

1S8W8_3RP series

1W - Single/Dual Output DC-DC Converter - Wide Input - Isolated & Regulated



DC-DC Converter

1 Watt

- ⊕ SIP8 package
- ⊕ 8:1 ultra-wide input voltage range
- ⊕ Operating temperature range: -40°C - +105°C

- ⊕ Up to 74% efficiency
- ⊕ 3000VDC isolation
- ⊕ Input under-voltage protection
- ⊕ Short circuit protection
- ⊕ Over current protection

Introducing our new 1S8W8_3RP series. Compact, efficient, and reliable — the new DC-DC converter series combines performance and protection in a space-saving SIP8 package. With its ultra-wide 8:1 input voltage range and an operating temperature from -40°C up to +105°C, it is designed to perform under demanding conditions. Offering up to 74 % efficiency and 3000 VDC isolation, the converter ensures stable operation and high safety standards. Built-in input under-voltage, short-circuit, and over-current protection provide additional reliability and peace of mind. The 1S8W8_3RP series — engineered for efficiency, built for endurance.



Common specifications

Short circuit protection	Input voltage range, continuous, self recovery	
Switching frequency	300 kHz (PWM)	
Operation temperature	-40°C ~+105°C (with derating)	
Storage temperature	-55°C ~+125°C	
Soldering profile	Wave-soldering Manual-welding	260°C (±5 °C); time: 5 - 10s 360°C (±10 °C); time: 3 - 5s
Storage humidity	5~95% RH (non-condensing)	
MTBF: (MIL-HDBK-217F@25°C)	1,000,000 hours	
Input filter	Capacitance filter	
Hot plug	Unavailable	
Case material	Black plastic, flame-retardant and heat-resistant (UL 94V-0 rated)	
Package dimensions	22.00 x 9.50 x 12.00mm	
Weight	4.8g (typ.)	
Cooling method	Free air convection	

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy (0% - 100% load)	Vo1		±1.0	±3.0	%
	Vo2		±3.0	±5.0	
Linear regulation (vin = min. to max. @full load)	Vo1		±0.5	±1.0	%
	Vo2		±1.0	±2.0	
Load regulation	5% - 100% load		±1.0	±2.0	%
	0% - 100% load		±2.0	±4.0	
Ripple & noise	20MHZ Bandwidth		50	150	mV
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	±8	%
	Others output		±3	±5	
Temperature coefficient	Full load			±0.03	%/°C
Ripple & noise	20MHz bandwidth, 100% load, parallel cable method		50	100	mVp-p
Over current protection	Input voltage range	110	160		%

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/no load)	Single - 24/28V Output		117/25	121/40	mA
	Single - Others output		113/20	117/30	
	Dual - 24V Output		117/30	121/50	
	Dual - Others output		114/20	119/40	
Reflected ripple current			50		mA
Impulse voltage	1 sec. (max.)	-0.7		50	VDC
Starting voltage				4.5	VDC
Undervoltage protection			3.5	4	VDC
CTRL	Turn on module	Ctrl pin open or pulled high (TTL 2.7 - 12VDC)			
	Turn off module	Ctrl pin pulled low to GND (0 - 1.2VDC)			

Example:

1S8W8_1205S3RP

1 = 1Watt; S8 = SIP; W8 = Ultra wide input; 12 = 12Vin; 05 = 5Vout; S = Single Output; 3 = 3000VDC isolation; R = Regulated Output; P = Short circuit protection;

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output, test time 1 minute, leakage current less than 1mA	3000			VDC
Isolation resistance	Input-output, resistance at 500VDC	1000			MΩ
Isolation capacitance	Input-output, 100kHz/0.1V		1000		pF

- 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 datasheet;
- 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 $T_a = 25^\circ\text{C}$, humidity $<75\%$ RH, nominal input voltage, and output rated load;
- All indicator testing methods in this datasheet are based on our company's standards;
- Product specifications are subject to change without prior notice.

