



## Single Output UWP Models

DIP-Packaged, Standard-Pinout  
3 Watt, DC/DC Converters

### Features

- Low cost! High quality!
- Highly reliable, 100% SMT construction
- Standard DIP package and pinout
- No external components required
- 5, 12 or 15 Volt outputs
- Choice of 3 wide input ranges:
  - 4.5-9 Volts
  - 9-18 Volts
  - 18-72 Volts
- Guaranteed efficiencies to 73%
- Fully isolated, 500Vdc guaranteed
- Internal input/output filtering
- Output current limiting
- -40 to +75°C operation with no derating
- UL1950/C22.2 No. 950/IEC950 certified
- Modifications and customs for OEM's

The proven cost-effectiveness, quality and long-term reliability that has come to define DATEL's standard, 3W, single-output, DIP-packaged DC/DC converters (see UST 3W Models) is now available in the "other standard pinout" (see next page) made popular by off-shore suppliers. These newly designed UWP Models exploit totally automated SMT assembly techniques and do not contain any trim pots, "wet" aluminum electrolytic capacitors, or manually soldered "flying" leads. Their made-in-the-USA quality and affordable pricing are rapidly making them the converters of choice in many existing applications.

UWP DC/DC converters bring true component-like convenience to designers of modern distributed power systems. Exploiting an efficient, high-frequency (170-200kHz), flyback topology and high-density SMT assembly techniques, UWP DC/DC's have enough space to include input (pi type) and output filters within their package. They are fully isolated (500Vdc guaranteed) and do not require any external components to meet published specifications. They operate, without derating, over the full -40 to +75°C temperature range.

Output voltages are either 5, 12 or 15 Volts. Input voltage ranges are either 4.5-9V ("D5" models), 9-18V ("D12" models) or an ultra-wide 18-72V ("D48" models). Output transient response time is a quick 200µsec, and output ripple and noise are typically 75mVp-p. All models are certified to UL1950, CSA 22.2 No. 950 and IEC950. Full EMI/EMC characterizations are currently in progress.

DATEL's UWP Model 3W DC/DC's are ideal replacements for other more costly, less reliable power converters as well as excellent choices for new design-ins in systems demanding small size, low cost and high reliability.

