DC – DC

Features

- Ultra-compact DIP/SMD package
- Wide 2:1 input voltage range
- Operating ambient temperature range: -40℃ to +85℃
- I/O isolation test voltage: 1.5K VDC
- Short circuit protection (continuous)
- Industry standard pin-out
- EN62368 approved
- Meets UL62368 standards

Ideal Power's 36WRA-ST-1WR2 1W Isolated DC/DC Converter in SMD Series are certified to cRUus, CE, RoHS & IEC/UL60950/EN62368 Standards and comply with the relevant Efficiency Regulations. These are primarily used in ITE, Audio & Video Industries and customised solutions are available upon request.

Models

Model No.	Input Voltage (VDC)		Output		Ripple & Noise ② (mVp-p) Typ/Max	Full Load Efficiency (%) Min/Typ.	Capacitive Load (µF) Max.
	Nominal (Range)	Max. ①	Voltage (VDC)	Current (mA) Max/Min.			
36WRA1205ST-1WR2	12 (9-18)	20	±5	±100	100/150	75/77	1000
36WRA1209ST-1WR2			±9	±56		78/80	680
36WRA1212ST-1WR2			±12	±42		78/80	470
36WRA1215ST-1WR2			±15	±33		75/77	330
36WRA2405ST-1WR2	24 (18-36)	40	±5	±100	70/100	75/77	1000
36WRA2409ST-1WR2			±9	±56		75/77	680
36WRA2412ST-1WR2			±12	±42		75/77	470
36WRA2415ST-1WR2			±15	±33		75/77	330

Notes:

①Exceeding the maximum input voltage may cause permanent damage.

②Efficiency is measured at nominal input voltage and rated output load.

Input Specifications

	Conditions	Min	Typ	Max	Unit
Input Current (full load / no-load)	12VDC input voltage	--	108/15	112/30	mA
	24VDC input voltage	--	54/6	56/12	
Reflected Ripple Current	12VDC input voltage	--	40	--	
	24VDC input voltage	--	55	--	
Surge Voltage (1sec. max.)	12VDC input voltage	-0.7	--	25	VDC
	24VDC input voltage	-0.7	--	50	
Start-up Voltage	12VDC input voltage	--	--	9	
	24VDC input voltage	--	--	18	
Input Filter	12VDC input voltage	Capacitance filter			
Hot Plug		Unavailable			

Output Specifications

Parameter	Conditions		Min	Typ	Max	Unit
Voltage Accuracy	5%-100% load, input voltage range	Vo1	--	±1	±3	%
		Vo2	--	±3	±5	
No-load Output Voltage Accuracy	Input voltage range	Vo1	--	±2	±5	
		Vo2	--	--	±8	
Linear Regulation	Input voltage variation from low to high, 5%-100% load	Vo1	--	±0.2	±0.5	
		Vo2	--	±0.5	±1	
Load Regulation	5%-100% load	Vo1	--	±0.5	±1	%
		Vo2	--	--	±2	
Transient Recovery Time	25% load step change		--	1	3	ms
Transient Response Deviation			--	±3	±5	%
Temperature Coefficient	Full load		--	--	±0.03	%/℃
Short-circuit Protection			Continuous, self-recovery			

General Specifications

Parameter	Conditions	Min	Typ	Max	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	100	--	pF
Operating Temperature	see Fig. 1	-40	--	+85	℃
Storage Temperature		-55	--	+125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10	--	--	+300	
Reflow Soldering Temperature		Peak temperature ≤245℃, duration ≤60s max.			
Storage Humidity	Non-condensing	5	--	95	%RH
Switching Frequency (PFM Mode)	Full load, nominal input voltage	--	300	--	KHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours

Mechanical Specifications

Case material	Black plastic; flame-retardant and heat-resistant
Dimensions	15.00 × 14.00 × 9.10 mm
Weight	2.2g(Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig. 3-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig. 3-② for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV (see Fig. 3-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (see Fig. 3-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

