



## SPECIFICATION FOR APPROVAL

产品规格承认书

Unibody Inductor

一体成型功率电感

CUSTOMER.

MODEL NO.

MS0650-100M

CUSTOMER'S PART NO.

LILE NO.

DATE.

2019-3-27

REVISION.

A/0

|                  |          |             |
|------------------|----------|-------------|
| CUSTOMER APPROVE |          |             |
|                  |          |             |
| DATE:            |          |             |
| DRAWING          |          |             |
| DRAWN BY         | CHECK BY | APPROVAL BY |
|                  |          |             |
| DATE:            |          |             |



IATF16949 / ISO9001 / ISO14000

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CUSTOMER

MODEL NO.

MS0650-100M

REVISION

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FILE NO.

PART NO.

DATE

2019-3-27

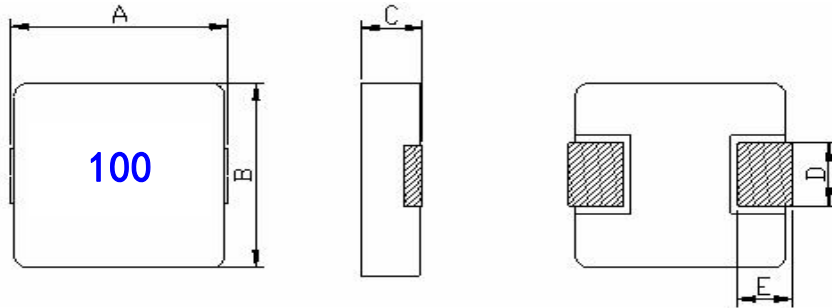
## REVISIONS

REW

PROJECT CHANGE

DESCRIPTION

Date

|                                                                                                                                                                                                                                                                                                    |                  |             |                     |          |           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|---------------------|----------|-----------|
| CUSTOMER                                                                                                                                                                                                                                                                                           |                  | MODEL NO.   | MS0650-100M         | REVISION | A/0       |
| FILE NO.                                                                                                                                                                                                                                                                                           |                  | PART NO.    |                     | DATE     | 2019-3-27 |
| 1.PRODUCT DIMENSION                                                                                                                                                                                                                                                                                |                  |             |                     | UNIT:mm  |           |
|                                                                                                                                                                                                                  |                  |             |                     | A        | 7.15±0.35 |
|                                                                                                                                                                                                                                                                                                    |                  |             |                     | B        | 6.6±0.2   |
|                                                                                                                                                                                                                                                                                                    |                  |             |                     | C        | 5.0 Max   |
|                                                                                                                                                                                                                                                                                                    |                  |             |                     | D        | 3.0±0.5   |
|                                                                                                                                                                                                                                                                                                    |                  |             |                     | E        | 1.7±0.3   |
|                                                                                                                                                                                                                                                                                                    |                  |             |                     |          |           |
|                                                                                                                                                                                                                                                                                                    |                  |             |                     |          |           |
|                                                                                                                                                                                                                                                                                                    |                  |             |                     |          |           |
|                                                                                                                                                                                                                                                                                                    |                  |             |                     |          |           |
|                                                                                                                                                                                                                                                                                                    |                  |             |                     |          |           |
| 2.ELECTRICAL REQUIREMENTS                                                                                                                                                                                                                                                                          |                  |             |                     |          |           |
| PARAMETER                                                                                                                                                                                                                                                                                          | SPECIFICATION    | CONDITION   | TEST INSTRUMENTS    |          |           |
| L(uH)                                                                                                                                                                                                                                                                                              | 10.0μH±20%       | 100KHz/1.0V | MICROTEST 6377      |          |           |
| DCR(mΩ)                                                                                                                                                                                                                                                                                            | 55 mΩMAX         | At 25℃      | TH2512A             |          |           |
| I sat(A)                                                                                                                                                                                                                                                                                           | 6.0A TYP L0A*70% | 100KHz/1.0V | MICROTEST 6377+6220 |          |           |
| I rms(A)                                                                                                                                                                                                                                                                                           | 4.5A TYP ΔT≤40℃  | 100KHz/1.0V | MICROTEST 6377+6220 |          |           |
|                                                                                                                                                                                                                                                                                                    |                  |             |                     |          |           |
| 3.CHARACTERISTICS                                                                                                                                                                                                                                                                                  |                  |             |                     |          |           |
| (1). All test data is based on 25℃ ambient.                                                                                                                                                                                                                                                        |                  |             |                     |          |           |
| (2). DC current(A)that will cause an approximate ΔT40℃                                                                                                                                                                                                                                             |                  |             |                     |          |           |
| (3). DC current(A)that will cause L0 to drop approximately 30%Typ                                                                                                                                                                                                                                  |                  |             |                     |          |           |
| (4). Operating temperature range: -55℃~+125℃                                                                                                                                                                                                                                                       |                  |             |                     |          |           |
| (5).The part temperature (ambient + temp rise)should not exceed 125℃ under worst case operating conditions. circuit design, component.PWB trace size and thickness,airflow and other cooling provision all affect the part temperature. Part temperature should be verified in the den application |                  |             |                     |          |           |
| 4.SPECIAL REQUEST                                                                                                                                                                                                                                                                                  |                  |             |                     |          |           |
| (1)Lettering 100 on top of the body.                                                                                                                                                                                                                                                               |                  |             |                     |          |           |

