SURA_YMD-6WR2& SURB_YMD-6WR2 Series

6W,ULTRA-WIDE INPUT ISOLATED& REGULATED DUAL/SINGLE OUTPUT DIP PACKAGING, DC-DC CONVERTER

FEATURES

- 4:1 wide input voltage range
- Efficiency up to 88%
- 1.5KVDC isolation
- Short circuit protection
- Output over voltage protection
- Operating Temperature range: -40°C ~ +85°C
- Industry standard pinout
- Low ripple & noise
- Meet CISPR22/EN55022 CLASS A
- Inverse polarity protection for A2S（chassis mounting）and A4S（DIN-Rail mounting）
- Meet EN60950

PART NUMBER SYSTEM

SURB2405YMD-6WR2

- Rated Power
- Package Style
- Output Voltage
- Input Voltage
- Product Series

APPLICATION

SURA_YMD-6WR2 & SURB_YMD-6WR2 series models provide 6 Watt output power, with 4:1 wide range of 9-36VDC,18-75VDC,output over-voltage and short-circuit protection. And all of them can meet CISPR22/EN55022 CLASS A without external circuit. Typical applications for these converters are industrial, electric power, instrumentation, telecommunication.

SELECTION GUIDE

Model①	Input Voltage(VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(Typ.)		Reflected Ripple Current (mA,Typ.)	Max. Capacitive Load③ (μF)	Efficiency (%, Typ.)④ @Max. Load	Approval
	Nominal (Range)	Max.②		Max.	Min.	@Max. Load	@No Load				
SURA2405YMD-6WR2	24 (9-36)	40	±5	±600	±30	301	7	20	470	83	
SURA2412 YMD-6WR2			±12	±250	±12	287			100	87	
SURA2415 YMD-6WR2			±15	±200	±10	284			100	88	
SURB2403YMD-6WR2			3.3	1500	75	261			1800	79	CE
SURB2405YMD-6WR2			5	1200	60	301			1000	83	
SURB2409YMD-6WR2			9	667	33	291			470	85	
SURB2412YMD-6WR2			12	500	25	287			100	87	
SURB2415YMD-6WR2			15	400	20	284			100	88	
SURB2424YMD-6WR2			24	250	12	284			47	88	
SURA4805YMD-6WR2	48 (18-75)	80	±5	±600	±30	151	3		470	83	
SURA4812YMD-6WR2			±12	±250	±12	143			100	87	
SURA4815YMD-6WR2			±15	±200	±10	142			100	88	
SURB4803YMD-6WR2			3.3	1500	75	130			1800	79	CE
SURB4805YMD-6WR2			5	1200	60	151			1000	83	
SURB4812YMD-6WR2			12	500	25	143			100	87	
SURB4815YMD-6WR2			15	400	20	142			100	88	
SURB4824YMD-6WR2			24	250	12	142			47	88	

Note: ① Series with suffix "A2S" are chassis mounting, with suffix "A4S" are DIN-Rail mounting, for example SURB2405YMD-6WR2A2S is chassis mounting , SURB2405YMD-6WR2A4S is DIN-Rail mounting.
②Absolute maximum rating without damage on the converter,but it isn't recommended.
③For dual output converter, the given value is the same for each output.
④ The efficiency of "A2S" and "A4S" is approx. 2% lower for the protection of inverse polarity.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1Sec. max.)	24VDC input	-0.7	--	50	VDC
	48VDC input	-0.7	--	100	

Start-up Voltage	24VDC input	--	--	9	VDC
	48VDC input	--	--	18	
Input Filter		Pi Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±2	%
Output Voltage Balance	Dual output, balanced Loads	--	±0.5	±1.5	
Line Regulation	Full load, Input voltage from low to high	--	±0.2	±0.5	
Load Regulation	5% to 100% load	--	±0.5	±1	
Cross Regulation	Dual output, main output 50% load, secondary output from 10% to 100% load	--	--	±5	
Transient Recovery Time	25% load step change	--	300	500	μs
Transient Response Deviation		--	±3	±5	%
Temperature coefficient	100% load	--	--	±0.03	%/°C
Ripple&Noise*	20MHz bandwidth	--	50	75	mVp-p
Output Over Voltage Protection	Input voltage range	110	120	140	%Vo
Output Short Circuit Protection		Continuous, automatic recovery			

