



## 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  $\leq 2:1$ )
- 2) Where isolation is necessary between input and output (isolation voltage  $\leq 1500\text{VDC}$ )
- 3) Where the regulation of the output voltage and the output ripple noise are demanded



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

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.

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

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EMC specifications				
EMI	CE	CISPR22/EN55022	CLASS A (bare component)	Class B (External circuit refer to EMC recommended circuit <sup>(2)</sup> )
EMI	RE	CISPR22/EN55022	CLASS A (bare component)	Class B (External circuit refer to EMC recommended circuit <sup>(2)</sup> )
EMS	ESD	IEC/EN61000-4-2	Contact $\pm 4\text{KV}$	perf. Criteria B
EMS	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
EMS	EFT	IEC/EN61000-4-4	$\pm 2\text{KV}$	perf. Criteria B (External circuit refer to EMC recommended circuit <sup>(1)</sup> )
EMS	Surge	IEC/EN61000-4-5	$\pm 2\text{KV}$	perf. Criteria B (External circuit refer to EMC recommended circuit <sup>(1)</sup> )
EMS	CS	IEC/EN61000-4-6	3 V.r.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** [ $\mu\text{F}$ ]
	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	$\pm 5$	$\pm 300$	$\pm 15$	76	2200
3DAW_0509D1.5	5	4.5-9	11	$\pm 9$	$\pm 166$	$\pm 8$	76	1800
3DAW_0512D1.5	5	4.5-9	11	$\pm 12$	$\pm 125$	$\pm 6$	78	1800
3DAW_0515D1.5	5	4.5-9	11	$\pm 15$	$\pm 100$	$\pm 5$	78	1000
3DAW_1205D1.5	12	9-18	22	$\pm 5$	$\pm 300$	$\pm 15$	81	2200
3DAW_1209D1.5	12	9-18	22	$\pm 9$	$\pm 166$	$\pm 8$	84	2000
3DAW_1212D1.5	12	9-18	22	$\pm 12$	$\pm 125$	$\pm 6$	84	1800
3DAW_1215D1.5	12	9-18	22	$\pm 15$	$\pm 100$	$\pm 5$	85	1000
3DAW_2405D1.5	24	18-36	40	$\pm 5$	$\pm 300$	$\pm 15$	82	2200
3DAW_2412D1.5	24	18-36	40	$\pm 12$	$\pm 125$	$\pm 6$	84	1800
3DAW_2415D1.5	24	18-36	40	$\pm 15$	$\pm 100$	$\pm 5$	84	1000
3DAW_4805D1.5	48	36-72	80	$\pm 5$	$\pm 300$	$\pm 15$	82	2200
3DAW_4812D1.5	48	36-72	80	$\pm 12$	$\pm 125$	$\pm 6$	84	1800
3DAW_4815D1.5	48	36-72	80	$\pm 15$	$\pm 100$	$\pm 5$	85	1000
3DAW_4824D1.5	48	36-72	80	$\pm 24$	$\pm 62.5$	$\pm 3$	84	680

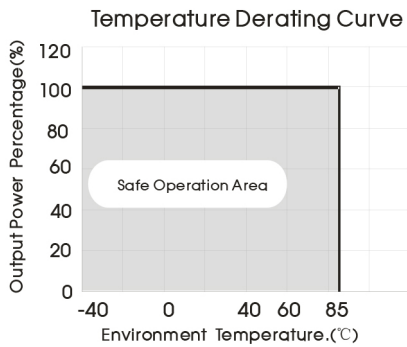
\* Input voltage can't exceed this value, or will cause permanent damage

\*\* For the dual output modules, the capacitive loads of positive and negative outputs are the same.