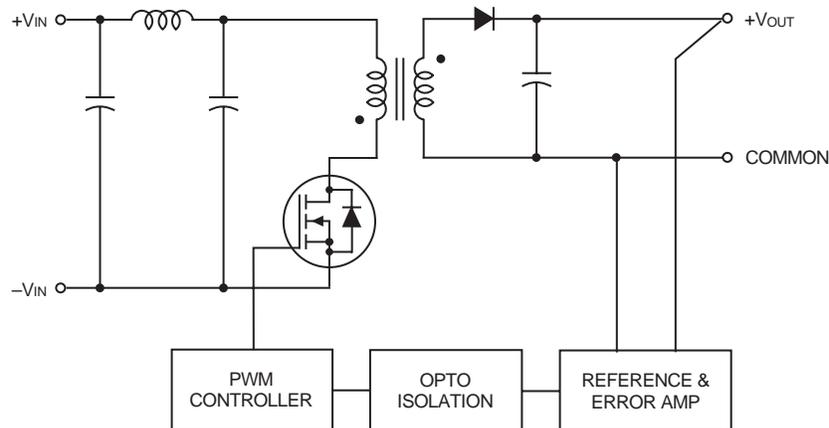


Figure 1. Simplified Schematic

**Performance Specifications and Ordering Guide** ①

Model	Output						Input			Efficiency		Package (Case, Pinout)
	V <sub>OUT</sub> (Volts)	I <sub>OUT</sub> (mA, Max.)	R/N (mVp-p) ②		Regulation (Max.) ③		V <sub>IN</sub> Nom. (Volts)	Range (Volts)	I <sub>IN</sub> ④ (mA)	Min.	Typ.	
			Typ.	Max.	Line	Load						
UWP-5/500-D5	5	500	75	120	±0.2%	±0.5%	5	4.5-9	18/676	72%	74%	C1A, P19
UWP-5/500-D12	5	500	75	120	±0.2%	±0.5%	12	9-18	25/278	71%	75%	C1A, P19
UWP-5/500-D48	5	500	75	120	±0.2%	±0.5%	48	18-72	7/69	71%	75%	C1A, P19
UWP-12/250-D5	12	250	75	150	±0.5%	±0.5%	5	4.5-9	30/800	73%	75%	C1A, P19
UWP-12/250-D12	12	250	75	150	±0.5%	±0.5%	12	9-18	25/338	72%	74%	C1A, P19
UWP-12/250-D48	12	250	75	150	±0.5%	±0.5%	48	18-72	8/81	73%	77%	C1A, P19
UWP-15/200-D5	15	200	75	150	±0.5%	±0.5%	5	4.5-9	30/800	73%	75%	C1A, P19
UWP-15/200-D12	15	200	75	150	±0.5%	±0.5%	12	9-18	25/338	72%	74%	C1A, P19
UWP-15/200-D48	15	200	75	150	±0.5%	±0.5%	48	18-72	8/81	73%	77%	C1A, P19

- ① Typical at T<sub>A</sub> = +25°C under nominal line voltage and full-load conditions unless otherwise noted.
- ② Ripple/Noise (R/N) measured over a 20MHz bandwidth.
- ③ 10% to 100% load.
- ④ Nominal line voltage, no-load/full-load conditions.

**PART NUMBER STRUCTURE**

**UWP-5/500-D48**

Output Configuration:  
U = Unipolar

Wide Range Input  
Alternate pinout

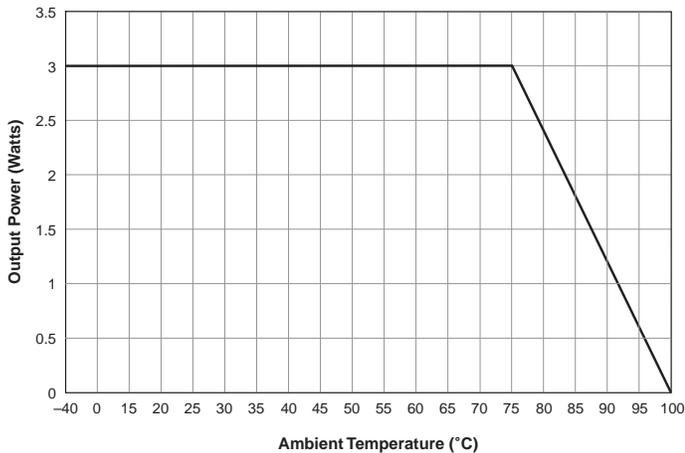
Nominal Output Voltage:  
5, 12 or 15 Volts

Input Voltage Range:  
D5 = 4.5-9 Volts (5V nominal)  
D12 = 9-18 Volts (12V nominal)  
D48 = 18-72 Volts (48V nominal)