Note:* Ripple and noise tested with "parallel cable" method. See detailed operation instructions at *DC-DC Application Notes*.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-Output, Tested for 1 minute , leakage current less than 1 mA	1500	--	--	VDC
Isolation Resistance	Input-Output, Test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output,100KHz/0.1V	--	1000	--	pF
Switching Frequency	PWM mode	--	300	--	KHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours
Safety approvals		EN60950			
Case Material		Aluminum Alloy			
Size	PCB mounting	25.4x25.4x11.7			mm
	A2S chassis mounting	76.0x31.5x21.2			
	A4S DIN-Rail mounting	76.0x31.5x25.8			
Weight	PCB mounting	--	13	--	g
	A2S chassis mounting	--	35	--	
	A4S DIN-Rail mounting	--	55	--	

ENVIRONMENTAL SPECIFICATIONS

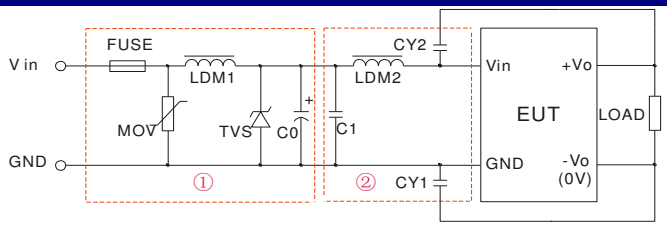
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	5	--	95	%
Operating Temperature	Power derating (above 71℃, see Figure 4)	-40	--	85	°C
Storage Temperature		-55	--	125	
Max. Case Temperature	Operating Temperature curve range	--	--	105	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022	CLASS A（Without External Circuit）/ CLASS B（External Circuit Refer to Figure1-② or Figure 3）	
	RE	CISPR22/EN55022	CLASS A（Without External Circuit）/ CLASS B（External Circuit Refer to Figure1-② or Figure 3）	
EMS	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	perf. Criteria B（External Circuit Refer to Figure1-①）
		IEC/EN61000-4-4	±4KV	perf. Criteria B（External Circuit Refer to Figure 3）

EMS	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B（External Circuit Refer to Figure1-①or Figure 3）
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A
	Voltage dips, short and interruptions immunity	IEC/EN61000-4-29	0%-70%	perf. Criteria B

EMC RECOMMENDED CIRCUIT



(Figure1)

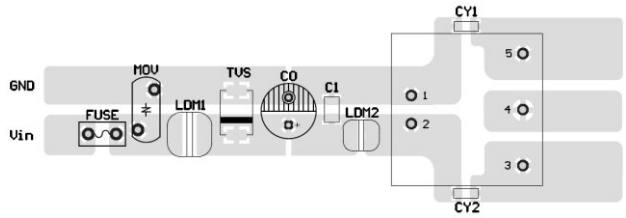
Recommended external circuit parameters:

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S14K35	S14K60
LDM1	56μH	
TVS	SMCJ48A	SMCJ90A
C0	330μF/50V	330μF/100V
C1	1μF/50V	1μF/100V
LDM2	4.7μH	
CY1	1nF /2KV	
CY2	1nF /2KV	

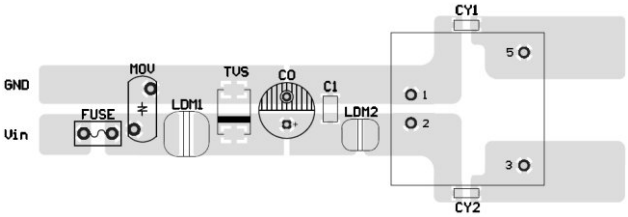
Note: In Figure 1,part①is EMS recommended external circuit, part② is EMI recommended external circuit. Choose according to requirements.

EMC RECOMMENDED CIRCUIT PCB LAYOUT

DUAL



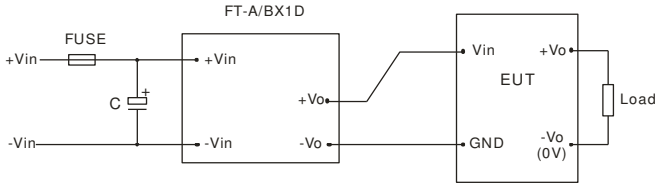
SINGLE



Note: The pad space between input and output (CY1/CY2) must≥2mm.

