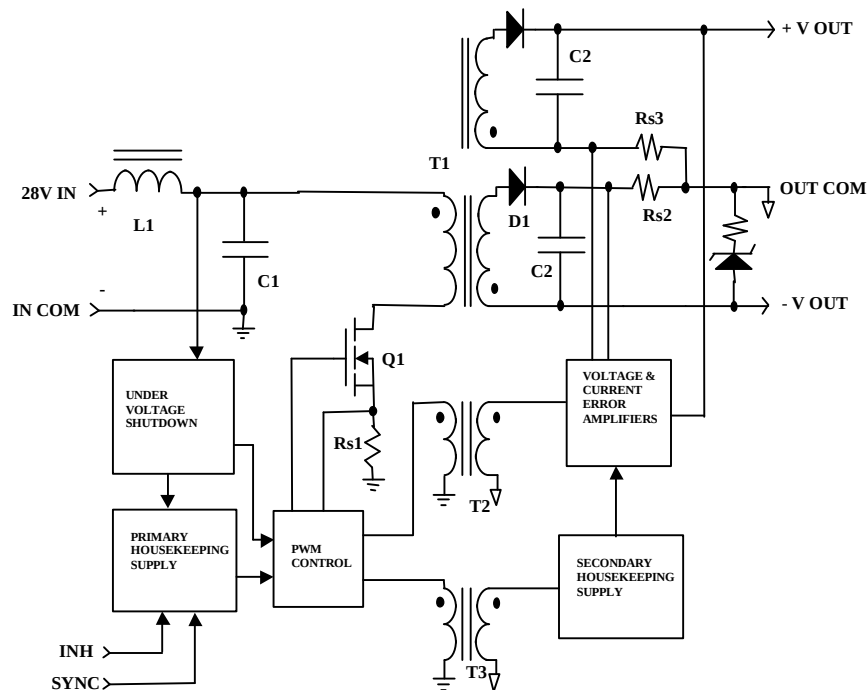
Description

The DVTR 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 DVTR 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 40 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 hermetic package
- High power density, >40 W/in³
- Custom Versions Available
- Environmental Screening Available
- Meets MIL-STD-461C and MIL-STD-461D EMC requirements when used with a DVMC28 EMI filter

Block Diagram



Specifications
Absolute Maximum Ratings

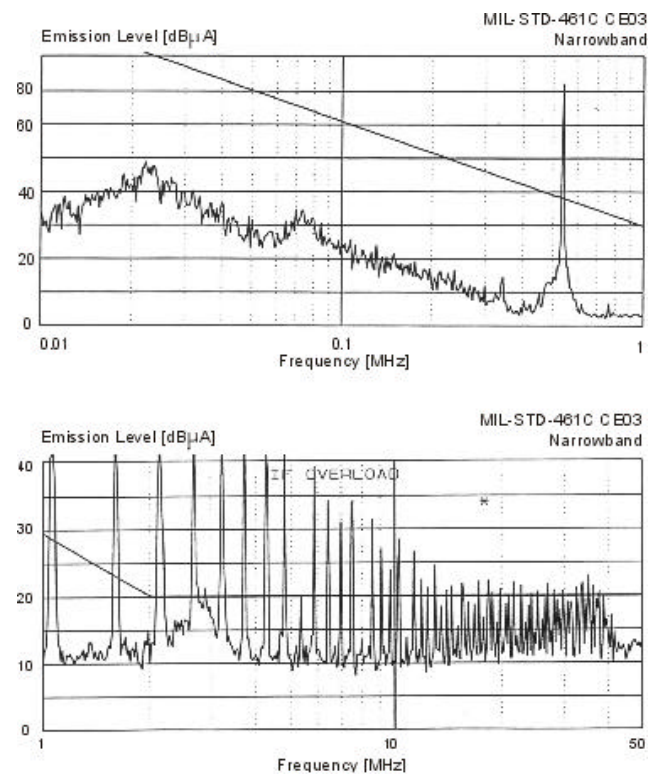
Input Voltage (Continuous)	50 Vdc
Input Voltage (Transient)	80 V (1sec)
Output Power ¹	40 Watts
Power Dissipation, Full Load, T _{CASE} = +125°C	13 Watts
Junction Temperature rise to case	+15°C
Storage Temperature	-65°C to +150°C
Lead Solder Temperature for 10 seconds	270°C
Weight	50 grams

