

# 1500UR series



www.martekpower.com

## Single & Dual Output DC/DC Converter



### DESCRIPTIONS

The 1500UR series is a family of miniature 15W DC/DC converters specifically designed for board mount power distribution applications where space is critical, but performance and power cannot be sacrificed. Standard features include an ultra-wide 4:1 input voltage range, efficiency as high as 83% and continuous short circuit protection by input current limiting. 14 models operate from (4:1) input voltage ranges of 10 to 40 VDC or 18 to 72 VDC and provide tightly regulated outputs of 3.3, 5, 12, 15,  $\pm 5$ ,  $\pm 12$  or  $\pm 15$  VDC. All models are packaged in a compact, low profile 2" X 2" X 0.4" metal case.

### OUTPUT CHARACTERISTICS

|                          | Min | Typ        | Max       | Unit/Comments   |
|--------------------------|-----|------------|-----------|---|
| Output Voltage Accuracy  |     |            |           |   |
| 3.3V Outputs             |     |            | $\pm 100$ | mV <sup>1</sup>   |
| All Other Models         |     |            | $\pm 1.0$ | % <sup>1</sup>  |
| Voltage Balance:         |     |            |           |   |
| Dual Outputs             |     |            | $\pm 2.0$ | %; Equal Output Loads   |
| Voltage Adjustment Range |     |            |           |   |
| 3.3 Vout                 |     |            | 50.0      | mV  |
| All Other Models         |     |            | $\pm 5.0$ | %; Output Voltage   |
| Line Regulation          |     |            | $\pm 1.0$ | % <sup>2</sup>  |
| Load Regulation          |     |            | $\pm 1.0$ | % <sup>3</sup>  |
| Ripple/Noise             |     |            |           |   |
| 3.3V Outputs             |     | 100        |           | mV; p-p, Nom.Line FL, 20Mhz B.W. using 1 $\mu$ f bypass capacitor |
| All Other Models         |     | 1          |           | %; p-p, Nom.Line FL, 20Mhz B.W. using 1 $\mu$ f bypass capacitor  |
| Short Circuit Protection |     |            |           | Continuous, Automatic Recovery                                    |
| Transient Recovery Time  |     | 300        |           | $\mu$ S to within 1% error band for 50% step load change          |
| Temperature Coefficient  |     | $\pm 0.02$ |           | % per °C  |
| Over Voltage Protection  |     |            |           | See Model Selection Guide   |

<sup>1</sup> = Output voltage at nominal line & FL

<sup>2</sup> = Output voltage measured from minimum input line to maximum

<sup>3</sup> = Output voltage measured from FL to 10% Load

### FEATURES

- 6 sided Continuous Shielding
- 4:1 Ultra-Wide Input Voltage Range
- Output Voltage Trim
- -40°C to +75°C Operating Temperature Range
- Efficiency to 83%
- 1000 VDC Input/Output Isolation
- 10W/In<sup>3</sup> Power Density

### INPUT CHARACTERISTICS

|                                | Min | Typ  | Max | Unit/Comments             |
|--------------------------------|-----|------|-----|---------------------------|
| Input Voltage                  |     |      |     |                           |
| 20 VDC Input Models            | 10  | 20   | 40  | VDC                       |
| 36 VDC Input Models            | 18  | 36   | 72  | VDC                       |
| Input Fuse Requirements        |     |      |     |                           |
| 20 VDC Input Models            |     | 3000 |     | mA; Slow blow type        |
| 36 VDC Input Models            |     | 2000 |     | mA; Slow blow type        |
| Reflected Ripple Current       |     |      |     | See Model Selection Guide |
| Reverse Polarity Input Current |     |      | 12  | Amp                       |
| Input Filter                   |     |      |     | LC Type                   |

### GENERAL CHARACTERISTICS

|                       | Min  | Typ | Max | Unit/Comments                        |
|-----------------------|------|-----|-----|--------------------------------------|
| Switching Frequency   | 130  |     |     | kHz                                  |
| Isolation Voltage     | 1000 |     |     | VDC, 1 minute                        |
| Isolation Resistance  | 1000 |     |     | Mohm, 500VDC                         |
| Isolation Capacitance |      | 100 |     | pF, 100kHz, 1Volt                    |
| MTBF (MIL-HBK-217F)   | 865  |     |     | Thousand Hours, +25°C, Ground Benign |

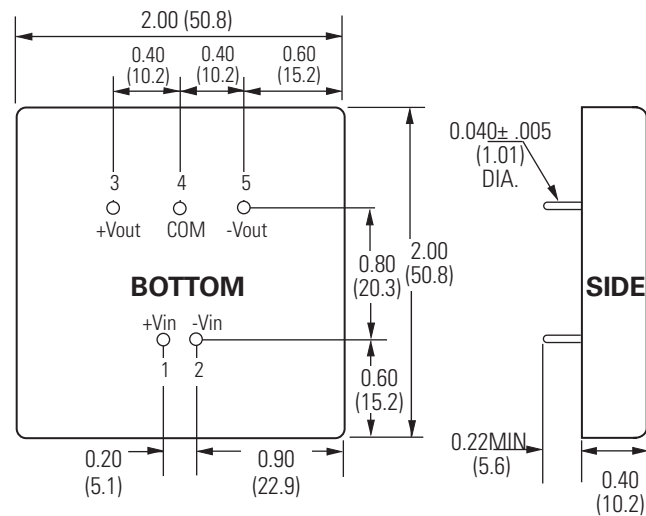
## ENVIRONMENTAL SPECIFICATIONS

|                       | Min | Typ | Max  | Unit/Comments              |
|-----------------------|-----|-----|------|----------------------------|
| Operating Temp. Range | -40 |     | +75  | °C; Ambient                |
| Storage Temp. Range   | -55 |     | +125 | °C                         |
| Relative Humidity     |     |     | +95  | % Humidity; non-condensing |
| Cooling               |     |     |      | Free-Air Convection        |

