Wall Industries, Inc.

SPW48S5-100

100W DC-DC Converter
18-75 Vdc Input
5 Vdc Output at 20A
Half-Brick Package

Features:

- **82% Efficient at Full Load**
- **Fast Transient Response**
- **Operation to No Load**
- **100% Burn In**
- **Remote ON/OFF (Active High/Low)**
- **Remote Sense Compensation**
- **UL 1950 Listed - CE Mark**
- **Low Output Ripple**
- **Fixed Switching Frequency**
- **Output Over Current Protection**
- **Output Short Circuit Protection**
- **Over Temperature Protection**
- **1500 Vdc Isolation**
- **Test Board Available**

Description:

The SPW series is a high-density half brick converter that incorporates the desired features required in today's demanding applications. When performance, reliability, and low cost are needed, the SPW series delivers.

WALL INDUSTRIES, INC.

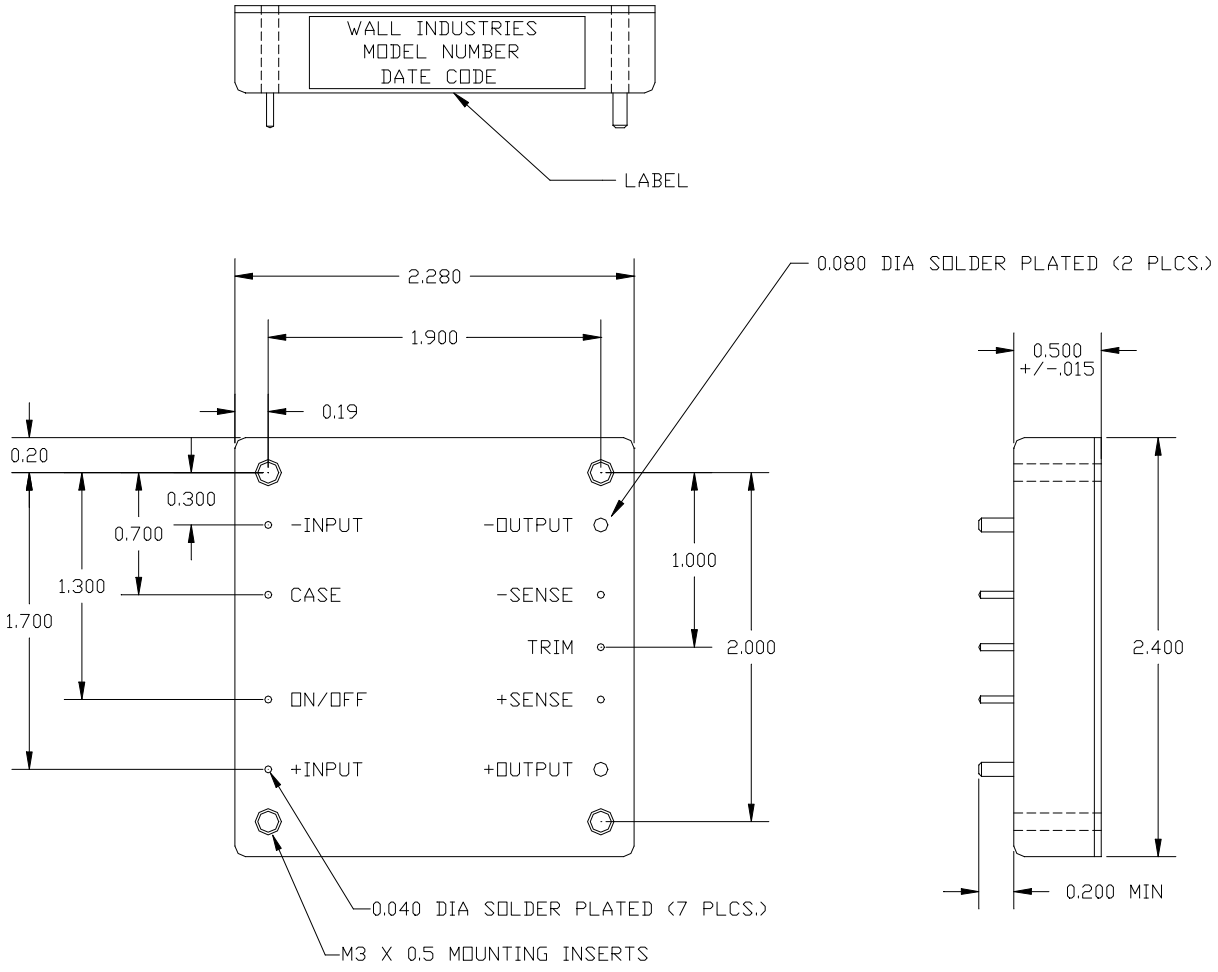
APPLICATION NOTES
SP & SPW SERIES

Technical Specifications			*Model No.* SPW48S5-100			
All specifications are based on 25C, Nominal Line and Full Load unless otherwise noted. We reserve the right to change specifications based on technological advances.						
SPECIFICATION	**Related condition**					
			MIN	**NOM**	**MAX**	**Unit Measured**
INPUT						
Turn on at				**17**		Volt DC
Turn off at				**15**		Volt DC
Input Over voltage Shutdown						
Turn off at				**79**		Volt DC
Turn on at				**77**		Volt DC
Operating Voltage Range	Rated Input Voltage		**18**	**48**	**75**	Volt DC
Maximum Input Current	Low Line 100% load			**3.45**		A
No Load Input Current				**30**		mA
Input Current under "LOGIC OFF"				**2**		mA
Inrush Current Transient Rating						A^2 Sec
Reflected Ripple Current				**20**		mA
