DC/DC Converter
SURA_S-6WR3 Series

6W isolated DC-DC converter in SIP package
Wide input and regulated dual output

Patent Protection

EN62368-1 BS EN62368-1 RoHS

FEATURES

- Wide 4:1 input voltage range
- High efficiency up to 83%
- No-load power consumption as low as 0.12W
- I/O isolation test voltage 1.5k VDC
- Input under-voltage protection, output short-circuit, over-current protection
- Operating ambient temperature range: -40℃ to +85℃
- Industry standard pin-out

SURA_S-6WR3 series of isolated 6W DC-DC converter products with a 4:1 input voltage range. They feature efficiencies of up to 83%, 1500VDC input to output isolation, operating ambient temperature range of -40℃ to +85℃, input under-voltage protection, output short-circuit, over-current protection and they are widely used in applications such as medical care, industrial control, electric power, instruments and communication fields.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency② (%) Min./Typ.	Capacitive Load③ (μF)Max.
		Nominal (Range)	Max.①	Voltage(VDC)	Current (mA) Max./Min.		
EN/BS EN	SURA2405S-6WR3	24 (9-36)	40	±5	±600	78/80	470
	SURA2409S-6WR3			±9	±333	81/83	220
	SURA2412S-6WR3			±12	±250	81/83	120
	SURA2415S-6WR3			±15	±200	81/83	100
	SURA2424S-6WR3			±24	±125	80/82	68

Notes:
① Exceeding the maximum input voltage may cause permanent damage;
② Efficiency is measured at nominal input voltage and rated output load;
③ The specified maximum capacitive load for positive and negative output is identical.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	±5V output	--	313/12	320/16	mA
	±9V/±12V/±15V output	--	301/12	309/16	
	±24V output	--	305/12	313/16	
Reflected Ripple Current		--	50	--	
Surge Voltage (1sec. max.)		-0.7	--	50	VDC
Start-up Voltage		--	--	9	
Input Under-voltage Protection		5.5	6.5	--	
Input Filter		Capacitance Filter			
Hot Plug		Unavailable			
Ctrl *	Module on	Ctrl pin open or pulled high (3.5-12VDC)			
	Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	Input current when off	--	6	10	mA

Note: *The Ctrl pin voltage is referenced to input GND.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy①	5% -100% load	Vo1	--	±1.5	±2	%
		Vo2		±2	±3	
Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.5	±1	
		Vo2	--	±1.0	±1.5	

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Load Regulation②	5% -100% load	Vo1	--	±0.8	±1.5	%
		Vo2	--	±1.2	±2	
Cross Regulation	Dual output, Vo1 load at 50%, Vo2 load at range of 25%-100%		--	--	±5	
Transient Recovery Time	25% load step change, nominal input voltage		--	450	500	μs
Transient Response Deviation	25% load step change, nominal input voltage	±5V output	--	±5	±8	%
		Others	--	±3	±5	
Temperature Coefficient	Full load		--	--	±0.03	%/℃
Ripple & Noise③	20MHz bandwidth, 5% -100% load		--	120	150	mV p-p
Over-current Protection	Input voltage range		110	160	230	%Io
Short-circuit Protection	Input voltage range		Continuous, self-recovery			

Note:
①At 0%~5% load, the Vo1 Max. output voltage accuracy is ±3%, the Vo2 Max. output voltage accuracy is ±5%;
②At 0%~100% load, the Vo1 regulation for 0%-100% load is ±4%, the Vo2 regulation for 0%-100% load is ±4.5%;
③Under 0% -5% load conditions, ripple & noise does not exceed 180mV. The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specification

Item	Operating 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 insulation at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	1000	--	pF
Operating Temperature	See Fig. 1	-40	--	+85	℃
Storage Humidity	Without condensation	5	--	95	%RH
Storage Temperature		-55	--	+125	℃
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency *	PWM mode	--	500	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

Note: *Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions	22.00 x 9.50 x 12.00 mm
Weight	4.6g (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 ±4kV	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

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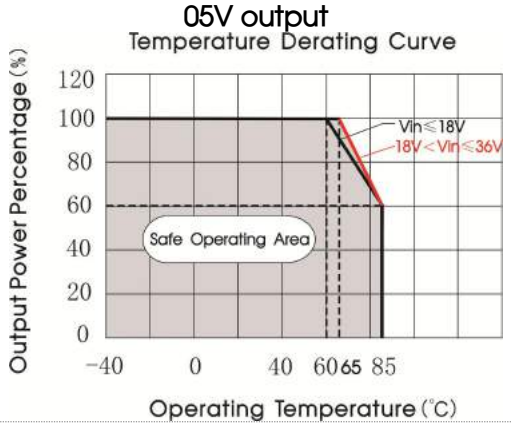
Typical Characteristic Curves



