Size:
0.74 x 0.54 x 0.33 inches
(4.5g)
18.9 x 13.7 x 8.45 mm

Weight:
0.16oz

FEATURES

- 1 Watt Output Power
- 1500VDC I/O Isolation
- Low Ripple & Noise
- Remote ON/OFF Control
- Fully Regulated Single & Dual Outputs
- MTBF > 2,800,000 Hours
- 2:1 Wide Input Voltage Range
- -40°C to +85°C Operating Temperature
- Continuous Short Circuit Protection
- Ultra Compact SMT Package
- Qualified for Lead-free Reflow Process
- CSA/UL/IEC/EN 60950-1 Safety Approvals (Pending)

DESCRIPTION

The DCMSW1 series of DC/DC converters provides 1 Watt of output power in an ultra compact SMT package. These converters operate over 2:1 input voltage ranges of 4.5-9VDC, 9-18VDC, 18-36VDC, and 36-75VDC. This series also has fully regulated single and dual output voltages of 5V, 12V, 15V, ±12V, and ±15V. The DCMSW1 series' impressive efficiencies enable these modules to deliver their fully rated output power from –40°C to +75°C without derating. Other features include remote on/off control, low ripple and noise, 1500VDC I/O isolation, and continuous short circuit protection. The very small footprint of these converters makes them an ideal solution for space critical applications in communication equipment, instrumentation, and many other battery operated applications.

MODEL SELECTION TABLE

SINGLE OUTPUT MODELS

Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Output Power	Efficiency	Maximum Capacitive Load
			Min	Max	No Load	Max Load				
DCMSW1-05S05	5 VDC (4.5 - 9 VDC)	5 VDC	0mA	200mA	40mA	256mA	80mA	1W	78%	1680µF
DCMSW1-05S12		12 VDC	0mA	83mA		252mA		1W	79%	820µF
DCMSW1-05S15		15 VDC	0mA	67mA		248mA		1W	81%	680µF
DCMSW1-12S05	12 VDC (9 - 18 VDC)	5 VDC	0mA	200mA	20mA	105mA	40mA	1W	79%	1680µF
DCMSW1-12S12		12 VDC	0mA	83mA		105mA		1W	79%	820µF
DCMSW1-12S15		15 VDC	0mA	67mA		102mA		1W	82%	680µF
DCMSW1-24S05	24 VDC (18 - 36 VDC)	5 VDC	0mA	200mA	10mA	53mA	30mA	1W	79%	1680µF
DCMSW1-24S12		12 VDC	0mA	83mA		51mA		1W	82%	820µF
DCMSW1-24S15		15 VDC	0mA	67mA		51mA		1W	82%	680µF
DCMSW1-48S05	48 VDC (36 - 75 VDC)	5 VDC	0mA	200mA	7mA	26mA	20mA	1W	79%	1680µF
DCMSW1-48S12		12 VDC	0mA	83mA		26mA		1W	80%	820µF
DCMSW1-48S15		15 VDC	0mA	67mA		26mA		1W	80%	680µF

DUAL OUTPUT MODELS

Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Output Power	Efficiency	Maximum Capacitive Load
			Min	Max	No Load	Max Load				
DCMSW1-05D12	5 VDC (4.5 - 9 VDC)	±12 VDC	0mA	±42mA	40mA	255mA	80mA	1W	79%	±470µF
DCMSW1-05D15		±15 VDC	0mA	±33mA		248mA		1W	80%	±330µF
DCMSW1-12D12	12 VDC (9 - 18 VDC)	±12 VDC	0mA	±42mA	20mA	104mA	40mA	1W	81%	±470µF
DCMSW1-12D15		±15 VDC	0mA	±33mA		103mA		1W	80%	±330µF
DCMSW1-24D12	24 VDC (18 - 36 VDC)	±12 VDC	0mA	±42mA	10mA	51mA	30mA	1W	82%	±470µF
DCMSW1-24D15		±15 VDC	0mA	±33mA		50mA		1W	82%	±330µF
DCMSW1-48D12	48 VDC (36 - 75 VDC)	±12 VDC	0mA	±42mA	7mA	26mA	20mA	1W	81%	±470µF
DCMSW1-48D15		±15 VDC	0mA	±33mA		25mA		1W	81%	±330µF

NOTES

1. All DC/DC converters should be externally fused at the front end for protection.
2. Other input and output voltages may be available, please contact factory.

