

10DMW_1.5 series

10W - Dual/Single Output - Wide Input - Isolated & Regulated
DC-DC Converter



DC-DC Converter

10 Watt

- ⊕ 2:1 wide input voltage range
- ⊕ Efficiency up to 88%
- ⊕ 1.5kVDC isolation
- ⊕ Short circuit protection (SCP)
- ⊕ Output over voltage protection
- ⊕ Output over current protection
- ⊕ EN60950 approved
- ⊕ Input under-voltage protection
- ⊕ No-load power consumption as low as 0.12W
- ⊕ Industry standard pinout
- ⊕ Operating Temperature range: -40°C ~ +85°C
- ⊕ Meet CISPR32/EN55032 CLASS A, without extra components

The 10DMW_1.5 series are isolated 10W DC-DC converter products with a 2:1 input voltage range. They feature efficiencies of up to 88%, 1500VDC input to output isolation, operating temperature of -40°C ~ +85°C, input under-voltage protection, output over-voltage, over-current and short circuit protection. They meet CLASS A CISPR32/EN55032 EMI standards without external components and they are widely used in applications such as industrial controls, electric power, instrumentation and communications.

Optional packages are offered for chassis or DIN-rail mounting, adding additional input reverse polarity protection.



Common specifications	
Short circuit protection:	Continuous, automatic recovery
Cooling:	Free air convection
Operation temperature range (power derating above 71°C):	-40°C~+85°C
Storage temperature range:	-55°C ~+125°C
Lead temperature range:	300°C MAX, 1.5mm from case for 10 sec
Switching frequency (PWM mode):	350KHz TYP
Storage humidity range:	< 95%
Vibration:	10-55Hz, 10G, 90 Min. along X, Y and Z
Case material:	Aluminium alloy
MTBF (MIL-HDBK-217F@25°C):	>1,000,000 hours
Weight:	15g 35g chassis mounting 55g Din rail mounting
Dimensions:	25.40×25.40×11.70 mm 76×31.50×21.20 mm chassis mounting 76×31.50×25.80 mm Din rail mounting

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and 1mA max	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/0.1V		1000		pF

Note:

- The maximum capacitive load offered were tested at input voltage range and full load;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75%RH with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see „Features“ and „EMC“;
- Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

Output specifications					
Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy (0-100% load)	• 5VDC				
	- positive output		±1	±2	%
	- negative output		±1	±3	%
• others			±1	±3	%
Linear regulation (Input voltage variation from low to high @full load)	• 5VDC				
	- single output			±0.5	%
	- dual output			±1	%
• others			±0.2	±0.5	%
Load regulation* (0% to 100% load)	• 5VDC				
	- single output			±1	%
	- dual output			±1.5	%
• 12/48VDC (5% to 100% load)			±0.5	±1	%
	• 24VDC		±0.5	±1	%
Cross regulation	Input voltage range, 25%-100% load			±5	%
Transient recovery time	25% load step change		300	500	μs
Transient response deviation	25% load step change				
	• ±5V output, 10DMW_4803S1.5		±5	±8	%
	• 10DMW_4805S1.5				
• others			±3	±5	%
Temperature coefficient	100% load			±0.03	%/°C
Ripple & Noise**	20MHz Bandwidth		40	100	mVp-p
Over voltage protection	Input voltage range	110		160	%Vo
Over current protection	Input voltage range	110	140	190	%Io

* Load regulation for 0% -100% for 12VDC/48VDC nominal input series parts to 5%;
**Ripple & Noise at < 5% load is 5%Vo max. The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

Example:

10DMW_2405S1.5

10 = 10Watt; D = DIP; M = series; W = wide input (2:1) 18-36Vin;
24 = 24Vin; 05 = 5Vout; S = Single output; 1.5 = 1500VDC isolation

