

# 25 to 30 Watt XW Single Series DC/DC Converters

## Features

- 4:1 Input Voltage Range
- Low Noise, Highly Regulated Output
- Efficiencies to 84% at Full Load
- No Derating to 80°C Case Temperature
- Six-Sided Continuous Shielded, Low Thermal Gradient Copper Case
- 500 VDC Minimum Input To Output Isolation
- Overvoltage Protection for Input and Outputs
- Direct Output Paralleling for Added Power
- Five Year Warranty

## Description

These single output DC/DC converters are designed for wide input range low noise telecommunications, industrial control and instrument applications. The ultra wide input range (4:1) is ideal for battery or solar based applications.

The converters are state-of-the-art 75kHz MOSFET based designs that provide outstanding efficiencies up to 84 percent at full load.

The output is regulated with a high loop gain feedback control method that provides linear regulator type performance with a true, high efficiency switching DC/DC topology. The large amount of loop gain insures excellent input ripple rejection and line transient response.

Outstanding line and load regulation are achieved over the full input voltage range and over the specified load current range.

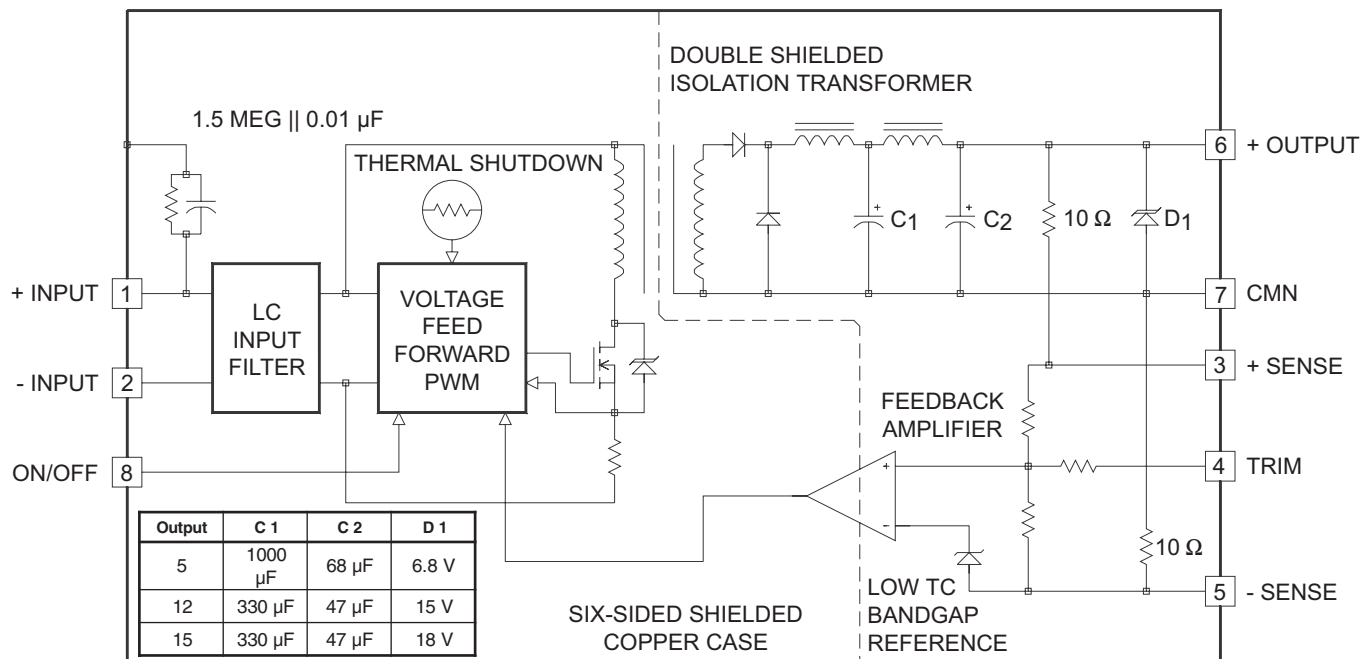
Also included is a logic (open collector TTL / CMOS compatible) shutdown pin to control converter operation.

