

# 15 Watt SW Triple Series DC/DC Converters



## Features

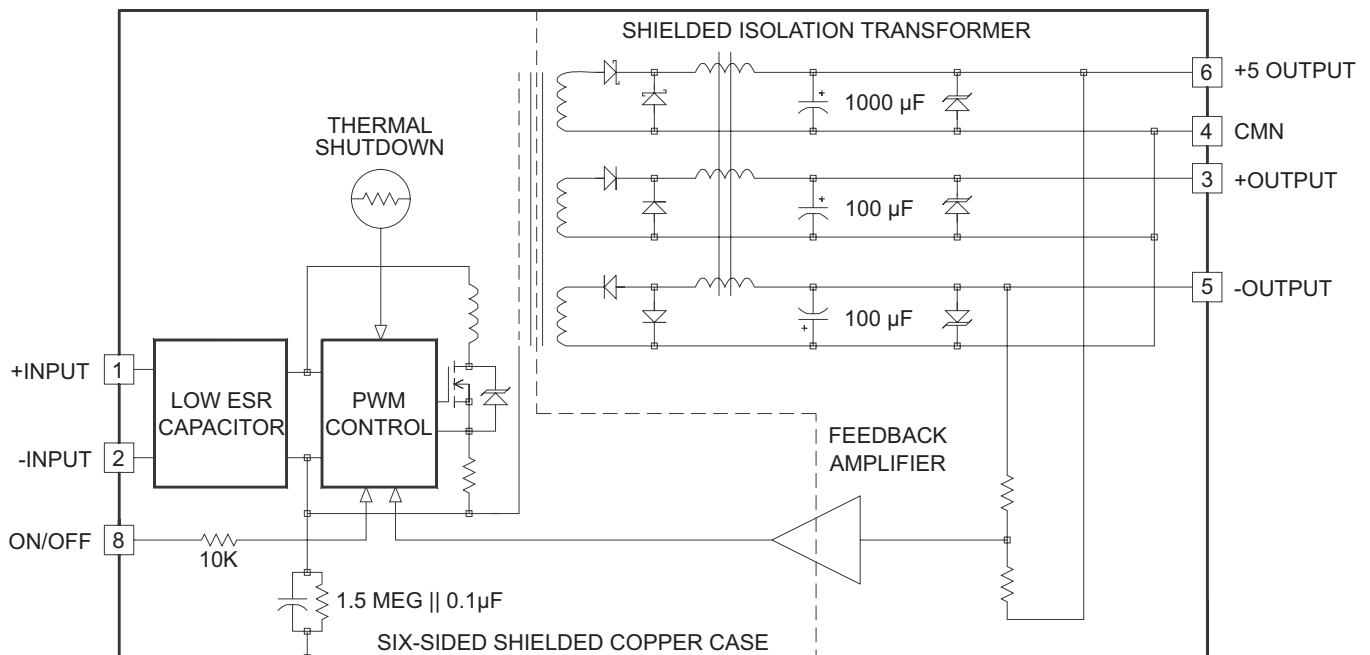
- Wide 2:1 Input Voltage Range (9-18, 18-36 or 36-72VDC)
- Low Noise, Highly Regulated Triple Outputs
- Efficiency 78% for All Line Conditions
- No Derating to 80°C Case Temperature
- Six-Sided Shielded Low Thermal Gradient Copper Case
- 500 VDC Minimum Input to Output Isolation
- Overvoltage Protected Outputs
- Pulse by Pulse Digital Current Limiting
- Five Year Warranty

## Description

These triple output converters are designed for wide input range telecommunications, medical instrument and industrial control system applications. The converters have a high accuracy feedback control circuit and coupled inductor magnetics. This combination provides linear regulator type performance with switching topology efficiency. Outstanding line and load regulation are achieved over the full input range and under the specified load current range. A logic shutdown pin is also included to inhibit converter operation as is internal thermal overload protection. The outputs and the power switch are both overvoltage protected.

| Selection Chart |                 |       |             |                 |
|-----------------|-----------------|-------|-------------|-----------------|
| Model           | Input Range VDC |       | Outputs VDC | Outputs mA      |
|                 | Min             | Max   |             |                 |
| 12T5.12SW       | 9.00            | 18.00 | 5, $\pm 12$ | 1500, $\pm 310$ |
| 12T5.15SW       | 9.00            | 18.00 | 5, $\pm 15$ | 1500, $\pm 250$ |
| 24T5.12SW       | 18.00           | 36.00 | 5, $\pm 12$ | 1500, $\pm 310$ |
| 24T5.15SW       | 18.00           | 36.00 | 5, $\pm 15$ | 1500, $\pm 250$ |
| 48T5.12SW       | 36.00           | 72.00 | 5, $\pm 12$ | 1500, $\pm 310$ |
| 48T5.15SW       | 36.00           | 72.00 | 5, $\pm 15$ | 1500, $\pm 250$ |

