

### FEATURES

- ◆ Efficiency up to 83%
- ◆ SMD Package with Industry Standard Pinout
- ◆ Isolation Voltage 1500VDC
- ◆ 2:1 Wide Input Range
- ◆ Low ripple and noise
- ◆ Short Circuit Protection
- ◆ Temperature Performance -40°C to +71°C
- ◆ CSA60950-1 Safety Approval
- ◆ > 1MHours MTBF
- ◆ Lead free, RoHs Compliant
- ◆ 3 Years Product Warranty



The SE03S/D series are miniature, SMD Package, isolated 3W DC/DC converters with 1,500VDC isolation. The SE03S/D series features fully regulated output and ultra wide 2:1 input voltage ranges. It offers short circuit protection and allows a wide operating temperature range of -40°C to +71°C. These isolated DC/DC converters are the latest offering from a world leader in power systems technology and manufacturing — Delta Electronics, Inc.

### Model List

| Model Number | Input Voltage (Range)<br>VDC | Output Voltage<br>VDC | Output Current |            | Input Current          |                      | Reflected Ripple Current<br>mA(typ.) | Max. capacitive Load<br>uF | Efficiency (typ.)<br>@Max. Load<br>% |
|--------------|------------------------------|-----------------------|----------------|------------|------------------------|----------------------|--------------------------------------|----------------------------|--------------------------------------|
|              |                              |                       | Max.<br>mA     | Min.<br>mA | @Max. Load<br>mA(typ.) | @No Load<br>mA(typ.) |                                      |                            |                                      |
|              |                              |                       |                |            |                        |                      |                                      |                            |                                      |
| SE03S1203A   | 12<br>(9 ~ 18)               | 3.3                   | 700            | 70         | 257                    | 20                   | 25                                   | 4700                       | 75                                   |
| SE03S1205A   |                              | 5                     | 600            | 60         | 316                    |                      |                                      |                            | 79                                   |
| SE03S1212A   |                              | 12                    | 250            | 25         | 305                    |                      |                                      |                            | 82                                   |
| SE03S1215A   |                              | 15                    | 200            | 20         | 305                    |                      |                                      |                            | 82                                   |
| SE03D1205A   |                              | ±5                    | ±300           | ±30        | 321                    |                      |                                      | 180*                       | 78                                   |
| SE03D1212A   |                              | ±12                   | ±125           | ±12.5      | 309                    |                      |                                      |                            | 81                                   |
| SE03D1215A   |                              | ±15                   | ±100           | ±10        | 309                    |                      |                                      |                            | 81                                   |
| SE03S2403A   | 24<br>(18 ~ 36)              | 3.3                   | 700            | 70         | 127                    | 5                    | 15                                   | 4700                       | 76                                   |
| SE03S2405A   |                              | 5                     | 600            | 60         | 156                    |                      |                                      |                            | 80                                   |
| SE03S2412A   |                              | 12                    | 250            | 25         | 151                    |                      |                                      |                            | 83                                   |
| SE03S2415A   |                              | 15                    | 200            | 20         | 151                    |                      |                                      |                            | 83                                   |
| SE03D2405A   |                              | ±5                    | ±300           | ±30        | 158                    |                      |                                      | 180*                       | 79                                   |
| SE03D2412A   |                              | ±12                   | ±125           | ±12.5      | 152                    |                      |                                      |                            | 82                                   |
| SE03D2415A   |                              | ±15                   | ±100           | ±10        | 152                    |                      |                                      |                            | 82                                   |
| SE03S4803A   | 48<br>(36 ~ 75)              | 3.3                   | 700            | 70         | 63                     | 3                    | 10                                   | 4700                       | 76                                   |
| SE03S4805A   |                              | 5                     | 600            | 60         | 78                     |                      |                                      |                            | 80                                   |
| SE03S4812A   |                              | 12                    | 250            | 25         | 75                     |                      |                                      |                            | 83                                   |
| SE03S4815A   |                              | 15                    | 200            | 20         | 75                     |                      |                                      |                            | 83                                   |
| SE03D4805A   |                              | ±5                    | ±300           | ±30        | 79                     |                      |                                      | 180*                       | 79                                   |
| SE03D4812A   |                              | ±12                   | ±125           | ±12.5      | 76                     |                      |                                      |                            | 82                                   |
| SE03D4815A   |                              | ±15                   | ±100           | ±10        | 76                     |                      |                                      |                            | 82                                   |

