15DAWE_1.5 series

15W - Single Output - Wide Input - Isolated & Regulated DC-DC Converter

DC-DC Converter 15 Watt

- Efficiency up to 90%
- 2:1 wide input voltage range
- Output over current, over voltage and input under voltage protection
- Short circuit protection (SCP)
- 1.5kVDC isolation
- Operating temperature range: -40°C ~ +85°C
- Six-sided metal shield
- Industry standard pinout
- Meet CISPR32/EN55032 CLASS A, without extra components
- IEC60950/UL60950/EN60950 approved

UL-60950-1 (E347551)

The 15DAWE_1.5 series are isolated 15W DC-DC products with a 2:1 input voltage range. They feature efficiencies of up to 90%, 1500VDC input to output isolation, operating ambient temperature range of -40°C ~ +85°C, input under-voltage protection, output short-circuit, over-voltage, over-current protection. They meet CLASS A of CISPR32/EN55032 EMI standards without external components.

They are widely used in applications such as data transmission device, battery power supplies, tele-comunication device, distributed power supply system, hybrid module system, remote control system, industrial robot system fields.

Common specifications

Short circuit protection:	Hiccup, continous, self-recovery
Cooling:	Free air convection
Vibrating:	10-55Hz, 2G, 30 Min. along X, Y and Z
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-55°C~+125°C
Pin soldering resistance temperature:	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	5-95%RH
Switching frequency:	270kHz TYP, PWM mode
Case material:	Plastic (UL94-V0)
MTBF (MIL-HDBK-217F@25°C):	1000 K hours MIN
Weight:	26g / 34g with heatsink
Dimensions:	50.80 × 25.40 × 11.80 mm 51.40 × 26.20 × 16.50 mm with heatsink

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	Positive and negative accuracy		±1	±3	%
Line regulation	Full load, Input voltage from low to high		±0.2	±0.5	%
Load regulation	5% to 100% load		±0.5	±1	%
Transient recovery time	25% load step change		300	500	µs
Transient response deviation	25% load step change • 3.3VDC output • others		 ±5 ±3	 ±8 ±5	 % %
Temperature drift	100% full load			±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth		50	100	mVp-p
Trim	Input voltage range	90		110	%Vo
Over voltage protection	Input voltage range	110		160	%Vo
Over current protection	Input voltage range	110		190	%Io

* Ripple and noise tested by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Reflected ripple current			30		mA
Input surge voltage (1000 ms)	• 24VDC input • 48VDC input	-0.7 -0.7		50 100	VDC VDC
Start-up voltage	• 24VDC input • 48VDC input			18 36	VDC VDC
Under voltage shutdown	• 24VDC input • 48VDC input	12 26	15.5 30		VDC VDC
Start-up time	Nominal input & constant resistance load		10		ms
Input filter	Pi				
Ctrl [1]	• Module ON • Module OFF • Input current when OFF	Ctrl pin open or pulled high (3.5-12VDC) Ctrl pin pulled low to GND (0-1.2VDC) 4		7	 mA
Hot plug	Unavailable				

1. The CTRL pin voltage is referenced to GND.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and leakage current less than 1 mA	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	100KHz/0.1V • 24VDC output • Others		 2050 1050		 pF pF

Example:
15DAWE_2415S1.5
15 = 15Watt; D = DIP; A = series; W = wide input (2:1) 18-36Vin;
E = cost effective; 15Vout; S = single output; 1.5 = 1500VDC isolation

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15DAWE_1.5 series

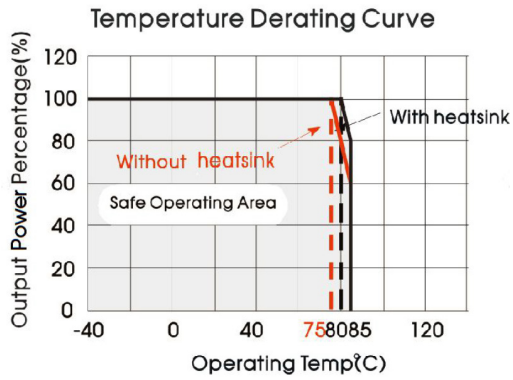
15W - Single Output - Wide Input - Isolated & Regulated
DC-DC Converter

