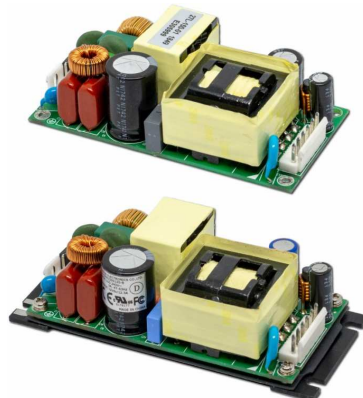




# CFM150S SERIES 150 WATT OPEN FRAME AC-DC MODULES

## Features

- Universal Input Range 90~264Vac
- High Efficiency up to 94%
- 2"x 4" Open Frame Compact Size
- Class I & Class II (NOTE7)
- 120W with Natural Convection (CFM150SXXX)
- 150W with Natural Convection (CFM150SXXXB)
- Peak Power Operation up to 180Watt for 5s
- No Load Input Power Consumption<150mW
- Approval Safety IEC/EN/UL 62368-1 Ed 3.0
- Operating Altitude 5000m
- Continuous Short Circuit Protection
- Over Voltage Protection
- Active PFC Function



| MODEL NUMBER | OUTPUT VOLTAGE | OUTPUT CURRENT     |              | VOLTAGE ACCURACY NOTE1 | RIPPLE & NOISE NOTE2 | VLOTAGE ADJ. RANGE | LINE REGULATION NOTE3 | LOAD REGULATION NOTE4 | % EFF. (Typ.) NOTE5 |
|--------------|----------------|--------------------|--------------|------------------------|----------------------|--------------------|-----------------------|-----------------------|---------------------|
|              |                | NATURAL CONVECTION | BASE COOLING |                        |                      |                    |                       |                       |                     |
| CFM150S120   | 12 V           | 10.0 A             | 12.5 A       | 1%                     | 120 mV               | ±8%                | ±0.5%                 | ±1%                   | 93%                 |
| CFM150S240   | 24 V           | 5.0 A              | 6.25 A       | 1%                     | 240 mV               | ±8%                | ±0.5%                 | ±1%                   | 94%                 |
| CFM150S280   | 28 V           | 4.28 A             | 5.35 A       | 1%                     | 280 mV               | ±8%                | ±0.5%                 | ±1%                   | 94%                 |
| CFM150S360   | 36 V           | 3.33 A             | 4.16 A       | 1%                     | 360 mV               | ±8%                | ±0.5%                 | ±1%                   | 94%                 |
| CFM150S480   | 48 V           | 2.5 A              | 3.125 A      | 1%                     | 480 mV               | ±8%                | ±0.5%                 | ±1%                   | 94%                 |

Note:

1. Voltage accuracy is set at 100% full load.
2. Add a 0.1uF ceramic capacitor and a 10uF E.L. capacitor to output for ripple & noise measuring @20MHz BW.
3. Line regulation is measured from 0V<sub>ac</sub> to 264V<sub>ac</sub> with 100% full load.
4. Load regulation measured from 0% to 100% full load.
5. Typical efficiency at 230 Vac and 75% full load at 25°C.
6. Standard input and output connectors (CN1 and CN2) wafer with TAIWAN KING PIN TERMINAL PVHI series and mate with JST housing VHR series or equivalent.
7. Conductive: Class I & Class II meets Class B Radiation: Class I meet Class B, Class II meet Class A.

## PART NUMBER

| Series | Number of Outputs | Nominal Output Voltage                                        | Type                                 |
|--------|-------------------|---------------------------------------------------------------|--------------------------------------|
| CFM150 | X                 | XXX                                                           | -X (Option)                          |
| CFM150 | S : Single        | 120 : 12V<br>240 : 24V<br>280 : 28V<br>360 : 36V<br>480 : 48V | Blank :Open Frame<br>B :Base Cooling |

Part Number Example:

