10DMW_1.5R series

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

DC-DC Converter 10 Watt

- 1"x 1" package style
- 1500VDC isolation
- Operating temperature range: -40°C to +85°C
- Input undervoltage protection
- Up to 88% efficiency
- Output short circuit protection and over current protection
- 2:1 input voltage range

Introducing our new compact DC/DC converter 10DMW_1.5R series in a space-saving 1"x1" package, engineered for reliable performance across a wide range of industrial and embedded applications. With a 2:1 input voltage range, up to 88% efficiency, and robust 1500VDC isolation, this series ensures efficient power conversion even under demanding conditions. It features built-in input undervoltage protection, output short circuit protection, and overcurrent protection - all housed in a durable design that operates reliably from -40°C to +85°C.

Common specifications

Short circuit protection	Continuous, self-recovery
Over current protection	110 (min.) 140 (typ.) %Io
Switching frequency	312 kHz (typ.)
Operation temperature	-40°C ~+85°C (with derating)
Storage temperature	-50°C ~ +125°C
Soldering profile	+300°C (1.5mm from case for 10 sec)
Storage humidity	5-95% RH
MTBF: (MIL-HDBK-217F@25°C)	1,000,000 hours
Input filter	PI filter
Hot plug	Unavailable
Case material	Aluminum alloy
Package dimensions	25.4 x 25.40 x 12.00 mm
Weight	21g (typ.)
Cooling method	Free air convection

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/ no-load)	24VDC nominal input series, 24V input 48VDC nominal input series, 48V input		429/6 189/6		mA
Reflected ripple current	Rated input voltage		40		mA
Impulse voltage	24VDC nominal input 48VDC nominal input	-0.7 -0.7		50 100	VDC
Starting voltage	24VDC nominal input 48VDC nominal input			9 18	VDC
Input undervoltage protection	24VDC nominal input 48VDC nominal input	5.5 12	6.5 15.5		VDC
Ctrl	Turn on module Turn off module	No connected or (3.5-12V) Connected GND or (0-1.2V)			

Example:
10DMW_1205S1.5R
10 = 10Watt; D = DIP; M = Series; W = Wide input; 12 = 12Vin; 05 = 5Vout; S = Single Output; 1.5 = 1500VDC isolation; R = Revised version

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	0% - 100% load		±1.0	±3.0	%
Linear regulation	Vin = Min. to Max. @full load			±0.5	%
Load regulation	0% -100% load			±1.0 ±1.5	%
Ripple & noise	20MHz bandwidth, 5%-100% load		40	100	mVp-p
Cross adjustment rate	Dual output, with 50% load on the main circuit and 10% -100% load on the secondary circuit			±5	%
Transient recovery time	25% load step change, nominal input voltage		300	500	µs
Transient response deviation	25% load step change, nominal input voltage		±3	±5	%

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output, test time 1 minute, leakage current less than 1mA	1500			VDC
Isolation resistance	Input-output, isolated voltage 500VDC	1000			MΩ
Isolation capacitance	Input-output, 100KHz/0.1V		1000		pF

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
3. Suggested dual output module load imbalance: ≤ ± 5%. If it exceeds ± 5%, it cannot be guaranteed that the product performance meets all performance indicators in this manual;
4. The maximum capacitive load is tested within the input voltage range and under full load conditions;
5. Unless otherwise specified, all indicators in this manual are measured at Ta = 25 °C, humidity <75% RH, nominal input voltage, and output rated load;
6. All indicator testing methods in this manual are based on our company's corporate standards;
7. We can provide product customization, and specific requirements can be directly contacted by our support team;
8. Product specifications are subject to change without prior notice.

GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

EMC specifications				
EMC	EMI	CE	CISPR32/EN55032 CLASS A (bare machine)/CLASS B (figure 3-2) CISPR32/EN55032 CLASS B (figure 3-2)	
EMC	EMI	RE	CISPR32/EN55032 CLASS A (bare machine)/CLASS B (figure 3-2) CISPR32/EN55032 CLASS B (recommended circuit as shown in figure 3-2)	
EMC	EMS	ESD	IEC/EN61000-4-2 Contact ±4kV	Perf. Criteria B
EMC	EMS	RS	IEC/EN61000-4-3 10V/m	Perf. Criteria A
EMC	EMS	EFT	IEC/EN61000-4-4 ±2kV (Figure3-1)	Perf. Criteria B
EMC	EMS	Surge	IEC/EN61000-4-5 line to line ±2kV (Figure 3-1)	Perf. Criteria B
EMC	EMS	CS	IEC/EN61000-4-6 10Vr.m.s	Perf. Criteria A

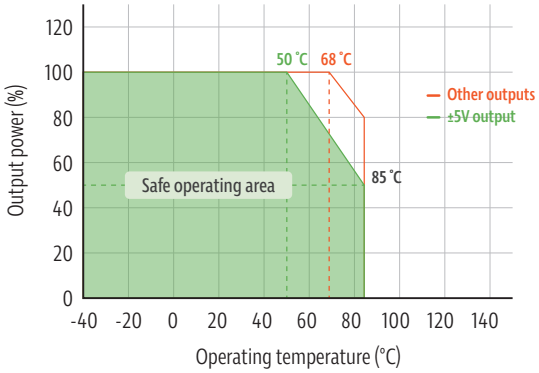
Product Selection Guide

Approval	Part number	Input Voltage Nominal Range (VDC)	Input Voltage Max. (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency (%) full load, (typ.)	Max. Capacitive Load (uF) max.
	10DMW_0505S1.5R	5 (4.5-9)	10	5	2000/0	85	470
	10DMW_0512S1.5R	5 (4.5-9)	10	12	834/0	83	470
	10DMW_0515S1.5R	5 (4.5-9)	10	15	667/0	84	330
	10DMW_0524S1.5R	5 (4.5-9)	10	24	417/0	83	100
	10DMW_1205S1.5R	12 (9-18)	20	5	2000/0	83	2200
	10DMW_1212S1.5R	12 (9-18)	20	12	833/0	87	470
	10DMW_1215S1.5R	12 (9-18)	20	15	667/0	88	330
	10DMW_1224S1.5R	12 (9-18)	20	24	416/0	88	100
	10DMW_2403S1.5R	24 (18-36)	40	3.3	2400/0	79	2200
	10DMW_2405S1.5R	24 (18-36)	40	5	2000/0	83	2200
	10DMW_2412S1.5R	24 (18-36)	40	12	833/0	87	470
	10DMW_2415S1.5R	24 (18-36)	40	15	667/0	88	330
	10DMW_2424S1.5R	24 (18-36)	40	24	416/0	88	100
	10DMW_4803S1.5R	48 (36-75)	80	3.3	2400/0	79	2200
	10DMW_4805S1.5R	48 (36-75)	80	5	2000/0	83	2200
	10DMW_4812S1.5R	48 (36-75)	80	12	834/0	87	470
	10DMW_4815S1.5R	48 (36-75)	80	15	667/0	87	330
	10DMW_4824S1.5R	48 (36-75)	80	24	416/0	88	100

