SURB YMD-10WR4

Product Feature

- Ultra-Wide 4:1 Input voltage range
- Operating ambient temperature range: -40℃ - +85℃
- Isolation voltage: 1600VDC
- High efficiency: 87%（Typ.）
- Output short-circuit protection, over-current protection, and over-voltage protection mechanisms.
- Application areas:Industry, Power, Instrumentation, Communication, Rail transit.

CE
EN62368-1

Selection Guide

Certification	Part No.①	Input Voltage (VDC)		Output		Full Load Efficiency④ (%)Typ.	Capacitive Load⑤ (μF)Max.
		Nominal② (Range)	Max.③	Voltage (VDC)	Current (mA) Max.		
EN	SURB 2403-YMD-10WR4	24 (9-36)	40	3.3	2400	77	2200
	SURB 2405-YMD-10WR4			5	2000	82	2200
	SURB 2406-YMD-10WR4			6	1667	82	1800
	SURB 2409-YMD-10WR4			9	1111	84	680
	SURB 2412-YMD-10WR4			12	833	86	470
	SURB 2415-YMD-10WR4			15	667	86	330
	SURB 2418-YMD-10WR4			18	556	87	220
	SURB 2424-YMD-10WR4			24	417	88	100
	SURB 2428-YMD-10WR4			28	358	88	100
	SURB 4803-YMD-10WR4	48 (18-75)	80	3.3	2400	78	2200
	SURB 4805-YMD-10WR4			5	2000	82	2200
	SURB 4806-YMD-10WR4			6	1667	82	1800
	SURB 4809-YMD-10WR4			9	1111	84	680
	SURB 4812-YMD-10WR4			12	833	86	470
	SURB 4815-YMD-10WR4			15	667	86	330
	SURB 4818-YMD-10WR4			18	556	86	220
	SURB 4824-YMD-10WR4			24	417	87	100
	SURB 4828-YMD-10WR4			28	358	87	100

Note:

①. Suffix plus "H" means plus heat sink package, plus "A2S" for extended wiring package, suffix plus "A4S" for extended rail type package;

②. The "A2S" and "A4S" Model's start-up and minimum input voltages are increased by 1VDC due to the input reverse polarity protection circuit;

③. Exceeding the maximum input voltage may cause permanent damage;

④. Efficiency is measured at nominal input voltage and rated output load; efficiencies for "A2S" and "A4S" Model's is decreased by 2% due to the input reverse polarity protection circuit;

⑤. It is not recommended to exceed the maximum capacitive load value.

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Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (Full Load/No-Load)	24VDC nominal input series, nominal input voltage	3.3V Output	--	429/5	440/12	mA
		5V/6V Output	--	508/5	521/12	
		9V Output	--	496/10	508/20	
		Other Output	--	484/10	496/20	
	48VDC nominal input series, nominal input voltage	3.3V Output	--	212/4	217/8	
		5V/6V Output	--	254/4	260/8	
		9V Output	--	248/5	254/10	
		Other Output	--	242/5	248/10	
Reflected Ripple Current	Nominal input voltage		--	20	--	
Surge Voltage (1sec. max.)	24VDC Nominal input series		-0.7	--	50	VDC
	48VDC Nominal input series		-0.7	--	100	
Start-Up Voltage	24VDC Nominal input series		--	--	9	
	48VDC Nominal input series		--	--	18	
Input Under-Voltage Protection	24VDC Nominal input series		5.5	6.5	--	
	48VDC Nominal input series		12	15.5	--	
Start Time	Nominal input and constant resistance load		--	10	--	ms
Ctrl	Turn on module		Ctrl pin open or pulled high (TTL2.7-12VDC)			
	Turn off module		Ctrl pin pulled low to GND (0-1.2VDC)			
	Cut-off input current		--	2	7	mA
Input Filter			PI filter			
Hot Plug			Unavailable			

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Output Specification

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	0%-100% load		--	±1.0	±3.0	%
Linear Regulation	Vin=Min. to Max. @Full Load		--	±0.2	±0.5	
Load Regulation	5%-100% load		--	±0.5	±1.0	
	0%-100% load		--	±1.0	±5.0	
Ripple & Noise①	20MHz bandwidth,100% load,parallel cable method		--	50	100	mVp-p
Transient Recovery Time	25% Load Step Change,nominal input voltage		--	300	500	μs
Transient Response Deviation	25% Load step change, nominal input voltage	3.3/5/6V Output	--	±5.0	±8.0	%
		Others	--	±3.0	±5.0	
Temperature Coefficient	Full load		--	--	±0.03	%/℃
Over-Voltage Protection	Input voltage range		110	--	160	%Vo
Over-Current Protection			110	140	--	%Io
Short-Circuit Protection			Continuous,Self-Recovery			

