6DAW_3R series

6W - Single/Dual Output DC-DC Converter - Wide Input - Isolated & Regulated

DC-DC Converter 6 Watt

- DIP24 package
- 2:1 input range
- Operating temperature range: -40°C to +85°C
- 3000VDC isolation
- Up to 88% efficiency
- Input under-voltage protection
- Short circuit protection (SCP)
- Over voltage protection
- Over current protection

Introducing our new 6DAW_3R series. Housed in a reliable DIP24 package with a 2:1 input range, this series delivers high performance and efficiency for demanding environments. With an extended operating temperature range from -40°C to +85°C, reinforced 3000VDC isolation, and efficiency levels of up to 88%, it is built for stability and endurance. The 6DAW_3R series includes robust protection features such as input under-voltage, short-circuit (SCP), over-voltage, and over-current safeguards—ensuring reliable operation under challenging conditions. Designed for critical applications, it is ideally suited for electricity, industrial control, and medical sectors.

Common specifications

Short circuit protection	Input voltage range, continuous, self recovery
Switching frequency	300 kHz (full load, nominal input voltage)
Operation temperature	-40°C ~+85°C (with derating)
Storage temperature	-55°C ~+125°C
Pin welding can withstand the highest temperature	+300°C (soldering spot is 1.5mm away from case for 10 seconds)
Storage humidity	5~95% RH (non-condensing)
MTBF: (MIL-HDBK-217F@25°C)	> 1,000,000 hours
Input filter	PI filter
Hot plug	Unavailable
Case material	Black flame retardant and heat-resistant plastic (UL 94V-0 rated)
Package dimensions	31.80 × 20.00 × 12.60mm
Weight	12.7g (typ.)
Cooling method	Free air convection

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/ no load)	**5VDC input** 12VDC input • Single 3.3VDC Output • Other Output **24VDC input** • Single 3.3VDC Output • Other Output **48VDC input** • Single 3.3VDC Output • Other Output		1538/10 550/7 607/7 261/10 297/10 131/4 146/4	1578/30 566/25 641/25 268/16 320/16 134/7 154/7	mA
Reflected ripple current			20		mA
Impulse voltage	5VDC Input 12VDC Input 24VDC Input 48VDC Input	-0.7 -0.7 -0.7 -0.7		16 25 50 100	VDC
Starting voltage	5VDC Input 12VDC Input 24VDC Input 48VDC Input			4.5 5 9 18	VDC
Input undervoltage protection	5VDC Input 12VDC Input 24VDC Input 48VDC Input	3.5 3.5 5.5 12	4 4 6.5 15.5		VDC
Start time	Nominal input and constant resistance load		10		ms

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	5% to 100% load 0% to 5% load Single output Dual output		±1.0 ±1.0 ±2.0	±3.0 ±3.0 ±5.0	%
Output voltage balance	Dual output, balanced load		±0.5	±1.5	%
Linear regulation (input voltage from low limit to high limit, full load)	Positive output Negative output		±0.2 ±0.5	±0.5 ±1	%
Load regulation (5% - 100% load)	Positive output Negative output		±0.5 ±0.5	±1 ±1.5	
Ripple & noise	20MHz bandwidth, 5% to 100% load		85	120	mVp-p
Transient recovery time	25% load step change		300	500	µs
Transient response deviation	25% load step change		±3	±5	%
Temperature drift coefficient	Full load			±0.03	%/°C
Overcurrent protection	Input voltage range	110	140		%Io

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output, test time 1 minute, leakage current less than 1mA	3000			VDC
Isolation resistance	Input-output, isolated voltage 500VDC	1000			MΩ
Isolation capacitance	Input-output, 100kHz/0.1V		1000		pF

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
3. Suggested dual output module load imbalance: ≤ ± 5%. If it exceeds ± 5%, it cannot be guaranteed that the product performance meets all performance indicators in this datasheet;
4. The maximum capacitive load is tested within the input voltage range and under full load conditions;
5. Unless otherwise specified, all indicators in this datasheet are measured at Ta = 25°C, humidity <75% RH, nominal input voltage, and output rated load;
6. All indicator testing methods in this datasheet are based on our standards;
7. Product specifications are subject to change without prior notice.

Example:
6DAW_2405S3R
6 = 6Watt; D = DIP; A = Series; W = Wide input; 24 = 24Vin; 05 = 5Vout;
S = Single Output; 3 = 3000VDC isolation; R = Regulated Output

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

EMC specifications						
EMC	EMI	CE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (Recommended circuit diagram 3-②)		
EMC	EMI	RE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (Recommended circuit diagram 3-②)		
EMC	EMS	ESD	IEC/EN61000-4-2	Contact± 4KV	Perf.Criteria	B
EMC	EMS	RS	IEC/EN61000-4-3	10V/m	Perf.Criteria	A
EMC	EMS	EFT	IEC/EN61000-4-4	± 2KV (Recommended circuit diagram 3-①)	Perf.Criteria	B
EMC	EMS	Surge	IEC/EN61000-4-5	line to line± 2KV (Recommended circuit diagram 3-①)	Perf.Criteria	B
EMC	EMS	CS	IEC/EN61000-4-6	3Vr.m.s	Perf.Criteria	A
EMC	EMS	Voltage sag, drop, and short-term immunity	IEC/EN61000-4-29	0-70%	Perf.Criteria	B