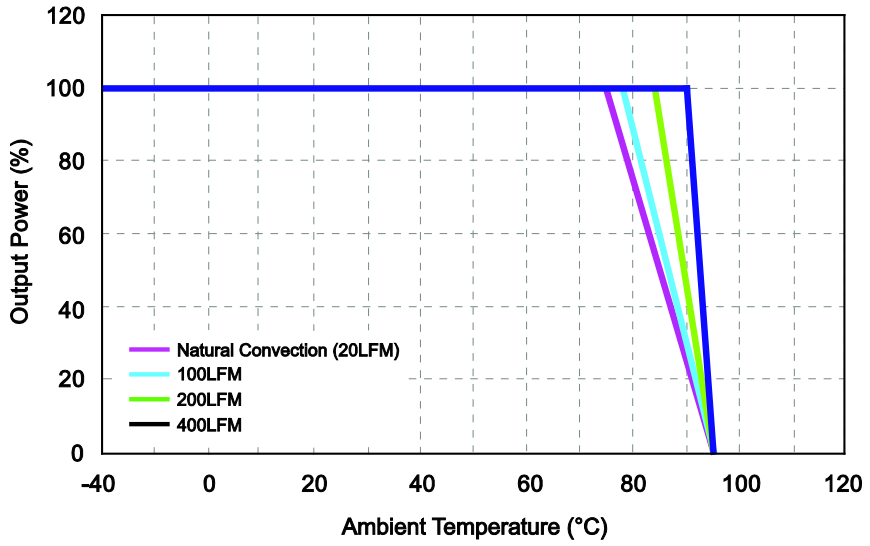
**Due to advances in technology, specifications are subject to change without notice.*

SPECIFICATIONS: DCMSW1 SERIES

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
We reserve the right to change specifications based on technological advances.

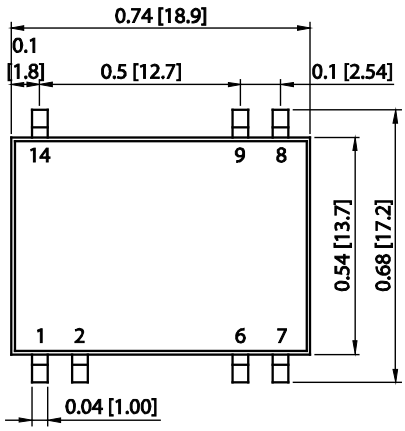
SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
INPUT SPECIFICATIONS						
Input Voltage Range	5VDC nominal input models		4.5	5	9	VDC
	12VDC nominal input models		9	12	18	
	24 VDC nominal input models		18	24	36	
	48 VDC nominal input models		36	48	75	
Input Surge Voltage (1sec, max.)	5VDC nominal input models		-0.7		15	VDC
	12VDC nominal input models		-0.7		25	
	24 VDC nominal input models		-0.7		50	
	48 VDC nominal input models		-0.7		100	
Start-Up Threshold Voltage	5VDC nominal input models				4.5	VDC
	12VDC nominal input models				9	
	24 VDC nominal input models				18	
	48 VDC nominal input models				36	
Input Current			See Table			
Input Filter			capacitor			
Input Fuse	5VDC nominal input models		500mA slow-blow type			
	12VDC nominal input models		250mA slow-blow type			
	24 VDC nominal input models		120mA slow-blow type			
	48 VDC nominal input models		60mA slow-blow type			
OUTPUT SPECIFICATIONS						
Output Voltage			See Table			
Output Voltage Setting Accuracy	Nominal input and half load				±1.0	%Vnom
Line Regulation	Low line to high line				±0.2	%
Load Regulation	Min load to full load	Single Output Models			±1.0	%
		Dual Output Models			±1.0	
	10% load to 90% load	Single Output Models			±0.5	%
		Dual Output Models			±0.8	
Minimum Load			0			mA
Output Power					1	W
Output Current			See Table			
Maximum Capacitive Load			See Table			
Ripple & Noise	Measurement bandwidth is 0-20MHz			30		mVp-p
Transient Recovery Time	25% load step change			250		µs
Temperature Coefficient					±0.02	%/°C
PROTECTION						
Short Circuit Protection			continuous			
REMOTE ON/OFF CONTROL						
Converter ON			Open or high impedance			
Converter OFF			2~4mA current applied via 1KΩ resistor			
Standby Input Current	Supply Off & Nominal Vin			2.5		mA
GENERAL SPECIFICATIONS						
Efficiency	Nominal input voltage and full load		See Table			
Switching Frequency				220		KHz
Isolation Voltage (I/P to O/P)	60 seconds		1500			VDC
Isolation Resistance (I/P to O/P)	500VDC		1000			MΩ
Isolation Capacitance (I/P to O/P)	100KHz, 1V				50	pF
ENVIRONMENTAL SPECIFICATIONS						
Operating Ambient Temperature	See derating curve		-40		+85	°C
Case Temperature					+95	°C
Storage Temperature			-50		+125	°C
Relative Humidity	Non-condensing				95	% RH
Cooling	Natural convection is about 20LFM but is not equal to still air (0LFM)		Free air convection (20LFM)			
Lead Temperature	1.5mm from case for 10 sec.				260	°C
MTBF	MIL-HDBK-217F at 25°C, ground benign		2,800,000			hours
PHYSICAL SPECIFICATIONS						
Weight			0.16oz (4.5g)			
Dimensions (L x W x H)			0.74 x 0.54 x 0.33 inch (18.9 x 13.7 x 8.45 mm)			
Case Material	Flammability to UL 94V-0 rated		Non-conductive black plastic			
Pin Material			Phosphor bronze			
SAFETY						
Safety Approvals	CSA 60950-1 recognition, IEC/EN 60950-1 (CB-scheme) pending					

