

**FEATURES:**

- Wide 2:1 Input Range
- 1600 VDC I/O Isolation
- Adjustable Output Voltage
- Soft Start
- Over Current & Over Voltage Protection
- Efficiency up to 93%
- Temperature Range -40°C to +85°C
- Remote On/Off Function
- Continuous Short Circuit Protection
- No Minimum Load Required

### Models

#### Single output



| Model        | Input Voltage (V) | Output Voltage (V) | Output Current max (A) | Maximum Capacitive Load (μF) | Efficiency (%) |
|--------------|-------------------|--------------------|------------------------|------------------------------|----------------|
| AM20E-1203SZ | 9-18              | 3.3                | 5.5                    | 10000                        | 90             |
| AM20E-1205SZ | 9-18              | 5                  | 4                      | 6800                         | 92             |
| AM20E-1212SZ | 9-18              | 12                 | 1.67                   | 1000                         | 90             |
| AM20E-1215SZ | 9-18              | 15                 | 1.33                   | 680                          | 90             |
| AM20E-2403SZ | 18-36             | 3.3                | 5.5                    | 10000                        | 91             |
| AM20E-2405SZ | 18-36             | 5                  | 4                      | 6800                         | 93             |
| AM20E-2412SZ | 18-36             | 12                 | 1.67                   | 1000                         | 91             |
| AM20E-2415SZ | 18-36             | 15                 | 1.33                   | 680                          | 91             |
| AM20E-4803SZ | 36-75             | 3.3                | 5.5                    | 10000                        | 91             |
| AM20E-4805SZ | 36-75             | 5                  | 4                      | 6800                         | 93             |
| AM20E-4812SZ | 36-75             | 12                 | 1.67                   | 1000                         | 91             |
| AM20E-4815SZ | 36-75             | 15                 | 1.33                   | 680                          | 91             |

Add suffix “-K” for optional heat sink

### Models

#### Dual output

| Model        | Input Voltage (V) | Output Voltage (V) | Output Current max (A) | Maximum Capacitive Load (μF) | Efficiency (%) |
|--------------|-------------------|--------------------|------------------------|------------------------------|----------------|
| AM20E-1212DZ | 9-18              | ±12                | ±0.835                 | ±470                         | 89             |
| AM20E-1215DZ | 9-18              | ±15                | ±0.665                 | ±330                         | 89             |
| AM20E-2412DZ | 18-36             | ±12                | ±0.835                 | ±470                         | 90             |
| AM20E-2415DZ | 18-36             | ±15                | ±0.665                 | ±330                         | 90             |
| AM20E-4812DZ | 36-75             | ±12                | ±0.835                 | ±470                         | 90             |
| AM20E-4815DZ | 36-75             | ±15                | ±0.665                 | ±330                         | 89             |

Add suffix “-K” for optional heat sink

### Input Specifications

| Parameters                     | Nominal                                                                                                    | Typical                | Maximum         | Units  |
|--------------------------------|------------------------------------------------------------------------------------------------------------|------------------------|-----------------|--------|
| Voltage range                  |                                                                                                            | 9-18<br>18-36<br>36-75 |                 | VDC    |
| Filter                         | π (Pi) Network                                                                                             |                        |                 |        |
| Start up time                  |                                                                                                            | 20                     |                 | ms     |
| Absolute Maximum Rating        | 12 Vin<br>24 Vin<br>48 Vin                                                                                 |                        | 36<br>50<br>100 | VDC    |
| Peak Input Voltage time        |                                                                                                            |                        | 100             | ms     |
| On/Off Control                 | ON : 3.0 to 12Vdc or open circuit ; OFF: 0 to 1.2Vdc or short pin2 and pin 1<br>OFF: Idle current: 5mA typ |                        |                 |        |
| Under Voltage Lockout          | 12 Vin<br>24 Vin<br>48 Vin                                                                                 | 8.6<br>17.8<br>33.5    |                 | VDC    |
| Input Reflected Ripple Current |                                                                                                            | 20                     |                 | mA p-p |

## Isolation Specifications

| Parameters                  | Conditions | Typical | Rated | Units |
|-----------------------------|------------|---------|-------|-------|
| Tested voltage Input/Output | 3 sec      |         | 1600  | VDC   |
| Case / Input & Output       |            | 1600    |       | VDC   |
| Resistance                  |            | >1000   |       | MOhm  |
| Capacitance                 |            | 1200    |       | pF    |

