40DAWE_1.5R series

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

DC-DC Converter 40 Watt

- 2"x 1" package
- 2:1 input voltage
- Operating temperature range: -40°C to +105°C
- 1500VDC isolation
- Up 90% efficiency
- Short circuit protection (SCP)
- Over current protection
- Over voltage protection

Introducing our new 40DAWE_1.5R series. A powerful solution designed to deliver exceptional performance and reliability. Housed in a compact 2"x1" package, this series offers a wide 2:1 input voltage range and operates effortlessly across temperatures from -40°C to +105°C. With 1500VDC isolation and efficiency levels reaching up to 90%, it ensures both safety and energy savings. Built-in protections against short circuit, over-current, and over-voltage provide added peace of mind. Perfectly suited for applications in industry, power, instrumentation, communication, and rail transit, the 40DAWE_1.5R series sets a new benchmark for dependable performance in demanding environments.

Common specifications

Short circuit protection	Input voltage range, continuous, self recovery
Over voltage protection	110 (typ.) % input voltage range
Over current protection	110 (min.) 140 (typ.) % Input voltage range
Switching frequency	300 KHz (typ.) PWM
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)
Storage humidity	95% RH (non-condensing)
MTBF: (MIL-HDBK-217F@25°C)	1,000,000 hours
Case material	Aluminum alloy, black anodized coating
Package dimensions	50.80 x 25.40 x 11.80mm
Weight	30g (typ.)
Cooling method	Free air convection

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/ no-load)	24VDC nominal input • 5VDC Output • Other Output 48VDCnominal input		1938/60 1893/12 926/12	1984/100 1938/25 968/25	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 12.0	6.5 15.5		VDC
Start time	Nominal input and constant resistance load		10	150	ms
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				

Example:
40DAWE_2405S1.5R
40 = 40Watt; D = DIP; A = Series; W = Wide input; E = Cost effective; 24 = 24Vin; 05 = 5Vout; S = Single Output; 1.5 = 1500VDC isolation; R = Revised version

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output 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 20MHz bandwidth 0%-5% load 5VDC Output Other Output		100	200 5 3	mVp-p
Transient recovery time	25% Load Step Change, nominal input voltage		250	500	µs
Transient response deviation	25% Load Step Change, nominal input voltage		±5	±8	%
Temperature coefficient	Full load		±0.01	±0.02	%/°C

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		2000		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 datasheet are measured at Ta = 25 °C, humidity <75% RH, nominal input voltage, and output rated load;
6. All indicator testing methods in this datasheet are based on our corporate standards;
7. Product specifications are subject to change without prior notice.

EMC specifications							
EMC	EMI	CE	CISPR32/EN55032 CLASS B (EMC Recommended Circuit 4-②)				
EMC	EMI	RE	CISPR32/EN55032 CLASS B (EMC Recommended Circuit 4-②)				
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	10Vrms	perf.	Criteria	A

Product Selection Guide

Approval	Part number	Input Voltage Nominal Range (VDC)	Input Voltage Max. (VDC)	Output Voltage (VDC)	Output Current (mA) max.	Efficiency (%) full load, (typ.)	Max. Capacitive Load (uF) max.
	40DAWE_2405S1.5R	24 (18-36)	40	5	8000	86	15000
	40DAWE_2409S1.5R	24 (18-36)	40	9	4444	87	4700
	40DAWE_2412S1.5R	24 (18-36)	40	12	3333	88	3000
	40DAWE_2415S1.5R	24 (18-36)	40	15	2666	90	2200
	40DAWE_2424S1.5R	24 (18-36)	40	24	1666	90	1300
	40DAWE_4805S1.5R	48 (36-75)	80	5	8000	86	15000
	40DAWE_4812S1.5R	48 (36-75)	80	12	3333	88	3000
	40DAWE_4815S1.5R	48 (36-75)	80	15	2666	90	2200
	40DAWE_4824S1.5R	48 (36-75)	80	24	1666	90	1300

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	40DAWE_2412D1.5R	24 (18-36)	40	±12	±1666	87	1000
	40DAWE_2415D1.5R	24 (18-36)	40	±15	±1333	87	680
	40DAWE_2424D1.5R	24 (18-36)	40	±24	±833	87	470
	40DAWE_4812D1.5R	48 (36-75)	80	±12	±1666	87	1000
	40DAWE_4815D1.5R	48 (36-75)	80	±15	±1333	87	680
	40DAWE_4824D1.5R	48 (36-75)	80	±24	±833	87	470

Note:
1. Please use suffix /CM for chassis mounting option; use suffix /DR for DIN rail mounting option (i.e. 40DAWE_4824D1.5R/DR).
2. The input end of the extended package is equipped with anti-reverse protection function, and its full load efficiency will be reduced by 2%;
3. The maximum Capacities load „#" means that the positive and negative outputs are connected to the same capacitance.

