

# NPIM\_V Series

Improved DCR Extended Temperature  
High Current Power Inductors



## SERIES FEATURES

- METAL COMPOSITE SHIELDED POWER INDUCTOR
- EXTENDED -55°C ~ +165°C OPERATING TEMPERATURE RANGE
- LOW DCR FOR HIGH EFFICIENCY
- AEC-Q200 QUALIFIED



## CHARACTERISTICS

| Series Sizes & Inductance Ranges                       | NPIM53V        | NPIM63V     | NPIM104V    | NPIM106V     | NPIM127V     |
|--------------------------------------------------------|----------------|-------------|-------------|--------------|--------------|
|                                                        | 0.10 ~ 15μH    | 0.47 ~ 22μH | 0.47 ~ 47μH | 0.33 ~ 100μH | 0.47 ~ 100μH |
| Maximum Component Temperature (Ambient + Self-Heating) | -55°C ~ +165°C |             |             |              |              |
| Maximum Temperature Rise at Irms                       | +40°C          |             |             |              |              |
| Inductance Change at Isat                              | -30%           |             |             |              |              |

## SIZES & DIMENSIONS (mm)

| Series   | Figure | A          | A1         | B          | C         | D         | D1        | E         | E1        | L typ. | G typ. | H typ. |
|----------|--------|------------|------------|------------|-----------|-----------|-----------|-----------|-----------|--------|--------|--------|
| NPIM53V  | 1      | 5.5 ± 0.3  | 4.9 ± 0.3  | 5.25 ± 0.2 | 2.8 ± 0.2 | 1.1 ± 0.3 | 1.3 ± 0.3 | 3.0 ± 0.3 | -         | 6.7    | 2.1    | 3.5    |
| NPIM63V  | 2      | 7.1 ± 0.3  | 6.6 ± 0.2  | 6.6 ± 0.2  | 2.8 ± 0.2 | 1.6 ± 0.3 | 1.8 ± 0.3 | 3.0 ± 0.2 | 4.3 ± 0.3 | 8.4    | 2.7    | 3.4    |
| NPIM104V | 2      | 11.0 ± 0.3 | 10.1 ± 0.3 | 10.0 ± 0.3 | 3.8 ± 0.2 | 2.0 ± 0.3 | 2.3 ± 0.3 | 4.5 ± 0.3 | 6.6 ± 0.3 | 12.3   | 5.5    | 5.0    |
| NPIM106V | 2      | 11.0 ± 0.3 | 10.1 ± 0.3 | 10.0 ± 0.3 | 5.1 ± 0.3 | 2.0 ± 0.3 | 2.3 ± 0.3 | 4.5 ± 0.3 | 6.6 ± 0.3 | 12.3   | 5.5    | 5.0    |
| NPIM127V | 2      | 13.6 ± 0.4 | 12.6 ± 0.3 | 12.6 ± 0.2 | 6.2 ± 0.3 | 2.0 ± 0.3 | 2.5 ± 0.3 | 5.0 ± 0.3 | 9.2 ± 0.3 | 15.0   | 8.0    | 6.0    |

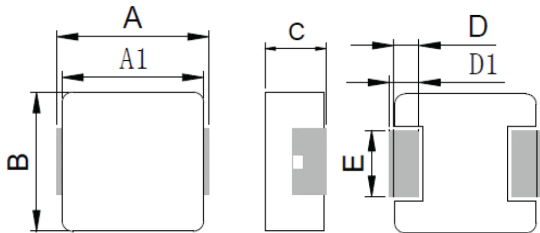


Figure 1

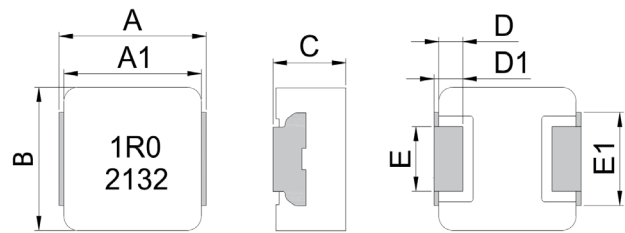
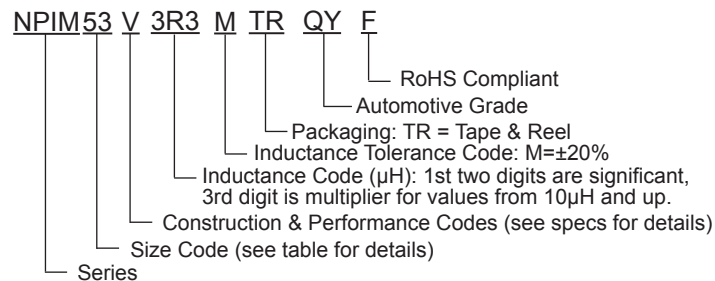


