# 15ACMEB_4 series

15W - Single Output AC-DC Converter - Universal Input - Isolated & Regulated

## AC-DC Converter 15 Watt

- **Universal input: 85~264VAC**
- **Regulated output, low ripple and noise**
- **High efficiency up to 86%**
- **Short circuit protection (SCP)**
- **Ocer current protection**
- **Over voltage protection**
- **Meet EN60950, UL60950**
- **Mounting: PCB Mounting, Chassis Mounting, DIN Rail Mounting**
- **IEC60601-1, EN60601-1, ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1 approval (2xMOPP)**

The 15ACMEB_4 series is a compact size power converter offered by Gaptec. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. Meets IEC60601-1, EN60601-1, ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1 standards (2xMOPP), and widely used in medical, industrial, instruments, telecommunication and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

| Approval | Model* | Power [W] | Output voltage [V] | Output current [mA, max] | Capacitive Load [µF, max] | Efficiency [@230VAC, %, typ] |
|---|---|---|---|---|---|---|
| CSA/CE/CB | 15ACMEB_05S4 | 15 | 5 | 2800 | 8000 | 73 |
| CSA/CE/CB | 15ACMEB_12S4 | 15 | 12 | 1250 | 4000 | 83 |
| CSA/CE/CB | 15ACMEB_15S4 | 15 | 15 | 1000 | 3000 | 83 |
| CSA/CE/CB | 15ACMEB_18S4 | 15 | 18 | 833 | 2000 | 84 |
| CSA/CE/CB | 15ACMEB_24S4 | 15 | 24 | 625 | 800 | 86 |

* Add suffix CM for Chassis mounting with screw terminals (f.ex. 15ACMEB_05S4CM), see different package measurements.
Add suffix DR for Din-Rail mounting (f.ex. 15ACMEB_05S4DR).

### Input specifications

| | | |
|---|---|---|
| Input voltage range | 85-264 VAC; 100-370 VDC | |
| Input frequency* | 47~440Hz | |
| Input current | 115VAC<br>• 0.37A (max) | 230VAC<br>• 0.22A (max) |
| Inrush current (<2ms, cold start) | 115VAC<br>• 10A (typ) | 230VAC<br>• 20A (typ) |
| Leakage current | 0.1mA RMS typ./264VAC/60Hz | |
| Recommended external fuse** | • 2A/250V | • slow fusing |

* Medical Certification Input frequency range 47-63 Hz
** Chassis mounting, DIN-Rail mounting package series include fuse.

### Output specifications

| Item | Test conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Output voltage accuracy | Full load | | ±2 | | % |
| Line regulation | Full load | | ±0.5 | | % |
| Load regulation | | | ±1 | | % |
| Ripple & Noise | 20MHz bandwidth (peak-peak value) | | 50 | 100 | mV |
| Stand-by power consumption | | | | 0.1 | W |
| Min. load | | 0 | | | % |
| Hold-up time (full load) | • @230VAC input<br>• @115VAC input | | | 80<br>15 | ms<br>ms |

* Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.

### Protection specifications

| | |
|---|---|
| Short circuit protection | Protection type:<br>Continuous, self-recovery |
| Over-voltage protection | Protection type:<br>• 5VDC output: ≤7.5VDC<br>• 12/15VDC output: ≤20VDC<br>• 18VDC output: ≤25VDC<br>• 24VDC output: ≤30VDC |
| Over-current protection | Protection type:<br>≥110%Io self-recovery |

**Example:**
**15ACMEB_05S4**
**15 = 15Watt; AC = AC-DC; MEB = series; 5Vout; S = Single Output;**
**4 = 4kVAC isolation**

**Note:**

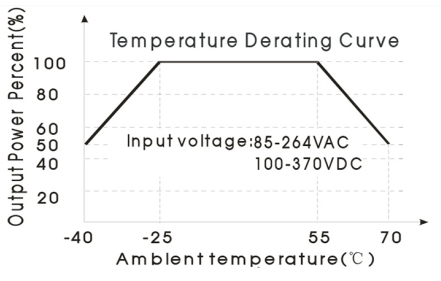
1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see „Features" and „EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

