

## Series AM6GH-Z

### 6 Watt | DC-DC Converter



#### FEATURES:

- SIP8 Package
- High Efficiency up to 87%
- On / Off Control
- No Minimum Load
- Operating Temperature -40°C to +71°C
- Continuous Short Circuit Protection
- Input / Output Isolation 1500 & 3000 VDC
- Wide 4:1 Input Range

#### Models Single Output



| Model           | Input Voltage (V) | Output Voltage (V) | Output Current Max (mA) | Isolation (VDC) | Input Current Full   No Load (mA) |   | Capacitor Load (μF) | Efficiency (%) |
|-----------------|-------------------|--------------------|-------------------------|-----------------|-----------------------------------|---|---------------------|----------------|
| AM6GH-2403SZ    | 9-36              | 3.3                | 1500                    | 1500            | 261                               | 6 | 4700                | 79             |
| AM6GH-2405SZ    | 9-36              | 5                  | 1200                    | 1500            | 298                               | 6 | 2200                | 84             |
| AM6GH-2409SZ    | 9-36              | 9                  | 666                     | 1500            | 290                               | 6 | 1000                | 86             |
| AM6GH-2412SZ    | 9-36              | 12                 | 500                     | 1500            | 287                               | 6 | 470                 | 87             |
| AM6GH-2415SZ    | 9-36              | 15                 | 400                     | 1500            | 287                               | 6 | 220                 | 87             |
| AM6GH-2424SZ    | 9-36              | 24                 | 250                     | 1500            | 287                               | 6 | 100                 | 87             |
| AM6GH-4803SZ    | 18-75             | 3.3                | 1500                    | 1500            | 131                               | 6 | 4700                | 79             |
| AM6GH-4805SZ    | 18-75             | 5                  | 1200                    | 1500            | 151                               | 6 | 2200                | 83             |
| AM6GH-4809SZ    | 18-75             | 9                  | 666                     | 1500            | 147                               | 6 | 1000                | 85             |
| AM6GH-4812SZ    | 18-75             | 12                 | 500                     | 1500            | 144                               | 6 | 470                 | 87             |
| AM6GH-4815SZ    | 18-75             | 15                 | 400                     | 1500            | 144                               | 6 | 220                 | 87             |
| AM6GH-4824SZ    | 18-75             | 24                 | 250                     | 1500            | 144                               | 6 | 100                 | 87             |
|                 |                   |                    |                         |                 |                                   |   |                     |                |
| AM6GH-2403SH30Z | 9-36              | 3.3                | 1500                    | 3000            | 261                               | 6 | 4700                | 79             |
| AM6GH-2405SH30Z | 9-36              | 5                  | 1200                    | 3000            | 298                               | 6 | 2200                | 84             |
| AM6GH-2409SH30Z | 9-36              | 9                  | 666                     | 3000            | 290                               | 6 | 1000                | 86             |
| AM6GH-2412SH30Z | 9-36              | 12                 | 500                     | 3000            | 287                               | 6 | 470                 | 87             |
| AM6GH-2415SH30Z | 9-36              | 15                 | 400                     | 3000            | 287                               | 6 | 220                 | 87             |
| AM6GH-2424SH30Z | 9-36              | 24                 | 250                     | 3000            | 287                               | 6 | 100                 | 87             |
| AM6GH-4803SH30Z | 18-75             | 3.3                | 1500                    | 3000            | 131                               | 6 | 4700                | 79             |
| AM6GH-4805SH30Z | 18-75             | 5                  | 1200                    | 3000            | 151                               | 6 | 2200                | 83             |
| AM6GH-4809SH30Z | 18-75             | 9                  | 666                     | 3000            | 147                               | 6 | 1000                | 85             |
| AM6GH-4812SH30Z | 18-75             | 12                 | 500                     | 3000            | 144                               | 6 | 470                 | 87             |
| AM6GH-4815SH30Z | 18-75             | 15                 | 400                     | 3000            | 144                               | 6 | 220                 | 87             |
| AM6GH-4824SH30Z | 18-75             | 24                 | 250                     | 3000            | 144                               | 6 | 100                 | 87             |

