aimtec
Your Power Partner

# Series AMEL5-MAZ

## 5 Watt | AC-DC / DC-DC Converter

### FEATURES:

- I/O Isolation 4000VAC
- Operating Temp: -40˚C to +80˚C or -25˚C to +80˚C
- Input: 90-264VAC, 47-440Hz, or 130-370VDC
- Over load, Over Voltage, Short Circuit Protection
- RoHS compliant
- Energy Star compliant
- Small package
- Soft start

RoHS CE cULus E309075 CB

## Models
## Single output

| Model | Input Voltage (VAC/Hz) | Input Voltage (VDC) | Temperature range (ºC) | Output Voltage (V) | Output Current max (A) | Maximum capacitive Load (µF) | Efficiency (%) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 115 VAC | 230 VAC |
| AMEL5-3.3SMAZ | 90-264/47-440 | 130-370 | -40 to +80 | 3.3 | 1. 5 | 2200 | 71 | 70 |
| AMEL5-5SMAZ | 90-264/47-440 | 130-370 | -40 to +80 | 5 | 1 | 1100 | 74 | 74 |
| AMEL5-12SMAZ | 90-264/47-440 | 130-370 | -40 to +80 | 12 | 0.42 | 680 | 77 | 75 |
| AMEL5-15SMAZ | 90-264/47-440 | 130-370 | -40 to +80 | 15 | 0.333 | 330 | 77 | 76 |
| AMEL5-24SMAZ | 90-264/47-440 | 130-370 | -40 to +80 | 24 | 0.21 | 220 | 76 | 75 |
| AMEL5-3.3SEMAZ | 90-264/47-440 | 130-370 | -40 to +80 | 3.3 | 1. 5 | 2200 | 71 | 70 |
| AMEL5-5SEMAZ | 90-264/47-440 | 130-370 | -40 to +80 | 5 | 1 | 1100 | 74 | 74 |
| AMEL5-12SEMAZ | 90-264/47-440 | 130-370 | -40 to +80 | 12 | 0.42 | 680 | 76 | 76 |
| AMEL5-15SEMAZ | 90-264/47-440 | 130-370 | -40 to +80 | 15 | 0.333 | 330 | 76 | 76 |
| AMEL5-24SEMAZ | 90-264/47-440 | 130-370 | -40 to +80 | 24 | 0.21 | 220 | 76 | 75 |

***Note: Optional mounting plate version can be ordered by adding "-ST" suffix to part number (ex. AMEL5-5SMAZ-ST)***

## Models
## Dual output

| Model | Input Voltage (VAC/Hz) | Input Voltage (VDC) | Temperature range (ºC) | Output Voltage (V) | Output Current max (A) | Maximum capacitive load (µF) | Efficiency (%) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 115 VAC | 230 VAC |
| AMEL5-5DMAZ | 90-264/47-440 | 130-370 | -40 to +80 | ±5 | ±0.5 | ±470 | 72 | 72 |
| AMEL5-12DMAZ | 90-264/47-440 | 130-370 | -40 to +80 | ±12 | ±0.21 | ±220 | 73 | 73 |
| AMEL5-15DMAZ | 90-264/47-440 | 130-370 | -40 to +80 | ±15 | ±0.168 | ±150 | 72 | 73 |
| AMEL5-5DEMAZ | 90-264/47-440 | 130-370 | -40 to +80 | ±5 | ±0.5 | ±470 | 72 | 72 |
| AMEL5-12DEMAZ | 90-264/47-440 | 130-370 | -40 to +80 | ±12 | ±0.21 | ±220 | 73 | 73 |
| AMEL5-15DEMAZ | 90-264/47-440 | 130-370 | -40 to +80 | ±15 | ±0.168 | ±150 | 72 | 73 |

***Note: Optional mounting plate version can be ordered by adding "-ST" suffix to part number (ex. AMEL5-5SMAZ-ST)***

## Input Specifications

| Parameters | Conditions | Typical | Maximum | Units |
|---|---|---|---|---|
| Current (full load) | 115 VAC | | 120 | mA |
| | 230 VAC | | 70 | mA |
| Inrush current <2ms (cold start) | 115 VAC | | 15 | A |
| | 230 VAC | | 30 | A |
| Leakage current | | | 0.2 | mA |
| External fuse | Recommended slow blow type | 1.5 | | A |
| Input Dissipation (No Load) | No load (110/230VAC) | ≤ 0.1 | | W |
| Start up time | Soft Start | 780 | | mS |
| Under Voltage Protection | | 85 | | VAC |

