

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

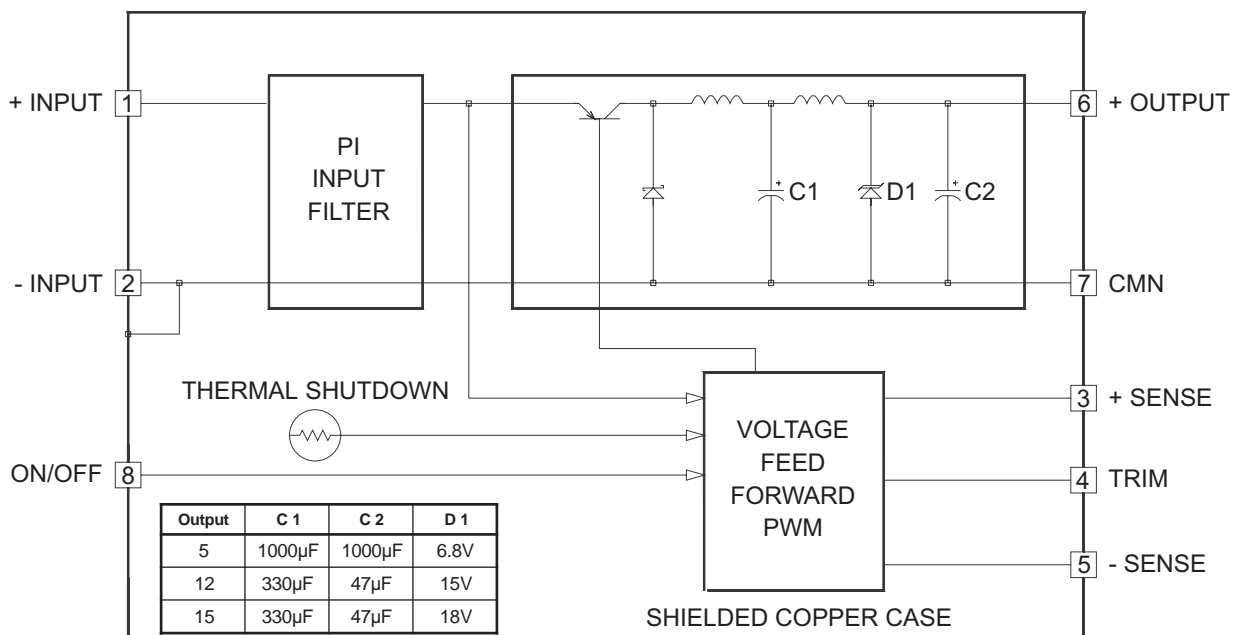
These converters are state-of-the-art 100kHz Bipolar based designs that provide outstanding efficiency of up to 91% at full load. The output is regulated with a high loop gain feed forward control method that provides linear regulator type performance with a true, high efficiency switching DC/DC topology. 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



25 to 45 Watt UW Single Series DC/DC Converters

| 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 | TYP | 2600 | 1380 | 1940 | 2050 | mA |
| | No Load | 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) | | | | |

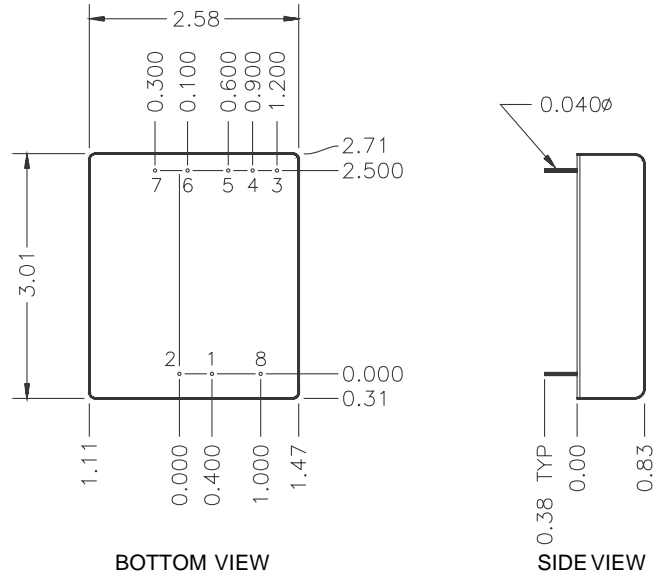
| Output Parameters* | | | | | | |
|---|-----|--|--------------|--------------|--------------|---------|
| Model | | 12S5.5000UW | 24S12.2500UW | 24S12.3500UW | 24S15.3000UW | Units |
| Output Voltage | | 5 | 12 | 12 | 15 | VDC |
| Rated Current (3) | MIN | 0 | 0 | 0 | 0 | mA |
| | MAX | 5000 | 2500 | 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.
- Determine the correct fuse size by calculating the maximum DC current drain at low line input, maximum load then adding 20 to 25 percent.
 - No minimum load required.
 - Short term stability is specified after a 30 minute warm-up at full load and with constant line, load and ambient conditions.
 - 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.
 - Dynamic response is the peak overshoot voltage during the transient response time defined in note 5 above.
 - The input ripple rejection is specified for DC to 120Hz ripple with a modulation amplitude of 1% Vin.
 - For module protection only, see also note 2.
 - The user must not let the output at the pins exceed this voltage due to the combined effects of line drops and output trim.
 - 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.
 - 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.
 - The case thermal impedance is specified as the case temperature rise over ambient per package watt dissipated.
 - Specifications subject to change without notice.
 - 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 TYP | 15 17 | % |
| Programming Voltage (MIN/ADJ Range) | MIN TYP MAX | 0.0 (+15%) 2.5 (0.0%) 5.0 (-15%) | VDC |
| Programming Linearity 0-5 VDC | TYP | Better than 1% | |
| Environmental | | | |
| Case Operating Range No Derating | MIN MAX | -25 80 | °C |
| Case Functional Range (11) | MIN MAX | -40 90 | °C |
| Storage Range | MIN MAX | -55 100 | °C |
| 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 | | |



