TECHNICAL DATASHEET

# 30-35W Medical Open Frame

## FSP035M-B23 Series

# FSP035M-B23 Series

### FEATURES

- Compact size 2 x 3 x 1.2 inches
- Certified medical safety IEC 60601-1
- Wide operation voltage 85-264 VAC
- Wide operation temperature -20℃ to +70℃
- No load power consumption less than 0.3W
- High altitude 5000 meters operation
- Meet EN55011 and FCC Class B
- Over voltage protection
- Over current protection
- Over temperature protection
- Compliant with RoHS requirement

### SAFETY STANDARD APPROVAL

EN 60601-1
IEC 60601-1
TÜVRheinland CERTIFIED

### DESCRIPTION

The FSP035M-B23 series is Class-I design in 2 x 3 inches, open PCB constructed, AC/DC switching power supplies are capable of delivering 35 watts maximum (5V at 30 watts) of continuous output power at convection cooling. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

### INPUT SPECIFICATIONS

| | |
|---|---|
| Input voltage: | 85-264 VAC |
| Input frequency: | 47-63 Hz |
| Input current: | < 1.0 A (rms) for 115 VAC<br>< 0.6 A (rms) for 230 VAC |
| Earth leakage current: | < 275 μA @ 264 VAC, 63 Hz |
| Touch current: | < 100 μA @ 264 VAC, 63 Hz |

### OUTPUT SPECIFICATIONS

| | |
|---|---|
| Output voltage/current: | See rating chart |
| Maximum output power: | See rating chart |
| Protection: | |
| Over voltage: | Set at 130% to 150% of its rated output voltage. |
| Short circuit: | The power supply will shut down without damage and enter auto-recovery mode. |
| Over current: | The power supply will shut down without damage and enter auto-recovery mode. |
| Over temperature: | The power supply will enter into shut down while the abnormal thermal rise occurs. |
| Transient response: | Maximum excursion of ±3%, load slew rate is 0.5A/us, 50% of max load changed. |

### ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| Operating temperature: | -20℃~+70℃ |
| Storage temperature: | -40℃~+85℃ |
| Operating humidity: | 30% to 80% RH non-condensing |
| Storage humidity: | 5% to 95% RH non-condensing |
| Temperature derating: | Derate from 100% at +50℃ linearly to 70% at +70℃ |

### GENERAL SPECIFICATIONS

| | |
|---|---|
| Efficiency: | See rating chart |
| Hold-up time: | 12 ms minimum at 115 VAC/60Hz |
| Line regulation: | ±1% maximum at full load |
| Inrush current: | 125 A @ 230 VAC, at 25℃ cold start |
| Withstand voltage: | 4000 VAC from input to output (2 MOPP)<br>1500 VAC from input to ground (1 MOPP) |
| MTBF: | 450,000 hours at full load at 25℃ ambient , calculated per MIL-HDBK-217F |
| EMC Performance (IEC60601-1-2) | |
| EN55011: | Class B conducted, class B radiated |
| FCC: | Class B conducted, class B radiated |
| VCCI: | Class B conducted, class B radiated |
| EN61000-3-2: | Harmonic distortion, Class A and D |
| EN61000-3-3: | Line flicker |
| EN61000-4-2: | ESD, ±8 KV air and ±6 KV contact |
| EN61000-4-3: | Radiated immunity, 10 V/m |
| EN61000-4-4: | Fast transient/burst, ±2 KV |
| EN61000-4-5: | Surge, ±1 KV diff., ±2 KV com. |
| EN61000-4-6: | Conducted immunity, 3 Vrms |
| EN61000-4-8: | Magnetic field immunity, 30 A/m |
| EN61000-4-11: | Voltage dip immunity, 30% reduction for 500 ms, 60% reduction for 100 ms, and >95% reduction for 10 ms |