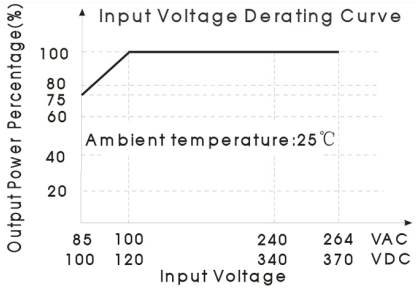
| Common specifications | | | |
|---|---|---|---|
| Operating temperature range | -40°C ~ +70°C | | |
| Power derating temperature range | 55°C ~ 70°C: 3.3%/°C<br>-40°C ~ -25°C: 3.3%/°C | | |
| Storage temperature range | -40°C ~ +85°C | | |
| Welding temperature | Wave-soldering: 260 ± 5°C; time: 5 - 10s<br>Manual welding: 360 ± 10°C; time: 3 - 5s | | |
| Switching frequency | 65 kHz TYP | | |
| Humidity | 95% MAX | | |
| Cooling | Free air convection | | |
| Temperature coefficient | ±0.02%/°C | | |
| I/O-isolation voltage | 4000VAC (Test time: 1min Leakage current ≤5mA) | | |
| Altitude during operation | 5000m | | |
| Atmospheric pressure | 70kPa to 106kPa | | |
| EMC / EMI / CE | EN55011(CISPR11) / EN55032(CISPR32) CLASS B | | |
| EMC / EMI / RE | EN55011(CISPR11) / EN55032(CISPR32) CLASS B | | |
| EMC / EMS / ESD | IEC/EN 61000-4-2 | Contact ±6KV / Air ±8KV | perf. Criteria B |
| EMC / EMS / RS | IEC/EN 61000-4-3 | 10V/m | perf. Criteria A |
| EMC / EMS / EFT | IEC/EN 61000-4-4<br>IEC/EN 61000-4-4 | ±2kV<br>±4kV (See EMC recommended circuit) | perf. Criteria B<br>perf. Criteria B |
| EMC / EMS / Surge | IEC/EN 61000-4-5<br>IEC/EN 61000-4-5 | ±1KV<br>±2KV (See EMC recommended circuit) | perf. Criteria B<br>perf. Criteria B |
| EMC / EMS / CS | IEC/EN 61000-4-6 | 10Vr.m.s | perf. Criteria A |
| EMC / EMS / Voltage dips, short interruptions and voltage variations immunity | IEC/EN 61000-4-11 | 0%, 70% | perf. Criteria B |
| Safety standards | IEC60601-1, EN60601-1, ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1 | | |
| Safety certification | IEC60601-1, EN60601-1, ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1 | | |
| Safety class | Class II | | |
| Insulation level | Primary to secondary: 2xMOPP | | |
| Case material | Black flame-retardant and heat-resistant plastic (UL94V-0) | | |
| MTBF | >300,000h MIL-HDBK-217F@25°C | | |
| Package | Horizontal package: 62.00*45.00*22.50mm<br>Chassis mounting: 96.10*54.00*31.00mm<br>Din-Rail mounting: 96.10*54.00*35.60 mm | | |
| Weight | Horizontal package: 85g<br>Chassis mounting: 135g<br>Din-Rail mounting: 175g | | |

