



## MWS SERIES - 20 WATT

### DESCRIPTION

MWS DC/DC converters provide up to 20 watts of output power in an industry-standard package and footprint. The MWS is available in either 24V or 48V input versions. With a maximum case temperature of 100°C, the MWS is well suited for the most demanding telecom, networking, and industrial applications. The MWS features 1500 VDC isolation, short circuit, and overtemperature protection.



### FEATURES

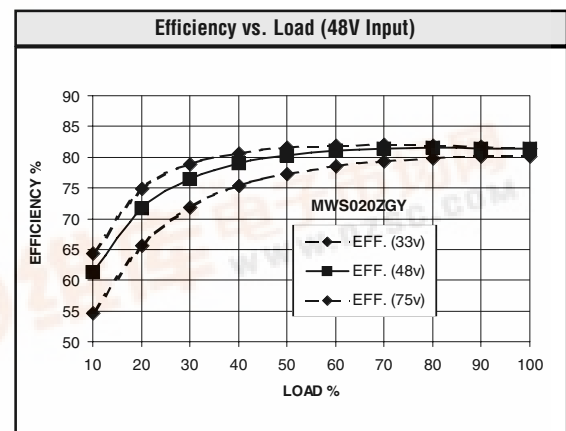
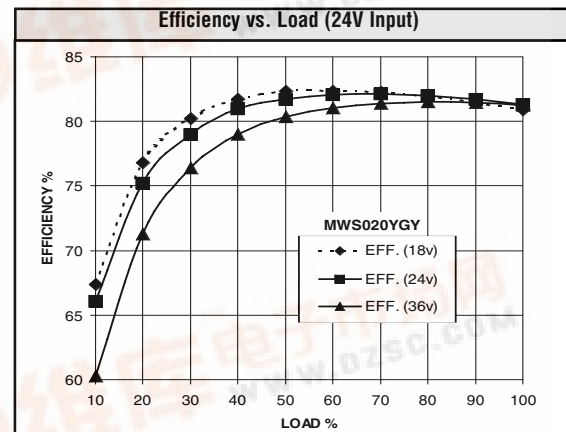
- 20W Standard Package
- 100°C Case Operation
- 3.3V Output Available
- Integrated Heatsink
- Enable and Trim Pins
- Wide Range Input Voltage
- 1500V Isolation
- Short Circuit Protection

### TECHNICAL SPECIFICATIONS

| Input                            |              |
|----------------------------------|--------------|
| 24 VDC Nominal                   | 18 - 36 VDC  |
| 48 VDC Nominal                   | 33 - 75 VDC  |
| Input Undervoltage Lockout       | <33V or <18V |
| UVLO Hysteresis                  | 1V Nominal   |
| Reflected Ripple                 | 50 mA        |
| Input Reverse Voltage Protection | Shunt Diode  |

| Output                                                         |                   |
|----------------------------------------------------------------|-------------------|
| Setpoint Accuracy                                              | ±1.0%             |
| Line regulation $V_{in}$ Min. - $V_{in}$ Max., $I_{out}$ Rated | 0.2% $V_{out}$    |
| Load Regulation $I_{out}$ Min. - $I_{out}$ Max., $V_{in}$ Nom. | 0.5% $V_{out}$    |
| Minimum Output Current                                         | 5 %               |
| Dynamic Regulation, Loadstep                                   | 25% $I_{out}$     |
| Pk Deviation                                                   | 4% $V_{out}$      |
| Settling Time                                                  | 500 $\mu$ s       |
| Voltage Trim Range                                             | ±10%              |
| Short Circuit / Overcurrent Protection                         | Shutdown / Hiccup |
| Current Limit Threshold Range, % of $I_{out}$ Rated            | 110 - 140%        |

| General                        |                           |
|--------------------------------|---------------------------|
| Turn-On Time, Max.             | 175 ms Max.               |
| Remote Shutdown                | Positive Logic            |
| Switching Frequency            | 450 kHz                   |
| Isolation                      |                           |
| Input - Output                 | 1500 VDC                  |
| Temperature Coefficient        | 0.015%/°C                 |
| Case Temperature               |                           |
| Operating Range                | -40 To +100°C             |
| Storage Range                  | -40 To +105°C             |
| Humidity Max., Non-Condensing  | 95%                       |
| Vibration, 3 Axes, 5 Min Each  | 5 g, 10 - 55 Hz           |
| MTBF† (Bellcore TR-NWT-000332) | 1.9 x 10 <sup>6</sup> hrs |
| Safety                         | UL, cUL, TUV              |
| Weight (approx.)               | 1.2 oz                    |



