

MNR50** Series

Wire Wound SMD Power Inductors

FEATURES

- Magnetic-resin shielded construction reduces buzz noise to ultra-low levels
- Metallization on ferrite core results in excellent shock resistance and damage-free durability
- Closed magnetic circuit design reduces leakage flux and Electro Magnetic Interference (EMI)
- 30% higher current rating than conventional inductors of equal size
- Takes up less PCB real estate and save more power
- Operate temperature range $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$ (Including self temp. rise)
- RoHS compliant



APPLICATIONS

- Smart phone, smart TV, set top box, notebook
- Car navigation systems, telecomm base stations
- VR, AR
- LED lighting

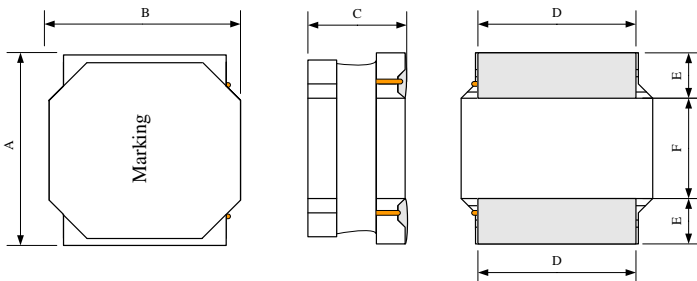
Explanation of Part Number

MNR 5040 T1R0 M T

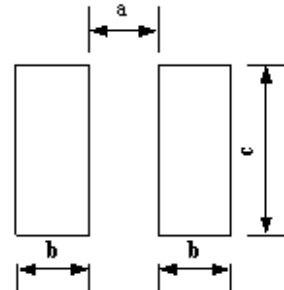
1 2 3 4 5 6

- ◆ 1:Product Series:Wire Wound SMD Power Inductors
- ◆ 2:Dimensions:
- ◆ 3: Feature Type:T Type
- ◆ 4: Initial inductance value: 1R0 = 1.0uH
- ◆ 5: Tolerance of Inductance:M: $\pm 20\%$, N: $\pm 30\%$
- ◆ 6:Packing:Tape Carrier Package

Dimensions: [mm]



Recommended Land Pattern



Unit: mm

| Series | A | B | C | D | E | F | a Typ. | b Typ. | c Typ. |
|---------|---------------|---------------|----------|---------------|----------------|---------------|--------|--------|--------|
| MNR5012 | 5.0 \pm 0.2 | 5.0 \pm 0.2 | 1.2 Max. | 4.0 \pm 0.2 | 1.25 \pm 0.2 | 2.5 \pm 0.2 | 2.3 | 1.4 | 4.2 |
| MNR5020 | 5.0 \pm 0.2 | 5.0 \pm 0.2 | 2.0 Max. | 4.0 \pm 0.2 | 1.25 \pm 0.2 | 2.5 \pm 0.2 | 2.3 | 1.4 | 4.2 |
| MNR5040 | 5.0 \pm 0.2 | 5.0 \pm 0.2 | 4.0 Max. | 4.0 \pm 0.2 | 1.25 \pm 0.2 | 2.5 \pm 0.2 | 2.3 | 1.4 | 4.2 |

Electrical Characteristics List

MNR5012 Series

| Part Number | Inductance | DC Resistance | | Self-resonant Frequency | Saturation Current ^{*3} | | Heat Rating Current ^{*4} | |
|---------------|-------------|---------------|-------|-------------------------|----------------------------------|------|-----------------------------------|------|
| | @100kHz, 1V | Max. | Typ. | Min. | Max. | Typ. | Max. | Typ. |
| Units | µH | Ω | | MHz | A | | A | |
| Symbol | L | DCR | | S.R.F | Isat | | Irms | |
| MNR5012T1R0MT | 1.0±20% | 0.068 | 0.057 | 103 | 4.40 | 4.70 | 2.00 | 2.40 |
| MNR5012T1R5MT | 1.5±20% | 0.086 | 0.072 | 68 | 3.70 | 3.80 | 1.90 | 2.20 |
| MNR5012T2R2MT | 2.2±20% | 0.108 | 0.090 | 50 | 3.10 | 3.20 | 1.70 | 2.00 |
| MNR5012T3R3MT | 3.3±20% | 0.151 | 0.126 | 34 | 2.40 | 2.60 | 1.40 | 1.70 |
| MNR5012T4R7MT | 4.7±20% | 0.197 | 0.164 | 31 | 2.20 | 2.30 | 1.30 | 1.50 |
| MNR5012T6R8MT | 6.8±20% | 0.294 | 0.245 | 22 | 1.70 | 1.90 | 1.00 | 1.20 |
| MNR5012T100MT | 10±20% | 0.413 | 0.344 | 17 | 1.40 | 1.50 | 0.85 | 1.00 |
| MNR5012T150MT | 15±20% | 0.523 | 0.436 | 13 | 1.20 | 1.30 | 0.80 | 0.92 |
| MNR5012T220MT | 22±20% | 0.858 | 0.780 | 16 | 0.88 | 0.98 | 0.60 | 0.68 |

