40DMW4_1.5R series

40W - Single Output DC-DC Converter - Ultra Wide Input - Isolated & Regulated

DC-DC Converter 40 Watt

- Operating temperature range: -40°C to +105°C
- Isolation voltage: 1500VDC
- High efficiency up to 92%
- 4:1 Ultra-wide input voltage range
- Input undervoltage protection
- Output short circuit protection
- Over current protection

Introducing our new 40DMW4_1.5R series, designed to deliver outstanding efficiency and reliability across a wide range of applications. With a high efficiency of up to 92%, these modules ensure optimal energy conversion and minimal power loss. Featuring a 4:1 ultra-wide input voltage range, they offer exceptional versatility, accommodating various input sources. The modules operate in a broad temperature range from -40°C to +105°C, making them suitable for harsh environments.

Our power modules provide robust protection features, including input undervoltage protection, output short circuit protection, and overcurrent protection, ensuring the safety and longevity of your devices. With an isolation voltage of 1500VDC, they offer excellent electrical insulation, enhancing operational safety.

Common specifications	
Short circuit protection	Continuous, self-recovery
Over Voltage Protection	110-140%
Over Current Protection	110-140%
Input undervoltage protection	24VDC nominal input 5.5VDC (Min.) 7.5VDC (typ.) 48VDC nominal input 12.0VDC (Min.) 15.5VDC (typ.)
Switching frequency	330 KHz (typ.) Full load, nominal input voltage
Operation temperature	-40°C ~+105°C (with derating)
Storage temperature	-50°C ~+125°C
Soldering profile	+300°C (1.5mm from case for 10 sec)
Humidity	95% RH (non condensing)
MTBF: (MIL-HDBK-217F@25°C)	1,000,000 hours
Case material	Aluminum alloy
Weight	21g (typ.)
Package Dimensions	25.4 x 25.40 x 12.00 mm
Cooling	Free air convection

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input current (full load/ no-load)	24VDC nominal input • 3.3VDC • 5VDC • Other 48VDC nominal input • 3.3VDC • 5VDC • Other		 1894/60 1852/60 1852/12 958/60 926/60 926/12	 1938/100 1894/100 1894/25 998/100 958/100 947/25	mA
Reflected ripple current			60		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
Ctrl	turn off module turn on module Input current when off	connected GND or (0-1.2V) No connected or (3.5-12V)	5	8	mA
Input filter	PI filter				

Output specifications					
Item	Test condition	Min	Typ	Max	Units
Voltage accuracy	5%-100% load		±1.0	±3.0	%
Linear regulation	Vin = Min. to Max. @Full Load		±0.2	±0.5	%
Load regulation	5%-100% load		±0.5	±1.0	%
Ripple & noise	20MHz bandwidth, 5%-100% load		100	200	mVp-p
Transient recovery time	25% Load step change, nominal input voltage		300	500	µs
Transient response	25% Load step change, nominal input voltage		±5	±8	%
Temperature coefficient	Full load		±0.01	±0.02	%/°C
Trim			±10.0		%

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output, test time 1 minute,	1500			VDC
Insulation resistance	Input-output, insulated voltage 500VDC	1000			MΩ
Isolation capacitance	Input-output, 100kHz/0.1V		2000		pF

Example:
40DMW4_2405S1.5R
40 = 40Watt; D = DIP; M = Series; W4 = Wide input; 24 = 24Vin; 05 = 5Vout; S = Single Output; 1.5 = 1500VDC isolation; R = Regulated Output

1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;
2. The maximum capacitive load is tested under the input voltage range and full load condition;
3. Unless otherwise stated, all indexes in this manual are measured at Ta = 25°C, humidity <75%RH, nominal input voltage and rated output load;
4. All index testing methods in this manual are based on the enterprise standards of the company;
5. Our company can provide product customization, specific needs can directly contact our technical staff;

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EMC specifications							
EMC	EMI	CE	EN55032, FCC part 15	CLASS B			
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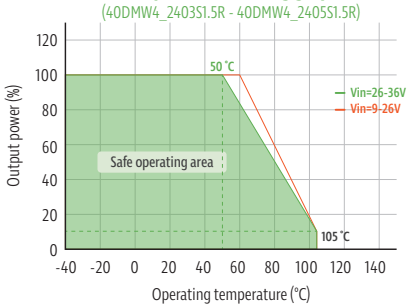
EMC	EMS	ESD	EN61000-4-2 Air ± 8kV, Contact ± 6kV		perf.	Criteria	B
EMC	EMS	RS	EN61000-4-3	10V/m	perf.	Criteria	A
EMC	EMS	EFT	EN61000-4-4	±2kV	perf.	Criteria	B
EMC	EMS	Surge	EN61000-4-5	±1kV	perf.	Criteria	B
EMC	EMS	CS	EN61000-4-6	3Vrms	perf.	Criteria	A