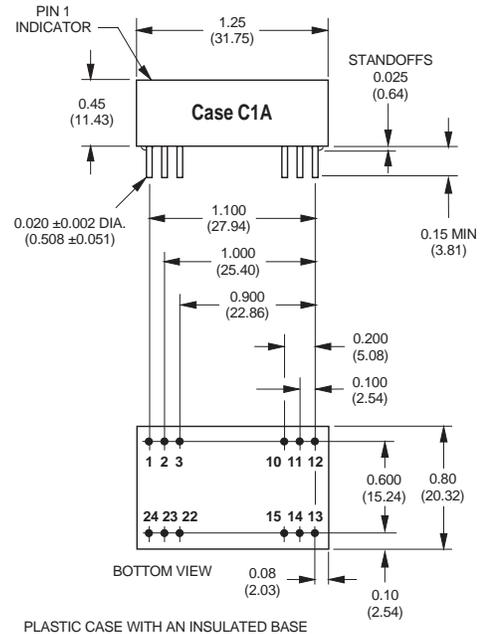
Maximum Output Current  
in mA

**TEMPERATURE DERATING**

**Output Power vs. Ambient Temperature**  
V<sub>IN</sub> Nominal, Natural Convection



**MECHANICAL SPECIFICATIONS**



I/O Connections			
Pin	Function P19	Pin	Function P19
1	+Input	13	-Input
2	N.C.	14	+Output
3	N.C.	15	-Output
10	-Output	22	N.C.
11	+Output	23	N.C.
12	-Input	24	+Input

Performance/Functional Specifications

Typical @ TA = +25°C under nominal line voltage and full-load conditions, unless noted. ①

Input	
<b>Input Voltage Range:</b>	
"D5" Models	4.5-9 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, 2A maximum)
Output	
<b>Vout 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>	500Vdc, minimum
<b>Current Limiting:</b>	
"D5" Models	Power-limiting technique, auto-recovery
"D12" and "D48" Models	Hiccup technique, auto-recovery
Dynamic Characteristics	
<b>Transient Response (50% load step)</b>	200µsec to ±1.5% of final value
<b>Switching Frequency:</b>	
"D48" Models	200kHz
"D5" and "D12" Models	170kHz
Environmental	
<b>Operating Temperature (Ambient, no derating)</b>	-40 to +75°C
<b>Storage Temperature</b>	-40 to +100°C
Physical	
<b>Dimensions</b>	1.25" x 0.8" x 0.45" (31.8 x 20.3 x 11.4mm)
<b>Case Material</b>	Diallyl phthalate, UL94V-0-rated
<b>Pin Material</b>	Brass, solder coated
<b>Weight</b>	0.5 ounces (14.2 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 recommended and perhaps added internally upon request. Contact DATEL Applications Engineering for details.
- ③ Devices can be screened or modified for higher guaranteed isolation voltages. Contact DATEL Applications Engineering for details or see DATEL's UST 3W DC/DC's for guaranteed 1000Vdc isolation.

Absolute Maximum Ratings	
<b>Input Voltage:</b>	
"D5" Models	12 Volts
"D12" Models	20 Volts
"D48" Models	80 Volts
<b>Input Reverse-Polarity Protection</b>	Current must be <2A. Brief duration only. Fusing recommended.
<b>Output Overvoltage Protection</b>	None
<b>Output Current</b>	Current limited. Max. current and short-circuit duration are model dependent. "D12" and "D48" models can withstand sustained output short circuits.
<b>Storage Temperature</b>	-40 to +100°C
<b>Lead Temperature (soldering, 10 sec.)</b>	+300°C
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.	

TECHNICAL NOTES

Floating Outputs

Since these are isolated DC/DC converters, their outputs are "floating." Users may ground either the negative side (-Output, pins 10 and 15) for normal usage or the positive side (+Output, pins 11 and 14) to effectively reverse the output polarity.

Filtering and Noise Reduction

All UWP 3 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 many applications, using values greater than those listed will yield better results.

To Reduce Input Ripple

"D5" Models	47µF, 15V
"D12" Models	10µF, 35V
"D48" Models	4.7µF, 100V

To Reduce Output Ripple

5V Outputs	47µF, 10V, Low ESR
12/15V Outputs	22µF, 20V, Low ESR

In critical, space-sensitive applications, DATEL may be able to tailor the internal input/output filtering of these units to meet your specific requirements. Contact our Applications Engineering Group 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 UWP 3 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"	1.5A
"D12"	1A
"D48"	0.5A

**CUSTOM CAPABILITIES**

DATEL's world-class design, development and manufacturing team stands ready to work with you to deliver the exact power converter you need for your demanding, large volume, OEM applications. And ... we'll do it on time and within budget!

Our experienced applications and design staffs; quick-turn prototype capability; highly automated, SMT assembly facilities; and in-line SPC quality-control techniques combine to give us the unique ability to design and deliver any quantity of power converters to the highest standards of quality and reliability.

