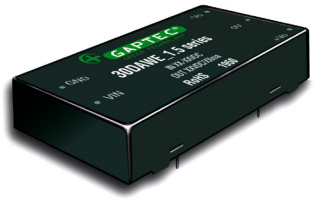
30DAWE_1.5 series

30W - Single/Dual Output - Wide Input - Isolated & Regulated DC-DC Converter



DC-DC Converter 30 Watt

- Efficiency up to 90%
- 2:1 wide input voltage range
- Output over current, over voltage protection
- Short circuit protection (SCP)
- 1.5kVDC isolation
- No-load power consumption as low as 0.14W
- Operating temperature range: -40°C ~ +80°C
- Six-sided metal shield
- Industry standard pinout
- Meet CISPR32/EN55032 CLASS A, without extra components
- EN/UL60950 approved

UL-60950-1 (E347551)

The 30DAWE_1.5 series are isolated 30W DC-DC products with a wide 2:1 input voltage and feature efficiencies of up to 90%, input to output isolation is tested with 1500VDC and the converters safely operate ambient temperature of -40°C to +80°C, output short-circuit, over-voltage, over-current protection. They meet CLASS A of CISPR32/EN55032 EMI standards without external components.

They are widely used in applications such as data transmission device, battery power supply device, tele-comunication device, distributed power supply system, hybrid module system, remote control system, industrial robot fields.

Common specifications

Short circuit protection:	Hiccup, continous, self-recovery
Cooling:	Free air convection
Operation temperature range:	-40°C~+80°C
Storage temperature range:	-55°C~+125°C
Pin soldering resistance temperature:	300°C MAX, 1.5mm from case for 10 sec
Vibration:	10-55Hz, 2G, 30 Min. along X, Y and Z
Storage humidity range:	5-95%RH
Switching frequency (PWM mode):	300KHz TYP
Case material:	Aluminium alloy
MTBF (MIL-HDBK-217F@25°C):	1000 K hours MIN
Weight:	27.8g
Dimensions:	50.80 × 25.40 × 11.80 mm

① Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Reflected ripple current			40		mA
Surge voltage (1 sec. max)	• 24VDC input • 48VDC input	-0.7 -0.7		50 100	VDC VDC
Start-up voltage	• 24VDC input • 48VDC input			18 36	VDC VDC
Start-up time	Nominal input & constant resistance load		10		ms
Input filter	Pi				
Hot plug	Unavailable				
Ctrl [1]	• Module on	Ctrl pin open or pulled high (3.5-12VDC)			
	• Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	• Input current when off		5	8	mA

① The Ctrl pin voltage is referenced to input GND.

Example:
30DAWE_2415S1.5
30 = 30Watt; D = DIP; A = series; W = wide input (2:1) 18-36Vin;
E = cost effective; 15Vout; S = single output; 1.5 = 1500VDC isolation

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	5%-100% load 0%-5% load		±1 ±1	±3 ±5	% %
Line regulation	Full load, input voltage low to high		±0.2	±0.5	%
Load regulation [1]	5%-100% load		±0.5	±1	%
Transient recovery time	25% load step change		300	500	µs
Transient response deviation	25% load step change • 3.3/5/±5VDC output • others		 ±5 ±3	 ±8 ±5	 % %
Temperature drift	100% full load			±0.03	%/°C
Ripple & Noise [3]	20MHz Bandwidth		50	100	mVp-p
Trim	Input voltage range (24V/48V input series)		±10		%Vo
Over voltage protection	Input voltage range (all models; except 30DAWE_12110S1.5)	110		160	%Vo
Over current protection	Input voltage range	110		190	%Io

① Load regulation for 0%-100% load is ±5%;
② The "parallel cable" method is used for Ripple and Noise test.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and leakage current less than 1 mA	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	100KHz/0.1V		2000		pF

Note:
1. The maximum capacitive load offered were tested at input voltage range and full load;
2. 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;
3. All index testing methods in this datasheet are based on company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see „Features" and „EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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