DERATING CURVE



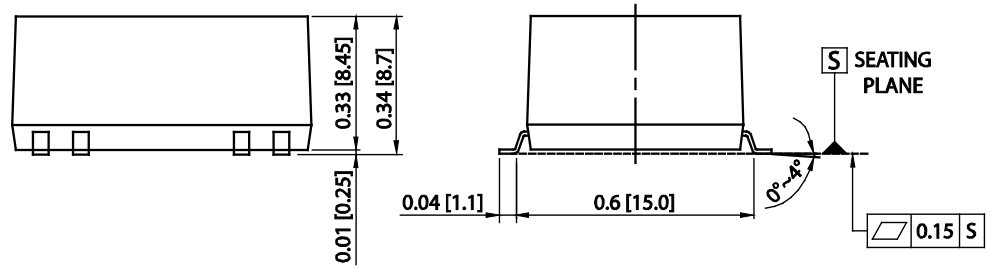
MECHANICAL DRAWING

Mechanical Dimensions



PIN CONNECTIONS		
PIN	SINGLE OUTPUT	DUAL OUTPUT
1	-Vin	-Vin
2	Remote On/Off	Remote On/Off
6	NC	Common
7	NC	-Vout
8	+Vout	+Vout
9	-Vout	Common
14	+Vin	+Vin

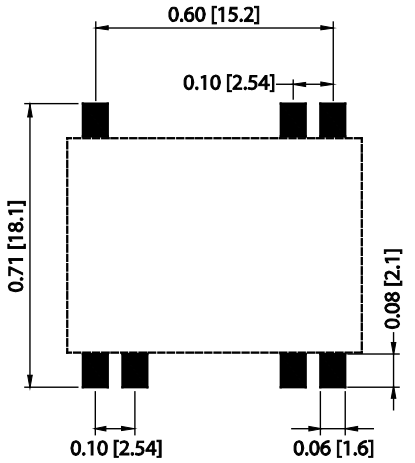
NC: No Connection



Notes:
Unit: inches [mm]
Tolerance: X.XX±0.02 [X.X±0.5]
X.XXX±0.01 [X.XX±0.25]
Pin Tolerance: ±0.002 [±0.05]

Physical Characteristics:
1. Weight: 0.16oz (4.5g)
2. Case Material: non-conductive black plastic (flammability to UL 94V-0 rated)
3. Pin Material: phosphor bronze
4. All dimensions are for reference only

Connecting Pin Patterns

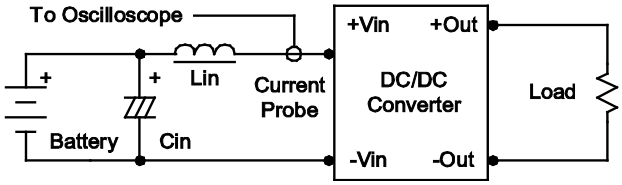


Notes:
Unit: inches [mm]
Tolerance: X.XX±0.02 [X.X±0.5]
X.XXX±0.01 [X.XX±0.25]
Pin Tolerance: ±0.002 [±0.05]

