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AM1LS-VZ



SMD

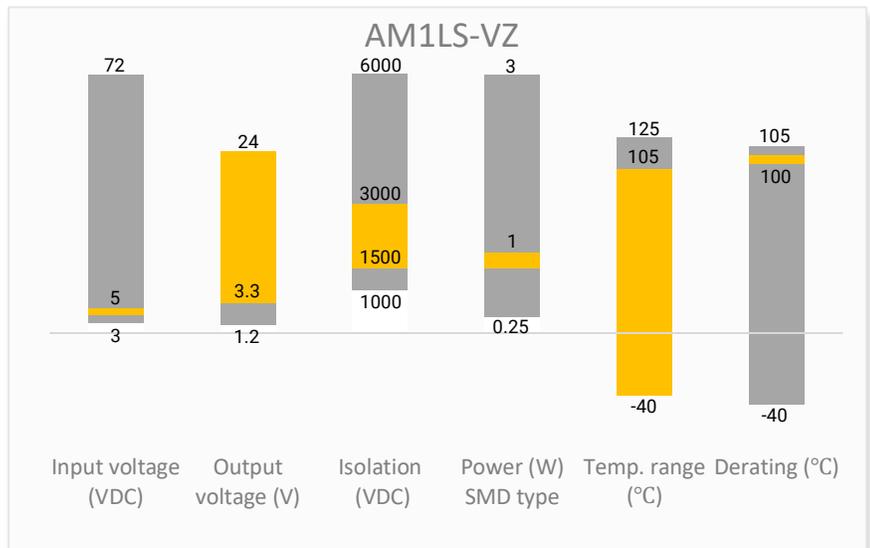
The new AM1LS-VZ is a DC/DC converter that is a direct replacement to the AM1L-NZ. Offering much greater cost effectiveness due to material normalization and production automation which increases the reliability and performance of this new component. Offering a commercial input voltage range of 5VDC and an output voltage range from 3.3-24V, this series will offer many benefits to your new system design.

This new series offers great operating temperatures, from -40°C to 105°C with full power up to 100°C. It also features an isolation of 1500VDC or 3000VDC for improved reliability and system safety. Furthermore, a higher MTBF of 3500,000h and output short circuit protection (OSCP) come standard with the series. The AM1LS-VZ is perfect for information technology, instrumentation, communication and civil applications.

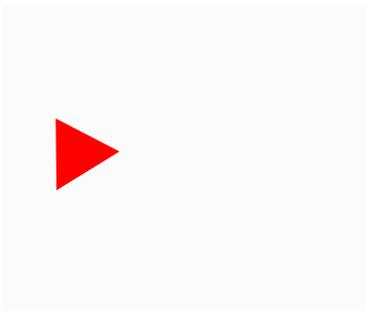
Features

- No load input current as low as 5mA
- Operating Temp: -40 °C to +105 °C
- High I/O isolation voltage : 1500 to 3000 VDC
- Output short circuit protection
- High efficiency up to 85%
- SMD type package, Industry standard pin-out

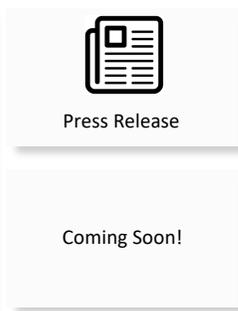
Summary



Training



Product Training Video
(click to open)



Application Notes

Applications



IoT



Industrial



Telecom



Instrumentation

Models & Specifications

Single Output

| Model | Input Voltage (VDC) | Output Voltage (VDC) | Input Current Max (mA) | | Output Current Max (mA) | Isolation (VDC) | Maximum Capacitive Load (μF) | Efficiency (%) Full Load Typ. |
|------------------|---------------------|----------------------|------------------------|-----------|-------------------------|-----------------|------------------------------|-------------------------------|
| | | | No Load | Full Load | | | | |
| AM1LS-0503SVZ | 5 (4.5 ~ 5.5) | 3.3 | 10 | 286 | 303 | 1500 | 2400 | 74 |
| AM1LS-0505SVZ | 5 (4.5 ~ 5.5) | 5 | 10 | 286 | 200 | 1500 | 2400 | 82 |
| AM1LS-0509SVZ | 5 (4.5 ~ 5.5) | 9 | 20 | 254 | 111 | 1500 | 1000 | 83 |
| AM1LS-0512SVZ | 5 (4.5 ~ 5.5) | 12 | 20 | 254 | 84 | 1500 | 560 | 83 |
| AM1LS-0503SH30VZ | 5 (4.5 ~ 5.5) | 3.3 | 10 | 286 | 303 | 3000 | 2400 | 74 |
| AM1LS-0505SH30VZ | 5 (4.5 ~ 5.5) | 5 | 10 | 286 | 200 | 3000 | 2400 | 82 |
| AM1LS-0509SH30VZ | 5 (4.5 ~ 5.5) | 9 | 20 | 254 | 111 | 3000 | 1000 | 83 |
| AM1LS-0512SH30VZ | 5 (4.5 ~ 5.5) | 12 | 20 | 254 | 84 | 3000 | 560 | 83 |
| AM1LS-0515SH30VZ | 5 (4.5 ~ 5.5) | 15 | 30 | 254 | 67 | 3000 | 560 | 83 |
| AM1LS-0524SH30VZ | 5 (4.5 ~ 5.5) | 24 | 30 | 254 | 42 | 3000 | 220 | 85 |