The XW Single Series is protected from output shorts to common by a high speed pulse by pulse digital current limit circuit and a resettable thermal shut down circuit.

The output and the power switch are overvoltage protected.

Selection Chart				
Model	Input Range VDC		Output VDC	Output mA
	MIN	MAX		
24S5.5000XW	9.0	36.0	5.0	5000
24S12.2500XW	9.0	36.0	12.0	2500
24S15.2000XW	9.0	36.0	15.0	2000
48S5.5000XW	20.0	72.0	5.0	5000
48S12.2500XW	20.0	72.0	12.0 </td <td>2500</td>	2500
48S15.2000XW	20.0	72.0	15.0	2000

25 - 30 Watt XW Single Series Block Diagram



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Input Parameters*								
Model		24S5.5000XW	24S12.2500XW	24S15.2000XW	48S5.5000XW	48S12.2500XW	48S15.2000XW	Units
Voltage Range	MIN	9.0			20.0			VDC
	MAX	36.0			72.0			
Reflected Ripple 0-20MHz bw	TYP	35	40	40	20	20	20	mA P-P
	MAX	100	100	100	40	40	40	
Input Current Full Load No Load	TYP	1320	1540	1510	650	760	745	mA
	TYP-RMS	15	25	25	20	20	20	
Efficiency	TYP	79	81	83	80	82	84	%
Switching Frequency	TYP	75						kHz
Maximum Input Overvoltage, 100ms No Damage	MAX	40			80			VDC
Undervoltage Lockout	TYP	8.5			18.0			VDC
Turn-on Time, 1% Output Error	TYP	30						ms
Recommended Fuse	Slow Blow Type (2)							

Output Parameters*					
Model		24S5.5000XW 48S5.5000XW	24S12.2500XW 48S12.2500XW	24S15.2000XW 48S15.2000XW	Units
Output Voltage		5	12	15	VDC
Rated Current	MIN	0	0	0	mA
	MAX	5000	2500	2000	
Voltage Range 100% Load	MIN	4.95	11.90	14.90	VDC
	TYP	5.00	12.00	15.00	
	MAX	5.05	12.10	15.10	
Load Regulation 0-100% Load	TYP	0.05			%
	MAX	0.50			
Line Regulation Vin = Min-Max VDC	TYP	0.05			%
	MAX	0.50			
Short Term Stability (3)	TYP	0.02			%
Long Term Stability	TYP	0.20			%/kHrs
Transient Response (4)	TYP	50	40	40	µs
		100	200	200	
Dynamic Response (5)	TYP	250	150	150	mV peak
		270	250	200	
Input Ripple Rejection (6)	TYP	75			dB
Noise, 0-20 MHz bw	TYP	10	20	20	mV P-P
	MAX	50	50	50	
Temperature Coefficient	TYP	50	100	100	ppm/°C
	MAX	200	200	200	
Overvoltage Clamp (7)	TYP	6.8	15	18	VDC
Maximum Allowable Voltage Between Pins 6 and 7 (8)	MAX	6.3	14	17	VDC
Short Circuit Protection to Common for all Outputs	Continuous, 8 Hours Minimum Current Limit and Thermal Overload				