## Output Specifications

| Parameters | Conditions | Typical | Maximum | Units |
|---|---|---|---|---|
| Voltage accuracy | | ±2 | | % |
| Line regulation | | ±1 | | % |

| | | | | |
|---|---|---|---|---|
| Load regulation (single output) | 0-100% load | ±1 | | % |
| Cross Regulation (dual output) | 25% load – 1st out, 100% load – 2nd out | ±5 | | % |
| Transient Recovery Time | | 300 | | µs |
| Transient Response Deviation | 25% load step | ±2 | | % of Vout |
| Minimum load | | 0 | | % |
| Ripple & Noise * | 3.3 / 5V models<br>12 / 15V models<br>24V | 75<br>100<br>150 | | mV p-p |
| Hold-up time (minimum) | | 15 | | ms |

*Ripple and Noise are measured at 20MHz bandwidth by using a 0.1µF (M/C) and 47µF (E/C) parallel capacitor.

## Isolation Specifications

| Parameters | Conditions | Typical | Rated | Units |
|---|---|---|---|---|
| Tested I/O voltage | 60 sec | 4000 | | VAC |
| Isolation Resistance | | >1000 | | MΩ |

## General Specifications

| Parameters | Conditions | Typical | Maximum | Units |
|---|---|---|---|---|
| Switching frequency | | 132 | | KHz |
| Protection class | Class II | | | |
| Over Load protection | Fold back | | | |
| Over voltage protection | Zener diode clamp | | | |
| Short circuit protection | Auto recovery | | | |
| Operating temperature | With derating above 50ºC | Refer to the models table above | | ºC |
| Storage temperature | | -40 to +95 | | ºC |
| Maximum Case temperature | | | 100 | ºC |
| Temperature coefficient | | 0.02 | | % / ºC |
| Cooling | Free air convection | | | |
| Humidity | Non condensing | 20 ~ 95 | | % RH |
| Case material | Plastic (flammability to UL 94V-0) | | | |
| Weight | | 30 | | g |
| Dimensions (L x W x H) | 2.03 x 1.10 x 0.70 inches 51.5 x 28 x 17.8mm | | | |
| MTBF | > 400,000 hrs (MIL-HDBK -217F, t=+25ºC)/Full Load<br>> 100,000 hrs (MIL-HDBK -217F, t=at highest operating temperature)/Full Load | | | |

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.

