

**HWS150A/HDA**

SPECIFICATIONS

A259-01-01/HDA-B

| ITEMS |                                | MODEL      | HWS150A<br>-3/HDA   | HWS150A<br>-5/HDA | HWS150A<br>-12/HDA | HWS150A<br>-15/HDA | HWS150A<br>-24/HDA | HWS150A<br>-48/HDA |     |
|-------|--------------------------------|------------|---|-------------------|--------------------|--------------------|--------------------|--------------------|-----|
| 1     | Nominal Output Voltage         | V          | 3.3   | 5                 | 12                 | 15                 | 24                 | 48                 |     |
| 2     | Maximum Output Current         | A          | 30  | 30                | 13                 | 10                 | 6.5                | 3.3                |     |
| 3     | Maximum Output Power           | W          | 99.0  | 150.0             | 156.0              | 150.0              | 156.0              | 158.4              |     |
| 4     | Efficiency (Typ.) (*1)         | 100VAC     | %   | 82                | 85                 | 85                 | 86                 | 88                 | 89  |
|       |                                | 200VAC     | %   | 84                | 87                 | 88                 | 89                 | 90                 | 91  |
| 5     | Input Voltage Range (*2)(*3)   | -          | 85 - 265VAC (47 - 63Hz) or 120 - 370VDC   |                   |                    |                    |                    |                    |     |
| 6     | Input Current (Typ.) (*1)      | A          | 1.3/0.65  | 1.9/0.95          |                    |                    |                    |                    |     |
| 7     | Inrush Current (Typ.) (*1)(*4) | -          | 14A at 100VAC, 28A at 200VAC, Ta=25°C, Cold Start   |                   |                    |                    |                    |                    |     |
| 8     | PFHC                           | -          | Designed to meet IEC61000-3-2   |                   |                    |                    |                    |                    |     |
| 9     | Power Factor (Typ.) (*1)       | -          | 0.96/0.89   | 0.98/0.93         |                    |                    |                    |                    |     |
| 10    | Output Voltage Range           | V          | 2.97 - 3.96   | 4.0 - 6.0         | 9.6 - 14.4         | 12.0 - 18.0        | 19.2 - 28.8        | 38.4 - 52.8        |     |
| 11    | Maximum Ripple & Noise (*5)    | 0≤Ta<71°C  | mV  | 120               | 120                | 150                | 150                | 150                | 200 |
|       |                                | -10≤Ta<0°C | mV  | 160               | 160                | 180                | 180                | 180                | 240 |
| 12    | Maximum Line Regulation (*6)   | mV         | 20  | 20                | 48                 | 60                 | 96                 | 192                |     |
| 13    | Maximum Load Regulation (*7)   | mV         | 40  | 40                | 96                 | 120                | 150                | 240                |     |
| 14    | Temperature Coefficient        | -          | Less than 0.02% / °C  |                   |                    |                    |                    |                    |     |
| 15    | Over Current Protection (*8)   | A          | 31.5 ≤  | 31.5 ≤            | 13.6 ≤             | 10.5 ≤             | 6.82 ≤             | 3.46 ≤             |     |
| 16    | Over Voltage Protection (*9)   | V          | 4.13 - 4.95   | 6.25 - 7.25       | 15.0 - 17.4        | 18.8 - 21.8        | 30.0 - 34.8        | 55.2 - 64.8        |     |
| 17    | Hold-up Time (Typ.) (*1)       | -          | 20ms  |                   |                    |                    |                    |                    |     |
| 18    | Leakage Current (*10)          | -          | Less than 0.5mA. 0.2mA (Typ) at 100VAC / 0.4mA (Typ) at 230VAC  |                   |                    |                    |                    |                    |     |
| 19    | Remote Sensing                 | -          | Possible  |                   |                    |                    |                    |                    |     |
| 20    | Parallel Operation             | -          | -   |                   |                    |                    |                    |                    |     |
| 21    | Series Operation               | -          | Possible  |                   |                    |                    |                    |                    |     |
| 22    | Operating Temperature (*11)    | -          | -10 to +71°C (-10 to +50°C:100%, +60°C:60%, +71°C:20%)<br>Guarantee Start up at -40 to -10°C  |                   |                    |                    |                    |                    |     |
| 23    | Operating Humidity             | -          | 30 to 90%RH (No Condensing)   |                   |                    |                    |                    |                    |     |
| 24    | Storage Temperature            | -          | -40 to +85°C  |                   |                    |                    |                    |                    |     |
| 25    | Storage Humidity               | -          | 10 to 95%RH (No Condensing)   |                   |                    |                    |                    |                    |     |
| 26    | Cooling                        | -          | Convection Cooling  |                   |                    |                    |                    |                    |     |
| 27    | Withstand Voltage              | -          | Input - FG : 2kVAC (20mA), Input - Output : 3kVAC (20mA)<br>Output - FG : 500VAC (20mA) for 1min  |                   |                    |                    |                    |                    |     |
| 28    | Isolation Resistance           | -          | More than 100MΩ at 25°C and 70%RH Output - FG : 500VDC  |                   |                    |                    |                    |                    |     |
| 29    | Vibration (*12)                | -          | At no operating, 10 - 55Hz (Sweep for 1min) 19.6m/s <sup>2</sup> Constant, X,Y,Z 1hour each.<br>Designed to meet MIL-STD-810F 514.5 Category 4, 10  |                   |                    |                    |                    |                    |     |
| 30    | Shock                          | -          | Less than 196.1m/s <sup>2</sup><br>Designed to meet MIL-STD-810F 516.5 Procedure I, VI  |                   |                    |                    |                    |                    |     |
| 31    | Safety                         | -          | Approved by UL/CSA/EN62368-1, EN62477-1 (OVCI)(24V only), UL/CSA60950-1, EN60950-1 (Expire date of 60950-1 : 20/12/2020), UL508, CSA C22.2 No.107.1-01.<br>Designed to meet Den-an Appendix 8 at 100VAC only. |                   |                    |                    |                    |                    |     |
| 32    | Line DIP                       | -          | Designed to meet SEMI-F47 (200VAC Line only)  |                   |                    |                    |                    |                    |     |
| 33    | Conducted Emission (*13)       | -          | Designed to meet EN55011/EN55032-B, FCC-B, VCCI-B   |                   |                    |                    |                    |                    |     |
| 34    | Radiated Emission (*13)        | -          | Designed to meet EN55011/EN55032-B, FCC-B, VCCI-B   |                   |                    |                    |                    |                    |     |
| 35    | Immunity (*13)                 | -          | Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11   |                   |                    |                    |                    |                    |     |
| 36    | Weight (Typ)                   | -          | 520g  |                   |                    |                    |                    |                    |     |
| 37    | Size (W x H x D)               | mm         | 42 x 82 x 160 ( Refer to Outline Drawing )  |                   |                    |                    |                    |                    |     |

