



**THE DATASHEET OF  
NR4012T4R7M**



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# SMD POWER INDUCTORS(NR SERIES/NR SERIES H TYPE/S TYPE/V TYPE)



REFLOW

■ PARTS NUMBER

\* Operating Temp.: -25~+120°C (NRS40/50/60/80: -25~+125°C) (Including self-generated heat)

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | R | △ | 4 | 0 | 1 | 8 | T | △ | 1 | 0 | 0 | M | △ |
| ① |   |   | ② |   |   |   | ③ |   | ④ |   |   | ⑤ | ⑥ |

△=Blank space

## ①Series name

| Code | Series name                 |
|------|-----------------------------|
| NR△  | Coating resin specification |
| NRH  |                             |
| NRS  |                             |
| NRV  |                             |

## ②Dimensions (L × W × H)

| Code | Dimensions (L × W × H) [mm] |
|------|-----------------------------|
| 2010 | 2.0 × 2.0 × 1.0             |
| 2012 | 2.0 × 2.0 × 1.2             |
| 2410 | 2.4 × 2.4 × 1.0             |
| 2412 | 2.4 × 2.4 × 1.2             |
| 3010 | 3.0 × 3.0 × 1.0             |
| 3012 | 3.0 × 3.0 × 1.2             |
| 3015 | 3.0 × 3.0 × 1.5             |
| 4010 | 4.0 × 4.0 × 1.0             |
| 4012 | 4.0 × 4.0 × 1.2             |
| 4018 | 4.0 × 4.0 × 1.8             |
| 5010 | 4.9 × 4.9 × 1.0             |
| 5012 | 4.9 × 4.9 × 1.2             |
| 5014 | 4.9 × 4.9 × 1.4             |
| 5020 | 4.9 × 4.9 × 2.0             |
| 5024 | 4.9 × 4.9 × 2.4             |
| 5030 | 4.9 × 4.9 × 3.0             |
| 5040 | 4.9 × 4.9 × 4.0             |
| 6010 | 6.0 × 6.0 × 1.0             |
| 6012 | 6.0 × 6.0 × 1.2             |
| 6014 | 6.0 × 6.0 × 1.4             |
| 6020 | 6.0 × 6.0 × 2.0             |
| 6028 | 6.0 × 6.0 × 2.8             |
| 6045 | 6.0 × 6.0 × 4.5             |
| 8030 | 8.0 × 8.0 × 3.0             |
| 8040 | 8.0 × 8.0 × 4.0             |

## ③Packaging

| Code | Packaging |
|------|-----------|
| T△   | Taping    |

## ④Nominal inductance

| Code (example) | Nominal inductance [μH] |
|----------------|-------------------------|
| 2R2            | 2.2                     |
| 100            | 10                      |
| 101            | 100                     |

※R=Decimal point

## ⑤Inductance tolerance

| Code | Inductance tolerance |
|------|----------------------|
| M    | ±20%                 |
| N    | ±30%                 |

## ⑥Internal code

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| Type                      | A    | B    | C   |
|---------------------------|------|------|-----|
| NRV2010                   | 0.65 | 1.35 | 2.0 |
| NRS2012, NRV2012          |      |      |     |
| NRH2410                   | 0.7  | 1.45 | 2.0 |
| NRH2412                   |      |      |     |
| NR 3010, NRH3010          | 0.8  | 2.2  | 2.7 |
| NR 3012, NRH3012, NRV3012 |      |      |     |
| NR 3015, NRS3015          |      |      |     |
| NR 4010, NRS4010          | 1.2  | 2.8  | 3.7 |
| NR 4012, NRS4012          |      |      |     |
| NR 4018, NRS4018          |      |      |     |
| NRS8030                   | 1.8  | 5.6  | 7.5 |
| NR 8040, NRS8040          |      |      |     |

Unit: mm

| Type                          | L                        | W                        | H  | e                         | f                         | Standard quantity<br>[pcs] Taping |
|-------------------------------|--------------------------|--------------------------|--|---------------------------|---------------------------|-----------------------------------|
| NRV2010                       | 2.0±0.1<br>(0.079±0.004) | 2.0±0.1<br>(0.079±0.004) | 1.0 max<br>(0.039 max)                                   | 0.5±0.2<br>(0.020±0.008)  | 1.25±0.2<br>(0.050±0.008) | 2500                              |
| NRS2012<br>NRV2012            | 2.0±0.1<br>(0.079±0.004) | 2.0±0.1<br>(0.079±0.004) | 1.2 max<br>(0.047 max)                                   | 0.5±0.2<br>(0.020±0.008)  | 1.25±0.2<br>(0.050±0.008) | 2500                              |
| NRH2410                       | 2.4±0.1<br>(0.095±0.004) | 2.4±0.1<br>(0.095±0.004) | 1.0 max<br>(0.039 max)                                   | 0.6±0.2<br>(0.024±0.008)  | 1.45±0.2<br>(0.057±0.008) | 2500                              |
| NRH2412                       | 2.4±0.1<br>(0.095±0.004) | 2.4±0.1<br>(0.095±0.004) | 1.2 max<br>(0.047 max)                                   | 0.6±0.2<br>(0.024±0.008)  | 1.45±0.2<br>(0.057±0.008) | 2500                              |
| NR 3010<br>NRH3010            | 3.0±0.1<br>(0.118±0.004) | 3.0±0.1<br>(0.118±0.004) | 1.0 max<br>(0.039 max)                                   | 0.9±0.2<br>(0.035±0.008)  | 1.9±0.2<br>(0.075±0.008)  | 2000                              |
| NR 3012<br>NRH3012<br>NRV3012 | 3.0±0.1<br>(0.118±0.004) | 3.0±0.1<br>(0.118±0.004) | 1.2 max<br>(0.047 max)                                   | 0.9±0.2<br>(0.035±0.008)  | 1.9±0.2<br>(0.075±0.008)  | 2000                              |
| NR 3015<br>NRS3015            | 3.0±0.1<br>(0.118±0.004) | 3.0±0.1<br>(0.118±0.004) | 1.5 max<br>(0.059 max)                                   | 0.9±0.2<br>(0.035±0.008)  | 1.9±0.2<br>(0.075±0.008)  | 2000                              |
| NR 4010<br>NRS4010            | 4.0±0.2<br>(0.158±0.008) | 4.0±0.2<br>(0.158±0.008) | 1.0 max<br>(0.039 max)                                   | 1.1±0.2<br>(0.043±0.008)  | 2.5±0.2<br>(0.098±0.008)  | 5000                              |
| NR 4012<br>NRS4012            | 4.0±0.2<br>(0.158±0.008) | 4.0±0.2<br>(0.158±0.008) | 1.2 max<br>(0.047 max)                                   | 1.1±0.2<br>(0.043±0.008)  | 2.5±0.2<br>(0.098±0.008)  | 4500                              |
| NR 4018<br>NRS4018            | 4.0±0.2<br>(0.158±0.008) | 4.0±0.2<br>(0.158±0.008) | 1.8 max<br>(0.071 max)                                   | 1.1±0.2<br>(0.043±0.008)  | 2.5±0.2<br>(0.098±0.008)  | 3500                              |
| NRS8030                       | 8.0±0.2<br>(0.315±0.008) | 8.0±0.2<br>(0.315±0.008) | 3.0 max<br>(0.118 max)                                   | 1.60±0.3<br>(0.063±0.012) | 5.6±0.3<br>(0.22±0.012)   | 1000                              |
| NR 8040<br>NRS8040            | 8.0±0.2<br>(0.315±0.008) | 8.0±0.2<br>(0.315±0.008) | *1) 4.2 max<br>(0.165 max)<br>*2) 4.0 max<br>(0.158 max) | 1.60±0.3<br>(0.063±0.012) | 5.6±0.3<br>(0.22±0.012)   | 1000                              |

\*1) 0R9~6R8 type, \*2) 100~221 type

Unit: mm (inch)



Recommended Land Patterns



| Type             | A   | B   | C   |
|------------------|-----|-----|-----|
| NRS5010          | 1.5 | 3.6 | 4.0 |
| NRS5012          |     |     |     |
| NRS5014          |     |     |     |
| NRS5020          |     |     |     |
| NRS5024          |     |     |     |
| NRS5030          |     |     |     |
| NR 5040, NRS5040 | 1.6 | 4.7 | 5.7 |
| NRS6010          |     |     |     |
| NR 6012, NRS6012 |     |     |     |
| NRS6014          |     |     |     |
| NR 6020, NRS6020 |     |     |     |
| NR 6028, NRS6028 |     |     |     |
| NR 6045, NRS6045 |     |     |     |

Unit: mm

| Type               | L                        | W                        | H  | e                         | f                        | ΔI                   | Standard quantity [pcs] Taping |
|--------------------|--------------------------|--------------------------|--|---------------------------|--------------------------|----------------------|--------------------------------|
| NRS5010            | 4.9±0.2<br>(0.193±0.008) | 4.9±0.2<br>(0.193±0.008) | 1.0 max<br>(0.039 max)                                   | 1.2±0.2<br>(0.047±0.008)  | 3.3±0.2<br>(0.130±0.008) | 1.3typ<br>(0.051typ) | 1000                           |
| NRS5012            | 4.9±0.2<br>(0.193±0.008) | 4.9±0.2<br>(0.193±0.008) | 1.2 max<br>(0.047 max)                                   | 1.2±0.2<br>(0.047±0.008)  | 3.3±0.2<br>(0.130±0.008) | 1.3typ<br>(0.051typ) | 1000                           |
| NRS5014            | 4.9±0.2<br>(0.193±0.008) | 4.9±0.2<br>(0.193±0.008) | 1.4 max<br>(0.055 max)                                   | 1.2±0.2<br>(0.047±0.008)  | 3.3±0.2<br>(0.130±0.008) | 1.3typ<br>(0.051typ) | 1000                           |
| NRS5020            | 4.9±0.2<br>(0.193±0.008) | 4.9±0.2<br>(0.193±0.008) | 2.0 max<br>(0.079 max)                                   | 1.2±0.2<br>(0.047±0.008)  | 3.3±0.2<br>(0.130±0.008) | 1.3typ<br>(0.051typ) | 800                            |
| NRS5024            | 4.9±0.2<br>(0.193±0.008) | 4.9±0.2<br>(0.193±0.008) | *3) 2.5 max<br>(0.098 max)<br>*4) 2.4 max<br>(0.095 max) | 1.2±0.2<br>(0.047±0.008)  | 3.3±0.2<br>(0.130±0.008) | 1.3typ<br>(0.051typ) | 2500                           |
| NRS5030            | 4.9±0.2<br>(0.193±0.008) | 4.9±0.2<br>(0.193±0.008) | *5) 3.1 max<br>(0.122 max)<br>*6) 3.0 max<br>(0.118 max) | 1.2±0.2<br>(0.047±0.008)  | 3.3±0.2<br>(0.130±0.008) | 1.3typ<br>(0.051typ) | 500                            |
| NR 5040<br>NRS5040 | 4.9±0.2<br>(0.193±0.008) | 4.9±0.2<br>(0.193±0.008) | *7) 4.1 max<br>(0.161 max)<br>*8) 4.0 max<br>(0.158 max) | 1.2±0.2<br>(0.047±0.008)  | 3.3±0.2<br>(0.130±0.008) | 1.3typ<br>(0.051typ) | 1500                           |
| NRS6010            | 6.0±0.2<br>(0.236±0.008) | 6.0±0.2<br>(0.236±0.008) | 1.0 max<br>(0.039 max)                                   | 1.35±0.2<br>(0.053±0.008) | 4.0±0.2<br>(0.158±0.008) | 2.3typ<br>(0.091typ) | 1000                           |
| NR 6012<br>NRS6012 | 6.0±0.2<br>(0.236±0.008) | 6.0±0.2<br>(0.236±0.008) | 1.2 max<br>(0.047 max)                                   | 1.35±0.2<br>(0.053±0.008) | 4.0±0.2<br>(0.158±0.008) | 2.3typ<br>(0.091typ) | 1000                           |
| NRS6014            | 6.0±0.2<br>(0.236±0.008) | 6.0±0.2<br>(0.236±0.008) | 1.4 max<br>(0.055 max)                                   | 1.35±0.2<br>(0.053±0.008) | 4.0±0.2<br>(0.158±0.008) | 2.3typ<br>(0.091typ) | 1000                           |
| NR 6020<br>NRS6020 | 6.0±0.2<br>(0.236±0.008) | 6.0±0.2<br>(0.236±0.008) | 2.0 max<br>(0.079 max)                                   | 1.35±0.2<br>(0.053±0.008) | 4.0±0.2<br>(0.158±0.008) | 2.3typ<br>(0.091typ) | 2500                           |
| NR 6028<br>NRS6028 | 6.0±0.2<br>(0.236±0.008) | 6.0±0.2<br>(0.236±0.008) | 2.8 max<br>(0.110 max)                                   | 1.35±0.2<br>(0.053±0.008) | 4.0±0.2<br>(0.158±0.008) | 2.3typ<br>(0.091typ) | 2000                           |
| NR 6045<br>NRS6045 | 6.0±0.2<br>(0.236±0.008) | 6.0±0.2<br>(0.236±0.008) | 4.5 max<br>(0.177 max)                                   | 1.35±0.2<br>(0.053±0.008) | 4.0±0.2<br>(0.158±0.008) | 2.3typ<br>(0.091typ) | 1500                           |

Unit: mm (inch)

- \*3) 1R0~1R5 type, \*4) 2R2~330 type
- \*5) R47~100 type, \*6) 150~470 type
- \*7) 1R5~100 type, \*8) 150~470 type

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■ PARTS NUMBER

● NRS2012 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS2012T 1R0N GJ | RoHS | 1.0                              | $\pm 30\%$           | —  | 0.070  | 1,900                    | 2,050 | 1,700                          | 1,850 | 100                          |
| NRS2012T 1R5N GJ | RoHS | 1.5                              | $\pm 30\%$           | —  | 0.090  | 1,650                    | 1,800 | 1,500                          | 1,650 | 100                          |
| NRS2012T 2R2M GJ | RoHS | 2.2                              | $\pm 20\%$           | —  | 0.107  | 1,350                    | 1,500 | 1,370                          | 1,500 | 100                          |
| NRS2012T 3R3M GJ | RoHS | 3.3                              | $\pm 20\%$           | —  | 0.190  | 1,000                    | 1,150 | 1,020                          | 1,100 | 100                          |
| NRS2012T 4R7M GJ | RoHS | 4.7                              | $\pm 20\%$           | —  | 0.241  | 900                      | 1,050 | 910                            | 1,000 | 100                          |

● NRV2010 type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRV2010T R47N GF | RoHS | 0.47                             | $\pm 30\%$           | —  | 0.052  | 2,100                    | 2,250 | 2,000                          | 2,300 | 100                          |
| NRV2010T R68N GF | RoHS | 0.68                             | $\pm 30\%$           | —  | 0.060  | 1,850                    | 2,000 | 1,850                          | 2,100 | 100                          |
| NRV2010T 1R0N GF | RoHS | 1.0                              | $\pm 30\%$           | —  | 0.080  | 1,550                    | 1,700 | 1,600                          | 1,850 | 100                          |
| NRV2010T 1R5M GF | RoHS | 1.5                              | $\pm 20\%$           | —  | 0.100  | 1,350                    | 1,450 | 1,450                          | 1,650 | 100                          |
| NRV2010T 2R2M GF | RoHS | 2.2                              | $\pm 20\%$           | —  | 0.175  | 1,100                    | 1,200 | 1,100                          | 1,200 | 100                          |
| NRV2010T 3R3M GF | RoHS | 3.3                              | $\pm 20\%$           | —  | 0.250  | 880                      | 950   | 1,000                          | 1,100 | 100                          |
| NRV2010T 4R7M GF | RoHS | 4.7                              | $\pm 20\%$           | —  | 0.320  | 760                      | 810   | 820                            | 930   | 100                          |