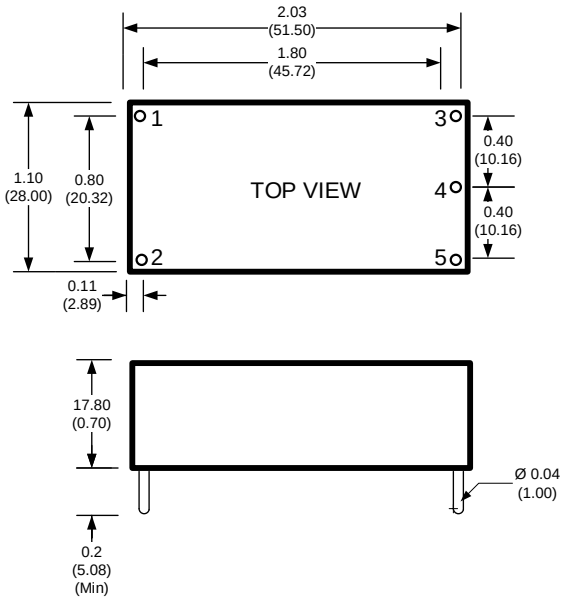
## Environment Approval

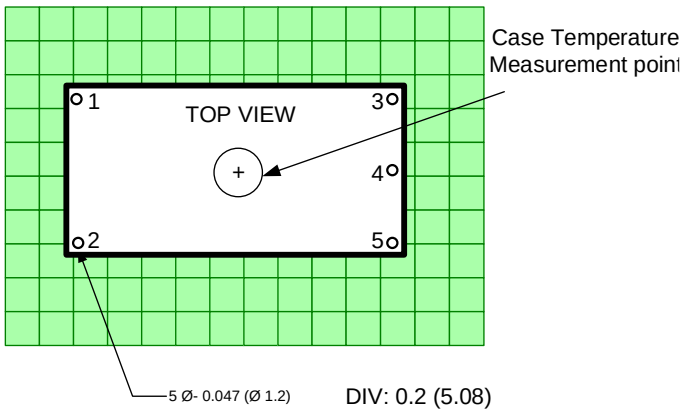
| Parameters | Conditions |
|---|---|
| Shock | Wave form: Half sine wave |
| | Acceleration amplitude: 5gn |
| | Bump duration: 30 ms |
| | Number of bumps: 18 (3 in each direction for every axis) |
| | Converter operation before and after test, body mounted (on chassis) |
| Vibrations | Test mode: Sweep sine |
| | 10-100Hz, speed 0.05Hz/s |
| | Displacement: 1mm |
| | Acceleration: 3g |
| | 3 loops 30min one cycle, 3h total, every axis tested |
| | Converter operation before and after test, body mounted (on chassis) |

## Safety Specifications

| Parameters | | |
|---|---|---|
| Agency approvals | cULus, CE, CB | |
| Standards | Medical Electrical Equipment | IEC\EN\UL 60601-1, 2 x MOOP, CSA-C22.2 No. 601.1-M90 |
| | Information technology Equipment | EN 60950-1:2006+A11:2009 |
| | EMI - Conducted and radiated emission | EN55032, class B with the recommended External EMI circuit |
| | Harmonic Current Emissions | IEC/EN 61000-3-2, Class A |
| | Voltage fluctuations and flicker | IEC/EN 61000-3-3, (EN60555-3) |
| | Electrostatic Discharge Immunity | IEC 61000-4-2 Level 3 |
| | RF, Electromagnetic Field Immunity | IEC 61000-4-3 Level 2 |
| | Electrical Fast Transient/Burst Immunity | IEC 61000-4-4 Level 3 |
| | Surge Immunity | IEC 61000-4-5 Level 3 |
| | RF, Conducted Disturbance Immunity | IEC 61000-4-6 Level 2 |
| | Power frequency Magnetic Field Immunity | IEC 61000-4-8 Level 2 |
| | Voltage dips, Short Interruptions Immunity | IEC 61000-4-11 |

## Dimensions



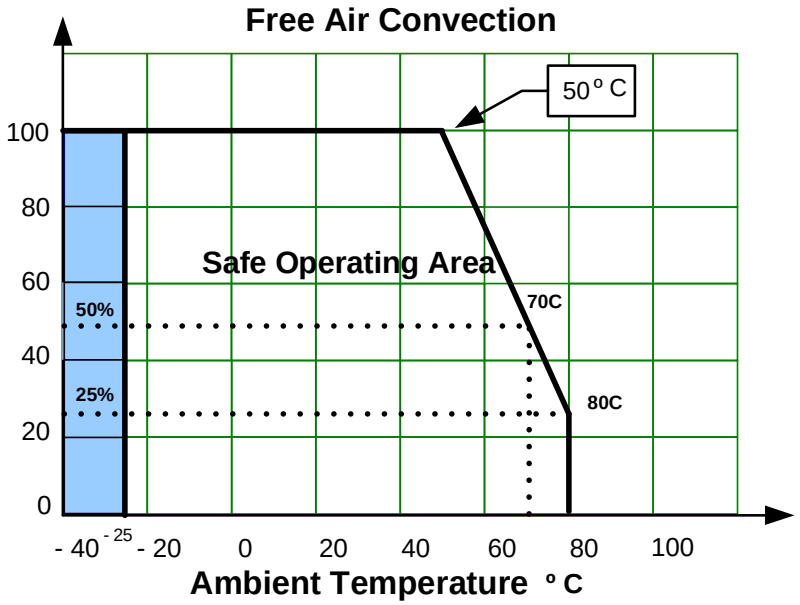




Dimensions: inch (mm)
Case Tolerance:± 0.02 (0.50)
Pin Pitch Tolerance: ± 0.012 (0.30)

