SP7153, 2W, PROPORTIONAL, SPECIFICATION SHEET

Standard Model Number : SP7153

RoHs Model Number : SP7153/Y

Standard Model is NOT RoHs Compliant

ELECTRICAL SPECIFICATIONS

Input Voltage	0V to15Vdc
Output Voltage	0V to + or -12kVdc
Output Current	0.16mA
Voltage Accuracy	+/- 10%
Line Regulation	Proportional
Load Regulation	+/- 10%
Output Ripple	< 1.5% P-P
Start-up Voltage	< 0.7Vdc
Input Filter	Low ESR Capacitor
No Load Input current	< 175mA
Full Load Input current	< 300mA
Short Circuit Protection	Continuous
Switching Frequency	60 kHz
Output Isolation	12,500 Vdc
Input / Output Capacitance	< 60pF

GENERAL SPECIFICATIONS

Temp. Stability	+/- 0.02%/°C
Temp. (Operating , Case)	-25 to +85°C
Temp. (Storage)	-55 to +100°C
Derating	None
Cooling	Free-Air Convection

PHYSICAL SPECIFICATIONS

Dimensions	1.5 x 2.4 x 0.81 inches
Weight	3.1 Oz
Case Material	Black Phenolic

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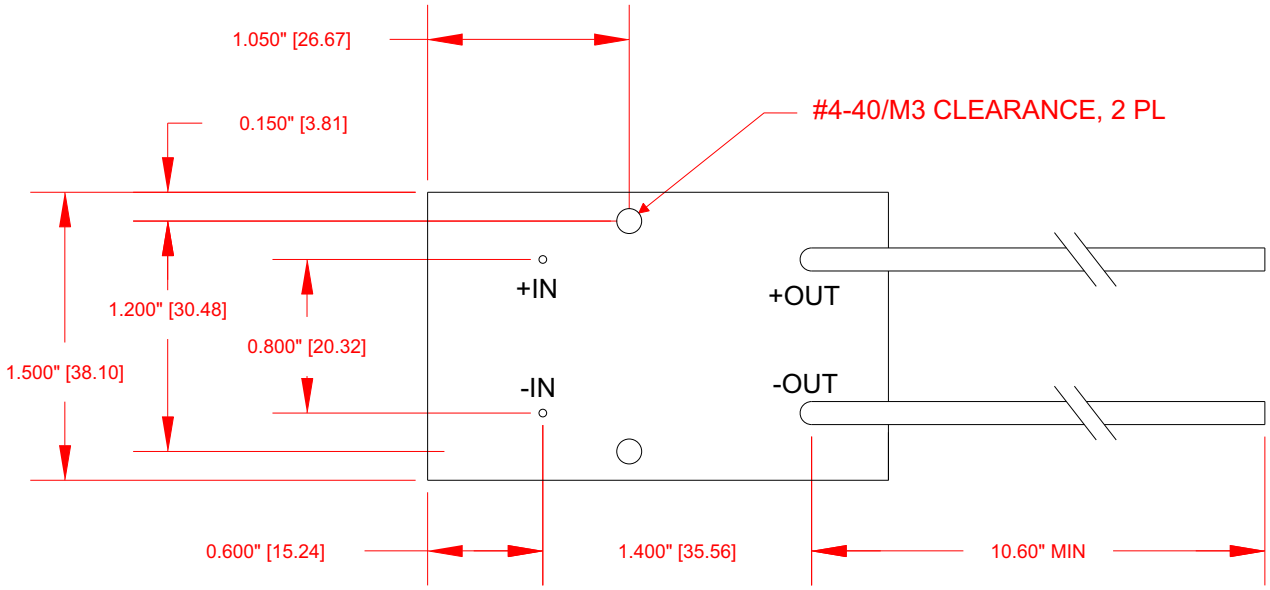
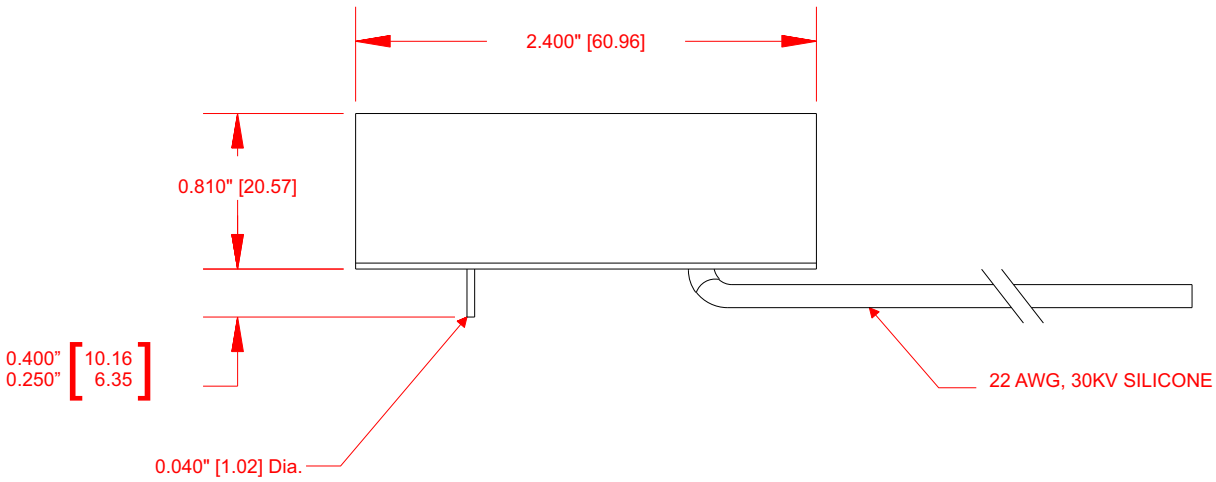


