

## Series AM1M-NZ

### 1 Watt | DC-DC Converter



#### FEATURES:

- Low Profile DIP14 case
- 1.5 and 3K VDC I/O Isolation
- Continuous Short circuit protection
- Operating Temperature: -40°C to +105°C
- High Power Density
- Low Isolation Capacitance



#### Models Single output

| Model            | Input Voltage (V) | Max Input Current Full/No Load (mA) | Output Voltage (V) | Full load Output max Current (mA) | Isolation (VDC) | Maximum Capacitive Load (μF) | Efficiency (%) |
|------------------|-------------------|-------------------------------------|--------------------|-----------------------------------|-----------------|------------------------------|----------------|
| AM1M-0505S-NZ    | 4.5-5.5           | 250/25                              | 5                  | 200                               | 1500            | 220                          | 74             |
| AM1M-0512S-NZ    | 4.5-5.5           | 271/30                              | 12                 | 83                                | 1500            | 220                          | 77             |
| AM1M-0515S-NZ    | 4.5-5.5           | 271/30                              | 15                 | 67                                | 1500            | 220                          | 76             |
| AM1M-1205S-NZ    | 10.8-13.2         | 115/15                              | 5                  | 200                               | 1500            | 220                          | 73             |
| AM1M-0303SH30-NZ | 2.97-3.63         | 420/30                              | 3.3                | 303                               | 3000            | 220                          | 72             |
| AM1M-0503SH30-NZ | 4.5-5.5           | 256/20                              | 3.3                | 303                               | 3000            | 220                          | 75             |
| AM1M-0505SH30-NZ | 4.5-5.5           | 256/20                              | 5                  | 200                               | 3000            | 220                          | 80             |
| AM1M-0512SH30-NZ | 4.5-5.5           | 256/20                              | 12                 | 83                                | 3000            | 220                          | 80             |
| AM1M-0515SH30-NZ | 4.5-5.5           | 256/20                              | 15                 | 67                                | 3000            | 220                          | 81             |
| AM1M-1205SH30-NZ | 10.8-13.2         | 106/15                              | 5                  | 200                               | 3000            | 220                          | 80             |
| AM1M-1212SH30-NZ | 10.8-13.2         | 106/15                              | 12                 | 83                                | 3000            | 220                          | 80             |
| AM1M-1215SH30-NZ | 10.8-13.2         | 106/15                              | 15                 | 67                                | 3000            | 220                          | 81             |
| AM1M-1515SH30-NZ | 13.5-16.5         | 84/10                               | 15                 | 67                                | 3000            | 220                          | 80             |
| AM1M-2405SH30-NZ | 21.6-26.4         | 54/7                                | 5                  | 200                               | 3000            | 220                          | 79             |

