



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
- Six Sided Metal Rugged Enclosure



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



VPTHVM-270 Series

SPECIFICATIONS ($T_{CASE} = -55^{\circ}C$ to $+100^{\circ}C$, $V_{IN} = +270V \pm 5\%$, 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, $T_{CASE} = +100^{\circ}C$)	25 Watts	Weight (Maximum)	88 Grams

Parameter	Conditions	VPHVM-270			Units
		Min	Typ	Max	
STATIC					
INPUT Voltage	Continuous	180	-	350	V
	Continuous, $P_{out} \leq 150W$	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
	V_{OUT} 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 @ $T_C = 55^{\circ}C$	-	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

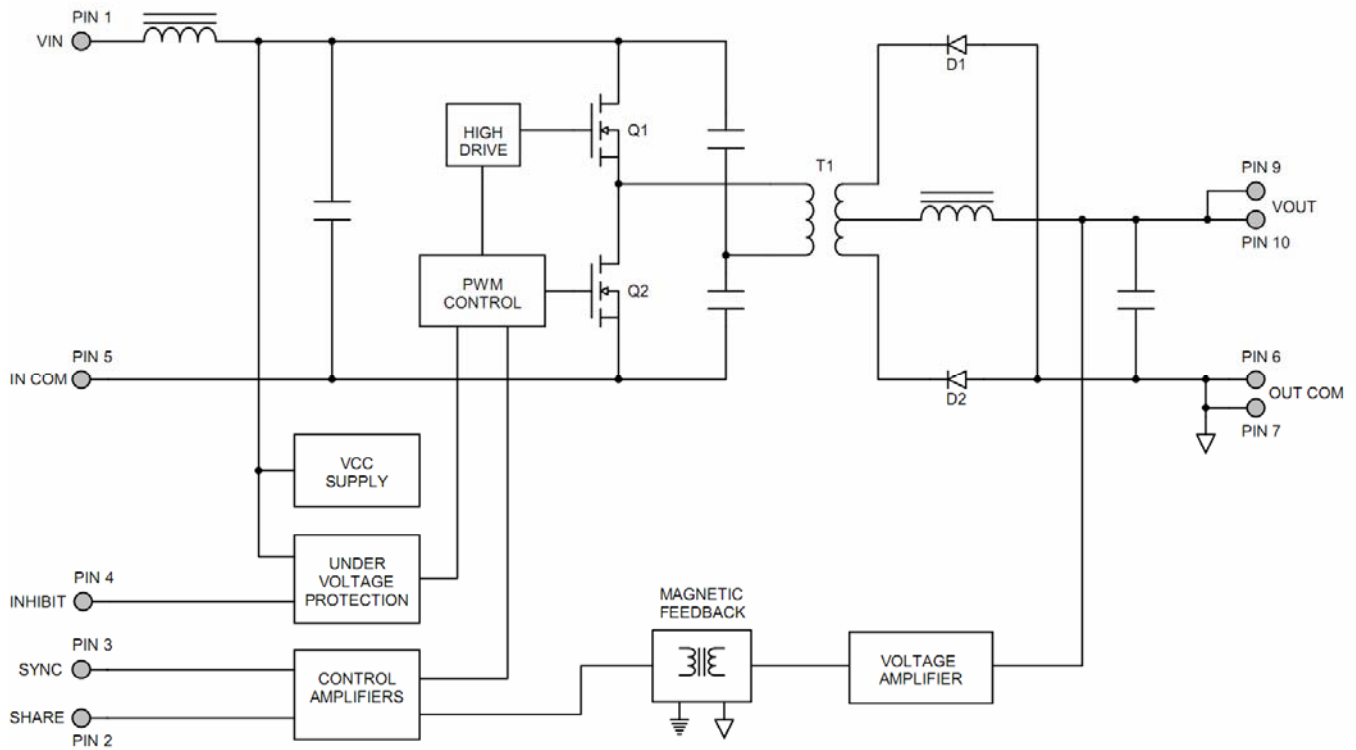


Figure 2

CONNECTION DIAGRAM

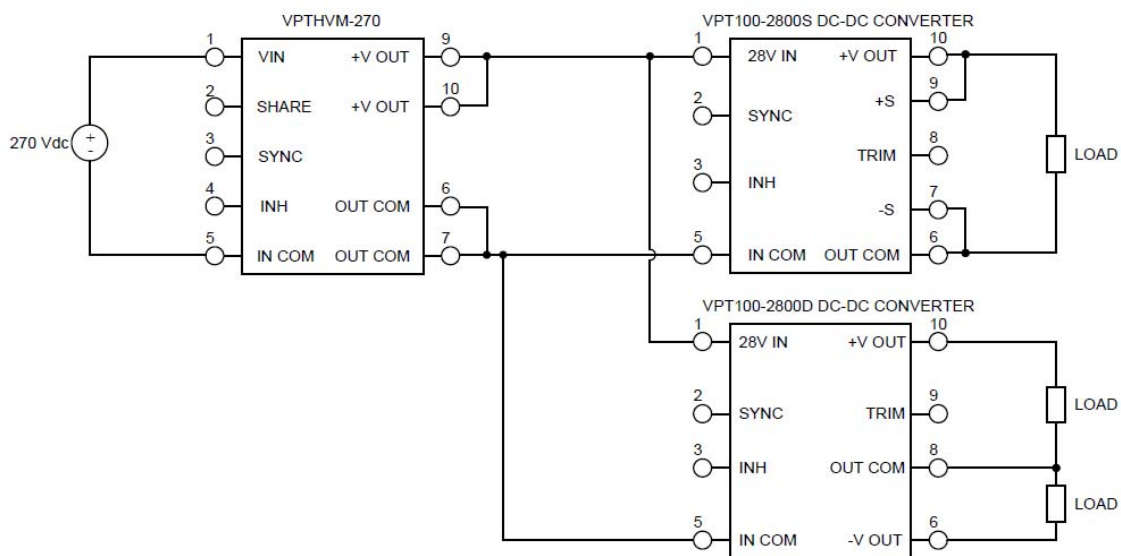


Figure 3

CONNECTION DIAGRAM

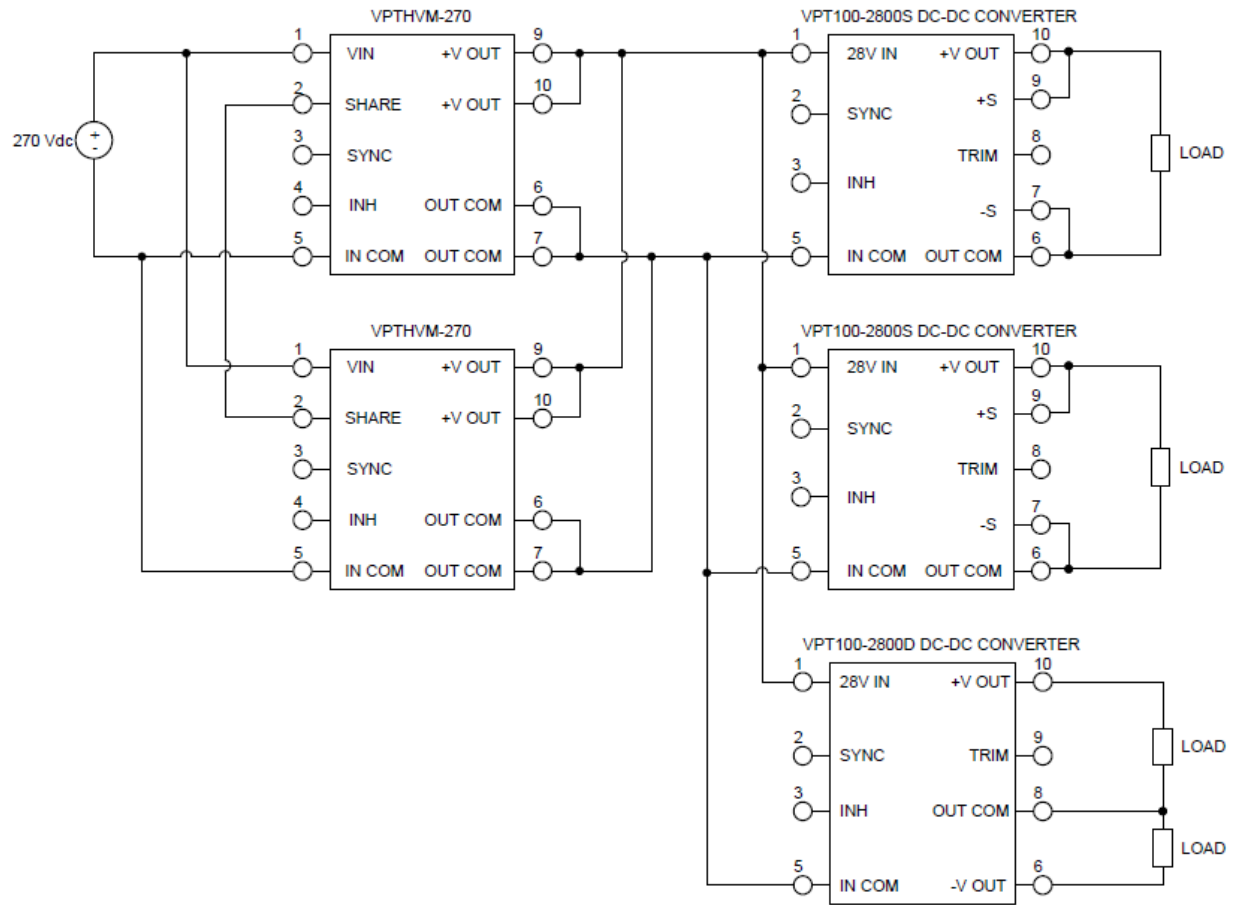


Figure 4