Bottom View



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APPLICATION NOTES

INPUT AND OUTPUT IMPEDANCE

The SP7153 of power converters have been designed to be stable with no external capacitors when used in low inductance input and output circuits. However, in some applications, the inductance associated with the distribution from the power source to the input of the converter can affect the stability of the converter. The addition of a 100 µF electrolytic capacitor with an ESR <1 Ohm across the input helps ensure stability of the converter. In many applications, the user has to use decoupling capacitance at the load.

SHORT CIRCUIT PROTECTION

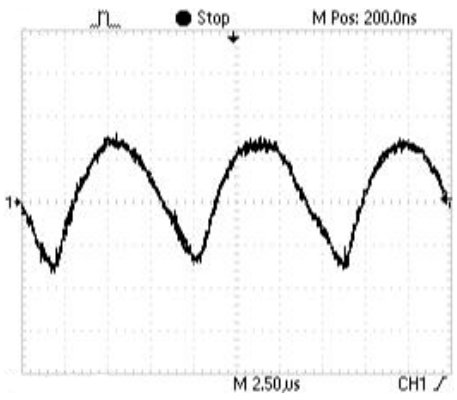
The SP7153 is equipped with short circuit protection. The converter will fold-back the input power whenever a short circuit is applied to its output and automatically recover after the overload condition is removed.

ISOLATION

The output of the SP7153 is galvanically isolated from the input, capacitance is < 30pF and resistance is > 10G Ohm. For dual output units Isolation is from Com output pin (5) and -Input (2).

RIPPLE AND NOISE

Figure below shows a typical output voltage ripple waveform, measured at full rated load current with no additional output filtering. External low ESR capacitors may be added across output to further reduce ripple.



STARTUP TRANSIENT

Figure below shows a typical output voltage during turn-on, measured at no load current with no additional output filtering.