Product Selection Guide - Single output

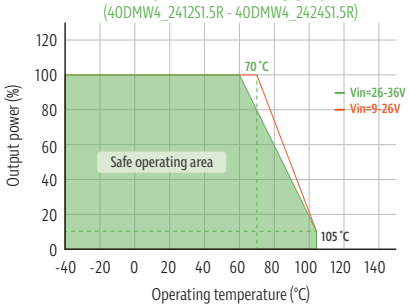
Approval	Part number	Input Voltage Nominal (VDC)	Input Voltage Range (VDC)	Input Voltage Max. (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency (%) full load, (typ.)	Max. Capacitive Load (uF)
	40DMW4_2403S1.5R	24	(9-36)	40	3.3	10000/0	89	10000
	40DMW4_2405S1.5R	24	(9-36)	40	5	8000/0	91	10000
	40DMW4_2412S1.5R	24	(9-36)	40	12	3333/0	91	2700
	40DMW4_2415S1.5R	24	(9-36)	40	15	2667/0	92	1680
	40DMW4_2424S1.5R	24	(9-36)	40	24	1667/0	91	680
	40DMW4_4803S1.5R	48	(18-75)	80	3.3	8000/0	89	10000
	40DMW4_4805S1.5R	48	(18-75)	80	5	8000/0	91	10000
	40DMW4_4812S1.5R	48	(18-75)	80	12	3333/0	92	2700
	40DMW4_4815S1.5R	48	(18-75)	80	15	2667/0	92	1680
	40DMW4_4824S1.5R	48	(18-75)	80	24	1667/0	91	680
	40DMW4_4828S1.5R	48	(18-75)	80	28	1428/0	91	680

Typical characteristics

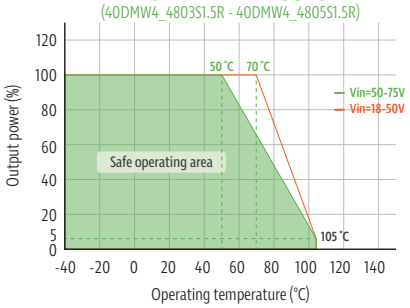
Temperature derating graph
(40DMW4_2403S1.5R - 40DMW4_2405S1.5R)



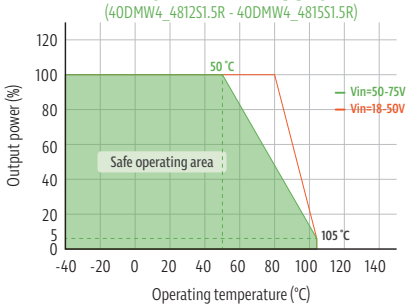
Temperature derating graph
(40DMW4_2412S1.5R - 40DMW4_2424S1.5R)



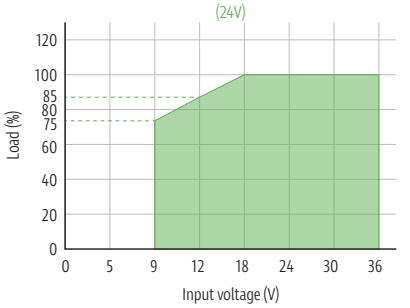
Temperature derating graph
(40DMW4_4803S1.5R - 40DMW4_4805S1.5R)



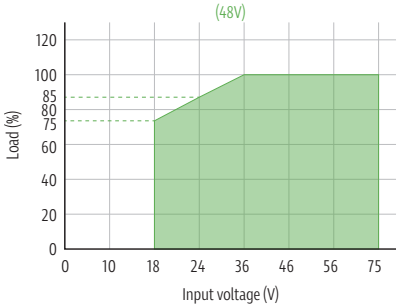
Temperature derating graph
(40DMW4_4812S1.5R - 40DMW4_4815S1.5R)



Load vs vin
(24V)



Load vs vin
(48V)