①The test method for ripples and noise adopts the parallel line test method. The test results of the other methods will vary.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	1600	--	--	VDC
Insulation Resistance	Input-output, resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	1000	--	pF
Operating Temperature	See Fig.1	-40	--	+85	℃
Storage Temperature		-55	--	+125	℃
Storage Humidity	Non-condensing	5	--	95	%RH
Soldering Profile	Wave-soldering	260±5℃; time:5 - 10s			
	Manual-welding	360±10℃; time:3 - 5s			
Switching Frequency	PWM	--	300	--	kHz
Vibration	IEC/EN 61373 -Category 1,Grade B				
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K Hours

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Mechanical Specifications

Case Material	Aluminum alloy		
Package Dimensions	Horizontal package (without heat sink)		25.40×25.40×12.00mm
	Horizontal package (with heat sink)		25.40x25.40x18.60mm
	CW chassis mounting (without heat sink)		76.00x31.50x21.20mm
	CR DIN-rail mounting (without heat sink)		76.00x31.50x25.80mm
	CW chassis mounting (with heat sink)		76.00x31.50x28.40mm
	CR DIN-rail mounting (with heat sink)		76.00x31.50x32.00mm
Weight	without heat sink	Horizontal package/CW chassis mounting/CR DIN-Rail mounting	12.6g/36.0g/56.0g(Typ.)
	with heat sink	Horizontal package/CW chassis mounting/CR DIN-Rail mounting	18.5g/41.5g/61.0g(Typ.)
Cooling Method	Free air convection		

EMC Specifications

EMI	CE	CISPR32/EN55032 CLASS A(without extra components)/ CLASS B (see Fig. 3-② for recommended circuit)	
	RE	CISPR32/EN55032 CLASS A(without extra components)/ CLASS B (see Fig. 3-② for recommended circuit)	
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 (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 3Vr.m.s	Perf.Criteria A

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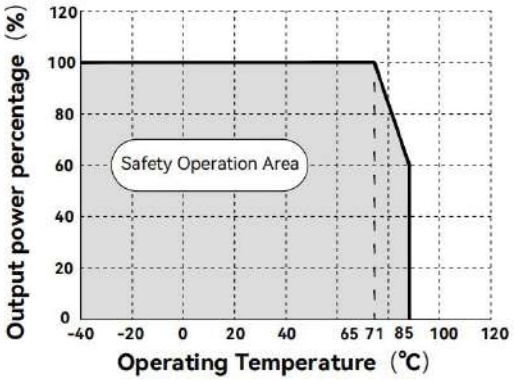
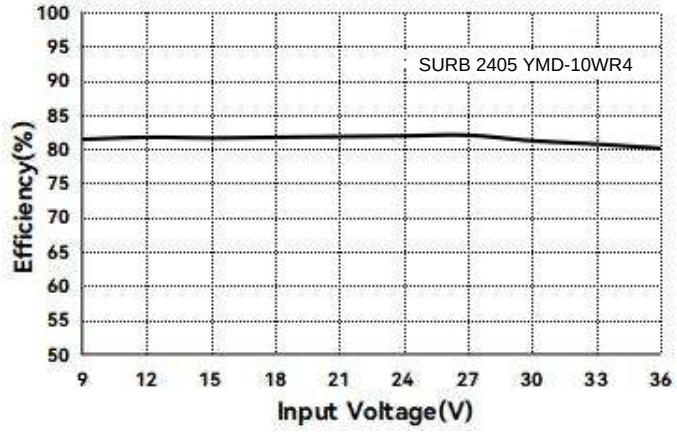
Typical Characteristic Curves

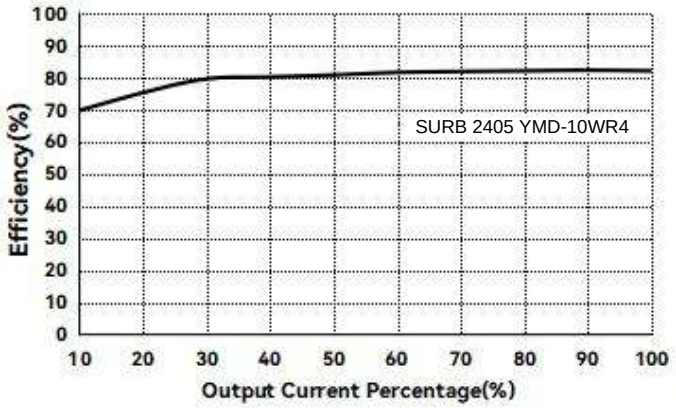
Temperature Derating Curve (Fig.1)



