

# MNR2520\*\* 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

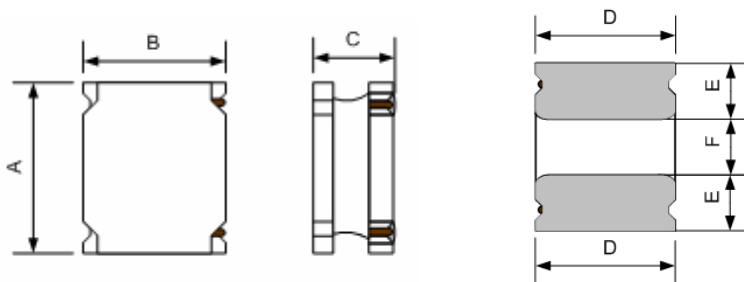
### Explanation of Part Number

MNR -252010 T1R0 M T

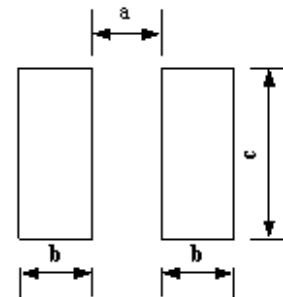
1 2 3 4 5 6

- ◆ 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:±20%, N:±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. |
|-----------|---------|---------|----------|---------|----------|----------|--------|--------|--------|
| MNR252010 | 2.5±0.1 | 2.0±0.1 | 1.0 Max. | 2.0±0.2 | 0.80±0.2 | 0.80±0.2 | 0.80   | 0.85   | 2.0    |
| MNR252012 | 2.5±0.1 | 2.0±0.1 | 1.2 Max. | 2.0±0.2 | 0.80±0.2 | 0.80±0.2 | 0.80   | 0.85   | 2.0    |

## Electrical Characteristics List

### MNR252010 Series

| Part Number     | Inductance  | DC Resistance |       | Self-resonant Frequency | Saturation Current <sup>3</sup> |      | Heat Rating Current <sup>4</sup> |      |
|-----------------|-------------|---------------|-------|-------------------------|---------------------------------|------|----------------------------------|------|
|                 | @100kHz, 1V | Max.          | Typ.  | Min.                    | Max.                            | Typ. | Max.                             | Typ. |
| Units           | μH          | Ω             |       | MHz                     | A                               |      | A                                |      |
| Symbol          | L           | DCR           |       | S.R.F                   | Isat                            |      | Irms                             |      |
| MNR252010TR47NT | 0.47±30%    | 0.056         | 0.047 | 206                     | 2.50                            | 3.35 | 2.35                             | 2.56 |
| MNR252010TR56NT | 0.56±30%    | 0.072         | 0.060 | 160                     | 2.90                            | 3.20 | 2.00                             | 2.18 |
| MNR252010TR68NT | 0.68±30%    | 0.074         | 0.062 | 129                     | 2.20                            | 2.75 | 2.00                             | 2.18 |
| MNR252010T1R0MT | 1.0±20%     | 0.108         | 0.090 | 100                     | 1.85                            | 2.20 | 1.65                             | 1.80 |
| MNR252010T1R5MT | 1.5±20%     | 0.182         | 0.152 | 81                      | 1.80                            | 2.10 | 1.30                             | 1.42 |
| MNR252010T2R2MT | 2.2±20%     | 0.209         | 0.174 | 61                      | 1.20                            | 1.60 | 1.20                             | 1.31 |
| MNR252010T3R3MT | 3.3±20%     | 0.328         | 0.273 | 47                      | 1.05                            | 1.30 | 0.90                             | 0.98 |
| MNR252010T4R7MT | 4.7±20%     | 0.563         | 0.469 | 42                      | 0.95                            | 1.15 | 0.70                             | 0.76 |
| MNR252010T5R6MT | 5.6±20%     | 0.563         | 0.469 | 35                      | 0.80                            | 0.95 | 0.73                             | 0.80 |
| MNR252010T6R8MT | 6.8±20%     | 0.896         | 0.747 | 31                      | 0.78                            | 0.92 | 0.59                             | 0.64 |
| MNR252010T100MT | 10±20%      | 1.092         | 0.910 | 27                      | 0.65                            | 0.78 | 0.50                             | 0.55 |

