

**DC/DC CONVERTERS****HIGH DENSITY, 2:1 WIDE INPUT RANGE****FEATURES**

- INPUT AND OUTPUT FILTERING
- SINGLE AND DUAL OUTPUTS
- EXTENDED TEMPERATURE RANGE:  
-40°C TO +85°C
- INDUSTRY STANDARD PINOUTS
- SIX-SIDED SHIELDING

**APPLICATIONS**

- TELECOMMUNICATION APPLICATIONS
- BATTERY POWERED SYSTEMS
- PORTABLE INSTRUMENTS
- PROCESS CONTROL EQUIPMENT
- TRANSPORTATION EQUIPMENT
- DISTRIBUTED POWER SYSTEMS

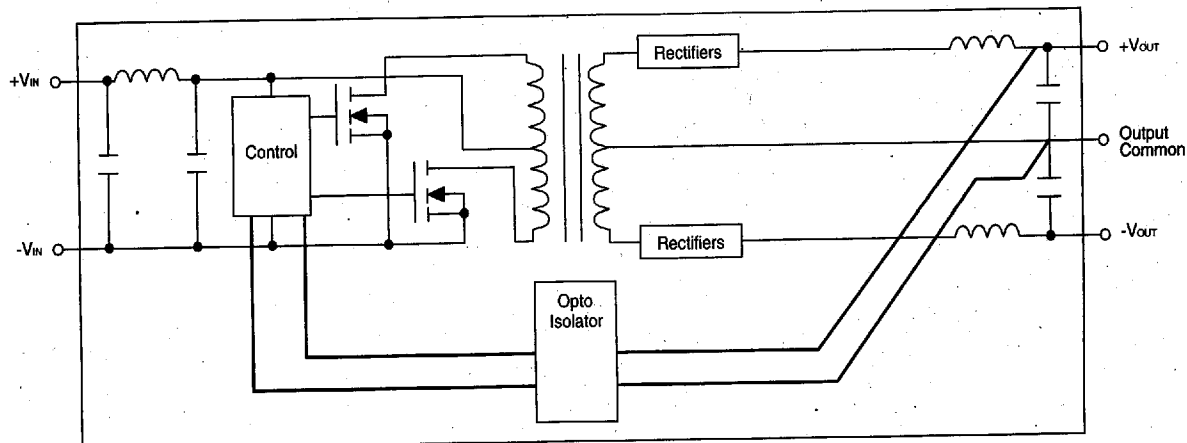
**DESCRIPTION**

The WP20R Series is a family of high performance DC/DC converters that offer regulated outputs with two input ranges of 18-36V and 36-72V over a wide temperature range of -40°C to +85°C.

The 300 KHz switching frequency and push-pull topology provides optimum performance over the

full input range. The design uses all surface mounted components including magnetic components to provide enhanced reliability.

The entire circuit is constructed on an aluminum substrate printed wiring board which provides improved thermal performance.

**SIMPLIFIED CIRCUIT DIAGRAM**

# ELECTRICAL SPECIFICATIONS

Specifications typical at  $T_A = +25^{\circ}\text{C}$ , nominal input voltage, rated output current unless otherwise specified.