# Typical characteristics

### Derating graphs

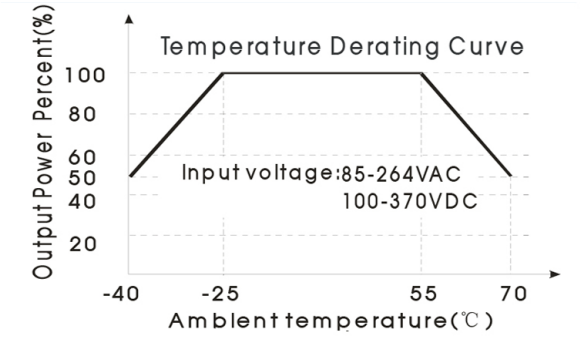
Power derating

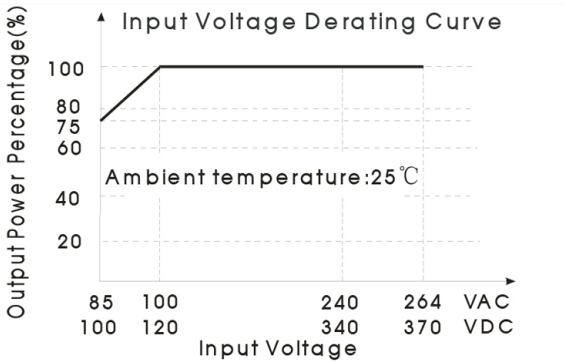


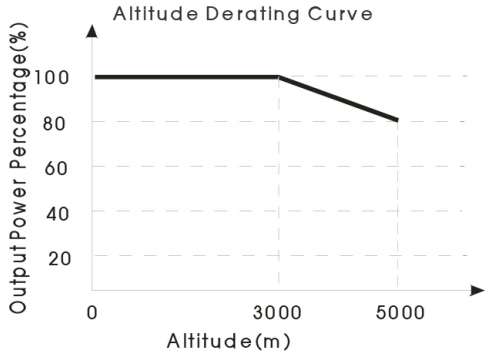



# Typical characteristics

**Derating graphs**



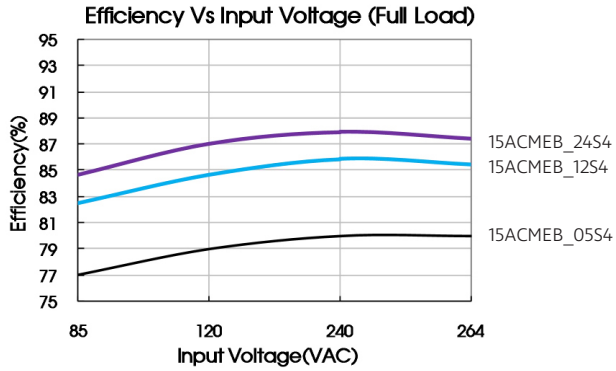



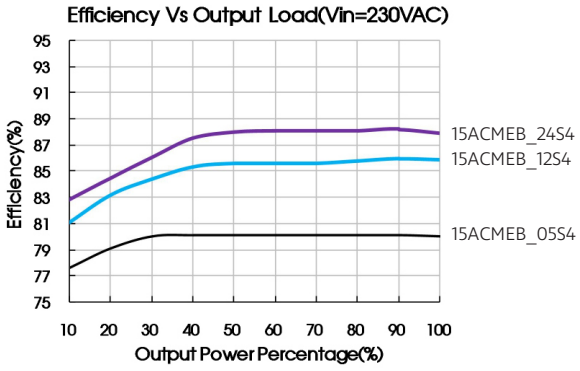




**Note:**

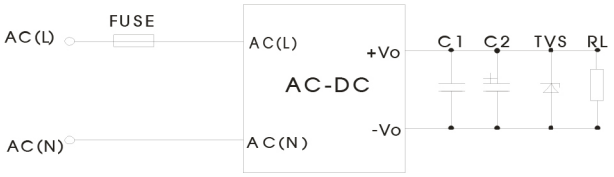
1. When input 85-100VAC/100-120VDC, it need to be voltage derated on basis of temperature derating;
2. Altitude should be derated based on temperature derating when it is 3000 - 5000m;
3. This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.

