PT4471—24V

100 Watt 30 Amp Programmable Isolated DC-DC Converter

Power Trends Products from Texas Instruments

EXCALIBUR

SLTS093

(Revised 6/30/2000)

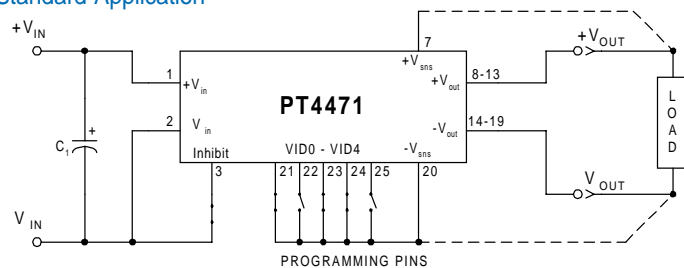Patent pending on package assembly

Features

- Input Range: 18V to 36V
- Programmable Output: 1.3V to 3.5V
- Temp Range: -40° to +100°C
- 1500 VDC Isolation
- 88% Efficiency
- Remote On/Off
- Differential Remote Sense
- N+1 Current Sharing
- Over-Current Protection
- Over-Temperature Protection
- Over-Voltage Protection
- Solderable Copper Case

Description

The PT4471 Excailbur™ module combines state-of-the-art power conversion technology with un-paralleled flexibility. Operating off a standard 24V telecom input, the PT4471 provides a full 100W output at load currents up to 30A, and over the programmable output voltage range of 1.3V to 3.5V.

The PT4471 features high efficiencies, 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, 50V electrolytic capacitor
- Programming pins, VID0–VID4, are shown configured for Vo =3.3V
- For normal operation, pin 3 (Inhibit) must be connected to –Vin.
- 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$_o$=3.3V unless noted)	PT4471			Units
			Min	Typ	Max	
Output Current	I$_o$	Over V$_{in}$ range	0	—	30	A
Current Limit	I$_{el}$	V$_{in}$ = 18V	—	35	—	A
Current Sharing		with PT4495 current booster	—	—	±10	%
Input Voltage Range	V$_{in}$	I$_o$ = 0 to max I$_o$	18	24	36	V
Output Voltage Tolerance	ΔV$_o$	Over V$_{in}$ Range 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 $\quad$ V$_o$ >2.0V V$_o$ ≤2.0V	— —	60 45	75 55	mV$_{pp}$
Transient Response	t$_{tr}$	50% to 75% I$_o$max @ 0.1A/µs V$_o$ over/undershoot (no ext caps)	— —	N/A 1.0	— —	µSec %V$_o$
		50% to 100% I$_o$max @1.0A/µs V$_o$ over/undershoot (no ext. caps)	— —	75 5	— —	µSec %V$_o$
V$_o$ Rise Time	V$_{otr}$	At turn-on	—	—	10	mSec
Efficiency	η	I$_o$=15A	—	88.5	—	%
Switching Frequency	f$_o$	—	—	300	—	kHz
Remote On/Off	Off On	Open or 2.5 to 5.1 VDC above -V$_{in}$ Short or 0 to 0.8 VDC above -V$_{in}$				
Over-Voltage Protection	OVP	Shutdown and latch off	—	125	—	%V$_o$
Isolation	—	—	1500	—	—	VDC
Maximum Operating Temperature Range	T$_c$	Measured at center of case	–40	—	+100	°C
Over-Temperature Shutdown Point	OTP	Case temperature - Auto reset	—	+105	—	°C
Reliability	MTBF	Per Bellcore TR-332 50% stress, t =40°C, ground benign	1.4	—	—	10^6 Hrs
Mechanical Shock	—	Per Mil-STD-883D, Method 2002.3, 1mS, Half-sine, mounted to a fixture	—	TBD	—	G's
Mechanical Vibration	—	Per Mil-STD-883D, Method 2007.2, 20-2000Hz, Soldered in a PC board	—	TBD	—	G's
Weight	—	—	—	90	—	grams

