

## FEATURES

- Designed for High Frequency Applications
- Available in EIA 0402, 0603 and 0805 Case Sizes
- High Q and SRF Characteristics
- Tight Tolerance D (0.3nH) and J ( 5%)
- Tape and Reel Packaging for Automatic Pick & Place

**RoHS  
Compliant**

includes all homogeneous materials

\*See Part Number System for Details



## SPECIFICATIONS

| NML Multilayer High Frequency Inductors                                                     |                                                     |             |             |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------|-------------|
| Specifications                                                                              | 0402                                                | 0603        | 0805        |
| Inductance Range                                                                            | 1.0 ~ 120nH                                         | 1.5 ~ 220nH | 1.5 ~ 470nH |
| Inductance Tolerance                                                                        | D( $\pm 0.3$ nH), J ( $\pm 5\%$ ), K ( $\pm 10\%$ ) |             |             |
| Operating Temperature Range                                                                 | -40°C ~ +85°C                                       |             |             |
| Q-Factor, Self Resonant Frequency, DC Resistance, Rated DC Current and Inductance Tolerance | See Individual Product Listings                     |             |             |

## ENVIRONMENTAL CHARACTERISTICS

| Test                       | Specification                                                                                                                                       | Test Method & Condition                                    |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Solderability              | 75% Min. Coverage                                                                                                                                   | After 5 Sec. Dip in +230°C Solder Pot (Post Flux)          |
| Humidity Resistance        | (1) No Evidence of Damage<br>(2) Inductance Shall Be Within $\pm 10\%$ of Initial Value<br>(3) Q Factor Shall Be Within $\pm 20\%$ of Initial Value | After 500 Hrs at 60°C and 90-95% RH (No Load)              |
| Soldering Effect           |                                                                                                                                                     | After 10 Seconds at +260°C (3 Minute, 150°C Pre-Heat)      |
| Low Frequency Vibration    |                                                                                                                                                     | After 100 Cycles (+85°C then -40°C) 1 hour each            |
| Thermal Shock              |                                                                                                                                                     |                                                            |
| Low Temperature Storage    |                                                                                                                                                     | After 500 Hrs at 85°C with Rated DC Current                |
| High Temperature Load Life | (1) No Evidence of Damage<br>(2) Inductance Shall Be Within $\pm 10\%$ of Initial Value<br>(3) Q Factor Shall Be Within $\pm 20\%$ of Initial Value |                                                            |
| Humidity Load Life         |                                                                                                                                                     | After 500 Hrs at 60°C with 90-95% RH with Rated DC Current |

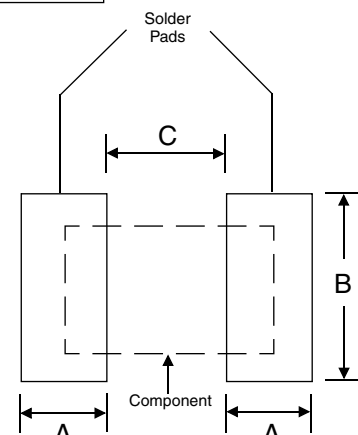
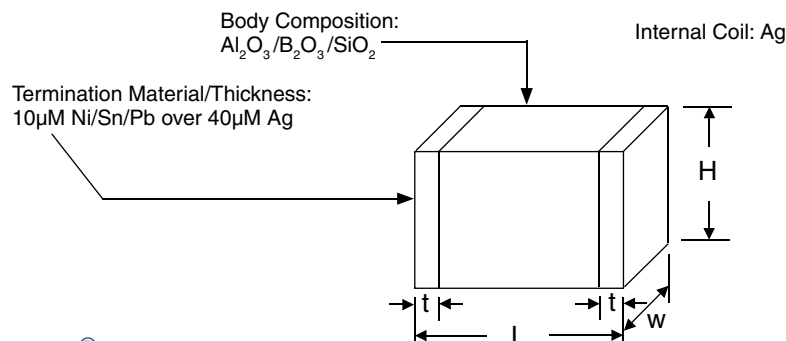
## PART NUMBER SYSTEM