CFM150S120B: With Base, 150W, Single 12V<sub>dc</sub> Output



# CFM150S Series

## TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25°C unless otherwise noted.)

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER             | NOTES and CONDITIONS                                                                           | Device | Min. | Typ. | Max. | Units           |
|-----------------------|------------------------------------------------------------------------------------------------|--------|------|------|------|-----------------|
| Input Voltage         |                                                                                                | All    | 90   |      | 264  | V <sub>ac</sub> |
| Operating Temperature | 100Vac~264Vac See Derating Curve<br>(V <sub>in</sub> =90V <sub>ac</sub> , Operate @-30°C~80°C) | All    | -40  |      | 80   | °C              |
| Storage Temperature   |                                                                                                | All    | -40  |      | 85   | °C              |
| Operating Altitude    |                                                                                                | All    |      |      | 5000 | m               |

### INPUT CHARACTERISTICS

| PARAMETER                | NOTES and CONDITIONS                                   | Device | Min. | Typ. | Max. | Units           |
|--------------------------|--------------------------------------------------------|--------|------|------|------|-----------------|
| Operating Voltage Range  |                                                        | All    | 90   |      | 264  | V <sub>ac</sub> |
| Input Frequency Range    |                                                        | All    | 47   |      | 63   | Hz              |
| Maximum Input Current    | 100% Load, V <sub>in</sub> =100V <sub>ac</sub>         | All    |      |      | 2    | A               |
| Power Factor             | 100% Load, V <sub>in</sub> =230V <sub>ac</sub>         | All    | 0.9  |      |      |                 |
| Inrush Current           | V <sub>in</sub> =240V <sub>ac</sub> , Cold Start @25°C | All    |      |      | 100  | A               |
| Leakage Current (Touch)  |                                                        | All    |      |      | 0.1  | mA              |
| Leakage Current (Earth)  |                                                        | All    |      |      | 1    | mA              |
| Under Voltage Protection |                                                        | All    | 60   |      | 75   | V <sub>ac</sub> |

### OUTPUT CHARACTERISTICS

| PARAMETER                      | NOTES and CONDITIONS                                                                                                                                                   | Device        | Min.  | Typ. | Max.  | Units           |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------|------|-------|-----------------|
| Output Voltage Set Point       | V <sub>in</sub> =90Vac~264Vac, I <sub>o</sub> =I <sub>o</sub> max.,<br>ambient temperature=25°C                                                                        | CFM150S120/-B | 11.88 | 12   | 12.12 | V <sub>dc</sub> |
|                                |                                                                                                                                                                        | CFM150S240/-B | 23.76 | 24   | 24.24 |                 |
|                                |                                                                                                                                                                        | CFM150S280/-B | 27.72 | 28   | 28.28 |                 |
|                                |                                                                                                                                                                        | CFM150S360/-B | 35.64 | 36   | 36.36 |                 |
|                                |                                                                                                                                                                        | CFM150S480/-B | 47.52 | 48   | 48.48 |                 |
| Output Voltage Adjustment      | CFM150S ≤ Rated output power 120W<br>CFM150S-B ≤ Rated output power 150W                                                                                               | CFM150S120/-B | 11.04 |      | 12.96 | V <sub>dc</sub> |
|                                |                                                                                                                                                                        | CFM150S240/-B | 22.08 |      | 25.92 |                 |
|                                |                                                                                                                                                                        | CFM150S280/-B | 25.76 |      | 30.24 |                 |
|                                |                                                                                                                                                                        | CFM150S360/-B | 33.12 |      | 38.88 |                 |
|                                |                                                                                                                                                                        | CFM150S480/-B | 44.16 |      | 51.84 |                 |
| Operating Output Current Range | CFM150SXXX<br>V <sub>in</sub> = 90V <sub>ac</sub> ~200V <sub>ac</sub> see typical current<br>V <sub>in</sub> = 200V <sub>ac</sub> ~264V <sub>ac</sub> see max. current | CFM150S120    | 0     | 10   | 11.67 | A               |
|                                |                                                                                                                                                                        | CFM150S240    | 0     | 5    | 5.83  |                 |
|                                |                                                                                                                                                                        | CFM150S280    | 0     | 4.28 | 4.99  |                 |
|                                |                                                                                                                                                                        | CFM150S360    | 0     | 3.33 | 3.88  |                 |
|                                |                                                                                                                                                                        | CFM150S480    | 0     | 2.5  | 2.92  |                 |
|                                | V <sub>in</sub> =90V <sub>ac</sub> ~264V <sub>ac</sub> , <b>See Derating Curve</b>                                                                                     | CFM150S120-B  | 0     |      | 12.5  | A               |
|                                |                                                                                                                                                                        | CFM150S240-B  | 0     |      | 6.25  |                 |
|                                |                                                                                                                                                                        | CFM150S280-B  | 0     |      | 5.35  |                 |
|                                |                                                                                                                                                                        | CFM150S360-B  | 0     |      | 4.16  |                 |
|                                |                                                                                                                                                                        | CFM150S480-B  | 0     |      | 3.125 |                 |
| Holdup Time                    | V <sub>in</sub> =115V <sub>ac</sub>                                                                                                                                    | All           | 20    | 25   |       | ms              |
| Output Voltage Regulation      |                                                                                                                                                                        |               |       |      |       |                 |
| Load Regulation                | 10% Load to full load                                                                                                                                                  | All           |       |      | ±1.0  | %               |
| Line Regulation                | V <sub>in</sub> =High line to low line                                                                                                                                 | All           |       |      | ±0.5  | %               |



