

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

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	%
	• 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

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.

* 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
	- 3.3V output - others		208/4 251/4	215/5 258/8	mA mA
Reflected ripple current	• 5/12VDC input		50		mA
	• 24VDC input		40		mA
	• 48VDC input		30		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 (see EMC compliance circuit, ②)		perf. Criteria B
EMS	Surge	IEC/EN61000-4-5	±2KV (see EMC compliance circuit, ②)		perf. Criteria B
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	5	2000	2200	83
	10DMW_2405S1.5	24	18-36	5	2000	2200	83
	10DMW_2412S1.5	24	18-36	12	833	470	87
	10DMW_2415S1.5	24	18-36	15	667	330	88
	10DMW_2424S1.5	24	18-36	24	416	100	88
	10DMW_4803S1.5	48	36-75	3.3	2000	2400	79
	10DMW_4805S1.5	48	36-75	5	2000	2200	83
	10DMW_4812S1.5	48	36-75	12	833	470	87
	10DMW_4815S1.5	48	36-75	15	667	330	87
	10DMW_4824S1.5	48	36-75	24	416	100	88
	10DMW_0505D1.5	5	4.5-9	±5	±1000	1000	80
	10DMW_0512D1.5	5	4.5-9	±12	±417	470	85
	10DMW_0515D1.5	5	4.5-9	±15	±334	330	86
	10DMW_0524D1.5	5	4.5-9	±24	±209	100	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

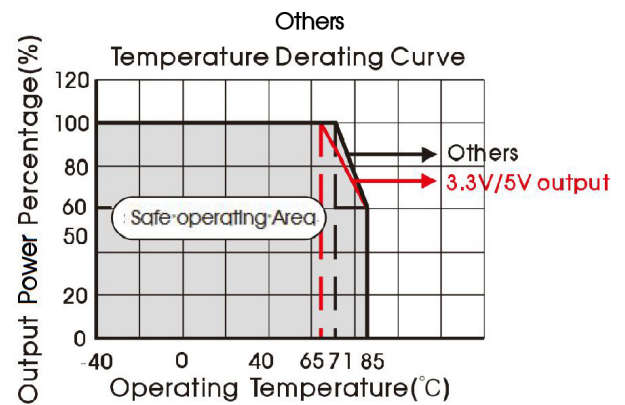
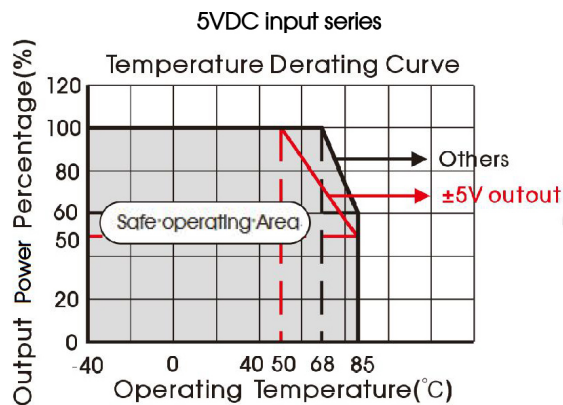
³⁾ Exceeding the maximum input voltage may cause permanent damage;

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.