EMC specifications				
EMI	CE	CISPR22/EN55022	Others: 3.3V output:	CLASS A (without external components) / CLASS B (see EMC compliance circuit ②) CLASS B (see EMC compliance circuit ②)
EMI	RE	CISPR22/EN55022	Others: 3.3V output:	CLASS A (without external components) / CLASS B (see EMC compliance circuit ②) CLASS B (see EMC compliance 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 (see EMC compliance circuit ①)	perf. Criteria B
EMS	Surge	IEC/EN61000-4-5	line to line ±2KV (see EMC compliance circuit ①)	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]			Output Voltage [VDC]	Output Current [mA, Max]	Input Current [mA, typ/max]		Efficiency [%, Typ.]	Capacitive load [µF, Max]
	Nominal	Range	Max[1]			Full load	No load		
15DAWE_2405S1.5	24	18-36	40	5	3000	702/718	30/75	89	4700
15DAWE_2412S1.5	24	18-36	40	12	1250	702/718	30/10	89	1000
15DAWE_2415S1.5	24	18-36	40	15	1000	702/718	5/10	89	820
15DAWE_2424S1.5	24	18-36	40	24	625	702/718	5/10	90	270
15DAWE_4803S1.5	48	36-75	80	3.3	4000	355/363	20/30	83	14700
15DAWE_4805S1.5	48	36-75	80	5	3000	355/363	20/30	88	4700
15DAWE_4812S1.5	48	36-75	80	12	1250	351/363	5/10	88	1000
15DAWE_4815S1.5	48	36-75	80	15	1000	351/363	5/10	89	820
15DAWE_4824S1.5	48	36-75	80	24	625	351/363	5/10	89	270

1. Input voltage can't exceed this value, or will cause the permanent damage.
2. Add suffix "H" for heat sink mounted, for example 15DAWE_2405S1.5H.

