



# LFM420S SERIES 420 WATT AC-DC POWER SUPPLY WITH PFC

## Features

- Universal Input Range 85~264Vac
- High Efficiency up to 94.5%
- Class I
- 25.4mm Low Profile Package
- No Load Input Power Consumption <0.5W
- No Load Input Power Consumption <0.6W for 54V
- Approval IEC/EN/UL 62368-1 Ed 3.0
- Approval EN55032 and CISPR/FCC Class B
- Meets IEC/EN 60335-1
- Operating Altitude 5000m
- Continuous Short Circuit Protection
- Over Voltage Protection
- Over Temperature Protection
- High Power Density 28.0 W/Inches<sup>3</sup>
- Active PFC Function
- Over Voltage Category OVC II & OVC III
- Constant Current



| MODEL<br>NUMBER | OUTPUT<br>VOLTAGE | OUTPUT CURRENT    |                                     |         | RIPPLE &<br>NOISE<br>NOTE1 | VOLTAGE<br>ACCURACY<br>NOTE2 | VOLTAGE<br>ADJ. RANGE | LINE<br>REGULATION<br>NOTE3 | LOAD<br>REGULATION<br>NOTE4 | % EFF.<br>(Typ.)<br>NOTE5 |
|-----------------|-------------------|-------------------|-------------------------------------|---------|----------------------------|------------------------------|-----------------------|-----------------------------|-----------------------------|---------------------------|
|                 |                   | With Fan<br>NOTE6 | With<br>Conduction Cooling<br>NOTE7 |         |                            |                              |                       |                             |                             |                           |
|                 |                   |                   | Baseplate                           | Cover   |                            |                              |                       |                             |                             |                           |
| LFM420S120      | 12 V              | 35.00 A           | 26.25 A                             | 29.17 A | 120 mV                     | ±1%                          | 11.4-12.6 V           | ±0.5%                       | ±1%                         | 92.5%                     |
| LFM420S150      | 15 V              | 28.00 A           | 21.00 A                             | 23.33 A | 150 mV                     | ±1%                          | 14.25-15.75 V         | ±0.5%                       | ±1%                         | 93.0%                     |
| LFM420S240      | 24 V              | 17.50 A           | 13.13 A                             | 14.58 A | 240 mV                     | ±1%                          | 22.8-25.2 V           | ±0.5%                       | ±1%                         | 94.0%                     |
| LFM420S280      | 28 V              | 15.00 A           | 11.25 A                             | 12.50 A | 280 mV                     | ±1%                          | 28-29.4 V             | ±0.5%                       | ±1%                         | 94.0%                     |
| LFM420S300      | 30 V              | 14.00 A           | 10.50 A                             | 11.67 A | 300 mV                     | ±1%                          | 28.5-31.5 V           | ±0.5%                       | ±1%                         | 94.0%                     |
| LFM420S360      | 36 V              | 11.67 A           | 8.75 A                              | 9.72 A  | 360 mV                     | ±1%                          | 34.2-37.8 V           | ±0.5%                       | ±1%                         | 94.0%                     |
| LFM420S480      | 48 V              | 8.75 A            | 6.56 A                              | 7.29 A  | 480 mV                     | ±1%                          | 45.6-50.4 V           | ±0.5%                       | ±1%                         | 94.0%                     |
| LFM420S540      | 54 V              | 7.78 A            | 5.83 A                              | 6.48 A  | 540 mV                     | ±1%                          | 51.3-55.0 V           | ±0.5%                       | ±1%                         | 94.5%                     |

Note:

1. Add a 0.1uF ceramic capacitor and a 10uF E.L. capacitor to output for ripple & noise measuring @20MHz BW.
2. Voltage accuracy is set at full load and 25°C Ta.
3. Line regulation is measured from high line to low line with rated load.
4. Load regulation is measured from full load to 10% rated load.
5. Typical efficiency at 230 Vac and full load at 25°C.
6. Forced air convection with 21.9CFM above 100V<sub>ac</sub>.
7. Conduction convection with external baseplate, 24.8\*48.0cm with min. 0.12cm thick @115V<sub>ac</sub>.