● NRV2012 type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRV2012T 1R0N GF | RoHS | 1.0                              | $\pm 30\%$           | —  | 0.073  | 2,200                    | 2,350 | 1,650                          | 1,830 | 100                          |
| NRV2012T 1R5N GF | RoHS | 1.5                              | $\pm 30\%$           | —  | 0.100  | 1,800                    | 1,950 | 1,400                          | 1,550 | 100                          |
| NRV2012T 2R2M GF | RoHS | 2.2                              | $\pm 20\%$           | —  | 0.129  | 1,600                    | 1,700 | 1,200                          | 1,350 | 100                          |
| NRV2012T 3R3M GF | RoHS | 3.3                              | $\pm 20\%$           | —  | 0.227  | 1,250                    | 1,350 | 900                            | 1,040 | 100                          |
| NRV2012T 4R7M GF | RoHS | 4.7                              | $\pm 20\%$           | —  | 0.325  | 1,100                    | 1,150 | 750                            | 850   | 100                          |

● NRH2410 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRH2410T R68NN 4 | RoHS | 0.68                             | $\pm 30\%$           | 120  | 0.060  | 2,200                    | 2,300 | 1,570                          | 1,810 | 100                          |
| NRH2410T 1R0NN 4 | RoHS | 1.0                              | $\pm 30\%$           | 106  | 0.070  | 1,800                    | 1,950 | 1,410                          | 1,640 | 100                          |
| NRH2410T 1R5MN   | RoHS | 1.5                              | $\pm 20\%$           | 94   | 0.110  | 1,550                    | 1,640 | 1,160                          | 1,320 | 100                          |
| NRH2410T 2R2MN   | RoHS | 2.2                              | $\pm 20\%$           | 77   | 0.150  | 1,290                    | 1,340 | 970                            | 1,110 | 100                          |
| NRH2410T 3R3MN   | RoHS | 3.3                              | $\pm 20\%$           | 56   | 0.220  | 1,000                    | 1,140 | 770                            | 890   | 100                          |
| NRH2410T 4R7MN   | RoHS | 4.7                              | $\pm 20\%$           | 50   | 0.290  | 880                      | 930   | 670                            | 780   | 100                          |
| NRH2410T 6R8MN   | RoHS | 6.8                              | $\pm 20\%$           | 43   | 0.410  | 750                      | 765   | 570                            | 650   | 100                          |
| NRH2410T 100MN   | RoHS | 10                               | $\pm 20\%$           | 32   | 0.690  | 550                      | 605   | 450                            | 520   | 100                          |
| NRH2410T 150MN   | RoHS | 15                               | $\pm 20\%$           | 27   | 1.02   | 470                      | 520   | 370                            | 430   | 100                          |
| NRH2410T 220MN   | RoHS | 22                               | $\pm 20\%$           | 22   | 1.47   | 390                      | 405   | 300                            | 340   | 100                          |

● NRH2412 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRH2412T R47NNGJ | RoHS | 0.47                             | $\pm 30\%$           | 180  | 0.050  | 2,900                    | 3,690 | 2,100                          | 2,300 | 100                          |
| NRH2412T 1R0NNGH | RoHS | 1.0                              | $\pm 30\%$           | 101  | 0.077  | 2,350                    | 2,610 | 1,300                          | 1,540 | 100                          |
| NRH2412T 1R5NNGH | RoHS | 1.5                              | $\pm 30\%$           | 89   | 0.100  | 2,100                    | 2,290 | 1,150                          | 1,390 | 100                          |
| NRH2412T 2R2MNGH | RoHS | 2.2                              | $\pm 20\%$           | 72   | 0.140  | 1,700                    | 1,940 | 1,000                          | 1,190 | 100                          |
| NRH2412T 3R3MNGH | RoHS | 3.3                              | $\pm 20\%$           | 56   | 0.225  | 1,400                    | 1,600 | 750                            | 890   | 100                          |
| NRH2412T 4R7MNGH | RoHS | 4.7                              | $\pm 20\%$           | 45   | 0.300  | 1,150                    | 1,280 | 650                            | 770   | 100                          |
| NRH2412T 6R8MNGH | RoHS | 6.8                              | $\pm 20\%$           | 34   | 0.420  | 950                      | 1,100 | 550                            | 635   | 100                          |
| NRH2412T 100MNGH | RoHS | 10                               | $\pm 20\%$           | 29   | 0.600  | 810                      | 900   | 450                            | 510   | 100                          |

● NRH3010 Shielded type

| Parts number   | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|----------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRH3010T 1R2NN | RoHS | 1.2                              | $\pm 30\%$           | 120  | 0.065  | 1,700                    | 1,740 | 1,480                          | 1,850 | 100                          |
| NRH3010T 1R5NN | RoHS | 1.5                              | $\pm 30\%$           | 99   | 0.075  | 1,440                    | 1,500 | 1,370                          | 1,680 | 100                          |
| NRH3010T 2R2MN | RoHS | 2.2                              | $\pm 20\%$           | 86   | 0.083  | 1,300                    | 1,400 | 1,300                          | 1,550 | 100                          |
| NRH3010T 3R3MN | RoHS | 3.3                              | $\pm 20\%$           | 64   | 0.130  | 1,000                    | 1,020 | 1,030                          | 1,220 | 100                          |
| NRH3010T 4R7MN | RoHS | 4.7                              | $\pm 20\%$           | 50   | 0.170  | 850                      | 930   | 900                            | 1,090 | 100                          |
| NRH3010T 6R8MN | RoHS | 6.8                              | $\pm 20\%$           | 44   | 0.250  | 700                      | 750   | 745                            | 920   | 100                          |
| NRH3010T 100MN | RoHS | 10                               | $\pm 20\%$           | 34   | 0.350  | 600                      | 650   | 620                            | 780   | 100                          |
| NRH3010T 150MN | RoHS | 15                               | $\pm 20\%$           | 25   | 0.550  | 450                      | 520   | 480                            | 600   | 100                          |
| NRH3010T 220MN | RoHS | 22                               | $\pm 20\%$           | 22   | 0.770  | 380                      | 440   | 410                            | 510   | 100                          |
| NRH3010T 470MN | RoHS | 47                               | $\pm 20\%$           | 17   | 2.050  | 250                      | 300   | 285                            | 320   | 100                          |

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

► This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our product specification sheets. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our website (<http://www.ty-top.com/>).

■ PARTS NUMBER

● NRH3012 Shielded type

| Parts number   | EHS  | Nominal inductance<br>[μH] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[Ω] (±20%) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|----------------|------|----------------------------|----------------------|--|-----------------------------|--------------------------|-------|--------------------------------|-------|------------------------------|
|                |      |                            |                      |  |                             | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                |      |                            |                      |  |                             | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRH3012T R47NN | RoHS | 0.47                       | ±30%                 | 160  | 0.033                       | 2,600                    | 3,200 | 1,900                          | 2,280 | 100                          |
| NRH3012T 1R0NN | RoHS | 1.0                        | ±30%                 | 111  | 0.048                       | 2,200                    | 2,500 | 1,710                          | 1,970 | 100                          |
| NRH3012T 1R5NN | RoHS | 1.5                        | ±30%                 | 95   | 0.055                       | 1,700                    | 1,900 | 1,600                          | 1,750 | 100                          |
| NRH3012T 2R2MN | RoHS | 2.2                        | ±20%                 | 78   | 0.075                       | 1,500                    | 1,750 | 1,370                          | 1,600 | 100                          |
| NRH3012T 3R3MN | RoHS | 3.3                        | ±20%                 | 61   | 0.100                       | 1,200                    | 1,500 | 1,210                          | 1,480 | 100                          |
| NRH3012T 4R7MN | RoHS | 4.7                        | ±20%                 | 50   | 0.130                       | 1,000                    | 1,200 | 1,060                          | 1,280 | 100                          |
| NRH3012T 6R8MN | RoHS | 6.8                        | ±20%                 | 43   | 0.190                       | 850                      | 910   | 890                            | 1,000 | 100                          |
| NRH3012T 100MN | RoHS | 10                         | ±20%                 | 32   | 0.270                       | 730                      | 780   | 720                            | 850   | 100                          |
| NRH3012T 150MN | RoHS | 15                         | ±20%                 | 26   | 0.450                       | 530                      | 650   | 570                            | 680   | 100                          |
| NRH3012T 220MN | RoHS | 22                         | ±20%                 | 22   | 0.630                       | 500                      | 550   | 500                            | 590   | 100                          |

● NRV3012 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[μH] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[Ω] (±20%) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------|----------------------|--|-----------------------------|--------------------------|-------|--------------------------------|-------|------------------------------|
|               |      |                            |                      |  |                             | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|               |      |                            |                      |  |                             | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRV3012T 1R0N | RoHS | 1.0                        | ±30%                 | 110  | 0.065                       | 2,500                    | 3,000 | 1,600                          | 1,970 | 100                          |
| NRV3012T 1R5N | RoHS | 1.5                        | ±30%                 | 92   | 0.075                       | 2,100                    | 2,500 | 1,400                          | 1,610 | 100                          |
| NRV3012T 2R2M | RoHS | 2.2                        | ±20%                 | 70   | 0.120                       | 1,800                    | 2,100 | 1,100                          | 1,330 | 100                          |
| NRV3012T 3R3M | RoHS | 3.3                        | ±20%                 | 55   | 0.150                       | 1,600                    | 1,900 | 1,000                          | 1,260 | 100                          |
| NRV3012T 4R7M | RoHS | 4.7                        | ±20%                 | 48   | 0.190                       | 1,250                    | 1,500 | 850                            | 1,040 | 100                          |
| NRV3012T 6R8M | RoHS | 6.8                        | ±20%                 | 40   | 0.300                       | 950                      | 1,200 | 650                            | 800   | 100                          |
| NRV3012T 100M | RoHS | 10                         | ±20%                 | 32   | 0.470                       | 800                      | 990   | 550                            | 640   | 100                          |

● NRS3015 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[μH] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[Ω] (±20%) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------|----------------------|--|-----------------------------|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                            |                      |  |                             | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                            |                      |  |                             | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS3015T 1R0NNGH | RoHS | 1.0                        | ±30%                 | 100  | 0.030                       | 2,100                    | 2,400 | 2,100                          | 2,350 | 100                          |
| NRS3015T 1R5NNGH | RoHS | 1.5                        | ±30%                 | 87   | 0.038                       | 1,800                    | 2,100 | 1,820                          | 2,100 | 100                          |
| NRS3015T 2R2MNGH | RoHS | 2.2                        | ±20%                 | 64   | 0.058                       | 1,480                    | 1,700 | 1,500                          | 1,800 | 100                          |
| NRS3015T 3R3MNGH | RoHS | 3.3                        | ±20%                 | 49   | 0.078                       | 1,210                    | 1,400 | 1,230                          | 1,500 | 100                          |
| NRS3015T 4R7MNGH | RoHS | 4.7                        | ±20%                 | 40   | 0.120                       | 1,020                    | 1,100 | 1,040                          | 1,300 | 100                          |
| NRS3015T 6R8MNGH | RoHS | 6.8                        | ±20%                 | 36   | 0.160                       | 870                      | 920   | 880                            | 1,100 | 100                          |
| NRS3015T 100MNGH | RoHS | 10                         | ±20%                 | 28   | 0.220                       | 700                      | 750   | 710                            | 840   | 100                          |
| NRS3015T 150MNGH | RoHS | 15                         | ±20%                 | 23   | 0.325                       | 580                      | 680   | 680                            | 760   | 100                          |
| NRS3015T 220MNGH | RoHS | 22                         | ±20%                 | 20   | 0.520                       | 470                      | 540   | 470                            | 530   | 100                          |
| NRS3015T 330MNGH | RoHS | 33                         | ±20%                 | 18   | 0.780                       | 400                      | 440   | 440                            | 490   | 100                          |
| NRS3015T 470MNGH | RoHS | 47                         | ±20%                 | 17   | 1.100                       | 325                      | 380   | 350                            | 380   | 100                          |

● NRS4010 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[μH] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[Ω] (±20%) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------|----------------------|--|-----------------------------|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                            |                      |  |                             | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                            |                      |  |                             | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS4010T 1R0NDGG | RoHS | 1.0                        | ±30%                 | 116  | 0.056                       | 2,000                    | 2,280 | 1,900                          | 2,390 | 100                          |
| NRS4010T 2R2MDGG | RoHS | 2.2                        | ±20%                 | 73   | 0.085                       | 1,200                    | 1,610 | 1,500                          | 1,800 | 100                          |
| NRS4010T 3R3MDGG | RoHS | 3.3                        | ±20%                 | 58   | 0.100                       | 1,100                    | 1,300 | 1,400                          | 1,700 | 100                          |
| NRS4010T 4R7MDGG | RoHS | 4.7                        | ±20%                 | 47   | 0.140                       | 950                      | 1,100 | 1,200                          | 1,450 | 100                          |
| NRS4010T 6R8MDGG | RoHS | 6.8                        | ±20%                 | 38   | 0.200                       | 800                      | 890   | 1,000                          | 1,200 | 100                          |
| NRS4010T 100MDGG | RoHS | 10                         | ±20%                 | 31   | 0.300                       | 620                      | 760   | 750                            | 860   | 100                          |
| NRS4010T 150MDGG | RoHS | 15                         | ±20%                 | 24   | 0.430                       | 540                      | 635   | 600                            | 700   | 100                          |
| NRS4010T 220MDGG | RoHS | 22                         | ±20%                 | 19   | 0.570                       | 450                      | 540   | 500                            | 600   | 100                          |
| NRS4010T 330MDGG | RoHS | 33                         | ±20%                 | 15   | 0.900                       | 350                      | 440   | 400                            | 460   | 100                          |
| NRS4010T 470MDGG | RoHS | 47                         | ±20%                 | 13   | 1.250                       | 300                      | 350   | 350                            | 370   | 100                          |

● NRS4012 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[μH] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[Ω] (±20%) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------|----------------------|--|-----------------------------|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                            |                      |  |                             | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                            |                      |  |                             | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS4012T 1R0NDGG | RoHS | 1.0                        | ±30%                 | 100  | 0.042                       | 2,800                    | 2,900 | 2,200                          | 2,670 | 100                          |
| NRS4012T 1R5NDGG | RoHS | 1.5                        | ±30%                 | 90   | 0.051                       | 2,300                    | 2,500 | 2,000                          | 2,430 | 100                          |
| NRS4012T 2R2MDGJ | RoHS | 2.2                        | ±20%                 | 70   | 0.060                       | 1,650                    | 1,950 | 1,900                          | 2,100 | 100                          |
| NRS4012T 3R3MDGJ | RoHS | 3.3                        | ±20%                 | 60   | 0.070                       | 1,400                    | 1,700 | 1,700                          | 1,880 | 100                          |
| NRS4012T 4R7MDGJ | RoHS | 4.7                        | ±20%                 | 45   | 0.095                       | 1,200                    | 1,320 | 1,500                          | 1,570 | 100                          |
| NRS4012T 6R8MDGJ | RoHS | 6.8                        | ±20%                 | 35   | 0.125                       | 900                      | 1,170 | 1,300                          | 1,400 | 100                          |
| NRS4012T 100MDGJ | RoHS | 10                         | ±20%                 | 30   | 0.170                       | 800                      | 990   | 1,100                          | 1,200 | 100                          |
| NRS4012T 150MDGJ | RoHS | 15                         | ±20%                 | 24   | 0.260                       | 650                      | 820   | 750                            | 840   | 100                          |
| NRS4012T 220MDGJ | RoHS | 22                         | ±20%                 | 18   | 0.400                       | 500                      | 620   | 620                            | 650   | 100                          |
| NRS4012T 330MDGJ | RoHS | 33                         | ±20%                 | 15   | 0.600                       | 400                      | 500   | 480                            | 530   | 100                          |
| NRS4012T 470MDGJ | RoHS | 47                         | ±20%                 | 12   | 0.770                       | 350                      | 430   | 420                            | 470   | 100                          |