## NOTES:

- \* All parameters measured at Tc=25°C, nominal input voltage and full rated load unless otherwise noted. Refer to the CALEX Application Notes for the definition of terms, measurement circuits and other information.
- (2) Determine the correct fuse size by calculating the maximum DC current drain at low line input, maximum load (or use the supplied curves) and then adding 20 to 25 percent to get the desired fuse size.
  - (3) Short term stability is specified after a 30 minute warm-up at full load.
  - (4) Transient response is defined as the time for the output to settle from a 25 to 75 % step load change to a 1% error band (rise time of step = 2µ Sec).
  - (5) Dynamic response is defined as the peak overshoot during a transient as defined in note 4 above.
  - (6) The input ripple rejection is specified for DC to 120 Hz ripple with a modulation amplitude of 1% of Vin.
  - (7) For module protection only, see also note 2.
  - (8) The user must not let the output at the pins exceed this voltage due to the combined effects of line drops and output trim.
  - (9) The logic shutdown pin is Open Collector TTL, CMOS, and relay compatible. The input to this pin is referenced to input (pin 2) and is protected to +100 VDC.
  - (10) The functional temperature range is intended to give an additional data point for use in evaluating this power supply. At the low functional temperature the power supply will function with no side effects, however, sustained operation at the high functional temperature will reduce expected operational life. The data sheet specifications are not guaranteed over the functional temperature range.
  - (11) The case thermal impedance is specified as the case temperature rise over ambient per package watt dissipated.
  - (12) Water Washability - Calex DC/DC converters are designed to withstand most solder/wash processes. Careful attention should be used when assessing the applicability in your specific manufacturing process. Converters are not hermetically sealed.

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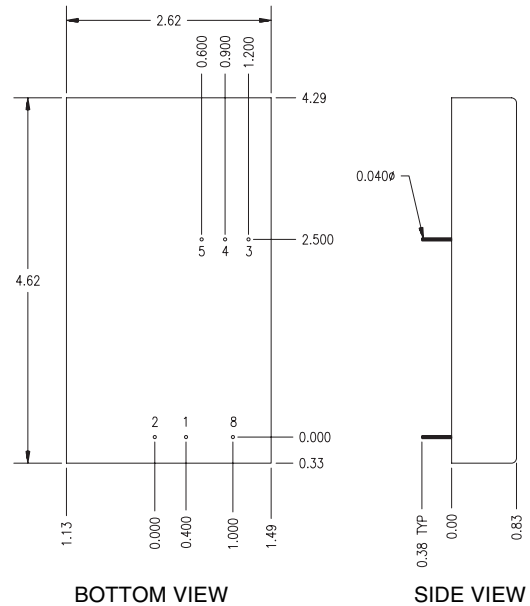
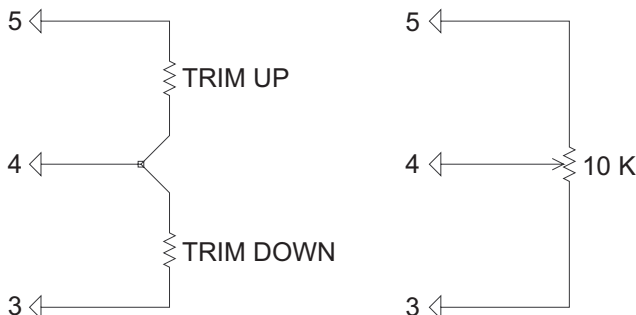
General Specifications*			
All Models			Units
<b>ON/OFF Function (9)</b>			
ON Logic Level or Leave Pin Open	MIN	5.5	VDC
OFF Logic Level	MAX	0.8	VDC
Input Resistance	TYP	100	kohms
Converter Idle Current, Shut Down Pin Low	TYP	5	mA
<b>Isolation</b>			
Isolation Voltage	MIN	500	VDC
Input to Either Output	MIN	250	VDC
Single to Dual Output			
10µA Leakage			
Input to Output Capacitance	TYP	160	pF
<b>Output Trim Function</b>			
Input Resistance	TYP	20	kohms
Proigramming Range	MIN	±10	%
<b>Environmental</b>			
Case Operating Range	MIN	-25	°C
No Derating	MAX	80	°C
Case Funtional Range (10)	MIN	-40	°C
	MAX	90	°C
Storage Range	MIN	-55	°C
	MAX	100	°C
Thermal Impedance (11)	TYP	3.4	°C/Watt
Thermal Shutdown Case Temperature	TYP	90	°C
<b>General</b>			
Unit Weight		10.5	oz.
Mounting Kit		MS10	

If the sense leads are not used they must be connected to their respective output pins (i.e. Pin 3 to Pin 6 and Pin 5 to Pin 7).

