



### Features

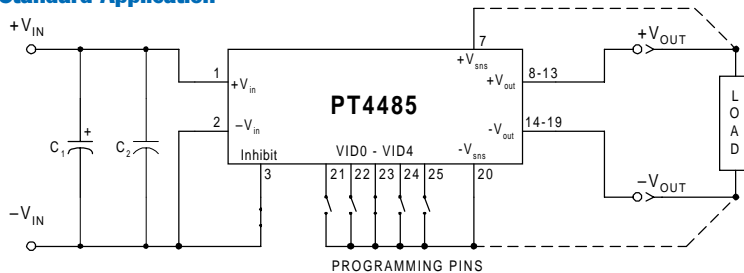
- 36V to 75V Input Range
- Temp Range: -40° to +100°C
- 1500 VDC Isolation
- 89% Efficiency
- Programmable Output Voltage 6.5V to 17.5V
- Remote On/Off
- Differential Remote Sense
- N+1 Current Sharing
- Over-Current Protection
- Over-Temperature Protection
- Over-Voltage Protection
- Solderable Copper Case

### Description

The PT4485 Excalibur™ module combines state-of-the-art power conversion technology with un-paralleled flexibility. Operating off a standard 48V telecom input, the PT4485 provides a full 100W output at load currents up to 8.5A, and over the programmable output voltage range of 6.5V to 17.5V.

The PT4485 features high efficiency, ultra-fast transient response, and the capability for true N+1 current sharing. This product also includes output short circuit and over-temperature protection.

### Standard Application



- C<sub>1</sub> = Optional 33μF, 100V electrolytic capacitor
- C<sub>2</sub> = Optional 1μF, 100V ceramic capacitor
- Programming pins, VID0–VID4, are shown configured for V<sub>o</sub> = 12.0V
- For normal operation, pin 3 (Inhibit) must be connected to -V<sub>in</sub>.
- For operation in N+1 configuration, consult the related application note.
- Pins 6 & 26 are used for N+1 configurations only.

### Specifications

Characteristics (T <sub>a</sub> = 25°C unless noted)	Symbols	Conditions (V <sub>in</sub> = 48V, V <sub>o</sub> = 12.0V unless noted)	PT4485			Units
			Min	Typ	Max	
Output Current	I <sub>o</sub>	Over V <sub>in</sub> range (100W max)	0.1	—	8.5 (1)	A
Current Limit	I <sub>cl</sub>	V <sub>in</sub> = 36V	—	10	—	A
Current Sharing		Single line reference to -V <sub>sense</sub>	—	—	±10	%
Input Voltage Range	V <sub>in</sub>	I <sub>o</sub> = 0 to I <sub>o</sub> max	36	48	75	V
Output Voltage Tolerance	ΔV <sub>o</sub>	Over V <sub>in</sub> range, I <sub>o</sub> = I <sub>o</sub> max T <sub>a</sub> = -40 to +100°C case	—	±1.0	±2.0	%V <sub>o</sub>
Line Regulation	Reg <sub>line</sub>	Over V <sub>in</sub> range @ max I <sub>o</sub>	—	±0.1	±1.0	%V <sub>o</sub>
Load Regulation	Reg <sub>load</sub>	0 to 100% of I <sub>o</sub> max	—	±0.5	±1.0	%V <sub>o</sub>
V <sub>o</sub> Ripple/Noise	V <sub>n</sub>	I <sub>o</sub> = I <sub>o</sub> max	—	120	150	mV <sub>pp</sub>
Transient Response	t <sub>tr</sub>	50% to 75% I <sub>o</sub> max @ 0.1A/μs V <sub>o</sub> over/undershoot (no ext caps)	—	N/A 1.0	—	μSec %V <sub>o</sub>
		50% to 100% I <sub>o</sub> max @ 1.0A/μs V <sub>o</sub> over/undershoot (no ext. caps)	—	200 4	—	μSec %V <sub>o</sub>
V <sub>o</sub> Rise Time	V <sub>otr</sub>	At turn-on	—	—	10	mSec
Efficiency	η	I <sub>o</sub> = 5A	—	89	—	%
Switching Frequency	f <sub>o</sub>	—	—	300	—	kHz
Remote On/Off	Off On	Referenced to -V <sub>in</sub>	+2.5 -0.5	—	+75.0 +0.8	VDC
Over-Voltage Protection	OVP	Shutdown and latch off	—	125	—	%V <sub>o</sub>
Isolation	—	—	1500	—	—	VDC
Operating Temperature Range	T <sub>c</sub>	Measured at center of case	-40	—	+100	°C
Over-Temperature Shutdown	OTP	Case temperature - Auto reset	—	+110	—	°C
Storage Temperature	T <sub>s</sub>	—	-40	—	+125	°C
Reliability	MTBF	Per Bellcore TR-332 50% stress, t = 40°C, ground benign	1.7	—	—	10 <sup>6</sup> Hrs
Mechanical Shock	—	Per Mil-STD-883D, Method 2002.3, 1mS, Half-sine, mounted to a fixture	—	500	—	G's
Mechanical Vibration (Mil-STD-883D, 20-2000Hz)	—	Vertical (Suffix N) Horizontal (Suffixes A, C)	—	10 (2) 20 (2)	—	G's
Weight	—	—	—	90	—	grams