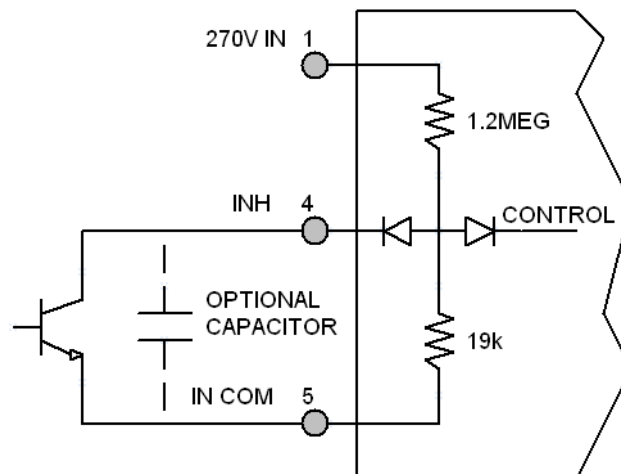


Figure 5-Inhibit Circuit
(Shown with optional capacitor for turn-on delay)

PERFORMANCE CURVES ($T_{CASE} = 25^{\circ}C$, Full Load, Unless Otherwise Specified)

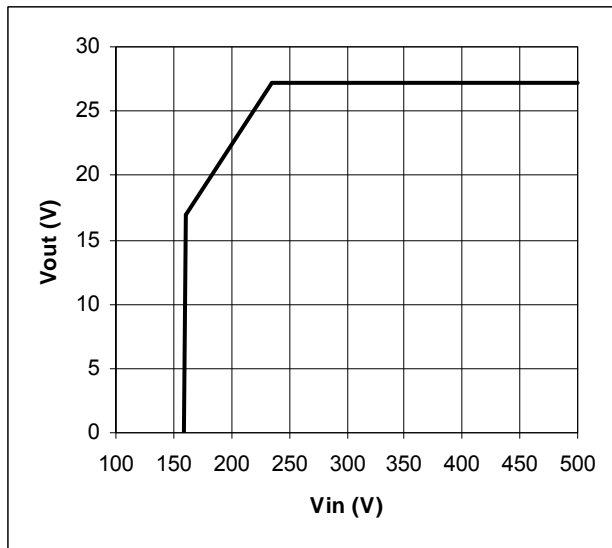


Figure 6 – Output Voltage vs Input Voltage

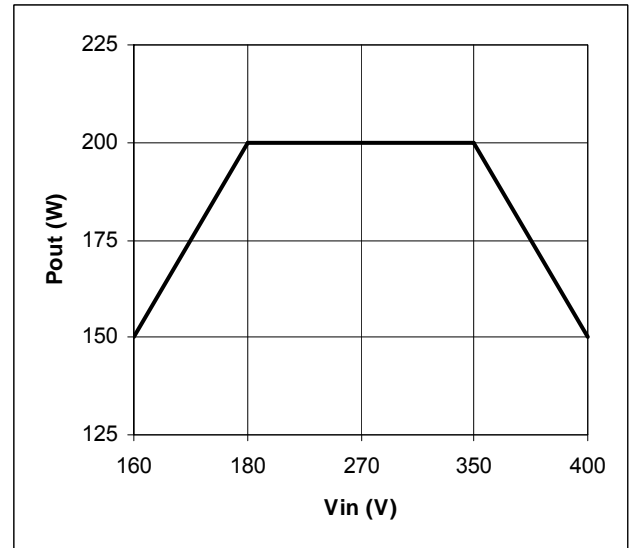


Figure 7 – Output Power vs Input Voltage

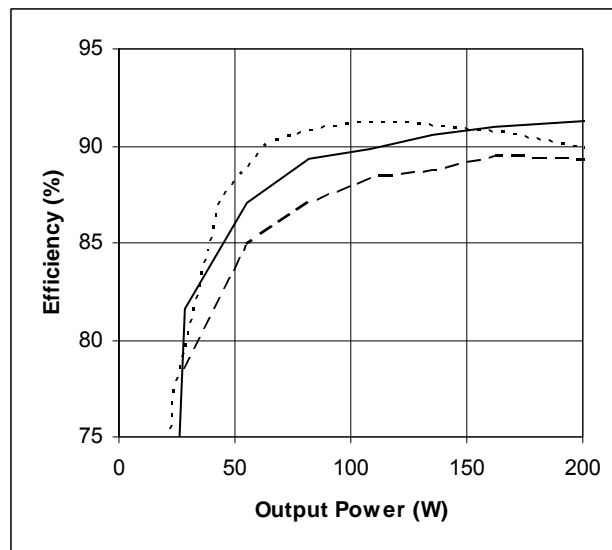
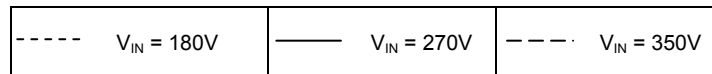