# LFM420S Series

## PART NUMBER

| Series | Number of Outputs | Nominal Output Voltage                                                                               | Type                                 | Mounting Inserts                         |
|--------|-------------------|------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------|
| LFM420 | O                 | XXX                                                                                                  | X                                    | -YZ                                      |
| LFM420 | S : Single        | 120 : 12V<br>150 : 15V<br>240 : 24V<br>280 : 28V<br>300 : 30V<br>360 : 36V<br>480 : 48V<br>540 : 54V | B : With Baseplate<br>C : With Cover | Blank: Through Hole<br>C0: Threaded Hole |

Part Number Example:

**LFM420S120C:** With Cover, 420W, 12Vdc Output



# LFM420S 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              | Safety approvals only to the AC input                              | All    | 85   |      | 264  | V <sub>ac</sub> |
|                            | No safety approvals                                                |        | 120  |      | 370  | V <sub>dc</sub> |
| Operating Temperature      | See derating curve                                                 | All    | -40  |      | 80   | °C              |
| Operating Case Temperature | At the center of base plate<br>(T <sub>c</sub> = Case temperature) | All    | -40  |      | 85   | °C              |
| Storage Temperature        |                                                                    | All    | -40  |      | 85   | °C              |
| Operating Altitude         | IEC/EN/UL 62368 OVC II                                             | All    |      |      | 5000 | m               |
|                            | IEC/EN/UL 62368 OVC III                                            |        |      |      | 2000 | 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    | 47   |      | 63   | Hz              |
| Maximum Input Current    | 100% Load, V <sub>in</sub> =100V <sub>ac</sub>           | All    |      |      | 6    | A               |
| Leakage Current          |                                                          | All    |      |      | 0.3  | mA              |
| Inrush Current           | V <sub>in</sub> =240V <sub>ac</sub> , Cold start at 25°C | All    |      | 30   |      | A               |
| Under Voltage Protection |                                                          | All    | 65   |      | 75   | V <sub>ac</sub> |
| Power Factor             | 230V <sub>ac</sub> @ Full load                           | All    |      | 0.95 |      |                 |

### 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 | LFM420S120 | 11.88 | 12   | 12.12  | V <sub>dc</sub> |
|                                |                                                                                                      | LFM420S150 | 14.85 | 15   | 15.15  |                 |
|                                |                                                                                                      | LFM420S240 | 23.76 | 24   | 24.24  |                 |
|                                |                                                                                                      | LFM420S280 | 27.72 | 28   | 28.28  |                 |
|                                |                                                                                                      | LFM420S300 | 29.70 | 30   | 30.30  |                 |
|                                |                                                                                                      | LFM420S360 | 35.64 | 36   | 36.36  |                 |
|                                |                                                                                                      | LFM420S480 | 47.52 | 48   | 48.48  |                 |
|                                |                                                                                                      | LFM420S540 | 53.46 | 54   | 54.54  |                 |
| Operating Output Current Range | V <sub>in</sub> =85V <sub>ac</sub> ~264V <sub>ac</sub> , <b>see derating curve</b>                   | LFM420S120 |       |      | 35.00A | A               |
|                                |                                                                                                      | LFM420S150 |       |      | 28.00A |                 |
|                                |                                                                                                      | LFM420S240 |       |      | 17.50A |                 |
|                                |                                                                                                      | LFM420S280 |       |      | 15.00A |                 |
|                                |                                                                                                      | LFM420S300 |       |      | 14.00A |                 |
|                                |                                                                                                      | LFM420S360 |       |      | 11.67A |                 |
|                                |                                                                                                      | LFM420S480 |       |      | 8.75A  |                 |
|                                |                                                                                                      | LFM420S540 |       |      | 7.78A  |                 |
| Holdup Time                    | V <sub>in</sub> =115Vac load:350W<br>Ambient temperature=25°C                                        | All        | 12    |      | ms     |                 |
|                                | V <sub>in</sub> =115Vac Load:420W<br>Ambient temperature=25°C                                        |            | 8     |      |        |                 |
| 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  |      |        | %               |
| Output Voltage Adjustment      | P <sub>o</sub> ≤ max. rated power, I <sub>o</sub> ≤ I <sub>o</sub> max.                              | LFM420S280 | 0     |      | +5     | %               |
|                                | P <sub>o</sub> ≤ max. rated power, I <sub>o</sub> ≤ I <sub>o</sub> max.                              | LFM420S540 | -5    |      | +2     | %               |
|                                | P <sub>o</sub> ≤ max. rated power, I <sub>o</sub> ≤ I <sub>o</sub> max.                              | Others     | -5    |      | +5     | %               |



