

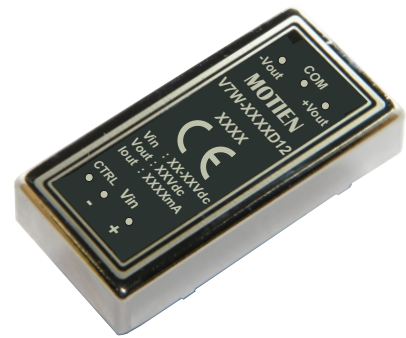
# V7W - 12W Series



12W 4:1 Regulated Single & Dual output

## Features

- Wide 4:1 Input Range
- Full SMD Technology
- 1500 VDC Isolation
- Continuous Short Circuit Protection
- Efficiency up to 85%
- -40 ~ 85°C Operation Temperature Range
- Remote on/off Control (Optional)
- EMI Complies With EN55022 Class A



The V7W series is a family of cost effective 12W single & dual output DC-DC converters. These converters are made with nickle-coated brass case in a 2"x1" with high performance features such as 1500 VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight line / load regulation. Devices are encapsulated by using flame retardant resin. Input voltages of 24 and 28 with output voltage of 3.3, 5, 7.2, 9, 12, 15,  $\pm 5$ ,  $\pm 7.2$ ,  $\pm 9$ ,  $\pm 12$ ,  $\pm 15$  Vdc. High performance features include high efficiency operation up to 85% and output voltage accuracy of  $\pm 1\%$  maximum.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

| OUTPUT SPECIFICATIONS                 |                                                                 |
|---------------------------------------|-----------------------------------------------------------------|
| Voltage accuracy                      | $\pm 1\%$                                                       |
| Line regulation                       | $\pm 0.5\%$                                                     |
| Load regulation                       | $\pm 0.5\%$ (10% to 100% Loading)<br>$\pm 1\%$ (below 10% load) |
| Cross Regulation (Dual Output) (1)    | $\pm 5\%$                                                       |
| Ripple & noise (20 MHz bandwidth) (2) | 75mV pk-pk                                                      |
| Over-current protection               | 140% of max. Iout                                               |
| Short circuit protection              | Indefinite (Automatic Recovery)                                 |
| Temperature coefficient               | $\pm 0.02\%/^{\circ}\text{C}$                                   |
| Capacitor load (3)                    | See table                                                       |

| INPUT SPECIFICATIONS                                    |            |
|---------------------------------------------------------|------------|
| Voltage Range                                           | See table  |
| Start up Time (Nominal Vin and constant resistive load) | 20mS, typ. |
| Max. Input Current                                      | See table  |
| No-Load Input Current                                   | See table  |
| Input Filter                                            | PI Type    |
| Input Reflected Ripple Current (4)                      | 35mA pk-pk |

| GENERAL SPECIFICATIONS                       |                                                                                                                      |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Efficiency                                   | See table, typ.                                                                                                      |
| I/O Isolation Voltage (3 sec)                |                                                                                                                      |
| Input/Output                                 | 1500Vdc                                                                                                              |
| Case/Input & Output                          | 1000Vdc                                                                                                              |
| I/O Isolation Capacitance                    | 1200 pF typ.                                                                                                         |
| I/O Isolation Resistance                     | 1000M Ohm                                                                                                            |
| Switching Frequency                          | Typical 300kHz                                                                                                       |
| Humidity                                     | 95% rel H                                                                                                            |
| Reliability Calculated MTBF (MIL-HDBK-217 F) | > 1.121 Mhrs                                                                                                         |
| Safety Standard : (designed to meet)         | IEC 60950-1:2001                                                                                                     |
| Remote On/Off (Optional)                     | ON: 2.5~5.5VDC or open circuit<br>OFF: -0.7~-0.8VDC or Short circuit pin 2 and pin 6<br>OFF idle current: 2.5mA Typ. |

| EMC SPECIFICATIONS      |               |                  |
|-------------------------|---------------|------------------|
| Radiated Emissions      | EN55022       | CLASS A          |
| Conducted Emissions (5) | EN55022       | CLASS A          |
| ESD                     | IEC 61000-4-2 | Perf. Criteria B |
| RS                      | IEC 61000-4-3 | Perf. Criteria A |
| EFT                     | IEC 61000-4-4 | Perf. Criteria B |
| CS                      | IEC 61000-4-6 | Perf. Criteria A |
| PFMF                    | IEC 61000-4-8 | Perf. Criteria A |

