GAPTEC®
GREEN TECHNOLOGY

3DAW_S & 3DAW_D Series

3W - Dual/Single Output - Wide Input - Isolated & Regulated DC-DC Converter

DC-DC Converter 3 Watt

- 2:1 wide input voltage range
- Operating temperature: -40°C ~ +85°C
- Short circuit protection (SCP) (automatic recovery)
- 1500VDC isolation
- Efficiency up to 86%
- Industry standard pinout
- MTBF >1,000,000 hours
- RoHS Compliance
- Meet CISPR22/EN55022, CLASS A
- EN60950 Approval

The 3DAW series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:
1) Where the voltage of the input power supply is wide range (voltage range ≤2:1)
2) Where isolation is necessary between input and output (isolation voltage ≤1500VDC)
3) Where the regulation of the output voltage and the output ripple noise are demanded

UL-60950-1 (E347551)

Common specifications

Short circuit protection:	Continuous, automatic recovery
Temperature rise at full load:	25°C TYP
Cooling:	Free air convection
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-55°C ~+125°C
Lead temperature range:	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
Case material:	Aluminium alloy
MTBF (MIL-HDBK-217F@25°C):	>1,000,000 hours
Weight:	14g

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (Full load/no load)	• 5V input • 12V input • 24V input • 48V input		811/40 309/30 155/15 77/5	834/45 317/35 158/20 79/10	mA mA mA mA
Reflected ripple current	• 5V input • 12V input • 24V input • 48V input		20 30 30 30		mA mA mA mA
Input impulse voltage (1sec. max.)	• 5V input • 12V input • 24V input • 48V input	-0.7 -0.7 -0.7 -0.7		12 25 50 100	VDC VDC VDC VDC
Starting voltage	• 5V input • 12V input • 24V input • 48V input			4.5 9 18 36	VDC VDC VDC VDC
Input filter	Pi filter				
Hot plug	Unavailable				

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/1V		120		pF

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	5%-100% load		±1	±3	%
No-load output voltage accuracy	Input voltage range		±1.5	±5	%
Balance of output Voltage	Dual output, balanced load		±0.5	±1	%
Line regulation	Full load, input voltage from low to high		±0.2	±0.5	%
Load regulation	5%-100% load		±0.2	±0.5	%
Transient Recovery time	25% load step change		0.5	2	ms
Transient Response Deviation	25% load step change		±2	±5	%
Temperature coefficient	Full load		±0.02	±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth		50	80	mVp-p
Switching frequency (PFM mode)	100% load, nominal input range		200		KHz

* Test ripple and noise by "parallel cable" method. See detailed operation

Example:
3DAW_0512D1.5
3 = 3Watt; D = DIP; A = series; W = wide input (2:1) 4,5-9Vin; 05 = Vin; 12 = 12Vout; D = Dual Output; 1.5 =1500VDC isolation

Note:
1. The load shouldn't be less than 10%, otherwise ripple will increase dramatically.
2. Operation under 10% load will not damage the converter; However, they may not meet all specifications listed.
3. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on corporate standards.
5. Only typical models listed, other models may be different, please contact our technical person for more details.

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3DAW_S & 3DAW_D Series

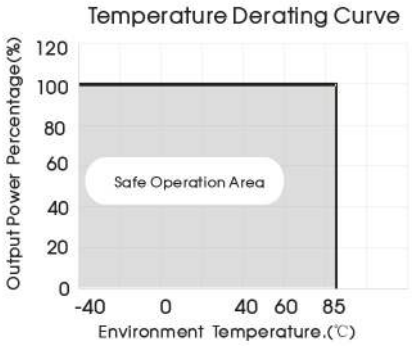
3W - Dual/Single Output - Wide Input - Isolated & Regulated
DC-DC Converter

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 EMC recommended 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	perf. Criteria B (External circuit refer to EMC recommended circuit ①)
EMS	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B (External circuit refer to EMC recommended circuit ①)
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

