PRELIMINARY

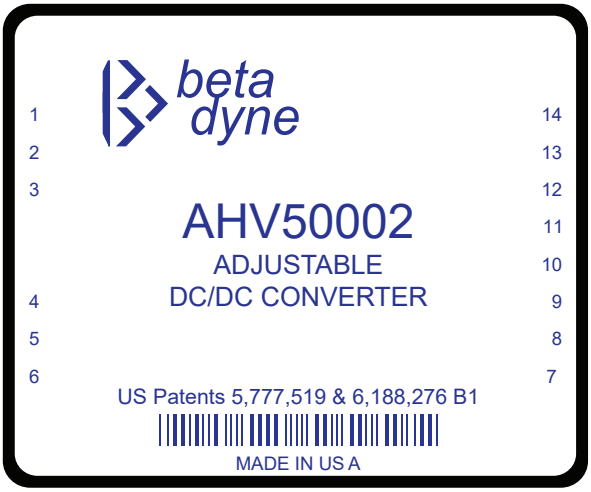
AHV50002

50W HIGH-VOLTAGE ADJUSTABLE DC/DC CONVERTER

V_{OUT}= ±210Vdc, V_{IN}=36-72V

Key Features

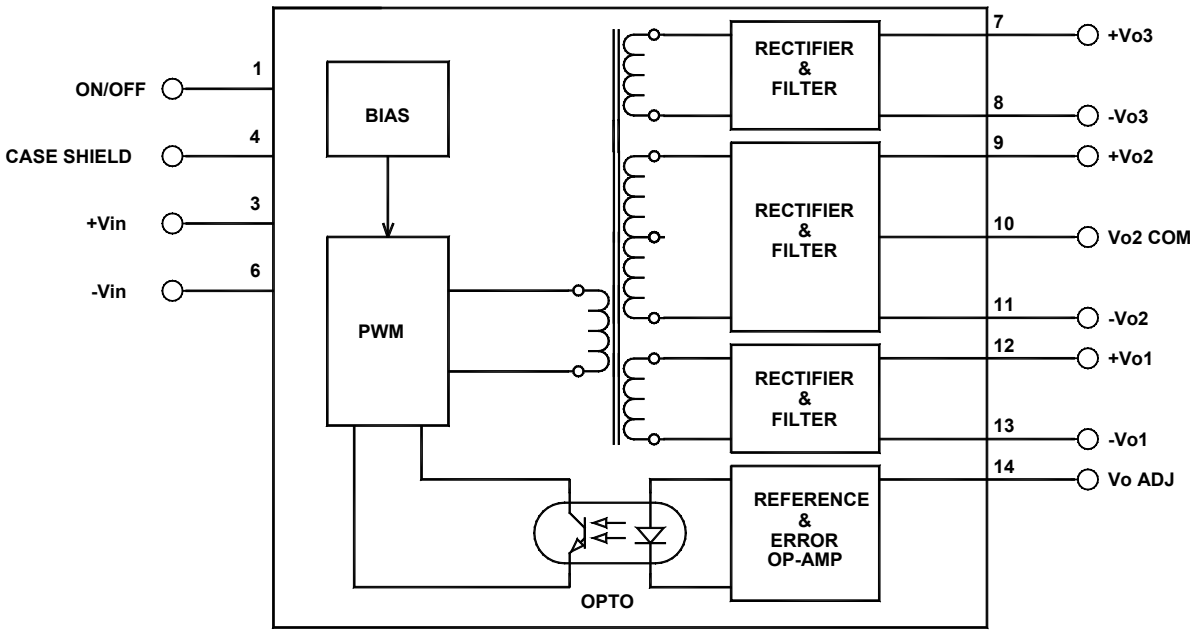
- Efficiency up to 90%
- Wide input voltage range (2:1)
- Six-sided shielding
- Soft start
- Dual Outputs
- Short circuit and thermal protection
- Adjustable output



Beta Dyne is protected under various patents, including but not limited to U.S. Patent numbers: 5,777,519; 6,188,276; 6,262,901; 6,452,818; 6,473,3171.

