



# MPI-706H

60W AC / DC

## SPECIFICATION

### For

## SWITCHING POWER SUPPLY

**M/N: MPI-706H**

#### Revision History

| Version | Revise Date   | Change Items                                |
|---------|---------------|---------------------------------------------|
| Rev. 01 | Jul. 3. 2008  | Update OVP description.                     |
| Rev. 02 | Jul. 15. 2008 | Mechanical drawing and description update.  |
| Rev. 03 | Mar. 28. 2011 | Update the safety approved status.          |
| Rev. 04 | Oct. 28. 2011 | Revised the specification of turn-on delay. |
| Rev. 05 | Jan. 11. 2018 | 1. Changed form.<br>2. Added EN 55032.      |
| Rev. 06 | Jan. 15. 2019 | Added output current to output field.       |
|         |               |                                             |



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## FEATURES

- ✓ 80W with 8.6CFM forced air- cooling, 60W convection cooling.
- ✓ 170 x 52 x 39 mm Slim size, ATX output.
- ✓ PG/PF Signal.
- ✓ +5V Stand by & Remote On/Off.
- ✓ MTBF>130,000 hr. MIL-217F.



## Models & Ratings

| Model Number | Wattage<br>(Rated / Max) | Output Voltage |        | Min. Current | Rated Current | Max. Current (Note 1) |
|--------------|--------------------------|----------------|--------|--------------|---------------|-----------------------|
| MPI-706H     | 60 W / 80 W              | V1             | +5 V   | 0.2 A        | 5.0 A         | 8.0 A                 |
|              |                          | V2             | +12 V  | 0 A          | 1.5 A         | 4.0 A                 |
|              |                          | V3             | -12 V  | 0 A          | 0.5 A         | -                     |
|              |                          | V4             | +3.3 V | 0 A          | 4.0 A         | 6.0 A                 |
|              |                          | V5             | +5Vsb  | 0 A          | 1.0 A         | -                     |

Total Output Power: maximum 80W with 8.6 CFM forced air-cooling and 60W convection cooling at 50°C ambient temperature.

Note:

1. The maximum total combined output power on the +3.3V and +5V rails is 40W.
2. While input voltage below 100V (90-99V), an accessory heat sink or the chassis of application (min. 440 cm<sup>2</sup>, aluminum with 1.5mm thickness) is recommend to be placed at the bottom of the power supply itself.
3. Model no. coding:

**M P I - 7 0 6 H - X**  
①

①

|           |                                     |
|-----------|-------------------------------------|
| <b>X=</b> | <b>blank</b>                        |
| <b>A</b>  | <b>input with AC socket version</b> |

## Summary

| Characteristic        | Minimum                                                                                                                                               | Typical   | Maximum | Units | Notes & Conditions                                                                      |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------|-------|-----------------------------------------------------------------------------------------|
| Input Range           | 90                                                                                                                                                    | 115 / 230 | 264     | VAC   | Continuous input range.                                                                 |
| Input Frequency       | 47                                                                                                                                                    |           | 63      | Hz    | AC input.                                                                               |
| Efficiency            |                                                                                                                                                       | 75        |         | %     | Rated load, 115VAC. Varies with distribution of loads among output.                     |
| Operation Temperature | 0                                                                                                                                                     |           | 70      | °C    | Derate linearly above 50°C by 2.5% per °C to a maximum temperature of 70°C at 50% load. |
| Weight                |                                                                                                                                                       | 208.4     |         | g     |                                                                                         |
| Dimensions            | 170.0 (L) x 52.0 (W) x 39.0 (H) mm, Tolerance +/- 0.4mm.                                                                                              |           |         |       |                                                                                         |
| EMC                   | EN 55022 / EN 55032, CISPR 22 & FCC Part 15, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 |           |         |       |                                                                                         |
| Safety Approvals      | EN 60950-1: 2006+A11: 2009, UL 60950-1, 2nd Edition, 2007-03-27, CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03                                       |           |         |       |                                                                                         |



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## Input

| Characteristic   | Minimum                                                                               | Typical   | Maximum | Units | Notes & Conditions                                           |
|------------------|---------------------------------------------------------------------------------------|-----------|---------|-------|--------------------------------------------------------------|
| Input Voltage    | 90                                                                                    | 115 / 230 | 264     | VAC   | Continuous input range.                                      |
| Input Frequency  | 47                                                                                    |           | 63      | Hz    | AC input.                                                    |
| Input Current    |                                                                                       |           | 2 / 1   | A     | Nominal AC Input Voltage (115VAC/230VAC), rated load.        |
| Inrush Current   |                                                                                       |           | 30 / 60 | A     | Nominal AC Input Voltage (115VAC/230VAC), one cycle at 25°C. |
| Input Protection | Non-user serviceable internally located AC input line fuse. Fuse : 5A / 250VAC * 1pcs |           |         |       |                                                              |