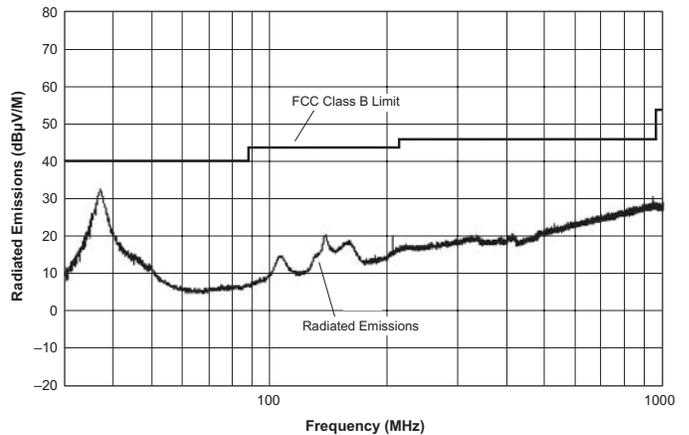
We have compiled a large library of DC/DC designs that are currently used in a variety of telecom, medical, computer, railway, aerospace and industrial applications. We may already have the converter you need.

Contact us. Our goal is to provide you the highest-quality, most cost-effective power converters available.

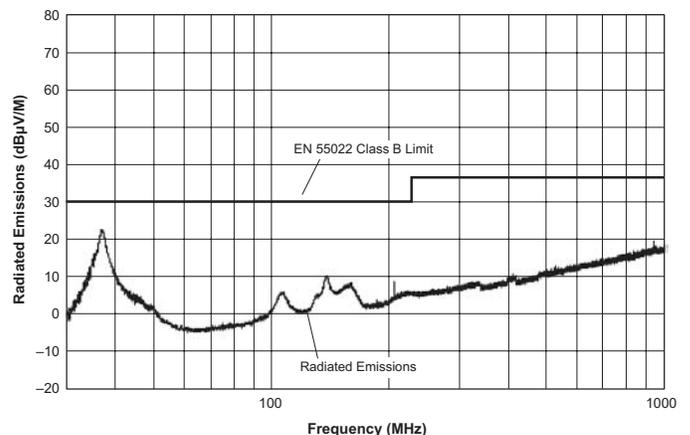
**EMI RADIATED EMISSIONS**

If you're designing with EMC in mind, please note that all of DATEL's UWP 3 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 UWP-15/200-D5 appear below. Published EMC test reports are available for each model number. Contact DATEL's Applications Engineering Department for more details.

**UWP-15/200-D5 Radiated Emissions  
FCC Part 15 Class B, 3 Meters  
Converter Output = +15Vdc @ +180mA**



**UWP-15/200-D5 Radiated Emissions  
EN 55022 Class B, 10 Meters  
Converter Output = +15Vdc @ +180mA**



ISO 9001 REGISTERED

DS-0405 6/01

DATEL, Inc. 11 Cabot Boulevard, Mansfield, MA 02048-1151  
Tel: (508) 339-3000 (800) 233-2765 Fax: (508) 339-6356  
Internet: www.datel.com Email: sales@datel.com  
Data Sheet Fax Back: (508) 261-2857

DATEL (UK) LTD. Tadley, England Tel: (01256)-880444  
DATEL S.A.R.L. Montigny Le Bretonneux, France Tel: 01-34-60-01-01  
DATEL GmbH München, Germany Tel: 89-544334-0  
DATEL KK Tokyo, Japan Tel: 3-3779-1031, Osaka Tel: 6-354-2025

DATEL makes no representation that the use of its products in the circuits described herein, or the use of other technical information contained herein, will not infringe upon existing or future patent rights. The descriptions contained herein do not imply the granting of licenses to make, use, or sell equipment constructed in accordance therewith. Specifications are subject to change without notice. The DATEL logo is a registered DATEL, Inc. trademark.