15 Watt SW Triple Series Block Diagram



# 15 Watt SW Triple Series DC/DC Converters

| Input Parameters*                             |  |                   |           |           |           |           |           |       |
|---|--|-------------------|-----------|-----------|-----------|-----------|-----------|-------|
| Model   |  | 12T5.12SW         | 12T5.15SW | 12T5.12SW | 24T5.15SW | 48T5.12SW | 48T5.15SW | Units |
| Voltage Range                                 |  | MIN               | 9.0       | 18.0      |           | 36.00     |           | VDC   |
|   |  | MAX               | 18.00     | 36.00     |           | 72.00     |           |       |
| Input Filter                                  |  | Low ESR Capacitor |           |           |           |           |           |       |
| Input Current Full Load                       |  | TYP               | 1600      |           | 780       |           | 380       |       |
| No Load                                       |  | TYP               | 25        |           | 18        |           | 16        |       |
| Efficiency                                    |  | TYP               | 78        |           |           |           |           | %     |
| Switching Frequency                           |  | TYP               | 55        |           |           |           |           | kHz   |
| Maximum Input Overvoltage,<br>100ms No Damage |  | MAX               | 25        |           | 45        |           | 85        |       |
| Turn-on Time, 1% Output Error                 |  | TYP               | 120       |           |           |           |           | ms    |
| Recommended Fuse                              |  | (2)               |           |           |           |           |           |       |

| Output Parameters*                                    |     |  |                                     |                                     |         |
|---|-----|--|-------------------------------------|-------------------------------------|---------|
| Model   |     | 12T5.12SW<br>12T5.15SW<br>24T5.12SW<br>24T5.15SW<br>48T5.12SW<br>48T5.15SW | 12T5.12SW<br>24T5.12SW<br>48T5.12SW | 12T5.15SW<br>24T5.15SW<br>48T5.15SW | Units   |
| Output Voltage  |     | 5  | ±12                                 | ±15                                 | VDC     |
| Rated Load (3)  | MIN | 250  | 100                                 | 100                                 | mA      |
|   | MAX | 1500   | 310                                 | 250                                 |         |
| Voltage Range<br>100% Load                            | MIN | 4.900  | 11.640                              | 14.550                              | VDC     |
|   | TYP | 5.000  | 12.000                              | 15.000                              |         |
|   | MAX | 5.100  | 12.360                              | 15.450                              |         |
| Load Regulation   Min-Max Load                        | TYP | 2.0  | 1.5                                 | 1.5                                 | %       |
|   | MAX | 3.5  | 3.0                                 | 3.0                                 |         |
| Line Regulation<br>Vin = Min-Max VDC                  | TYP | 0.1  |                                     |                                     | %       |
|   | MAX | 0.5  |                                     |                                     |         |
| Short Term Stability (4)                              | TYP | 0.02   |                                     |                                     | %       |
| Long Term Stability                                   | TYP | 0.2  |                                     |                                     | %/kHrs  |
| Transient Response (5)                                | TYP | 50   |                                     |                                     | µs      |
| Dynamic Response (6)                                  | TYP | 85   | 75                                  | 70                                  | mV peak |
| Input Ripple Rejection (7)                            | TYP | 35   |                                     |                                     | dB      |
| Noise, 0-20MHz bw                                     | TYP | 25   | 20                                  | 20                                  | mV P-P  |
|   | MAX | 50   | 50                                  | 50                                  |         |
| Temperature Coefficient                               | TYP | 120  |                                     |                                     | ppm/°C  |
|   | MAX | 250  |                                     |                                     |         |
| Overvoltage Clamp (8)                                 | TYP | 6.8  | 15.0                                | 18.0                                | VDC     |
| Short Circuit Protection to<br>Common for all Outputs |     | Continuous, 8 Hours Minimum Current Limit and Thermal Overload             |                                     |                                     |         |

