40DAWE_1.5 series

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

DC-DC Converter 40 Watt

- High efficiency up to 91%
- 2:1 wide input voltage range
- Isolation voltage 1500VDC
- Six-sided metal shield
- Short circuit protection (SCP) (automatic recovery)
- Operating temperature: -40°C to +85°C
- Over voltage protection
- Over current protection
- Industry standard pinout
- EN62368 approved

The 40DAWE_1.5 series are isolated 40W DC-DC products with 2:1 input voltage. They feature efficiency up to 91%, 1500VDC isolation, operating temperature of -40°C to +85°C, output short circuit protection, over-voltage protection, over-current protection , which make them widely applied in data transmission device, battery power supply device, telecommunication device, distributed power supply system, remote control system, industrial robot fields.

UL-62368-1 (E347551)

Common specifications

Cooling:	Free air convection
Short circuit protection:	Hiccup, auto-recovery
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-55°C~+125°C
Vibration:	10-55Hz, 10G, 30 Min. along X, Y and Z
Pin welding resistance temperature:	300°C MAX, 1.5mm from case for 10 sec
Switching frequency (PWM mode)*:	300kHz TYP
Humidity:	non-condensing, 95% MAX
Case material:	Aluminum alloy
Potting material:	Epoxy (UL94V-0 rated)
MTBF (MIL-HDBK-217F @25°C)*:	500,000 hours
Weight:	26.8g (Typ.) - 36g with heatsink
Dimensions:	50.80 × 25.40 × 11.80 mm 51.40 × 26.20 × 16.50 mm (heatsink)

* This series of products using reduced frequency technology, the switching frequency is test value of full load. When the load is reduced to below 50%, the

Output specifications

Item	Test condition	Min	Typ	Max	Units
Voltage accuracy	0%-100% load		±1	±3	%
Line regulation	input voltage from low to high @full load		±0.2	±0.5	%
Load regulation	0% to 100% load			±1	%
Transient recovery time	25% load step change		300	500	μs
Transient respon-se deviation	25% load step change		±3	±5	%
Temperature coefficient	Full load			±0.03	%/°C
Ripple and noise*	20MHz Bandwidth		50	100	mV
Trim			±10		%Vo
Over voltage protection	Input voltage range	110		160	%Vo
Over current protection	Input voltage range	110		190	%Io

* Test ripple and noise by "parallel cable" method.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/no load)	• 24Vin • 48Vin		1894/60 926/12	1938/100 947/25	mA mA
Reflected ripple current	Nominal input voltage		30		mA
Surge voltage (1s max.)	• 24Vin • 48Vin	-0.7 -0.7		50 100	VDC VDC
Input under-voltage protection	• 24Vin • 48Vin	13 26	15.5 33		VDC VDC
Starting voltage	• 24Vin • 48Vin			18 36	VDC VDC
Input filter	Pi type				
Hot plug	Unavailable				
Ctrl (The voltage of Ctrl pin is relative to input pin GND.)	• Module ON • Module OFF • Input current when switched OFF	Ctrl suspended or connected to TTL high level (3.5-12VDC) Ctrl pin connected to GND or low level (0-1.2VDC) 5		10	mA

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input/Output, tested for 1 minute and 1mA max	1500			VDC
Isolation resistance	Test at 500VDC/60sec	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/0.1V		2000		pF

Example:
40DAWE_2415S1.5
40 = 40Watt; D = DIP; A = series; W = wide input (2:1); E = Eco series; 9-36Vin; 15Vout; S = single output; 1.5 = 1500VDC isolation

Note:

1. Input voltage can't exceed this value, or will cause the permanent damage.
2. The load shouldn't be less than 5%, otherwise ripple will increase dramatically.
3. Max. Capacitive Load is tested on Vin-nominal and full load.
4. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
5. In this datasheet, all the test methods of indications are based on corporate standards.
6. Only typical models listed, other models may be different, please contact our technical person for more details.
7. Specifications subject to change without notice.