**Notes:** (1) The maximum output current is limited to 8.5A or 100V<sub>OUT</sub>, whichever is less.

(2) Only the case pins on the through-hole package types (suffixes N & A) must be soldered. For more information see the applicable package outline drawing.

100-W 8.5-A Programmable Isolated DC/DC Converter

Pin-Out Information

Pin	Function	Pin	Function
1	+V <sub>in</sub>	14	-V <sub>out</sub>
2	-V <sub>in</sub>	15	-V <sub>out</sub>
3	Inhibit	16	-V <sub>out</sub>
4	Do not connect	17	-V <sub>out</sub>
5	Do not connect	18	-V <sub>out</sub>
6	Sync	19	-V <sub>out</sub>
7	+V <sub>sense</sub>	20	-V <sub>sense</sub>
8	+V <sub>out</sub>	21	VID0
9	+V <sub>out</sub>	22	VID1
10	+V <sub>out</sub>	23	VID2
11	+V <sub>out</sub>	24	VID3
12	+V <sub>out</sub>	25	VID4
13	+V <sub>out</sub>	26	Share

Programming Information

VID3	VID2	VID1	VID0	VID4=1 Vout	VID4=0 Vout
1	1	1	1	10.0	6.5
1	1	1	0	10.5	6.75
1	1	0	1	11.0	7.0
1	1	0	0	11.5	7.25
1	0	1	1	12.0	7.5
1	0	1	0	12.5	7.75
1	0	0	1	13.0	8.0
1	0	0	0	13.5	8.25
0	1	1	1	14.0	8.5
0	1	1	0	14.5	8.75
0	1	0	1	15.0	9.0
0	1	0	0	15.5	9.25
0	0	1	1	16.0	9.5
0	0	1	0	16.5	9.75
0	0	0	1	17.0	10.0
0	0	0	0	17.5	10.25

Logic 0 = Pin 20 potential (remote sense gnd)  
 Logic 1 = Open circuit (no pull-up resistors)  
 VID4 may not be changed while the unit is operating.

Ordering Information

PT 4485 □ = +6.5V to 17.5V

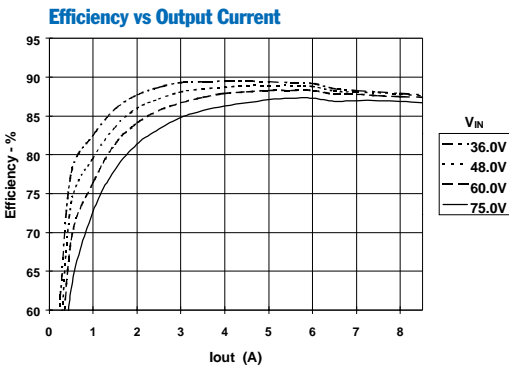
PT Series Suffix (PT1234 x)

Case/Pin Configuration	Order Suffix	Package Code
Vertical	<b>N</b>	(EKD)
Horizontal	<b>A</b>	(EKA)
SMD	<b>C</b>	(EKC)