### MNR252012 Series

| Part Number     | Inductance  | DC Resistance |       | Self-resonant Frequency | Saturation Current <sup>3</sup> |      | Heat Rating Current <sup>4</sup> |      |
|-----------------|-------------|---------------|-------|-------------------------|---------------------------------|------|----------------------------------|------|
|                 | @100kHz, 1V | Max.          | Typ.  | Min.                    | Max.                            | Typ. | Max.                             | Max. |
| Units           | μH          | Ω             |       | MHz                     | A                               |      | A                                |      |
| Symbol          | L           | DCR           |       | S.R.F                   | Isat                            |      | Irms                             |      |
| MNR252012TR47NT | 0.47±30%    | 0.061         | 0.047 | 160                     | 3.82                            | 4.27 | 2.15                             | 2.34 |
| MNR252012TR68NT | 0.68±30%    | 0.074         | 0.057 | 140                     | 3.28                            | 3.68 | 1.95                             | 2.13 |
| MNR252012T1R0MT | 1.0±20%     | 0.090         | 0.069 | 110                     | 2.59                            | 2.90 | 1.93                             | 2.10 |
| MNR252012T1R2MT | 1.2±20%     | 0.129         | 0.099 | 100                     | 2.38                            | 2.67 | 1.46                             | 1.59 |
| MNR252012T1R5MT | 1.5±20%     | 0.147         | 0.113 | 97                      | 2.24                            | 2.51 | 1.40                             | 1.53 |
| MNR252012T2R2MT | 2.2±20%     | 0.216         | 0.166 | 69                      | 1.85                            | 2.07 | 1.15                             | 1.25 |
| MNR252012T2R7MT | 2.7±20%     | 0.239         | 0.184 | 63                      | 1.72                            | 1.92 | 1.09                             | 1.19 |
| MNR252012T3R3MT | 3.3±20%     | 0.264         | 0.203 | 62                      | 1.61                            | 1.80 | 1.04                             | 1.13 |
| MNR252012T3R6MT | 3.6±20%     | 0.348         | 0.268 | 53                      | 1.46                            | 1.64 | 0.90                             | 0.98 |
| MNR252012T4R3MT | 4.3±20%     | 0.377         | 0.290 | 51                      | 1.37                            | 1.53 | 0.87                             | 0.95 |
| MNR252012T4R7MT | 4.7±20%     | 0.377         | 0.290 | 47                      | 1.12                            | 1.25 | 0.84                             | 0.92 |
| MNR252012T5R1MT | 5.1±20%     | 0.500         | 0.385 | 44                      | 1.23                            | 1.37 | 0.75                             | 0.82 |
| MNR252012T5R6MT | 5.6±20%     | 0.538         | 0.414 | 38                      | 1.11                            | 1.25 | 0.73                             | 0.80 |
| MNR252012T6R2MT | 6.2±20%     | 0.542         | 0.417 | 38                      | 1.03                            | 1.16 | 0.73                             | 0.80 |
| MNR252012T6R8MT | 6.8±20%     | 0.581         | 0.447 | 38                      | 0.98                            | 1.09 | 0.69                             | 0.75 |
| MNR252012T7R5MT | 7.5±20%     | 0.611         | 0.470 | 35                      | 0.97                            | 1.09 | 0.68                             | 0.74 |
| MNR252012T8R2MT | 8.2±20%     | 0.658         | 0.506 | 36                      | 0.98                            | 1.10 | 0.65                             | 0.71 |
| MNR252012T9R1MT | 9.1±20%     | 0.690         | 0.531 | 34                      | 0.91                            | 1.02 | 0.62                             | 0.68 |
| MNR252012T100MT | 10±20%      | 0.690         | 0.531 | 34                      | 0.79                            | 0.88 | 0.62                             | 0.68 |
| MNR252012T120MT | 12±20%      | 1.075         | 0.827 | 28                      | 0.78                            | 0.88 | 0.51                             | 0.56 |
| MNR252012T150MT | 15±20%      | 1.591         | 1.224 | 25                      | 0.68                            | 0.77 | 0.42                             | 0.46 |
| MNR252012T220MT | 22±20%      | 1.976         | 1.520 | 20                      | 0.53                            | 0.59 | 0.38                             | 0.41 |

