# 英 吉 亞 科 技 股 份 有 限 公 司
# ENGYA TECHNOLOGY CO., LTD.

## *承　　認　　書*
## *SPECIFICATION FOR APPROVAL*

| | |
|---|---|
| **Customer Name:** | 宜鼎國際股份有限公司 |
| **Customer Part No:** | 9ZLL1-04H713-20-1-4 |

| | |
|---|---|
| **ENGYA Model:** | Power Inductor 4.0*4.0*1.8 4.7uH 0.078Ω 2.10A |
| **ENGYA Part No:** | ENP4018M-4R7M |
| **Date:** | 2015/11/3 |

| | |
|---|---|
| ☑ | RoHS環保產品(無鉛) |
| ☐ | 一般產品(含鉛) |

| CUSTOMER APPROVED |
|---|
| |

| **Approved By:** | **Checked By:** | **Drawn By:** |
|---|---|---|
| *Benson* | *Susan* | *Linda* |

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| ENGYA P/N | ENP4018M-4R7M | COIL SPECIFICATION | DATE | 2015/11/3 |
|---|---|---|---|---|
| CUS. P/N | 9ZLL1-04H713-20-1-4 | | PAGE | 1 of 7 |

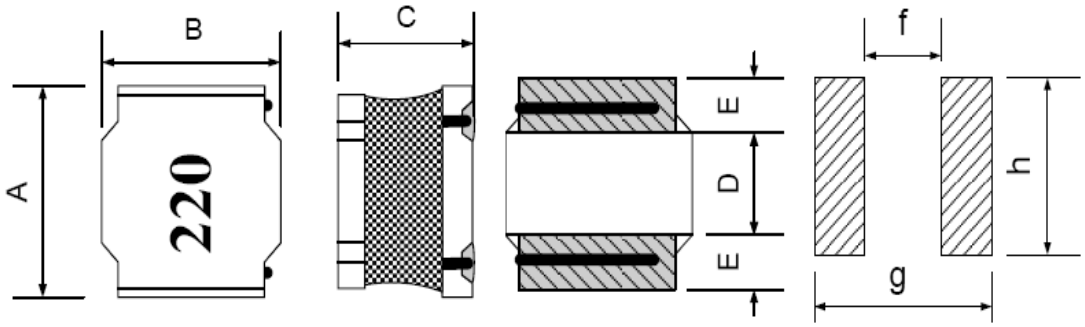
| PART NO | INDUCTANCE (μH) | DCR (Ω)Max. | Isat (A)Max. | Irms (A)Max. |
|---|---|---|---|---|
| ENP4018M-4R7M | 4.7±20% | 0.078 | 2.10 | 2.00 |

1. PART NUMBERS SYSTEM

ENP 4018M - 4R7 M

- Inductance tolerance M=±20%
- Inductance value 4R7：4.7uH
- Dimensions
- Series name

2. DIMENSION




Units:mm

| | |
|---|---|
| A | 4.0±0.2 |
| B | 4.0±0.2 |
| C | 1.80Max. |
| D | 2.0±0.2 |
| E | 1.0±0.2 |
| f | 1.9Typ. |
| g | 4.1Typ. |
| h | 3.4Typ. |

3. MATERIAL LIST

| NO. | ITEM | MATERIAL |
|---|---|---|
| 1 | Ferrite Core | Ni-Zn Ferrite |
| 2 | WIRE | Enameled Copper Wire |
| 3 | Terminal Electrode | Ag/Ni/Sn/Cu |
| 4 | Magnetic Glue | Epoxy resin and magnetic powder |

| ENGYA 英吉亞科技股份有限公司 | Approved By: | Checked By: | Drawn By: |
|---|---|---|---|
| | Benson | Susan | Linda |