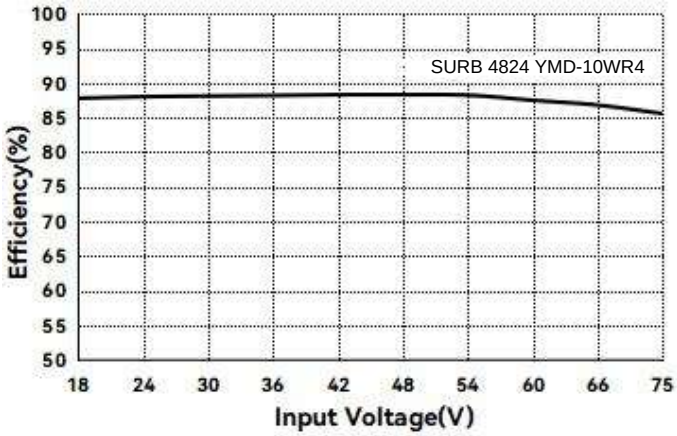
Efficiency VS Input Voltage (Full load)



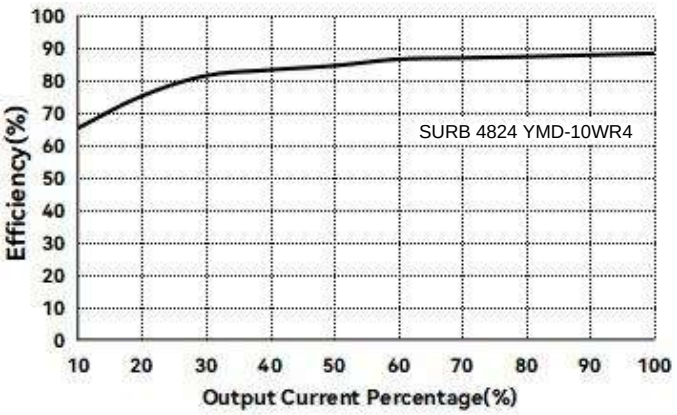
Efficiency VS Output Load(Vin=24V)



Efficiency VS Input Voltage (Full load)



Efficiency VS Output Load(Vin=48V)



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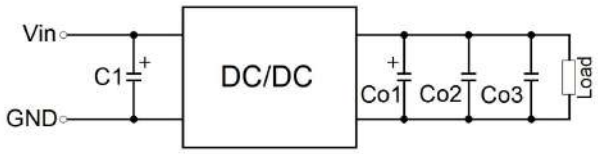
Typical Circuit Design And Application

Recommended Circuit (Fig.2)

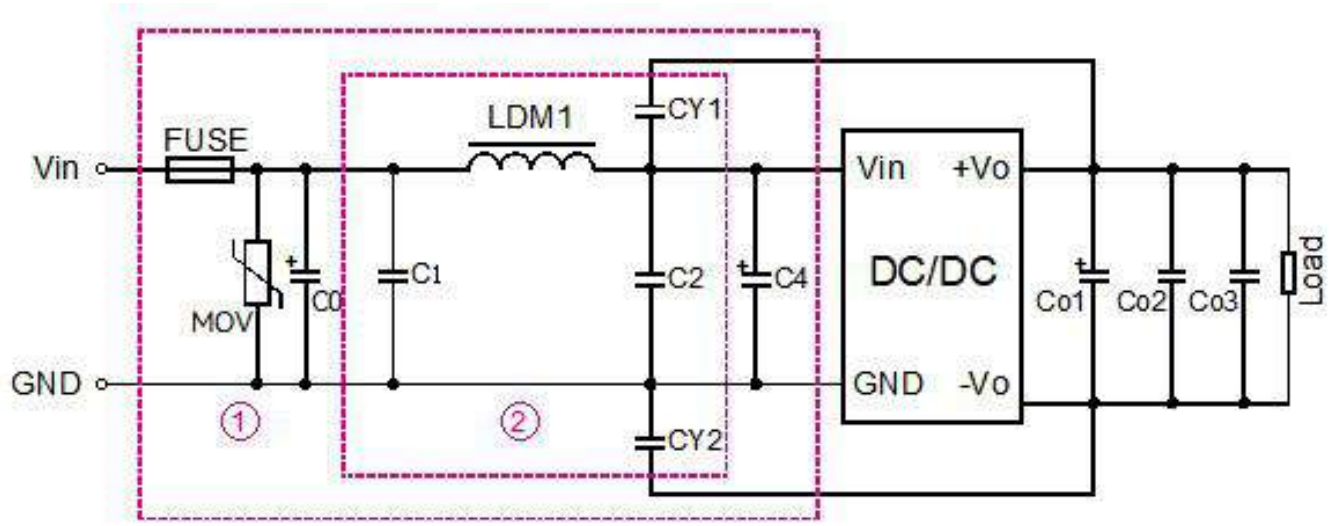


Recommended Capacitive Load Value Table

Vout	C1	Co1	Co2	Co3
3.3/5/6VDC	100μF/100V	100uF/16V	10uF/50V	0.1uF/16V
9/12/15/18/24/28VDC	100μF/100V	47μF/50V	10μF/50V	0.1μF/50V

