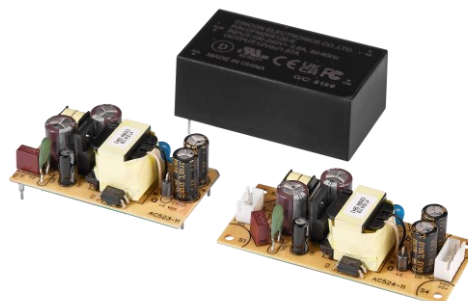




# CFM20S SERIES 20 WATT OPEN FRAME AC-DC MODULES

## Features

- Universal Input Range 90~264V<sub>ac</sub>
- High Efficiency up to 87%
- 1.30"x 2.38" Size
- Class II
- No Load Power <0.1W
- Approval IEC/EN/UL 62368-1 Ed 3.0
- Design Meets IEC/EN 60335-1
- Approval EN 55032 Class B and CISPR/FCC Class B
- Operating Altitude 5000m
- Continuous Short Circuit Protection
- Over Voltage Protection
- Over Voltage Category OVC II & OVC III



| MODEL NUMBER | OUTPUT VOLTAGE | OUTPUT CURRENT | VOLTAGE ACCURACY NOTE1 | RIPPLE& NOISE NOTE2 | LINE REGULATION NOTE3 | LOAD REGULATION NOTE4 | %EFF. (Typ.) NOTE5 |
|--------------|----------------|----------------|------------------------|---------------------|-----------------------|-----------------------|--------------------|
| CFM20S050    | 5 V            | 4.0 A          | ±2%                    | 100 mV              | ±0.5%                 | ±1%                   | 84%                |
| CFM20S120    | 12 V           | 1.67 A         | ±2%                    | 120 mV              | ±0.5%                 | ±1%                   | 86%                |
| CFM20S150    | 15 V           | 1.34 A         | ±2%                    | 150 mV              | ±0.5%                 | ±1%                   | 86%                |
| CFM20S240    | 24 V           | 0.83 A         | ±2%                    | 240 mV              | ±0.5%                 | ±1%                   | 86%                |
| CFM20S480    | 48 V           | 0.42 A         | ±2%                    | 480 mV              | ±0.5%                 | ±1%                   | 87%                |

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 measurement @20MHz B.W.
3. Line regulation is measured from high line to low line with 100% full load.
4. Load regulation is measured from 10% to 100% full load.
5. Typical efficiency at 230 V<sub>ac</sub> and 100% full load at 25°C.
6. T Version wafer with JST B3B-XH/B4B-XH and mate with JST housing XH series or equivalent.

## PART NUMBER

| Series | Number of Outputs | Nominal Output Voltage                                        | Type                                               |
|--------|-------------------|---------------------------------------------------------------|----------------------------------------------------|
| CFM20  | X                 | XXX                                                           | -X (Option)                                        |
| CFM20  | S : Single        | 050 : 05V<br>120 : 12V<br>150 : 15V<br>240 : 24V<br>480 : 48V | Blank : PCB mount<br>T : Wafer<br>E : Encapsulated |

Part Number Example:

**CFM20S120:** 20W, Single 12Vdc Output, PCB Mount Type

**CFM20S120-T:** 20W, Single 12Vdc Output, Wafer Type



# CFM20S Series

## TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, 100% full load at 25°C unless otherwise noted.)

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER             | NOTES and CONDITIONS                                                                  | Device | Min.      | Typ. | Max.                 | Units                              |
|-----------------------|---------------------------------------------------------------------------------------|--------|-----------|------|----------------------|------------------------------------|
| Input Voltage         | Safety approvals only to the AC input                                                 | All    | 90<br>120 |      | 264<br>370           | V <sub>ac</sub><br>V <sub>dc</sub> |
| Operating Temperature | See Derating Curve                                                                    | All    | -40       |      | 80                   | °C                                 |
| Storage Temperature   |                                                                                       | All    | -40       |      | 85                   | °C                                 |
| Operating Altitude    | IEC/EN/UL 62368-1 OVC II<br>IEC 62368-1 OVC III<br>Design meets IEC/EN 60335-1 OVC II | All    |           |      | 5000<br>2000<br>3000 | m                                  |

