GAPTEC®
GREEN TECHNOLOGY




# 6S8W_3RP Series

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

## DC-DC Converter 6 Watt

- **Highest power density in SIP8 package**
- **Low profile (L*W*H=21.8*9.2*11.1 mm)**
- **2:1 wide input voltage range**
- **Isolation 3000VDC**
- **High Efficiency up to 88%**
- **Short circuit protection (SCP; (automatic recovery)**
- **External On/Off control**
- **Internal SMD construction**
- **RoHS Compliance**
- **Internal PI-Filtering**

The 6S8W_ series is an excellent performance and high power density design. Wide 2:1 input voltage ranges: 4.5V-9V, 9V-18V, 18V-36V and 36V-75V.

The highest efficiency allows -40°C to +85°C operating temperatures.The very low stand-by (no-load) input power consumption 50mW typ,makes them an ideal solution for application in battery-powered equipment and instrumentation.

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≤3000VDC)
3) Where the regulation of the output voltage and the output ripple noise are demanded

### Common specifications

| | |
|---|---|
| Short circuit protection*: | Continuous, automatic recovery |
| Temperature rise at full load: | 40°C TYP |
| Cooling: | Free air convection |
| Operation temperature range: | -40°C~+85°C |
| Operation case temperature: | +110°C MAX |
| Storage temperature range: | -55°C ~+125°C |
| Storage humidity range: | < 95% |
| Lead temperature range: | 300°C MAX, 1.5mm from case for 10 sec |
| No-load power consumption: | Vin=Nominal<br>50mW TYP / 150mW MAX |
| Temperature coefficient: | - 40°C to +85°C ambient<br>0.02 %/°C TYP |
| Operating Frequency: | 200kHz MIN |
| Efficiency at Full Load: | 79% MIN/88% MAX |
| Case material: | Non-conductive black plastic [UL94-V0] |
| MTBF (MIL-HDBK 217F): | +25°C: 1319x10$^3$ hours<br>+71°C: 159x10$^3$ hours |
| Weight: | 4.7g |

### Isolation specifications

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Isolation voltage | Tested for 1 second | 3000 | | | VDC |
| Isolation resistance | 500VDC, input to output | 15 | | | GΩ |
| Isolation capacitance | Input/Output, 100KHz | | | 30 | pF |

### Output specifications

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Output accuracy | Nominal Vin and full load | | ±2 | | % |
| Line regulation | Vin=min to max, full load | | ±0.5 | | % |
| Load regulation | 20% to 100% full load | | ±0.5 | | % |
| Minimum load | | | 0 | | % |
| Temperature drift (Vout) | Refer to recommended circuit | | | ±0.03 | %/°C |
| Output Ripple & Noise | 20MHz Bandwidth | | | 60 | mVp-p |
| Remote Power OFF (leave open if not used) | Device ON | | | | open or <0.8 VDC |
| (15 VDC max.) | Device OFF<br>Device OFF (Stand by input current) | | | | CTRL>1.5VDC<br>0.5mA max. |

**Model selection:**
**WCT**_xxyyN##O**
**W=**Watt; **C=** Case; **T=**Type; ****=** Voltage Variation (omitted ± 10%);
**xx=** Vin; **yy=** Vout; **N=** Numbers of Output; **##=** Isolation (kVDC);
**O=** output regulation

**Example:**
**6S8W_1205S3RP**
**6= 6Watt; S8= SIP8; W= wide input; 9-18Vin; 5Vout; S=Single Output; 3=3000VDC; R=Regulated Output P=Short Curcuit Protection**

**Note:**
1. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. In this datasheet, all the test methods of indications are based on corporate standards.



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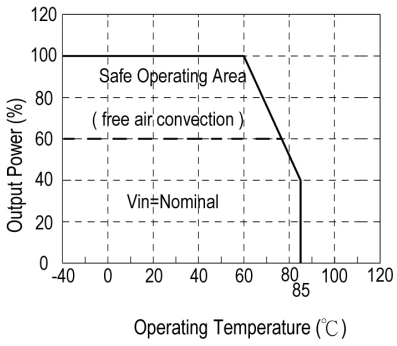
## 6S8W_3RP Series

