International
Power Sources, Inc.

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HIGH DENSITY DC/DC Converters

IBT Series: 200 & 400 Watts

FEATURES

- Patented Flat Transformer™ Technology
- DC Input Range: 18 VDC to 400 VDC
- DC Output Range: 2.1 VDC to 15 VDC
- Switching Frequency: 300 kHz (fixed)
- Output Trim and Remote Sense
- Remote on/off Control
- Industry standard Pin-Out
- Up to 70 W/in^3
- Over 80% Conversion Efficiency
- Less than 10°C Internal Temperature Rise Above Base Plate Temperature
- MTBF 700Khrs (MIL-HDBK-217E)

MODELS CHART

MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE (±1% w/o trimming) Nominal	OUTPUT CURRENT Min.	OUTPUT CURRENT Max.	NO LOAD Power Consumption (Watts) Max.	OUTPUT VOLTAGE Trim Range (%Vnom) * Min.	OUTPUT VOLTAGE Trim Range (%Vnom) Max.	LONG TERM Short Circuit Current Max.	%EFF Typ.
IBT200-200	18-36	3.3V	0A	40A	0.6	-5	+8	0.10A	75
IBT200-201	18-36	5V	0A	30A	0.6	-5	+8	0.10A	82
IBT200-201-3	18-36	10V	0A	20A	0.8	-8	+8	0.10A	82
IBT200-202	18-36	12V	0A	17A	0.8	-8	+8	0.10A	85
IBT200-300	36-72	3.3V	0A	50A	0.8	-6	+9	0.10A	75
IBT200-301	36-72	5V	0A	40A	0.8	-8	+8	0.10A	82
IBT200-301-3	36-72	10V	0A	20A	0.8	-8	+10	0.10A	85
IBT200-302	36-72	12V	0A	17A	0.9	-8	+10	0.10A	87
IBT200-400	50-100	3.3V	0A	50A	0.8	-6	+9	0.05A	78
IBT200-401	50-100	5V	0A	40A	0.8	-8	+10	0.05A	82
IBT200-401-3	50-100	10V	0A	20A	0.9	-8	+10	0.05A	85
IBT200-402	50-100	12V	0A	17A	0.9	-8	+10	0.05A	86
IBT200-500	100-200	3.3V	0A	50A	0.9	-6	+9	0.02A	75
IBT200-501	100-200	5V	0A	40A	0.9	-8	+10	0.02A	80
IBT200-501-3	100-200	10V	0A	20A	0.9	-8	+10	0.02A	83
IBT200-502	100-200	12V	0A	17A	1.2	-8	+10	0.02A	85
IBT200-503	100-200	15V	0A	10A	1.2	-8	+10	0.02A	83
IBT200-600-1	200-400	2.1V	0A	100A	1.8	-8	+10	0.01A	70
IBT200-600	200-400	3.3V	0A	50A	1.5	-6	+9	0.01A	72
IBT200-601	200-400	5V	0A	40A	1.5	-6	+9	0.01A	78
IBT200-600-3	200-400	10V	0A	20A	1.5	-8	+10	0.01A	80
IBT200-602	200-400	12V	0A	17A	1.5	-8	+10	0.01A	81
IBT200-603	200-400	15V	0A	10A	1.5	-8	+10	0.01A	80

* Voltage adjustment down to -40% available as an option.

Electrical Specifications

All specifications typical at nominal line, full load and 25°C

Output Specifications

Voltage/Current ..... See Table
Setpoint Accuracy ..... ±1% max.
Load Regulation ..... 0.1% max. (10% to 100% load)
Line Regulation ..... 0.1% max. (Low line to high line)
Output Ripple and Noise (p-p) ..... 2.0% max. (20MHz bandwidth)
Output Temperature Drift ..... 0.02%/°C max. (Tbase = 30° to 90°C)
Start-up Overshoot ..... 25mV max. (10% to 100% load)
Transient Response
Settling Time ..... 200µsec max. (75% to 100% load change, 2.5A/µsec)
Over/under-shoot ..... 500mV max. (75% to 100% load change, 2.5A/µsec)
Remote Sense Compensation ..... 0.15V max.
Overvoltage Protection ..... 120-140% Vout (Latching)
Overcurrent Protection ..... 110-120% Full load (Latching)
Overtemperature Protection..... 90°-105°C Baseplate

Input Specifications

Voltage/Current ..... See Table, Page 1
Reflected Ripple Current ..... 35mA (max.)
Input Ripple Rejection (120 Hz/1kHz) ..... 30/25db (min.)