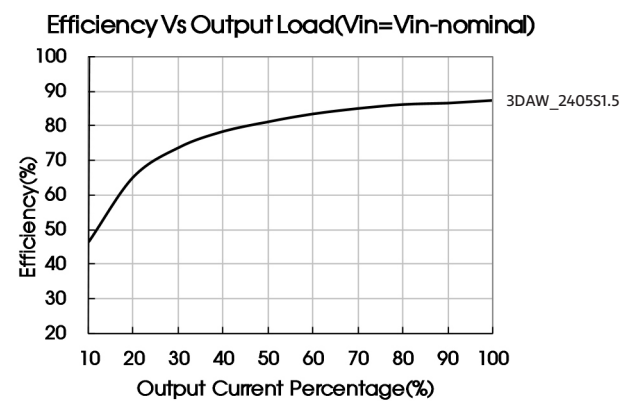
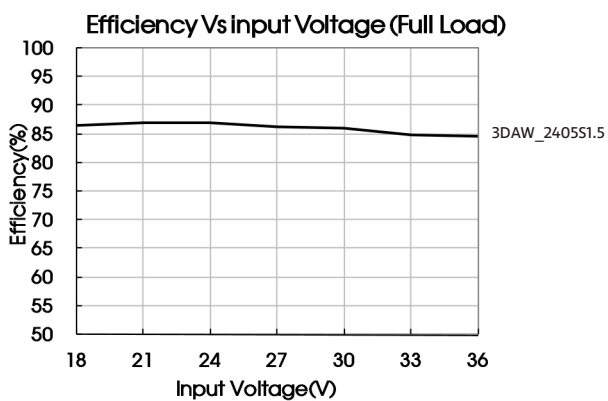
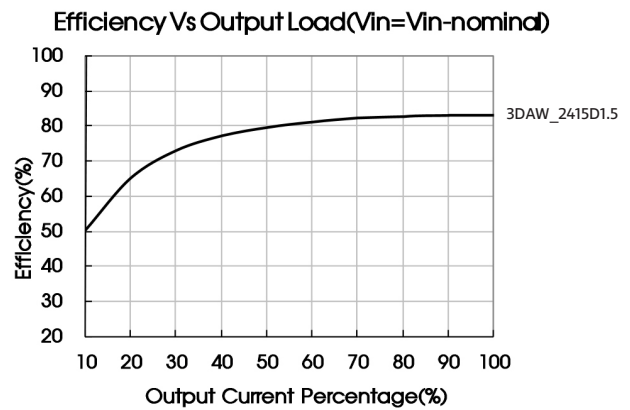
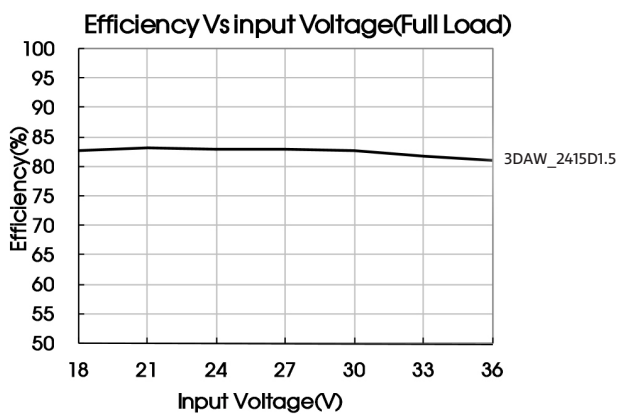
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### Typical characteristics



### 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  $C_{in}$  and  $C_{out}$  or select capacitors of low equivalent impedance provided that the capacitance is no larger than the max. capacitive load of the product.

#### Dual Output



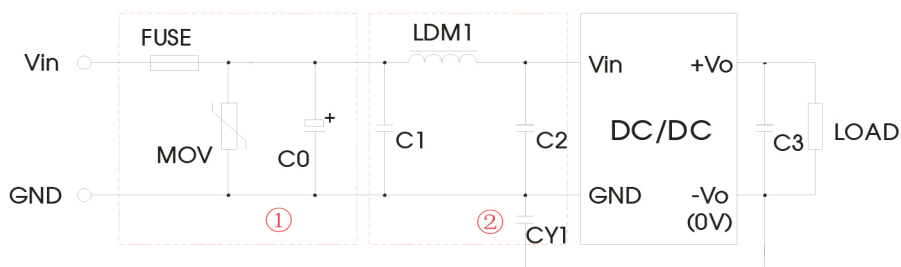
#### Single Output



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: Part ① in the Fig. 3 is used for EMS test and part ②③ for EMI filtering, selected based on needs.