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DC-DC Converter

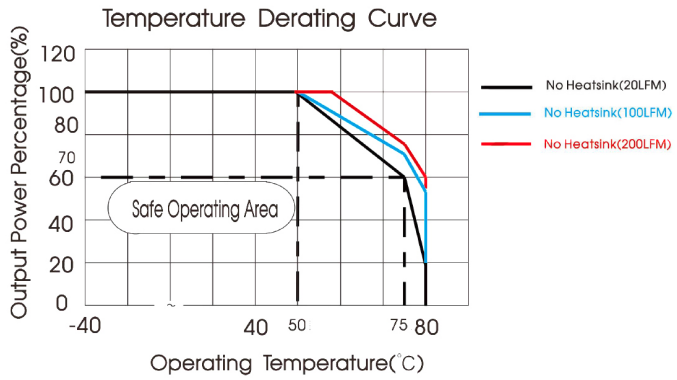
EMC specifications				
EMI	CE	CISPR32/EN550232	CLASS A (without external components) CLASS B (see EMC compliance circuit ②)	
EMI	RE	CISPR32/EN55032	CLASS A (without external components) CLASS B (see EMC compliance circuit ②)	
EMS	ESD	IEC/EN61000-4-2	Contact ±4KV	perf. Criteria B
EMS	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
EMS	EFT	IEC/EN61000-4-4	±2KV (see EMC compliance circuit ①)	perf. Criteria B
EMS	Surge	IEC/EN61000-4-5	line to line ±2KV (see EMC compliance circuit ①)	perf. Criteria B
EMS	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

Part Number	Input Voltage [VDC]			Output Voltage [VDC]	Output Current [mA, Max]	Input Current [mA, typ/max]		Efficiency(2) [%, Typ.]	Capacitive load [µF, Max]
	Nominal	Range	Max(1)			Full load	No load		
30DAWE_2403S1.5	24	18-36	40	3.3	6000	1471/1507	60/100	85	10000
30DAWE_2405S1.5	24	18-36	40	5	6000	1421/1453	60/100	88	10000
30DAWE_2409S1.5	24	18-36	40	9	3333	1389/1489	6/12	86	4700
30DAWE_2412S1.5	24	18-36	40	12	2500	1389/1489	6/12	88	2700
30DAWE_2415S1.5	24	18-36	40	15	2000	1389/1489	6/12	90	1680
30DAWE_2424S1.5	24	18-36	40	24	1250	1389/1489	6/12	90	680
30DAWE_4803S1.5	48	36-75	80	3.3	6000	727/745	20/30	86	10000
30DAWE_4805S1.5	48	36-75	80	5	6000	711/727	20/35	88	10000
30DAWE_4812S1.5	48	36-75	80	12	2500	711/727	5/10	88	2700
30DAWE_4815S1.5	48	36-75	80	15	2000	711/727	5/10	89	1680
30DAWE_4824S1.5	48	36-75	80	24	1250	711/727	5/10	89	680

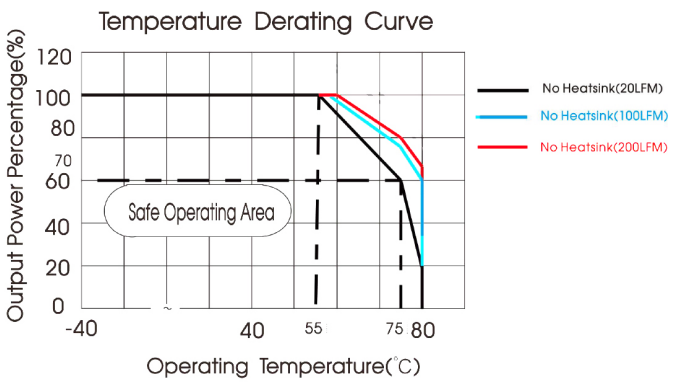
① Exceeding the maximum input voltage may cause permanent damage;
② Efficiency is measured In nominal input voltage and rated output load.