|          |  |           |             |          |           |
|----------|--|-----------|-------------|----------|-----------|
| CUSTOMER |  | MODEL NO. | MS0650-100M | REVISION | A/0       |
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## 5.PRODUCT IDENTIFICATION

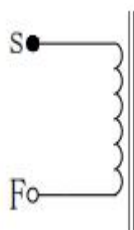
XX XXXX - XXX X X

① ② ③ ④ ⑤

①、 Product Symbol ②、 Dimensions ③、 Inductance

④、 Tolerance: M±20%, N±30%. ⑤、 Material

## 6.ELECTRICAL SCHEMATICS



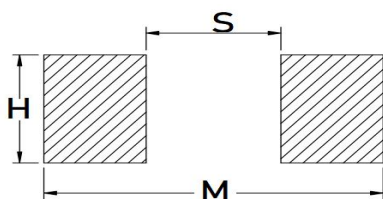
## 7.APPLICATION

- (1)Low profile,high current power supplies.
- (2)Battery powered devices.
- (3)DC/DC converters in distributed power systems.
- (5)DC/DC converters for field programmable gate array.

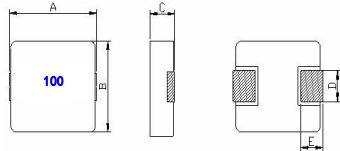
## 8.FEATURES

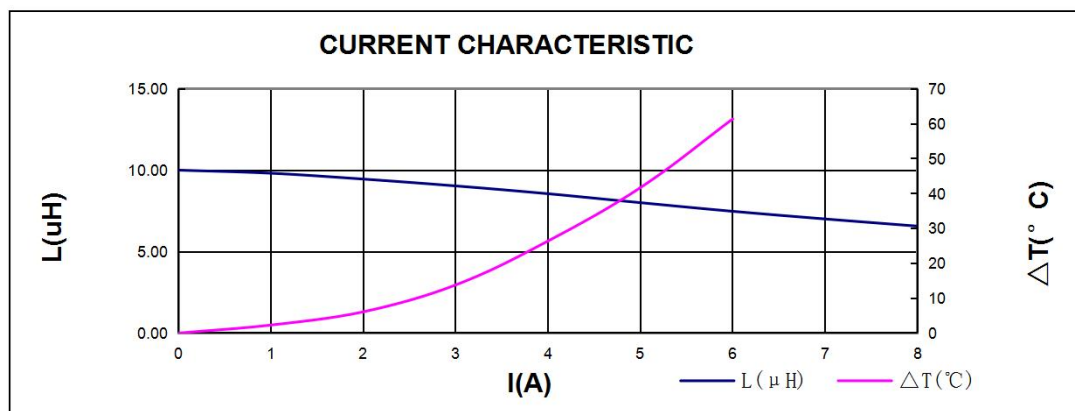
- (1)ROHS compliant.
- (2)Super low resistance,ultra high current rating.
- (3)high performance(I sat)realized by metal dust core.
- (4)Frequency Range:up to 1MHZ.