#### Models Dual output

| Model            | Input Voltage (V) | Max Input current Full/No Load (mA) | Output Voltage (V) | Full load Output max Current (mA) | Isolation (VDC) | Maximum Capacitive Load (μF) | Efficiency (%) |
|------------------|-------------------|-------------------------------------|--------------------|-----------------------------------|-----------------|------------------------------|----------------|
| AM1M-0505D-NZ    | 4.5-5.5           | 256/25                              | ±5                 | ±100                              | 1500            | 100                          | 80             |
| AM1M-0509D-NZ    | 4.5-5.5           | 256/25                              | ±9                 | ±56                               | 1500            | 100                          | 80             |
| AM1M-0512D-NZ    | 4.5-5.5           | 256/25                              | ±12                | ±42                               | 1500            | 100                          | 80             |
| AM1M-0515D-NZ    | 4.5-5.5           | 256/25                              | ±15                | ±34                               | 1500            | 100                          | 81             |
| AM1M-0524D-NZ    | 4.5-5.5           | 256/25                              | ±24                | ±21                               | 1500            | 100                          | 80             |
| AM1M-1205D-NZ    | 10.8-13.2         | 106/15                              | ±5                 | ±100                              | 1500            | 100                          | 80             |
| AM1M-1212D-NZ    | 10.8-13.2         | 106/15                              | ±12                | ±42                               | 1500            | 100                          | 80             |
| AM1M-1224D-NZ    | 10.8-13.2         | 106/15                              | ±24                | ±21                               | 1500            | 100                          | 81             |
| AM1M-1524D-NZ    | 13.5-16.5         | 82/12                               | ±24                | ±21                               | 1500            | 100                          | 81             |
| AM1M-2409D-NZ    | 21.6-26.4         | 54/7                                | ±9                 | ±56                               | 1500            | 100                          | 80             |
| AM1M-2412D-NZ    | 21.6-26.4         | 54/7                                | ±12                | ±42                               | 1500            | 100                          | 80             |
| AM1M-2415D-NZ    | 21.6-26.4         | 54/7                                | ±15                | ±34                               | 1500            | 100                          | 80             |
| AM1M-0505DH30-NZ | 4.5-5.5           | 256/20                              | ±5                 | ±100                              | 3000            | 100                          | 79             |
| AM1M-0512DH30-NZ | 4.5-5.5           | 256/20                              | ±12                | ±42                               | 3000            | 100                          | 80             |
| AM1M-0515DH30-NZ | 4.5-5.5           | 256/20                              | ±15                | ±34                               | 3000            | 100                          | 81             |
| AM1M-1205DH30-NZ | 10.8-13.2         | 106/15                              | ±5                 | ±100                              | 3000            | 100                          | 80             |
| AM1M-2412DH30-NZ | 21.6-26.4         | 54/7                                | ±12                | ±42                               | 3000            | 100                          | 81             |
| AM1M-2415DH30-NZ | 21.6-26.4         | 54/7                                | ±15                | ±34                               | 3000            | 100                          | 80             |

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.

### Input Specifications

| Parameters                            | Nominal   | Typical   | Maximum   | Units  |
|---------------------------------------|-----------|-----------|-----------|--------|
| Voltage range                         | 3.3       | 2.97-3.63 |           | VDC    |
|                                       | 5         | 4.5-5.5   |           |        |
|                                       | 12        | 10.8-13.2 |           |        |
|                                       | 15        | 13.5-16.5 |           |        |
|                                       | 24        | 21.6-26.4 |           |        |
| Absolute Max Input Voltage<br>(100ms) | 3.3V      |           | -0.7 - 5  | VDC    |
|                                       | 5V        |           | -0.7 - 9  |        |
|                                       | 12V       |           | -0.7 - 18 |        |
|                                       | 15V       |           | -0.7 - 21 |        |
|                                       | 24V       |           | -0.7 - 30 |        |
| Filter                                | Capacitor |           |           |        |
| Input reflected ripple current        |           | 15        |           | mA p-p |

### Isolation Specifications

| Parameters            | Conditions                                       | Typical | Rated      | Units |
|-----------------------|--------------------------------------------------|---------|------------|-------|
| Tested I/O voltage    | 60 Sec, <1mA                                     |         | 1500, 3000 | VDC   |
| Isolation Resistance  | 500Vdc                                           | >1000   |            | MOhm  |
| Isolation Capacitance | 100KHz/0.1V                                      | 20      |            | pF    |
|                       | AM1M-0512S-NZ, AM1M-0515S-NZ, AM1M-1205S-NZ only | 25      |            |       |

### Output Specifications

| Parameters               | Conditions                           | Typical                   | Maximum | Units    |
|--------------------------|--------------------------------------|---------------------------|---------|----------|
| Voltage accuracy         | See tolerance envelope graph         |                           |         |          |
| Short Circuit protection | 3.3Vin, 24Vin & 24Vout models        | 1s                        |         |          |
|                          | Others                               | Continuous, Auto recovery |         |          |
| Line voltage regulation  | For Vin change of 1%                 |                           | ±1.2    | % of Vin |
|                          | 3.3Vout models, For Vin change of 1% |                           | ±1.5    |          |
| Load voltage regulation  | 10% to 100% load                     | ±15                       |         | %        |
| Temperature coefficient  | Nominal input, 100% full load        |                           | ±0.03   | %/°C     |
| Ripple & Noise           | 20MHz Bandwidth                      | 60                        | 150     | mVp-p    |

