



# LFM420M SERIES 420 WATT MEDICAL 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 Safety IEC/EN/UL 60601-1 2 MOPP
- Approval Safety IEC/EN/UL 62368-1
- Meets IEC/EN60335-1
- Operating Altitude 5000m
- Continuous Short Circuit Protection
- Over Voltage Protection
- Over Temperature Protection
- High Power Density 25.0 W/Inches<sup>3</sup>
- Active PFC Function



| MODEL NUMBER | OUTPUT VOLTAGE | OUTPUT CURRENT |                            |                               | RIPPLE & NOISE NOTE1 | VOLTAGE ACCURACY NOTE2 | VOLTAGE ADJ. RANGE | LINE REGULATION NOTE3 | LOAD REGULATION NOTE4 | %EFF. (Typ.) NOTE5 |
|--------------|----------------|----------------|----------------------------|-------------------------------|----------------------|------------------------|--------------------|-----------------------|-----------------------|--------------------|
|              |                | With Fan NOTE6 | Without Conduction Cooling | With Conduction Cooling NOTE7 |                      |                        |                    |                       |                       |                    |
| LFM420M120C  | 12 V           | 35.00 A        | 23.33 A                    | 29.17 A                       | 120 mV               | ±1%                    | 11.4-12.6 V        | ±0.5%                 | ±1%                   | 92.5%              |
| LFM420M150C  | 15 V           | 28.00 A        | 18.67 A                    | 23.33 A                       | 150 mV               | ±1%                    | 14.25-15.75 V      | ±0.5%                 | ±1%                   | 93.0%              |
| LFM420M240C  | 24 V           | 17.50 A        | 11.67 A                    | 14.58 A                       | 240 mV               | ±1%                    | 22.8-25.2 V        | ±0.5%                 | ±1%                   | 94.0%              |
| LFM420M280C  | 28 V           | 15.00 A        | 10.00 A                    | 12.50 A                       | 280 mV               | ±1%                    | 28-29.4 V          | ±0.5%                 | ±1%                   | 94.0%              |
| LFM420M300C  | 30 V           | 14.00 A        | 9.33 A                     | 11.67 A                       | 300 mV               | ±1%                    | 28.5-31.5 V        | ±0.5%                 | ±1%                   | 94.0%              |
| LFM420M360C  | 36 V           | 11.67 A        | 7.78 A                     | 9.72 A                        | 360 mV               | ±1%                    | 34.2-37.8 V        | ±0.5%                 | ±1%                   | 94.0%              |
| LFM420M480C  | 48 V           | 8.75 A         | 5.83 A                     | 7.29 A                        | 480 mV               | ±1%                    | 45.6-50.4 V        | ±0.5%                 | ±1%                   | 94.0%              |
| LFM420M540C  | 54 V           | 7.78 A         | 5.19 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 100Vac.
7. Conduction convection with external baseplate, 24.8\*48.0cm with min. 0.12cm thick.



# LFM420M Series

## PART NUMBER

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

Part Number Example:

