



SP7198, 30W, REGULATED, SPECIFICATION SHEET



Standard Model Number : SP7198

RoHs Model Number : SP7198/Y

ELECTRICAL SPECIFICATIONS

Standard Model is NOT RoHs Compliant

Input Voltage	6V to 8Vdc	Input Filter	Pi Network
Output Voltage	0V to + or - 500 Vdc	Efficiency	85% (typ.)
Output Current	60 mA	Short Circuit Protection	Continuous
Voltage Accuracy	< 3%	Switching Frequency	130 kHz
Line Regulation	< 2%	Output Isolation	1500 Vdc
Load Regulation	< 4% (20% to full Load)	Input / Output Capacitance	< 80pF
Output Ripple	< 0.4% P-P		
Reference Voltage	5Vdc @ 1mA		

GENERAL SPECIFICATIONS

Temp. Stability	+/- 0.02%/°C	EMI/RFI	Six Sided Shield
Temp. (Operating , Case)	-25 to +70°C	Derating	None
Temp. (Storage)	-40 to +125°C	Cooling	Free-Air Convection
Humidity	0 to 95% (Non-Condensing)		

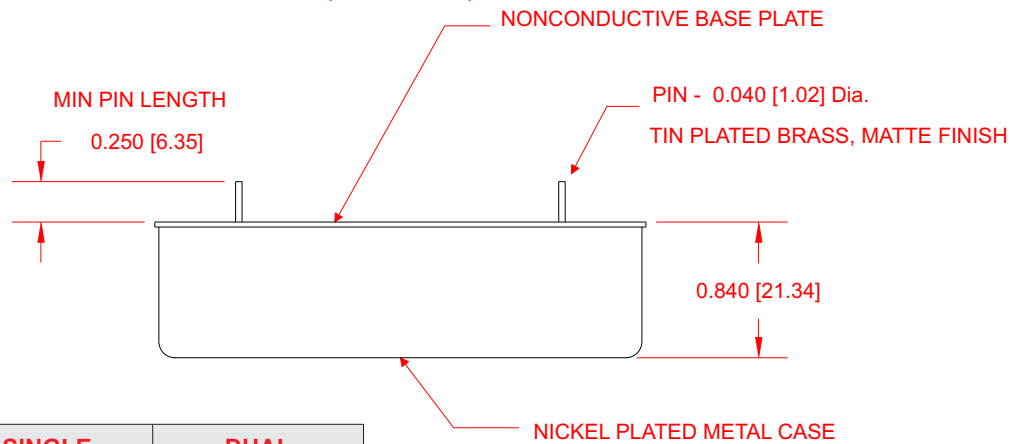
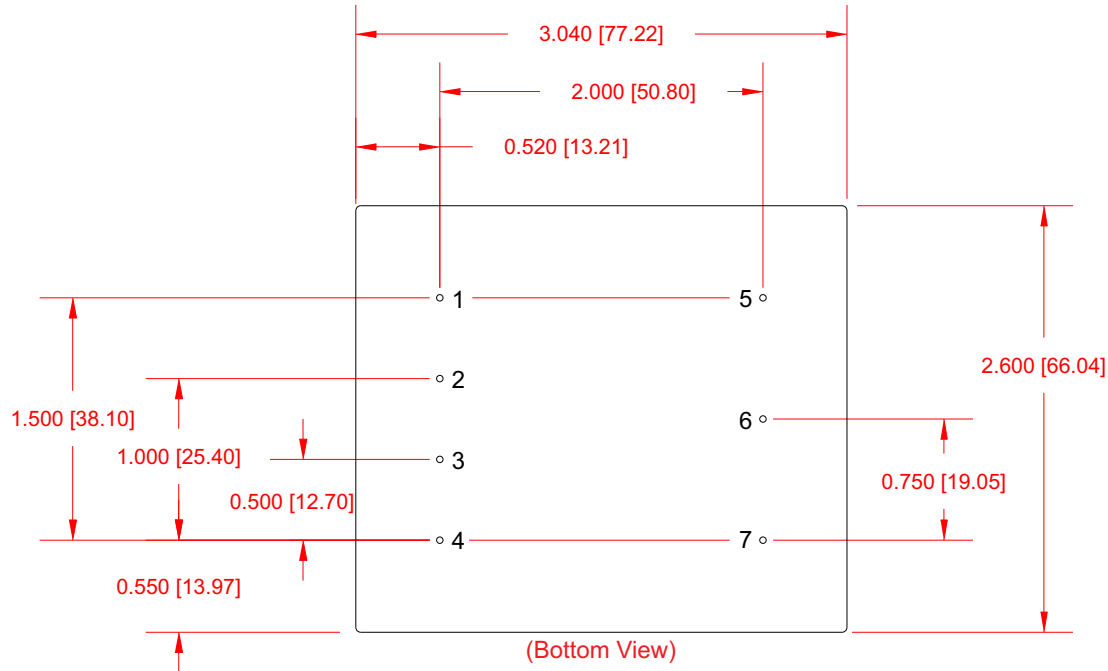
PHYSICAL SPECIFICATIONS