| MODEL      | NOMINAL INPUT VOLTAGE (VDC) | RATED OUTPUT VOLTAGE (VDC) | OUTPUT CURRENT |                | INPUT CURRENT |                 | EFFICIENCY (%) |
|------------|-----------------------------|----------------------------|----------------|----------------|---------------|-----------------|----------------|
|            |                             |                            | MIN LOAD (A)   | RATED LOAD (A) | MIN LOAD (mA) | RATED LOAD (mA) |                |
| WP20R24S05 | 24                          | 5                          | 0.4            | 4.0            | 160           | 1096            | 76             |
| WP20R24S08 | 24                          | 8.0                        | 0.25           | 2.50           | 160           | 1016            | 82             |
| WP20R24S12 | 24                          | 12                         | 0.16           | 1.67           | 150           | 1004            | 82             |
| WP20R24D12 | 24                          | $\pm 12$                   | $\pm 0.08$     | $\pm 0.83$     | 150           | 1016            | 82             |
| WP20R24D15 | 24                          | $\pm 15$                   | $\pm 0.06$     | $\pm 0.67$     | 150           | 1004            | 83             |
| WP20R48S05 | 48                          | 5                          | 0.4            | 4.0            | 80            | 534             | 78             |
| WP20R48S12 | 48                          | 12                         | 0.16           | 1.67           | 75            | 502             | 83             |
| WP20R48D12 | 48                          | $\pm 12$                   | $\pm 0.08$     | $\pm 0.83$     | 75            | 502             | 83             |
| WP20R48D15 | 48                          | $\pm 15$                   | $\pm 0.06$     | $\pm 0.67$     | 75            | 496             | 84             |

NOTE: Other input to output voltages may be available. Please consult factory.

## COMMON SPECIFICATIONS

Specifications typical at  $T_A = +25^{\circ}\text{C}$ , nominal input voltage, rated output current unless otherwise specified.

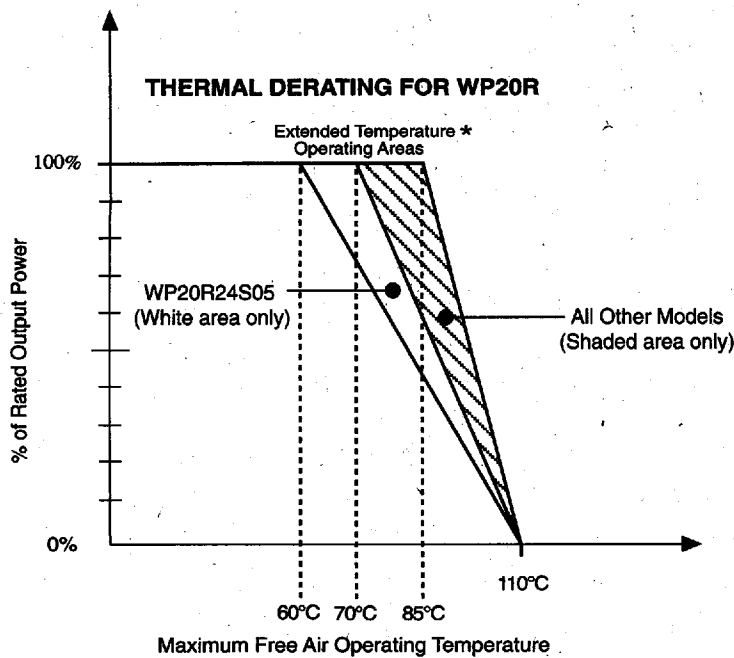
| PARAMETER                 | CONDITIONS                       | MIN | TYP     | MAX        | UNITS                 |
|---------------------------|----------------------------------|-----|---------|------------|-----------------------|
| <b>INPUT</b>              |                                  |     |         |            |                       |
| Voltage Range             |                                  | 18  | 24      | 36         | VDC                   |
| Voltage Range             |                                  | 36  | 48      | 72         | VDC                   |
| Input Filter              | PI-Type                          |     |         |            |                       |
| Reflected Ripple Current  |                                  |     | 50      | 100        | mA                    |
| <b>ISOLATION</b>          |                                  |     |         |            |                       |
| Rated Voltage             |                                  | 500 |         |            | VDC                   |
| Test Voltage              | 60 Hz, 10 Seconds                | 500 |         |            | Vpk                   |
| Resistance                |                                  |     | 10      |            | G $\Omega$            |
| Capacitance               |                                  |     | 400     |            | pF                    |
| Leakage Current           | $V_{iso} = 240\text{VAC}$ , 60Hz |     | 30      |            | $\mu\text{Ams}$       |
| <b>OUTPUT</b>             |                                  |     |         |            |                       |
| Rated Power               |                                  |     |         | 20         | Watts                 |
| Voltage Setpoint Accuracy |                                  |     |         | $\pm 1.5$  | %                     |
| Singles                   |                                  |     |         | $\pm 1.5$  | %                     |
| Duals                     |                                  |     |         | $\pm 0.02$ | %/ $^{\circ}\text{C}$ |
| Temperature Coefficient   |                                  |     |         | $\pm 0.2$  | %                     |
| Line Regulation           | High Line to Low Line            |     |         |            | %                     |
| Load Regulation           |                                  |     |         |            | %                     |
| Single                    | Min Load to Rated Load           |     |         | $\pm 1$    | %                     |
| Duals                     | Min Load to Rated Load           |     |         | $\pm 1$    | %                     |
| Ripple & Noise            | BW = 5 Hz to 20 MHz              |     | 50      | 100        | mVp-p                 |
| <b>GENERAL</b>            |                                  |     |         |            |                       |
| Switching Frequency       |                                  |     | 300     |            | KHz                   |
| MTTF per MIL-HDBK-217     | Circuit Stress Method            |     |         |            |                       |
| Ground Benign             | Using an Unmodified Database     |     | 296,563 |            | Hr                    |
| Fixed Ground              | Using an Unmodified Database     |     | 168,528 |            | Hr                    |
| Package Weight            |                                  |     | 55      |            | g                     |
| <b>TEMPERATURE</b>        |                                  |     |         |            |                       |
| Specification             | Derate From $70^{\circ}\text{C}$ | -25 |         | +85        | $^{\circ}\text{C}$    |
| Operation                 |                                  | -40 |         | +85        | $^{\circ}\text{C}$    |
| Storage                   |                                  | -55 |         | +125       | $^{\circ}\text{C}$    |

