3DAW4_1.5 series

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

DC-DC Converter 3 Watt

- 4:1 wide input voltage range
- Operating temperature: -40°C to +85°C
- 1500VDC isolation
- Short circuit protection (SCP) (automatic recovery)
- Internal SMD construction
- UL94-V0 package
- No external component required
- Meet CISPR32/EN55032 CLASS A, without external components
- EN60950 approval

The 3DAW4_1.5 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≤ 4:1);
2) Where isolation is necessary between input and output (isolation≤1500VDC);
3) Where the regulation of the output voltage and the output ripple noise are demanded.

Common specifications

Short circuit protection:	Continuous, automatic recovery
Cooling:	Free air convection
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-55°C ~+125°C
Casing temperature rise (Ta= 25°C):	25°C TYP
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
Dimension:	32.00 x 20.00 x 10.80 mm

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input current (full load / no-load)	• 24Vin DC (3.3V) • 24Vin DC (others) • 48Vin DC (3.3V) • 48Vin DC (others)		167/10 155/10 83/8 77/8	172/20 161/20 85/15 82/15	mA mA mA mA
Reflected ripple current	• 24VDC input • 48VDC input		30 30		mA mA
Input impulse Voltage (1sec. max.)	• 24VDC input • 48VDC input	-0.7 -0.7		50 100	VDC VDC
Starting Voltage	• 24VDC input • 48VDC input	4.5 11	7 16	9 18	VDC VDC

Note:
1. The min. load shall be no lower than 5%, or the output ripple may increase rapidly; If the product is operated under the min. required load, the product performance cannot be guaranteed to comply with all performance indexes in the Manual, but the reliability of the product will not be influenced;
2. The max. capacitive load should be tested within the input voltage range and under full load conditions;
3. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta = 25°C, humidity <75% when inputting nominal voltage and outputting rated load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. The performance indexes of the product models listed in this datasheet are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technicians for specific information;
6. We can provide product customization service;

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	%
Linear regulation	Full load, the input voltage is from low to high voltage		±0.2	±0.5	%
Load regulation	5%-100% load		±0.2	±1.0	%
Transient Recovery Time	25% load step change		0.5	3	ms
ent Response Deviation	25% load step change		±2	±5	%
Temperature coefficient	full load		±0.02	±0.03	%/°C
Ripple*	20MHz Bandwidth		35	85	mVp-p
Noise*	20MHz Bandwidth		35	85	mVp-p
Output Power Protection	Input voltage range	120			%
Switching frequency (PFM mode)	100% load, nominal input range		250		KHz

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		120		pF

Example:
3DAW4_2405S1.5
3 = 3Watt; D = DIP; A = series; W4 = wide input (4:1); 24 = 9-36Vin; 05 = 5Vout; S = Single Output; 1.5 = 1500VDC isolation

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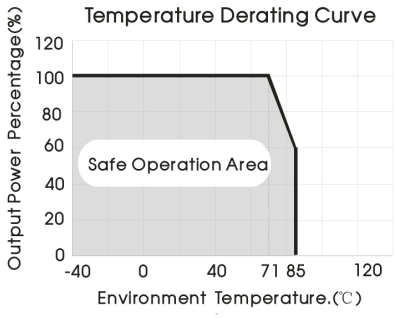
EMC specifications					
EMI	CE	CISPR22/EN55032	150KHz-30MHz	CLASS A CLASS B	Bare component (see EMC solution recommended circuit,②)
EMI	RE	CISPR22/EN55032	30MHz-1GHz	CLASS A CLASS B	Bare component (see EMC solution recommended circuit,②)
EMS	ESD	IEC/EN61000-4-2	Contact ±4KV; Air ±8KV		perf. Criteria B
EMS	Radiation Immunity	IEC/EN61000-4-3	10V/m		perf. Criteria A
EMS	EFT	IEC/EN61000-4-4	±2KV (see EMC solution rec. circuit ①)		perf. Criteria B
EMS	Surge Immunity	IEC/EN61000-4-5	±2KV (see EMC solution rec. circuit ①)		perf. Criteria B
EMS	Conducted disturbance Immunity	IEC/EN61000-4-6	3Vr.m.s		perf. Criteria A
EMS	Immunities of voltage dip, drop and short interruption	IEC/EN61000-4-29	0%-70%		perf. Criteria B

