

Features

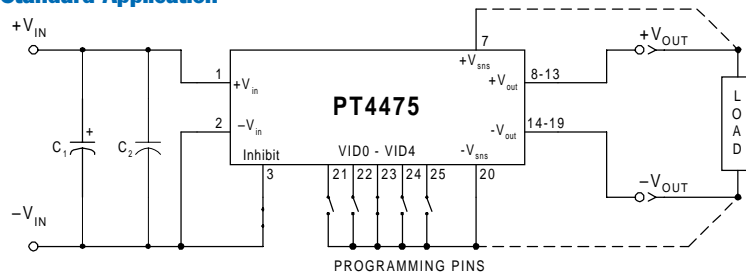
- 18V to 36V Input Range
- -40° to +100°C Operating Temp
- 1500 VDC Isolation
- 88.5% Efficiency
- Programmable Output Voltage 6.5V to 17.5V
- Remote On/Off
- Differential Remote Sense
- N+1 Current Sharing
- Over-Current Protection
- Over-Temperature Protection
- Over-Voltage Protection
- Solderable Copper Case

Description

The PT4475 Excalibur™ module combines state-of-the-art power conversion technology with un-paralleled flexibility. Operating off a standard 24V telecom input, the PT4475 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 PT4475 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



- C₁ = Optional 33μF, 100V electrolytic capacitor
- C₂ = Optional 1μF, 100V ceramic capacitor
- Programming pins, VID0–VID4, are shown configured for V_o = 12.0V
- For normal operation, pin 3 (Inhibit) must be connected to -V_{in}.
- For operation in N+1 configuration, consult the related application note.
- Pins 6 & 26 are used for N+1 configurations only.

Specifications

Characteristics (T _a = 25°C unless noted)	Symbols	Conditions (V _{in} = 24V, V _o = 12.0V unless noted)	PT4475			
			Min	Typ	Max	Units
Output Current	I _o	Over V _{in} range (100W max)	0.1	—	8.5 ⁽¹⁾	A
Current Limit	I _{cl}	V _{in} = 18V	—	10	—	A
Current Sharing		Single line referenced to -V _{sense}	—	—	±10	%
Input Voltage Range	V _{in}	I _o = 0 to I _o max	18	24	36	V
Output Voltage Tolerance	ΔV _o	Over V _{in} range, I _o = I _o max T _a = -40 to +100°C case	—	±1.0	±2.0	%V _o
Line Regulation	Reg _{line}	Over V _{in} range @ max I _o	—	±0.1	±1.0	%V _o
Load Regulation	Reg _{load}	0 to 100% of I _o max	—	±0.5	±1.0	%V _o
V _o Ripple/Noise	V _n	I _o = I _o max	—	120	150	mV _{pp}
Transient Response	t _{tr}	50% to 75% I _o max @ 0.1A/μs V _o over/undershoot (no ext caps)	—	N/A	—	μSec
		50% to 100% I _o max @ 1.0A/μs V _o over/undershoot (no ext. caps)	—	1.0	—	%V _o
V _o Rise Time	V _{otr}	At turn-on	—	—	10	mSec
Efficiency	η	I _o = 5A	—	89	—	%
Switching Frequency	f _o	—	—	300	—	kHz
Remote On/Off	Off On	referenced to -V _{in}	+2.5 -0.5	—	+75.0 +0.8	VDC
Over-Voltage Protection	OVP	Shutdown and latch off	—	125	—	%V _o
Isolation	—	—	1500	—	—	VDC
Operating Temperature Range	T _c	Measured at center of case	-40	—	+100	°C
Over-Temperature Shutdown	OTP	Case temperature - Auto reset	—	+110	—	°C
Storage Temperature	T _s	—	-40	—	+125	°C
Reliability	MTBF	Per Bellcore TR-332 50% stress, t = 40°C, ground benign	1.7	—	—	10 ⁶ 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)	—	10 ⁽²⁾	—	G's
		Horizontal (Suffixes A, C)	—	20 ⁽²⁾	—	G's
Weight	—	—	—	90	—	grams

Notes: (1) The maximum output current is limited to 8.5A or 100/V_{OUT}, 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.

