



## 6S8W4\_1.6RPR1 series

6W - Single/Dual Output DC-DC Converter - Wide Input - Isolated & Regulated

### DC-DC Converter

6 Watt

- ⊕ SIP8 package
- ⊕ 4:1 input voltage range
- ⊕ Operating temperature range: -40°C to +105°C
- ⊕ 1600VDC isolation
- ⊕ Up to 87% efficiency
- ⊕ Input under-voltage protection
- ⊕ Short circuit protection
- ⊕ Over current protection

Introducing our new 6S8W4\_1.6RPR1 series — a high-performance DC/DC converter family designed for reliability and efficiency in compact applications. Built in a rugged SIP8 package, this series offers a wide 4:1 input voltage range and delivers stable operation across a broad temperature spectrum from -40°C up to +105°C. With reinforced isolation rated at 1600 VDC and efficiencies reaching up to 87%, the 6S8W4\_1.6RPR1 series ensures dependable performance even under demanding conditions. Integrated input under-voltage, short-circuit, and over-current protection functions provide additional safety and system stability. Compact, robust, and engineered for precision — the smart choice for designers who need maximum power density and consistent performance in a small footprint.



#### Common specifications

|   |  |
|---|--|
| Short circuit protection                          | Input voltage range, continuous, self recovery                 |
| Switching frequency                               | 300 kHz (full load, nominal input voltage)                     |
| Operation temperature                             | -40°C ~+105°C (with derating)                                  |
| Storage temperature                               | -55°C ~+125°C  |
| Pin welding can withstand the highest temperature | +300°C (soldering spot is 1.5mm away from case for 10 seconds) |
| Storage humidity                                  | 5~95% RH (non-condensing)                                      |
| MTBF  | > 1,000,000 hours (MIL-HDBK-217F@25°C)                         |
| Input filter                                      | Capacitance filter   |
| Hot plug  | Unavailable  |
| Certification                                     | UL - 62368-1; CB - 62368-1; CE - 62368-1                       |
| Safety standard                                   | IEC/UL62368-1, IEC/EN60335-1, IEC/EN61558-1                    |
| Case material                                     | Black plastic; flame-retardant and heat-res. (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 (5% - 100% load)                                   | Vo1   |     | ±1.0  | ±3.0  | %     |
|  | Vo2   |     | ±3.0  | ±5.0  |       |
| Linear regulation (Full load, Input voltage from low limit to high limit)  | Vo1   |     | ±0.5  | ±1.0  | %     |
|  | Vo2   |     | ±1.0  | ±1.5  |       |
| Load regulation (5% - 100% Load)   | Vo1   |     | ±0.5  | ±1.5  | %     |
|  | Vo2   |     | ±1.0  | ±1.5  |       |
| Ripple & noise (5% - 100% Load)  | 20MHZ Bandwidth, Parallel line test method  |     | 50    | 100   | mVp-p |
| Transient recovery time (Dual)   | 25% load step change, nominal input voltage |     | 0.3   | 0.5   | ms    |
| Transient response deviation (25% load step change, nominal input voltage) | 3.3/5VDC Output                             |     | ±5    | ±8    | %     |
|  | Other Output                                |     | ±3    | ±5    |       |
| Temperature coefficient  | Full Load                                   |     | ±0.01 | ±0.02 | %/°C  |
| Over current protection  | Input voltage range                         | 110 | 160   |       | %Io   |

Note: 1. Under the load condition of 0% - 100%, the load regulation rate index is ±3%.  
2. The testing method for ripple and noise adopts the industry-standard parallel line test method. The ripple and noise of 0% - 5% load are less than or equal to 150mV.

