

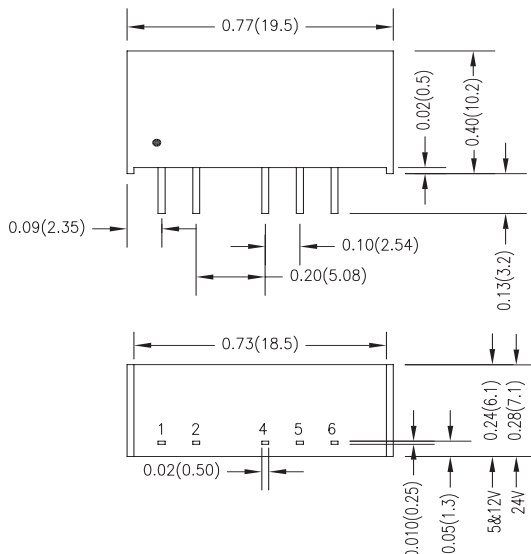
1 Watt SPX Single and Dual Series



- Efficiency up to 88%
- 1000VDC Isolation
- MTBF > 2,000,000 Hours
- RoHS Compliant



Model Number	Voltage			Current				Load Regulation	Input Overvoltage (1000ms)	Efficiency	Capacitive Load
	Input		Output	Input		Output					
	Nom. (VDC)	Range (VDC)	(VDC)	@ No Load (mA)	@ Max Load (mA)	Min (mA)	Max (mA)	% (Max)	Max (VDC)	@ Max Load (% Typ)	Max (Dual each output)
SPX1F5S5	5	4.5 - 5.5	5	30	238	4	200	6.5	9	84	220 µF
SPX1F5S9	5	4.5 - 5.5	9	30	228	2	110	5	9	87	220 µF
SPX1F5S12	5	4.5 - 5.5	12	30	232	1.5	84	5.2	9	87	220 µF
SPX1F5S15	5	4.5 - 5.5	15	30	230	1	67	5	9	87.5	220 µF
SPX1F5D5	5	4.5 - 5.5	±5	30	237	±2	±100	5.2	9	84.5	100 µF
SPX1F5D9	5	4.5 - 5.5	±9	30	234	±1	±56	4.2	9	86	100 µF
SPX1F5D12	5	4.5 - 5.5	±12	30	233	±0.8	±42	4.6	9	86.5	100 µF
SPX1F5D15	5	4.5 - 5.5	±15	30	236	±0.7	±34	4.5	9	86.5	100 µF
SPX1F12S5	12	10.8 - 13.2	5	12	99	4	200	5	18	84	220 µF
SPX1F12S9	12	10.8 - 13.2	9	12	95	2	110	3.4	18	86.5	220 µF
SPX1F12S12	12	10.8 - 13.2	12	12	95	1.5	84	3.4	18	88.5	220 µF
SPX1F12S15	12	10.8 - 13.2	15	12	95	1	67	2.7	18	88	220 µF
SPX1F12D5	12	10.8 - 13.2	±5	12	99	±2	±100	3.9	18	84.5	100 µF
SPX1F12D9	12	10.8 - 13.2	±9	12	98	±1	±56	2.8	18	86	100 µF
SPX1F12D12	12	10.8 - 13.2	±12	12	95	±0.8	±42	2.9	18	88.5	100 µF
SPX1F12D15	12	10.8 - 13.2	±15	12	94	±0.7	±34	2.6	18	87.5	100 µF
SPX1F24S5	24	21.6 - 26.4	5	11	50	4	200	3.7	30	84	220 µF
SPX1F24S9	24	21.6 - 26.4	9	11	48	2	110	2.5	30	86.5	220 µF
SPX1F24S12	24	21.6 - 26.4	12	11	48	1.5	84	2.4	30	87.5	220 µF
SPX1F24S15	24	21.6 - 26.4	15	11	48	1	67	2.3	30	87.5	220 µF
SPX1F24D5	24	21.6 - 26.4	±5	11	50	±2	±100	3.7	30	83.5	100 µF
SPX1F24D9	24	21.6 - 26.4	±9	11	49	±1	±56	2.5	30	86	100 µF
SPX1F24D12	24	21.6 - 26.4	±12	11	48	±0.8	±42	2.4	30	87	100 µF
SPX1F24D15	24	21.6 - 26.4	±15	11	49	±0.7	±34	2.3	30	87	100 µF



