

## FMDA4020 series (Rev. 5.0)



## Features

- \* RoHS compliant
- \* Low profile type
- \* Shielded construction
- \* Ultra low buzz noise due to molding construction

## Product Identification

FMDA    4020    -    R68    M  
 1            2            3            4

1. Product Code
2. Size Code
3. Inductance: 0.68uH
4. Tolerance: M= ±20%

FMDA series is designed for low profile type with low RDC & ultra large current. Its molded magnetic shielded type is suitable for high-density mounting and ultra low buzz noise. Soldering conditions can be easily confirmed when mounting onto the board. It also provides customers with embossed carrier type packaging for automatic mounting machine.

## Applications

- \* High density DC/DC converters
- \* POL converters
- \* High current VRM/VRD for notebook / Server / desktop CPUs
- \* High speed charger
- \* For thickness less than 1.2mm, suitable for low profile applications e.g., Ultra thin NB/Monitor/TV/Tablet

## Operating &amp; Storage Condition :

- \* Operating Temp. : -55 to +125 °C
- \* Storage Temp. : -25 to +35 °C
- \* Storage Life Time : 12 Months @25 °C , RH 70%

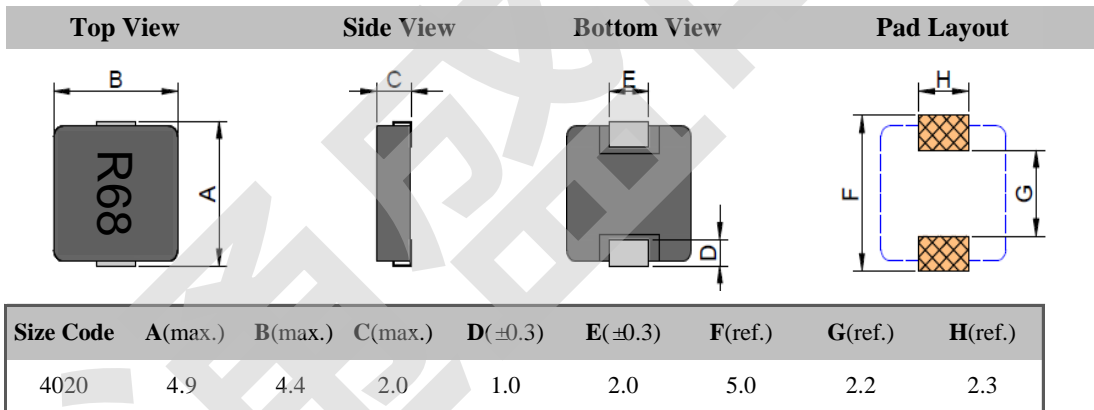
## Test Equipment :

- \* Wayne kerr 3260B/G LCR Meter
- \* Wayne kerr 3265B Bias Current Source

## Standard Atmospheric Conditions :

- \* Ambient Temp : 20+/-15 °C
- \* Relative Humidity : 65+/-20%

## Dimension &amp; Recommended PAD Layout: [ mm ]



## Electrical Characteristics

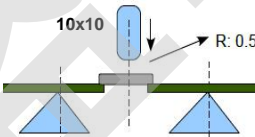
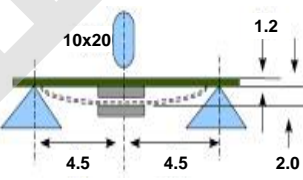
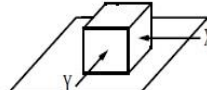
P/N	L (uH)	Tolerance ( ± % )	DCR (mΩ) max.	I <sub>rms</sub> . (A) typ.	I <sub>sat</sub> . (A) typ.
FMDA4020-R68M	0.68	20	23.0	5.0	9.0

