GAPTEC®
GREEN TECHNOLOGY

30DAW4_1.5 Series

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



DC-DC Converter 30 Watt

- High efficiency up to 90%
- 4:1 wide input voltage range
- I/O Isolation 1500VDC
- Six-sided metal shield
- Short circuit protection (SCP) (automatic recovery)
- MTBF >1,000,000 hours
- Operating temperature: -40°C to +75°C
- Input under-voltage protection Over-voltage protection
- Over-current protection
- Meet CISPR22/EN55022 CLASS A
- No-load power consumption as low as 0.14W

The 30DAW4 series offer 30W of output, wide input voltage of 9-36VDC, 18-75VDC, and features 1500VDC isolation, six-sided metal shield over current and short circuit protection.

All models are particularly suited to tele-communications, industrial, test equipments power etc.

Common specifications

Cooling:	Free air convection
Operation temperature range:	-40°C~+75°C
Storage temperature range:	-55°C~+125°C
Lead temperature range:	300°C MAX, 1.5mm from case for 10 sec
Switching frequency* (PWM mode):	300kHz TYP, Nominal input, full load
Storage humidity range:	5% MIN, 95% MAX
Vibration:	10-55Hz, 10G, 30 Min. along X, Y and Z
Case material:	Aluminium alloy
MTBF (MIL-HDBK-217F @25°C):	>1,000,000 hours
Weight:	without heatsink 26g, with heatsink 34g

* 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 switching frequency decreases with decreasing load.

Isolation specifications

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

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/no load)	• 24VDC input				
	- 3.3V output		970/60	993/65	mA
	- 5V output		1420/60	1453/65	mA
	- Others		1388/6	1420/9	mA
	• 48VDC input				
	- 3.3V output		474/20	485/23	mA
	- 5V output		702/20	735/25	mA
	- Others		702/5	735/8	mA
Reflected ripple current			40		mA
Input impulse voltage (1sec. max)	• 24VDC input	-0.7		50	VDC
	• 48VDC input	-0.7		100	VDC
Starting voltage	• 24VDC input			9	VDC
	• 48VDC input			18	VDC
Output short circuit protection	• 24VDC input	5.5	6.5		VDC
	• 48VDC input	14	15.5		VDC
Input filter			PI		
Start-up time	Nominal input & constant resistance load		10		ms
Hot plug	Unavailable				
Ctrl*	• Models ON	Ctrl leave open or connect TTL high level (3.5-12VDC)			
	• Models OFF	Ctrl connect GND or low level (0-1.2VDC)			
	• Input current (OFF)		5	8	mA

* The CTRL pin voltage is referenced to GND.

Example:
30DAW4_2415S1.5
30=30Watt; D= DIP; A=series; W4= wide input (4:1) 9-36Vin; 15Vout;
S= single output; 1.5=1500VDC

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. The CTRL pin voltage is referenced to GND.
5. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
6. In this datasheet, all the test methods of indications are based on corporate standards.
7. Only typical models listed, other models may be different, please contact our technical person for more details.

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Specifications subject to change without notice.

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Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy			±1	±3	%
Line regulation	Full load, low to high		±0.2	±0.5	%
Load regulation	5% to 100% load		±0.5	±1	%
Temperature drift	100% full load			±0.03	%/°C
Ripple and noise*	20MHz Bandwidth		50	100	mV
Transient recovery time	25% load step change		300	500	us
Transient response deviation	25% load step change • 3.3/5V output • Others		 ±5 ±3	 ±8 ±5	 % %
Over current protection	Input voltage range	110		190	%Io
Short circuit protection	Input voltage range		Hiccup, continuous, auto-recovery		
Over voltage protection	Input voltage range	110		160	%Vo
Trim			±10		%Vo

* Test ripple and noise by “parallel cable” method. See detailed operation instructions at Testing of Power Converter section, application notes.