T_{case} = -55°C to +125°C, V_{in} = +28V ±5%, Full Load² unless otherwise specified

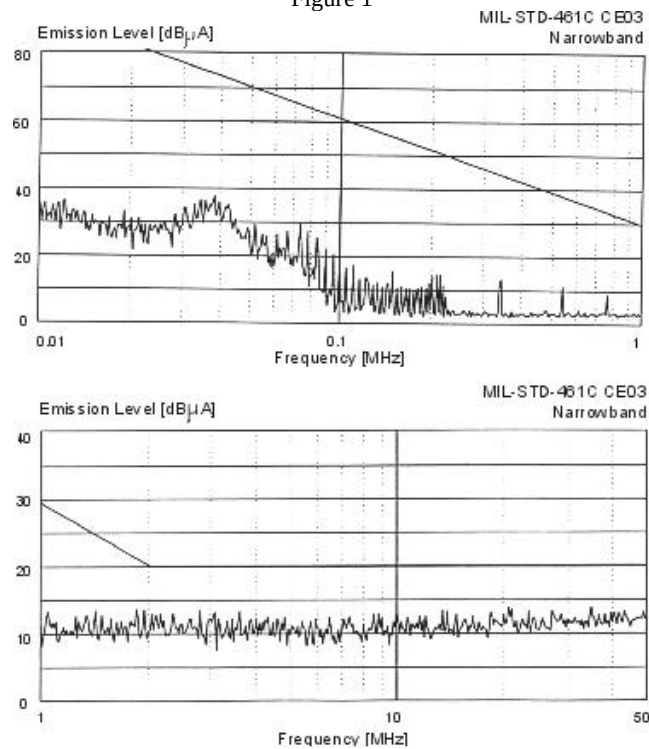
Parameter		Conditions -55 °C ≤Tc≤125 °C, VIN = 28 VDC ±5%, Full Load ² Unless otherwise specified	DVTR2805D			DVTR2812D			DVTR2815D			Units
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Static												
INPUT												
Voltage			15	28	50	15	28	50	15	28	50	V
Current		Inhibited No Load		3.5 45	5 65		3.5 45	5 65		3.5 45	5 65	mA mA
Ripple Current		Full Load ² , 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 ²	+V _{OUT}	Tcase = 25°C	4.95	5.00	5.05	11.88	12.00	12.12	14.85	15.00	15.15	V
	-V _{OUT}		4.90	5.00	5.10	11.76	12.00	12.24	14.70	15.00	15.30	V
	+V _{OUT}	-55°C≤Tcase≤+125°C	4.85	5.00	5.15	11.64	12.00	12.36	14.55	15.00	15.45	V
	-V _{OUT}		4.80		5.20	11.52	12.00	12.48	14.40	15.00	15.60	V
	Total		0		30	0		40	0		40	W
Power ^{3,5}	±V _{OUT}		0		21	0		28	0		28	W
Current ^{3,5}	±V _{OUT}		0		4.2	0		2.33	0		1.87	A
Ripple Voltage	±V _{OUT}	Full Load ² , 20Hz to 10MHz		30	60		30	60		30	60	mV _{p-p}
Line Regulation	±V _{OUT}	Vin = 15 V to 50 V		10	30		15	40		15	40	mV _{p-p}
Load Regulation	+V _{OUT}	No Load to Full Load ²		25	60		25	50		25	50	mV
	-V _{OUT}			25	100		25	100		25	100	mV
Cross Regulation	+V _{OUT}	+V _{OUT} =30% Load, -V _{OUT} =70% Load		25	60		25	50		25	50	mV
	-V _{OUT}	+V _{OUT} =70% Load, -V _{OUT} =30% Load		350	550		350	550		350	550	mV
EFFICIENCY		Full Load ²	71	75		78	82		80	84		%
LOAD FAULT POWER DISSIPATION		Overload Short Circuit			20 15			20 15			20 15	W W
CAPACITIVE LOAD					500			500			500	μF
SWITCHING FREQUENCY			400	450	525	400	450	525	400	450	525	kHz
SYNC FREQUENCY RANGE		V _H -V _L =5V, Duty Cycle=20-80%	500		700	500		700	500		700	kHz
ISOLATION		Input to Output at 500Vdc Tcase = 25°C	100			100			100			MΩ
THERMAL RESISTANCE		Case to Ambient (θCA)		19			19			19		°C/W
MTBF		MIL-HDBK-217F, AIF @Tc=55°C		413			413			413		kHrs
Dynamic												
LOAD STEP		Half load to Full Load										
Output Transient Recovery ⁴	±V _{OUT}			200 200	400 400		300 200	500 400		300 200	500 400	mV _{PK} μSec
LINE STEP		V _{IN} = 15 V to 50 V										
Output Transient Recovery ⁴	±V _{OUT}			200 200	400 400		300 300	500 500		300 200	500 400	mV _{PK} μSec
TURN ON		V _{IN} = 0 V to 28 V										
Delay Overshoot ⁴	±V _{OUT}			10 0	15 50		10 0	15 120		10 0	15 150	mSec mV _{PK}

