



### FEATURES

- IEC60601 Ed.3 medical (2 x MOPP Pri-Sec)  
EN60950 ITE safety approved
- 250W compact high density
- 3" x 5" standard footprint
- High efficiency up to 94%
- Remote sense
- Remote On/Off, Power OK (MVAC250-xxAFx)
- Universal AC input with active PFC
- Less than 1U high – 1.4"
- Convection cooled operation up to 170W
- Isolated 12V@1A fan output
- Isolated 5V@2A standby/auxiliary output with models MVAC250-xxAFx
- RoHS compliant
- Active inrush protection
- Current sharing option

### DESCRIPTION

The MVAC250 series switching power supplies utilize advanced component and circuit technologies to deliver high efficiency. Designed for medical, computing, communications, telecom and other OEM applications to satisfy 1U height design considerations, the MVAC250 Series measures only 3.0" x 5.0" x 1.40". All models offer universal AC input with active power factor correction (PFC) and compliance to worldwide safety and EMC standards.



Available now at  
[www.murata-ps.com/en/3d/acdc.html](http://www.murata-ps.com/en/3d/acdc.html)

### ORDERING GUIDE

| Model Number   | Natural Convection Cooling  | Forced Air Cooling | Main Output (V1) | Fan Output (V2) | Aux Output (V3) |
|----------------|---|--------------------|------------------|-----------------|-----------------|
| MVAC250-12F    | 170W  | 250W @ 250LFM      | 12V              | 12V             |                 |
| MVAC250-24F    |   |                    | 24V              | 12V             |                 |
| MVAC250-48F    |   |                    | 50V              | 12V             |                 |
| MVAC250-12AF   |   |                    | 12V              | 12V             | 5V              |
| MVAC250-12AFD* |   |                    | 12V              | 12V             | 5V              |
| MVAC250-24AFD* |   |                    | 24V              | 12V             | 5V              |
| MVAC250-48AFD* |   |                    | 50V              | 12V             | 5V              |
| MVAC250-24AFT* |   |                    | 24V              | 12V             | 5V              |
| MVAC-COVER     | Optional cover kit assembly; see MVAC-COVER datasheet for details |                    |                  |                 |                 |

\* Refer to page 2 for current sharing model number MVAC250-xxAFD notes.

\* CCC Certification is not available for these models.

### INPUT CHARACTERISTICS

| Parameter                            | Conditions                         | Min. | Typ.    | Max. | Units |
|--------------------------------------|------------------------------------|------|---------|------|-------|
| Input Voltage Operating Range        | Single phase                       | 90   | 115/230 | 264  | Vac   |
|                                      | DC                                 | 127  |         | 300  | Vdc   |
| Input Frequency                      |                                    | 47   | 50/60   | 63   | Hz    |
| Turn-on Input Voltage                | Input rising                       | 80   |         | 90   | Vac   |
| Turn-off Input Voltage               | Input falling                      | 70   |         | 80   |       |
| Input Current                        | 90Vac input, full load all outputs |      |         | 3.4  | A     |
| No Load Input Power (MVAC250-xxAFD)* | (PS_ON = OFF, 5V_Aux = 0A)         | 1.5  |         | 2.0  | W     |
| Inrush Current                       | At 264Vac, at 25°C cold start      |      | 15      |      | Apk   |
| Power Factor                         | At 230Vac, full load               |      | 0.96    |      |       |