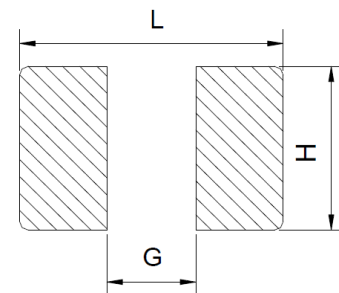
Figure 2

## PART NUMBER SYSTEM



"QY" denotes suitable for automotive equipment, sourced to special production and inspection at IATF-16949 certified production site

## Recommended Land Pattern



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## NPIM53V Values (5.5 x 5.25 x 2.8 mm size)

| Part Number      | Inductance Value (μH) | Irms (A) typ. | Isat (A) typ. | DC Resistance (mΩ) typ. | DC Resistance (mΩ) max. |
|------------------|-----------------------|---------------|---------------|-------------------------|-------------------------|
| NPIM53VR10MTRQYF | 0.10                  | 20            | 33            | 1.5                     | 1.8                     |
| NPIM53VR33MTRQYF | 0.33                  | 17            | 15            | 3.9                     | 4.7                     |
| NPIM53VR36MTRQYF | 0.36                  | 16            | 14.5          | 4.3                     | 5.2                     |
| NPIM53VR68MTRQYF | 0.68                  | 12.0          | 11.7          | 8.5                     | 9.7                     |
| NPIM53V1R0MTRQYF | 1.0                   | 10.5          | 8.0           | 10                      | 11.5                    |
| NPIM53V1R5MTRQYF | 1.5                   | 8.5           | 6.5           | 15.4                    | 17.7                    |
| NPIM53V2R2MTRQYF | 2.2                   | 7.5           | 5.8           | 20                      | 23                      |
| NPIM53V3R3MTRQYF | 3.3                   | 6.0           | 5.4           | 31                      | 36                      |
| NPIM53V4R7MTRQYF | 4.7                   | 5.2           | 4.5           | 49.0                    | 57.0                    |
| NPIM53V5R6MTRQYF | 5.6                   | 4.4           | 4.3           | 61.0                    | 71.0                    |
| NPIM53V6R8MTRQYF | 6.8                   | 4.0           | 4.0           | 72                      | 83                      |
| NPIM53V100MTRQYF | 10                    | 3.0           | 2.4           | 97.0                    | 111.0                   |
| NPIM53V150MTRQYF | 15                    | 2.5           | 2.2           | 165.0                   | 190.0                   |
| NPIM53V220MTRQYF | 22                    | 2.2           | 2.0           | 205.0                   | 235.0                   |

Maximum +40°C temperature rise at Irms. Approximate -30% inductance change at Isat.

Visit [www.niccomp.com](http://www.niccomp.com) for Idc performance curves for all series' part numbers

## NPIM63V Values (7.1 x 6.8 x 2.8 mm size)

| Part Number      | Inductance Value (μH) | Irms (A) typ. | Isat (A) typ. | DC Resistance (mΩ) typ. | DC Resistance (mΩ) max. |
|------------------|-----------------------|---------------|---------------|-------------------------|-------------------------|
| NPIM63VR47MTRQYF | 0.47                  | 19.0          | 19.0          | 3.4                     | 3.74                    |
| NPIM63VR68MTRQYF | 0.68                  | 16.5          | 17.5          | 4.5                     | 5.3                     |
| NPIM63V1R0MTRQYF | 1.0                   | 14.0          | 14.0          | 6.0                     | 6.6                     |
| NPIM63V1R5MTRQYF | 1.5                   | 11.5          | 13.0          | 10.6                    | 11.7                    |
| NPIM63V2R2MTRQYF | 2.2                   | 9.0           | 10.5          | 15.0                    | 16.5                    |
| NPIM63V3R3MTRQYF | 3.3                   | 7.8           | 9.5           | 22.0                    | 24.2                    |
| NPIM63V4R7MTRQYF | 4.7                   | 6.4           | 7.2           | 29.0                    | 32.0                    |
| NPIM63V6R8MTRQYF | 6.8                   | 5.2           | 6.1           | 42.0                    | 46.2                    |
| NPIM63V8R2MTRQYF | 8.2                   | 4.8           | 5.6           | 49.0                    | 54.0                    |
| NPIM63V100MTRQYF | 10                    | 4.2           | 4.7           | 63                      | 69.3                    |
| NPIM63V150MTRQYF | 15                    | 3.7           | 4.0           | 100.0                   | 110.0                   |
| NPIM63V220MTRQYF | 22                    | 2.9           | 3.0           | 150.0                   | 165.0                   |

