# Specification for Approval

AEC-Q200

| | |
|---|---|
| **Customer:** | |
| **Customer P/N:** | |
| **EEC P/N:** | MA0650A Series |
| **Spec No.:** | |
| **Version No.:** | V0.1 |
| **Description:** | Alloy Powder Molding Inductor |
| | Surface Mount Package |
| | Automotive Applications |

| Customer Approval | | EEC Company Approval | |
|---|---|---|---|
| | |  | |
| Inspected By: | | Issued By: | YinJun Chen |
| Checked By: | | Checked By: | HongJun Zhu |
| Approved By: | | Approved By: | Focus Wang |
| Approved Date: | | Issued Date: | 2023/4/19 |

Please Return One Copy to Us After Approved,TKS! (承认后请回寄一份,谢谢)

Remark:
1. Before use, please confirm whether this product is suitable for your design, Scientic only ensure products meet this specification.
2. This specification data change must be confirmed by both parties,any individual modification is invalid.
3. If customer placed orders without signing back this specification, it is regarded as recognition.

Excellent · Efficient · Creative
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Mianyang Dunyuan Electronics Technology Co.,Ltd
地址: 四川省绵阳市高新区综合保税区
ADD: Comprehensive Bonded Zone, High-Tech Industrial Development Zone Mianyang, SiChuan

# Specification for Approval

**Revision History**

| Revision | Issued Date | Issued By | Description |
|---|---|---|---|
| V0.1 | 2023/4/19 | YinJun Chen | 新版发行 |
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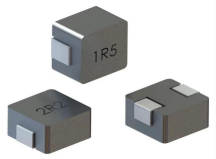
# Specification for Approval

## 1 Features

High performance (Isat) realized by metal dust core.
Low profile：Thickness 5mm max.
Low loss realized with low DCR.
Capable of corresponding high frequency.
Compliance with RoHS and Halogen Free.
Operating temperature range - 55 °C to + 125 °C(Including self - temperature rise).
Compatible with RoHS Directive and AEC-Q200.




## Application

Automotive applications.

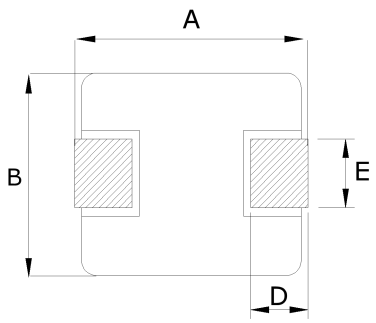
## 2 Electrical Specifications @ 25°C

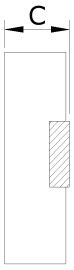
| Part No. | Inductance | DC Resistance | Saturation Current | Heating Rating Current |
|---|---|---|---|---|
| | L0 (μH) | DCR (mΩ) | Isat (A) | Irms (A) |
| | ±20 %, 100 kHz, 1V | Max | TYP | TYP |
| MA0650A-R47M0 | 0.47 | 3.9 | 21 | 20 |
| MA0650A-R68M0 | 0.68 | 4.5 | 18 | 16.5 |
| MA0650A-1R0M0 | 1 | 6.6 | 16 | 12 |
| MA0650A-1R5M0 | 1.5 | 10 | 13 | 9.5 |
| MA0650A-2R2M0 | 2.2 | 12.5 | 11 | 9 |
| MA0650A-3R3M0 | 3.3 | 22 | 10 | 8.5 |
| MA0650A-4R7M0 | 4.7 | 29 | 8 | 6 |
| MA0650A-6R8M0 | 6.8 | 41 | 6.3 | 5.8 |
| MA0650A-8R2M0 | 8.2 | 48 | 5.5 | 5.5 |
| MA0650A-100M0 | 10 | 60 | 5.3 | 4.5 |
| MA0650A-150M0 | 15 | 90 | 4 | 3.1 |
| MA0650A-220M0 | 22 | 140 | 3.5 | 2.6 |
| MA0650A-330M0 | 33 | 190 | 3 | 2.3 |
| MA0650A-470M0 | 47 | 230 | 2.6 | 2 |

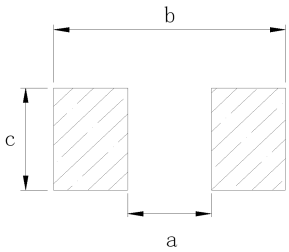
Notes：

1. All test data is referenced to 25 °C ambient
2. Irms (A):DC current (A) that will cause an approximate ΔT of 40 °C(reference ambient temperature is 25 °C)
3. Isat(A):DC current (A) that will cause L0 to drop approximately **30 %**
4. The part temperature (ambient + temp rise) should not exceed 125 °C under worst case operating conditions. Circuit design, component placement, PWB trace size and thickness, airflow and other cooling provisions all affect the part temperature. Part temperature should be verified in the end application.