Functional Description

The AHV50002 is a 50W Dual isolated DC/DC converters that accepts a 36-72V_{IN}, and produces outputs of +/-210V@110mA. Additional features include input over/under voltage protection, soft start, over temperature protection and +/-10% adjustable output. Packaged in a 3.0 x 2.5 x 0.75 inch copper case for EMI/RFI shielding and good thermal performance for 0C to 50C.



Typical Block Diagram

Unless otherwise specified, all parameters are given under typical +25°C with nominal input voltage and under full output load conditions.

Electrical Specifications

INPUT SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Input Voltage Range		36	48	72	Vdc
Startup Voltage for Bias Converter		4.7	5		Vdc
Input Startup Voltage, 48V_{IN}		35	36		Vdc
Input Overvoltage Protection, 48V_{IN}		74	76		Vdc
Input Filter	LC				
Reverse Polarity	Internal parasitic shunt diodes				
No Load Input Current	See Model Selection Guide				
Input Surge Current (20µS Spike)				10	A
Short Circuit Current Limit	See Short Circuit Protection		150		% I_{IN}
Off State Current			750		µA
Remote ON/OFF Control					
Supply ON	Pin 1 Open (Open circuit voltage: 13V max.)				
Supply OFF		-0.6	0	0.8	Vdc
Logic Input Reference	To -V_{IN} for ON/OFF and SYNC				
Logic Compatibility for Reference	TTL Open Collector or CMOS Open Drain				

OUTPUT SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Output Voltage			±210		Vdc
Output Voltage Accuracy			±0.5	±1	%
Ripple & Noise			.5	1	%
Output Current			±110		mA
Line Regulation			±.1	±1.0	%
Temperature Coefficient @ FL			0.02		%/°C
Transient Response Time	50% FL to FL to 50% FL		200	250	µS
Short Circuit Protection	By input current limiting				

GENERAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Efficiency			91		%
Isolation Voltage (1 min.), Input to Output			1500		Vdc
Isolation Voltage (1 min.), Output to Output			500		Vdc
Isolation Resistance			10^9		Ω
Isolation Capacitance			220		pF
Switching Frequency, Power Stage			110		kHz
Switching Frequency, BIAS Stage			330		kHz
Turn On Delay	See Figure 2		12	20	mS
Soft Start Time	See Figure 2		12	20	mS

ENVIRONMENTAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Operating Temperature, Industrial (Ambient)*	See note in Figures 1,2 & 8	0		+50	°C
Storage Temperature Range		-55		+125	°C
Thermal Resistance			1.6		°C/W_{DISS}
Heatsink Thermal Res	See Figure 4 & 5		2.5		°C/W_{DISS}
Maximum Operating Case Temperature				95	°C
Thermal Turn Off, Case Temperature		75	85	95	°C
Thermal Hysterisis			20		°C
Derating	See Figure 4				
Humidity	Up to 95% non-condensing				
Cooling	Free-air convection				
EMI/RFI	Six-sided continuous shielded metal case				
MTBF	per MIL-HNBK-217F (Ground benign, +25°C)		485,000		hours

PHYSICAL CHARACTERISTICS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Dimensions (L×W×H)	3.00×2.50×0.75 in. (76.20×63.50×19.5mm)				
Weight	7.9 oz. (225g)				
Case Material	Coated metal				
Shielding Connection, 48V_{IN}	Case Shield (Pin 4)				

* See footnotes 3, 4, 5 and 6

Contact factory for custom input and output voltage combinations

[1] ⚠ WARNING - Usage of input fuse with adequate ratings is essential to avoid possible hazard and damage of the unit. A suppressor diode with adequate ratings is intended to be connected in series to the supply for reverse polarity protection.
[2] Pins 8,9 and 11,12 are connected internally.
[3] Contact factory for other operating temperature range.
[4] The maximum input current at any given input range measured at minimum input voltage is given as 1.6*$I_{NOMINAL}$. Nominal input current is the typical value measured at the input of the converter under full-load room temperature and nominal input voltage (48V_{IN}).
[5] Adequate insulation is to be provided to the converters at the end usage as per applicable requirements.
[6] Temperature rise on the case of the converters is to be considered during the end usage as per applicable requirements.
[7] Measured with 100µF external capacitor at the input pins.
[8] See Figure 8.

