

Product Feature

- ◆ Package Type: 2" X 1"
- ◆ Input voltage range: 4:1
- ◆ Operating temperature range: -40°C - +105°C
- ◆ Isolation voltage: 1500VDC
- ◆ High efficiency up: 90% (Typ.)
- ◆ Equipped with output short-circuit protection, over-current protection, and over-voltage protection mechanisms.
- ◆ Fields of application: Industry, Power, Instrumentation, Communication, Rail transit.



Selection Guide

Part No.	Input Voltage (VDC)		Output		Full Load Efficiency (%)Typ.	Capacitive Load (μF)Max.
	Nominal (Range)	Max.	Voltage (VDC)	Current (mA)Max.		
SURB 2405 LD-40WR4	24 (9-36)	40	5	8000	86	15000
SURB 2409 LD-40WR4	24 (9-36)	40	9	4444	87	4700
SURB 2412 LD-40WR4	24 (9-36)	40	12	3333	88	3000
SURB 2415 LD-40WR4	24 (9-36)	40	15	2666	90	2200
SURB 2424 LD-40WR4	24 (9-36)	40	24	1666	90	1300
SURA 2412 LD-40WR4	24 (9-36)	40	±12	±1666	87	#1000
SURA 2415 LD-40WR4	24 (9-36)	40	±15	±1333	87	#680
SURA 2424 LD-40WR4	24 (9-36)	40	±24	±833	87	#470
SURB 4805 LD-40WR4	48 (18-75)	80	5	8000	86	15000
SURB 4812 LD-40WR4	48 (18-75)	80	12	3333	88	3000
SURB 4815 LD-40WR4	48 (18-75)	80	15	2666	90	2200
SURB 4824 LD-40WR4	48 (18-75)	80	24	1666	90	1300
SURA 4812 LD-40WR4	48 (18-75)	80	±12	±1666	87	#1000
SURA 4815 LD-40WR4	48 (18-75)	80	±15	±1333	87	#680
SURA 4824 LD-40WR4	48 (18-75)	80	±24	±833	87	#470

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 input end of the extended package is equipped with anti-reverse protection function, and its full load efficiency will be reduced by 2%;
3. The maximum Capacities load "#" means that the positive and negative outputs are connected to the same capacitance.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Input Current (full load/no-load)	24VDC nominal input series	5VDC Output	--	1938/60	1984/100	mA
		Other Output	--	1893/12	1938/25	
	48VDC nominal input series	--	926/12	968/25		
Reflected Ripple Current	Rated input voltage	--	--	40	mA	
Impulse Voltage	24VDC nominal input series	-0.7	--	50	VDC	
	48VDC nominal input series	-0.7	--	100		
Starting Voltage	24VDC nominal input series	--	--	9	VDC	
	48VDC nominal input series	--	--	18		
Input undervoltage protection	24VDC nominal input series	5.5	6.5	--	VDC	
	48VDC nominal input series	12.0	15.5	--		
Start time	Nominal input and constant resistance load	--	10	150	ms	
Ctrl	turn off module	connected GND or (0-1.2V)				
	turn on module	No connected or (3.5-12V)				
	Input current when off	--	5	8	mA	
Input Filter		PI filter				

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	5%-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	%	
Ripple & Noise	20MHz bandwidth, 5%-100% load		--	100	200	mVp-p
	20MHz bandwidth	5VDC Output	--	--	5	%Vo
		Other Output	--	--	3	
Cross regulation rate	Dual output, main circuit 50% loaded, auxiliary circuit 10% -100% loaded	--	--	±5	%	
Transient Recovery Time	25% Load Step Change, nominal input voltage	--	250	500	μs	
Transient Response Deviation	25% Load Step Change, nominal input voltage	--	±5	±8	%	
Temperature Coefficient	Full Load	--	±0.01	±0.02	%/°C	
Trim	input voltage range	--	±10.0	--	%	
Over Current Protection	input voltage range	110	140	--	%	
Short-Circuit Protection	input voltage range	Continuous, Self-Recovery				

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	1500	--	--	VDC
Insulation Resistance	Input-output, insulated voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	2000	--	pF
Operating Temperature	See Fig 1、 Fig 2	-40	--	+105	°C
Storage Temperature		-50	--	+125	°C
Storage Humidity	Non-condensing	--	--	95	%RH
Soldering Profile	1.5mm from case for 10 sec	--	--	300	°C
Switching Frequency	PWM	--	300	--	kHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K Hours