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

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

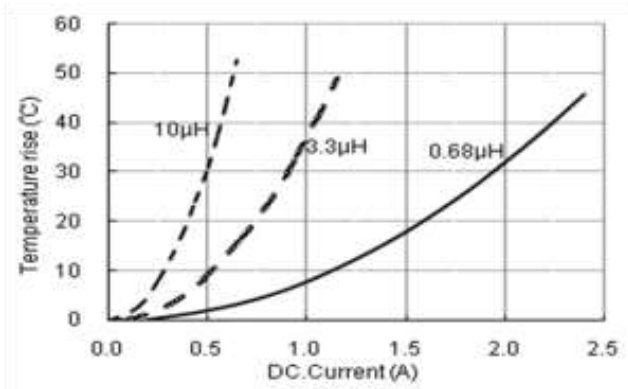
※\*3: Isat: DC current at which the inductance drops approximate 30% from its value without current;

※\*4: Irms: DC current that causes the temperature rise (ΔT =40°C) from 20°C ambient.

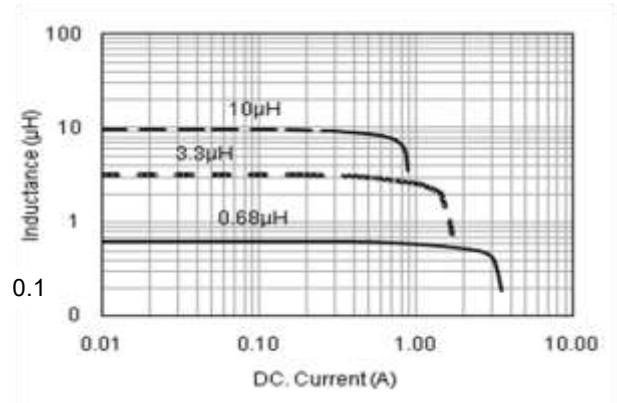
## TYPICAL ELECTRICAL CHARACTERISTICS

### MNR252010 Series

Temperature vs. DC Current Characteristics

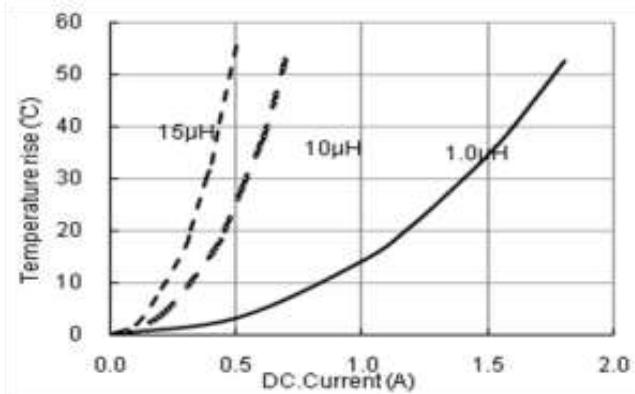


Inductance vs. DC Current Characteristics

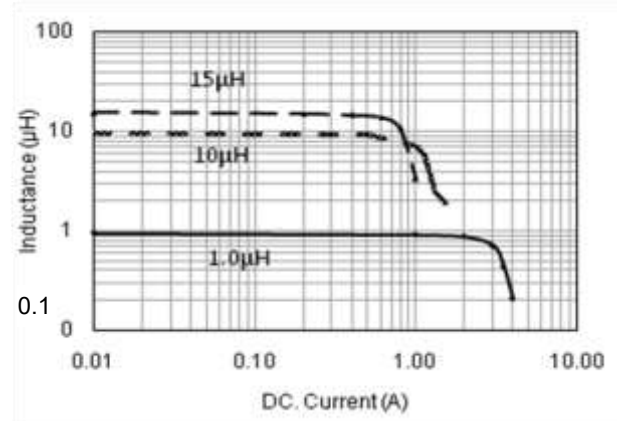


### MNR252012 Series

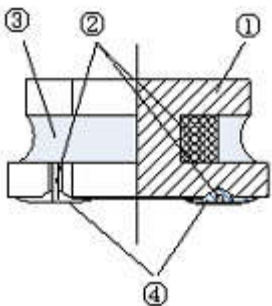
Temperature vs. DC Current Characteristics