EMC specifications

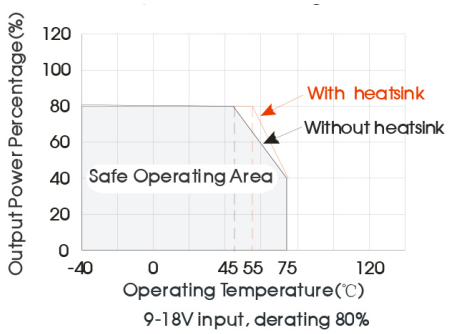
EMI	CE	CISPR22/EN55022 CLASS A (Bare component) CLASS B (External Circuit Refer to EMC recommended circuit,②)		
EMI	RE	CISPR22/EN55022 CLASS A (Bare component) CLASS B (External Circuit Refer to recommended circuit,②)		
EMS	ESD	IEC/EN61000-4-2 perf. Criteria B	Contact ±4KV	
EMS	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
EMS	EFT	IEC/EN61000-4-4 (External Circuit Refer to recommended circuit,①)	±2KV	perf. Criteria B
EMS	Surge	IEC/EN61000-4-5 (External Circuit Refer to recommended circuit,①)	±2KV	perf. Criteria B
EMS	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A
EMS	Voltage dips, short and interruptions immunity	IEC/EN61000-4-29	0%-70%	perf. Criteria B

Part Number	Input Voltage [VDC] Nominal	Range	Max(1)	Output Voltage [VDC]	Output Current [mA] Max	Min	Efficiency(2) [%, Typ.]	Capacitor load [µF, Max]
30DAW4_2403S1.5	24	9-36	40	3.3	6000	300	85	10000
30DAW4_2405S1.5	24	9-36	40	5	6000	300	88	10000
30DAW4_2409S1.5	24	9-36	40	9	3333	167	88	4700
30DAW4_2412S1.5	24	9-36	40	12	2500	125	90	2700
30DAW4_2415S1.5	24	9-36	40	15	2000	100	90	1680
30DAW4_2424S1.5	24	9-36	40	24	1250	63	90	680
30DAW4_4803S1.5	48	18-75	80	3.3	6000	300	87	10000
30DAW4_4805S1.5	48	18-75	80	5	6000	300	88	10000
30DAW4_4812S1.5	48	18-75	80	12	2500	125	89	2700
30DAW4_4815S1.5	48	18-75	80	15	2000	100	89	1680
30DAW4_4824S1.5	48	18-75	80	24	1250	63	89	680

Add suffix “H” for heatsink mounted, for example 30DAW4_2405SH1.5
1) Absolute maximum rating without damage on the converter, but it isn‘t recommended.
2) Efficiency is measured In nominal input voltage and rated output load.