NOTE: It is not recommended to have the outputs connected in parallel

### General Specifications

| Parameters                    | Conditions                                                                                                                                                              | Typical     | Maximum | Units |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------|-------|
| Switching frequency           | 100% load                                                                                                                                                               | 100         |         | KHz   |
|                               | AM1M-0505S-NZ                                                                                                                                                           | 100         | 300     |       |
| Operating temperature         | Without derating up to 85°C                                                                                                                                             | -40 to +105 |         | °C    |
| Storage temperature           | -55 to +125                                                                                                                                                             |             |         | °C    |
| Maximum case temperature      |                                                                                                                                                                         |             | 100     | °C    |
| Cooling                       | Free Air Convection                                                                                                                                                     |             |         |       |
| Humidity                      |                                                                                                                                                                         |             | 95      | % RH  |
| Case material                 | Black flame-retardant heat-proof plastic (UL94-V0)                                                                                                                      |             |         |       |
| Weight                        | 1.4*(Single output models)                                                                                                                                              |             |         | g     |
|                               | 2.4*(Dual output & 3000VDC isolation models)                                                                                                                            |             |         |       |
| Dimensions (L x W x H)        | 0.77 x 0.28 x 0.18 inches, 19.50 x 6.60 x 4.50 mm (Single output models)<br>0.79 x 0.39 x 0.28 inches, 20.00 x 10.00 x 7.00 mm (Dual output & 3000VDC isolation models) |             |         |       |
| MTBF                          | >3,500,000 hours (MIL-HDBK -217F, Ground Benign, t=+25°C)                                                                                                               |             |         |       |
| Maximum Soldering Temperature | 1.5mm from case for 10 seconds                                                                                                                                          |             | 300     | °C    |

### Safety Specifications

| Parameters |                                                      |
|------------|------------------------------------------------------|
| Standards  | EN55022 Class B (see recommended circuit)            |
|            | IEC61000-4-2, Perf. Criteria B (ESD Contact +/- 6KV) |

## Pin Out Specifications

| 1500VDC Isolation |        |
|-------------------|--------|
| Pin               | Single |
| 1                 | +Vin   |
| 2                 | -Vin   |
| 5                 | -Vout  |
| 6                 | +Vout  |
| 7                 | NC     |
| 8                 | NC     |
| 14                | NC     |

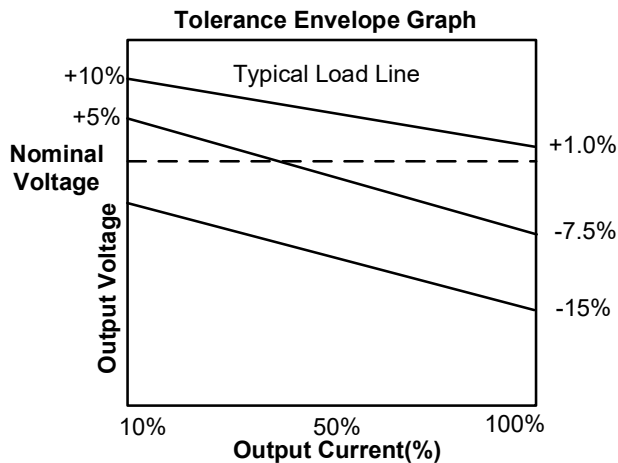
| 1500VDC Isolation |        |
|-------------------|--------|
| Pin               | Dual   |
| 1                 | -Vin   |
| 7                 | NC     |
| 8                 | Common |
| 9                 | +Vout  |
| 11                | -Vout  |
| 14                | +Vin   |

| 3000VDC Isolation |        |        |
|-------------------|--------|--------|
| Pin               | Single | Dual   |
| 1                 | -Vin   | -Vin   |
| 7                 | NC     | NC     |
| 8                 | +Vout  | +Vout  |
| 9                 | No Pin | Common |
| 10                | -Vout  | -Vout  |
| 14                | +Vin   | +Vin   |