Product Selection Guide

Part Number	Input Voltage [VDC]			Output Voltage [VDC]	Current [mA]		Efficiency [%, Typ.]	Max. Capacitive Load [µF]
	Nominal	Range	Max*		Max	Min		
3DAW4_2403S1.5	24	9-36	40	3.3	909	45	75	2700
3DAW4_2405S1.5	24	9-36	40	5	600	60	80	2200
3DAW4_2409S1.5	24	9-36	40	9	333	17	80	1000
3DAW4_2412S1.5	24	9-36	40	12	250	13	81	680
3DAW4_2415S1.5	24	9-36	40	15	200	10	82	680
3DAW4_2424S1.5	24	9-36	40	24	125	6	82	470
3DAW4_4805S1.5	48	18-75	80	5	600	30	79	2200
3DAW4_4812S1.5	48	18-75	80	12	250	13	82	680
3DAW4_4815S1.5	48	18-75	80	15	200	10	83	680
3DAW4_4824S1.5	48	18-75	80	24	125	6	81	470

* Absolute maximum rating without damage on the converter, but it isn't recommended.

Temperature derating curve



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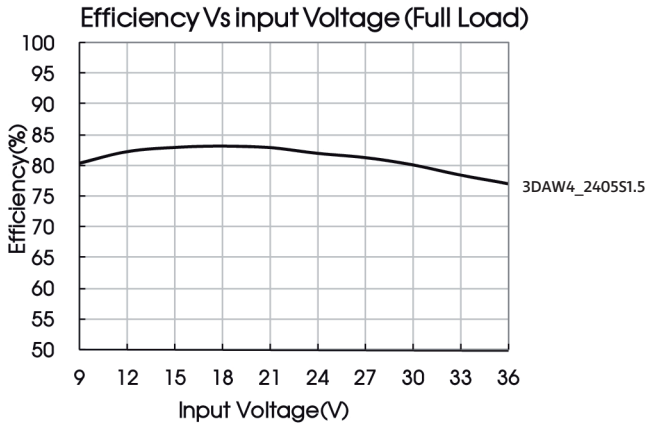
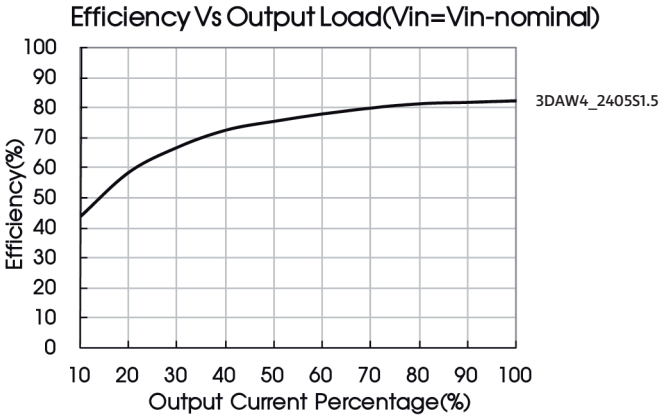
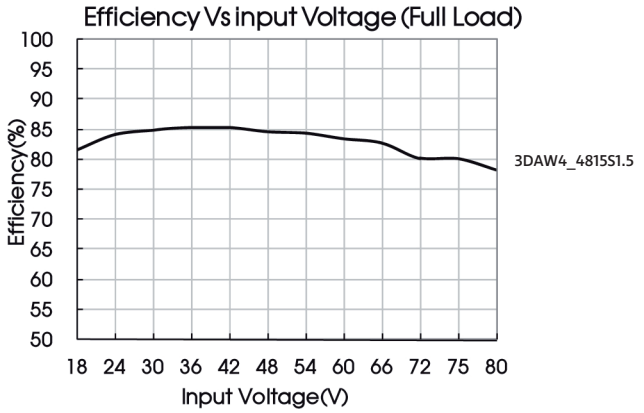
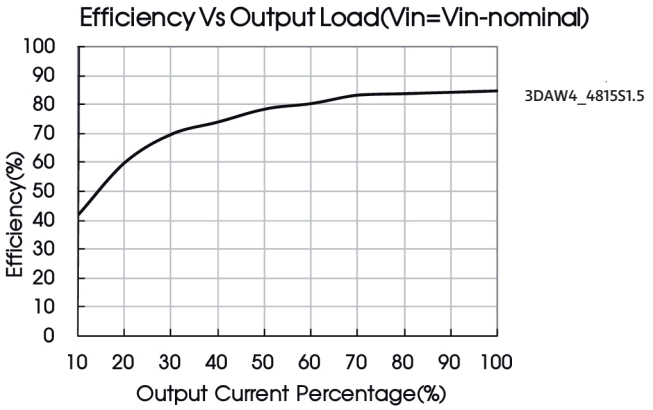
Product Characteristics









Design reference

Output load requirements
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.