## Pin Out Specifications

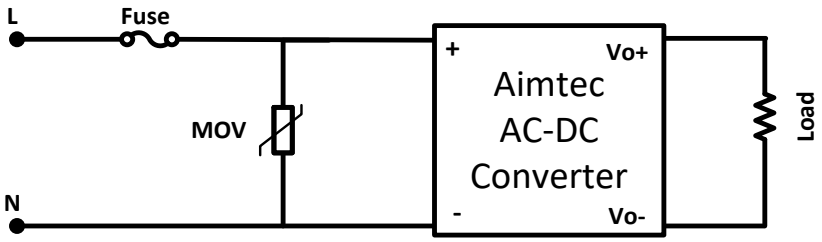
| Pin | Single | Dual |
|---|---|---|
| 1 | AC Input (N) | AC Input (N) |
| 2 | AC Input (L) | AC Input (L) |
| 3 | +V Output | +V Output |
| 4 | -V Output | Common |
| 5 | No pin | -V Output |

## Derating



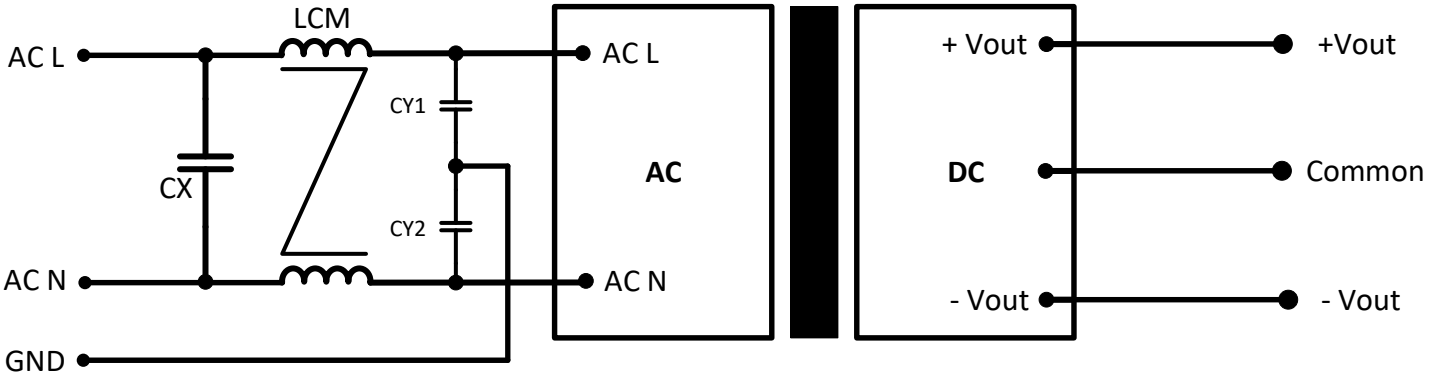
## Additional Surge Protective Circuitry

The AMEL5-MAZ series design level surge protection is certified to IEC 61000-4-5 surge Line to Line of 1KV. However greater protection can be enhanced by adding protective devices to ingress circuitry. For example, by adding an MOV (Metal Oxide Varistor) device example TVR10471KSY to the N / L input lines 2KV surge protection or greater, can be achieved.



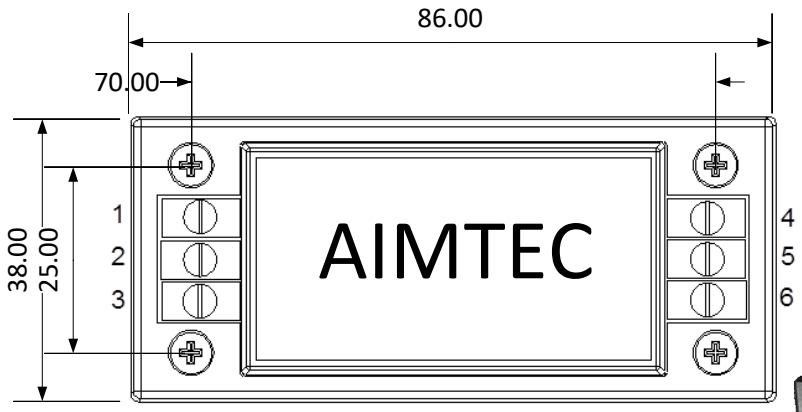

| MOV PN | Vrms V | Vdc V | Wmax (2ms) J | Pmax W |
|---|---|---|---|---|
| TVR10471KSY | 300 | 385 | 70 | 0.4 |

