

## DESCRIPTION

The PM60 series of compact, open PCB constructed, AC-DC switching power supplies are capable of delivering 37.5-64 watts of continuous output power at convection cooling. They operate at 90-264 VAC input voltage without the need of voltage selection, and are suited for medical, information technology and industrial applications. Approval to both EN60601-1 and EN62368-1 safety standards improves design-in time and reduces end equipment compliance costs.

## FEATURES

- BF Class insulation
- Medical and ITE approvals
- Compact size 2" x 4" x 1.18"
- Single, dual and triple outputs
- Wide-range input 90-264 VAC
- Low earth leakage current
- Level B emissions
- RoHS compliant

## INPUT SPECIFICATIONS

|                        |  |
|------------------------|--|
| Input voltage:         | 90-264 VAC   |
| Input frequency:       | 47-63 Hz   |
| Input current:         | 1.3 A (rms) for 100 VAC<br>0.7 A (rms) for 240 VAC |
| Earth leakage current: | 150 $\mu$ A max. @ 264 VAC, 63 Hz                  |
| Touch current:         | 100 $\mu$ A max. @ 264 VAC, 63 Hz                  |

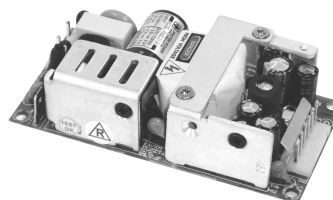
## OUTPUT SPECIFICATIONS

|                          |  |
|--------------------------|--|
| Output voltage/current:  | See rating chart.  |
| Maximum output power:    | See rating chart.  |
| Ripple and noise:        | 100 mV peak to peak on 3.3 V & 5.0 V models, 1% peak to peak on other models   |
| Over voltage protection: | Provided on output #1 only; set at 112-132% of its nominal output voltage, automatic recovery                                    |
| Short circuit protection | Automatic recovery   |
| Temperature coefficient: | All outputs $\pm 0.04\%$ / $^{\circ}$ C maximum  |
| Transient response:      | Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500 $\mu$ s after a 25% step load change |

## ENVIRONMENTAL SPECIFICATIONS

|                        |  |
|------------------------|--|
| Operating temperature: | -10 $^{\circ}$ C to +70 $^{\circ}$ C                                     |
| Storage temperature:   | -40 $^{\circ}$ C to +85 $^{\circ}$ C                                     |
| Relative humidity:     | 5% to 95% non-condensing   |
| Temperature derating:  | Derate from 100% at +50 $^{\circ}$ C linearly to 50% at +70 $^{\circ}$ C |

## PM60 SERIES



CE  
RoHS

## SAFETY STANDARD APPROVALS



UL ES 60601-1, CSA C22.2 No. 60601-1  
File No. E178020



TUV EN 60601-1



UL 62368-1, CSA C22.2 No. 62368-1



TUV EN 62368-1

## GENERAL SPECIFICATIONS

|                      |  |
|----------------------|--|
| Switching frequency: | 62 K $\pm 5$ KHz   |
| Efficiency:          | 80-88% typical except PM60-31-3A and PM60-31-5 A at 75% typical  |
| Hold-up time:        | 12 ms minimum at 110 VAC   |
| Line regulation:     | $\pm 0.5\%$ maximum at full load   |
| Inrush current:      | 30 A @ 115 VAC, or 60 A @ 230 VAC, at 25 $^{\circ}$ C cold start   |
| Withstand voltage:   | 4000 VAC from input to output (2 MOPP)<br>1500 VAC from input to ground (1 MOPP)<br>1500 VAC from output to ground |
| MTBF:                | 400,000 hours at full load at 25 $^{\circ}$ C ambient, calculated per MIL-HDBK-217F                                |
| EMC Performance      |  |
| EN55011 / EN55022:   | 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, $\pm 15$ KV air and $\pm 8$ KV contact  |
| EN61000-4-3:         | Radiated immunity, 10 V/m  |
| EN61000-4-4:         | Fast transient/burst, $\pm 2$ KV   |
| EN61000-4-5:         | Surge, $\pm 1$ KV diff., $\pm 2$ KV com  |
| EN61000-4-6:         | Conducted immunity, 10 Vrms  |
| EN61000-4-8:         | Magnetic field immunity, 30 A/m  |
| EN61000-4-11:        | Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms   |