4. SERIES LIST

| No. | Part No. | L (μH) | Tolerance (%) | RDC (Ω)Max. | Isat (A)Max. | Irms (A)Max. |
|---|---|---|---|---|---|---|
| 1 | ENP4018M-1R0□ | 1.0 | ±30% | 0.030 | 4.55 | 3.40 |
| 2 | ENP4018M-1R5□ | 1.5 | ±30% | 0.036 | 3.90 | 2.95 |
| 3 | ENP4018M-2R2□ | 2.2 | ±30% | 0.048 | 3.15 | 2.60 |
| 4 | ENP4018M-3R3□ | 3.3 | ±20% | 0.060 | 2.70 | 2.20 |
| 5 | ENP4018M-4R7□ | 4.7 | ±20% | 0.078 | 2.10 | 2.00 |
| 6 | ENP4018M-6R8□ | 6.8 | ±20% | 0.108 | 1.70 | 1.70 |
| 7 | ENP4018M-100□ | 10.0 | ±20% | 0.168 | 1.40 | 1.20 |
| 8 | ENP4018M-220□ | 22.0 | ±20% | 0.336 | 1.00 | 0.95 |

Test instruments and remarks

＊CHROMA 3302 meter for L and DCR/ CHROMA 3302 and 1320 meter for IDC.

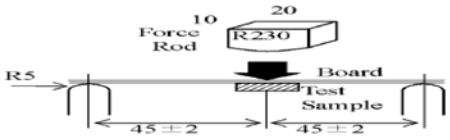
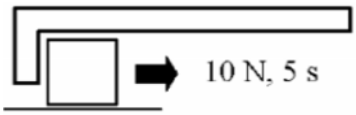
＊L test condition: 100KHz & 1V at 20℃ ambirnt;

＊Rated current:Isat,whichever is smaller:

Isat:direct current at which the inductance drops approximate 30% from its value without current.

Irms:direct current when the temperature of the product rise(△T=40℃) from 20℃ ambient.