OUTPUT						
Output Voltage Set point			**4.95**	**5.00**	**5.05**	Volt DC
Output Voltage Regulation						
Over Load					**0.1**	%
Over Line					**0.1**	%
Over Temperature					**0.02**	% / °C
Output Voltage Ripple and Noise						
Basic Ripple						mV
Spikes P-P					**75**	mV
Output Current Ranges	Rated Output Current		**0**		**20**	A
Output Current Limit			**24**	**28**	**32**	A
Short Term Output Current Surge						A/sec
DYNAMIC CHARACTERISTICS						
Input Voltage Ripple Rejection	120 Hz					dB
Output Transient and Load Changes						
Load step / delta V	X 50 to 75%	50 to 100%		**250**		mV
Load step / delta V	X 75 to 50%	100 to 50 %		**250**		mV
Recovery Time	To within 1% Rated Vo			**100**		µsec
Turn on Delay	From Vin(nom) to 90% Vout (nom)			**250**		M sec
Overshoot of Output Voltage	Full Load Resistive			**0**		%
EFFICIENCY						
@ 100% load				**82**		%
@ 75% load				**83**		%
@ 50% load				**83**		%
@ 25% load				**80**		%
TEMPERATURE CONSIDERATIONS						
Thermal Resistance						
Normal Convection	Rtheta c-a			**7.5**		°C/Watt
100 lfm				**6.2**		°C/Watt
200 lfm				**5.1**		°C/Watt
300 lfm				**4.3**		°C/Watt
400 lfm				**3.5**		°C/Watt
Heatsink Considerations	Contact Factory					
General Technical Data						
Switching Frequency	FIXED			**400**		KHz
Remote ON OFF Control *(See Note Below)*	POSITIVE OR NEGATIVE					High/Low TTL
Trimmablility						
Over Temperature Shutdown	Case Temperature			**105**		°C
MTBF						
	Bellcore TR-332 nom is 2.50m					Hours

Note: Positive Remote ON/OFF control is standard. To order negative logic Remote ON/OFF control add the suffix "R" to the part number.