MNR5020 Series

| Part Number | Inductance | DC Resistance | | Self-resonant Frequency | Saturation Current ^{*3} | | Heat Rating Current ^{*4} | |
|---------------|-------------|---------------|-------|-------------------------|----------------------------------|-------|-----------------------------------|------|
| | @100kHz, 1V | Max. | Typ. | Min. | Max. | Typ. | Max. | Typ. |
| Units | µH | Ω | | MHz | A | | A | |
| Symbol | L | DCR | | S.R.F | Isat | | Irms | |
| MNR5020TR22NT | 0.22±30% | 0.011 | 0.009 | 280 | 9.00 | 12.00 | 5.30 | 6.00 |
| MNR5020TR24NT | 0.24±30% | 0.011 | 0.009 | 248 | 8.00 | 10.00 | 5.30 | 6.00 |
| MNR5020TR47NT | 0.47±30% | 0.017 | 0.013 | 160 | 6.15 | 6.70 | 4.60 | 5.00 |
| MNR5020TR56NT | 0.56±30% | 0.022 | 0.017 | 137 | 8.50 | 9.60 | 3.80 | 4.20 |
| MNR5020TR68NT | 0.68±30% | 0.022 | 0.017 | 120 | 5.50 | 6.00 | 4.00 | 4.40 |
| MNR5020TR82NT | 0.82±30% | 0.022 | 0.017 | 117 | 5.50 | 6.00 | 4.00 | 4.40 |
| MNR5020T1R0MT | 1.0±20% | 0.026 | 0.020 | 114 | 4.10 | 5.00 | 3.80 | 4.10 |
| MNR5020T1R2MT | 1.2±20% | 0.029 | 0.022 | 83 | 4.50 | 4.90 | 3.55 | 3.90 |
| MNR5020T1R5MT | 1.5±20% | 0.034 | 0.026 | 68 | 4.10 | 4.50 | 3.20 | 3.50 |
| MNR5020T2R2MT | 2.2±20% | 0.042 | 0.032 | 57 | 3.20 | 4.00 | 2.90 | 3.10 |
| MNR5020T2R7MT | 2.7±20% | 0.049 | 0.038 | 52 | 2.90 | 3.50 | 2.70 | 2.90 |
| MNR5020T3R0MT | 3.0±20% | 0.049 | 0.038 | 49 | 2.55 | 2.80 | 2.70 | 2.90 |
| MNR5020T3R3MT | 3.3±20% | 0.056 | 0.043 | 46 | 2.55 | 3.00 | 2.50 | 2.70 |
| MNR5020T3R6MT | 3.6±20% | 0.056 | 0.043 | 43 | 2.80 | 3.00 | 2.50 | 2.70 |
| MNR5020T3R9MT | 3.9±20% | 0.056 | 0.043 | 40 | 2.30 | 2.80 | 2.50 | 2.70 |
| MNR5020T4R3MT | 4.3±20% | 0.074 | 0.057 | 37 | 2.50 | 3.00 | 2.20 | 2.40 |
| MNR5020T4R7MT | 4.7±20% | 0.074 | 0.057 | 37 | 2.50 | 2.70 | 2.20 | 2.40 |
| MNR5020T5R1MT | 5.1±20% | 0.083 | 0.064 | 32 | 2.25 | 2.60 | 2.05 | 2.20 |
| MNR5020T5R6MT | 5.6±20% | 0.083 | 0.064 | 32 | 2.30 | 2.50 | 2.05 | 2.20 |
| MNR5020T6R8MT | 6.8±20% | 0.108 | 0.083 | 30 | 2.05 | 2.20 | 1.80 | 1.90 |
| MNR5020T7R5MT | 7.5±20% | 0.117 | 0.090 | 26 | 1.85 | 2.00 | 1.75 | 1.90 |
| MNR5020T8R2MT | 8.2±20% | 0.127 | 0.098 | 26 | 1.85 | 2.00 | 1.65 | 1.80 |
| MNR5020T9R1MT | 9.1±20% | 0.143 | 0.110 | 24 | 1.70 | 1.80 | 1.55 | 1.70 |
| MNR5020T100MT | 10±20% | 0.143 | 0.110 | 24 | 1.70 | 1.80 | 1.55 | 1.70 |

