



Features

- Wide 36-75V input range
- Fixed 96V, 100mA output
- Synchronous rectifier topology
- Efficiency to 89%
- -40 to +60°C ambient with no Derating
- Isolated to 1500 Volts
- Extensive current, voltage and temperature self-protection
- Standard 1" x 2" x 0.4" package and pinouts
- UL1950/EN60950 certification applied for

In DATEL's flagship 7-15 Watt 1" x 2" high reliability A-series, the new UWR-96/100-D48A DC/DC power converter offers a 96Vdc output from 48V input with very high efficiency (to 89%) and thermal performance. Natural convection operation is available up to +60°C and only a moderate forced 200 LFM airflow will deliver full rated power of 9.6 Watts up to +100°C.

Input voltages may be accepted from +36 to +75 Volts DC using +48 Volts DC as nominal. The output is +96 Volts DC at 100mA max. regulated to within ±0.5%. The UWR-96/100-D48A includes functional isolation between input and output of 1500 Volts DC, minimum, continuous rating.

Other outstanding features include 350mV peak-to-peak wideband output noise and only 15mA no-load input current. The design includes extensive self protection and protection for external circuits. Electromagnetic interference compliance is achieved with an efficient, low-noise design rather than through expensive metal shielding.

The UWR-96/100-D48A combines a high-frequency, high efficiency synchronous-rectifier topology with advanced components and fully-automated surface mount construction. Contemporary engineering design and state-of-the art manufacturing are complemented by DATEL's extensive computer-aided automatic test, vendor quality programs, life and stress certification and component screening systems.

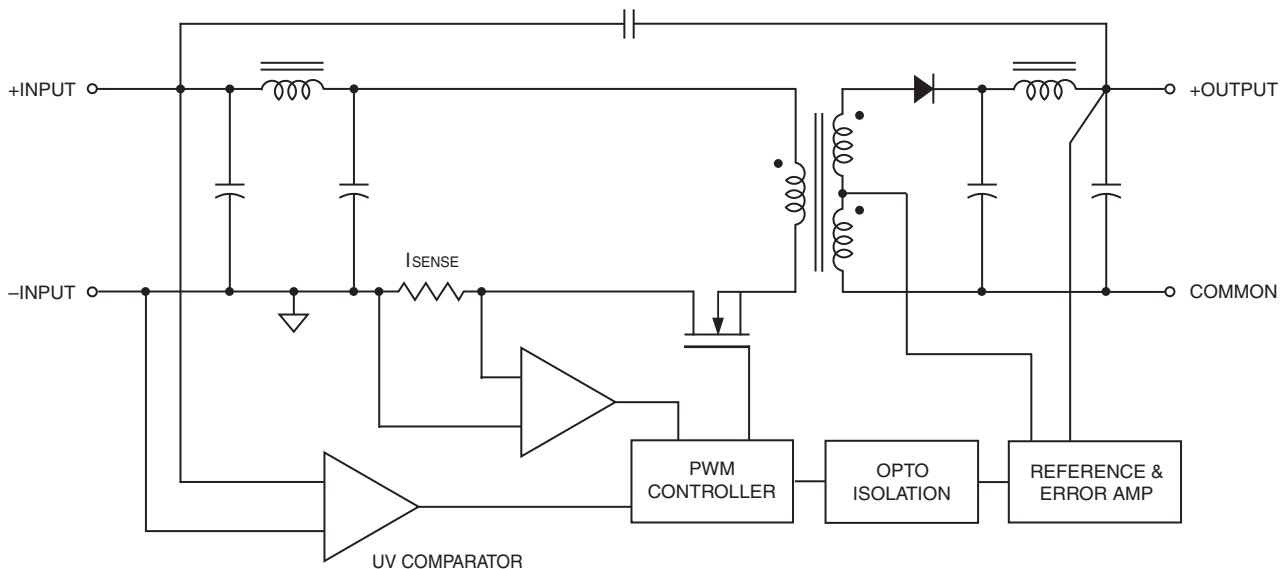


Figure 1. Simplified Schematic

Typical topology is shown



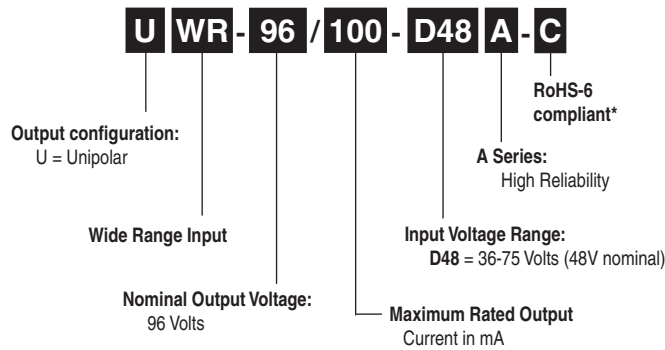
For full details go to www.murata-ps.com/rohs

