



## 1 and 2 Watt SB Series DC/DC Converters

### Key Features

- Standard SIP Package
- High Density / Compact size
- Efficiencies up to 80%
- Thru Hole mounting
- 1000 VDC input/output isolation
- No derating to 71°C Operating Temperature



### Applications

- Distributed Power Systems
- Data-communications Equipment
- Telecommunications Equipment
- Computer Systems
- Industrial Control Systems

The "SB" Series of DC/DC converters feature 1 to 2 Watts of isolated power combining compact size and high efficiency. The small size of this 7 pin SIP package saves valuable board space in new product design. With single or dual outputs, the SB series is ideal for a variety of demanding requirements such as those found in the data-com/telecom, industrial control, computing, transportation, or office automation industries.

The size and pin out conform to internationally recognized packaging that is an industry standard. Operating from a nominal 5, 12, 24 or 48 VDC input source, this PCB mountable, low profile miniature converter provides single or dual unregulated, isolated outputs varying from 5 to 15VDC. It is designed to meet or exceed a variety of safety and emissions requirements including CE (LVD), EN 55022 "Class A", and UL 1950.

Reliability Incorporated also provides custom designed DC/DC Converters to meet customer specifications. Reliability Incorporated is based in Houston, Texas, USA and is a leading provider of semiconductor processing equipment and DC/DC converters. Corporate headquarters, located in Houston, TX, USA. DC/DC converters are manufactured in Costa Rica.

### General Electrical Specifications

(Specifications at Nominal Input and 25 C, nominal input voltage and rated output current unless otherwise noted.)

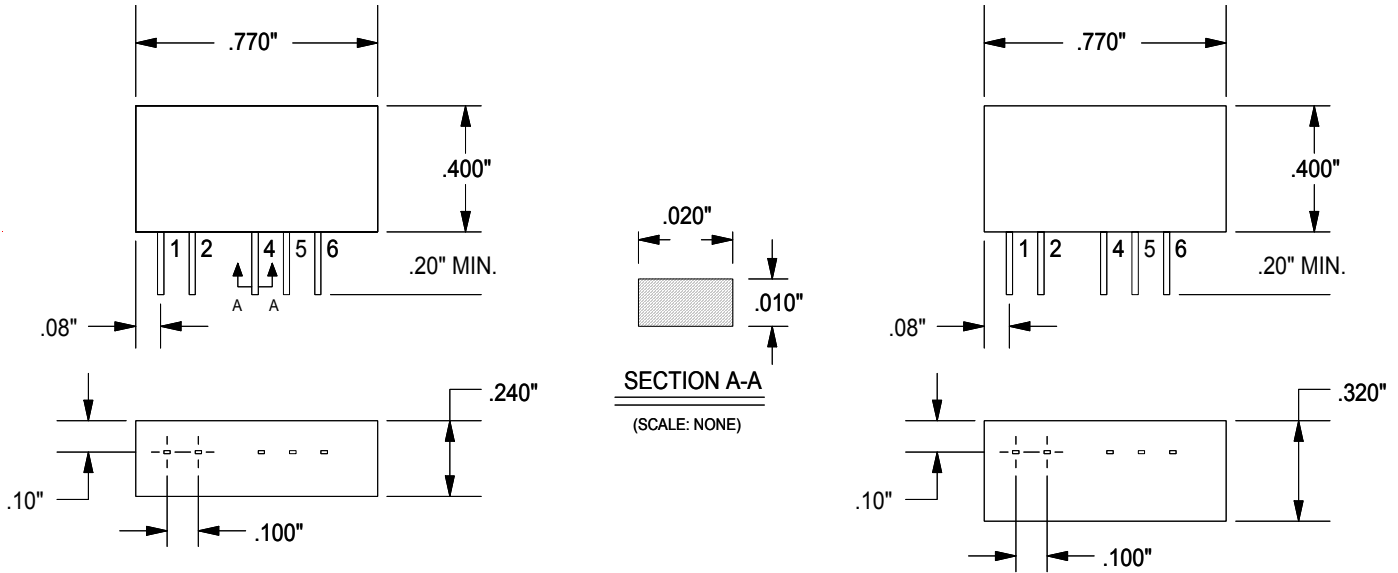
| Parameter                | Limits  | Conditions                             |
|--------------------------|---|--|
| Output Voltage Accuracy  | See selection guide column 4.                             | Nominal Line, Full Load                |
| Input / Output Isolation | 1000VDC   | For 60 seconds, 1500VDC SB24U20 only   |
| Minimum Load             | 10% of Full Load  |  |
| Output Ripple & Noise    | <100 mV Peak to Peak (max)                                | 20 MHz Bandwidth                       |
| Load Regulation          | 7% typical (varies by model, consult factory for details) | 10% to 100% of Full Load, Nominal Line |
| Line Regulation          | 1.2% output change per 1% input voltage change (max.)     | Full Load                              |
| Efficiency               | 75% typical   | Nominal Line                           |
| Operating Temperature    | -25° C to +85° C  | Ambient Temperature                    |
| Storage Temperature      | -55° C to 125° C  | Ambient Temperature                    |
| Temperature Coefficient  | ± 0.02%/°C  | Output VDC                             |
| Short Circuit Protection | Intermittent (<2 sec)                                     | Self Recovering                        |
| CE                       | LVD   |  |
| EMC / RFI                | Input Capacitor   |  |