NOTES:

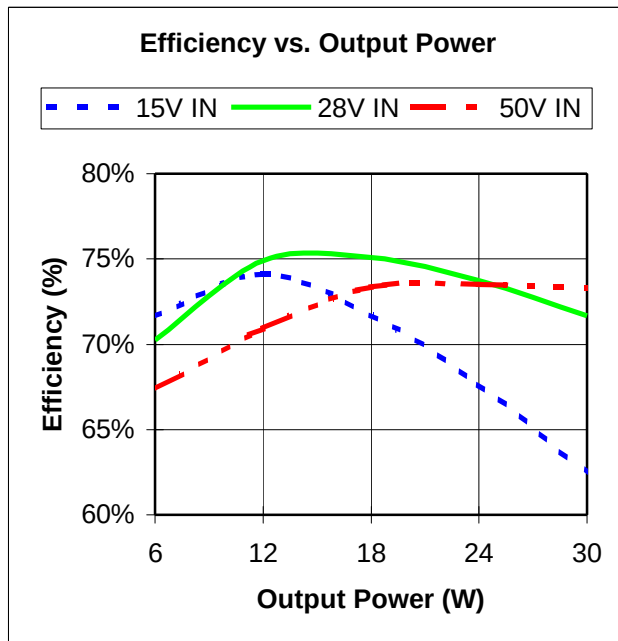
- Dependent on output voltage.
- Half Load at +V_{out} and Half Load at -V_{out}.
- Up to 70% of the total power or current can be drawn from any one of the two outputs.
- Time for output voltage to settle within 1% of its nominal value
- Derate linearly to 0 at 135°C.