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## NPIM104V Values (11 x 10 x 3.8 mm size)

| Part Number       | Inductance Value (μH) | Irms (A) typ. | Isat (A) typ. | DC Resistance (mΩ) typ. | DC Resistance (mΩ) max. |
|-------------------|-----------------------|---------------|---------------|-------------------------|-------------------------|
| NPIM104VR47MTRQYF | 0.47                  | 34.0          | 31.0          | 1.42                    | 1.63                    |
| NPIM104VR56MTRQYF | 0.56                  | 32.0          | 29.0          | 1.7                     | 2                       |
| NPIM104VR68MTRQYF | 0.68                  | 31.0          | 28.0          | 2.0                     | 2.3                     |
| NPIM104VR78MTRQYF | 0.78                  | 30.0          | 27.0          | 2.3                     | 2.5                     |
| NPIM104VR82MTRQYF | 0.82                  | 27.0          | 26.5          | 2.4                     | 2.7                     |
| NPIM104V1R0MTRQYF | 1.0                   | 25.0          | 26.0          | 2.7                     | 3.1                     |
| NPIM104V1R2MTRQYF | 1.2                   | 23.0          | 25.0          | 3.2                     | 3.7                     |
| NPIM104V1R5MTRQYF | 1.5                   | 22.0          | 24            | 3.9                     | 4.5                     |
| NPIM104V1R8MTRQYF | 1.8                   | 20.0          | 23.0          | 4.4                     | 5.5                     |
| NPIM104V2R2MTRQYF | 2.2                   | 18.0          | 19.0          | 5.3                     | 6.1                     |
| NPIM104V3R3MTRQYF | 3.3                   | 15.0          | 17            | 9                       | 10.4                    |
| NPIM104V4R7MTRQYF | 4.7                   | 11.0          | 13.5          | 13.4                    | 15.0                    |
| NPIM104V5R6MTRQYF | 5.6                   | 10.5          | 12.0          | 15.4                    | 17.0                    |
| NPIM104V6R8MTRQYF | 6.8                   | 10.0          | 11.0          | 17.0                    | 19.0                    |
| NPIM104V8R2MTRQYF | 8.2                   | 8.5           | 9.0           | 23.0                    | 25.3                    |
| NPIM104V100MTRQYF | 10                    | 8.0           | 8.2           | 27.0                    | 30.0                    |
| NPIM104V120MTRQYF | 12                    | 7.4           | 7.50          | 29.0                    | 33.4                    |
| NPIM104V150MTRQYF | 15                    | 6.4           | 7.00          | 40.0                    | 45.0                    |
| NPIM104V220MTRQYF | 22                    | 5.5           | 6.0           | 59.0                    | 68.0                    |
| NPIM104V330MTRQYF | 33                    | 4.7           | 4.8           | 89.0                    | 102.0                   |
| NPIM104V470MTRQYF | 47                    | 3.6           | 4.0           | 143.0                   | 165.0                   |

Maximum +40°C temperature rise at Irms. Approximate -30% inductance change at Isat.

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## NPIM106V Values (11 x 10 x 5.1 mm size)

| Part Number       | Inductance Value (μH) | Irms (A) typ. | Isat (A) typ. | DC Resistance (mΩ) typ. | DC Resistance (mΩ) max. |
|-------------------|-----------------------|---------------|---------------|-------------------------|-------------------------|
| NPIM106VR33MTRQYF | 0.33                  | 41.0          | 60.0          | 1.0                     | 1.2                     |
| NPIM106VR36MTRQYF | 0.36                  | 40.0          | 55.0          | 1.1                     | 1.32                    |
| NPIM106VR47MTRQYF | 0.47                  | 36.0          | 50.0          | 1.4                     | 1.68                    |
| NPIM106VR56MTRQYF | 0.56                  | 34.0          | 48.0          | 1.6                     | 1.92                    |
| NPIM106VR68MTRQYF | 0.68                  | 32.0          | 46.0          | 1.85                    | 2.22                    |
| NPIM106V1R0MTRQYF | 1.0                   | 30.0          | 37.0          | 2.3                     | 2.76                    |
| NPIM106V1R2MTRQYF | 1.2                   | 27.0          | 29.0          | 3.0                     | 3.6                     |
| NPIM106V1R5MTRQYF | 1.5                   | 25.0          | 28.0          | 3.6                     | 4.3                     |
| NPIM106V1R8MTRQYF | 1.8                   | 24.0          | 26.00         | 3.9                     | 4.6                     |
| NPIM106V2R2MTRQYF | 2.2                   | 23.0          | 25.0          | 4.1                     | 4.9                     |
| NPIM106V3R3MTRQYF | 3.3                   | 18.7          | 20.00         | 6.2                     | 7.2                     |
| NPIM106V4R7MTRQYF | 4.7                   | 14.5          | 17.00         | 9.0                     | 10.0                    |
| NPIM106V5R6MTRQYF | 5.6                   | 13.2          | 16.20         | 10.2                    | 11.7                    |
| NPIM106V6R8MTRQYF | 6.8                   | 12.3          | 15.30         | 12.4                    | 14.0                    |
| NPIM106V8R2MTRQYF | 8.2                   | 10.3          | 14.00         | 17.8                    | 20.5                    |
| NPIM106V100MTRQYF | 10                    | 9.0           | 13.00         | 20.0                    | 23.0                    |
| NPIM106V120MTRQYF | 12                    | 8.3           | 9.8           | 23.0                    | 26.4                    |
| NPIM106V150MTRQYF | 15                    | 7.6           | 9.20          | 26.3                    | 30.3                    |
| NPIM106V180MTRQYF | 18                    | 7.0           | 9.0           | 33.0                    | 38.0                    |
| NPIM106V220MTRQYF | 22                    | 6.0           | 5.40          | 43.0                    | 49.5                    |
| NPIM106V330MTRQYF | 33                    | 5.0           | 7.60          | 66.0                    | 75.3                    |
| NPIM106V470MTRQYF | 47                    | 4.2           | 5.50          | 89.0                    | 103.0                   |
| NPIM106V680MTRQYF | 68                    | 3.5           | 4.80          | 130.0                   | 150.0                   |
| NPIM106V820MTRQYF | 82                    | 3.2           | 4.30          | 165.0                   | 190.0                   |
| NPIM106V101MTRQYF | 100                   | 2.7           | 4.00          | 233.0                   | 268.0                   |

