

## Series AM1SS-NZ

### 1 Watt | DC-DC Converter



#### FEATURES:

- Unregulated
- 4 Pin SIP Package
- Low ripple and noise
- High efficiency up to 82%
- Operating temperature -40°C to +105°C
- Input / Output isolation 1500 VDC
- Pin compatible with multiple manufacturers
- Continuous Short Circuit Protection



#### Models

##### Single output

| Model             | Input Voltage (VDC) | Output Voltage (VDC) | Output Current max (mA) | Isolation (VDC) | Max. Capacitive Load (µF) | Efficiency (%) |
|-------------------|---------------------|----------------------|-------------------------|-----------------|---------------------------|----------------|
| AM1SS-0303S-NZ ‡* | 2.97-3.63           | 3.3                  | 303                     | 1500            | 220                       | 72             |
| AM1SS-0305S-NZ ‡  | 2.97-3.63           | 5                    | 200                     | 1500            | 220                       | 76             |
| AM1SS-0312S-NZ ‡  | 2.97-3.63           | 12                   | 84                      | 1500            | 220                       | 80             |
| AM1SS-0503S-NZ*   | 4.5-5.5             | 3.3                  | 303                     | 1500            | 220                       | 72             |
| AM1SS-0503S-JZ*   | 4.5-5.5             | 3.3                  | 303                     | 1500            | 2400                      | 74             |
| AM1SS-0505S-NZ    | 4.5-5.5             | 5                    | 200                     | 1500            | 220                       | 80             |
| AM1SS-0505S-JZ*   | 4.5-5.5             | 5                    | 200                     | 1500            | 2400                      | 82             |
| AM1SS-0509S-NZ    | 4.5-5.5             | 9                    | 111                     | 1500            | 220                       | 80             |
| AM1SS-0509S-JZ*   | 4.5-5.5             | 9                    | 111                     | 1500            | 1000                      | 83             |
| AM1SS-0512S-NZ    | 4.5-5.5             | 12                   | 84                      | 1500            | 220                       | 81             |
| AM1SS-0512S-JZ*   | 4.5-5.5             | 12                   | 84                      | 1500            | 560                       | 83             |
| AM1SS-0515S-NZ    | 4.5-5.5             | 15                   | 67                      | 1500            | 220                       | 81             |
| AM1SS-0515S-JZ*   | 4.5-5.5             | 15                   | 67                      | 1500            | 560                       | 83             |
| AM1SS-0524S-NZ ‡  | 4.5-5.5             | 24                   | 42                      | 1500            | 220                       | 81             |
| AM1SS-0524S-JZ*   | 4.5-5.5             | 24                   | 42                      | 1500            | 220                       | 85             |
| AM1SS-1203S-NZ*   | 10.8-13.2           | 3.3                  | 303                     | 1500            | 220                       | 72             |
| AM1SS-1205S-NZ    | 10.8-13.2           | 5                    | 200                     | 1500            | 220                       | 80             |
| AM1SS-1209S-NZ    | 10.8-13.2           | 9                    | 110                     | 1500            | 220                       | 80             |
| AM1SS-1212S-NZ    | 10.8-13.2           | 12                   | 83                      | 1500            | 220                       | 81             |
| AM1SS-1215S-NZ    | 10.8-13.2           | 15                   | 67                      | 1500            | 220                       | 80             |
| AM1SS-1224S-NZ    | 10.8-13.2           | 24                   | 42                      | 1500            | 220                       | 80             |
| AM1SS-1515S-NZ*   | 13.5-16.5           | 15                   | 67                      | 1500            | 220                       | 81             |
| AM1SS-2403S-NZ ‡* | 21.6-26.4           | 3.3                  | 303                     | 1500            | 220                       | 72             |
| AM1SS-2405S-NZ ‡  | 21.6-26.4           | 5                    | 200                     | 1500            | 220                       | 80             |
| AM1SS-2409S-NZ ‡  | 21.6-26.4           | 9                    | 110                     | 1500            | 220                       | 80             |
| AM1SS-2412S-NZ ‡  | 21.6-26.4           | 12                   | 83                      | 1500            | 220                       | 81             |
| AM1SS-2415S-NZ ‡  | 21.6-26.4           | 15                   | 67                      | 1500            | 220                       | 82             |
| AM1SS-2424S-NZ ‡  | 21.6-26.4           | 24                   | 42                      | 1500            | 220                       | 82             |