Dimensions	2.6 x 3 x 0.84 inches	Case Material	Nickel Plated Metal
Weight	8.4 Oz		(With Non-Conductive Base Plate)

REFER TO STANDARD M30 DATASHEET FOR ADDITIONAL INFORMATION



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PIN #	SINGLE	DUAL
1	5V Ref	5V Ref
2	+ Input	+ Input
3	Control	Control
4	- Input	- Input
5	+ Output	+ Output
6	No Pin	Com
7	- Output	- Output

*Dimensions are in Inches
[Metric equivalents in brackets]*

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APPLICATION NOTES

INPUT AND OUTPUT IMPEDANCE

The SP7198 Series 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 μ F 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

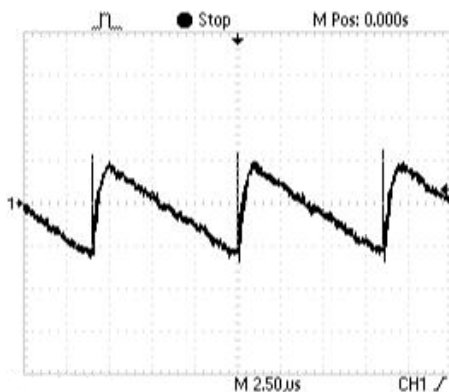
The SP7198 Series is equipped with short circuit protection. The converter will fold-back the input power whenever a short circuit is applied to its output and automatically recover after the overload condition is removed.

ISOLATION

The output of the SP7198 Series is galvanically isolated from both the input and case, capacitance is < 80pF and resistance is > 10G Ohm. The converters case is connected directly to -In to aid in reducing unwanted noise.

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 20% load current with no additional output filtering.

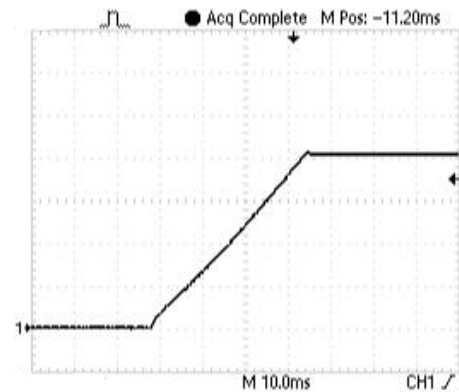
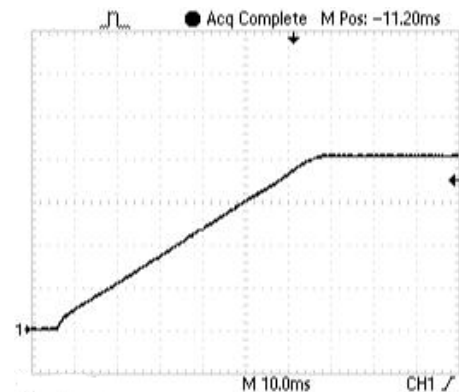


Figure below shows a typical output voltage during turn-on, measured at full rated load current with no additional output filtering.





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APPLICATION NOTES

INRUSH CURRENT

The inrush current of the SP7198 Series 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 20% load current with no additional output filtering.

