



# Single Output UWR Models

High-Density, 2" x 1"  
6-10 Watt, DC/DC Converters

## Features

- Compact size:  
2" x 1" x 0.375"  
51mm x 25mm x 9.5mm
- Modern SMT-on-ceramic construction
- Power densities to 13.3W/in<sup>3</sup>
- 3.3, 5, 5.2, 12 or 15 Volt outputs
- Choice of 3 wide range inputs:  
4.7-7 Volts  
9-18 Volts  
18-72 Volts
- Industry-standard pinouts
- Guaranteed efficiencies to 82%
- Internal input/output filtering
- Low ripple/noise, superb line/load regulation
- Fully isolated (750Vdc min.) and protected
- -25 to +100°C operation, shielded cases
- UL 1950, CSA 22.2 No. 234 and IEC 950
- Modifications and customs for OEM's

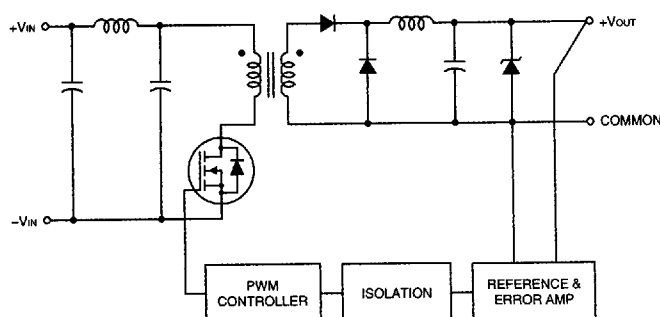
UWR Model 2" x 1" DC/DC converters are assembled in metal cases with SMT components on thick-film ceramic substrates and a thermally conductive potting compound. This integrated approach to thermal management, coupled with high-frequency (165kHz) current-mode topologies, yields efficient, compact, highly reliable power converters with prolonged MTBF's, power densities as high as 13.3W/in<sup>3</sup>, and output power as great as 10 Watts.

Offering true "plug-and-play" convenience, these converters contain internal input (pi type) and output filters and require no external components. They are completely isolated (750Vdc minimum), tightly regulated ( $\pm 0.2\%$  max. line,  $\pm 0.5\%$  max. load), and I/O protected. All devices incorporate input reverse-polarity protection and output current limiting.

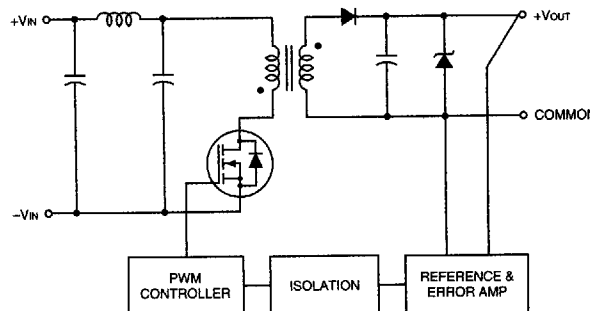
Output voltages are either 3.3, 5, 5.2, 12 or 15 Volts. Input voltage ranges are either 4.7-7V ("D5" models), 9-18V ("D12" models) or an ultra-wide 18-72V ("D48" models). Cases are 5-side metal shielded with non-conductive base plates. Transient response time is a quick 200 $\mu$ sec.

These extremely rugged modules are moisture and vibration resistant, and they operate over the full -25 to +100°C temperature range. For telecommunication, computer and other EMI-sensitive applications, each device offers full EMI/EMC characterization data.

The industry-standard pinouts of DATEL's UWR Model 6-10W DC/DC's makes them ideal replacements for other more costly, less reliable power converters. They are similarly excellent choices for original design-ins in systems demanding small size, low cost and high reliability.