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

Dimensions are inches (mm) unless noted

Tolerance: Inches Millimeters

X.XX ±0.01 X.X ±0.25

X.XXX ±0.005 X.XX ±0.13

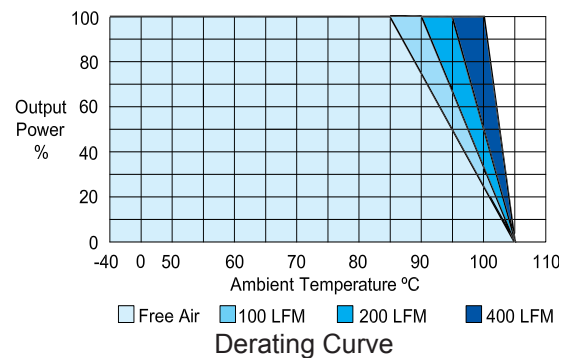
Pin ±0.002 ±0.05

See Model Selection Table for Model Specific Parameters

Input Parameters	Min	Typ	Max	Units
Reverse Polarity Input Current			0.3	A
Switching Frequency	50	100	120	kHz
Input Filter	Internal Capacitor			
Output Parameters	Min	Typ	Max	Units
Output Voltage Balance Dual Output, Balanced Loads		±0.1	±1.0	%
Load Regulation $I_o = 20\%$ to 100%	See Model Selection Guide			%
Line Regulation for V_{in} Change of 1%		±1.05	±1.2	%
Ripple & Noise (20MHz)		30	60	mV P-P
Temperature Coefficient		±0.01	±0.02	% / °C
Short Circuit Protection	0.5 Second Max			
General Specifications	Min	Typ	Max	Units
Isolation Voltage, 60 seconds	1000			VDC
Isolation Resistance 500VDC	1000			Mohms
Isolation Capacitance, 100kHz, 1V	40	60	120	pF
Operating Temperature (Ambient)	-40		+85	°C
Operating Temperature (Case)	-40		+90	°C
Storage Temperature	-50		+125	°C
Humidity			95	%
MTBF MIL-HDBK-217F @25°C, Ground Benign	2000			K Hours
Cooling	Free-Air Convection			
Case Size 5V & 12V	0.77 x 0.24 x 0.40 inches 19.5 x 6.1 x 10.2 mm			
24V	0.77 x 0.28 x 0.40 inches 19.5 x 7.1 x 10.2 mm			
Case Material	Non Conductive Black Plastic (UL94V-0)			
Weight 5V & 12V 24V	2.2g 2.6g			

Notes:

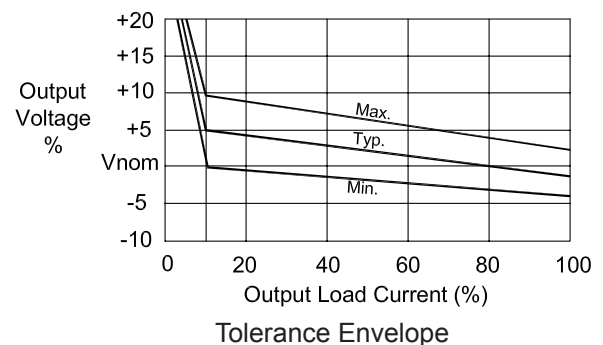
- Specifications typical at $T_a = +25^\circ\text{C}$, resistive load, nominal input voltage, full rated output current unless otherwise noted.
- ConTech power converters require a minimum output loading to maintain specified regulation. Operation under no-load conditions will not damage these modules; however, they may not meet all specifications listed.
- The series has a limitation of a maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time.
- When measuring peak-to-peak output noise, use a Cout 0.33 μF ceramic capacitor. Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20MHz. Position the load between 2" and 2.5" from the converter.
- Water washability - ConTech DC/DC converters are designed to withstand most solder/wash processes. Careful attention should be used when assessing the applicability in your specific manufacturing process. Converters are not hermetically sealed.
- See ConTech website for Definition of Terms, Application Notes, and Test Setups and Parameters. www.ConTech-us.com/appnotes.html.
- Specifications subject to change without notice.
- See ConTech website www.ConTech-us.com/pdf/rohs.pdf for RoHS Statement.



To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 90°C.

Input Fuse Selection Table	
5V Input	500 mA Slow-Blow
12V Input	200 mA Slow-Blow
24V Input	100 mA Slow-Blow

External fusing should be used for system protection due to a catastrophic failure. See ConTech website for Fusing Application Notes to determine the correct fuse.