### INPUT CHARACTERISTICS

| PARAMETER               | NOTES and CONDITIONS                                     | Device | Min. | Typ. | Max. | Units           |
|-------------------------|----------------------------------------------------------|--------|------|------|------|-----------------|
| Operating Voltage Range |                                                          | All    | 100  |      | 240  | V <sub>ac</sub> |
| Input Frequency Range   |                                                          | All    | 50   |      | 60   | Hz              |
| Maximum Input Current   | 100% full load, V <sub>in</sub> =100V <sub>ac</sub>      | All    |      |      | 0.6  | A               |
| Leakage Current         |                                                          | All    |      |      | 0.1  | mA              |
| Inrush Current          | V <sub>in</sub> =240V <sub>ac</sub> , Cold start at 25°C | All    |      | 35   |      | A               |

### OUTPUT CHARACTERISTICS

| PARAMETER                      | NOTES and CONDITIONS                                                                                 | Device                                                        | Min.                                     | Typ.                      | Max.                                     | Units           |
|--------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------|---------------------------|------------------------------------------|-----------------|
| Output Voltage Set Point       | V <sub>in</sub> =Nominal V <sub>in</sub> , I <sub>o</sub> =I <sub>o</sub> max., T <sub>c</sub> =25°C | CFM20S050<br>CFM20S120<br>CFM20S150<br>CFM20S240<br>CFM20S480 | 4.90<br>11.76<br>14.70<br>23.52<br>47.04 | 5<br>12<br>15<br>24<br>48 | 5.10<br>12.24<br>15.30<br>24.48<br>48.96 | V <sub>dc</sub> |
| Operating Output Current Range | V <sub>in</sub> =90V <sub>ac</sub> ~264V <sub>ac</sub> , <b>See Derating Curve</b>                   | CFM20S050<br>CFM20S120<br>CFM20S150<br>CFM20S240<br>CFM20S480 |                                          |                           | 4.00<br>1.67<br>1.34<br>0.83<br>0.42     | A               |
| Holdup Time                    | V <sub>in</sub> =115V <sub>ac</sub>                                                                  | CFM20S050<br>Others                                           |                                          | 8<br>10                   |                                          | ms              |
| Output Voltage Regulation      |                                                                                                      |                                                               |                                          |                           |                                          |                 |
| Load Regulation                | 10% load to 100% full load                                                                           | All                                                           |                                          |                           | ±1.0                                     | %               |
| Line Regulation                | V <sub>in</sub> =High line to low line                                                               | All                                                           |                                          |                           | ±0.5                                     | %               |
| Over Current Protection        | Hiccup mode (Auto recovery)                                                                          | All                                                           | 110                                      |                           | 180                                      | %               |
| Short Circuit Protection       | Auto recovery                                                                                        | All                                                           |                                          |                           |                                          |                 |
| Over Voltage Protection        | Latch mode (AC recycle to restart)                                                                   | CFM20S050<br>CFM20S120<br>CFM20S150<br>CFM20S240<br>CFM20S480 |                                          |                           | 8.0<br>16.5<br>19.6<br>31.5<br>60.0      | V <sub>dc</sub> |



## CFM20S Series

| PARAMETER               | NOTES and CONDITIONS                                                                                                                                       | Device    | Min. | Typ. | Max. | Units |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------|------|------|-------|
| Output Ripple and Noise | 1. Add a 0.1uF ceramic capacitor and a 10uF aluminum electrolytic capacitor to output<br>2. Oscilloscope is 20MHz bandwidth<br>3. Ambient temperature=25°C | CFM20S050 |      |      | 100  | mV    |
|                         |                                                                                                                                                            | CFM20S120 |      |      | 120  |       |
|                         |                                                                                                                                                            | CFM20S150 |      |      | 150  |       |
|                         |                                                                                                                                                            | CFM20S240 |      |      | 240  |       |
|                         |                                                                                                                                                            | CFM20S480 |      |      | 480  |       |
| Load Capacitance        | 1. $V_{in}=115V_{ac}$ and $230V_{ac}$<br>2. Output is 100% full load<br>3. Ambient temperature=25°C                                                        | CFM20S050 |      |      | 4000 | uF    |
|                         |                                                                                                                                                            | CFM20S120 |      |      | 1670 |       |
|                         |                                                                                                                                                            | CFM20S150 |      |      | 1340 |       |
|                         |                                                                                                                                                            | CFM20S240 |      |      | 830  |       |
|                         |                                                                                                                                                            | CFM20S480 |      |      | 420  |       |
| Efficiency              | 1. $V_{in}=230V_{ac}$<br>2. Output is 100% full load<br>3. Ambient temperature=25°C                                                                        | CFM20S050 |      | 84   |      | %     |
|                         |                                                                                                                                                            | CFM20S120 |      | 86   |      |       |
|                         |                                                                                                                                                            | CFM20S150 |      | 86   |      |       |
|                         |                                                                                                                                                            | CFM20S240 |      | 86   |      |       |
|                         |                                                                                                                                                            | CFM20S480 |      | 87   |      |       |