‡ With Momentary short circuit protection of 1 second

#### Input Specifications

| Parameters                        | Conditions         | Typical   | Maximum | Units |
|-----------------------------------|--------------------|-----------|---------|-------|
| Voltage range                     | Nominal 3.3V input | 2.97-3.63 |         | VDC   |
|                                   | Nominal 5 input    | 4.5-5.5   |         |       |
|                                   | Nominal 12 input   | 10.8-13.2 |         |       |
|                                   | Nominal 15 input   | 13.5-16.5 |         |       |
|                                   | Nominal 24 input   | 21.6-26.4 |         |       |
| Absolute Max Rating (1 sec. max.) | Nominal 3.3 input  |           | 5       | VDC   |
|                                   | Nominal 5 input    |           | 9       |       |
|                                   | Nominal 12 input   |           | 18      |       |
|                                   | Nominal 15 input   |           | 21      |       |
|                                   | Nominal 24 input   |           | 30      |       |

|                          |                                      |    |    |    |
|--------------------------|--------------------------------------|----|----|----|
| Input no load current    | 3.3V output models with suffix NZ    | 30 | 70 | mA |
|                          | 5V output models with suffix NZ      | 20 | 60 |    |
|                          | 12V output models with suffix NZ     | 15 | 50 |    |
|                          | 15V output models with suffix NZ     | 10 | 35 |    |
|                          | 24V output models with suffix NZ     | 17 | 30 |    |
|                          | 3.3V/5V output models with suffix JZ | 5  | 10 |    |
|                          | 9V/12V output models with suffix JZ  | 12 | 20 |    |
|                          | 15V/24V output models with suffix JZ | 18 | 30 |    |
| Reflected Ripple Current |                                      | 15 |    | mA |
| Filter                   | Capacitor                            |    |    |    |
| Hot Plug                 | Unavailable                          |    |    |    |

Note: Reflected ripple current testing method please see DC-DC Converter Application Notes for specific operation.

### Isolation Specifications

| Parameters         | Conditions | Typical | Rated | Units |
|--------------------|------------|---------|-------|-------|
| Tested I/O voltage | 60 sec     |         | 1500  | VDC   |
| Resistance         |            | > 1000  |       | MOhm  |
| Capacitance        |            | 20      |       | pF    |

### Output Specifications

| Parameters   | Conditions  | Typical   | Maximum                      | Units    |
|--|---|---|------------------------------|----------|
| Voltage accuracy   | See tolerance graph                                   | ±5  |                              | %        |
| Short Circuit protection                                 |   | Continuous, unless marked with ‡  |                              |          |
| Line voltage regulation                                  | For 1.0% Vin, 3.3V Model<br>For 1.0% Vin, Other Model |   | ±1.5<br>±1.2                 | % of Vin |
| Load voltage regulation                                  | 10 – 100% load for parts with suffix NZ               | 3.3V output<br>5V output<br>9V output<br>12V output<br>15V output<br>24V output | 18<br>12<br>8<br>7<br>6<br>5 | %        |
|  | 10 – 100% load for parts with suffix JZ               | 3.3V output<br>5V output<br>9V output<br>12V output<br>15V output<br>24V output | 15<br>10<br>8<br>7<br>6<br>5 |          |
| Temperature coefficient                                  |   | ±0.03   |                              | %/°C     |
| Temperature coefficient (for part number with suffix JZ) |   | ±0.02   |                              | %/°C     |
| Ripple & Noise   | At 20 MHz Bandwidth                                   | 60  | 150                          | mV p-p   |
| Ripple & Noise (for part number with suffix JZ)          | At 20 MHz Bandwidth                                   | Other Model<br>24V Model  | 30<br>75<br>100              | mV p-p   |

### General Specifications

| Parameters   | Conditions                  | Typical     | Maximum | Units |
|--|-----------------------------|-------------|---------|-------|
| Switching frequency                                  | 100% load                   | 100-300     |         | KHz   |
| Switching frequency (for part number with suffix JZ) | 100% load                   | 270         |         | KHz   |
| Operating temperature                                | Derating Above 85°C         | -40 to +105 |         | °C    |
| Storage temperature                                  |                             | -55 to +125 |         | °C    |
| Maximum case temperature                             |                             |             | 125     | °C    |
| Cooling  | Free air convection         |             |         |       |
| Humidity   | Non condensing              |             | 95      | %     |
| Soldering Lead Temperature                           | 1.5mm from Lead, for 10 Sec |             | 300     | °C    |
| Case material  | Plastic UL94-V0             |             |         |       |
| Weight   |                             | 1.3         |         | g     |

|                        |  |                         |
|------------------------|--|-------------------------|
| Dimensions (L x H x W) | 0.46 x 0.4 x 0.24 inches                           | 11.60 x 10.16 x 6.00 mm |
| MTBF                   | >3500K hrs(MIL-HDBK -217F, Ground Benign, t=+25°C) |                         |

NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified.