NML 04 J 22N TR F

Series: NML  
Size Code: 04=0402, 06=0603, 08=0805  
Inductance Code (N=decimal point) in nano-henries  
(Ex. 2N2 = 2.2nH, 33N=33nH, R10=100nH)  
Tolerance Code (D= $\pm 0.3$ nH, J= $\pm 5\%$ , K= $\pm 10\%$ )  
Pb-free/RoHS compliant  
Packaging: TR = Tape/Reel

## PART AND LAND PATTERN DIMENSIONS

| Series | L              | W               | H                                  | t               | A               | B               | C               |
|--------|----------------|-----------------|------------------------------------|-----------------|-----------------|-----------------|-----------------|
| NML04  | 1.0 $\pm$ 0.05 | 0.5 $\pm$ 0.05  | 0.5 $\pm$ 0.05                     | 0.25 $\pm$ 0.1  | 0.50 $\pm$ 0.05 | 0.50 $\pm$ 0.05 | 0.50 $\pm$ 0.05 |
| NML06  | 1.6 $\pm$ 0.10 | 0.8 $\pm$ 0.10  | 0.8 $\pm$ 0.15                     | 0.30 $\pm$ 0.2  | 0.70 $\pm$ 0.10 | 0.70 $\pm$ 0.10 | 0.70 $\pm$ 0.10 |
| NML08  | 2.0 $\pm$ 0.2  | 1.25 $\pm$ 0.20 | 0.85 $\pm$ 0.20<br>1.25 $\pm$ 0.20 | 0.50 $\pm$ 0.30 | 1.00 $\pm$ 0.10 | 1.00 $\pm$ 0.10 | 1.00 $\pm$ 0.10 |



### NML04 SERIES

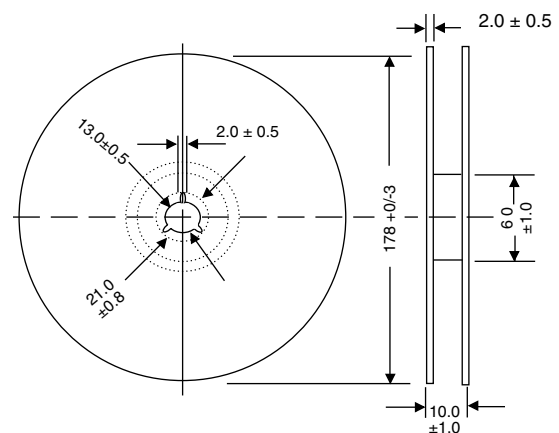
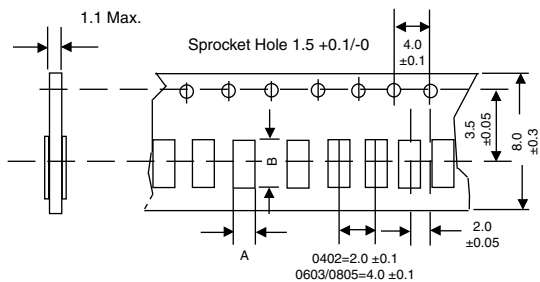
### VALUES AND SPECIFICATIONS