#### Input specifications

| Item                              | Test condition                | Min                              | Typ    | Max    | Units |
|-----------------------------------|-------------------------------|----------------------------------|--------|--------|-------|
| Input current (full load/no load) | <b>Single</b>                 |                                  |        |        |       |
|                                   | 12VDC Input 3.3VDC Output     |                                  | 465/10 | 476/30 |       |
|                                   | 12VDC Input 5VDC Output       |                                  | 625/10 | 641/30 |       |
|                                   | 12VDC Input Other Output      |                                  | 596/10 | 610/30 |       |
|                                   | 24VDC Input 3.3VDC Output     |                                  | 238/5  | 248/12 |       |
|                                   | 24VDC Input 5VDC Output       |                                  | 313/5  | 325/12 |       |
|                                   | 24VDC Input Other Output      |                                  | 305/5  | 315/12 |       |
|                                   | 48VDC Input 3.3 / 5VDC Output |                                  | 158/5  | 166/12 |       |
|                                   | 48VDC Input Other Output      |                                  | 146/10 | 156/16 |       |
|                                   | <b>Dual</b>                   |                                  |        |        |       |
|                                   | 12VDC Input 3.3VDC Output     |                                  | 543/12 | 560/30 |       |
|                                   | 12VDC Input 5VDC Output       |                                  | 641/10 | 658/30 |       |
|                                   | 12VDC Input Other Output      |                                  | 618/10 | 633/30 |       |
|                                   | 24VDC Input 3.3VDC Output     |                                  | 264/5  | 271/12 |       |
|                                   | 24VDC Input 5VDC Output       |                                  | 313/5  | 320/12 |       |
|                                   | 24VDC Input Other Output      |                                  | 308/5  | 316/12 |       |
| 48VDC Input 3.3VDC Output         |                               | 132/5                            | 136/12 |        |       |
| 48VDC Input 5VDC Output           |                               | 158/5                            | 166/12 |        |       |
| 48VDC Input Other Output          |                               | 146/5                            | 156/12 |        |       |
| Reflected ripple current          |                               |                                  | 50     |        | mA    |
| Impulse voltage                   | 12VDC Input                   | -0.7                             |        | 25     | VDC   |
|                                   | 24VDC Input                   | -0.7                             |        | 50     |       |
|                                   | 48VDC Input                   | -0.7                             |        | 100    |       |
| Starting voltage                  | 12VDC Input                   |                                  |        | 4.5    | VDC   |
|                                   | 24VDC Input                   |                                  |        | 9      |       |
|                                   | 48VDC Input                   |                                  |        | 18     |       |
| Undervoltage protection           | 12VDC Input                   | 3.5                              | 4      |        | VDC   |
|                                   | 24VDC Input                   | 5.5                              | 6.5    |        |       |
|                                   | 48VDC Input                   | 12                               | 15.5   |        |       |
| CTRL                              | turn off module               | Connected to GND or (0 - 1.2VDC) |        |        |       |
|                                   | turn on module                | Suspended or (3.5 - 12VDC)       |        |        |       |

#### Isolation specifications

| Item                  | Test condition  | Min  | Typ  | Max | Units |
|-----------------------|---|------|------|-----|-------|
| Isolation voltage     | Input-output, test time 1 minute, leakage current less than 1mA | 1600 |      |     | VDC   |
| Isolation resistance  | Input-output, isolated voltage 500VDC                           | 1000 |      |     | MΩ    |
| Isolation capacitance | Input-output, 100kHz, 0.1V                                      |      | 1000 |     | pF    |

#### Example:

**6S8W4\_2405S1.6RPR1**  
**6 = 6Watt; S8 = SIP; W4 = Wide input; 24 = 24Vin; 05 = 5Vout; S = Single Output;**  
**1.6 = 1600VDC isolation; R = Regulated Output; P = Short circuit protection;**  
**R1 = Revised**

- 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  $< 75\% \text{ RH}$ , nominal input voltage, and output rated load;
- All indicator testing methods in this datasheet are based on our corporate standards;
- Product specifications are subject to change without prior notice.

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| EMC specifications |       |                 |  |                  |  |  |  |
|--------------------|-------|-----------------|--|------------------|--|--|--|
| EMI                | CE    | CISPR32/EN55032 | CLASS B (recommended circuit as shown in Figure 3-②)           |                  |  |  |  |
| EMI                | RE    | CISPR32/EN55032 | CLASS B (recommended circuit as shown in Figure 3-②)           |                  |  |  |  |
| EMS                | ESD   | IEC/EN61000-4-2 | Contact ±4kV   | perf. criteria B |  |  |  |
| EMS                | RS    | IEC/EN61000-4-3 | 10V/m  | Perf. criteria A |  |  |  |
| EMS                | EFT   | IEC/EN61000-4-4 | ±2kV (recommended circuit as shown in Figure 3-③)              | Perf. criteria B |  |  |  |
| EMS                | Surge | IEC/EN61000-4-5 | line to line ±1kV (recommended circuit as shown in Figure 3-③) | Perf. criteria B |  |  |  |
| EMS                | CS    | IEC/EN61000-4-6 | 3Vr.m.s  | Perf. criteria A |  |  |  |