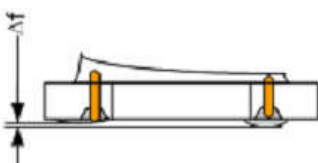
Inductance vs. DC Current Characteristics



## Structure



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



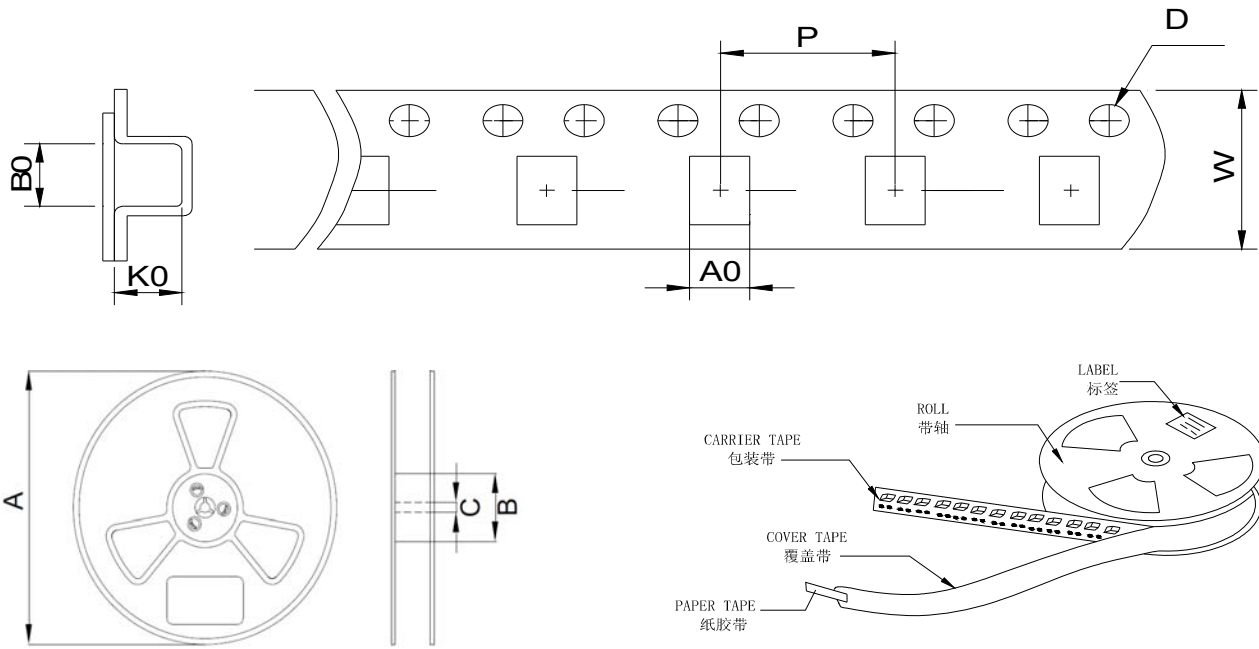
Δf: Clearance between terminal and the surface of plate must be 0.1mm max when coil is placed on a flat plate.