Typical characteristics



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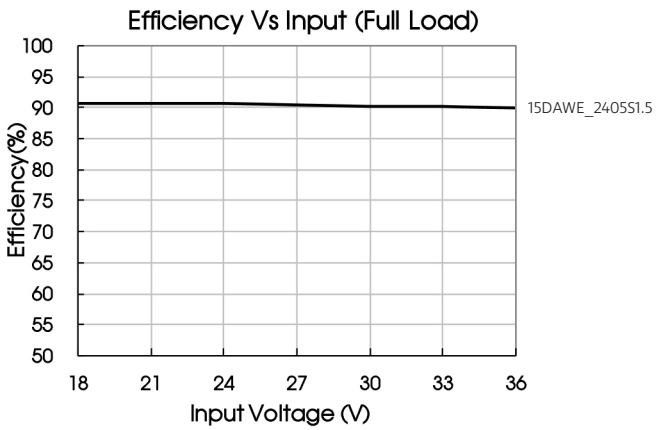
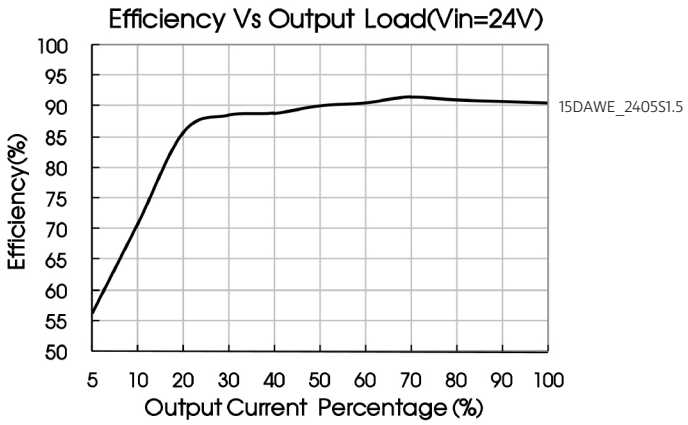
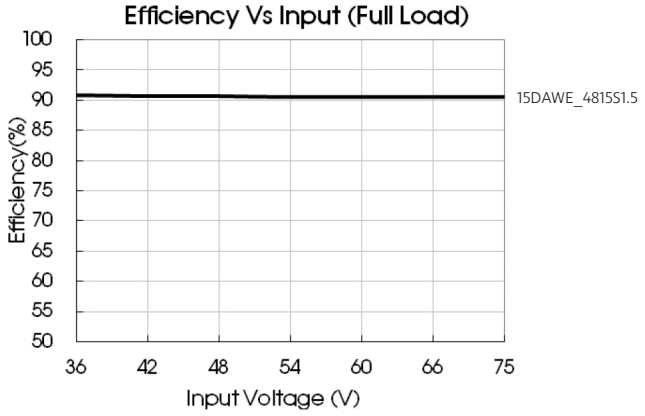
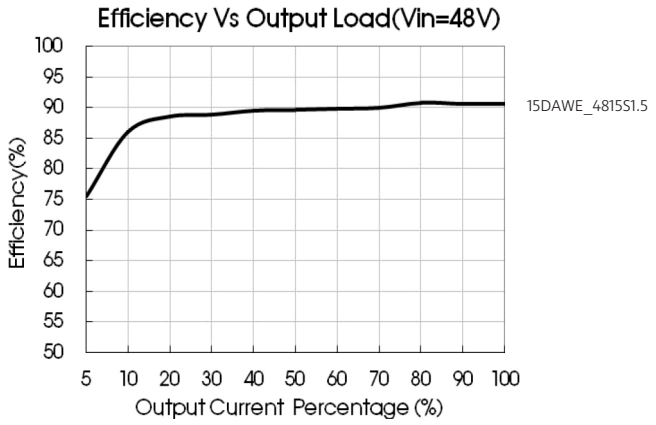
Efficiency









Typical application

All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 1.

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

Figure 1

Vout (VDC)	Cout (µF)	Cin (µF)
3.3/5	470	100
12/15	220	
24	100	

EMC recommended circuit

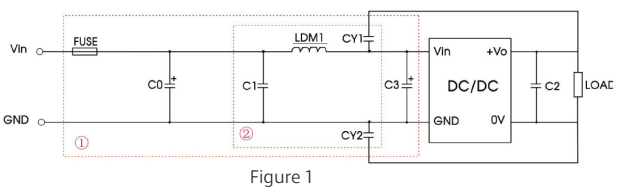


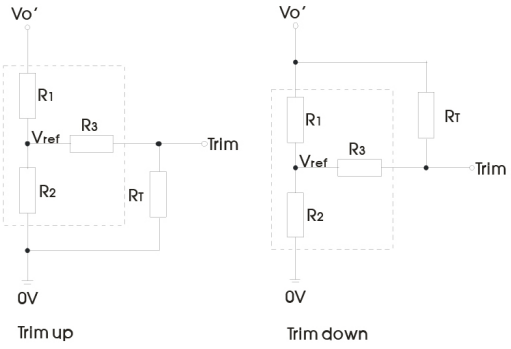
Figure 1

Notes: For EMC tests we use Part ① for immunity and part ② for emissions test. Selecting based on needs.

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
C0/C3	330µF/50V	330µF/100V
C1	1µF/50V	4.7µF/100V
C2		
LDM1	4.7µH/2.2A	
CY1/CY2	1nF/2KV	

Trim

Trim Function for Output Voltage Adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