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.

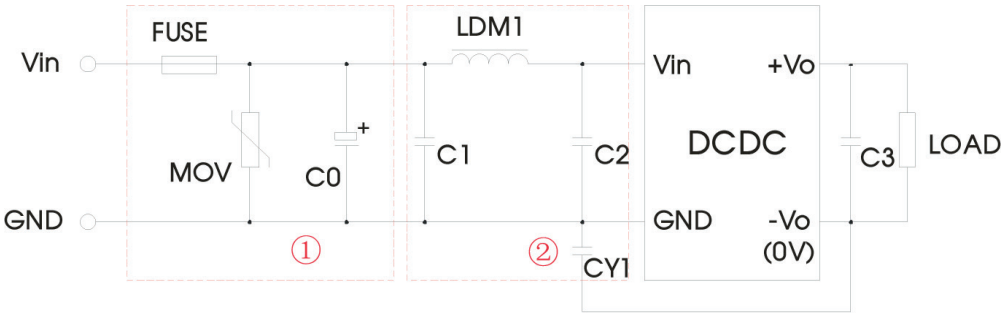
Figure 1

Vin (VDC)	Cin (μF)	Cout (μF)
24	10	10
48	47	10

Parameter description:

Model	Vin: 24V	Vin: 48V
Fuse	Slow blown fuses according to the actual input current selections of the clients	
MOV	S14K35	S14K60
C0	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	

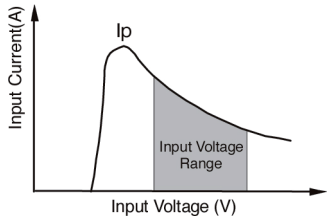
EMC solution-recommended circuit



Input current

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 star-tup current of this kind of DC/DC module.

Generally:Vin = 24V Iave = 640mA
Vin = 48V Iave = 320mA



Cannot use in parallel and hot swap.

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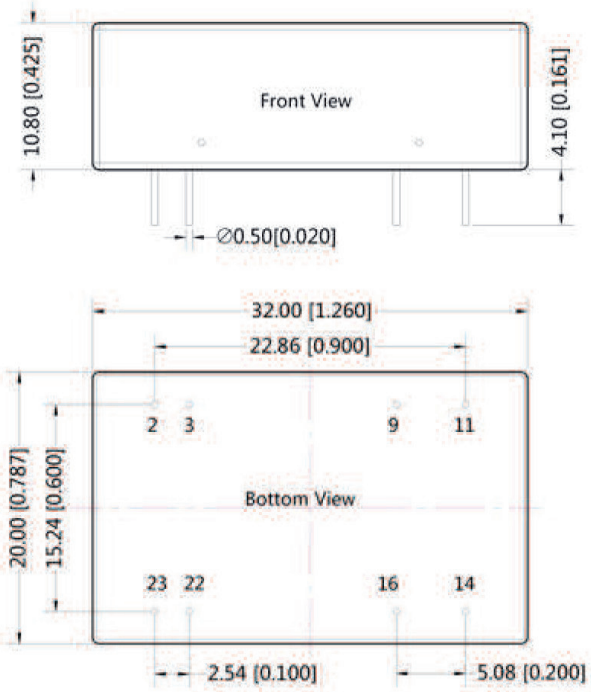
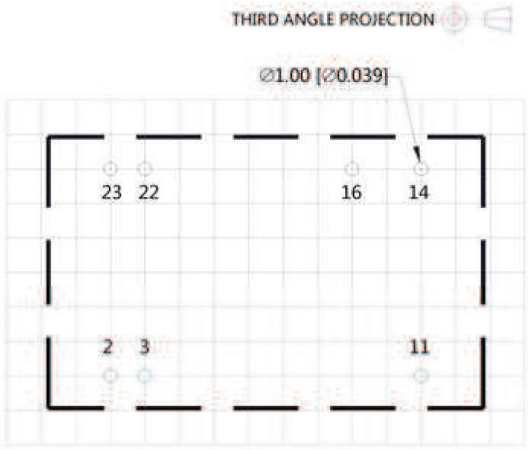
Mechanical dimensions



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



Note:Grid 2.54*2.54mm

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

NC: No Connection