| Part Number | Inductance | DC Resistance | | Self-resonant Frequency | Saturation Current ³ | | Heat Rating Current ⁴ | |
|---------------|-------------|---------------|-------|-------------------------|---------------------------------|------|----------------------------------|------|
| | @100kHz, 1V | Max. | Typ. | Min. | Max. | Typ. | Max. | Typ. |
| Units | μH | Ω | | MHz | A | | A | |
| Symbol | L | DCR | | S.R.F | Isat | | I _{rms} | |
| MNR5020T120MT | 12±20% | 0.182 | 0.140 | 22 | 1.50 | 1.60 | 1.40 | 1.50 |
| MNR5020T150MT | 15±20% | 0.215 | 0.165 | 20 | 1.35 | 1.40 | 1.25 | 1.30 |
| MNR5020T180MT | 18±20% | 0.260 | 0.200 | 16 | 1.25 | 1.30 | 1.15 | 1.20 |
| MNR5020T220MT | 22±20% | 0.294 | 0.226 | 14 | 1.15 | 1.20 | 1.10 | 1.20 |
| MNR5020T330MT | 33±20% | 0.507 | 0.390 | 10 | 0.92 | 1.00 | 0.90 | 0.99 |
| MNR5020T470MT | 47±20% | 0.680 | 0.523 | 7 | 0.77 | 0.84 | 0.77 | 0.84 |
| MNR5020T560MT | 56±20% | 0.819 | 0.630 | 6 | 0.77 | 0.84 | 0.70 | 0.77 |
| MNR5020T680MT | 68±20% | 0.962 | 0.740 | 6 | 0.65 | 0.70 | 0.64 | 0.70 |
| MNR5020T820MT | 82±20% | 1.158 | 0.965 | 6 | 0.65 | 0.75 | 0.50 | 0.60 |
| MNR5020T101MT | 100±20% | 1.430 | 1.100 | 6 | 0.53 | 0.58 | 0.53 | 0.58 |
| MNR5020T121MT | 120±20% | 1.755 | 1.350 | 6 | 0.42 | 0.53 | 0.40 | 0.50 |
| MNR5020T221MT | 220±20% | 2.60 | 2.00 | 4.5 | 0.30 | 0.33 | 0.40 | 0.45 |

