

DC-DC CONVERTER AER10

RAILWAY CONVERTER.

FOR PCB MOUNTING



HIGHLIGHTS

- + Output Power up to 10 Watts
- + Efficiency up to 89 %
- + Wide Input Range
- + Wide Temperature Range
- + RoHS compliance
- + According to EN50155
- + Remote On/Off

INPUT

Input Voltage Nominal 12/24 VDC, 36/48 VDC, 72/110 VDC

OUTPUT

| | |
|-------------------------|--|
| Output Voltage | 5, 12, 15, 24 V and ± 12 , ± 15 V |
| Initial Set Accuracy | < 1 %* |
| Output Voltage Balance | Dual Output, Balanced Loads $\pm 2,0$ % |
| Minimum Load | No minimum load |
| Short Circuit | Continuous short circuit proof |
| Line Regulation | $\pm 0,2$ % |
| Load Regulation | Single Output $\pm 0,5$ % (0 % - 100 % load) Dual Output $\pm 1,0$ % (0 % - 100 % load) |
| Ripple & Noise | < 1 % pk-pk, 20 MHz bandwidth** |
| Start Time | 50 ms |
| Max. Output Capacitance | See table page 2 - 5 |
| Temperature Coefficient | ± 0.02 %/°C |

FEATURES

| | |
|---------------|------------------------|
| Remote On/Off | See page 8 |
| Trim | ± 10 %, See page 7 |

PROTECTION

| | |
|-------------------------------|------------------------|
| Over Voltage Protection (OVP) | 120-125% $V_{out nom}$ |
| Over Current Protection (OCP) | See table page 2 - 5 |

GENERAL

| | |
|-----------------------|--|
| Product Standard | EN 50155 |
| Isolation | Input to Output 4200 VDC, Reinforced Input or Output to case 2200 VDC |
| Isolation Resistance | > 1000 M Ω (@500 VDC) |
| Isolation Capacitance | max. 1,5 nF (100 kHz, 1 V) |
| Switching Frequency | Typ. 280 kHz |
| Lead Temperature | 260°C (1,5 mm from case for 10 sec.) |
| Dimensions [mm] | 50,8 x 25,4 x 11,0 |
| Weight | 40,5 g |
| MTBF | 2.840.000h acc. to MIL-HDBK-217F (GB,25°) |
| Fire & Smoke | EN 45545-2 |

ENVIRONMENTAL

| | |
|--------------------------|-------------------|
| Operating Ambient Temp. | -40°C up to +95°C |
| Operating Case Temp. | max. +105°C |
| Storage Temperature | -50°C to +125°C |
| Vibration / Shock / Bump | EN 61373, Cat. 1B |

EMC & SAFETY

| | |
|---|---|
| EMC Standard | EN 50121-3-2 |
| Conducted Emissions | EN 55032, FCC Level A, Class A*** |
| ESD Immunity | EN 61000-4-2 Air ± 8 kV, Contact ± 6 kV, Criteria A |
| Burst | EN 61000-4-4 ± 2 kV, Criteria A**** |
| Surge | EN 61000-4-5 ± 2 kV, Criteria A**** |
| Conducted Immunity | EN 61000-4-6 10 Vrms, Criteria A |
| Radiated Immunity | EN 61000-4-3 20 V/m, Criteria A |
| Power Frequency Magnetic Field Immunity | EN 61000-4-8, 3 A/m, Criteria A |
| Safety | UL/cUL 60950-1 recognition (UL certificate), IEC/EN 60950-1 (CB-report), IEC 60571 UL/cUL 62368-1 recognition (UL certificate), IEC/EN 62368-1 (CB-report) |

* For $T_{amb} = 25^{\circ}\text{C}$, $V_{in nom}$, $I_{out nom}$

** 5 V_o , 12 V_o 15 V_o = Measured with a 10 $\mu\text{F}/25$ V MLCC
24 V_o = Measured with a 4,7 $\mu\text{F}/50$ V MLCC

*** In built-in condition our devices may show different EMC properties

**** See note 5 page 7

TECHNICAL DATA

For $T_{amb} = 25^{\circ}\text{C}$, $V_{in\ nom}$, $I_{out\ nom}$ unless otherwise specified.

SINGLE OUTPUT

SPECIFICATION Input 9 - 36 VDC (12/24 Vin nom) ; K = with Heatsink

| | TYPE | Unit | AER10-24S05 AER10-24S05/K | | | AER10-24S12 AER10-24S12/K | | | AER10-24S15 AER10-24S15/K | | | AER10-24S24 AER10-24S24/K | | |
|--------|---|------|---|------------------------------------|------|------------------------------|------------------------------------|-----|------------------------------|------------------------------------|-----|------------------------------|------------------------------------|-----|
| | | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max |
| | | | ORDER NUMBER | 11 75 11 1211 2 11 75 11 1214 5 | | | 11 75 11 1221 5 11 75 11 1224 8 | | | 11 75 11 1231 8 11 75 11 1234 2 | | | 11 75 11 1241 2 11 75 11 1244 5 | |
| INPUT | Input Voltage Operating | V | 9...36 | | | | | | | | | | | |
| | Input Voltage Range | V | 9...50 (t ≤ 100 ms) | | | | | | | | | | | |
| | Under Voltage Turn-on (typical) | V | 9 | | | | | | | | | | | |
| | Under Voltage Turn-off (typical) | V | 7,5 | | | | | | | | | | | |
| | Input Current @ Full Load | mA | | 496 | | | 485 | | | 481 | | | | 474 |
| | Input Current @ No Load (typical) | mA | 25 | | | | | | | | | | | |
| | Standby Input Current (typical) | mA | 2,5 | | | | | | | | | | | |
| OUTPUT | Output Voltage | V | 5 | | | 12 | | | 15 | | | 24 | | |
| | Output Current (typical) | mA | 2000 | | | 835 | | | 670 | | | 417 | | |
| | Output Power | W | 10 | | | | | | | | | | | |
| | Max. Capacitive Load | μF | | | 2200 | | | 330 | | | 220 | | | 100 |
| | Efficiency @ Full Load | % | | 84 | | | 86 | | | 87 | | | 88 | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | | | | | | | |
| | Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ±5 | | | | | | | | | | | |