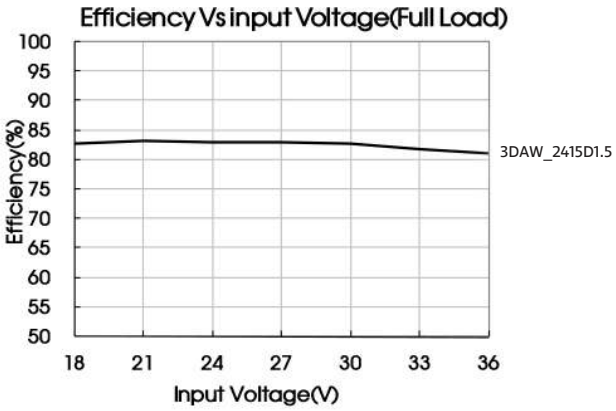
Part Number	Input Voltage [VDC]			Output Voltage [VDC]	Output Current [mA]		Efficiency [%, Typ.]	Max. capacitive load** [µF]
	Nominal	Range	Max*		Max	Min		
3DAW_0505S1.5	5	4.5-9	11	5	600	30	74	4700
3DAW_0512S1.5	5	4.5-9	11	12	250	12	77	2700
3DAW_0515S1.5	5	4.5-9	11	15	200	10	77	2200
3DAW_1203S1.5	12	9-18	22	3.3	909	46	74	4700
3DAW_1205S1.5	12	9-18	22	5	600	30	81	4700
3DAW_1212S1.5	12	9-18	22	12	250	12	83	2700
3DAW_1215S1.5	12	9-18	22	15	200	10	82	2200
3DAW_1224S1.5	12	9-18	22	24	125	6	83	1800
3DAW_2403S1.5	24	18-36	40	3.3	909	46	78	4700
3DAW_2405S1.5	24	18-36	40	5	600	30	81	4700
3DAW_2409S1.5	24	18-36	40	9	333	16	81	2700
3DAW_2412S1.5	24	18-36	40	12	250	12	86	2700
3DAW_2415S1.5	24	18-36	40	15	200	10	86	2200
3DAW_2424S1.5	24	18-36	40	24	125	6	85	1800
3DAW_4803S1.5	48	36-72	80	3.3	909	46	76	4700
3DAW_4805S1.5	48	36-72	80	5	600	30	82	4700
3DAW_4812S1.5	48	36-72	80	5	250	12	86	2700
3DAW_4815S1.5	48	36-72	80	5	200	10	86	2200
3DAW_4824S1.5	48	36-72	80	5	125	6	84	1000
3DAW_0505D1.5	5	4.5-9	11	±5	±300	±15	76	2200
3DAW_0509D1.5	5	4.5-9	11	±9	±166	±8	76	1800
3DAW_0512D1.5	5	4.5-9	11	±12	±125	±6	78	1800
3DAW_0515D1.5	5	4.5-9	11	±15	±100	±5	78	1000
3DAW_1205D1.5	12	9-18	22	±5	±300	±15	81	2200
3DAW_1209D1.5	12	9-18	22	±9	±166	±8	84	2000
3DAW_1212D1.5	12	9-18	22	±12	±125	±6	84	1800
3DAW_1215D1.5	12	9-18	22	±15	±100	±5	85	1000
3DAW_2405D1.5	24	18-36	40	±5	±300	±15	82	2200
3DAW_2412D1.5	24	18-36	40	±12	±125	±6	84	1800
3DAW_2415D1.5	24	18-36	40	±15	±100	±5	84	1000
3DAW_4805D1.5	48	36-72	80	±5	±300	±15	82	2200
3DAW_4812D1.5	48	36-72	80	±12	±125	±6	84	1800
3DAW_4815D1.5	48	36-72	80	±15	±100	±5	85	1000
3DAW_4824D1.5	48	36-72	80	±24	±62.5	±3	84	680

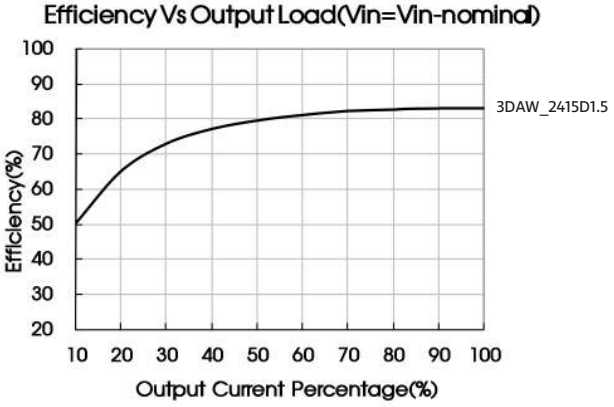
* Input voltage can't exceed this value, or will cause permanent damage
** For the dual output modules, the capacitive loads of positive and negative outputs are the same.