MNR5040 Series

| Part Number | Inductance | DC Resistance | | Self-resonant Frequency | Saturation Current ³ | | Heat Rating Current ⁴ | |
|---------------|-------------|---------------|-------|-------------------------|---------------------------------|-------|----------------------------------|------|
| | @100kHz, 1V | Max. | Typ. | Min. | Max. | Typ. | Max. | Typ. |
| Units | μH | Ω | | MHz | A | | A | |
| Symbol | L | DCR | | S.R.F | Isat | | I _{rms} | |
| MNR5040TR22NT | 0.22±20% | 0.008 | 0.006 | 289 | 18.00 | 20.00 | 6.50 | 7.50 |
| MNR5040TR24NT | 0.24±30% | 0.008 | 0.006 | 251 | 15.70 | 18.00 | 6.40 | 7.40 |
| MNR5040TR47NT | 0.47±20% | 0.009 | 0.007 | 171 | 10.00 | 11.50 | 6.60 | 7.60 |
| MNR5040T1R0MT | 1.0±20% | 0.016 | 0.012 | 117 | 7.35 | 8.20 | 4.90 | 5.10 |
| MNR5040T1R2MT | 1.2±20% | 0.021 | 0.016 | 110 | 6.50 | 7.10 | 4.15 | 4.30 |
| MNR5040T1R5MT | 1.5±20% | 0.020 | 0.015 | 86 | 6.30 | 7.30 | 4.30 | 4.80 |
| MNR5040T1R8MT | 1.8±20% | 0.021 | 0.016 | 55 | 5.50 | 6.40 | 4.15 | 4.30 |
| MNR5040T2R2MT | 2.2±30% | 0.025 | 0.019 | 50 | 4.90 | 5.60 | 3.80 | 4.30 |
| MNR5040T2R7MT | 2.7±30% | 0.029 | 0.022 | 37 | 4.30 | 5.10 | 3.60 | 4.10 |
| MNR5040T3R0MT | 3.0±30% | 0.029 | 0.022 | 37 | 4.15 | 4.80 | 3.60 | 4.20 |
| MNR5040T3R3MT | 3.3±30% | 0.031 | 0.024 | 32 | 3.95 | 4.60 | 3.40 | 3.90 |
| MNR5040T3R6MT | 3.6±20% | 0.031 | 0.026 | 30 | 3.80 | 4.40 | 3.30 | 3.70 |
| MNR5040T3R9MT | 3.9±30% | 0.035 | 0.027 | 29 | 3.55 | 4.20 | 3.20 | 3.70 |
| MNR5040T4R7MT | 4.7±30% | 0.039 | 0.030 | 28 | 3.50 | 3.90 | 3.00 | 3.30 |
| MNR5040T5R6MT | 5.6±20% | 0.046 | 0.035 | 27 | 3.00 | 4.10 | 2.80 | 3.10 |
| MNR5040T6R8MT | 6.8±20% | 0.056 | 0.043 | 21 | 2.90 | 3.50 | 2.50 | 2.80 |
| MNR5040T8R2MT | 8.2±20% | 0.062 | 0.048 | 20 | 2.70 | 3.00 | 2.30 | 2.60 |
| MNR5040T100MT | 10±20% | 0.083 | 0.064 | 18 | 2.35 | 2.90 | 2.10 | 2.40 |
| MNR5040T120MT | 12±20% | 0.100 | 0.077 | 14 | 2.20 | 2.50 | 2.00 | 2.10 |
| MNR5040T150MT | 15±20% | 0.112 | 0.086 | 13 | 2.00 | 2.30 | 2.00 | 2.10 |
| MNR5040T180MT | 18±20% | 0.155 | 0.119 | 12 | 1.70 | 2.00 | 1.45 | 1.65 |
| MNR5040T220MT | 22±20% | 0.168 | 0.129 | 11 | 1.60 | 1.90 | 1.50 | 1.60 |
| MNR5040T270MT | 27±20% | 0.244 | 0.188 | 9.8 | 1.52 | 1.75 | 1.10 | 1.25 |
| MNR5040T330MT | 33±20% | 0.244 | 0.188 | 9 | 1.30 | 1.50 | 1.20 | 1.40 |
| MNR5040T470MT | 47±20% | 0.354 | 0.272 | 7 | 1.10 | 1.30 | 1.00 | 1.10 |
| MNR5040T510MT | 51±20% | 0.494 | 0.380 | 6 | 1.00 | 1.20 | 1.00 | 1.10 |
| MNR5040T560MT | 56±20% | 0.494 | 0.380 | 6 | 1.05 | 1.20 | 0.80 | 0.90 |

| Part Number | Inductance | DC Resistance | | Self-resonant Frequency | Saturation Current ^{*3} | | Heat Rating Current ^{*4} | |
|---------------|---------------|---------------|-------|-------------------------|----------------------------------|------|-----------------------------------|------|
| | @100kHz,1V | Max. | Typ. | Min. | Max. | Typ. | Max. | Typ. |
| Units | μH | Ω | | MHz | A | | A | |
| Symbol | L | DCR | | S.R.F | Isat | | Irms | |
| MNR5040T680MT | 68 \pm 20% | 0.520 | 0.40 | 6 | 0.90 | 1.10 | 0.80 | 0.90 |
| MNR5040T750MT | 75 \pm 20% | 0.585 | 0.450 | 6 | 0.85 | 0.95 | 0.72 | 0.80 |
| MNR5040T101MT | 100 \pm 20% | 0.728 | 0.560 | 5 | 0.75 | 0.90 | 0.70 | 0.80 |
| MNR5040T151MT | 150 \pm 20% | 0.975 | 0.750 | 3.7 | 0.65 | 0.67 | 0.60 | 0.70 |
| MNR5040T221MT | 220 \pm 20% | 1.820 | 1.400 | 3.0 | 0.48 | 0.55 | 0.40 | 0.50 |
| MNR5040T301MT | 300 \pm 20% | 2.600 | 2.000 | 2.7 | 0.50 | 0.58 | 0.35 | 0.40 |
| MNR5040T331MT | 330 \pm 20% | 2.730 | 2.100 | 2.7 | 0.42 | 0.47 | 0.40 | 0.50 |
| MNR5040T471MT | 470 \pm 20% | 3.900 | 3.000 | 2.7 | 0.37 | 0.43 | 0.35 | 0.40 |
| MNR5040T561MT | 560 \pm 20% | 4.920 | 3.780 | 1.5 | 0.31 | 0.36 | 0.31 | 0.35 |
| MNR5040T681MT | 680 \pm 20% | 5.070 | 3.900 | 1.60 | 0.30 | 0.35 | 0.25 | 0.30 |