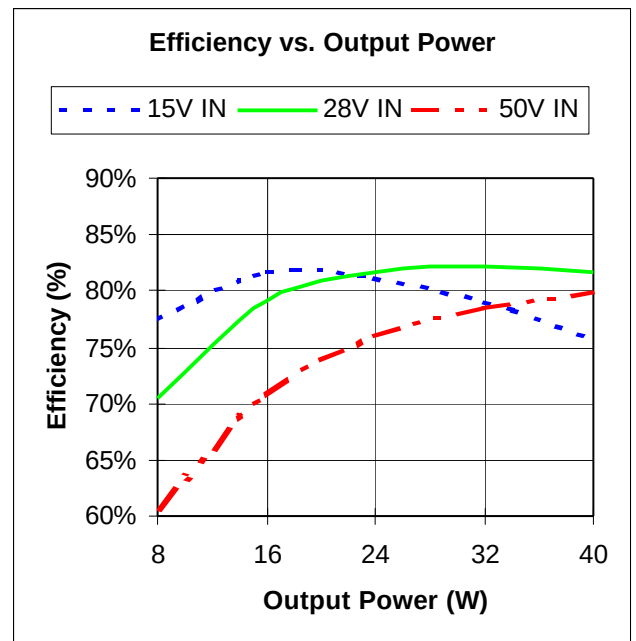
DVTR2800D Without EMI filter
Figure 1



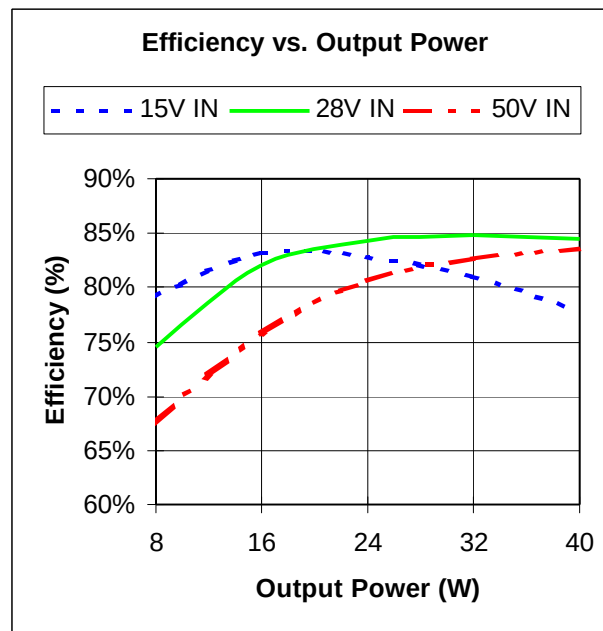
DVTR2800D With EMI filter
Figure 2



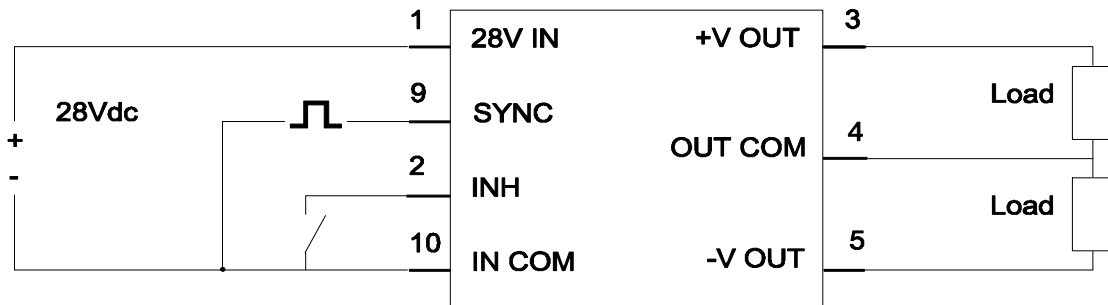
Efficiency vs. Load, **DVTR2805D**
Figure 3



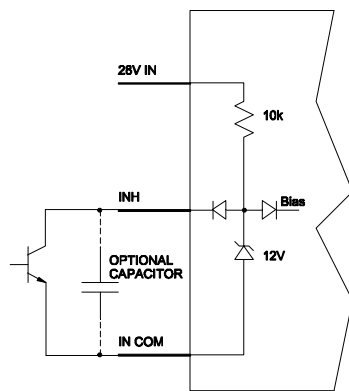
Efficiency vs. Load, **DVTR2812D**
Figure 4



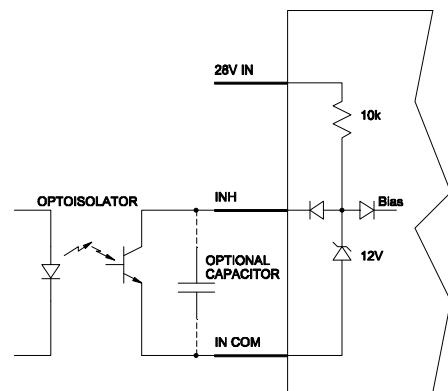
Efficiency vs. Load, **DVTR2815D**
Figure 5