### Notes

† MTBF predictions may vary slightly from model to model.

Specifications typically at 25°C, normal line, and full load, unless otherwise stated.

Soldering Conditions: I/O pins, 260°C, ten seconds; fully compatible with commercial wave-soldering equipment.

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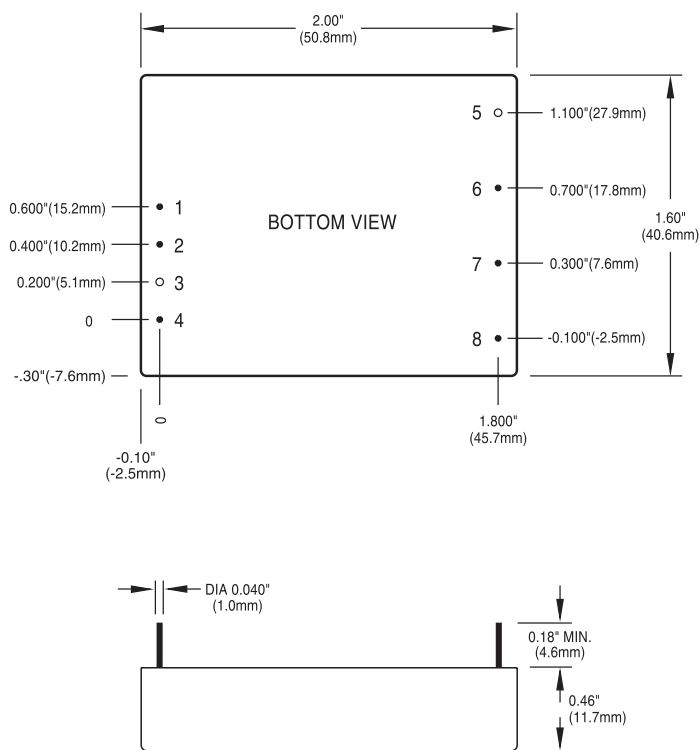
MODELS - (See the last page of Section for options.)

| MODEL     | INPUT VOLTAGE<br>(VOLTS) | INPUT VOLTAGE<br>RANGE (VOLTS) | MAXIMUM INPUT<br>CURRENT (AMPS)* | OUTPUT<br>VOLTAGE (VOLTS) | RATED OUTPUT<br>CURRENT (AMPS) | RIPPLE & NOISE<br>pk-pk (mV) | TYPICAL<br>EFFICIENCY** |
|-----------|--------------------------|--------------------------------|----------------------------------|---------------------------|--------------------------------|------------------------------|-------------------------|
| MWS020ZGY | 48                       | 33 - 75                        | 0.77                             | 5                         | 4                              | 75                           | 81%                     |
| MWS020ZHY | 48                       | 33 - 75                        | 0.73                             | 12                        | 1.66                           | 120                          | 85%                     |
| MWS020YJY | 24                       | 18 - 36                        | 1.34                             | 15                        | 1.33                           | 150                          | 85%                     |

NOTES: \* Maximum input current at minimum input voltage, maximum rated output power.

\*\* At nominal  $V_{in}$ , rated output.