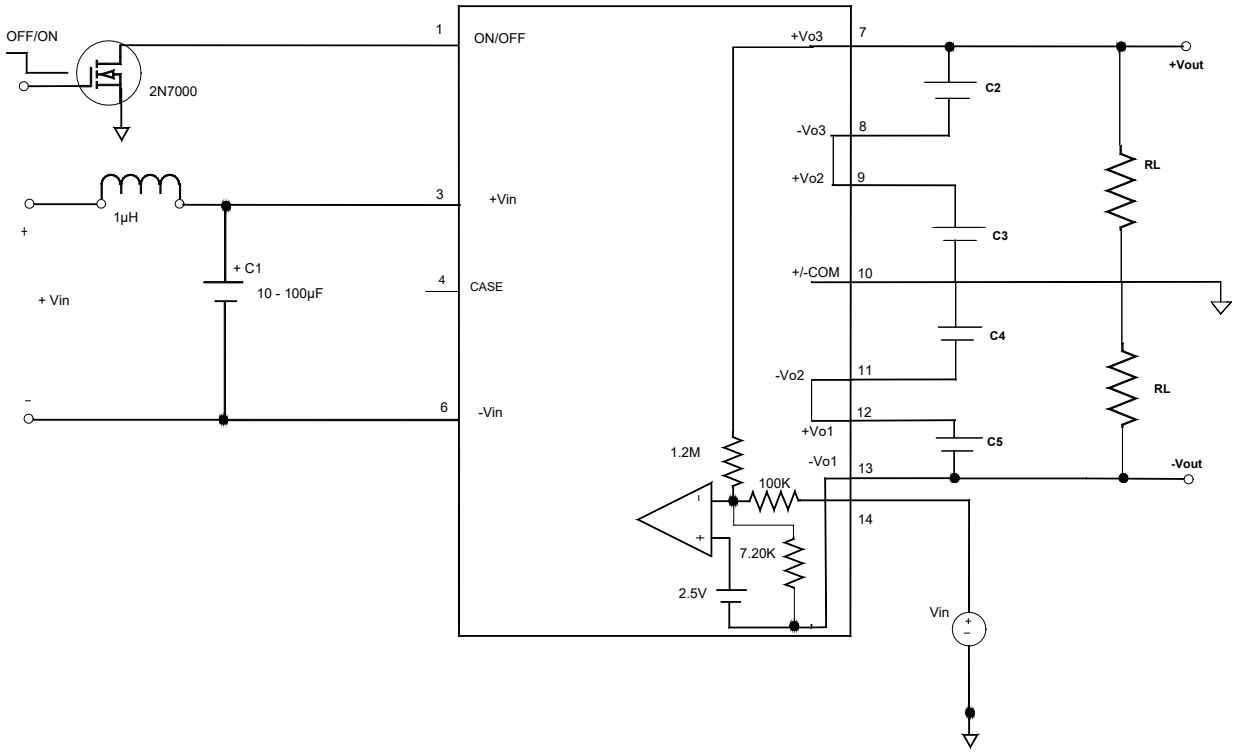


FIGURE 1. Typical Output Diagram Connection of AHV 50 Series Dual Output ±210V

NOTE: C2 Through C5 Must Be 1.5µF Or Greater @200V X7R Or Y5U Type
Example: Nippon Chemi-Con (TCD51E2E155M)