Either a fixed resistor or a trimpot can be used for adjusting the output voltage as shown in Figure 1.

The XW Single Output Series can be directly paralleled for higher output current. The circuit shown in Figure 2 results in output currents that differ by less than 10% between the two units. With the addition of an OPAMP active trim as shown in Figure 3, the current sharing will be as good as the match between the current sense resistors. A minimum load of 100mA should be used with these circuits.

**Figure 1. CONNECTIONS FOR OUTPUT TRIM**



Mechanical tolerances unless otherwise noted:

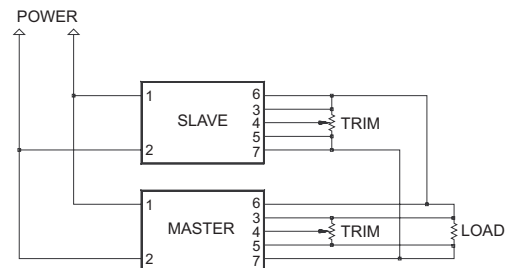
X.XX dimensions: ±0.020 inches

X.XXX dimensions: ±0.005 inches

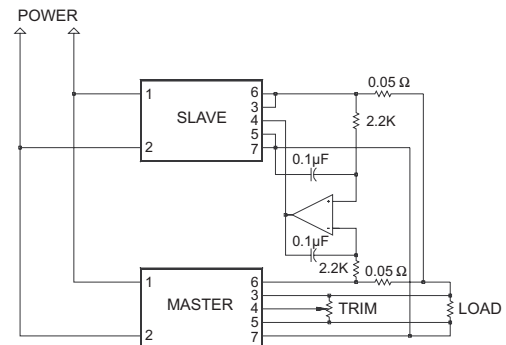
Seal around terminals is not hermetic. Do not immerse units in any liquid.