PT4475—24V

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

Pin-Out Information

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

Programming Information

VID3	VID2	VID1	VID0	VID4=1 V _{out}	VID4=0 V _{out}
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

PT4475□ = +6.5V to 17.5V

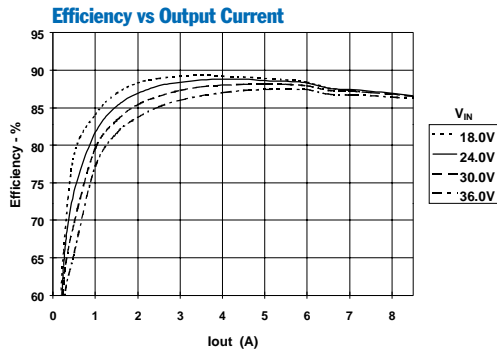
PT Series Suffix (PT1234 x)

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

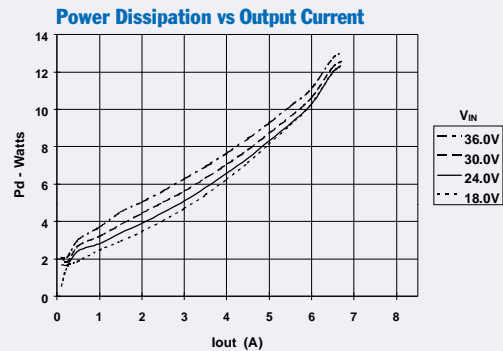
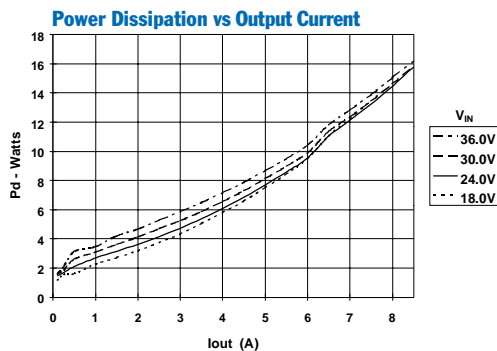
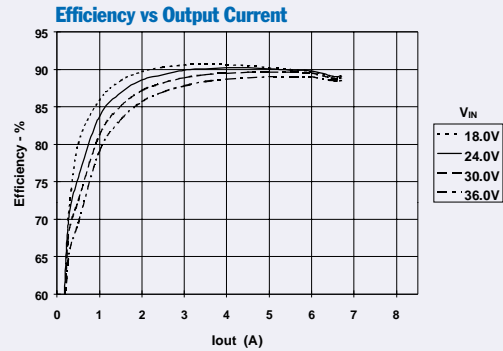
(Reference the applicable package code drawing for the dimensions and PC board layout)

TYPICAL CHARACTERISTICS

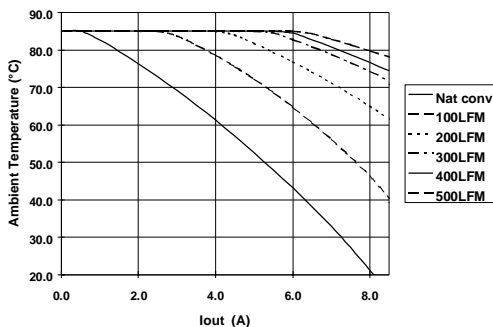
PT4475, V_o = 12.0V (See Note A)



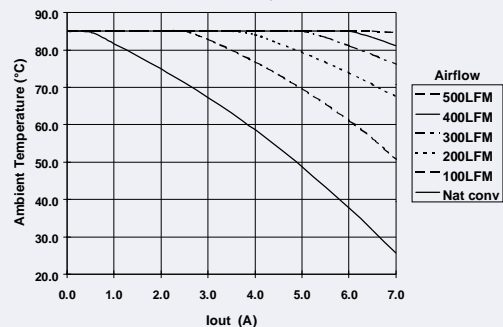
PT4475, V_o = 15.0V (See Note A)



Safe Operating Area, V_o = 12V (See Note B)



Safe Operating Area, V_o = 15V (See Note B)