## 9.RECOMMENDED PCB LAYOUT



|   |     |
|---|-----|
| H | 3.5 |
| S | 3.7 |
| M | 8.4 |

|                           |      |            |          |                     |         |                    |                                                                                       |           |  |
|---------------------------|------|------------|----------|---------------------|---------|--------------------|---------------------------------------------------------------------------------------|-----------|--|
| CUSTOMER                  |      | MODEL NO.  |          | MS0650-100M         |         | REVISION           |                                                                                       | A/0       |  |
| FILE NO.                  |      | PART NO.   |          |                     |         | DATE               |                                                                                       | 2019-3-27 |  |
| SORT                      | ITEM | A          | B        | C                   | D       | E                  |                                                                                       |           |  |
| PRODUCT & DIMENSION       | SPEC | 7.15±0.35  | 6.6±0.2  | 5.0 Max             | 3.0±0.5 | 1.7±0.3            |                                                                                       |           |  |
|                           | 1    | 7.18       | 6.65     | 4.87                | 2.92    | 1.74               |                                                                                       |           |  |
|                           | 2    | 7.22       | 6.65     | 4.92                | 2.93    | 1.75               |                                                                                       |           |  |
|                           | 3    | 7.21       | 6.64     | 4.88                | 2.92    | 1.74               |                                                                                       |           |  |
|                           | 4    | 7.20       | 6.65     | 4.91                | 2.92    | 1.74               |                                                                                       |           |  |
|                           | 5    | 7.19       | 6.64     | 4.92                | 2.92    | 1.75               |                                                                                       |           |  |
|                           | X    | 7.20       | 6.65     | 4.90                | 2.92    | 1.74               |                                                                                       |           |  |
|                           | R    | 0.04       | 0.01     | 0.05                | 0.01    | 0.01               |                                                                                       |           |  |
| ELECTRICAL & REQUIREMENTS | ITEM | L(μH)      | DCR (mΩ) | I sat(A)            | DC BIAS | I <sub>rms</sub>   | SHAPE:                                                                                |           |  |
|                           | SPEC | 10.0μH±20% | 55 mΩMAX | 6.0A TYP<br>L0A*70% |         | 4.5A TYP<br>ΔT≤40℃ |  |           |  |
|                           | 1    | 9.950      | 48.800   | 7.430               | -25.3%  | OK                 |                                                                                       |           |  |
|                           | 2    | 9.320      | 48.500   | 7.410               | -20.5%  | OK                 |                                                                                       |           |  |
|                           | 3    | 9.560      | 48.700   | 7.410               | -22.5%  | OK                 |                                                                                       |           |  |
|                           | 4    | 10.010     | 48.600   | 7.454               | -25.5%  | OK                 |                                                                                       |           |  |
|                           | 5    | 9.980      | 48.900   | 7.420               | -25.7%  | OK                 |                                                                                       |           |  |
|                           | X    | 9.76       | 48.70    | 7.42                | -23.9%  |                    |                                                                                       |           |  |
|                           | R    | 0.69       | 0.40     | 0.04                | 5.2%    |                    |                                                                                       |           |  |



|        |        |      |      |      |      |      |      |      |      |
|--------|--------|------|------|------|------|------|------|------|------|
| I(A)   | 0      | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
| L(μH)  | 10.010 | 9.82 | 9.46 | 9.04 | 8.56 | 8.01 | 7.48 | 7.01 | 6.57 |
| ΔT(°C) | 0      | 2.3  | 6.1  | 13.8 | 26.4 | 41.7 | 61.4 |      |      |