## ABSOLUTE MAXIMUM RATINGS

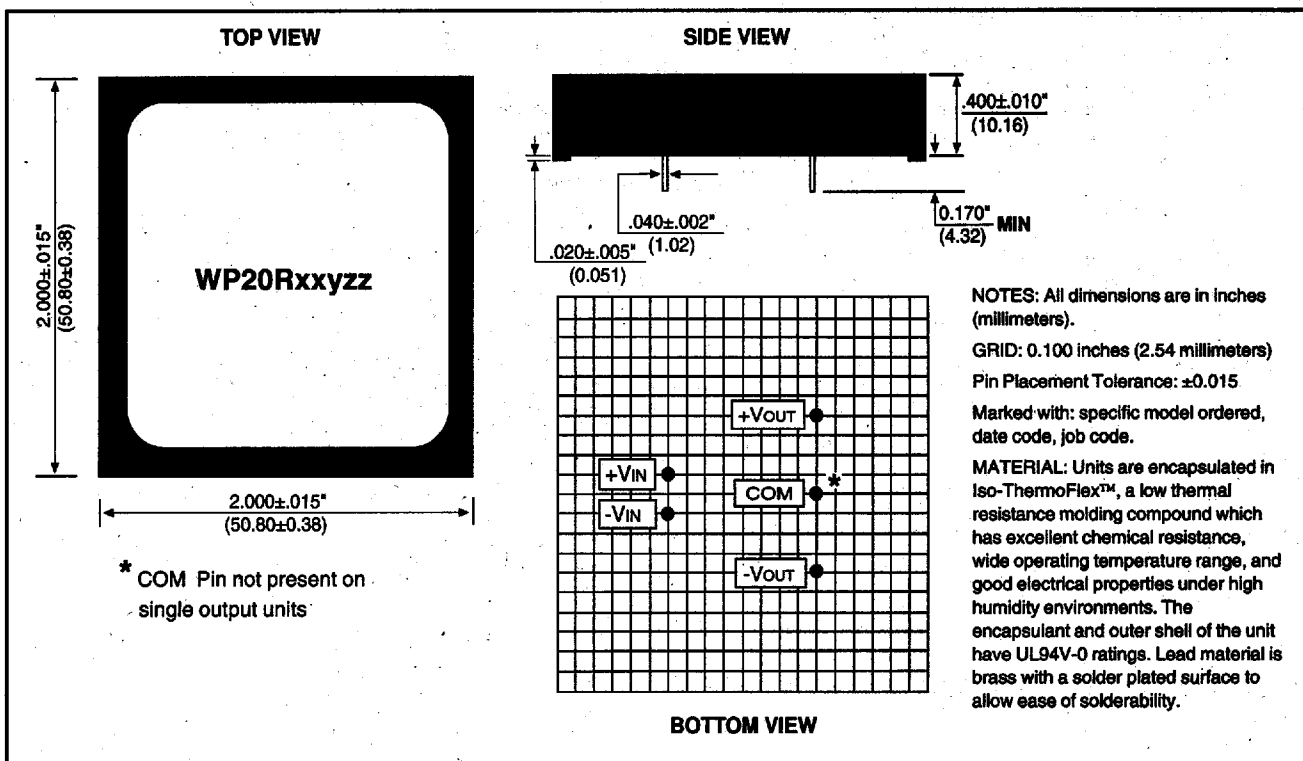
|                                                   |                         |
|---------------------------------------------------|-------------------------|
| Short Circuit Protection .....                    | Continuous              |
| Internal Power Dissipation .....                  | 7W                      |
| Lead Temperature (soldering 10seconds, max) ..... | +300 $^{\circ}\text{C}$ |
| Maximum Case Temperature.....                     | +110 $^{\circ}\text{C}$ |