Mechanical Specifications

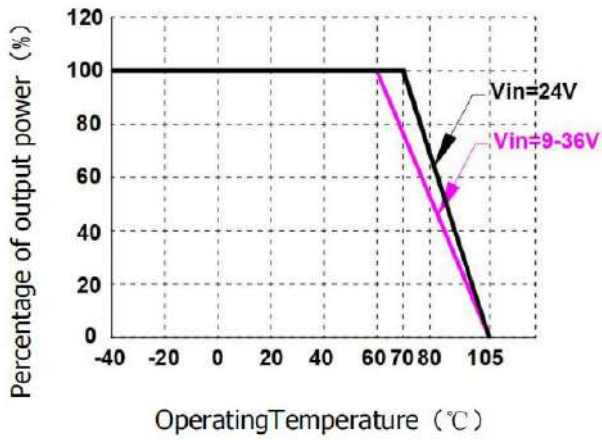
Case Material	Aluminum alloy, black anodized coating
Package Dimensions	50.80 x 25.40 x 12.00mm
Weight	30.00g(Typ.)
Cooling Method	Free air convection

EMC Specifications

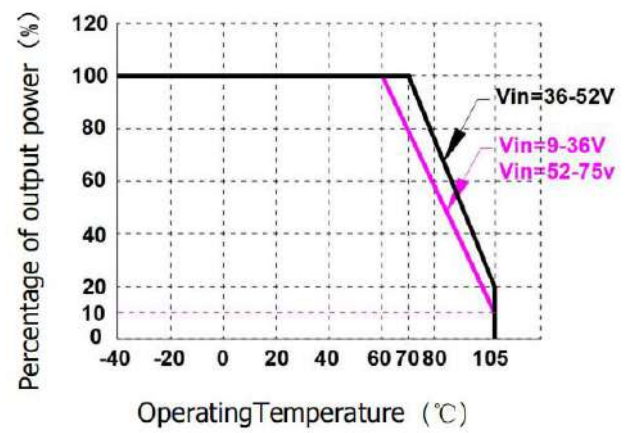
EMI	CE	CISPR32/EN55032 CLASS B (EMC Recommended Circuit 4-②)	
	RE	CISPR32/EN55032 CLASS B (EMC Recommended Circuit 4-②)	
EMS	ESD	EN61000-4-2 Air ± 8kV , Contact ± 6kV	perf. Criteria B
	RS	EN61000-4-3 10V/m	perf. Criteria A
	EFT	EN61000-4-4 ±2kV	perf. Criteria B
	Surge	EN61000-4-5 ±1kV	perf. Criteria B
	CS	EN61000-4-6 10Vrms	perf. Criteria A

Typical Characteristic Curves

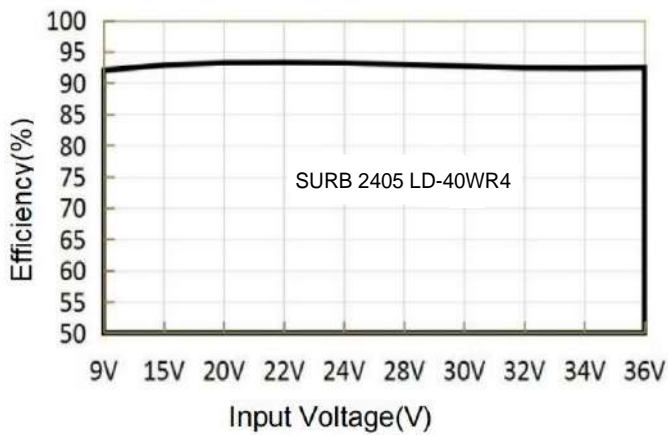
Temperature Derating Curve (Vin=24V)Figure1



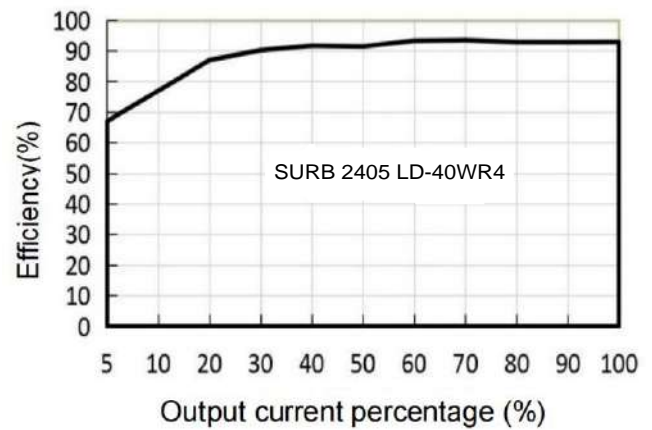
Temperature Derating Curve (Vin=48V)Figure2