### OUTPUT CHARACTERISTICS

| Model Number                 | Main Output Voltage (V1) | Load Current | Maximum Load Capacitance | Line, Load, Cross Regulation | Typical Efficiency @230Vac |
|------------------------------|--------------------------|--------------|--------------------------|------------------------------|----------------------------|
| MVAC250-12F                  | 12V                      | 0.4 to 20.8A | 0 to 1500µF              | ± 1%                         | 93%                        |
| MVAC250-24F<br>MVAC250-24AFT | 24V                      | 0.2 to 10.4A | 0 to 300µF               | ± 1%                         | 93%                        |
| MVAC250-48F                  | 50V                      | 0.1 to 5.0A  | 0 to 82µF                | ± 1%                         | 94%                        |
| MVAC250-12AF                 | 12V                      | 0 to 20.8A   | 0 to 1500µF              | ± 1%                         | 93%                        |
| MVAC250-12AFD                | 12V @ 10.4A <sup>6</sup> | 0 to 20.8A   | 0 to 1500µF              | ± 1.5% <sup>6</sup>          | 93%                        |
| MVAC250-24AFD                | 24V @ 5.2A <sup>6</sup>  | 0 to 10.4A   | 0 to 300µF               | ± 1.5% <sup>6</sup>          | 93%                        |
| MVAC250-48AFD                | 50V @ 2.5A <sup>6</sup>  | 0 to 5.0A    | 0 to 68µF                | +3.0% / -1.5% <sup>6</sup>   | 94%                        |

### Main Output Characteristics (all models)

| Parameter                           | Conditions   | Typ. | Max. | Units |
|-------------------------------------|--|------|------|-------|
| Transient Response <sup>9</sup>     | 50% load step, 1A/µsec slew rate   |      | ± 5  | %     |
| Settling Time to 1% of Nominal      |  |      | 500  | µsec  |
| Turn On Delay                       | After application of input power   |      | 3    | sec   |
| Output Voltage Rise                 | Monotonic <sup>5</sup>   |      | 50   | msec  |
| Output Holdup                       | 120Vac/60Hz, full load   | 20   |      |       |
| Temperature Coefficient             |  |      | 0.02 | %/°C  |
| Ripple Voltage & Noise <sup>1</sup> |  |      | 1    | %     |
| Remote Sense                        | Compensates for up to 0.5V of lead drop with remote sense connected. Protected against short circuit and reverse connection. |      | 500  | mV    |

### Auxiliary Output Characteristics (varies by model)

| Auxiliary Output         | Aux Output Voltage <sup>8</sup> | Load Current | Load Capacitance | Line, Load, Cross Regulation <sup>3</sup> | Ripple Voltage & Noise <sup>1</sup> |
|--------------------------|---------------------------------|--------------|------------------|---|-------------------------------------|
| Fan (V2) all models      | 12V                             | 0 to 1A      | 0 to 220µF       | ± 10%                                     | 2%                                  |
| Aux (V3) – MVAC250-xxAFx | 5V                              | 0 to 2A      | 0 to 220µF       | ± 5%                                      | 1%                                  |



### ENVIRONMENTAL CHARACTERISTICS

| Parameter  | Conditions   | Min.                             | Typ. | Max. | Units |
|--|--|----------------------------------|------|------|-------|
| Storage Temperature Range                                  |  | -40                              |      | 85   | °C    |
| Operating Temperature Range                                | See power rating curves  | -10                              |      | 70   |       |
| Operating Humidity   | Non-condensing   | 10                               |      | 95   | %     |
| Operating Altitude   |  | -200                             |      | 5000 | m     |
| MTBF   | Telcordia SR-332 M1C3 @25°C  | 474K                             |      |      | Hours |
| Shock  | Operating, MIL-HBK-810E  | Complies                         |      |      |       |
|  | Non-operating, MIL-HBK-810E  | Complies                         |      |      |       |
| Operational Vibration                                      | IEC-68-2-27 standard   | Complies to levels of IEC721-3-2 |      |      |       |
| Safety – Medical Standards<br>2 x MOPP (Primary-Secondary) | IEC60601-1 (Ed. 3) – CB Cert & Report<br>ANSI/AAMI ES60601-1 (2005+ C1:2005+A2:10)<br>CAN/CSA 22.2 No. 60601-1 (2008) 3rd Edition<br>EN60601-1:2006+CORR:2010                                  |                                  |      |      |       |
| Safety – ITE Standards                                     | UL60950-1; 2nd Edition, 2011-12-19<br>CSA22.2 No..60950-1-07, 2nd Edition, 2001-12.<br>EN60950-1:2006+A11:2009/A1/2010/A12:2011<br>IEC 60950 (ed.2), IEC60950 (ed.2);am1<br>CE Marking per LVD |                                  |      |      |       |
| Warranty   | 2 years  |                                  |      |      |       |
| Outside Dimensions   | 3.0" x 5.0" x 1.4" (76.2mm x 127mm x 35.6mm)   |                                  |      |      |       |
| Weight   | MVAC250-xxF: 0.73 lbs (332.9g); MVAC250-xxAFD: 0.76 lbs (344.7g); MVAC250-xxAFT 0.78 lbs (352.7g)  |                                  |      |      |       |