Maximum +40°C temperature rise at Irms. Approximate -30% inductance change at Isat.

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## NPIM127V Values (13.6 x 12.6 x 6.2 mm size)

| Part Number       | Inductance Value (μH) | Irms (A) typ. | Isat (A) typ. | DC Resistance (mΩ) typ. | DC Resistance (mΩ) max. |
|-------------------|-----------------------|---------------|---------------|-------------------------|-------------------------|
| NPIM127VR47MTRQYF | 0.47                  | 45.0          | 60.0          | 1.0                     | 1.2                     |
| NPIM127VR68MTRQYF | 0.68                  | 36.5          | 36.5          | 1.35                    | 1.62                    |
| NPIM127V1R0MTRQYF | 1.0                   | 32.0          | 32.0          | 1.75                    | 2.1                     |
| NPIM127V1R5MTRQYF | 1.5                   | 27.0          | 29.0          | 2.3                     | 2.76                    |
| NPIM127V2R2MTRQYF | 2.2                   | 23.0          | 26.0          | 3.6                     | 4.2                     |
| NPIM127V3R3MTRQYF | 3.3                   | 19.0          | 24.0          | 5.9                     | 6.8                     |
| NPIM127V4R7MTRQYF | 4.7                   | 17.0          | 20.0          | 7.3                     | 8.4                     |
| NPIM127V5R6MTRQYF | 5.6                   | 15.0          | 18.0          | 9.1                     | 10.0                    |
| NPIM127V6R8MTRQYF | 6.8                   | 14.0          | 17.0          | 9.7                     | 11.2                    |
| NPIM127V8R2MTRQYF | 8.2                   | 13.0          | 16.0          | 11.8                    | 13.6                    |
| NPIM127V100MTRQYF | 10                    | 12.0          | 13.5          | 14.3                    | 16.5                    |
| NPIM127V150MTRQYF | 15                    | 9.0           | 10.00         | 23.6                    | 27.2                    |
| NPIM127V220MTRQYF | 22                    | 7.5           | 8.0           | 34.1                    | 39.2                    |
| NPIM127V330MTRQYF | 33                    | 6.3           | 7.20          | 53                      | 61                      |
| NPIM127V470MTRQYF | 47                    | 5.2           | 6.00          | 74.1                    | 89                      |
| NPIM127V680MTRQYF | 68                    | 4.5           | 5.50          | 92                      | 110                     |
| NPIM127V820MTRQYF | 82                    | 4.0           | 5.2           | 115                     | 138                     |
| NPIM127V101MTRQYF | 100                   | 3.8           | 4.50          | 120                     | 144                     |

Maximum +40°C temperature rise at Irms. Approximate -30% inductance change at Isat.