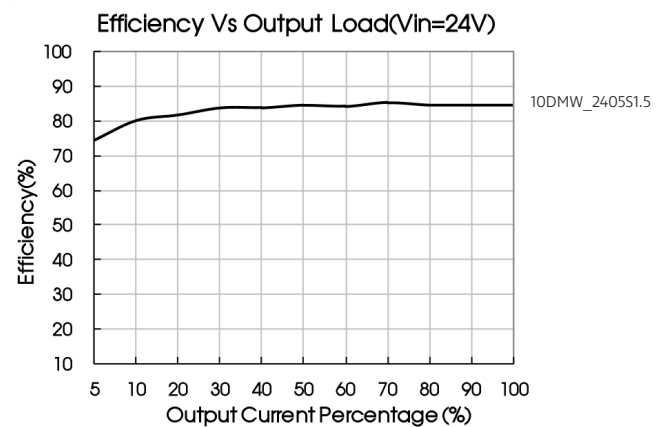
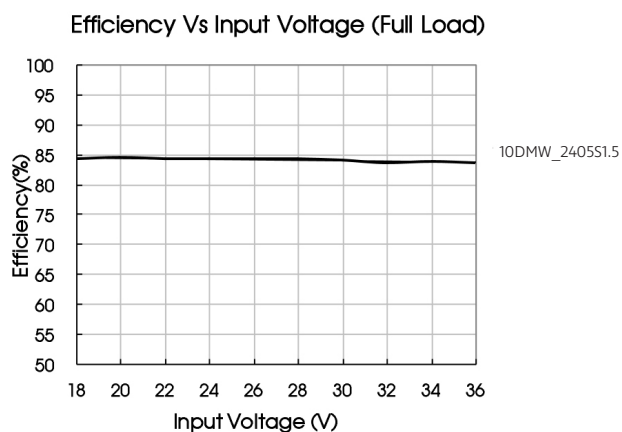
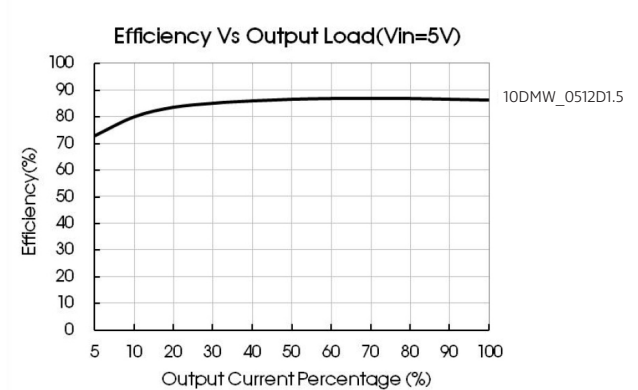
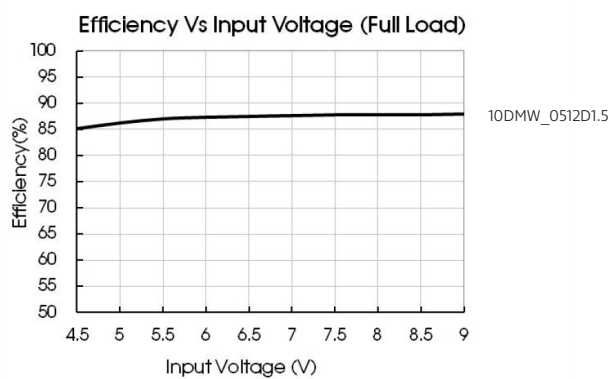
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Typical characteristics



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

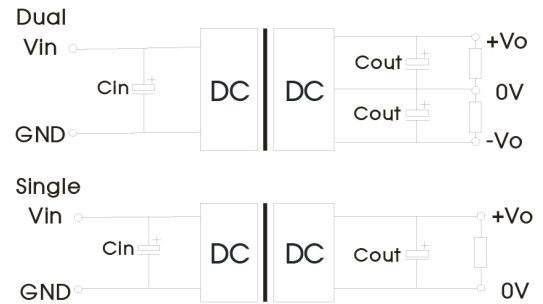
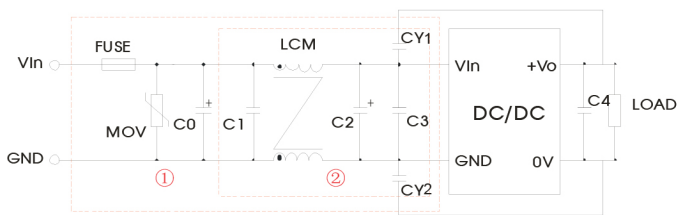