#### Models Dual output

| Model           | Input Voltage (V) | Output Voltage (V) | Output Current Max (mA) | Isolation (VDC) | Input Current Full   No Load (mA) |   | Capacitor Load (μF) | Efficiency (%) |
|-----------------|-------------------|--------------------|-------------------------|-----------------|-----------------------------------|---|---------------------|----------------|
| AM6GH-2405DZ    | 9-36              | ±5                 | ±600                    | 1500            | 298                               | 6 | ±330                | 84             |
| AM6GH-2412DZ    | 9-36              | ±12                | ±250                    | 1500            | 291                               | 6 | ±220                | 86             |
| AM6GH-2415DZ    | 9-36              | ±15                | ±200                    | 1500            | 287                               | 6 | ±100                | 87             |
| AM6GH-4805DZ    | 18-75             | ±5                 | ±600                    | 1500            | 152                               | 6 | ±330                | 82             |
| AM6GH-4812DZ    | 18-75             | ±12                | ±250                    | 1500            | 147                               | 6 | ±220                | 85             |
| AM6GH-4815DZ    | 18-75             | ±15                | ±200                    | 1500            | 145                               | 6 | ±100                | 86             |
|                 |                   |                    |                         |                 |                                   |   |                     |                |
| AM6GH-2405DH30Z | 9-36              | ±5                 | ±600                    | 3000            | 298                               | 6 | ±330                | 84             |
| AM6GH-2412DH30Z | 9-36              | ±12                | ±250                    | 3000            | 291                               | 6 | ±220                | 86             |
| AM6GH-2415DH30Z | 9-36              | ±15                | ±200                    | 3000            | 287                               | 6 | ±100                | 87             |
| AM6GH-4805DH30Z | 18-75             | ±5                 | ±600                    | 3000            | 152                               | 6 | ±330                | 82             |
| AM6GH-4812DH30Z | 18-75             | ±12                | ±250                    | 3000            | 147                               | 6 | ±220                | 85             |
| AM6GH-4815DH30Z | 18-75             | ±15                | ±200                    | 3000            | 145                               | 6 | ±100                | 86             |

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                   | 24<br>48                                                                                   | 9-36<br>18-75       |          | VDC    |
| Filter                          | Capacitor                                                                                  |                     |          |        |
| Transient recovery time         |                                                                                            | 250                 |          | μs     |
| Transient Response deviation    | 3.3 & 5 V output                                                                           |                     | ±3<br>±5 | %      |
| Start up time                   | Nominal input voltage and constant resistive load                                          |                     | 30       | ms     |
| Absolute Maximum Rating         | 24 Vin<br>48 Vin                                                                           | -0.7-50<br>-0.7-100 |          | VDC    |
| Peak Input Voltage time         |                                                                                            |                     | 100      | ms     |
| On / Off Control                | ON – high impedance or open;<br>OFF – 2-4mA input current through 1KΩ (standby 2.5mA typ.) |                     |          |        |
| Input reflected ripple current* | 24Vin<br>48Vin                                                                             | 20<br>40            |          | mA p-p |

\* The input reflected ripple current should be measured with connected 12μH inductor and 47μF input capacitor (ESR<1Ω at 100 KHz)

### Isolation Specifications

| Parameters         | Conditions | Typical | Rated       | Units |
|--------------------|------------|---------|-------------|-------|
| Tested I/O voltage | 60 sec     |         | 1500 & 3000 | VDC   |
| Resistance         |            | > 1000  |             | MOhm  |
| Capacitance        |            |         | 50          | pF    |

### Output Specifications

| Parameters               | Conditions                                                      | Typical | Maximum      | Units  |
|--------------------------|-----------------------------------------------------------------|---------|--------------|--------|
| Voltage accuracy         |                                                                 |         | ±1           | %      |
| Cross Regulation (Dual)  | 1 <sup>st</sup> output 25% to 100%, 2 <sup>nd</sup> output 100% | ±5      |              | %      |
| Short Circuit protection | Continuous                                                      |         |              |        |
| Short Circuit restart    | Auto recovery                                                   |         |              |        |
| Line voltage regulation  | LL~HL                                                           |         | ±0.2         | %      |
| Load voltage regulation  | (0 to 100% load) Single<br>(0 to 100% load) 3.3V, 5V, & Dual    |         | ±0.5<br>±1.0 | %      |
| Temperature coefficient  |                                                                 | ±0.02   |              | %/°C   |
| Ripple & Noise*          | At 20MHz Bandwidth                                              |         | 125          | mV p-p |

\* Measured with a 100nF CC.