Product Selection Guide

Approval	Part number	Input Voltage Nominal Range (VDC)	Input Voltage Max. (VDC)	Output Voltage (VDC)	Output Current (mA) Max.	Full Load Efficiency% (typ.)	Capacitive Load Max. (µF)
	6DAW_0505S3R	5 (4.5-9)	20	5	1200	79	1000
	6DAW_0512S3R	5 (4.5-9)	20	12	500	81	470
	6DAW_0515S3R	5 (4.5-9)	20	15	400	82	220
	6DAW_0524S3R	5 (4.5-9)	20	24	250	84	100
	6DAW_1203S3R	12 (9-18)	20	3.3	1500	76	1800
	6DAW_1205S3R	12 (9-18)	20	5	1200	80	1000
	6DAW_1209S3R	12 (9-18)	20	9	667	81	1000
	6DAW_1212S3R	12 (9-18)	20	12	500	82	470
	6DAW_1215S3R	12 (9-18)	20	15	400	83	220
	6DAW_1224S3R	12 (9-18)	20	24	250	86	100
	6DAW_2403S3R	24 (18-36)	40	3.3	1500	77	1800
	6DAW_2405S3R	24 (18-36)	40	5	1200	82	1000
	6DAW_2409S3R	24 (18-36)	40	9	667	83	1000
	6DAW_2412S3R	24 (18-36)	40	12	500	85	470
	6DAW_2415S3R	24 (18-36)	40	15	400	86	220
	6DAW_2424S3R	24 (18-36)	40	24	250	86	100
	6DAW_4803S3R	48 (36-75)	80	3.3	1500	80	1800
	6DAW_4805S3R	48 (36-75)	80	5	1200	84	1000
	6DAW_4809S3R	48 (36-75)	80	9	667	85	680
	6DAW_4812S3R	48 (36-75)	80	12	500	87	470
	6DAW_4815S3R	48 (36-75)	80	15	400	88	220
	6DAW_4824S3R	48 (36-75)	80	24	250	87	100

Approval	Part number	Input Voltage Nominal Range (VDC)	Input Voltage Max. (VDC)	Output Voltage (VDC)	Output Current (mA) Max.	Full Load Efficiency% (typ.)	Capacitive Load Max. (µF)
	6DAW_1205D3R	12 (9-18)	20	±5	±600	80	680
	6DAW_1212D3R	12 (9-18)	20	±12	±250	84	330
	6DAW_1215D3R	12 (9-18)	20	±15	±200	85	220
	6DAW_1224D3R	12 (9-18)	20	±24	±125	84	100
	6DAW_2405D3R	24 (18-36)	40	±5	±600	82	680
	6DAW_2409D3R	24 (18-36)	40	±9	±333	84	220
	6DAW_2412D3R	24 (18-36)	40	±12	±250	85	330
	6DAW_2415D3R	24 (18-36)	40	±15	±200	88	220
	6DAW_2424D3R	24 (18-36)	40	±24	±125	86	100
	6DAW_4805D3R	48 (36-75)	80	±5	±600	83	680
	6DAW_4812D3R	48 (36-75)	80	±12	±250	87	330
	6DAW_4815D3R	48 (36-75)	80	±15	±200	88	220

Typical characteristics

Temperature derating graph

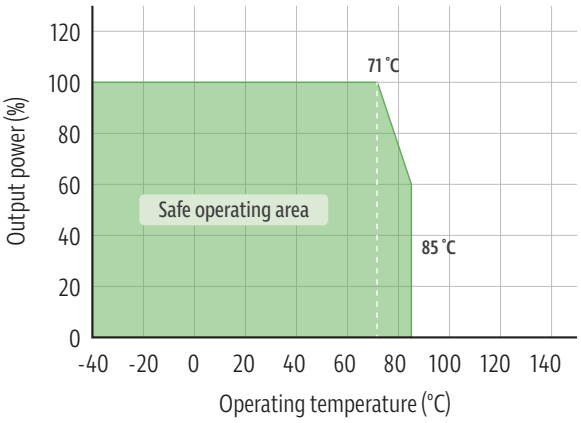
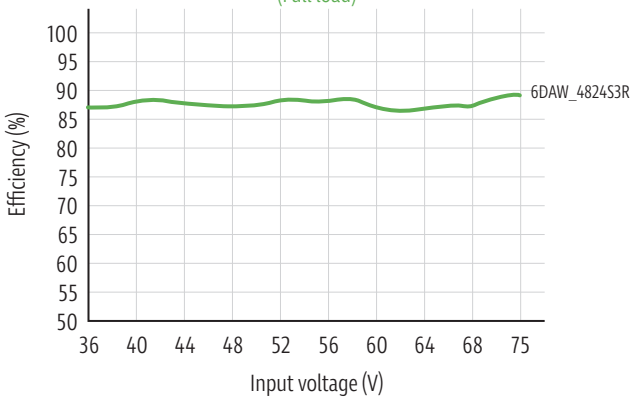
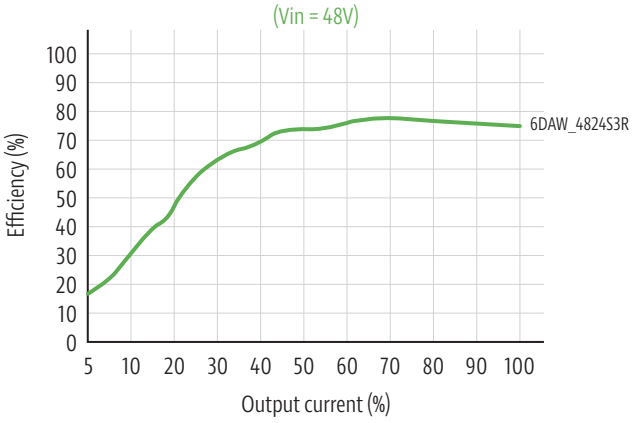