## Output

| Characteristic          | Minimum                                                                                                                                                                                                                        | Typical                                                                                                              | Maximum | Units | Notes & Conditions                                                                                                                                                    |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output Voltage          |                                                                                                                                                                                                                                | +5 V                                                                                                                 |         | DC    |                                                                                                                                                                       |
|                         |                                                                                                                                                                                                                                | +12 V                                                                                                                |         |       |                                                                                                                                                                       |
|                         |                                                                                                                                                                                                                                | -12 V                                                                                                                |         |       |                                                                                                                                                                       |
|                         |                                                                                                                                                                                                                                | +3.3 V                                                                                                               |         |       |                                                                                                                                                                       |
|                         |                                                                                                                                                                                                                                | +5Vsb                                                                                                                |         |       |                                                                                                                                                                       |
| Output Current          |                                                                                                                                                                                                                                | 5.0                                                                                                                  | 8.0     | A     |                                                                                                                                                                       |
|                         |                                                                                                                                                                                                                                | 1.5                                                                                                                  | 4.0     |       |                                                                                                                                                                       |
|                         |                                                                                                                                                                                                                                | 0.5                                                                                                                  |         |       |                                                                                                                                                                       |
|                         |                                                                                                                                                                                                                                | 4.0                                                                                                                  | 6.0     |       |                                                                                                                                                                       |
|                         |                                                                                                                                                                                                                                | 1.0                                                                                                                  |         |       |                                                                                                                                                                       |
| Initial Set Accuracy    | 5.08                                                                                                                                                                                                                           |                                                                                                                      | 5.13    | VDC   | The +5V output is set between 5.08V to 5.13V by variable resistor and all output at 60% rated load and the other outputs are checked to be within the accuracy range. |
|                         | 11.4                                                                                                                                                                                                                           |                                                                                                                      | 12.6    |       |                                                                                                                                                                       |
|                         | -11.4                                                                                                                                                                                                                          |                                                                                                                      | -12.6   |       |                                                                                                                                                                       |
|                         | 3.1                                                                                                                                                                                                                            |                                                                                                                      | 3.5     |       |                                                                                                                                                                       |
|                         | 4.8                                                                                                                                                                                                                            |                                                                                                                      | 5.2     |       |                                                                                                                                                                       |
| Minimum Load            |                                                                                                                                                                                                                                | 0.2                                                                                                                  |         | A     | At Output Voltage +5V                                                                                                                                                 |
|                         |                                                                                                                                                                                                                                | 0                                                                                                                    |         |       | At Output Voltage +12 V, -12 V, +3.3 V, +5Vsb                                                                                                                         |
| Start Up Delay          |                                                                                                                                                                                                                                |                                                                                                                      | 4       | Sec   | Time required for initial output voltage stabilization.                                                                                                               |
| Hold Up Time            | 20                                                                                                                                                                                                                             |                                                                                                                      |         | mS    | Nominal AC Input Voltage (230VAC), rated load.                                                                                                                        |
| Line Regulation         |                                                                                                                                                                                                                                | ±1.0 <sup>(V1)</sup><br>±1.0 <sup>(V2)</sup><br>±1.0 <sup>(V3)</sup><br>±1.0 <sup>(V4)</sup><br>±1.0 <sup>(V5)</sup> |         | %     | Less than ±1% at rated load with ±10% changing in input voltage.                                                                                                      |
| Load Regulation         |                                                                                                                                                                                                                                | ±2.0 <sup>(V1)</sup><br>±4.0 <sup>(V2)</sup><br>±5.0 <sup>(V3)</sup><br>±4.0 <sup>(V4)</sup><br>±4.0 <sup>(V5)</sup> |         | %     | Measured is done by changing the measured output loading +/-40% from 60% rated load, and keep other output is at 60% rated load.                                      |
| Ripple & Noise          |                                                                                                                                                                                                                                | 50 <sup>(V1)</sup><br>120 <sup>(V2)</sup><br>120 <sup>(V3)</sup><br>50 <sup>(V4)</sup><br>120 <sup>(V5)</sup>        |         | mV    | Measured at rated load by a 20MHz bandwidth limited oscilloscope and the each output is connected with a 10µF Electrolytic Capacitor and a 0.1µF Ceramic Capacitor.   |
| Over Voltage Protection | For some reason the power supply fails to control itself, the build-in over voltage protection circuit will protect auto-recovery model and to prevent damaging external circuits. The trigger point is about 6.5-8.5V at +5V. |                                                                                                                      |         |       |                                                                                                                                                                       |
| Over Load Protection    | Fully protected against output overload and short circuit. Automatic recovery upon of overload condition.                                                                                                                      |                                                                                                                      |         |       |                                                                                                                                                                       |



