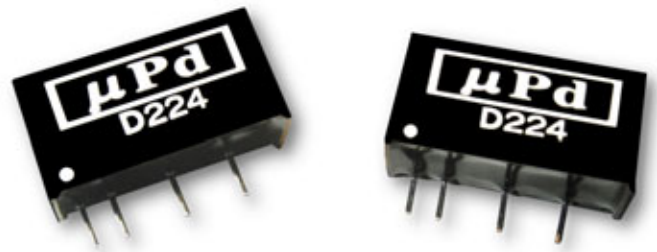


# D200 Series

## Single & Dual Output Miniature, 2W SIP DC/DC Converters



### Key Features:

- 2W Output Power
- Miniature SIP Case
- Single & Dual Outputs
- 1,000 VDC Isolation
- >2 MHour MTBF
- 28 Standard Models
- Industry Standard Pin-Out

### Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

#### Input

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range	5 VDC Input	4.5	5.0	5.5	VDC
	12 VDC Input	10.8	12.0	13.2	
	24 VDC Input	21.6	24.0	26.4	
	48 VDC Input	43.2	48.0	52.8	
Input Filter	Internal Capacitor				
Reverse Polarity Input Current				0.3	A

#### Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±1.0	±3.0	%
Output Voltage Balance	Dual Output , Balanced Loads			±1.0	%
Line Regulation	For Vin Change of 1%		±1.2		%
Load Regulation	See Model Selection Guide				
Ripple & Noise (20 MHz)				75	mV P - P
Output Power Protection		120			%
Temperature Coefficient				±0.02	%/°C
Output Short Circuit	Momentary (0.5 Sec.)				

#### General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 Seconds	1,000			VDC
Isolation Resistance	500 VDC	1,000			MΩ
Isolation Capacitance	100 kHz, 1V		60		pF
Switching Frequency			125		kHz

#### Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Operating Temperature Range	Case			+100	°C
Storage Temperature Range		-40		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

#### Physical

Case Size (5V, 12V & 24V Input Models)	0.76 x 0.24 x 0.37 Inches (19.5 x 6.0 x 9.5 mm)				
Case Size (48V Input Models)	0.76 x 0.28 x 0.37 Inches (19.5 x 7.2 x 9.5 mm)				
Case Material	Non-Conductive Black Plastic (UL94-V0)				
Weight	0.09 Oz (2.7g)				

#### Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	2.0			MHours

#### Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	5 VDC Input	-0.7		9.0	VDC
	12 VDC Input	-0.7		18.0	
	24 VDC Input	-0.7		30.0	
	48 VDC Input	-0.7		55.0	
Lead Temperature	1.5 mm From Case For 10 Sec			260	°C
Internal Power Dissipation	All Models			650	mW

**Caution:** Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

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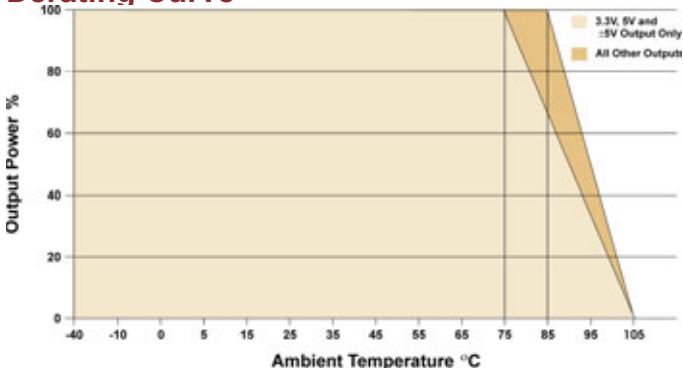
## Model Selection Guide