## Output Specifications

| Parameters                            | Conditions                                        | Typical | Maximum | Units  |
|---------------------------------------|---------------------------------------------------|---------|---------|--------|
| Voltage accuracy                      |                                                   | ±1      |         | %      |
| Voltage balance (Dual Output Models)  | Balanced Load                                     | ±1      |         | %      |
| Cross Regulation (Dual Output Models) | 25% load on one output - 100% load on second load | ±5      |         | %      |
| Over voltage protection               | Zener diode clamp                                 |         |         |        |
| Over current protection               | 140% of Full Load                                 |         |         |        |
| Short Circuit protection              | Continuous                                        |         |         |        |
| Short circuit restart                 | Auto-Recovery                                     |         |         |        |
| Line voltage regulation               | HL-LL                                             | ±0.2    |         | %      |
| Load voltage regulation (Single)      | From 0% load to 100% load                         | ±0.5    |         | %      |
| Load voltage regulation (Dual)        | Balanced Load                                     | ±1      |         | %      |
| Ripple & Noise                        | 20MHz Bandwidth<br>With 1uF ceramic capacitor     | 75      |         | mV p-p |
| Voltage adjustment range (single)     |                                                   |         | ±10     | %      |
| Transient Recovery Time               | 25% load step change ( 75%-50%-25% of Io          | 250     |         | uS     |
| Transient Recovery Deviation          | 25% load step change ( 75%-50%-25% of Io          | ±3      |         | %      |

## General Specifications

| Parameters                | Conditions                                            | Typical                 | Maximum | Units |
|---------------------------|-------------------------------------------------------|-------------------------|---------|-------|
| Switching frequency       | 100% load                                             | 330                     |         | KHz   |
| Operating temperature     | -40 to +85                                            |                         |         | °C    |
| Storage temperature       | -40 to +125                                           |                         |         | °C    |
| Maximum case temperature  |                                                       |                         | 100     | °C    |
| Temperature coefficient   |                                                       | ±0.02                   |         | %/°C  |
| Derating                  | Above +70°C                                           | 3.3                     |         | %/°C  |
| Cooling                   | Free Air Convection                                   |                         |         |       |
| Humidity                  |                                                       |                         | 95      | % RH  |
| Case material             | Nickel-coated Copper                                  |                         |         |       |
| Base material             | Non-conductive Black Plastic(UL94V-0 rated)           |                         |         |       |
| Potting material          | Epoxy (UL94V-0 rated)                                 |                         |         |       |
| Weight                    | 30                                                    |                         |         | g     |
| Dimensions (L x W x H)    | 2.00 x 1.00 x 0.40 inches                             | 50.80 x 25.40 x 10.16mm |         |       |
| MTBF                      | >684,000 hrs (MIL-HDBK -217F, Ground Benign, t=+25°C) |                         |         |       |
| Max Soldering temperature | 1.5mm from case, 10 sec. max.                         |                         | 260     | °C    |

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.

## Safety Specifications

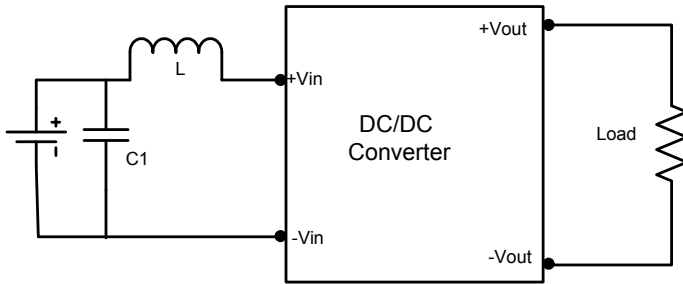
| Parameters       |                                             |
|------------------|---------------------------------------------|
| Agency Approvals | CE                                          |
| Standards        | EN55022 Class A (see note A)                |
|                  | EN61000-4-2 Perf. Criteria B                |
|                  | EN61000-4-3 Perf. Criteria A                |
|                  | EN61000-4-4 Perf. Criteria B (see note B)   |
|                  | EN61000-4-5 Perf. Criteria B (see note B)   |
|                  | EN61000-4-6 Perf. Criteria A                |
|                  | EN61000-4-8 Perf. Criteria A                |
|                  | NOTE: also designed to meets IEC/EN 60950-1 |

**Note A:** Input filter components (C1, L, see circuit below) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

**Note B:** An external filter capacitor is required if the module has to meet EN61000-4-4 and EN61000-4-5. The filter capacitor suggested value of 220uF/100V.