Characteristic Curve

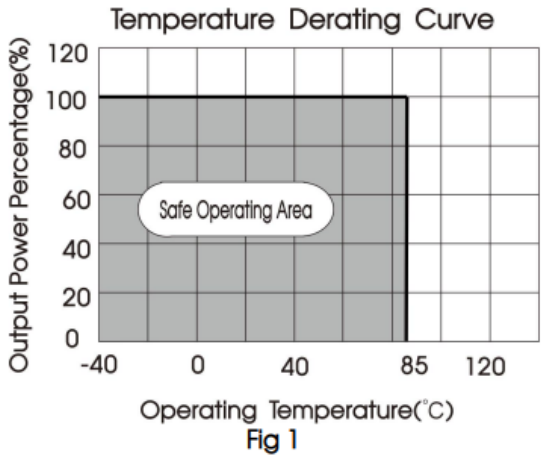
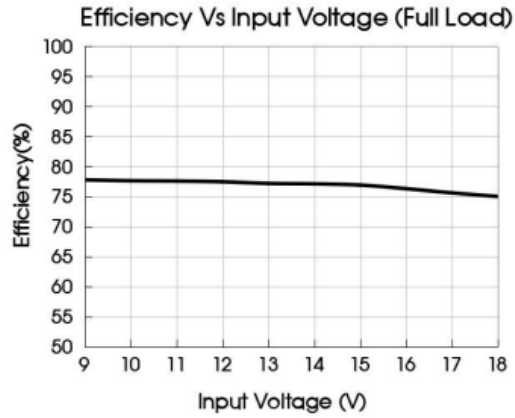
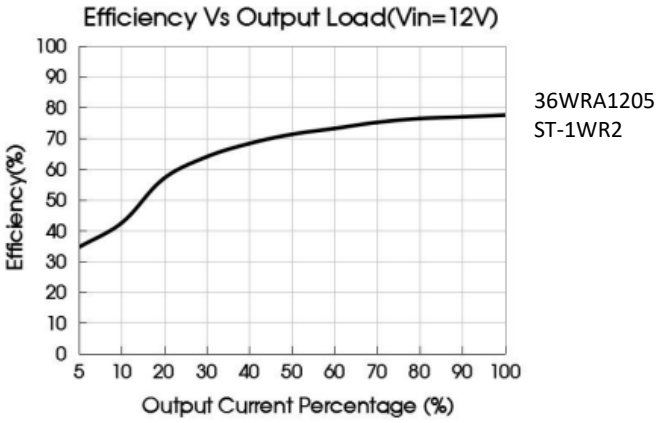


Fig 1

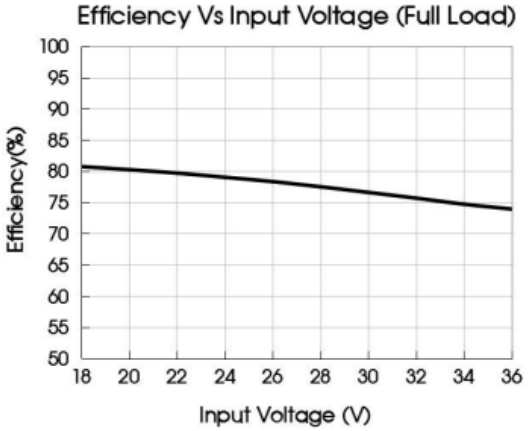
Characteristic Curve (Continued)



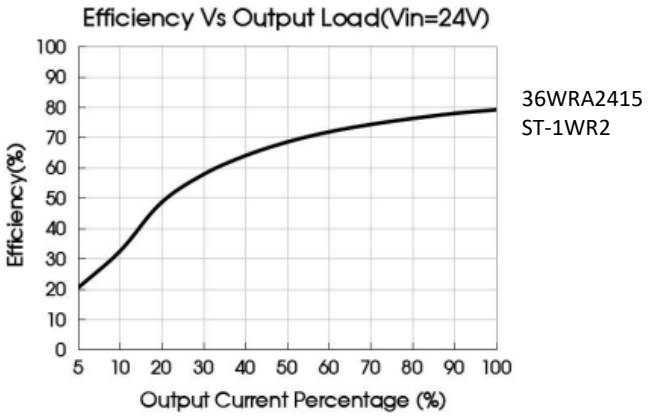
36WRA1205
ST-1WR2



36WRA1205
ST-1WR2



36WRA2415
ST-1WR2



36WRA2415
ST-1WR2

Design Reference (Figure 1)

1 Typical application

All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.
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.

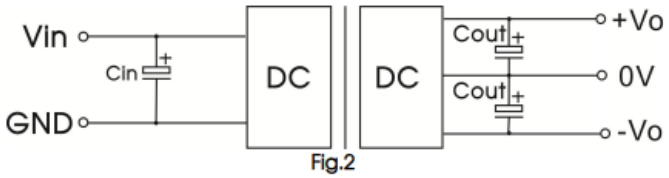


Fig.2

Vin(VDC)	12	24
Cin	47uF/25V	47uF/50V

Vo(VDC)	±5, ±9	±12, ±15
Cout	100uF/16V	27uF/25V

2. EMC compliance circuit

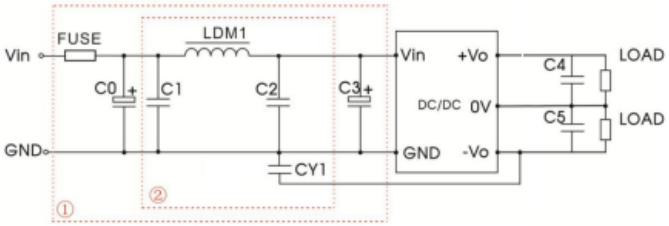


Fig.3

Parameter description:

Part No.	Vin:12VDC	Vin:24VDC
FUSE	slow blow, choose according to actual input current	
C0	1000μF/25V	680μF/50V
C1	4.7μF/50V	
LDM1	15μH	
C2	4.7μF/50V	
C3	330μF/50V	
CY1	1nF/2KV	
C4, C5	Refer to the Cout Fig.2	

Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

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. 4).

