



**Features**

- . Input 90V to 264VAC, 50~60Hz suitable for worldwide use
- . Output voltage optional from 3.3V to 24Vdc constant voltage
- . Protections: Short Circuit / Overload / Over Voltage Protection
- . 100% full load burn-in test for 2Hrs to make every unit reliable
- . Suitable for BF application with appropriate system consideration
- . Cooling by free air convection, operating temperature -35~45°C
- . Long life and high reliability design with 3 years warranty
- . Low standby consumption power <0.1W
- . No minimum load required and extremely low leakage current

**Safety Standards**

- . IEC60601-1 CB report for worldwide use
- . UL ANSI/AAMI ES60601-1/CAN/CSA-C22.2 for USA
- . TUV BS EN/EN 60601-1 for European Union



**Product Description:**

This is a highly reliable and small size AC/DC on board type 20W medical grade switching power supply solution with wide range 90-264Vac input and designed strictly according to the international medical safety standards. The design is with a very low no load power consumption less than 0.1W and ultra-low leakage current. The entire series supplies different models with output voltages ranging between 3.3Vdc and 24Vdc that can satisfy the demands for various types of medical equipment such as portable medical device, mobile clinical workstation, medical computer monitor, medical examination instrument and so on. The 20W PCB type medical switching power supply is built-in full protections of over load / short circuit and over voltage with small and compact size of 49 x 28.3 x 23mm.

**Technical Specification**

| Typ. Model             | KMFM-20-3.3  | KMFM-20-5 | KMFM-20-12 | KMFM-20-15 | KMFM-20-24 |
|------------------------|--|-----------|------------|------------|------------|
| <b>Output</b>          |  |           |            |            |            |
| Output Voltage         | 3.3VDC   | 5VDC      | 12VDC      | 15VDC      | 24VDC      |
| Rated Current          | 4.5A   | 4A        | 1.8A       | 1.4A       | 0.9A       |
| Current Range          | 0 ~ 4.5A   | 0 ~ 4A    | 0 ~ 1.8A   | 0 ~ 1.4A   | 0 ~ 0.9A   |
| Output Power           | 14.9W Max.   | 20W Max.  | 21.6W Max. | 21W Max.   | 21.6W Max. |
| Voltage Tolerance      | ±3%  | ±3%       | ±3%        | ±3%        | ±3%        |
| Ripple & Noise         | 150mVp-p   | 150mVp-p  | 200mVp-p   | 200mVp-p   | 200mVp-p   |
| <b>Input</b>           |  |           |            |            |            |
| Input voltage          | 90 - 264Vac or 120- 370Vdc   |           |            |            |            |
| Input Frequency        | 50-60Hz (When the input is AC)                                       |           |            |            |            |
| Input Current          | 0.75A Max. @ 100 ~240Vac 50/60Hz input                               |           |            |            |            |
| Inrush Current         | 45A Max. @ 100 ~240Vac 50/60Hz input                                 |           |            |            |            |
| Efficiency (Typ.)      | 81%  | 85%       | 85%        | 87%        | 87%        |
| Leakage Current        | ≤0.08mA @ full input range   |           |            |            |            |
| <b>Protections</b>     |  |           |            |            |            |
| Over current           | 110~180% rated output power. Auto-Recovery when the fault is removed |           |            |            |            |
| Short Circuit          | No damage. Auto-Recovery when the fault is removed                   |           |            |            |            |
| Over temperature       | Shut down o/p voltage, re-power on to recover                        |           |            |            |            |
| <b>Environmental</b>   |  |           |            |            |            |
| Operation Temperature  | -35°C to +45°C, 20%RH to 90%RH                                       |           |            |            |            |
| Storage Temp, Humidity | -45~ +85°C, 10%RH to 95%RH   |           |            |            |            |
| Operation Altitude     | ≤5000m @ full load and rated operating temperatures                  |           |            |            |            |
| MTBF                   | ≥50000Hrs @ full load and rated operating temperatures               |           |            |            |            |
| <b>Mechanical</b>      |  |           |            |            |            |
| Dimensions (L x W x H) | 49.0 x 28.3 x 23.0mm (1.93 x 1.12 x 0.91 inch)                       |           |            |            |            |
| Unit Weight            | 28g±3 grams  |           |            |            |            |
| Packing Information    | 200pcs/ Carton, carton dimensions:47*37*20cm, 6.6kgs/ Carton         |           |            |            |            |

## TEST REPORT

### OUTPUT FUNCTION TEST

| NO | TEST ITEM         | SPECIFICATION       | TEST CONDIDTION                                  | RESULT                            | VERDICT |
|----|-------------------|---------------------|--|-----------------------------------|---------|
| 1  | RIPPLE & NOISE    | 150mVp-p (Max)      | I/P:230VAC / O/P:FULL LOAD / Ta:25°C             | 87mVp-p                           | P       |
| 2  | VOLTAGE TOLERANCE | -3% ~ +3% (Max)     | I/P:90VAC~264VAC<br>O/P:FULL~MIN. LOAD / Ta:25°C | -1.0% ~ +1.0% of output voltage   | P       |
| 3  | LINE REGULATION   | -0.3% ~ +0.3% (Max) | I/P:90VAC ~264VAC<br>O/P:FULL LOAD / Ta:25°C     | -0.09% ~ +0.08% of output voltage | P       |
| 4  | LOAD REGULATION   | -0.5% ~ +0.5% (Max) | I/P:230VAC<br>O/P:FULL ~MIN LOAD / Ta:25°C       | -0.29% ~ +0.28% of output voltage | P       |
| 5  | OVER/UNDERSHOOT   | <±5%                | I/P: 230VAC<br>O/P:FULL LOAD / Ta:25°C           | 0.8%                              | P       |
| 6  | SET UP TIME       | 1500 mS (Max)       | I/P:230VAC<br>O/P:FULL LOAD / Ta:25°C            | 1080 mS                           | P       |
| 7  | RISE TIME         | 30 mS (Max)         | I/P: 230VAC<br>O/P:FULL LOAD / Ta:25°C           | 24 mS                             | P       |
| 8  | HOLD UP TIME      | 10 mS (Min)         | I/P: 115VAC<br>O/P:FULL LOAD / Ta:25°C           | 13 mS                             | P       |

