

SCOPE :

This specification applies to the Pb Free high current type SMD inductors for
MNR-6028-SERIES

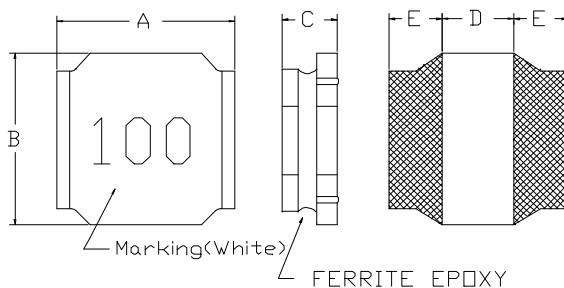
PRODUCT IDENTIFICATION

MNR - 6028 - 100 M

① ② ③ ④

- ① Product Code
- ② Dimensions Code
- ③ Inductance Code
- ④ Tolerance Code

(1) SHAPES AND DIMENSIONS



| | | |
|----|----------|----|
| A: | 6.0±0.2 | mm |
| B: | 6.0±0.2 | mm |
| C: | 2.9±0.2 | mm |
| D: | 2.70Typ. | mm |
| E: | 1.65Typ. | mm |

(2) ELECTRICAL SPECIFICATIONS

SEE TABLE 1

TEST INSTRUMENTS

- L : HP 4284A PRECISION LCR METER (or equivalent)
- SRF : HP 4291B IMPEDANCE ANALYZER (or equivalent)
- RDC : CHROMA MODEL 16502 MILLIOHMETER (or equivalent)

(3) CHARACTERISTICS

- (3)-1 Ambient temperature +60°C Max.
- (3)-2 Operate temperature range -40°C ~ +125°C
(Including self temp. rise)
- (3)-3 Storage temperature range -40°C ~ +125°C



MAG.LAYERS

TABLE 1

| MAGLAYERS PT/NO. | Inductance L(μ H) | Percent Tolerance | L Test Frequency | SRF(MHz) Typ. | Resistance RDC(Ω) \pm 30% | Rated DC Current | | Marking |
|---------------------|---------------------------|----------------------|---------------------|------------------|---|------------------|---------|---------|
| | | | | | | IDC1(A) | IDC2(A) | |
| MNR-6028-R90□ | 0.9 | N | 100KHz/0.25V | 90 | 13m | 6.60 | 4.60 | R90 |
| MNR-6028-2R2□ | 2.2 | N | 100KHz/0.25V | 68 | 20m | 4.20 | 3.70 | 2R2 |
| MNR-6028-4R7□ | 4.7 | M,N | 100KHz/0.25V | 39 | 31m | 2.70 | 3.00 | 4R7 |
| MNR-6028-100□ | 10 | M,N | 100KHz/0.25V | 20 | 65m | 1.90 | 1.90 | 100 |
| MNR-6028-220□ | 22 | M,N | 100KHz/0.25V | 12 | 0.135 | 1.30 | 1.40 | 220 |
| MNR-6028-330□ | 33 | M,N | 100KHz/0.25V | 10 | 0.22 | 1.10 | 1.10 | 330 |
| MNR-6028-470□ | 47 | M,N | 100KHz/0.25V | 8.0 | 0.30 | 0.95 | 0.92 | 470 |
| MNR-6028-680□ | 68 | M,N | 100KHz/0.25V | 5.0 | 0.42 | 0.76 | 0.77 | 680 |
| MNR-6028-101□ | 100 | M,N | 100KHz/0.25V | 3.0 | 0.60 | 0.62 | 0.66 | 101 |
| MNR-6028-221□ | 220 | M,N | 100KHz/0.25V | 1.0 | 1.30 | 0.45 | 0.50 | 221 |

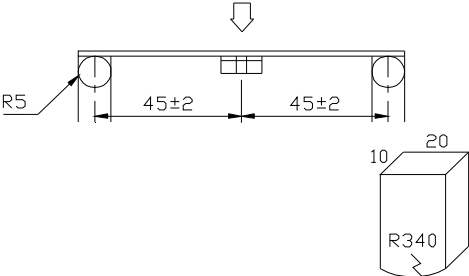
※ □ specify the inductance tolerance, M(\pm 20%), N(\pm 30%)

※ IDC1 : Based on inductance change (Δ L/Lo : drop 30% Max.) @ ambient temp. 25°C

IDC2 : Based on temperature rise (Δ T : 40°C Typ.)

Rated DC Current : The less value which is IDC1 or IDC2.