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

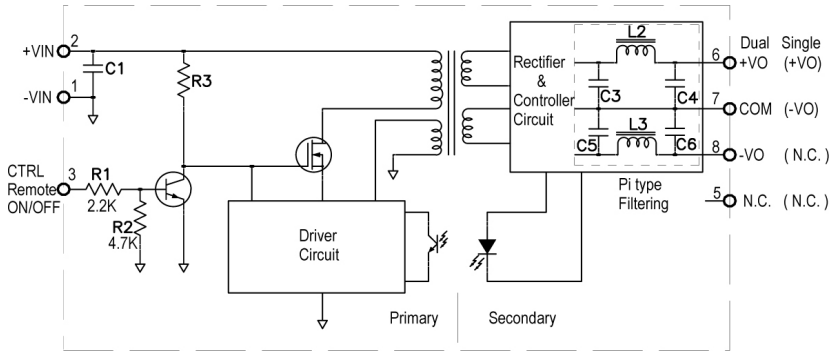
| Part Number | Input Voltage [VDC] | | | Output Voltage [VDC] | Output Current [mA, max.] | Efficiency [%, typ.] | Capacitive Load [max.] |
|---|---|---|---|---|---|---|---|
| | Nominal | Range | Max (100 msec.max.) | | | | |
| 6S8W_0503S3RP | 5 | 4.5-9 | 15 | 3.3 | 1300 | 79 | 1000 |
| 6S8W_0505S3RP | 5 | 4.5-9 | 15 | 5 | 1200 | 81 | 1000 |
| 6S8W_0509S3RP | 5 | 4.5-9 | 15 | 9 | 666 | 82 | 680 |
| 6S8W_0512S3RP | 5 | 4.5-9 | 15 | 12 | 500 | 84 | 470 |
| 6S8W_0515S3RP | 5 | 4.5-9 | 15 | 15 | 400 | 85 | 330 |
| 6S8W_1203S3RP | 12 | 9-18 | 25 | 3.3 | 1300 | 81 | 1000 |
| 6S8W_1205S3RP | 12 | 9-18 | 25 | 5 | 1200 | 84 | 1000 |
| 6S8W_1209S3RP | 12 | 9-18 | 25 | 9 | 666 | 85 | 680 |
| 6S8W_1212S3RP | 12 | 9-18 | 25 | 12 | 500 | 87 | 470 |
| 6S8W_1215S3RP | 12 | 9-18 | 25 | 15 | 400 | 87 | 330 |
| 6S8W_2403S3RP | 24 | 18-36 | 45 | 3.3 | 1300 | 81 | 1000 |
| 6S8W_2405S3RP | 24 | 18-36 | 45 | 5 | 1200 | 84 | 1000 |
| 6S8W_2409S3RP | 24 | 18-36 | 45 | 9 | 666 | 86 | 680 |
| 6S8W_2412S3RP | 24 | 18-36 | 45 | 12 | 500 | 87 | 470 |
| 6S8W_2415S3RP | 24 | 18-36 | 45 | 15 | 400 | 88 | 330 |
| 6S8W_4803S3RP | 48 | 36-75 | 85 | 3.3 | 1300 | 81 | 1000 |
| 6S8W_4805S3RP | 48 | 36-75 | 85 | 5 | 1200 | 84 | 1000 |
| 6S8W_4809S3RP | 48 | 36-75 | 85 | 9 | 666 | 85 | 680 |
| 6S8W_4812S3RP | 48 | 36-75 | 85 | 12 | 500 | 87 | 470 |
| 6S8W_4815S3RP | 48 | 36-75 | 85 | 15 | 400 | 87 | 330 |
| 6S8W_0505D3RP | 5 | 4.5-9 | 15 | ±5 | ±600 | 81 | ±470 |
| 6S8W_0512D3RP | 5 | 4.5-9 | 15 | ±12 | ±250 | 84 | ±100 |
| 6S8W_0515D3RP | 5 | 4.5-9 | 15 | ±15 | ±200 | 85 | ±47 |
| 6S8W_1205D3RP | 12 | 9-18 | 25 | ±5 | ±600 | 84 | ±470 |
| 6S8W_1212D3RP | 12 | 9-18 | 25 | ±12 | ±250 | 86 | ±100 |
| 6S8W_1215D3RP | 12 | 9-18 | 25 | ±15 | ±200 | 86 | ±47 |
| 6S8W_2405D3RP | 24 | 18-36 | 45 | ±5 | ±600 | 84 | ±470 |
| 6S8W_2412D3RP | 24 | 18-36 | 45 | ±12 | ±250 | 88 | ±100 |
| 6S8W_2415D3RP | 24 | 18-36 | 45 | ±15 | ±200 | 88 | ±47 |
| 6S8W_4805D3RP | 48 | 36-75 | 85 | ±5 | ±600 | 84 | ±470 |
| 6S8W_4812D3RP | 48 | 36-75 | 85 | ±12 | ±250 | 88 | ±100 |
| 6S8W_4815D3RP | 48 | 36-75 | 85 | ±15 | ±200 | 88 | ±47 |