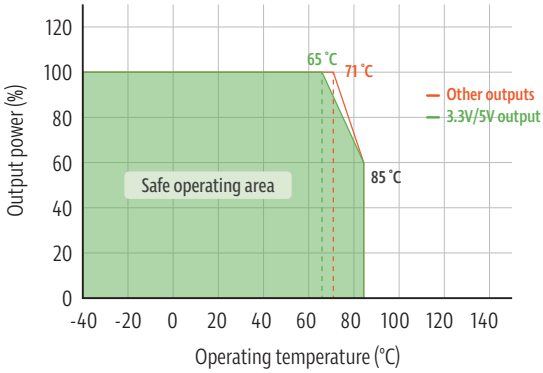
Approval	Part number	Input Voltage Nominal Range (VDC)	Input Voltage Max. (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency (%) full load, (typ.)	Max. Capacitive Load (uF) max.
	10DMW_0505D1.5R	5 (4.5-9)	10	±5	±1000/0	78	1000
	10DMW_0512D1.5R	5 (4.5-9)	10	±12	±417/0	83	470
	10DMW_0515D1.5R	5 (4.5-9)	10	±15	±334/0	84	330
	10DMW_0524D1.5R	5 (4.5-9)	10	±24	±209/0	83	100
	10DMW_1205D1.5R	12 (9-18)	20	±5	±1000/0	83	1000
	10DMW_1212D1.5R	12 (9-18)	20	±12	±417/0	86	470
	10DMW_1215D1.5R	12 (9-18)	20	±15	±334/0	87	330
	10DMW_1224D1.5R	12 (9-18)	20	±24	±209/0	87	100
	10DMW_2405D1.5R	24 (18-36)	40	±5	±1000/0	83	1000
	10DMW_2412D1.5R	24 (18-36)	40	±12	±417/0	87	470
	10DMW_2415D1.5R	24 (18-36)	40	±15	±334/0	88	330
	10DMW_2424D1.5R	24 (18-36)	40	±24	±209/0	88	100

Typical characteristics

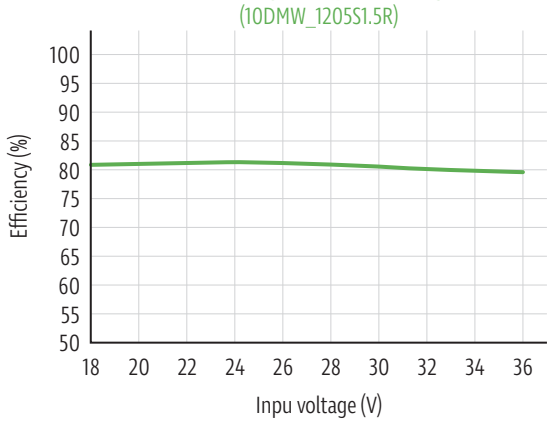
Temperature derating graph



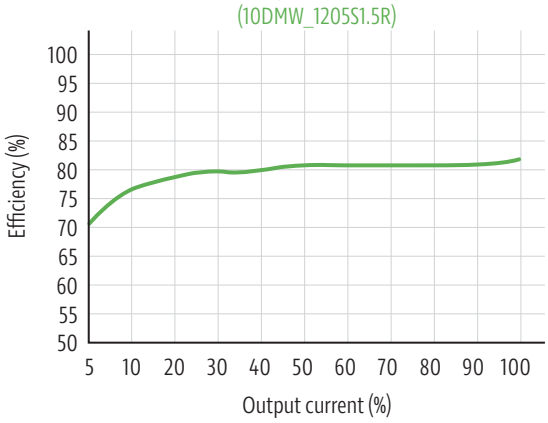
Temperature derating graph



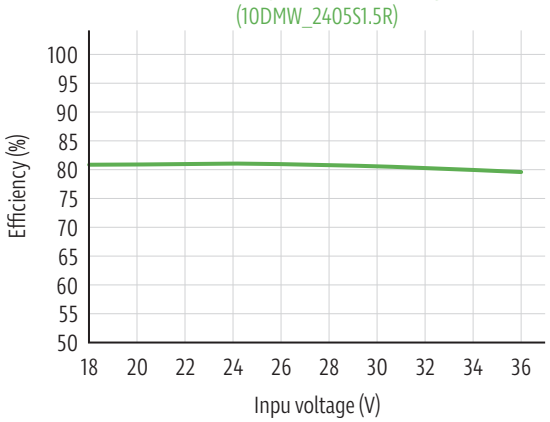
Efficiency vs input voltage
(10DMW_1205S1.5R)