| NIC P/N      | 'L' Inductance (nH) | Tolerance (std) | 'Q' Factor (min.) | L & Q Test Freq. | SRF Mhz (min.) | DC Resistance (ohms) Max. | Rated DC Current (mA) Max. |
|--------------|---------------------|-----------------|-------------------|------------------|----------------|---------------------------|----------------------------|
| NML04D1N0TRF | 1.0                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.12                      | 300                        |
| NML04D1N2TRF | 1.2                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.12                      | 300                        |
| NML04D1N5TRF | 1.5                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.13                      | 300                        |
| NML04D1N8TRF | 1.8                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.14                      | 300                        |
| NML04D2N0TRF | 2.0                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.16                      | 300                        |
| NML04D2N2TRF | 2.2                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.16                      | 300                        |
| NML04D2N7TRF | 2.7                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.17                      | 300                        |
| NML04D3N3TRF | 3.3                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.19                      | 300                        |
| NML04D3N9TRF | 3.9                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.22                      | 300                        |
| NML04D4N7TRF | 4.7                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.24                      | 300                        |
| NML04D5N6TRF | 5.6                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.27                      | 300                        |
| NML04J6N8TRF | 6.8                 | ±5% (J)         | 8.0               | 100 Mhz          | 3900           | 0.32                      | 250                        |
| NML04J8N2TRF | 8.2                 | ±5% (J)         | 8.0               | 100 Mhz          | 3500           | 0.37                      | 250                        |
| NML04J10NTRF | 10                  | ±5% (J)         | 8.0               | 100 Mhz          | 3200           | 0.42                      | 250                        |
| NML04J12NTRF | 12                  | ±5% (J)         | 8.0               | 100 Mhz          | 2600           | 0.50                      | 250                        |
| NML04J15NTRF | 15                  | ±5% (J)         | 8.0               | 100 Mhz          | 2300           | 0.55                      | 250                        |
| NML04J18NTRF | 18                  | ±5% (J)         | 8.0               | 100 Mhz          | 2000           | 0.65                      | 200                        |
| NML04J22NTRF | 22                  | ±5% (J)         | 8.0               | 100 Mhz          | 1600           | 0.80                      | 200                        |
| NML04J27NTRF | 27                  | ±5% (J)         | 8.0               | 100 Mhz          | 1400           | 0.90                      | 200                        |
| NML04J33NTRF | 33                  | ±5% (J)         | 9.0               | 100 Mhz          | 1200           | 1.00                      | 200                        |
| NML04J39NTRF | 39                  | ±5% (J)         | 8.0               | 100 Mhz          | 1100           | 1.20                      | 150                        |
| NML04J47NTRF | 47                  | ±5% (J)         | 8.0               | 100 Mhz          | 900            | 1.30                      | 150                        |
| NML04J56NTRF | 56                  | ±5% (J)         | 8.0               | 100 Mhz          | 750            | 1.40                      | 150                        |
| NML04J68NTRF | 68                  | ±5% (J)         | 8.0               | 100 Mhz          | 750            | 1.40                      | 150                        |
| NML04J82NTRF | 82                  | ±5% (J)         | 8.0               | 100 Mhz          | 600            | 1.60                      | 100                        |
| NML04JR10TRF | 100                 | ±5% (J)         | 8.0               | 100 Mhz          | 600            | 1.60                      | 100                        |
| NML04JR12TRF | 120                 | ±5% (J)         | 8.0               | 100 Mhz          | 600            | 1.60                      | 100                        |

### TAPE AND REEL DIMENSIONS (mm)

| TYPE  | A           | B           | Reel Qty |
|-------|-------------|-------------|----------|
| NML04 | 0.7 ± 0.05  | 1.2 ± 0.05  | 10,000   |
| NML06 | 1.0 ± 0.20  | 1.8 ± 0.20  | 4,000    |
| NML08 | 1.42 ± 0.20 | 2.25 ± 0.20 | 4,000    |