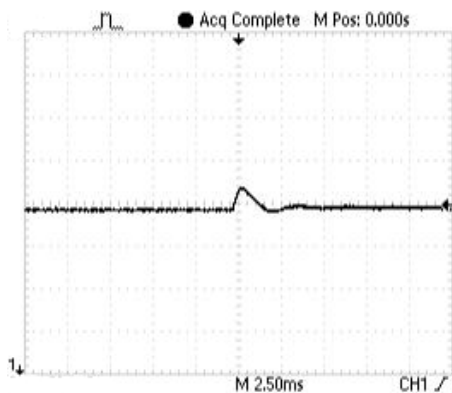
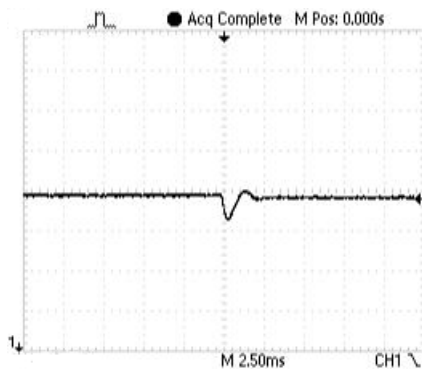
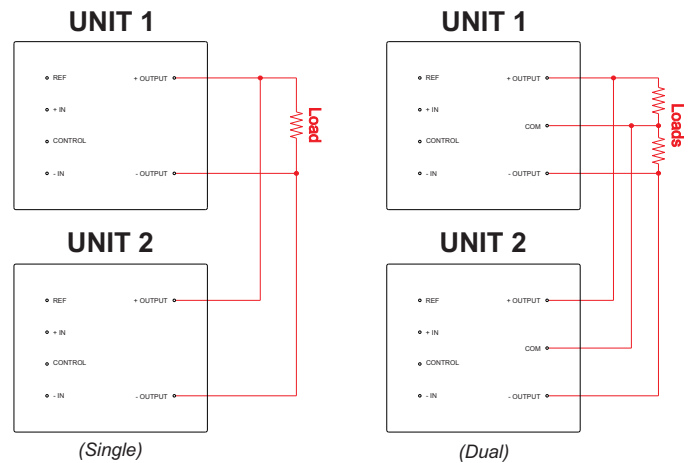


Figure below shows a typical output voltage response, measured during a transition from 20% load current to full rated load current with no additional output filtering.



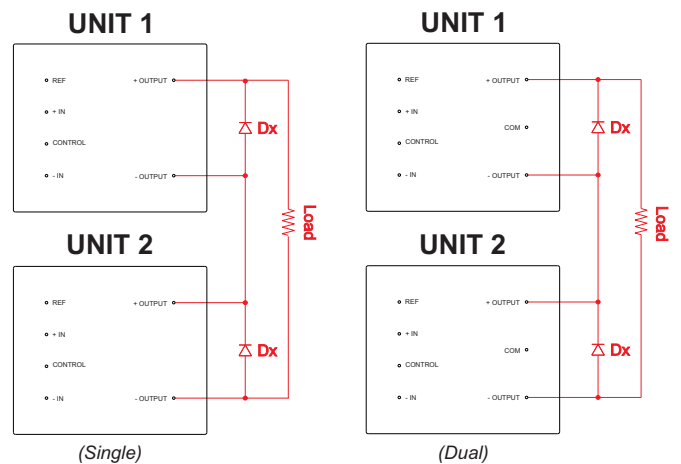
CONNECTION IN PARALLEL

The figures below show how to connect both single and dual outputs of several units with equal nominal output voltage in parallel.



CONNECTION IN SERIES

The figures below show 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.



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

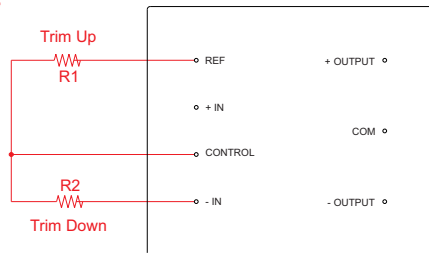
Remote Control

The SP7198 Series is equipped with an output Control pin (Pin 3). This feature allows the user to adjust the output voltage from 0 to 100% of the rated output voltage using a fixed precision resistor or adjustable trim pot in conjunction with the on board reference (Pin 2).

The figure below shows how to adjust the output voltage using a fixed precision resistor.