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 C1 and Co1/Co2/Co3 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.

EMC Recommended 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.

EMC Recommended Parameter Table

Model	Vin: 24V	Vin: 48V
FUSE	Select according to the actual input current of the customer	
MOV	20D470K	14D101K
C0	680uF/50V	680uF/100V
C1	1uF/50V	1uF/100V
C2	4.7uF/50V	4.7uF/100V
C4	470uF/50V	470uF/100V
LDM1	10uH	
Co1/Co2/Co3	Refer Fig. 2 Capacitive load value table	
CY1/CY2	2.2nF/2KV	

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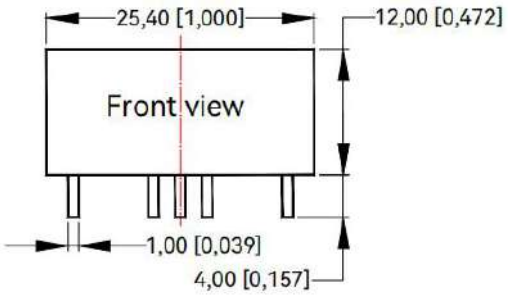
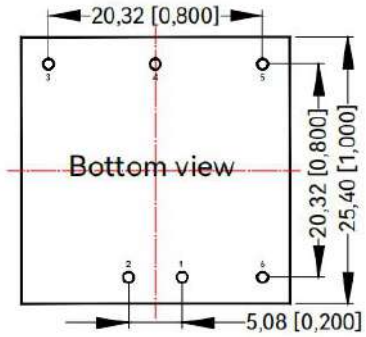
Dimensions and Recommended Layout