## ORDERING INFORMATION

|                                                   |                |
|---------------------------------------------------|----------------|
| Device Family                                     | WP20R xxyzz /H |
| Indicates 20 Watt Regulated DC/DC converter       |                |
| Model Number                                      |                |
| Selected from Table of Electrical Characteristics |                |
| Where:                                            |                |
| xx = Input Voltage                                |                |
| y = Number of Outputs (Single "S", Dual "D")      |                |
| zz = Output Voltage                               |                |
| Screening Option                                  |                |



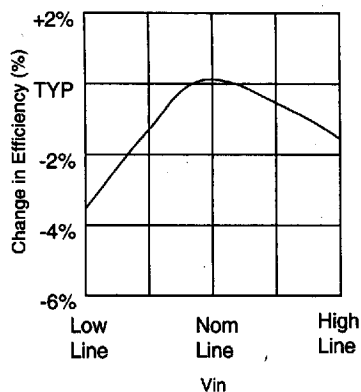
## MECHANICAL



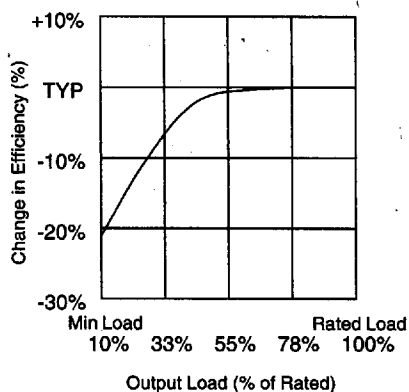
# TYPICAL PERFORMANCE CURVES

$T_A = +25^\circ\text{C}$ , nominal input voltage, rated load, recommended external components applied, unless otherwise specified.