## Product Selection Guide

| Approval | Part number        | Input Voltage (VDC) | Input Voltage max. (VDC) | Output Voltage (VDC) | Output Current (mA) max. | Full Load Efficiency (%) typ. | Capacitive Load Max. (µF) |
|----------|--------------------|---------------------|--------------------------|----------------------|--------------------------|-------------------------------|---------------------------|
|          | 6S8W4_1203S1.6RPR1 | 12 (4.5-18)         | 20                       | 3.3                  | 1350                     | 80                            | 1800                      |
|          | 6S8W4_1205S1.6RPR1 | 12 (4.5-18)         | 20                       | 5                    | 1200                     | 80                            | 1000                      |
|          | 6S8W4_1206S1.6RPR1 | 12 (4.5-18)         | 20                       | 6                    | 1000                     | 81                            | 680                       |
|          | 6S8W4_1209S1.6RPR1 | 12 (4.5-18)         | 20                       | 9                    | 667                      | 83                            | 470                       |
|          | 6S8W4_1212S1.6RPR1 | 12 (4.5-18)         | 20                       | 12                   | 500                      | 83                            | 470                       |
|          | 6S8W4_1215S1.6RPR1 | 12 (4.5-18)         | 20                       | 15                   | 400                      | 84                            | 220                       |
|          | 6S8W4_1224S1.6RPR1 | 12 (4.5-18)         | 20                       | 24                   | 250                      | 84                            | 100                       |
| UL       | 6S8W4_2403S1.6RPR1 | 24 (9-36)           | 40                       | 3.3                  | 1350                     | 80                            | 1800                      |
| UL       | 6S8W4_2405S1.6RPR1 | 24 (9-36)           | 40                       | 5                    | 1200                     | 82                            | 1000                      |
| UL       | 6S8W4_2406S1.6RPR1 | 24 (9-36)           | 40                       | 6                    | 1000                     | 82                            | 680                       |
| UL       | 6S8W4_2409S1.6RPR1 | 24 (9-36)           | 40                       | 9                    | 667                      | 84                            | 470                       |
| UL       | 6S8W4_2412S1.6RPR1 | 24 (9-36)           | 40                       | 12                   | 500                      | 86                            | 470                       |
| UL       | 6S8W4_2415S1.6RPR1 | 24 (9-36)           | 40                       | 15                   | 400                      | 87                            | 220                       |
| UL       | 6S8W4_2424S1.6RPR1 | 24 (9-36)           | 40                       | 24                   | 250                      | 85                            | 100                       |
|          | 6S8W4_4803S1.6RPR1 | 48 (18-75)          | 80                       | 3.3                  | 1600                     | 78                            | 1200                      |
|          | 6S8W4_4805S1.6RPR1 | 48 (18-75)          | 80                       | 5                    | 1200                     | 82                            | 680                       |
|          | 6S8W4_4809S1.6RPR1 | 48 (18-75)          | 80                       | 9                    | 667                      | 84                            | 470                       |
|          | 6S8W4_4812S1.6RPR1 | 48 (18-75)          | 80                       | 12                   | 500                      | 83                            | 330                       |
|          | 6S8W4_4815S1.6RPR1 | 48 (18-75)          | 80                       | 15                   | 400                      | 84                            | 150                       |
|          | 6S8W4_4824S1.6RPR1 | 48 (18-75)          | 80                       | 24                   | 250                      | 82                            | 68                        |
|          | 6S8W4_4828S1.6RPR1 | 48 (18-75)          | 80                       | 28                   | 214                      | 82                            | 68                        |

Note: 1. The input voltage must not exceed the maximum value; otherwise, it may cause permanent and irreparable damage.

2. The above efficiency values were measured within 10 seconds of starting the machine when the input nominal voltage was applied and the output was fully loaded.