### TAPE AND REEL PACKAGING (mm)

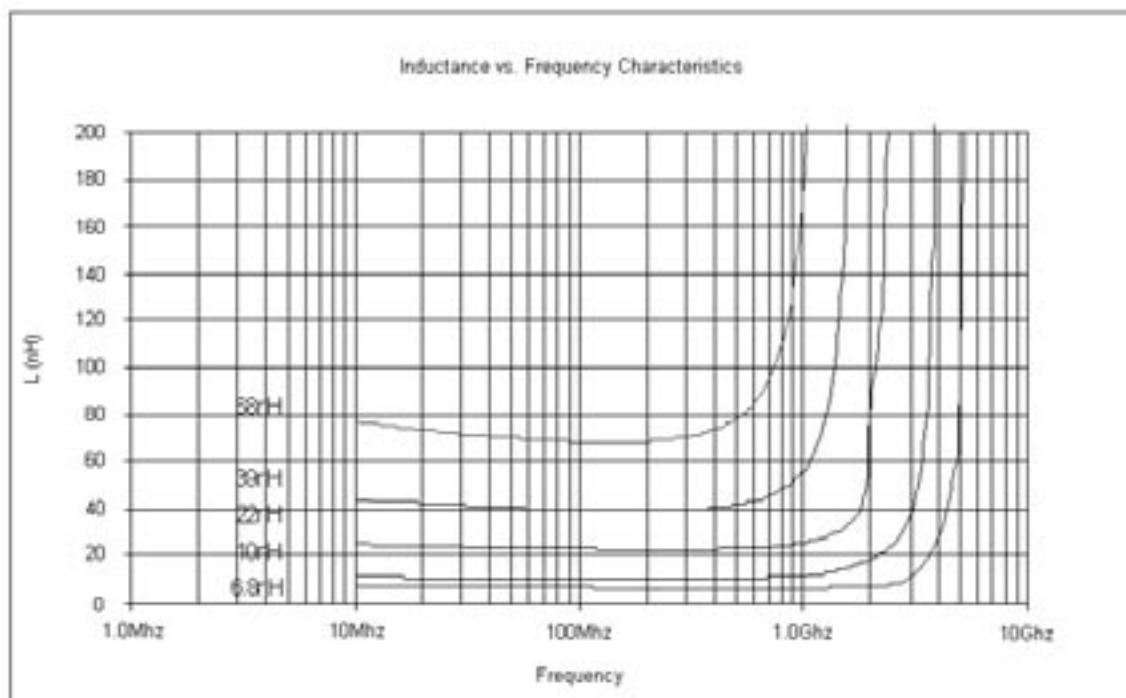


### NML06 SERIES

