

25 to 45 Watt UW Single Series DC/DC Converters



Features

- Ultra Wide Input Voltage Range
- Low Noise, Highly Regulated Single Outputs
- No Derating to 80°C Case Temperature
- Six-Sided Shielded Low Thermal Gradient Copper Case
- Overvoltage Protected Output
- Pulse by Pulse Digital Current Limiting Thermal Overload Protection
- Direct Paralleling of Outputs
- 5 Year Warranty

Description

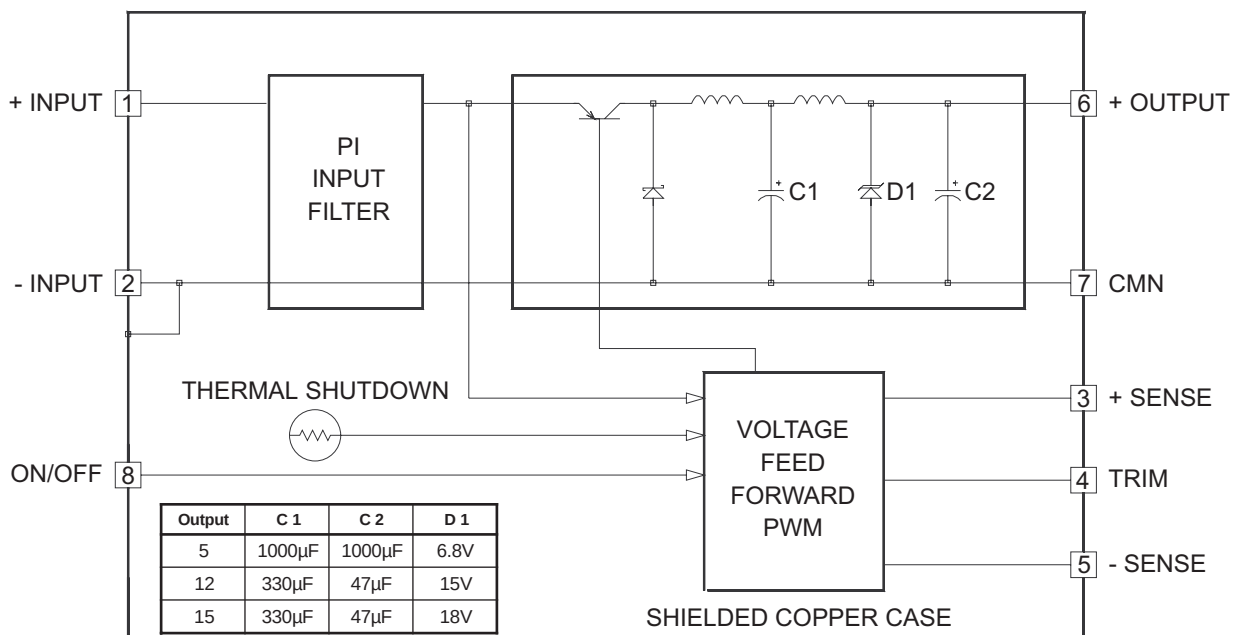
These converters are state-of-the-art 100kHz Bipolar based designs that provide outstanding efficiency of up to 91% at full load. The output is regulated with a high loop gain feed forward control method that provides linear regulator type performance with a true, high efficiency switching DC/DC topology. 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 by the use of external voltage sensing circuitry. Also included are a logic shutdown pin to control converter operation and an output voltage trim pin.

The converters are protected from output shorts to common by a high speed, pulse by pulse digital, current limit circuit and a resettable thermal shutdown circuit. The output and the power switch are overvoltage protected.

Selection Chart				
Model	Input Range VDC		Output VDC	Output mA
	MIN	MAX		
12S5.5000UW	7.0	40.0	5.0	5000
24S12.2500UW	14.0	40.0	12.0	2500
24S12.3500UW	14.0	40.0	12.0	3500
24S15.3000UW	17.0	40.0	15.0	3000

