VPTHVM-270 Series

HIGH RELIABILITY COTS REGULATED BUS CONVERTER MODULE

DESCRIPTION

The VPTHVM-270 is an Isolated Regulated Bus Converter Module which allows VPT's DV and VPT series 28V input DC-DC converters to operate from a nominal 270V DC input. A wide input voltage range accommodates MIL-STD-704 input power requirements for avionics, mobile, ground, and other applications. A regulated high efficiency design reduces input power requirements and eases thermal management. A proven design heritage and a rugged all metal package ensure long term reliability.

The VPTHVM-270 intended for harsh environments including severe vibration, shock and temperature cycling. Testing is to JESD22, MIL-STD-810, and MIL-STD-883.

These converters are designed and manufactured in the USA in a facility certified to ISO9001, J-STD-001 and IPC-A-610.

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 at Low Cost
- Up to 200 Watts of Output Power
- High Efficiency, Up to 91%
- Wide Input Voltage Range: 160 to 400 Volts per MIL-STD-704
- High Input Transient Voltage: 500V for 1 second
- High Isolation, 2250V
- Parallel up to 5 Units with Current Sharing
- Input Undervoltage Lockout
- Fixed Frequency
- Frequency Synchronization
- Output Soft Start
- Current Limit Protection
- Short Circuit Protection
- Magnetic Feedback, no Optoisolators
- Wide Temperature Range: -55°C to 100°C Baseplate with no Derating
- Internally Conformal Coated
- Six Sided Non-Hermetic Rugged Metal Enclosure

Figure 1 – VPTHVM-270 Regulated Bus Converter Module
(Not To Scale)

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

Sales Information:
Phone: (425) 353-3010
Fax: (425) 353-4030
E-mail: vptsales@vpt-inc.com

SPECIFICATIONS (T_{CASE} = -55°C to +100°C, V_{IN} = +270V ± 5%, Full Load, Unless Otherwise Specified)

ABSOLUTE MAXIMUM RATINGS			
Input Voltage (Continuous)	400 V_{DC}	Junction Temperature Rise to Case	+15°C
Input Voltage (Transient, 1 second)	500 Volts	Storage Temperature	-55°C to +125°C
Output Power	200 Watts	Lead Solder Temperature (10 seconds)	300°C
Power Dissipation (Full Load, T_{CASE} = +100°C)	25 Watts	Weight (Maximum)	88 Grams

Parameter	Conditions	VPHVM-270			Units
		Min	Typ	Max	
STATIC					
INPUT Voltage	Continuous	180	-	350	V
	Continuous, Pout ≤ 150W	160	-	400	V
	Transient, 1 sec[3]	160	-	500	V
Current	Inhibited	-	2	4	mA
	No Load	-	3	6	mA
Ripple Current	20Hz to 10MHz	-	50	250	mA_{p-p}
Inhibit Pin Input[3]		0	-	1.5	V
Inhibit Pin Open Circuit Voltage[3]		3	4.5	6	
UVLO Turn On		-	156	159	V
UVLO Turn Off[3]		145	150	-	V
OUTPUT Voltage V_{OUT}	Vin = 270V	26	27	30	V
	Vin = 160V to 500V	16	27	30	V
Power[1]		0	-	200	W
Ripple Voltage V_{OUT}	20Hz to 10MHz	-	100	250	mV_{p-p}
Load Regulation V_{OUT}	No Load to Full Load	-	100	300	mV
EFFICIENCY		88	91	-	%
CAPACITIVE LOAD[3]		-	-	250	µF
Load Fault Power Dissipation[3]	Overload	-	27	35	W
	Short Circuit	-	19	35	W
SWITCHING FREQUENCY		350	450	550	kHz
SYNC FREQUENCY RANGE	V_H-V_L=5V, Duty=50%	550	-	650	kHz
ISOLATION	2250 V_{DC}	100	-	-	MΩ
MTBF (MIL-HDBK-217F)	GM @ T_C = 55°C	-	429	-	kHrs
DYNAMIC					
Load Step Output Transient V_{OUT}	Half Load to Full Load	-	1	3	V_{PK}
Load Step Recovery[2]		-	100	300	µSec
Turn On Delay	V_{IN} = 0V to 270V	-	10	20	mSec
Turn On Overshoot		-	0	150	mV_{PK}

Notes: 1. Derate linearly to 0 at 110°C.
2. Time for output voltage to settle within 1% of its nominal value.
3. Verified by qualification testing.