## CFM150S Series

| PARAMETER                | NOTES and CONDITIONS                                                                                                                                                                                                             | Device                                                                            | Min.       | Typ.                            | Max.                                  | Units           |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------|---------------------------------|---------------------------------------|-----------------|
| Over Voltage Protection  | Latch off (AC recycle to reset)                                                                                                                                                                                                  | CFM150S120/-B<br>CFM150S240/-B<br>CFM150S280/-B<br>CFM150S360/-B<br>CFM150S480/-B |            |                                 | 14.2<br>29.2<br>34.2<br>44.2<br>58.2  | V <sub>dc</sub> |
| Output Ripple and Noise  | 1. Add a 0.1uF ceramic capacitor and a 10uF aluminum electrolytic capacitor to output.<br>2. Oscilloscope is 20MHz band width.<br>3. Ambient temperature=25°C                                                                    | CFM150S120/-B<br>CFM150S240/-B<br>CFM150S280/-B<br>CFM150S360/-B<br>CFM150S480/-B |            |                                 | 120<br>240<br>280<br>360<br>480       | mVp-p           |
| Over Current Protection  | Auto recovery                                                                                                                                                                                                                    | CFM150S<br>CFM150S-B                                                              | 150<br>120 | 160<br>130                      | 170<br>140                            | %               |
| Peak Power               | 1. V <sub>in</sub> = 115V <sub>ac</sub> and 230V <sub>ac</sub><br>2. Ambient temperature=25°C<br>3. Peak power should be less than 5seconds, with a maximum 10% duty cycle, peak power function by 120% load 5S and 75% load 45S | All                                                                               |            | 120                             |                                       | %               |
| Short Circuit Protection | Auto recovery                                                                                                                                                                                                                    | All                                                                               |            |                                 |                                       |                 |
| Load Capacitance         | 1. Input voltage is 115V <sub>ac</sub> and 230V <sub>ac</sub><br>2. Output is 100% full load<br>3. Ambient temperature=25°C                                                                                                      | CFM150S120/-B<br>CFM150S240/-B<br>CFM150S280/-B<br>CFM150S360/-B<br>CFM150S480/-B |            |                                 | 12500<br>6200<br>5340<br>4100<br>3080 | uF              |
| Efficiency               | 1. Input voltage is 230V <sub>ac</sub> .<br>2. Output is 75% full load<br>3. Ambient temperature=25°C                                                                                                                            | CFM150S120/-B<br>CFM150S240/-B<br>CFM150S280/-B<br>CFM150S360/-B<br>CFM150S480/-B |            | 93%<br>94%<br>94%<br>94%<br>94% |                                       | %               |

### ISOLATION CHARACTERISTICS

| PARAMETER                | NOTES and CONDITIONS                    | Device | Min. | Typ. | Max. | Units           |
|--------------------------|-----------------------------------------|--------|------|------|------|-----------------|
| Input to Output          | 1 Minute (without dielectric breakdown) | All    |      |      | 4000 | V <sub>ac</sub> |
| Input to Earth (Ground)  | 1 Minute (without dielectric breakdown) | All    |      |      | 2500 | V <sub>ac</sub> |
| Output to Earth (Ground) | 1 Minute (without dielectric breakdown) | All    |      |      | 360  | V <sub>ac</sub> |
| Isolation Resistance     | Input to output                         | All    | 100  |      |      | MΩ              |

