DVEHF2800T Series

HIGH RELIABILITY HYBRID DC-DC CONVERTERS WITH INTEGRAL EMI FILTER

DESCRIPTION

The DVEHF 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 DVEHF series is a fault tolerant magnetic feedback circuit. Operating at a nominal fixed frequency of 450 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, compliant to AS9000, and certified to MIL-PRF-38534 and MIL-STD-883.

FEATURES

- High Reliability
- Very Low Output Noise
- Wide Input Voltage Range: 15 to 50 Volts per MIL-STD-704
- Up to 10 Watts Output Power
- Fault Tolerant Magnetic Feedback Circuit
- NO Use of Optoisolators
- Undervoltage Lockout
- Industry Standard Pinout
- High Input Transient Voltage: 80 Volts for 1 sec per MIL-STD-704A
- Solder Seal Hermetic Package
- 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, SC01 and CS02
- Flanged and Non-flanged Versions Available
- MIL-PRF-38534 Element Evaluated Components

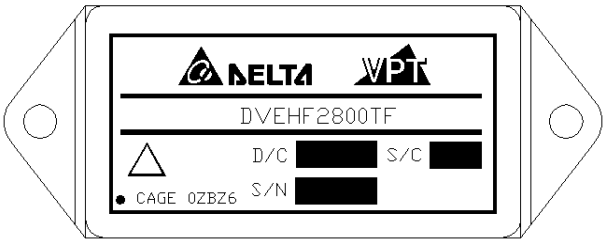

Figure 1 – DVEHF2800T / DVEHF2800TF DC-DC Converter
(Not To Scale)

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SPECIFICATIONS (T_{CASE} = -55°C to +125°C, V_{IN} = +28V ± 5%, Full Load[5], 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	10 Watts	Lead Solder Temperature (10 seconds)	270°C
Power Dissipation (Full Load, T_{CASE} = +125°C)	5.0 Watts	Weight	50 grams

Parameter		Conditions	DVEHF28512T			DVEHF28515T			Units
			Min	Typ	Max	Min	Typ	Max	
STATIC									
INPUT Voltage		Continuous	15	28	50	15	28	50	V
		Transient, 1 sec[4]	-	-	80	-	-	80	V
Current		Inhibited	-	3.5	6.0	-	3.5	6.0	mA
		No Load	-	-	70	-	-	70	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			8.0	-	12.0	8.0	-	12.0	V
UVLO Turn Off[4]			4.0	-	8.0	4.0	-	8.0	V
OUTPUT Voltage	V_{MAIN}	T_{CASE} = 25°C	4.95	5.0	5.05	4.95	5.0	5.05	V
	$\pm V_{AUX}$		11.88	12.0	12.12	14.85	15.0	15.15	V
	V_{MAIN}	T_{CASE} = -55°C to +125°C	4.925	5.0	5.075	4.925	5.0	5.075	V
	$\pm V_{AUX}$		11.82	12.0	12.18	14.775	15.0	15.225	V
Power[4]	Total		0	-	10	0	-	10	W
	V_{MAIN}		0.15	-	5.0	0.15	-	5.0	W
	$\pm V_{AUX}$[6]	Either Output	0	-	3.5	0	-	3.5	W
Current[3]	V_{MAIN}		0	-	1.0	0	-	1.0	A
	$\pm V_{AUX}$	Either Output[6]	0	-	0.29	0	-	0.23	A
Ripple Voltage	V_{MAIN}	Full Load[5], 20Hz to 10MHz	-	15	50	-	15	50	mV_{p-p}
	$\pm V_{AUX}$		-	15	50	-	15	50	mV_{p-p}
Line Regulation	V_{MAIN}	V_{IN} = 16V to 40V	-	10	20	-	10	20	mV
	$\pm V_{AUX}$		-	15	50	-	15	50	mV
Load Regulation	V_{MAIN}	No Load to Full Load[5]	-	5	20	-	5	20	mV
	$\pm V_{AUX}$		-	10	50	-	10	50	mV
Cross Regulation	$\pm V_{AUX}$	$+V_{OUT}$ = 30%, $-V_{OUT}$ = 70% $+V_{OUT}$ = 70%, $-V_{OUT}$ = 30%	-	-	50	-	-	50	mV
EFFICIENCY		Full Load[5]	67	72	-	67	72	-	%
LOAD FAULT POWER DISSIPATION		Overload[4]	-	-	7.5	-	-	7.5	W
		Short Circuit	-	-	7.5	-	-	7.5	W
CAPACITIVE LOAD[4]			-	-	500	-	-	500	µF
SWITCHING FREQUENCY			350	450	550	350	450	550	kHz
ISOLATION		500 V_{DC}, T_{CASE} = 25°C	100	-	-	100	-	-	MΩ
THERMAL RESISTANCE		Case to Ambient (θCA)	-	19	-	-	19	-	°C/W
MTBF (MIL-HDBK-217F)		AIF @ T_C = 55°C	-	350	-	-	350	-	kHrs