※1: All test data is referenced to 20°C ambient;

※2: Rated current: Isat or Irms, whichever is smaller;

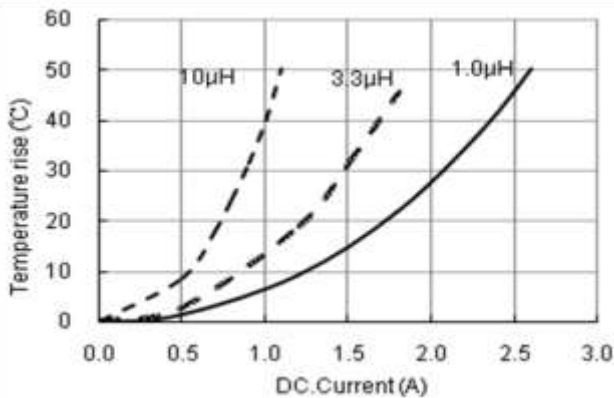
※*3: Isat: DC current at which the inductance drops approximate 30% from its value without current;

※*4: Irms: DC current that causes the temperature rise ($\Delta T = 40^\circ\text{C}$) from 20°C ambient.

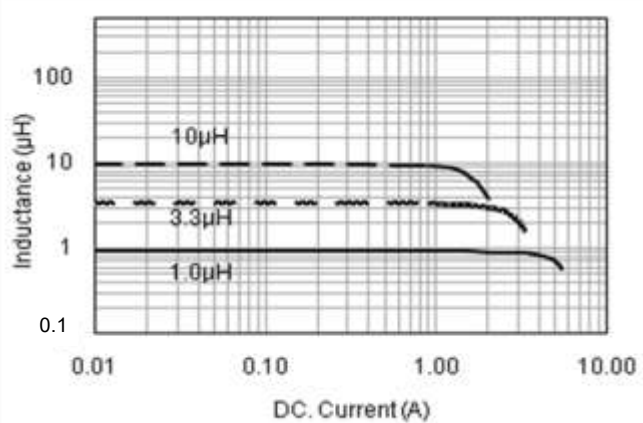
TYPICAL ELECTRICAL CHARACTERISTICS

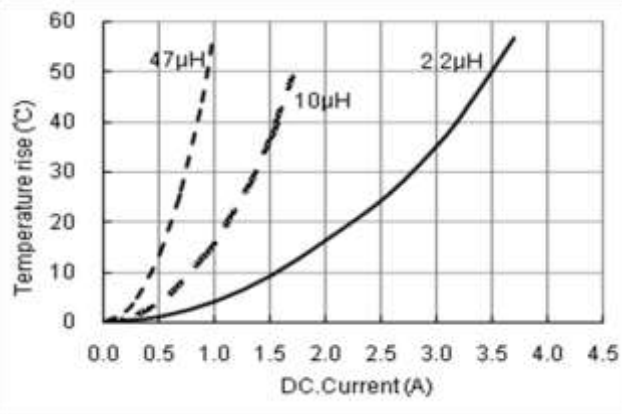
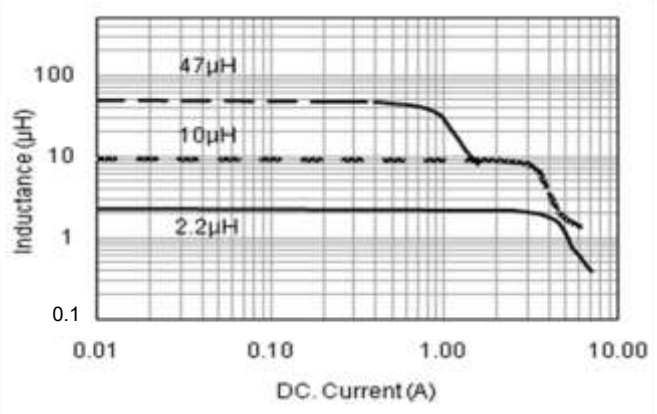
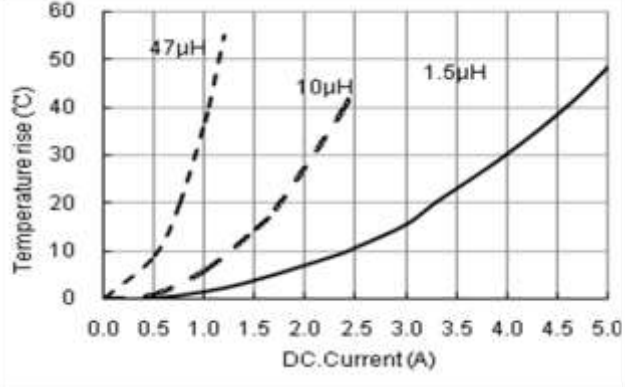
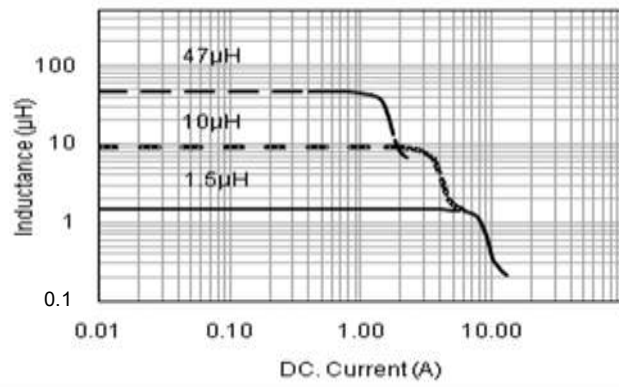
MNR5012 Series

Temperature vs. DC Current Characteristics



Inductance vs. DC Current Characteristics



MNR5020 Series
Temperature vs. DC Current Characteristics

Inductance vs. DC Current Characteristics

MNR5040 Series
Temperature vs. DC Current Characteristics

Inductance vs. DC Current Characteristics


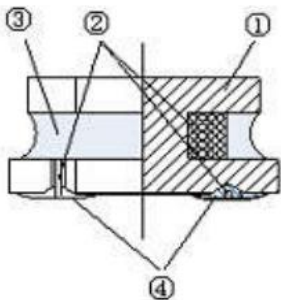
Reliability Test

| TEST ITEM | SPECIFICATION | TEST CONDITION |
|---------------------------------------|---|--|
| Withstanding voltage test | After test, inductors shall have no evidence of electrical and mechanical damage. | AC voltage of 100v and AC current of 1mA applied between inductor's terminal and core for 3 secs. |