**(4) RELIABILITY TEST METHOD
MECHANICAL**

| TEST ITEM | SPECIFICATION | TEST DETAILS |
|-------------------|--|--|
| Substrate bending | $\Delta L/L_0 \leq \pm 5\%$ There shall be no mechanical damage or electrical damage. | <p>The sample shall be soldered onto the printed circuit board in figure 1 and a load applied until the figure in the arrow direction is made approximately 3mm.(keep time 30 seconds) PCB dimension shall the page 7/9</p> <p>F(Pressurization)</p>  <p>PRESSURE ROD figure-1</p> |
| Vibration | $\Delta L/L_0 \leq \pm 5\%$ There shall be no mechanical damage. | <p>The sample shall be soldered onto the printed circuit board and when a vibration having an amplitude of 1.52mm and a frequency of from 10 to 55Hz/1 minute repeated should be applied to the 3 directions (X,Y,Z) for 2 hours each. (A total of 6 hours)</p> |
| Solderability | New solder More than 90% | <p>Flux (rosin, isopropyl alcohol{JIS-K-1522}) shall be coated over the whole of the sample before hard, the sample shall then be preheated for about 2 minutes in a temperature of 130~150°C and after it has been immersed to a depth 0.5mm below for 3±0.2 seconds fully in molten solder M705 with a temperature of 245±5°C.</p> <p>More than 90% of the electrode sections shall be covered with new solder smoothly when the sample is taken out of the solder bath.</p> |

MECHANICAL

| TEST ITEM | SPECIFICATION | |
|---|---------------------------------------|---|
| Resistance to Soldering heat (reflow soldering) | There shall be no damage or problems. | <p style="text-align: center;">Temperature profile of reflow soldering</p> <p>The specimen shall be passed through the reflow oven with the condition shown in the above profile for 1 time.</p> <p>The specimen shall be stored at standard atmospheric conditions for 1 hour, after which the measurement shall be made.</p> |

ELECTRICAL

| TEST ITEM | SPECIFICATION | TEST DETAILS |
|------------------------------|--|--|
| Insulation resistance | There shall be no other damage or problems. | DC 100V voltage shall be applied across this sample of top surface and the terminal. The insulation resistance shall be more than $1 \times 10^8 \Omega$. |
| Dielectric withstand voltage | There shall be no other damage or problems. | AC 100V voltage shall be applied for 1 minute across the top surface and the terminal of this sample |
| Temperature characteristics | $\Delta L/L20^\circ\text{C} \leq \pm 10\%$ $0 \sim 2000 \text{ ppm}/^\circ\text{C}$ | The test shall be performed after the sample has stabilized in an ambient temperature of -20 to $+85^\circ\text{C}$, and the value calculated based on the value applicable in a normal temperature and normal humidity shall be $\Delta L/L20^\circ\text{C} \leq \pm 10\%$. |



ENVIROMENT CHARACTERISTICS

| TEST ITEM | SPECIFICATION | | | | | | | | | | | | | | | | |
|--|---|---|--|-------------|----------|---|-------------------------------|---------|---|----------------------|-----------|---|-----------------------------|---------|---|----------------------|-----------|
| High temperature storage | $\Delta L/L_0 \leq \pm 5\%$ There shall be no mechanical damage. | The sample shall be left for 96±4 hours in an atmosphere with a temperature of 85±2°C and a normal humidity. Upon completion of the measurement shall be made after the sample has been left in a normal temperature and normal humidity for 1 hour. | | | | | | | | | | | | | | | |
| Low temperature storage | $\Delta L/L_0 \leq \pm 5\%$ There shall be no mechanical damage. | The sample shall be left for 96±4 hours in an atmosphere with a temperature of -25±3°C. Upon completion of the test, the measurement shall be made after the sample has been left in a normal temperature and normal humidity for 1 hour. | | | | | | | | | | | | | | | |
| Change of temperature | $\Delta L/L_0 \leq \pm 5\%$ There shall be no other damage of problems | The sample shall be subject to 5 continuous cycles, such as shown in the table 2 below and then it shall be subjected to standard atmospheric conditions for 1 hour, after which measurement shall be made. <div style="text-align: center; margin: 10px 0;"> table 2 </div> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;">Temperature</th> <th style="text-align: center;">Duration</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">- 25±3°C (Thermostat No.1)</td> <td style="text-align: center;">30 min.</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Standard atmospheric</td> <td style="text-align: center;">No.1→No.2</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">85±2°C (Thermostat No.2)</td> <td style="text-align: center;">30 min.</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Standard atmospheric</td> <td style="text-align: center;">No.2→No.1</td> </tr> </tbody> </table> | | Temperature | Duration | 1 | - 25±3°C (Thermostat No.1) | 30 min. | 2 | Standard atmospheric | No.1→No.2 | 3 | 85±2°C (Thermostat No.2) | 30 min. | 4 | Standard atmospheric | No.2→No.1 |
| | Temperature | Duration | | | | | | | | | | | | | | | |
| 1 | - 25±3°C (Thermostat No.1) | 30 min. | | | | | | | | | | | | | | | |
| 2 | Standard atmospheric | No.1→No.2 | | | | | | | | | | | | | | | |
| 3 | 85±2°C (Thermostat No.2) | 30 min. | | | | | | | | | | | | | | | |
| 4 | Standard atmospheric | No.2→No.1 | | | | | | | | | | | | | | | |
| Moisture storage | $\Delta L/L_0 \leq \pm 5\%$ There shall be no mechanical damage. | The sample shall be left for 96±4 hours in a temperature of 40±2°C and a humidity(RH) of 90~95%. Upon completion of the test, the measurement shall be made after the sample has been left in a normal temperature and normal humidity more than 1 hour. | | | | | | | | | | | | | | | |
| Test conditions : The sample shall be reflow soldered onto the printed circuit board in every test. | | | | | | | | | | | | | | | | | |