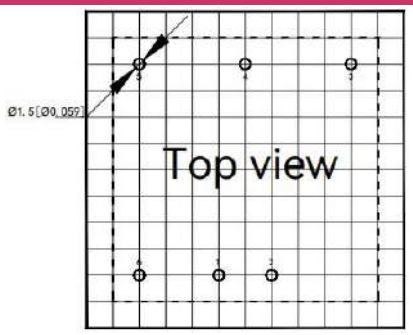
Dimensions





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

PCB Printing Layout

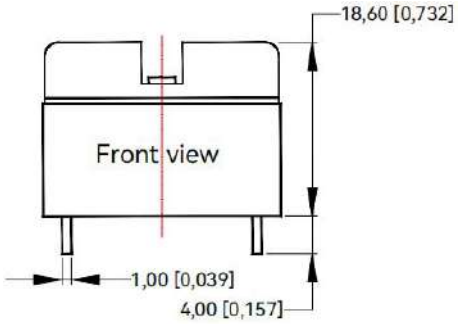


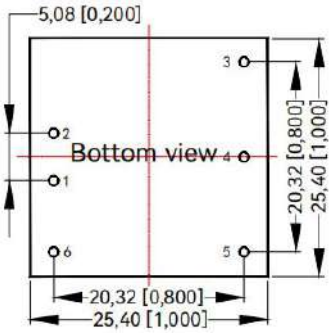
The grid distance is 2.54mm x2.54mm

Pin Definition Table

Pin	Single
1	GND
2	Vin
3	+Vo
4	No Pin
5	-Vo
6	Ctrl

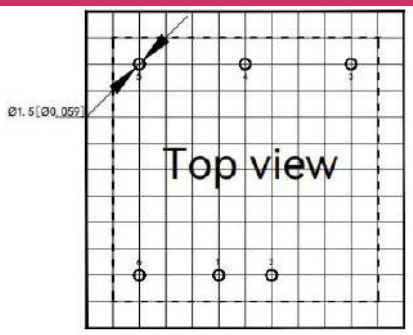
H Dimensions





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

PCB Printing Layout



The grid distance is 2.54mm x2.54mm

Pin Definition Table

Pin	Single
1	GND
2	Vin
3	+Vo
4	No Pin
5	-Vo
6	Ctrl

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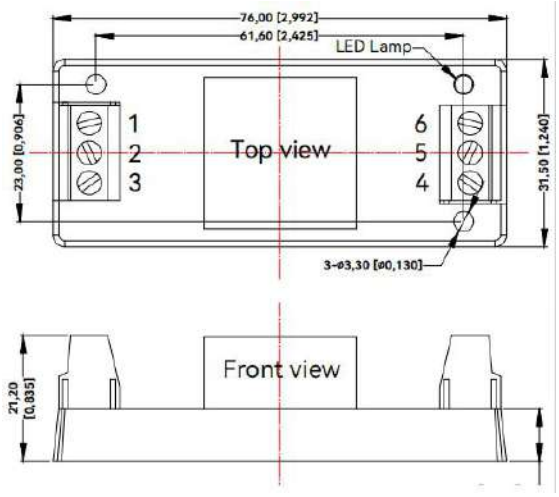
A2S Dimensions

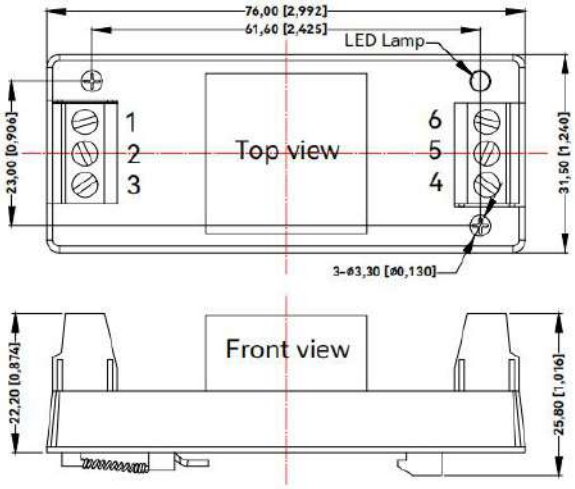


Pin Definition Table

Pin	Single
1	Ctrl
2	GND
3	Vin
4	+Vo
5	NC
6	-Vo

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

A4S Dimensions

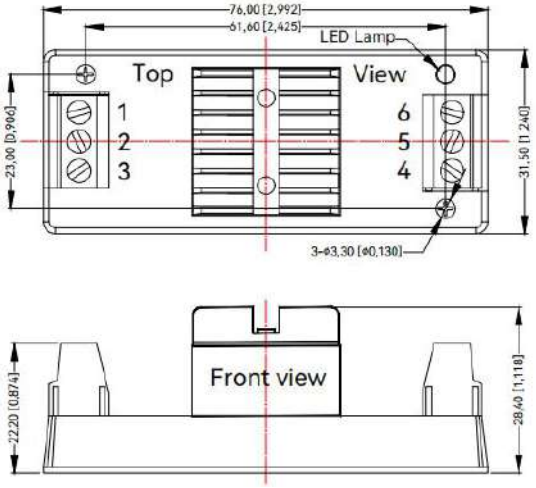


Pin Definition Table

Pin	Single
1	Ctrl
2	GND
3	Vin
4	+Vo
5	NC
6	-Vo

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

H A2S Dimensions



Pin Definition Table

Pin	Single
1	Ctrl
2	GND
3	Vin
4	+Vo
5	NC
6	-Vo

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

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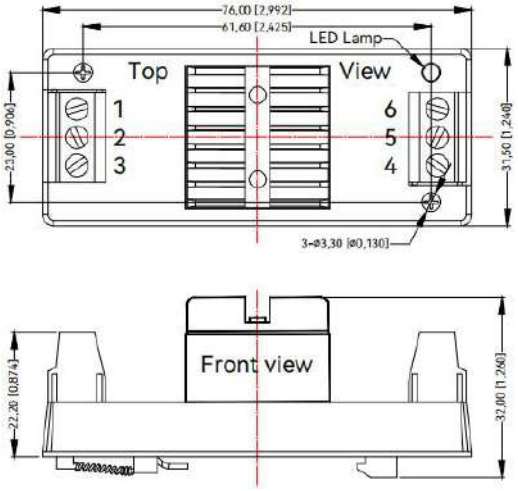
H A4S Dimensions



Pin Definition Table

Pin	Single
1	Ctrl
2	GND
3	Vin
4	+Vo
5	NC
6	-Vo

Note:

Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

SURB YMD-10WR4

Note:

- The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
- 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;
- The maximum capacitive load is tested within the input voltage range and under full load conditions;
- Unless otherwise specified, all indicators in this manual are measured at Ta=25 ℃, humidity<75% RH, nominal input voltage, and output rated load;
- All indicator testing methods in this manual are based on our company's corporate standards;
- Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
- Product specifications are subject to change without prior notice.