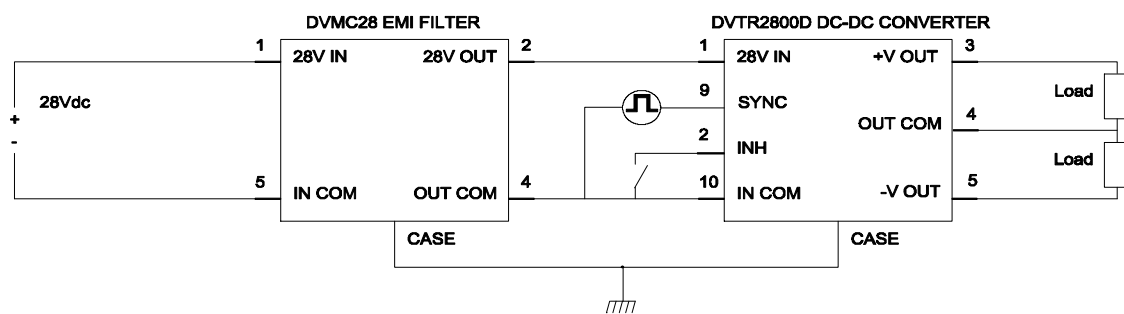
Connection Diagram
Figure 6



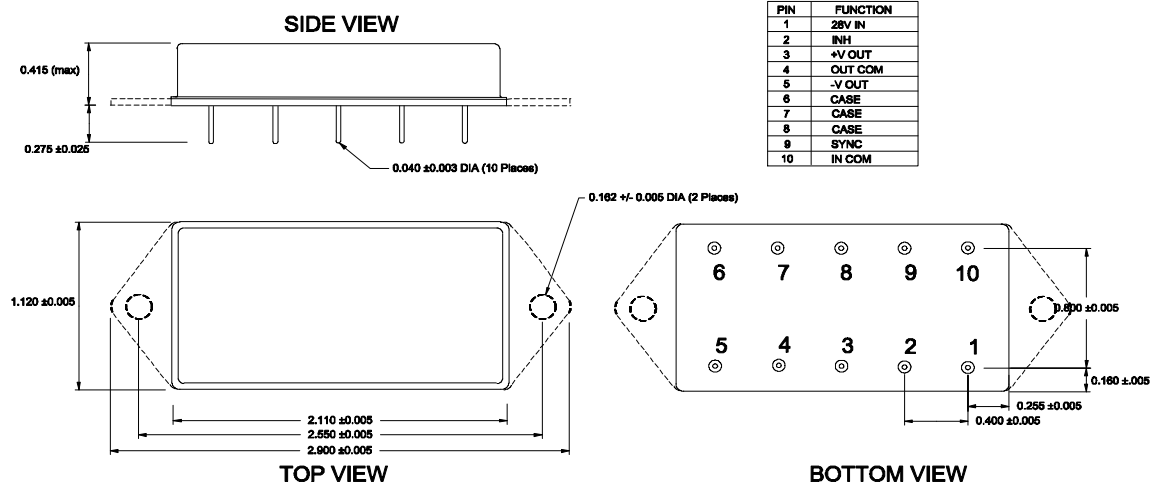
Internal Inhibit Circuit and Recommended Drive
(Shown with optional capacitor for turn on delay)
Figure 7



Isolated Inhibit Drive
(Shown with optional capacitor for turn on delay)
Figure 8



Converter with EMI Filter Hookup Diagram
Figure 9



Package Drawing and Pinout
Figure 10

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: DVTR2805DFR/ES						
DVTR	28	05	D	F	R	/ES
Product Series	Nominal Input Voltage	Output Voltage	No. Outputs	Package Style	Rad Hard Opt.	Screening
DVTR	28 28 Volts	05 5 Volts	D Dual	None No Flange	None Standard R 100kRad	None Standard
		12 12 Volts		F Flanged		/ES Extended
		15 15 Volts				/HB HB Screening