"D5" and "D12" Models



"D48" Models

Figure 1. Simplified Schematics

### Performance Specifications and Ordering Guide ①

Model	Output					Input			Efficiency (Min.)	Package (Case, Pinout)
	V <sub>out</sub> (Volts)	I <sub>out</sub> (mA, Max.)	Ripple/Noise ② (mVp-p, Max.)	Regulation (Max.)		V <sub>in</sub> Nom. (Volts)	Range (Volts)	I <sub>in</sub> ④ (mA, Max.)		
UWR-3.3/1800-D5	3.3	1800	50	±0.2%	±1.0%	5	4.7-7	30/1770	69%	C2, P11
UWR-3.3/2500-D12	3.3	2500	50	±0.2%	±1.0%	12	9-18	30/958	74%	C2, P11
UWR-3.3/1800-D48	3.3	1800	75	±0.2%	±1.0%	48	18-72	25/177	72%	C2, P11
UWR-5/1600-D5	5	1600	100	±0.2%	±0.5%	5	4.7-7	50/2184	74%	C2, P11
UWR-5/2000-D12	5	2000	75	±0.2%	±0.5%	12	9-18	30/1059	80%	C2, P11
UWR-5/1800-D48	5	1800	75	±0.2%	±0.5%	48	18-72	25/245	77%	C2, P11
UWR-5.2/1500-D5	5.2	1500	100	±0.2%	±0.5%	5	4.7-7	50/2128	74%	C2, P11
UWR-12/665-D5	12	665	100	±0.2%	±0.5%	5	4.7-7	50/2178	74%	C2, P11
UWR-12/830-D12	12	830	100	±0.2%	±0.5%	12	9-18	75/1035	81%	C2, P11
UWR-12/750-D48	12	750	100	±0.2%	±0.5%	48	18-72	25/236	80%	C2, P11
UWR-15/530-D5	15	530	100	±0.2%	±0.5%	5	4.7-7	75/2170	74%	C2, P11
UWR-15/665-D12	15	665	100	±0.2%	±0.5%	12	9-18	75/1024	82%	C2, P11
UWR-15/600-D48	15	600	100	±0.2%	±0.5%	48	18-72	25/257	80%	C2, P11

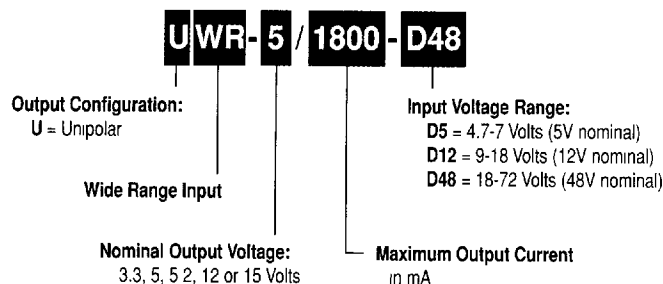
① Typical at T<sub>A</sub> = +25°C under nominal line voltage and full load conditions unless otherwise noted.

② 20MHz bandwidth

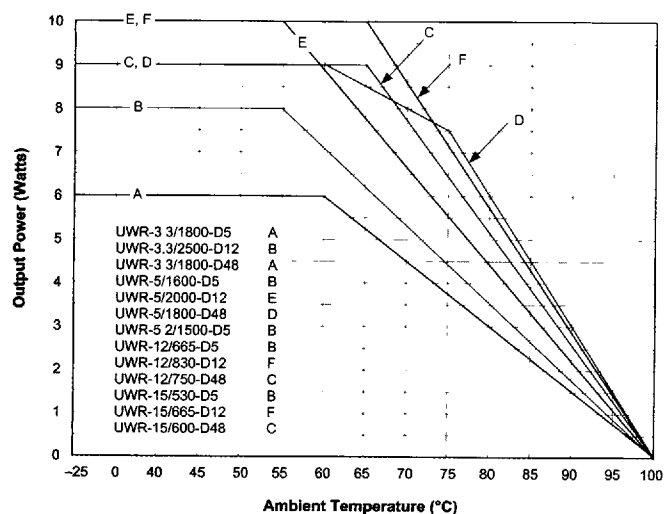
③ 10% to 100% load

④ Nominal line voltage, no load/full load conditions.