Typical characteristics

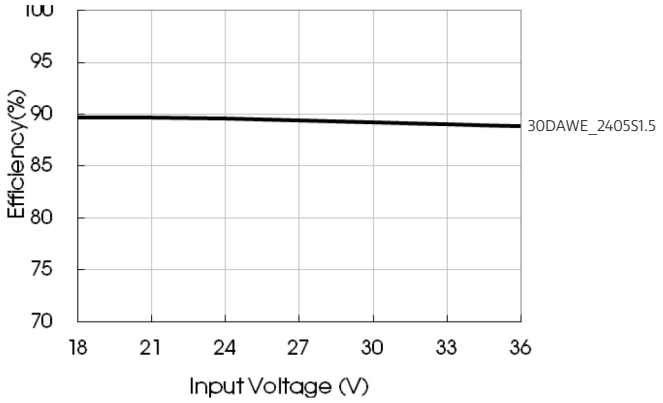
3VDC/5VDC output

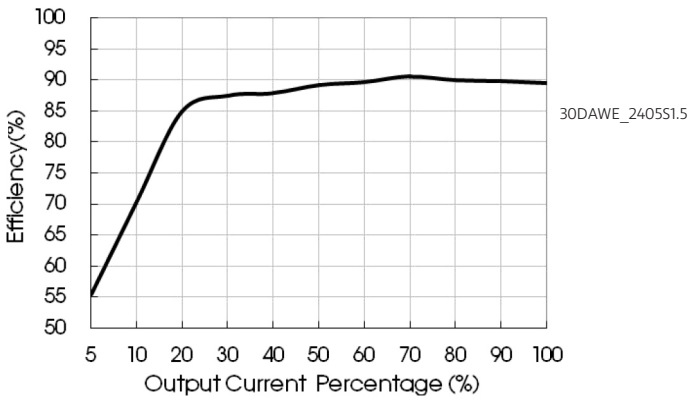


9VDC/12VDC/15VDC/24VDC output



Efficiency





Typical application

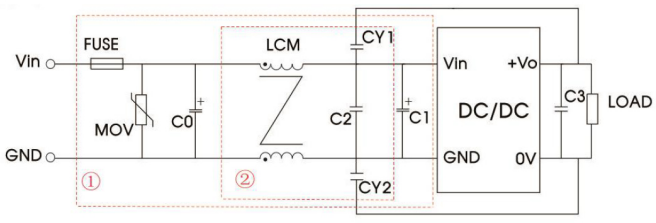
All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 1.

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values 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.

Figure 1

output voltage (VDC)	Cout (μF)	Cin (μF)
3.3/5/9	220	100
12/15/24	100	

EMC recommended circuit

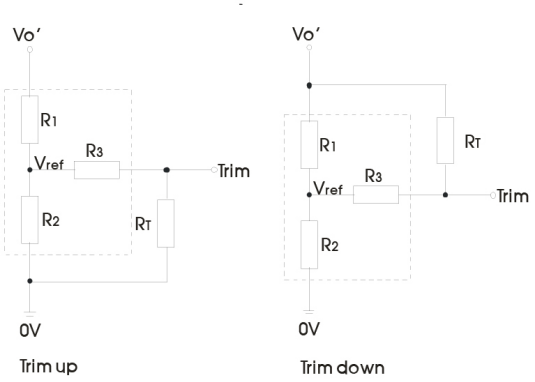


Parameter description

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	680μF/50V	330μF/100V
C1	330μF/50V	330μF/100V
C2	4.7μF/50V	2.2μF/100V
C3	Refer to Cout in figure 1	
LCM	1mH	
CY1、CY2	1nF/2KV	

Trim

Trim Function for Output Voltage Adjustment (open if unused)



Calculating Trim resistor values:

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

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

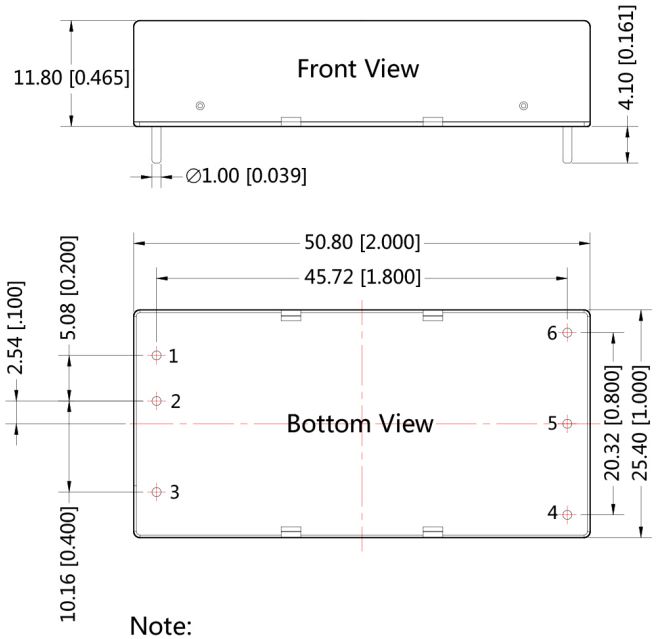
R_T=Trim resistance;
a=self-defined parameter;
Vo'= desired output voltage.

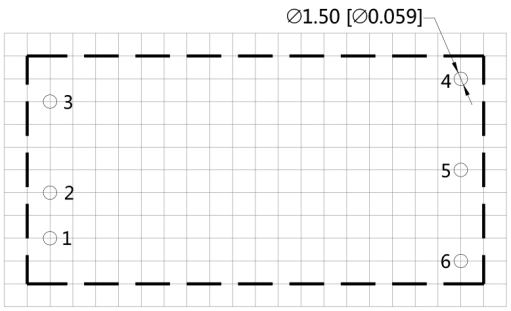
TRIM resistor connection (dashed line shows internal resistor network)

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	4.801	2.87	12.4	1.24
5	2.883	2.87	10	2.5
9	7.500	2.87	15	2.5
12	11.000	2.87	15	2.5
15	14.494	2.87	15	2.5
24	24.872	2.87	17.8	2.5

Mechanical dimensions

THIRD ANGLE PROJECTION





Note : Grid 2.54*2.54mm

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

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