## NOTES

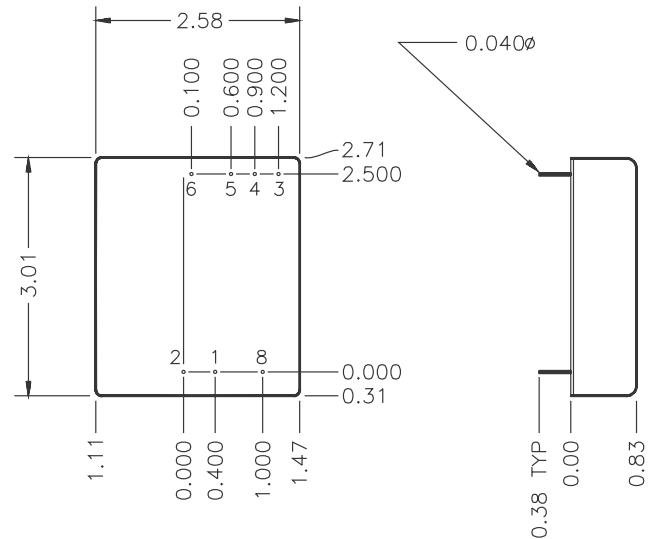
\* **All parameters measured at Tc = 25°C, nominal input voltage and full rated load unless otherwise noted. Refer to the CALEX Application Notes for the definition of terms, measurement circuits and other information.**

- (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. Slow blow type recommended.
- (3) The module will not be damaged if run at less than minimum load. Regulation can degrade with less than minimum load or substantial load imbalance.
- (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 50 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 logic shutdown pin is Open Collector TTL, CMOS, and relay compatible. The input to this pin is referenced to input minus.
- (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) Specifications subject to change without notice.
- (13) 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.

# 15 Watt SW Triple Series DC/DC Converters

| General Specifications*                      |     |      |         |
|--|-----|------|---------|
| All Models                                   |     |      | Units   |
| Logic Shutdown (9)                           |     |      |         |
| ON Logic Level<br>or Leave Pin open          | MIN | 2.4  | VDC     |
| OFF Logic Level                              | MAX | 1.2  | VDC     |
| Input Resistance                             | TYP | 10   | k ohms  |
| Converter Idle Current,<br>Shut Down Pin Low | TYP | 6    | mA      |
| Isolation                                    |     |      |         |
| Isolation Voltage                            |     |      |         |
| 10μA Leakage<br>Input-Output                 |     |      |         |
| 12T & 24T Models                             | MIN | 700  | VDC     |
| 48T Models                                   | MIN | 1544 |         |
| Input to Output<br>Capacitance               | TYP | 190  | pF      |
| Environmental                                |     |      |         |
| Case Operating Range                         | MIN | -25  | °C      |
| No Derating                                  | MAX | 80   |         |
| Case Functional Range (10)                   | MIN | -40  | °C      |
|  | MAX | 90   |         |
| Storage Range                                | MIN | -55  | °C      |
|  | MAX | 100  |         |
| Thermal Impedance (11)                       | TYP | 4.4  | °C/Watt |
| Thermal Shutdown                             |     |      |         |
| Case Temperature                             | TYP | 90   | °C      |
| General                                      |     |      |         |
| Unit Weight                                  | TYP | 7.0  | oz      |
| Mounting Kit                                 |     | MS9  |         |



BOTTOM VIEW

SIDE VIEW

Mechanical tolerances unless otherwise noted:

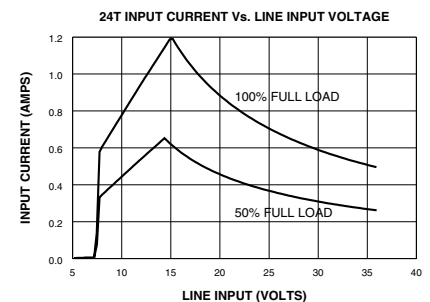
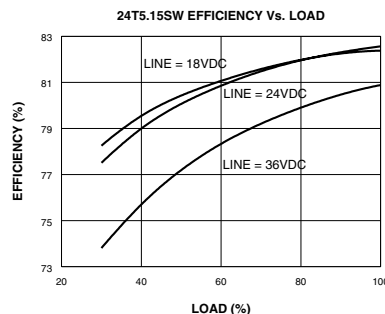
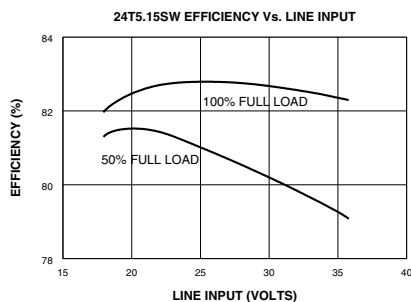
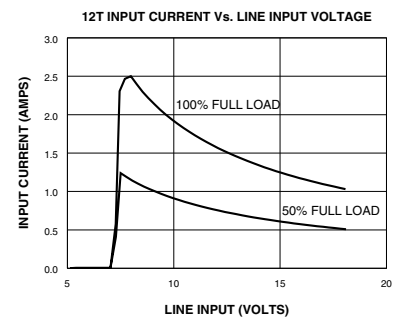
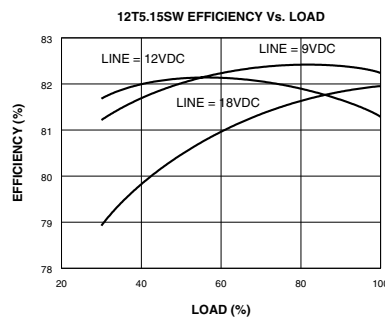
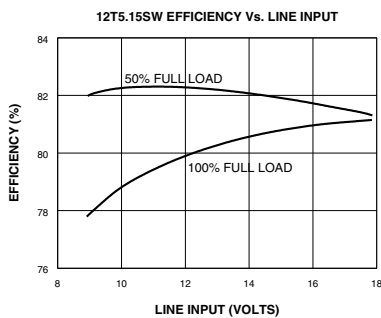
X.XX dimensions:  $\pm 0.020$  inches