TEST SETUP

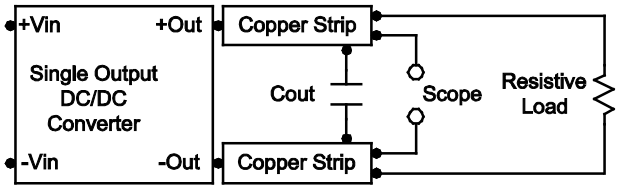
Input Reflected-Ripple Current Test Setup

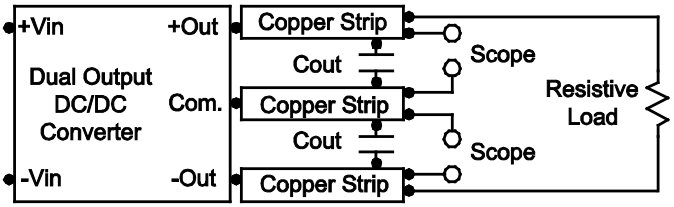
Input reflected-ripple current is measured with an inductor Lin (4.7µH) and Cin (220µF, ESR < 1.0Ω at 100 KHz) to simulate source impedance. Capacitor Cin offsets possible battery impedance. Current ripple is measured at the input terminals of the module. Measurement bandwidth is 0-500 KHz.



Peak-to-Peak Output Noise Measurement Test

Use a 0.47µF ceramic capacitor. Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20MHz. Position the load between 50mm and 75mm from the DC/DC converter.





DESIGN & FEATURE CONSIDERATIONS

Remote On/Off

Negative logic remote on/off turns the module OFF during a logic high voltage on the remote on/off pin and ON during a logic low. To turn the module on and off, the user must supply a switch to control the voltage between the on/off terminal and the –Vin terminal. The switch can be an open collector or equivalent. A logic high is 2~4mA current applied via 1KΩ resistor. A logic low is open circuit or high impedance.

Maximum Capacitive Load

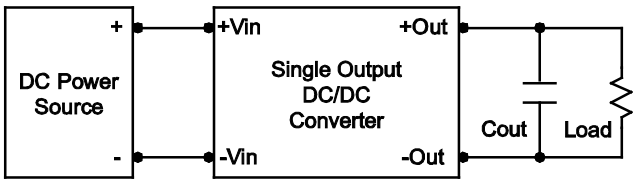
The DCMSW1 series has a limitation of maximum connected capacitance on the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the start-up time. The maximum capacitance can be found in the Model Selection Table.

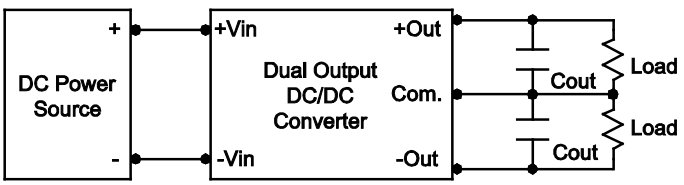
Over Current Protection

To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure overload for an unlimited duration. At the point of current-limit inception, the unit shifts from voltage control to current control. The unit operates normally once the output current is brought back into its specified range.

Output Ripple Reduction

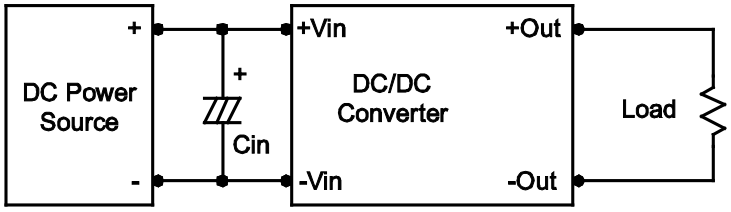
A good quality low ESR capacitor placed as close as possible across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 3.3µF capacitors at the output.





Input Source Impedance

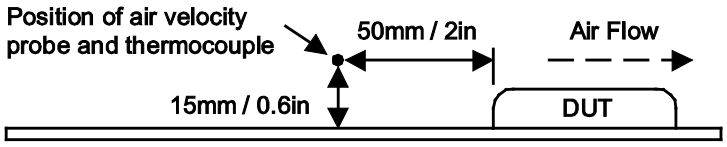
The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup. Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100 KHz) capacitor of 8.2µF for 5VDC input models, 3.3µF for 12VDC input models, and 1.5µF for 24VDC and 48VDC input models.



DESIGN & FEATURE CONSIDERATIONS

Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module, and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 95°C. The derating curves are determined from measurements obtained in a test setup.



COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001-2008 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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