### FEATURE CHARACTERISTICS

| PARAMETER           | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---------------------|----------------------|--------|------|------|------|-------|
| Switching Frequency |                      | All    |      | 115  |      | kHz   |

### GENERAL CHARACTERISTICS

| PARAMETER | NOTES and CONDITIONS                                                                       | Device | Min. | Typ.       | Max. | Units   |
|-----------|--------------------------------------------------------------------------------------------|--------|------|------------|------|---------|
| MTBF      | I <sub>o</sub> =100%; T <sub>a</sub> =25°C per MIL-HDBK-217F                               | All    | 350  |            |      | k hours |
| Life Time | @75% Load, 40°C                                                                            | All    | 26   |            |      | k hours |
| Humidity  | Non-condensing                                                                             | All    |      |            | 93   | % RH    |
| Shock     | Meets MIL-STD-810F Table 516.5, TABLE 516.5- I 10ms, each axis 3 times(±X、±Y、±Z axis)      | All    |      | 75         |      | g       |
| Vibration | Meets MIL-STD-810F Table 514.5C-VIII, 15~2000Hz, X、Y、Z axis, 1 hr(each axis),. total 3 hrs | All    |      | 4          |      | g       |
| Weight    | Open Frame<br>B (Base Cooling)                                                             | All    |      | 200<br>240 |      | grams   |



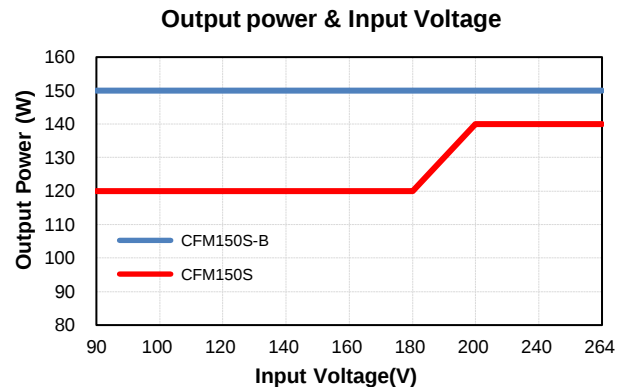
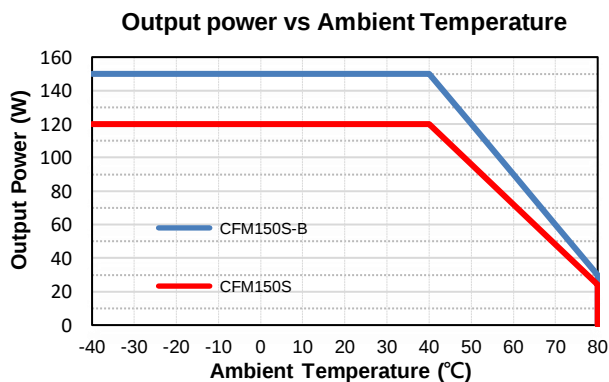
# CFM150S Series