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■ PARTS NUMBER

● NRS4018 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS4018T 1R0NDGJ | RoHS | 1.0                              | $\pm 30\%$           | 90   | 0.027  | 4,000                    | 4,590 | 3,200                          | 3,720 | 100                          |
| NRS4018T 1R5NDGJ | RoHS | 1.5                              | $\pm 30\%$           | 75   | 0.037  | 3,300                    | 3,750 | 2,400                          | 3,000 | 100                          |
| NRS4018T 2R2MDGJ | RoHS | 2.2                              | $\pm 20\%$           | 60   | 0.042  | 3,000                    | 3,110 | 2,200                          | 2,590 | 100                          |
| NRS4018T 3R3MDGJ | RoHS | 3.3                              | $\pm 20\%$           | 45   | 0.055  | 2,300                    | 2,560 | 2,000                          | 2,240 | 100                          |
| NRS4018T 4R7MDGJ | RoHS | 4.7                              | $\pm 20\%$           | 35   | 0.070  | 2,000                    | 2,330 | 1,700                          | 1,880 | 100                          |
| NRS4018T 6R8MDGJ | RoHS | 6.8                              | $\pm 20\%$           | 30   | 0.098  | 1,600                    | 1,820 | 1,450                          | 1,690 | 100                          |
| NRS4018T 100MDGJ | RoHS | 10                               | $\pm 20\%$           | 25   | 0.150  | 1,300                    | 1,440 | 1,200                          | 1,250 | 100                          |
| NRS4018T 150MDGJ | RoHS | 15                               | $\pm 20\%$           | 18   | 0.210  | 1,100                    | 1,150 | 850                            | 915   | 100                          |
| NRS4018T 220MDGJ | RoHS | 22                               | $\pm 20\%$           | 15   | 0.290  | 900                      | 920   | 720                            | 810   | 100                          |
| NRS4018T 330MDGJ | RoHS | 33                               | $\pm 20\%$           | 12   | 0.460  | 700                      | 830   | 550                            | 630   | 100                          |
| NRS4018T 470MDGJ | RoHS | 47                               | $\pm 20\%$           | 10   | 0.650  | 600                      | 700   | 440                            | 520   | 100                          |
| NRS4018T 680MDGJ | RoHS | 68                               | $\pm 20\%$           | 8.3  | 1.00   | 520                      | 600   | 320                            | 400   | 100                          |
| NRS4018T 101MDGJ | RoHS | 100                              | $\pm 20\%$           | 6.5  | 1.45   | 420                      | 490   | 280                            | 330   | 100                          |
| NRS4018T 151MDGJ | RoHS | 150                              | $\pm 20\%$           | 5.5  | 2.30   | 340                      | 390   | 220                            | 280   | 100                          |
| NRS4018T 221MDGJ | RoHS | 220                              | $\pm 20\%$           | 4.0  | 3.80   | 275                      | 310   | 170                            | 210   | 100                          |

● NRS5010 type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS5010T 1R0NMGF | RoHS | 1.0                              | $\pm 30\%$           | 95   | 0.070  | 2,350                    | 2,510 | 1,750                          | 2,000 | 100                          |
| NRS5010T 2R2NMGF | RoHS | 2.2                              | $\pm 30\%$           | 65   | 0.105  | 1,500                    | 1,710 | 1,400                          | 1,600 | 100                          |
| NRS5010T 3R3MMGF | RoHS | 3.3                              | $\pm 20\%$           | 42   | 0.125  | 1,400                    | 1,530 | 1,250                          | 1,520 | 100                          |
| NRS5010T 4R7MMGF | RoHS | 4.7                              | $\pm 20\%$           | 37   | 0.145  | 1,200                    | 1,340 | 1,150                          | 1,390 | 100                          |
| NRS5010T 6R8MMGF | RoHS | 6.8                              | $\pm 20\%$           | 33   | 0.185  | 1,000                    | 1,120 | 1,000                          | 1,210 | 100                          |
| NRS5010T 100MMGF | RoHS | 10                               | $\pm 20\%$           | 23   | 0.250  | 850                      | 970   | 900                            | 950   | 100                          |
| NRS5010T 150MMGF | RoHS | 15                               | $\pm 20\%$           | 19   | 0.400  | 680                      | 740   | 650                            | 700   | 100                          |
| NRS5010T 220MMGF | RoHS | 22                               | $\pm 20\%$           | 15   | 0.600  | 550                      | 620   | 450                            | 560   | 100                          |

● NRS5012 type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS5012T 1R0NMGF | RoHS | 1.0                              | $\pm 30\%$           | 100  | 0.053  | 4,500                    | 4,670 | 2,300                          | 2,750 | 100                          |
| NRS5012T 1R5NMGF | RoHS | 1.5                              | $\pm 30\%$           | 86   | 0.070  | 3,800                    | 3,970 | 2,200                          | 2,470 | 100                          |
| NRS5012T 2R2MMGF | RoHS | 2.2                              | $\pm 20\%$           | 70   | 0.085  | 3,100                    | 3,510 | 2,000                          | 2,300 | 100                          |
| NRS5012T 3R3MMGF | RoHS | 3.3                              | $\pm 20\%$           | 48   | 0.160  | 2,400                    | 2,580 | 1,450                          | 1,650 | 100                          |
| NRS5012T 4R7MMGF | RoHS | 4.7                              | $\pm 20\%$           | 40   | 0.180  | 2,200                    | 2,320 | 1,400                          | 1,560 | 100                          |
| NRS5012T 6R8MMGF | RoHS | 6.8                              | $\pm 20\%$           | 36   | 0.260  | 1,700                    | 1,950 | 1,100                          | 1,260 | 100                          |
| NRS5012T 100MMGF | RoHS | 10                               | $\pm 20\%$           | 26   | 0.420  | 1,400                    | 1,550 | 850                            | 1,000 | 100                          |
| NRS5012T 150MMGF | RoHS | 15                               | $\pm 20\%$           | 22   | 0.670  | 1,200                    | 1,240 | 640                            | 740   | 100                          |

● NRS5014 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS5014T R47NMGG | RoHS | 0.47                             | $\pm 30\%$           | 185  | 0.025  | 5,800                    | 6,400 | 3,300                          | 3,470 | 100                          |
| NRS5014T 1R2NMGG | RoHS | 1.2                              | $\pm 30\%$           | 86   | 0.045  | 3,800                    | 4,200 | 2,400                          | 3,000 | 100                          |
| NRS5014T 2R2NMGG | RoHS | 2.2                              | $\pm 30\%$           | 56   | 0.065  | 2,800                    | 3,100 | 2,000                          | 2,400 | 100                          |
| NRS5014T 3R3NMGG | RoHS | 3.3                              | $\pm 30\%$           | 48   | 0.080  | 2,350                    | 2,650 | 1,700                          | 2,200 | 100                          |
| NRS5014T 4R7NMGG | RoHS | 4.7                              | $\pm 30\%$           | 41   | 0.100  | 2,050                    | 2,400 | 1,400                          | 1,900 | 100                          |
| NRS5014T 6R8MMGG | RoHS | 6.8                              | $\pm 20\%$           | 33   | 0.150  | 1,600                    | 1,850 | 1,200                          | 1,450 | 100                          |
| NRS5014T 100MMGG | RoHS | 10                               | $\pm 20\%$           | 27   | 0.200  | 1,400                    | 1,600 | 1,050                          | 1,250 | 100                          |
| NRS5014T 150MMGG | RoHS | 15                               | $\pm 20\%$           | 20   | 0.320  | 1,100                    | 1,300 | 650                            | 790   | 100                          |
| NRS5014T 220MMGG | RoHS | 22                               | $\pm 20\%$           | 16   | 0.450  | 900                      | 1,000 | 550                            | 660   | 100                          |

● NRS5020 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS5020T R47NMGG | RoHS | 0.47                             | $\pm 30\%$           | 230  | 0.012  | 6,100                    | 6,900 | 5,000                          | 5,800 | 100                          |
| NRS5020T 1R0NMGG | RoHS | 1.0                              | $\pm 30\%$           | 81   | 0.021  | 4,000                    | 4,500 | 3,600                          | 3,710 | 100                          |
| NRS5020T 1R5NMGG | RoHS | 1.5                              | $\pm 30\%$           | 68   | 0.026  | 3,350                    | 3,800 | 3,200                          | 3,540 | 100                          |
| NRS5020T 2R2NMGG | RoHS | 2.2                              | $\pm 30\%$           | 57   | 0.035  | 2,900                    | 3,200 | 2,900                          | 3,200 | 100                          |
| NRS5020T 3R3NMGG | RoHS | 3.3                              | $\pm 30\%$           | 46   | 0.048  | 2,400                    | 2,700 | 2,400                          | 3,080 | 100                          |
| NRS5020T 4R7NMGG | RoHS | 4.7                              | $\pm 20\%$           | 37   | 0.060  | 2,000                    | 2,270 | 2,000                          | 2,370 | 100                          |
| NRS5020T 6R8MMGG | RoHS | 6.8                              | $\pm 20\%$           | 30   | 0.090  | 1,600                    | 1,850 | 1,650                          | 2,200 | 100                          |
| NRS5020T 100MMGG | RoHS | 10                               | $\pm 20\%$           | 24   | 0.120  | 1,300                    | 1,480 | 1,450                          | 1,850 | 100                          |
| NRS5020T 150MMGG | RoHS | 15                               | $\pm 20\%$           | 20   | 0.165  | 1,100                    | 1,260 | 1,200                          | 1,480 | 100                          |
| NRS5020T 220MMGG | RoHS | 22                               | $\pm 20\%$           | 17   | 0.260  | 900                      | 1,100 | 1,000                          | 1,230 | 100                          |
| NRS5020T 470MMGG | RoHS | 47                               | $\pm 20\%$           | 12   | 0.435  | 630                      | 750   | 560                            | 610   | 100                          |
| NRS5020T 101MMGG | RoHS | 100                              | $\pm 20\%$           | 7  | 0.850  | 420                      | 510   | 400                            | 450   | 100                          |

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

## ● NRS5024 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS5024T 1R0NMGJ | RoHS | 1.0                              | $\pm 30\%$           | 85   | 0.016  | 5,800                    | 6,800 | 4,400                          | 4,900 | 100                          |
| NRS5024T 1R5NMGJ | RoHS | 1.5                              | $\pm 30\%$           | 67   | 0.022  | 5,200                    | 5,800 | 3,600                          | 4,300 | 100                          |
| NRS5024T 2R2NMGJ | RoHS | 2.2                              | $\pm 30\%$           | 51   | 0.029  | 4,100                    | 4,800 | 3,100                          | 3,600 | 100                          |
| NRS5024T 3R3NMGJ | RoHS | 3.3                              | $\pm 30\%$           | 41   | 0.043  | 3,100                    | 3,700 | 2,400                          | 2,750 | 100                          |
| NRS5024T 4R7MMGJ | RoHS | 4.7                              | $\pm 20\%$           | 37   | 0.055  | 2,700                    | 3,400 | 2,000                          | 2,400 | 100                          |
| NRS5024T 6R8MMGJ | RoHS | 6.8                              | $\pm 20\%$           | 28   | 0.080  | 2,200                    | 2,750 | 1,600                          | 1,800 | 100                          |
| NRS5024T 100MMGJ | RoHS | 10                               | $\pm 20\%$           | 21   | 0.125  | 1,700                    | 2,100 | 1,200                          | 1,460 | 100                          |
| NRS5024T 150MMGJ | RoHS | 15                               | $\pm 20\%$           | 18   | 0.170  | 1,400                    | 1,750 | 1,000                          | 1,250 | 100                          |
| NRS5024T 220MMGJ | RoHS | 22                               | $\pm 20\%$           | 15   | 0.230  | 1,200                    | 1,450 | 820                            | 900   | 100                          |
| NRS5024T 330MMGJ | RoHS | 33                               | $\pm 20\%$           | 11   | 0.370  | 1,000                    | 1,200 | 630                            | 700   | 100                          |

## ● NRS5030 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 30\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS5030T R47NMGJ | RoHS | 0.47                             | $\pm 30\%$           | 185  | 0.010  | 9,000                    | 9,400 | 5,000                          | 5,900 | 100                          |
| NRS5030T 1R0NMGJ | RoHS | 1.0                              | $\pm 30\%$           | 110  | 0.015  | 6,600                    | 7,400 | 4,000                          | 4,900 | 100                          |
| NRS5030T 2R2NMGJ | RoHS | 2.2                              | $\pm 30\%$           | 46   | 0.023  | 4,200                    | 5,000 | 3,500                          | 4,100 | 100                          |
| NRS5030T 3R3MMGJ | RoHS | 3.3                              | $\pm 20\%$           | 36   | 0.030  | 3,600                    | 3,900 | 3,000                          | 3,600 | 100                          |
| NRS5030T 4R7MMGJ | RoHS | 4.7                              | $\pm 20\%$           | 31   | 0.035  | 3,100                    | 3,500 | 2,600                          | 3,000 | 100                          |
| NRS5030T 6R8MMGJ | RoHS | 6.8                              | $\pm 20\%$           | 22   | 0.052  | 2,500                    | 2,800 | 2,300                          | 2,500 | 100                          |
| NRS5030T 100MMGJ | RoHS | 10                               | $\pm 20\%$           | 20   | 0.070  | 2,100                    | 2,300 | 1,700                          | 2,000 | 100                          |
| NRS5030T 150MMGJ | RoHS | 15                               | $\pm 20\%$           | 14   | 0.125  | 1,600                    | 1,800 | 1,400                          | 1,550 | 100                          |
| NRS5030T 220MMGJ | RoHS | 22                               | $\pm 20\%$           | 13   | 0.180  | 1,400                    | 1,500 | 1,050                          | 1,200 | 100                          |
| NRS5030T 330MMGJ | RoHS | 33                               | $\pm 20\%$           | 10   | 0.225  | 1,150                    | 1,250 | 800                            | 950   | 100                          |
| NRS5030T 470MMGJ | RoHS | 47                               | $\pm 20\%$           | 9  | 0.325  | 950                      | 1,050 | 700                            | 800   | 100                          |

## ● NRS5040 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 30\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS5040T 1R5NMGJ | RoHS | 1.5                              | $\pm 30\%$           | 60   | 0.017  | 6,400                    | 6,530 | 4,500                          | 4,730 | 100                          |
| NRS5040T 2R2NMGJ | RoHS | 2.2                              | $\pm 30\%$           | 42   | 0.022  | 5,000                    | 5,250 | 3,700                          | 4,080 | 100                          |
| NRS5040T 3R3NMGJ | RoHS | 3.3                              | $\pm 30\%$           | 32   | 0.027  | 4,000                    | 4,280 | 3,300                          | 3,770 | 100                          |
| NRS5040T 4R7NMGK | RoHS | 4.7                              | $\pm 30\%$           | 28   | 0.029  | 3,300                    | 3,470 | 3,100                          | 3,500 | 100                          |
| NRS5040T 6R8MMGJ | RoHS | 6.8                              | $\pm 20\%$           | 21   | 0.049  | 2,800                    | 2,910 | 2,400                          | 2,470 | 100                          |
| NRS5040T 100MMGJ | RoHS | 10                               | $\pm 20\%$           | 18   | 0.056  | 2,300                    | 2,470 | 2,100                          | 2,210 | 100                          |
| NRS5040T 150MMGJ | RoHS | 15                               | $\pm 20\%$           | 13   | 0.080  | 2,000                    | 2,150 | 1,800                          | 1,920 | 100                          |
| NRS5040T 220MMGK | RoHS | 22                               | $\pm 20\%$           | 9  | 0.126  | 1,500                    | 1,580 | 1,400                          | 1,470 | 100                          |
| NRS5040T 330MMGJ | RoHS | 33                               | $\pm 20\%$           | 7  | 0.180  | 1,300                    | 1,390 | 1,200                          | 1,270 | 100                          |
| NRS5040T 470MMGJ | RoHS | 47                               | $\pm 20\%$           | 6  | 0.310  | 1,100                    | 1,150 | 900                            | 950   | 100                          |