\* For each output

## Input Characteristics

| Parameter                         | Model            | Min.      | Typ. | Max. | Unit |
|-----------------------------------|------------------|-----------|------|------|------|
| Input Surge Voltage (1 sec. max.) | 12V Input Models | -0.7      | ---  | 25   | VDC  |
|                                   | 24V Input Models | -0.7      | ---  | 50   |      |
|                                   | 48V Input Models | -0.7      | ---  | 100  |      |
| Start-Up Voltage                  | 12V Input Models | 4.5       | 6    | 8    |      |
|                                   | 24V Input Models | 8         | 12   | 18   |      |
|                                   | 48V Input Models | 16        | 24   | 36   |      |
| Under Voltage Shutdown            | 12V Input Models | ---       | ---  | 8    |      |
|                                   | 24V Input Models | ---       | ---  | 16   |      |
|                                   | 48V Input Models | ---       | ---  | 32   |      |
| Reverse Polarity Input Current    | All Models       | ---       | ---  | 0.5  | A    |
| Short Circuit Input Power         |                  | ---       | ---  | 1500 | mW   |
| Input Filter                      |                  | Pi Filter |      |      |      |
| Internal Power Dissipation        |                  | ---       | ---  | 2500 | mW   |

## Output Characteristics

| Parameter                    | Conditions                  | Min.       | Typ.  | Max.  | Unit              |
|------------------------------|-----------------------------|------------|-------|-------|-------------------|
| Output Voltage Accuracy      |                             | ---        | ±0.5  | ±1.0  | %                 |
| Output Voltage Balance       | Dual Output, Balanced Loads | ---        | ±0.5  | ±2.0  | %                 |
| Line Regulation              | Vin=Min. to Max.            | ---        | ±0.1  | ±0.3  | %                 |
| Load Regulation              | Io=10% to 100%              | ---        | ±0.3  | ±1.0  | %                 |
| Ripple & Noise (20MHz)       |                             | ---        | 50    | 75    | mV <sub>P-P</sub> |
| Ripple & Noise (20MHz)       | Over Line, Load & Temp.     | ---        | ---   | 100   | mV <sub>P-P</sub> |
| Ripple & Noise (20MHz)       |                             | ---        | ---   | 10    | mV rms            |
| Transient Recovery Time      | 25% Load Step Change        | ---        | 200   | 500   | uS                |
| Transient Response Deviation |                             | ---        | ±2    | ±6    | %                 |
| Temperature Coefficient      |                             | ---        | ±0.01 | ±0.02 | %/°C              |
| Short Circuit Protection     |                             | Continuous |       |       |                   |

## General Characteristics

| Parameter                        | Conditions                        | Min.      | Typ. | Max. | Unit  |
|----------------------------------|-----------------------------------|-----------|------|------|-------|
| I/O Isolation Voltage (rated)    | 60 Seconds                        | 1500      | ---  | ---  | VDC   |
| I/O Isolation Resistance         | 500 VDC                           | 1000      | ---  | ---  | MΩ    |
| I/O Isolation Capacitance        | 100KHz, 1V                        | ---       | 65   | 100  | pF    |
| Switching Frequency              |                                   | ---       | 300  | ---  | KHz   |
| MTBF (calculated)                | MIL-HDBK-217F@25°C, Ground Benign | 1,000,000 | ---  | ---  | Hours |
| Moisture Sensitivity Level (MSL) | IPC/JEDEC J-STD-020D              | Level 2   |      |      |       |