**LFM420M120C:** With Cover, 420W, 12Vdc Output, Through Hole



# LFM420M 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              | No safety approvals                                                | All    | 85<br>120 |      | 264<br>370 | V <sub>ac</sub><br>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         |                                                                    | All    |           |      | 5000       | 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> =100Vac                       | All    |      |      | 6    | A               |
| Leakage Current (Earth)  |                                                          | All    |      |      | 300  | uA              |
| Leakage Current (Touch)  |                                                          | All    |      |      | 100  | uA              |
| 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 | LFM420M120<br>LFM420M150<br>LFM420M240<br>LFM420M280<br>LFM420M300<br>LFM420M360<br>LFM420M480<br>LFM420M540 | 11.88<br>14.85<br>23.76<br>27.72<br>29.70<br>35.64<br>47.52<br>53.46 | 12<br>15<br>24<br>28<br>30<br>36<br>48<br>54 | 12.12<br>15.15<br>24.24<br>28.28<br>30.30<br>36.36<br>48.48<br>54.54       | V <sub>dc</sub> |
| Operating Output Current Range | V <sub>in</sub> =85V <sub>ac</sub> ~264V <sub>ac</sub> , See Derating Curve                          | LFM420M120<br>LFM420M150<br>LFM420M240<br>LFM420M280<br>LFM420M300<br>LFM420M360<br>LFM420M480<br>LFM420M540 |                                                                      |                                              | 35.00A<br>28.00A<br>17.50A<br>15.00A<br>14.00A<br>11.67A<br>8.75A<br>7.78A | A               |
| Holdup Time                    | V <sub>in</sub> =115V <sub>ac</sub> Load: 350W<br>Ambient temperature=25°C                           | All                                                                                                          |                                                                      | 12                                           |                                                                            | ms              |
|                                | V <sub>in</sub> =115V <sub>ac</sub> Load: 420W<br>Ambient temperature=25°C                           | All                                                                                                          |                                                                      | 8                                            |                                                                            | 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                                                                       | %               |
| Output Voltage adjustment      | P <sub>o</sub> ≤ max. rated power, I <sub>o</sub> ≤ I <sub>o</sub> max.                              | LFM420M280                                                                                                   | 0                                                                    |                                              | +5                                                                         | %               |
|                                | P <sub>o</sub> ≤ max. rated power, I <sub>o</sub> ≤ I <sub>o</sub> max.                              | LFM420M540                                                                                                   | -5                                                                   |                                              | +2                                                                         | %               |
|                                | P <sub>o</sub> ≤ max. rated power, I <sub>o</sub> ≤ I <sub>o</sub> max.                              | Others                                                                                                       | -5                                                                   |                                              | +5                                                                         | %               |



# LFM420M 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)                                                                                                              | LFM420M120<br>LFM420M150<br>LFM420M240<br>LFM420M280<br>LFM420M300<br>LFM420M360<br>LFM420M480<br>LFM420M540 |      | 16<br>20<br>30<br>35<br>35<br>50<br>63<br>63                         |                                                                   | V <sub>dc</sub> |
| 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 <sub>c</sub> temperature must be maintained <85°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°C                         | LFM420M120<br>LFM420M150<br>LFM420M240<br>LFM420M280<br>LFM420M300<br>LFM420M360<br>LFM420M480<br>LFM420M540 |      |                                                                      | 120<br>150<br>240<br>280<br>300<br>360<br>480<br>540              | mV              |
| Load Capacitance            | 1. V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub><br>2. Output is max. load<br>3. Ambient temperature=25°C                                                              | LFM420M120<br>LFM420M150<br>LFM420M240<br>LFM420M280<br>LFM420M300<br>LFM420M360<br>LFM420M480<br>LFM420M540 |      |                                                                      | 29100<br>23300<br>14500<br>12500<br>11600<br>9700<br>7200<br>6400 | uF              |
| Efficiency                  | 1. Input Voltage is 230V <sub>ac</sub><br>2. Output is rated load<br>3. Ambient temperature=25°C                                                                                    | LFM420M120<br>LFM420M150<br>LFM420M240<br>LFM420M280<br>LFM420M300<br>LFM420M360<br>LFM420M480<br>LFM420M540 |      | 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 <sub>ac</sub> |
| Input to Earth (Ground)  | 1 Minute (without dielectric breakdown) | All    |      |      | 2000 | V <sub>ac</sub> |
| Output to Earth (Ground) | 1 Minute (without dielectric breakdown) | All    |      |      | 2000 | 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 | P <sub>out</sub> =max. rated power | All    |      | 65   |      | kHz   |