# Typical characteristics

**Derating graph**

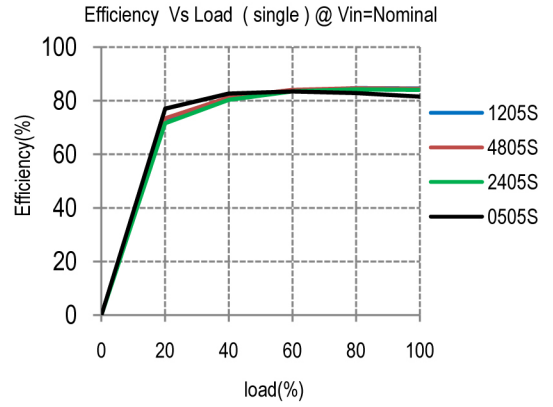


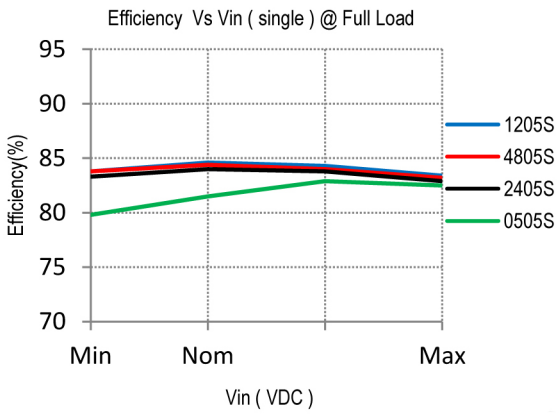
# Functional block diagram

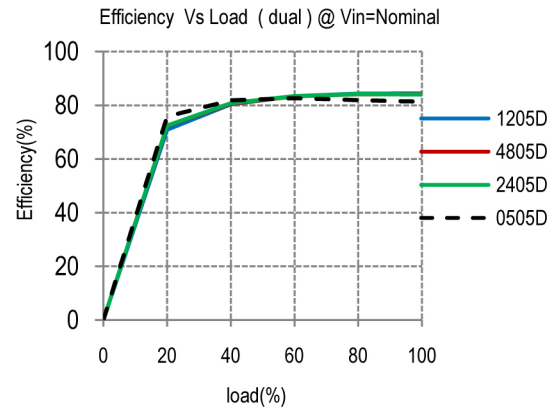


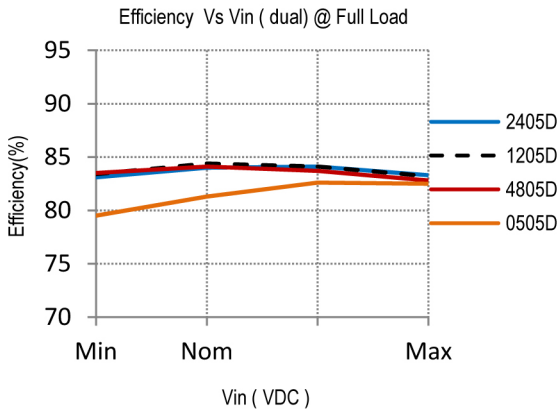

| Input Voltage | C1 Values |
|---|---|
| 4.5~9VDC | 22uF/16V |
| 9~18VDC | 10uF/25V |
| 18~36VDC | 4.7uF/50V |
| 36~75VDC | 2.2uF/100V |