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## General

| Characteristic      | Minimum                                                                                                                               | Typical | Maximum | Units | Notes & Conditions                                                  |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------|---------|-------|---------------------------------------------------------------------|
| Efficiency          |                                                                                                                                       | 75      |         | %     | Rated load, 115VAC. Varies with distribution of loads among output. |
| Isolation IP to OP  | 3000                                                                                                                                  |         |         | VAC   |                                                                     |
| Switching Frequency |                                                                                                                                       | 60      |         | KHZ   |                                                                     |
| Power Good Signal   | When power is turned on, the power good signal will go high 100ms to 500ms after all output DC voltages are within regulation limits. |         |         |       |                                                                     |
| Power Fail Signal   | The power fail signal will go low at least 1 mS before any of the output voltages fall below the regulation limits.                   |         |         |       |                                                                     |
| Power On / Off      | The power supply will be turned on when the power On/Off pin is connected to secondary GND.                                           |         |         |       |                                                                     |

## Environmental

| Characteristic                       | Minimum | Typical       | Maximum | Units | Notes & Conditions                                                                      |
|--------------------------------------|---------|---------------|---------|-------|-----------------------------------------------------------------------------------------|
| Operating Temperature                | 0       |               | 70      | °C    | Derate linearly above 50°C by 2.5% per °C to a maximum temperature of 70°C at 50% load. |
| Storage Temperature                  | -40     |               | +70     | °C    |                                                                                         |
| Relative Humidity                    | 5       |               | 95      | %RH   | Non-condensing.                                                                         |
| Cooling                              | 8.6     |               |         | CFM   | Forced-cooled > 60W                                                                     |
| Operating / Non - Operating Altitude |         | 10000 / 40000 |         | Feet  |                                                                                         |

## EMC: Emissions

| Phenomenon | Standard                                      | Class | Notes & Conditions |
|------------|-----------------------------------------------|-------|--------------------|
| Conducted  | EN 55022 / EN 55032<br>CISPR 22 & FCC Part 15 | B     |                    |
| Radiated   | EN 55022 / EN 55032<br>CISPR 22 & FCC Part 15 | B     |                    |

## EMC: Immunity

| Phenomenon             | Standard       | Criteria | Notes & Conditions                       |
|------------------------|----------------|----------|------------------------------------------|
| ESD                    | IEC 61000-4-2  | 3        | 8KV air discharge, 6KV contact discharge |
| Radiated               | IEC 61000-4-3  | 2        | 3V/m                                     |
| EFT                    | IEC 61000-4-4  | 3        | 2KV Line & PE                            |
| Surges                 | IEC 61000-4-5  | 3        | 2KV                                      |
| Conducted              | IEC 61000-4-6  | 3        | 10V                                      |
| Power Magnetic         | IEC 61000-4-8  | 3        | 10A/m                                    |
| Dips and Interruptions | IEC 61000-4-11 | -        |                                          |

## Safety Approvals

| Safety Agency | Safety Standard                                                                        | Notes & Conditions |
|---------------|----------------------------------------------------------------------------------------|--------------------|
| TUV           | EN 60950-1: 2006+A11: 2009                                                             | Approved.          |
| UL/cUL        | UL 60950-1, 2nd Edition, 2007-03-27,<br>CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 | Approved.          |