## LFM420S Series

| PARAMETER                   | NOTES and CONDITIONS                                                                                                                                                                       | Device                                                                                                       | Min. | Typ.                                                                 | Max.                                                              | Units         |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------|----------------------------------------------------------------------|-------------------------------------------------------------------|---------------|
| Over Voltage Protection     | Latch off (reset after about one minute after the input is turned off)                                                                                                                     | LFM420S120<br>LFM420S150<br>LFM420S240<br>LFM420S280<br>LFM420S300<br>LFM420S360<br>LFM420S480<br>LFM420S540 |      | 16<br>20<br>30<br>35<br>35<br>50<br>63<br>63                         |                                                                   | $V_{dc}$      |
| Over Current Protection     | Constant current, auto recovery<br>(see application note)                                                                                                                                  | All                                                                                                          | 110  |                                                                      | 170                                                               | %             |
| Short Circuit Protection    | Auto recovery                                                                                                                                                                              | All                                                                                                          |      |                                                                      |                                                                   |               |
| Over Temperature Protection | Auto recovery<br>If conduction convection with external baseplate is used or the recommended temperature curve is exceeded, the $T_c$ temperature must be maintained $<85^{\circ}\text{C}$ | All                                                                                                          |      |                                                                      |                                                                   |               |
| 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= $25^{\circ}\text{C}$               | LFM420S120<br>LFM420S150<br>LFM420S240<br>LFM420S280<br>LFM420S300<br>LFM420S360<br>LFM420S480<br>LFM420S540 |      |                                                                      | 120<br>150<br>240<br>280<br>300<br>360<br>480<br>540              | mV            |
| Load Capacitance            | 1. $V_{in}=115V_{ac}$ and $230V_{ac}$<br>2. Output is max. load<br>3. Ambient temperature= $25^{\circ}\text{C}$                                                                            | LFM420S120<br>LFM420S150<br>LFM420S240<br>LFM420S280<br>LFM420S300<br>LFM420S360<br>LFM420S480<br>LFM420S540 |      |                                                                      | 29100<br>23300<br>14500<br>12500<br>11600<br>9700<br>7200<br>6400 | $\mu\text{F}$ |
| Efficiency                  | 1. Input Voltage is $230V_{ac}$<br>2. Output is rated load<br>3. Ambient temperature= $25^{\circ}\text{C}$                                                                                 | LFM420S120<br>LFM420S150<br>LFM420S240<br>LFM420S280<br>LFM420S300<br>LFM420S360<br>LFM420S480<br>LFM420S540 |      | 92.5%<br>93.0%<br>94.0%<br>94.0%<br>94.0%<br>94.0%<br>94.0%<br>94.5% |                                                                   | %             |

### ISOLATION CHARACTERISTICS

| PARAMETER                | NOTES and CONDITIONS                    | Device | Min. | Typ. | Max. | Units     |
|--------------------------|-----------------------------------------|--------|------|------|------|-----------|
| Input to Output          | 1 Minute (without dielectric breakdown) | All    |      |      | 4250 | $V_{ac}$  |
| Input to Earth (Ground)  | 1 Minute (without dielectric breakdown) | All    |      |      | 2000 | $V_{ac}$  |
| Output to Earth (Ground) | 1 Minute (without dielectric breakdown) | All    |      |      | 2000 | $V_{ac}$  |
| Isolation Resistance     | Input to Output                         | All    | 100  |      |      | $M\Omega$ |