### ISOLATION CHARACTERISTICS

| PARAMETER            | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units    |
|----------------------|----------------------|--------|------|------|------|----------|
| Input to Output      | 1 Minute             | All    |      |      | 4300 | $V_{ac}$ |
| Isolation Resistance | Input to output      | All    | 100  |      |      | MΩ       |

### FEATURE CHARACTERISTICS

| PARAMETER           | NOTES and CONDITIONS        | Device | Min. | Typ. | Max. | Units |
|---------------------|-----------------------------|--------|------|------|------|-------|
| Switching Frequency | $P_{out}$ =max. rated power | All    |      | 65   |      | kHz   |

### GENERAL SPECIFICATIONS

| 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    | 1300                                           |      |      | k hours     |
| Humidity                       | Non-condensing                                                                                                                                                          | All    |                                                |      | 93   | % RH        |
| Shock                          | Meet MIL-STD-810F Table 516.5, Table 516.5-I 10ms, each axis 3 times(±X、±Y、±Z axis)                                                                                     | All    |                                                | 75   |      | g           |
| Vibration                      | Meet MIL-STD-810F Table 514.5C-VIII, 15~2000Hz, X、Y、Z axis, 1 hour (each axis),. Total 3 hrs.                                                                           | All    |                                                | 4    |      | g           |
| Weight                         | Blank (PCB mount)                                                                                                                                                       | All    |                                                | 35   |      | grams       |
|                                | E (Encapsulated)                                                                                                                                                        |        |                                                | 95   |      |             |
|                                | T (Wafer)                                                                                                                                                               |        |                                                | 36   |      |             |
| Dimensions                     | Blank (PCB mount)                                                                                                                                                       | All    | 2.38x1.30x0.906 Inches<br>(60.5x33.0x23.00 mm) |      |      |             |
|                                | E (Encapsulated)                                                                                                                                                        |        | 2.48x1.40x0.933 Inches<br>(63.0x35.6x23.70 mm) |      |      |             |
|                                | T (Wafer)                                                                                                                                                               |        | 3.00x1.30x0.831 Inches<br>(76.2x33.0x21.10 mm) |      |      |             |
| Safety                         | Class II, IEC/EN/UL 62368-1                                                                                                                                             |        |                                                |      |      | Ed.3.0      |
| EMC Emission                   | EN 55032:2015+A11:2020, 47 CFR FCC Part 15 Subpart B, ICES-003 Issue7, EN 61204-3:2000, EN 61000-6-3:2007+A1:2011+AC:2012, EN 61000-3-2:2019, EN 61000-3-3:2013+A1:2019 |        |                                                |      |      | Class B     |
| Conducted Disturbance          | EN 55032:2015+A11:2020, 47 CFR FCC Part 15 Subpart B, ICES-003 Issue7, EN 61204-3:2000, EN 61000-6-3:2007+A1:2011+AC:2012                                               |        |                                                |      |      | Class B     |
| Radiated Disturbance           | EN 55032:2015+A11:2020, 47 CFR FCC Part 15 Subpart B, ICES-003 Issue7, EN 61204-3:2000, EN 61000-6-3:2007+A1:2011+AC:2012                                               |        |                                                |      |      | Class B     |
| Harmonic Current Emissions     | EN 61000-3-2:2019                                                                                                                                                       |        |                                                |      |      |             |
| Voltage Fluctuations & Flicker | EN 61000-3-3:2013+A1:2019                                                                                                                                               |        |                                                |      |      |             |
| EMC Immunity                   | EN 55035:2017+A11:2020, EN 61204-3:2000, EN 61000-6-1:2007                                                                                                              |        |                                                |      |      |             |
| Electrostatic Discharge (ESD)  | IEC 61000-4-2:2008                                                                                                                                                      |        |                                                |      |      | Criterion A |