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## Selection Guide

| Device Type | Input Voltage Range VDC | Input Current (A) Max Load | Output Voltage VDC | Max Output Current (A) | Product Style |
|-------------|-------------------------|----------------------------|--------------------|------------------------|---------------|
| SB5U5       | 4.75-5.25               | 0.267                      | 5.0 ±10%           | 0.200                  | 1S            |
| SB5U12      | 4.75-5.25               | 0.270                      | 12.0 ±10%          | 0.083                  | 1S            |
| SB5U15      | 4.75-5.25               | 0.270                      | 15.0 ±10%          | 0.067                  | 1S            |
| SB12U5      | 10.8-13.2               | 0.111                      | 5.0 ±10%           | 0.200                  | 1S            |
| SB12U12     | 10.8-13.2               | 0.111                      | 12.0 ±10%          | 0.083                  | 1S            |
| SB12U15     | 10.8-13.2               | 0.111                      | 15.0 ±10%          | 0.067                  | 1S            |
| SB24U5      | 21.6-26.4               | 0.056                      | 5.0 ±10%           | 0.200                  | 2S            |
| SB24U12     | 21.6-26.4               | 0.056                      | 12.0 ±10%          | 0.083                  | 2S            |
| SB24U15     | 21.6-26.4               | 0.056                      | 15.0 ±10%          | 0.067                  | 2S            |
| SB48U5      | 43.2-52.8               | 0.028                      | 5.0 ±10%           | 0.200                  | 2S            |
| SB48U12     | 43.2-52.8               | 0.028                      | 12.0 ±10%          | 0.083                  | 2S            |
| SB48U15     | 43.2-52.8               | 0.028                      | 15.0 ±10%          | 0.067                  | 2S            |
| SB5U5-5     | 4.75-5.25               | 0.267                      | ±5.0 ±10%          | ±0.100                 | 1D            |
| SB5U12-12   | 4.75-5.25               | 0.267                      | ±12.0 ±10%         | ±0.042                 | 1D            |
| SB5U15-15   | 4.75-5.25               | 0.267                      | ±15.0 ±10%         | ±0.033                 | 1D            |
| SB12U5-5    | 10.8-13.2               | 0.110                      | ±5.0 ±10%          | ±0.100                 | 1D            |
| SB12U12-12  | 10.8-13.2               | 0.110                      | ±12.0 ±10%         | ±0.042                 | 1D            |
| SB12U15-15  | 10.8-13.2               | 0.110                      | ±15.0 ±10%         | ±0.033                 | 4             |