CONTECH



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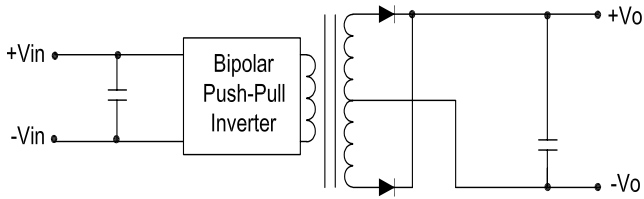


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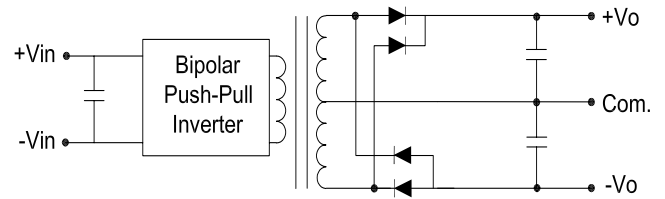


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Block Diagrams



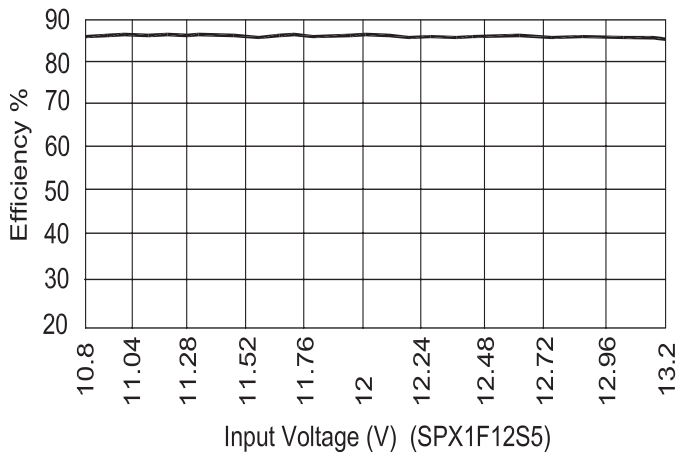
Single Output Block Diagram



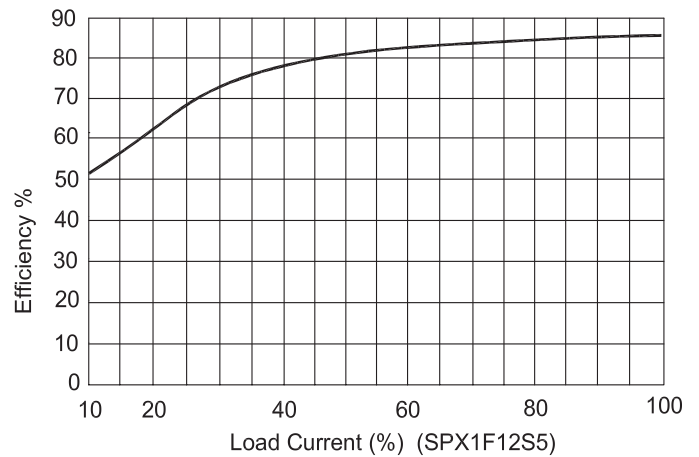
Dual Output Block Diagram

Efficiency Curves

Single Output

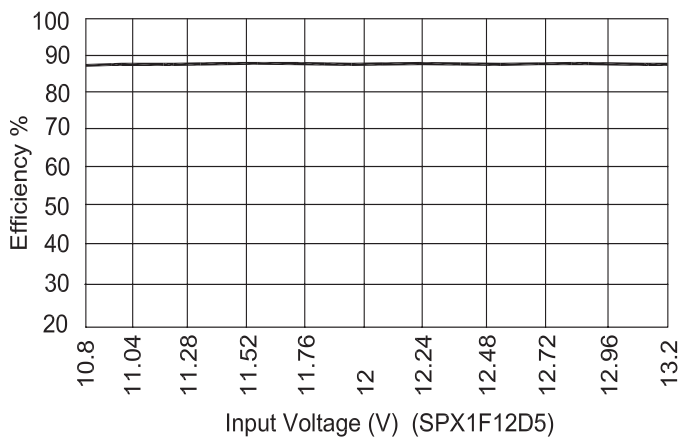


Efficiency vs Input Voltage

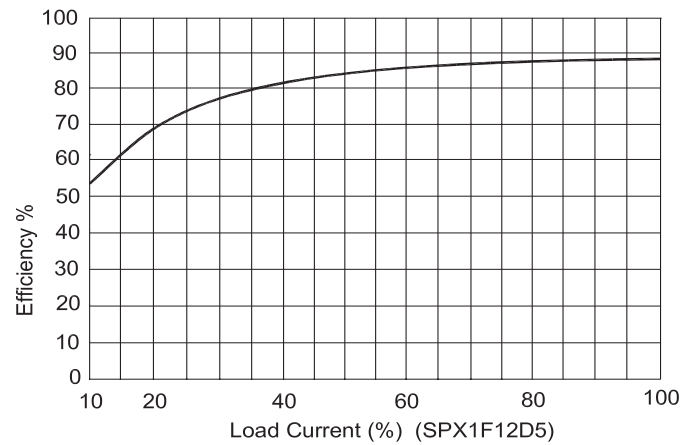


Efficiency vs Output Load

Dual Output



Efficiency vs Input Voltage



Efficiency vs Output Load