\* Test Condition @100KHz / 1.0Vrms, 25 °C Ambient

\* I<sub>rms</sub> DC current (A) that will cause an approximate ΔT of 40°C

\* I<sub>sat</sub> DC current (A) that will cause L to drop approximately 35%

## SMD Type :

SN	Test Item	Test Method	Standard	Samples ( pcs )												
1	Thermal Shock 冷热冲击测试	Temperature: - 40 ℃ / +85 ℃ kept stabilized for 30 minutes ; Cycle: 100 cycles (power off)	No appearance deformation Inductance deviation within ±5%	30												
2	Humidity Resistance 防潮性能测试	Humidity: 90%- 95% RH; Temperature: 40±2 ℃ Time: 500±12 hours	No appearance deformation Inductance deviation within ±5%	30												
3	High Temperature 耐热测试	Temperature: 105±2 ℃ Time: 500±12 Hours	No appearance deformation Inductance deviation within ±5%	30												
4	Low Temperature 耐寒测试	Temperature: - 40±2 ℃ Time: 500±12 Hours	No appearance deformation Inductance deviation within ±5%	30												
5	Temperature and Humidity Cycle 温/湿度循环测试	<table border="0"> <tr> <td>Temperature</td> <td>Humidity</td> <td>Time</td> </tr> <tr> <td>25 ℃ ±2 ℃</td> <td>90% - 95% RH</td> <td>3.0 hours</td> </tr> <tr> <td>55 ℃ ±2 ℃</td> <td>95% - 96% RH</td> <td>5.0 hours</td> </tr> <tr> <td>25 ℃ ±2 ℃</td> <td>90% - 95% RH</td> <td>3.0 hours</td> </tr> </table> Cycle: 100 cycles	Temperature	Humidity	Time	25 ℃ ±2 ℃	90% - 95% RH	3.0 hours	55 ℃ ±2 ℃	95% - 96% RH	5.0 hours	25 ℃ ±2 ℃	90% - 95% RH	3.0 hours	No appearance deformation Inductance deviation within ±5%	30
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6	Reflow Heating Resistance 回流焊耐热性测试	IR-Reflow (3 times ) Preheat: 150~200 ℃ Time: 60-120 sec. Peak Temp.: 255±5 ℃ Time: 30 sec. Reflow Temp.: above 217 ℃ Time: 60-150 sec.	No appearance deformation Inductance deviation within ±5%	30												
7	Iron Heating Resistance 烙铁焊耐热性测试	Soldering Temp.: 350 ± 5 ℃ Time: 3±1 sec.	No appearance deformation Inductance deviation within ±5%	30												
8	Withstanding Voltage 耐压测试	100 VDC/ 1 minute, between core & winding	No dielectric breakdown	30												
9	Rated Current 额定电流测试	Temperature: 25±3 ℃; Time: 10 minutes Load: Rated Current	Inductance and Temp. Rise variation within spec.	30												
10	Bending Strength 折断力测试	Uint: mm IR-Reflow (2 times) Force : 1 kgf/ min.		No appearance deformation Inductance deviation within ±3%	30											
11	Flexure Strength 抗弯强度测试	Uint: mm IR-Reflow (2 times) Solder cream 0.15mm		No appearance deformation Inductance deviation within ±3%	30											
12	Electrode Strength 电极强度测试	Mounted on PCB Pushed in X, Y direction, Strength: 5N for 10±2 sec.		No electrode detachment No appearance deformation Inductance deviation within ±3%	30											
13	Vibration 振动测试	Frequency: 10Hz-55Hz Amplitude: 1.5mm Direction: X,Y,Z Time: 2 hours for each Product: after packing	No appearance deformation Inductance deviation within ±3%	30												
14	Dropping 跌落测试	Freely dropped down; Height: 1m ; Direction: 1 Angle ridge; 3 surfaces; Product: after packing	No appearance deformation Inductance deviation within ±3%	30												

**Remark:** Before/after reliability test for above each item, must carry out visual inspection and/or measure crucial dimension inspection if needed. If confirmation of defects is required, use visual aids or equipment such as 10X magnifying glass, microscope etc. to check.