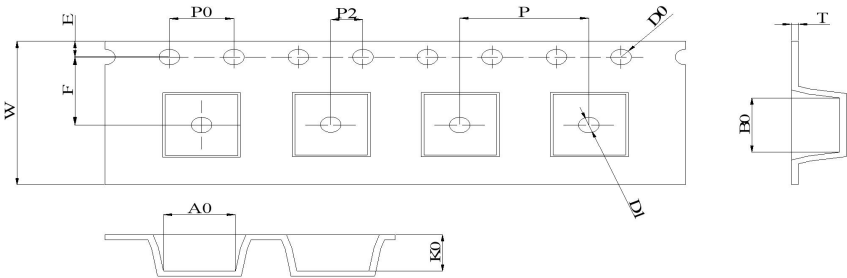
|                                     |                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                |          |           |
|-------------------------------------|-----------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|
| CUSTOMER                            |                                                                                                     | MODEL NO. | MS0650-100M                                                                                                                                                                                                                                                                                                                                    | REVISION | A/0       |
| FILE NO.                            |                                                                                                     | PART NO.  |                                                                                                                                                                                                                                                                                                                                                | DATE     | 2019-3-27 |
| 11.可靠性Reliability                   |                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                |          |           |
| 项目Item                              | 规格与需求<br>Specification and Requirement                                                              |           | 测试方法Test Method                                                                                                                                                                                                                                                                                                                                |          |           |
| 可焊性<br>Solder ability test          | 沾锡面积不得小于95%上锡面<br>Terminals area must have 95% min solder coverage                                  |           | 上锡升温曲线Solder heat proof:<br>(1) 预热: 160±10℃持续90s<br>Preheating: 160±10℃ for 90 seconds<br>(2) 恒温时段: 245±5℃持续2±0.5s<br>Retention time: 245±5℃ for 2±0.5 seconds                                                                                                                                                                                 |          |           |
| 振动测试<br>Vibration test              | 感值变化: 不超过±5%<br>且无破裂等机械损伤产生<br>Inductance change: Within±5% Without mechanical damage such as break |           | (1) 振动频率(10Hz 55Hz 10Hz)60s为一个周期 Vibration frequency: (10Hz to 55Hz to 10Hz) in 60 seconds as a period<br>(2) 振动时间 Vibration time:<br>三维正交坐标系每个方向振动(周期) 循环2小时 Period cycled for 2 hours in each of 3 mutual perpendicular directions<br>(3) 振幅 Amplitude: 1.5 mm Max                                                                           |          |           |
| 冲击测试<br>Shock test                  | 感值变化: 不超过±5%<br>且无破裂等机械损伤产生<br>Inductance change: Within±5% Without mechanical damage such as break |           | (1) 最大振幅 Peak value: 100G<br>(2) 脉冲波长 Duration of pulse: 11ms<br>(3) 三维正交坐标系每个方向正负方向冲击3次 Times in each positive and negative direction of 3 mutual perpendicular directions                                                                                                                                                                    |          |           |
| 冷热冲击<br>Thermal shock               | 感值变化: 不超过±5%<br>且无破裂等机械损伤产生<br>Inductance change: Within±5% Without mechanical damage such as break |           | (1)重复以上100个循环Repeat 100 cycle as follow<br>(-55±2℃,30±3分钟) 室温5分钟<br>(-55±2℃,30±3 minutes)<br>Room temperature,5 minutes<br>(+125±2℃,30±3分钟) 室温5分钟<br>(+125±2℃,30±3 minutes)<br>Room temperature,5 minutes<br>(2)恢复: 测试于标准条件下恢复48+4/-0小时 (参考注释1)<br>Recovery:48+4/-0 hours of recovery under the standard condition after the test. (see Note1) |          |           |
| 耐高温测试<br>High temperature life test | 感值变化: 不超过±5%<br>且无破裂等机械损伤产生<br>Inductance change: Within±5% Without mechanical damage such as break |           | (1)环境条件: 85±2℃<br>Environment condition : 85±2℃<br>应用电流: 额定电流<br>Applied current: Rated current<br>(2)持续时间: 1000+4/-0 小时 (参考注释1)<br>Duration:1000+4/-0 hours (see Note1)                                                                                                                                                                       |          |           |
| 耐湿测试<br>Humidity Resistance         | 感值变化: 不超过±5%<br>且无破裂等机械损伤产生<br>Inductance change: Within±5% Without mechanical damage such as break |           | (1)环境条件: 60±2℃<br>Environment condition : 60±2℃<br>湿度: 90~95%<br>Humidity:90~95%<br>应用电流: 额定电流<br>Applied current: Rated current<br>(2)持续时间: 1000+4/-0 小时 (参考注释1)<br>Duration:1000+4/-0 hours (see Note1)                                                                                                                                      |          |           |
| 低温存放测试Low temperature life test     | 感值变化: 不超过±5%<br>且无破裂等机械损伤产生<br>Inductance change: Within±5% Without mechanical damage such as break |           | (1)存储温度 Store temperature<br>-55±2℃下存放 1000+4/-0 小时<br>-55±2℃ for total 1000+4/-0 hours                                                                                                                                                                                                                                                        |          |           |
| 高温存放测试High temperature life test    | 感值变化: 不超过±5%<br>且无破裂等机械损伤产生<br>Inductance change: Within±5% Without mechanical damage such as break |           | (1)存储温度 Store temperature<br>+125±2℃下存放 1000+4/-0 小时<br>+125±2℃ for total 1000+4/-0 hours                                                                                                                                                                                                                                                      |          |           |

|          |  |           |             |          |           |
|----------|--|-----------|-------------|----------|-----------|
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12、包装 Packaging