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

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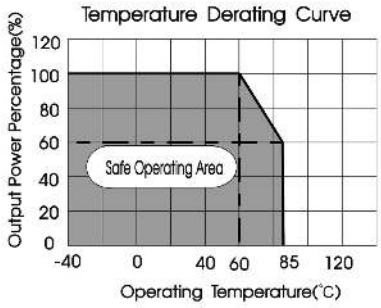
DC-DC Converter

EMC specifications				
EMI	CE	CISPR32/EN55032	CLASS B	(External Circuit Refer to EMC recommended circuit, ②)
EMI	RE	CISPR32/EN55032	CLASS B	(External Circuit Refer to EMC recommended circuit, ②)
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria A
EMS	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
EMS	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria A (External Circuit Refer to recommended circuit, ①)
EMS	Surge	IEC/EN61000-4-5	line to line ±2KV	perf. Criteria A (External Circuit Refer to recommended circuit, ①)
EMS	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A

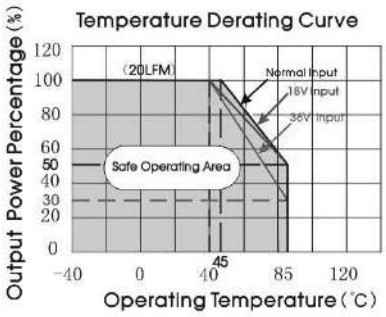
Part Number	Input Voltage Range [VDC] nominal	Range	Max.	Output Voltage [VDC]	Output Current [mA, max]	Efficiency** [%, Typ.]	Capacitive load [µF, max.]
40DAWE_2405S1.5	24	18-36	40	05	8000	88	10000
40DAWE_2412S1.5	24	18-36	40	12	3333	90	2700
40DAWE_2415S1.5	24	18-36	40	15	2667	91	1680
40DAWE_2424S1.5	24	18-36	40	24	1667	91	680
40DAWE_4812S1.5	48	36-75	80	12	3333	90	2700
40DAWE_4815S1.5	48	36-75	80	15	2667	91	1680
40DAWE_4824S1.5	48	36-75	80	24	1667	91	680

Add suffix "H" for heatsink mounted, for example: 40DAWE_2412SH1.5

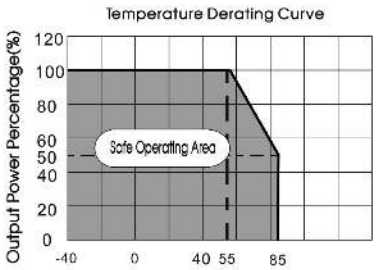
Typical characteristics



Other outputs(with heatsink)



40DAWE_2405S1.5



Other outputs(without heatsink)

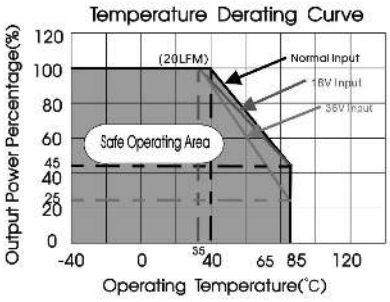
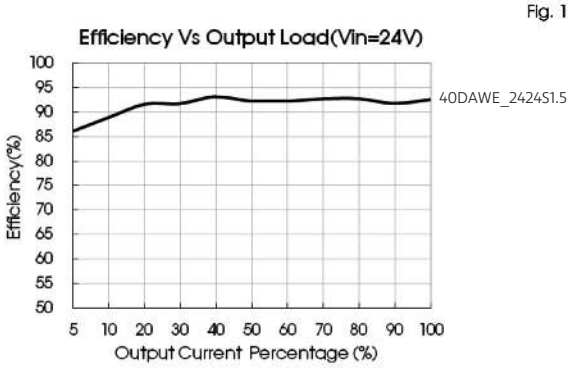
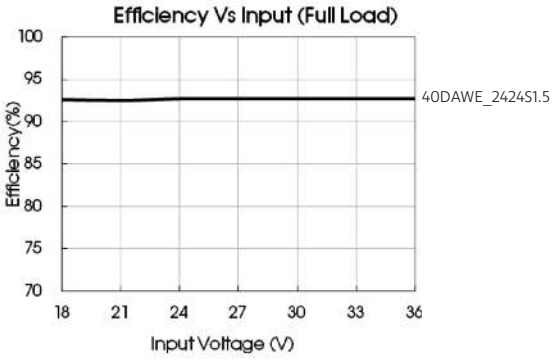