### MECHANICAL DRAWING



| Thermal Impedance                                                                                                                                       |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Natural Convection                                                                                                                                      | 11.5 °C/W |
| 100 LFM                                                                                                                                                 | 10.2 °C/W |
| 200 LFM                                                                                                                                                 | 8.5 °C/W  |
| 300 LFM                                                                                                                                                 | 6.5 °C/W  |
| 400 LFM                                                                                                                                                 | 5.4 °C/W  |
| Note:<br>Thermal impedance data is dependent on many environmental factors. The exact thermal performance should be validated for specific application. |           |

| Pin | Function    |
|-----|-------------|
| 1   | + $V_{in}$  |
| 2   | - $V_{in}$  |
| 3   | No Pin      |
| 4   | Shutdown    |
| 5   | No Pin      |
| 6   | + $V_{out}$ |
| 7   | - $V_{out}$ |
| 8   | Trim        |

| Tolerances                                         |               |
|----------------------------------------------------|---------------|
| Inches:                                            | (Millimeters) |
| .XX ± 0.020                                        | .X ± 0.5      |
| .XXX ± 0.010                                       | .XX ± 0.25    |
| Pin:                                               |               |
| ± 0.002                                            | ± 0.05        |
| Case:                                              |               |
| + 0.04, - 0.00                                     | + 1.0, - 0.00 |
| (Dimensions as listed unless otherwise specified.) |               |

## OPTIONS

When ordering equipment options, use the following suffix information. Select the option(s) that you prefer and add them to the model number. Example ordering options are located below the options table.

| OPTION                                 | SUFFIX | APPLICABLE SERIES                                                     | REMARKS                                                  |
|----------------------------------------|--------|-----------------------------------------------------------------------|----------------------------------------------------------|
| Negative Logic                         | N      | HAS, HBD, HBS, HES, HLS, LES, QBS, QES, QLS, TES, TQD                 | TTL "Low" Turns Module ON<br>TTL "High" Turns Module OFF |
| Lucent-Compatible Trim                 | T      | HAS, HBD, HBS, HES, HLS, QBS, QES, QLS                                |                                                          |
| Terminal Strip                         | TS     | XWS, XWD, XWT                                                         |                                                          |
| Trim                                   | 1      | IAS, LES                                                              |                                                          |
| Enable                                 | 2      | IAD, IAS, LES, SMS                                                    |                                                          |
| Trim and Enable                        | 3      | IAS, LES                                                              |                                                          |
| Current Share                          | 4      | SMS                                                                   |                                                          |
| Headerless                             | Y      | Encapsulated EWS, IWS, OWS                                            |                                                          |
| <b>PIN LENGTH AND HEATSINK OPTIONS</b> |        |                                                                       | Standard Pin Length is 0.180" (4.6mm)                    |
| 0.110" (2.8mm) Pin Length              | 8      | All Units (Except SMS)                                                |                                                          |
| 0.150" (3.8mm) Pin Length              | 9      | All Units (Except SMS)                                                |                                                          |
| 0.24" (6.1mm) Horizontal Heatsink      | 1H     | All Units (Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages) | Includes Thermal Pad                                     |
| 0.24" (6.1mm) Vertical Heatsink        | 1V     | All Units (Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages) | Includes Thermal Pad                                     |
| 0.45" (11.4mm) Horizontal Heatsink     | 2H     | All Units (Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages) | Includes Thermal Pad                                     |
| 0.45" (11.4mm) Vertical Heatsink       | 2V     | All Units (Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages) | Includes Thermal Pad                                     |
| 0.95" (24.1mm) Horizontal Heatsink     | 3H     | All Units (Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages) | Includes Thermal Pad                                     |
| 0.95" (24.1mm) Vertical Heatsink       | 3V     | All Units (Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages) | Includes Thermal Pad                                     |

**Example Options:**

HBS050ZG-ANT3V = HBS050ZG-A with negative logic, Lucent-compatible trim, and 0.95" vertical heatsink.

LES015YJ-3N = LES015YJ with optional trim and enable, negative logic.

QBS066ZG-AT8 = QBS066ZG-A with Lucent compatible trim and 0.110" pin length.

**NUCLEAR AND MEDICAL APPLICATIONS** Power-One products are not authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of the President of Power-One, Inc.

**TECHNICAL REVISIONS** The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

**For the Most Up-To-Date Information**

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