Typical characteristics

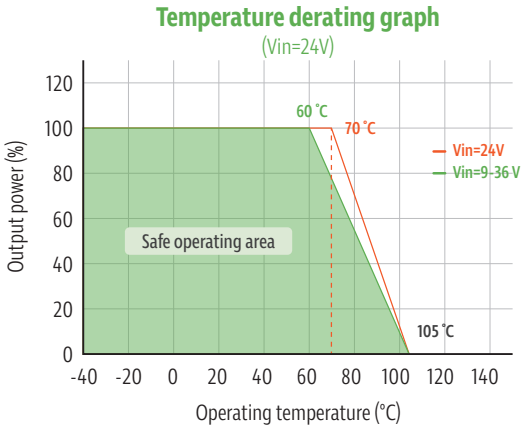


Figure1

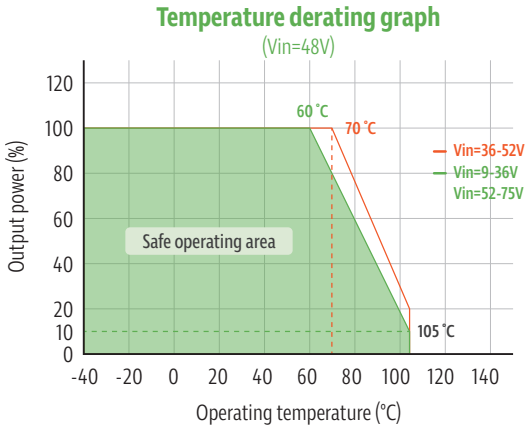


Figure2

Typical circuit design and application

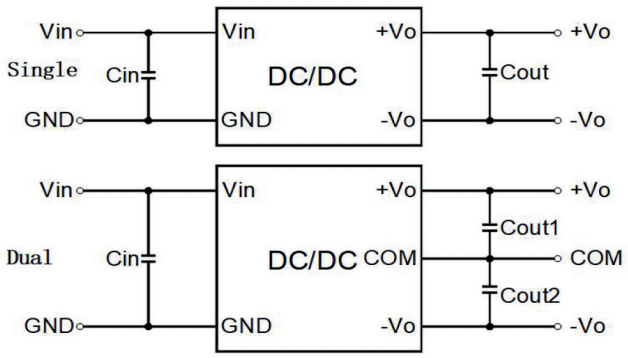


Figure3

Recommended component parameters

Vin	24V	48V
Cin	330uF/50V	100uF/100V
Cout	330uF/50V	220uF/50V

EMI recommended component parameters

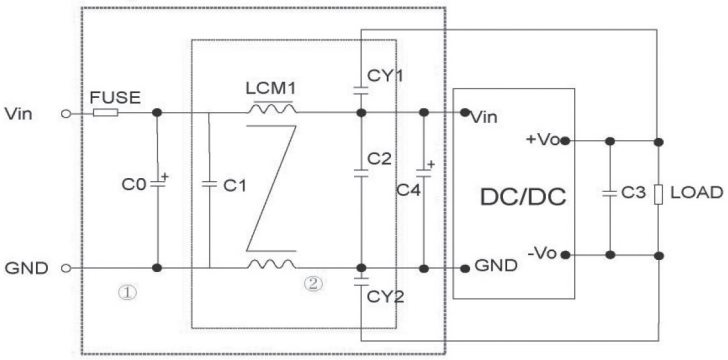


Fig 4

EMI recommended component parameters

Vin (VDC)	Vin: 24V	Vin: 48V
FUSE	Choose according to actual input current	
C0, C4	680μF/50V	470μF/100V
C1, C2	4.7μF/50V	2.2μF/100V
C3	Refer to the Cout parameters in Figure 3	
LCM1	1mH	
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.

Trim

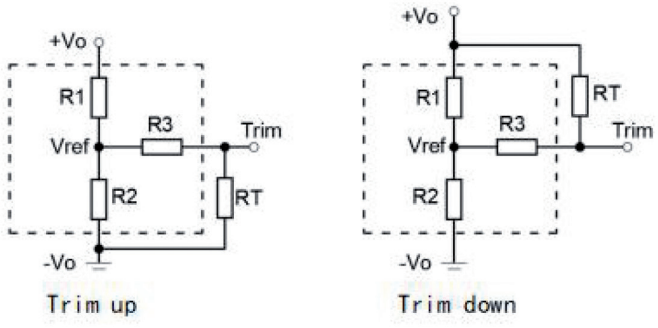


Fig 5

Trim resistor connections
(dashed line shows internal resistor network)