Figure 1: Mechanical Dimensions

Unit: inches



Tolerance: X.XX ±0.020
X.XXX±0.010

Output Voltage Trim

The following information is provided to allow quick calculation of the trim resistor value for a desired output voltage. The general procedure for calculating a trim resistor is as follows:

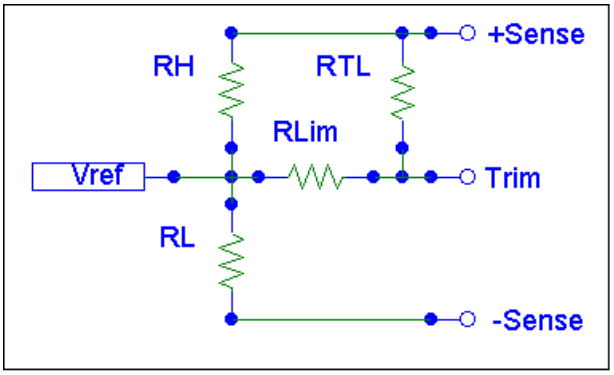
1. Determine the desired output voltage (Vo)
2. Select Equation. (Trim Low/Trim High)
3. Use the data in Table 1 to complete the equation.
4. Evaluate.

In order to trim low use Equation 1 and Table 1 to calculate resistor RTL for the desired output voltage.

Equation 1: Trim Low

$$RT_L = \left[\frac{V_o - V_{REF}}{(V_{REF}/R_L) - (1/R_H \cdot (V_o - V_{REF}))} \right] - R_{LIM}$$

Vo - Desired output voltage.
All resistor values in K ohms.



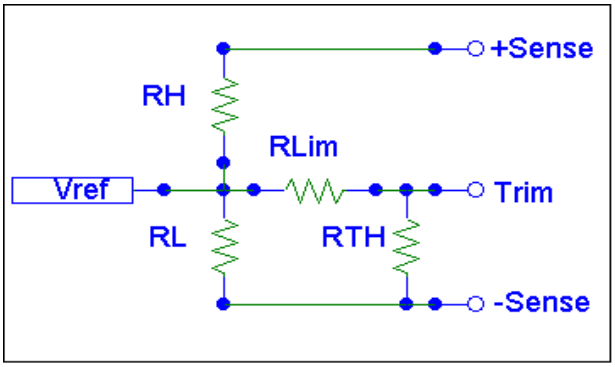
Schematic 1: Trim Low

In order to trim high use Equation 2 and Table 1 to calculate resistor RTH for the desired output voltage.

Equation 2: Trim High

$$RT_H = \left[\frac{V_{REF}}{\left(\frac{V_o - V_{REF}}{R_H}\right) - \left(\frac{V_{REF}}{R_L}\right)} \right] - R_{LIM}$$

Vo - Desired output voltage.
All resistor values in K ohms.