## Test Circuits

### Conducted Emissions



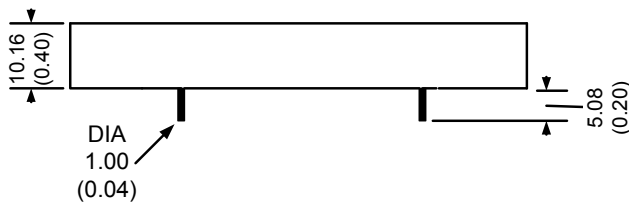
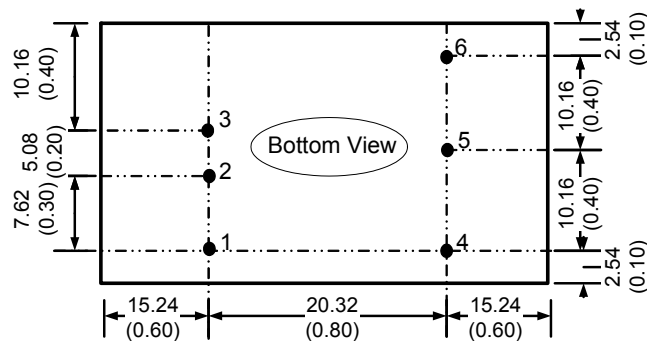
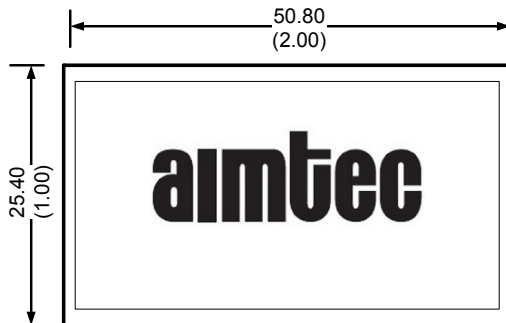
### External parts table

| Model        | C1    | L    |
|--------------|-------|------|
| AM20E-12XXXZ | 330uF | 12uH |
| AM20E-24XXXZ | 220uF | 12uH |
| AM20E-48XXXZ | 220uF | 12uH |

## Pin Out Specifications

| Pin | Single         | Dual           |
|-----|----------------|----------------|
| 1   | On/Off Control | On/Off Control |
| 2   | - V Input      | - V Input      |
| 3   | + V Input      | + V Input      |
| 4   | - V Output     | - V Output     |
| 5   | Trim           | Common         |
| 6   | + V Output     | + V Output     |

## Dimensions

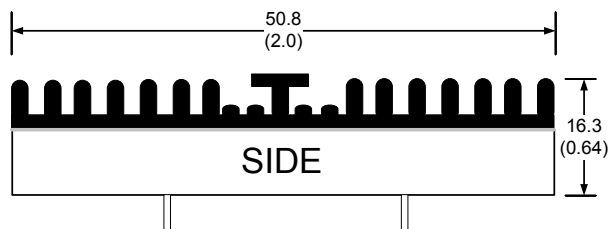


### Notes:

All dimensions are typical  
in millimeters (inches).  
Tolerance  $\pm 0.25$  ( $\pm 0.01$ )

Pin diameter:  $1.0 \pm 0.05$  ( $0.04 \pm 0.002$ )  
Pin pitch tolerance:  $\pm 0.35$  ( $\pm 0.014$ )  
Case Tolerance:  $\pm 0.5$  ( $\pm 0.02$ )