25 to 45 Watt UW Single Series Block Diagram



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Input Parameters*						
Model		12S5.5000UW	24S12.2500UW	24S12.3500UW	24S15.3000UW	Units
Voltage Range	MIN	7.0	14.0	14.0	17.0	VDC
	MAX	40.0	40.0	40	40.0	
Reflected Ripple, 0-20MHz bw	TYP	35	20	20	20	mA P-P
	MAX	100	70	70	70	
Input Current Full Load No Load	TYP	2600	1380	1940	2050	mA
	TYP	12	12	12	12	
Efficiency	TYP	81	90	90	91	%
Switching Frequency	TYP	100				kHz
Maximum Input Overvoltage, 100ms No Damage	MAX	45				VDC
Undervoltage Lockout	TYP	6	13	13	16	VDC
Turn-on Time, 1% Output Error	TYP	35	25	25	25	ms
Recommended Fuse		(2)				

Output Parameters*						
Model		12S5.5000UW	24S12.2500UW	24S12.3500UW	24S15.3000UW	Units
Output Voltage		5	12	12	15	VDC
Rated Current (3)	MIN	0	0	0	0	mA
	MAX	5000	2500	3500	3000	
Voltage Range 100% Load	MIN	4.950	11.900	11.900	14.900	VDC
	TYP	5.000	12.000	12.000	15.000	
	MAX	5.050	12.100	12.100	15.100	
Load Regulation 0-100% Load	TYP	0.02				%
	MAX	0.2				
Line Regulation Vin = Min-Max VDC	TYP	0.02				%
	MAX	0.2				
Short Term Stability (4)	TYP	0.02				%
Long Term Stability	TYP	0.2				%/kHrs
Transient Response (5)	TYP	300	55	120	50	μs
Dynamic Response (6)	TYP	150	100	135	130	mV peak
Input Ripple Rejection (7)	TYP	56	60	60	60	dB
Noise, 0-20MHz bw	TYP	20				mV P-P
	MAX	60				
Temperature Coefficient	TYP	50				ppm/°C
	MAX	150				
Overvoltage Clamp (8)	TYP	6.8	15	15	20	VDC
Maximum Allowable Voltage Between Pins 6 and 7 (9)	VDC	6.3	14.0	14.0	18.0	VDC
Short Circuit Protection to Common for all Outputs		Continuous, 8 Hours Minimum Current Limit and Thermal Overload				