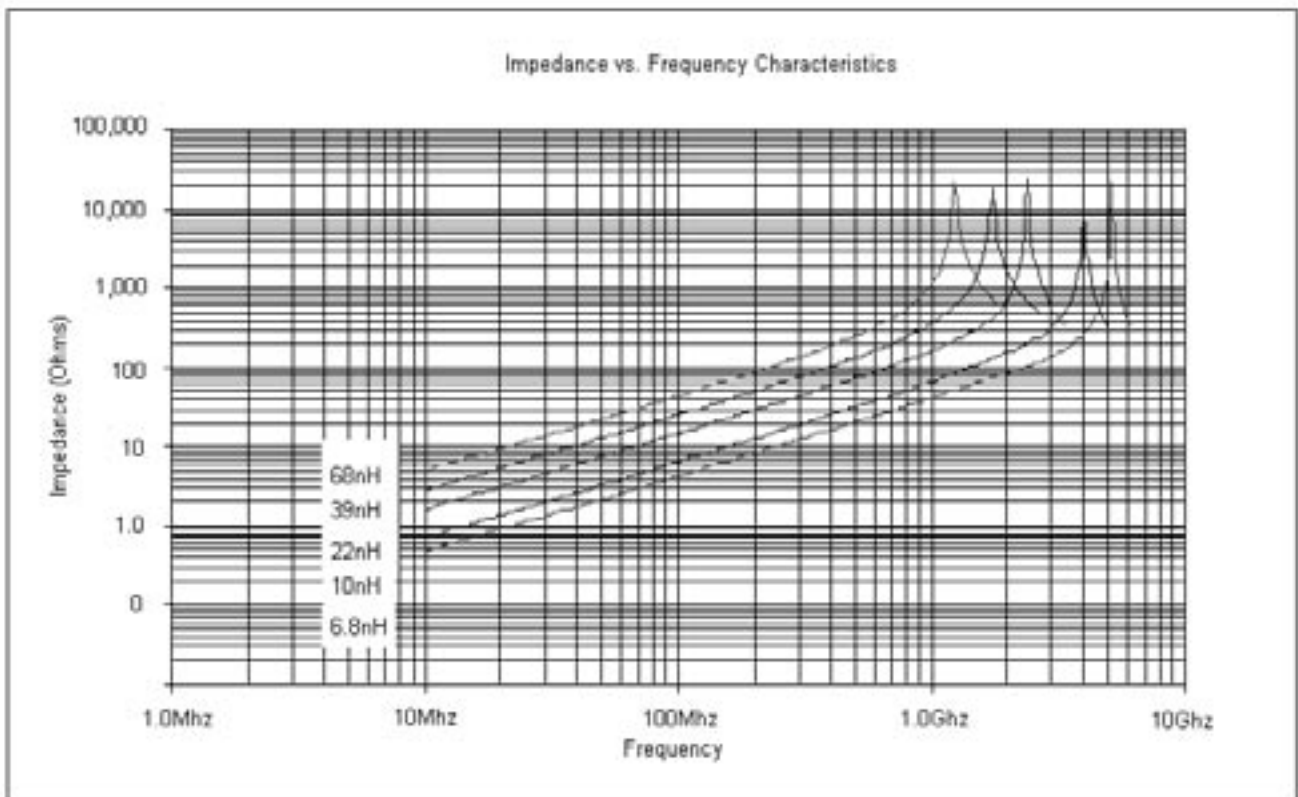
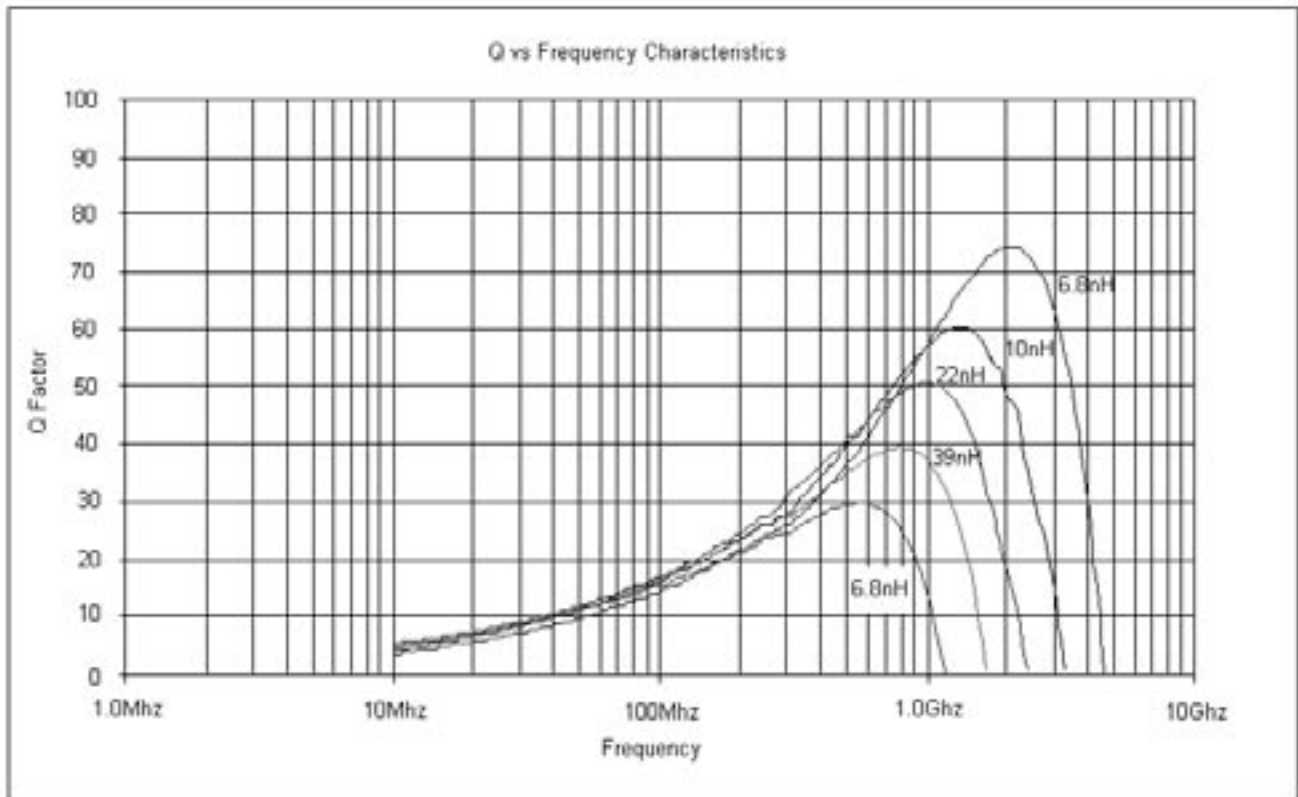
### VALUES AND SPECIFICATIONS