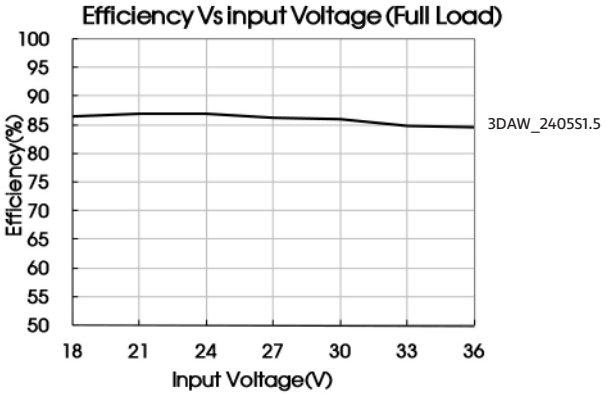
Typical characteristics

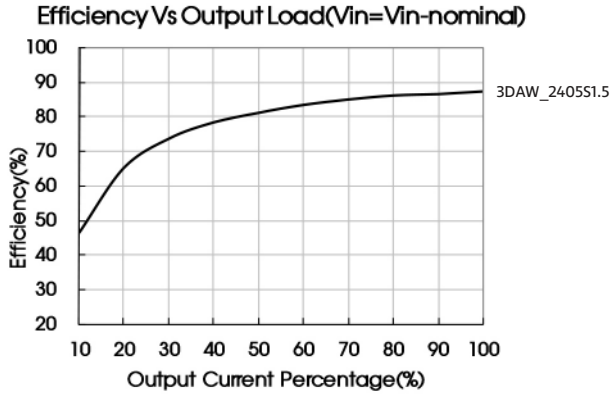


Efficiency









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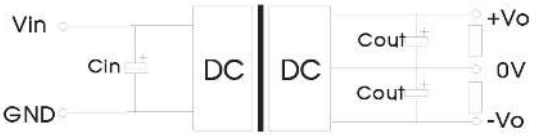
Typical application

Requirement on output load
To ensure that the module can work efficiently and reliably, its output min. load shall be no lower than 5% of the rated load when using, or the output ripple may increase rapidly. Ensure that the product working load must be higher than 5% of the rated load.

Recommended Circuit
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.

Dual Output

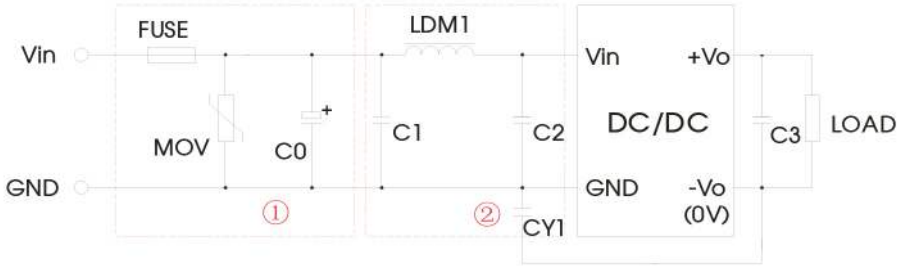


Single Output

Figure 1

Vin (VDC)	Cin (uF)	Cout (uF)
5	100	10
12	100	10
24	10~47	10
48	10~47	10

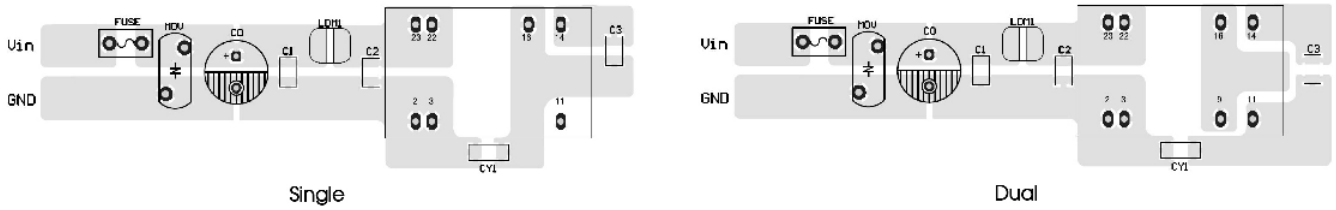
EMC solution-recommended circuit



Note: Part①② in the Fig. 3 is used for EMS test and part②②for EMI filtering, selected based on needs.
② If there is no recommended parameters, the model no require the external component.