# LFM420M 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<br>I <sub>o</sub> =100%, T <sub>a</sub> =25°C, Telcordia SR332                                                                                                                                                                               | All    | 1600                                         | 400  |      | 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                                           | Cover                                                                                                                                                                                                                                                                                                     | All    |                                              | 470  |      | g           |
| Dimensions                                       | C (Cover)                                                                                                                                                                                                                                                                                                 | All    | 5.09x3.29x1.00 Inches<br>(129.4x83.5x25.4mm) |      |      |             |
| Safety                                           | Class I,<br>ANSI/AAMI ES 60601-1:2005 & A1:2012 & A2:2021<br>IEC 60601-1:2005/AMD1:2012 + AMD2:2020, EN 60601-1:2006/A1:2013 + A12:2014 + A2:2021                                                                                                                                                         |        |                                              |      |      | Ed. 3.2     |
|                                                  | Class I, IEC/EN/UL 62368-1                                                                                                                                                                                                                                                                                |        |                                              |      |      | Ed. 3.0     |
| EMC Emission                                     | EN 55011: 2016+A2: 2021, Class B, IEC/EN 61000-3-2: 2019+A1:2021,<br>EN 61000-3-3: 2013+A2: 2021, 47 CFR FCC Part 18<br>EN 55032:2015+A11:2020 (Class B), EN 61000-6-3:2021, EN 61000-6-4:2019,<br>EN 61204-3:2018, EN 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A2:2021,<br>47 CFR FCC Part 15 Subpart B |        |                                              |      |      |             |
| Conducted Disturbance                            | EN 55011: 2016+A2: 2021, EN 55032:2015+A11:2020 47, CFR FCC Part 18 & Part 15                                                                                                                                                                                                                             |        |                                              |      |      | Class B     |
| Radiated Disturbance                             | EN 55011: 2016+A2: 2021, EN 55032:2015+A11:2020 47, CFR FCC Part 18 & Part 15                                                                                                                                                                                                                             |        |                                              |      |      | Class B     |
| Harmonic Current Emissions                       | IEC/EN 61000-3-2: 2019+A1:2021                                                                                                                                                                                                                                                                            |        |                                              |      |      | Class A,C,D |
| Voltage Fluctuations & Flicker                   | EN 61000-3-3:2013+A2: 2021                                                                                                                                                                                                                                                                                |        |                                              |      |      | Criterion A |
| EMC Immunity                                     | EN 60601-1-2: 2015+A1:2021, IEC/EN 61000-4-2, 3, 4, 5, 6, 8, 11<br>EN 55035:2017+A11:2020, EN 61000-6-1:2019+CRGD:2019, EN 61000-6-2:2019,<br>EN 61204-3:2018                                                                                                                                             |        |                                              |      |      | Ed 4.1      |
| Electrostatic Discharge (ESD)                    | IEC 61000-4-2:2009 Air Discharge: ±15kV, Contact Discharge: ±8kV                                                                                                                                                                                                                                          |        |                                              |      |      | Criterion A |
| Radio-Frequency, Continuous Radiated Disturbance | IEC/EN 61000-4-3: 2020                                                                                                                                                                                                                                                                                    |        |                                              |      |      | Criterion A |
| Electrical Fast Transient (EFT)                  | EN 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     | EN 61000-4-6: 2014+AC: 2015                                                                                                                                                                                                                                                                               |        |                                              |      |      | Criterion A |
| Power Frequency Magnetic Field                   | EN 61000-4-8: 2010                                                                                                                                                                                                                                                                                        |        |                                              |      |      | Criterion A |
| Voltage Dips                                     | IEC/EN 61000-4-11: 2020, Dip: 30% Reduction, Dip >95% Reduction                                                                                                                                                                                                                                           |        |                                              |      |      | Criterion A |
| Voltage Interruptions                            | IEC/EN 61000-4-11: 2020, >95% reduction                                                                                                                                                                                                                                                                   |        |                                              |      |      | Criterion B |
| Application Note Link                            | <a href="#">LFM420M Series App Notes</a>                                                                                                                                                                                                                                                                  |        |                                              |      |      |             |

