# 2S8W_1RP series

2W - Dual/Single Output - Wide Input - Isolated & Regulated DC-DC Converter




## DC-DC Converter 2 Watt

- 8 Pin SIL
- Wide 2:1 input voltage range
- Efficiency up to 80%
- 2W Single and Dual outputs
- I/O Isolation 1kVDC and 3kVDC Option
- Operating Temperature Range: -40°C to +85°C
- Continuous Short Circuit Protection (SCP)
- Remote ON/OFF Control

SHORT CIRCUIT PROTECTED · 100% RoHS compliant · c UL us

UL-60950-1 (E347551)

The 2S8W_1RP series is a family of cost effective 2W single & dual output DC-Dc converters, specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:
1) Where the voltage of the input power supply is wide range (voltage range ≤2:1)
2) Where isolation is necessary between input and output (isolation voltage ≤1000VDC/3000VDC)
3) Where the regulation of the output voltage and the output ripple noise are demanded

### Common specifications

| | |
|---|---|
| Short circuit protection: | Continuous |
| Temperature rise at full load: | 15°C TYP |
| Cooling: | Free air convection |
| Operation temperature range: | -40°C~+85°C |
| Operating case temperature: | 100°C max. |
| Storage temperature range: | -40°C ~+125°C |
| Storage humidity range: | < 95% |
| Soldering temperature: | 260°C max, 1.5mm from case for 10 sec |
| Switching frequency: | 100~650kHz |
| Temperature coefficient: | 0.02%/°C typ. |
| Operating Frequency: | 150kHz min. |
| Case material: | Non-conductive black plastic [UL94-V0] |
| Potting material: | Epoxy [UL94-V0] |
| MTBF (MIL-HDBK-217F): | >1.61 Mhours |
| Safety standard: | IEC/EN 60950-1 |
| Weight: | Plastic case: 4.5g (SIP) |

### Input specifications

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Input filter | Capacitor | | | | |
| Input reflected ripple current* | | | 35 | | mA pk-pk |
| Input surge voltage | • 5VDC<br>• 12VDC<br>• 24VDC<br>• 48VDC | | | 12<br>24<br>40<br>80 | VDC<br>VDC<br>VDC<br>VDC |

* Measured input reflected ripple current with a simulated source inductance of 12µH.

### Isolation specifications

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Isolation voltage | Tested for 1 second | 1000 and 3000 | | | VDC |
| Metal case | Input & output | 1000 | | | VDC |
| Isolation resistance | 500VDC, input to output | 1000 | | | MΩ |
| Isolation capacitance | 100KHz | | | 60 | pF |

### Output specifications

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Output voltage accuracy | Nominal Vin and full load | | ±2 | | % |
| Line regulation | Vin=min to max,full load | | | ±0.5 | % |
| Load regulation | 20% to 100% full load | | | ±1 | % |
| Cross regulation* | Dual output | | ±5 | | % |
| Output Ripple & Noise | 20MHz Bandwidth | | | 80 | mVp-p |

* One load is 25% to 100% load, ther other load is 100% load, the output voltage variable rate is within ±5%.

### EMC specifications

| | | |
|---|---|---|
| Radiated emissions | EN55032 | CLASS A |
| Conducted emissi-ons* | EN55032 | CLASS A |
| ESD | IEC61000-4-2 | Perfect criteria B |
| RS | IEC61000-4-3 | Perfect criteria A |
| EFT** | IEC61000-4-4 | Perfect criteria B |
| Surge** | IEC61000-4-5 | Perfect criteria B |
| CS | IEC61000-4-6 | Perfect criteria A |
| PFMF | IEC61000-4-8 | Perfect criteria A |

* Input filter components are required to help meet conducted emission Class A, which application refer to the EMI filter of design & test configuration.
** An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.

**Example:**
**2S8W_0505S1RP**
**2 = 2Watt; S8 = SIP8; W = wide input (2:1); 4,5 - 9Vin; 5Vout;**
**S = Single Output; 1 = 1000VDC isolation; R = Regulated Output**
**P = Short Circuit Protection**

**Note:**
1. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
2. Capacitive load: test by nominal input voltage and constant resistor load.
3. Exceeding the absolut ratings of the unit could cause damage. It is not allowed for continuous operating.
4. In this datasheet, all the test methods of indications are based on corporate standards.


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Specifications subject to change without notice.