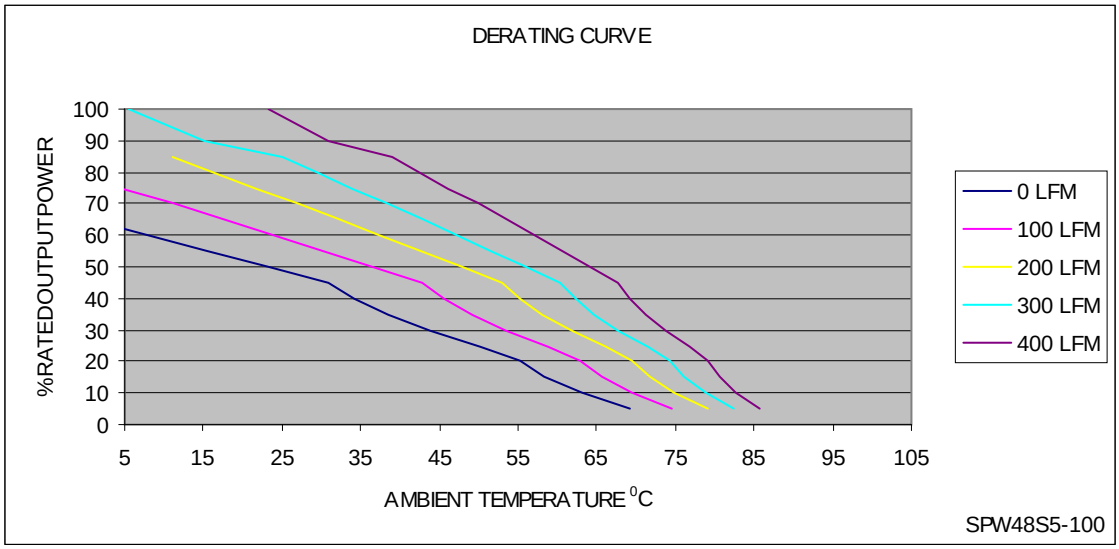


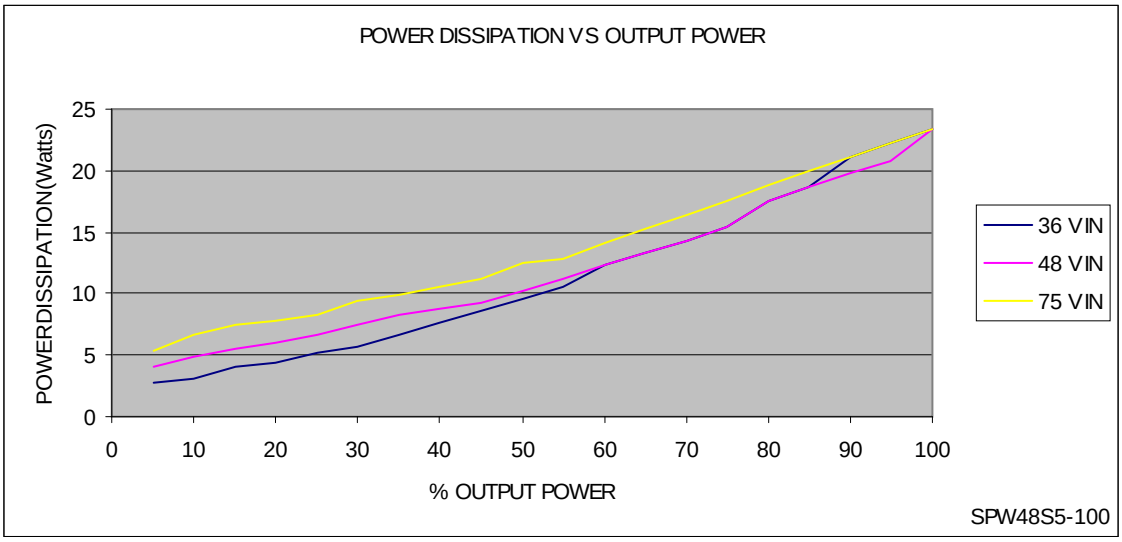
Schematic 2: Trim High

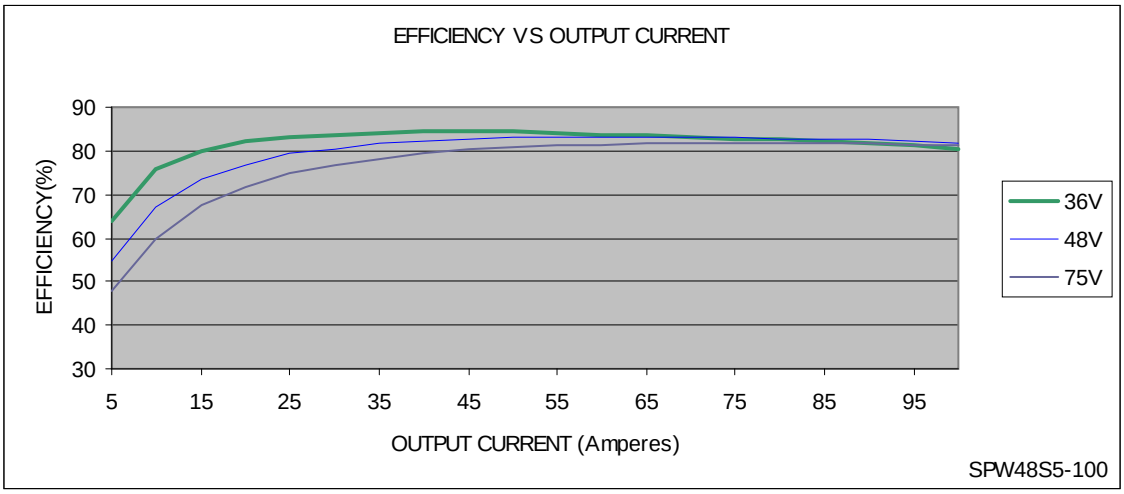
MODEL (Output Voltage)	R_H (K OHMS)	R_{LIM} (K OHMS)	R_L (K OHMS)	V_{REF} (VOLTS)
3.3V	0.750	0.499	2.32	2.495
5.0V	2.49	10.0	2.49	2.495
8.0V	5.49	10.0	2.49	2.495
9.0V	6.49	10.0	2.49	2.495
12.0V	9.53	13.7	2.49	2.495
15.0V	12.4	13.7	2.49	2.495
24.0V	21.5	15.4	2.49	2.495
26.0V	17.6	15.4	1.87	2.495
32.0V	23.7	12.7	2.00	2.495