General Specifications

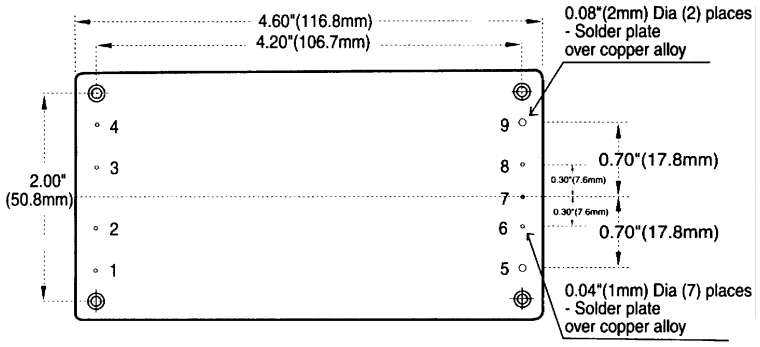
Isolation: Input-Output ..... 3750 VAC min.
Input to Baseplate..... 2500 VAC min.
Output to Baseplate ..... 500 VAC min.

Saftey Requirements – Compilance..... UL 1950, EN60950 (Per TUV), CSA 22.2 # 950, CE (LVD)

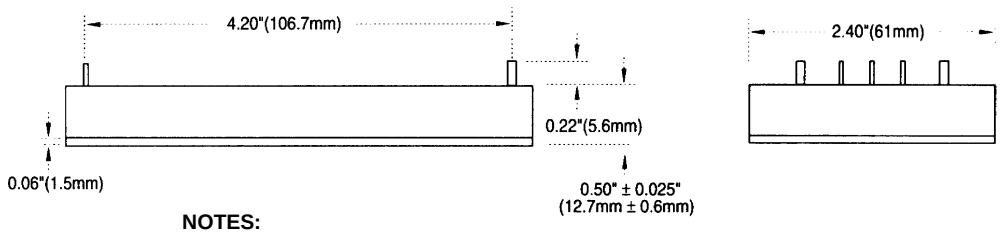
Environmental Specifications

Storage Temperature ..... –40°C to +125°C
Operating Temperature ..... –40°C to +105°C Baseplate
Humidity ..... 0 to 95%

Mechanical Specifications



PIN #	Function
1	+ In
2	Gate In
3	NC
4	- In
5	+Out
6	+Sense
7	Trim
8	-Sense
9	-Out



NOTES:

Weight: 226 grams/0.5 lbs.
Mounting Screw Type: M3
Suggested Screw Torque: 8.0m-Kg

Product Overview

The unique transformer technology is the basis of International Power Sources low cost, high performance, high reliability DC/DC converter line. These converters are designed for telecommunication and industrial applications. The converter design utilizes a push-pull topology operating at a fixed switching frequency of 300 kHz. By using a fixed switching frequency, EMI filtering is made easier and less expensive.

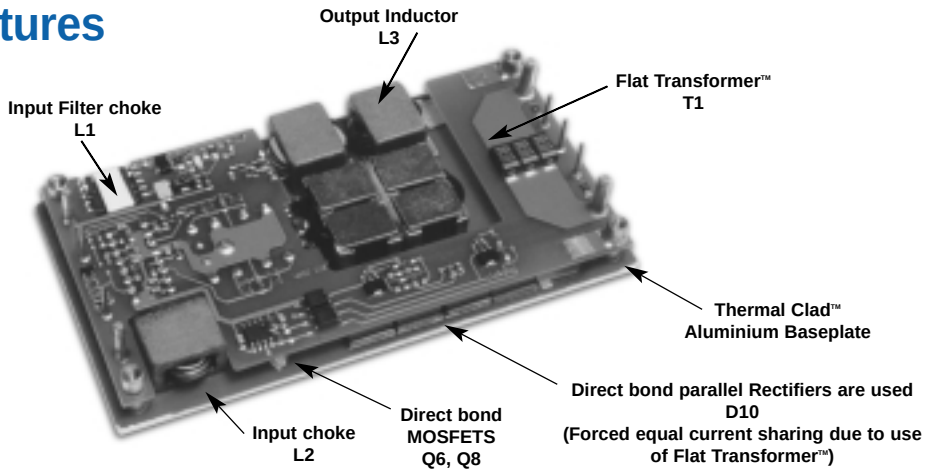
The core technology is a patented, modular, and very low noise Flat Transformer™ which generates extremely low leakage inductance and inter-winding capacitance, a combination not available in conventional transformers. In addition, the Flat Transformer does not create hot spots, making the converters more reliable.

The use of direct bond aluminum base plates, forced current sharing in parallel rectifiers and the absence of hot spots in the transformers allow the converter to have very low temperature gradients.

The converter's internal temperature rise is less than 10°C above the base plate temperature, allowing base plate temperature to be raised to 105°C.

The converters are manufactured in an ISO9001 approved facility utilizing advanced automated surface mount technology and state of the art in-process test procedures.

IBT200 Features



Competitive Advantages

International Power Sources' DC/DC converters are low cost, and can be delivered in a timely manner because readily available standard off the shelf components are used. No custom parts are used.