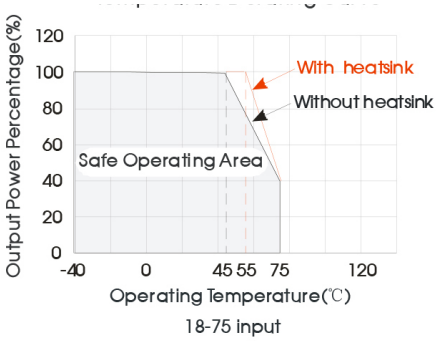
Typical characteristics

Temperature derating curve, 9-18V input



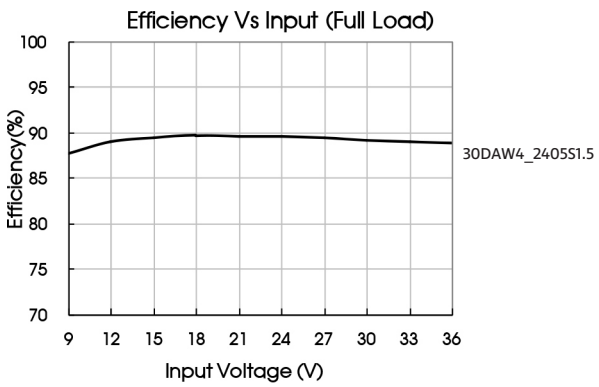
9-18V input, derating 80%

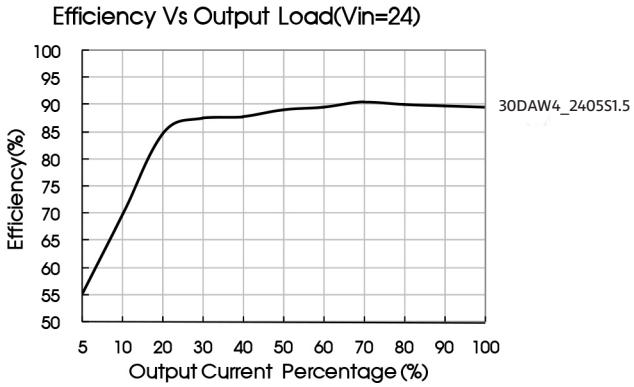
Temperature derating curve, 18-75V input



18-75 input

Efficiency





Typical application

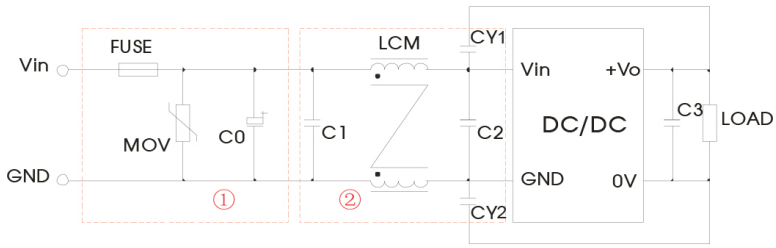
All the DC/DC converters of this series are tested according to the recommended circuit (see Fig. 1) before delivery.
If it is required to further reduce input and output ripple, properly increase the input & output of additional capacitors Cin and Cout or select capacitors of low equivalent impedance provided that the capacitance is no larger than the max. capacitive load of the product.



figure 1

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

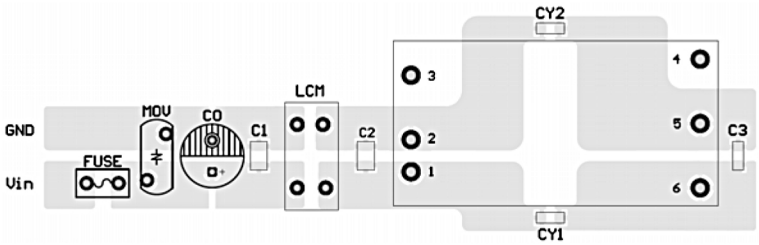
EMC recommended circuit



Note:
In Figure 1, part 1 is used for EMS test, part 2 for EMI filtering.
Choose according to requirements.

Recommended external circuit parameters	Vin: 24V	Vin: 48V
FUSE	Choose according to actual input current	
MOV	S14K35	S14K60
C0	330µF/50V	330µF/100V
C1, C2	4.7µF/50V	2.2µF/100V
C3	Refer to the Cout in Typical application	
LCM	1mH	
CY1, CY2	1nF/2KV	

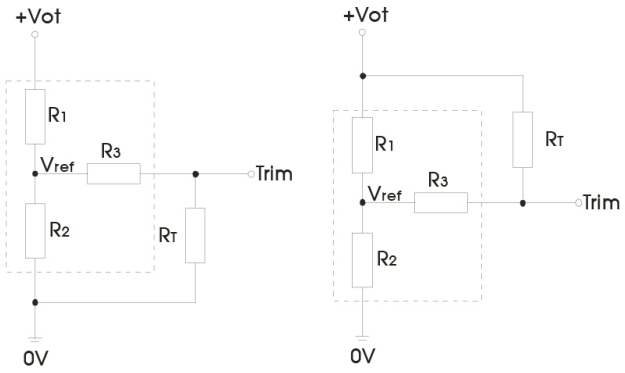
EMC recommended circuit PCB layout



Note:
Note: the min. distance of the bonding pads between input & output isolation capacitors (CY1/CY2) shall be ≥ 2mm.