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

ABSOLUTE MAXIMUM RATINGS			
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Power Dissipation (Full Load, T_{CASE} = +125°C)	5.0 Watts	Weight	50 grams

Parameter		Conditions	DVEHF28512T			DVEHF28515T			Units
			Min	Typ	Max	Min	Typ	Max	
DYNAMIC									
Load Step Output Transient	V_{MAIN}	Half Load to Full Load	-	200	500	-	200	500	mV_{PK}
	$\pm V_{AUX}$		-	100	400	-	100	400	mV_{PK}
Load Step Recovery[2]	V_{MAIN}		-	200	500	-	200	500	µSec
	$\pm V_{AUX}$		-	200	500	-	200	500	µSec
Line Step Output Transient[4]	V_{MAIN}	V_{IN} = 16V to 40V	-	200	600	-	200	600	mV_{PK}
	$\pm V_{AUX}$		-	50	100	-	50	100	mV_{PK}
Line Step Recovery[2, 4]	V_{MAIN}		-	200	500	-	200	500	µSec
	$\pm V_{AUX}$		-	200	500	-	200	500	µSec
Turn On Delay		V_{IN} = 0V to 28V	-	20	30	-	20	30	mSec
Turn On Overshoot[2]			-	-	50	-	-	50	mV_{PK}

Notes:
1. This note intentionally not used.
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.
5. 5.0W on V_{MAIN} and 2.5W on $\pm V_{AUX}$.
6. Up to 70% of the total auxiliary power or current can be drawn from either of the auxiliary outputs.