(Figure 2)

EMC MODULE APPLICATION CIRCUIT

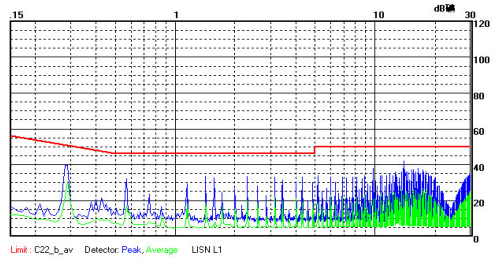


SFT-A/BX1D is SCHMID-M's EFT suppresser

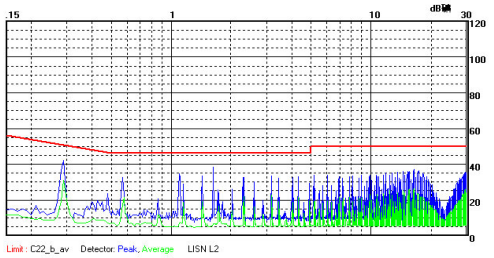
For nominal voltage <48V,C≥330μF/50V
For nominal voltage =48V,C≥330μF/100V

(Figure 3)

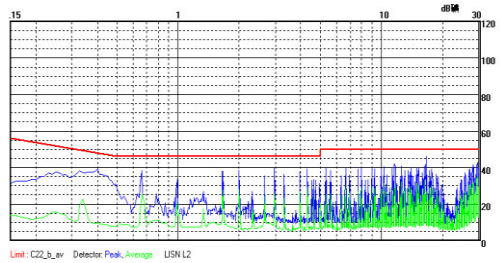
EMI TEST WAVEFORM (RECOMMENDED CIRCUIT FIGURE 1-②)



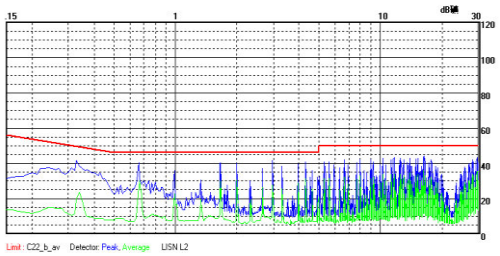
SURB2405YMD-6WR2 CE（Class B, Positive line）



SURB2405YMD-6WR2 CE（Class B, Negative line）

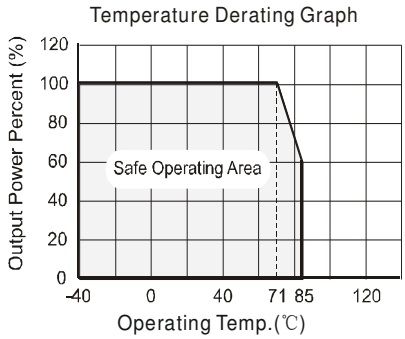


SURA4805YMD-6WR2 CE（Class B, Positive line）

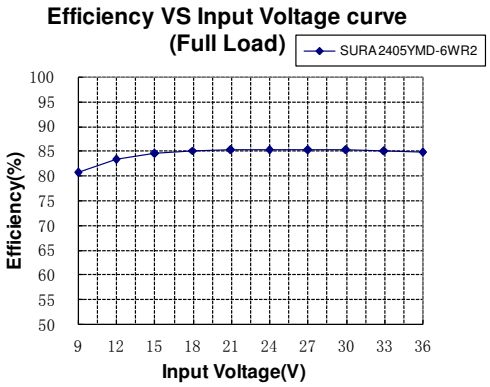


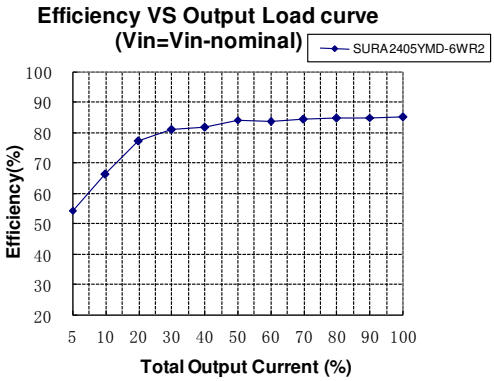
SURA4805YMD-6WR2 CE（Class B, Negative line）