BLOCK DIAGRAM

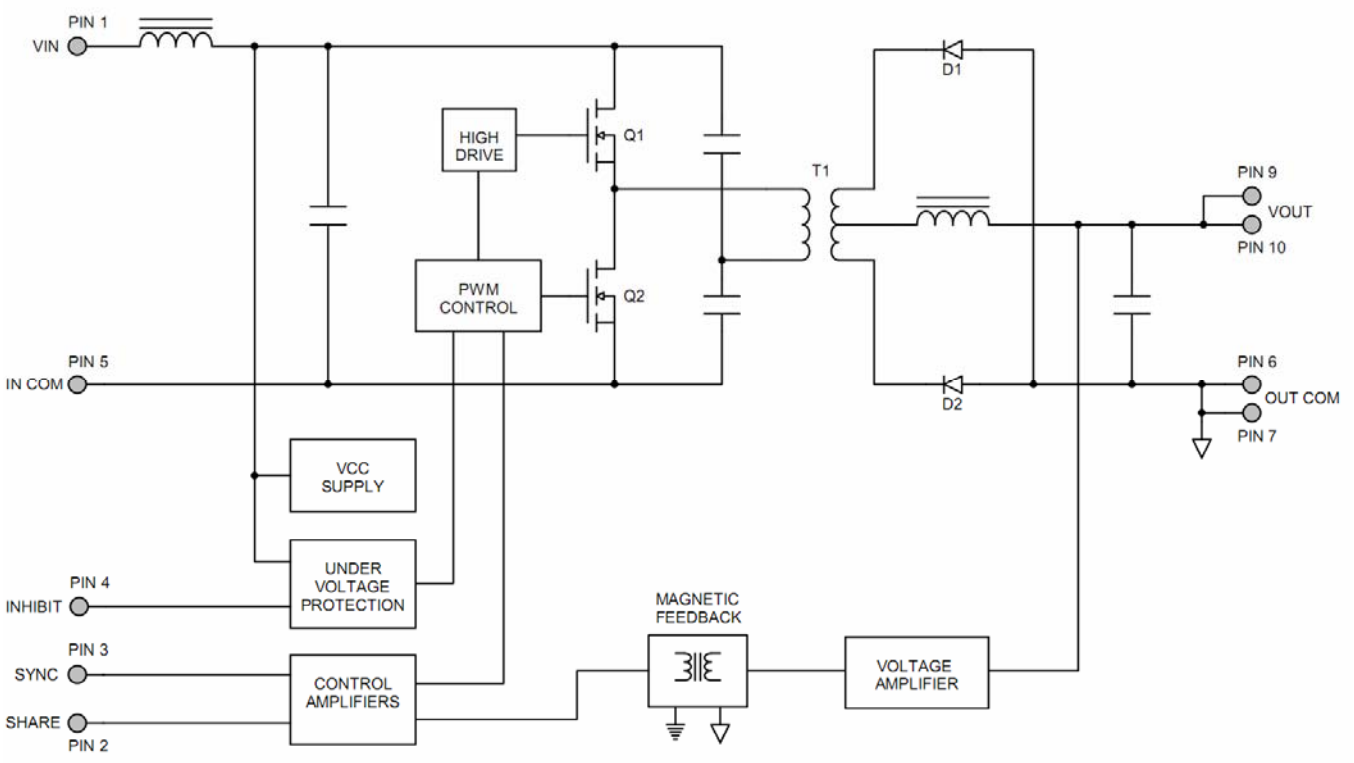


Figure 2

CONNECTION DIAGRAM

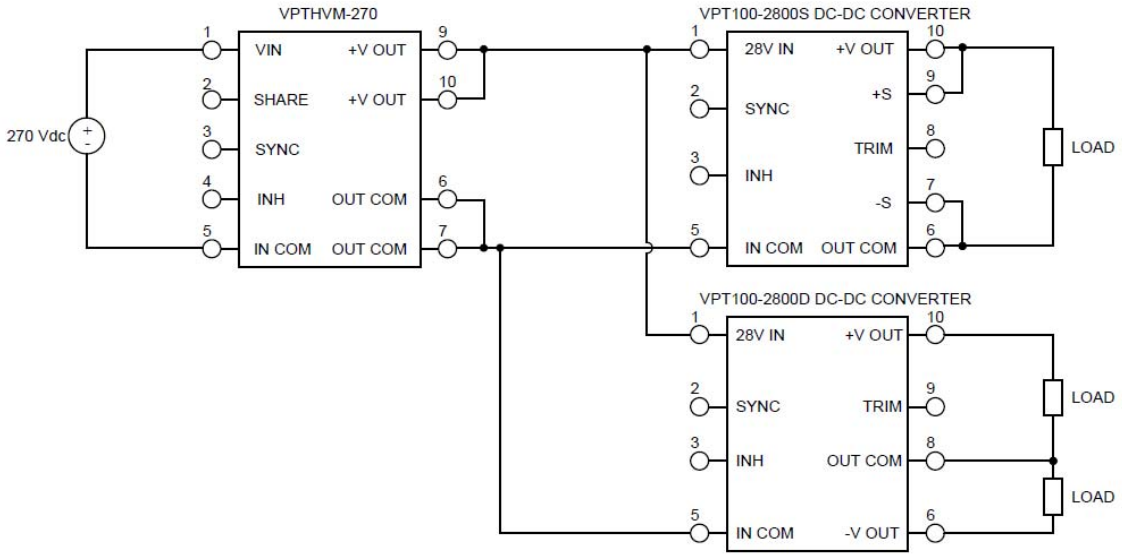