## Reliability Test

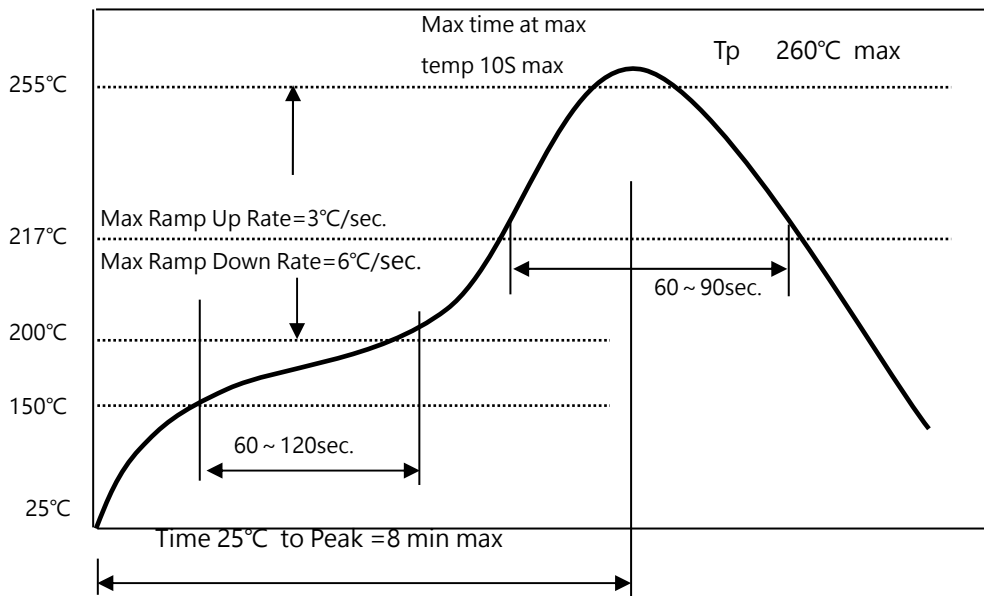
| TEST ITEM                             | SPECIFICATION   | TEST CONDITION   |
|---------------------------------------|---|--|
| Withstanding voltage test             | After test, inductors shall have no evidence of electrical and mechanical damage.   | AC voltage of 100v and AC current of 1mA applied between inductor's terminal and core for 3 secs.  |
| Resistance to soldering heat          | 1. Inductor shall have no evidence of electrical and mechanical damage.<br>2. Inductance shall not change more than $\pm 5\%$ .<br>3. Q shall not change more than 20%. | a. Temp: $260 \pm 5$<br>b. Time: $10 \pm 1.0$ 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 $4 \pm 1.0$ 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<br>1)Temp.: $85^\circ\text{C}$ , R.H.:85%<br>2)Time: $144 \pm 2$ hours<br>b. Measurement method<br>The experimental component should be put at normal condition for 2 hours then to measure again after test                         |
| Salt spray test                       |   | a. Test condition<br>1)Temp.: $35 \pm 2^\circ\text{C}$<br>2)Time: $48 \pm 2$ hours<br>3)Salt solution PH:6.5~7.2<br>b. Measurement method<br>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.<br>2. Appearance: no damage   | a. Frequency: 10 to 55<br>b. Amplitude: 1.5<br>c. Direction and time<br>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<br>2. Appearance: No dama | a. Test conditi<br>1)Temp.: -55°C, time: 30±3min<br>2)Temp.: +125°C, time: 30±3min<br>3)Cycles times: 12 cycles<br>b. Measurement method<br>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<br>1)Applied rated current<br>2)Temp.: 85°C±2°C<br>3)Test time: 1000+24/-0H<br>b. Measurement method<br>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<br>1)Temp.: -55°C±2°C<br>2)Test time: 1000+24/-0H<br>b. Measurement method<br>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.

**PACKAGING SPECIFICATION :**


| Type      | Tape Dimension (mm) |     |     |      |     |   | Reel Dimension (mm) |    |    | Quantity (Pcs/Reel) |
|-----------|---------------------|-----|-----|------|-----|---|---------------------|----|----|---------------------|
|           | W                   | A0  | B0  | K0   | D   | P | A                   | B  | C  |                     |
| MNR252010 | 8                   | 2.4 | 2.9 | 1.35 | 1.5 | 4 | 178                 | 58 | 13 | 2000                |
| MNR252012 | 8                   | 2.4 | 2.9 | 1.35 | 1.5 | 4 | 178                 | 58 | 13 | 2000                |

**Re-flowing Profile:**


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