# Efficiency



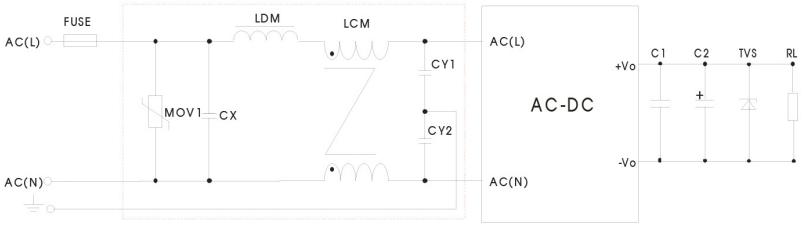
# Typical application circuit




| Element model | C2 (µF) | TVS1 |
|---|---|---|
| 15ACMEB_05S4 | 680 | SMBJ7.0A |
| 15ACMEB_12S4 | 470 | SMBJ20A |
| 15ACMEB_15S4 | 220 | SMBJ20A |
| 15ACMEB_18S4 | 220 | SMBJ30A |
| 15ACMEB_24S4 | 68 | SMBJ30A |

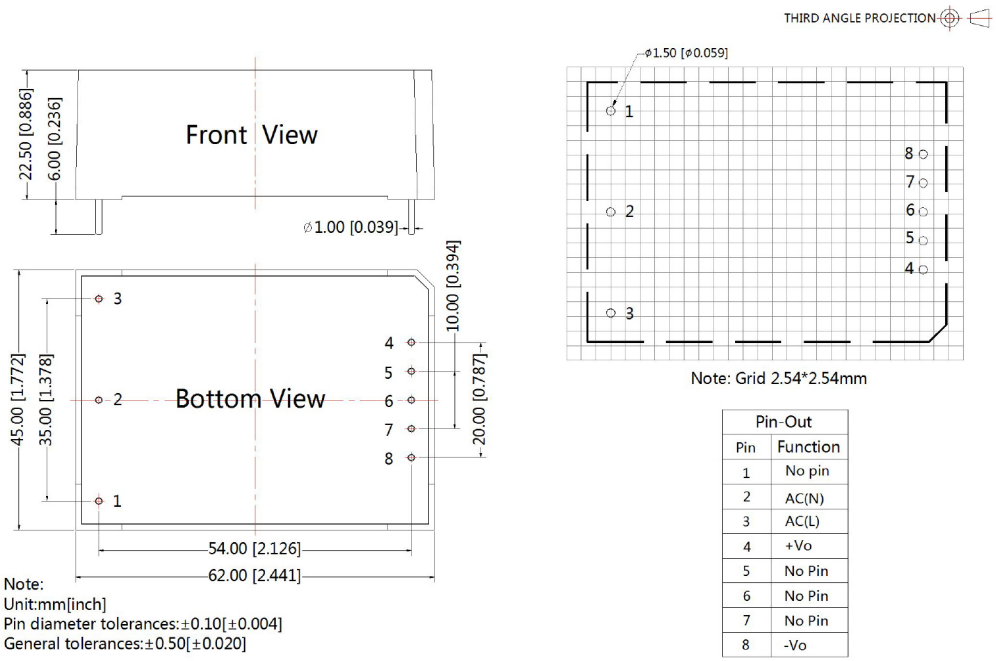
Output filtering capacitors C2 is electrolytic capacitor, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor voltage reduced to at least 80%. C1 is ceramic capacitor, which is used to filter high-frequency noise, advice use 1µF. TVS is a recommended component to protect post-circuits if converter fails. External input FUSE model is recommended to use 2A/250V slow fusing.

# EMC solution-recommended circuit




| Element model | Recommended value |
|---|---|
| MOV1 | S14K300 |
| CY1, CY2 | 1nF/400VAC |
| CX | 0.1µF/275VAC |
| LCM | 10mH |
| LDM | 4.7µH/2A |
| FC-LX1D | 2KV/4KV EMC filter |
| FUSE | 2A/250V slow fusing, necessary |