SPECIFICATION Input 18 - 75 VDC (36/48 Vin nom) ; K = with Heatsink

| | TYPE | Unit | AER10-48S05 AER10-48S05/K | | | AER10-48S12 AER10-48S12/K | | | AER10-48S15 AER10-48S15/K | | | AER10-48S24 AER10-48S24/K | | |
|--------|---|------|---|------------------------------------|------|------------------------------|------------------------------------|-----|------------------------------|------------------------------------|-----|------------------------------|------------------------------------|-----|
| | | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max |
| | | | ORDER NUMBER | 11 75 11 1511 8 11 75 11 1514 2 | | | 11 75 11 1521 2 11 75 11 1524 5 | | | 11 75 11 1531 5 11 75 11 1534 8 | | | 11 75 11 1541 8 11 75 11 1544 2 | |
| INPUT | Input Voltage Operating | V | 18...75 | | | | | | | | | | | |
| | Input Voltage Range | V | 18...100 (t ≤ 100 ms) | | | | | | | | | | | |
| | Under Voltage Turn-on (typical) | V | 18 | | | | | | | | | | | |
| | Under Voltage Turn-off (typical) | V | 16 | | | | | | | | | | | |
| | Input Current @ Full Load | mA | | 245 | | | 240 | | | 241 | | | 242 | |
| | Input Current @ No Load (typical) | mA | 15 | | | | | | | | | | | |
| | Standby Input Current (typical) | mA | 2,5 | | | | | | | | | | | |
| OUTPUT | Output Voltage | V | 5 | | | 12 | | | 15 | | | 24 | | |
| | Output Current (typical) | mA | 2000 | | | 835 | | | 670 | | | 417 | | |
| | Output Power | W | 10 | | | | | | | | | | | |
| | Max. Capacitive Load | μF | | | 2200 | | | 330 | | | 220 | | | 100 |
| | Efficiency @ Full Load | % | | 85 | | | 87 | | | 87 | | | 86 | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | | | | | | | |
| | Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ±5 | | | | | | | | | | | |

SPECIFICATION Input 40 - 160 VDC (72/110 Vin nom) ; K = with Heatsink

| | TYPE | Unit | AER10-110S05 AER10-110S05/K | | | AER10-110S12 AER10-110S12/K | | | AER10-110S15 AER10-110S15/K | | | AER10-110S24 AER10-110S24/K | | |
|--------|---|------|---|------------------------------------|------|--------------------------------|------------------------------------|-----|--------------------------------|------------------------------------|-----|--------------------------------|------------------------------------|-----|
| | | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max |
| | | | ORDER NUMBER | 11 75 11 1711 3 11 75 11 1714 6 | | | 11 75 11 1721 6 11 75 11 1724 9 | | | 11 75 11 1731 9 11 75 11 1734 3 | | | 11 75 11 1741 3 11 75 11 1744 6 | |
| INPUT | Input Voltage Operating | V | 40...160 | | | | | | | | | | | |
| | Input Voltage Range | V | 40...170 (t ≤ 100 ms) | | | | | | | | | | | |
| | Under Voltage Turn-on (typical) | V | 40 | | | | | | | | | | | |
| | Under Voltage Turn-off (typical) | V | 37 | | | | | | | | | | | |
| | Input Current @ Full Load | mA | | 111 | | | 107 | | | 107 | | | 107 | |
| | Input Current @ No Load (typical) | mA | 10 | | | | | | | | | | | |
| | Standby Input Current (typical) | mA | 2,5 | | | | | | | | | | | |
| OUTPUT | Output Voltage | V | 5 | | | 12 | | | 15 | | | 24 | | |
| | Output Current (typical) | mA | 2000 | | | 835 | | | 670 | | | 417 | | |
| | Output Power | W | 10 | | | | | | | | | | | |
| | Max. Capacitive Load | μF | | | 2200 | | | 330 | | | 220 | | | 100 |
| | Efficiency @ Full Load | % | | 82 | | | 85 | | | 85 | | | 85 | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | | | | | | | |
| | Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ±5 | | | | | | | | | | | |



TECHNICAL DATA

For $T_{amb} = 25^{\circ}\text{C}$, $V_{in\ nom}$, $I_{out\ nom}$ unless otherwise specified.

DUAL OUTPUT

SPECIFICATION Input 9 - 36 VDC (12/24 Vin nom) ; K = with Heatsink

| TYPE | | AER10-24D12 AER10-24D12/K | | | AER10-24D15 AER10-24D15/K | | | |
|----------------|---|------------------------------------|---|-----|------------------------------------|------|-----|------|
| ORDER NUMBER | | 11 75 11 1222 9 11 75 11 1225 3 | | | 11 75 11 1232 3 11 75 11 1235 6 | | | |
| CHARACTERISTIC | Unit | Min | Typ | Max | Min | Typ | Max | |
| INPUT | Input Voltage Operating | 9...36 | | | | | | |
| | Input Voltage Range | 9...50 (t ≤ 100 ms) | | | | | | |
| | Under Voltage Turn-on (typical) | 9 | | | | | | |
| | Under Voltage Turn-off (typical) | 7,5 | | | | | | |
| | Input Current @ Full Load | mA | | 485 | | | 481 | |
| | Input Current @ No Load (typical) | mA | 25 | | | | | |
| | Standby Input Current (typical) | mA | 2,5 | | | | | |
| OUTPUT | Output Voltage | V | ±12 | | | ±15 | | |
| | Output Current (typical) | mA | ±417 | | | ±335 | | |
| | Output Power | W | 10 | | | | | |
| | Max. Capacitive Load | μF | | | 150# | | | 100# |
| | Efficiency @ Full Load | % | | 86 | | | 87 | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | |
| | Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ±5 | | | | | |

SPECIFICATION Input 18 - 75 VDC (36/48 Vin nom) ; K = with Heatsink

| TYPE | | AER10-48D12 AER10-48D12/K | | | AER10-48D15 AER10-48D15/K | | | |
|----------------|---|------------------------------------|---|-----|------------------------------------|------|-----|------|
| ORDER NUMBER | | 11 75 11 1522 6 11 75 11 1525 9 | | | 11 75 11 1532 9 11 75 11 1535 3 | | | |
| CHARACTERISTIC | Unit | Min | Typ | Max | Min | Typ | Max | |
| INPUT | Input Voltage Operating | 18...75 | | | | | | |
| | Input Voltage Range | 18...100 (t ≤ 100 ms) | | | | | | |
| | Under Voltage Turn-on (typical) | 18 | | | | | | |
| | Under Voltage Turn-off (typical) | 16 | | | | | | |
| | Input Current @ Full Load | mA | | 234 | | | 238 | |
| | Input Current @ No Load (typical) | mA | 15 | | | | | |
| | Standby Input Current (typical) | mA | 2,5 | | | | | |
| OUTPUT | Output Voltage | V | ±12 | | | ±15 | | |
| | Output Current (typical) | mA | ±417 | | | ±335 | | |
| | Output Power | W | 10 | | | | | |
| | Max. Capacitive Load | μF | | | 150# | | | 100# |
| | Efficiency @ Full Load | % | | 89 | | | 88 | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | |
| | Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ±5 | | | | | |