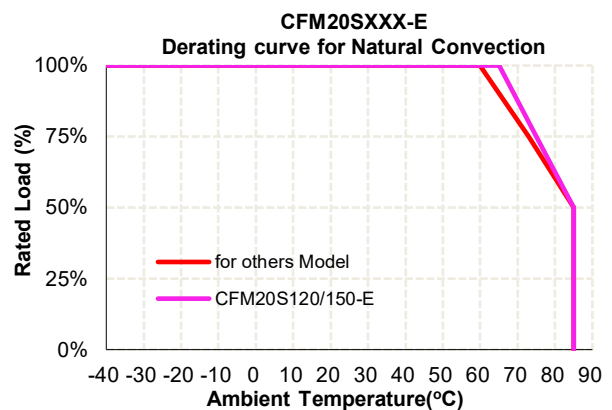
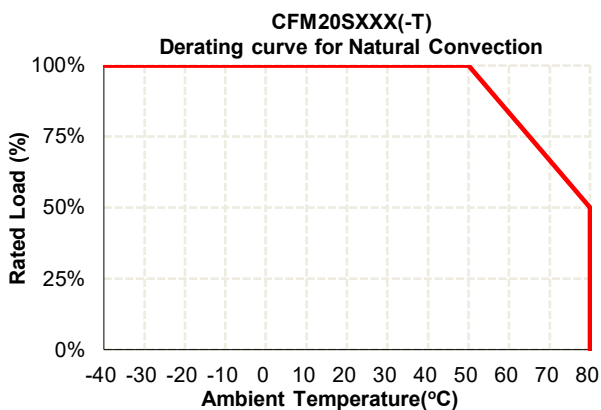
# CFM20S Series

## GENERAL SPECIFICATIONS

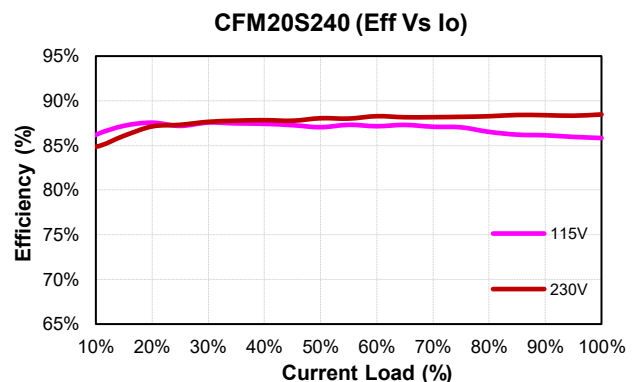
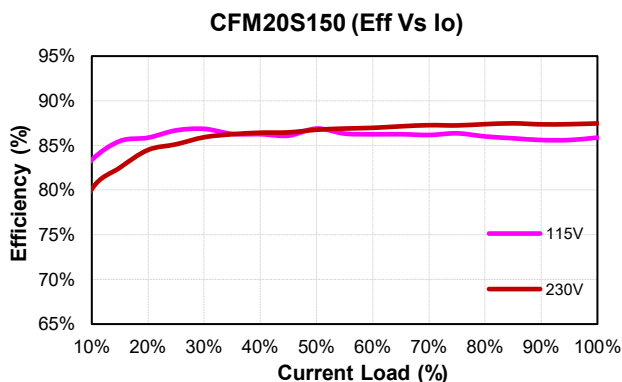
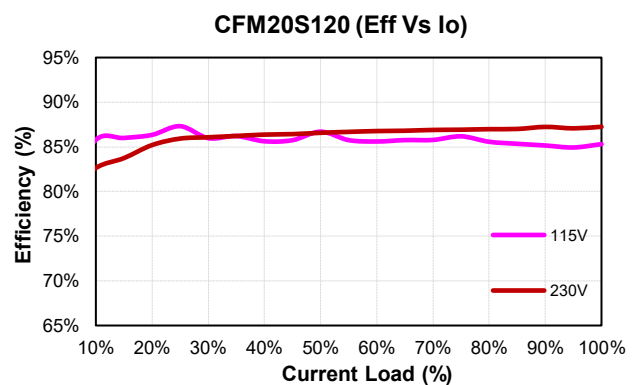
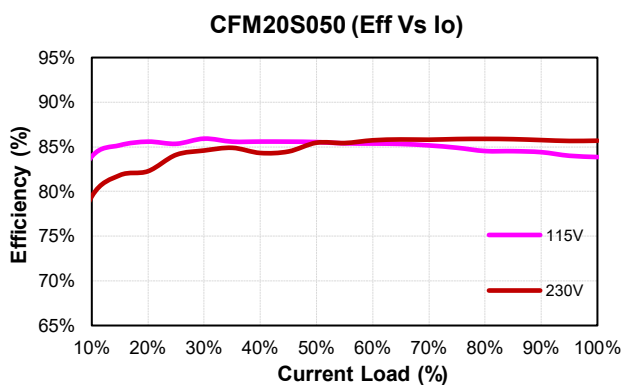
|                                                  |                                                                        |                                         |
|--------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------|
| Radio-Frequency, Continuous Radiated Disturbance | IEC 61000-4-3:2020                                                     | Criterion A                             |
| Electrical Fast Transient (EFT)                  | IEC 61000-4-4:2012, $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$              | Criterion A                             |
| Surge                                            | IEC 61000-4-5:2014+A1:2017, L-N: $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$ | Criterion A                             |
| Conducted Disturbances, Induced by RF Fields     | IEC 61000-4-6:2013                                                     | Criterion A                             |
| Power Frequency Magnetic Field                   | IEC 61000-4-8:2009                                                     | Criterion A                             |
| Voltage Dips                                     | IEC 61000-4-11:2020, Dip: 30% Reduction, Dip >95% Reduction            | Criterion A                             |
| Voltage Interruptions                            | IEC 61000-4-11:2020, >95% Reduction                                    | Criterion B                             |
| Application Note Link                            |                                                                        | <a href="#">CFM20S Series App Notes</a> |