| Resistance to soldering heat | 1. Inductor shall have no evidence of electrical and mechanical damage. 2. Inductance shall not change more than $\pm 5\%$. 3. Q shall not change more than 20%. | a. Temp: 260 ± 5 b. Time: 10 ± 1.0 se |
| Solderability test | The terminal shall be at least 95% covered with solder. | After fluxing, the terminal shall be dipped in a melted solder bath at $245 \pm 5^\circ\text{C}$ for 4 ± 1.0 secs. |
| High temperature & high humidity test | The anti-erosion quality of the surface and the specimen's inductance shall not change from the initial value within $\pm 10\%$ | a. Test condition 1)Temp.: 85°C , R.H.:85% 2)Time: 144 ± 2 hours b. Measurement method The experimental component should be put at normal condition for 2 hours then to measure again after test |
| Salt spray test | | a. Test condition 1)Temp.: $35 \pm 2^\circ\text{C}$ 2)Time: 48 ± 2 hours 3)Salt solution PH:6.5~7.2 b. Measurement method The experimental component should be put at normal condition for 2 hours then to measure again after test |
| Vibration test | 1. Inductance shall be within 10% of the initial value. 2. Appearance: no damage | a. Frequency: 10 to 55 b. Amplitude: 1.5 c. Direction and time X, Y and Z directions for 2 hours each. |