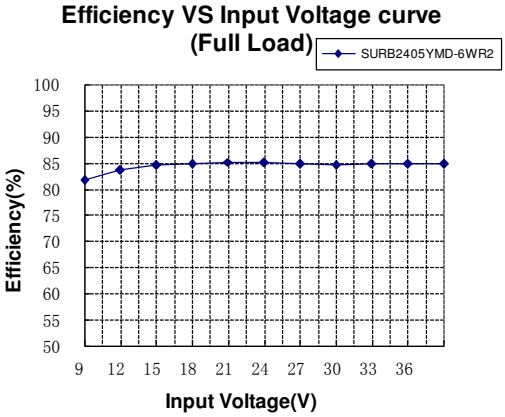
PRODUCT TYPICAL PERFORMANCE CURVE

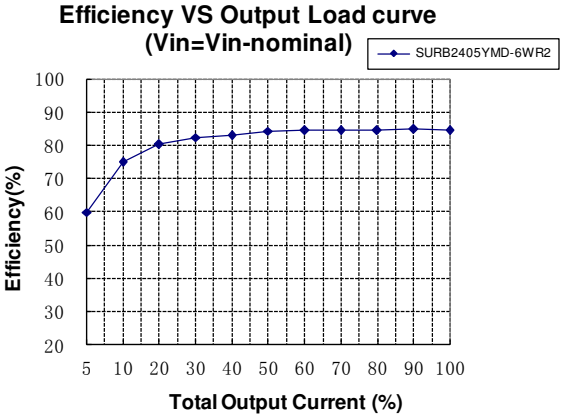


(Figure 4)