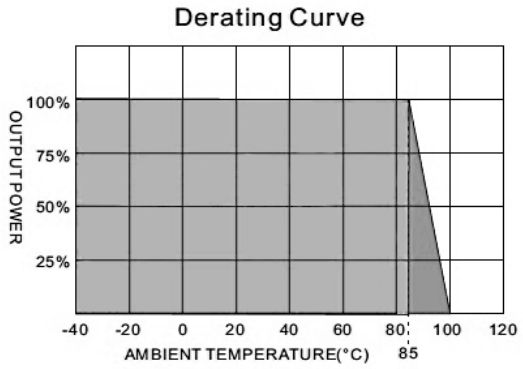
## 2S8W_1RP series

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DC-DC Converter

| Part Number | Input Voltage [V] | Input Current [mA, typ] | Output Voltage [VDC] | Output Current [mA, max] | Efficiency [%, typ] | Capacative Load [µF, max] |
|---|---|---|---|---|---|---|
| 2S8W_xx03SXRP | 4.5-9, 9-18, 18-36, 36-72 | 492, 205, 98, 48 | 3.3 | 500 | 67-71 | 3300 |
| 2S8W_xx05SXRP | 4.5-9, 9-18, 18-36, 36-72 | 571, 216, 108, 56 | 5 | 400 | 70-77 | 3300 |
| 2S8W_xx09SXRP | 4.5-9, 9-18, 18-36, 36-72 | 555, 213, 104, 53 | 9 | 222 | 72-80 | 470 |
| 2S8W_xx12SXRP | 4.5-9, 9-18, 18-36, 36-72 | 555, 208, 104, 53 | 12 | 167 | 72-80 | 470 |
| 2S8W_xx15SXRP | 4.5-9, 9-18, 18-36, 36-72 | 547, 213, 104, 53 | 15 | 133 | 73-80 | 470 |
| 2S8W_xx24SXRP | 4.5-9, 9-18, 18-36, 36-72 | 533, 208, 104, 52 | 24 | 83 | 75-80 | 220 |
| 2S8W_xx03DXRP | 4.5-9, 9-18, 18-36, 36-72 | 471, 188, 94, 47 | ±3.3 | ±250 | 70-73 | ±1000 |
| 2S8W_xx05DXRP | 4.5-9, 9-18, 18-36, 36-72 | 571, 222, 106, 56 | ±5 | ±200 | 70-78 | ±1000 |
| 2S8W_xx09DXRP | 4.5-9, 9-18, 18-36, 36-72 | 540, 210, 105, 53 | ±9 | ±111 | 74-79 | ±220 |
| 2S8W_xx12DXRP | 4.5-9, 9-18, 18-36, 36-72 | 533, 208, 104, 53 | ±12 | ±83 | 75-80 | ±220 |
| 2S8W_xx15DXRP | 4.5-9, 9-18, 18-36, 36-72 | 533, 210, 104, 52 | ±15 | ±67 | 75-80 | ±220 |
| 2S8W_xx24DXRP | 4.5-9, 9-18, 18-36, 36-72 | 563, 219, 106, 55 | ±24 | ±42 | 71-78 | ±100 |

- X=1 = 1kVDC or X=3 = 3kVDC
- xx=Input Voltage (possible for other input and output voltage combinations on request)
  Vin=4.5-9V, xx=05
  Vin=9-18V, xx=12
  Vin=18-36V, xx=24
  Vin=36-72V, xx=48

# Typical characteristics




# Remote On/Off (CTRL)

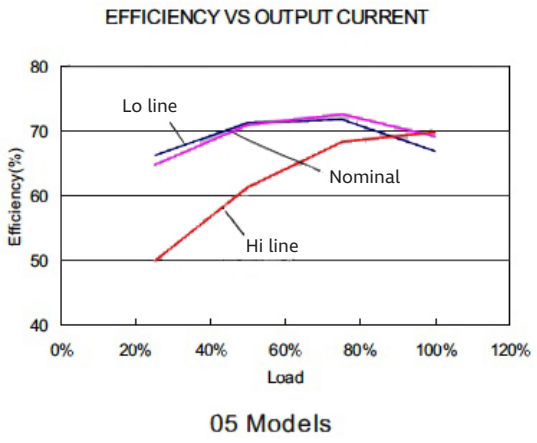
MCU (Master cotrol unit)
The MCU pin voltage is referenced to -Vin (Pin 1)

ON: 0~0.8VDC max.
(Short circuit pin 1 and pin 3) or open circuit
OFF: 4.5 to 15VDC max.
(or 3.5mA to 15mA max.) (via R1, D1)
OFF idle current: 5mA typ.