### FEATURE CHARACTERISTICS

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



# LFM420S Series

## GENERAL SPECIFICATIONS

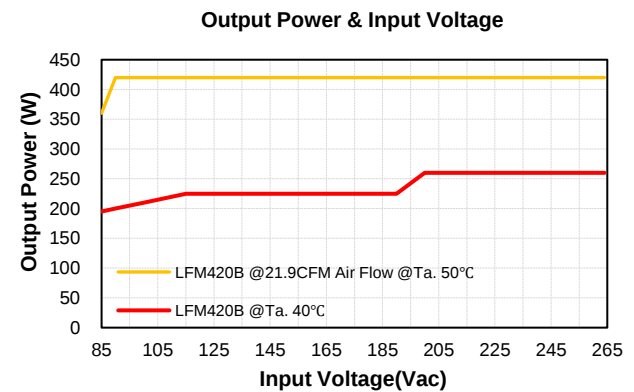
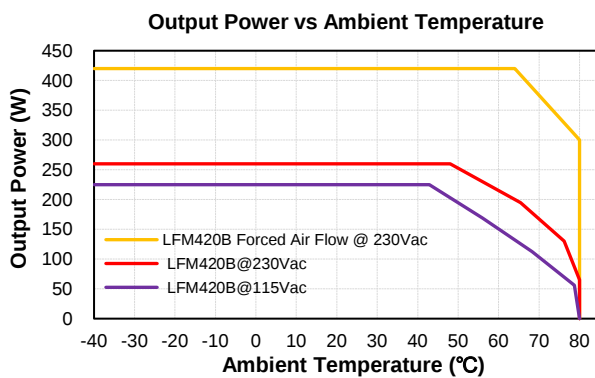
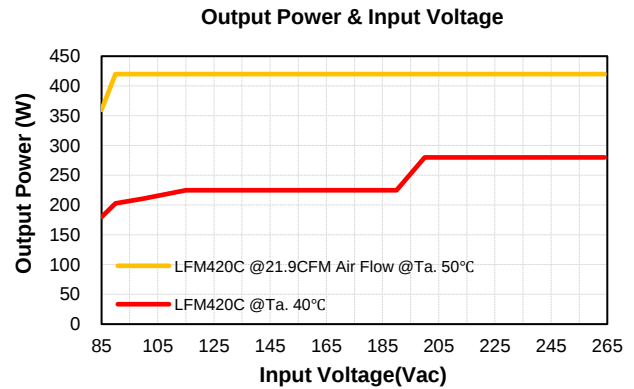
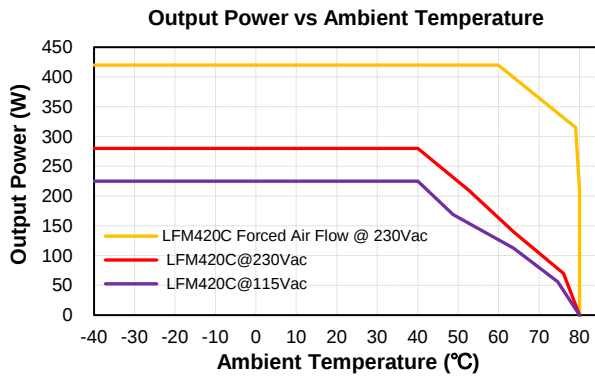
| PARAMETER                                        | NOTES and CONDITIONS                                                                                                                                                        | Device | Min.                                         | Typ.       | Max. | Units         |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------|------------|------|---------------|
| MTBF                                             | I <sub>o</sub> =100%; T <sub>a</sub> =25°C per MIL-HDBK-217F                                                                                                                | All    |                                              | 400        |      | K hours       |
| Life Time                                        | @75% Load, 40°C                                                                                                                                                             | All    | 26                                           |            |      | k hours       |
| Humidity                                         | Non-condensing                                                                                                                                                              | All    |                                              |            | 93   | % RH          |
| Shock                                            | Meet MIL-STD-810F Table 516.5,Table 516.5-1 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                                           | Baseplate versions<br>Covered versions                                                                                                                                      | All    |                                              | 350<br>470 |      | g             |
| Dimensions                                       | Baseplate versions                                                                                                                                                          | All    | 5.00x3.00x1.00 Inches<br>(127x76.2x25.40mm)  |            |      |               |
|                                                  | Covered versions                                                                                                                                                            |        | 5.09x3.29x1.00 Inches<br>(129.4x83.5x25.4mm) |            |      |               |
| Safety                                           | Class I , IEC/EN/UL 62368-1                                                                                                                                                 |        |                                              |            |      | Ed. 3.0       |
| EMC Emission                                     | EN 55032:2015+A11:2020 (Class B), EN 61000-6-3:2021, EN 61000-6-4:2019, EN 61204-3:2018, EN 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A2:2021, 47 CFR FCC Part 15 Subpart B |        |                                              |            |      | Class B       |
| Conducted Disturbance                            | EN 55032, 47 CFR FCC Part 15 Subpart B (Class B)                                                                                                                            |        |                                              |            |      | Class B       |
| Radiated Disturbance                             | EN 55032, 47 CFR FCC Part 15 Subpart B (Class B)                                                                                                                            |        |                                              |            |      | Class B       |
| Harmonic Current Emissions                       | EN 61000-3-2:2019+A1:2021                                                                                                                                                   |        |                                              |            |      | Class A, C, D |
| Voltage Fluctuations & Flicker                   | EN 61000-3-3:2013+A2:2021                                                                                                                                                   |        |                                              |            |      |               |
| EMC Immunity                                     | EN 55035:2017+A11:2020, EN 61000-6-1:2019+CRGD:2019, EN 61000-6-2:2019, EN 61204-3:2018                                                                                     |        |                                              |            |      |               |
| Electrostatic Discharge (ESD)                    | IEC 61000-4-2:2008, Air Discharge: ±8kV, Contact Discharge: ±4kV                                                                                                            |        |                                              |            |      | Criterion A   |
| Radio-Frequency, Continuous Radiated Disturbance | IEC 61000-4-3:2020                                                                                                                                                          |        |                                              |            |      | Criterion A   |
| Electrical Fast Transient (EFT)                  | IEC 61000-4-4:2012, ±2kV                                                                                                                                                    |        |                                              |            |      | Criterion A   |
| Surge                                            | IEC 61000-4-5:2014+A1:2017, Line-Line: ±2kV, Line-Earth (Ground): ±4kV                                                                                                      |        |                                              |            |      | 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% Reduction, Dip >95% Reduction                                                                                                                 |        |                                              |            |      | Criterion A   |
| Voltage Interruptions                            | IEC 61000-4-11:2020, >95% Reduction                                                                                                                                         |        |                                              |            |      | Criterion B   |
| Application Note Link                            |                                                                                                                                                                             |        | <a href="#">LFM420S Series App Notes</a>     |            |      |               |