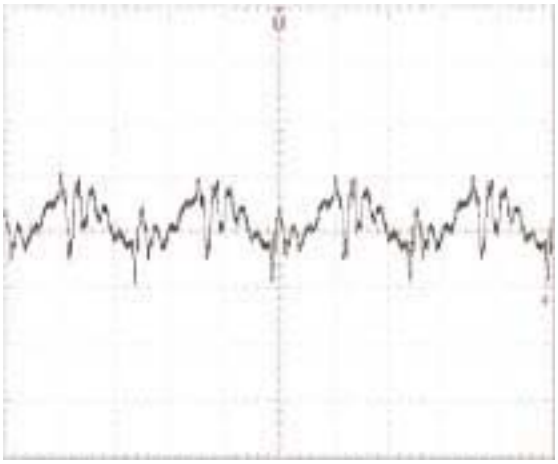
Table 1 : Trim Low/High Data Table.

Note: Output trim +/- 10% max.

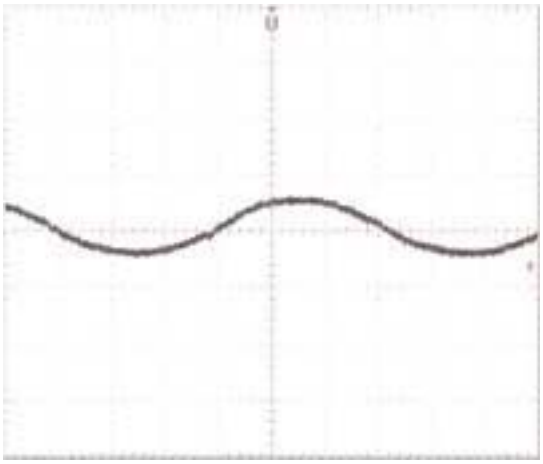

DERATING CURVE
%RATEDOUTPUTPOWER
100
90
80
70
60
50
40
30
20
10
0
5
15
25
35
45
55
65
75
85
95
105
AMBIENT TEMPERATURE 0C
0 LFM
100 LFM
200 LFM
300 LFM
400 LFM
SPW48S5-100


POWER DISSIPATION VS OUTPUT POWER
POWERDISSIPATION(Watts)
25
20
15
10
5
0
0
10
20
30
40
50
60
70
80
90
100
% OUTPUT POWER
36 VIN
48 VIN
75 VIN
SPW48S5-100

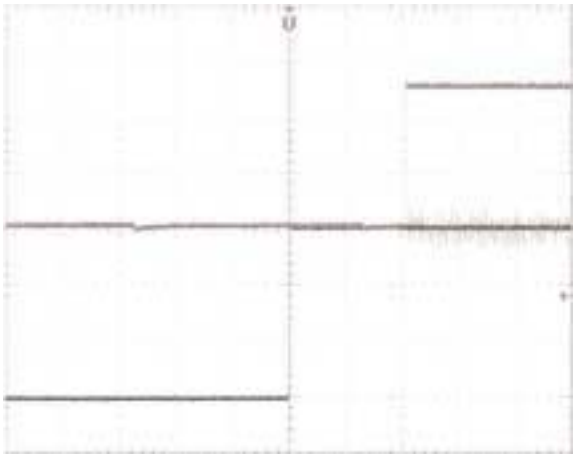

EFFICIENCY VS OUTPUT CURRENT
EFFICIENCY(%)
90
80
70
60
50
40
30
5
15
25
35
45
55
65
75
85
95
OUTPUT CURRENT (Amperes)
36V
48V
75V
SPW48S5-100