# Efficiency



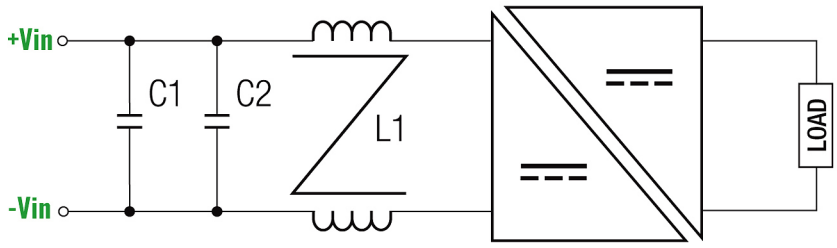



# EMC filtering

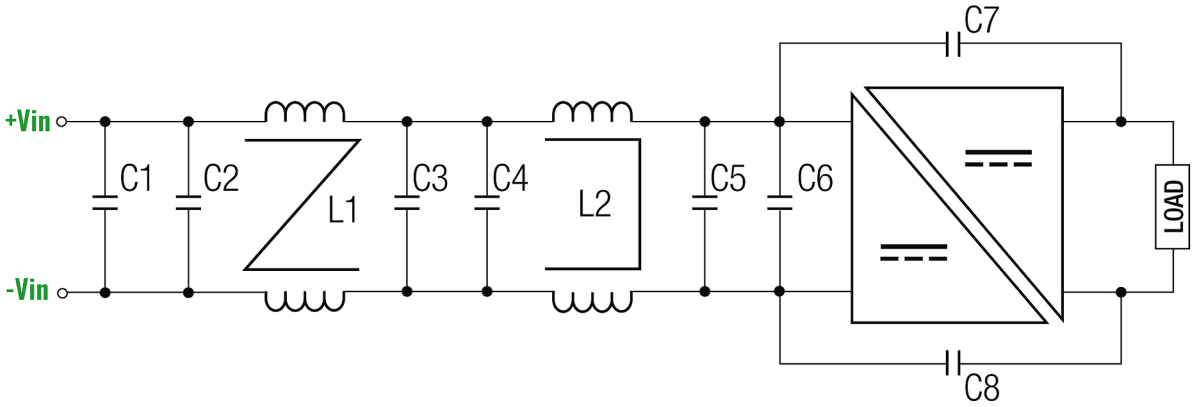
### EMC Filtering - Suggestions for EN55022 Class A

| Model | C1 | C2 | L1 |
|---|---|---|---|
| 6S8W_05xx | 22µF | N/A | 1µH |
| 6S8W_12xx | 4.7µF | | 2.2µH |
| 6S8W_24xx | | | 6.8µH |
| 6S8W_48xx | 2.2µF | 2.2µF | 10µH |

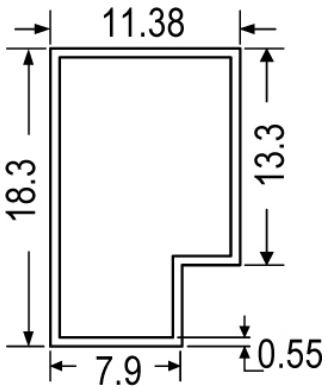



### EMC Filtering - Suggestions for EN55022 Class B

| Model | C1 | C2 | L1 | C3 | C4 | L2 | C5 | C6 | C7 | C8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6S8W_05xx | 22µF | N/A | 1µH | 10µF | N/A | 200µH | 10µF | N/A | 47pF | 100pF |
| 6S8W_12xx | 10µF | | 6.8µH | | | | | 4.7µF | | |
| 6S8W_24xx | 4.7µF | | 10µH | 4.7µF | | | 4.7µF | N/A | 33pF | 220pF |
| 6S8W_48xx | 2.2µF | 2.2µF | 22µH | 2.2µF | 2.2µF | 600µH | 1µF | | 47pF | 680pF |



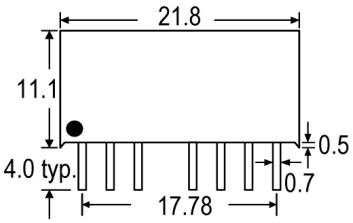

# Tube outline

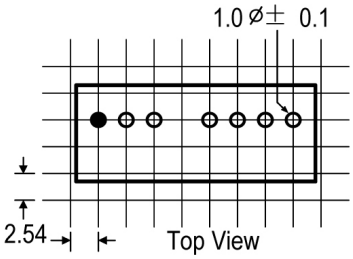



**Note:**
Unit: mm
General tolerances: ±0.50mm

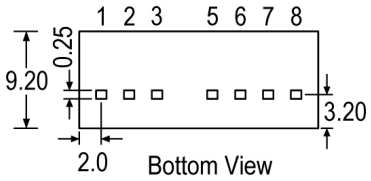
L=520mm ±2mm
Tube quantity: 23pcs

## Mechanical dimensions/footprint




Recommended Footprint Details




XX.X ± 0.25 mm

XX.XX ± 0.15 mm

**Pin Connections**

| Pin# | Single | Dual |
|---|---|---|
| 1 | -Vin | -Vin |
| 2 | +Vin | +Vin |
| 3 | CTRL | CTRL |
| 5 | NC | NC |
| 6 | +Vout | +Vout |
| 7 | -Vout | COM |
| 8 | NC | -Vout |

NC=No Connection
CTRL=Remote ON/OFF Control