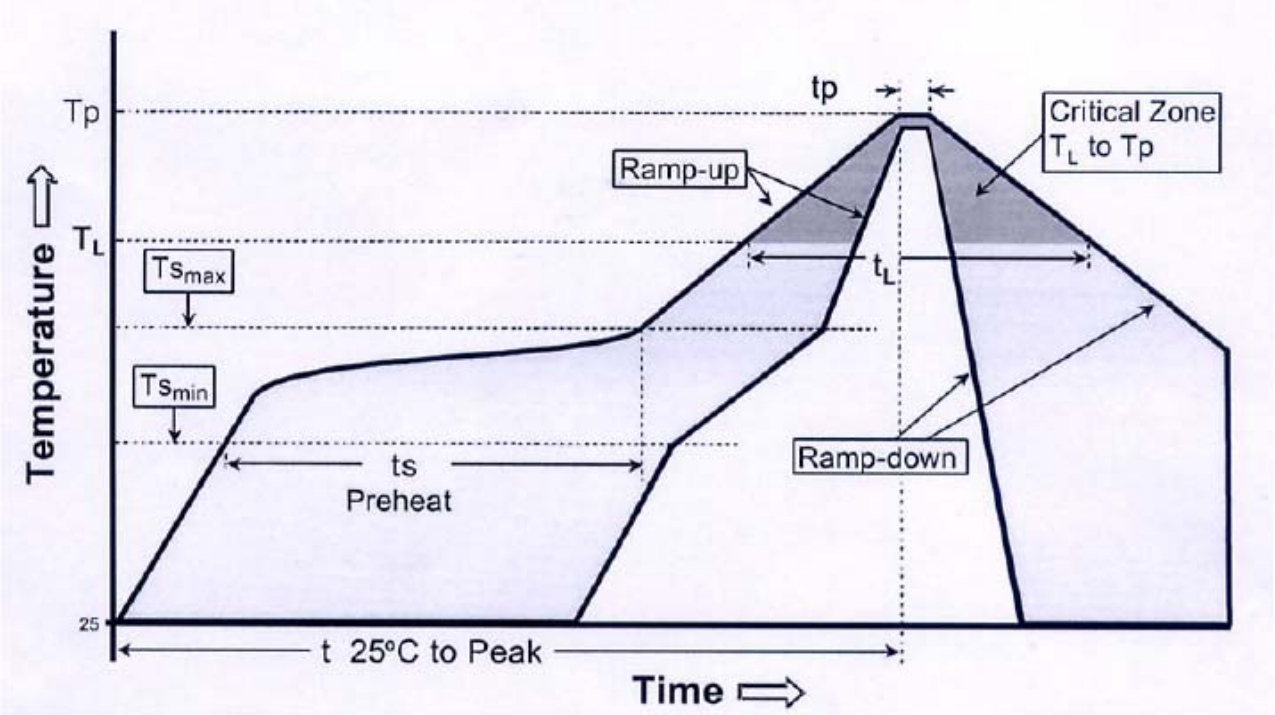
5. Reliability Test

| Item | Performance | Test Condition |
|---|---|---|
| Operating Temperature | - 25 ~ +125℃. | Including self-generated heat |
| Storage Temperature | - 40 ~ +85℃.<br>- 5 to 40℃ for the product with taping. | |
| Rated current | Within the specified tolerance | |
| Inductance (L) | | LCR Meter: HP 4285A or equivalent, 100kHz, 1V |
| DC Resistance | | DC Ohmmeter: HIOKI3227 or equivalent |
| Temperature characteristics | Inductance change：Within±20% | Measurement of inductance shall be taken at temperature rang within－25℃ to +85℃.With reference to inductance value at+20 ℃,change rate shall be calculated.Measurement of inductance shall be taken at temperature rang within–40℃ to +125℃.With reference to inductance value at+20 ℃,change rate shall be calculated. |
| Resistance to flexure substrate | No damage. | The test samples shall be soldered to the testing board by the reflow.<br>As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2mm.<br>  <br>Substrate size：100x40x1.0<br>Substrate material：glass epoxy-resin<br>Solder cream thickness：0.10 |
| Adhesion of Terminal electrode | Shall not come off PC board. | The test samples shall be soldered to the testing board and by the reflow.<br>  <br>Applied force：10 N to X and Y directions.<br>Duration：5s<br>Solder cream thickness：0.15 |

| Item | Performance | Test Condition |
|---|---|---|
| Resistance to Vibration | Inductance change：Within±10%<br>No abnormality observed in appearance. | The test samples shall be soldered to the test board by the reflow.Then it shall be submitted to below test conditions.Frequency: 10-55Hz Total Amplitude: 1.5mm (May not exceed acceleration 196m/S2 ) Sweeping Method:10Hz to 55Hz to 10Hz for 1min. Time：2 hours each in X,Y, and Z Direction.<br>Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. |
| Solderability | At least 90% of surface of terminal electrode is covered by new solder | The test samples shall be dipped in flux, and then immersed in molten solder as shown in below.<br>Flux：methanol solution containing rosin 25%<br>Solder temperature: 245±5℃<br>Time: 5±1.0 sec.<br>Immersion depth: All sides of mounting terminal shall be immersed. |
| Resistance to soldering | Inductance change：Within±10%<br>No abnormality observed in appearance. | The test sample shall be exposed to reflow oven at 230±5℃ for 40 seconds, with peak temperature at 260±5℃ for 5 seconds,2 times.<br>Test board thickness: 1.0mm<br>Test board material: glass epoxy-resin |