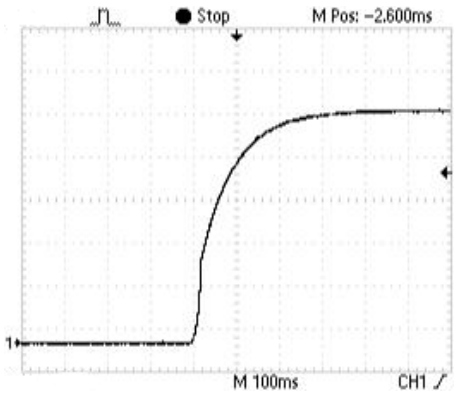
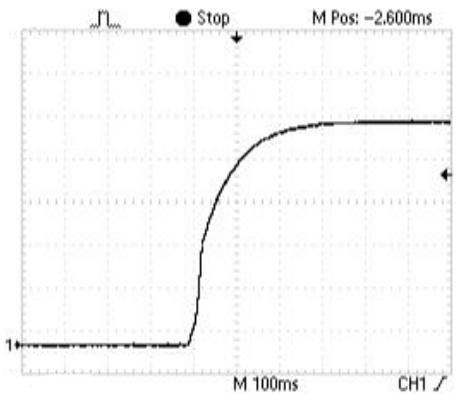


Figure below shows a typical output voltage during turn-on, measured at full rated load current with no additional output filtering.



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APPLICATION NOTES

INRUSH CURRENT

The inrush current of the SP7153 has been kept as low as possible. However, a series resistor may be inserted in the input line to limit this current further.

LOAD TRANSIENT

Figure below shows a typical output voltage response, measured during a transition from full rated load current to no load current with no additional output filtering.

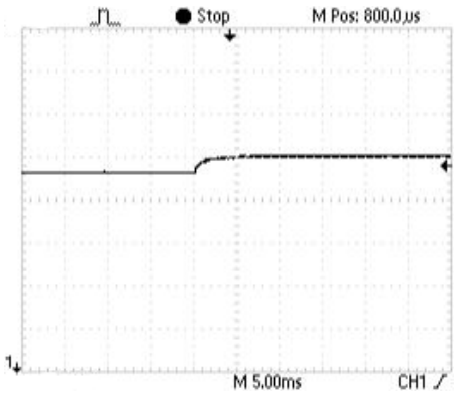
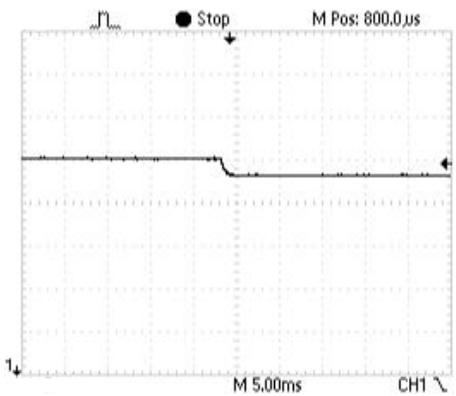


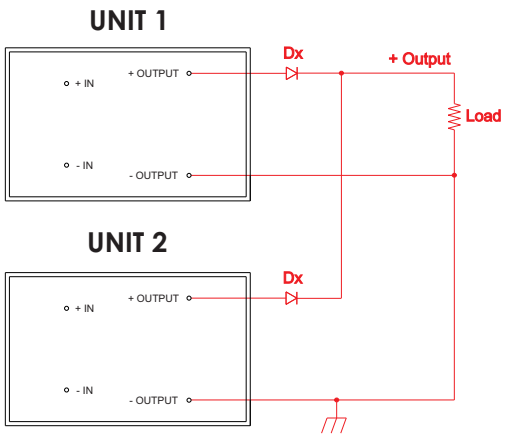
Figure below shows a typical output voltage response, measured during a transition from no load current to full rated load current with no additional output filtering.