Dual Output

| Model | Input Voltage (VDC) | Output Voltage (VDC) | Input Current Max (mA) | | Output Current Max (mA) | Isolation (VDC) | Maximum Capacitive Load (μF) | Efficiency (%) Full Load Typ. |
|------------------|---------------------|----------------------|------------------------|-----------|-------------------------|-----------------|------------------------------|-------------------------------|
| | | | No Load | Full Load | | | | |
| AM1LS-0503DH30VZ | 5 (4.5 ~ 5.5) | ± 3.3 | 10 | 286 | ± 151 | 3000 | 1200 | 74 |
| AM1LS-0505DH30VZ | 5 (4.5 ~ 5.5) | ± 5 | 10 | 286 | ± 100 | 3000 | 1200 | 82 |
| AM1LS-0509DH30VZ | 5 (4.5 ~ 5.5) | ± 9 | 20 | 254 | ± 56 | 3000 | 470 | 83 |
| AM1LS-0512DH30VZ | 5 (4.5 ~ 5.5) | ± 12 | 20 | 254 | ± 42 | 3000 | 220 | 83 |
| AM1LS-0515DH30VZ | 5 (4.5 ~ 5.5) | ± 15 | 30 | 254 | ± 34 | 3000 | 220 | 83 |
| AM1LS-0524DH30VZ | 5 (4.5 ~ 5.5) | ± 24 | 30 | 254 | ± 21 | 3000 | 100 | 85 |

Input Specification

| Parameters | Conditions | Typical | Maximum | Units |
|--------------------------------|------------|-----------|---------|-------|
| Voltage range | 5 | 4.5 – 5.5 | | VDC |
| Filter | Capacitor | | | |
| Absolute maximum rating | 1 sec, max | | 9 | VDC |
| Input reflected ripple current | | 15 | | mA |

Output Specification

| Parameters | Conditions | Typical | Maximum | Units |
|------------------|------------------------------|-------------------|---------|-------|
| Voltage accuracy | See Typical Characteristic | | | |
| Line regulation | Input voltage change : 1% | 3.3V output model | 1.5 | % |
| | | Others | 1.2 | |

| | | | | | |
|--|-----------------|-------------------|-------|-----|----------|
| Load regulation | 10 ~ 100% load | 3.3V output model | 15 | 20 | % |
| | | 5V output model | 10 | 15 | |
| | | 9V output model | 8 | 10 | |
| | | 12V output model | 7 | 10 | |
| | | 15V output model | 6 | 10 | |
| | | 24V output model | 5 | 10 | |
| Temperature coefficient | Full load | | ±0.02 | | %/°C |
| Ripple & Noise | 20MHz bandwidth | Others | 30 | 75 | mV pk-pk |
| | | 24V output model | 50 | 100 | |
| Note: Please refer to application notes for Ripple & Noise test information. | | | | | |

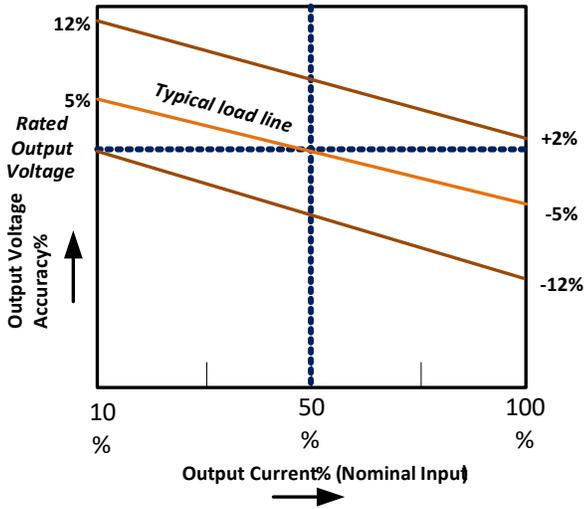
| Isolation Specification | | | | |
|-------------------------|--------------------------------------|-------------|---------|-------|
| Parameters | Conditions | Typical | Maximum | Units |
| Tested I/O voltage | 60 sec, 1mA max | 1500 / 3000 | | VDC |
| Resistance | Input to output resistance at 500Vdc | >1000 | | MOhm |
| Capacitance | Input to output, 100KHz/0.1V | 20 | | pF |