Model Number	Input				Output			Load Regulation (% Max)	Efficiency (% Typ)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)			
	Nominal	Range	Full-Load	No-Load						
D201	5	4.5 - 5.5	533	35	3.3	400.0	10.0	12	75	1,000
D202	5	4.5 - 5.5	513	35	5.0	400.0	8.0	12	78	1,000
D203	5	4.5 - 5.5	495	35	12.0	165.0	3.0	8	80	1,000
D204	5	4.5 - 5.5	499	35	15.0	133.0	2.5	8	80	1,000
D205	5	4.5 - 5.5	533	35	±5.0	±200.0	±4.0	12	75	1,000
D206	5	4.5 - 5.5	504	35	±12.0	±83.0	±1.5	8	79	1,000
D207	5	4.5 - 5.5	501	35	±15.0	±66.0	±1.0	8	79	1,000
D211	12	10.8 - 13.2	204	25	3.3	400.0	10.0	8	67	500
D212	12	10.8 - 13.2	212	25	5.0	400.0	8.0	8	78	500
D213	12	10.8 - 13.2	196	25	12.0	165.0	3.0	8	85	500
D214	12	10.8 - 13.2	200	25	15.0	133.0	2.5	8	83	500
D215	12	10.8 - 13.2	216	25	±5.0	±200.0	±4.0	8	77	500
D216	12	10.8 - 13.2	201	25	±12.0	±83.0	±1.5	8	82	500
D217	12	10.8 - 13.2	200	25	±15.0	±66.0	±1.0	8	82	500
D221	24	21.6 - 26.4	92	10	3.3	400.0	10.0	8	74	200
D222	24	21.6 - 26.4	108	10	5.0	400.0	8.0	8	77	200
D223	24	21.6 - 26.4	101	10	12.0	165.0	3.0	8	81	200
D224	24	21.6 - 26.4	101	10	15.0	133.0	2.5	8	82	200
D225	24	21.6 - 26.4	108	10	±5.0	±200.0	±4.0	8	77	200
D226	24	21.6 - 26.4	102	10	±12.0	±83.0	±1.5	8	81	200
D227	24	21.6 - 26.4	99	10	±15.0	±66.0	±1.0	8	84	200
D231	48	43.2 - 52.8	59	10	3.3	400.0	10.0	8	70	100
D232	48	43.2 - 52.8	54	10	5.0	400.0	8.0	8	77	100
D233	48	43.2 - 52.8	51	10	12.0	165.0	3.0	8	81	100
D234	48	43.2 - 52.8	50	10	15.0	133.0	2.5	8	82	100
D235	48	43.2 - 52.8	54	10	±5.0	±200.0	±4.0	8	76	100
D236	48	43.2 - 52.8	51	10	±12.0	±83.0	±1.5	8	81	100
D237	48	43.2 - 52.8	50	10	±15.0	±66.0	±1.0	8	82	100

### Notes:

- Output load regulation is specified for a load change of 20% to 100%.
- When measuring output ripple, it is recommended that an external ceramic capacitor (approx 10  $\mu\text{F}$ ) be placed from the +Vout pin to the -Vout pin for single output units and from each output to common for dual output units.
- All 3.3, 5 and  $\pm 5$  VDC output models may be operated to +85°C ambient with an unobstructed airflow of 3.6 ft/S (1.1 m/S).
- The 5V, 12V and 24V input units do not require external components to operate, but the use of an input capacitor (10  $\mu\text{F}$ ) may enhance performance in some applications. An output capacitor (1.0  $\mu\text{F}$  to 10  $\mu\text{F}$ ) may be used to reduce ripple. The 48V input models require an input capacitor of 4.7  $\mu\text{F}$  to 47  $\mu\text{F}$  (dependent upon the application).
- Dual output units may be connected to provide a 10V, 24V or 30 VDC output. To do this, connect the load across the positive (+Vout) and negative (-Vout) outputs and float the output common.
- It is recommended that a fuse be used on the input of a power supply for protection. See the table above for the correct rating.

### Derating Curve



### Capacitive Load

Single Output  
( $\mu\text{F}$  Max)

470

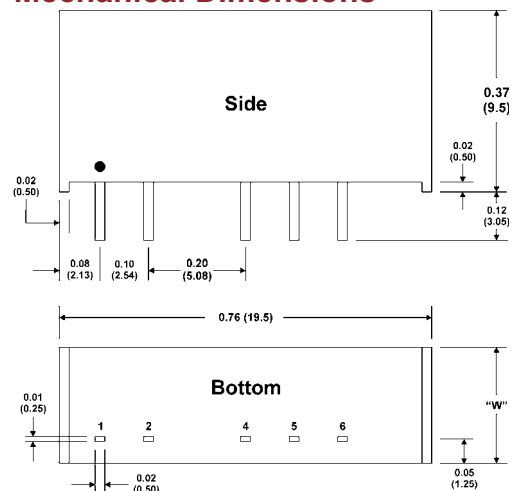
Dual Output  
( $\mu\text{F}$  Max)

±390

### Pin Connections

Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	No Pin	Common
6	+Vout	+Vout

### Mechanical Dimensions



- Notes:** All dimensions are typical in inches (mm)  
Tolerance x.xx =  $\pm 0.01$  ( $\pm 0.25$ )  
Pin 1 is marked by a "dot" or indentation on the side of the unit  
For 5V, 12V & 24V input models, "W" = 0.24 in (6.0 mm)  
For 48V input models, "W" = 0.28 in (7.2 mm)



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