International Power Sources' DC/DC converters are extremely reliable because of the lower temperature gradient and even thermal loading:

- The highly derated multiple parallel rectifiers receive the exact same shared currents from the use of Flat Transformer technology. This ensures even thermal loading on the rectifiers.
- The Flat Transformer technology uses multiple cores. This coupled with the absence of many turns eliminates hot spots in the transformer windings.
- All heat generating components such as the Flat Transformers, inductors, rectifiers, and MOSFETS are directly solder-bonded onto the aluminum base plate for maximum transfer of heat out of the converter

International Power Sources' DC/DC converters utilize simple push-pull topology with fewer components. The fixed switching frequency ensures easier and less expensive EMI filtering. In addition, negligible leakage inductance of Flat Transformers™ reduces the switching losses.

High Power Units

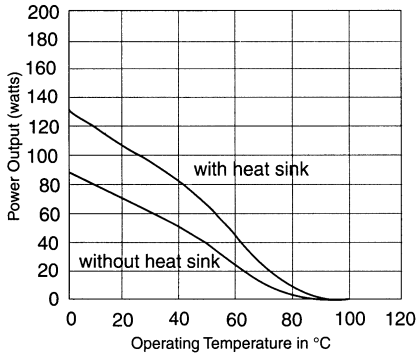
We are also pleased to offer new 400 watt modules in an industry standard 200 watt footprint.

Input Voltage	Output Voltage	Output Current	Output Power
200-400 VDC	5.0 VDC	80 Amps	400 Watts
200-400 VDC	12.0 VDC	34 Amps	400 Watts
200-400 VDC	15.0 VDC	27 Amps	400 Watts
36-72 VDC	5.0 VDC	80 Amps	400 Watts
36-72 VDC	12.0 VDC	34 Amps	400 Watts
36-72 VDC	15.0 VDC	27 Amps	400 Watts

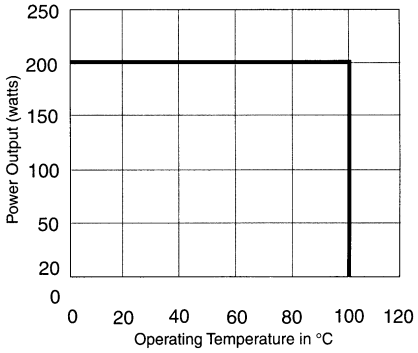
Application Notes

Thermal Consideration

Graph A shows the output power derating (in watts) with heat sink and without heat sink at various ambient temperatures in still air conditions. If appropriate forced air is used with or without a heat sink, there is no power deration as illustrated in Graph B. In such a case, the converter can be operated at its full output power rating.



Graph A: Output Power Derating in Still Air

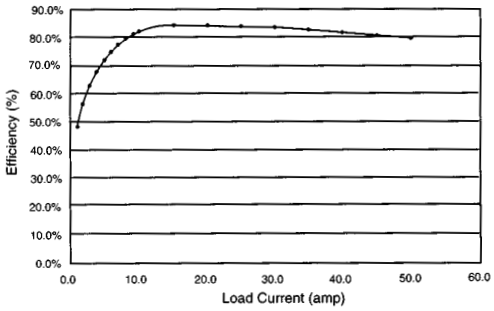


Graph B: Output Power With Forced Air

Conversion Efficiency

The graph below shows load current vs. conversion efficiency specific to IBT200-301 only. Graphs for other models available upon request.

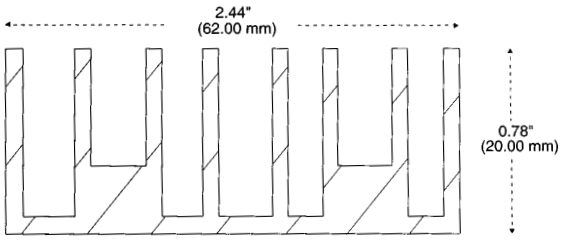
Load Current vs Efficiency



Heat Sink

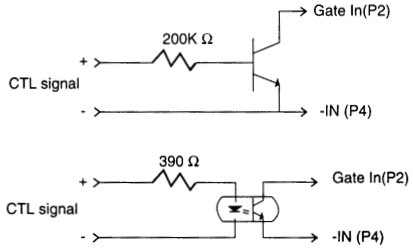
The converter can be operated at full-load with appropriate forced air cooling or by using a lower thermal resistance heat sink.

Material: Aluminum Extrusion
Dimensions: 2.44 " x 0.78" x 4.6"
Weight: 135 grams(0.3 lbs)
Thermal Impedance: 3.0°C/W



Gate Control

A remote on-off control pin is provided to enable or disable the converter. When the Gate-In Pin 2 is at logic high (2.8 to 7V) or open circuited, the converter is enabled. At logic low (<2.8V) the converter is then disabled. If the control signal has a common return with the primary side, one can use a NPN transistor circuit to enable/disable the converter. If the control signal is from the secondary, or anywhere else, an opto-coupler circuit can be used.



Output Trimming

Approximately ±10% output voltage trimming can be achieved by adding a potentiometer. The recommended circuit connection technique is shown below. The suggested minimum resistance value is 5.1K .