X.XXX dimensions:  $\pm 0.005$  inches

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

| Pin | Function        |
|-----|-----------------|
| 1   | +INPUT          |
| 2   | -INPUT          |
| 3   | +12/ +15 OUTPUT |
| 4   | CMN             |
| 5   | -12/-15 OUTPUT  |
| 6   | +5 OUTPUT       |
| 8   | ON/OFF          |

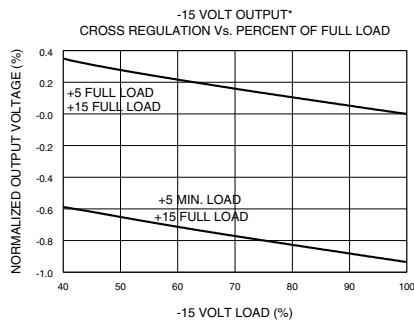
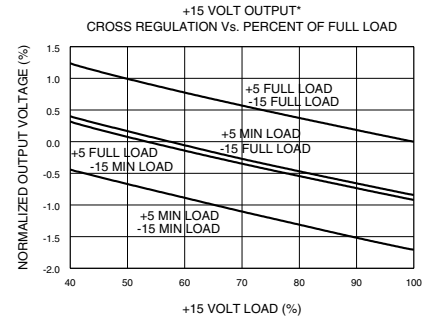
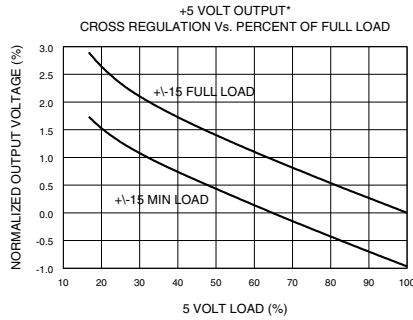
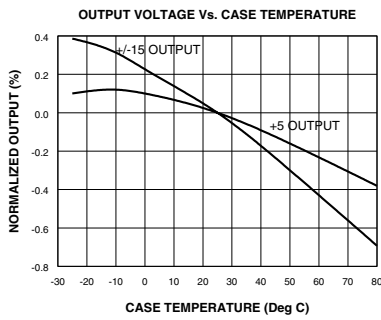
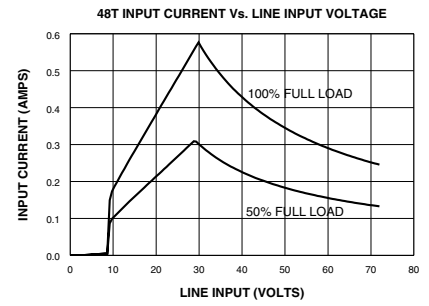
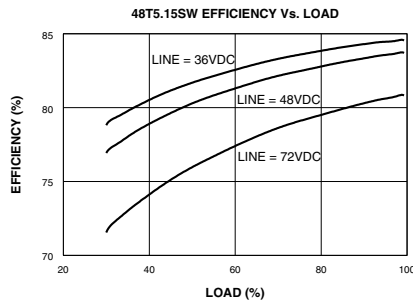
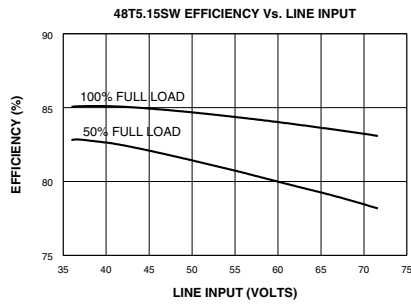
Typical Performance ( $T_c=25^{\circ}\text{C}$ ,  $V_{in}=\text{Nom VDC}$ , Rated Load).



\* Curves are applicable to both outputs  $\pm 12$  and  $\pm 15$  VDC

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