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Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input filter	PI				
Input current (full load / no load)	• 5VDC input		2500/10	2564/30	mA
	• 12VDC input		1004/5	1029/12	mA
	• 24VDC input		502/5	515/12	mA
	• 48VDC input				mA
Reflected ripple current	• 5VDC input		208/4	215/5	mA
	• 12VDC input		251/4	258/8	mA
	• 24VDC input				mA
	• 48VDC input				mA
Surge Voltage (1sec. max.)	• 5VDC input	-0.7		16	VDC
	• 12VDC input	-0.7		25	VDC
	• 24VDC input	-0.7		50	VDC
	• 48VDC input	-0.7		100	VDC
Start-up voltage	• 5VDC input			4.5	VDC
	• 12VDC input			9	VDC
	• 24VDC input			18	VDC
	• 48VDC input			36	VDC
Under-voltage protection	• 5VDC input	3	3.5		VDC
	• 12VDC input	5.5	6.5		VDC
	• 24VDC input	12	15.5		VDC
	• 48VDC input	26	30		VDC
Start-up time	Nominal input & constant resistance load		10		ms
Hot plug	Unavailable				
Ctrl ⁽¹⁾	• Module on	Ctrl pin open or pulled high (TTL 3.5-12VDC)			
	• Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	• Input current when off	6	10		mA

1. The CTRL pin voltage is referenced to GND.

EMC specifications					
EMI	CE	CISPR32/EN55032			
		• 5VDC: CLASS B (see EMC compliance circuit, ②) • 12VDC: CLASS A (without extra components) CLASS B (see EMC compliance circuit, ②) • 24VDC: CLASS A (without extra components) CLASS B (see EMC compliance circuit, ②) • 48VDC: CLASS B (see EMC compliance circuit, ②)			
EMI	RE	CISPR22/EN55032			
		• 5VDC: CLASS B (see EMC compliance circuit, ②) • 12VDC: CLASS A (without extra components) CLASS B (see EMC compliance circuit, ②) • 24VDC: CLASS A (without extra components) CLASS B (see EMC compliance circuit, ②) • 48VDC: CLASS B (see EMC compliance circuit, ②)			
EMS	ESD	IEC/EN61000-4-2	Contact ±4KV/ ±6KV (for 5VDC input)	Contact	perf. Criteria B
EMS	RS	IEC/EN61000-4-3	10V/m		perf. Criteria A
EMS	EFT	IEC/EN61000-4-4	±2KV		perf. Criteria B (see EMC compliance circuit, ②)
EMS	Surge	IEC/EN61000-4-5	±2KV		perf. Criteria B (see EMC compliance circuit, ②)
EMS	CS	IEC/EN61000-4-6	3 Vr.m.s		perf. Criteria A

Product Selection Guide

Certification	Part Number ¹⁾	Input Voltage [VDC]		Output Voltage [VDC]	Output current [mA]	Capacitive load ³⁾ [μF, Max.]	Efficiency ⁴⁾ [% , Typ.]
		Nominal	Range Max ²⁾				
	10DMW_0512S1.5	5	4.5-9	12	834	470	85
	10DMW_0515S1.5	5	4.5-9	15	667	330	86
	10DMW_0524S1.5	5	4.5-9	24	417	100	85
	10DMW_1205S1.5	12	9-18	40	2000	2200	83
	10DMW_2405S1.5	24	18-36	40	2000	2200	83
	10DMW_2412S1.5	24	18-36	40	833	470	87
	10DMW_2415S1.5	24	18-36	40	667	330	88
	10DMW_2424S1.5	24	18-36	40	416	100	88
	10DMW_4803S1.5	48	36-75	80	2000	2400	79
	10DMW_4805S1.5	48	36-75	80	5	2000	83
	10DMW_4812S1.5	48	36-75	80	12	833	87
	10DMW_4815S1.5	48	36-75	80	15	667	87
	10DMW_4824S1.5	48	36-75	80	24	416	88
	10DMW_0505D1.5	5	4.5-9	12	±5	±1000	80
	10DMW_0512D1.5	5	4.5-9	12	±12	±417	85
	10DMW_0515D1.5	5	4.5-9	12	±15	±334	86
	10DMW_0524D1.5	5	4.5-9	12	±24	±209	85

¹⁾ Add suffix CM for chassis mounting (f.ex. 10DMW_0512S1.5CM) and suffix RM for DIN-Rail mounting (f.ex. 10DMW_0512S1.5RM);

²⁾ The chassis mounting and din rail mounting model's start-up and minimum input voltages are increased by 1VDC due to the input reverse polarity protection circuit