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EMC specifications

EMI	CE	CISPR32/EN55032 CLASS B (see fig. 3- ② for recommended circuit)	
EMI	RE	CISPR32/EN55032 CLASS B (see fig. 3- ② for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2 contact $\pm 6\text{kV}$	Perf. criteria B
EMS	RS	IEC/EN61000-4-3 10V/m	Perf. criteria A
EMS	EFT	IEC/EN61000-4-4 $\pm 2\text{kV}$ (see Fig. 3- ① for recommended circuit)	Perf. criteria B
EMS	Surge	IEC/EN61000-4-5 line to line $\pm 2\text{kV}$ (see Fig. 3- ① for recommended circuit)	Perf. criteria B
EMS	CS	IEC/EN61000-4-6 3Vr.m.s	Perf. criteria A

Product Selection Guide

Approval	Part number	Input Voltage Nominal (Range) (VDC)	Input Voltage Max. (VDC) *	Output Voltage (VDC)	Output Current (mA) max.	Full Load Efficiency (%) typ. **	Capacitive Load max. (μF)
	1S8W8_1203S3RP	12 (4.5-36)	40	3.3	303	73	470
	1S8W8_1205S3RP	12 (4.5-36)	40	5	200	74	470
	1S8W8_1206S3RP	12 (4.5-36)	40	6	167	74	330
	1S8W8_1209S3RP	12 (4.5-36)	40	9	111	74	220
	1S8W8_1212S3RP	12 (4.5-36)	40	12	83	74	220
	1S8W8_1215S3RP	12 (4.5-36)	40	15	67	74	220
	1S8W8_1218S3RP	12 (4.5-36)	40	18	56	74	180
	1S8W8_1224S3RP	12 (4.5-36)	40	24	42	71	100
	1S8W8_1228S3RP	12 (4.5-36)	40	28	36	71	100

Note: * The input voltage must not exceed the maximum value; otherwise, it may cause permanent and irreparable damage;

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

Approval	Part number	Input Voltage Nominal (Range) (VDC)	Input Voltage Max. (VDC) *	Output Voltage (VDC)	Output Current (mA) max.	Full Load Efficiency (%) typ. **	Capacitive Load max. (μF) ***
	1S8W8_1203D3RP	12 (4.5-36)	40	± 3.3	± 152	73	330
	1S8W8_1205D3RP	12 (4.5-36)	40	± 5	± 100	73	220
	1S8W8_1209D3RP	12 (4.5-36)	40	± 9	± 56	72	150
	1S8W8_1212D3RP	12 (4.5-36)	40	± 12	± 42	72	100
	1S8W8_1215D3RP	12 (4.5-36)	40	± 15	± 33	72	68
	1S8W8_1224D3RP	12 (4.5-36)	40	± 24	± 21	71	47

Note:

* The input voltage must not exceed the maximum value; otherwise, it may cause permanent and irreparable damage;

** Efficiency is measured at nominal input voltage and rated output load;

*** The specified maximum capacitive load value for positive and negative output is identical.

Typical characteristics

Temperature derating graph

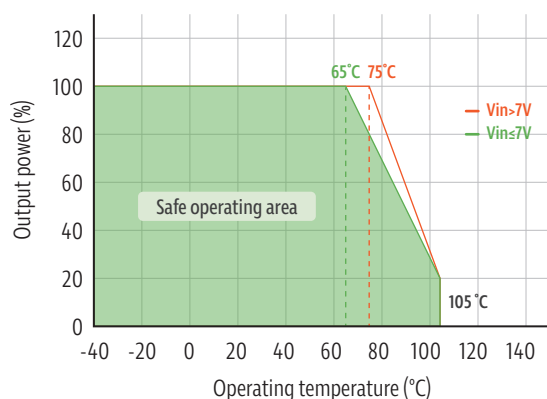


Figure 1

1S8W8_3RP series

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Typical circuit design and application

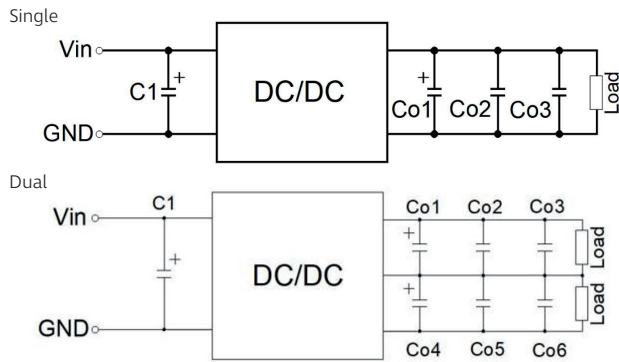


Figure 2

All DC-DC converters in this series are tested according to the recommended circuit (Fig. 2) before leaving the factory. If further reduction of input and output ripple is required, the input and output external capacitors C1 and Co1/Co2/Co3/Co4/Co5/Co6 can be increased or a capacitor with a small series equivalent impedance value can be selected, but the capacitance value cannot exceed the maximum capacitive load of the product.