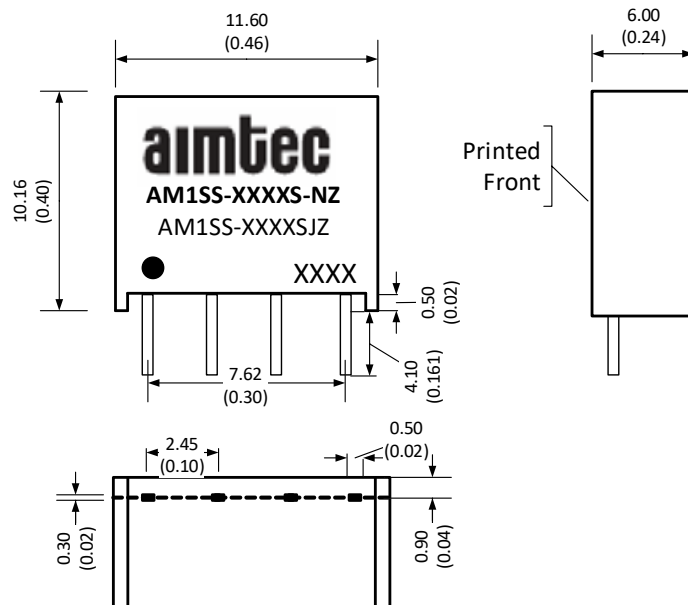
### Safety Specifications

| Parameters       |                                  |  |
|------------------|----------------------------------|--|
| Agency approvals | cULus                            |  |
| Standards        | Information technology Equipment | UL 60950-1 (except the models marked with *)             |
|                  |                                  | Design to meet UL 62368 (for part number with suffix JZ) |

### Pin Out Specifications

| Pin | Single    |
|-----|-----------|
| 1   | - V Input |
| 2   | +V Input  |
| 3   | -V Output |
| 4   | +V Output |

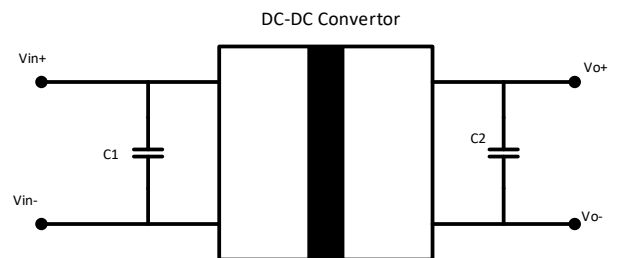
### Dimensions for part number with suffix JZ



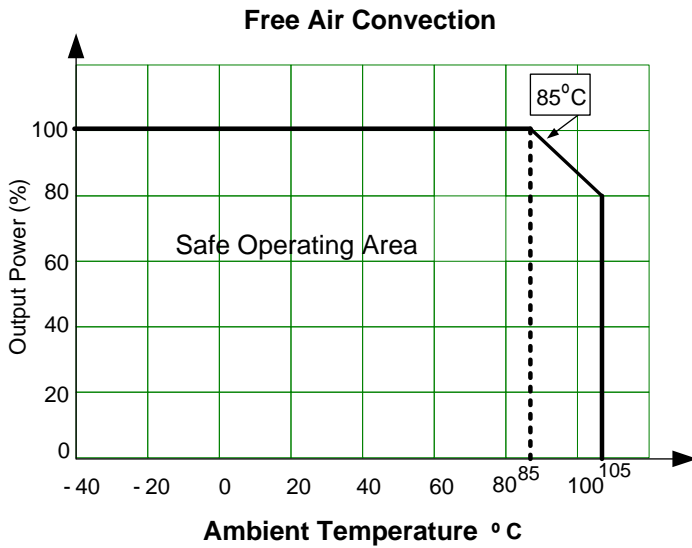
### Typical Application Circuit

#### Capacitor selection Table

| V <sub>in</sub>                | C1     | Single VDC | C2      |
|--------------------------------|--------|------------|---------|
| 3.3                            | 4.7 μF | 3.3 V      | 10 μF   |
| 5                              | 4.7 μF | 5 V        | 10μF    |
| 12                             | 2.2μF  | 9 V        | 4.7 μF  |
| 15                             | 2.2μF  | 12 V       | 2.2μF   |
| 24                             | 1μF    | 15 V       | 1μF     |
|                                |        | 24V        | 0.47 μF |
| for part number with suffix JZ |        | 9 V        | 2.2 μF  |
|                                |        | 24 V       | 1μF     |