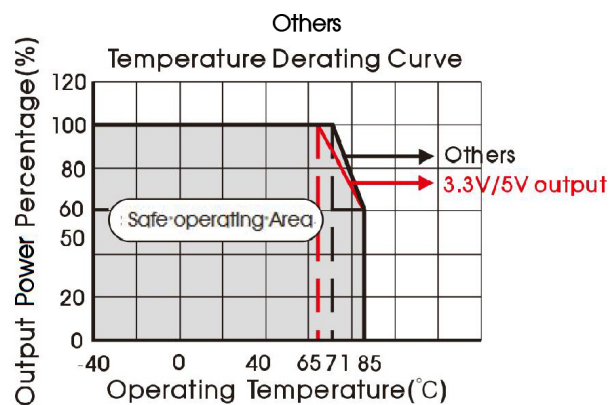
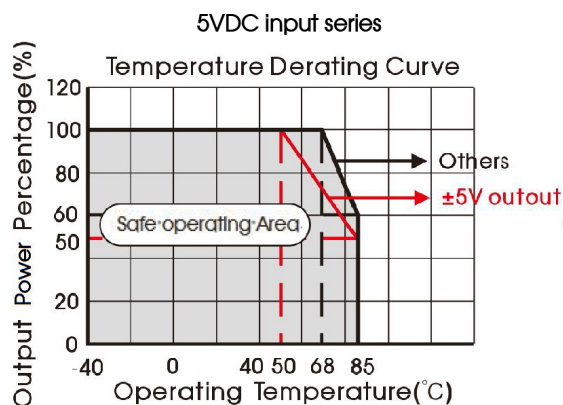
³⁾ Exceeding the maximum input voltage may cause permanent damage;

⁴⁾ Efficiency is measured at nominal input voltage and rated output load; efficiencies for A2S and A4S Models is decreased by 2% due to the input reverse polarity protection circuit.

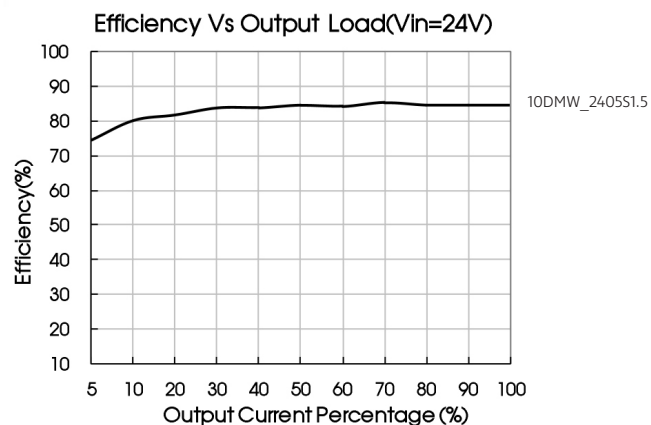
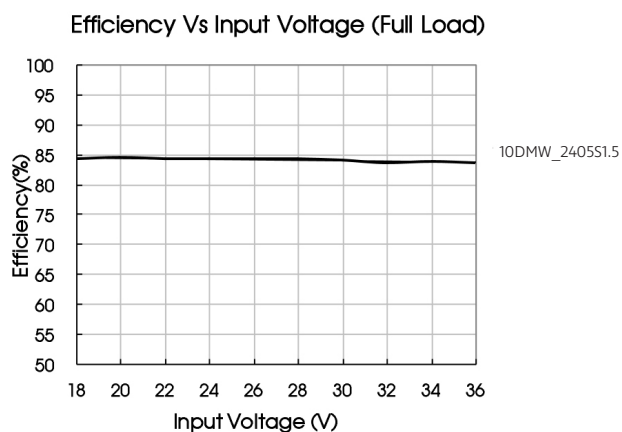
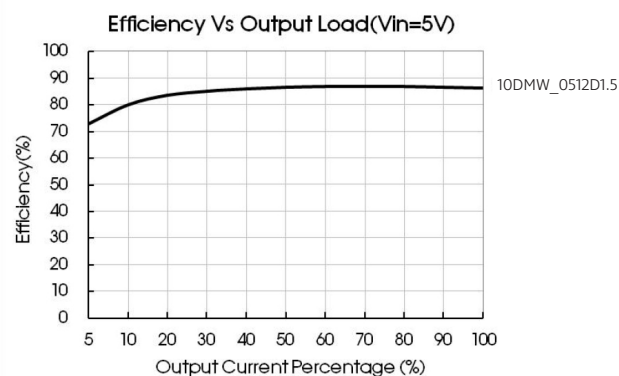
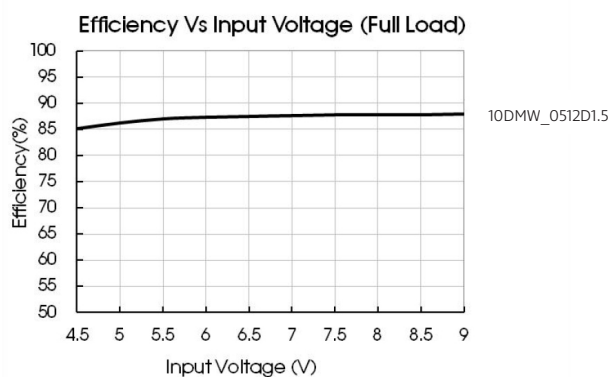
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Typical characteristics