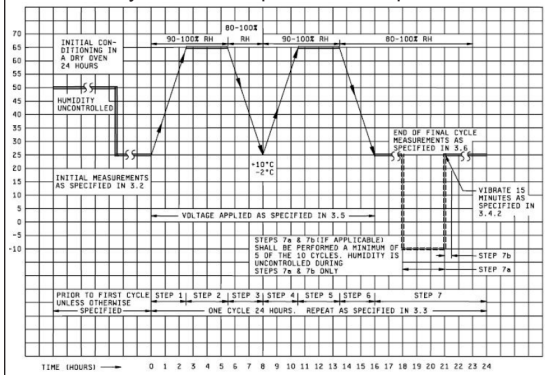
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### RELIABILITY TEST

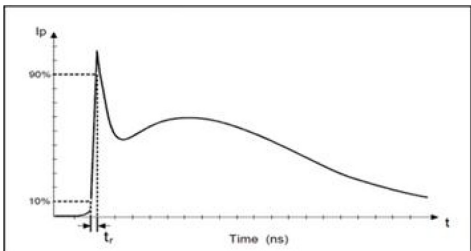
| Item                                             | Performance                                                                                                                                                                                         | Test Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |                            |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------|--------------------------|-----------|----------------------------|-----|-----|---|-----------|------|------|-----|---|-----------|------|
| High Temperature Exposure(Storage)<br>(AEC-Q200) |                                                                                                                                                                                                     | Preconditioning: Run through IR reflow for 3 times.( IPC/ JEDEC<br>J-STD-020E Classification Reflow Profiles<br>Temperature: 165±2°C (Inductor)<br>Duration: 1000hrs Min.<br>Measured at room temperature after placing for 24±2 hrs                                                                                                                                                                                                                                                                       |           |                            |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
| Temperature Cycling<br>(AEC-Q200)                |                                                                                                                                                                                                     | Preconditioning: Run through IR reflow for 3 times.( IPC/ JEDEC<br>J-STD-020E Classification Reflow Profiles<br>Condition for 1 cycle<br>Step1: -55±2°C 30min Min.(Inductor)<br>Step2: 165±2°C transition time 1min MAX.<br>Step3: 165±2°C 30min Min.<br>Step4: Low temp. transition time 1min MAX.<br>Number of cycles:1000<br>Measured at room temperature after placing for 24±2 hrs                                                                                                                    |           |                            |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
| Moisture Resistance<br>AEC-Q200                  | Appearance: No damage.<br>Inductance: within±10% of initial value<br>Q: Shall not exceed the specification value.<br>RDC: within ±15% of initial value and shall not exceed the specification value | t=24 hours/cycle. Note:Steps 7a & 7b Unpowered.<br>                                                                                                                                                                                                                                                                                                                                                                     |           |                            |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
| Biased Humidity<br>(AEC-Q200)                    |                                                                                                                                                                                                     | Preconditioning: Run through IR reflow for 3 times.<br>( IPC/JEDEC J-STD-020E Classification Reflow Profiles)<br>Humidity: 85±3%R.H,<br>Temperature: 85°C±2°C<br>Duration : 1000hrs Min<br>Measured at room temperature after placing for24±2hrs                                                                                                                                                                                                                                                           |           |                            |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
| High Temperature Operational Life<br>(AEC-Q200)  |                                                                                                                                                                                                     | Preconditioning: Run through IR reflow for 3 times.<br>( IPC/JEDECJ-STD-020E Classification Reflow Profiles<br>Temperature: 165±2°C(Inductor)<br>Duration: 1000hrs Min. With 100% rated current.<br>Measured at room temperature after placing for24±2hrs                                                                                                                                                                                                                                                  |           |                            |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
| External Visual                                  | Appearance: No damage.                                                                                                                                                                              | Inspect device construction, marking and workmanship.<br>Electrical Test                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |                            |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
| Physical Dimension                               | According to the product specification size measurement                                                                                                                                             | According to the product specification size measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |                            |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
| Resistance to Solvents                           | Appearance: No damage.                                                                                                                                                                              | Add aqueous wash chemical - OKEM clean or equivalent.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |                            |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
| Mechanical Shock                                 | Appearance: No damage.<br>Inductance: within±10% of initial value<br>Q: Shall not exceed the specification value.<br>RDC: within ±15% of initial value and shall not exceed the specification value | Preconditioning: Run through IR reflow for 3 times.( IPC/ JEDECJ-STD-020E Classification Reflow Profiles)<br>Test condition <table><tr><th>Type</th><th>Peak value (g's)</th><th>Normal duration (D) (ms)</th><th>Wave form</th><th>Velocity change (Vi)ft/sec</th></tr><tr><td>SMD</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr><tr><td>Lead</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr></table><br>3 shocks in each direction along 3 perpendicular axes(18 shocks). | Type      | Peak value (g's)           | Normal duration (D) (ms) | Wave form | Velocity change (Vi)ft/sec | SMD | 100 | 6 | Half-sine | 12.3 | Lead | 100 | 6 | Half-sine | 12.3 |
| Type                                             | Peak value (g's)                                                                                                                                                                                    | Normal duration (D) (ms)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Wave form | Velocity change (Vi)ft/sec |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
| SMD                                              | 100                                                                                                                                                                                                 | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Half-sine | 12.3                       |                          |           |                            |     |     |   |           |      |      |     |   |           |      |
| Lead                                             | 100                                                                                                                                                                                                 | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Half-sine | 12.3                       |                          |           |                            |     |     |   |           |      |      |     |   |           |      |