Figure 1

EMC solution recommended circuit

The products do not support parallel connection of their output

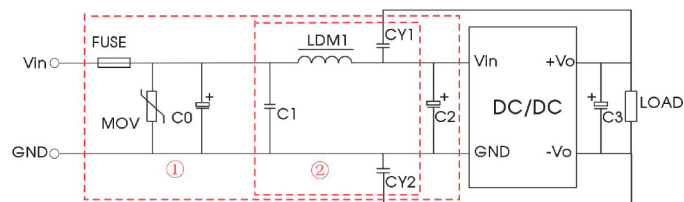
24VDC/48VDC nominal input series



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	

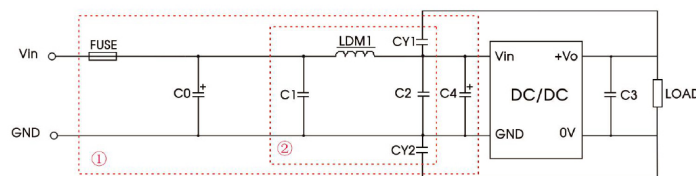
12VDC nominal input series



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



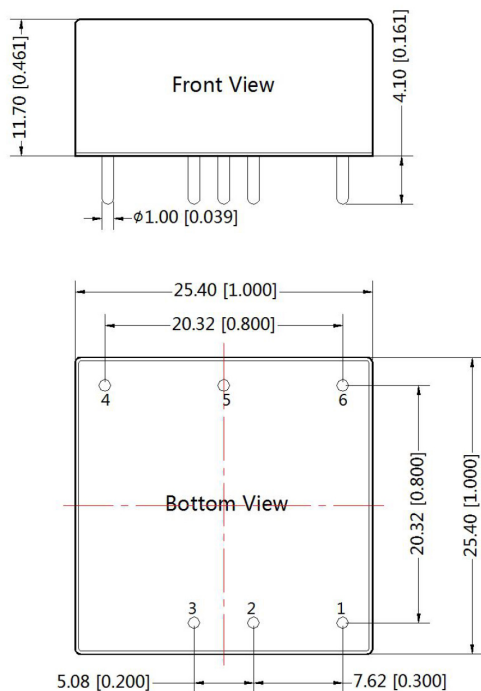
Note:
For EMC tests we use Part ① or immunity and part ② for emissions test. Selecting based on needs

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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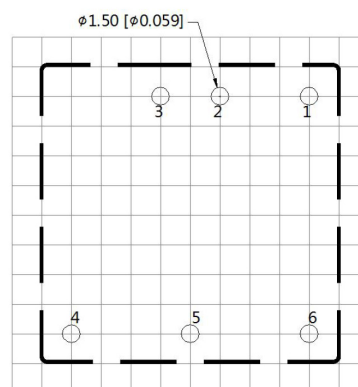
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Mechanical dimensions and recommended layout



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

THIRD ANGLE PROJECTION

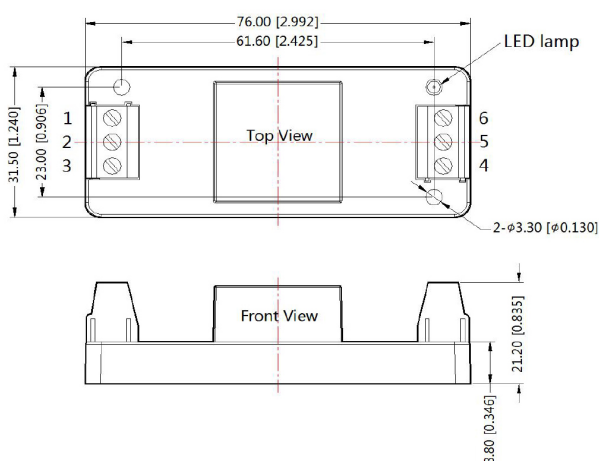


Note: Grid 2.54*2.54mm

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

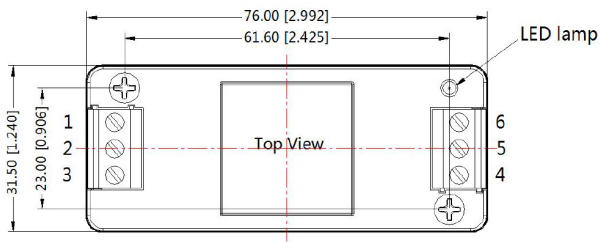
Note:
 Unit: mm[inch]
 Wire range: 24-12 AWG
 Tightening torque: Max 0.4 N·m
 General tolerances: ± 1.00 [± 0.039]

10DMW_1.5 series

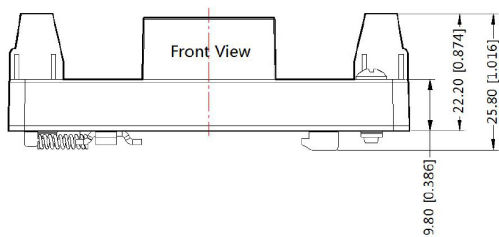
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Chassis mounting

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: $\pm 1.00 [\pm 0.039]$