BLOCK DIAGRAM

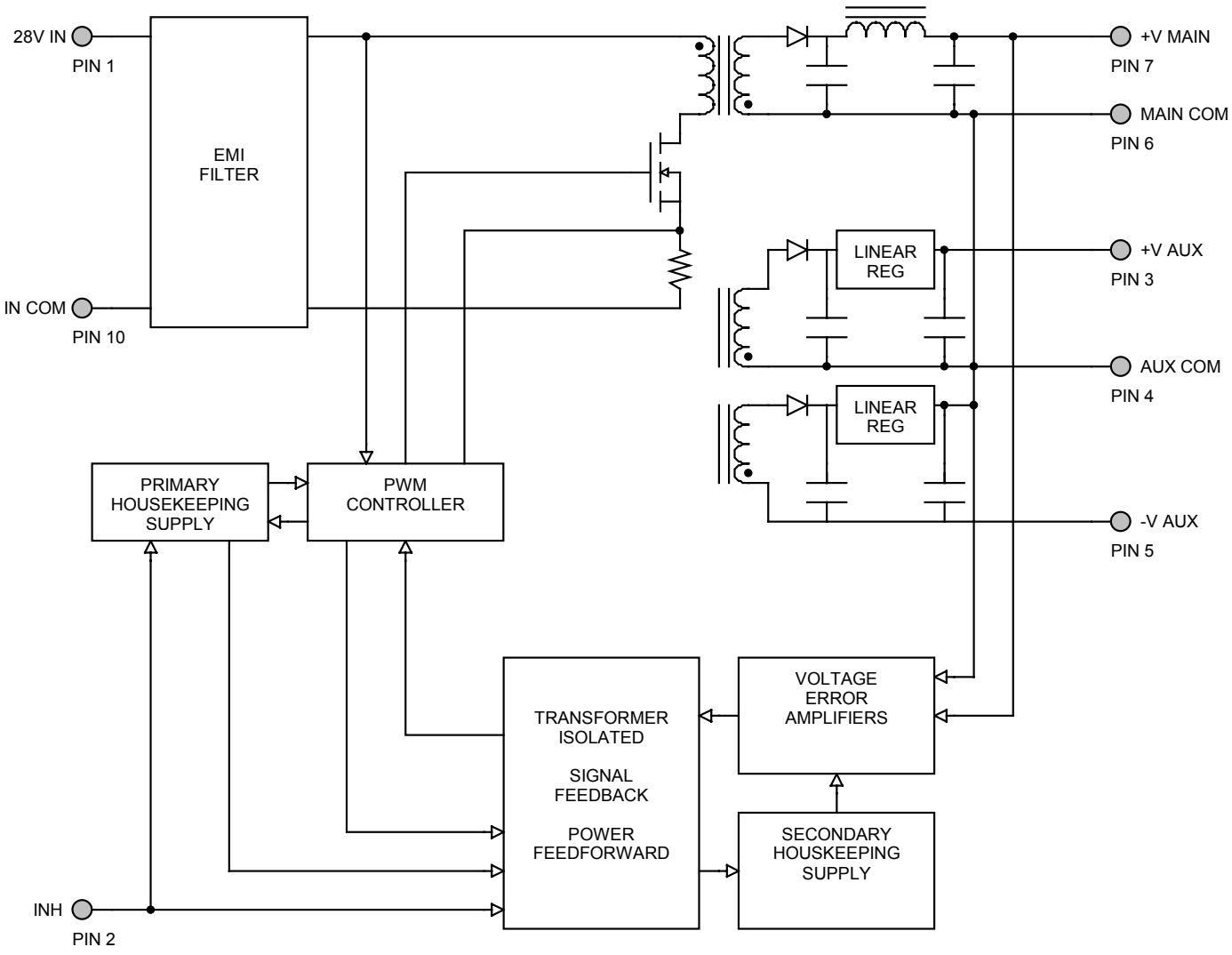


Figure 2

CONNECTION DIAGRAM

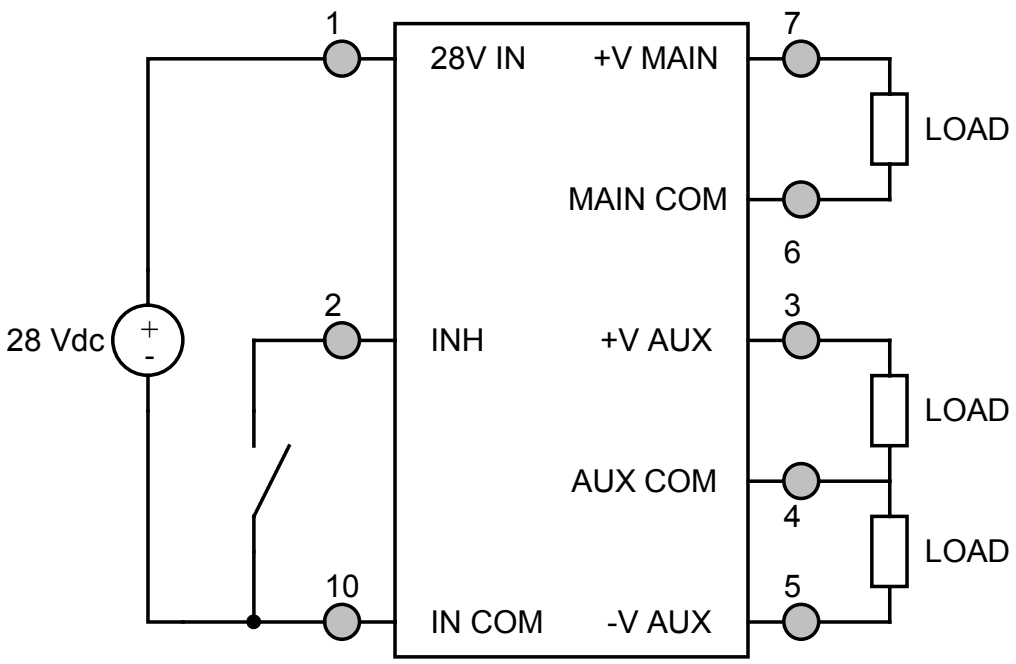


Figure 3

INHIBIT DRIVE CONNECTION DIAGRAMS

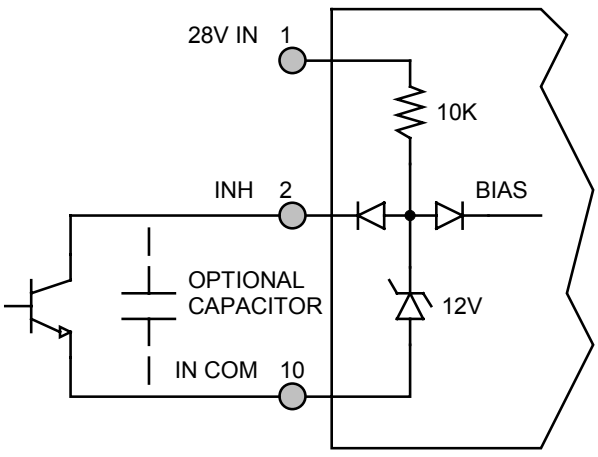


Figure 4 – Internal Inhibit Circuit and Recommended Drive
(Shown with optional capacitor for turn-on delay)