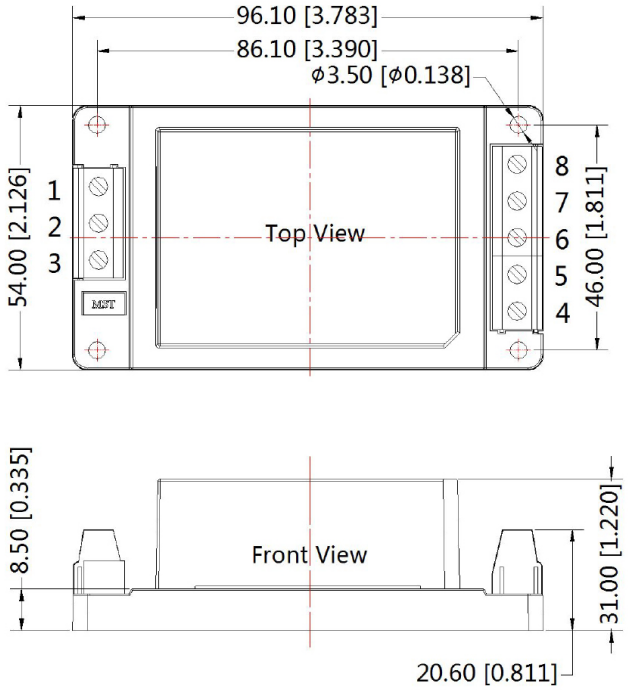
# Mechanical dimensions




| Pin-Out | |
|---|---|
| Pin | Function |
| 1 | No pin |
| 2 | AC(N) |
| 3 | AC(L) |
| 4 | +Vo |
| 5 | No Pin |
| 6 | No Pin |
| 7 | No Pin |
| 8 | -Vo |

## Chassis mounting with screw terminals

THIRD ANGLE PROJECTION

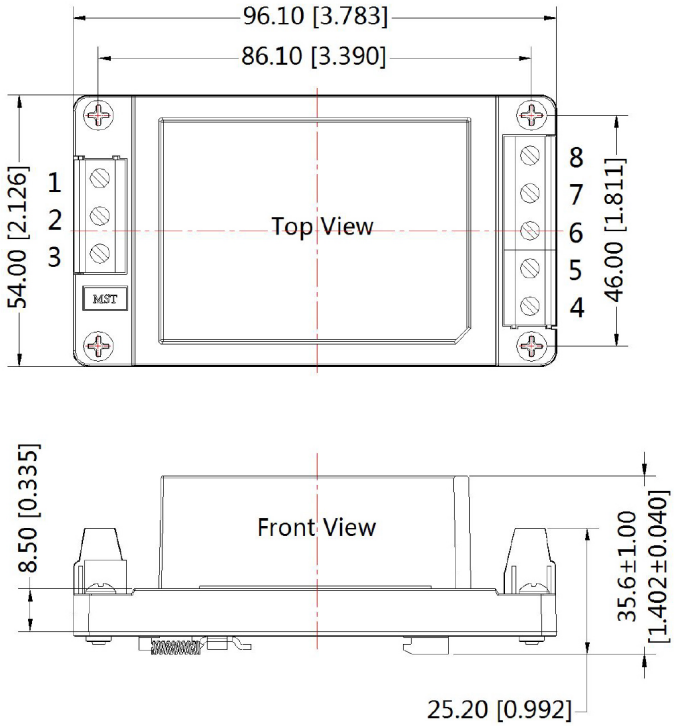



| Pin-Out | |
|---|---|
| Pin | Function |
| 1 | NC |
| 2 | AC(N) |
| 3 | AC(L) |
| 4 | +Vo |
| 5 | NC |
| 6 | NC |
| 7 | NC |
| 8 | -Vo |

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±0.50[±0.020]

## Din rail mounting

THIRD ANGLE PROJECTION




| Pin-Out | |
|---|---|
| Pin | Function |
| 1 | NC |
| 2 | AC(N) |
| 3 | AC(L) |
| 4 | +Vo |
| 5 | NC |
| 6 | NC |
| 7 | NC |
| 8 | -Vo |

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
Mounting rail: TS35, rail needs to connect safety ground
General tolerances: ±1.00[±0.039]