SPECIFICATION Input 40 - 160 VDC (72/110 Vin nom) ; K = with Heatsink

| TYPE | | AER10-110D12 AER10-110D12/K | | | AER10-110D15 AER10-110D15/K | | | |
|----------------|---|------------------------------------|---|-----|------------------------------------|------|-----|------|
| ORDER NUMBER | | 11 75 11 1722 1 11 75 11 1725 4 | | | 11 75 11 1732 4 11 75 11 1735 7 | | | |
| CHARACTERISTIC | Unit | Min | Typ | Max | Min | Typ | Max | |
| INPUT | Input Voltage Operating | 40...160 | | | | | | |
| | Input Voltage Range | 40...170 (t ≤ 100 ms) | | | | | | |
| | Under Voltage Turn-on (typical) | 40 | | | | | | |
| | Under Voltage Turn-off (typical) | 37 | | | | | | |
| | Input Current @ Full Load | mA | | 106 | | | 106 | |
| | Input Current @ No Load (typical) | mA | 10 | | | | | |
| | Standby Input Current (typical) | mA | 2,5 | | | | | |
| OUTPUT | Output Voltage | V | ±12 | | | ±15 | | |
| | Output Current (typical) | mA | ±417 | | | ±335 | | |
| | Output Power | W | 10 | | | | | |
| | Max. Capacitive Load | μF | | | 150# | | | 100# |
| | Efficiency @ Full Load | % | | 86 | | | 86 | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | |
| | Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ±5 | | | | | |

For each output



TECHNICAL DATA

For $T_{amb} = 25^{\circ}\text{C}$, $V_{in nom}$, $I_{out nom}$, unless otherwise specified.

SINGLE OUTPUT – A-PINNING

SPECIFICATION Input 9 - 36 VDC (12/24 Vin nom) ; K = with Heatsink

| | TYPE | AER10A-24S05 AER10A-24S05/K | | | AER10A-24S12 AER10A-24S12/K | | | AER10A-24S15 AER10A-24S15/K | | | AER10A-24S24 AER10A-24S24/K | | | | | |
|--------|---|--------------------------------|---|-----|------------------------------------|-----|-----|------------------------------------|-----|-----|------------------------------------|-----|-----|------------------------------------|-----|--|
| | | ORDER NUMBER | | | 11 75 11 1217 8 11 75 11 1218 3 | | | 11 75 11 1227 2 11 75 11 1228 6 | | | 11 75 11 1237 5 11 75 11 1238 9 | | | 11 75 11 1247 8 11 75 11 1248 3 | | |
| | | CHARACTERISTIC | Unit | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| INPUT | Input Voltage Operating | V | 9...36 | | | | | | | | | | | | | |
| | Input Voltage Range | V | 9...50 (t ≤ 100 ms) | | | | | | | | | | | | | |
| | Under Voltage Turn-on (typical) | V | 9 | | | | | | | | | | | | | |
| | Under Voltage Turn-off (typical) | V | 7,5 | | | | | | | | | | | | | |
| | Input Current @ Full Load | mA | | 496 | | | 485 | | | 481 | | | 474 | | | |
| | Input Current @ No Load (typical) | mA | 25 | | | | | | | | | | | | | |
| | Standby Input Current (typical) | mA | 2,5 | | | | | | | | | | | | | |
| OUTPUT | Output Voltage | V | 5 | | | 12 | | | 15 | | | 24 | | | | |
| | Output Current (typical) | mA | 2000 | | | 835 | | | 670 | | | 417 | | | | |
| | Output Power | W | 10 | | | | | | | | | | | | | |
| | Max. Capacitive Load | μF | | | 2200 | | | 330 | | | 220 | | | 100 | | |
| | Efficiency @ Full Load | % | | 84 | | | 86 | | | 87 | | | 88 | | | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | | | | | | | | | |
| | Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ±5 | | | | | | | | | | | | | |

SPECIFICATION Input 18 - 75 VDC (36/48 Vin nom) ; K = with Heatsink

| | TYPE | AER10A-48S05 AER10A-48S05/K | | | AER10A-48S12 AER10A-48S12/K | | | AER10A-48S15 AER10A-48S15/K | | | AER10A-48S24 AER10A-48S24/K | | | | | |
|--------|---|--------------------------------|---|-----|------------------------------------|-----|-----|------------------------------------|-----|-----|------------------------------------|-----|-----|------------------------------------|-----|--|
| | | ORDER NUMBER | | | 11 75 11 1517 5 11 75 11 1518 9 | | | 11 75 11 1527 8 11 75 11 1528 3 | | | 11 75 11 1537 2 11 75 11 1538 6 | | | 11 75 11 1547 5 11 75 11 1548 9 | | |
| | | CHARACTERISTIC | Unit | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| INPUT | Input Voltage Operating | V | 18...75 | | | | | | | | | | | | | |
| | Input Voltage Range | V | 18...100 (t ≤ 100 ms) | | | | | | | | | | | | | |
| | Under Voltage Turn-on (typical) | V | 18 | | | | | | | | | | | | | |
| | Under Voltage Turn-off (typical) | V | 16 | | | | | | | | | | | | | |
| | Input Current @ Full Load | mA | | 245 | | | 240 | | | 241 | | | 242 | | | |
| | Input Current @ No Load (typical) | mA | 15 | | | | | | | | | | | | | |
| | Standby Input Current (typical) | mA | 2,5 | | | | | | | | | | | | | |
| OUTPUT | Output Voltage | V | 5 | | | 12 | | | 15 | | | 24 | | | | |
| | Output Current (typical) | mA | 2000 | | | 835 | | | 670 | | | 417 | | | | |
| | Output Power | W | 10 | | | | | | | | | | | | | |
| | Max. Capacitive Load | μF | | | 2200 | | | 330 | | | 220 | | | 100 | | |
| | Efficiency @ Full Load | % | | 85 | | | 87 | | | 87 | | | 86 | | | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | | | | | | | | | |
| | Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ±5 | | | | | | | | | | | | | |

