



# 500 series

## Single & Dual Output DC/DC Converter



### DESCRIPTIONS

The 500 series is a family of compact, high performance, low noise 5W DC/DC converters. High performance features include 1000 VDC input/output isolation, continuous short circuit protection with automatic restart and a maximum line/load regulation of only  $\pm 0.03\%$ . Thirty-six models operate from power busses of 5, 12, 18, 24, 28 or 48 VDC and provide single or dual output of 5, 12, 15,  $\pm 5$ ,  $\pm 12$  or  $\pm 15$  VDC. Standard features include an internal Pi filter to reduce reflected ripple current, efficiency as high as 82% and low noise operation (20 mV Pk-Pk).

### OUTPUT CHARACTERISTICS

	Min	Typ	Max	Unit/Comments
Output Voltage Set Point	$\pm 0.5$	$\pm 1.0$		% Output voltage at nominal line & FL
Output Voltage Balance			$\pm 50$	mV; Equal Output Loads
Line Regulation	$\pm 0.01$	$\pm 0.03$		% Output voltage measured from min. input line to maximum
Load Regulation	$\pm 0.01$	$\pm 0.03$		% Output voltage measured from FL to 10% load
Ripple/Noise			20	mV p-p, Nom.Line @FL, 20MHz B.W., using 1 $\mu$ f bypass capacitor
Short Circuit Protection				Limited, Automatic Recovery
Transient Response Deviation			$\pm 5$	% deviation of Vout for a 25% load change
Transient Recovery Time			50	$\mu$ S for 25% load change, to within 1%
Temperature Coefficient			$\pm 0.02$	% per $^{\circ}$ C

### FEATURES

- Low Output Noise/Ripple
- $-40^{\circ}$ C to  $+75^{\circ}$ C Operating Temperature Range
- $\pm 0.03\%$  Line/Load Regulation
- Full Input/Output Protection
- UL1950, CSA 22.2-950, VDE/EN 60950 Approved
- $>1,000,000$  Hours MTBF

### INPUT CHARACTERISTICS

	Min	Typ	Max	Unit/Comments
Input Voltage				
5 VDC Input Models	4.65	5	5.25	VDC
12 VDC Input Models	10.9	12	13.2	VDC
18 VDC Input Models	16.4	18	19.8	VDC
24 VDC Input Models	21.6	24	26.4	VDC
28 VDC Input Models	25.2	28	30.8	VDC
48 VDC Input Models	43.2	48	52.8	VDC
Input Fuse Requirements				
5 VDC Input Models		2000		mA; Slow blow type
12 VDC Input Models		1000		mA; Slow blow type
18 VDC Input Models		750		mA; Slow blow type
24 VDC Input Models		500		mA; Slow blow type
28 VDC Input Models		350		mA; Slow blow type
48 VDC Input Models		200		mA; Slow blow type
Reverse Polarity Input Current			5	Amp
Input Filter				Pi Filter

### GENERAL CHARACTERISTICS

	Min	Typ	Max	Unit/Comments
Switching Frequency		150		kHz
Isolation Voltage	1000			VDC, 1 minute
Isolation Resistance	1000			Mohm, 500VDC
Isolation Capacitance		70		pF, 100kHz, 1Volt
MTBF (MIL-HBK-217F)	1			Million Hours, $+25^{\circ}$ C, Ground Benign



### ENVIRONMENTAL SPECIFICATIONS

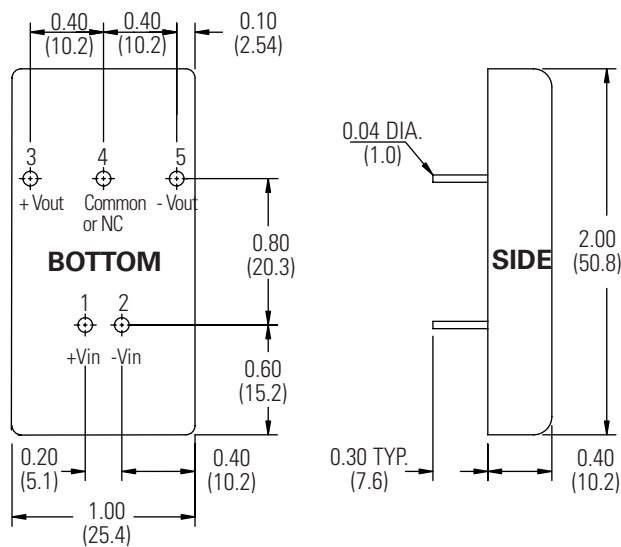
	Min	Typ	Max	Unit/Comments
Operating Temp. Range	-40		+75	°C; Ambient
Storage Temp. Range	-50		+125	°C
Relative Humidity			+95	% Humidity; non-condensing
Cooling				Free-Air Convection

### PHYSICAL CHARACTERISTICS

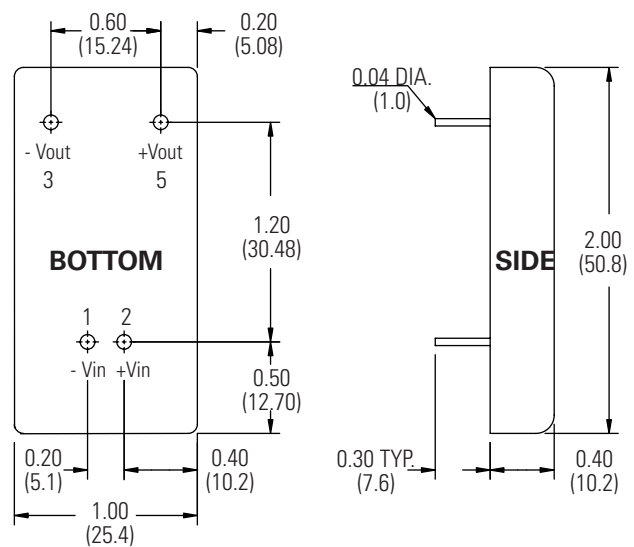
	Unit/Comments
Case Size	1.0 X 2.0 X 0.40 inches (25.5 X 51.0 X 10.2 mm)
Case Material	Painted Metal with Non-Conductive Base
Shield Connection	
Single Output	Negative Output Pin
Dual Output	Common Output Pin
Flammability	UL94V-0
Weight	39.25 Grams