Pin	Function
1	+INPUT
2	-INPUT
3	+SENSE
4	OUTPUT TRIM
5	-SENSE
6	+OUTPUT
7	CMN
8	ON/OFF

**Figure 2. SIMPLE PARALLEL CIRCUIT**

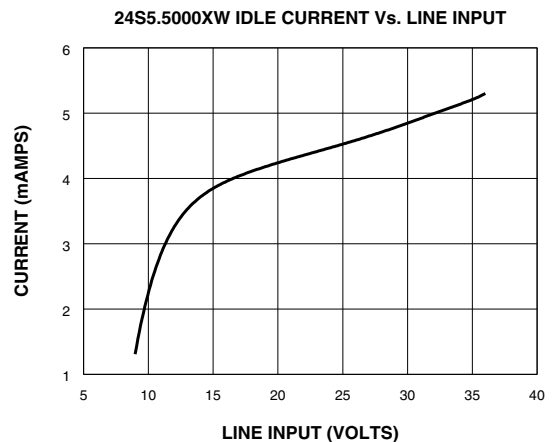
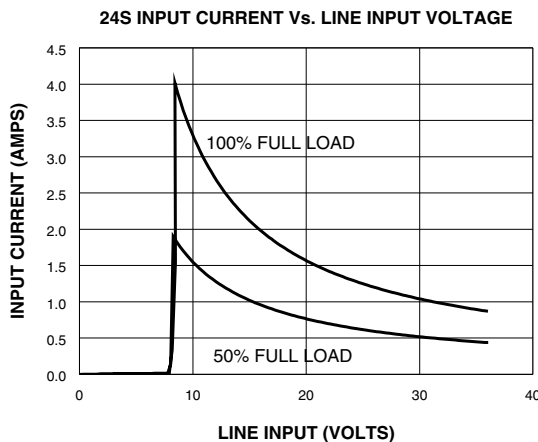
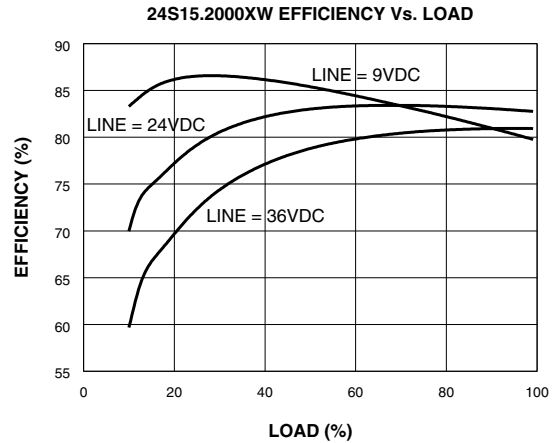
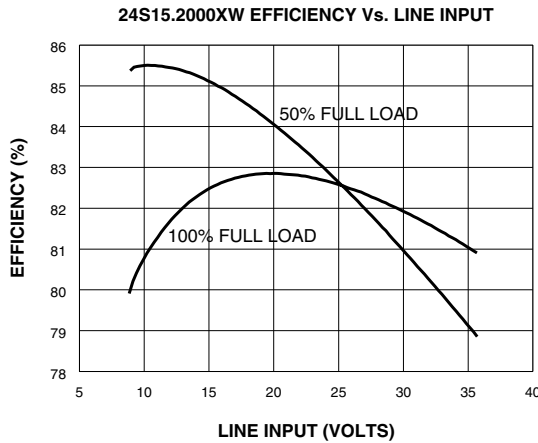
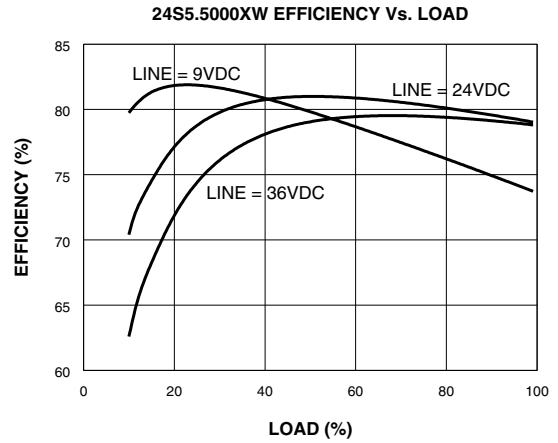
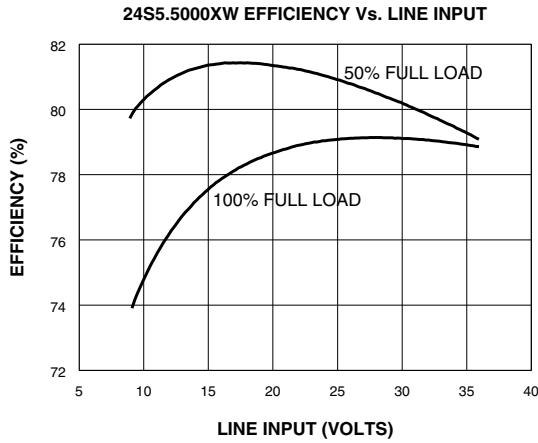