SPECIFICATION Input 40 - 160 VDC (72/110 Vin nom) ; K = with Heatsink

| | TYPE | AER10A-110S05 AER10A-110S05/K | | | AER10A-110S12 AER10A-110S12/K | | | AER10A-110S15 AER10A-110S15/K | | | AER10A-110S24 AER10A-110S24/K | | | | | |
|--------|---|----------------------------------|---|-----|------------------------------------|-----|-----|------------------------------------|-----|-----|------------------------------------|-----|-----|------------------------------------|-----|--|
| | | ORDER NUMBER | | | 11 75 11 1717 9 11 75 11 1718 4 | | | 11 75 11 1727 3 11 75 11 1728 7 | | | 11 75 11 1737 6 11 75 11 1738 1 | | | 11 75 11 1747 9 11 75 11 1748 4 | | |
| | | CHARACTERISTIC | Unit | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| INPUT | Input Voltage Operating | V | 40...160 | | | | | | | | | | | | | |
| | Input Voltage Range | V | 40...170 (t ≤ 100 ms) | | | | | | | | | | | | | |
| | Under Voltage Turn-on (typical) | V | 40 | | | | | | | | | | | | | |
| | Under Voltage Turn-off (typical) | V | 37 | | | | | | | | | | | | | |
| | Input Current @ Full Load | mA | | 111 | | | 107 | | | 107 | | | 107 | | | |
| | Input Current @ No Load (typical) | mA | 10 | | | | | | | | | | | | | |
| | Standby Input Current (typical) | mA | 2,5 | | | | | | | | | | | | | |
| OUTPUT | Output Voltage | V | 5 | | | 12 | | | 15 | | | 24 | | | | |
| | Output Current (typical) | mA | 2000 | | | 835 | | | 670 | | | 417 | | | | |
| | Output Power | W | 10 | | | | | | | | | | | | | |
| | Max. Capacitive Load | μF | | | 2200 | | | 330 | | | 220 | | | 100 | | |
| | Efficiency @ Full Load | % | | 82 | | | 85 | | | 85 | | | 85 | | | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | | | | | | | | | |
| | Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ±5 | | | | | | | | | | | | | |



TECHNICAL DATA

For $T_{amb} = 25^{\circ}\text{C}$, $V_{in\ nom}$, $I_{out\ nom}$ unless otherwise specified.

DUAL OUTPUT – A-PINNING

SPECIFICATION Input 9 - 36 VDC (12/24 Vin nom) ; K = with Heatsink

| | TYPE | Unit | AER10A-24D12 AER10A-24D12/K | | | AER10A-24D15 AER10A-24D15/K | | |
|--|-----------------------------------|---------------|---|-----|------|------------------------------------|-----|------|
| | | | Min | Typ | Max | Min | Typ | Max |
| | ORDER NUMBER | | 11 75 11 1257 2 11 75 11 1258 6 | | | 11 75 11 1267 5 11 75 11 1268 9 | | |
| INPUT | Input Voltage Operating | V | 9...36 | | | | | |
| | Input Voltage Range | V | 9...50 ($t \leq 100$ ms) | | | | | |
| | Under Voltage Turn-on (typical) | V | 9 | | | | | |
| | Under Voltage Turn-off (typical) | V | 7,5 | | | | | |
| | Input Current @ Full Load | mA | | 485 | | | 481 | |
| | Input Current @ No Load (typical) | mA | 25 | | | | | |
| | Standby Input Current (typical) | mA | 2,5 | | | | | |
| OUTPUT | Output Voltage | V | ± 12 | | | ± 15 | | |
| | Output Current (typical) | mA | ± 417 | | | ± 335 | | |
| | Output Power | W | 10 | | | | | |
| | Max. Capacitive Load | μF | | | 150# | | | 100# |
| | Efficiency @ Full Load | % | | 86 | | | 87 | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | |
| Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ± 5 | | | | | | |

SPECIFICATION Input 18 - 75 VDC (36/48 Vin nom) ; K = with Heatsink

| | TYPE | Unit | AER10A-48D12 AER10A-48D12/K | | | AER10A-48D15 AER10A-48D15/K | | |
|--|-----------------------------------|---------------|---|-----|------|------------------------------------|-----|------|
| | | | Min | Typ | Max | Min | Typ | Max |
| | ORDER NUMBER | | 11 75 11 1557 8 11 75 11 1558 3 | | | 11 75 11 1567 2 11 75 11 1568 6 | | |
| INPUT | Input Voltage Operating | V | 18...75 | | | | | |
| | Input Voltage Range | V | 18...100 ($t \leq 100$ ms) | | | | | |
| | Under Voltage Turn-on (typical) | V | 18 | | | | | |
| | Under Voltage Turn-off (typical) | V | 16 | | | | | |
| | Input Current @ Full Load | mA | | 234 | | | 238 | |
| | Input Current @ No Load (typical) | mA | 15 | | | | | |
| Standby Input Current (typical) | mA | 2,5 | | | | | | |
| OUTPUT | Output Voltage | V | ± 12 | | | ± 15 | | |
| | Output Current (typical) | mA | ± 417 | | | ± 335 | | |
| | Output Power | W | 10 | | | | | |
| | Max. Capacitive Load | μF | | | 150# | | | 100# |
| | Efficiency @ Full Load | % | | 89 | | | 88 | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | |
| Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ± 5 | | | | | | |

SPECIFICATION Input 40 - 160 VDC (72/110 Vin nom) ; K = with Heatsink

| | TYPE | Unit | AER10A-110D12 AER10A-110D12/K | | | AER10A-110D15 AER10A-110D15/K | | |
|--|-----------------------------------|---------------|---|-----|------|------------------------------------|-----|------|
| | | | Min | Typ | Max | Min | Typ | Max |
| | ORDER NUMBER | | 11 75 11 1757 3 11 75 11 1758 7 | | | 11 75 11 1767 6 11 75 11 1768 1 | | |
| INPUT | Input Voltage Operating | V | 40...160 | | | | | |
| | Input Voltage Range | V | 40...170 ($t \leq 100$ ms) | | | | | |
| | Under Voltage Turn-on (typical) | V | 40 | | | | | |
| | Under Voltage Turn-off (typical) | V | 37 | | | | | |
| | Input Current @ Full Load | mA | | 106 | | | 106 | |
| | Input Current @ No Load (typical) | mA | 10 | | | | | |
| Standby Input Current (typical) | mA | 2,5 | | | | | | |
| OUTPUT | Output Voltage | V | ± 12 | | | ± 15 | | |
| | Output Current (typical) | mA | ± 417 | | | ± 335 | | |
| | Output Power | W | 10 | | | | | |
| | Max. Capacitive Load | μF | | | 150# | | | 100# |
| | Efficiency @ Full Load | % | | 86 | | | 86 | |
| | Short Circuit Current (typical) | | hiccup mode 150 %, pulse approx 0,3Hz, automatic recovery | | | | | |
| Transient Response 75% / 100% Load Step, Recovery Time < 300 μs | % | ± 5 | | | | | | |

