

1MS4A Series

1W - Single Output - Micro Size Fixed Input - Isolated & Unregulated

DC-DC Converter

1 Watt

- ⊕ Efficiency up to 78%
- ⊕ Super miniature SIP Package
- ⊕ 1KVDC Isolation
- ⊕ Temperature Range: -40°C to +85°C
- ⊕ UL94-V0 Package
- ⊕ No Heat sink Required
- ⊕ No external component required
- ⊕ Industry standard pinout
- ⊕ Internal SMD construction
- ⊕ RoHS Compliance

The 1MS4A Series are specially designed for applications where a single power supply is isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation $\leq \pm 10\%$);
- 2) Where isolation is necessary between input and output (isolation voltage $\leq 1000\text{VDC}$);
- 3) Where the regulation of the output voltage and the output ripple noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits, and IGBT power device driving circuits, etc.

RoHS

Common specifications

Short circuit protection*:	1 second
Temperature rise at full load:	25°C MAX, 15°C TYP
Cooling:	Free air convection
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-55°C ~+125°C
Storage humidity range:	< 95%
Lead temperature range:	300°C MAX, 1.5mm from case for 10 sec
Case material:	Plastic [UL94-V0]
MTBF:	>3,500,000 hours
Weight:	1.05g

* Supply voltage must be discontinued at the end of short circuit duration.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and 1mA max	1000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitor			60		pF

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.
2. All specifications measured at TA=25°C, humidity < 75%, nominal input voltage and rated output load unless otherwise specified.

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output power		0.1		1	W
Line regulation	For Vin change of $\pm 1\%$ • 3.3V output • others output			± 1.5 ± 1.2	% %
Load regulation	10% to 100% full load • 3.3V output • 5V output • 9V output • 12V output • 15V output		12 10.5 8.3 6.8 6.3	20 15 10 10 10	% % % % %
Output voltage accuracy	See tolerance envelope graph				
Temperature drift	100% full load			0.03	%/°C
Output ripple*	20MHz Bandwidth		75	100	mVp-p
Switching frequency	Full load, nominal input		100		KHz

*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

Model selection:

WCTP**_xxyyN##O

W=Watt; C= Case; T=Type; P=Pinning; **= Voltage Variation (omitted $\pm 10\%$); xx= Vin; yy= Vout; N= Numbers of Output; ##= Isolation (kVDC); O= Output Regulation

Example:

1MS4A_0505S1U

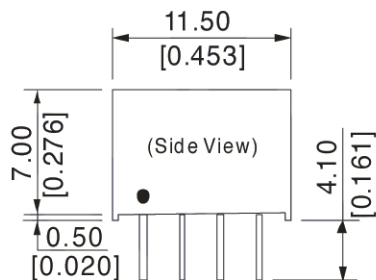
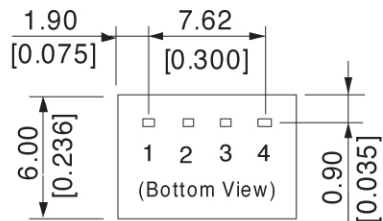
1=1Watt; MS4=Micro SIP4; A=Pinpot; 05= 5Vin; 05= 5Vout; S= Single Output; 1= 1000 VDC Isolation; U= Unregulated Output

Part Number	Input Voltage [V]	Output Voltage [VDC]	Current [mA]	Efficiency [%, max]
1MS4A_0305S1U	3.3	3.3	303	69
1MS4A_0305S1U	3.3	5	200	74
1MS4A_0505S1U	5	5	200	70
1MS4A_0512S1U	5	12	83	77
1MS4A_0515S1U	5	15	67	78
1MS4A_1205S1U	12	5	200	70
1MS4A_1212S1U	12	12	83	77

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Mechanical dimensions



Note:

Unit: mm[inch]

Pin section tolerances: $\pm 0.10\text{mm}[\pm 0.004\text{inch}]$

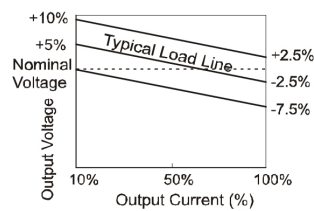
General tolerances: $\pm 0.25\text{mm}[\pm 0.010\text{inch}]$

FOOTPRINT DETAILS	
Pin	Function
1	GND
2	Vin
3	0V
4	+Vo

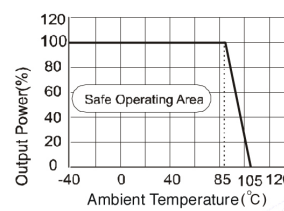
NC: No Connection .