Performance Specifications and Ordering Guide ^①

| Model | Output | | | | | | Input | | | Efficiency | | Package (Case/ Pinout) | |
|-----------------|--------------------------|-----------------------|---------------|--------------------------|------|-------------------------|-------|------------------------------|---------------|------------------------|------|------------------------|----------|
| | V _{OUT} (Volts) | I _{OUT} (mA) | Power (Watts) | R/N (mVp-p) ^② | | Regulation ^③ | | V _{IN} Nom. (Volts) | Range (Volts) | I _{IN} * (mA) | Min. | | Typ. |
| | | | | Typ. | Max. | Line | Load | | | | | | |
| UWR-96/100-D48A | 96 | 100 | 9.6 | 350 | 700 | ±0.5% | ±0.5% | 48 | 36-75 | 15/220 | 85% | 88% | C65, P68 |

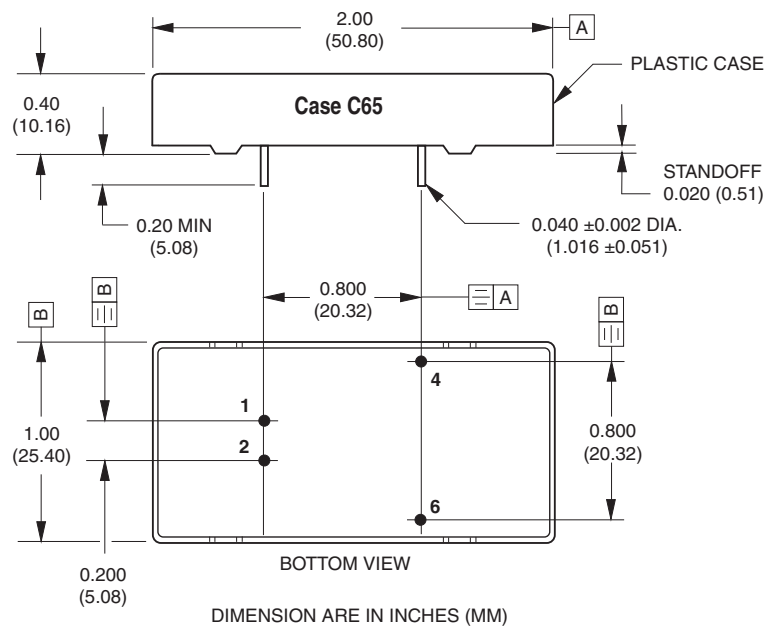
* Nominal line voltage, no load/full load conditions.

PART NUMBER STRUCTURE



* Contact C&D Technologies (Datel) for availability.

MECHANICAL SPECIFICATIONS



| I/O Connections | |
|-----------------|--------------|
| Pin | Function P68 |
| 1 | +Input |
| 2 | -Input |
| 3 | No Pin |
| 4 | +Output |
| 5 | No Pin |
| 6 | -Output |

Performance/Functional Specifications ⁽¹⁾

| Input | |
|--|--|
| Input Voltage Range | 36 to 75 Volts |
| Nominal Input Voltage | 48 Volts |
| Start-Up Threshold | 34.5 Volts |
| Undervoltage Shutdown | 34 Volts |
| Overvoltage Shutdown | None |
| Internal Input Filter Type | L-C |
| Reverse Polarity Protection | See fuse information |
| Input Current: | |
| Full Load Conditions | 220mA |
| Inrush Transient | 50A ² sec |
| Shutdown Mode (Off, UV, OT) | TBD |
| Output Short Circuit | 40mA |
| No Load | 15mA |
| Low Line (V _{in} =V _{min} .) | 300mA |
| Reflected (Back) Ripple Current ⁽²⁾ | TBD |
| Output | |
| Output Voltage | 96 Volts DC |
| Output Power | 9.7 Watts max. |
| Minimum Loading ⁽⁸⁾ | |
| Resistive | No minimum resistive load |
| Capacitive | 2.2µF min., 150 Volts |
| Maximum Capacitive Loading | 47µF, 150 Volts |
| Accuracy (50% load) | ±1 % of V _{nominal} |
| Output Trim | None. Unit is pre-trimmed. |
| Temperature Coefficient | ±0.02% of V _{OUT} range per °C |
| Ripple/Noise (20 MHz bandwidth) | See Ordering Guide |
| Line/Load Regulation | See Ordering Guide ⁽¹⁰⁾ |
| Efficiency | See Ordering Guide |
| Isolation | |
| Isolation Voltage, Input to Output | 1500Vdc, min., continuous |
| Safety Rating | Functional isolation |
| Isolation Resistance | 100MΩ |
| Isolation Capacitance | 1000 pF |
| Current Limit Inception (98% of V_{OUT}) | |
| Cold start | 145mA |
| After warm up | 135mA |
| Short Circuit Mode ⁽⁶⁾ | |
| Short Circuit Current Output | 150mA |
| Protection Method | Hiccup autorecovery upon overload removal ⁽⁵⁾ |
| Short Circuit Duration | Continuous, no damage (output shorted to ground) |
| Dynamic Characteristics | |
| Dynamic Load Response (50-75-50% load step) | 250µsec to ±2% of final value |
| Start-Up Time (V _{IN} on to V _{OUT} regulated) | 20msec for V _{OUT} = nominal |
| Switching Frequency | 280 ±20kHz |
| Environmental | |
| Calculated MTBF ⁽⁴⁾ | TBD |
| Operating Temperature Range (Ambient) | |
| No derating, natural convection, vertical mount | -40 to +60°C ⁽⁹⁾ |
| With derating | See Derating Curves |
| Operating Case Temperature | -40 to +100°C max. ⁽⁷⁾ |
| Storage Temperature Range | -55 to +125°C |
| Thermal Protection/Shutdown | NA |
| Relative Humidity | To 85% / 85°C |