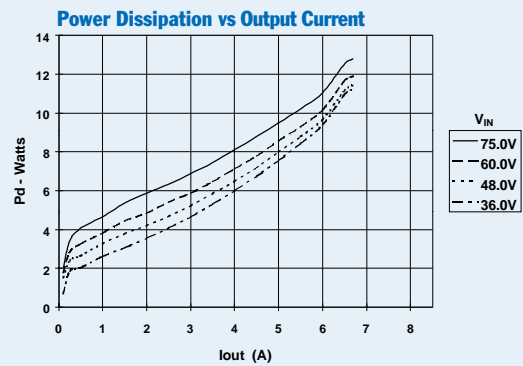
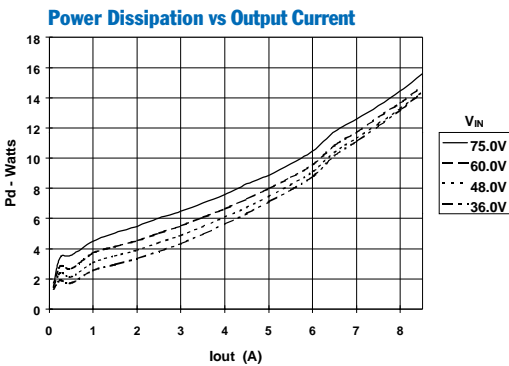
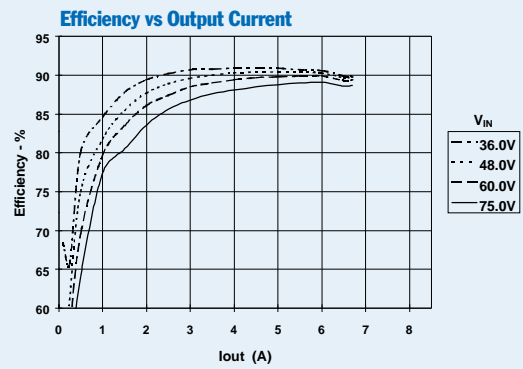
(Reference the applicable package code drawing for the dimensions and PC board layout)

TYPICAL CHARACTERISTICS

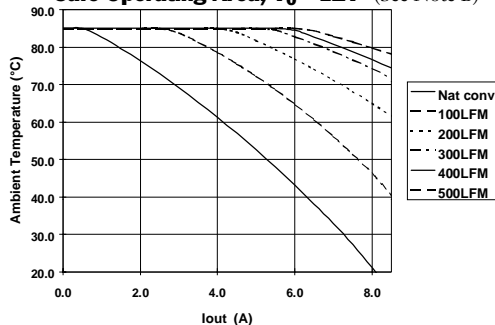
PT4485, V<sub>o</sub> = 12.0V (See Note A)



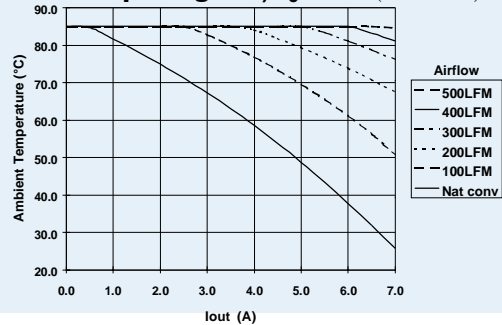
PT4485, V<sub>o</sub> = 15.0V (See Note A)



Safe Operating Area, V<sub>o</sub> = 12V (See Note B)



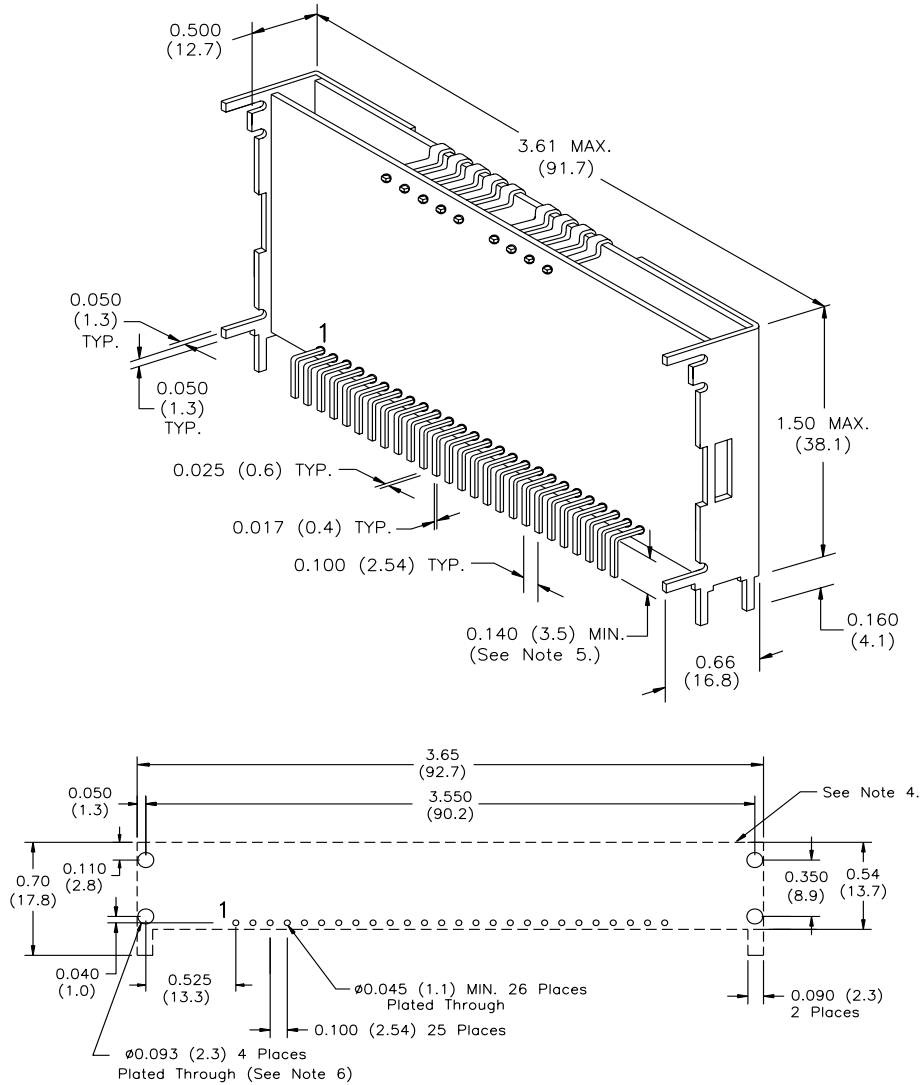
Safe Operating Area, V<sub>o</sub> = 15V (See Note B)