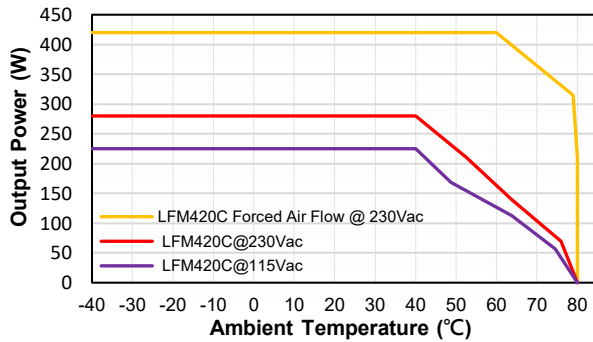


# LFM420M Series

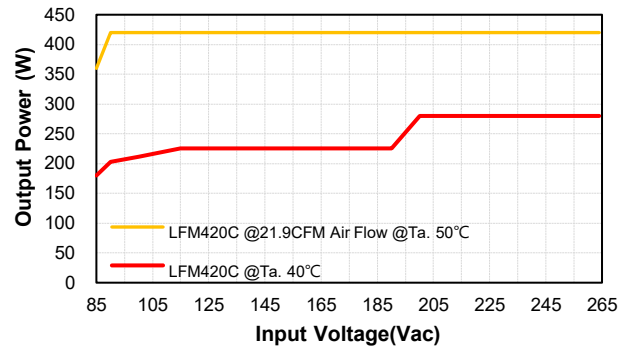
## CHARACTERISTIC CURVE

### Power Derating Curve

Output power vs Ambient Temperature

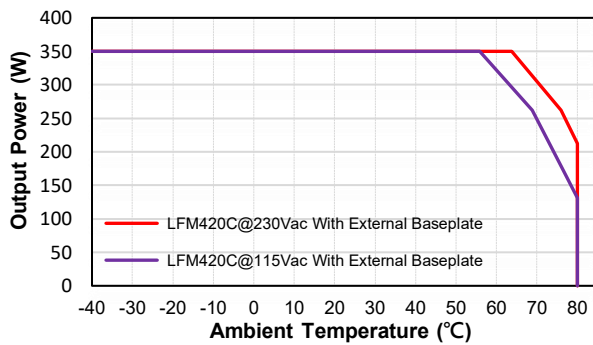


Output power & Input Voltage

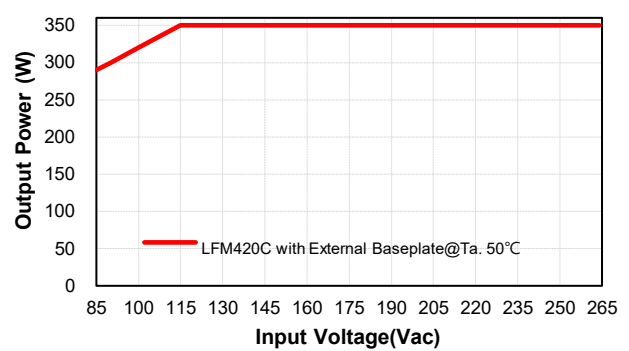


### Conduction Convection with External Baseplate (24.8cmx48cmx0.12cm)

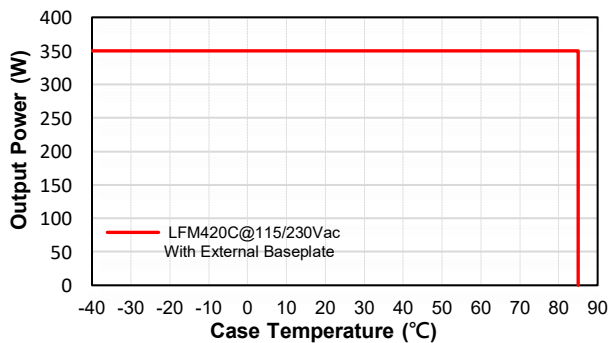
Output power vs Ambient Temperature



Natural Convection With External Baseplate  