### RESIDUAL RISK (PER ISO 14971 & IEC60601-1) FOR USER CONSIDERATION

| Fault Condition | Residual Risk                               |
|-----------------|---|
| Complies        | Contact your Murata salesperson for details |

### PROTECTION CHARACTERISTICS

| Parameter                                  | Conditions                              | Min. | Typ.     | Max. | Units |
|--|---|------|----------|------|-------|
| Over Voltage Protection <sup>4</sup>       | V1 (main output) latching               | 110  |          | 125  | %     |
|  | V3 (aux output: MVAC250-xxAFx) latching | 5.5  |          | 7.5  | V     |
| Over Current Protection <sup>4</sup>       | V1, hiccup mode                         | 110  |          | 130  | %Amax |
| Over Temperature Protection                | Auto-recovery                           |      | Complies |      |       |
| Remote Sense Short Circuit Protection      |   |      | Complies |      |       |
| Remote Sense Reverse Connection Protection |   |      | Complies |      |       |

### ISOLATION CHARACTERISTICS

| Parameter   | Conditions                    | Min. | Typ. | Max. | Units |
|---|-------------------------------|------|------|------|-------|
| Isolation   | Primary to Chassis            | 1500 |      |      | Vac   |
|   | Primary to Secondary (2xMOPP) | 4000 |      |      |       |
|   | Secondary to Chassis          | 500  |      |      |       |
|   | Output to Output              | 500  |      |      |       |
| Earth Leakage Current (under single fault condition):<br>264Vac, 60Hz, 25°C | MVAC250-xxAFD                 |      | 300  |      | µA    |
|   | MVAC250-xxAF; -xxAFT          |      | 300  |      |       |
|   | MVAC250-xxF                   |      | 350  |      |       |
| Earth Leakage Current (under normal conditions):<br>264Vac, 60Hz, 25°C      | MVAC250-xxAFD                 |      | 150  |      | µA    |
|   | MVAC250-xxAF; -xxAFT          |      | 150  |      |       |
|   | MVAC250-xxF                   |      | 250  |      |       |

### CURRENT SHARING OPTION – MVAC250-xxAFD ONLY

| Model Number  | Description  |
|---------------|--|
| MVAC250-12AFD | Main Output: Current share is achieved using the droop method. Nominal output voltage is achieved at 50% load and output voltage increases/drops at a rate of: <ul style="list-style-type: none"> <li>• 48mv per amp for 12V output</li> <li>• 192mV per amp for 24V output</li> <li>• 800mV per amp for 50V output.</li> </ul>  |
| MVAC250-24AFD | Startup of parallel power supplies is not internally synchronized. If more than 250W combined power is needed, start-up synchronization must be provided by using a common PS_ON signal. To account for ±10% full load current sharing accuracy and the reduction in full load output voltage due to droop, available output power must be derated by 15% when units are operated in parallel. Current sharing can be achieved with or without remote sense connected to the common load. If ORing protection is desired, please contact Murata sales for external ORing FET board or external ORing FET reference circuit design. |
| MVAC250-48AFD | Aux (V3) output can be tied together for redundancy but total combined output power must not exceed 10W, external ORing devices must be used.<br>Fan (V2) can be tied together for redundancy but total combined output power must not exceed 12W, external ORing diodes can be used.  |