### General Specifications

| Parameters             | Conditions                                            | Typical                 | Maximum | Units |
|------------------------|-------------------------------------------------------|-------------------------|---------|-------|
| Switching frequency    | 100% load                                             | 580                     |         | KHz   |
| Operating temperature  | Derating above +71°C                                  | -40 to +71              |         | °C    |
| Storage temperature    |                                                       | -55 to +125             |         | °C    |
| Max Case temperature   |                                                       |                         | +100    | °C    |
| Cooling                | Free air convection (30-65 LFM)                       |                         |         |       |
| Humidity               |                                                       |                         | 95      | %     |
| Case material          | Non-conductive black plastic                          |                         |         |       |
| Potting material       | Epoxy (UL94V-0 rated)                                 |                         |         |       |
| Pin Material           | C5191R-H Solder coated                                |                         |         |       |
| Weight                 |                                                       | 4.5                     |         | g     |
| Dimensions (L x W x H) | 0.86 x 0.36 x 0.44 inch                               | 21.85 x 9.20 x 11.10 mm |         |       |
| MTBF                   | >800,000 hrs (MIL-HDBK -217F, Ground Benign, t=+25°C) |                         |         |       |

### Safety Specifications

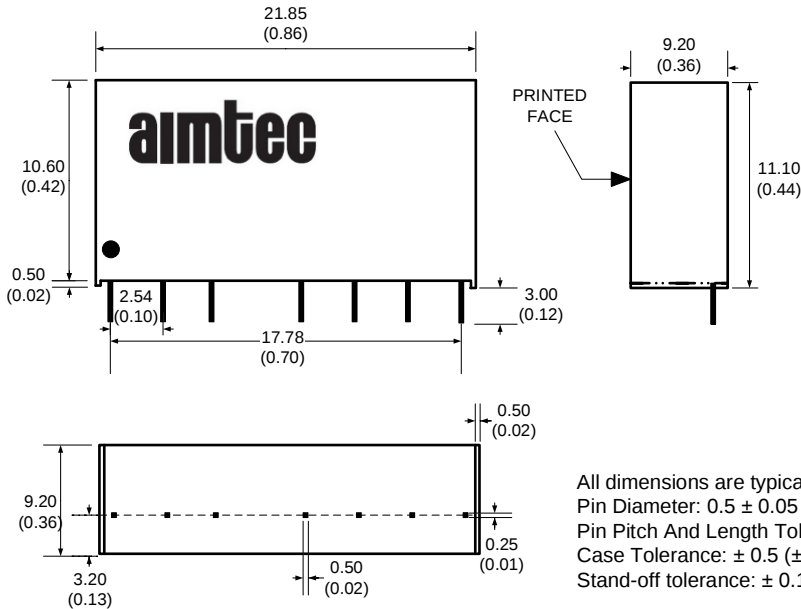
| Parameters       |                                        |
|------------------|----------------------------------------|
| Agency Approvals | UL                                     |
| Standards        | UL 60950-1:2001 & UL 62368-1           |
|                  | Design to meet IEC/EN 60950-1, 62368-1 |

|                                                                      |
|----------------------------------------------------------------------|
| EN55032 Class A, EN55024 (external class A circuit required)         |
| IEC61000-4-2, Perf. Criteria A                                       |
| IEC61000-4-3, Perf. Criteria A                                       |
| IEC61000-4-4, Perf. Criteria A (external EFT/Surge circuit required) |
| IEC61000-4-5, Perf. Criteria A (external EFT/Surge circuit required) |
| IEC61000-4-6, Perf. Criteria A                                       |
| IEC61000-4-8, Perf. Criteria A                                       |

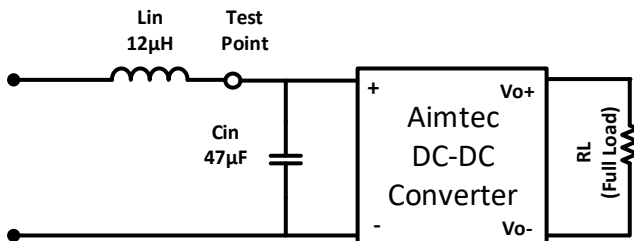
## Pin Out Specifications

| Pin | 1500 VDC       |                | 3000 VDC       |                |
|-----|----------------|----------------|----------------|----------------|
|     | Single         | Dual           | Single         | Dual           |
| 1   | - V Input      | - V Input      | - V Input      | - V Input      |
| 2   | + V Input      | + V Input      | + V Input      | + V Input      |
| 3   | On/Off Control | On/Off Control | On/Off Control | On/Off Control |
| 5   | N.C.           | N.C.           | No Pin         | No Pin         |
| 6   | + V Output     | + V Output     | + V Output     | + V Output     |
| 7   | - V Output     | Common         | - V Output     | Common         |
| 8   | N.C.           | - V Output     | N.C.           | - V Output     |