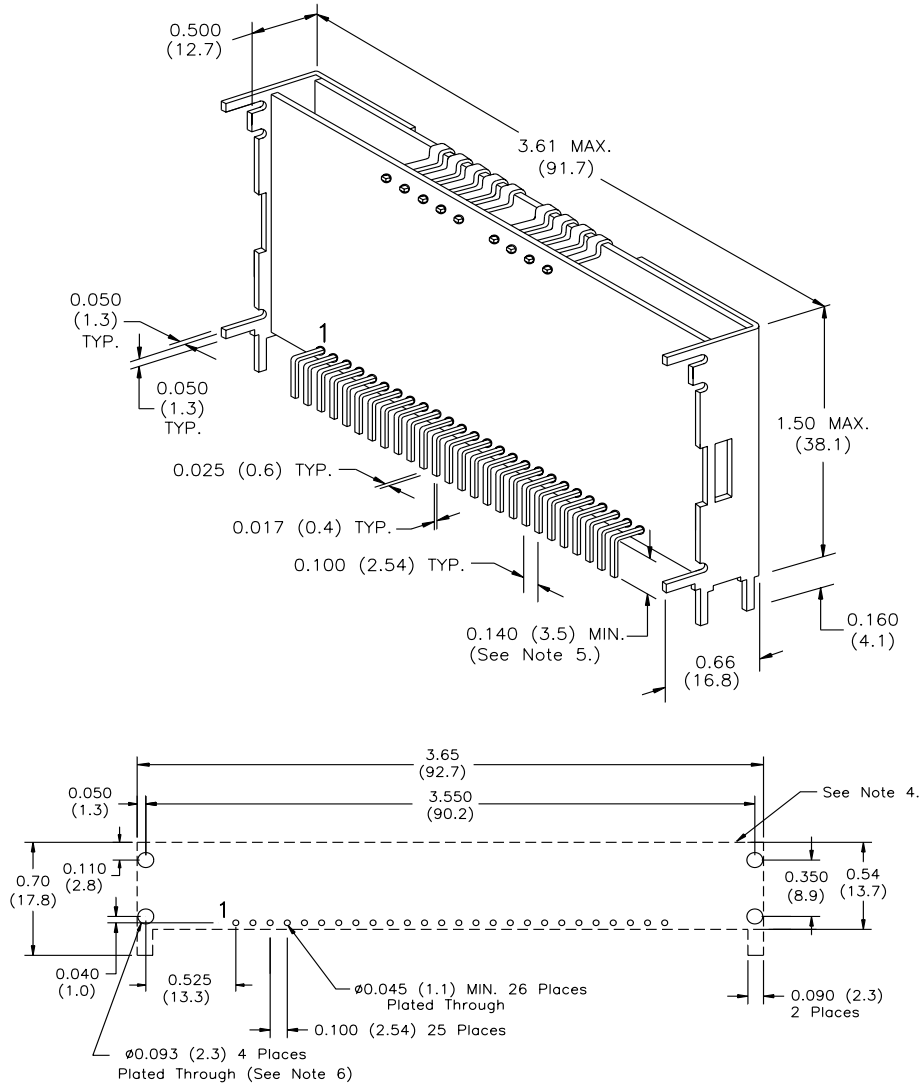


Note A: All data listed in the above graphs has been developed from actual products tested at 25°C. This data is considered typical data for the DC/DC Converter.

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)



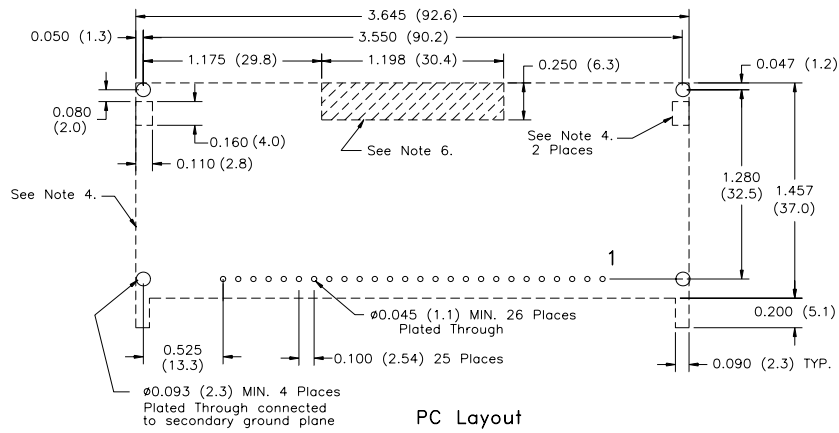
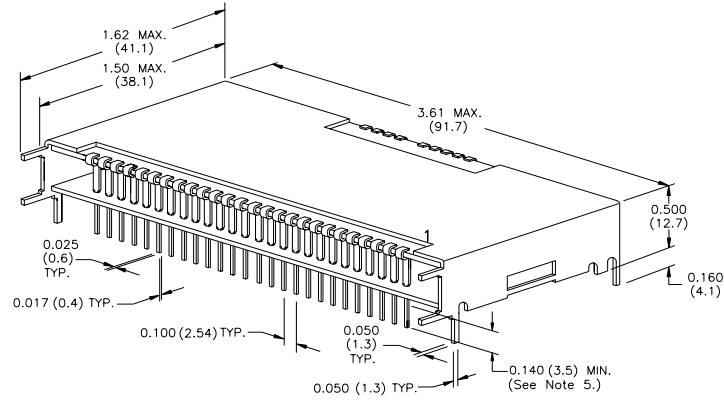
PC Layout