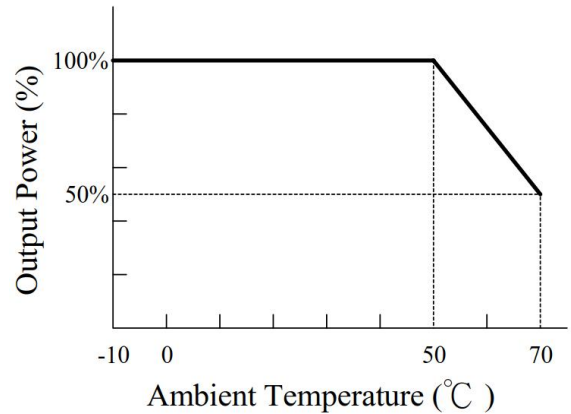
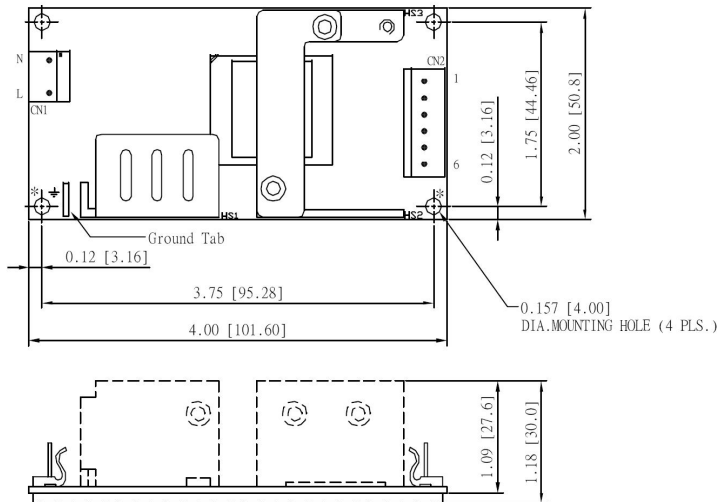
## OUTPUT VOLTAGE/CURRENT RATING CHART