Figure 3

CONNECTION DIAGRAM

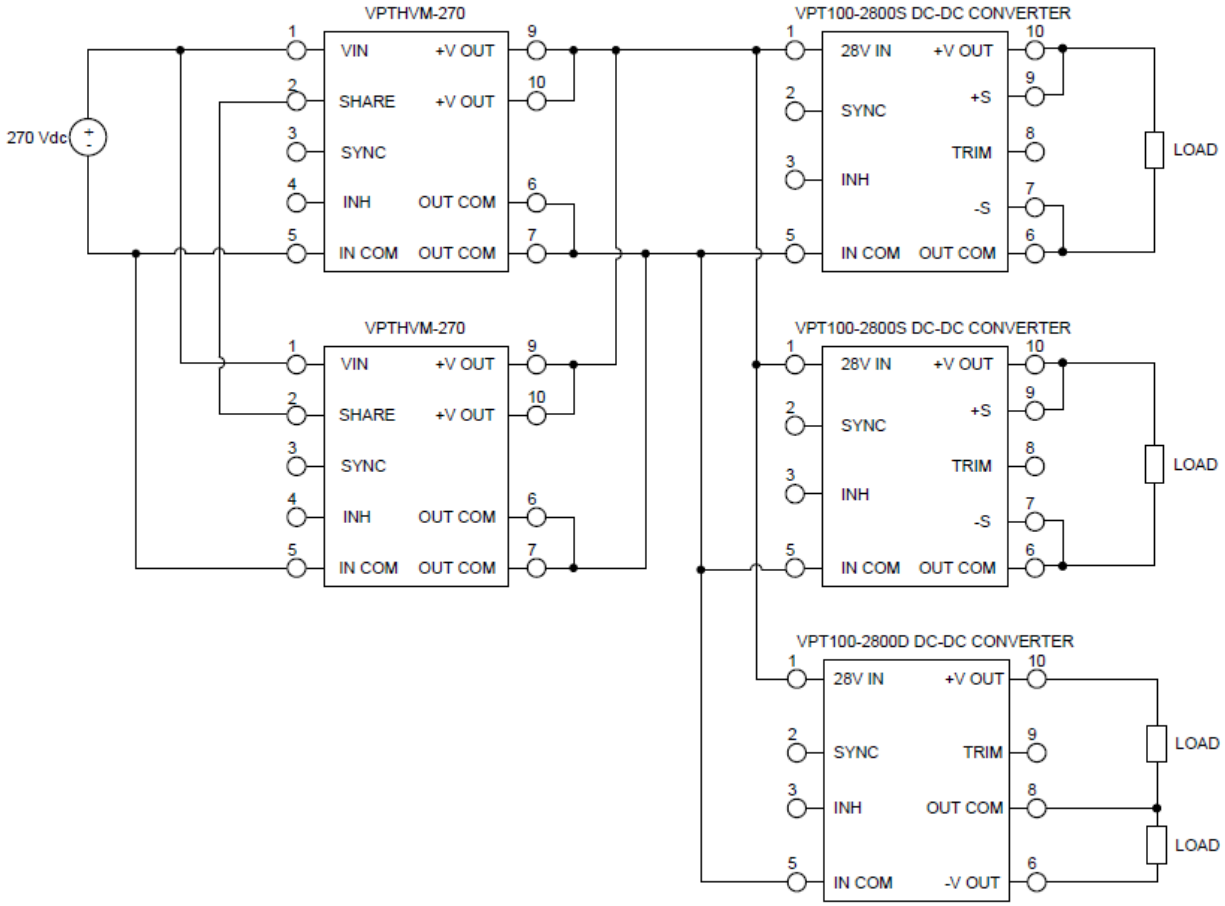


Figure 4

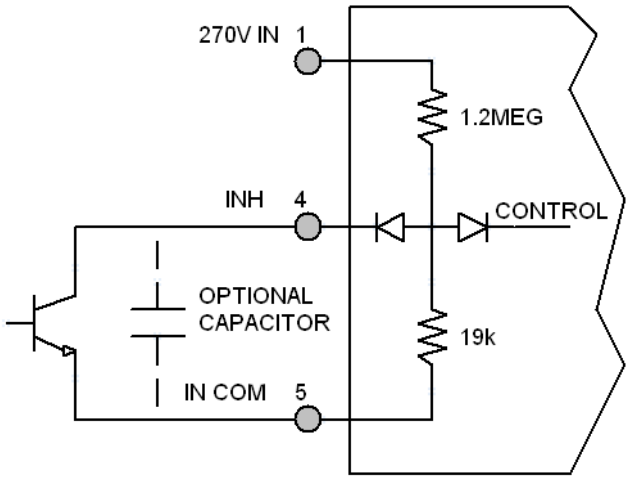


Figure 5-Inhibit Circuit
(Shown with optional capacitor for turn-on delay)