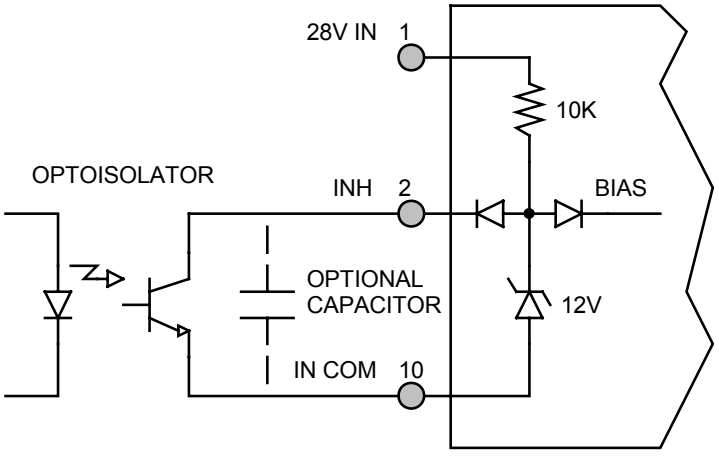


Figure 5 – Isolated Inhibit Drive
(Shown with optional capacitor for turn-on delay)

EFFICIENCY PERFORMANCE CURVES (T_{CASE} = 25°C)

------- V_{IN} = 15V	——— V_{IN} = 28V	– – – – – V_{IN} = 50V

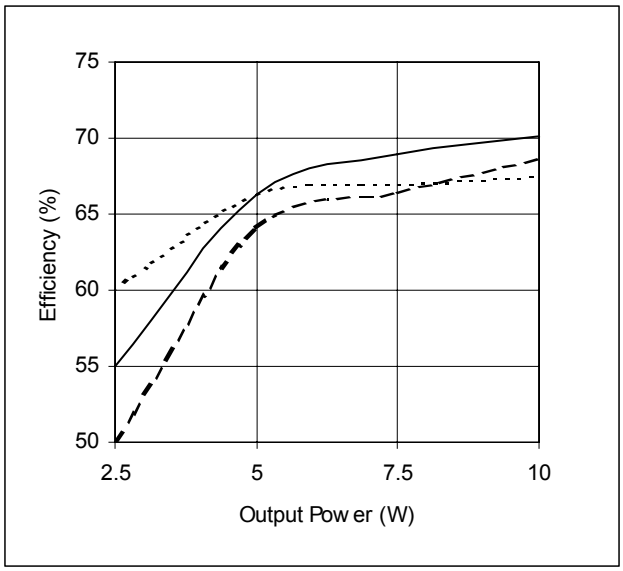


Figure 7 – DVEHF28512T
Efficiency (%) vs. Output Power (W)

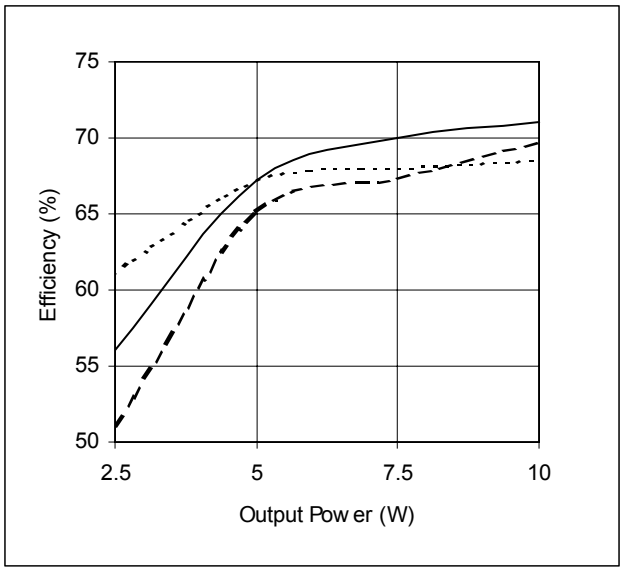


Figure 8 – DVEHF28515T
Efficiency (%) vs. Output Power (W)