Figure 8 – Efficiency (%) vs. Output Power (W)

PACKAGE SPECIFICATIONS

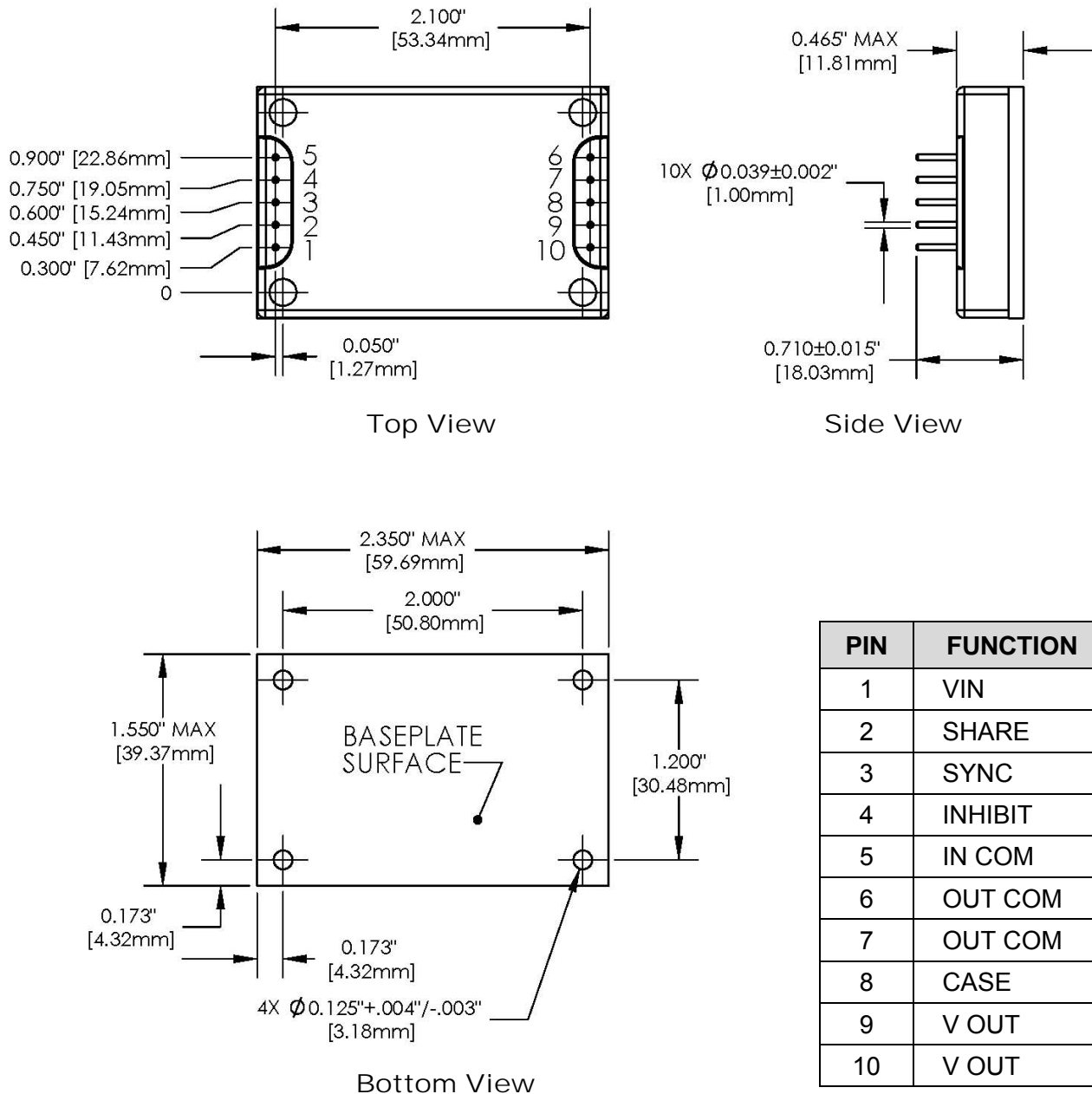


Figure 9 – Package and Pinout
(Dimensional Limits are ± 0.005 " Unless Otherwise Stated)

Package Notes:

- Case temperature is measured on the center of the baseplate surface.
- Materials: Baseplate – aluminum, conductive conversion coating.
Cover – nickel plated.
Pins – copper, gold over nickel plating.
- Mounting holes are not threaded. Recommended fastener is 4-40.

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:

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