**Figure 3. OPTIMUM PARALLEL CIRCUIT**



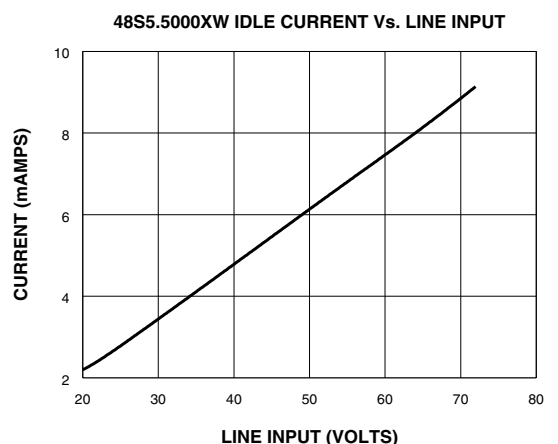
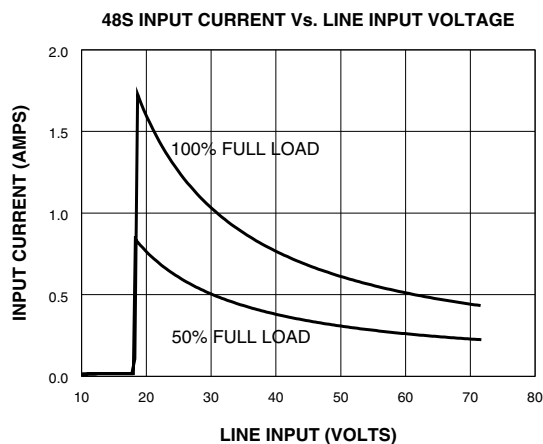
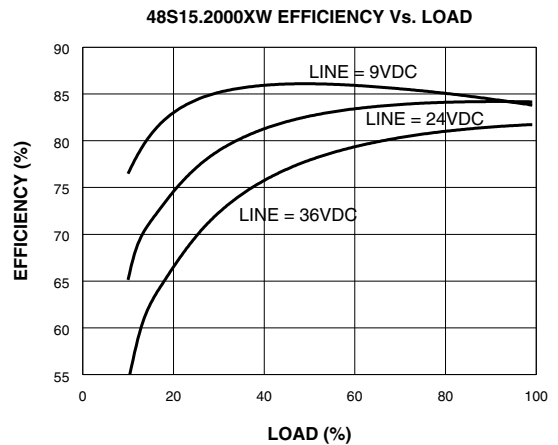
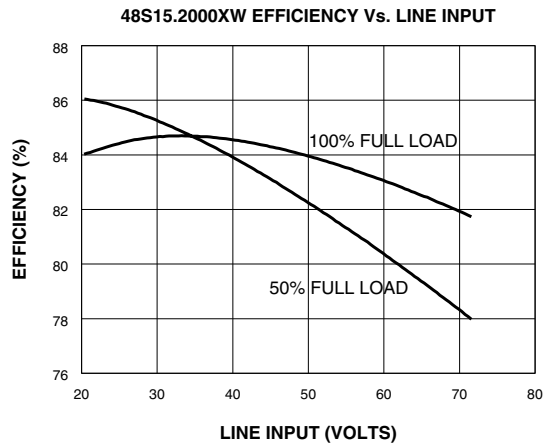
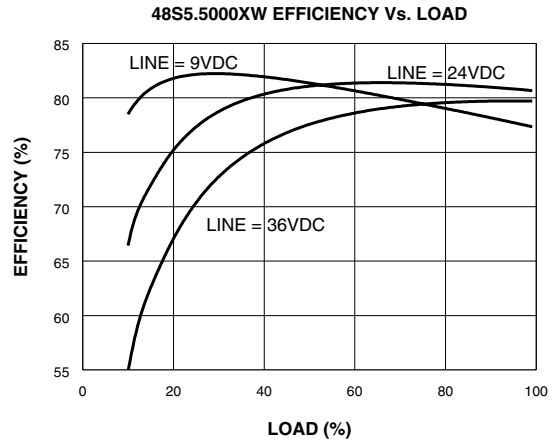
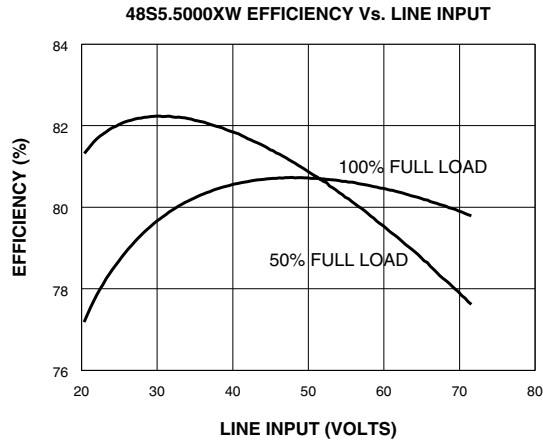
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