Note A: All data listed in the above graphs has been developed from actual products tested at 25°C. This data is considered typical data for the DC/DC Converter.  
 Note B: SOA curves represent operating conditions at which the temperature of the metal case is at or below the maximum specified 100°C

**PACKAGE INFORMATION AND DIMENSIONS**

Vertical Through-Hole Mount (Suffix N)



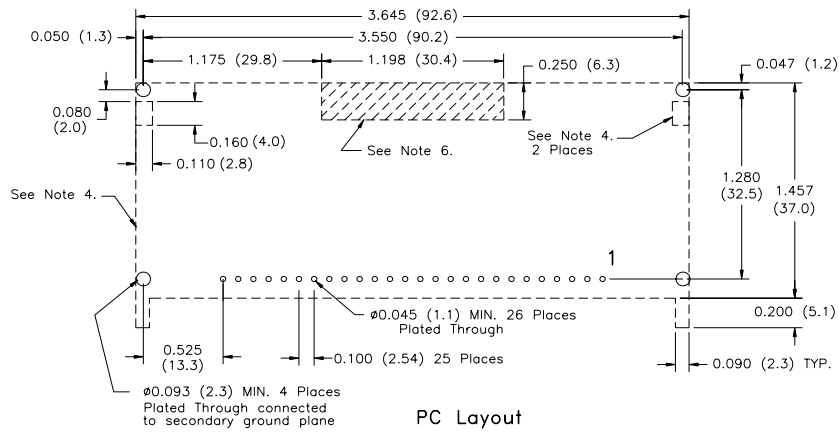
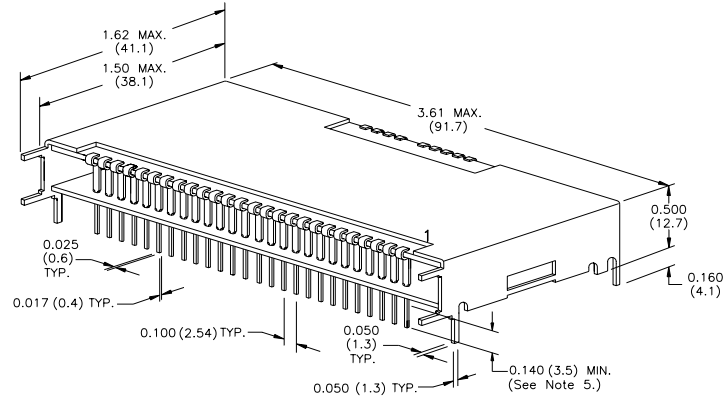
PC Layout

Notes: (Rev. E)

- 1: All dimensions are in inches (mm).
- 2: 2 place decimals are  $\pm 0.030$  ( $\pm 0.8$ mm).
- 3: 3 place decimals are  $\pm 0.010$  ( $\pm 0.3$ mm).
- 4: Recommended mechanical keep out area (dotted line).
- 5: Electrical pin length mounted on printed circuit board seating plane to pin end.
- 6: Option (Electrically connect heatsink pins to secondary ground.)