### INPUT FUNCTION TEST

| NO | TEST ITEM          | SPECIFICATION                      | TEST CONDIDTION                                      | RESULT                             | VERDICT |
|----|--------------------|------------------------------------|--|------------------------------------|---------|
| 1  | VOLTAGE RANGE      | 90VAC~264VAC                       | I/P:TESTING<br>O/P:FULL LOAD / Ta:25°C               | 77V~264V                           | P       |
| 2  | FREQUENCY RANGE    | 50HZ - 60HZ (Typ)<br>NO DAMAGE OSC | I/P: 100VAC ~ 240VAC<br>O/P:FULL~MIN LOAD / Ta:25°C  | TEST: OK                           | P       |
| 3  | EFFICIENCY         | 81% (Typ)                          | I/P:230VAC<br>O/P:FULL LOAD / Ta:25°C                | 78.63%                             | P       |
| 4  | AVERAGE EFFICIENCY | 79%                                | I/P:115/230VAC & O/P:25%、50%、75%、100% LOAD & Ta:25°C | 79.65% (115VAC)<br>80.08% (230VAC) | P       |
| 5  | AC CURRENT         | 0.75A (Max)                        | I/P:100VAC & O/P:FULL LOAD Ta:25°C                   | 0.63A                              | P       |
| 6  | INRUSH CURRENT     | <45A<br>COLD START                 | I/P: 230VAC / O/P:FULL LOAD<br>Ta:25°C               | 36.62A                             | P       |
| 7  | LEAKAGE CURRENT    | <0.08mA                            | I/P:240VAC & O/P:Min LOAD<br>Ta:25°C                 | L-FG:0.061mA<br>N-FG:0.061mA       | P       |

### PROTECTION FUNCTION TEST

| NO | TEST ITEM               | SPECIFICATION                    | TEST CONDIDTION                       | RESULT   | VERDICT |
|----|-------------------------|----------------------------------|---------------------------------------|--|---------|
| 1  | OVER LOAD PROTECTION    | 110 ~ 150% (Typ)                 | I/P:230VAC & O/P:TESTING<br>Ta:25°C   | 143.2%<br>HICCUP MODE  | P       |
| 2  | OVER VOLTAGE PROTECTION | 115 ~ 135% (Typ)                 | I/P:230VAC<br>O/P:MIN LOAD & Ta:25°C  | Hiccup mode ,recovers automatically after fault condition is removed | P       |
| 3  | SHORT PROTECTION        | SHORT OUTPUT<br>1 HOUR NO DAMAGE | I/P:264VAC<br>O/P:FULL LOAD & Ta:25°C | NO DAMAGE<br>HICCUP MODE   | P       |

### SAFETY TEST & E.M.C TEST

| NO | TEST ITEM            | SPECIFICATION   | TEST CONDIDTION  | RESULT   | VERDICT |
|----|----------------------|---|--|--|---------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P: 4KVAC/min<br>I/P- FG: 2KVAC/min<br>O/P-FG:0.5KVAC/min      | I/P-O/P: 4 KVAC/min<br>I/P-FG: 2.4KVAC/min<br>O/P-FG: 0.6KVAC/min<br>Ta:25°C | I/P-O/P:2.96mA<br>I/P-FG: NA<br>O/P-FG: NA<br>NO DAMAGE  | P       |
| 2  | ISOLATION RESISTANCE | I/P-O/P:500VDC>100MΩ<br>I/P-FG: 500VDC>100MΩ<br>O/P-FG:500VDC>100MΩ | I/P-O/P: 500 VDC<br>I/P-FG: 500 VDC<br>O/P-FG: 500 VDC<br>Ta:25°C            | I/P-O/P: 9999MΩ<br>I/P-FG: NA<br>O/P-FG: NA<br>NO DAMAGE | P       |
| 3  | CONDUCTION           | BS EN/EN55032(CISPR32),<br>FCC PART 15 / CISPR22<br>CAN             | I/P: 230 VAC (50HZ)<br>O/P: FULL/50% LOAD<br>Ta: 25°C                        | PASS<br>Test by certified Lab                            | P       |
| 4  | RADIATION            | BS EN/EN55032(CISPR32),<br>FCC PART 15 / CISPR22<br>CAN             | I/P: 230 VAC (50HZ)<br>O/P: FULL LOAD<br>Ta: 25°C                            | PASS<br>Test by certified Lab                            | P       |
| 5  | SURGE                | BS EN/EN61000-4-5<br>LIGHT INDUSTRY<br>L-N: 1KV                     | I/P: 230 VAC/50HZ<br>O/P: FULL LOAD<br>Ta: 25°C                              | CRITERIA B   | P       |
| 6  | E.S.D                | BS EN/EN61000-4-2<br>LIGHT INDUSTRY<br>AIR: 8KV / Contact: 4KV      | I/P: 230 VAC/50HZ<br>O/P: FULL LOAD<br>Ta: 25°C                              | CRITERIA B   | P       |

| TEST RESULT | TESTER        | REVIEW         | APPROVAL        |
|-------------|---------------|----------------|-----------------|
| <b>PASS</b> | <b>ZHU LI</b> | <b>WANG LW</b> | <b>ZHANG DL</b> |