

## DSP1 SERIES SINGLE OUTPUT

### DESCRIPTION

The DSP1 Series is specifically designed to convert a nominal 5 volt input into an isolated output voltage. The semi-regulated output voltages were designed to allow analog circuits and three terminal regulators to operate within their most efficient input voltage range. This series achieves high power densities through the use of 350KHz fixed frequency switching converters.

### FEATURES

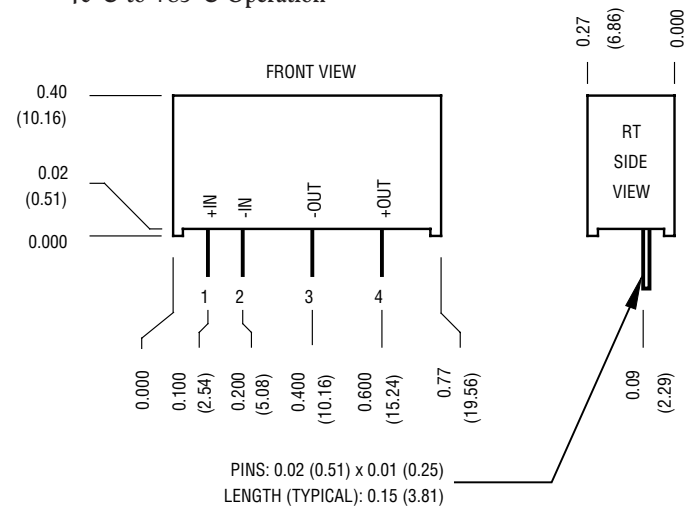
- Up to 1 Watt Unregulated Output Power
- Single In Line Package
- Four Terminal Operation
- Efficiencies to 75%
- 350KHz Fixed Frequency Operation
- 700V Isolation
- -40°C to +85°C Operation

Selection Chart					
Model	Input Range VDC		Output VDC	Output mA	Power W
	Min	Max			
DSP1N5S5	4.5	5.5	5	150	0.75
DSP1N5S7	4.5	5.5	7	140	1.0
DSP1N5S12	4.5	5.5	12	80	1.0
DSP1N5S14	4.5	5.5	14	70	1.0
DSP1N5S15	4.5	5.5	15	65	1.0
DSP1N5S17	4.5	5.5	17	60	1.0

General Specifications (1)			
All Models			Units
<b>Isolation</b>			
Isolation Voltage Input to Output 10µA	MIN	700	VDC
Input to Output Capacitance	TYP	25	pF
<b>Environmental</b>			
Case Operating Range, Tc (3)	MIN MAX	-40 +85	°C
Storage Range	MIN MAX	-55 105	°C
Thermal Impedance (2)	TYP	58	°C/Watt
<b>General</b>			
MTBF (Calculated)	TYP	700,000	HRS
Unit Weight	TYP	0.1 / 2.8	oz / gm
Case Material	Non Conductive Plastic		

### NOTES

- (1) All parameters measured at Tc=25°C, nominal input voltage and full rated load unless otherwise noted.
- (2) The case Thermal Impedance is specified as the case temperature rise over ambient per package dissipated.
- (3) Derate output power linearly to 0.6 watts from 70°C to 85°C.



Mechanical tolerances unless otherwise noted:  
 X.XX dimensions: ±0.020 inches  
 X.XXX dimensions: ±0.010 inches

Pin	Function
1	+INPUT
2	-INPUT
3	-OUT
4	+OUT

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## DSP1 SERIES – SINGLE OUTPUT

Input Parameters (1)								
Model		DSP1N5S5	DSP1N5S7	DSP1N5S12	DSP1N5S14	DSP1N5S15	DSP1N5S17	Units
Voltage Range	MIN	4.5						VDC
	MAX	5.5						
Reflected Ripple (2)	TYP	50	65					$\text{mA}_{PP}$
Input Current	Full Load	TYP	221	280	263	268	267	mA
	No Load	TYP	20	20	20	20	20	
Efficiency	TYP	68	70	73	73	73	73	%
Switching Frequency	TYP	350						kHz