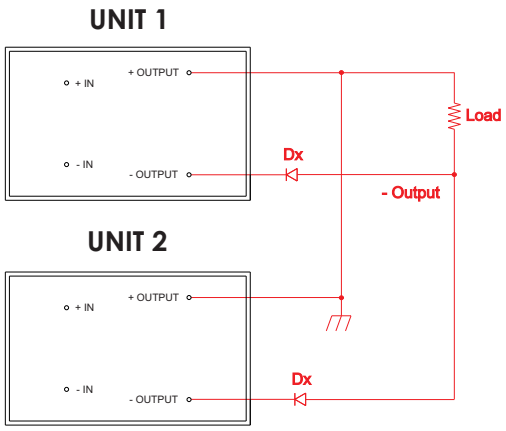
CONNECTION IN PARALLEL

The figures below shows how to connect outputs of several units with equal nominal output voltage in parallel with the use of oring diodes.

POSITIVE OUTPUT



NEGATIVE OUTPUT



NOTE:
The ratings of Dx should be 1.5 times the maximum current and voltage expected in each branch.

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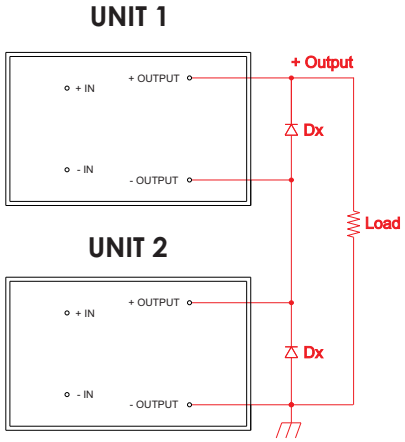
SP7153, 2W, PROPORTIONAL SPECIFICATIONS SHEET

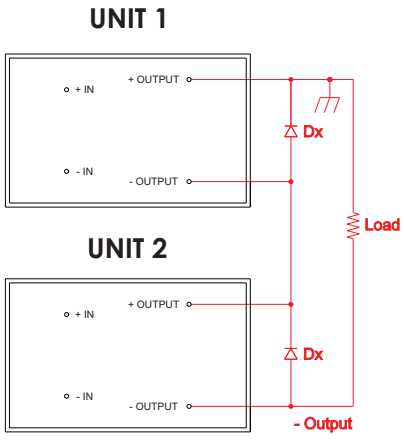
CONNECTION IN SERIES

Figures below shows how to connect multiple outputs in series with the use of shunt diodes, taking into consideration that the highest achieved output voltage should remain below the rated isolation voltage.

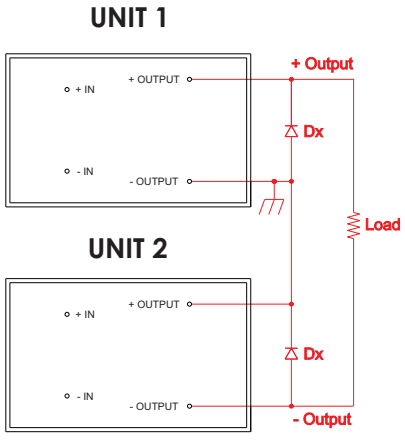
POSITIVE OUTPUT



NEGATIVE OUTPUT



DUAL OUTPUT



NOTE:
The ratings of Dx should be 1.5 times the maximum current and voltage expected in each branch.

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APPLICATION NOTES

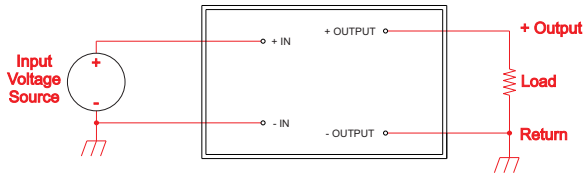
POSITIVE OR NEGATIVE OUTPUTS

Isolated DC-DC voltage converters can provide positive or negative voltages from a single device.