Output power & Input Voltage



Output power vs Case Temperature

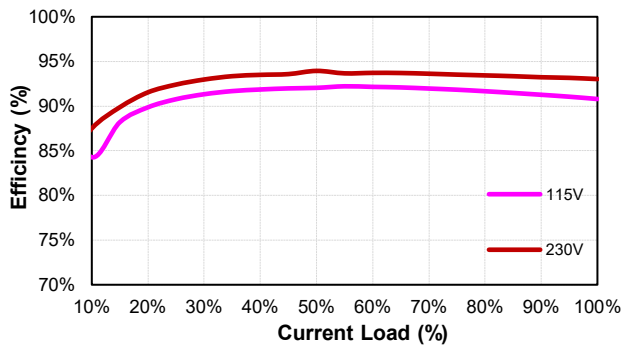




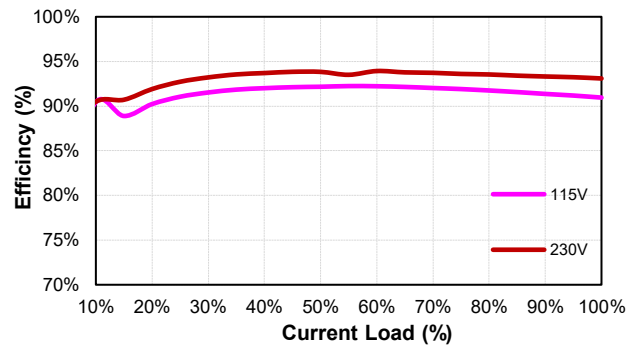
# LFM420M Series

## Performance Data

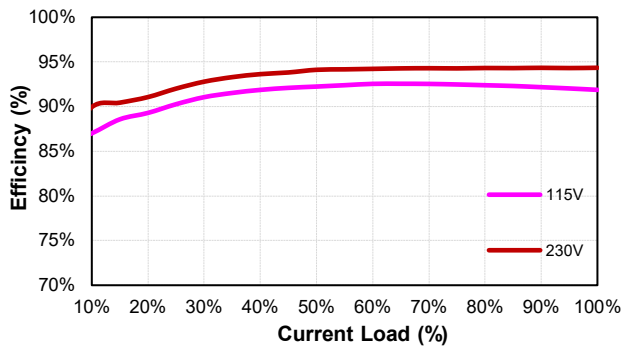
LFM420M120 (Eff Vs Io)



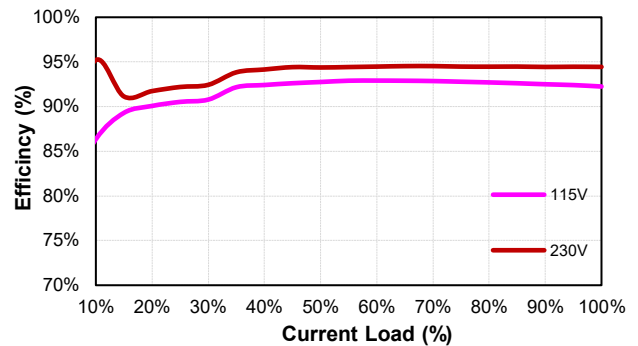
LFM420M150 (Eff Vs Io)



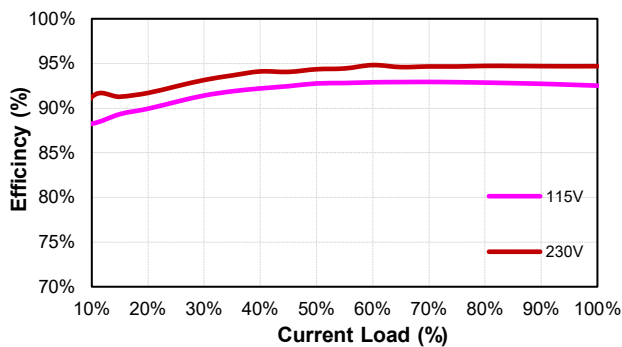
LFM420M240 (Eff Vs Io)



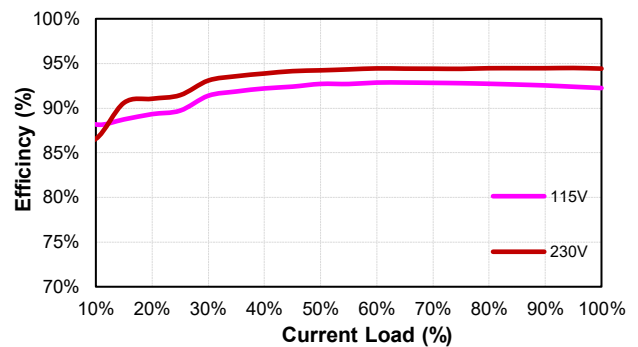
LFM420M280 (Eff Vs Io)