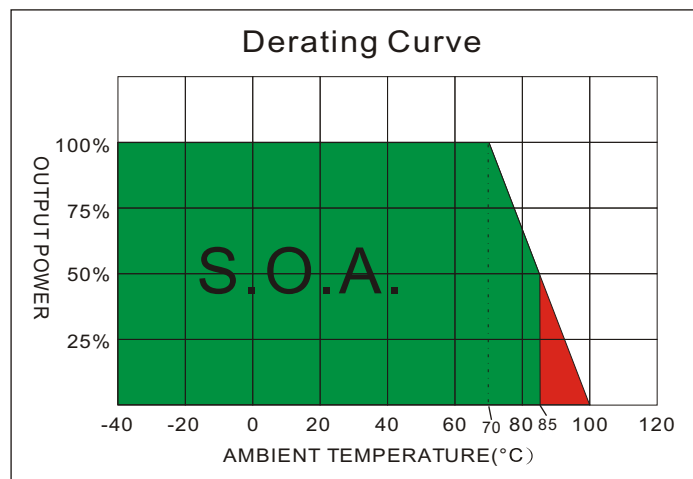
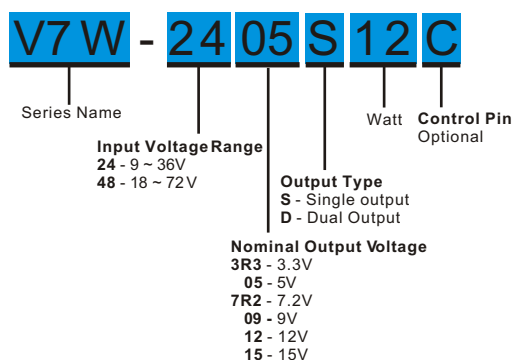
| PHYSICAL SPECIFICATIONS |                                                |
|-------------------------|------------------------------------------------|
| Case Material           | Nickel-coated Brass                            |
| Pin Material            | $\varnothing 1.0\text{mm}$ Brass Solder-coated |
| Potting Material        | Epoxy (UL94V-0 rated)                          |
| Weight                  | 30.0g                                          |
| Dimensions              | 2.00"x1.00"x0.40"                              |

| ENVIRONMENT SPECIFICATIONS |                                                                   |
|----------------------------|-------------------------------------------------------------------|
| Operating Temperature      | -40°C ~ 85°C (See Derating Curve)<br>-40°C ~ 70°C (For 100% load) |
| Maximum Case Temperature   | 100°C                                                             |
| Storage Temperature        | -40°C ~ 125°C                                                     |
| Cooling                    | Nature Convection                                                 |

| ABSOLUTE MAXIMUM RATINGS (6)                                                                                         |              |
|----------------------------------------------------------------------------------------------------------------------|--------------|
| These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability. |              |
| Input Surge Voltage (100mS)                                                                                          |              |
| 24 Models                                                                                                            | 50 Vdc max.  |
| 48 Models                                                                                                            | 100 Vdc max. |
| Lead Soldering Temperature<br>(1.5mm from case 10sec.max.)                                                           | 260°C        |