\*Read instruction manual carefully, before using the power supply unit.

=NOTES=

- \*1. At 100VAC/200VAC, Ta=25°C, nominal output voltage and maximum output power.
- \*2. For cases where conformance to various safety specs (UL, CSA, EN) are required, to be described as 100 - 240VAC(50 - 60Hz).
- \*3. Output derating needed when input voltage less than 90VAC. Refer to OUTPUT DERATING CURVE (A259-01-02/HDA- ).
- \*4. Not applicable for the inrush current to Noise Filter for less than 0.2ms.
- \*5. Measure with JEITA RC-9131B probe, Bandwidth of scope :100MHz.
- \*6. 85 - 265VAC, constant load.
- \*7. No load-Full load, constant input voltage.
- \*8. Constant current limit and Hiccup with automatic recovery. Avoid to operate at over load or short circuit condition.
- \*9. OVP circuit will shut down output, manual reset (Re power on).
- \*10. Measured by the each measuring method of UL, CSA, EN and Den-an (at 60Hz), Ta=25°C.
- \*11. Output Derating
  - Derating at standard mounting. Refer to OUTPUT DERATING CURVE (A259-01-02/HDA- ).
  - Load (%) is percent of maximum output power or maximum output current, do not exceed its derating of maximum load.
  - For conditions of start up at -40°C to -10°C, refer to derating curve (A259-01-03/HD- ).
- \*12. Category 4 exposure levels : Track transportation over U.S. highways, Composite two-wheeled trailer.
- \*13. The power supply is considered a component which will be installed into a final equipment.  
The final equipment should be re-evaluated that it meets EMC directives.

**HWS150A/HDA**

OUTPUT DERATING

A259-01-02/HDA

| Ta (°C)   | LOAD (%)   |                  |
|-----------|------------|------------------|
|           | MOUNTING A | MOUNTING B, C, D |
| -10 - +30 | 100        | 100              |
| 50        | 100        | 60               |
| 60        | 60         | 35               |
| 71        | 20         | 10               |

\*Refer to dotted line for output derating curve, when input voltage range is " $85 \leq V_{in} < 90$ " for the MOUNTING A.