| General Specifications | | | | |
|---|---|---|---------|-------|
| Parameters | Conditions | Typical | Maximum | Units |
| Switching frequency | Full load, nominal input voltage | 270 | | KHz |
| Operating temperature | See derating graph | -40 to +105 | | °C |
| Storage temperature | | -55 to +125 | | °C |
| Case temperature rise | Ta = 25°C | 3.3V output mode | 25 | °C |
| | | Others | 15 | |
| Maximum case temperature | | | 95 | °C |
| Reflow Temperature | Maximum duration ≤60s over 217°C. | | 245 | °C |
| Lead-free reflow solder process | IPC/JEDEC J-STD-020D.1 | | | |
| Short circuit protection | Continuous, auto-recovery | | | |
| Cooling | Free air convection | | | |
| Humidity | Non-condensing | | 95 | % RH |
| Case material | Heat resistant black Plastic (flammability to UL 94V-0) | | | |
| Weight | 1.3 | | | g |
| Dimensions (L x W x H) | 1500VDC isolated models | 0.52 x 0.45 x 0.29inches (13.20 x 11.40 x 7.25mm) | | |
| | 3000VDC isolated models | 0.60 x 0.45 x 0.29inches (15.24 x 11.40 x 7.25mm) | | |
| MTBF | > 3 500 000 hrs (MIL-HDBK -217F, t=+25°C) / Full Load | | | |
| Moisture sensitivity level (MSL) | IPC/JEDEC J-STD-020D.1 | Level 1 | | |
| 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. | | | | |

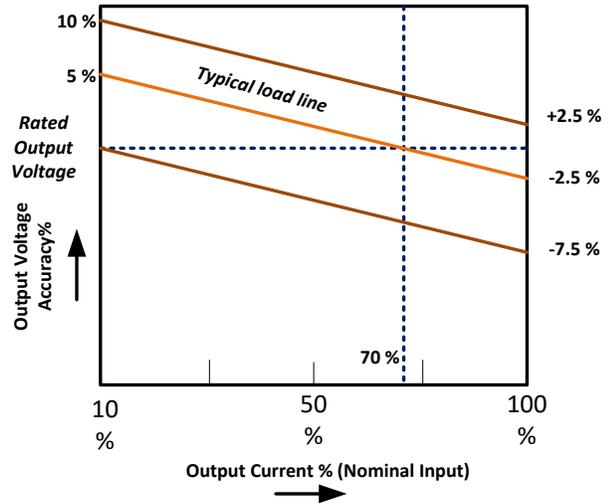
| Safety Specifications | | |
|-----------------------|---|---|
| Parameters | | |
| Standards | Design to meet IEC62368/UL62368/EN62368 | |
| | EMC - Conducted and radiated emission | CISPR32/EN55032, Class B with recommended circuit |
| | Electrostatic Discharge Immunity | IEC 61000-4-2 Air ±8KV, Contact ±4KV, Criteria B |