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## RELIABILITY TEST CONT'D

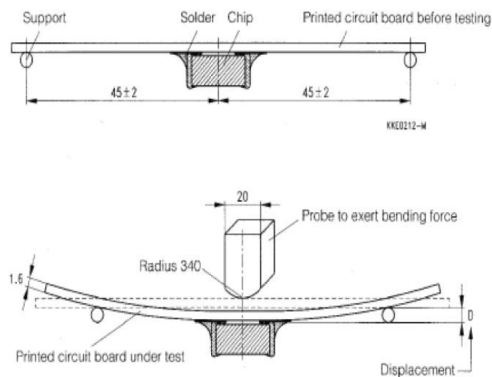
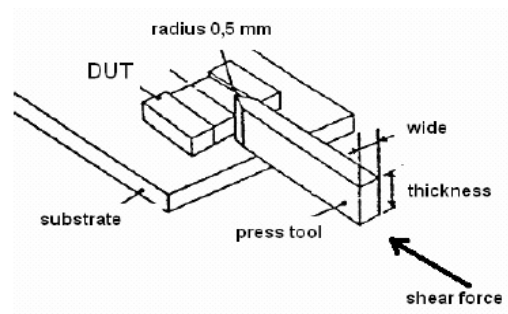
| Item                         | Performance                                                                                                                                                                                                                                                                                                                                                 | Test Condition                                                                                                                                                                                                                                                                                     |                                              |         |                                              |                        |      |                 |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------|----------------------------------------------|------------------------|------|-----------------|
| Vibration                    | Appearance: No damage.<br>Inductance: within±10% of initial value<br>Q: Shall not exceed the specification value.<br>RDC: within ±15% of initial value and shall not exceed the specification value                                                                                                                                                         | Preconditioning: Run through IR reflow for 3 times.( IPC/ JEDEC J-STD-020E Classification Reflow Profiles)<br>Oscillation Frequency: 10Hz~2KHz~10Hz for 20 minute<br>Equipment: Vibration checker<br>Total Amplitude: 5g<br>Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations). |                                              |         |                                              |                        |      |                 |
| Resistance to Soldering Heat |                                                                                                                                                                                                                                                                                                                                                             | Test condition:(MIL-STD-202 Condition B)<br>Number of heat cycles:1 <table><tr><th>Temperature(°C)</th><th>Time(s)</th><th>Temperature ramp/immersion and emersion rate</th></tr><tr><td>260±5<br/>(solder temp)</td><td>10±5</td><td>25mm/s ± 6 mm/s</td></tr></table>                            | Temperature(°C)                              | Time(s) | Temperature ramp/immersion and emersion rate | 260±5<br>(solder temp) | 10±5 | 25mm/s ± 6 mm/s |
| Temperature(°C)              |                                                                                                                                                                                                                                                                                                                                                             | Time(s)                                                                                                                                                                                                                                                                                            | Temperature ramp/immersion and emersion rate |         |                                              |                        |      |                 |
| 260±5<br>(solder temp)       | 10±5                                                                                                                                                                                                                                                                                                                                                        | 25mm/s ± 6 mm/s                                                                                                                                                                                                                                                                                    |                                              |         |                                              |                        |      |                 |
| Thermal shock (AEC-Q200)     | Depth: completely cover the termination<br>Preconditioning: Run through IR reflow for 3 times.( IPC/ JEDEC J-STD-020E Classification Reflow Profiles<br>Condition for 1 cycle<br>Step1: -55±2°C 15±1min(Inductor)<br>Step2: 165±2°C within 20Sec.<br>Step3: 165±2°C 15±1min<br>Number of cycles: 300<br>Measured at room fempraturc after placing fo24±2hrs |                                                                                                                                                                                                                                                                                                    |                                              |         |                                              |                        |      |                 |
| ESD<br>HBM>=2KV              | Appearance: No damage.                                                                                                                                                                                                                                                                                                                                      | <br>Direct Contact and Air Discharge PASSIVE COMPONENT<br>HBM ESD<br>Discharge Waveform to a Coaxial Target<br>Test method: AEC-Q200-002<br>Test mode: Contact Discharge<br>Discharge level: 4 KV (Level: 2 )  |                                              |         |                                              |                        |      |                 |
| Solderability                | More than 95% of the terminal electrode should be covered with solder.                                                                                                                                                                                                                                                                                      | a. Method B1, 4 hrs @155°C dry heat @255°C±5°C<br>Test time:5 +0/-0.5 seconds.<br>b. Method D category 3. (steam aging 8hours ± 15 min)@ 260°C±5°C<br>Test time: 30 +0/-0.5 seconds.                                                                                                               |                                              |         |                                              |                        |      |                 |
| Electrical Characterization  | Refer Specification for Approval                                                                                                                                                                                                                                                                                                                            | Summary to show Min, Max, Mean and Standard deviation                                                                                                                                                                                                                                              |                                              |         |                                              |                        |      |                 |
| Flammability                 | Electrical Test not required.                                                                                                                                                                                                                                                                                                                               | V-0 or V-1 are acceptable.                                                                                                                                                                                                                                                                         |                                              |         |                                              |                        |      |                 |