## CHARACTERISTIC CURVE

### Power Derating Curve



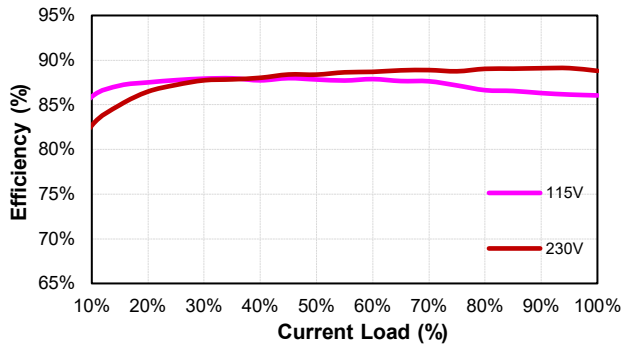
### Performance Data



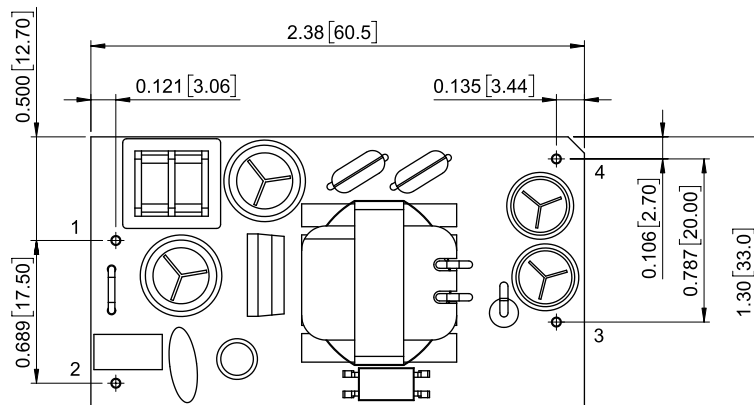


# CFM20S Series

CFM20S480 (Eff Vs Io)



## MECHANICAL SPECIFICATION



## CFM20SXXX

All Dimensions in Inches[mm]

