# SA_S-W25 & SB_LS-W25 Series

## *0.25W, FIXED INPUT, ISOLATED & UNREGULATED DUAL/SINGLE OUTPUT DC-DC CONVERTER*

### FEATURES

Small Footprint
1KVDC Isolation
SIP Package
Internal SMD Construction
Temperature Range: -40°C to +85°C
No Heatsink Required
No External Component Required
Industry Standard Pinout
RoHS Compliance

### APPLICATIONS

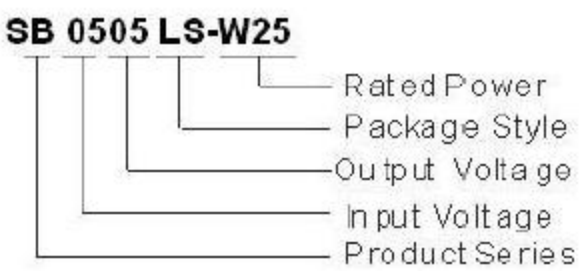
The A_S-W25 & B_LS-W25 Series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

1) Where the voltage of the input power supply is fixed (voltage variation ≤ ±10%);
2) Where isolation is necessary between input and output (isolation voltage ≤1000VDC);
3) Where the regulation of the output voltage and the output ripple noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits, and IGBT power device driving circuits.

### MODEL SELECTION




### PRODUCT PROGRAM

| Part Number | Input Voltage (VDC) Nominal | Input Voltage (VDC) Nominal | Output Voltage (VDC) | Output Current (mA) Max | Efficiency (%, Typ) |
|---|---|---|---|---|---|
| SB0303LS-W25* | 3.3 | 3.0-3.6 | 3.3 | 75.8 | 62 |
| SB0305LS-W25 | | | 5 | 50 | 65 |
| SA0505S- W25 | 5 | 4.5-5.5 | ±5 | ±25 | 62 |
| SA0509S- W25* | | | ±9 | ±13.8 | 64 |
| SA0512S- W25 | | | ±12 | ±10.4 | 66 |
| SA0515S- W25 | | | ±15 | ±8.3 | 65 |
| SB0505LS- W25 | | | 5 | 50 | 64 |
| SB0509LS- W25* | | | 9 | 27.8 | 65 |
| SB0512 LS- W25 | | | 12 | 20.8 | 67 |
| SB0515 LS- W25 | | | 15 | 16.7 | 65 |
| SA1205S- W25* | 12 | 10.8-13.2 | ±5 | ±25 | 62 |
| SA1209S- W25* | | | ±9 | ±13.8 | 63 |
| SA1212S- W25* | | | ±12 | ±10.4 | 64 |
| SA1215S- W25* | | | ±15 | ±8.3 | 65 |
| SB1203LS- W25* | | | 3.3 | 75.8 | 62 |
| SB1205 LS- W25 | | | 5 | 50 | 65 |
| SB1209LS- W25* | | | 9 | 27.8 | 66 |
| SB1212LS-W25 | | | 12 | 20.8 | 67 |
| SB1215LS-W25* | | | 15 | 16.7 | 66 |
| SA2405S- W25 | 24 | 21.6-26.4 | ±5 | ±25 | 63 |
| SA2409S- W25* | | | ±9 | ±13.8 | 64 |
| SA2412S- W25* | | | ±12 | ±10.4 | 65 |
| SA2415S- W25* | | | ±15 | ±8.3 | 65 |
| SB2405 LS- W25 | | | 5 | 50 | 63 |
| SB2409LS- W25* | | | 9 | 27.8 | 63 |
| SB2412LS- W25* | | | 12 | 20.8 | 65 |
| SB2415LS- W25* | | | 15 | 16.7 | 65 |
| SB2424LS- W25* | | | 24 | 10.4 | 64 |

*Designing.

### COMMON SPECIFICATIONS

| Item | Test conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Storage humidity | | | | 95 | % |
| Operating Temperature | | -40 | | 85 | °C |
| Storage Temperature | | -55 | | 125 | |
| Temp. rise at full load | | | 15 | 25 | |
| Lead temperature | 1.5mm from case for 10 seconds | | | 300 | |
| Short circuit protection* | | | | 1 | s |
| Cooling | | Free air convection | | | |
| Case material | | Plastic (UL94-V0) | | | |
| MTBF | | 3500 | | | K hours |
| Weight | | | 2.1 | | g |

*Supply voltage must be discontinued at the end of short circuit duration.