For each output

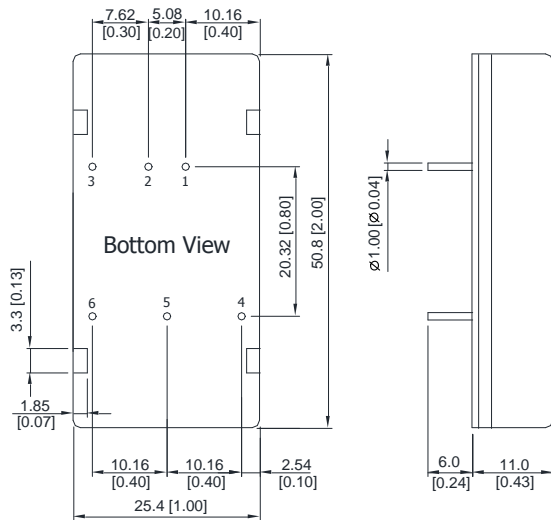


TECHNICAL DATA

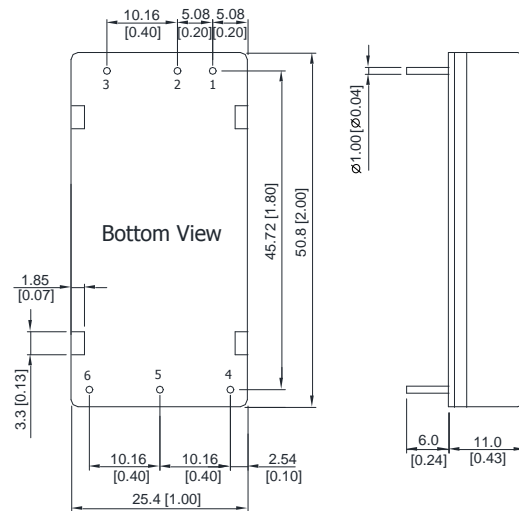
For $T_{amb} = 25^{\circ}\text{C}$, $V_{in\ nom}$, $I_{out\ nom}$ unless otherwise specified.

MECHANICAL DETAILS

1. Dimensions are in mm [inches].
2. Tolerance: $X.X \pm 0.75$ ($X.XX \pm 0.03$)
 $X.XX \pm 0.25$ ($X.XXX \pm 0.01$)
3. Pin diameter $\varnothing 1.0 \pm 0.05$ (0.04 ± 0.002)



A-Pinning



Case Material: Red Copper, Powder Coating
 Base Material: FR4 PCB (flammability to UL 94V-0 rated)
 Insulated Frame Material: Non-Conductive Black Plastic (flammability to UL 94V-0 rated)
 Pin Material: Tinned Copper
 Potting Material: Epoxy (flammability to UL 94V-0 rated)

PINNING

| Pin | Single Output | Dual Output |
|-----|-------------------|-------------------|
| 1 | +V _{in} | +V _{in} |
| 2 | -V _{in} | -V _{in} |
| 3 | Remote On/Off | Remote On/Off |
| 4 | +V _{out} | +V _{out} |
| 5 | Trim | Common |
| 6 | -V _{out} | -V _{out} |

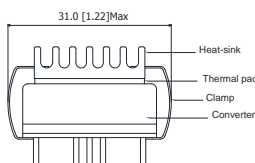
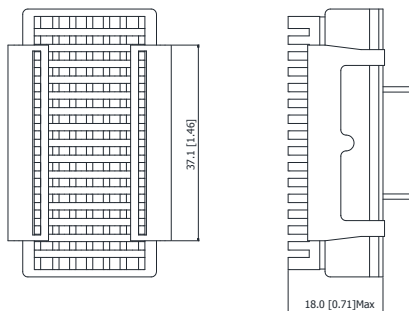
PINNING

| Pin | Single Output | Dual Output |
|-----|-------------------|-------------------|
| 1 | +V _{in} | +V _{in} |
| 2 | -V _{in} | -V _{in} |
| 3 | Remote On/Off | Remote On/Off |
| 4 | +V _{out} | +V _{out} |
| 5 | -V _{out} | Common |
| 6 | Trim | -V _{out} |

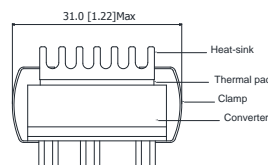
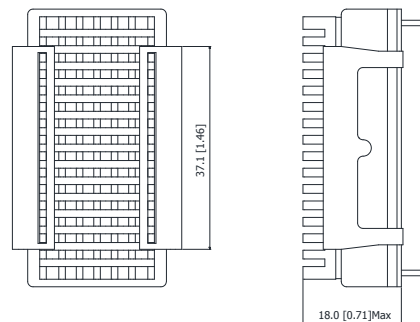
MECHANICAL DETAILS

Heatsink (Option, -HS)

- The advantages of adding a heatsink are:
1. To improve heat dissipation and increase the stability and reliability of the DC/DC converters at high operating temperatures.
 2. To increase operating temperature of the DC/DC converter, please refer to Derating Curve.



A-Pinning



Heatsink Material: Aluminum
 Finish: Black Anodized Coating
 Weight: 9 g

DESCRIPTION OF FEATURES

NOTES

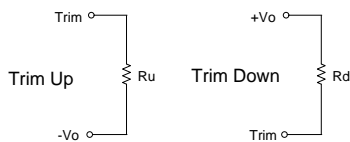
- 1 Specifications typical at $T_a = +25^\circ\text{C}$, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Transient recovery time is measured to within 1% error band for a step change in output load of 75 % to 100 %.
- 3 We recommend to protect the converter by a slow blow fuse in the input supply line.
- 4 Other input and output voltage may be available, please contact factory.
- 5 To meet EN61000-4-4 & EN61000-4-5 an external capacitor across the input pins is required.
Suggested capacitor: 24XXX: CHEMI-CON KY Series 390 $\mu\text{F}/63\text{ V}$.
48XXX: CHEMI-CON KY Series 330 $\mu\text{F}/100\text{ V}$.
110XXX: CHEMI-CON KXG Series 220 $\mu\text{F}/250\text{ V}$.
- 6 That "natural convection" is about 20 LFM but is not equal to still air (0 LFM).
- 7 Specifications are subject to change without notice.

Installation instructions:

The converters have to be installed according to the guidelines currently in force, like other open electronic component assemblies. Attention must be paid to sufficient ventilation, carry off heat, fastening and protection against accidental contact. Case temperature must not exceed $+105^\circ\text{C}$. See Power Derating Curve and note 6. Fault protection: The converters have no internal fuse. In order to achieve maximum safety and system protection, always use an input a time-lag fuse corresponding to IEC 60127-2 (see note 3). Pay attention on sufficient current source in case of short circuit.