## ● NRS6010 type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS6010T 1R5MMGF | RoHS | 1.5                              | $\pm 20\%$           | 77   | 0.090  | 2,400                    | 2,650 | 1,900                          | 2,150 | 100                          |
| NRS6010T 2R2MMGF | RoHS | 2.2                              | $\pm 20\%$           | 56   | 0.110  | 1,900                    | 2,120 | 1,700                          | 1,950 | 100                          |
| NRS6010T 3R3MMGF | RoHS | 3.3                              | $\pm 20\%$           | 42   | 0.135  | 1,600                    | 1,750 | 1,500                          | 1,750 | 100                          |
| NRS6010T 4R7MMGF | RoHS | 4.7                              | $\pm 20\%$           | 36   | 0.165  | 1,300                    | 1,470 | 1,400                          | 1,600 | 100                          |
| NRS6010T 6R8MMGF | RoHS | 6.8                              | $\pm 20\%$           | 30   | 0.220  | 1,200                    | 1,300 | 1,200                          | 1,320 | 100                          |
| NRS6010T 100MMGF | RoHS | 10                               | $\pm 20\%$           | 25   | 0.270  | 1,000                    | 1,100 | 1,100                          | 1,200 | 100                          |
| NRS6010T 220MMGF | RoHS | 22                               | $\pm 20\%$           | 12   | 0.580  | 650                      | 720   | 700                            | 740   | 100                          |

## ● NRS6012 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS6012T 1R0NMGJ | RoHS | 1.0                              | $\pm 30\%$           | 95   | 0.050  | 3,000                    | 3,900 | 2,400                          | 2,700 | 100                          |
| NRS6012T 1R5NMGJ | RoHS | 1.5                              | $\pm 30\%$           | 69   | 0.067  | 2,600                    | 3,500 | 2,100                          | 2,300 | 100                          |
| NRS6012T 2R5NMGJ | RoHS | 2.5                              | $\pm 30\%$           | 45   | 0.090  | 2,100                    | 2,900 | 1,800                          | 2,100 | 100                          |
| NRS6012T 3R3NMGJ | RoHS | 3.3                              | $\pm 30\%$           | 42   | 0.105  | 1,800                    | 2,500 | 1,700                          | 1,950 | 100                          |
| NRS6012T 4R7MMGJ | RoHS | 4.7                              | $\pm 20\%$           | 36   | 0.125  | 1,600                    | 2,100 | 1,550                          | 1,750 | 100                          |
| NRS6012T 5R3MMGJ | RoHS | 5.3                              | $\pm 20\%$           | 34   | 0.125  | 1,500                    | 1,750 | 1,550                          | 1,750 | 100                          |
| NRS6012T 6R8MMGJ | RoHS | 6.8                              | $\pm 20\%$           | 30   | 0.165  | 1,300                    | 1,600 | 1,350                          | 1,600 | 100                          |
| NRS6012T 100MMGJ | RoHS | 10                               | $\pm 20\%$           | 22   | 0.200  | 1,000                    | 1,400 | 1,200                          | 1,380 | 100                          |
| NRS6012T 150MMGJ | RoHS | 15                               | $\pm 20\%$           | 18   | 0.295  | 800                      | 1,100 | 800                            | 950   | 100                          |
| NRS6012T 220MMGJ | RoHS | 22                               | $\pm 20\%$           | 12   | 0.465  | 760                      | 900   | 650                            | 750   | 100                          |
| NRS6012T 330MMGJ | RoHS | 33                               | $\pm 20\%$           | 8  | 0.580  | 590                      | 800   | 550                            | 670   | 100                          |
| NRS6012T 470MMGJ | RoHS | 47                               | $\pm 20\%$           | 6  | 0.965  | 520                      | 630   | 460                            | 540   | 100                          |
| NRS6012T 680MMGJ | RoHS | 68                               | $\pm 20\%$           | 3  | 1.16   | 440                      | 560   | 410                            | 450   | 100                          |
| NRS6012T 101MMGJ | RoHS | 100                              | $\pm 20\%$           | 1  | 1.67   | 350                      | 490   | 320                            | 380   | 100                          |

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■ PARTS NUMBER

● NRS6014 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS6014T 1R2NMGG | RoHS | 1.2                              | $\pm 30\%$           | 77   | 0.042  | 4,000                    | 4,400 | 2,750                          | 3,200 | 100                          |
| NRS6014T 2R2NMGG | RoHS | 2.2                              | $\pm 30\%$           | 61   | 0.055  | 3,000                    | 3,500 | 2,300                          | 2,600 | 100                          |
| NRS6014T 3R3NMGG | RoHS | 3.3                              | $\pm 30\%$           | 41   | 0.075  | 2,500                    | 2,600 | 2,000                          | 2,200 | 100                          |
| NRS6014T 4R7MMGG | RoHS | 4.7                              | $\pm 20\%$           | 36   | 0.090  | 2,000                    | 2,170 | 1,900                          | 1,950 | 100                          |
| NRS6014T 6R8MMGG | RoHS | 6.8                              | $\pm 20\%$           | 30   | 0.115  | 1,700                    | 1,880 | 1,650                          | 1,700 | 100                          |
| NRS6014T 100MMGG | RoHS | 10                               | $\pm 20\%$           | 24   | 0.140  | 1,400                    | 1,540 | 1,400                          | 1,500 | 100                          |
| NRS6014T 150MMGG | RoHS | 15                               | $\pm 20\%$           | 20   | 0.210  | 1,150                    | 1,300 | 1,200                          | 1,280 | 100                          |
| NRS6014T 220MMGG | RoHS | 22                               | $\pm 20\%$           | 16   | 0.300  | 950                      | 1,100 | 1,000                          | 1,090 | 100                          |

● NRS6020 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS6020T 0R8NMGG | RoHS | 0.8                              | $\pm 30\%$           | 110  | 0.020  | 6,400                    | 7,400 | 4,100                          | 4,800 | 100                          |
| NRS6020T 1R5NMGG | RoHS | 1.5                              | $\pm 30\%$           | 93   | 0.026  | 4,300                    | 5,300 | 3,600                          | 4,200 | 100                          |
| NRS6020T 2R2NMGG | RoHS | 2.2                              | $\pm 30\%$           | 73   | 0.034  | 3,200                    | 4,000 | 2,900                          | 3,400 | 100                          |
| NRS6020T 3R3NMGG | RoHS | 3.3                              | $\pm 30\%$           | 55   | 0.040  | 2,800                    | 3,400 | 2,750                          | 3,100 | 100                          |
| NRS6020T 4R7NMGG | RoHS | 4.7                              | $\pm 30\%$           | 43   | 0.058  | 2,400                    | 2,800 | 2,150                          | 2,500 | 100                          |
| NRS6020T 6R8NMGG | RoHS | 6.8                              | $\pm 30\%$           | 30   | 0.085  | 2,000                    | 2,600 | 1,800                          | 2,100 | 100                          |
| NRS6020T 100MMGG | RoHS | 10                               | $\pm 20\%$           | 18   | 0.125  | 1,900                    | 2,240 | 1,500                          | 1,700 | 100                          |
| NRS6020T 220MMGG | RoHS | 22                               | $\pm 20\%$           | 11   | 0.290  | 1,250                    | 1,470 | 950                            | 1,100 | 100                          |

● NRS6028 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 30\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS6028T 0R9NMGG | RoHS | 0.9                              | $\pm 30\%$           | 90   | 0.013  | 6,700                    | 7,900 | 4,600                          | 5,200 | 100                          |
| NRS6028T 1R5NMGG | RoHS | 1.5                              | $\pm 30\%$           | 78   | 0.016  | 5,100                    | 6,100 | 4,200                          | 4,700 | 100                          |
| NRS6028T 2R2NMGG | RoHS | 2.2                              | $\pm 30\%$           | 68   | 0.020  | 4,200                    | 5,100 | 3,700                          | 4,200 | 100                          |
| NRS6028T 3R3NMGG | RoHS | 3.0                              | $\pm 30\%$           | 55   | 0.023  | 3,600                    | 4,300 | 3,400                          | 3,900 | 100                          |
| NRS6028T 4R7MMGG | RoHS | 4.7                              | $\pm 20\%$           | 39   | 0.031  | 2,700                    | 3,300 | 3,000                          | 3,400 | 100                          |
| NRS6028T 6R8MMGG | RoHS | 6.8                              | $\pm 20\%$           | 25   | 0.043  | 2,600                    | 3,000 | 2,500                          | 2,900 | 100                          |
| NRS6028T 100MMGG | RoHS | 10                               | $\pm 20\%$           | 20   | 0.065  | 1,900                    | 2,200 | 1,900                          | 2,200 | 100                          |
| NRS6028T 150MMGG | RoHS | 15                               | $\pm 20\%$           | 17   | 0.095  | 1,600                    | 1,900 | 1,800                          | 1,900 | 100                          |
| NRS6028T 220MMGG | RoHS | 22                               | $\pm 20\%$           | 12   | 0.135  | 1,300                    | 1,600 | 1,400                          | 1,600 | 100                          |
| NRS6028T 330MMGG | RoHS | 33                               | $\pm 20\%$           | 10   | 0.220  | 1,100                    | 1,300 | 1,100                          | 1,250 | 100                          |
| NRS6028T 470MMGG | RoHS | 47                               | $\pm 20\%$           | 8  | 0.300  | 1,000                    | 1,150 | 920                            | 1,050 | 100                          |
| NRS6028T 680MMGG | RoHS | 68                               | $\pm 20\%$           | 5  | 0.420  | 800                      | 950   | 770                            | 880   | 100                          |
| NRS6028T 101MMGG | RoHS | 100                              | $\pm 20\%$           | 3  | 0.600  | 650                      | 750   | 660                            | 750   | 100                          |

● NRS6045 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 30\%$ ) | Rated current ※) [mA]    |        |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|--------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |        | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.   | Max.                           | Typ.  |                              |
| NRS6045T 1R0NMGG | RoHS | 1.0                              | $\pm 30\%$           | 110  | 0.014  | 9,800                    | 11,000 | 4,500                          | 5,200 | 100                          |
| NRS6045T 1R3NMGG | RoHS | 1.3                              | $\pm 30\%$           | 95   | 0.016  | 8,200                    | 9,300  | 4,200                          | 4,800 | 100                          |
| NRS6045T 1R5NMGG | RoHS | 1.5                              | $\pm 30\%$           | 95   | 0.016  | 8,200                    | 9,300  | 4,200                          | 4,800 | 100                          |
| NRS6045T 1R8NMGG | RoHS | 1.8                              | $\pm 30\%$           | 80   | 0.019  | 7,200                    | 8,100  | 3,900                          | 4,400 | 100                          |
| NRS6045T 2R2NMGG | RoHS | 2.2                              | $\pm 30\%$           | 60   | 0.022  | 6,400                    | 7,300  | 3,600                          | 4,100 | 100                          |
| NRS6045T 2R3NMGG | RoHS | 2.3                              | $\pm 30\%$           | 60   | 0.022  | 6,400                    | 7,300  | 3,600                          | 4,100 | 100                          |
| NRS6045T 3R0NMGG | RoHS | 3.0                              | $\pm 30\%$           | 45   | 0.024  | 5,600                    | 6,500  | 3,300                          | 4,000 | 100                          |
| NRS6045T 3R3NMGG | RoHS | 3.3                              | $\pm 30\%$           | 45   | 0.024  | 5,600                    | 6,500  | 3,300                          | 4,000 | 100                          |
| NRS6045T 4R5MMGG | RoHS | 4.5                              | $\pm 20\%$           | 25   | 0.030  | 4,400                    | 5,400  | 3,100                          | 3,600 | 100                          |
| NRS6045T 4R7NMGG | RoHS | 4.7                              | $\pm 30\%$           | 25   | 0.030  | 4,400                    | 5,400  | 3,100                          | 3,600 | 100                          |
| NRS6045T 6R3MMGG | RoHS | 6.3                              | $\pm 20\%$           | 15   | 0.036  | 3,600                    | 4,300  | 3,000                          | 3,300 | 100                          |
| NRS6045T 6R8MMGG | RoHS | 6.8                              | $\pm 20\%$           | 15   | 0.036  | 3,600                    | 4,300  | 3,000                          | 3,300 | 100                          |
| NRS6045T 100MMGG | RoHS | 10                               | $\pm 20\%$           | 12   | 0.046  | 3,100                    | 3,600  | 2,400                          | 2,800 | 100                          |
| NRS6045T 150MMGG | RoHS | 15                               | $\pm 20\%$           | 10   | 0.070  | 2,500                    | 3,000  | 1,900                          | 2,300 | 100                          |
| NRS6045T 220MMGG | RoHS | 22                               | $\pm 20\%$           | 7  | 0.107  | 2,000                    | 2,400  | 1,600                          | 1,900 | 100                          |
| NRS6045T 330MMGG | RoHS | 33                               | $\pm 20\%$           | 6  | 0.141  | 1,650                    | 2,000  | 1,400                          | 1,600 | 100                          |
| NRS6045T 470MMGG | RoHS | 47                               | $\pm 20\%$           | 5  | 0.211  | 1,400                    | 1,600  | 1,150                          | 1,350 | 100                          |
| NRS6045T 680MMGG | RoHS | 68                               | $\pm 20\%$           | 4  | 0.304  | 1,100                    | 1,300  | 950                            | 1,100 | 100                          |
| NRS6045T 101MMGG | RoHS | 100                              | $\pm 20\%$           | 3  | 0.466  | 900                      | 1,200  | 750                            | 900   | 100                          |

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■ PARTS NUMBER

● NRS8030 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 30\%$ ) | Rated current ※) [mA]    |       |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|-------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |       | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.  | Max.                           | Typ.  |                              |
| NRS8030T 1R0NJGJ | RoHS | 1.0                              | $\pm 30\%$           | 120  | 0.009  | 7,800                    | 9,300 | 6,200                          | 7,600 | 100                          |
| NRS8030T 1R5NJGJ | RoHS | 1.5                              | $\pm 30\%$           | 80   | 0.012  | 6,200                    | 7,800 | 5,300                          | 6,400 | 100                          |
| NRS8030T 2R2NJGJ | RoHS | 2.2                              | $\pm 30\%$           | 60   | 0.015  | 4,900                    | 6,100 | 4,800                          | 5,600 | 100                          |
| NRS8030T 3R3MJGJ | RoHS | 3.3                              | $\pm 20\%$           | 50   | 0.019  | 4,200                    | 5,200 | 4,300                          | 5,100 | 100                          |
| NRS8030T 4R7MJGJ | RoHS | 4.7                              | $\pm 20\%$           | 40   | 0.022  | 3,600                    | 4,400 | 4,000                          | 4,700 | 100                          |
| NRS8030T 6R8MJGJ | RoHS | 6.8                              | $\pm 20\%$           | 32   | 0.029  | 3,000                    | 3,600 | 3,400                          | 4,000 | 100                          |
| NRS8030T 100MJGJ | RoHS | 10                               | $\pm 20\%$           | 27   | 0.033  | 2,400                    | 2,900 | 3,000                          | 3,600 | 100                          |
| NRS8030T 150MJGJ | RoHS | 15                               | $\pm 20\%$           | 20   | 0.060  | 2,000                    | 2,300 | 2,200                          | 2,600 | 100                          |
| NRS8030T 220MJGJ | RoHS | 22                               | $\pm 20\%$           | 16   | 0.070  | 1,750                    | 2,200 | 1,900                          | 2,300 | 100                          |
| NRS8030T 330MJGJ | RoHS | 33                               | $\pm 20\%$           | 13   | 0.120  | 1,300                    | 1,600 | 1,500                          | 1,800 | 100                          |
| NRS8030T 470MJGJ | RoHS | 47                               | $\pm 20\%$           | 11   | 0.170  | 1,100                    | 1,400 | 1,300                          | 1,500 | 100                          |