2019.06 spec

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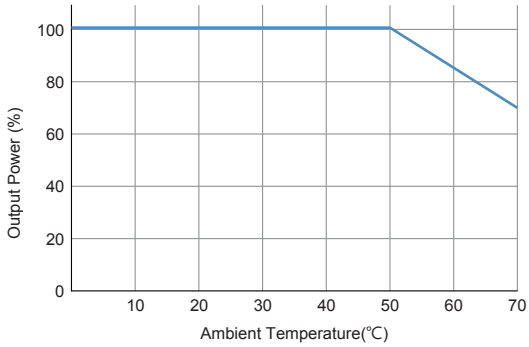
### OUTPUT VOLTAGE/CURRENT RATING CHART

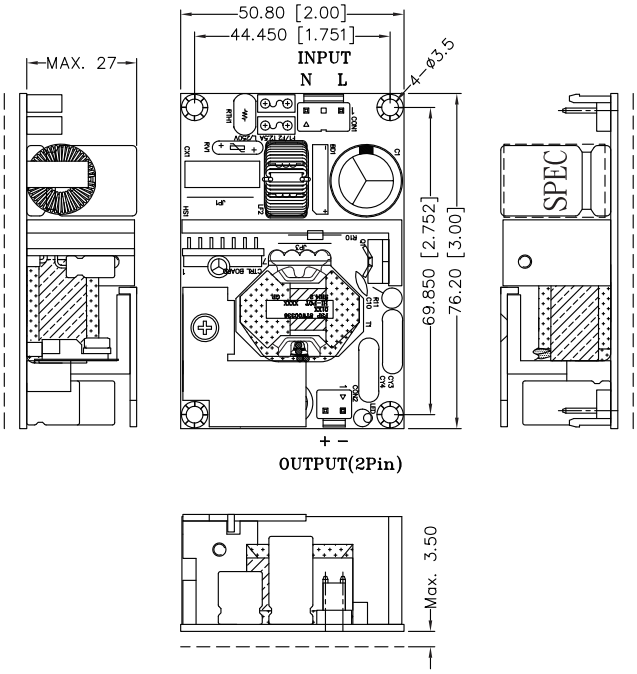
| Model | Output | | | | | | Average Active Efficiency (typical) @ 115 / 230 VAC |
|---|---|---|---|---|---|---|---|
| | V1 | Min. Current | Max. Current | Tolerance | Ripple & Noise(1) | Max. Power | |
| FSP030M-B23-05 | 5 V | 0 A | 6.00 A | ±3% | 100 mV | 30 W | 76% / 78% |
| FSP035M-B23-12 | 12 V | 0 A | 2.92 A | ±3% | 120 mV | 35 W | 85% / 87% |
| FSP035M-B23-15 | 15 V | 0 A | 2.34 A | ±3% | 150 mV | 35 W | 85% / 87% |
| FSP035M-B23-18 | 18 V | 0 A | 1.95 A | ±3% | 180 mV | 35 W | 85% / 87% |
| FSP035M-B23-24 | 24 V | 0 A | 1.46 A | ±3% | 240 mV | 35 W | 85% / 87% |

NOTES:
1. Ripple and noise measurements shall be made with an oscilloscope of at least 20MHz bandwidth. Output shall be bypassed at the connector with a 0.1μF ceramic disk capacitor and a 47μF electrolytic capacitor to simulate system loading.

### OUTPUT POWER DERATING CURVE




### MECHANICAL SPECIFICATIONS




NOTES:
1. Dimensions shown in mm [inches].
2. Tolerance 0.5 [0.02] maximum.
3. Input connector CON1: JST B3P-VH or equivalent, mating with housing JST VHR series & terminal SVH-21T-P1.1 or equivalent.
4. Output connector CON2: JST B2P-VH or equivalent, mating with housing JST VHR series & terminal SVH-21T-P1.1 or equivalent.

### PIN CHART

| Connector | CON1 | | | CON2 | |
|---|---|---|---|---|---|
| Pin No. | 1 | 2 | 3 | 1 | 2 |
| Polarity | Live | NC | Neutral | V1 Return | +V1 |