## V7W - 12W 4:1 Regulated Single & Dual output

### PARTNUMBER STRUCTURE



### MODEL SELECTION GUIDE

| MODEL NUMBER  | INPUT Voltage Range (Vdc) | INPUT Current |                | OUTPUT Voltage (Vdc) | OUTPUT Current |                | EFFICIENCY @FL (%) | Capacitor Load(μF) |
|---------------|---------------------------|---------------|----------------|----------------------|----------------|----------------|--------------------|--------------------|
|               |                           | No-Load (mA)  | Full Load (mA) |                      | Min. load (mA) | Full load (mA) |                    |                    |
| V7W-243R3S 12 | 9-36                      | 25            | 412            | 3.3                  | 0              | 2400           | 80                 | 3300               |
| V7W-2405S 12  | 9-36                      | 25            | 609            | 5                    | 0              | 2400           | 82                 | 3300               |
| V7W-247R2S 12 | 9-36                      | 25            | 602            | 7.2                  | 0              | 1666           | 83                 | 1000               |
| V7W-2409S 12  | 9-36                      | 25            | 602            | 9                    | 0              | 1333           | 83                 | 680                |
| V7W-2412S 12  | 9-36                      | 25            | 588            | 12                   | 0              | 1000           | 85                 | 680                |
| V7W-2415S 12  | 9-36                      | 25            | 588            | 15                   | 0              | 800            | 85                 | 470                |
| V7W-2405D12   | 9-36                      | 25            | 609            | ±5                   | 0              | ±1200          | 82                 | ±2200              |
| V7W-247R2D1 2 | 9-36                      | 25            | 602            | ±7.2                 | 0              | ±833           | 83                 | ±470               |
| V7W-2409D12   | 9-36                      | 25            | 602            | ±9                   | 0              | ±666           | 83                 | ±470               |
| V7W-2412D12   | 9-36                      | 25            | 588            | ±12                  | 0              | ±500           | 85                 | ±470               |
| V7W-2415D12   | 9-36                      | 25            | 588            | ±15                  | 0              | ±400           | 85                 | ±330               |
| V7W-483R3S 12 | 18-72                     | 20            | 206            | 3.3                  | 0              | 2400           | 80                 | 3300               |
| V7W-4805S 12  | 18-72                     | 20            | 304            | 5                    | 0              | 2400           | 82                 | 3300               |
| V7W-487R2S 12 | 18-72                     | 20            | 301            | 7.2                  | 0              | 1666           | 83                 | 1000               |
| V7W-4809S 12  | 18-72                     | 20            | 301            | 9                    | 0              | 1333           | 83                 | 680                |
| V7W-4812S 12  | 18-72                     | 20            | 294            | 12                   | 0              | 1000           | 85                 | 680                |
| V7W-4815S 12  | 18-72                     | 20            | 294            | 15                   | 0              | 800            | 85                 | 470                |
| V7W-4805D12   | 18-72                     | 20            | 304            | ±5                   | 0              | ±1200          | 82                 | ±2200              |
| V7W-487R2D1 2 | 18-72                     | 20            | 301            | ±7.2                 | 0              | ±833           | 83                 | ±470               |
| V7W-4809D12   | 18-72                     | 20            | 301            | ±9                   | 0              | ±666           | 83                 | ±470               |
| V7W-4812D12   | 18-72                     | 20            | 294            | ±12                  | 0              | ±500           | 85                 | ±470               |
| V7W-4815D12   | 18-72                     | 20            | 294            | ±15                  | 0              | ±400           | 85                 | ±330               |

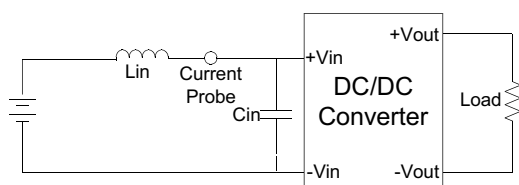
### NOTE

- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Measured with 20MHz bandwidth and 1.0uF ceramic capacitor.
- Tested by minimal Vin and constant resistive load.
- Measured Input reflected ripple current with a simulated source inductance of 12uH.
- Input filter components (C1, L, C2) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.
- Exceeding the absolute ratings of the unit could cause damage.  
It is not allowed for continuous operating.

## TEST CONFIGURATIONS

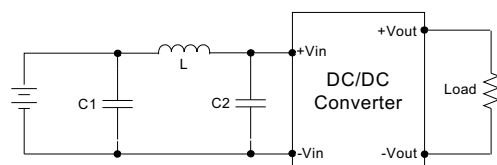
## Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor  $L_{in}$  (12 $\mu$ H) and a source capacitor  $C_{in}$  (47 $\mu$ F, ESR<1.0 $\Omega$  at 100KHz) at nominal input and full load.



## EMI Filter

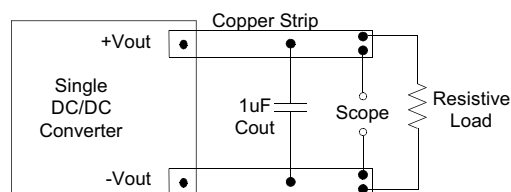
Input filter components ( $C_1, L, C_2$ ) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



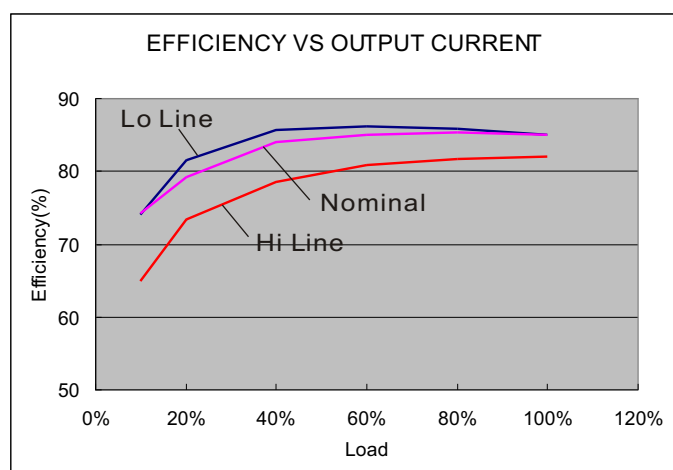
|              | C1               | L          | C2               |
|--------------|------------------|------------|------------------|
| V7W-24XXXXXX | 330 $\mu$ F/100V | 12 $\mu$ H | 100 $\mu$ F/100V |
| V7W-48XXXXXX | 330 $\mu$ F/100V | 12 $\mu$ H | 100 $\mu$ F/100V |