### OUTLINE DRAWING

CASE "D"



CASE "D1" (OPTIONAL)



### PIN OUT CHART - CASE "D"

Pins	Single	Dual
1	+ Vin	+ Vin
2	- Vin	- Vin
3	+ Vout	+ Vout
4	NC	Common
5	- Vout	- Vout

NC = No Connection

### PIN OUT CHART - CASE "D1" (OPTIONAL)

Pins	Single
1	- Vin
2	+ Vin
3	- Vout
5	+ Vout

#### Notes:

1. Unless otherwise specified dimensions are in inches (mm).

Tolerances	Inches	mm
	X.XX = ±0.02	X.X = ±0.5
	X.XXX = ±0.010	X.XX = ±0.25

2. Case D pinning is standard. Case D model numbers do not require suffixing.

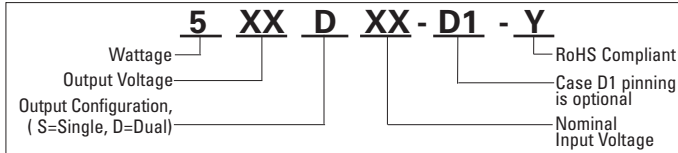
3. Case D1 pinning is optional. Case D1 model numbers must be suffixed with "D1". Example: 505S48-D1

All specifications are typical at nominal input, nominal load and 25° C unless otherwise specified.  
 External, low ESR, 10 microfarad (minimum) capacitor across output is recommended for operation.



## How To ORDER

### HOW TO ORDER



Case D pinning is standard. Case D model numbers do not require suffixing.  
 Case D1 pinning is optional. Case 1 model numbers must be suffixed with "D1".  
 Example: 505S48-D1

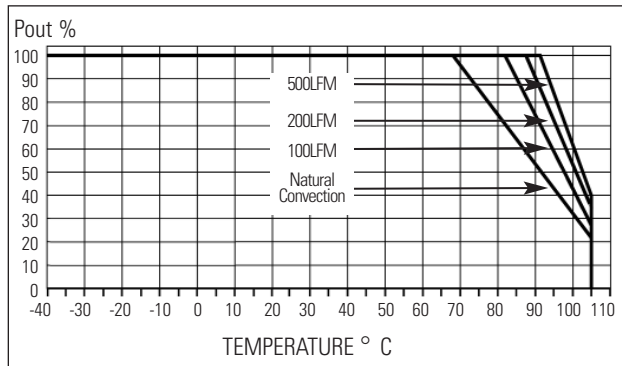
## MODEL SELECTION CHART

Model	Nominal Input Voltage (VDC)	Output Voltage (VDC)	Full Load Output Current (mA)	No Load Input Current (mA)	Full Load Input Current (mA)	Reflected Ripple Current (mA)	Efficiency @ FL (%)	Case Style
505S5	5	5	1000	107	1830	80	55	D or D1
512S5	5	12	420	110	1430	80	70	D or D1
515S5	5	15	340	160	1390	80	72	D or D1
505D5	5	±5	±500	112	1790	80	56	D
512D5	5	±12	±210	140	1550	80	65	D
515D5	5	±15	±170	170	1500	80	66	D
505S12	12	5	1000	35	680	40	61	D or D1
512S12	12	12	420	35	630	40	66	D or D1
515S12	12	15	340	35	528	40	79	D or D1
505D12	12	±5	±500	50	670	40	62	D
512D12	12	±12	±210	50	650	40	64	D
515D12	12	±15	±170	70	600	40	70	D
505S18	18	5	1000	30	450	35	62	D or D1
512S18	18	12	420	30	391	35	71	D or D1
515S18	18	15	340	36	375	35	74	D or D1
505D18	18	±5	±500	30	447	35	62	D
512D18	18	±12	±210	30	391	35	71	D
515D18	18	±15	±170	35	375	35	74	D
505S24	24	5	1000	15	350	20	60	D or D1
512S24	24	12	420	15	292	20	71	D or D1
515S24	24	15	340	21	283	20	75	D or D1
505D24	24	±5	±500	22	325	20	64	D
512D24	24	±12	±210	21	292	20	72	D
515D24	24	±15	±170	30	270	20	77	D
505S28	28	5	1000	20	290	20	61	D or D1
512S28	28	12	420	20	250	20	71	D or D1
515S28	28	15	340	20	228	20	78	D or D1
505D28	28	±5	±500	16	300	20	60	D
512D28	28	±12	±210	16	238	20	75	D
515D28	28	±15	±170	20	226	20	79	D
505S48	48	5	1000	10	153	15	68	D or D1
512S48	48	12	420	10	133	15	78	D or D1
515S48	48	15	340	15	130	15	80	D or D1
505D48	48	±5	±500	10	165	15	63	D
512D48	48	±12	±210	12	150	15	70	D
515D48	48	±15	±170	13	126	15	82	D



## DERATING CURVES

**MODEL 500 5V**



**MODEL 500 12V & 15V**