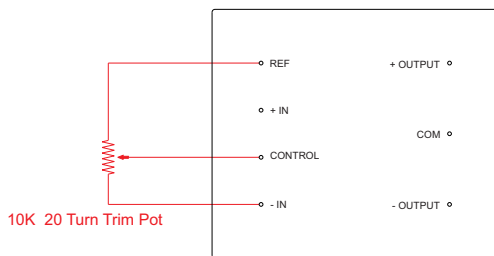
Control Voltage can be calculated by:

$$V_{control} = 5 \times \frac{R2}{R1 + R2}$$



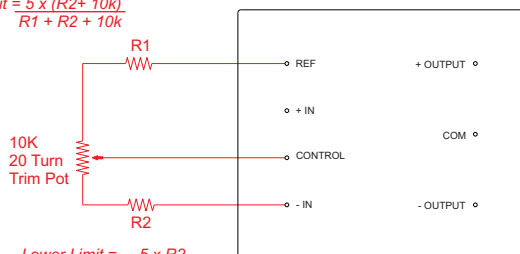
NOTE:
Do not exceed 1mA when selecting R1 & R2.

The figure below shows how to adjust the output voltage using an external Trim Pot.



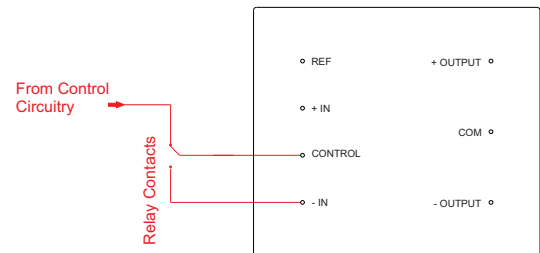
The figure below shows how to combine both of the prior configurations to form upper and lower boundaries for the adjustable range.

$$\text{Upper Limit} = 5 \times \frac{(R2 + 10k)}{R1 + R2 + 10k}$$



$$\text{Lower Limit} = \frac{5 \times R2}{R1 + R2 + 10k}$$

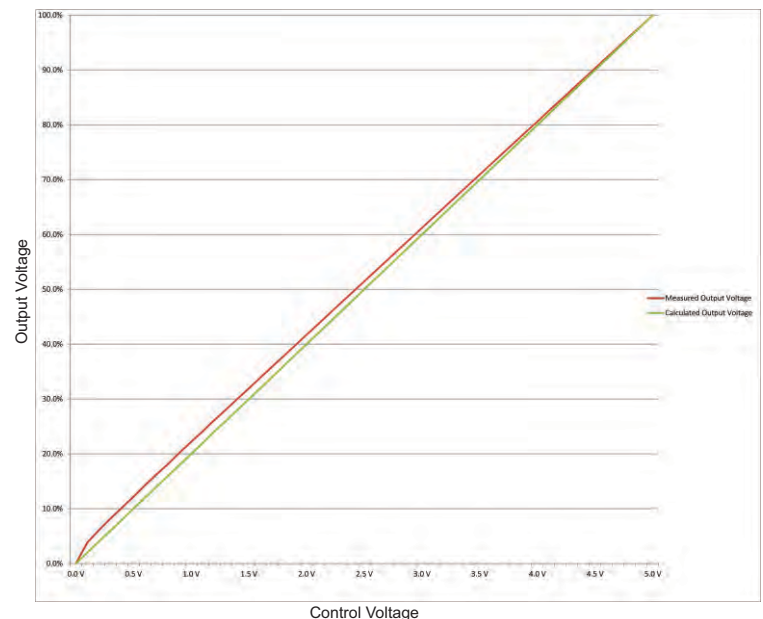
Figure below shows how to remotely mechanically shutdown the converter while maintaining any preset control voltage.



Output Voltage Tracking

The SP7198 Series is a semi-regulated converter and as a result there are many factors that affect the way the output voltage tracks the Control pin (Pin 3). Input regulation and load current are two of the primary influences.

Figure below show a typical plot of both the actual and calculated output voltage as a function of control voltage.



Operating Conditions:

Nominal Input Voltage = Fixed

Output Load = Resistive (fixed at full output current @ 100% output voltage)



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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 (10A 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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