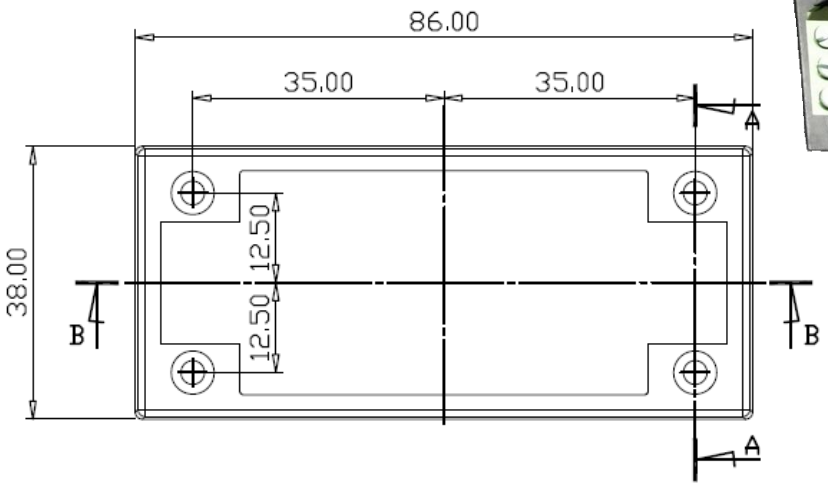
## Recommended EMI Circuit for Dual output models




| CX | LCM PN | CY1/CY2 |
|---|---|---|
| 330nF/275VAC | 2mH, Recommended SU9V-05020 | 1000pF/400VAC |

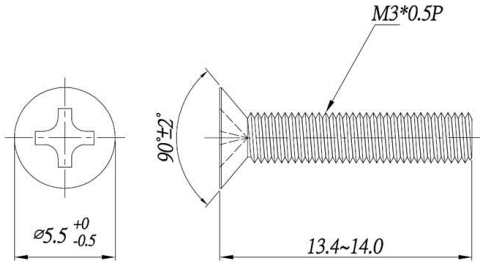
## Dimensions of Optional ST Mounting Plate Version

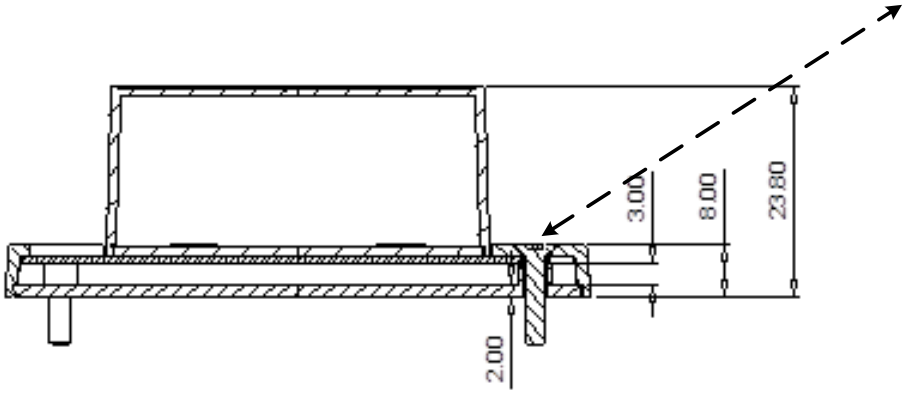


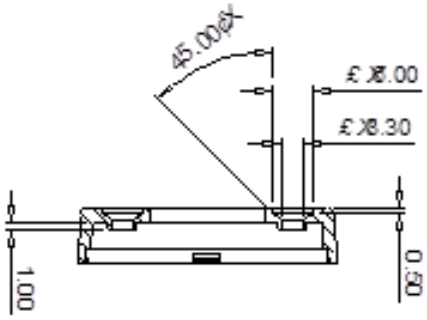




### Pin Out Specification ST

| Pin | Single | Dual |
|---|---|---|
| 1 | AC Input (N) | AC Input (N) |
| 2 | No pin | No pin |
| 3 | AC Input (L) | AC Input (L) |
| 4 | +V Output | +V1 Output |
| 5 | Common | Common |
| 6 | No pin | -V2 Output |




**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 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 the ones listed in this datasheet. **7.** Warranty is in accordance with Aimtec's standard Terms of Sale available at www.aimtec.com.