## Dimensions with Optional Heat Sink



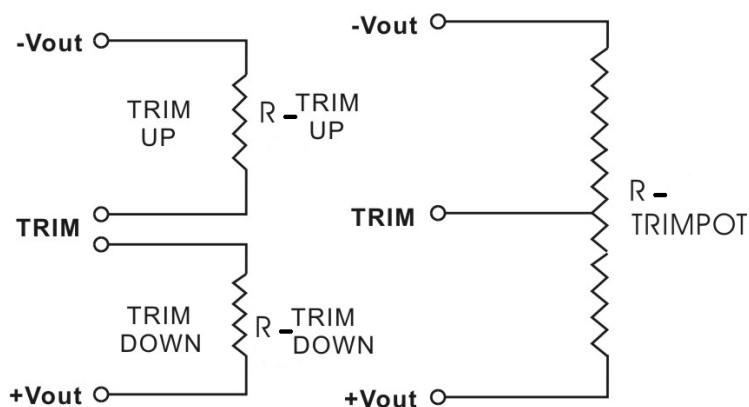
Notes: Add “-K” suffix for ordering, heat sink is affixed with thermally dissipative adhesive tape.  
See derating graph for temperature performance. Heat sink material is anodized (black) aluminum, adds weight 11.2g to total mass (42.2g). Thermal impedance of converter is: with heat sink 10°C/W and 12°C/W without heat sink.

## Trimming

Output voltage on single output models can be externally trimmed by utilizing the methods as shown below

### Fixed Resistor

### Variable Potentiometer



## Trim Table

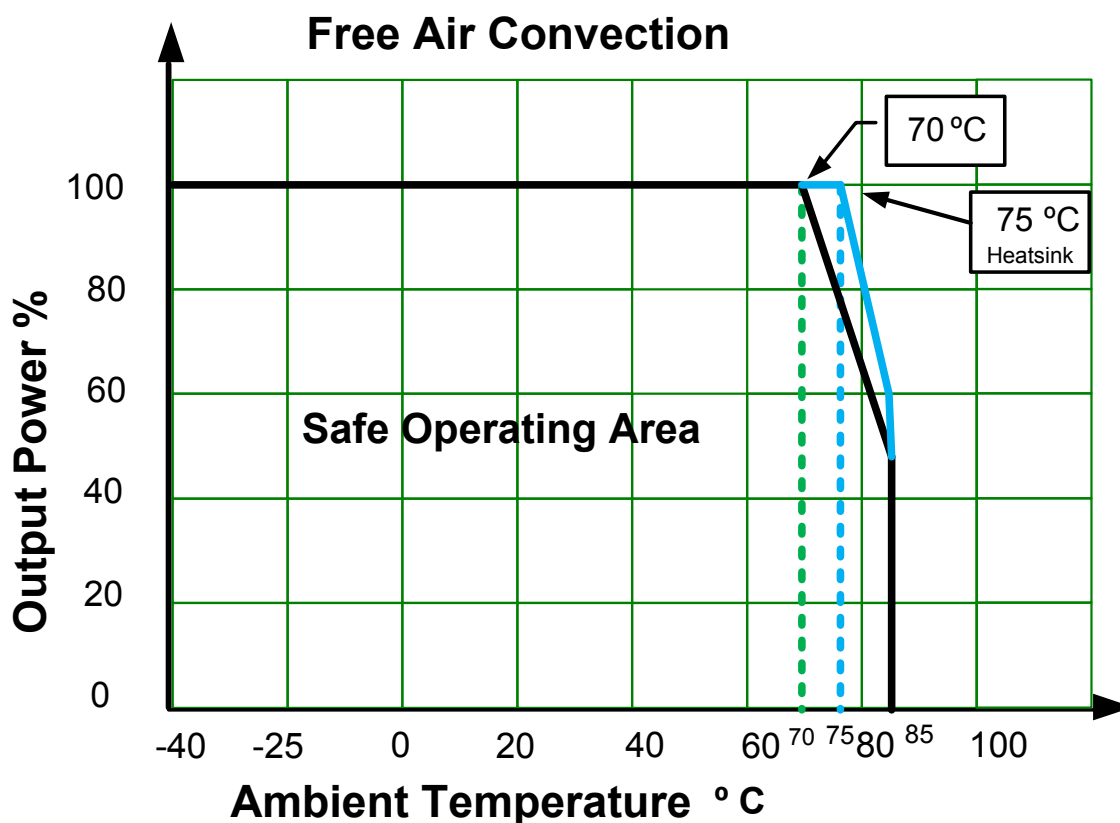
| AM20E(W)-xx03SZ |         |         |         |        |        |        |        |        |        |        |       |
|-----------------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|-------|
| Trim down       | 1       | 2       | 3       | 4      | 5      | 6      | 7      | 8      | 9      | 10     | %     |
| Vout=           | 3.267   | 3.234   | 3.201   | 3.168  | 3.135  | 3.102  | 3.069  | 3.036  | 3.003  | 2.970  | Volts |
| Rtrim-down      | 315.932 | 172.257 | 112.528 | 79.806 | 59.153 | 44.930 | 34.539 | 26.616 | 20.374 | 15.330 | KOhms |
| Trim up         | 1.000   | 2.000   | 3.000   | 4.000  | 5.000  | 6.000  | 7.000  | 8.000  | 9.000  | 10.000 | %     |
| Vout=           | 3.333   | 3.366   | 3.399   | 3.432  | 3.465  | 3.498  | 3.531  | 3.564  | 3.597  | 3.630  | Volts |
| Rtrim-up        | 544.612 | 184.034 | 103.305 | 67.715 | 47.676 | 34.824 | 25.880 | 19.297 | 14.249 | 10.255 | KOhms |