Efficiency



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Typical application

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 1.
Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

Vin (VDC)	5V/12V/24V/48V
Cin	100 μ F
Cout	10 μ F

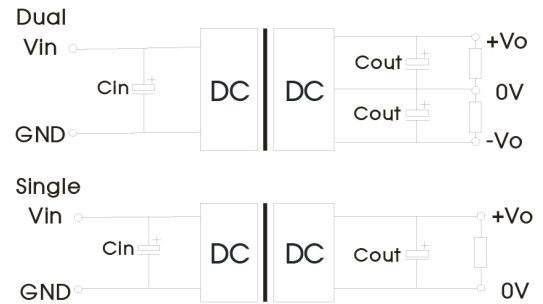
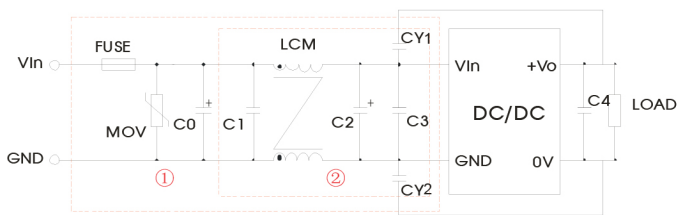


Figure 1

EMC solution recommended circuit

The products do not support parallel connection of their output

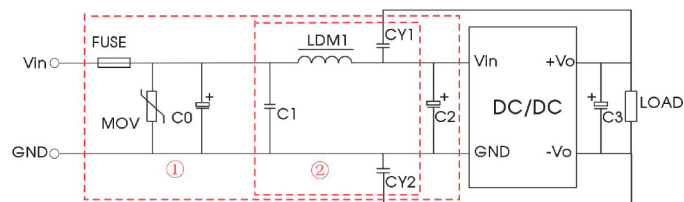
24VDC/48VDC nominal input series



Note:
For EMC tests we use Part ① for immunity and part ② for emissions test. Selecting based on needs.

Model	Vin: 24V	Vin: 48V
FUSE	Select fuse value according to actual input current	
MOV	S20K30	S14K60
C0	680 μ F/50V	680 μ F/100V
C1	1 μ F/50V	1 μ F/100V
C2	330 μ F/50V	330 μ F/100V
C3	4.7 μ F/50V	4.7 μ F/100V
C4	Refer to the Cout in typical application	
LCM	4.7 μ H	
CY1/CY2	1nF/2KV	

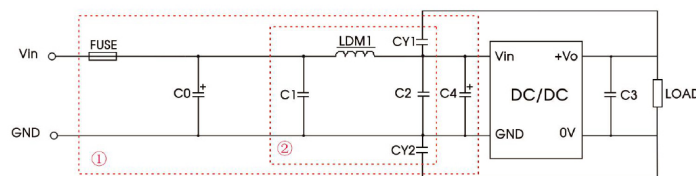
12VDC nominal input series



Note:
For EMC tests we use Part ① or immunity and part ② for emissions test. Selecting based on needs

Model	Vin: 12V
FUSE	Select fuse value according to actual input current
MOV	S20K30
C0/C2	330 μ F/50V
C1	1 μ F/50V
C3	Refer to the Cout in typical application
LDM1	4.7 μ H
CY1/CY2	1nF/2KV