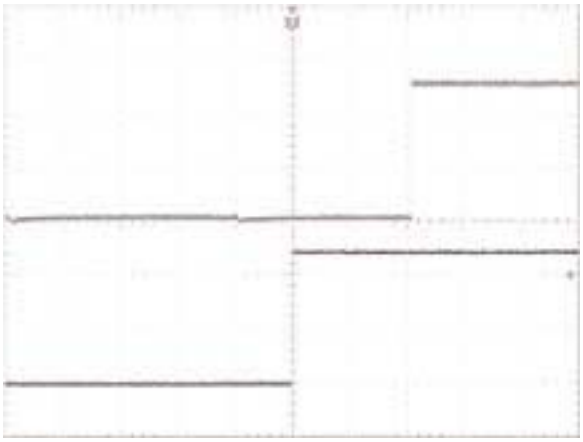
TYPICAL OUTPUT RIPPLE VOLTAGE
20mV/div, 2 us/div, full load 48 vin 10 uF decoupling cap. Room temperature.



TYPICAL INPUT REFLECTED RIPPLE CURRENT
20mA/div, full load 48 vin.(using 12uH, 33uF (low ESR) source impedance). Room temperature.



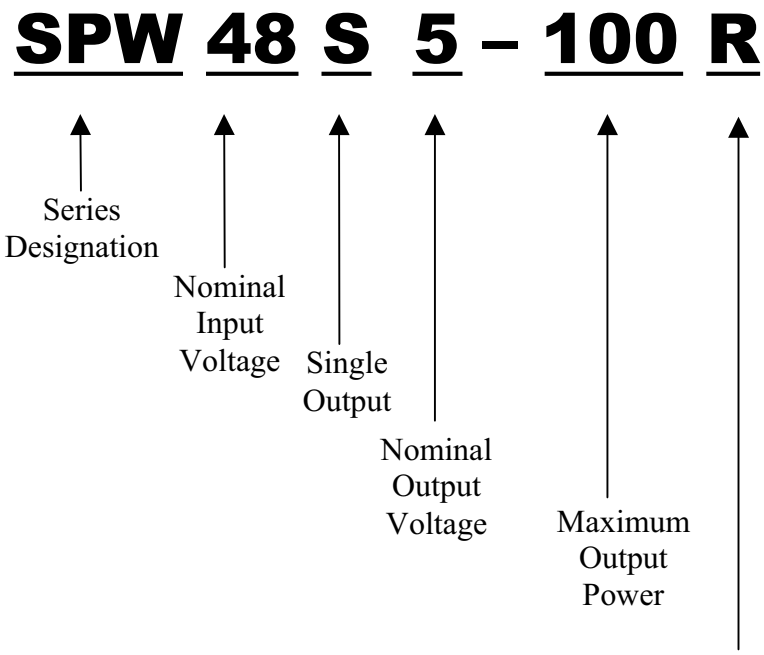
TYPICAL RISE TIME AND TURN ON DELAY
USING LOGIC ENABLE
2 V/div, 200 mS/div, (vout) 2 V/div, 200 mS/div (logic enable) 48 vin, full load. Room temperature.



TYPICAL RISE TIME AND TURN ON DELAY
WITH VIN 0-48V
2V/div, 200 mS/div, (vout) 20 V/div 200 mS/div (vin) 48 vin full load. Room temperature.

Ordering Information:

Part Number Example:



Options	
Blank	Leave Blank for Active High Enable
R	Active Low Enable

Company Information:

Wall Industries, Inc. has created custom and modified units for over 40 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on time and on budget. Our ISO9001-2000 certification is just one example of our commitment to producing a high quality, well documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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