## Output Ripple &amp; Noise Measurement Test

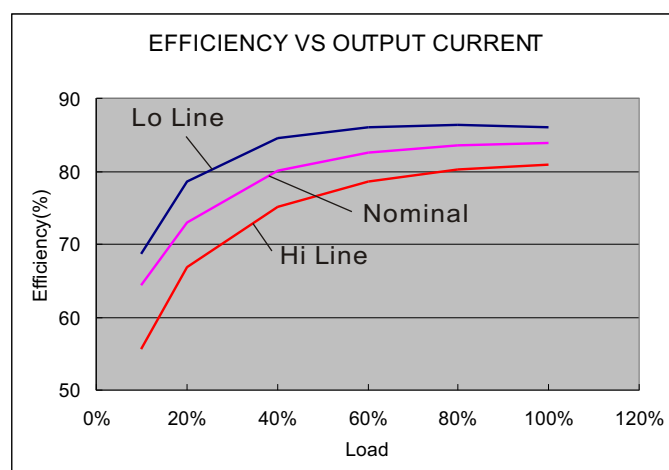
Use a capacitor  $C_{out}$  (1.0 $\mu$ F) measurement. The Scope measurement bandwidth is 0-20MHz.



## ELECTRICAL CHARACTERISTIC CURVES



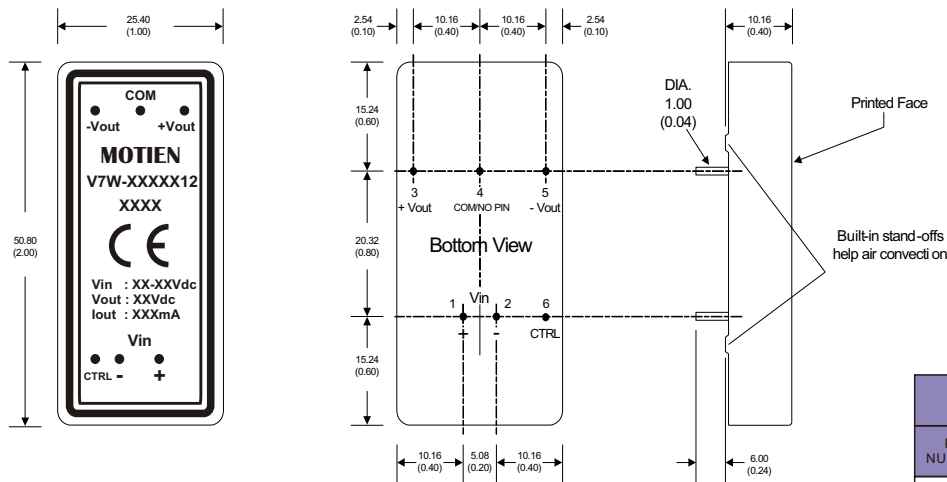
24 Models



48 Models

# V7W - 12W 4:1 Regulated Single & Dual output

## MECHANICAL SPECIFICATIONS



All dimensions are typical in millimeters ( inches ).

1. Pin diameter:  $1.0 \pm 0.05$  (  $0.04 \pm 0.002$  )
2. Pin pitch and length tolerance:  $\pm 0.35$  (  $\pm 0.014$  )
3. Case Tolerance:  $\pm 0.5$  (  $\pm 0.02$  )

### PIN CONNECTIONS

| PIN NUMBER | Standard  |           | Remote Control(Optional) |           |
|------------|-----------|-----------|--------------------------|-----------|
|            | SINGLE    | DUAL      | SINGLE                   | DUAL      |
| 1          | +V Input  | +V Input  | +V Input                 | +V Input  |
| 2          | -V Input  | -V Input  | -V Input                 | -V Input  |
| 3          | +V Output | +V Output | +V Output                | +V Output |
| 4          | N.P.      | Common    | N.P.                     | Common    |
| 5          | -V Output | -V Output | -V Output                | -V Output |
| 6          | N.P.      | N.P.      | CTRL                     | CTRL      |