EMI PERFORMANCE CURVES

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

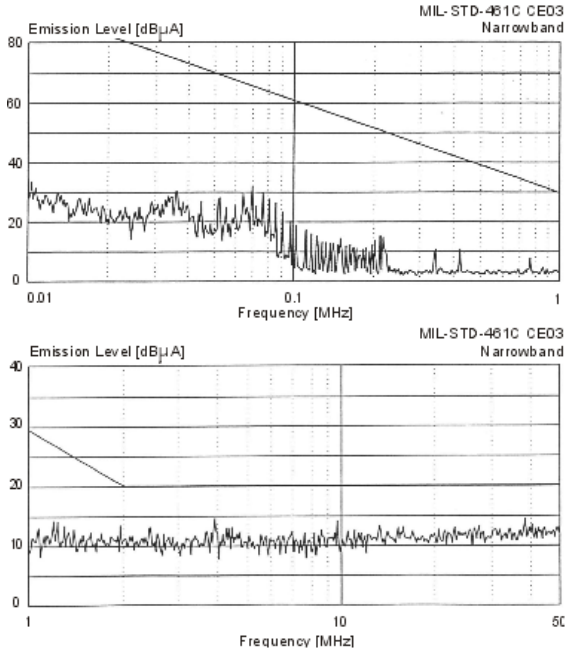


Figure 9 – MIL-STD-461C
DVEHF2800T

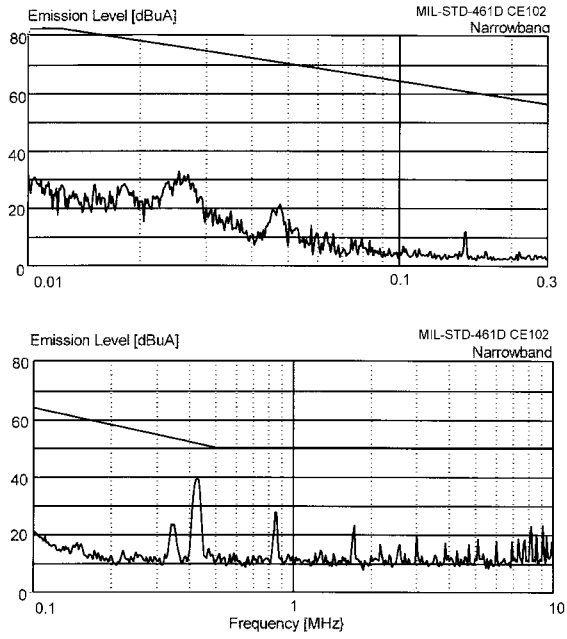
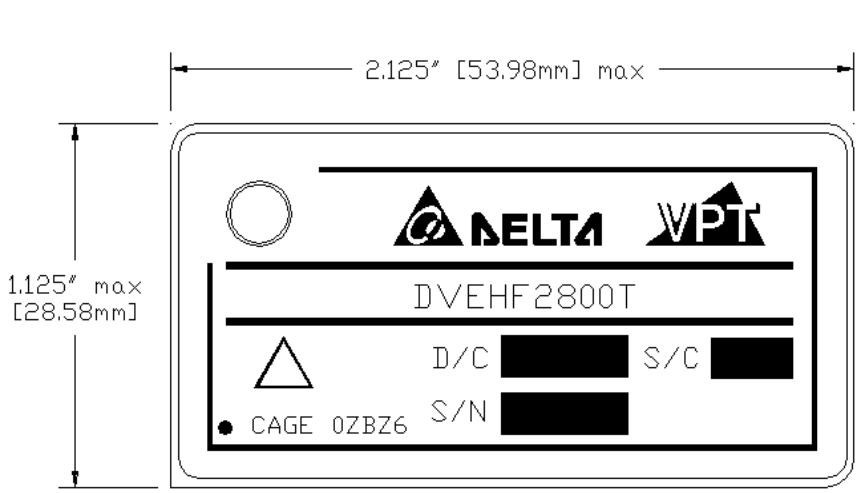
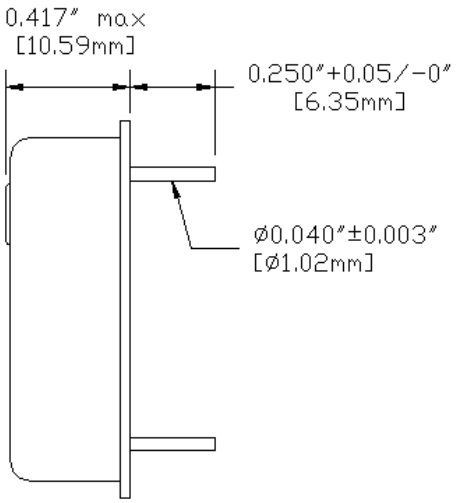