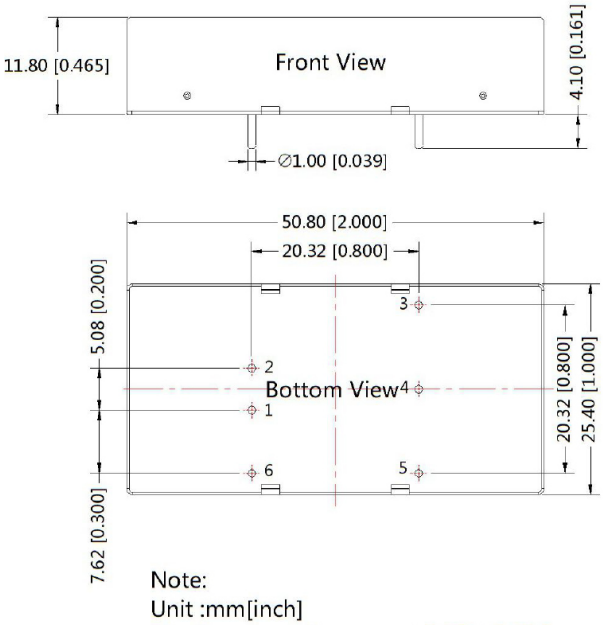
$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2$$

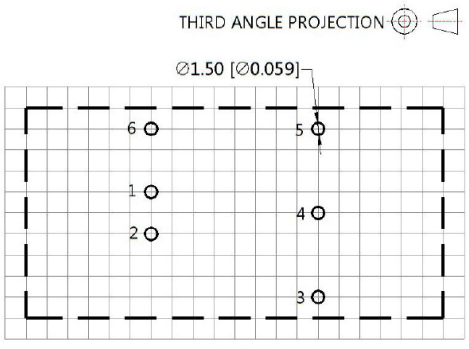
R_T is Trim resistance
a is a self-defined parameter, with no real meaning.

Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	4.801	2.87	12.4	1.24
5	2.883	2.87	10	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

Mechanical dimensions



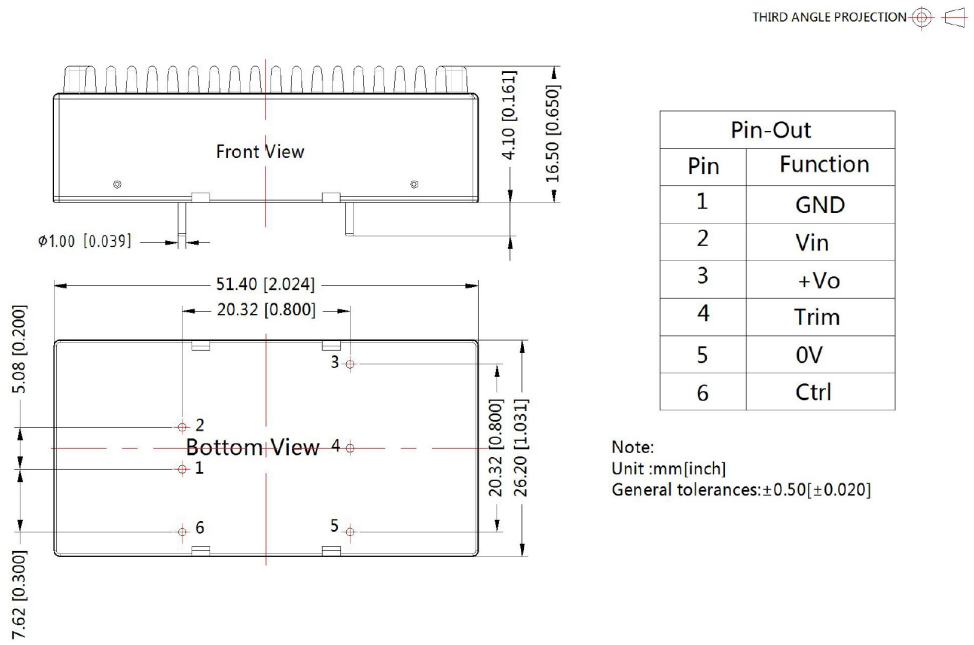
Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
General tolerances:±0.50[±0.020]



Note : Grid 2.54*2.54mm

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

Mechanical dimensions (with heatsink)



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

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

Note:
1. The maximum capacitive load offered were tested at input voltage range and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75%RH with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see „Features" and „EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.