

## FEATURES

- ◆ Low ripple
- ◆ Good dynamic feature
- ◆ 1KVDC Isolation
- ◆ DIP24 Package
- ◆ Temperature Range: -40°C ~ +85 °C
- ◆ UL94-V0 Package
- ◆ No Heatsink Required
- ◆ No External Component Required
- ◆ Internal SMD construction
- ◆ RoHS Compliance

## MODEL SELECTION

**MA<sup>①</sup>05<sup>②</sup>12<sup>③</sup>-X<sup>④</sup>D<sup>⑤</sup>-2W(83)<sup>⑥</sup>**

- ① Product Series
- ② Input Voltage
- ③ Output Voltage
- ④ Fixed Input
- ⑤ DIP24 Package Style
- ⑥ Rated Power(Output current)

## APPLICATIONS

The MA\_XD-1W & MA\_XD-2W Series are specially designed for applications where a group of polar power supplies are 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  $\leq \pm 5\%$ );
- 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 demanded.



## SELECTION GUIDE

Order code	Input		Output			Efficiency <sup>1</sup> (%, Typ)
	Voltage(VDC)		Voltage (VDC)	Current(mA)		
	Nominal	Range		Max.	Min.	
MA0512XD-1W	5	4. 75-5.25	±12	±42	±5	64
MA0515XD-1W	5	4. 75-5.25	±15	±33	±4	65
MA0509XD-2W	5	4. 75-5.25	±9	±100	±10	62
MA0512XD-2W	5	4. 75-5.25	±12	±83	±9	63
MA0515XD-2W	5	4. 75-5.25	±15	±67	±7	64
MA1212XD-1W	12	11. 4-12.6	±12	±42	±5	64
MA1215XD-1W	12	11. 4-12.6	±15	±33	±4	65
MA1209XD-2W	12	11. 4-12.6	±9	±100	±10	63
MA1212XD-2W	12	11. 4-12.6	±12	±83	±9	65
MA1215XD-2W	12	11. 4-12.6	±15	±67	±7	66
MA2412XD-1W	24	22. 8-25.2	±12	±42	±5	64
MA2415XD-1W	24	22. 8-25.2	±15	±33	±4	65
MA2409XD-2W	24	22. 8-25.2	±9	±100	±10	63
MA2412XD-2W	24	22. 8-25.2	±12	±83	±9	66
MA2415XD-2W	24	22. 8-25.2	±15	±67	±7	67

## ISOLATION SPECIFICATIONS

Parameter	Test conditions	Min.	Typ.	Max.	Units
Storage humidity	Tested for 1 minute and 1mA max	1000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ

## COMMON SPECIFICATIONS

Parameter	Test conditions	Min.	Typ.	Max.	Units
Line regulation	For Vin change of $\pm 5\%$ (1W&2W)			±	%
	10% to 100% full load			±2.5	%
Output voltage accuracy	100% full load			±3	%
Temperature drift <sup>2</sup>	100% full load			0.03	%/°C
Output ripple*	20MHz Bandwidth(1W)		10	20	mVp-p
	20MHz Bandwidth(2W)		20	40	mVp-p
Output Noise*	20MHz Bandwidth(1W&2W)		50	150	mVp-p
Switching frequency	Full load, nominal input		75		KHz

\*Test ripple and noise by "parallel cable" met hod.

See detailed operation instructions at Testing of Power Converter section, application notes.

Note:

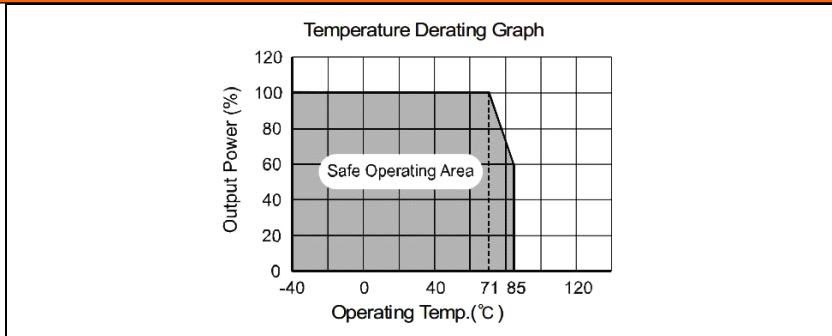
1. All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. See below recommended circuits for more details.

### COMMON SPECIFICATION

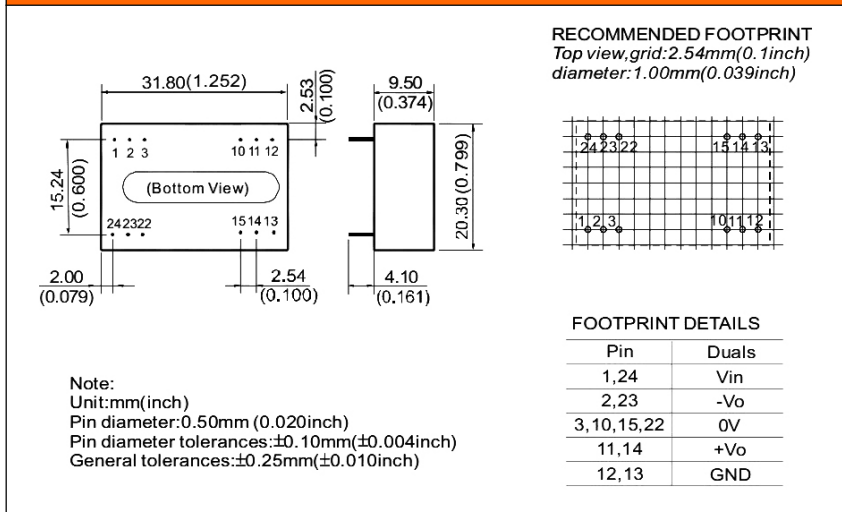
Parameter	Test conditions	Min.	Typ.	Max	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	°C
Temp. rise at full load			20	30	°C
Lead temperature	1.5mm from case for 10 seconds			300	°C
Short circuit protection*				1	s
Cooling	Free air convection				
Case material	Plastic(UL94-V0)				
MTBF		3500			K hours
Weight			11		g

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

### TYPICAL CHARACTERISTICS



### TYPICAL CHARACTERISTICS



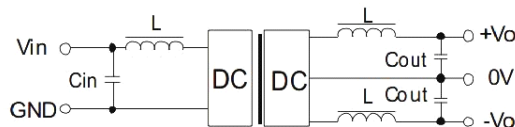
### APPLICATION NOTE

#### Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load is **not less than 10% of the full load**, and that this product should **never be operated under no 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 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 out put filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of out put, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees (Table 1).

#### EXTERNAL CAPACITOR TABLE (Table 1)

Vin(VDC)	Cin(uF)	Vout(VDC)	Cout(uF)
5	4.7	±5	4.7
12	2.2	±9	2.2
24	1	±12	1
-	-	±15	0.47

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

#### 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.

#### Input Over-voltage Protection Circuit

The simplest device for input over-voltage protection is a linear voltage regulator with overheat protection that is connected to the input end in series (Figure 2).



(Figure 2)

**When the environment temperature is higher than 71° C, the product output power should be less then 60% of the rated power.**

**No parallel connection or plug and play.**