# NPIM\_V Series

Improved DCR Extended Temperature  
High Current Power Inductors

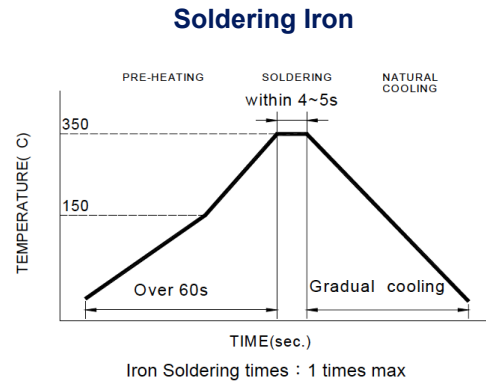
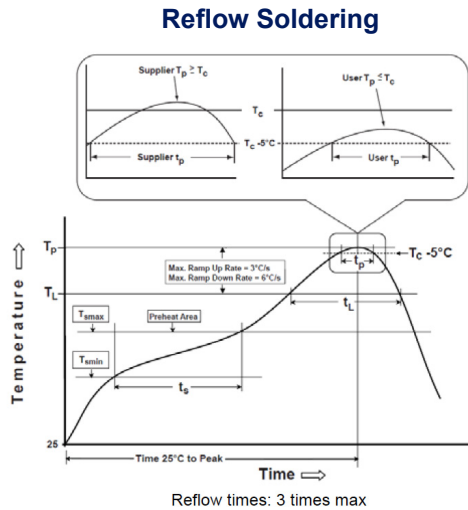


## RELIABILITY TEST CONT'D

| Item              | Performance           | Test Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Board Flex        | Appearance: No damage | <p>Preconditioning: Run through IR reflow for 3 times.( IPC/ JEDEC J-STD-020E Classification Reflow Profiles<br/>Place the 100mm X 40mm board into a fixture similar to the one shown in below Figure with the component facing down.<br/>The apparatus shall consist of mechanical means to apply a force which will bend the board (D) x = 2 mm minimum. The duration of the applied forces shall be 60 (+ 5) sec. The force is to be applied only once to the board.</p>  |
| Terminal Strength |                       | <p>Preconditioning: Run through IR reflow for 3 times.( IPC/ JEDEC J-STD-020E Classification Reflow Profiles<br/>With the component mounted on a PCB with the device to be tested, apply a 17.7 N (1.8 Kg) force to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to apply a shock to the component being tested.</p>                                                                 |



### REFLOW SOLDERING PROFILE



Recommended temperature profiles for lead free re-flow soldering in reflow profile table & package thickness table (J-STD-020E)

#### Reflow Profiles

| Profile Type                                                 | Pb-Free Assembly |
|--------------------------------------------------------------|------------------|
| Preheat                                                      |                  |
| -Temperature Min(Tsmin)                                      | 150°C            |
| -Temperature Max(Tsmax)                                      | 200°C            |
| -Time(ts)from(Tsmin to Tsmax)                                | 60-120seconds    |
| Ramp-up rate(TLto Tp)                                        | 3°C/second max.  |
| Liquidus temperature(TL)                                     | 217°C            |
| Time(tL)maintained above TL                                  | 60-150 seconds   |
| Classification temperature(Tc)                               | See Table (1.2)  |
| Time(tp) at Tc- 5°C (Tp should be equal to or less than Tc.) | < 30 seconds     |
| Ramp-down rate(Tp to TL)                                     | 6°C /second max. |
| Time 25°C to peak temperature                                | 8 minutes        |

**Tp**: maximum peak package body temperature, **Tc**: the classification temperature.  
For user (customer) **Tp** should be equal to or less than **Tc**.

#### Package Thickness/Volume and Classification Temperature (Tc)

|                  | Package Thickness | Volume mm3 <350 | Volume mm3 350-2000 | Volume mm3 >2000 |
|------------------|-------------------|-----------------|---------------------|------------------|
| PB-Free Assembly | <1.6mm            | 260°C           | 260°C               | 260°C            |
|                  | 1.6-2.5mm         | 260°C           | 250°C               | 245°C            |
|                  | ≥2.5mm            | 250°C           | 245°C               | 245°C            |