● NRS8040 Shielded type

| Parts number     | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 30\%$ ) | Rated current ※) [mA]    |        |                                |       | Measuring<br>frequency [kHz] |
|------------------|------|----------------------------------|----------------------|--|--|--------------------------|--------|--------------------------------|-------|------------------------------|
|                  |      |                                  |                      |  |  | Saturation current: Idc1 |        | Temperature rise current: Idc2 |       |                              |
|                  |      |                                  |                      |  |  | Max.                     | Typ.   | Max.                           | Typ.  |                              |
| NRS8040T 0R9NJGJ | RoHS | 0.9                              | $\pm 30\%$           | 85   | 0.006  | 13,000                   | 14,000 | 7,800                          | 9,600 | 100                          |
| NRS8040T 1R0NJGJ | RoHS | 1                                | $\pm 30\%$           | 85   | 0.006  | 13,000                   | 14,000 | 7,800                          | 9,600 | 100                          |
| NRS8040T 1R4NJGJ | RoHS | 1.4                              | $\pm 30\%$           | 63   | 0.007  | 10,000                   | 11,000 | 7,000                          | 8,400 | 100                          |
| NRS8040T 1R5NJGJ | RoHS | 1.5                              | $\pm 30\%$           | 63   | 0.007  | 10,000                   | 11,000 | 7,000                          | 8,400 | 100                          |
| NRS8040T 2R0NJGJ | RoHS | 2.0                              | $\pm 30\%$           | 50   | 0.009  | 8,100                    | 9,200  | 6,300                          | 7,600 | 100                          |
| NRS8040T 2R2NJGJ | RoHS | 2.2                              | $\pm 30\%$           | 50   | 0.009  | 8,100                    | 9,200  | 6,300                          | 7,600 | 100                          |
| NRS8040T 3R3NJGJ | RoHS | 3.3                              | $\pm 30\%$           | 34   | 0.015  | 6,400                    | 6,800  | 4,900                          | 6,000 | 100                          |
| NRS8040T 3R6NJGJ | RoHS | 3.6                              | $\pm 30\%$           | 34   | 0.015  | 6,400                    | 6,800  | 4,900                          | 6,000 | 100                          |
| NRS8040T 4R7NJGJ | RoHS | 4.7                              | $\pm 30\%$           | 30   | 0.018  | 5,400                    | 5,900  | 4,100                          | 5,200 | 100                          |
| NRS8040T 6R8NJGJ | RoHS | 6.8                              | $\pm 30\%$           | 24   | 0.025  | 4,400                    | 4,800  | 3,700                          | 4,400 | 100                          |
| NRS8040T 100MJGJ | RoHS | 10                               | $\pm 20\%$           | 22   | 0.034  | 3,800                    | 4,100  | 3,100                          | 3,500 | 100                          |
| NRS8040T 150MJGJ | RoHS | 15                               | $\pm 20\%$           | 16   | 0.050  | 2,900                    | 3,200  | 2,400                          | 3,000 | 100                          |
| NRS8040T 220MJGJ | RoHS | 22                               | $\pm 20\%$           | 13   | 0.066  | 2,400                    | 2,700  | 2,200                          | 2,600 | 100                          |
| NRS8040T 330MJGK | RoHS | 33                               | $\pm 20\%$           | 12   | 0.100  | 2,000                    | 2,300  | 1,700                          | 1,900 | 100                          |
| NRS8040T 470MJGK | RoHS | 47                               | $\pm 20\%$           | 8  | 0.140  | 1,500                    | 1,800  | 1,500                          | 1,600 | 100                          |
| NRS8040T 680MJGK | RoHS | 68                               | $\pm 20\%$           | 7  | 0.210  | 1,300                    | 1,500  | 1,200                          | 1,300 | 100                          |
| NRS8040T 101MJGK | RoHS | 100                              | $\pm 20\%$           | 6  | 0.280  | 1,100                    | 1,300  | 1,000                          | 1,100 | 100                          |
| NRS8040T 151MJGK | RoHS | 150                              | $\pm 20\%$           | 5  | 0.420  | 900                      | 980    | 800                            | 890   | 100                          |
| NRS8040T 221MJGK | RoHS | 220                              | $\pm 20\%$           | 4  | 0.620  | 700                      | 800    | 670                            | 740   | 100                          |

● NR 3010 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |                                | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|--------------------------|--------------------------------|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1 | Temperature rise current: Idc2 |                              |
|               |      |                                  |                      |  |  | Max.                     | Max.                           |                              |
| NR 3010T 1R0N | RoHS | 1.0                              | $\pm 30\%$           | 126  | 0.065  | 1,300                    | 1,400                          | 100                          |
| NR 3010T 1R5N | RoHS | 1.5                              | $\pm 30\%$           | 98   | 0.080  | 1,200                    | 1,300                          | 100                          |
| NR 3010T 2R2M | RoHS | 2.2                              | $\pm 20\%$           | 82   | 0.095  | 1,100                    | 1,100                          | 100                          |
| NR 3010T 3R3M | RoHS | 3.3                              | $\pm 20\%$           | 63   | 0.140  | 870                      | 940                            | 100                          |
| NR 3010T 4R7M | RoHS | 4.7                              | $\pm 20\%$           | 56   | 0.190  | 750                      | 780                            | 100                          |
| NR 3010T 6R8M | RoHS | 6.8                              | $\pm 20\%$           | 46   | 0.300  | 610                      | 630                            | 100                          |
| NR 3010T 100M | RoHS | 10                               | $\pm 20\%$           | 35   | 0.450  | 500                      | 510                            | 100                          |
| NR 3010T 150M | RoHS | 15                               | $\pm 20\%$           | 30   | 0.740  | 400                      | 400                            | 100                          |
| NR 3010T 220M | RoHS | 22                               | $\pm 20\%$           | 25   | 1.03   | 350                      | 350                            | 100                          |
| NR 3010T 330M | RoHS | 33                               | $\pm 20\%$           | 20   | 1.55   | 260                      | 275                            | 100                          |
| NR 3010T 470M | RoHS | 47                               | $\pm 20\%$           | 17   | 2.05   | 220                      | 235                            | 100                          |

● NR 3012 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]    |                                | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|--------------------------|--------------------------------|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1 | Temperature rise current: Idc2 |                              |
|               |      |                                  |                      |  |  | Max.                     | Max.                           |                              |
| NR 3012T 1R0N | RoHS | 1.0                              | $\pm 30\%$           | 110  | 0.050  | 1,500                    | 1,490                          | 100                          |
| NR 3012T 1R5N | RoHS | 1.5                              | $\pm 30\%$           | 92   | 0.060  | 1,360                    | 1,400                          | 100                          |
| NR 3012T 2R2M | RoHS | 2.2                              | $\pm 20\%$           | 70   | 0.080  | 1,100                    | 1,200                          | 100                          |
| NR 3012T 3R3M | RoHS | 3.3                              | $\pm 20\%$           | 55   | 0.100  | 910                      | 1,050                          | 100                          |
| NR 3012T 4R7M | RoHS | 4.7                              | $\pm 20\%$           | 48   | 0.130  | 770                      | 980                            | 100                          |
| NR 3012T 6R8M | RoHS | 6.8                              | $\pm 20\%$           | 40   | 0.190  | 670                      | 740                            | 100                          |
| NR 3012T 100M | RoHS | 10                               | $\pm 20\%$           | 32   | 0.290  | 540                      | 630                            | 100                          |
| NR 3012T 150M | RoHS | 15                               | $\pm 20\%$           | 27   | 0.450  | 440                      | 485                            | 100                          |
| NR 3012T 220M | RoHS | 22                               | $\pm 20\%$           | 22   | 0.630  | 375                      | 420                            | 100                          |
| NR 3012T 330M | RoHS | 33                               | $\pm 20\%$           | 19   | 1.03   | 310                      | 330                            | 100                          |
| NR 3012T 470M | RoHS | 47                               | $\pm 20\%$           | 17   | 1.45   | 250                      | 280                            | 100                          |

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■ PARTS NUMBER

● NR 3015 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]            |  | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|----------------------------------|--|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1<br>Max. | Temperature rise current: Idc2<br>Max. |                              |
| NR 3015T 1R0N | RoHS | 1.0                              | $\pm 30\%$           | 100  | 0.030  | 2,100                            | 2,100                                  | 100                          |
| NR 3015T 1R5N | RoHS | 1.5                              | $\pm 30\%$           | 87   | 0.040  | 1,800                            | 1,820                                  | 100                          |
| NR 3015T 2R2M | RoHS | 2.2                              | $\pm 20\%$           | 64   | 0.060  | 1,480                            | 1,500                                  | 100                          |
| NR 3015T 3R3M | RoHS | 3.3                              | $\pm 20\%$           | 49   | 0.080  | 1,210                            | 1,230                                  | 100                          |
| NR 3015T 4R7M | RoHS | 4.7                              | $\pm 20\%$           | 40   | 0.120  | 1,020                            | 1,040                                  | 100                          |
| NR 3015T 6R8M | RoHS | 6.8                              | $\pm 20\%$           | 36   | 0.160  | 870                              | 880                                    | 100                          |
| NR 3015T 100M | RoHS | 10                               | $\pm 20\%$           | 28   | 0.230  | 700                              | 710                                    | 100                          |
| NR 3015T 150M | RoHS | 15                               | $\pm 20\%$           | 23   | 0.360  | 560                              | 560                                    | 100                          |
| NR 3015T 220M | RoHS | 22                               | $\pm 20\%$           | 20   | 0.520  | 470                              | 470                                    | 100                          |
| NR 3015T 330M | RoHS | 33                               | $\pm 20\%$           | 18   | 0.840  | 390                              | 370                                    | 100                          |
| NR 3015T 470M | RoHS | 47                               | $\pm 20\%$           | 17   | 1.34   | 320                              | 300                                    | 100                          |

● NR 4010 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]            |  | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|----------------------------------|--|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1<br>Max. | Temperature rise current: Idc2<br>Max. |                              |
| NR 4010T 1R0N | RoHS | 1.0                              | $\pm 30\%$           | 116  | 0.100  | 1,800                            | 1,050                                  | 100                          |
| NR 4010T 2R2N | RoHS | 2.2                              | $\pm 30\%$           | 73   | 0.150  | 1,150                            | 890                                    | 100                          |
| NR 4010T 3R3M | RoHS | 3.3                              | $\pm 20\%$           | 58   | 0.180  | 1,100                            | 820                                    | 100                          |
| NR 4010T 4R7M | RoHS | 4.7                              | $\pm 20\%$           | 47   | 0.210  | 900                              | 750                                    | 100                          |
| NR 4010T 6R8M | RoHS | 6.8                              | $\pm 20\%$           | 38   | 0.300  | 740                              | 620                                    | 100                          |
| NR 4010T 100M | RoHS | 10                               | $\pm 20\%$           | 31   | 0.380  | 560                              | 600                                    | 100                          |
| NR 4010T 150M | RoHS | 15                               | $\pm 20\%$           | 24   | 0.510  | 470                              | 510                                    | 100                          |
| NR 4010T 220M | RoHS | 22                               | $\pm 20\%$           | 19   | 0.870  | 360                              | 400                                    | 100                          |
| NR 4010T 330M | RoHS | 33                               | $\pm 20\%$           | 15   | 1.54   | 280                              | 300                                    | 100                          |
| NR 4010T 470M | RoHS | 47                               | $\pm 20\%$           | 13   | 1.81   | 240                              | 280                                    | 100                          |

● NR 4012 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]            |  | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|----------------------------------|--|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1<br>Max. | Temperature rise current: Idc2<br>Max. |                              |
| NR 4012T 1R0N | RoHS | 1.0                              | $\pm 30\%$           | 131  | 0.060  | 2,500                            | 1,500                                  | 100                          |
| NR 4012T 2R2M | RoHS | 2.2                              | $\pm 20\%$           | 66   | 0.090  | 1,650                            | 1,200                                  | 100                          |
| NR 4012T 3R3M | RoHS | 3.3                              | $\pm 20\%$           | 50   | 0.130  | 1,200                            | 980                                    | 100                          |
| NR 4012T 4R7M | RoHS | 4.7                              | $\pm 20\%$           | 45   | 0.140  | 1,050                            | 960                                    | 100                          |
| NR 4012T 6R8M | RoHS | 6.8                              | $\pm 20\%$           | 35   | 0.180  | 900                              | 840                                    | 100                          |
| NR 4012T 100M | RoHS | 10                               | $\pm 20\%$           | 28   | 0.240  | 740                              | 770                                    | 100                          |
| NR 4012T 150M | RoHS | 15                               | $\pm 20\%$           | 23   | 0.400  | 560                              | 600                                    | 100                          |
| NR 4012T 220M | RoHS | 22                               | $\pm 20\%$           | 18   | 0.480  | 510                              | 540                                    | 100                          |
| NR 4012T 330M | RoHS | 33                               | $\pm 20\%$           | 15   | 0.810  | 400                              | 420                                    | 100                          |
| NR 4012T 470M | RoHS | 47                               | $\pm 20\%$           | 12   | 1.00   | 350                              | 370                                    | 100                          |

● NR 4018 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]            |  | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|----------------------------------|--|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1<br>Max. | Temperature rise current: Idc2<br>Max. |                              |
| NR 4018T 1R0N | RoHS | 1.0                              | $\pm 30\%$           | 80   | 0.030  | 4,000                            | 1,830                                  | 100                          |
| NR 4018T 2R2M | RoHS | 2.2                              | $\pm 20\%$           | 52   | 0.060  | 2,700                            | 1,440                                  | 100                          |
| NR 4018T 3R3M | RoHS | 3.3                              | $\pm 20\%$           | 44   | 0.070  | 2,000                            | 1,230                                  | 100                          |
| NR 4018T 4R7M | RoHS | 4.7                              | $\pm 20\%$           | 34   | 0.090  | 1,700                            | 1,200                                  | 100                          |
| NR 4018T 6R8M | RoHS | 6.8                              | $\pm 20\%$           | 29   | 0.110  | 1,450                            | 1,060                                  | 100                          |
| NR 4018T 100M | RoHS | 10                               | $\pm 20\%$           | 24   | 0.180  | 1,200                            | 840                                    | 100                          |
| NR 4018T 150M | RoHS | 15                               | $\pm 20\%$           | 19   | 0.250  | 940                              | 650                                    | 100                          |
| NR 4018T 220M | RoHS | 22                               | $\pm 20\%$           | 16   | 0.360  | 800                              | 590                                    | 100                          |
| NR 4018T 330M | RoHS | 33                               | $\pm 20\%$           | 12   | 0.530  | 650                              | 490                                    | 100                          |
| NR 4018T 470M | RoHS | 47                               | $\pm 20\%$           | 10   | 0.650  | 570                              | 420                                    | 100                          |
| NR 4018T 680M | RoHS | 68                               | $\pm 20\%$           | 8.3  | 1.00   | 470                              | 320                                    | 100                          |
| NR 4018T 101M | RoHS | 100                              | $\pm 20\%$           | 6.5  | 1.50   | 400                              | 270                                    | 100                          |
| NR 4018T 151M | RoHS | 150                              | $\pm 20\%$           | 5.5  | 2.50   | 310                              | 220                                    | 100                          |
| NR 4018T 221M | RoHS | 220                              | $\pm 20\%$           | 4.0  | 4.00   | 270                              | 170                                    | 100                          |