Trim recommended component parameters

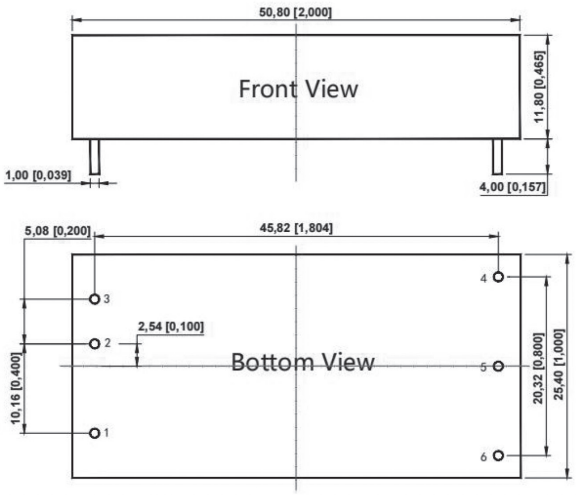
Vout (V)	R1 (KΩ)	R2 (KΩ)	R3 (KΩ)	Vref (V)
5	2.4	2.344	13.622	2.5
9	12	4.602	17.346	2.5
12	8.2	2.153	17.346	2.5
15	12	2.388	21.016	2.5
24	10	1.158	10.714	2.5

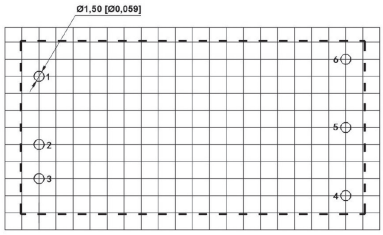
$$Up: \quad Rt = \frac{nR2}{R2-n} - R3 \qquad n = \frac{Vref}{Vo-Vref} * R1$$

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

Note: All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 3. 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.
The product does not support output parallel power boosting.

Mechanical dimensions



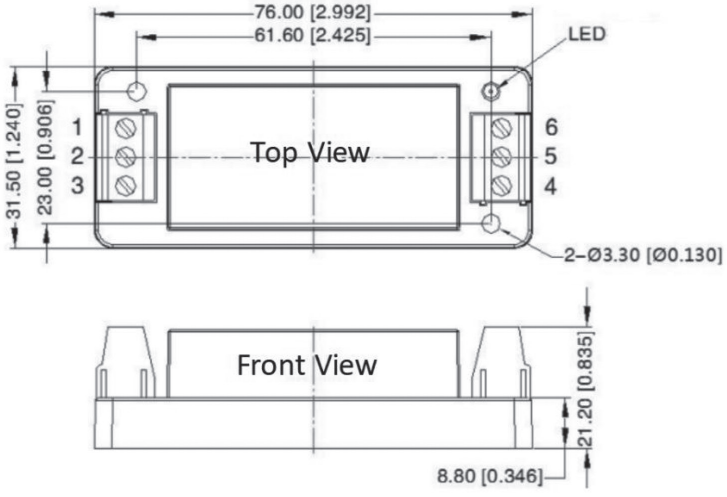


Note: The grid distance is 2.54 x 2.54mm

Pin definition table		
Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	-Vo	COM
6	Trim	-Vo

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

Chassis mounting dimensions



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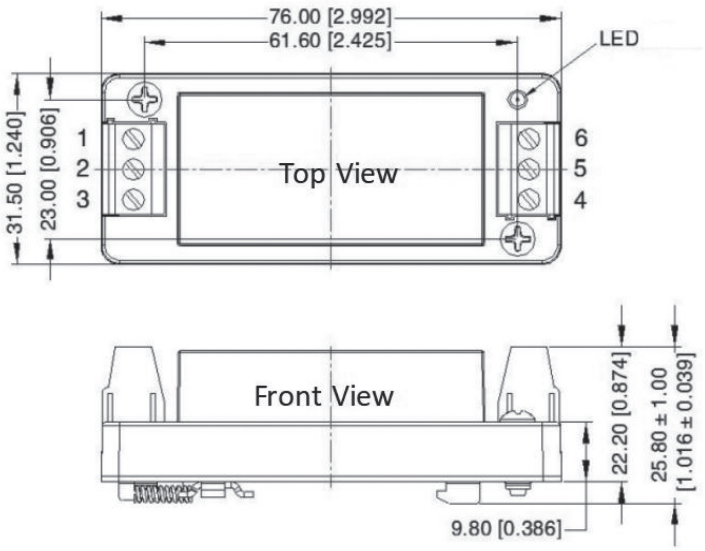
Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	-Vo	COM
6	Trim	-Vo

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

DIN rail dimensions



Pin definition table		
Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	-Vo	COM
6	Trim	-Vo

Note:
Unit: mm [inch]
Mounting rail: TS35
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ± 1.00 [±0.039]