## Dimensions

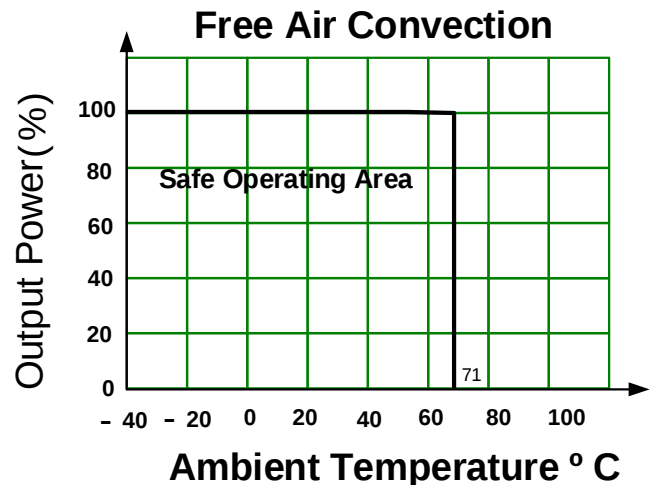


## Input Reflected Ripple Test Circuit

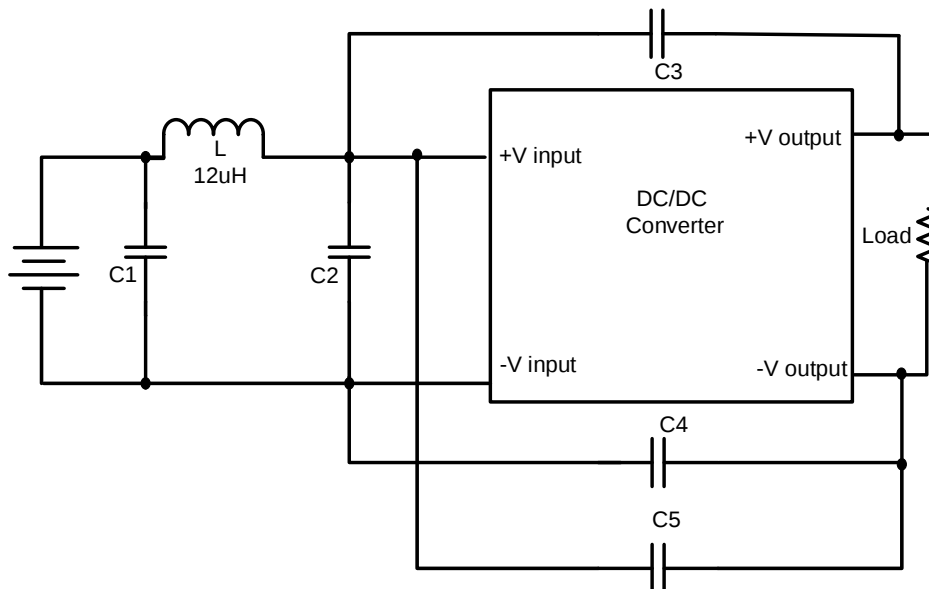


\* Tested at full load, and nominal input

## Derating

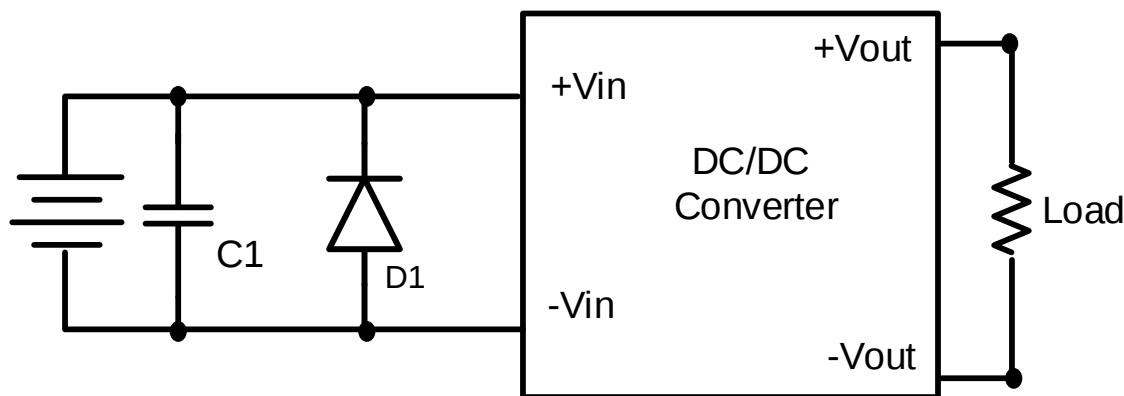


### Class A EMI, external filter



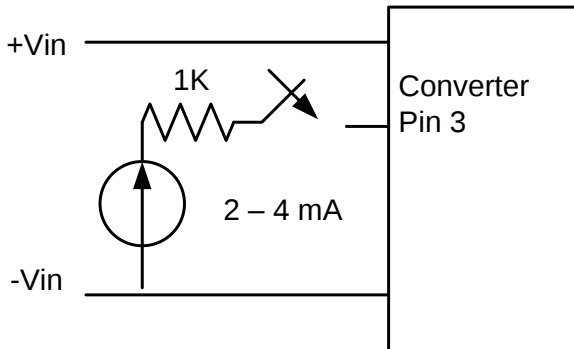
| Vin   | C1 & C2                | C3 & C4         | C5            |
|-------|------------------------|-----------------|---------------|
| 24VDC | 10 $\mu$ F/35V, MLCC   | 470pF/3KV, MLCC | -             |
| 48VDC | 2.2 $\mu$ F/100V, MLCC | 1nF/3KV, MLCC   | 1nF/3KV, MLCC |