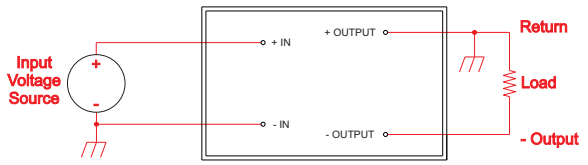
Isolated DC-DC converters may also be used with either a positive or a negative input voltage source, as long as the relative polarity of the input to the device is maintained.

The figures below show the various polarity combinations and how to connect the converter to provide them relative to ground.

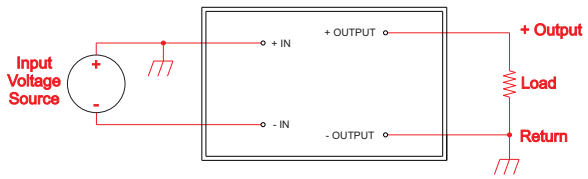
POSITIVE SOURCE WITH A POSITIVE OUTPUT



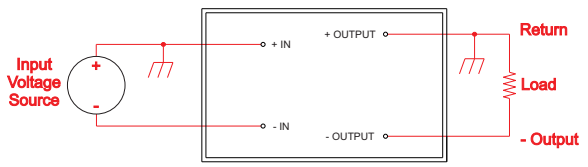
POSITIVE SOURCE WITH A NEGATIVE OUTPUT



NEGATIVE SOURCE WITH A POSITIVE OUTPUT



NEGATIVE SOURCE WITH A NEGATIVE OUTPUT

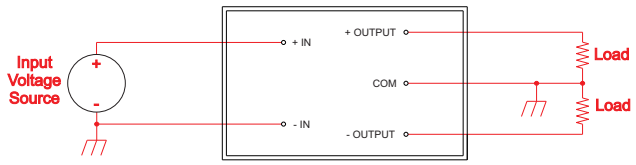


CONNECTIONS FOR DUAL OUTPUTS

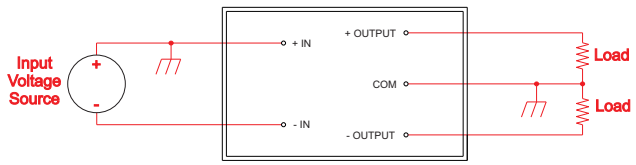
Isolation on a dual output converter is from Com output pin (5) and -Input (2) and therefore ground connection on the output is to Com pin only.

The figures below shows how to power a dual output converter with either a positive or a negative input voltage source.

POSITIVE VOLTAGE SOURCE



NEGATIVE VOLTAGE SOURCE



NOTE:
The (- In) must be kept negative with respect to the (+In) pin. If this polarity is reversed, permanent damage to the converter may occur.

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APPLICATION NOTES

CLEANING AGENTS

In order to avoid possible damage, any penetration of cleaning fluids must be prevented, since the power supplies are not hermetically sealed.

NUCLEAR AND MEDICAL APPLICATIONS

American Power Design products are not designed, intended for use in, or authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of American Power Design, Inc.

SAFETY REQUIREMENTS

The converters are designed to meet North American and International safety regulatory requirements per UL 60950-1/CSA 22.2 No. 60950-1-07 Second Edition, IEC 60950-1: 2005, and EN 60950-1:2006. Basic Insulation is provided between input and output. To comply with safety agencies requirements, an input line fuse (3A SB) must be used external to the converter.

If one input fuse is used for a group of modules, the maximum fuse rating should not exceed 20A.

WARRANTY

All products manufactured by American Power Design, Inc. (APD) are warranted to be free of defects due to material or workmanship for a period of one year from date of shipment. At our option, APD will repair or replace any non-conforming product.
APD expressly disclaims any liability for consequential or incidental damages resulting from the use or misuse of its products by the purchaser or others.
This warranty is in lieu of all warranties expressed or implied, including the warranties of merchantability. No other warranties, obligations, or liabilities are expressed or implied.
All products being returned for repair require a return material authorization(RMA) assigned by APD prior to return shipment.

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