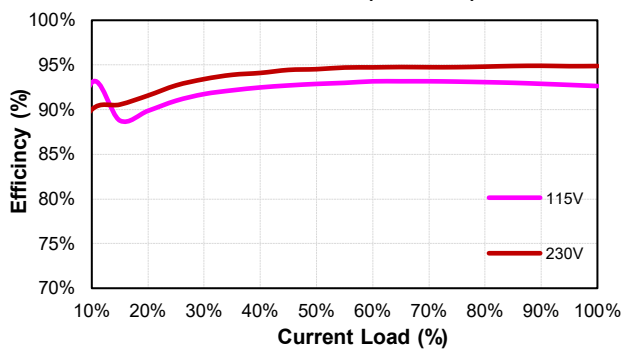
LFM420M300 (Eff Vs Io)



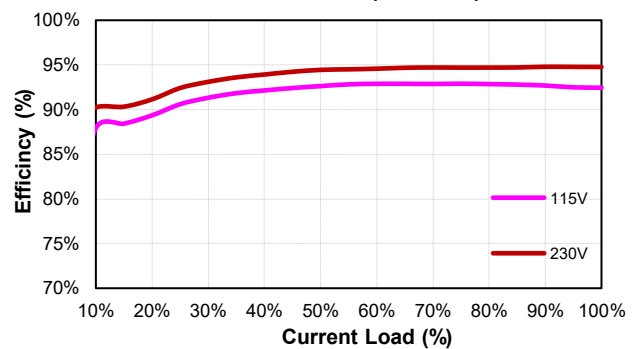
LFM420M360 (Eff Vs Io)



LFM420M480 (Eff Vs Io)



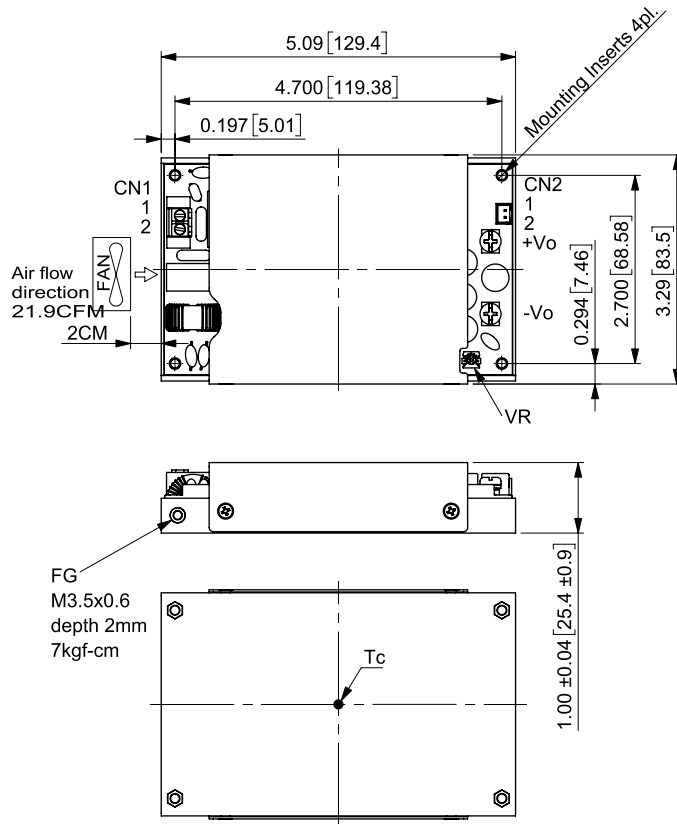
LFM420M540 (Eff Vs Io)





# LFM420M Series

## MECHANICAL SPECIFICATION



### LFM420MXXXC LFM420MXXXC-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<br>or equivalent | JST                             |
| 2   | Rs-      |                            | SXH-001T-P0.6N<br>or equivalent |

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 |

# Mouser Electronics

Authorized Distributor

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[LFM420M300C-C0](#) [LFM420M120C-C0](#) [LFM420M280C-C0](#) [LFM420M280C](#) [LFM420M240C-C0](#) [LFM420M120C](#)  
[LFM420M360C](#) [LFM420M480C](#) [LFM420M300C](#) [LFM420M150C-C0](#)