### EFT/Surge Application circuit



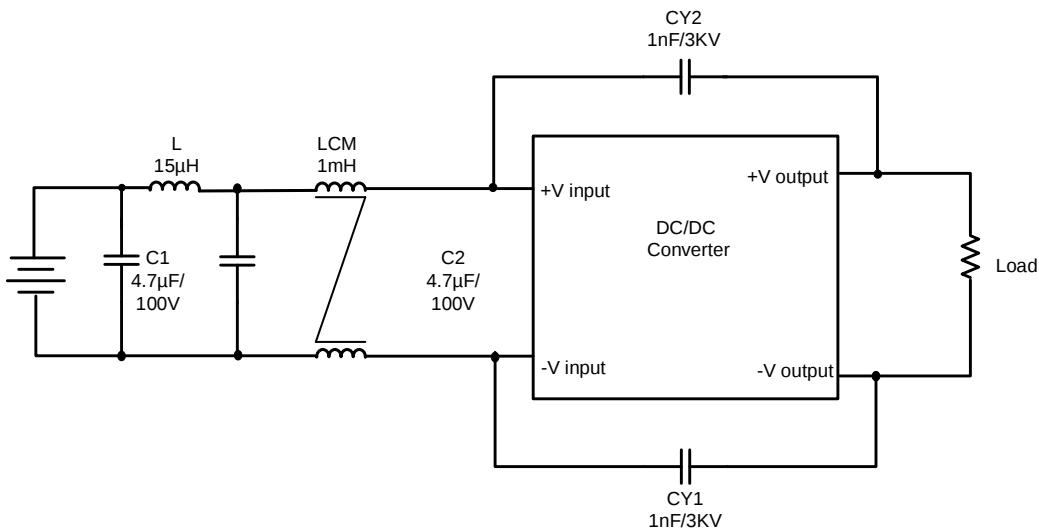
| Vin   | C1               | D1             |
|-------|------------------|----------------|
| 24VDC | 300 $\mu$ F/100V | TVS, 3kW, 75V  |
| 48VDC | 470 $\mu$ F/100V | TVS, 3kW, 130V |

### Control ON/OFF pin connection example:



The voltage could be applied through a limiting resistor. The converter is turned on when the external switching circuit is open.

### Recommended circuit for class B compliance



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