## GENERAL CHARACTERISTICS

| PARAMETER                                        | NOTES and CONDITIONS                                                                                                                                                              | Device | Min.                                                                                                   | Typ. | Max. | Units       |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------|------|------|-------------|
| Dimension                                        | Open Frame<br>B (Base Cooling)                                                                                                                                                    | All    | 4.000x2.000x1.283 Inches<br>(101.6x50.80x32.6 mm)<br>4.598x2.000x1.362 Inches<br>(116.8x50.80x34.6 mm) |      |      |             |
| Safety                                           | Class I & Class II, IEC/EN/UL 62368-1                                                                                                                                             |        |                                                                                                        |      |      | Ed 3.0      |
| EMC Emission                                     | EN 55032:2015+A11:2020 Class B, 47 CFR FCC Part 15 Subpart B, EN 61204-3:2018, EN 61000-3-2:2019, EN 61000-3-3:2013+A1:2019, EN 61000-6-3:2007+A1:2011+AC:2012, EN 61000-6-4:2019 |        |                                                                                                        |      |      |             |
| Conducted Disturbance                            | EN 55032:2015+A11:2020, 47 CFR FCC Part 15 (Class I & Class II meets Class B)                                                                                                     |        |                                                                                                        |      |      | Class B     |
| Radiated Disturbance                             | EN 55032:2015+A11:2020, 47 CFR FCC Part 15 (Class I Meet Class B; Class II Meet Class A)                                                                                          |        |                                                                                                        |      |      | Class B     |
| Harmonic Current Emissions                       | EN 61000-3-2:2019                                                                                                                                                                 |        |                                                                                                        |      |      | Class A     |
| Voltage Fluctuations & Flicker                   | EN 61000-3-3:2013+A1:2019                                                                                                                                                         |        |                                                                                                        |      |      | Criterion A |
| EMC Immunity                                     | EN 55035:2017+A11:2020, EN 61000-6-1:2019, EN 61000-6-2:2019, EN 61204-3:2018                                                                                                     |        |                                                                                                        |      |      | Criterion A |
| Electrostatic Discharge (ESD)                    | IEC 61000-4-2:2008 Air Discharge: $\pm 8\text{kV}$ , Contact Discharge: $\pm 4\text{kV}$                                                                                          |        |                                                                                                        |      |      | Criterion A |
| Radio-Frequency, Continuous Radiated Disturbance | IEC 61000-4-3:2020                                                                                                                                                                |        |                                                                                                        |      |      | Criterion A |
| Electrical Fast Transient (EFT)                  | IEC 61000-4-4:2012, $\pm 2\text{kV}$                                                                                                                                              |        |                                                                                                        |      |      | Criterion A |
| Surge                                            | IEC 61000-4-5:2014+A1:2017, L-N: $\pm 1\text{kV}$ , L-E(Ground): $\pm 2\text{kV}$                                                                                                 |        |                                                                                                        |      |      | Criterion A |
| Conducted Disturbances, Induced by RF Fields     | IEC 61000-4-6:2013+COR1:2015                                                                                                                                                      |        |                                                                                                        |      |      | Criterion A |
| Power Frequency Magnetic Field                   | IEC 61000-4-8:2009                                                                                                                                                                |        |                                                                                                        |      |      | Criterion A |
| Voltage Dips                                     | IEC 61000-4-11:2020 Dip: 30% 10ms, Dip: 60% 100ms, Dip >95% 5000ms                                                                                                                |        |                                                                                                        |      |      | Criterion A |
| Voltage Interruptions                            | IEC 61000-4-11:2020, >95% 5000ms                                                                                                                                                  |        |                                                                                                        |      |      | Criterion B |
| Application Note Link                            |                                                                                                                                                                                   |        | <a href="#">CFM150S Series App Notes</a>                                                               |      |      |             |