5VDC nominal input series



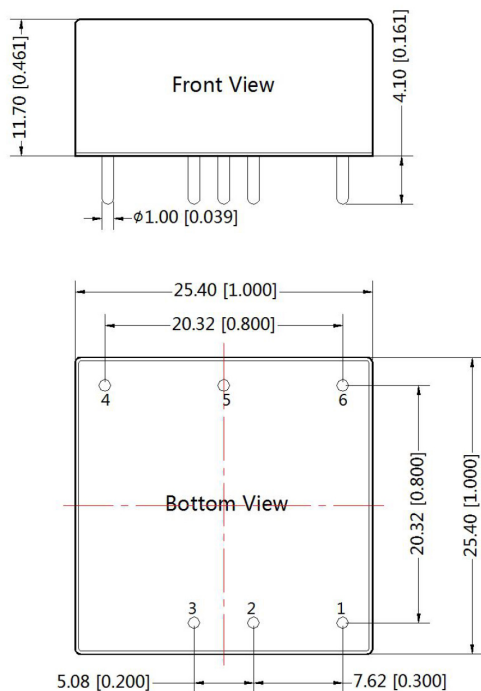
Note:
For EMC tests we use Part ① or immunity and part ② for emissions test. Selecting based on needs

Model	Vin: 5V
FUSE	Select fuse value according to actual input current
MOV	S20K30
C0	2200 μ F/35V
C1/C2	4.7 μ F/50V
C3	Refer to the Cout in typical application
C4	1000 μ F/35V
LDM1	4.7 μ H
CY1/CY2	1nF/2KV

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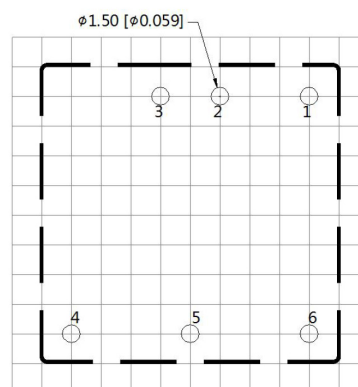
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Mechanical dimensions and recommended layout



Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.50 [± 0.020]

THIRD ANGLE PROJECTION

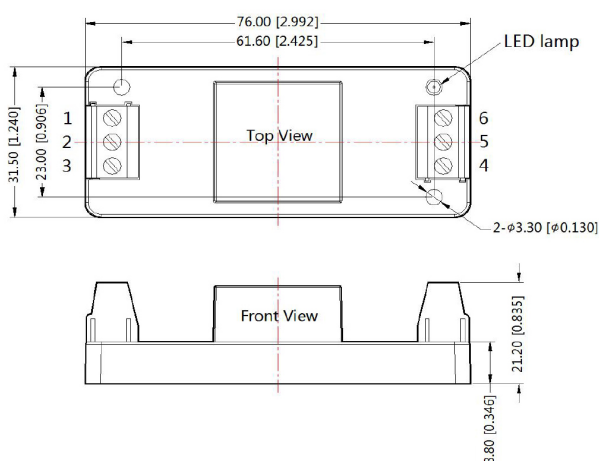


Note: Grid 2.54*2.54mm

Pin-Out		
Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	No Pin	0V
6	0V	-Vo

Chassis mounting

THIRD ANGLE PROJECTION



Pin-Out		
Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	No Pin	0V
6	0V	-Vo

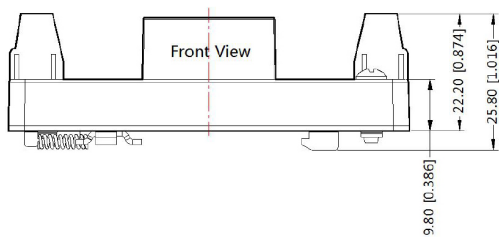
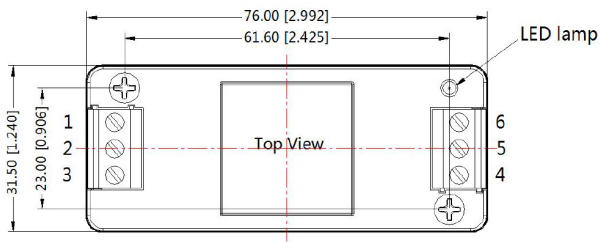
Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ± 1.00 [± 0.039]

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Chassis mounting

THIRD ANGLE PROJECTION 



Pin-Out		
Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	No Pin	0V
6	0V	-Vo

Note:

Unit: mm[inch]

Mounting rail: TS35

Wire range: 24-12 AWG

Tightening torque: Max 0.4 N·m

General tolerances: $\pm 1.00 [\pm 0.039]$