Trim application & trim resistance

Application circuit for TRIM
(Part in broken line is the interior of models)



Trim up　　Trim down

Formula for resistance of Trim

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

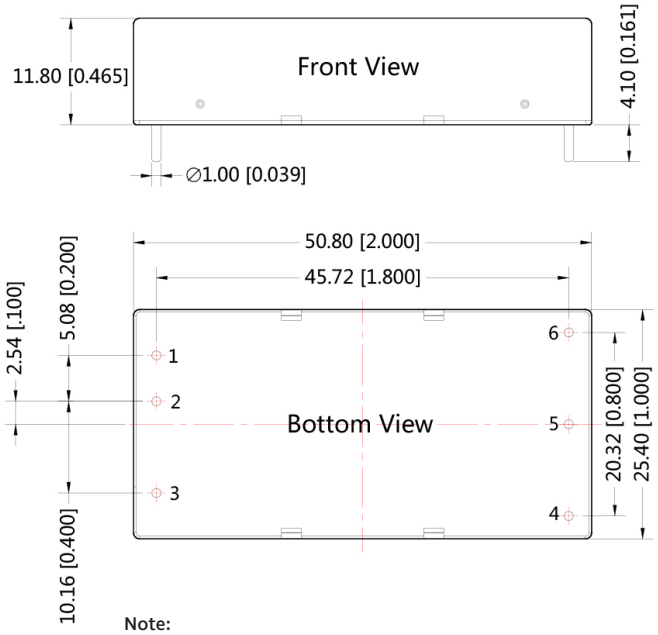
$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{Vo' - Vref}{Vref} R_2$$

Note:
Value for R1, R2, R3, and Vref refer to the following table.
R_T: Resistance of Trim
a: User-defined parameter, no actual meanings
Vo': The trim up/down voltage

Vout (V)	R1 (KΩ)	R2 (KΩ)	R3 (KΩ)	Vref (V)
3.3	4.801	2.87	12.4	1.25
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

The product does not support output in parallel with power per liter.

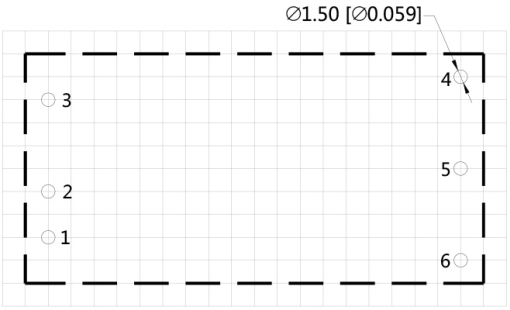
Mechanical dimensions (no heatsink)



Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10mm [±0.004inch]
General tolerances: ±0.25mm [±0.010inch]

Recommended footprint

THIRD ANGLE PROJECTION

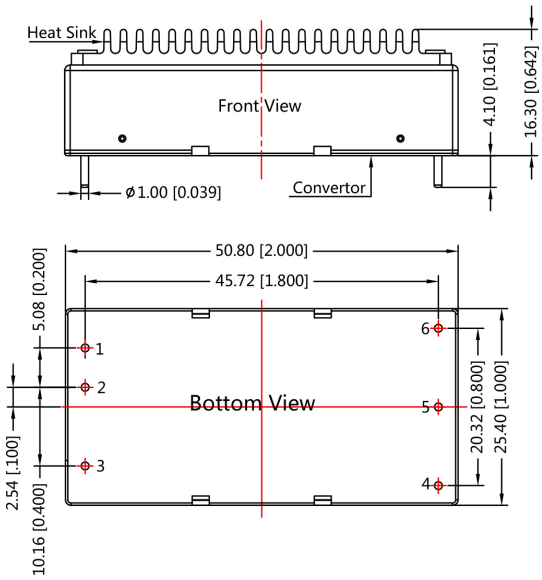


Note : Grid 2.54*2.54mm

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

Mechanical dimensions (with heatsink)

Thermal pal ANGLE PROJECTION



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

Note:
Unit: mm[inch]
General tolerances: ±0.50mm [±0.020inch]

If use heatsinks, make sure there is enough space for a specific size in the above graph;