Output Parameters (1)								
Model		DSP1N5S5	DSP1N5S7	DSP1N5S12	DSP1N5S14	DSP1N5S15	DSP1N5S17	Units
Output Voltage		5	7	12	14	15	17	VDC
Output Voltage Accuracy (3)	MIN	4.75	6.65	11.40	13.30	14.25	16.15	VDC
	TYP	5.00	7.00	12.00	14.00	15.00	17.00	
	MAX	5.25	7.35	12.60	14.70	15.75	17.85	
Output Voltage, No Load	TYP	7	10	16	19	21	24	VDC
Rated Load Range	MIN	0	0	0	0	0	0	mA
	MAX	150	140	80	70	65	60	
Load Regulation (4) 75% - 20% Load 75% - 100% Load	TYP	+8						%
	TYP	-5						
Line Regulation (5)	TYP	1.6						%
Noise, Peak - Peak (2)	TYP	70						$\text{mV}_{PP}$
Temperature Coefficient	TYP	400						$\text{ppm}/^{\circ}\text{C}$
Short Circuit Protection to Common (6)		Momentary						

### NOTES

- (1) All parameters measured at  $T_c=25^{\circ}\text{C}$ , nominal input voltage and full rated load unless otherwise noted.
- (2) Measurement bandwidth is 20 MHz. Input Reflected Ripple and output noise are measured with an external  $10\mu\text{F}/25\text{V}$  tantalum capacitor connected across the input and output pins.
- (3) Output Voltage Accuracy measured at 75% of maximum Rated Load.
- (4) Load Regulations measured relative to 75% of maximum Rated Load Current.
- (5) Line Regulation is for a 1.0% change in input Voltage.
- (6) Use input fuse for protection. See Applying the input.

### DSP1 SERIES APPLICATION NOTES:

#### External Capacitance Requirements

Output filtering is required for operation. A minimum of  $10\mu\text{F}$  is specified for optimal performance. Output capacitance may be increased for additional filtering, not to exceed  $400\mu\text{F}$ . To meet the reflected ripple requirements of the converter, an input impedance of less than 0.5 Ohms from DC to 350KHz is required. If a capacitive input source is farther than 2" from the converter, it is recommended to use a  $10\mu\text{F}$ , 25V solid tantalum capacitor.

#### Regulation

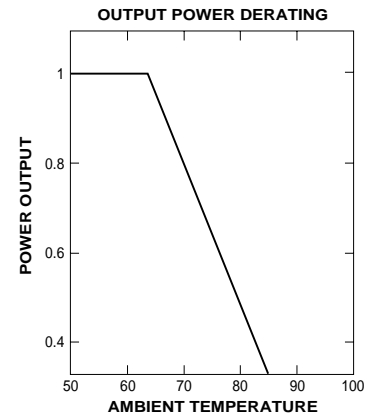
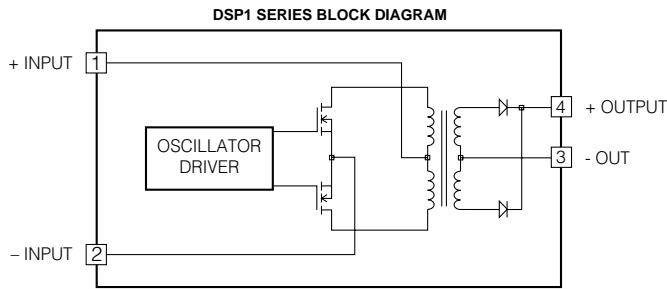
This converter uses a semi-regulated design. The output will vary as the load is changed, with output decreasing with increasing load. See Output Voltage vs. Output Load curves. Additionally, output voltage will change in proportion to a change in input voltage. The typical output voltage will change 1.2% for each 1% change in input voltage.

#### Negative Outputs

A negative output voltage may be obtained by connecting the +OUT to circuit ground and connecting -OUT as the negative output.



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Typical Performance: (Tc=25°C)