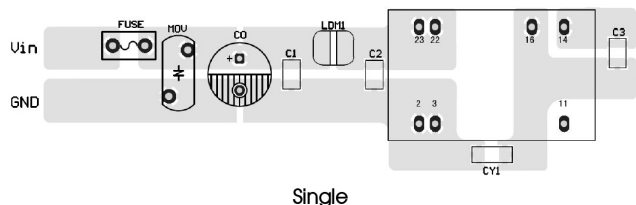
② If there is no recommended parameters, the model no require the external component.

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			

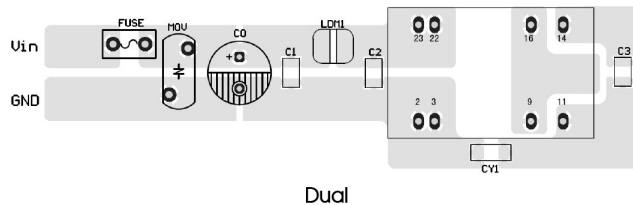
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### EMC solution-recommended circuit, PCB layout



Single



Dual

Note: the min. distance of the bonding pads between input grounding and output grounding shall be  $\geq 2\text{mm}$ .

### Input current

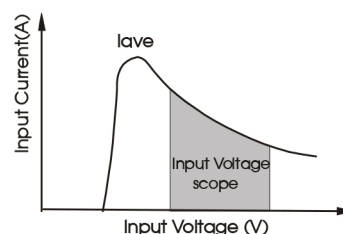
When the electricity is provided by the unstable power supply, please make sure that the range of the output voltage fluctuation and the ripple voltage of the power supply do not exceed the indicators of the modules. Input current of power supply should afford the flash startup current of this kind of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

Generally:  $V_{in}=5\text{V}$   $I_{ave}=1400\text{mA}$

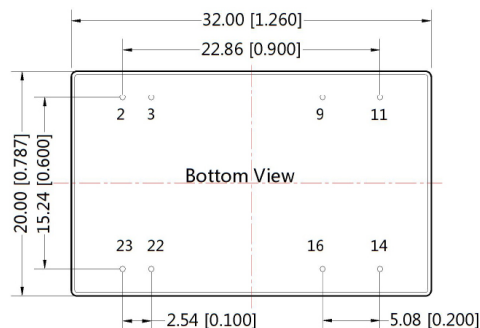
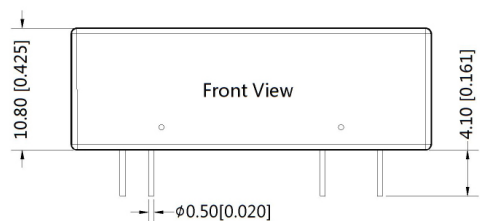
$V_{in}=12\text{V}$   $I_{ave}=620\text{mA}$

$V_{in}=24\text{V}$   $I_{ave}=310\text{mA}$

$V_{in}=48\text{V}$   $I_{ave}=150\text{mA}$



### Mechanical dimensions



**Note:**

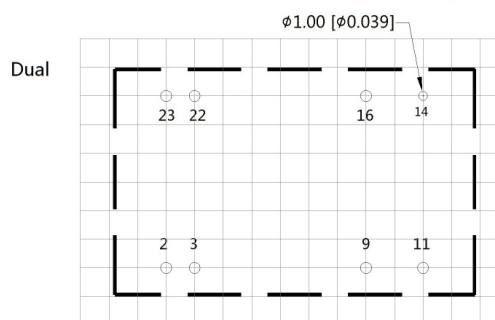
Unit: mm[inch]

Pin diameter tolerances:  $\pm 0.10\text{mm}$  [ $\pm 0.004\text{inch}$ ]

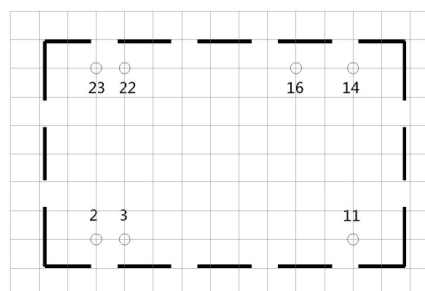
Pin pitch tolerances:  $\pm 0.25\text{mm}$  [ $\pm 0.010\text{inch}$ ]

General tolerances:  $\pm 0.50\text{mm}$  [ $\pm 0.020\text{inch}$ ]

THIRD ANGLE PROJECTION



Single



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