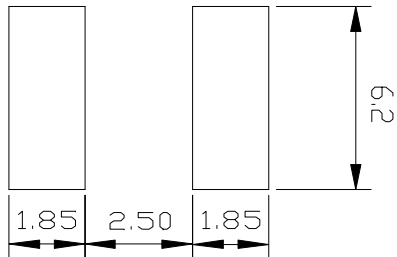
(5) LAND DIMENSION (Ref.)

PCB: GLASS EPOXY t=1.6mm

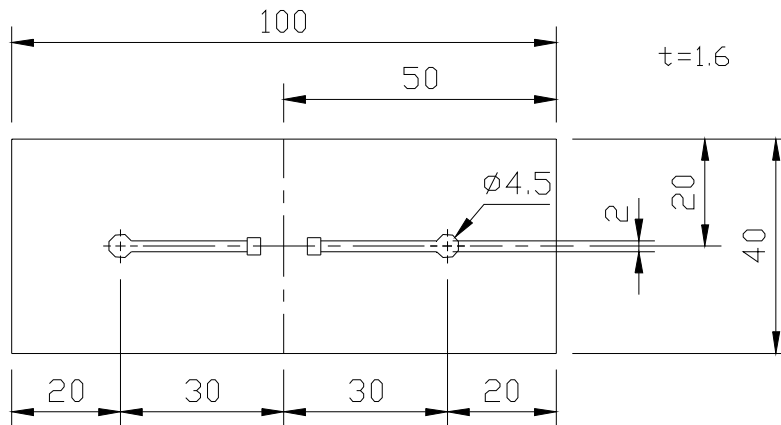
(5)-1 LAND PATTERN DIMENSIONS

(STANDARD PATTERN)