## ISOLATION SPECIFICATIONS

| Item | Test conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Isolation voltage | Tested for 1 minute and 1 mA max | 1000 | | | VDC |
| Isolation resistance | Test at 500VDC | 1000 | | | MΩ |

## OUTPUT SPECIFICATIONS

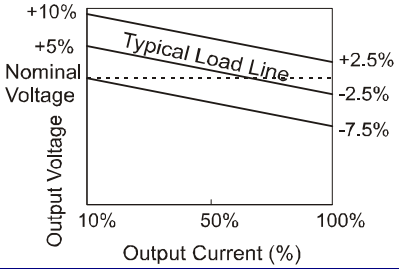
| Item | Test conditions | | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Output power | | | | | 0.25 | W |
| Line regulation | For Vin change of ±1% | (3.3V input) | | | ±1.5 | % |
| | | (Others input) | | | ±1.2 | |
| Load regulation | 10% to 100% load | (3.3V output) | | 12 | 20 | |
| | | (5V output) | | 10.5 | 15 | |
| | | (9V output) | | 8.3 | 15 | |
| | | (12V output) | | 6.8 | 15 | |
| | | (15V output) | | 6.3 | 15 | |
| Output voltage accuracy | | | See tolerance envelope graph | | | |
| Temperature drift | 100% full load | | | | 0.03 | %/°C |
| Ripple & Noise* | 20MHz Bandwidth | | | 50 | 75 | mVp-p |
| Switching frequency | Full load, nominal input | | | 100 | | KHz |

*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

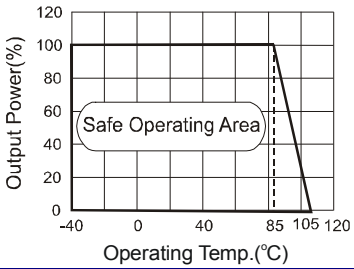
Note:
1. All specifications measured at $T_A$=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. See below recommended circuits for more details.
3. Dual output models unbalanced load: ±5%.

## TYPICAL CHARACTERISTICS

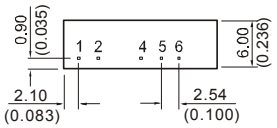
Tolerance Envelope Graph

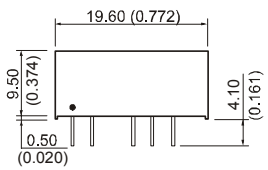



Temperature Derating Graph




## OUTLINE DIMENSIONS & PIN CONNECTIONS



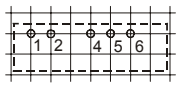




Note:
Unit:mm(inch)
Pin section:0.50*0.30mm(0.020*0.012inch)
Pin section tolerances:±0.10mm(±0.004inch)
General tolerances:±0.25mm (±0.010inch)

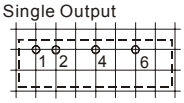
*First Angle Projection*

RECOMMENDED FOOTPRINT
*Top view,grid:2.54*2.54mm(0.1*0.1inch), diameter:1.00mm(0.039inch)*

Dual Output




Single Output




FOOTPRINT DETAILS

| Pin | Single | Dual |
|---|---|---|
| 1 | Vin | Vin |
| 2 | GND | GND |
| 4 | 0V | -Vo |
| 5 | No Pin | 0V |
| 6 | +Vo | +Vo |

## APPLICATION NOTE

**Requirement on output load**

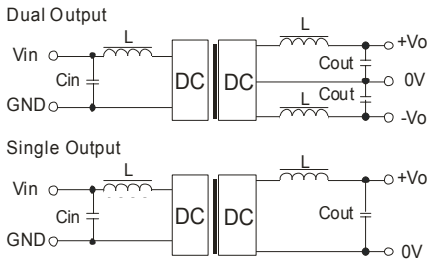
To ensure this module can operate efficiently and reliably, During operation, the minimum output load is not less than 10% of the full load, and that this product should never be operated under no load! If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load.

**Overload Protection**

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

**Recommended circuit**

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1).

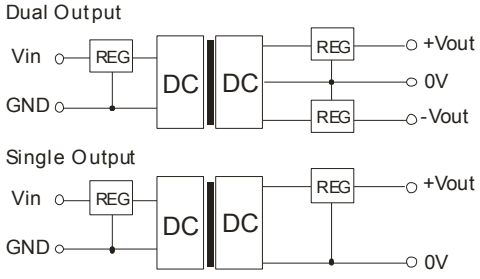



(Figure 1)

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. It's not recommended to connect any external capacitor in the application field.

**Output Voltage Regulation and Over-voltage Protection Circuit**

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Figure 2).




(Figure 2)

**No parallel connection or plug and play.**