Reflow is referred to standard IPC/JEDEC J-STD-020E

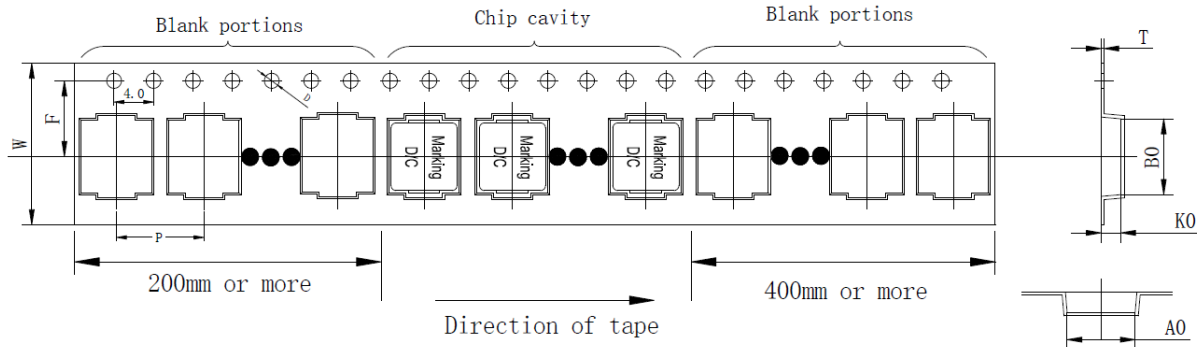
# NPIM\_V Series

Improved DCR Extended Temperature  
High Current Power Inductors



## TAPING DIMENSIONS (mm)

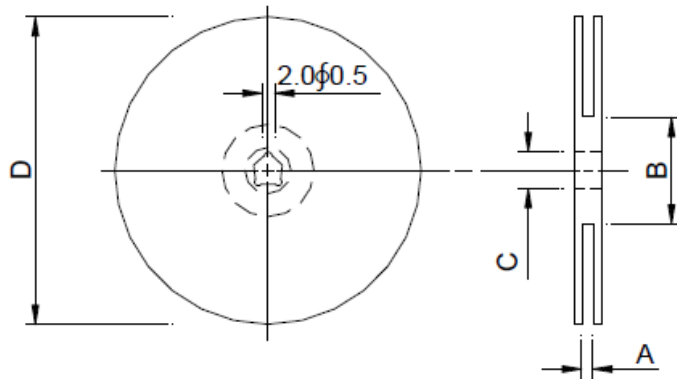
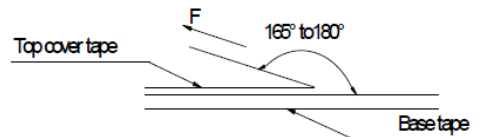
| Series   | Ao       | Bo       | Ko      | P        | W        | F        | t         | D       |
|----------|----------|----------|---------|----------|----------|----------|-----------|---------|
| NPIM53V  | 5.5±0.1  | 6.2±0.1  | 3.3±0.1 | 8.0±0.1  | 12.0±0.3 | 5.5±0.1  | 0.35±0.05 | 1.5±0.1 |
| NPIM63V  | 7.1±0.1  | 8.1±0.1  | 3.3±0.1 | 12.0±0.1 | 16.0±0.3 | 7.5±0.1  | 0.35±0.05 | 1.5±0.1 |
| NPIM104V | 10.4±0.1 | 12.3±0.1 | 4.5±0.1 | 16.0±0.1 | 24.0±0.3 | 11.5±0.1 | 0.40±0.05 | 1.5±0.1 |
| NPIM106V | 10.4±0.1 | 12.3±0.1 | 5.7±0.1 | 16.0±0.1 | 24.0±0.3 | 11.5±0.1 | 0.40±0.05 | 1.5±0.1 |
| NPIM127V | 13.0±0.1 | 14.8±0.1 | 7.0±0.1 | 16.0±0.1 | 24.0±0.3 | 11.5±0.1 | 0.50±0.05 | 1.5±0.1 |



## REEL DIMENSIONS (mm)

| Series   | A         | B     | C           | D   | Qty/Reel |
|----------|-----------|-------|-------------|-----|----------|
| NPIM53V  | 12.4+2/-0 | 100±2 | 13+0.5/-0.2 | 330 | 2,000    |
| NPIM63V  | 16.4+2/-0 | 100±2 | 13+0.5/-0.2 |     | 1,000    |
| NPIM104V | 24.4+2/-0 | 100±2 | 13+0.5/-0.2 |     | 500      |
| NPIM106V | 24.4+2/-0 | 100±2 | 13+0.5/-0.2 |     | 500      |
| NPIM127V | 24.4+2/-0 | 100±2 | 13+0.5/-0.2 |     | 500      |

## Tearing Off Force (mm)



| Tearing Speed | Room Temp (°C) | Room Humidity (%) | Room Atm (hPa) |
|---------------|----------------|-------------------|----------------|
| 300±10%       | 5~35           | 100±2             | 860~1060       |