Typical Characteristic

3.3V output models

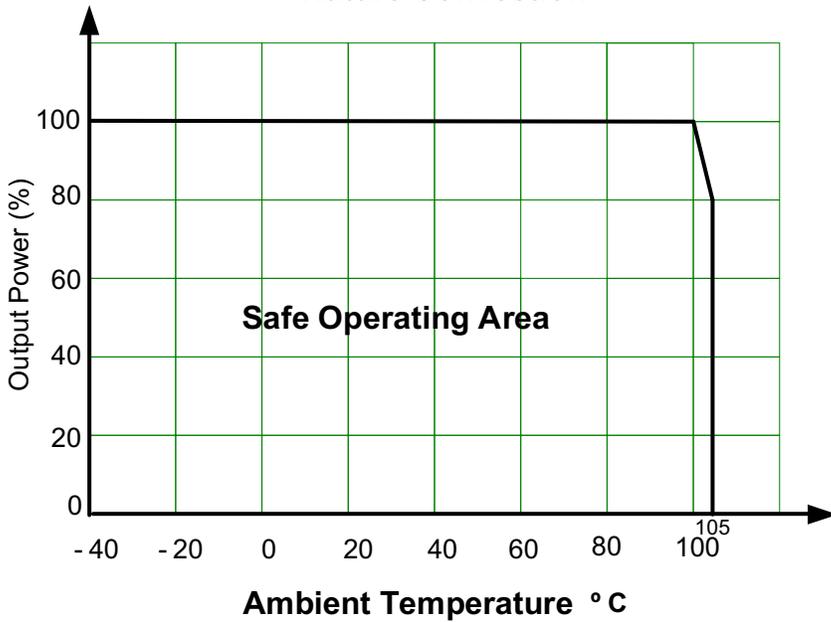


Other models

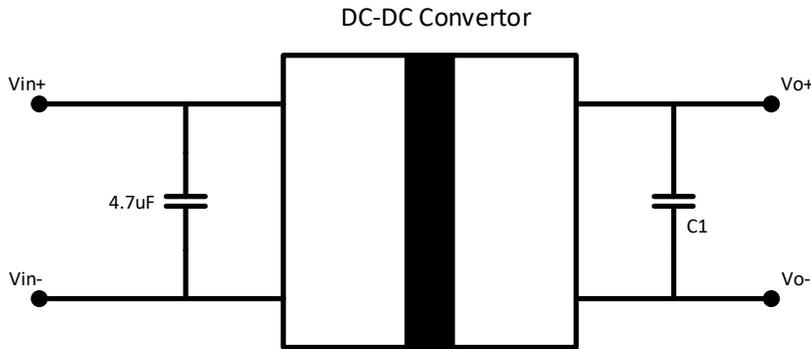


Derating

Nature Convection



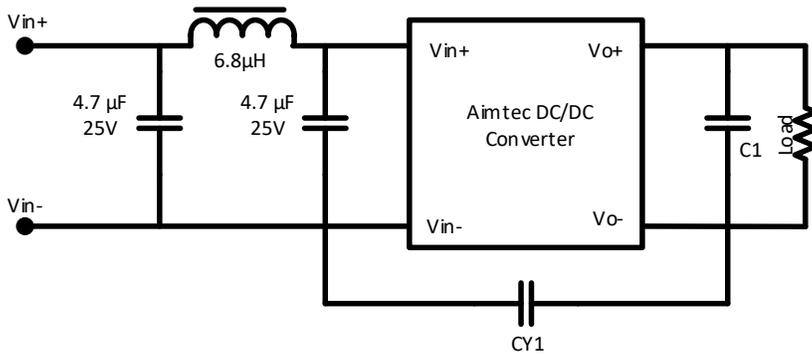
Typical Application Circuit



Capacitor selection Table

| Output voltage | C1 |
|----------------|--------|
| 3.3 V | 10µF |
| 5 V | 10µF |
| 9 V | 4.7µF |
| 12 V | 2.2µF |
| 15 V | 1µF |
| 24V | 0.47µF |

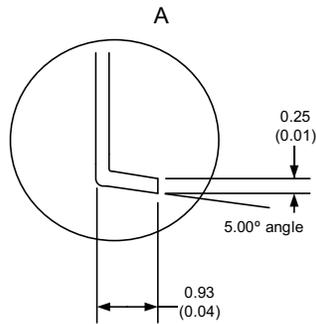
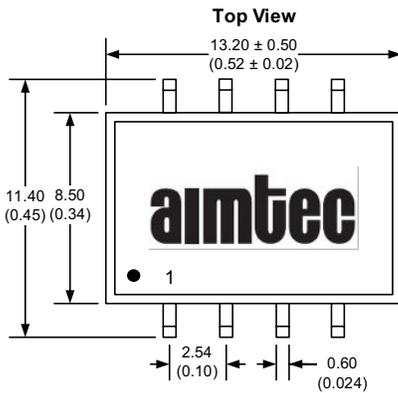
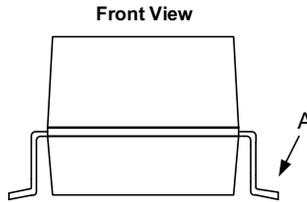
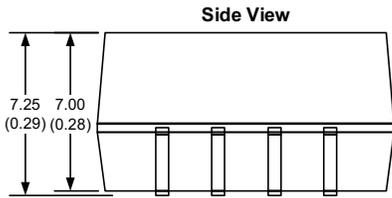
EMI Recommended Circuit



| Output voltage | C1 | CY1 |
|----------------|--------|--|
| 3.3 V | 10µF | N/C |
| 5 V | 10µF | |
| 9 V | 4.7µF | |
| 12 V | 2.2µF | 1nF / 4KVDC for 3KV isolation 1nF / 2KVDC for 1.5KV isolation |
| 15 V | 1µF | |
| 24V | 0.47µF | |