| Model <sup>(1)</sup> | Output #1 |              |                            |                                      |      | Output #2 |              |              |      | Output #3 |              |              |      | Max. Output Power <sup>(3)</sup> |
|----------------------|-----------|--------------|----------------------------|--------------------------------------|------|-----------|--------------|--------------|------|-----------|--------------|--------------|------|----------------------------------|
|                      | V1        | Min. Current | Max. Current at convection | Max. Current at 5 CFM <sup>(2)</sup> | ToI. | V2        | Min. Current | Max. Current | ToI. | V3        | Min. Current | Max. Current | ToI. |                                  |
| PM60-10A             | 5 V       | 0 A          | 11.0 A                     | 11.0 A                               | ±2%  | (N/A)     |              |              |      | (N/A)     |              |              |      | 55 W                             |
| PM60-12A             | 12 V      | 0 A          | 5.0 A                      | 5.0 A                                | ±2%  | (N/A)     |              |              |      | (N/A)     |              |              |      | 60 W                             |
| PM60-13A             | 15 V      | 0 A          | 4.3 A                      | 4.3 A                                | ±2%  | (N/A)     |              |              |      | (N/A)     |              |              |      | 64 W                             |
| PM60-14A             | 24 V      | 0 A          | 2.7 A                      | 2.7 A                                | ±2%  | (N/A)     |              |              |      | (N/A)     |              |              |      | 64 W                             |
| PM60-18A             | 48 V      | 0 A          | 1.35 A                     | 11.0 A                               | ±2%  | (N/A)     |              |              |      | (N/A)     |              |              |      | 64 W                             |
| PM60-23A             | +5 V      | 0.5 A        | 6.0 A                      | 8 A                                  | ±3%  | +12 V     | 0.1 A        | 3.0 A        | ±5%  | (N/A)     |              |              |      | 55 W                             |
| PM60-25A             | +5 V      | 0.5 A        | 6.0 A                      | 8 A                                  | ±3%  | +24 V     | 0.1 A        | 1.5 A        | ±5%  | (N/A)     |              |              |      | 55 W                             |
| PM60-31A             | +5 V      | 0.5 A        | 6.0 A                      | 8 A                                  | ±3%  | +12 V     | 0.1 A        | 3.0 A        | ±5%  | -12 V     | 0 A          | 0.5 A        | ±4%  | 55 W                             |
| PM60-31-3A           | +3.3 V    | 0.8 A        | 6.0 A                      | 8 A                                  | ±3%  | +5.2 V    | 0.1 A        | 3.0 A        | ±5%  | +12 V     | 0 A          | 0.5 A        | ±4%  | 37.5 W                           |
| PM60-31-5A           | +5 V      | 0.5 A        | 6.0 A                      | 8 A                                  | ±3%  | +3.3 V    | 0 A          | 1.5 A        | ±5%  | +12 V     | 0 A          | 0.5 A        | ±4%  | 37.5 W/47.5W                     |
| PM60-32A             | +5 V      | 0.5 A        | 6.0 A                      | 8 A                                  | ±3%  | +15 V     | 0.1 A        | 2.4 A        | ±5%  | -15 V     | 0 A          | 0.5 A        | ±4%  | 55 W                             |
| PM60-39A             | +5 V      | 0.5 A        | 6.0 A                      | 8 A                                  | ±3%  | +24 V     | 0.1 A        | 1.5 A        | ±5%  | -12 V     | 0 A          | 0.5 A        | ±4%  | 55 W                             |

- NOTES:
1. Safety approvals are for PCB form only. To order unit with cover fitted, change suffix "A" to "C".
  2. Maximum current of output #1 of multi-output models can be 8 A at 5 CFM forced air provided by user.
  3. It is rated at 37.5 W maximum at convection cooling or 47.5 W maximum at 5 CFM forced air cooling by user.
  4. The output voltages of a multiple output model may go outside of the stated tolerance when an output load current is out of stated limits. All models may be operated at no-load without damage.
  5. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

## MECHANICAL SPECIFICATIONS

## OUTPUT POWER DERATING CURVE



### NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Connector CN1: Molex header 09-65-2038 or equivalent, mating with Molex housing 09-50-1031 or equivalent.
4. Connector CN2: Molex header 09-65-2068 or equivalent, mating with Molex housing 09-50-1061 or equivalent.
5. Ground tab is 0.25 [6.35] x 0.032 [0.8] fast-on connector.
6. To ensure compliance with level B emissions, connect the two "\*" marked mounting holes with metallic standoffs to chassis.
7. Weight: 205 grams (0.45 lbs.) approx.

## PIN CHART

| MODEL      | PIN        | 1        | 2   | 3   | 4             | 5         | 6    |
|------------|------------|----------|-----|-----|---------------|-----------|------|
| PM60-10A   | PM60-12A   | PM60-13A | +V1 | +V1 | V1 Return     | V1 Return | N.C. |
| PM60-14A   | PM60-18A   |          |     |     |               |           | N.C. |
| PM60-23A   | PM60-25A   |          | V1  | V1  | Common Return |           | N.C. |
| PM60-31A   | PM60-32A   | PM60-39A | V1  | V1  | Common Return |           | V3   |
| PM60-31-3A | PM60-31-5A |          | V1  | V1  | Common Return |           | V3   |