## CHARACTERISTIC CURVE

### Power Derating Curve

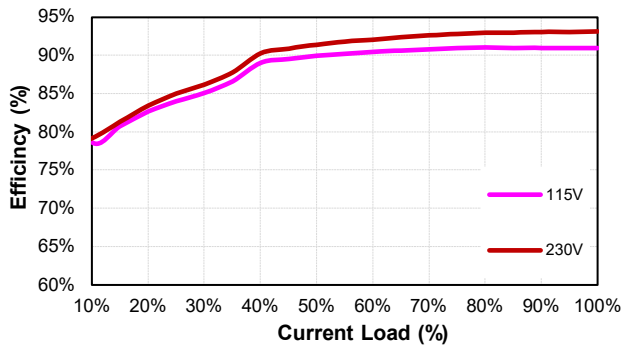




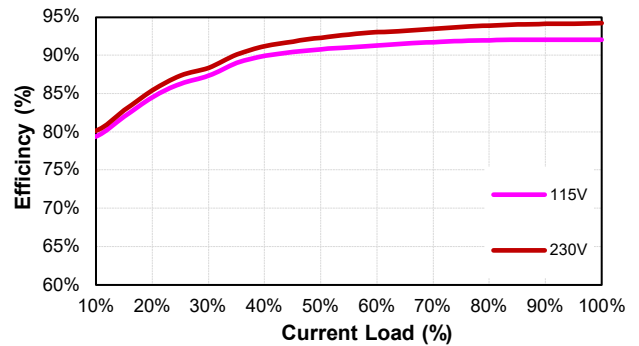
# CFM150S Series

## Performance Data

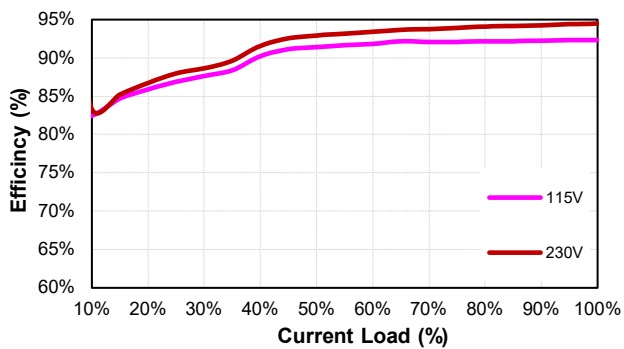
CFM150S120 (Eff Vs Io)



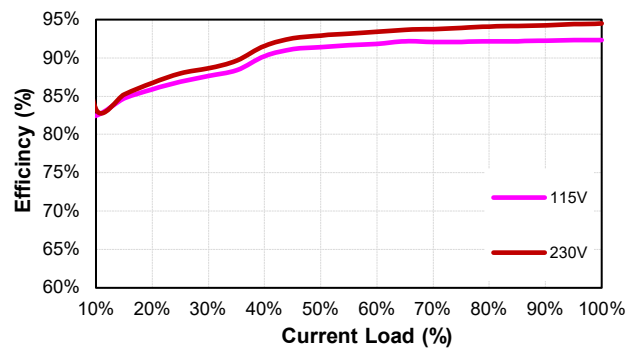
CFM150S240 (Eff Vs Io)



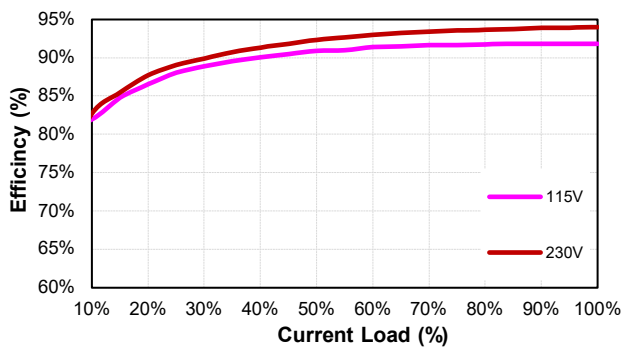
CFM150S280 (Eff Vs Io)



CFM150S360 (Eff Vs Io)