Typical Circuit design and application

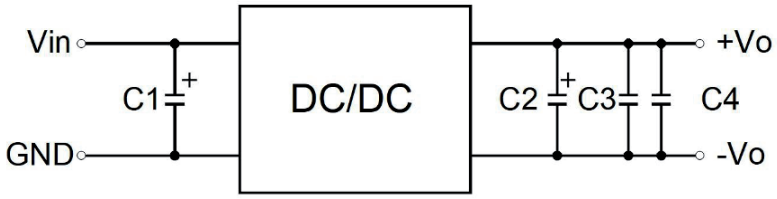


Fig 3

Recommended component parameters

Vin (VDC)	C1 (uF)	C2 (uF)	C3 (uF)	C4 (uF)
24	100	470	10	0.1
48	100	470	22	10

EMI recommended component parameters

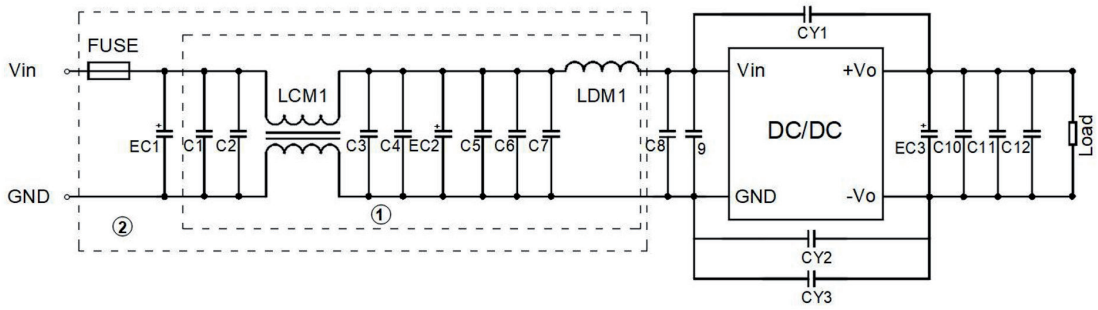
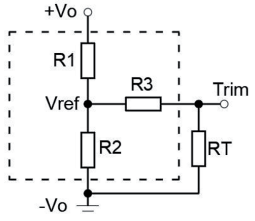


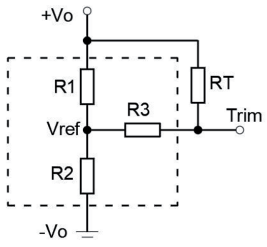
Fig 4

Vin (VDC)	FUSE	CEC1 (uF)	EC2 (uF)	C1, C2, C3, C4, C5	LCM1 (mH)	LDM1 (uH)	C8, C9 (uF)	CY2	CY1, CY3	EC3 (uF)	C10 (uF)	C11, C12
24V	Choose according to actual input	1000	220	4.7	0.32	2.2	-	222	2200	470	10	1uF
48V		680	100	4.7	10	6.8	4.7	102	2200	470	22	10u

Trim



Trim up



Trim down

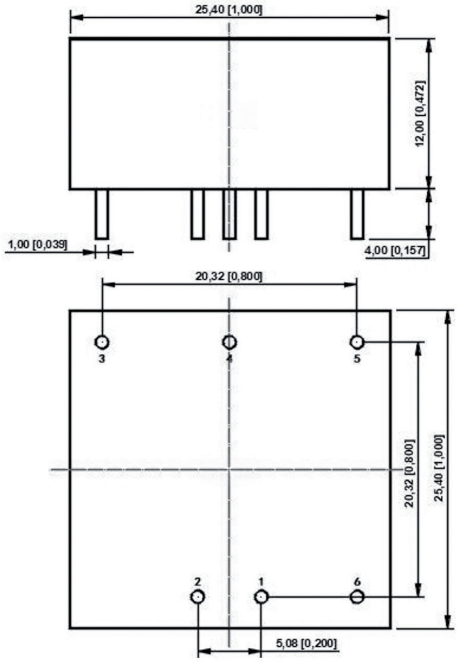
Vout (V)	R1 (KΩ)	R2 (KΩ)	R3 (KΩ)	Vref (V)
3.3	10	6.064	13.622	1.24
5	2.4	2.344	13.622	2.5
12	8.2	2.153	17.346	2.5
15	12	2.388	21.016	2.5
24	10	1.158	10.714	2.5
28	10	0.979	13.04	2.5

$$Up: \ Rt = \frac{nR2}{R2-n} - R3 \qquad n = \frac{Vref}{Vo-Vref} * R1$$

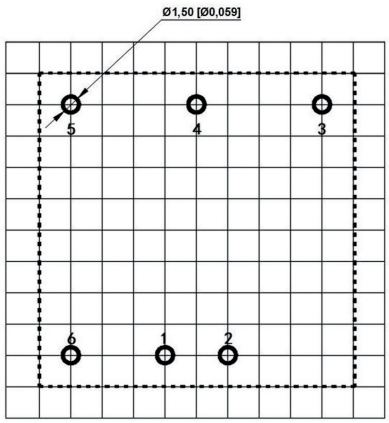
$$Down: Rt = \frac{nR1}{R1-n} - R3 \quad n = \frac{Vo-Vref}{Vref} * R2$$

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 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.

Mechanical 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 x 2.54mm

Pin	Function
1	GND
2	Vin
3	+Vo
4	Trim
5	-Vo
6	Ctrl