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below



AER10-XXS05 Trim Table

| Trim down | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| Vout= | Vox0.99 | Vox0.98 | Vox0.97 | Vox0.96 | Vox0.95 | Vox0.94 | Vox0.93 | Vox0.92 | Vox0.91 | Vox0.90 | Volts |
| Rd= | 137.88 | 61.93 | 36.61 | 23.95 | 16.35 | 11.29 | 7.67 | 4.96 | 2.85 | 1.16 | kOhms |
| Trim up | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
| Vout= | Vox1.01 | Vox1.02 | Vox1.03 | Vox1.04 | Vox1.05 | Vox1.06 | Vox1.07 | Vox1.08 | Vox1.09 | Vox1.10 | Volts |
| Ru= | 108.09 | 48.39 | 28.49 | 18.54 | 12.56 | 8.58 | 5.74 | 3.61 | 1.95 | 0.62 | kOhms |

AER10-XXS12 Trim Table

| Trim down | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| Vout= | Vox0.99 | Vox0.98 | Vox0.97 | Vox0.96 | Vox0.95 | Vox0.94 | Vox0.93 | Vox0.92 | Vox0.91 | Vox0.90 | Volts |
| Rd= | 419.81 | 187.68 | 110.30 | 71.61 | 48.40 | 32.93 | 21.87 | 13.58 | 7.13 | 1.98 | kOhms |
| Trim up | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
| Vout= | Vox1.01 | Vox1.02 | Vox1.03 | Vox1.04 | Vox1.05 | Vox1.06 | Vox1.07 | Vox1.08 | Vox1.09 | Vox1.10 | Volts |
| Ru= | 344.74 | 154.37 | 90.92 | 59.19 | 40.15 | 27.46 | 18.39 | 11.59 | 6.31 | 2.07 | kOhms |

AER10-XXS15 Trim Table

| Trim down | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| Vout= | Vox0.99 | Vox0.98 | Vox0.97 | Vox0.96 | Vox0.95 | Vox0.94 | Vox0.93 | Vox0.92 | Vox0.91 | Vox0.90 | Volts |
| Rd= | 602.92 | 269.91 | 158.91 | 103.41 | 70.10 | 47.90 | 32.05 | 20.15 | 10.90 | 3.50 | kOhms |
| Trim up | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
| Vout= | Vox1.01 | Vox1.02 | Vox1.03 | Vox1.04 | Vox1.05 | Vox1.06 | Vox1.07 | Vox1.08 | Vox1.09 | Vox1.10 | Volts |
| Ru= | 482.88 | 215.89 | 126.89 | 82.40 | 55.70 | 37.90 | 25.18 | 15.65 | 8.23 | 2.30 | kOhms |

AER10-XXS24 Trim Table

| Trim down | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| Vout= | Vox0.99 | Vox0.98 | Vox0.97 | Vox0.96 | Vox0.95 | Vox0.94 | Vox0.93 | Vox0.92 | Vox0.91 | Vox0.90 | Volts |
| Rd= | 598.97 | 267.93 | 157.59 | 102.42 | 69.31 | 47.25 | 31.48 | 19.66 | 10.46 | 3.11 | kOhms |
| Trim up | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | % |
| Vout= | Vox1.01 | Vox1.02 | Vox1.03 | Vox1.04 | Vox1.05 | Vox1.06 | Vox1.07 | Vox1.08 | Vox1.09 | Vox1.10 | Volts |
| Ru= | 486.83 | 217.87 | 128.21 | 83.38 | 56.49 | 38.56 | 25.75 | 16.14 | 8.67 | 2.69 | kOhms |

REMOTE ON/OFF

Positive logic remote on/off turns the module on during a logic high voltage on the remote on/off pin, and off during a logic low. To turn the power module on and off, the user must supply a switch to control the voltage between the on/off terminal and the -Vin terminal. The switch can be an open collector or equivalent. A logic low is 0 V to 1,2 V. A logic high is 3,5 V to 12 V. The maximum sink current at the on/off terminal (Pin 3) during a logic low is -100µA.

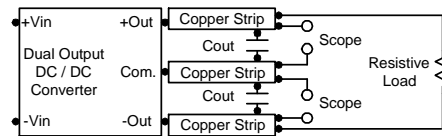
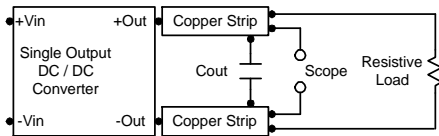
When not in use, leave Remote pin not-connected.

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------|------------------------------|------|------|------|------|
| Converter On | 3,5 V ~ 12 V or Open Circuit | | | | |
| Converter Off | 0 V ~ 1,2 V or Short Circuit | | | | |
| Control Input Current (on) | Vctrl = 5,0 V | --- | 0,5 | --- | mA |
| Control Input Current (off) | Vctrl = 0 V | --- | -0,5 | --- | mA |
| Control Common | Referenced to Negative Input | | | | |
| Standby Input Current | Nominal Vin | --- | 2,5 | --- | mA |

TEST SETUP

Peak-to-Peak Output Noise Measurement Test

Use a 1 µF ceramic capacitor and a 10 µF tantalum capacitor. Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20 MHz. Position the load between 50 mm and 75 mm from the DC/DC Converter.



TECHNICAL NOTES

Overload Protection

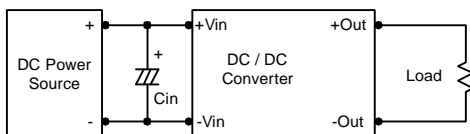
To provide hiccup mode protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure overload for an unlimited duration.

Overvoltage Protection

The output overvoltage clamp consists of control circuitry, which is independent of the primary regulation loop, that monitors the voltage on the output terminals. The control loop of the clamp has a higher voltage set point than the primary loop. This provides a redundant voltage control that reduces the risk of output overvoltage. The OVP level can be found in the output data.

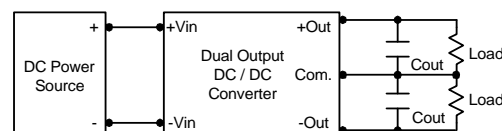
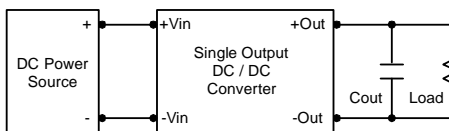
Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup. Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1 Ω at 100 kHz) capacitor of 4,7 µF for the 24 V input devices, a 2,2 µF for the 48 V devices and a 1 µF for the 110 V devices.



Output Ripple Reduction

A good quality low ESR capacitor placed as close as practicable across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 4,7 µF capacitors at the output.