## 3 Dimensions (mm)& recommend layout



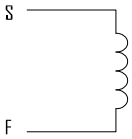




Recommend Land Pattern

| A | B | C | D | E | a typ | b typ | c typ |
|---|---|---|---|---|---|---|---|
| 7.0±0.3 | 6.6±0.2 | 4.8±0.2 | 1.6±0.3 | 3.0±0.3 | 3.7 | 8.4 | 3.5 |

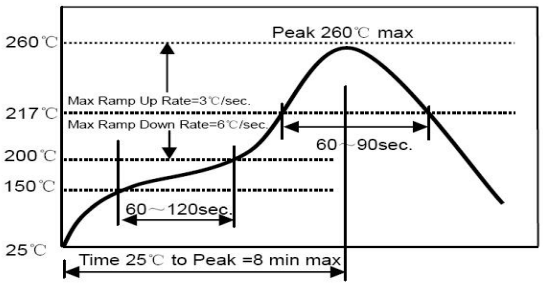
## 4 Schematics




Schematics

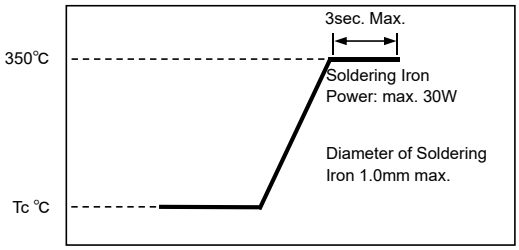
## 5 Recommended Solder Profile

a. Reflow Profile



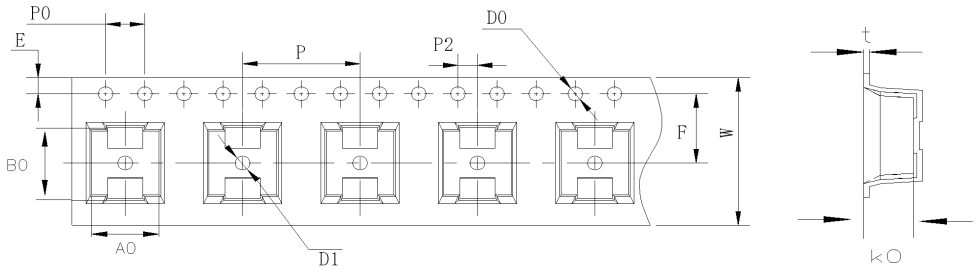

Preheat condition: 150 ~200℃/60~120sec.
Allowed time above 217℃: 60~90sec.
Max temp: 260℃
Max time at max temp: 10 sec.
Solder paste: Sn/3.0Ag/0.5Cu
Allowed Reflow time: 2x max

b. Iron Soldering Profile

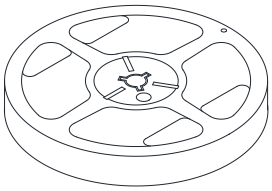



Iron soldering power: Max. 30W
Pre-heating: 150℃/60sec.
Soldering Tip temperature: 350℃ Max.
Soldering time: 3sec. Max.
Solder paste: Sn/3.0Ag/0.5Cu
Max.1 times for iron soldering

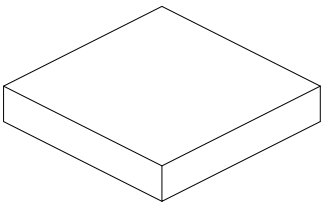
## 6 Packaging specification



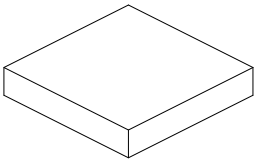

| Tape dimensions (mm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| W | P | P0 | P2 | D0 | D1 | t | A0 | B0 | K0 | E | F |
| 16±0.3 | 12±0.1 | 4±0.1 | 2±0.1 | 1.5±0.1 | 1.5±0.1 | 0.35±0.05 | 6.9±0.1 | 7.5±0.1 | 5.3 ±0.1 | 1.75 ±0.1 | 7.5 ±0.1 |