● NR 5040 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 30\%$ ) | Rated current ※) [mA]            |  | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|----------------------------------|--|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1<br>Max. | Temperature rise current: Idc2<br>Max. |                              |
| NR 5040T 1R5N | RoHS | 1.5                              | $\pm 30\%$           | 60   | 0.020  | 6,000                            | 3,600                                  | 100                          |
| NR 5040T 2R2N | RoHS | 2.2                              | $\pm 30\%$           | 42   | 0.022  | 4,600                            | 3,500                                  | 100                          |
| NR 5040T 3R3N | RoHS | 3.3                              | $\pm 30\%$           | 32   | 0.027  | 3,800                            | 3,300                                  | 100                          |
| NR 5040T 4R7N | RoHS | 4.7                              | $\pm 30\%$           | 28   | 0.029  | 3,300                            | 3,100                                  | 100                          |
| NR 5040T 6R8M | RoHS | 6.8                              | $\pm 20\%$           | 21   | 0.049  | 2,600                            | 2,300                                  | 100                          |
| NR 5040T 100M | RoHS | 10                               | $\pm 20\%$           | 18   | 0.056  | 2,300                            | 2,100                                  | 100                          |
| NR 5040T 150M | RoHS | 15                               | $\pm 20\%$           | 13   | 0.080  | 2,000                            | 1,800                                  | 100                          |
| NR 5040T 220M | RoHS | 22                               | $\pm 20\%$           | 9  | 0.126  | 1,600                            | 1,400                                  | 100                          |
| NR 5040T 330M | RoHS | 33                               | $\pm 20\%$           | 7  | 0.180  | 1,300                            | 1,200                                  | 100                          |
| NR 5040T 470M | RoHS | 47                               | $\pm 20\%$           | 6  | 0.310  | 1,100                            | 900                                    | 100                          |

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

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## ● NR 6012 Shielded type

| Parts number   | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]            |  | Measuring<br>frequency [kHz] |
|----------------|------|----------------------------------|----------------------|--|--|----------------------------------|--|------------------------------|
|                |      |                                  |                      |  |  | Saturation current: Idc1<br>Max. | Temperature rise current: Idc2<br>Max. |                              |
| NR 6012T 2R5NE | RoHS | 2.5                              | $\pm 30\%$           | 45   | 0.090  | 2,100                            | 1,730                                  | 100                          |
| NR 6012T 4R0NE | RoHS | 4.0                              | $\pm 30\%$           | 39   | 0.105  | 1,800                            | 1,570                                  | 100                          |
| NR 6012T 5R3ME | RoHS | 5.3                              | $\pm 20\%$           | 34   | 0.125  | 1,500                            | 1,400                                  | 100                          |
| NR 6012T 6R8ME | RoHS | 6.8                              | $\pm 20\%$           | 30   | 0.165  | 1,300                            | 1,180                                  | 100                          |
| NR 6012T 100ME | RoHS | 10                               | $\pm 20\%$           | 22   | 0.235  | 1,000                            | 1,000                                  | 100                          |
| NR 6012T 150ME | RoHS | 15                               | $\pm 20\%$           | 18   | 0.330  | 800                              | 790                                    | 100                          |
| NR 6012T 220ME | RoHS | 22                               | $\pm 20\%$           | 12   | 0.530  | 760                              | 630                                    | 100                          |
| NR 6012T 330ME | RoHS | 33                               | $\pm 20\%$           | 8  | 0.700  | 590                              | 530                                    | 100                          |
| NR 6012T 470ME | RoHS | 47                               | $\pm 20\%$           | 6  | 1.05   | 520                              | 460                                    | 100                          |
| NR 6012T 680ME | RoHS | 68                               | $\pm 20\%$           | 3  | 1.35   | 440                              | 410                                    | 100                          |
| NR 6012T 101ME | RoHS | 100                              | $\pm 20\%$           | 1  | 2.18   | 350                              | 320                                    | 100                          |

## ● NR 6020 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 20\%$ ) | Rated current ※) [mA]            |  | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|----------------------------------|--|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1<br>Max. | Temperature rise current: Idc2<br>Max. |                              |
| NR 6020T 0R8N | RoHS | 0.8                              | $\pm 30\%$           | 110  | 0.020  | 5,500                            | 3,800                                  | 100                          |
| NR 6020T 1R5N | RoHS | 1.5                              | $\pm 30\%$           | 93   | 0.026  | 4,000                            | 3,200                                  | 100                          |
| NR 6020T 2R2N | RoHS | 2.2                              | $\pm 30\%$           | 73   | 0.034  | 3,200                            | 2,700                                  | 100                          |
| NR 6020T 3R3N | RoHS | 3.3                              | $\pm 30\%$           | 55   | 0.040  | 2,800                            | 2,600                                  | 100                          |
| NR 6020T 4R7N | RoHS | 4.7                              | $\pm 30\%$           | 43   | 0.058  | 2,400                            | 2,000                                  | 100                          |
| NR 6020T 6R8N | RoHS | 6.8                              | $\pm 30\%$           | 30   | 0.085  | 2,000                            | 1,800                                  | 100                          |
| NR 6020T 100M | RoHS | 10                               | $\pm 20\%$           | 18   | 0.125  | 1,700                            | 1,400                                  | 100                          |
| NR 6020T 220M | RoHS | 22                               | $\pm 20\%$           | 11   | 0.290  | 1,050                            | 950                                    | 100                          |

## ● NR 6028 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 30\%$ ) | Rated current ※) [mA]            |  | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|----------------------------------|--|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1<br>Max. | Temperature rise current: Idc2<br>Max. |                              |
| NR 6028T 0R9N | RoHS | 0.9                              | $\pm 30\%$           | 90   | 0.013  | 6,600                            | 4,600                                  | 100                          |
| NR 6028T 1R5N | RoHS | 1.5                              | $\pm 30\%$           | 78   | 0.016  | 5,000                            | 4,200                                  | 100                          |
| NR 6028T 2R2N | RoHS | 2.2                              | $\pm 30\%$           | 68   | 0.020  | 4,200                            | 3,700                                  | 100                          |
| NR 6028T 3R0N | RoHS | 3.0                              | $\pm 30\%$           | 55   | 0.023  | 3,600                            | 3,400                                  | 100                          |
| NR 6028T 4R7M | RoHS | 4.7                              | $\pm 20\%$           | 39   | 0.031  | 2,700                            | 3,000                                  | 100                          |
| NR 6028T 6R0M | RoHS | 6.0                              | $\pm 20\%$           | 30   | 0.040  | 2,500                            | 2,500                                  | 100                          |
| NR 6028T 100M | RoHS | 10                               | $\pm 20\%$           | 20   | 0.065  | 1,900                            | 1,900                                  | 100                          |
| NR 6028T 150M | RoHS | 15                               | $\pm 20\%$           | 17   | 0.095  | 1,600                            | 1,800                                  | 100                          |
| NR 6028T 220M | RoHS | 22                               | $\pm 20\%$           | 12   | 0.135  | 1,300                            | 1,400                                  | 100                          |
| NR 6028T 330M | RoHS | 33                               | $\pm 20\%$           | 10   | 0.220  | 1,100                            | 1,100                                  | 100                          |
| NR 6028T 470M | RoHS | 47                               | $\pm 20\%$           | 8  | 0.300  | 950                              | 920                                    | 100                          |
| NR 6028T 680M | RoHS | 68                               | $\pm 20\%$           | 5  | 0.420  | 760                              | 770                                    | 100                          |
| NR 6028T 101M | RoHS | 100                              | $\pm 20\%$           | 3  | 0.600  | 620                              | 660                                    | 100                          |

## ● NR 6045 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 30\%$ ) | Rated current ※) [mA]            |  | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|----------------------------------|--|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1<br>Max. | Temperature rise current: Idc2<br>Max. |                              |
| NR 6045T 1R0N | RoHS | 1.0                              | $\pm 30\%$           | 110  | 0.014  | 8,500                            | 4,200                                  | 100                          |
| NR 6045T 1R3N | RoHS | 1.3                              | $\pm 30\%$           | 95   | 0.016  | 8,000                            | 4,000                                  | 100                          |
| NR 6045T 1R8N | RoHS | 1.8                              | $\pm 30\%$           | 80   | 0.018  | 7,000                            | 3,700                                  | 100                          |
| NR 6045T 2R3N | RoHS | 2.3                              | $\pm 30\%$           | 60   | 0.021  | 6,000                            | 3,500                                  | 100                          |
| NR 6045T 3R0N | RoHS | 3.0                              | $\pm 30\%$           | 45   | 0.024  | 5,000                            | 3,200                                  | 100                          |
| NR 6045T 4R5M | RoHS | 4.5                              | $\pm 20\%$           | 25   | 0.031  | 4,000                            | 3,000                                  | 100                          |
| NR 6045T 6R3M | RoHS | 6.3                              | $\pm 20\%$           | 15   | 0.038  | 3,800                            | 2,800                                  | 100                          |
| NR 6045T 100M | RoHS | 10                               | $\pm 20\%$           | 12   | 0.047  | 3,000                            | 2,500                                  | 100                          |
| NR 6045T 150M | RoHS | 15                               | $\pm 20\%$           | 10   | 0.077  | 2,300                            | 1,900                                  | 100                          |
| NR 6045T 220M | RoHS | 22                               | $\pm 20\%$           | 7  | 0.115  | 1,900                            | 1,500                                  | 100                          |
| NR 6045T 330M | RoHS | 33                               | $\pm 20\%$           | 6  | 0.145  | 1,500                            | 1,400                                  | 100                          |
| NR 6045T 470M | RoHS | 47                               | $\pm 20\%$           | 5  | 0.220  | 1,300                            | 1,100                                  | 100                          |
| NR 6045T 680M | RoHS | 68                               | $\pm 20\%$           | 4  | 0.330  | 1,000                            | 900                                    | 100                          |
| NR 6045T 101M | RoHS | 100                              | $\pm 20\%$           | 3  | 0.500  | 800                              | 700                                    | 100                          |

## ● NR 8040 Shielded type

| Parts number  | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance tolerance | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] ( $\pm 30\%$ ) | Rated current ※) [mA]            |  | Measuring<br>frequency [kHz] |
|---------------|------|----------------------------------|----------------------|--|--|----------------------------------|--|------------------------------|
|               |      |                                  |                      |  |  | Saturation current: Idc1<br>Max. | Temperature rise current: Idc2<br>Max. |                              |
| NR 8040T 0R9N | RoHS | 0.9                              | $\pm 30\%$           | 85   | 0.006  | 11,000                           | 7,800                                  | 100                          |
| NR 8040T 1R4N | RoHS | 1.4                              | $\pm 30\%$           | 63   | 0.007  | 9,000                            | 7,000                                  | 100                          |
| NR 8040T 2R0N | RoHS | 2.0                              | $\pm 30\%$           | 50   | 0.009  | 7,400                            | 6,300                                  | 100                          |
| NR 8040T 3R6N | RoHS | 3.6                              | $\pm 30\%$           | 34   | 0.015  | 5,300                            | 4,900                                  | 100                          |
| NR 8040T 4R7N | RoHS | 4.7                              | $\pm 30\%$           | 30   | 0.018  | 4,700                            | 4,100                                  | 100                          |
| NR 8040T 6R8N | RoHS | 6.8                              | $\pm 30\%$           | 24   | 0.025  | 4,000                            | 3,700                                  | 100                          |
| NR 8040T 100M | RoHS | 10                               | $\pm 20\%$           | 22   | 0.034  | 3,400                            | 3,100                                  | 100                          |
| NR 8040T 150M | RoHS | 15                               | $\pm 20\%$           | 16   | 0.050  | 2,700                            | 2,400                                  | 100                          |
| NR 8040T 220M | RoHS | 22                               | $\pm 20\%$           | 13   | 0.066  | 2,200                            | 2,200                                  | 100                          |
| NR 8040T 330M | RoHS | 33                               | $\pm 20\%$           | 12   | 0.100  | 1,900                            | 1,700                                  | 100                          |
| NR 8040T 470M | RoHS | 47                               | $\pm 20\%$           | 8  | 0.150  | 1,500                            | 1,400                                  | 100                          |
| NR 8040T 680M | RoHS | 68                               | $\pm 20\%$           | 7  | 0.230  | 1,200                            | 1,100                                  | 100                          |
| NR 8040T 101M | RoHS | 100                              | $\pm 20\%$           | 6  | 0.290  | 1,000                            | 1,000                                  | 100                          |

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

# SMD POWER INDUCTORS (NR SERIES/NR SERIES H TYPE/M TYPE/S TYPE/V TYPE)

## PACKAGING

### ① Minimum Quantity

| Type    | Standard Quantity [pcs] |
|---------|-------------------------|
|         | Tape & Reel             |
| NRV2010 | 2500                    |
| NRS2012 | 2500                    |
| NRV2012 | 2500                    |
| NRH2410 | 2500                    |
| NRH2412 | 2500                    |
| NR 3010 | 2000                    |
| NRH3010 | 2000                    |
| NR 3012 | 2000                    |
| NRH3012 | 2000                    |
| NRV3012 | 2000                    |
| NR 3015 | 2000                    |
| NRS3015 | 2000                    |
| NR 4010 | 5000                    |
| NRS4010 | 5000                    |
| NR 4012 | 4500                    |
| NRS4012 | 4500                    |
| NR 4018 | 3500                    |
| NRS4018 | 3500                    |

| Type    | Standard Quantity [pcs] |
|---------|-------------------------|
|         | Tape & Reel             |
| NRS5010 | 1000                    |
| NRS5012 | 1000                    |
| NRS5014 | 1000                    |
| NRS5020 | 800                     |
| NRS5024 | 2500                    |
| NRS5030 | 500                     |
| NR 5040 | 1500                    |
| NRS5040 | 1500                    |
| NRS6010 | 1000                    |
| NR 6012 | 1000                    |
| NRS6012 | 1000                    |
| NRS6014 | 1000                    |
| NR 6020 | 2500                    |
| NRS6020 | 2500                    |
| NR 6028 | 2000                    |
| NRS6028 | 2000                    |
| NR 6045 | 1500                    |
| NRM6045 | 1500                    |
| NRS6045 | 1500                    |
| NRS8030 | 1000                    |
| NR 8040 | 1000                    |
| NRS8040 | 1000                    |

### ② Tape Material

#### ● Embossed Tape



### ③ Taping dimensions

#### ● Embossed tape 8mm wide (0.315 inches wide)



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● Embossed tape 16mm wide (0.63 inches wide)



| Type               | Chip cavity                            |  | Insertion pitch<br>F                    | Tape thickness                         |  |
|--------------------|--|--|---|--|--|
|                    | A                                      | B                                      |   | T                                      | K                                      |
| NRS8030            | $8.3 \pm 0.1$<br>( $0.327 \pm 0.004$ ) | $8.3 \pm 0.1$<br>( $0.327 \pm 0.004$ ) | $12.0 \pm 0.1$<br>( $0.472 \pm 0.004$ ) | $0.5 \pm 0.1$<br>( $0.020 \pm 0.004$ ) | $3.4 \pm 0.1$<br>( $0.134 \pm 0.004$ ) |
| NR 8040<br>NRS8040 |  |  |   |  | $4.5 \pm 0.1$<br>( $0.177 \pm 0.004$ ) |

Unit: mm (inch)

#### ④ Leader and Blank portion

● NR, NRH, NRS, NRV



#### ⑤ Reel size



| Type    | Reel size (Reference values)           |                                     |   |
|---------|--|-------------------------------------|---|
|         | $\phi D$                               | $\phi d$                            | W                                       |
| NRV2010 | $180 \pm 0.5$<br>( $7.087 \pm 0.019$ ) | $60 \pm 1.0$<br>( $2.36 \pm 0.04$ ) | $10.0 \pm 1.5$<br>( $0.394 \pm 0.059$ ) |
| NRS2012 |  |                                     |   |
| NRV2012 |  |                                     |   |
| NRH2410 |  |                                     |   |
| NRH2412 |  |                                     |   |
| NR 3010 |  |                                     |   |
| NRH3010 |  |                                     |   |
| NR 3012 |  |                                     |   |
| NRH3012 |  |                                     |   |
| NRV3012 |  |                                     |   |
| NR 3015 | $180 \pm 0.5$<br>( $7.087 \pm 0.019$ ) | $60 \pm 1.0$<br>( $2.36 \pm 0.04$ ) | $10.0 \pm 1.5$<br>( $0.394 \pm 0.059$ ) |
| NRS3015 |  |                                     |   |