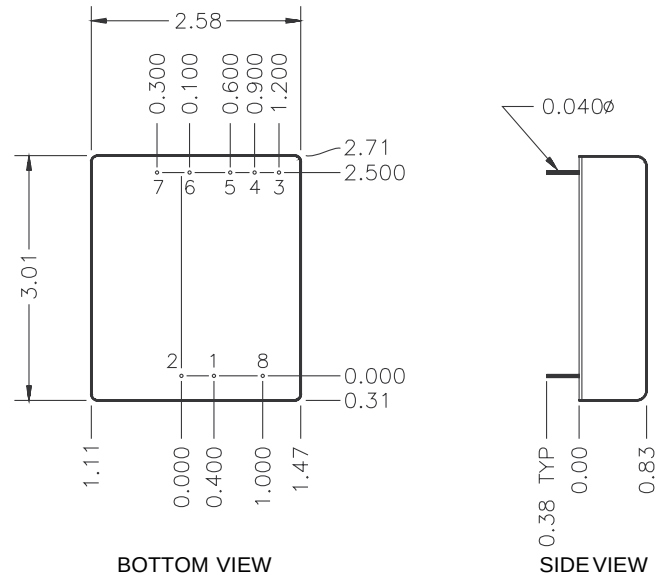
NOTES

* 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 then adding 20 to 25 percent.
- (3) No minimum load required.
- (4) Short term stability is specified after a 30 minute warm-up at full load and with constant line, load and ambient conditions.
- (5) The transient response is specified as the time required to settle from 25 to 75% step load change (rise time of step = 2μSec.) to a 1% error band.
- (6) Dynamic response is the peak overshoot voltage during the transient response time defined in note 5 above.
- (7) The input ripple rejection is specified for DC to 120Hz ripple with a modulation amplitude of 1% Vin.
- (8) For module protection only, see also note 2.
- (9) The user must not let the output at the pins exceed this voltage due to the combined effects of line drops and output trim.
- (10) The logic shutdown pin is Open Collector TTL, CMOS, and relay compatible. The input to this pin is referenced to input minus and is protected to +100 VDC.
- (11) 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.
- (12) The case thermal impedance is specified as the case temperature rise over ambient per package watt dissipated.
- (13) Specifications subject to change without notice.
- (14) 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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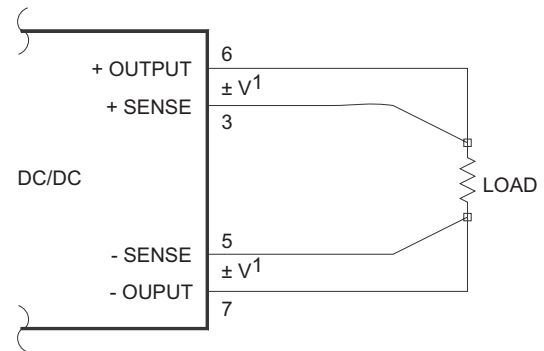
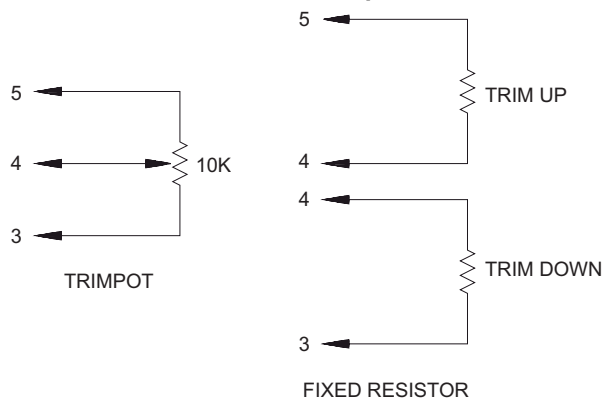
General Specifications*			
All Models			Units
Logic Shutdown (10)			
ON Logic Level or Leave Pin Open	MIN	2.4	VDC
OFF Logic Level	MAX	1.5	VDC
Input Resistance	TYP	2	kohms
Converter Idle Current, Shut Down Pin Low	TYP	12	mA
Output Trim Function			
Input Resistance	TYP	10	kohms
Programming Range (10)	MIN	15	%
	TYP	17	
Programming Voltage (MIN/ADJ Range)	MIN	0.0 (+15%)	VDC
	TYP	2.5 (0.0%)	
	MAX	5.0 (-15%)	
Programming Linearity 0-5 VDC	TYP	Better than 1%	
Environmental			
Case Operating Range No Derating	MIN	-25	°C
	MAX	80	
Case Funtional Range (11)	MIN	-40	°C
	MAX	90	
Storage Range	MIN	-55	°C
	MAX	100	
Thermal Impedance (12)	TYP	4.4	°C/Watt
Thermal Shutdown Case Temperature	TYP	90	°C
General			
Unit Weight		7.0	oz.
Chassis Mounting Kit		MS9	



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.

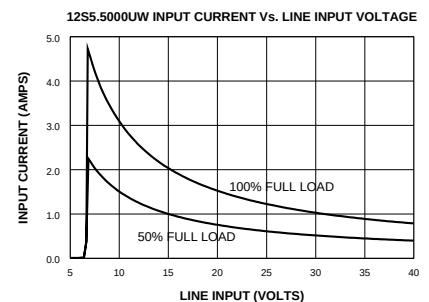
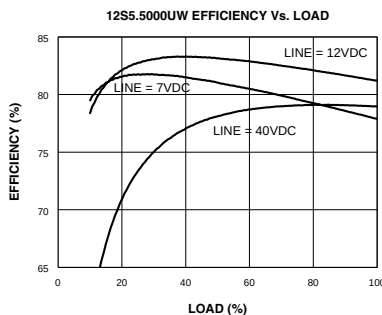
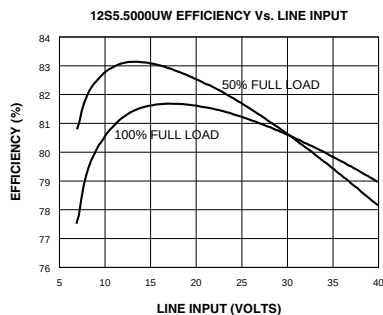
Pin	Function
1	+INPUT
2	-INPUT
3	+SENSE
4	TRIM
5	-SENSE
6	+OUTPUT
7	CMN
8	ON/OFF

Connections for Output Trim



NOTE: Keep $V^1 < 0.3$ volts for optimum regulation

Typical Performance ($T_c=25^\circ\text{C}$; Full Rated Load)



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Typical Performance (Tc=25°C; Full Rated Load)