BOTTOM VIEW

Mechanical tolerances unless otherwise noted:

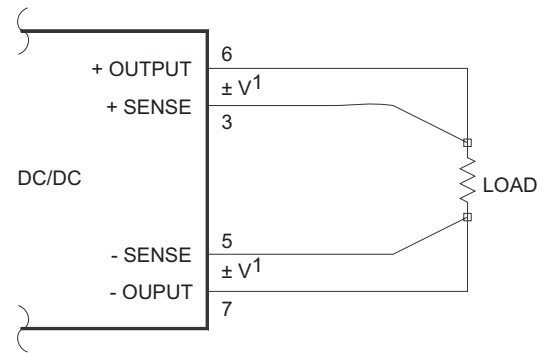
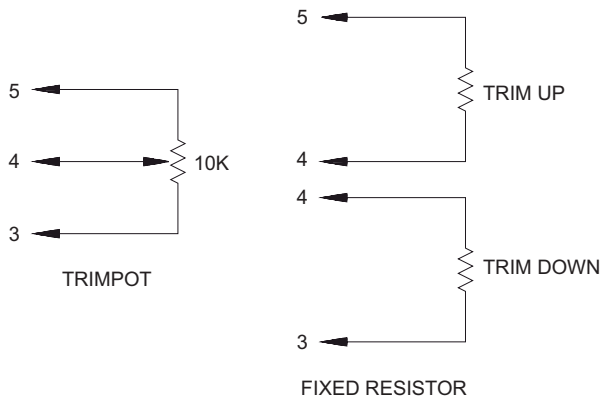
X.XX dimensions: ± 0.020 inches

X.XXX dimensions: ± 0.005 inches

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

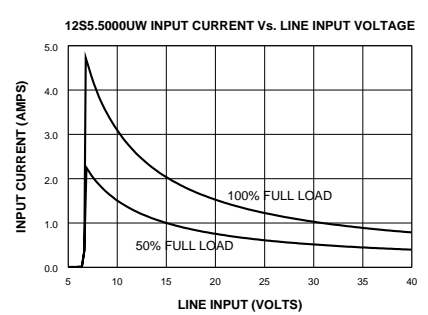
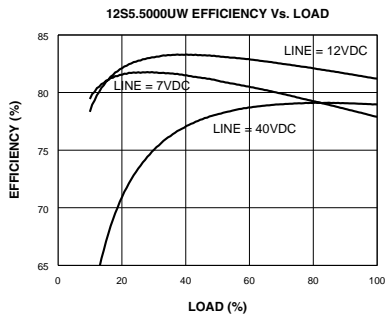
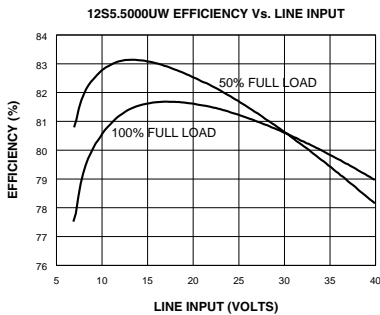
| Pin | Function |
|-----|----------|
| 1 | +INPUT |
| 2 | -INPUT |
| 3 | +SENSE |
| 4 | TRIM |
| 5 | -SENSE |
| 6 | +OUTPUT |
| 7 | CMN |
| 8 | ON/OFF |

Connections for Output Trim



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

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



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