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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 Vout	VID4=0 Vout
1	1	1	1	2.0V	1.30V
1	1	1	0	2.1V	1.35V
1	1	0	1	2.2V	1.40V
1	1	0	0	2.3V	1.45V
1	0	1	1	2.4V	1.50V
1	0	1	0	2.5V	1.55V
1	0	0	1	2.6V	1.60V
1	0	0	0	2.7V	1.65V
0	1	1	1	2.8V	1.70V
0	1	1	0	2.9V	1.75V
0	1	0	1	3.0V	1.80V
0	1	0	0	3.1V	1.85V
0	0	1	1	3.2V	1.90V
0	0	1	0	3.3V	1.95V
0	0	0	1	3.4V	2.00V
0	0	0	0	3.5V	2.05V

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 4471☐ = 1.3 to 3.5 Volts

*(For dimensions and PC board layout, see
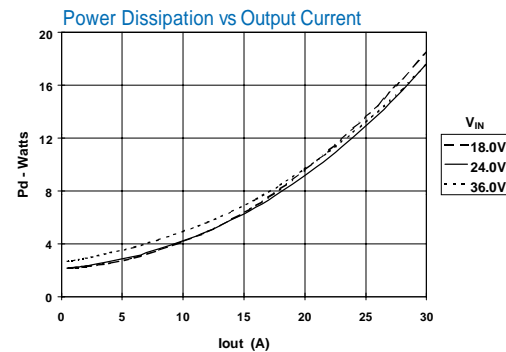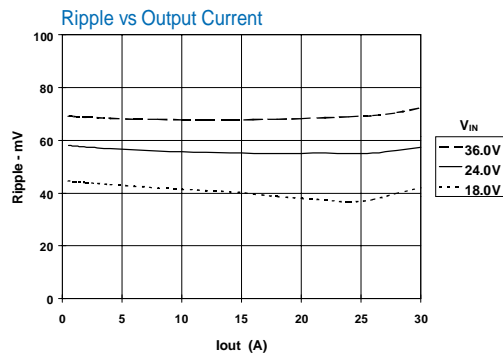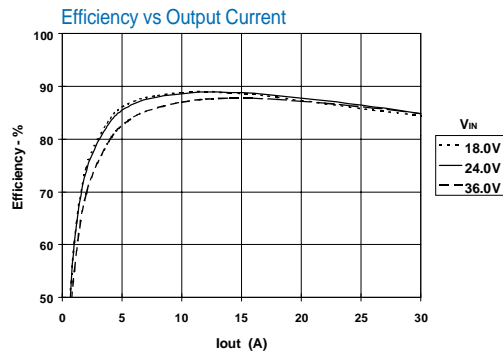Package Styles 1200, 1210 and 1215.)*

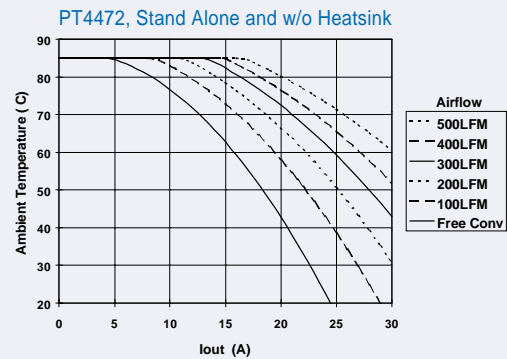### PT Series Suffix (PT1234X)

Case/Pin
Configuration

Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

T Y P I C A L   C H A R A C T E R I S T I C S

PT4471, V_O =3.3V (See Note A)

Efficiency vs Output Current

V_{IN}
- 18.0V
- 24.0V
- 36.0V

Ripple vs Output Current

V_{IN}
- 36.0V
- 24.0V
- 18.0V

Power Dissipation vs Output Current

V_{IN}
- 18.0V
- 24.0V
- 36.0V

Safe Operating Area, V_{in} =24V, V_O =3.3V (See Note B)

PT4472, Stand Alone and w/o Heatsink

Airflow
- 500LFM
- 400LFM
- 300LFM
- 200LFM
- 100LFM
- Free Conv

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*