Physical

| | |
|---|--|
| Outline Dimensions | See Mechanical Specifications |
| Case Material | Black diallyl phthalate plastic, UL94V-0 rated |
| Pin Diameter | 0.04 inches (1.01 mm) |
| Pin Material | Gold-plated copper alloy |
| Weight | 0.7 ounces (20 grams) |
| Electromagnetic Interference (conducted and radiated) | FCC part 15, class B, EN55022 (may need external filter) |
| Safety | UL/cUL 60950, CSA-C22.2 No.234 IEC/EN 60950 |

Performance/Functional Specification Notes:

- Specifications are typical at +25°C, V_{IN} = nominal, V_{OUT} = nominal, full load, external cap and natural convection unless otherwise indicated. "Nominal" input voltage is +48V. All models are tested and specified with an external 47µF low ESR electrolytic output capacitor. This capacitor is necessary to accommodate our test equipment and may not be required to achieve specified performance in your applications. All models are stable and regulate within spec with no resistive loads.
- Input Back Ripple Current is tested and specified over a 5Hz to 20MHz bandwidth. Input filtering is C_{BUS} (source) = 220µF tantalum (100V), L_{BUS IN} = 12µH, C_{IN} (at converter) = 22µF electrolytic.
- Note that Maximum Power Derating curves indicate an average current at nominal input voltage. At higher temperatures and/or lower airflow, the DC/DC converter will tolerate brief full current outputs if the total RMS current over time does not exceed the Derating curve.
- Mean Time Before Failure is calculated using the Telcordia (Belcore) SR-332 Method 1, Case 3, ground fixed conditions, T_{PCBOARD} = +25°C, full output load, natural air convection.
- After short circuit shutdown, if the load is partially removed such that the load still exceeds the overcurrent (OC) detection, the converter will remain in hiccup restart mode.
- Short circuit shutdown begins when the output voltage degrades approximately 2% from the selected setting.
- Maximum PC board temperature is measured with the sensor in the center.
- A minimum 2.2µF external capacitive load is REQUIRED for stable operation. Use low-ESR aluminum electrolytic capacitors with 150 Volt or greater rating. Use short leads and mount the capacitor close to the converter. DATEL uses a 47µF cap for some testing. Greater capacitance reduces noise but also slows dynamic response time.
- All models are fully operational and meet published specifications, including "cold start" at -40°C.
- Regulation specifications describe the deviation as the line input voltage or output load current is varied from a nominal midpoint value to either extreme.
- Other input or output voltage ranges are available under scheduled quantity special order.
- The Isolation voltage rating is a "minimum maximum." DATEL guarantees performance up to 1500Vdc (minimum) continuous rating with no damage. However, this is the maximum isolation voltage which should be applied.

Absolute Maximum Ratings

| | |
|---|--|
| Input Voltage (Continuous) | +75 Volts |
| Transient (100 mSec.) | +100 Volts |
| Input Reverse Polarity Protection | See Fuse section |
| Isolation Voltage | 1500Vdc, continuous min. ⁽¹²⁾ |
| Output Overvoltage | Do not apply reverse output current |
| Output Current | Current-limited. Devices can withstand sustained short circuit without damage. |
| Storage Temperature | -55 to +125°C |
| Lead Temperature (soldering 10sec max.) | +280°C |

Absolute maximums are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability. Proper operation under conditions other than those listed in the Performance/Functional Specifications Table is not implied nor recommended.