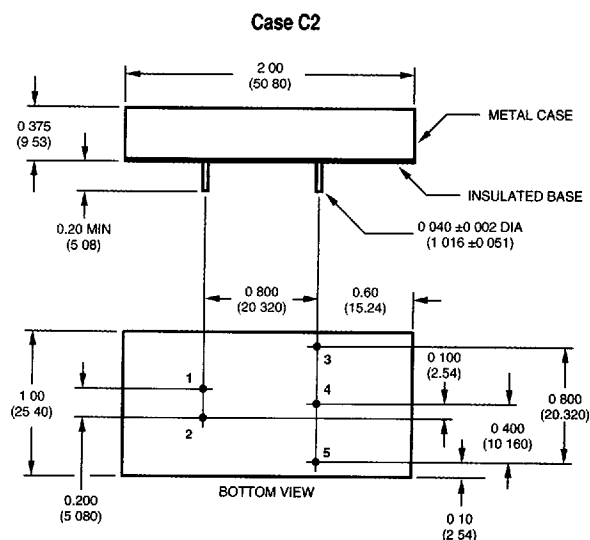
### Part Number Structure



### Temperature Derating



### Mechanical Specifications



### I/O Connections

Pin	Function P11
1	+Input
2	-Input
3	+Output
4	No Pin
5	Common

### Notes:

For "D5" and "D12" models, the case is connected to pin 2 (-V<sub>in</sub>).

For "D48" models, the case is connected to pin 1 (+V<sub>in</sub>).

## Performance/Functional Specifications

Typical @ T<sub>A</sub> = +25°C under nominal line voltage and full load conditions unless noted ①

Input	
<b>Input Voltage Range:</b>	
"D5" Models	4.7-7 Volts (5V nominal)
"D12" Models	9-18 Volts (12V nominal)
"D48" Models	18-72 Volts (48V nominal)
<b>Input Current</b>	See Ordering Guide
<b>Input Filter Type ②</b>	Pi
<b>Reverse-Polarity Protection</b>	Yes (Instantaneous, 6A maximum)
Output	
<b>V<sub>OUT</sub> Accuracy (50% load)</b>	±1%, maximum
<b>Temperature Coefficient</b>	±0.02% per °C
<b>Ripple/Noise (20MHz BW) ②</b>	See Ordering Guide
<b>Line/Load Regulation</b>	See Ordering Guide
<b>Efficiency</b>	See Ordering Guide
<b>Isolation Voltage ③</b>	750Vdc, minimum
<b>Isolation Capacitance</b>	250pF
<b>Current Limiting</b>	Auto-recovery
<b>Overvoltage Protection</b>	Clamp, 2W transorb
Dynamic Characteristics	
<b>Transient Response (50% load step)</b>	200µsec max. to ±1.5% of final value
<b>Switching Frequency</b>	165kHz (±15kHz)
Environmental	
<b>Operating Temperature (ambient): ④</b>	
Without Derating	-25 to +55/60/65°C (model dependent)
With Derating	to +100°C (See Derating Curves)
<b>Storage Temperature</b>	-55 to +125°C
Physical	
<b>Dimensions</b>	2" x 1" x 0.375" (51 x 25 x 9.5mm)
<b>Shielding</b>	5-sided ⑤
<b>Case Connection:</b>	
"D5" and "D12" Models	Pin 2 (-V <sub>IN</sub> )
"D48" Models	Pin 1 (+V <sub>IN</sub> )
<b>Case Material</b>	Corrosion resistant steel with epoxy-based enamel finish
<b>Pin Material</b>	Brass, solder coated
<b>Weight</b>	1.3 ounces (37 grams)

① These power converters require a minimum 10% loading to maintain specified regulation. Operation under no-load conditions will not damage these devices, however, they may not meet all listed specifications.

② Application-specific internal input/output filtering can be added upon request. Contact DATEL for details.

③ Guaranteed isolation voltage for models UWR-3.3/1800-D5 and UWR-3.3/2500-D12 is 500Vdc minimum. Any model can be screened for guaranteed isolation voltage greater than its listed specification.

④ Devices can be screened for -40°C operation. Contact DATEL for details.

⑤ Cases can be provided with 6-sided shielding. Contact DATEL for details.

## Absolute Maximum Ratings

These 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. Storage temperatures have been verified for 168 hours.