Efficiency Vs Input Voltage (Full Load)



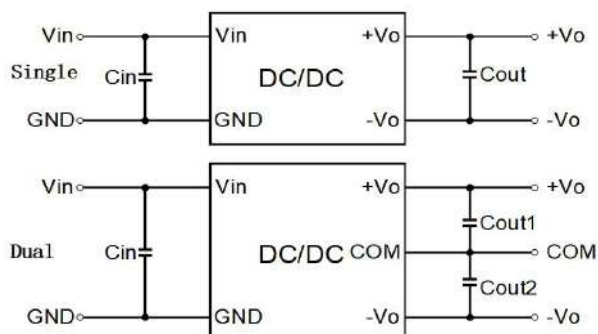
Efficiency Vs Output Load (Vin=24V)



Typical Circuit Design And Application

Figure 3

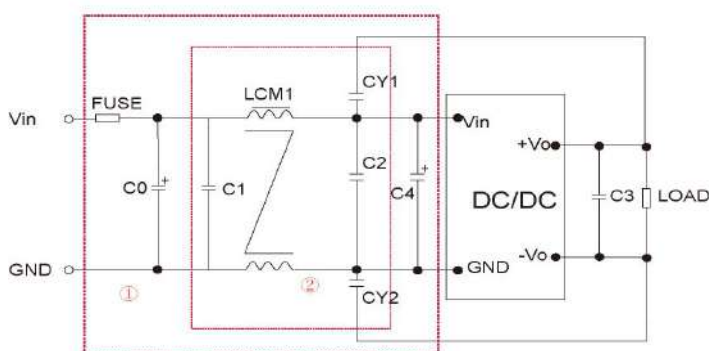
Recommended component parameters



Vin	24V	48V
Cin	330uF	100uF
Cout	330uF	220uF

EMC Recommended Circuit (Figure 4)

EMI Recommended component parameters

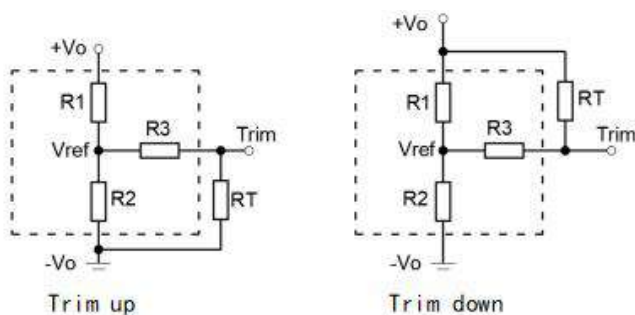


Vin(VDC)	Vin: 24V	Vin: 48V
FUSE	Choose according to actual input current	
C0, C4	680µF/50V	470µF/100V
C1, C2	4.7µF/50V	2.2µF/100V
C3	Refer to the Cout parameters in Figure 3	
LCM1	1mH	
CY1/CY2	1nF/2KV	

Note: Part ① of Figure 3 is used for EMS testing; Part 2 is used for EMI filtering and can be selected according to requirements.

Figure 5

Trim Recommended component parameters



Trim resistor connections (dashed line shows internal resistor network)

Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	10	6.064	13.622	1.24
5	2.4	2.344	13.622	2.5
12	8.2	2.153	17.346	2.5
15	12	2.388	21.016	2.5
24	10	1.158	10.714	2.5

$$\text{Up : } R_t = \frac{nR_2}{R_2 - n} - R_3 \quad n = \frac{V_{ref}}{V_o - V_{ref}} * R_1$$

$$\text{Down : } R_t = \frac{nR_1}{R_1 - n} - R_3 \quad n = \frac{V_o - V_{ref}}{V_{ref}} * R_2$$