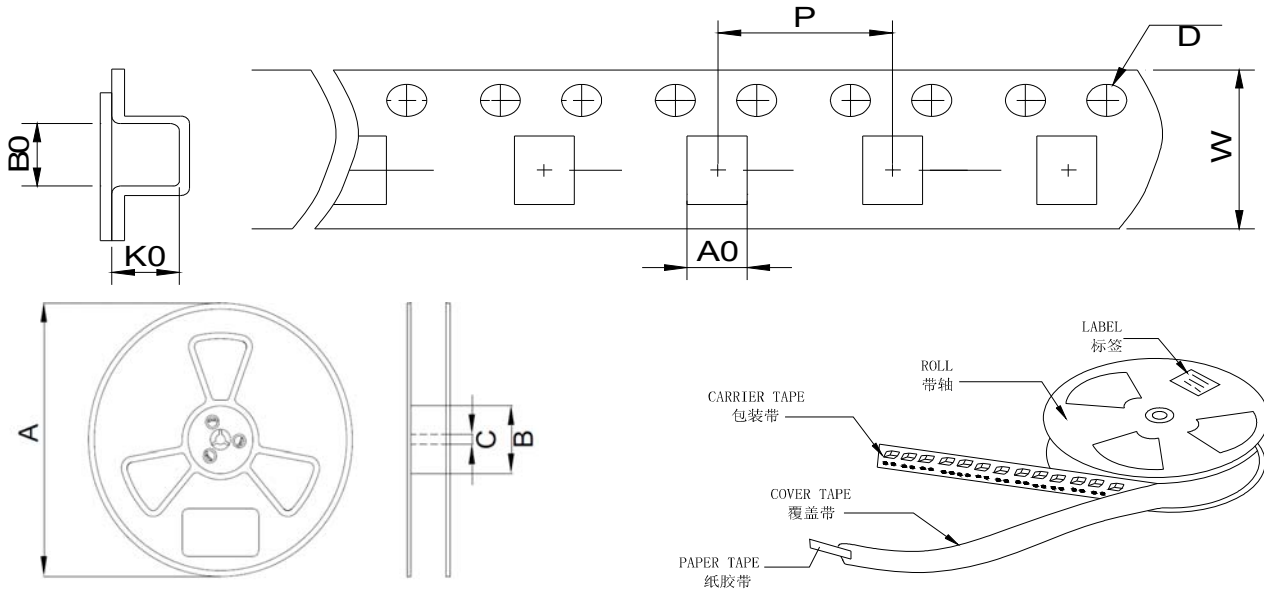
| TEST ITEM | SPECIFICATION | TEST CONDITION |
|----------------------------------|--|--|
| Free fall test | No mechanical damage shall be noticed. | Drop 5 times on a concrete floor from 1m the height |
| Temperature Cycling test | 1. Inductance shall be within 10% of the initial value 2. Appearance: No dama | a. Test conditi 1)Temp.: -55°C ,time: $30\pm 3\text{min}$ 2)Temp.: $+125^{\circ}\text{C}$,time: $30\pm 3\text{min}$ 3)Cycles times:12 cycles b. Measurement method The experimental component should be put at normal condition for 2 hours then to measure again after test |
| High Temperature resistance test | | a. Test conditi 1)Applied rated current 2)Temp.: $85^{\circ}\text{C}\pm 2^{\circ}\text{C}$ 3)Test time: $1000+24/-0\text{H}$ b. Measurement method The experimental component should be put at normal condition for 24 hours then to measure again after test. |
| Low temperature resistance test | | a. Test conditi 1)Temp.: $-55^{\circ}\text{C}\pm 2^{\circ}\text{C}$ 2)Test time: $1000+24/-0\text{H}$ b. Measurement method The experimental component should be put at normal condition for 24 hours then to measure again after test. |

We have suggested the storage period of lead-free product should not over 6 months.