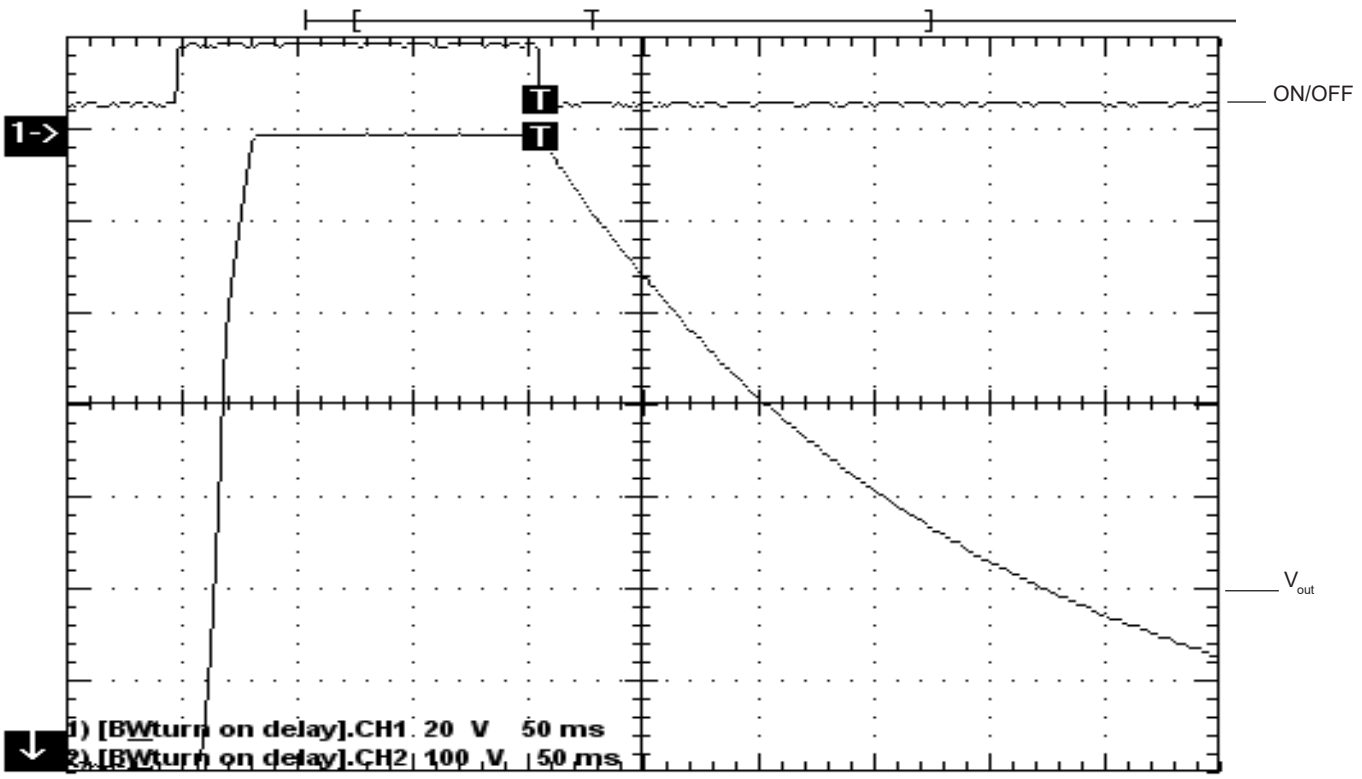
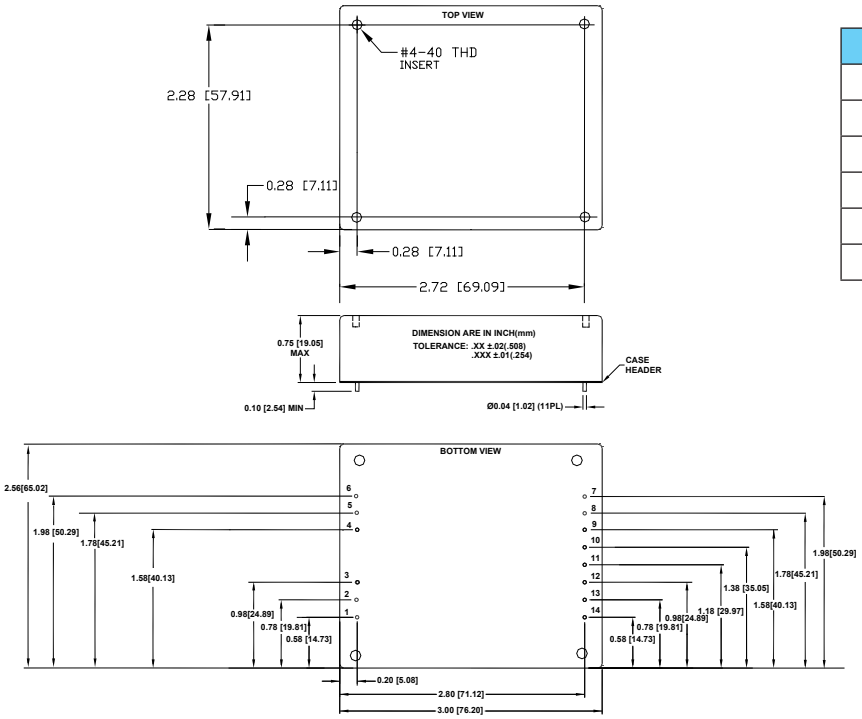