Figure1

Efficiency vs input voltage
(Full load)



Efficiency vs output load
(Vin = 48V)



Typical circuit design and application

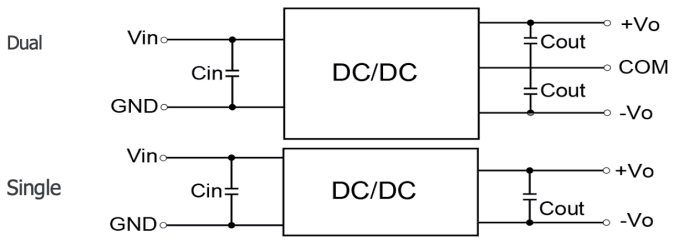


Figure2

Recommended capacitive load value table

Vin	5V	12V	24V	48V
Cin	330uF	330uF	220uF	10-47uF
Cout	10uF	10uF	10uF	10uF

Application circuit description:

1. All DC-DC converters in this series are tested according to the recommended testing circuit (figure 2) before leaving the factory.

2. If further reduction of input and output ripple is required, the input and output external capacitors C0, C1, C2, C3 , C4 can be increased or a capacitor with a small series equivalent impedance value can be selected.

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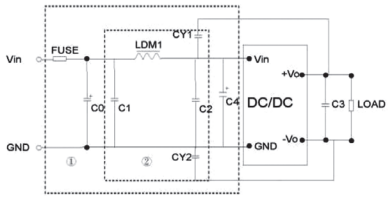
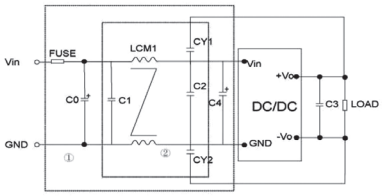
sales@gaptec-electronic.com – www.gaptec-electronic.com

EMI recommended component parameters



3.3VDC, 5VDC Output (figure3)



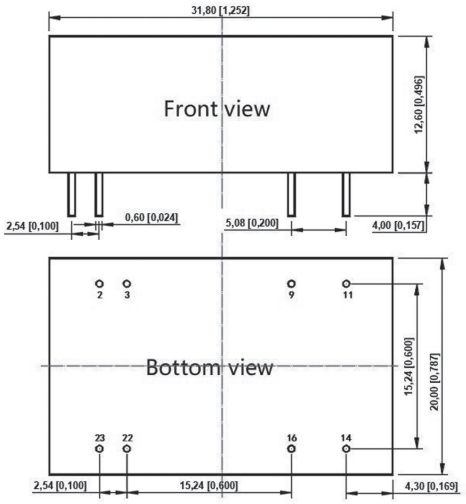
Other Output (figure4)

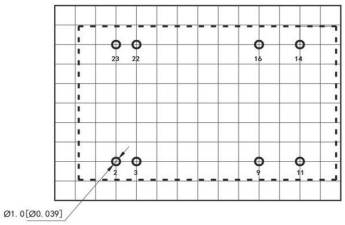
EMI recommended component parameters

Model	5V	12V	24V	48V
FUSE	Select based on the actual input current of the customer			
C0, C4	470μF/50V	470μF/50V	330μF/50V	330μF/100V
C1, C2	10F/25V	10F/25V	10μF/50V	10μF/100V
C3	Refer to the Cout in Fig.2			
LCM1	1.4-1.7mH			
LDM1	10uH			
CY1, CY2	1nF/2KV			

Note: Part ① of Figure 3 is used for EMC testing; Part 2 is used for EMI filtering and can be selected according to requirements.

Mechanical dimensions





The grid distance is 2.54mm x2.54mm

Pin definition table		
Pin	Single	Dual
2	GND	GND
3	GND	GND
9	NC	COM
11	NC	-Vo
14	+Vo	+Vo
16	-Vo	COM
22	Vin	Vin
23	Vin	Vin

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

NC: Pin to be isolated from circuity