| NIC P/N      | 'L' Inductance (nH) | Tolerance (std) | 'Q' Factor (min.) | L & Q Test Freq. | SRF Mhz (min.) | DC Resistance (ohms) Max. | Rated DC Current (mA) Max. |
|--------------|---------------------|-----------------|-------------------|------------------|----------------|---------------------------|----------------------------|
| NML06D1N5TRF | 1.5                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.10                      | 300                        |
| NML06D1N8TRF | 1.8                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.10                      | 300                        |
| NML06D2N2TRF | 2.2                 | ±0.3nH(D)       | 8.0               | 100 Mhz          | 4000           | 0.10                      | 300                        |
| NML06D2N7TRF | 2.7                 | ±0.3nH(D)       | 10.0              | 100 Mhz          | 4000           | 0.10                      | 300                        |
| NML06D3N3TRF | 3.3                 | ±0.3nH(D)       | 10.0              | 100 Mhz          | 4000           | 0.13                      | 300                        |
| NML06D3N9TRF | 3.9                 | ±0.3nH(D)       | 10.0              | 100 Mhz          | 4000           | 0.15                      | 300                        |
| NML06D4N7TRF | 4.7                 | ±0.3nH(D)       | 10.0              | 100 Mhz          | 4000           | 0.20                      | 300                        |
| NML06D5N6TRF | 5.6                 | ±0.3nH(D)       | 10.0              | 100 Mhz          | 4000           | 0.23                      | 300                        |
| NML06J6N8TRF | 6.8                 | ±5% (J)         | 10.0              | 100 Mhz          | 4000           | 0.25                      | 300                        |
| NML06J8N2TRF | 8.2                 | ±5% (J)         | 10.0              | 100 Mhz          | 3500           | 0.28                      | 300                        |
| NML06J10NTRF | 10                  | ±5% (J)         | 12.0              | 100 Mhz          | 3200           | 0.30                      | 300                        |
| NML06J12NTRF | 12                  | ±5% (J)         | 12.0              | 100 Mhz          | 2600           | 0.35                      | 300                        |
| NML06J15NTRF | 15                  | ±5% (J)         | 12.0              | 100 Mhz          | 2300           | 0.40                      | 300                        |
| NML06J18NTRF | 18                  | ±5% (J)         | 12.0              | 100 Mhz          | 2000           | 0.45                      | 300                        |
| NML06J22NTRF | 22                  | ±5% (J)         | 12.0              | 100 Mhz          | 1600           | 0.50                      | 300                        |
| NML06J27NTRF | 27                  | ±5% (J)         | 12.0              | 100 Mhz          | 1400           | 0.55                      | 300                        |
| NML06J33NTRF | 33                  | ±5% (J)         | 12.0              | 100 Mhz          | 1200           | 0.60                      | 300                        |
| NML06J39NTRF | 39                  | ±5% (J)         | 12.0              | 100 Mhz          | 1100           | 0.65                      | 300                        |
| NML06J47NTRF | 47                  | ±5% (J)         | 12.0              | 100 Mhz          | 900            | 0.70                      | 300                        |
| NML06J56NTRF | 56                  | ±5% (J)         | 12.0              | 100 Mhz          | 900            | 0.75                      | 300                        |
| NML06J68NTRF | 68                  | ±5% (J)         | 12.0              | 100 Mhz          | 700            | 0.80                      | 300                        |
| NML06J82NTRF | 82                  | ±5% (J)         | 12.0              | 100 Mhz          | 600            | 0.85                      | 300                        |
| NML06JR10TRF | 100                 | ±5% (J)         | 12.0              | 100 Mhz          | 600            | 0.90                      | 300                        |
| NML06JR12TRF | 120                 | ±5% (J)         | 8.0               | 50 Mhz           | 500            | 1.00                      | 300                        |
| NML06JR15TRF | 150                 | ±5% (J)         | 8.0               | 50 Mhz           | 500            | 1.20                      | 300                        |
| NML06JR18TRF | 180                 | ±5% (J)         | 9.0               | 50 Mhz           | 400            | 1.30                      | 300                        |
| NML06JR22TRF | 220                 | ±5% (J)         | 8.0               | 50 Mhz           | 400            | 1.50                      | 300                        |