FIGURE 2. Typical turn on delay and soft start for single AHV50002.

MECHANICAL SPECIFICATIONS



Pin	Function	Pin	Function
1	ON/OFF	7	$+V_{O3}$
2	NO Pin	8	$-V_{O3}$
3	$+V_{IN}$	9	$+V_{O2}$
4	Case Shield Pin	10	$\pm V_{O2}$
5	NO Pin	11	$-V_{O2}$
6	$-V_{IN}$	12	$+V_{O1}$
		13	$-V_{O1}$
		14	V_O ADJ

MECHANICAL SPECIFICATIONS for HEAT SINK

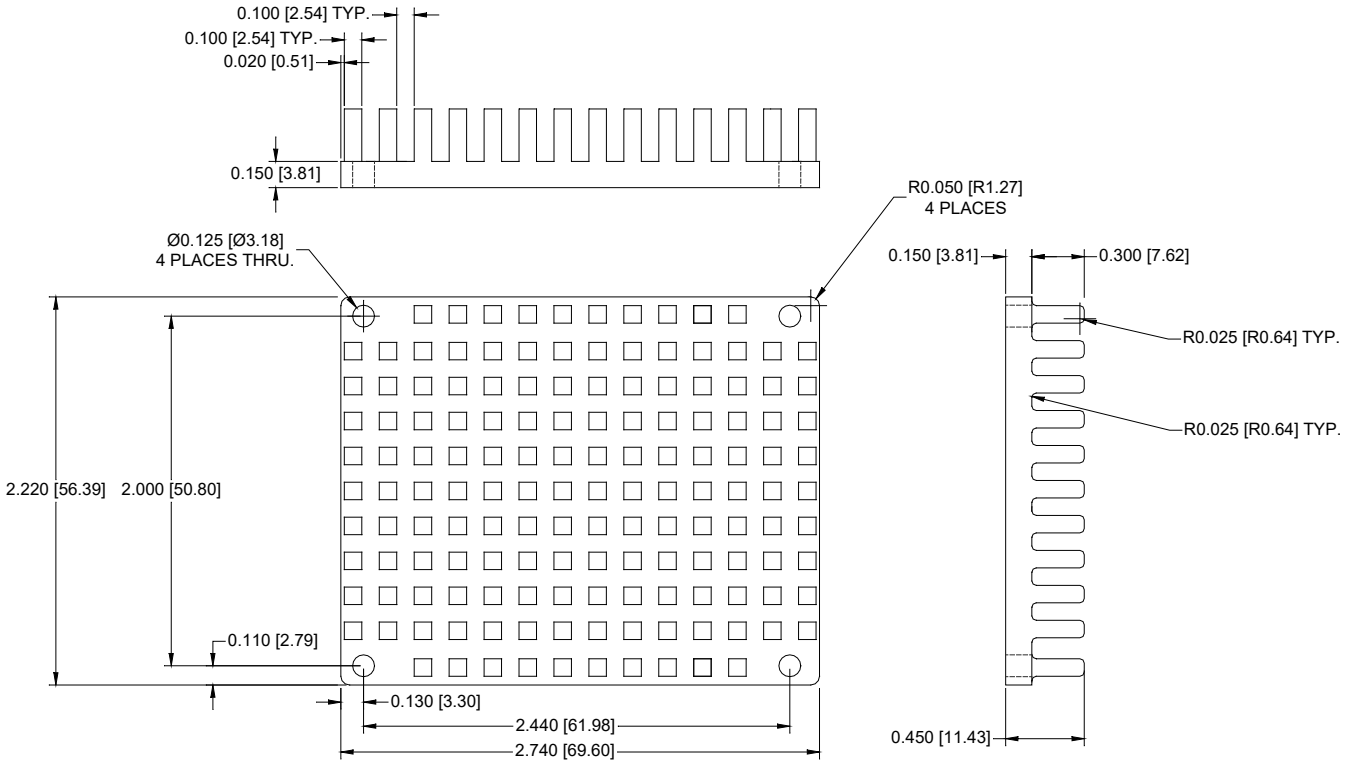


FIGURE 3. Optional Heat Sink for the AHV50 DC-DC Converter

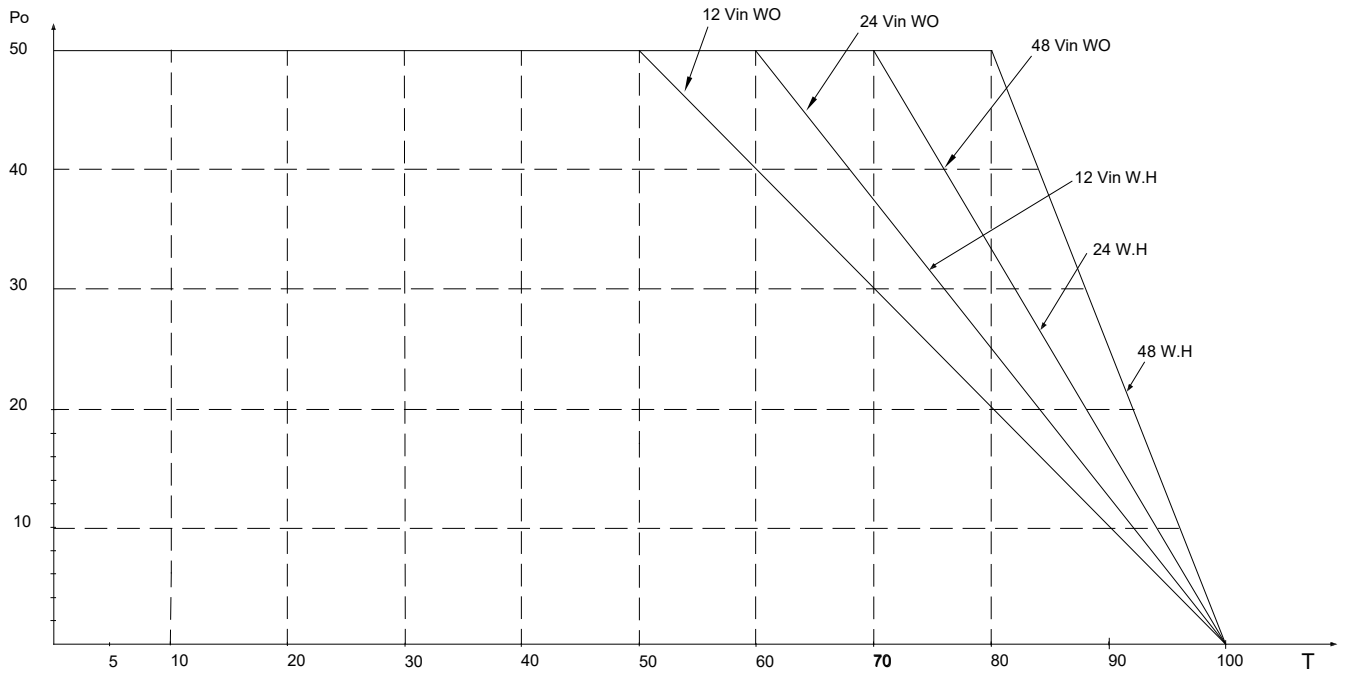


FIGURE 4. Derating Curves of the AHV50 without heatsink. For AHV50 with heatsink add 10°C to the above curves

WO= Without Heatsink W.H= With Heatsink