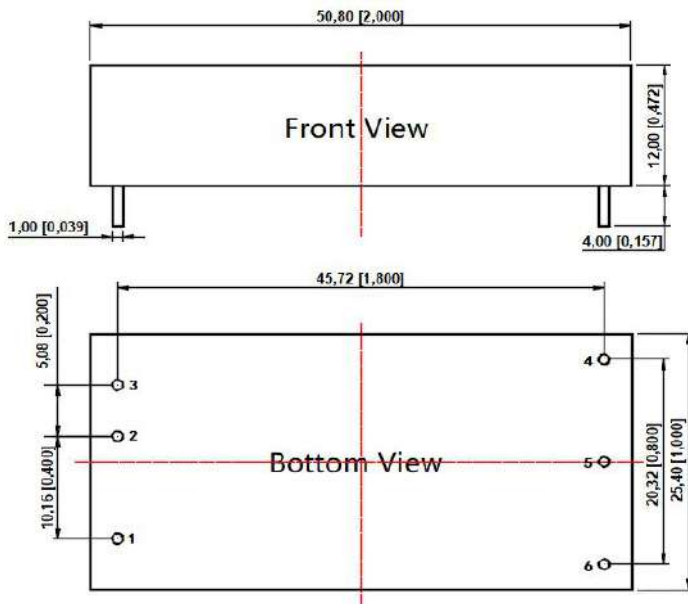
Note:

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 3. 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.

The product does not support output parallel power boosting.

Dimensions and Recommended Layout

Dimensions



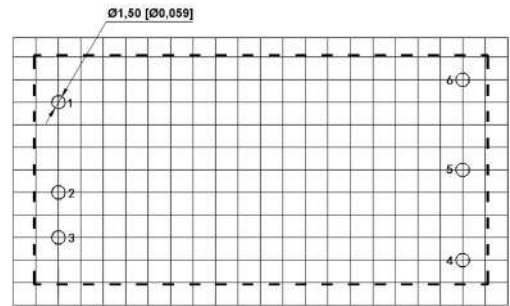
Note:

Unit: mm[inch]

Pin section tolerances: ±0.10 [±0.004]

General tolerances: ±0.50 [±0.020]

PCB Printing Layout

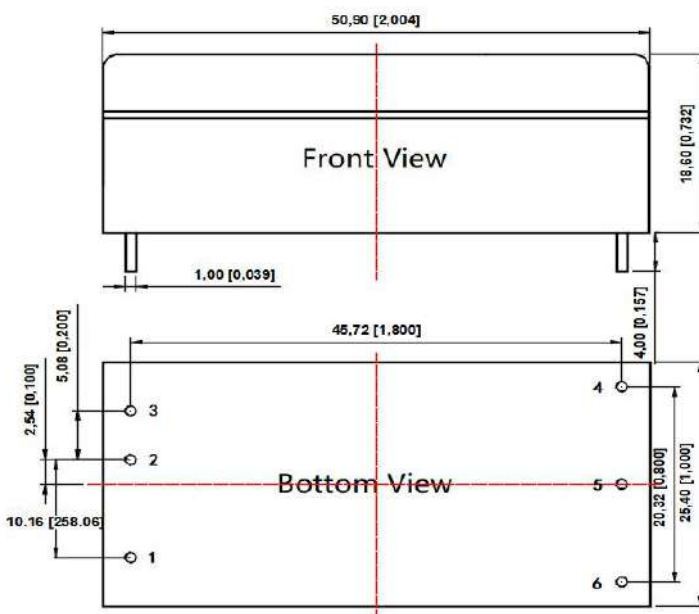


The grid distance is 2.54 x 2.54mm

Pin Definition Table

Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	-Vo	COM
6	Trim	-Vo

Heatsink Dimensions



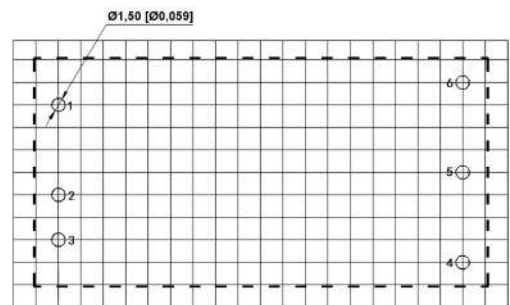
Note:

Unit: mm[inch]

Pin section tolerances: ±0.10 [±0.004]

General tolerances: ±0.50 [±0.020]

