FEATURES

- Ultra compact SMD Package
- Wide 2:1 Input Range
- Fully regulated Outputs
- Low Ripple and Noise
- Operating Temp. Range -40°C to +85°C
- I/O-isolation Voltage 1500VDC
- Continuous Short-circuit Protection
- Remote On/Off Control
- Qualified for Lead-free Reflow Process
- CSA/UL/IEC/EN 60950-1 (Approval pending)
- 3 Years Product Warranty



NEW

RoHS Compliant

3 year warranty

PRODUCT OVERVIEW

The MSCW01 series is a family of compact 1W dc/dc-converters with wide 2:1 input voltage ranges and tightly regulated output voltages.
They work with high efficiency over the full load range and come with a remote On/Off control input.
High efficiency to 82% allows operating temperatures up to +75°C without power derating. The very small footprint of these converters make them an ideal solution for many space critical applications in communication equipment, instrumentation and many other battery operated applications.

Model Selection Guide

Model Number	Input Voltage (Range)	Output Voltage	Output Current	Input Current		Max. capacitive Load	Reflected Ripple current	Efficiency (typ.)
			Max.	@Max. Load	@No Load			@Max. Load
	VDC	VDC	mA	mA(typ.)	mA(typ.)	µF	mA (typ.)	%
MSCW01-05S05	5 (4.5 ~ 9)	5	200	256	40	1680	80	78
MSCW01-05S12		12	83	252		820		79
MSCW01-05S15		15	67	248		680		81
MSCW01-05D12		±12	±42	255		470#		79
MSCW01-05D15		±15	±33	248		330#		80
MSCW01-12S05	12 (9 ~ 18)	5	200	105	20	1680	40	79
MSCW01-12S12		12	83	105		820		79
MSCW01-12S15		15	67	102		680		82
MSCW01-12D12		±12	±42	104		470#		81
MSCW01-12D15		±15	±33	103		330#		80
MSCW01-24S05	24 (18 ~ 36)	5	200	53	10	1680	30	79
MSCW01-24S12		12	83	51		820		82
MSCW01-24S15		15	67	51		680		82
MSCW01-24D12		±12	±42	51		470#		82
MSCW01-24D15		±15	±33	50		330#		82
MSCW01-48S05	48 (36 ~ 75)	5	200	26	7	1680	20	79
MSCW01-48S12		12	83	26		820		80
MSCW01-48S15		15	67	26		680		80
MSCW01-48D12		±12	±42	26		470#		81
MSCW01-48D15		±15	±33	25		330#		81

For each output

Total Power International, Inc.

MSCW01 SERIES

DC/DC CONVERTER 1W, SMD Package

Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	5V Input Models	-0.7	---	15	VDC
	12V Input Models	-0.7	---	25	
	24V Input Models	-0.7	---	50	
	48V Input Models	-0.7	---	100	
Start-Up Threshold Voltage	5V Input Models	---	---	4.5	
	12V Input Models	---	---	9	
	24V Input Models	---	---	18	
	48V Input Models	---	---	36	
Internal Filter Type	All Models	Capacitor			

Output Specifications

Parameter	Conditions		Min.	Typ.	Max.	Unit
Output Voltage Setting Accuracy	At 50% Load and Nominal Vin		---	---	±1.0	%Vnom.
Line Regulation	Vin=Min. to Max.		---	---	±0.2	%
Load Regulation	Min. Load to Full Load	Single Output	---	---	±1.0	%
		Dual Output	---	---	±1.0	%
	Io=10% to 90%	Single Output	---	---	±0.5	%
		Dual Output	---	---	±0.8	%
Min.Load	No minimum Load Requirement					
Ripple & Noise (20MHz)			---	30	---	mV_{P-P}
Transient Recovery Time	25% Load Step Change		---	250	---	µsec
Temperature Coefficient			---	---	±0.02	%/℃
Short Circuit Protection	Continuous					

General Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage (rated)	60 Seconds	1500	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100KHz, 1V	---	---	50	pF
Switching Frequency		---	220	---	KHz
MTBF(calculated)	MIL-HDBK-217F@25℃, Ground Benign	2,800,000	---	---	Hours
Safety Approvals(pending)	CSA 60950-1 recognition,IEC/EN 60950-1(CB-scheme)				

Input Fuse

5V Input Models	12V Input Models	24V Input Models	48V Input Models
500mA Slow-Blow Type	250mA Slow-Blow Type	120mA Slow-Blow Type	60mA Slow-Blow Type

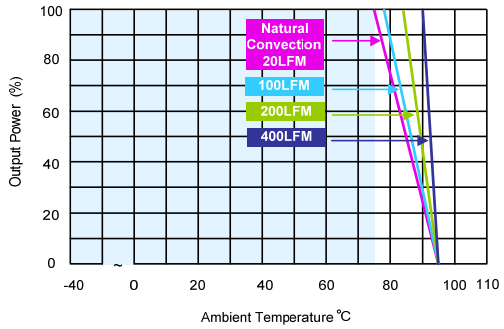
Remote On/Off Control

Parameter	Conditions	Min.	Typ.	Max.	Unit
Converter On	Open or high impedance				
Converter Off	2~4mA current applied via 1Kohm resistor				
Standby Input Current	Supply Off & Nominal Vin	---	2.5	---	mA

Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Ambient Temperature Range (See Power Derating Curve)	Natural Convection	-40	+85	℃
Case Temperature		---	+95	℃
Storage Temperature		-55	+125	℃
Humidity (non condensing)		---	95	% rel. H
Lead Temperature (1.5mm from case for 10Sec.)		---	260	℃

Power Derating Curve

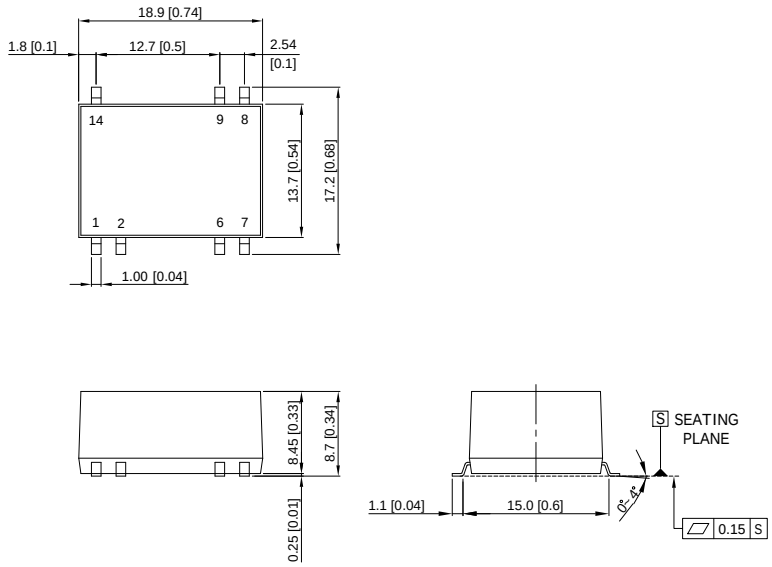


Notes

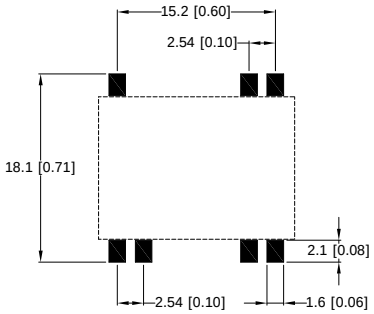
1. Specifications typical at Ta=+25℃, resistive load, nominal input voltage, rated output current unless otherwise noted.
2. Ripple & Noise measurement bandwidth is 0-20 MHz.
3. All DC/DC converters should be externally fused at the front end for protection.
4. Other input and output voltage may be available, please contact factory.
5. That “natural convection” is about 20LFM but is not equal to still air (0 LFM).
6. Specifications are subject to change without notice.

Package Specifications

Mechanical Dimensions



Connecting Pin Patterns



- ▶ All dimensions in mm (inches)
- ▶ Tolerance: X.X±0.5 (X.XX±0.02)
  X.XX±0.25 (X.XXX±0.01)
- ▶ Pins ±0.05(±0.002)

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

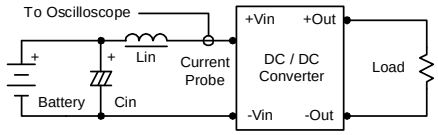
Physical Characteristics

Case Size	:	18.9x13.7x8.45mm (0.74x0.54x0.33 inches)
Case Material	:	Non-Conductive Black Plastic (flammability to UL 94V-0 rated)
Pin Material	:	Phosphor bronze
Weight	:	4.5g

Test Setup

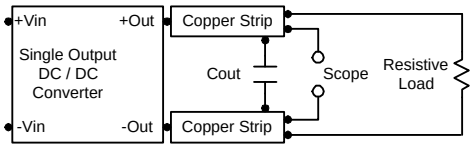
Input Reflected-Ripple Current Test Setup

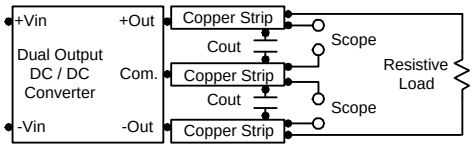
Input reflected-ripple current is measured with a inductor Lin (4.7μH) and Cin (220μF, ESR < 1.0Ω at 100 KHz) to simulate source impedance.
Capacitor Cin, offsets possible battery impedance. Current ripple is measured at the input terminals of the module, measurement bandwidth is 0-500 KHz.



Peak-to-Peak Output Noise Measurement Test

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





Technical Notes

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 power 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 1Kohm resistor. A logic low is open circuit or high impedance.

Maximum Capacitive Load

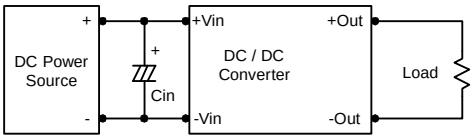
The MSCW01 series has limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. The maximum capacitance can be found in the data sheet.

Overcurrent Protection

To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure current limiting 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.

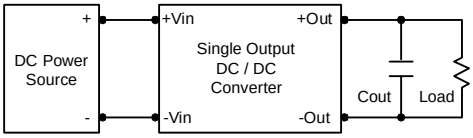
Input Source Impedance

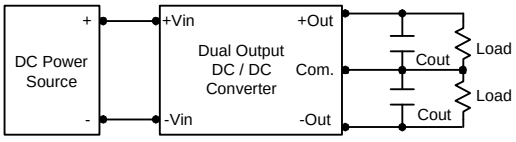
The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.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



Output Ripple Reduction

A good quality low ESR capacitor placed as close as practicable 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.





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.