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|         |                          |                       |                           |
|---------|--------------------------|-----------------------|---------------------------|
| NRS5010 | 180±3.0<br>(7.087±0.118) | 60±2.0<br>(2.36±0.08) | 14.0±1.5<br>(0.551±0.059) |
| NRS5012 |                          |                       |                           |
| NRS5014 |                          |                       |                           |
| NRS5020 |                          |                       |                           |
| NRS5030 |                          |                       |                           |
| NRS6010 |                          |                       |                           |
| NR 6012 |                          |                       |                           |
| NRS6012 |                          |                       |                           |
| NRS6014 |                          |                       |                           |

Unit: mm (inch)



| Type    | Reel size (Reference values) |                          |                |                          |
|---------|------------------------------|--------------------------|----------------|--------------------------|
|         | ϕD                           | ϕd                       | t (max.)       | W                        |
| NR 4010 | 330±3.0<br>(12.99±0.118)     | 80±2.0<br>(3.15±0.078)   | 18.5<br>(0.72) | 13.5±1.0<br>(0.531±0.04) |
| NRS4010 |                              |                          |                |                          |
| NR 4012 |                              |                          |                |                          |
| NRS4012 |                              |                          |                |                          |
| NR 4018 |                              |                          |                |                          |
| NRS4018 |                              |                          |                |                          |
| NRS5024 |                              |                          |                |                          |
| NR 5040 |                              |                          |                |                          |
| NRS5040 |                              |                          |                |                          |
| NR 6020 |                              |                          |                |                          |
| NRS6020 |                              |                          |                |                          |
| NR 6028 |                              |                          |                |                          |
| NRS6028 |                              |                          |                |                          |
| NR 6045 |                              |                          |                |                          |
| NRM6045 |                              |                          |                |                          |
| NRS6045 |                              |                          |                |                          |
| NRS8030 | 22.5<br>(0.89)               | 17.5±1.0<br>(0.689±0.04) |                |                          |
| NR 8040 |                              |                          |                |                          |
| NRS8040 |                              |                          |                |                          |

Unit: mm (inch)

### ⑥ Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



# SMD POWER INDUCTORS (NR□, NS SERIES)

## RELIABILITY DATA

| 1. Operating Temperature Range |   |                                |
|--------------------------------|---|--------------------------------|
| Specified Value                | NR30/40/50/60/80, NRS20, NRV20/30, NRH24/30 Type  | -25~+120°C                     |
|                                | NRS40/50/60/80 Type   | -25~+125°C                     |
|                                | NR10050 Type  | -25~+105°C                     |
|                                | NS101, NS125 Type   | -40~+125°C                     |
| Test Methods and Remarks       | Including self-generated heat   |                                |
| 2. Storage Temperature Range   |   |                                |
| Specified Value                | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type  | -40~+85°C                      |
|                                | NR10050 Type  |                                |
|                                | NS101, NS125 Type   |                                |
| Test Methods and Remarks       | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type, NS101/125 Type :<br>-5 to 40°C for the product with taping.   |                                |
| 3. Rated current               |   |                                |
| Specified Value                | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type  | Within the specified tolerance |
|                                | NR10050 Type  |                                |
|                                | NS101, NS125 Type   |                                |
| 4. Inductance                  |   |                                |
| Specified Value                | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type  | Within the specified tolerance |
|                                | NR10050 Type  |                                |
|                                | NS101, NS125 Type   |                                |
| Test Methods and Remarks       | Measuring equipment : LCR Meter (HP 4285A or equivalent)<br>Measuring frequency : Specified frequency<br>NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type, NS101/125 Type :<br>Measuring equipment : LCR Meter (HP 4285A or equivalent)<br>Measuring frequency : 100kHz, 1V<br>NR10050 Type :<br>Measuring equipment : LCR Meter (HP 4263A or equivalent)<br>Measuring frequency : 100kHz, 1V |                                |
| 5. DC Resistance               |   |                                |
| Specified Value                | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type  | Within the specified tolerance |
|                                | NR10050 Type  |                                |
|                                | NS101, NS125 Type   |                                |
| Test Methods and Remarks       | Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)  |                                |
| 6. Self resonance frequency    |   |                                |
| Specified Value                | NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type  | Within the specified tolerance |
|                                | NR10050 Type  |                                |
|                                | NS101, NS125 Type   | -                              |
| Test Methods and Remarks       | NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NR10050 Type :<br>Measuring equipment : Impedance analyzer/material analyzer (HP4291A or equivalent HP4191A, 4192A or equivalent)   |                                |

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| 7. Temperature characteristic |  |                                       |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
|-------------------------------|--|---------------------------------------|------------------------------------|---|----|---|-------------------------------|---|---------------------------|---|-------------------------------|---|----|--|
| Specified Value               | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type  | Inductance change : Within $\pm 20\%$ |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
|                               | NR10050 Type   |                                       |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
|                               | NS101, NS125 Type  | Inductance change : Within $\pm 15\%$ |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
| Test Methods and Remarks      | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type :<br>Measurement of inductance shall be taken at temperature range within $-25^{\circ}\text{C}\sim +85^{\circ}\text{C}$ .<br>With reference to inductance value at $+20^{\circ}\text{C}$ ., change rate shall be calculated.  |                                       |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
|                               | NS101, NS125 Type :<br>Measurement of inductance shall be taken at temperature range within $-40^{\circ}\text{C}\sim +125^{\circ}\text{C}$ .<br>With reference to inductance value at $+20^{\circ}\text{C}$ ., change rate shall be calculated.<br>Change of maximum inductance deviation in step 1 to 5   |                                       |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
|                               | <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (<math>^{\circ}\text{C}</math>)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20</td> </tr> <tr> <td>2</td> <td>Minimum operating temperature</td> </tr> <tr> <td>3</td> <td>20 (Standard temperature)</td> </tr> <tr> <td>4</td> <td>Maximum operating temperature</td> </tr> <tr> <td>5</td> <td>20</td> </tr> </tbody> </table> | Step                                  | Temperature ( $^{\circ}\text{C}$ ) | 1 | 20 | 2 | Minimum operating temperature | 3 | 20 (Standard temperature) | 4 | Maximum operating temperature | 5 | 20 |  |
| Step                          | Temperature ( $^{\circ}\text{C}$ )   |                                       |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
| 1                             | 20   |                                       |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
| 2                             | Minimum operating temperature  |                                       |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
| 3                             | 20 (Standard temperature)  |                                       |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
| 4                             | Maximum operating temperature  |                                       |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |
| 5                             | 20   |                                       |                                    |   |    |   |                               |   |                           |   |                               |   |    |  |

| 8. Resistance to flexure of substrate |   |           |     |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
|---------------------------------------|---|-----------|-----|---|---|--------------|------|-----|-----|-------|-----|------|-----|--------------------|-----|-----|-----|-------------|-----|-----|-----|-------------|-----|-----|-----|-------------|-----|-----|-----|-------------|-----|-----|-----|------|---|---|---|-------|-----|-----|-----|-------|-----|-----|
| Specified Value                       | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type   | No damage |     |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
|                                       | NR10050 Type  | —         |     |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
|                                       | NS101, NS125 Type   | No damage |     |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| Test Methods and Remarks              | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NS101/125 Type :<br>The test samples shall be soldered to the test board by the reflow. As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm.<br>Test board size : $100 \times 40 \times 1.0$<br>Test board material : Glass epoxy-resin<br>Solder cream thickness : $0.10\text{mm}$ (NR30, NRS20, NRH24/30, NRV20/30)<br>$0.15\text{mm}$ (NR40/50/60/80, NRS40/50/60, NS101/125Type)  |           |     |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
|                                       | <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p>Land dimension</p>  </div> <table border="1"> <thead> <tr> <th>Type</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>NRS20, NRV20</td> <td>0.65</td> <td>0.7</td> <td>2.0</td> </tr> <tr> <td>NRH24</td> <td>0.7</td> <td>0.75</td> <td>2.0</td> </tr> <tr> <td>NR30, NRV30, NRH30</td> <td>0.8</td> <td>1.4</td> <td>2.7</td> </tr> <tr> <td>NR40, NRS40</td> <td>1.2</td> <td>1.6</td> <td>3.7</td> </tr> <tr> <td>NR50, NRS50</td> <td>1.5</td> <td>2.1</td> <td>4.0</td> </tr> <tr> <td>NR60, NRS60</td> <td>1.6</td> <td>3.1</td> <td>5.7</td> </tr> <tr> <td>NR80, NRS80</td> <td>1.8</td> <td>3.8</td> <td>7.5</td> </tr> </tbody> </table> </div> <div style="margin-left: 20px;">  <table border="1"> <thead> <tr> <th>Type</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>NS101</td> <td>2.5</td> <td>5.6</td> <td>3.2</td> </tr> <tr> <td>NS125</td> <td>2.5</td> <td>8.6</td> <td>3.2</td> </tr> </tbody> </table> </div> | Type      | A   | B | C | NRS20, NRV20 | 0.65 | 0.7 | 2.0 | NRH24 | 0.7 | 0.75 | 2.0 | NR30, NRV30, NRH30 | 0.8 | 1.4 | 2.7 | NR40, NRS40 | 1.2 | 1.6 | 3.7 | NR50, NRS50 | 1.5 | 2.1 | 4.0 | NR60, NRS60 | 1.6 | 3.1 | 5.7 | NR80, NRS80 | 1.8 | 3.8 | 7.5 | Type | A | B | C | NS101 | 2.5 | 5.6 | 3.2 | NS125 | 2.5 | 8.6 |
| Type                                  | A   | B         | C   |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| NRS20, NRV20                          | 0.65  | 0.7       | 2.0 |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| NRH24                                 | 0.7   | 0.75      | 2.0 |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| NR30, NRV30, NRH30                    | 0.8   | 1.4       | 2.7 |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| NR40, NRS40                           | 1.2   | 1.6       | 3.7 |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| NR50, NRS50                           | 1.5   | 2.1       | 4.0 |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| NR60, NRS60                           | 1.6   | 3.1       | 5.7 |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| NR80, NRS80                           | 1.8   | 3.8       | 7.5 |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| Type                                  | A   | B         | C   |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| NS101                                 | 2.5   | 5.6       | 3.2 |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |
| NS125                                 | 2.5   | 8.6       | 3.2 |   |   |              |      |     |     |       |     |      |     |                    |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |             |     |     |     |      |   |   |   |       |     |     |     |       |     |     |

| 9. Insulation resistance : between wires |   |   |
|--|---|---|
| Specified Value                          | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type | — |
|  | NR10050 Type  |   |
|  | NS101, NS125 Type   |   |

| 10. Insulation resistance : between wire and core |   |   |
|---|---|---|
| Specified Value                                   | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type | — |
|   | NR10050 Type  |   |
|   | NS101, NS125 Type   |   |

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11. Withstanding voltage : between wire and core

|                 |   |   |
|-----------------|---|---|
| Specified Value | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type | - |
|                 | NR10050 Type  |   |
|                 | NS101, NS125 Type   |   |

12. Adhesion of terminal electrode

|                          |   |                             |
|--------------------------|---|-----------------------------|
| Specified Value          | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type   | Shall not come off PC board |
|                          | NR10050 Type  |                             |
|                          | NS101, NS125 Type   |                             |
| Test Methods and Remarks | <p>NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NS101/125 Type :</p> <p>The test samples shall be soldered to the test board by the reflow.</p> <p>Applied force : 10N to X and Y directions.<br/>Duration : 5s.<br/>Solder cream thickness : 0.10mm (NR30, NRS20, NRH24/30, NRV20/30)<br/>: 0.15mm (NR40/50/60/80, NRS40/50/60, NS101/125Type)</p>  <p>NR10050 Type<br/>Applied force : 5N to X and Y directions.<br/>Duration : 5s.</p> |                             |

13. Resistance to vibration

|                          |   |  |         |  |                 |  |  |                 |                                |  |      |   |                                       |   |   |  |
|--------------------------|---|--|---------|--|-----------------|--|--|-----------------|--------------------------------|--|------|---|---------------------------------------|---|---|--|
| Specified Value          | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type   | Inductance change : Within $\pm 10\%$<br>No significant abnormality in appearance. |         |  |                 |  |  |                 |                                |  |      |   |                                       |   |   |  |
|                          | NR10050 Type  |  |         |  |                 |  |  |                 |                                |  |      |   |                                       |   |   |  |
|                          | NS101, NS125 Type   |  |         |  |                 |  |  |                 |                                |  |      |   |                                       |   |   |  |
| Test Methods and Remarks | <p>NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type, NS101/125 Type :</p> <p>The test samples shall be soldered to the test board by the reflow.<br/>Then it shall be submitted to below test conditions.</p> <table border="1" data-bbox="295 1164 1133 1344"> <tr> <td>Frequency Range</td> <td colspan="2">10~55Hz</td> </tr> <tr> <td>Total Amplitude</td> <td colspan="2">1.5mm (May not exceed acceleration 196m/s<sup>2</sup>)</td> </tr> <tr> <td>Sweeping Method</td> <td colspan="2">10Hz to 55Hz to 10Hz for 1min.</td> </tr> <tr> <td rowspan="3">Time</td> <td>X</td> <td rowspan="3">For 2 hours on each X, Y, and Z axis.</td> </tr> <tr> <td>Y</td> </tr> <tr> <td>Z</td> </tr> </table> <p>Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.</p> | Frequency Range  | 10~55Hz |  | Total Amplitude | 1.5mm (May not exceed acceleration 196m/s <sup>2</sup> ) |  | Sweeping Method | 10Hz to 55Hz to 10Hz for 1min. |  | Time | X | For 2 hours on each X, Y, and Z axis. | Y | Z |  |
| Frequency Range          | 10~55Hz   |  |         |  |                 |  |  |                 |                                |  |      |   |                                       |   |   |  |
| Total Amplitude          | 1.5mm (May not exceed acceleration 196m/s <sup>2</sup> )  |  |         |  |                 |  |  |                 |                                |  |      |   |                                       |   |   |  |
| Sweeping Method          | 10Hz to 55Hz to 10Hz for 1min.  |  |         |  |                 |  |  |                 |                                |  |      |   |                                       |   |   |  |
| Time                     | X   | For 2 hours on each X, Y, and Z axis.  |         |  |                 |  |  |                 |                                |  |      |   |                                       |   |   |  |
|                          | Y   |  |         |  |                 |  |  |                 |                                |  |      |   |                                       |   |   |  |
|                          | Z   |  |         |  |                 |  |  |                 |                                |  |      |   |                                       |   |   |  |

14. Solderability

|                          |  |   |                          |      |                  |  |
|--------------------------|--|---|--------------------------|------|------------------|--|
| Specified Value          | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type  | At least 90% of surface of terminal electrode is covered by new solder. |                          |      |                  |  |
|                          | NR10050 Type   |   |                          |      |                  |  |
|                          | NS101, NS125 Type  |   |                          |      |                  |  |
| Test Methods and Remarks | <p>The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table.</p> <p>Flux : Methanol solution containing rosin 25%.<br/>NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type, NS101/125 Type</p> <table border="1" data-bbox="279 1691 702 1758"> <tr> <td>Solder Temperature</td> <td>245<math>\pm</math>5<math>^{\circ}</math>C</td> </tr> <tr> <td>Time</td> <td>5<math>\pm</math>1.0 sec.</td> </tr> </table> <p>※Immersion depth : All sides of mounting terminal shall be immersed.</p> | Solder Temperature  | 245 $\pm$ 5 $^{\circ}$ C | Time | 5 $\pm$ 1.0 sec. |  |
| Solder Temperature       | 245 $\pm$ 5 $^{\circ}$ C   |   |                          |      |                  |  |
| Time                     | 5 $\pm$ 1.0 sec.   |   |                          |      |                  |  |