Fig. 1

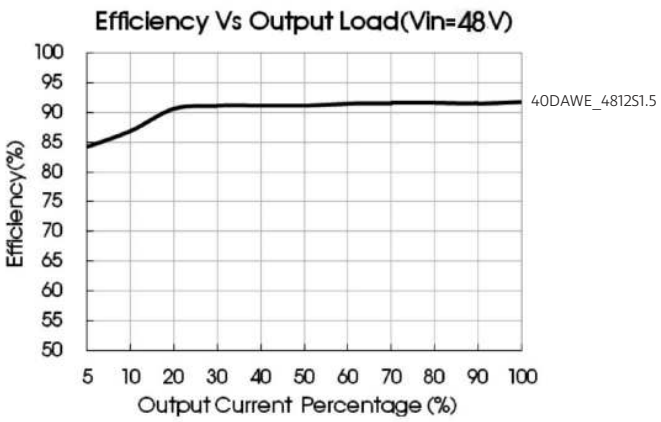


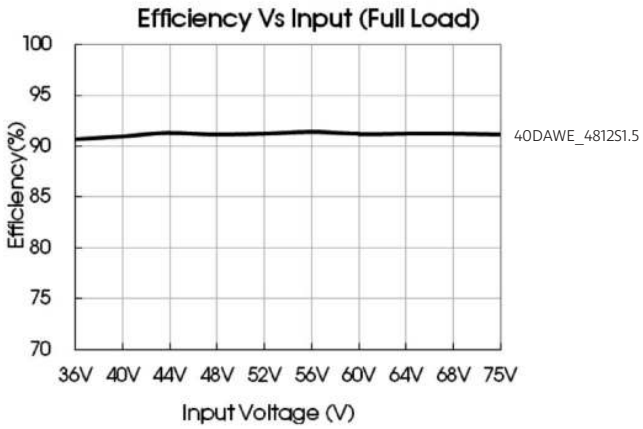
40DAWE_2424S1.5



40DAWE_2424S1.5

Efficiency





Typical application and EMC solution recommended circuit

Fig.2

output voltage (VDC)	Cout (μF)	Cin (μF)
5/12/15/24	100	100

2. EMC solution-recommended circuit

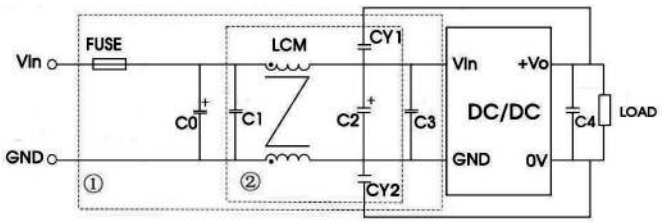
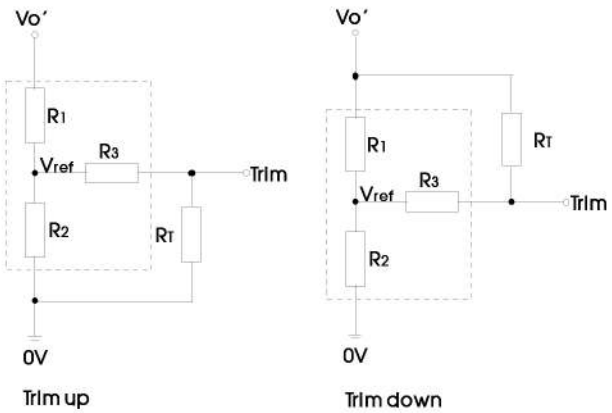


Fig. 3
Notes:For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

Parameter description

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
C0	680μF/50V	680μF/100V
C1, C3	4.7μF/50V	4.7μF/100V
C2	330μF/50V	330μF/100V
C4	Refer to the Cout in Fig.2	
LCM	2.2mH, recommended to use	
CY1, CY2	2.2nF/2KV	

3. Trim function for output voltage adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

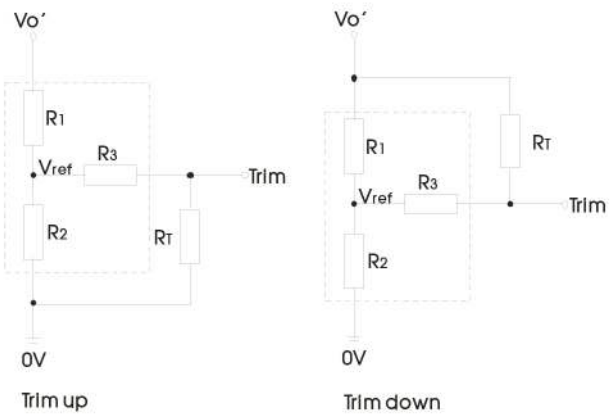
Calculation formula of Trim resistance:

$$up:\ R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{V_{ref}}{V_o' - V_{ref}} R_1$$

$$down:\ R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{V_o' - V_{ref}}{V_{ref}} R_2$$

RT = Trim Resistor value;
a = self-defined parameter
Vo' = desired output voltage

Application of Trim and calculation of trim resistance



Applied circuits of Trim (Part in broken line is the interior of models)