| SB24U20     | 21.6-26.4               | 0.057                      | 20.0±5%            | .050                   | 2S            |
| SB24U5-5    | 21.6-26.4               | 0.056                      | ±5.0 ±10%          | ±0.100                 | 2D            |
| SB24U12-12  | 21.6-26.4               | 0.056                      | ±12.0 ±10%         | ±0.042                 | 2D            |
| SB24U15-15  | 21.6-26.4               | 0.056                      | ±15.0 ±10%         | ±0.033                 | 2D            |
| SB48U5-5    | 43.2-52.8               | 0.028                      | ±5.0 ±10%          | ±0.100                 | 2D            |
| SB48U12-12  | 43.2-52.8               | 0.028                      | ±12.0 ±10%         | ±0.042                 | 2D            |
| SB48U15-15  | 43.2-52.8               | 0.028                      | ±15.0 ±10%         | ±0.033                 | 2D            |
| 2SB5U9      | 4.9-5.1                 | 0.560                      | 9.0 ±3%            | 0.250                  | 3             |
| 2SB12U5     | 10.8-13.2               | 0.222                      | 5.0 ±10%           | 0.400                  | 2S            |
| 2SB12U9     | 11.64-12.36             | 0.250                      | 9.0 ±3%            | 0.250                  | 2S            |
| 2SB24U5-5   | 21.6-26.4               | 0.115                      | ±5.0 ±10%          | ±0.200                 | 2D            |
| 2SB24U9     | 21.6-26.4               | 0.125                      | 9.0 ±3%            | 0.250                  | 3             |
| 2SB24U15    | 21.6-26.4               | 0.125                      | 15.0 ±10%          | 0.133                  | 2S            |
| 2SB48U9     | 43.2-52.8               | 0.062                      | 9.0 ±10%           | 0.250                  | 2S            |
| 2SB5U9-9    | 4.75-5.25               | 0.520                      | ±9.0 ±10%          | ±0.110                 | 2D            |
| 2SB12U9-9   | 10.8-13.2               | 0.220                      | ±9.0 ±10%          | ±0.110                 | 2D            |
| 2SB12U12-12 | 10.8-13.2               | 0.220                      | ±12.0 ±10%         | ±0.080                 | 2D            |
| 2SB24U9-9   | 21.6-26.4               | 0.110                      | ±9.0 ±10%          | ±0.110                 | 2D            |
| 2SB48U9-9   | 43.2-52.8               | 0.055                      | ±9.0 ±10%          | ±0.110                 | 2D            |

**Mechanical Specification & Pin Connections (dimensions in inches)**


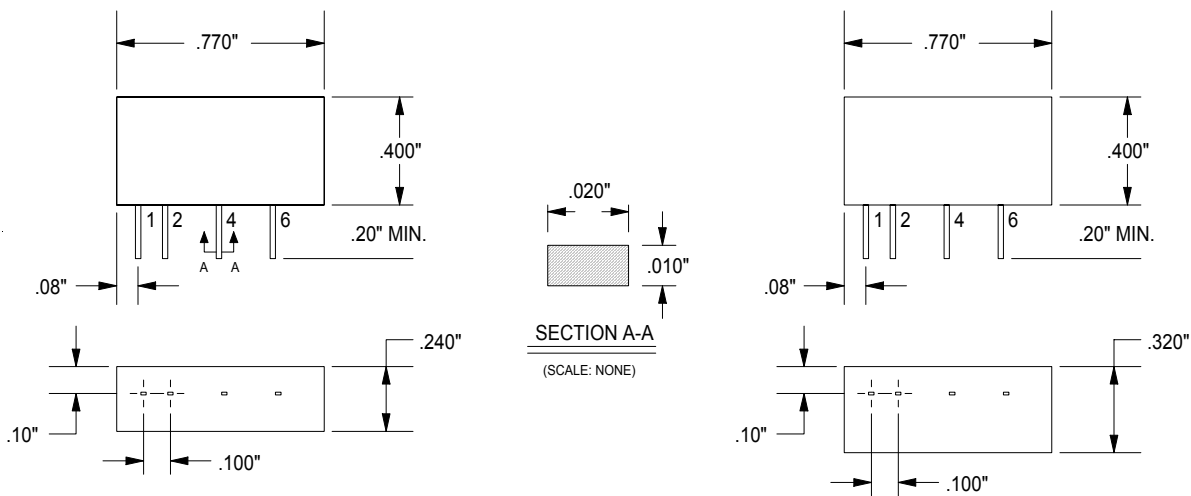
Tolerances: .XX ± 0.020" .XXX ± 0.010"