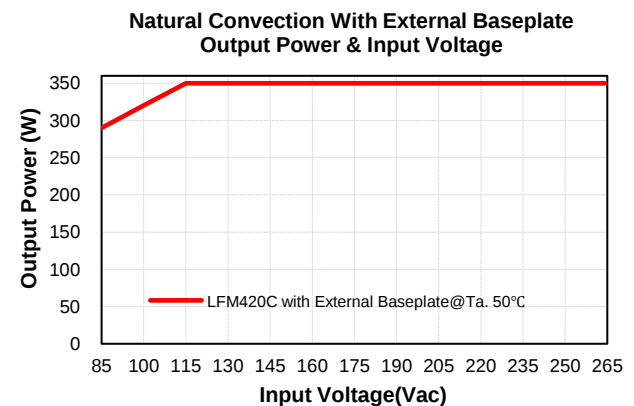
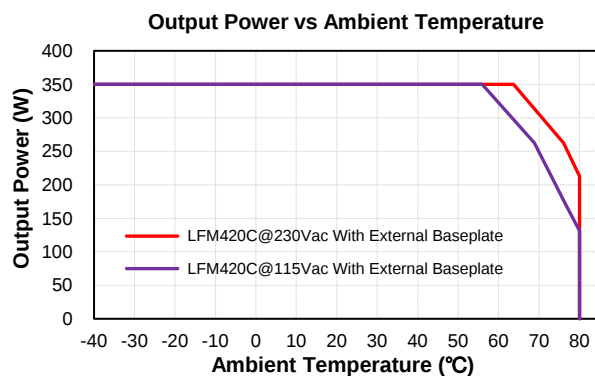
# LFM420S Series