**PACKAGE INFORMATION AND DIMENSIONS**

Horizontal Through-Hole Mount (Suffix A)



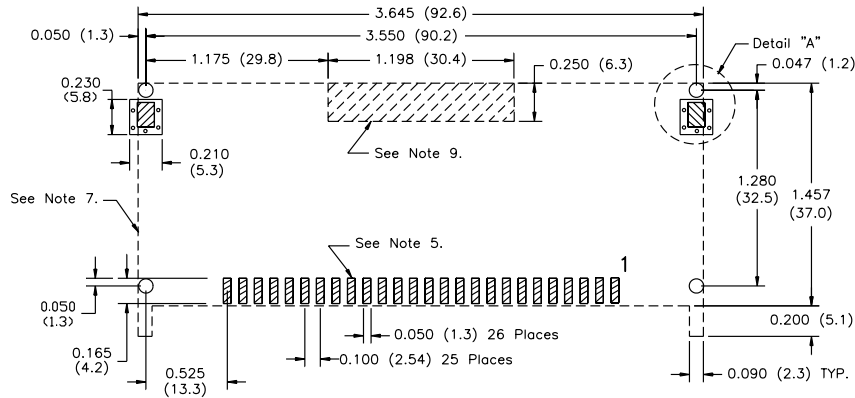
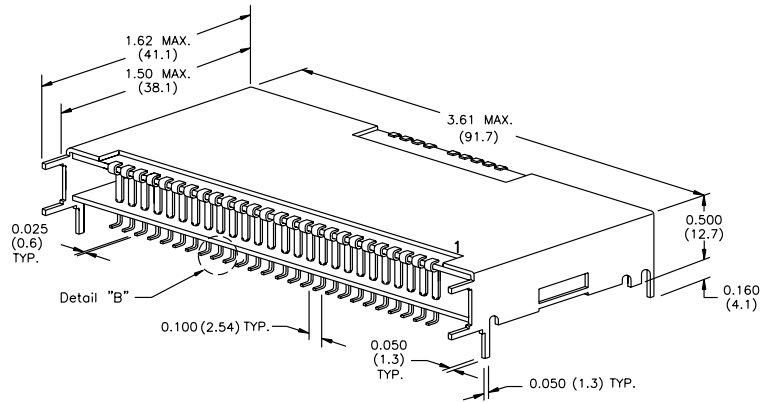
PC Layout

Notes: (Rev. G)

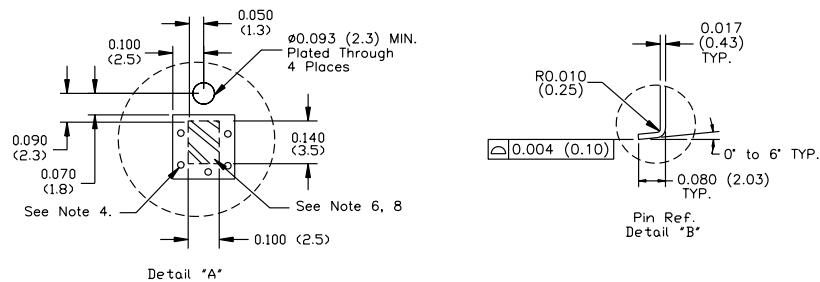
- 1: All dimensions are in inches (mm).
- 2: 2 place decimals are  $\pm 0.030$  ( $\pm 0.8\text{mm}$ ).
- 3: 3 place decimals are  $\pm 0.010$  ( $\pm 0.3\text{mm}$ ).
- 4: Recommended mechanical keep out area (dotted lines).
- 5: Electrical pin length mounted on printed circuit board seating plane to pin end.
- 6: No copper, power or signal traces in this area.

PACKAGE INFORMATION AND DIMENSIONS

Horizontal Surface Mount (Suffix C)



PC Layout



Notes: (Rev. E)

- 1: All dimensions are in inches (mm).
- 2: 2 place decimals are  $\pm 0.030$  ( $\pm 0.8$ mm).
- 3: 3 place decimals are  $\pm 0.010$  ( $\pm 0.3$ mm).
- 4: Vias are recommended to improve copper adhesion.
- 5: Power pin connections should utilize two or more vias per input, ground and output pin.
- 6: Solder mask openings to copper island for solder joints to mechanical pins.
- 7: Recommended mechanical keep out area (dotted lines).
- 8: Electrically connected case to secondary ground plane.
- 9: No copper, power or signal traces in this area.

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

### Mailing Address:

Texas Instruments  
Post Office Box 655303  
Dallas, Texas 75265