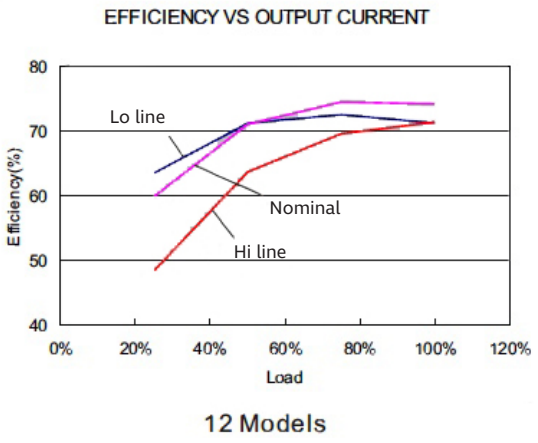
**Connection example**



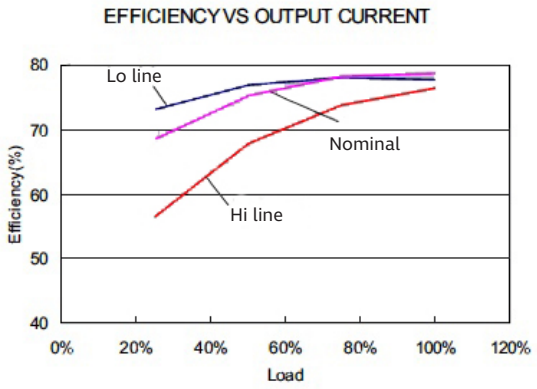
# Typical characteristics




05 Models



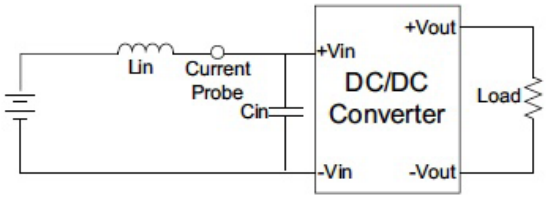

12 Models



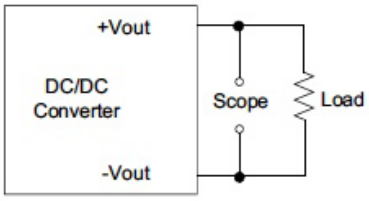

24 Models

# Test configurations

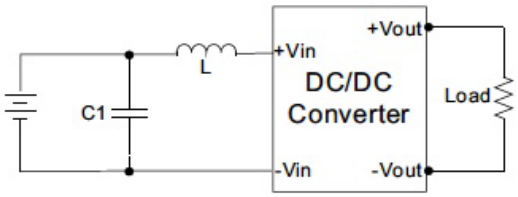
**Input reflected ripple current test step**
Input reflected ripple current ist measured through a source indicator Lin (12µH) and a source capacitor Cin (47µF, ESR<1.0Ω at 100kHz) at nominal input and full load.




**Output ripple & noise measurement test**
The scope measurement bandwidth is 20MHz.

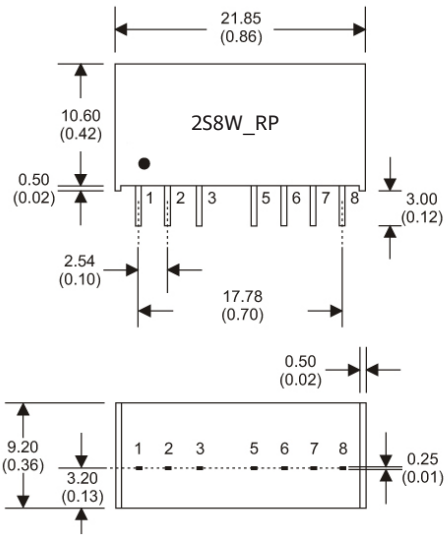


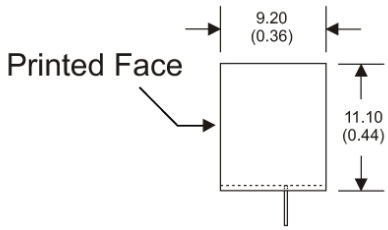

**EMI filter**
Input filter components (C1, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.




| | C1 | L |
|---|---|---|
| 2S8W_RP | 100µF/100V | 12µH |

# Mechanical specifications




| Pin number | Single | Dual |
|---|---|---|
| 1 | -Vin | -Vin |
| 2 | +Vin | +Vin |
| 3 | N.P. | N.C. |
| 5 | N.P. | N.C. |
| 6 | +Vout | +Vout |
| 7 | -Vout | Common |
| 8 | N.C. | -Vout |

With control pin:

| Pin number | Single | Dual |
|---|---|---|
| 1 | -Vin | -Vin |
| 2 | +Vin | +Vin |
| 3 | Remote On/ Off | Remote On/ Off |
| 5 | N.C. | N.C. |
| 6 | +Vout | +Vout |
| 7 | -Vout | Common |
| 8 | N.C. | -Vout |

(The pin connections of high isolation are the same as with the normal one)