Calculation formula of Trim resistance:

$$up:\ R_T=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{Vref}{Vo'-Vref}R_1$$

$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}R_2$$

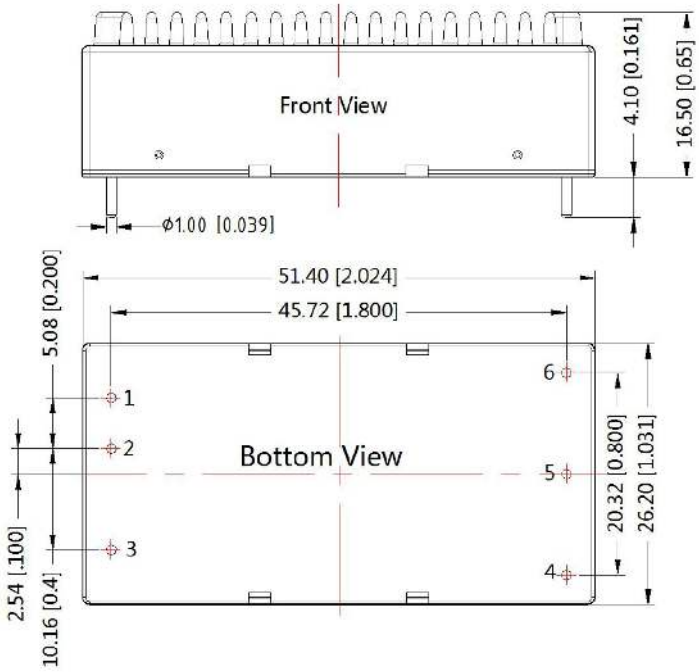
R_T is Trim resistance ,a is a self-defined parameter, with no real meaning.
Vo' for the actual needs of the up or down regulated voltage

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
05	2.880	2.87	10	2.5
12	11.000	2.87	15	2.5
15	14.494	2.87	15	2.5
24	24.872	2.87	15	2.5

It is not allowed to connect modules output in parallel to enlarge the power.

Mechanical dimensions

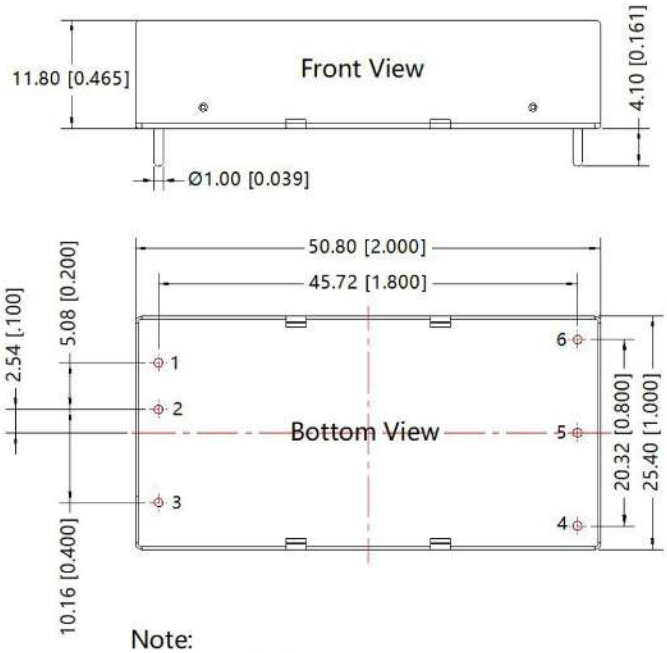
THIRD ANGLE PROJECTION



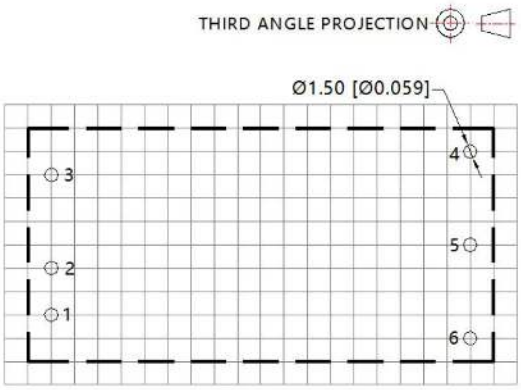
Pin-Out	
Pin	Function
1	Vin
2	GND
3	Ctrl
4	Trim
5	0V
6	+Vo

Note:
Unit: mm[inch]
General tolerances: ±0.5mm [±0.020inch]

Mechanical dimensions



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



Note : Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	Vin
2	GND
3	Ctrl
4	Trim
5	0V
6	+Vo