### Performance Curves



## Performance Curves



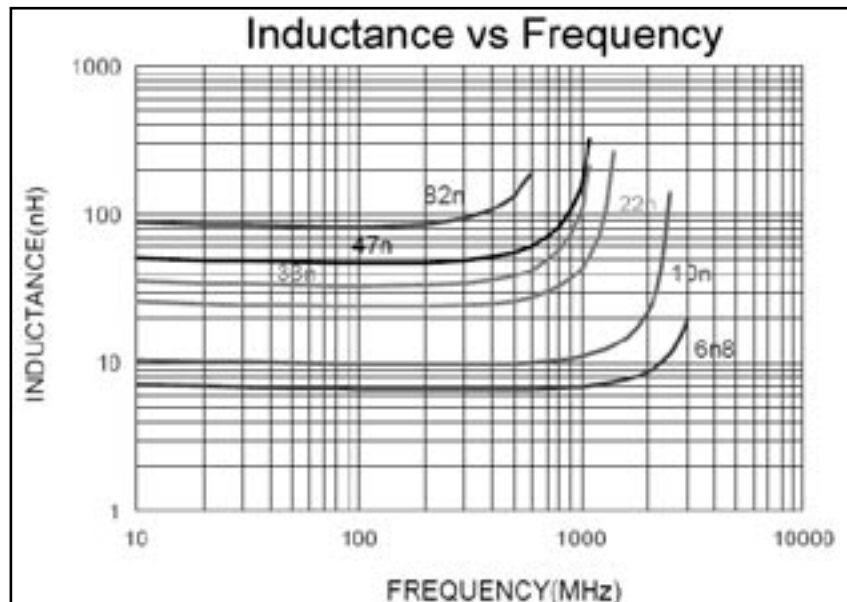
### NML08 SERIES

### VALUES AND SPECIFICATIONS

| NIC P/N      | 'L' Inductance (nH) | Tolerance (std) | 'Q' Factor (min.) | L & Q Test Freq. | SRF MHz (min.) | DC Resistance (ohms) Max. | Rated DC Current (mA) Max. |
|--------------|---------------------|-----------------|-------------------|------------------|----------------|---------------------------|----------------------------|
| NML08D1N5TRF | 1.5                 | ±0.3nH (D)      | 10                | 100MHz           | 4,000          | 0.10                      | 300                        |
| NML08D1N8TRF | 1.8                 | ±0.3nH (D)      | 10                |                  | 4,000          | 0.10                      | 300                        |
| NML08D2N2TRF | 2.2                 | ±0.3nH (D)      | 10                |                  | 4,000          | 0.10                      | 300                        |
| NML08D2N7TRF | 2.7                 | ±0.3nH (D)      | 12                |                  | 4,000          | 0.10                      | 300                        |
| NML08J3N3TRF | 3.3                 | ±5% (J)         | 12                |                  | 4,000          | 0.13                      | 300                        |
| NML08J3N9TRF | 3.9                 | ±5% (J)         | 12                |                  | 4,000          | 0.15                      | 300                        |
| NML08J4N7TRF | 4.7                 | ±5% (J)         | 12                |                  | 3,500          | 0.20                      | 300                        |
| NML08J5N6TRF | 5.6                 | ±5% (J)         | 15                |                  | 3,200          | 0.23                      | 300                        |
| NML08J6N8TRF | 6.8                 | ±5% (J)         | 15                |                  | 2,800          | 0.25                      | 300                        |
| NML08J8N2TRF | 8.2                 | ±5% (J)         | 15                |                  | 2,400          | 0.28                      | 300                        |
| NML08J10NTRF | 10                  | ±5% (J)         | 15                |                  | 2,100          | 0.30                      | 300                        |
| NML08J12NTRF | 12                  | ±5% (J)         | 15                |                  | 1,900          | 0.35                      | 300                        |
| NML08J15NTRF | 15                  | ±5% (J)         | 15                |                  | 1,600          | 0.40                      | 300                        |
| NML08J18NTRF | 18                  | ±5% (J)         | 15                |                  | 1,500          | 0.45                      | 300                        |