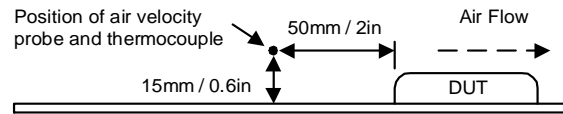
Maximum Capacitive Load

The AER10 series has limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. The maximum capacitance can be found in the output data.

APPLICATION NOTES

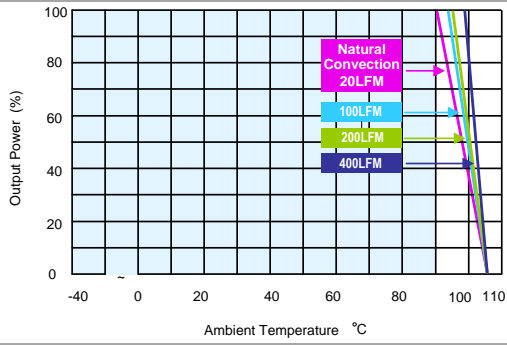
Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 105°C. The derating curves are determined from measurements obtained in a test setup.

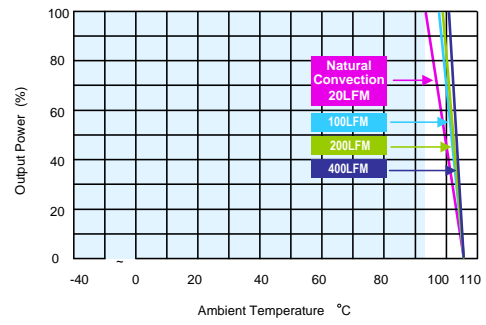


| Parameter | Conditions / Model | Min. | Max. | | Unit |
|--|--|------|------------------|---------------|------|
| | | | without Heatsink | with Heatsink | |
| Operating Ambient Temperature Range Natural Convection (see note 6 page 7) Nominal Vin, Load 100% Inom. (for Power Derating see relative Derating Curves) | AER10-48D12 | -40 | 90 | 93 | °C |
| | AER10-24S24 AER10-48D15 | | 88 | 92 | |
| | AER10-24S15, AER10-48S12, AER10-48S15 AER10-24D15 | | 87 | 90 | |
| | AER10-24S12, AER10-48S24, AER10-24D12, AER10-110D12, AER10-110D15 | | 85 | 89 | |
| | AER10-48S05, AER10-110S12, AER10-110S15, AER10-110S24 | | 84 | 88 | |
| | AER10-24S05 | | 82 | 86 | |
| | AER10-110S05 | | 78 | 83 | |
| | | | | | |
| Thermal Impedance | Natural Convection without Heatsink | 12,1 | --- | --- | °C/W |
| | Natural Convection with Heatsink | 9,8 | --- | --- | °C/W |
| | 100LFM Convection without Heatsink | 9,2 | --- | --- | °C/W |
| | 100LFM Convection with Heatsink | 5,4 | --- | --- | °C/W |
| | 200LFM Convection without Heatsink | 7,8 | --- | --- | °C/W |
| | 200LFM Convection with Heatsink | 4,5 | --- | --- | °C/W |
| | 400LFM Convection without Heatsink | 5,2 | --- | --- | °C/W |
| | 400LFM Convection with Heatsink | 3,0 | --- | --- | °C/W |

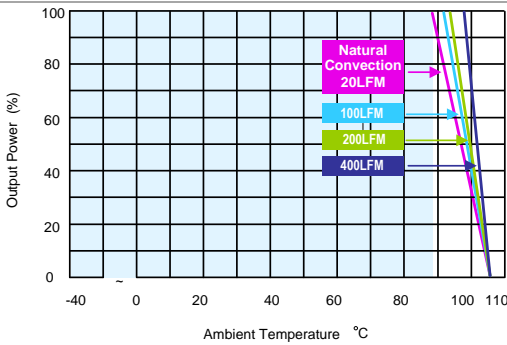
POWER DERATING CURVE



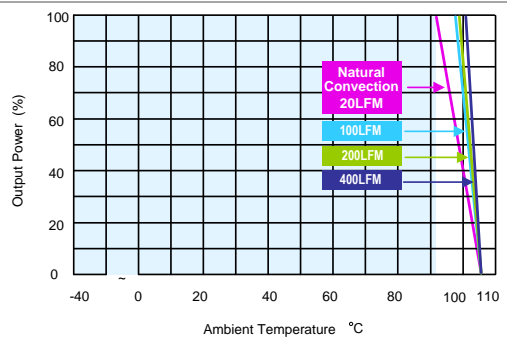
AER10-48D12 Derating Curve without Heatsink



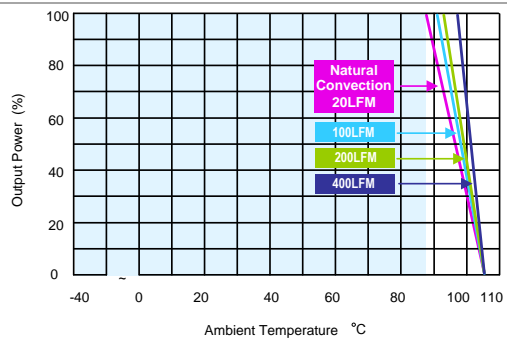
AER10-48D12 Derating Curve with Heatsink



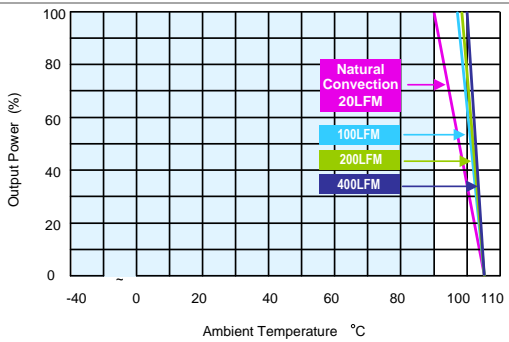
AER10-24S24, AER10-48D15 Derating Curve without Heatsink



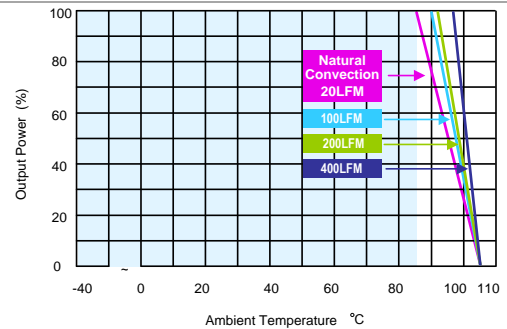
AER10-24S24, AER10-48D15 Derating Curve with Heatsink