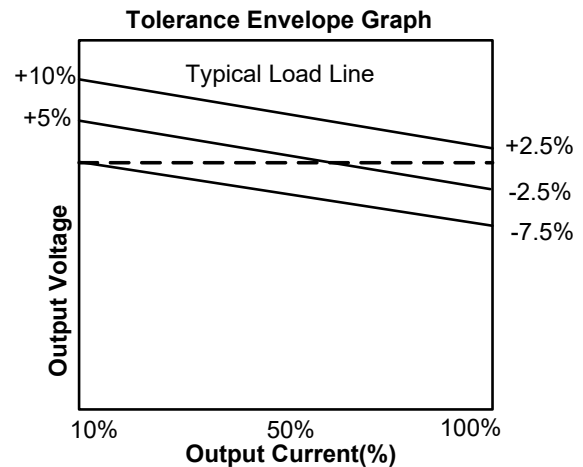
NC: not connected

## Typical Characteristics

### 3.3V output models

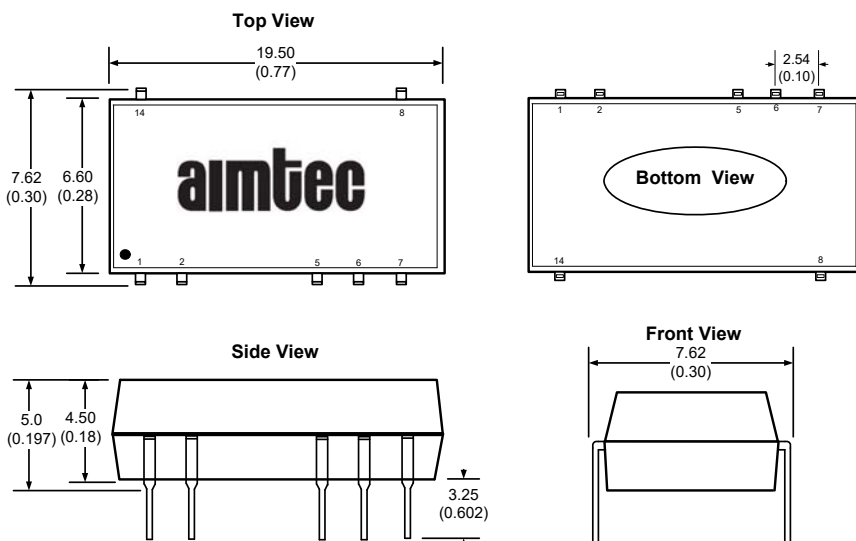


### Others

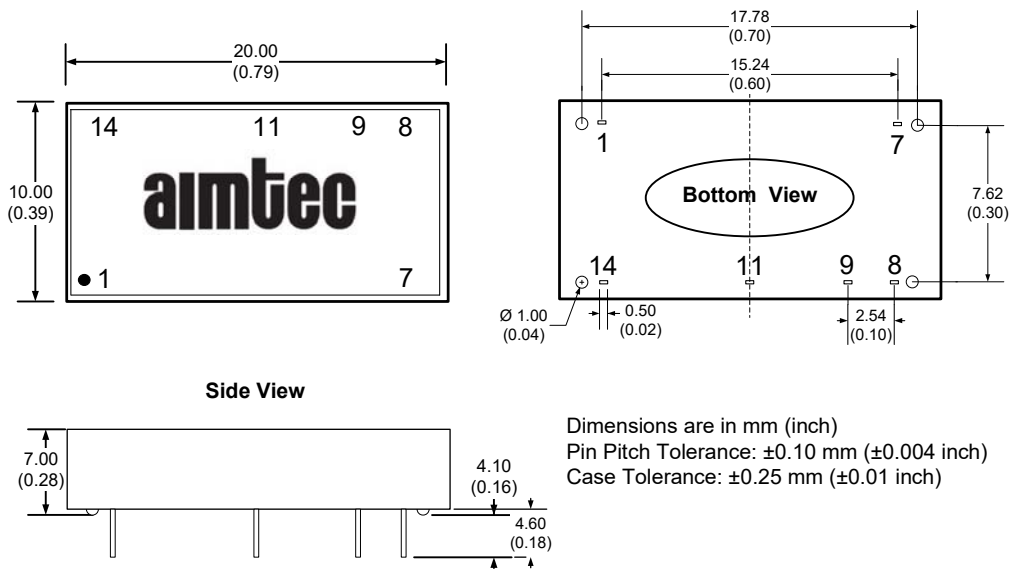


## Dimensions

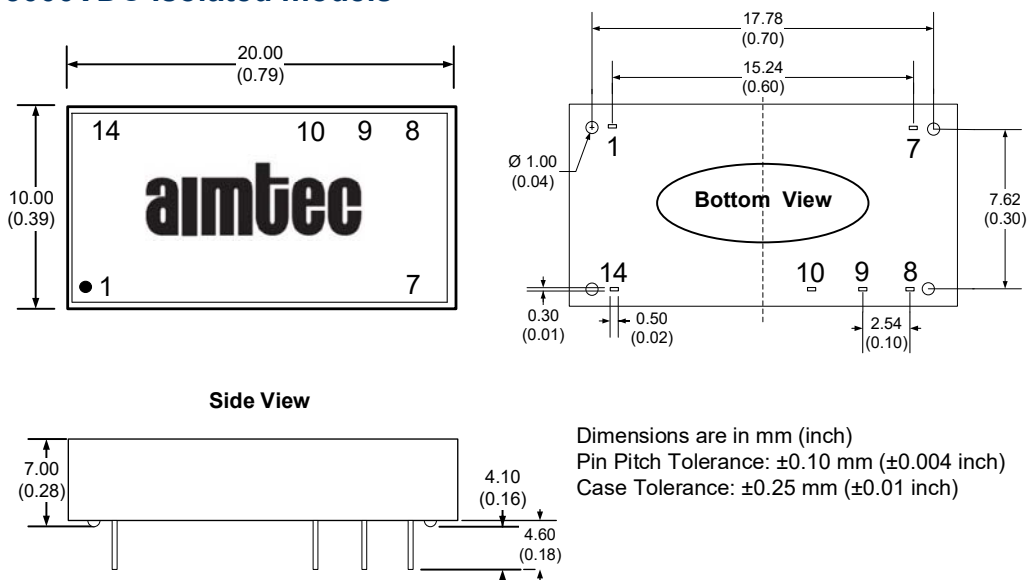
### Single 1500VDC Isolated models



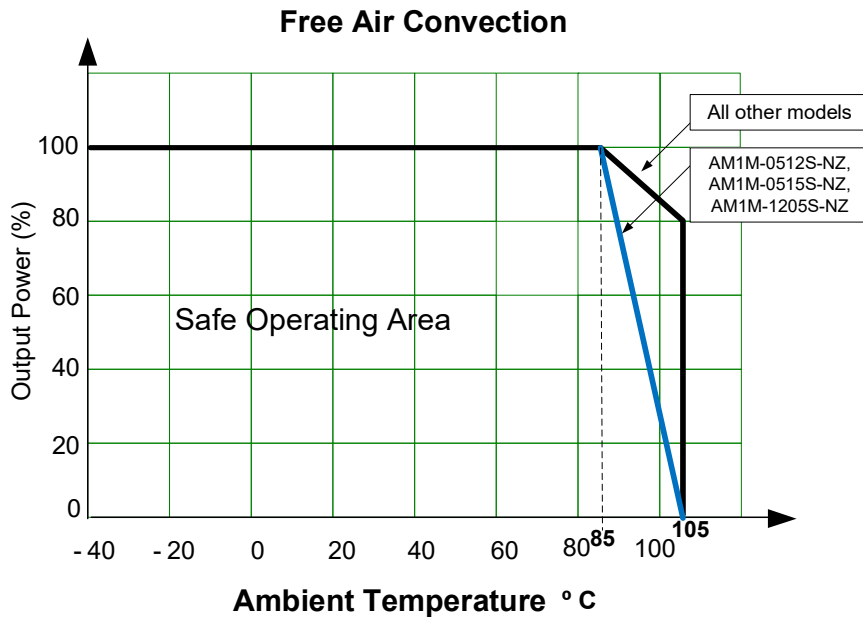
## Dual 1500VDC Isolated models



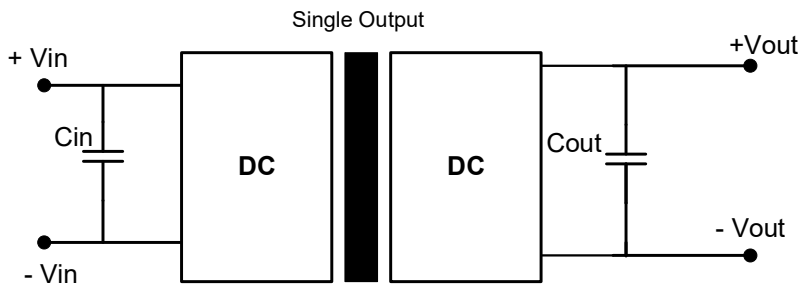
## 3000VDC Isolated models



## Derating

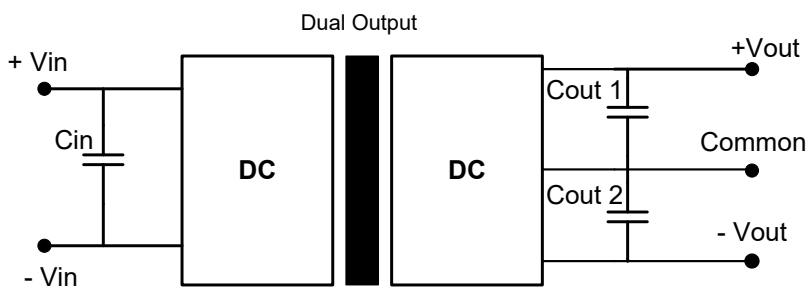