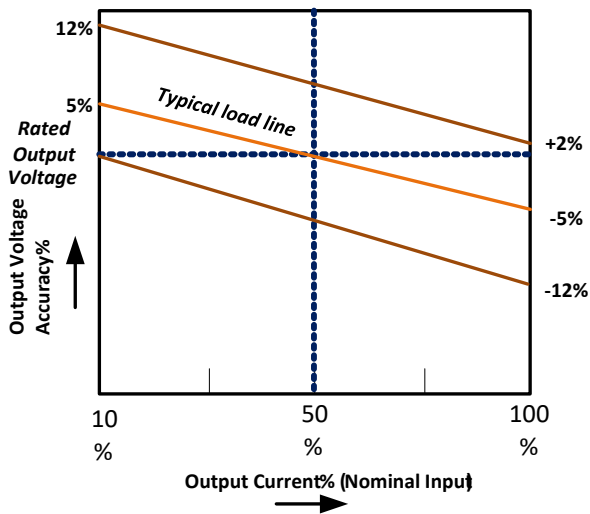


**Derating**

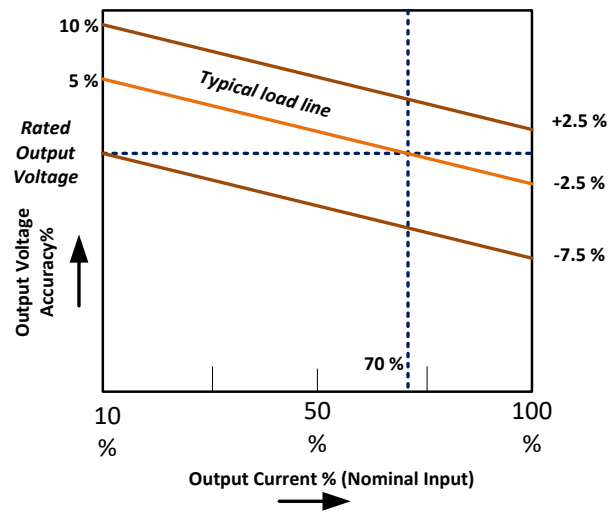


**Typical Characteristics**

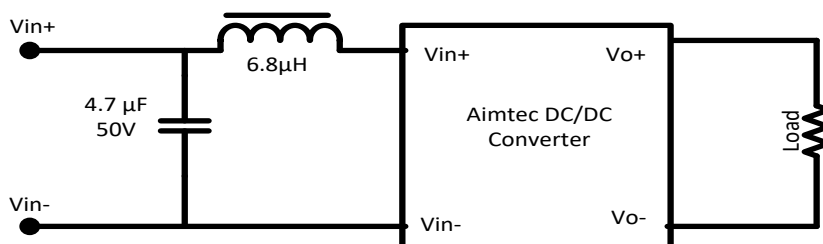
**AM1SS-0503SJZ**



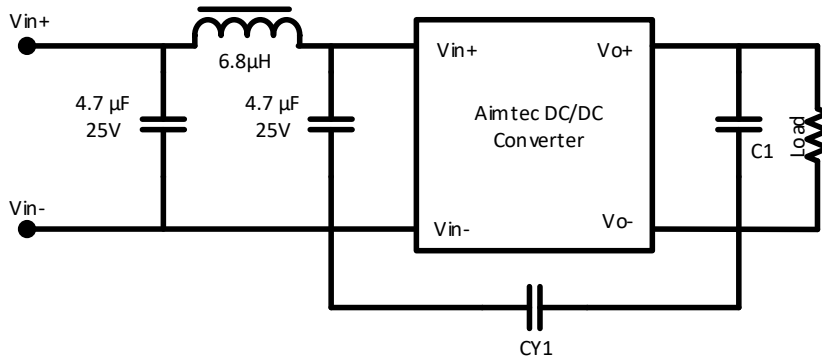
**Other Model**



**Recommended Circuit for EMI Class B**



**Recommended Circuit for EMI Class B (for part numbers with suffix JZ)**



| Single VDC | C1    | CY1  |
|------------|-------|--|
| 3.3 V      | 10 µF | N/C  |
| 5 V        |       |  |
| 9 V        | 2.2µF | 1nF / 4KVDC<br>VISHAY HGZ102MBP<br>TDK CD45-E2GA102M-GKA |
| 12 V       |       |  |
| 15 V       | 1µF   | 1nF / 4KVDC<br>VISHAY HGZ102MBP<br>TDK CD45-E2GA102M-GKA |
| 24V        |       |  |

**NOTE: 1.** Datasheets are updated as needed and as such, specifications are subject to change without notice. Once printed or downloaded, datasheets are no longer controlled by Aimtec; refer to [www.aimtec.com](http://www.aimtec.com) for the most current product specifications. **2.** Product labels shown, including safety agency certifications on labels, may vary based on the date manufactured. **3.** Mechanical drawings and specifications are for reference only. **4.** All specifications are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified. **5.** Aimtec may not have conducted destructive testing or chemical analysis on all internal components and chemicals at the time of publishing this document. CAS numbers and other limited information are considered proprietary and may not be available for release. **6.** This product is not designed for use in critical life support systems, equipment used in hazardous environments, nuclear control systems or other such applications which necessitate specific safety and regulatory standards other than the ones listed in this datasheet. **7.** Warranty is in accordance with Aimtec's standard Terms of Sale available at [www.aimtec.com](http://www.aimtec.com).