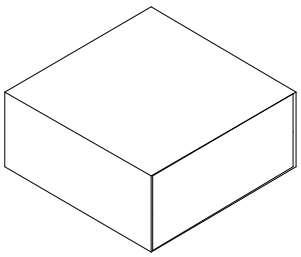
Two Reel



One Inner Carton



Four Inner Carton



One Export Carton

Package Quantity:

One Reel=800 Pcs

One Inner Carton=800*2=1600 Pcs

One Export Carton=1600*4=6400 Pcs

## 7 Reliability test

| NO. | Test Item | Specification and Requirement | Test Condition |
|---|---|---|---|
| 1 | Solderability | 1. No case deformation or change in visual<br>2. New solder coverage More than 95% | 1.Preheat：155℃±5℃，60S±2S<br>2.Tin: lead-free.<br>3.Temperature:240℃±5℃，flux 3.0S±0.5S. |
| 2 | Mechanical shock | 1. No case deformation or change in visual<br>2. △L/Lo≦±10% | 1. Acceleration： 100G<br>2. Pulse time:：6ms<br>3. 3 times in each positive and negative direction of 3 mutual perpendicular directions |
| 3 | Mechanical vibration | 1. No case deformation or change in visual<br>2. △L/Lo≦±10% | 1. Reflow: 2times<br>2. Frequency: 10HZ～50HZ～10HZ，20 Min/Cycles<br>3. Amplitude: 1.52 mm±10%<br>4. Directions: X,Y,Z<br>5. Time: 12 cycle / direction |
| 4 | Thermal Shock | Inductance change:<br>Within ± 10% Without distinct damage in visual | 1. First -55℃ for 30 minutes，last 125 ℃ for 30 minutes as 1 cycle. Go through 1000 cycles.<br>2. Max transfer time is 3 minutes.<br>3. Measured at room temperature after placing for 24±2 hours |
| 5 | Biased Humidity | Inductance change:<br>Within ± 10% Without distinct damage in visual | 1.Reflow 2 times,<br>2.85℃±3℃,85%±3%RH,1000 hours<br>3.Measured at room temperature after placing for 24±2 hours |
| 6 | Low temperature storage | Inductance change:<br>Within ± 10% Without distinct damage in visual | 1. Temperature：-55 ± 2℃<br>2. Time：1000 hours<br>3. Measured at room temperature after placing for 24±2 hours |
| 7 | High temperature storage | Inductance change:<br>Within ± 10% Without distinct damage in visual | 1. Temperature：+125 ± 2℃<br>2. Time：1000 hours<br>3. Measured at room temperature after placing for 24±2 hours |

## ⚠ REMINDERS

☆ The best assembly quality guarantee period of product: 12 months (From shipment date)
Storage condition : seal in packaging, (temperature: 5 to 40°C, humidity: 10 to 75% RH or less).

☆ If taking out for use, the remaining products should be sealed in plastic bags and preserved in accordance with the above conditions, to avoid oxidation of electrodes and affect soldering status.

☆ Do not use or store in locations where there are conditions such as gas corrosion (salt, acid, alkali, etc.).

☆ Before soldering, be sure to preheat components.
The preheating temperature should be set so that the temperature difference between the solder temperature and chip temperature does not exceed 150°C.

☆ Always handle products with care to avoid damage.

☆ Do not touch electrodes with bare hands directly, as oil secretions may inhibit soldering.
Always ensure optimum conditions for soldering.

☆ Soldering corrections after mounting should be within the range of the conditions determined in the specifications.If overheated, a short circuit, performance deterioration, or lifespan shortening may occur.

☆ Use a wrist band to discharge static electricity in your body through the grounding wire.

☆ Do not expose the products to magnets or magnetic fields.

☆ Do not use for a purpose outside of the contents regulated in the delivery specifications.