PCB Printing Layout

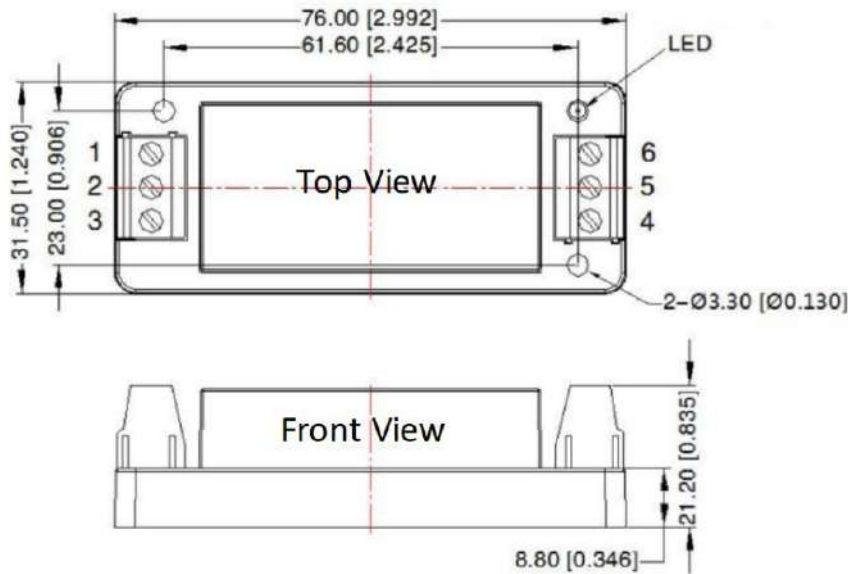


The grid distance is 2.54 x 2.54mm

Pin Definition Table

Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	-Vo	COM
6	Trim	-Vo

A2S Dimensions



Pin Definition Table

Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	Trim	COM
6	-Vo	-Vo

Note:

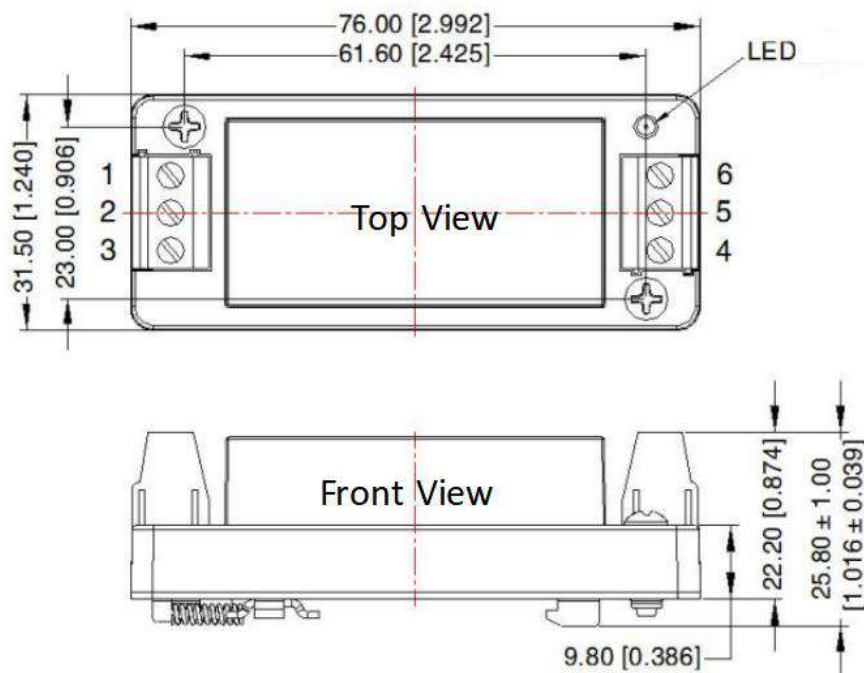
Unit: mm[inch]

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	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	Trim	COM
6	-Vo	-Vo

Note:

Unit: mm[inch]

Mounting rail: TS35

Wire range: 24-12 AWG

Tightening torque: Max 0.4 N·m

General tolerances: ± 1.00[±0.039]

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;
- ✦ Suggested dual output module load imbalance: $\leq \pm 5\%$. If it exceeds $\pm 5\%$, it cannot be guaranteed that the product performance meets all performance indicators in this manual;
- ✦ 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 $T_a=25\text{ }^\circ\text{C}$, 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.