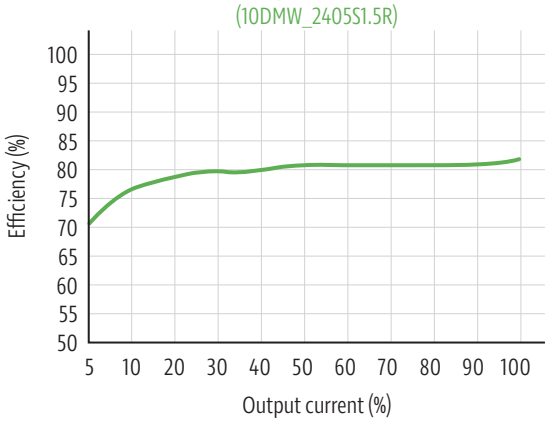
Efficiency vs output load
(10DMW_1205S1.5R)



Efficiency vs input voltage
(10DMW_2405S1.5R)



Efficiency vs output load
(10DMW_2405S1.5R)



GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

Typical circuit design and application

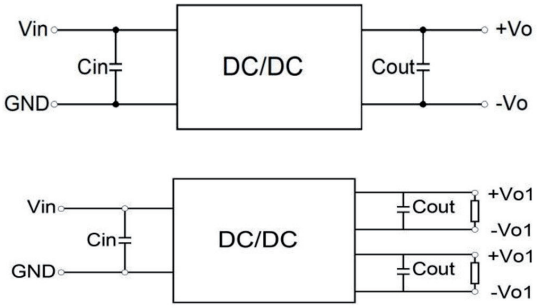


Figure2

Recommended component parameters

Vin (VDC)	Cin (uF)	Cout (uF)
24	100	10
48	10-47	10

EMI recommended component parameters

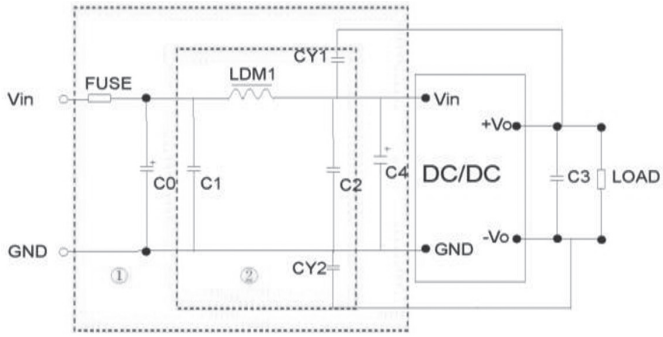


Fig 3

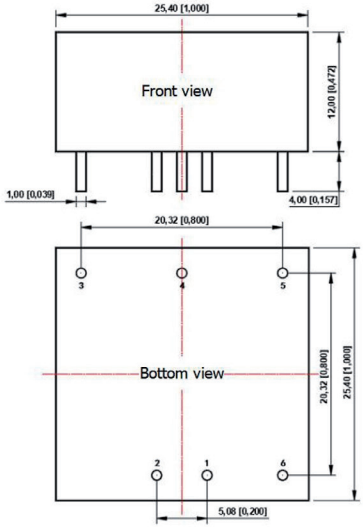
EMI recommended component parameters

Vin	24VDC	48VDC
FUSE	Choose according to actual input current	
MOV	20D470K	14D101K
C0	680uF/50V	680uF/100V
C1	1uF/50V	1uF/100V
C2	330uF/50V	330uF/100V
C3	4.7uF/50V	4.7uF/100V
C4	Refer to the Cout in Fig.3	
LCM	4.7mH	
CY1, CY2	1nF/2KV	

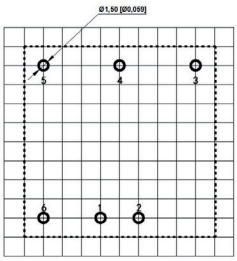
Note: Part 1 of Figure 3 is used for EMS testing; Part 2 is used for EMI filtering and can be selected according to requirements.

Application Circuit Description:
1. All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.
2. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout 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.

Dimensions



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



Note: The grid distance is 2.54*2.54mm

Pin Definition Table		
Pin	Single	Dule
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No pin	Com
5	-Vo	-Vo
6	CTRL	CTRL