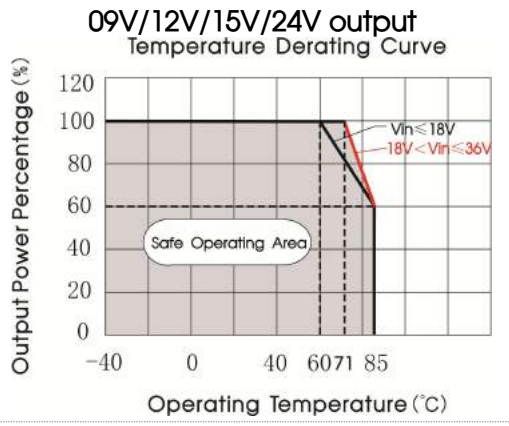


Fig. 1

Design Reference

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.

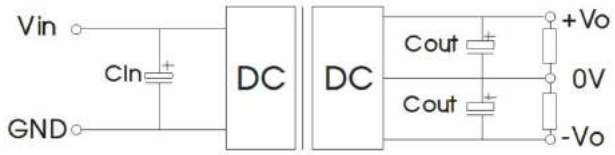


Fig. 2

Cin	Cout
100μF/50V	22μF/50V

2. EMC compliance circuit

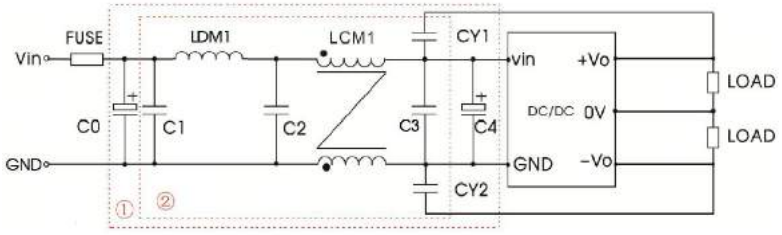


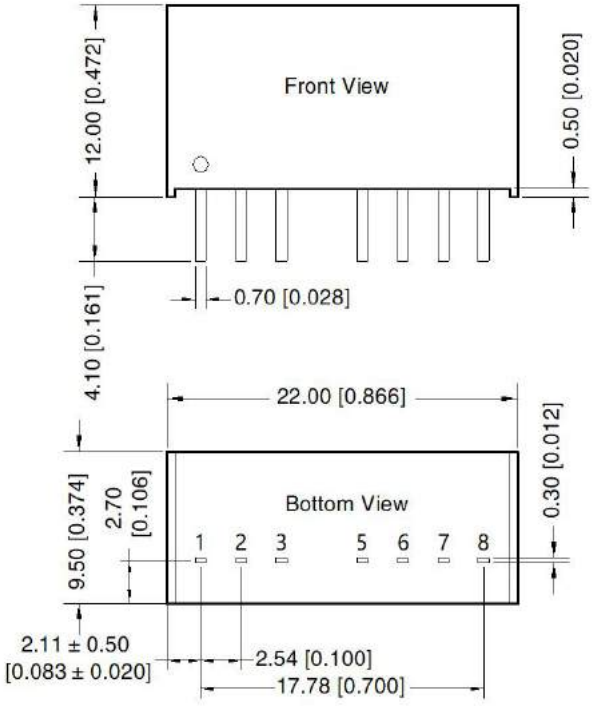
Fig. 3

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

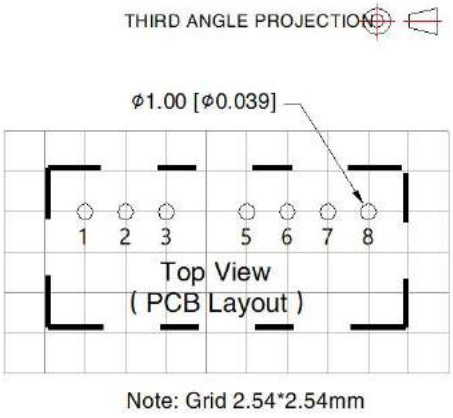
Components	Vin: 24V
FUSE	Choose according to actual input current
C0/C4	330μF/100V
C1/C2/C3	10μF/50V
LDM1	10uH
LCM1	1.4-1.7mH (TN150P-RH12.7*12.7*7.9)
CY1/CY2	1nF/2kV

3. The products do not support parallel connection of their output

Dimensions and Recommended Layout



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



Note: Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
1	GND
2	Vin
3	Ctrl
5	NC
6	+Vo
7	0V
8	–Vo

NC: Pin to be isolated from circuitry

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℃, 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.