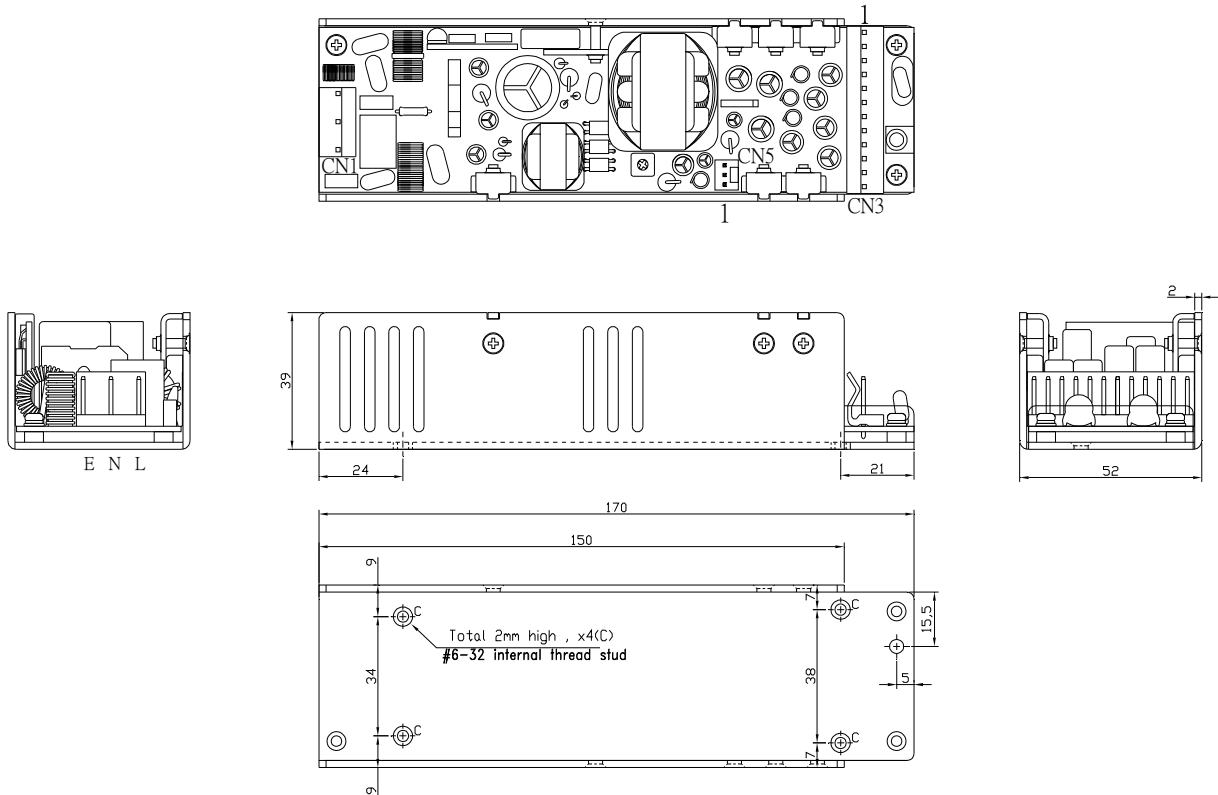


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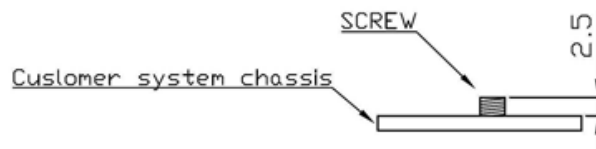
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## Mechanical Details

SIZE : 170.0(L) x 52.0(W) x 39.0(H)mm, Tolerance +/-0.4mm.



Measuring the screw protrusion first:



| Parameter      | Conditions/Description                          |     |            |                                               |              |           |
|----------------|-------------------------------------------------|-----|------------|-----------------------------------------------|--------------|-----------|
| Dimension      | 170(L) x 52(W) x 39(H) mm, Tolerance +/- 0.4mm. |     |            |                                               |              |           |
| Connector      | CN1                                             | --- | AC input:  | Molex 5273-05A withdraw 2 pins or equivalent. |              |           |
|                | CN3                                             | --- | DC output: | Molex 5273-12A or equivalent.                 |              |           |
|                | CN5                                             | --- | DC output: | Molex 5045-03A or equivalent.                 |              |           |
| Pin Assignment | CN1                                             | Pin | 1. L       | 2. N                                          | 3. Earth     |           |
|                | CN3                                             | Pin | 1. +3.3V   | 4. GND                                        | 7. +5V       | 10. PG/PF |
|                |                                                 |     | 2. +3.3V   | 5. GND                                        | 8. +5V       | 11. +12V  |
|                |                                                 |     | 3. GND     | 6. GND                                        | 9. +5V       | 12. -12V  |
|                | CN5                                             | Pin | 1. +5Vsb   | 2. GND                                        | 3. PS on/off |           |



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## Thermal Considerations

In order to ensure safe operation of the PSU in the end-use equipment, the temperature of the components listed in the table below must not be exceeded.

Temperature should be monitored using J type thermocouples placed on the hottest part of the component (out of any direct air flow). See Mechanical Details for component locations.

| Temperature Measurements at max. amb. |                 |
|---------------------------------------|-----------------|
| Component                             | Max Temperature |
| T1                                    | 110°C           |
| Q1                                    | 120°C           |
| D5, D6                                | 120°C           |
| C2                                    | 105°C           |
| C21                                   | 105°C           |