Notes: (Rev. E)

- 1: All dimensions are in inches (mm).
- 2: 2 place decimals are ± 0.030 (± 0.8 mm).
- 3: 3 place decimals are ± 0.010 (± 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)



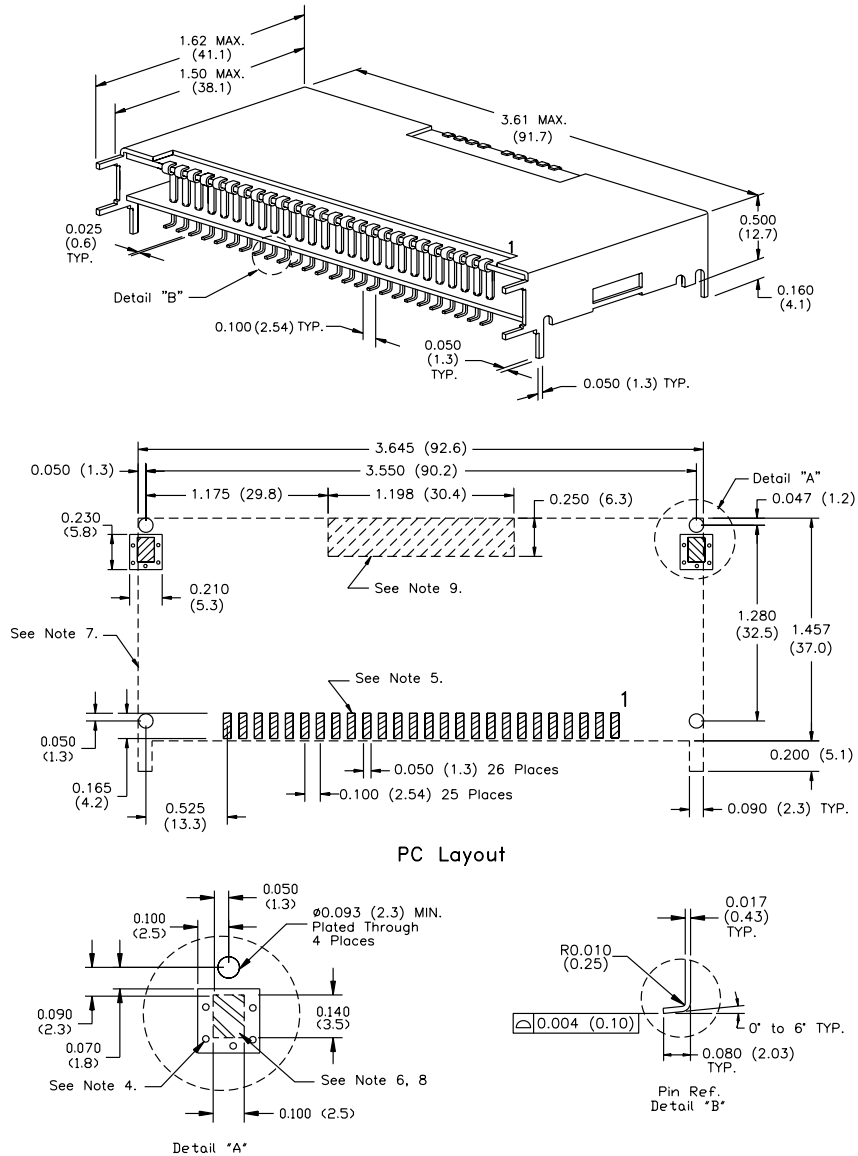
PC Layout

Notes: (Rev. G)

- 1: All dimensions are in inches (mm).
- 2: 2 place decimals are ± 0.030 ($\pm 0.8\text{mm}$).
- 3: 3 place decimals are ± 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)



Notes: (Rev. E)

- 1: All dimensions are in inches (mm).
- 2: 2 place decimals are ± 0.030 (± 0.8 mm).
- 3: 3 place decimals are ± 0.010 (± 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.

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
PT4475A	ACTIVE	SIP MOD ULE	EKA	26	6	TBD	Call TI	Level-1-215C-UNLIM
PT4475C	ACTIVE	SIP MOD ULE	EKC	26	6	TBD	Call TI	Level-3-215C-168HRS

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBsolete: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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