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

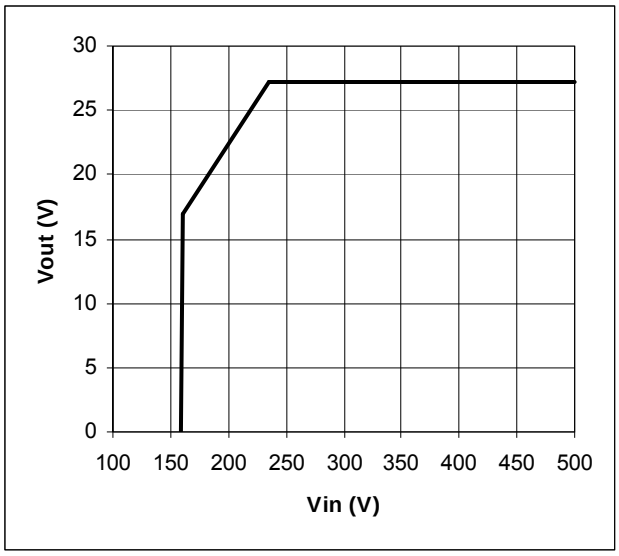


Figure 6 – Output Voltage vs Input Voltage

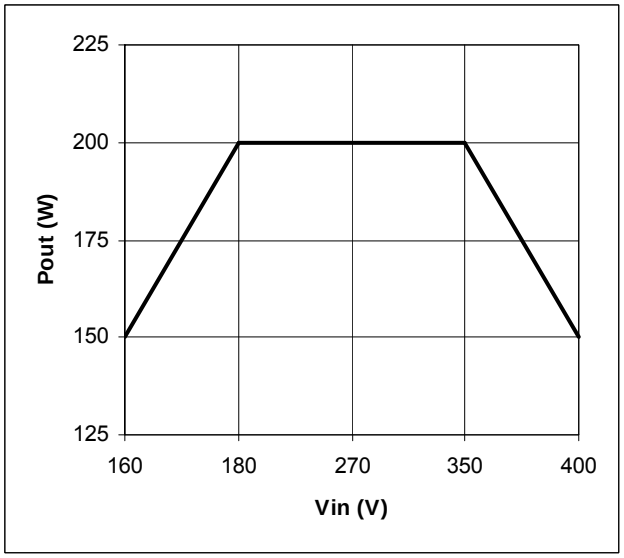
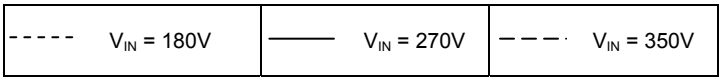


Figure 7 – Output Power vs Input Voltage



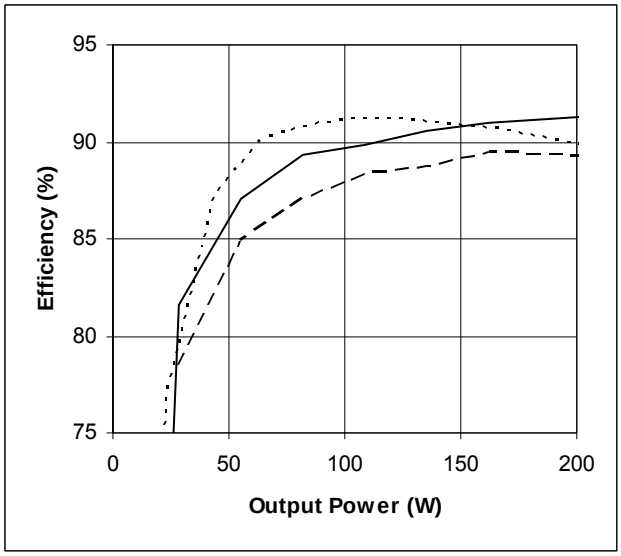
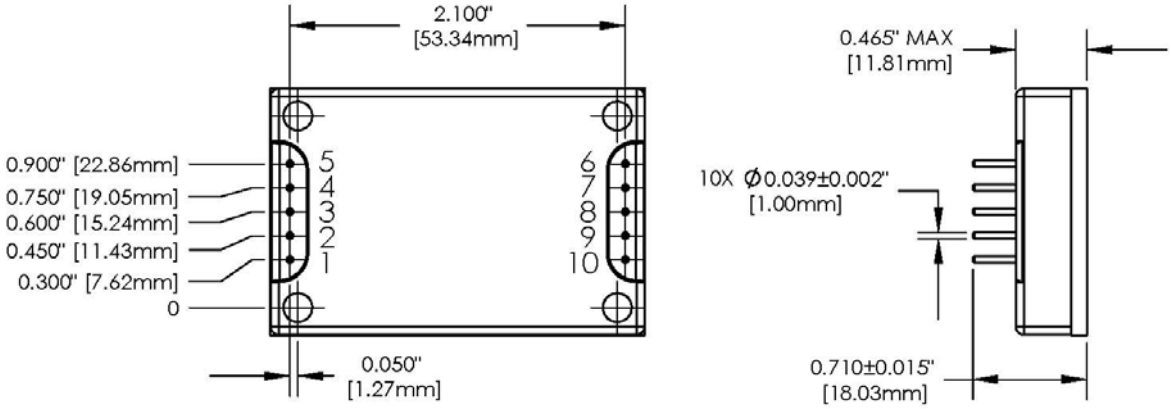