Recommended Capacitive Load Value Table

Vout (VDC)	C1 (μF)	Co1 (μF)	Co2 (μF)	Co3 (μF)
3.3/5/6VDC	100μF/100V	100μF/16V	10μF/50V	0.1μF/16V
9/12/15VDC	100μF/100V	47μF/25V	10μF/50V	0.1μF/25V
18/24/28VDC	100μF/100V	47μF/50V	10μF/50V	0.1μF/50V

Recommended Capacitive Load Value Table

Vout (VDC)	C1 (μF)	Co1/Co4 (μF)	Co2/Co5 (μF)	Co3/Co6 (μF)
3.3/5VDC	100μF/100V	100μF/16V	10μF/50V	0.1μF/16V
9/12/15VDC	100μF/100V	47μF/25V	10μF/50V	0.1μF/25V
24VDC	100μF/100V	47μF/50V	10μF/50V	0.1μF/50V

Recommended EMC circuit diagram

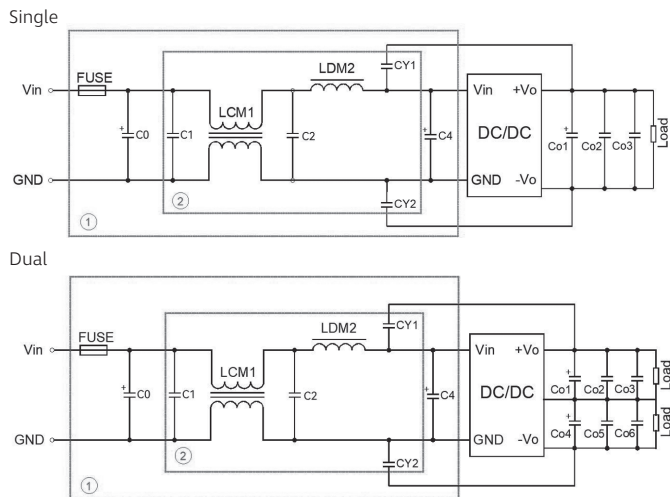


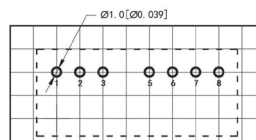
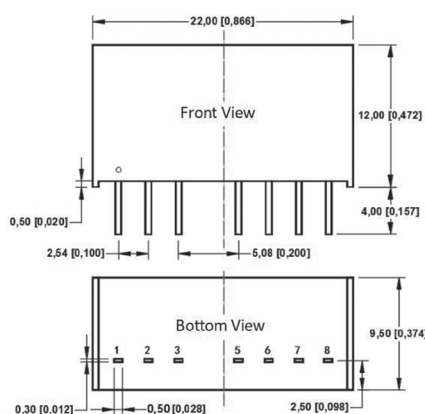
Figure 3

EMI recommended component parameters

Model	Vin: 12V
FUSE	Select according to the actual input current of the customer
C0	1000μF/50V
C4	100μF/50V
C1/C2	4.7μF/50V
Co1/Co2/Co3/ Co4/ Co5/Co6	Refer Fig. 2 capacitive load value table
LCM1	2.2mH
LDM2	4.7μH
CY1/CY2	1nF/3kV

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

Mechanical dimensions



The grid distance is 2.54mm x 2.54mm

Note:

Unit: mm [inch]

Pin section tolerances: ± 0.10 [± 0.004]

General tolerances: ± 0.50 [± 0.020]

Pin Definition Table

Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	Ctrl	Ctrl
5	NC	NC
6	+Vo	+Vo
7	-Vo	COM
8	NC	-Vo

NC: Pin to be isolated from circuitry