Model	Vin: 5V	Vin: 12V	Vin: 24V	Vin: 48V
FUSE	Slow blown fuses according to the actual input current selections of the clients			
MOV	–	S14K25	S14K35	S14K60
C0	1000μF/16V	1000μF/25V	330μF/50V	330μF/100V
C1	4.7μF/50V			4.7μF/100V
LDM1	12μH			
C2	4.7μF/50V			4.7μF/100V
C3	10μF			
CY1	1nF/2KV			

EMC solution-recommended circuit, PCB layout

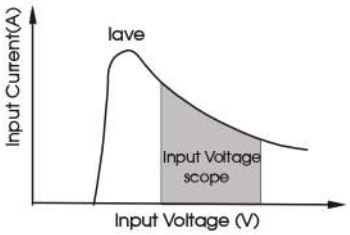


Note: the min. distance of the bonding pads between input grounding and output grounding shall be ≥ 2mm.

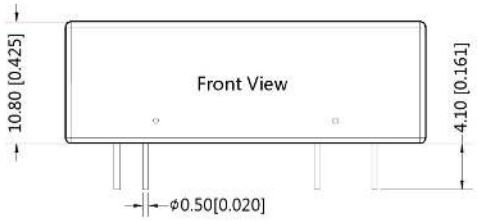
Input current

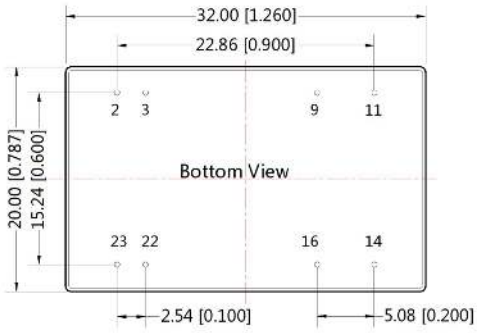
When the electricity is provided by the unstable power supply, please make sure that the range of the output voltage fluctuation and the ripple voltage of the power supply do not exceed the indicators of the modules. Input current of power supply should afford the flash startup current of this kind of DC/DC module(see Fig. 5).

Generally: Vin=5V Iave =1400mA
Vin=12V Iave=620mA
Vin=24V Iave=310mA
Vin=48V Iave =150mA

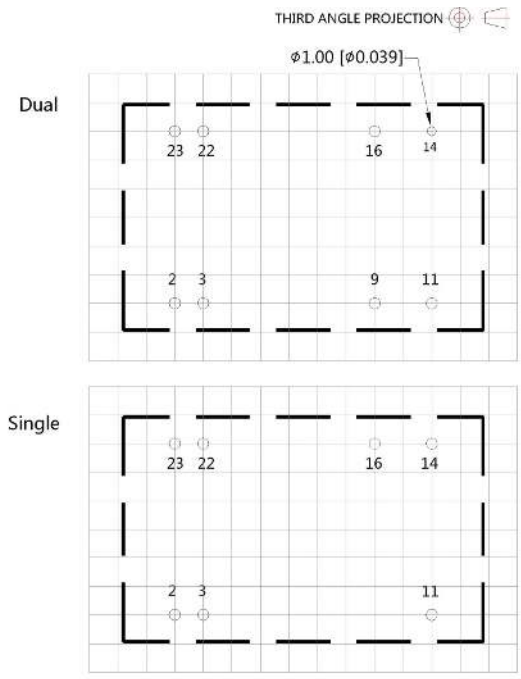


Mechanical dimensions





Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10mm [±0.004inch]
Pin pitch tolerances: ±0.25mm [±0.010inch]
General tolerances: ±0.50mm [±0.020inch]



Note:Grid 2.54*2.54mm

Pin-Out		
Pin	Single	Dual
2,3	GND	GND
9	No Pin	0V
11	NC	-Vo
14	+Vo	+Vo
16	0V	0V
22,23	Vin	Vin

NC: No Connection