Tolerance Inches: x.xx=±0.03, x.xxx=±0.020

Millimeters: x.x=±0.7, x.xx=±0.50

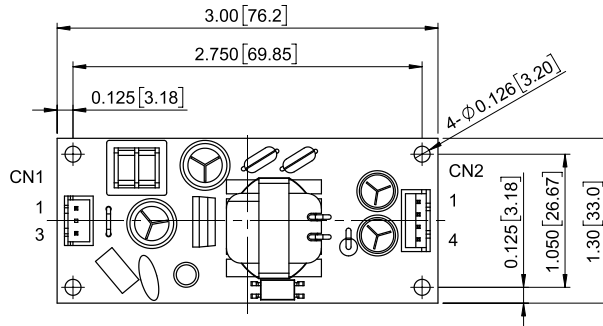
### Pin Connection

| Pin | Function |
|-----|----------|
| 1   | ACN      |
| 2   | ACL      |
| 3   | +Vout    |
| 4   | -Vout    |



# CFM20S Series

## MECHANICAL SPECIFICATION



### CFM20SXXX-T

All Dimensions in Inches[mm]

Tolerance Inches: x.xx=±0.03, x.xxx=±0.020

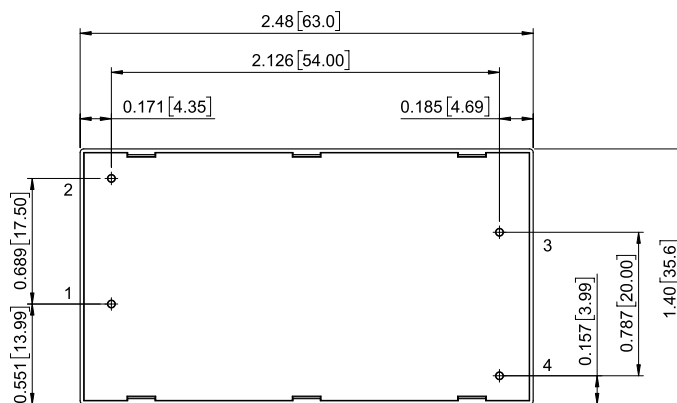
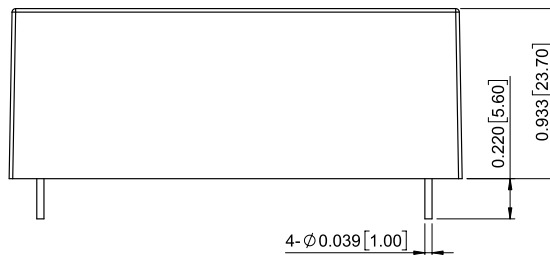
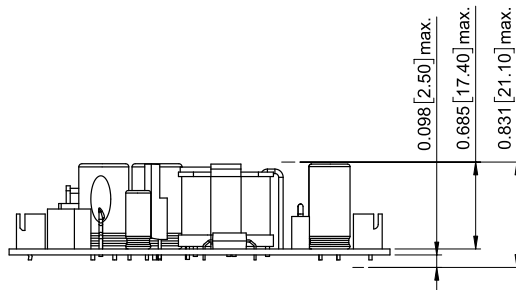
Millimeters: x.x=±0.7, x.xx=±0.50

AC Input Connector(CN1):JST B3B-XH-A(LF)(SN)(2N) or equivalent

| Pin | Function | Mating Housing             | Terminal                               |
|-----|----------|----------------------------|----------------------------------------|
| 1   | ACN      | JST XHP-3<br>or equivalent | JST<br>SXH-001T-P0.6N<br>or equivalent |
| 2   | -        |                            |                                        |
| 3   | ACL      |                            |                                        |

DC Output Connector(CN2):JST B4B-XH-A(LF)(SN) or equivalent

| Pin | Function | Mating Housing             | Terminal                               |
|-----|----------|----------------------------|----------------------------------------|
| 1   | -Vout    | JST XHP-4<br>or equivalent | JST<br>SXH-001T-P0.6N<br>or equivalent |
| 2   | -Vout    |                            |                                        |
| 3   | +Vout    |                            |                                        |
| 4   | +Vout    |                            |                                        |



BOTTOM VIEW

### CFM20SXXX-E

All Dimensions in Inches[mm]

Tolerance Inches: x.xx=±0.03, x.xxx=±0.020

Millimeters: x.x=±0.7, x.xx=±0.50

Pin Connection

| Pin | Function |
|-----|----------|
| 1   | ACN      |
| 2   | ACL      |
| 3   | +Vout    |
| 4   | -Vout    |

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