## CHARACTERISTIC CURVE

### Power Derating Curve

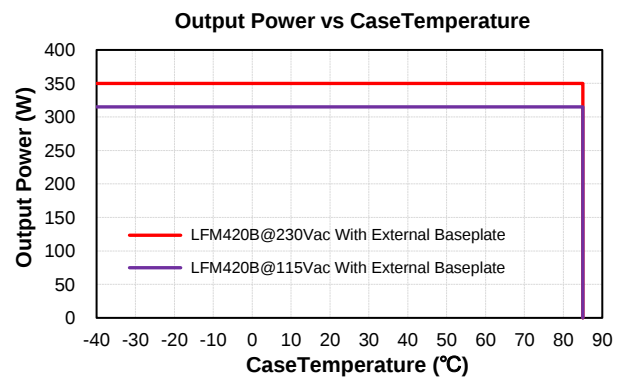
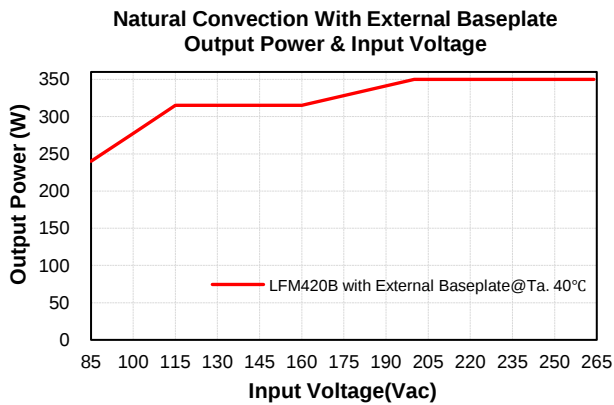
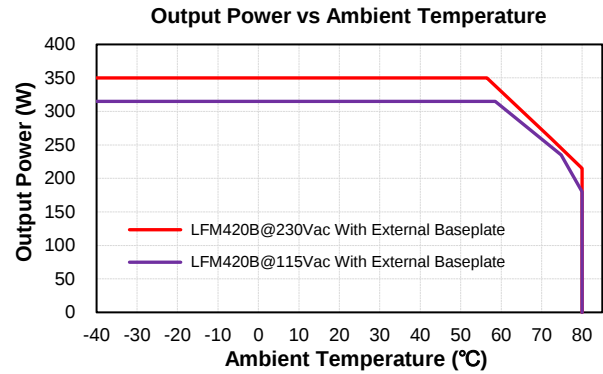
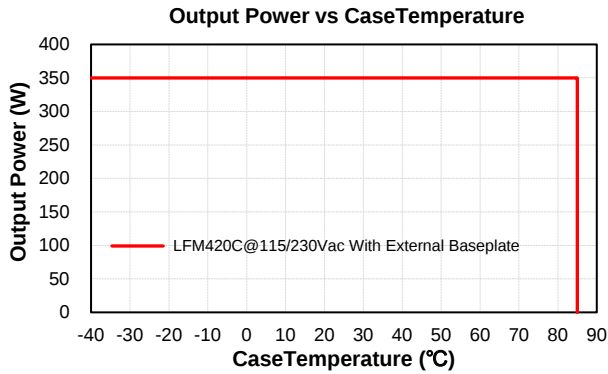


### Conduction Convection with External Baseplate (24.8cmx48cmx0.12cm)

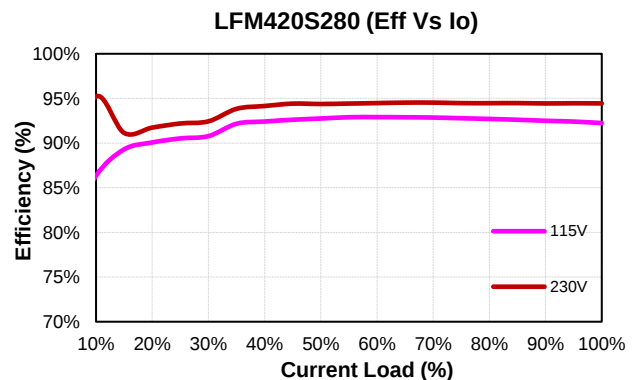
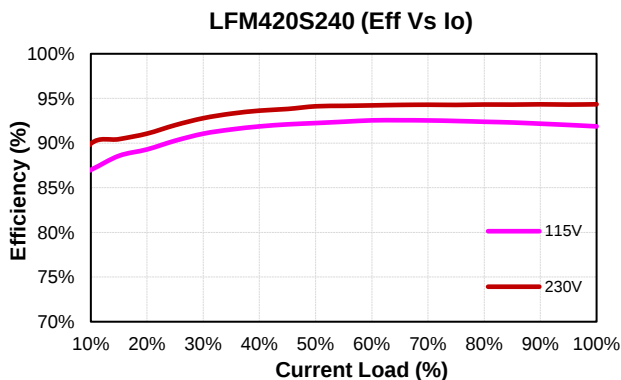
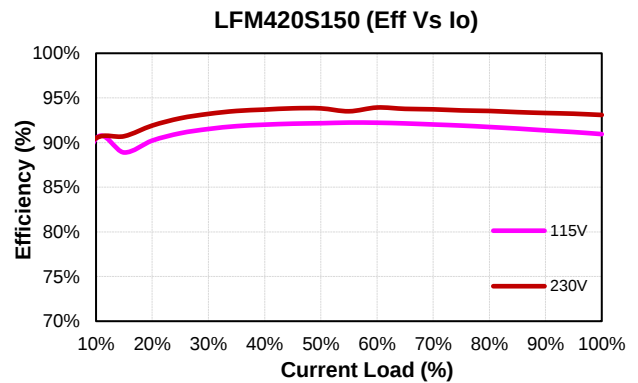
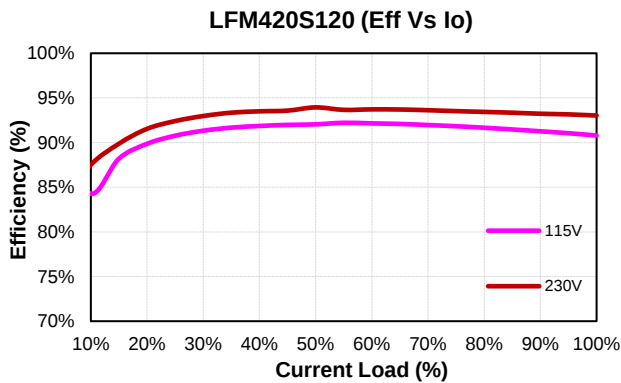