Figure 10 – MIL-STD-461D
DVEHF2800T

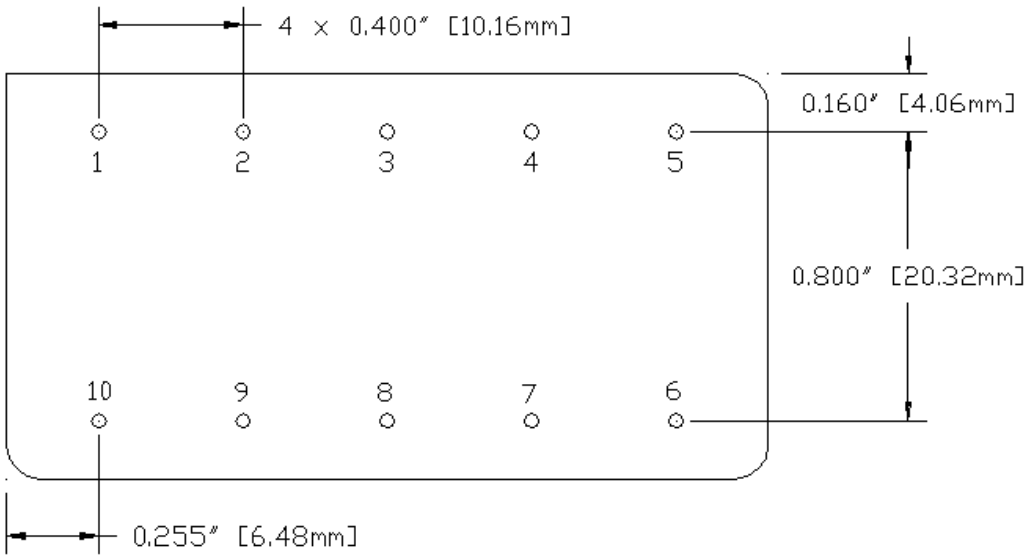
PACKAGE SPECIFICATIONS (NON-FLANGED, SOLDER SEAL)



TOP VIEW



SIDE VIEW

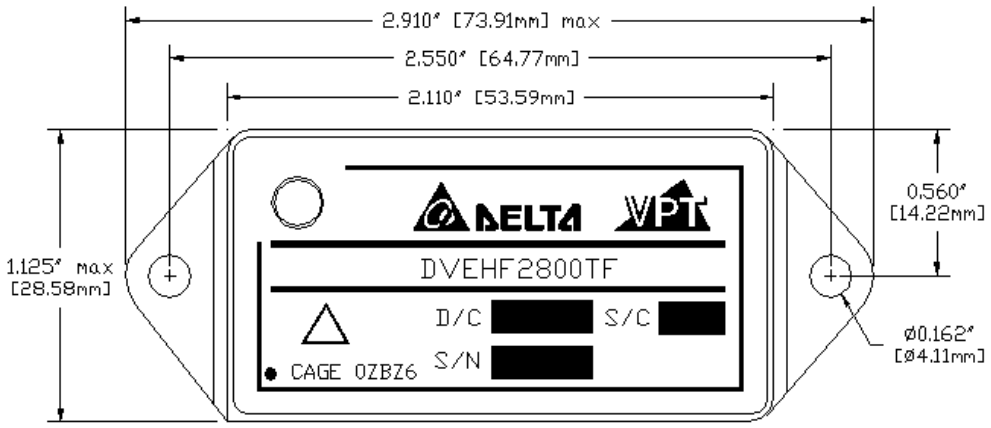


BOTTOM VIEW

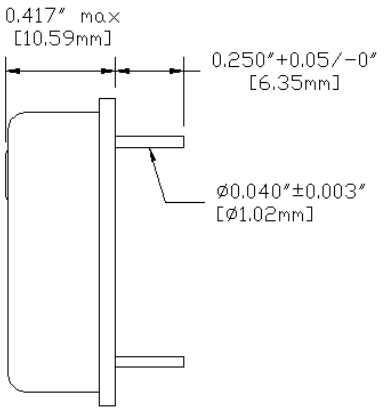
PIN	FUNCTION
1	28V IN
2	INHIBIT
3	+V AUX
4	AUX COM
5	-V AUX
6	MAIN COM
7	+V MAIN
8	CASE
9	N/C
10	IN COM