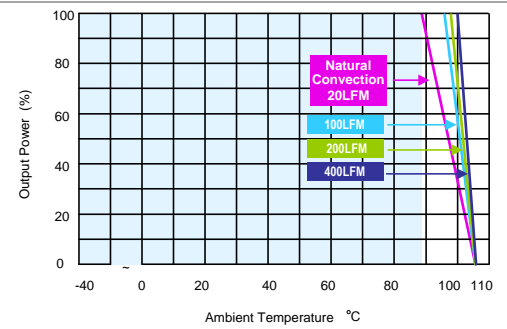
AER10-24S15, AER10-24D15, AER10-48S12, AER10-48S15 Derating Curve without Heatsink



AER10-24S15, AER10-24D15, AER10-48S12, AER10-48S15 Derating Curve with Heatsink

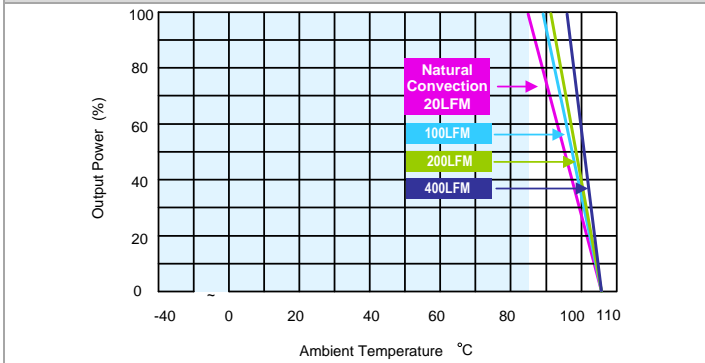


AER10-24S12, AER10-24D12, AER10-48S24, AER10-110D12, AER10-110D15 Derating Curve without Heatsink

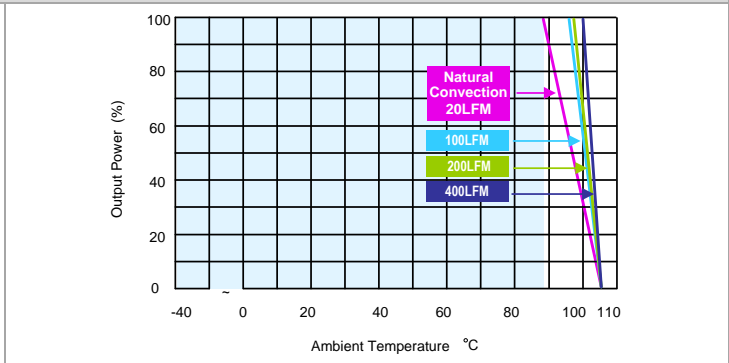


AER10-24S12, AER10-24D12, AER10-48S24, AER10-110D12, AER10-110D15 Derating Curve with Heatsink

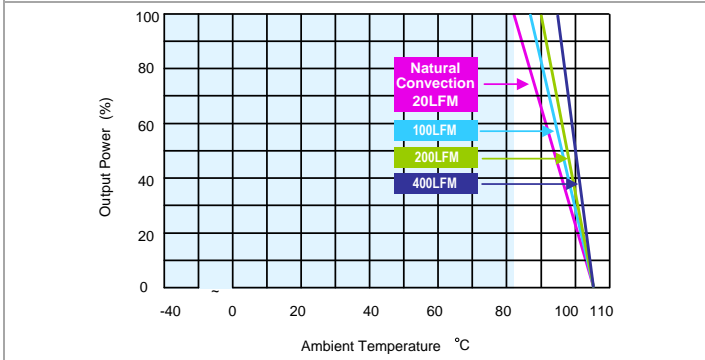
POWER DERATING CURVE



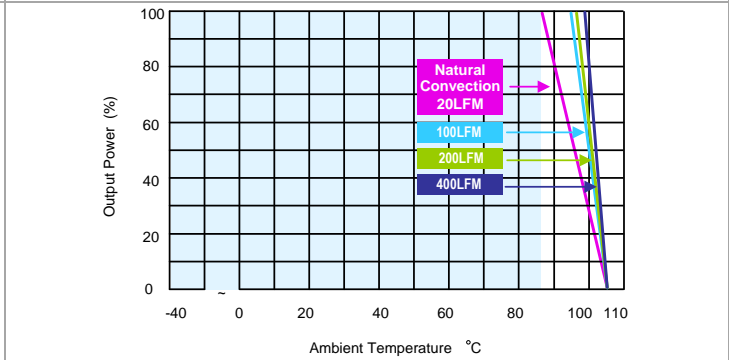
AER10-48S05, AER10-110S12, AER10-110S15, AER10-110S24
Derating Curve without Heatsink



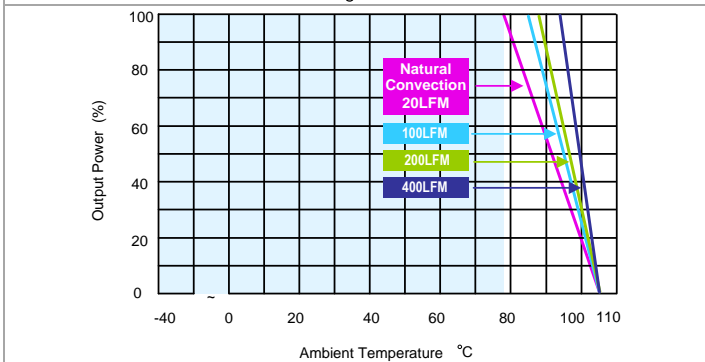
AER10-48S05, AER10-110S12, AER10-110S15, AER10-110S24
Derating Curve with Heatsink



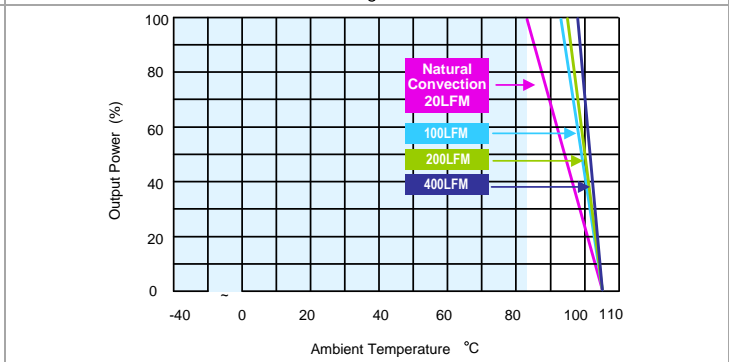
AER10-24S05 Derating Curve without Heatsink



AER10-24S05 Derating Curve with Heatsink



AER10-110S05 Derating Curve without Heatsink



AER10-110S05 Derating Curve with Heatsink