<table>
<tr><th>Item</th><th>Performance</th><th>Test Condition</th></tr>
<tr><td>Thermal shock</td><td rowspan="5">Inductance change：Within±10%<br>No abnormality observed in appearance.</td><td>The test samples shall be soldered to the test board by the reflow.<br>The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown below in sequence.<br>The temperature cycles shall be repeated 100 cycles .
<table>
<tr><th>Phase</th><th>Temperature(℃)</th><th>Time(min)</th></tr>
<tr><td>1</td><td>- 40±3℃</td><td>30±3</td></tr>
<tr><td>2</td><td>Room Temp</td><td>Within 3</td></tr>
<tr><td>3</td><td>85±2℃</td><td>30±3</td></tr>
<tr><td>4</td><td>Room Temp</td><td>Within 3</td></tr>
</table>
</td></tr>
<tr><td>Damp heat life test</td><td>Test Method and Remarks The test samples shall be soldered to the test board by the reflow.<br>The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below.<br>Temperature: 60±2℃<br>Humidity: 90~95%RH<br>Time: 500+24/-0 hrs</td></tr>
<tr><td>Loading under damp heat life test</td><td>Test Method and Remarks The test samples shall be soldered to the test board by the reflow.<br>The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below.<br>Temperature: 60±2℃<br>Humidity: 90~95%RH<br>Time: 500+24/-0 hrs</td></tr>
<tr><td>Low temperature life test</td><td>The test samples shall be soldered to the test board by the reflow.<br>After that, the test samples shall be placed at test conditions as shown in below.<br>Temperature:-40±2℃<br>Time:500+24/-0 hrs</td></tr>
<tr><td>Loading at high temperature life test</td><td>The test samples shall be soldered to the test board by the reflow.<br>Temperature: 85±2℃.<br>Applied current: Rated current<br>Time: 500+24/-0 hrs.</td></tr>
</table>

6. Reflow curve



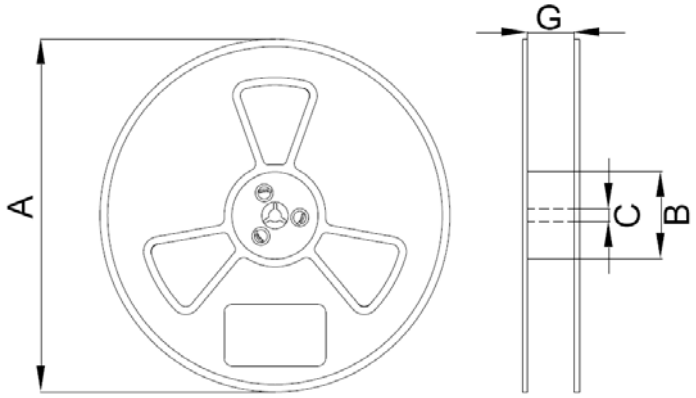

| Profile Feature | | Lead-Free Assembly |
|---|---|---|
| Average Ramp-Up Rate ( Ts max. to Tp ) | | 3℃ C/second max. |
| Preheat | – Temperature Min (Ts min.)<br>– Temperature Max (Ts max.)<br>– Time ( ts min to ts max.) | 150 ℃<br>200 ℃<br>60-180 seconds |
| Time maintained above | – Temperature (TL)<br>– Time (tL) | 217 ℃<br>60-150 seconds |
| Peak/Classification Temperature (Tp)<br>Peak/Classification Time (Tp) | | 260 ℃<br>3-4 seconds |
| Time within 5 °C of actual Peak Temperature (Tp) | | 20-40 seconds |
| Ramp-Down Rate | | 6°C/second max. |
| Time 25 °C to Peak Temperature | | 8 minutes max. |

7. PACKAGING QUANTITIES

| TYPE | Pcs / REEL |
|---|---|
| ENP4018M-4R7M | 3000 |

7-1REEL DIMENSIONS UNIT:mm

| | |
|---|---|
| A | 330±1.0 |
| B | 100±1.0 |
| C | 13±0.5 |
| G | 12.8±0.3 |




7-2TAPE DIMENSIONS UNIT:mm

| | |
|---|---|
| W | 12.0±0.3 |
| A0 | 4.3±0.1 |
| B0 | 4.3±0.1 |
| K0 | 2.1±0.1 |
| E | 1.75±0.1 |
| F | 5.5±0.1 |
| P | 8.0±0.1 |
| P0 | 4.0±0.1 |
| D0 | 1.5±0.1 |
| T | 0.40±0.05 |