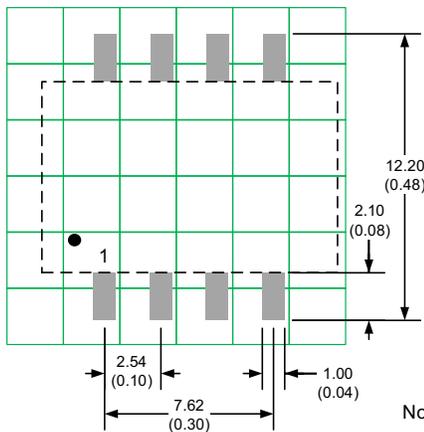
Dimensions

Dimensions for 1500VDC isolated models



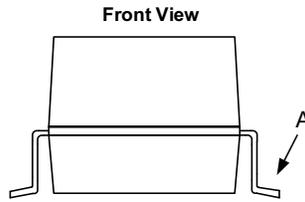
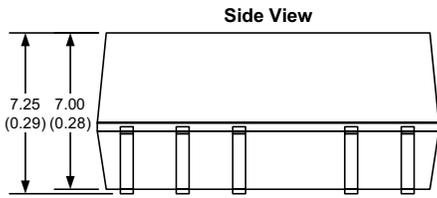
| Pin Out Specifications | |
|------------------------|-----------|
| Pin | Single |
| 1 | -V Input |
| 2 | +V Input |
| 4 | -V Output |
| 5 | +V Output |
| Other Pins | NC |

NC: Pin to be isolated from circuitry



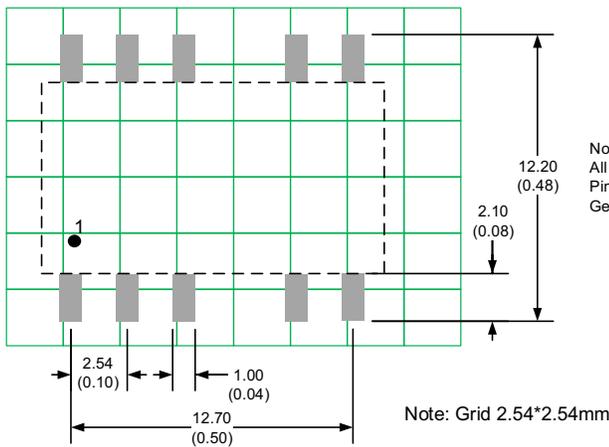
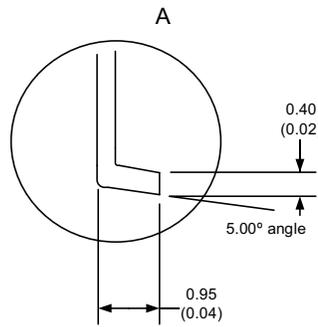
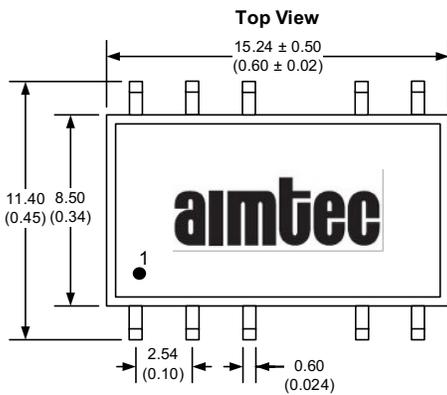
Notes:
All dimensions are typical in millimeters (inches).
Pin section tolerances : ± 0.10 (± 0.004)
General tolerances : ± 0.25 (± 0.01)

Dimensions for 3000VDC isolated models



| Pin Out Specifications | | |
|------------------------|-----------|-----------|
| Pin | Single | Dual |
| 1 | -V Input | -V Input |
| 2 | +V Input | +V Input |
| 5 | -V Output | Common |
| 6 | NC | -V Output |
| 8 | +V Output | +V Output |
| Other Pins | NC | NC |

NC: Pin to be isolated from circuitry



Notes:
All dimensions are typical in millimeters (inches).
Pin section tolerances : ± 0.10 (± 0.004)
General tolerances : ± 0.25 (± 0.01)

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