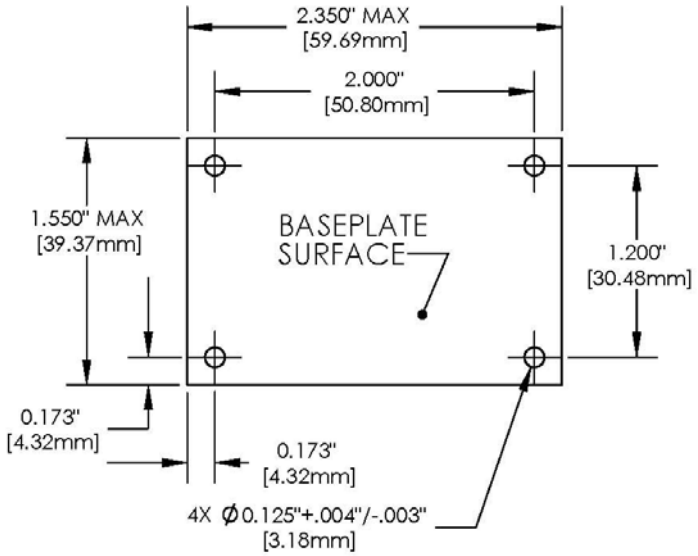
Figure 8 – Efficiency (%) vs. Output Power (W)

PACKAGE SPECIFICATIONS



Top View

Side View



Bottom View

PIN	FUNCTION
1	VIN
2	SHARE
3	SYNC
4	INHIBIT
5	IN COM
6	OUT COM
7	OUT COM
8	CASE
9	V OUT
10	V OUT

Figure 9 – Package and Pinout
(Dimensional Limits are ±0.005" Unless Otherwise Stated)

Package Notes:
1. Case temperature is measured on the center of the baseplate surface.
2. Materials: Baseplate – aluminum, conductive conversion coating.
   Cover – nickel plated.
   Pins – copper, gold over nickel plating.
3. Mounting holes are not threaded. Recommended fastener is 4-40.
4. This Package is not hermetic. VPT offers a wide range of hermetic products. Please contact VPT for details if hermetic products are required.
5. For applications requiring exposure to liquid cleaning, please contact VPT.

PACKAGE PIN DESCRIPTION

Pin	Function	Description
1	VIN	Positive Input Voltage Connection
2	SHARE	Current Share connection for parallel operation. Leave open if not used. Input referenced.
3	SYNC	Frequency Synchronization Input. Apply a TTL squarewave, 5Vpp, 20 - 80% duty cycle, internally capacitively coupled. Leave open if not used. Input referenced.
4	INHIBIT	This is an open collector input. Logic Low = Disabled Output. Connect the inhibit pin to input common to disable the output. Unconnected, open collector or open drain = Enabled Output. Input referenced.
5	INCOM	Input Return Connection
6	OUTCOM	Output Return Connection
7	OUTCOM	Output Return Connection
8	CASE	Case Connection
9	VOUT	Positive Output Voltage Connection
10	VOUT	Positive Output Voltage Connection

100% ENVIRONMENTAL SCREENING

Screening	Condition
Internal Visual	IPC-A-610
Stabilization Bake	MIL-STD-883, Method 1008, Condition B, 125°C, 24 hours
Temperature Cycling	MIL-STD-883, Method 1010, Condition B, -55°C to +125°C, 10 Cycles
Burn-In	MIL-STD-883, Method 1015, 96 hours at +100°C
Final Electrical	100% at 25°C
External Visual	MIL-STD-883, Method 2009

ORDERING INFORMATION

VPTHVM-	270
1	2

(1)	(2)	
Product Series	**Nominal Input Voltage**	
VPTHVM	**270**	160 - 400 Volts

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

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