## Typical application circuit



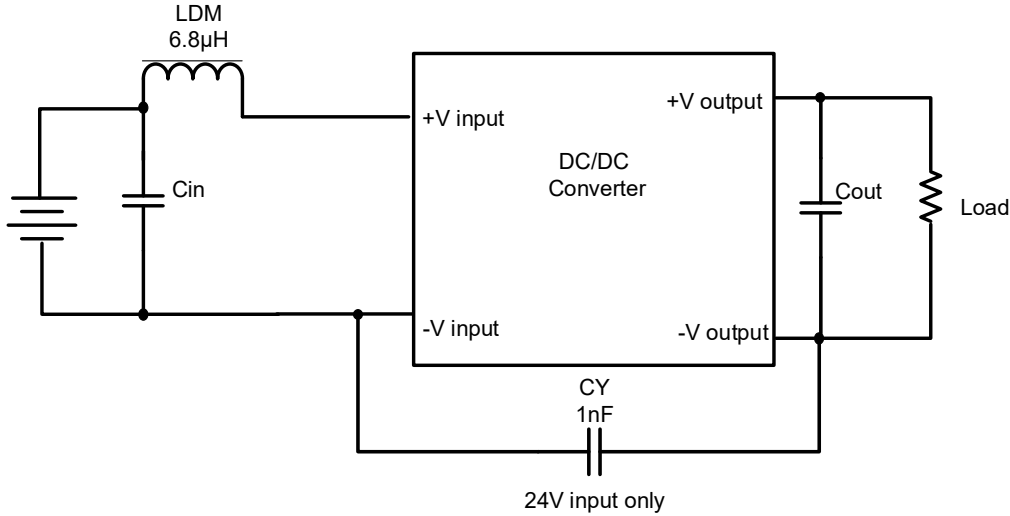
| Vin (VDC) | Cin (uF) | Vout (VDC) | Cout (uF) |
|-----------|----------|------------|-----------|
| 3.3/5     | 4.7      | 3.3/5      | 10        |
| 12/15     | 2.2      | 12         | 2.2       |
| 24        | 1        | 15         | 1         |

It is not recommended to connect any external capacitor in the application field when output loading is less than 0.5 watt.



| Vin (VDC) | Cin (uF) | Vout (VDC) | Cout 1 & 2 (uF) |
|-----------|----------|------------|-----------------|
| 3.3/5     | 4.7      | ±5         | 4.7             |
| 12/15     | 2.2      | ±9/±12     | 1               |
| 24        | 1        | ±15/±24    | 0.47            |

## EMI Recommended Circuit (Class B)



NOTE: Cin and Cout values are the same as referenced in the Application Circuit.

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