<b>Input Voltage:</b>	
"D5" Models	10 Volts
"D12" Models	20 Volts
"D48" Models	80 Volts
<b>Input Reverse-Polarity Protection</b>	Current must be <6A. Brief duration. Fusing recommended.
<b>Output Overvoltage Protection</b>	
3.3V Outputs	No protection
5/5.2V Outputs	6.8 Volts, limited duration
12V Outputs	15 Volts, limited duration
15V Outputs	18 Volts, limited duration
<b>Output Current</b>	Current limited. Max. current and short-circuit duration model dependent.
<b>Storage Temperature</b>	-55 to +125°C
<b>Lead Temperature (soldering, 10sec.)</b>	+300°C

## Technical Notes

## Floating Outputs

All outputs are floating. Users may ground either the Common (pin 5) for normal usage or the positive side (+Output, pin 3) to effectively reverse the output polarity.

## Filtering and Noise Reduction

All UWR 6-10 Watt DC/DC Converters achieve their rated ripple and noise specifications without the use of external input/output capacitors. In critical applications, input/output ripple and noise may be further reduced by installing electrolytic capacitors across the input terminals and/or low-ESR tantalum or electrolytic capacitors across the output terminals. The caps should be located as close to the power converters as possible. Typical values are listed in the tables below. In most applications, using values greater than those listed will yield better results.

## To Reduce Input Ripple

"D5" Models	47µF, 10V
"D12" Models	20µF, 35V
"D48" Models	10µF, 100V

## To Reduce Output Ripple

3.3V Outputs	100µF, 6V, Low ESR
5/5.2V Outputs	47µF, 10V, Low ESR
12/15V Outputs	22µF, 20V, Low ESR

In critical, space-sensitive applications, DATEL can easily tailor the internal input/output filtering of these devices to meet your specific requirements. Contact DATEL for additional details.

### Input Fusing

Certain applications and/or safety agencies may require the installation of fuses at the inputs of power conversion components. For DATEL UWR 6-10 Watt DC/DC Converters, you should use slow-blow type fuses with values no greater than the following:

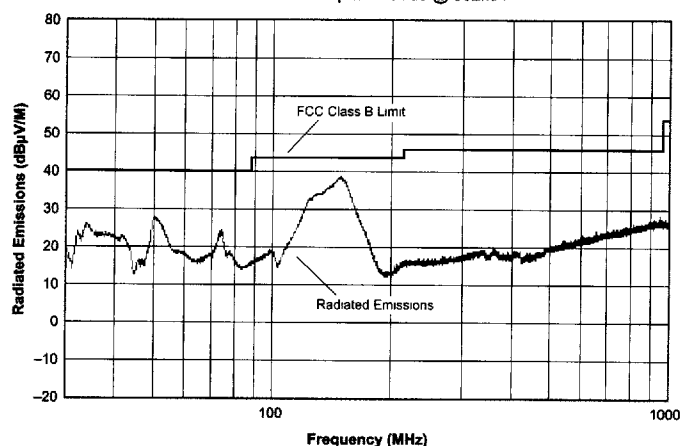
V <sub>IN</sub> Range	Fuse Value
"D5"	3A
"D12"	2A
"D48"	1A

### EMI Radiated Emissions

If you're designing with EMC in mind, please note that all of DATEL's UWR 6-10 Watt DC/DC Converters have been characterized for radiated and conducted emissions in our new EMI/EMC laboratory. Testing is conducted in an EMCO 5305 GTEM test cell utilizing EMCO automated EMC test software. Radiated emissions are tested to the limits of FCC Part 15, Class B and CISPR 22 (EN 55022), Class B. Correlation to other specifications can be supplied upon request. Radiated emissions plots to FCC and CISPR 22 for model UWR-15/665-D12 appear below. Published EMC test reports are available for each model number. Contact DATEL's Applications Engineering Department for more details.

#### UWR-15/665-D12 Radiated Emissions

FCC Part 15 Class B, 3 Meters  
Converter Output = 15Vdc @ 532mA



#### UWR-15/665-D12 Radiated Emissions

EN 55022 Class B, 10 Meters  
Converter Output = 15Vdc @ 532mA