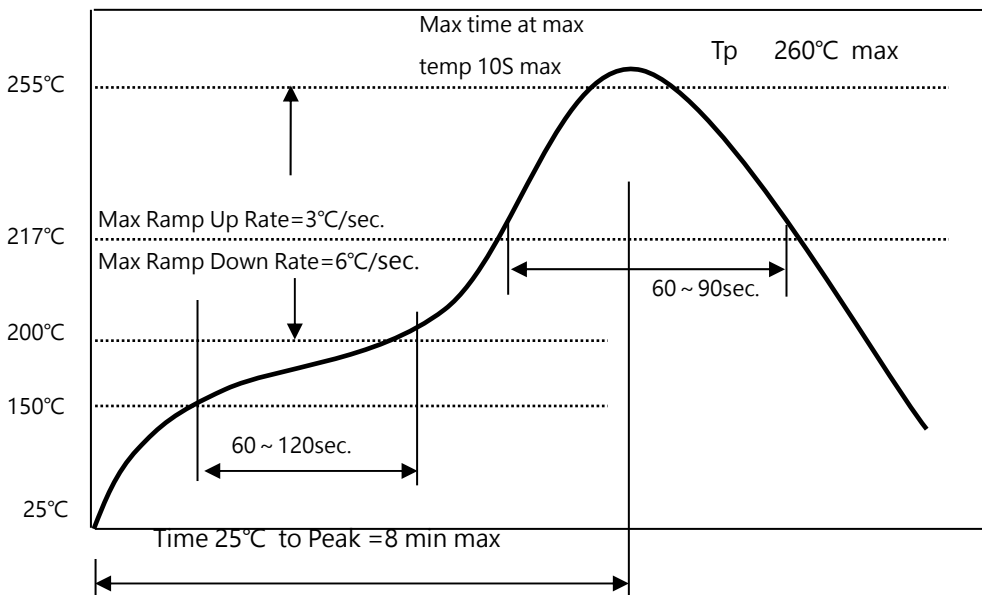
Structure (The structure of product.)



| NO | Components | Material |
|----|---------------|--|
| ① | Core | Ni-Zn Ferrite |
| ② | Wire | Polyurethane system enameled copper wire |
| ③ | Magnetic Glue | Epoxy resin and magnetic powder |
| ④ | Plating | AgNiSn or FeNiCu + Sn Alloy |

PACKAGING SPECIFICATION :


| Type | Tape Dimension (mm) | | | | | | Reel Dimension (mm) | | | Quantity (Pcs/Reel) |
|---------|---------------------|-----|-----|-----|-----|---|---------------------|-----|----|---------------------|
| | W | A0 | B0 | K0 | D | P | A | B | C | |
| MNR5012 | 12 | 5.3 | 5.3 | 1.4 | 1.5 | 8 | 330 | 100 | 13 | 4500 |
| MNR5020 | 12 | 5.3 | 5.3 | 2.3 | 1.5 | 8 | 330 | 100 | 13 | 2500 |
| MNR5040 | 12 | 5.3 | 5.3 | 4.2 | 1.5 | 8 | 330 | 100 | 13 | 1500 |

Re-flowing Profile:


X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [Fixed Inductors](#) category:

Click to view products by [MetalLions](#) manufacturer:

Other Similar products are found below :

[CR32NP-100KC](#) [70F224AI](#) [MHQ1005P10NJ](#) [MHQ1005P1N0S](#) [MHQ1005P2N4S](#) [MHQ1005P3N6S](#) [MHQ1005P5N1S](#) [MHQ1005P8N2J](#)
[PE-53601NL](#) [PE-53602NL](#) [PG0936.113NLT](#) [9220-20](#) [9310-16](#) [PM06-2N7](#) [PM06-39NJ](#) [A01TK](#) [1206CS-471XJ](#) [HC2-R47-R](#) [HC8-1R2-R](#)
[HCF1305-3R3-R](#) [1206CS-151XG](#) [RCH664NP-4R7M](#) [RCP1317NP-391L](#) [DH2280-4R7M](#) [DS1608C-106](#) [B10TJ](#) [B82498B3101J000](#) [ELJ-](#)
[RE27NJF2](#) [1812CS-153XJ](#) [1812CS-183XJ](#) [1812CS-223XJ](#) [1812LS-104XJ](#) [1812LS-105XJ](#) [1812LS-124XJ](#) [1812LS-154XJ](#) [1812LS-223XJ](#)
[1812LS-224XJ](#) [1812LS-563XJ](#) [1812LS-683XJ](#) [1812LS-824XJ](#) [NIN-FB101JTR110F](#) [NIN-FB471JTR62F](#) [NIN-FC1R5JTR220F](#) [NIN-](#)
[HCR15JTRF](#) [NIN-HCR33JTRF](#) [NIN-HDR22JTRF](#) [NIN-HDR82JTRF](#) [NIN-HK2N7STRF](#) [NIN-PA150KTR370F](#) [NIN-PB100KTR550F](#)