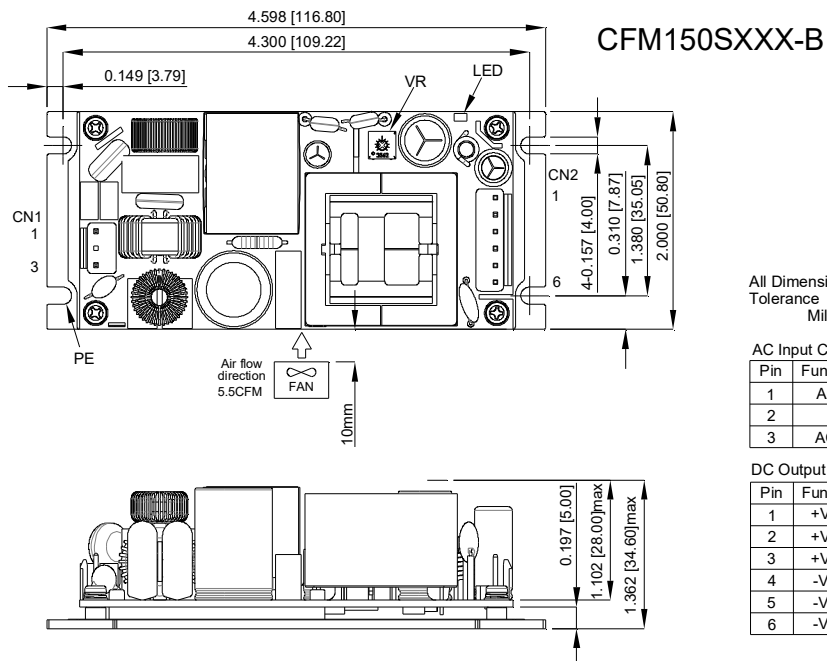
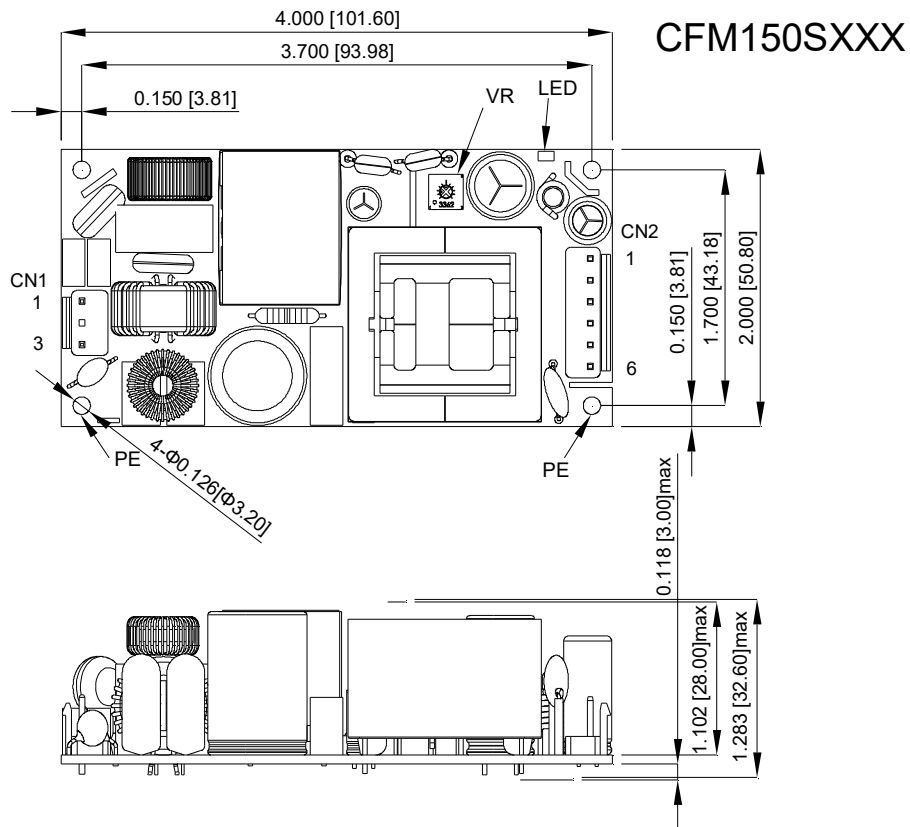
CFM150S480 (Eff Vs Io)





# CFM150S Series

## MECHANICAL SPECIFICATION



All Dimensions In Inches[mm]  
Tolerance Inches:x.xxx= ± 0.02  
Millimeters: x.xx = ± 0.5

AC Input Connector(CN1):TKP PVHI-03N2 or equivalent

| Pin | Function | Mating Housing              | Terminal                          |
|-----|----------|-----------------------------|-----------------------------------|
| 1   | ACL      | JST VHR-3N<br>or equivalent | JST SVH-21T-P1.1<br>or equivalent |
| 2   | -        |                             |                                   |
| 3   | ACN      |                             |                                   |

DC Output Connector(CN2):TKP PVHI-06 or equivalent

| Pin | Function | Mating Housing              | Terminal      |
|-----|----------|-----------------------------|---------------|
| 1   | +Vout    | JST VHR-6N<br>or equivalent | or equivalent |
| 2   | +Vout    |                             |               |
| 3   | +Vout    |                             |               |
| 4   | -Vout    |                             |               |
| 5   | -Vout    |                             |               |
| 6   | -Vout    |                             |               |

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