## PHYSICAL CHARACTERISTICS

|                     | Unit/Comments                                     |
|---------------------|---|
| Case Size           | 2.0 X 2.0 X 0.4 inches<br>(51.0 X 51.0 X 10.2 mm) |
| Case Material       | Coated Metal with Non-Conductive Base             |
| Shield Connection   |   |
| 20 VDC Input Models | Negative Input, Pin 2                             |
| 36 VDC Input Models | Positive Input, Pin 1                             |
| Flammability        | UL94V-0   |
| Weight              | 79 Grams  |

## OUTLINE DRAWING



## PIN OUT CHART

| Pins | Single | Dual     |
|------|--------|----------|
| 1    | +Vin   | + Vin    |
| 2    | - Vin  | - Vin    |
| 3    | + Vout | + Vout   |
| 4    | Trim   | ± Common |
| 5    | - Vout | - Vout   |

NC = No Connection

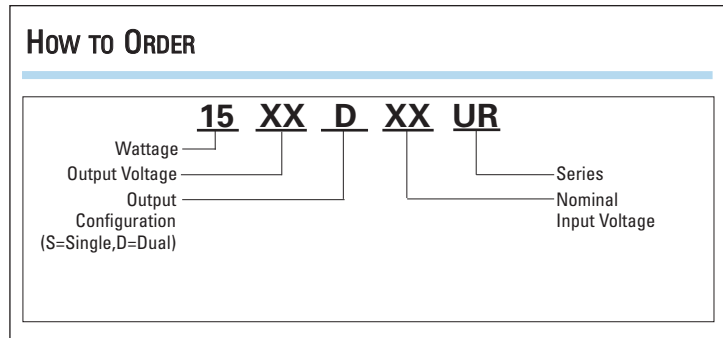
### Notes:

1. Unless otherwise specified dimensions are in inches (mm).

| Tolerances | Inches         | mm           |
|------------|----------------|--------------|
|            | X.XX = ±0.02   | X.X = ±0.5   |
|            | X.XXX = ±0.010 | X.XX = ±0.25 |

All specifications are typical at nominal input, nominal load and 25° C unless otherwise specified. External, low ESR, 10 microfarad (minimum) capacitor across input is recommended for operation.

## HOW TO ORDER



## MODEL SELECTION CHART

| Model     | Nominal Input Voltage (VDC) | Output Voltage (VDC) | Full Load Output Current (mA) | No Load Input Current (mA) | Full Load Input Current (mA) | Reflected Ripple Current (mA) | Output Over Voltage (V) | Efficiency @ FL (%) |
|-----------|-----------------------------|----------------------|-------------------------------|----------------------------|------------------------------|-------------------------------|-------------------------|---------------------|
| 1503S20UR | 20                          | 3.3                  | 4500                          | 40                         | 900                          | 120                           | 5.8                     | 82                  |
| 1505S20UR | 20                          | 5                    | 3000                          | 40                         | 900                          | 120                           | 6.8                     | 83                  |
| 1512S20UR | 20                          | 12                   | 1250                          | 40                         | 960                          | 120                           | 15                      | 78                  |
| 1515S20UR | 20                          | 15                   | 1000                          | 40                         | 950                          | 120                           | 18                      | 79                  |
| 1505D20UR | 20                          | ±5                   | ±1500                         | 40                         | 920                          | 120                           | ±6.8                    | 81                  |
| 1512D20UR | 20                          | ±12                  | ±625                          | 40                         | 960                          | 120                           | ±15                     | 78                  |
| 1515D20UR | 20                          | ±15                  | ±500                          | 40                         | 1000                         | 120                           | ±18                     | 75                  |
| 1503S36UR | 36                          | 3.3                  | 4500                          | 40                         | 500                          | 60                            | 5.8                     | 82                  |
| 1505S36UR | 36                          | 5                    | 3000                          | 40                         | 500                          | 60                            | 6.8                     | 83                  |
| 1512S36UR | 36                          | 12                   | 1250                          | 40                         | 510                          | 60                            | 15                      | 81                  |
| 1515S36UR | 36                          | 15                   | 1000                          | 40                         | 500                          | 60                            | 18                      | 83                  |
| 1505D36UR | 36                          | ±5                   | ±1500                         | 40                         | 510                          | 60                            | ±6.8                    | 81                  |
| 1512D36UR | 36                          | ±12                  | ±625                          | 40                         | 520                          | 60                            | ±15                     | 80                  |
| 1515D36UR | 36                          | ±15                  | ±500                          | 40                         | 520                          | 60                            | ±18                     | 80                  |