**Style 1D**

SB5U5-5      SB12U5-5  
 SB5U12-12    SB12U12-12  
 SB5U15-15

**Style 2D**

SB24U5-5      2SB5U9-9  
 SB24U12-12    2SB12U9-9  
 SB24U15-15    2SB24U5-5  
 SB48U5-5      2SB24U9-9  
 SB48U12-12    2SB48U9-9  
 SB48U15-15    2SB12U12-12

**Mechanical Specification & Pin Connections (dimensions in inches)**

**Style 1S**

SB5U5      SB12U5  
 SB5U12    SB12U12  
 SB5U15    SB12U15

**Style 2S**

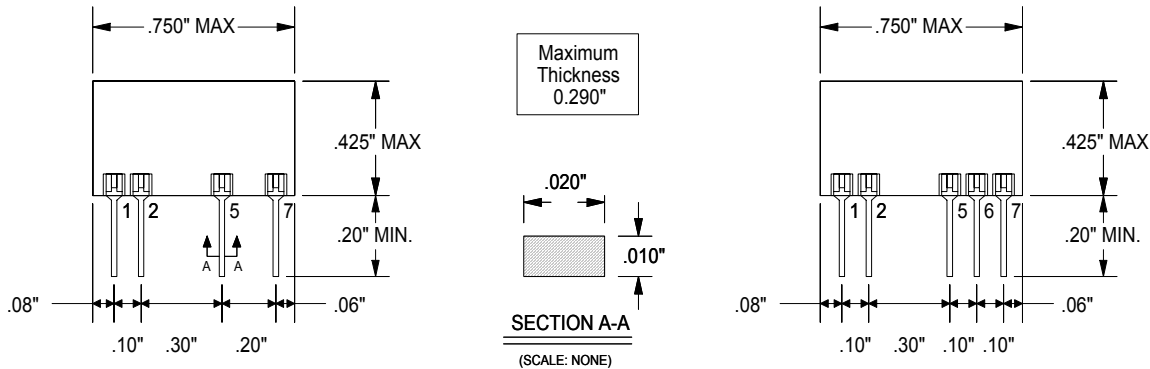
SB24U5      SB48U5      2SB12U5  
 SB24U12    SB48U12    2SB12U9  
 SB24U15    SB48U15    2SB24U15  
 SB24U20                            2SB48U9



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| Single Output |          | Dual Output Models |          |
|---------------|----------|--------------------|----------|
| 1             | + input  | 1                  | + input  |
| 2             | - input  | 2                  | - input  |
| 4             | - output | 4                  | - output |
| 6             | + output | 5                  | com      |
|               |          | 6                  | + output |

## Alternative Pin Connections & Mechanical Dimensions (dimensions in inches)



### Style 3\*

2SB5U9  
2SB24U9

### Style 4\*

SB12U15-15

\* Styles 3 and 4 are coated, not potted in shells.

| Single Output |          | Dual Output Models |          |
|---------------|----------|--------------------|----------|
| 1             | + input  | 1                  | + input  |
| 2             | - input  | 2                  | - input  |
| 5             | - output | 5                  | - output |
| 7             | + output | 6                  | com      |
|               |          | 7                  | + output |

| Reliability Incorporated Locations  |   |  |
|---|---|--|
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