# LFM420S Series



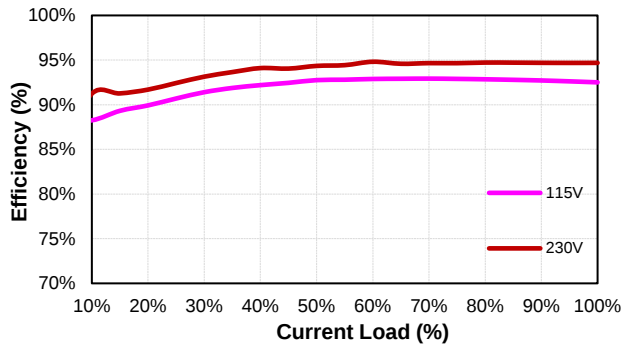
## Performance Data



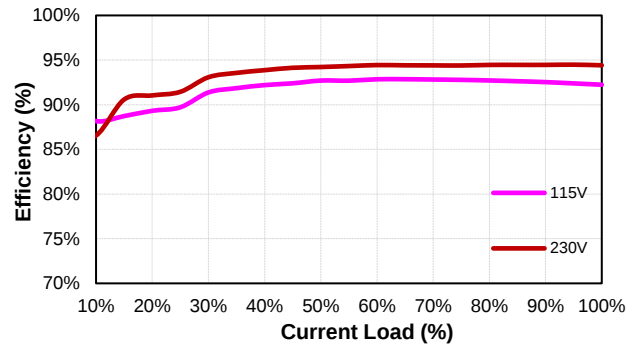


## LFM420S Series

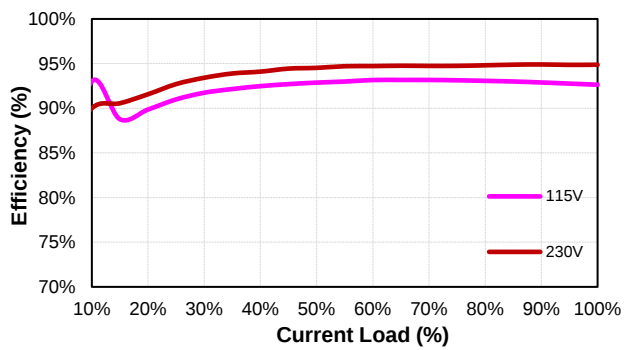
LFM420S300 (Eff Vs Io)



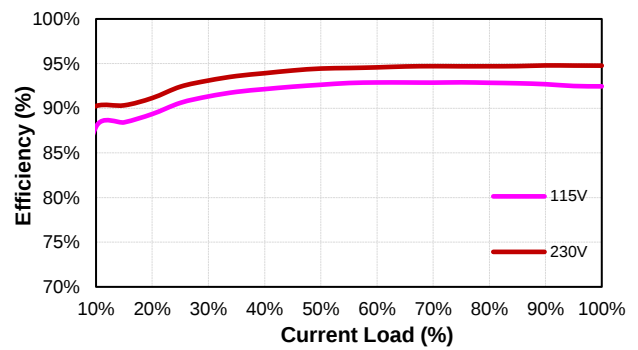
LFM420S360 (Eff Vs Io)



LFM420S480 (Eff Vs Io)