| Approval | Part number        | Input Voltage (VDC) | Input Voltage max. (VDC) | Output Voltage (VDC) | Output Current (mA) max. | Full Load Efficiency (%) typ. | Capacitive Load max. (µF) |
|----------|--------------------|---------------------|--------------------------|----------------------|--------------------------|-------------------------------|---------------------------|
|          | 6S8W4_1203D1.6RPR1 | 12 (4.5-18)         | 20                       | ±3.3                 | ±750                     | 76                            | 470                       |
|          | 6S8W4_1205D1.6RPR1 | 12 (4.5-18)         | 20                       | ±5                   | ±600                     | 78                            | 470                       |
|          | 6S8W4_1209D1.6RPR1 | 12 (4.5-18)         | 20                       | ±09                  | ±333                     | 80                            | 220                       |
|          | 6S8W4_1212D1.6RPR1 | 12 (4.5-18)         | 20                       | ±12                  | ±250                     | 81                            | 120                       |
|          | 6S8W4_1215D1.6RPR1 | 12 (4.5-18)         | 20                       | ±15                  | ±200                     | 81                            | 100                       |
|          | 6S8W4_1224D1.6RPR1 | 12 (4.5-18)         | 20                       | ±24                  | ±125                     | 82                            | 68                        |
|          | 6S8W4_2403D1.6RPR1 | 24 (9-36)           | 40                       | ±3.3                 | ±750                     | 78                            | 470                       |
|          | 6S8W4_2405D1.6RPR1 | 24 (9-36)           | 40                       | ±5                   | ±600                     | 80                            | 470                       |
|          | 6S8W4_2409D1.6RPR1 | 24 (9-36)           | 40                       | ±9                   | ±333                     | 81                            | 220                       |
|          | 6S8W4_2412D1.6RPR1 | 24 (9-36)           | 40                       | ±12                  | ±250                     | 82                            | 120                       |
|          | 6S8W4_2415D1.6RPR1 | 24 (9-36)           | 40                       | ±15                  | ±200                     | 82                            | 100                       |
|          | 6S8W4_2424D1.6RPR1 | 24 (9-36)           | 40                       | ±24                  | ±125                     | 83                            | 68                        |
|          | 6S8W4_4803D1.6RPR1 | 48 (18-75)          | 80                       | ±3.3                 | ±750                     | 78                            | 470                       |
|          | 6S8W4_4805D1.6RPR1 | 48 (18-75)          | 80                       | ±5                   | ±600                     | 80                            | 470                       |
|          | 6S8W4_4809D1.6RPR1 | 48 (18-75)          | 80                       | ±9                   | ±333                     | 81                            | 220                       |
|          | 6S8W4_4812D1.6RPR1 | 48 (18-75)          | 80                       | ±12                  | ±250                     | 82                            | 120                       |
|          | 6S8W4_4815D1.6RPR1 | 48 (18-75)          | 80                       | ±15                  | ±200                     | 82                            | 100                       |
|          | 6S8W4_4824D1.6RPR1 | 48 (18-75)          | 80                       | ±24                  | ±125                     | 83                            | 68                        |

Note: 1. The input voltage must not exceed the maximum value; otherwise, it may cause permanent and irreparable damage.

2. The above efficiency values were measured within 10 seconds of starting the machine when the input nominal voltage was applied and the output was fully loaded.

3. The maximum capacitive load is the output capacitance value of each channel.

# 6S8W4\_1.6RPR1 series

6W - Single/Dual Output DC-DC Converter - Wide Input - Isolated & Regulated

## Typical characteristics

### Temperature derating graph

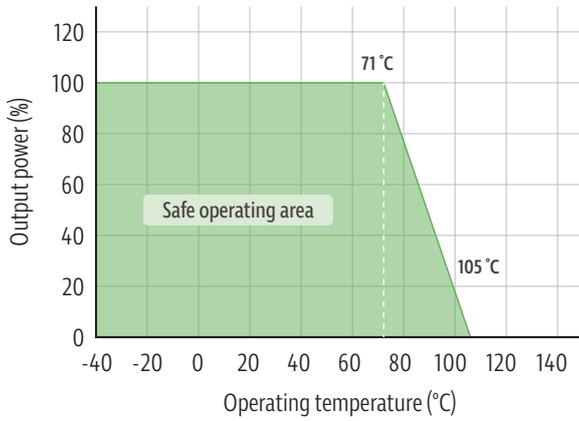
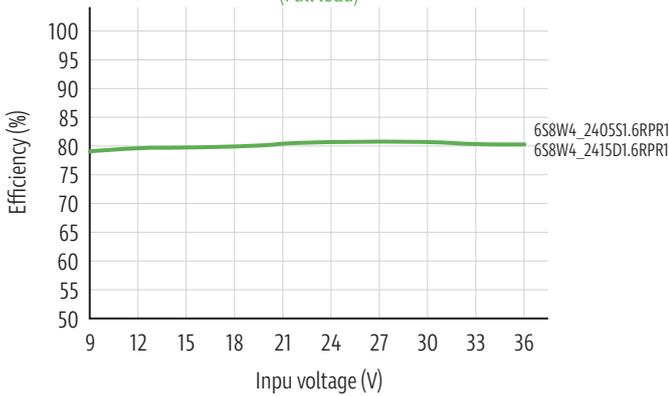
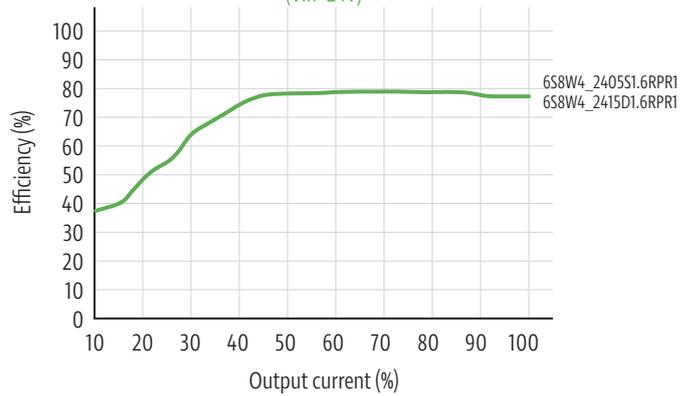