| NML08J22NTRF | 22                  | ±5% (J)         | 18                |                  | 1,400          | 0.50                      | 300                        |
| NML08J27NTRF | 27                  | ±5% (J)         | 18                |                  | 1,300          | 0.55                      | 300                        |
| NML08J33NTRF | 33                  | ±5% (J)         | 18                |                  | 1,200          | 0.60                      | 300                        |
| NML08J39NTRF | 39                  | ±5% (J)         | 18                |                  | 1,000          | 0.65                      | 300                        |
| NML08J47NTRF | 47                  | ±5% (J)         | 18                |                  | 900            | 0.70                      | 300                        |
| NML08J56NTRF | 56                  | ±5% (J)         | 18                |                  | 800            | 0.75                      | 300                        |
| NML08J68NTRF | 68                  | ±5% (J)         | 18                |                  | 700            | 0.80                      | 300                        |
| NML08J82NTRF | 82                  | ±5% (J)         | 18                |                  | 600            | 0.90                      | 300                        |
| NML08JR10TRF | 100*                | ±5% (J)         | 18                | 50MHz            | 600            | 0.90                      | 300                        |
| NML08JR12TRF | 120*                | ±5% (J)         | 13                |                  | 500            | 0.95                      | 300                        |
| NML08JR15TRF | 150*                | ±5% (J)         | 13                |                  | 500            | 1.00                      | 300                        |
| NML08JR18TRF | 180*                | ±5% (J)         | 13                |                  | 400            | 1.10                      | 300                        |
| NML08JR22TRF | 220*                | ±5% (J)         | 12                |                  | 350            | 1.20                      | 300                        |
| NML08JR27TRF | 270*                | ±5% (J)         | 12                |                  | 300            | 1.30                      | 300                        |
| NML08JR33TRF | 330*                | ±5% (J)         | 12                |                  | 250            | 1.40                      | 300                        |
| NML08JR39TRF | 390*                | ±5% (J)         | 10                |                  | 250            | 1.30                      | 300                        |
| NML08JR47TRF | 470*                | ±5% (J)         | 10                |                  | 200            | 1.50                      | 300                        |

\*These values have a 1.25mm ±0.20mm height dimension

### Performance Curves



## Performance Curves