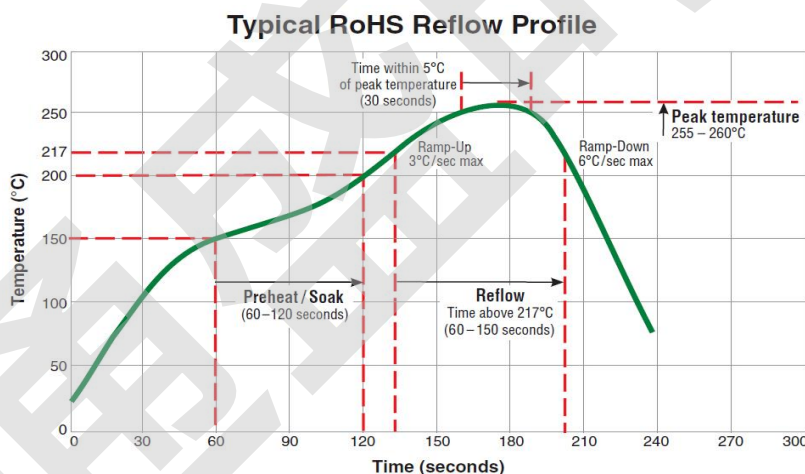
## General

- ◆ Products should not be kept in unsuitable storage conditions, such as areas susceptible to high temperatures, high humidity, dust or corrosion.
- ◆ Don't use products in a place where dew condenses. Since dew condensation caused by temperature change, please pay special attention when using products in a sealed condition.
- ◆ Always handle products with care.
- ◆ Don't touch electrodes directly with bare hands as oil secretions may inhibit soldering.
- ◆ Always ensure optimum conditions for soldering.
- ◆ Don't bend the terminals or subject them to excessive stress.
- ◆ Please ensure that all terminals and case lugs are completely fixed with solder onto PCB.
- ◆ Avoid placing chip inductors near the edge of the PCB.
- ◆ Our SMD coils are designed for automatic mounting. Please be careful if soldering by hand.
- ◆ Don't touch any exposed winding part and avoid coming into contact with the guide of electrode in automatic mounting.
- ◆ Our specification limits the quality of the component as a single unit. Please ensure the component is thoroughly evaluated in your application circuit.
- ◆ When using our high voltage inverter transformers, please keep 2mm away from the electric conductor.

## Soldering

### ◆ Reflow soldering

Please refer to the following recommended condition. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.



### ◆ Lead free soldering

When using products with lead free soldering, we request to use them after confirming of adhesion, temperature of resistance to soldering heat, soldering etc. sufficiently.

### ◆ Soldering iron

Put the soldering iron on the land-pattern.

Soldering iron's temperature - Below 350 °C (FCD43 Type).

Duration - 3 seconds or less

The soldering iron should not directly touch the inductor.

## Cleaning

- ◆ Refrain from cleaning coils. Ultrasonic cleaning may cause broken products. If it is a must, kindly refer to following advice or consult with our company.  
When cleaning the PC board after the inductors are all mounted, select the appropriate cleaning solution according to the type of flux used and purpose of the cleaning (e.g. to remove soldering flux or other materials from the production process.)
- ◆ Cleaning conditions should be determined after verifying through a test run, the cleaning process does not affect the inductor's characteristics.
- ◆ The use of inappropriate solutions can cause foreign substances such as flux residue to adhere to the inductor, resulting in a degradation of the inductor's electrical properties, especially insulation resistance.
- ◆ Inappropriate cleaning conditions (insufficient or excessive cleaning) may detrimentally affect the performance of the inductors.  
\* In the case of ultrasonic cleaning, too much power output can cause excessive vibration of the PC board which may lead to the cracking of the inductor or the soldered portion, or decrease the terminal electrodes' strength. Thus following conditions shall be checked.
  - Ultrasonic output below 20W
  - Ultrasonic frequency below 40KHz
  - Ultrasonic washing period 5 minutes or less

## Handling

- ◆ Keep the product away from all magnets and magnetic objects.
- ◆ Breakaway PC boards (splitting along perforations)
  1. When splitting the PC board after mounting product, care should be taken not to give any stresses of deflection or twisting to the board.
  2. Board separation should not be done manually, but by using the appropriate devices.
- ◆ Mechanical considerations  
Please do not give the product any excessive mechanical shocks and power in transportation.
- ◆ Pick-up pressure  
Damage and a characteristic can vary with an excessive shock or stress. Please don't push to add any pressure to a winding part.
- ◆ Packing- Please avoid accumulation of a packing box as much as possible.

## Storage

- ◆ To maintain the solderability of terminal electrodes and to keep the packaging material in good condition, care must be taken to control temperature and humidity in the storage area. Humidity should especially be kept as low as possible.
- ◆ Recommended conditions
  - Ambient temperature Below 40°C
  - Humidity Below 70% RH
- ◆ The ambient temperature must be kept below 40°C. Even under ideal storage conditions inductor electrode solderability decreases as time passes, so inductors should be used within 6 months from the time of delivery.
- ◆ In case of storage over 6 months, solderability shall be checked before actual usage.
- ◆ The packaging material should be kept where no chlorine or sulfur exists in the air.
- ◆ Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/ packaging materials may take place.