Generally: Vin=12V series lave =205mA Vin=24V series lave =104mA

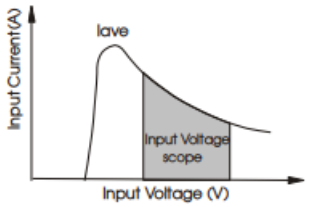
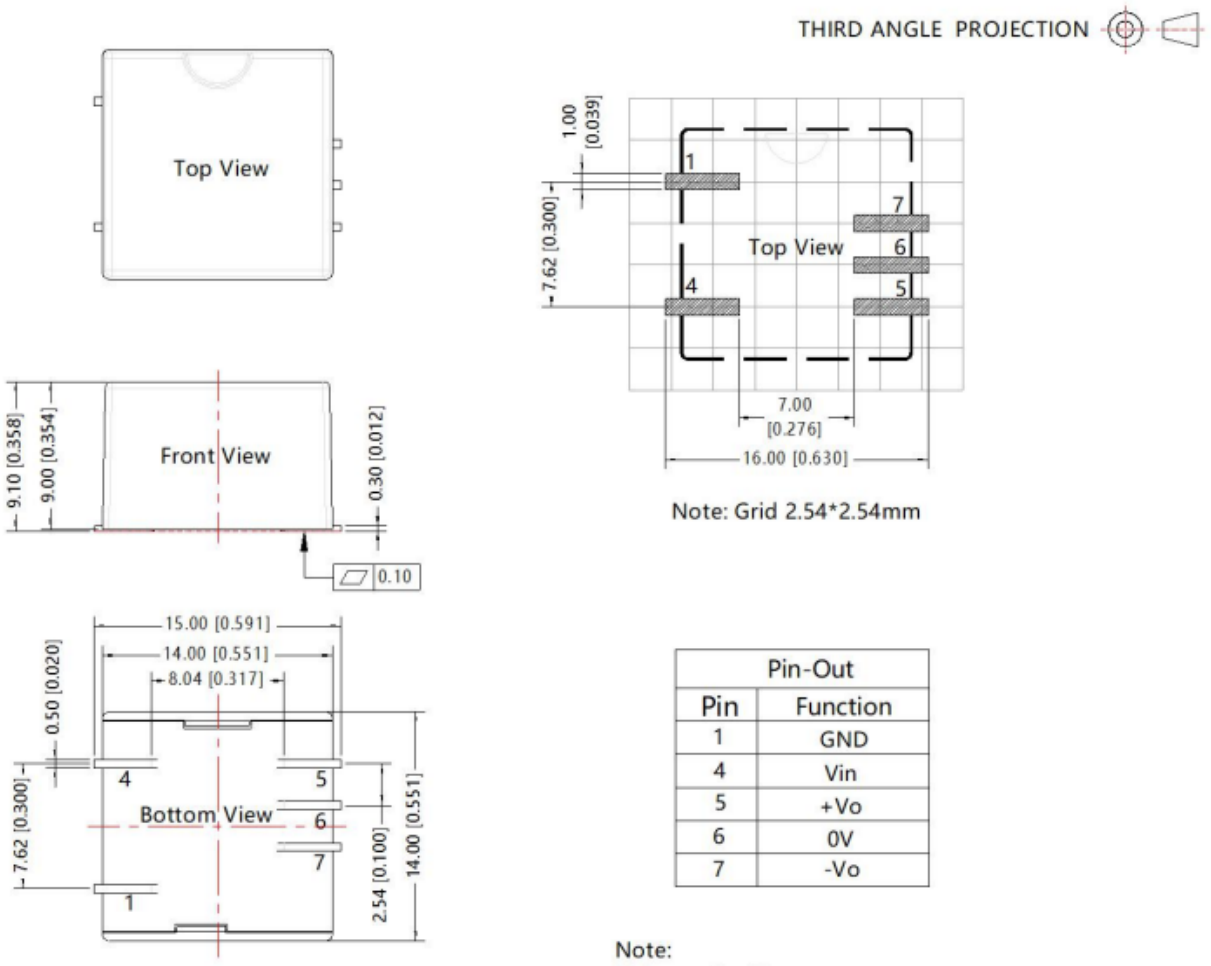


Fig. 4

Output load requirements
When using, the minimum load of the module output should not be less than 5% of the nominal load. To meet the performance parameters of this datasheet, please connect a 5% dummy load in parallel at the output end, the dummy load is generally a resistor, please note that the resistor needs to be used in derating.

Dimensions and Recommended Layout



Pin-Out	
Pin	Function
1	GND
4	Vin
5	+Vo
6	0V
7	-Vo

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

Notes:

For additional information on Product Packaging please refer to www.Idealpower.com.
Recommend using module with more than 5% load, if not, the ripple of the product may exceed the specification, but does not affect the reliability of the product.
The maximum capacitive load offered were tested at input voltage range and full load.
Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load.
All index testing methods in this datasheet are based on company corporate standards.
We can provide product customization service, please contact our technicians directly for specific information.
Products are related to laws and regulations: see "Features" and "EMC".
Our products shall be classified according to ISO14001 and related environmental laws and regulations and shall be handled by qualified units.