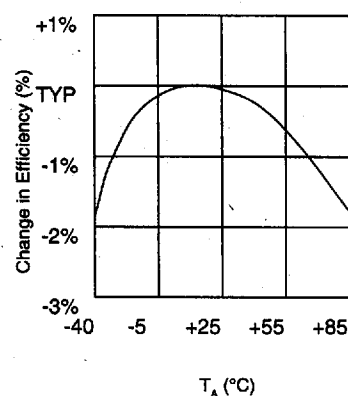
EFFICIENCY vs INPUT VOLTAGE



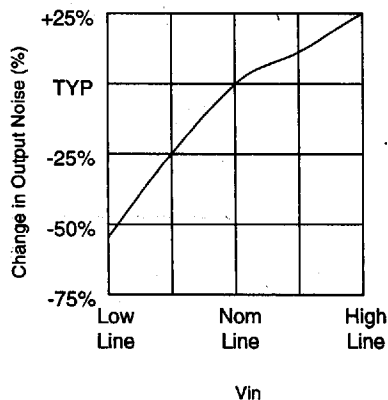
EFFICIENCY vs OUTPUT LOAD



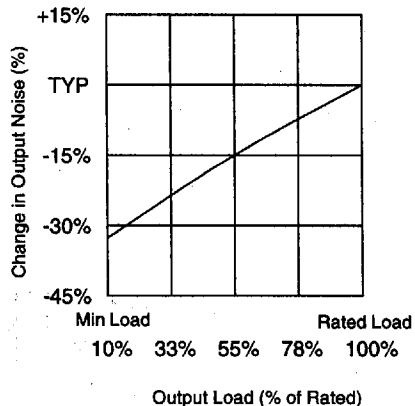
EFFICIENCY vs TEMPERATURE



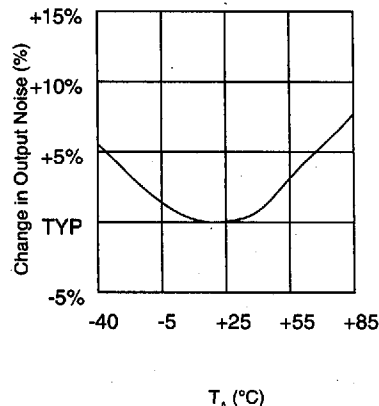
OUTPUT NOISE vs INPUT VOLTAGE



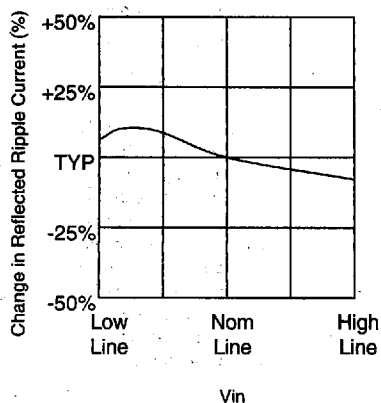
OUTPUT NOISE vs OUTPUT LOAD



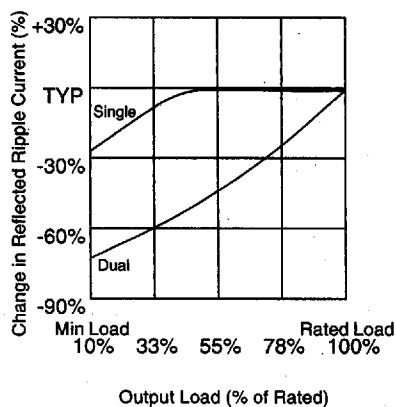
OUTPUT NOISE vs TEMPERATURE



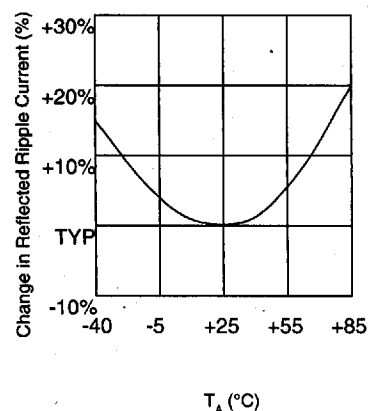
REFLECTED RIPPLE CURRENT vs INPUT VOLTAGE



REFLECTED RIPPLE CURRENT vs OUTPUT LOAD



REFLECTED RIPPLE CURRENT vs TEMPERATURE



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