Typical characteristics

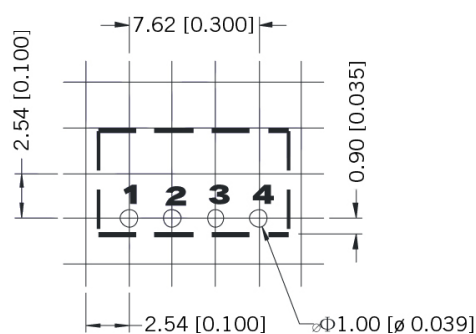
Tolerance Envelope Graph



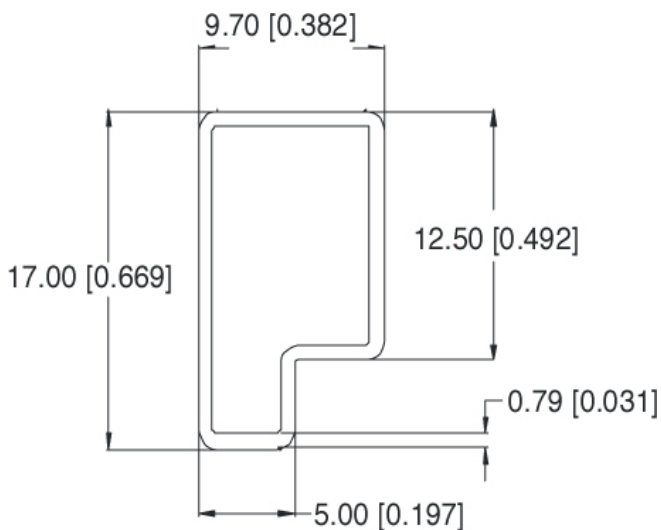
Temperature Derating Graph



Recommended footprint



Tube outline



Note:

Unit: mm[inch]

General tolerances: $\pm 0.5\text{mm}[\pm 0.020\text{inch}]$

L=530mm[20.866inch]

Tube quantity: 43pcs

L=220mm[8.661inch]

Tube quantity: 17pcs

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Application note

Requirement On Output Load

To ensure this module can operate efficiently and reliably, a minimum load is specified for this kind of DC/DC converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, the minimum output load could not be less than 10% of the full load. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use our company's products with a lower rated output power.

Recommended and testing circuit

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1).

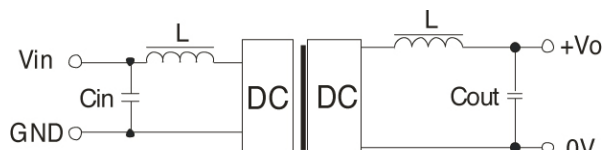


Figure 1

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the recommended capacitance of its filter capacitor sees (Table 1).

Vin (VDC)	Cin (uF)	Vout (VDC)	Cout (uF)
3.3/5	4.7	3.3/5	10
12	2.2	9	4.7
--	--	12	2.2
--	--	15	1

It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output

Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (see Figure 2).

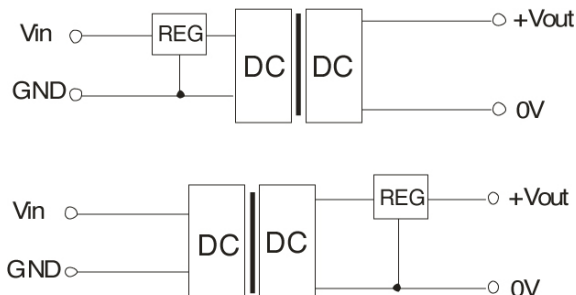


Figure 2

Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against over-current and short-circuits. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

No parallel connection or plug and play.

Only typical models listed, other models may be different, please contact our technical person for more details.