Figure 11 – Non-Flanged, Solder Seal Package and Pinout
(Dimensional Limits are ±0.005" Unless Otherwise Stated)

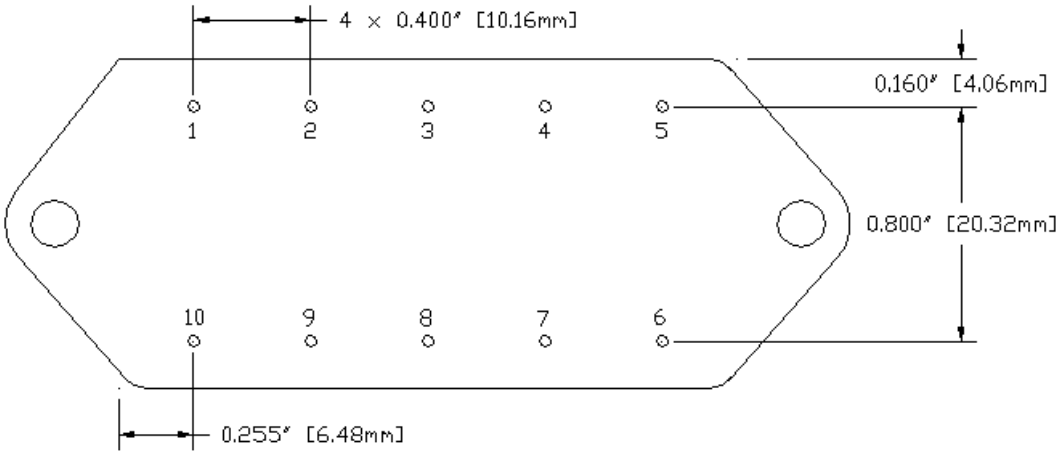
PACKAGE SPECIFICATIONS (FLANGED, SOLDER SEAL)



TOP VIEW



SIDE VIEW



BOTTOM VIEW

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

Figure 12 – Flanged, Solder Seal 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	+V AUX	Positive Auxiliary Output Voltage Connection
4	AUX COM	Auxiliary Output Common Connection
5	-V AUX	Negative Auxiliary Output Voltage Connection
6	MAIN COM	Main Output Common Connection
7	+V MAIN	Positive Main Output Voltage Connection
8	CASE	Case Connection
9	N/C	No Connection
10	IN COM	Input Common Connection

ENVIRONMENTAL SCREENING (Per MIL-STD-883 as referenced to MIL-PRF-38534, Class H)

Screening	MIL-STD-883	Standard (No Suffix)	Extended /ES
Pre-Cap Inspection	Method 2017, 2032 Internal Procedure	•	•
Temperature Cycling	Method 1010, -55°C to 125°C		•
Constant Acceleration	Method 2001, 500g		•
Burn-In	96 hours at +125°C 24 hours at +125°C	•	•
Hermeticity	Method 1014, Fine Leak, Condition A Method 1014, Gross Leak, Condition C Dip (1×10^{-3})	•	• •
Final Electrical	100% at 25°C	•	•
Final Inspection	Method 2009	•	•

ORDERING INFORMATION

DVEHF	28	5	12	T	F	/ES	-	XXX
1	2	3	4	5	6	7		8

(1) Product Series	(2) Nominal Input Voltage		(3) Main Output Voltage		(4) Auxiliary Output Voltages	
DVEHF	**28**	28 Volts	**5**	+ 5 Volts	**12** **15**	± 12 Volts ± 15 Volts

(5) Number of Outputs		(6) Package Option		(7) Screening Code		(8) Additional Screening Code
T	Triple	**None** **F**	Non-Flanged Flanged	**None** **/ES**	Standard Extended	Contact Sales

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 an order please contact your sales representative or the VPT Inc. Sales Department at:

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E-mail: sales@vpt-inc.com