| AM20E(W)-xx05SZ |         |         |        |        |        |        |        |        |        |        |       |
|-----------------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| Trim down       | 1       | 2       | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | %     |
| Vout=           | 4.950   | 4.900   | 4.850  | 4.800  | 4.750  | 4.700  | 4.650  | 4.600  | 4.550  | 4.500  | Volts |
| Rtrim-down      | 230.566 | 106.182 | 64.301 | 43.281 | 30.643 | 22.207 | 16.177 | 11.651 | 8.129  | 5.310  | KOhms |
| Trim up         | 1.000   | 2.000   | 3.000  | 4.000  | 5.000  | 6.000  | 7.000  | 8.000  | 9.000  | 10.000 | %     |
| Vout=           | 5.050   | 5.100   | 5.150  | 5.200  | 5.250  | 5.300  | 5.350  | 5.400  | 5.450  | 5.500  | Volts |
| Rtrim-up        | 244.547 | 113.776 | 70.631 | 49.142 | 36.274 | 27.707 | 21.592 | 17.010 | 13.447 | 10.598 | KOhms |

| AM20E(W)-xx12SZ |         |         |         |        |        |        |        |        |        |        |       |
|-----------------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|-------|
| Trim down       | 1       | 2       | 3       | 4      | 5      | 6      | 7      | 8      | 9      | 10     | %     |
| Vout=           | 11.880  | 11.760  | 11.640  | 11.520 | 11.400 | 11.280 | 11.160 | 11.040 | 10.920 | 10.800 | Volts |
| Rtrim-down      | 327.351 | 142.100 | 83.928  | 55.470 | 38.591 | 27.418 | 19.477 | 13.542 | 8.939  | 5.264  | KOhms |
| Trim up         | 1.000   | 2.000   | 3.000   | 4.000  | 5.000  | 6.000  | 7.000  | 8.000  | 9.000  | 10.000 | %     |
| Vout=           | 12.120  | 12.240  | 12.360  | 12.480 | 12.600 | 12.720 | 12.840 | 12.960 | 13.080 | 13.200 | Volts |
| Rtrim-up        | 371.425 | 183.645 | 117.623 | 83.929 | 63.489 | 49.767 | 39.919 | 32.508 | 26.728 | 22.094 | KOhms |

| AM20E(W)-xx15SZ |         |         |         |        |        |        |        |        |        |        |       |
|-----------------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|-------|
| Trim down       | 1       | 2       | 3       | 4      | 5      | 6      | 7      | 8      | 9      | 10     | %     |
| Vout=           | 14.850  | 14.700  | 14.550  | 14.400 | 14.250 | 14.100 | 13.950 | 13.800 | 13.650 | 13.500 | Volts |
| Rtrim-down      | 433.811 | 174.916 | 100.946 | 65.907 | 45.468 | 32.077 | 22.625 | 15.596 | 10.165 | 5.842  | KOhms |
| Trim up         | 1.000   | 2.000   | 3.000   | 4.000  | 5.000  | 6.000  | 7.000  | 8.000  | 9.000  | 10.000 | %     |
| Vout=           | 15.150  | 15.300  | 15.450  | 15.600 | 15.750 | 15.900 | 16.050 | 16.200 | 16.350 | 16.500 | Volts |
| Rtrim-up        | 347.293 | 178.523 | 115.235 | 82.084 | 61.683 | 47.863 | 37.882 | 30.336 | 24.430 | 19.682 | KOhms |

## Derating



Extended temperature performance can be achieved with optional heat sink. (add suffix “-K” to part number)

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