Figure 1

### Efficiency vs input voltage (Full load)

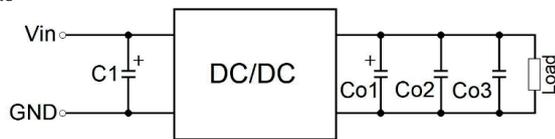


### Efficiency vs output load (Vin=24V)

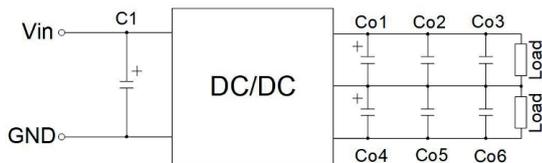


## Typical circuit design and application

Single



Dual



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) |
|------------|-------------|---------------|---------------|---------------|
| 3.3/5/6VDC | 100μF/100 V | 100μF/16V     | 0.1μF/50V     | 10μF/50V      |
| 9/12/15VDC | 100μF/100 V | 47μF/25V      | 0.1μF/50V     | 10μF/50V      |
| 24/28VDC   | 100μF/100 V | 47μF/50V      | 0.1μF/50V     | 10μF/50V      |

All DC-DC converters in this series are tested according to the recommended testing circuit (figure 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.

## 6S8W4\_1.6RPR1 series

6W - Single/Dual Output DC-DC Converter - Wide Input - Isolated & Regulated

### Recommended EMC circuit diagram

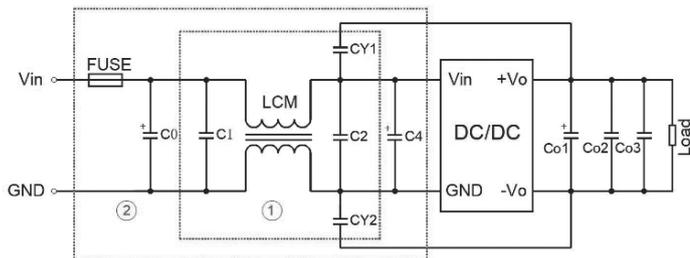


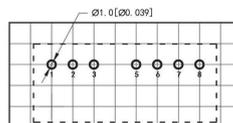
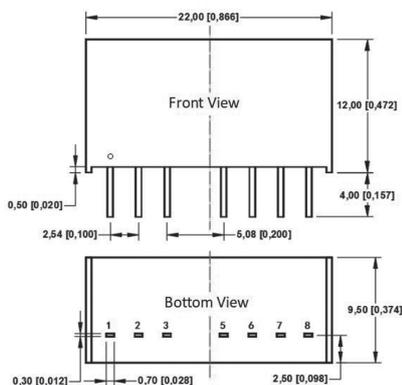
Figure 3

Recommended Parameter Table

| Model                       | Vin: 12V   | Vin: 24V  | Vin: 48V   |
|-----------------------------|--|-----------|------------|
| FUSE                        | Select according to the actual input current of the customer |           |            |
| C0; C4                      | 330uF/25V  | 330uF/50V | 220uF/100V |
| C1; C2                      | 10uF/50V   |           |            |
| LCM                         | 1.4-1.7mH  |           |            |
| Co1/Co2/Co3/<br>Co4/Co5/Co6 | Figure 2 Capacitive load value table                         |           |            |
| CY1; CY2                    | 1nF/400VAC   |           |            |

Note: Part 1 in Figure 3 is for EMC testing; The second part is used for EMI filtering, which can be selected according to the demand.

### Mechanical dimensions



The grid distance is 2.54mm x 2.54mm

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: Not available for electrical connection

Note:

Unit: mm [inch]

Pin section tolerances:  $\pm 0.10$  [ $\pm 0.004$ ]

General tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]