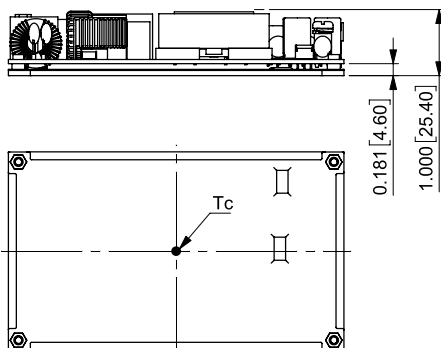
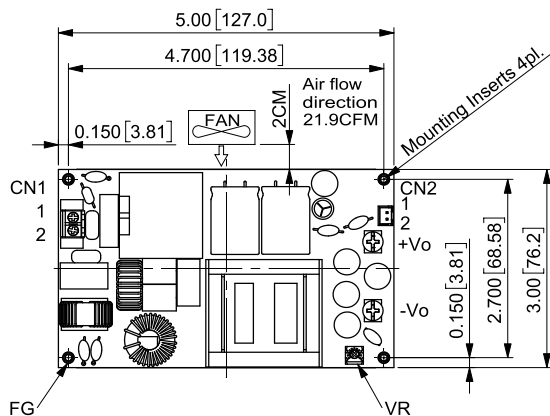
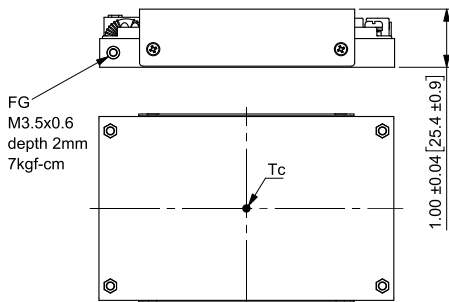
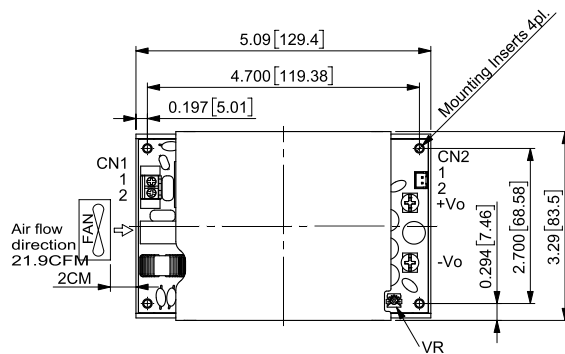
LFM420S540 (Eff Vs Io)





# LFM420S Series

## MECHANICAL SPECIFICATION



### LFM420SXXXC LFM420SXXXC-C0

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):ECE ETB22

| Pin | Function | Mating Wire Range |
|-----|----------|-------------------|
| 1   | ACL      | 14~18 AWG         |
| 2   | ACN      |                   |

DC Output Connector(CN2):TKP 8822-02-NHB or equivalent

| Pin | Function | Mating Housing          | Terminal                         |
|-----|----------|-------------------------|----------------------------------|
| 1   | Rs+      | JST XHP-2 or equivalent | JST SXH-001T-P0.6N or equivalent |
| 2   | Rs-      |                         |                                  |

DC Output Connector:KANG YANG PCB-58M4

| Function | The screw locked torque |
|----------|-------------------------|
| +Vo      | M4 7kgf-cm              |
| -Vo      |                         |

Mounting Inserts

| Series | Option                       |
|--------|------------------------------|
| Blank  | Ø 3.2 Through depth 10.5mm   |
| -C0    | M3x0.5 Threaded depth 10.5mm |

### LFM420SXXXB LFM420SXXXB-C0

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):ECE ETB22

| Pin | Function | Mating Wire Range |
|-----|----------|-------------------|
| 1   | ACL      | 14~18 AWG         |
| 2   | ACN      |                   |

DC Output Connector(CN2):TKP 8822-02-NHB or equivalent

| Pin | Function | Mating Housing          | Terminal                         |
|-----|----------|-------------------------|----------------------------------|
| 1   | Rs+      | JST XHP-2 or equivalent | JST SXH-001T-P0.6N or equivalent |
| 2   | Rs-      |                         |                                  |

DC Output Connector:KANG YANG PCB-58M4

| Function | The screw locked torque |
|----------|-------------------------|
| +Vo      | M4 7kgf-cm              |
| -Vo      |                         |

Mounting Inserts

| Series | Option                      |
|--------|-----------------------------|
| Blank  | Ø 3.2 Through depth 8.1mm   |
| -C0    | M3x0.5 Threaded depth 8.1mm |