unit : mm

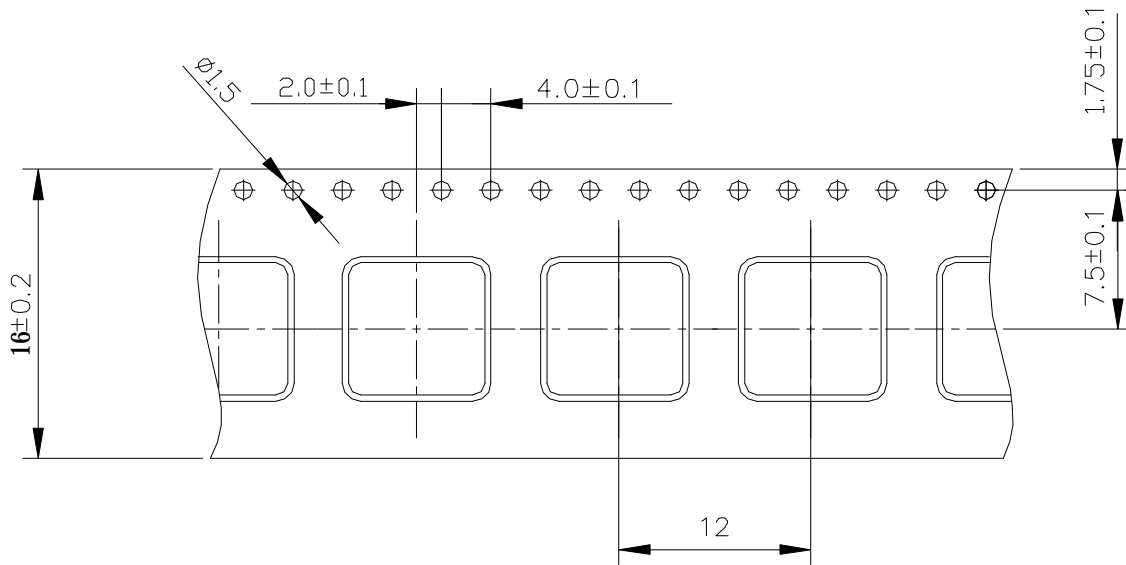


(5)-2 SUBSTRATE BENDING TEST BENDING TEST BOARD

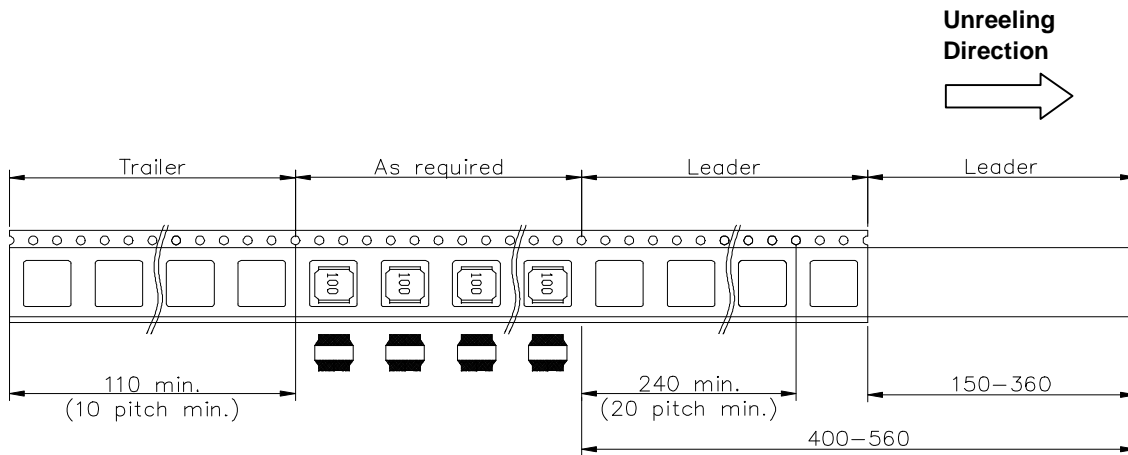


(6) PACKAGING

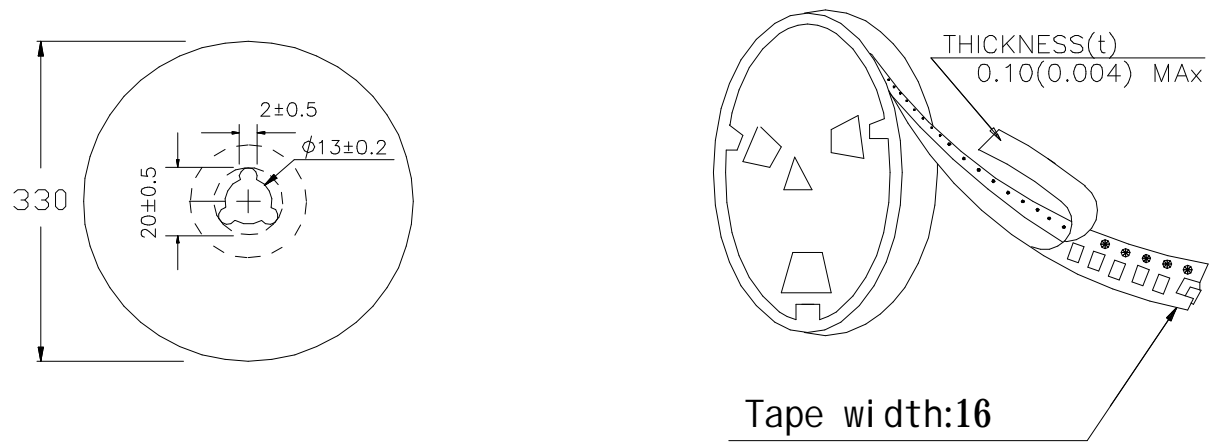
(6)-1 CARRIER TAPE DIMENSIONS (mm)



(6)-2 TAPING DIMENSIONS (mm)



(6)-3 REEL DIMENSIONS (mm)



(6)-4 QUANTITY

1000 pcs/Reel

The products are packaged so that no damage will be sustained.