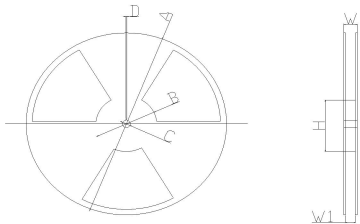
12.1、尺寸 Dimensions

12.1.1 包装料带尺寸 Tape packaging dimensions



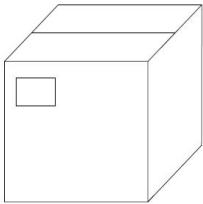
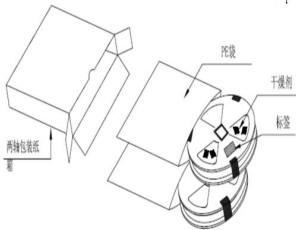
| W              | A0            | B0           | K0           | P           | F            | E             | D0            | P0           | T             |
|----------------|---------------|--------------|--------------|-------------|--------------|---------------|---------------|--------------|---------------|
| 16.00<br>±0.30 | 7.05<br>±0.10 | 7.2<br>±0.10 | 5.3<br>±0.10 | 12<br>±0.10 | 11.5<br>±0.1 | 1.75<br>±0.10 | 1.50<br>±0.10 | 4.0<br>±0.10 | 0.35<br>±0.05 |

12.1.2 卷轴尺寸 Reel dimensions



| 项目 | 尺寸(mm)      |
|----|-------------|
| A  | 330.0 ± 2.0 |
| B  | 100.0 ± 1.0 |
| C  | 13.0 ± 1.0  |
| D  | 1.9 ± 0.4   |
| W  | 30.4 Max    |
| W1 | 24.4 ± 1.0  |

12.1.3 外箱尺寸Carton dimensions



| 项目  | 数量 (PCS) |
|-----|----------|
| 1卷轴 | 1000     |
| 1内箱 | 3000     |
| 1外箱 | 9000     |

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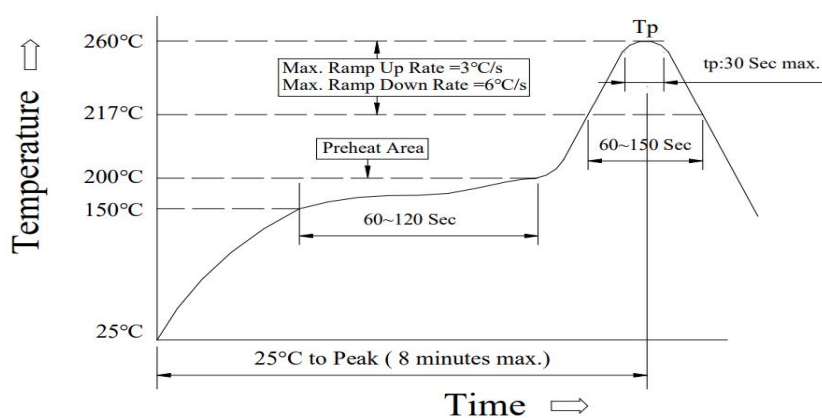
DATE

2019-3-27

## Reflow curve

## ※ Reflow Profile

## Power Choke Coil Type



## 1. Reflow Soldering Method

|                               |                |                       |
|-------------------------------|----------------|-----------------------|
| Reflow Soldering              | Tp:255~260°C   | Max.30 seconds ( tp ) |
|                               | 217°C          | 60~150 seconds        |
| Pre-Heat                      | 150 ~ 200°C    | 60~120 seconds        |
| Time 25°C to peak temperature | 8 minutes max. |                       |

## 2. Soldering iron method : 350±5°C Max.3 seconds.