PT4472—24V

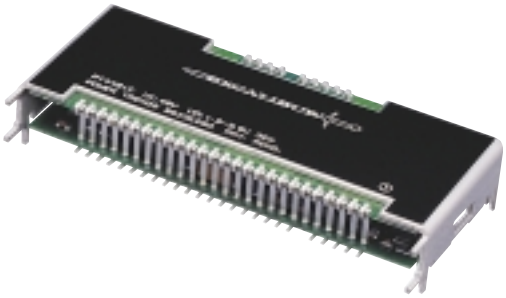
100 Watt 30 Amp Programmable Isolated DC-DC Converter

EXCALIBUR

Power Trends Products from Texas Instruments

SLTS094

(Revised 6/30/2000)



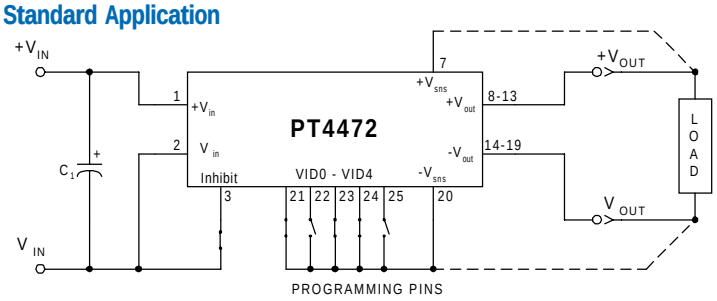
Patent pending on package assembly

- 18V to 36V Input Range
- Programmable Output Voltage Range: 1.3V to 3.5V
- -40° to +100°C Operating Temp
- 1500 VDC Isolation
- 88% Efficiency
- Remote On/Off
- Differential Remote Sense
- 60A Output with PT4495
- Over-Current Protection
- Over-Temperature Protection
- Over-Voltage Protection
- Solderable Copper Case

The PT4472 Excailbur™ module combines state-of-the-art power conversion technology with un-paralleled flexibility. Operating off a standard 24V telecom input, the PT4472 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 output may be increased to 60A when used with the compatible PT4495 booster module.

The PT4472 features high efficiencies, ultra-fast transient response, and 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 with the compatible current booster module, consult the PT4495 data sheet.
- Pins 4, 5, & 26 are used for booster applications only.

Specifications

Characteristics (T_a=25°C unless noted)	Symbols	Conditions (V_{in}=24V, V_o=3.3V unless noted)		PT4472 Min	Typ	Max	Units
Output Current	I_o	Over V_{in} range		0	—	30	A
Current Limit	I_{cl}	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	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

PT4472—24V

100 Watt 30 Amp 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	V_r	17	$-V_{out}$
5	V_a	18	$-V_{out}$
6	Not used	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	DRV

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

PT4472❑ = 1.3 to 3.5 Volts

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

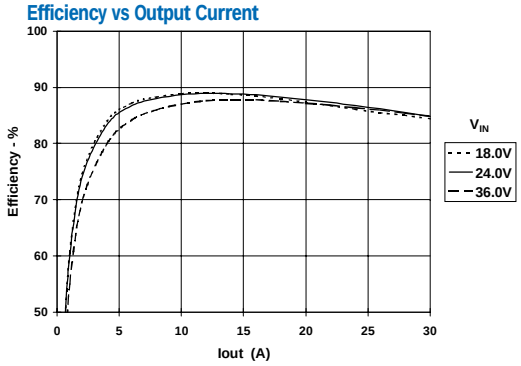
PT Series Suffix (PT1234X)

Case/Pin Configuration	
Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

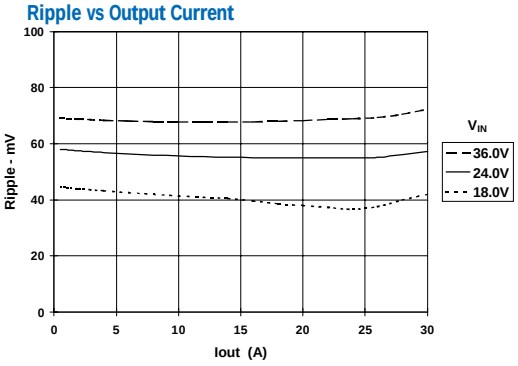
TYPICAL CHARACTERISTICS

PT4472, V_o =3.3V (See Note A)

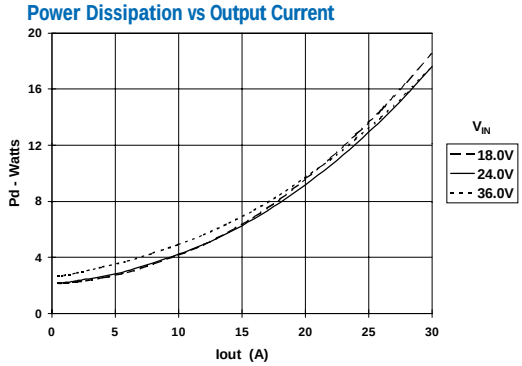
Efficiency vs Output Current



Ripple vs Output Current

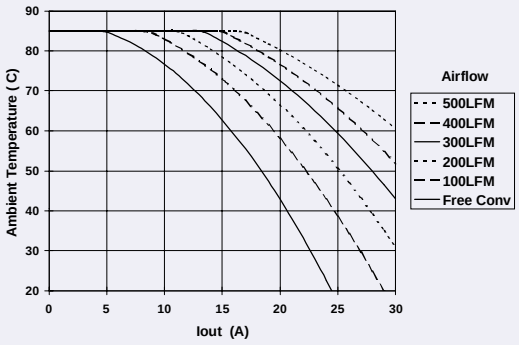


Power Dissipation vs Output Current



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

PT4472, Stand Alone and w/o Heatsink



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*

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgment, including those pertaining to warranty, patent infringement, and limitation of liability.

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

Customers are responsible for their applications using TI components.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.