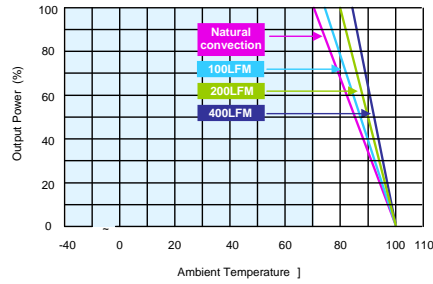
## Recommended Input Fuse

| 12V Input Models     | 24V Input Models     | 48V Input Models     |
|----------------------|----------------------|----------------------|
| 750mA Slow-Blow Type | 350mA Slow-Blow Type | 200mA Slow-Blow Type |

## Environmental Specifications

| Parameter                                     | Conditions          | Min. | Max. | Unit     |
|---|---------------------|------|------|----------|
| Operating Temperature Range (with Derating)   | Ambient             | -40  | +85  | °C       |
| Case Temperature                              |                     | ---  | +90  | °C       |
| Storage Temperature Range                     |                     | -50  | +125 | °C       |
| Humidity (non condensing)                     |                     | ---  | 95   | % rel. H |
| Cooling                                       | Free-Air convection |      |      |          |
| Lead Temperature (1.5mm from case for 10Sec.) |                     | ---  | 260  | °C       |

## Power Derating Curve



## Notes

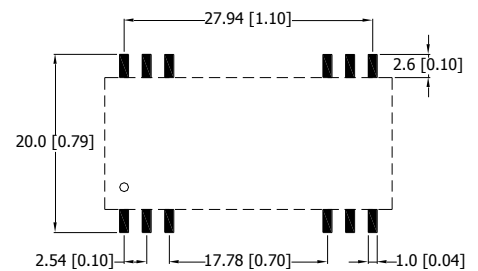
- 1 Specifications typical at  $T_a=+25^{\circ}\text{C}$ , resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%
- 3 Ripple & Noise measurement bandwidth is 0-20MHz.
- 4 These power converters require a minimum output loading to maintain specified regulation, operation under no-load conditions will not damage these modules; however they may not meet all specifications listed.
- 5 All DC/DC converters should be externally fused at the front end for protection.
- 6 Specifications subject to change without notice.
- 7 It is not recommended to use water-washing process on SMT units.

## Mechanical Drawing

### Mechanical Dimensions



### Connecting Pin Patterns



- ▶ All dimensions in mm (inches)
- ▶ Tolerance:  $X.X \pm 0.25$  ( $X.XX \pm 0.01$ )  
 $X.XX \pm 0.13$  ( $X.XXX \pm 0.005$ )
- ▶ Pins  $\pm 0.05$  ( $\pm 0.002$ )

### Pin Connections

| Pin        | Single Output | Dual Output |
|------------|---------------|-------------|
| 1,2        | -Vin          | -Vin        |
| 3,11,14,22 | NC            | NC          |
| 10         | NC            | Common      |
| 12         | NC            | -Vout       |
| 13         | +Vout         | +Vout       |
| 15         | -Vout         | Common      |
| 23,24      | +Vin          | +Vin        |

NC : No Connection

### Physical Characteristics

|               |  |
|---------------|--|
| Case Size     | : 32.3x14.8x10.2mm (1.27x0.58x0.4 Inches)                          |
| Case Material | : Non-Conductive Black Plastic<br>(flammability to UL 94V-0 rated) |
| Weight        | : 8.8g   |



## Part Numbering System

| S           | E             | 03    | S                 | 12            | 05             | A                  |
|-------------|---------------|-------|-------------------|---------------|----------------|--------------------|
| Form factor | Family series | Watt  | Number of Outputs | Input Voltage | Output Voltage | Option Code        |
| D-DIP       | A-Z           | 01:1W | S - Single        | 03:3.3V       | 03:3.3V        | A - Std. Functions |
| P-SIP       |               | 02:2W | D- Dual           | 05: 5V        | 05: 5V         |                    |
| S-SMD       |               | 03:3W |                   | 12:12V        | 12:12V         |                    |
|             |               | 04:4W |                   | 24: 24V       | 15: 15V        |                    |
|             |               | 06:6W |                   | 48:48V        | 24: 24V        |                    |

### WARRANTY

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А