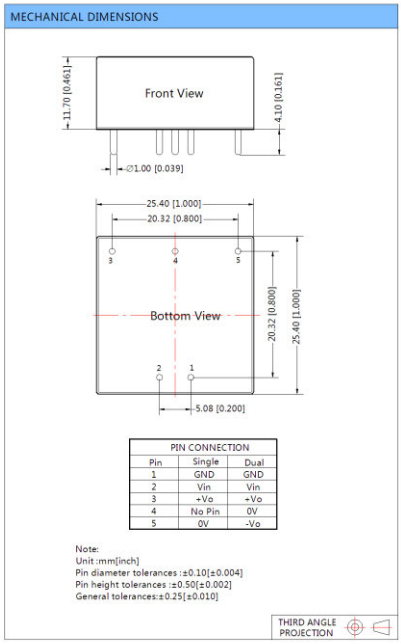


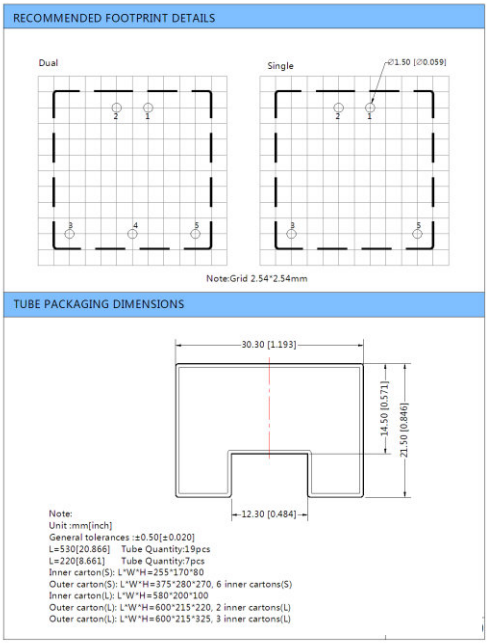




SURA_YMD-6WR2& SURB_YMD-6WR2 PCB MOUNTING OUTLINE DIMENSIONS,RECOMMENDED

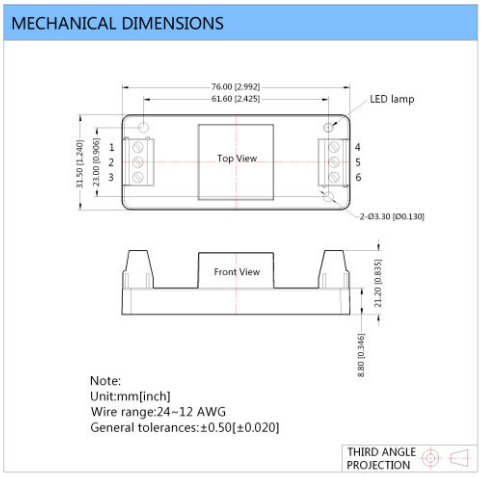
FOOTPRINT





SURA_YMD-6WR2A2S& SURB_YMD-6WR2A2S CHASSIS MOUNTING OUTLINE DIMENSIONS

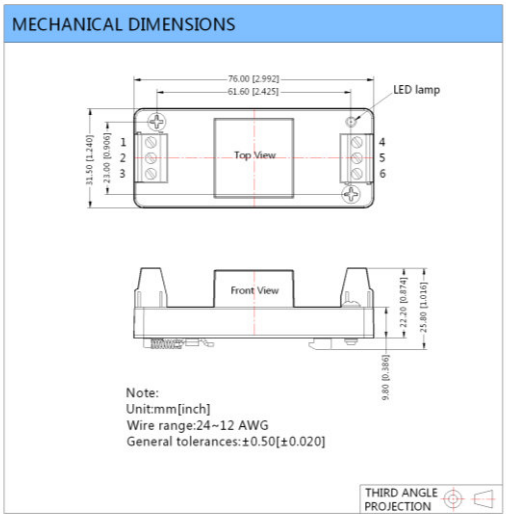
Footprint Details						
Pin	1	2	3	4	5	6
Dual	NC	GND	Vin	-Vo	0V	+Vo
Single	NC	GND	Vin	0V	NC	+Vo



SURA_YMD-6WR2A4S& SURB_YMD-6WR2A4S DIN-RAIL MOUNTING OUTLINE DIMENSIONS

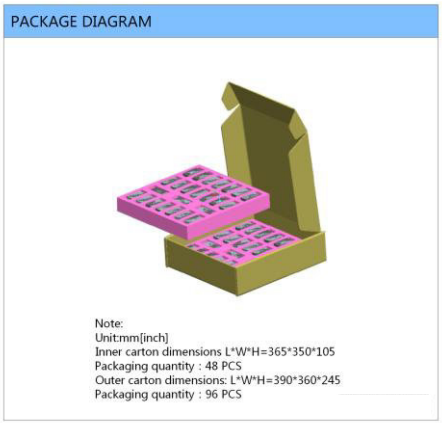
DIN-rail modules are fitting to TS35 rails

Footprint Details						
Pin	1	2	3	4	5	6
Dual	NC	GND	Vin	-Vo	0V	+Vo
Single	NC	GND	Vin	0V	NC	+Vo



PACKAGE DIAGRAM

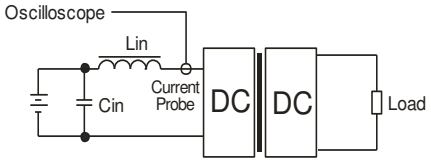
Special Package Series（A2S/A4S）



TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor Lin and Capacitor Cin to simulate the source impedance.



Lin(4.7μH) Cin(220μF, ESR < 1.0Ω at 100 KHz)

DESIGN CONSIDERATIONS

1) Recommended circuit

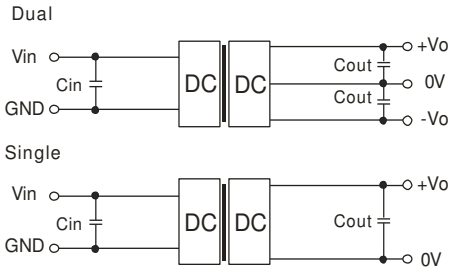
All the SURA_YMD-6WR2 & SURB_YMD-6WR2 Series have been tested according to the following recommended test circuit before leaving the factory (see Figure 5).

If you want to further decrease the input/output ripple, you can increase a capacitance-values properly or choose capacitors with low ESR, but the total capacitance of the filter capacitor must not exceed the Max. Capacitive Load.

Cin: 100μF（Vin nom=24V）

Cin: 10μF~47μF（Vin nom=48V）

Cout: 10μF



(Figure 5)

2) It is not recommended to increase the output power capability by connecting two or more converters in parallel.The product is not hot-swappable

Note:

1. Min. load shouldn't be less than 5%, otherwise ripple maybe increased dramatically, If the product operates under min. load, it may not be guaranteed to meet all specifications listed. Operation under minimum load will not damage the converter.
2. Recommended Dual output models unbalanced load is ≤±5%, If the product operates >±5%, it may not be guaranteed to meet all specifications listed. Please contact our technical support for more details.
3. Max. Capacitive Load is tested at input voltage range and full load.
4. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
5. In this datasheet, all test methods are based on our corporate standards.
6. All characteristics are for listed models, and non-standard models may perform differently. Please contact our technical support for more details.
7. Please contact our technical support for any specific requirement.
8. Specifications of this product are subject to changes without prior notice.