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| 15. Resistance to soldering heat |  |  |
|----------------------------------|--|--|
| Specified Value                  | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type  | Inductance change : Within $\pm 10\%$<br>No significant abnormality in appearance. |
|                                  | NR10050 Type   |  |
|                                  | NS101, NS125 Type  |  |
| Test Methods and Remarks         | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type, NS101/125 Type :<br>The test sample shall be exposed to reflow oven at $230\pm 5^{\circ}\text{C}$ for 40 seconds, with peak temperature at $260\pm 5^{\circ}\text{C}$ for 5 seconds, 2 times.<br><br>NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NS101/125 Type<br>Test board material : Glass epoxy-resin<br>Test board thickness : 1.0mm<br>NR10050 Type<br>Test board material : Glass epoxy-resin<br>Test board thickness : 1.6mm<br>Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. |  |

| 16. Thermal shock        |  |  |                       |  |  |      |                                    |                |   |            |           |   |                  |          |   |            |           |   |                  |          |
|--------------------------|--|--|-----------------------|--|--|------|------------------------------------|----------------|---|------------|-----------|---|------------------|----------|---|------------|-----------|---|------------------|----------|
| Specified Value          | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type  | Inductance change : Within $\pm 10\%$<br>No significant abnormality in appearance. |                       |  |  |      |                                    |                |   |            |           |   |                  |          |   |            |           |   |                  |          |
|                          | NR10050 Type   |  |                       |  |  |      |                                    |                |   |            |           |   |                  |          |   |            |           |   |                  |          |
|                          | NS101, NS125 Type  |  |                       |  |  |      |                                    |                |   |            |           |   |                  |          |   |            |           |   |                  |          |
| Test Methods and Remarks | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type, NS101/125 Type :<br>The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence. The temperature cycle shall be repeated 100 cycles. <table border="1" style="margin: 10px auto;"> <thead> <tr> <th colspan="3">Conditions of 1 cycle</th> </tr> <tr> <th>Step</th> <th>Temperature (<math>^{\circ}\text{C}</math>)</th> <th>Duration (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-40\pm 3</math></td> <td><math>30\pm 3</math></td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td><math>+85\pm 2</math></td> <td><math>30\pm 3</math></td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>Within 3</td> </tr> </tbody> </table> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. |  | Conditions of 1 cycle |  |  | Step | Temperature ( $^{\circ}\text{C}$ ) | Duration (min) | 1 | $-40\pm 3$ | $30\pm 3$ | 2 | Room temperature | Within 3 | 3 | $+85\pm 2$ | $30\pm 3$ | 4 | Room temperature | Within 3 |
| Conditions of 1 cycle    |  |  |                       |  |  |      |                                    |                |   |            |           |   |                  |          |   |            |           |   |                  |          |
| Step                     | Temperature ( $^{\circ}\text{C}$ )   | Duration (min)   |                       |  |  |      |                                    |                |   |            |           |   |                  |          |   |            |           |   |                  |          |
| 1                        | $-40\pm 3$   | $30\pm 3$  |                       |  |  |      |                                    |                |   |            |           |   |                  |          |   |            |           |   |                  |          |
| 2                        | Room temperature   | Within 3   |                       |  |  |      |                                    |                |   |            |           |   |                  |          |   |            |           |   |                  |          |
| 3                        | $+85\pm 2$   | $30\pm 3$  |                       |  |  |      |                                    |                |   |            |           |   |                  |          |   |            |           |   |                  |          |
| 4                        | Room temperature   | Within 3   |                       |  |  |      |                                    |                |   |            |           |   |                  |          |   |            |           |   |                  |          |

| 17. Damp heat            |   |  |             |                           |          |          |      |                |
|--------------------------|---|--|-------------|---------------------------|----------|----------|------|----------------|
| Specified Value          | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type   | Inductance change : Within $\pm 10\%$<br>No significant abnormality in appearance. |             |                           |          |          |      |                |
|                          | NR10050 Type  |  | —           |                           |          |          |      |                |
|                          | NS101, NS125 Type   | Inductance change : Within $\pm 10\%$<br>No significant abnormality in appearance. |             |                           |          |          |      |                |
| Test Methods and Remarks | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NS101/125 Type :<br>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 table. <table border="1" style="margin: 10px auto;"> <tbody> <tr> <td>Temperature</td> <td><math>60\pm 2^{\circ}\text{C}</math></td> </tr> <tr> <td>Humidity</td> <td>90~95%RH</td> </tr> <tr> <td>Time</td> <td>500+24/-0 hour</td> </tr> </tbody> </table> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. |  | Temperature | $60\pm 2^{\circ}\text{C}$ | Humidity | 90~95%RH | Time | 500+24/-0 hour |
| Temperature              | $60\pm 2^{\circ}\text{C}$   |  |             |                           |          |          |      |                |
| Humidity                 | 90~95%RH  |  |             |                           |          |          |      |                |
| Time                     | 500+24/-0 hour  |  |             |                           |          |          |      |                |

| 18. Loading under damp heat |   |  |             |                           |          |          |                 |               |      |                |
|-----------------------------|---|--|-------------|---------------------------|----------|----------|-----------------|---------------|------|----------------|
| Specified Value             | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type   | Inductance change : Within $\pm 10\%$<br>No significant abnormality in appearance. |             |                           |          |          |                 |               |      |                |
|                             | NR10050 Type  |  |             |                           |          |          |                 |               |      |                |
|                             | NS101, NS125 Type   |  |             |                           |          |          |                 |               |      |                |
| Test Methods and Remarks    | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type, NS101/125 Type :<br>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 and applied the rated current continuously as shown in below table. <table border="1" style="margin: 10px auto;"> <tbody> <tr> <td>Temperature</td> <td><math>60\pm 2^{\circ}\text{C}</math></td> </tr> <tr> <td>Humidity</td> <td>90~95%RH</td> </tr> <tr> <td>Applied current</td> <td>Rated current</td> </tr> <tr> <td>Time</td> <td>500+24/-0 hour</td> </tr> </tbody> </table> Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. |  | Temperature | $60\pm 2^{\circ}\text{C}$ | Humidity | 90~95%RH | Applied current | Rated current | Time | 500+24/-0 hour |
| Temperature                 | $60\pm 2^{\circ}\text{C}$   |  |             |                           |          |          |                 |               |      |                |
| Humidity                    | 90~95%RH  |  |             |                           |          |          |                 |               |      |                |
| Applied current             | Rated current   |  |             |                           |          |          |                 |               |      |                |
| Time                        | 500+24/-0 hour  |  |             |                           |          |          |                 |               |      |                |

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 For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (<http://www.ty-top.com/>).

| 19. Low temperature life test   |  |  |
|---|--|--|
| Specified Value   | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type  | Inductance change : Within $\pm 10\%$<br>No significant abnormality in appearance.   |
|   | NR10050 Type   |  |
|   | NS101, NS125 Type  |  |
| Test Methods and Remarks  | NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type, NS101/125 Type :<br>The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table. |  |
|   | Temperature  | $-40 \pm 2^{\circ}\text{C}$  |
|   | Time   | $500 + 24 / - 0$ hour  |
| Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. |  |  |
| 20. High temperature life test  |  |  |
| Specified Value   | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type  | —  |
|   | NR10050 Type   | —  |
|   | NS101, NS125 Type  | —  |
| Test Methods and Remarks  | NR10050 Type :   |  |
|   | Temperature  | $105 \pm 3^{\circ}\text{C}$  |
|   | Time   | $500 + 24 / - 0$ hour  |
| Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. |  |  |
| 21. Loading at high temperature life test   |  |  |
| Specified Value   | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type  | Inductance change : Within $\pm 10\%$<br>No significant abnormality in appearance.   |
|   | NR10050 Type   | —  |
|   | NS101, NS125 Type  | Inductance change : Within $\pm 10\%$<br>No significant abnormality in appearance.   |
| Test Methods and Remarks  | NR30/40/50/60/80, NRV30, NRH24/30, NRS40/50/60/80 Type, NS12555, NS12565, NS12575 Type :<br>The test samples shall be soldered to the test board by the reflow soldering.  |  |
|   | Temperature  | $85 \pm 2^{\circ}\text{C}$   |
|   | Applied current  | Rated current  |
|   | Time   | $500 + 24 / - 0$ hour  |
| Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. |  |  |
| 22. Standard condition  |  |  |
| Specified Value   | NR30/40/50/60/80, NRV20/30,<br>NRH24/30, NRS20/40/50/60/80 Type  | Standard test condition :<br>Unless otherwise specified, temperature is $20 \pm 15^{\circ}\text{C}$ and $65 \pm 20\%$ of relative humidity.<br>When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of $20 \pm 2^{\circ}\text{C}$ of temperature, $65 \pm 5\%$ relative humidity.<br>Inductance is in accordance with our measured value. |
|   | NR10050 Type   |  |
|   | NS101, NS125 Type  |  |

# SMD POWER INDUCTORS (NR□, NS SERIES)

## PRECAUTIONS

### 1. Circuit Design

#### Precautions

##### ◆ Operating environment

- The products described in this specification are intended for use in general electronic equipment, (office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.

### 2. PCB Design

#### Precautions

##### ◆ Land pattern design

- Please refer to a recommended land pattern.
- There is stress, which has been caused by distortion of a PCB, to the inductor.  
(NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/30/40/50/60/80 Type)
- Please consider the arrangement of parts on a PCB. (NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/30/40/50/60/80 Type)

#### Technical considerations

##### ◆ Land pattern design

###### Surface Mounting

- Mounting and soldering conditions should be checked beforehand.
- Applicable soldering process to this products is reflow soldering only.
- Please use the recommended land pattern shown as below. Electrical characteristics and the mounting ability of the product are being considered in the recommended land pattern. If a PCB is designed with other dimensions, defective soldering and stress to a product may occur due to misalignment. The performance of the product may not be brought out. If an adopted land pattern is different from the recommended land pattern, stress to the product will increase. It may cause cracks or defective electrical characteristics of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility.  
(NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/30/40/50/60/80 Type)
- As coefficients of thermal expansion between an inductor and a PCB differs, cracks may occur on a ferrite core when thermal stress is applied to them after mounting an inductor. (Please refer to the drawings below.) Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility.  
(NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/30/40/50/60/80 Type)



- SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection. When splitting the PCB board after mounting inductors and other components, care is required so as not to give any stresses of deflection or twisting to the board.  
(NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/30/40/50/60/80 Type)



A product tends to undergo stress in order "A>C>B≡D".  
Please consider the layouts of a product to minimize any stresses.

| 3. Considerations for automatic placement |   |
|---|---|
| Precautions                               | <p>◆Adjustment of mounting machine</p> <ol style="list-style-type: none"> <li>Excessive impact load should not be imposed on the products when mounting onto the PC boards.</li> <li>Mounting and soldering conditions should be checked beforehand.</li> </ol>   |
| Technical considerations                  | <p>◆Adjustment of mounting machine</p> <ol style="list-style-type: none"> <li>When installing products, care should be taken not to apply distortion stress as it may deform the products.</li> <li>Stress may be applied to a product with a warp or a twist in handling of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility.<br/>(NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/30/40/50/60/80 Type)</li> </ol> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>&lt;Wrap&gt;</p>  </div> <div style="text-align: center;"> <p>&lt;Twist&gt;</p>  </div> </div> |

| 4. Soldering             |  |
|--------------------------|--|
| Precautions              | <p>◆Reflow soldering</p> <ol style="list-style-type: none"> <li>Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.</li> <li>The product shall be used reflow soldering only.</li> <li>Please do not add any stress to a product until it returns in normal temperature after reflow soldering.</li> </ol> <p>◆Lead free soldering</p> <ol style="list-style-type: none"> <li>When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.</li> </ol> <p>◆Recommended conditions for using a soldering iron (NR10050 Type)</p> <ul style="list-style-type: none"> <li>Put the soldering iron on the land-pattern.</li> <li>Soldering iron's temperature - Below 350°C</li> <li>Duration - 3 seconds or less</li> <li>The soldering iron should not directly touch the inductor.</li> </ul> |
| Technical considerations | <p>◆Reflow soldering</p> <ol style="list-style-type: none"> <li>If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.</li> </ol> <p>•NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type, NS101/125 Type</p> <p>Recommended reflow condition (Pb free solder)</p>    |

| 5. Cleaning              |  |
|--------------------------|--|
| Precautions              | <p>◆Cleaning conditions</p> <ol style="list-style-type: none"> <li>Washing by supersonic waves shall be avoided.</li> </ol>                |
| Technical considerations | <p>◆Cleaning conditions</p> <ol style="list-style-type: none"> <li>If washed by supersonic waves, the products might be broken.</li> </ol> |

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| 6. Handling              |  |
|--------------------------|--|
| Precautions              | <ul style="list-style-type: none"> <li>◆ Handling               <ol style="list-style-type: none"> <li>1. Keep the product away from all magnets and magnetic objects.</li> </ol> </li> <li>◆ Breakaway PC boards (splitting along perforations)               <ol style="list-style-type: none"> <li>1. When splitting the PC board after mounting product, care should be taken not to give any stresses of deflection or twisting to the board.</li> <li>2. Board separation should not be done manually, but by using the appropriate devices.</li> </ol> </li> <li>◆ Mechanical considerations               <ol style="list-style-type: none"> <li>1. Please do not give the product any excessive mechanical shocks.</li> <li>2. Please do not add any shock and power to a product in transportation.</li> </ol> </li> <li>◆ Pick-up pressure               <ol style="list-style-type: none"> <li>1. Please do not push to add any pressure to a winding part. Please do not give any shock and push into a ferrite core exposure part.</li> </ol> </li> <li>◆ Packing               <ol style="list-style-type: none"> <li>1. Please avoid accumulation of a packing box as much as possible.</li> </ol> </li> </ul> |
| Technical considerations | <ul style="list-style-type: none"> <li>◆ Handling               <ol style="list-style-type: none"> <li>1. There is a case that a characteristic varies with magnetic influence.</li> </ol> </li> <li>◆ Breakaway PC boards (splitting along perforations)               <ol style="list-style-type: none"> <li>1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs.</li> </ol> </li> <li>◆ Mechanical considerations               <ol style="list-style-type: none"> <li>1. There is a case to be damaged by a mechanical shock.</li> <li>2. There is a case to be broken by the handling in transportation.</li> </ol> </li> <li>◆ Pick-up pressure               <ol style="list-style-type: none"> <li>1. Damage and a characteristic can vary with an excessive shock or stress.</li> </ol> </li> <li>◆ Packing               <ol style="list-style-type: none"> <li>1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.</li> </ol> </li> </ul>   |
| 7. Storage conditions    |  |
| Precautions              | <ul style="list-style-type: none"> <li>◆ Storage               <ol style="list-style-type: none"> <li>1. To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled.                   <ul style="list-style-type: none"> <li>• Recommended conditions                       <ul style="list-style-type: none"> <li>Ambient temperature : <math>-5\sim 40^{\circ}\text{C}</math></li> <li>Humidity : Below 70% RH</li> </ul> </li> <li>• The ambient temperature must be kept below <math>30^{\circ}\text{C}</math>. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes.                       <ul style="list-style-type: none"> <li>For this reason, product should be used within 6 months from the time of delivery.</li> <li>In case of storage over 6 months, solderability shall be checked before actual usage.</li> </ul> </li> </ul> </li> </ol> </li> </ul>  |
| Technical considerations | <ul style="list-style-type: none"> <li>◆ Storage               <ol style="list-style-type: none"> <li>1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.</li> </ol> </li> </ul>   |

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