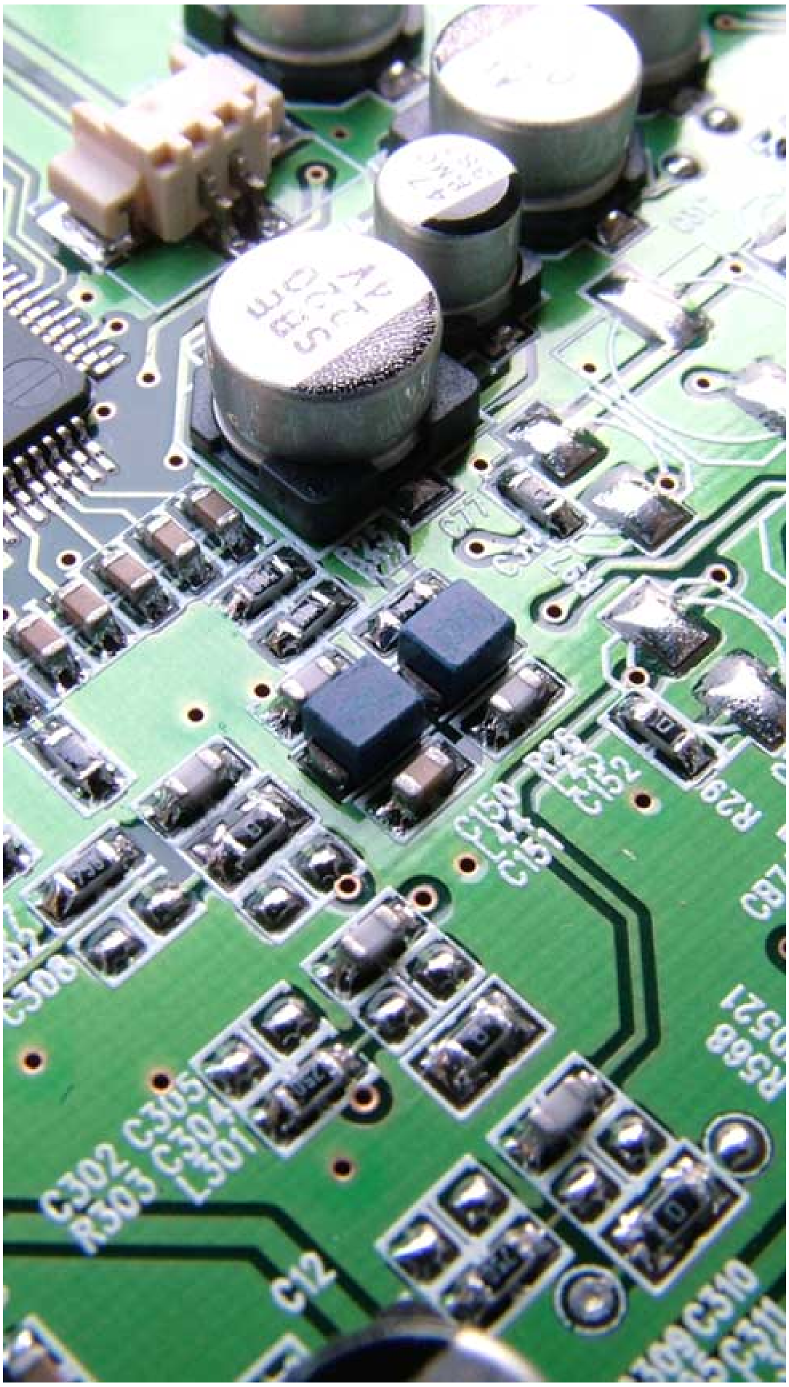
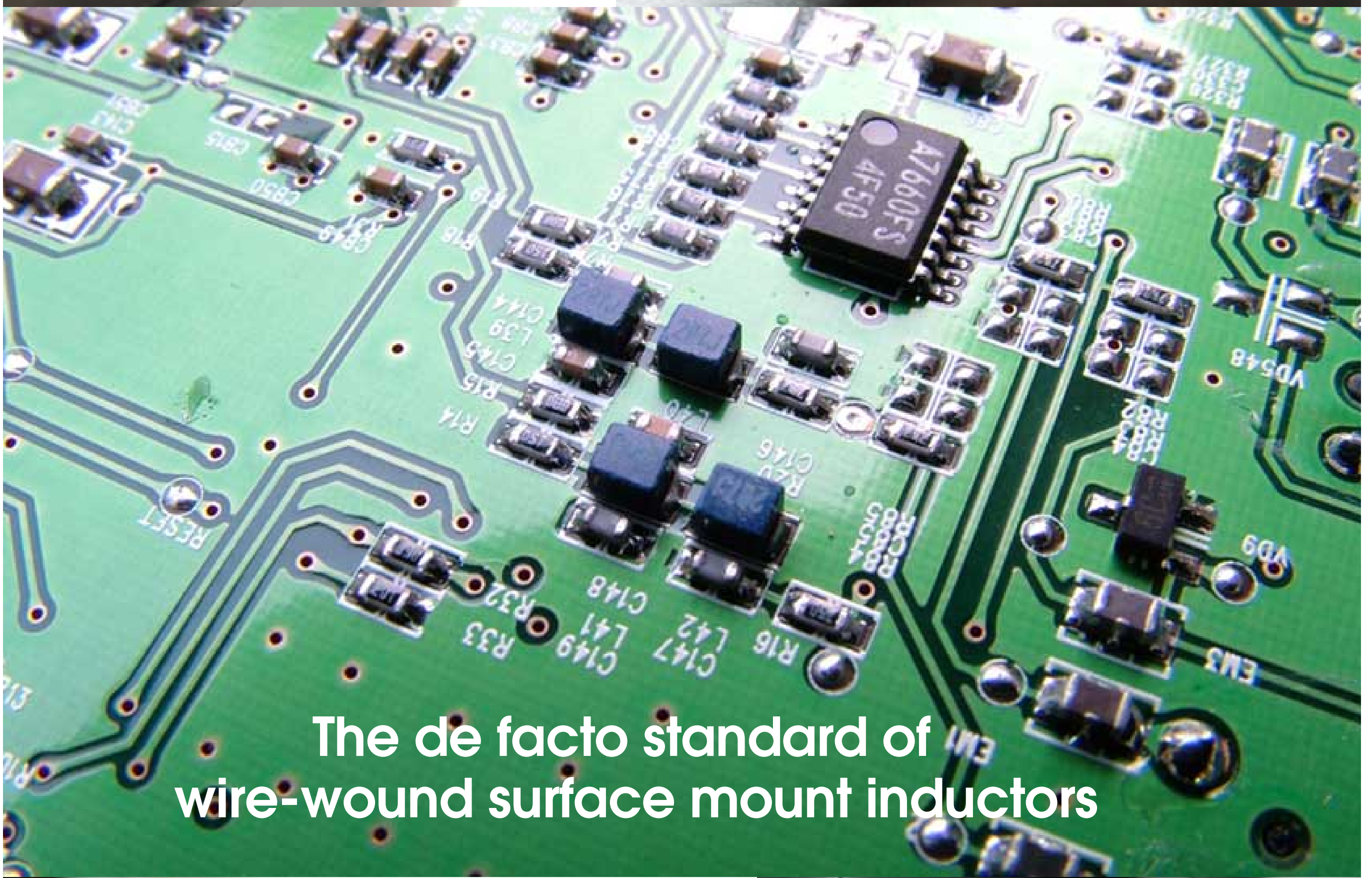
# Wire-wound Surface Mount Small Inductors For Signal Lines And DC Power Lines

# NL/NLV, NLC/NLCV, NLFC/NLFV series

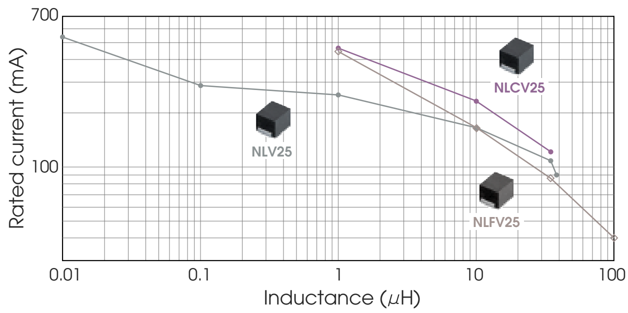


# The de facto standard of wire-wound surface mount inductors

**Comparison of characteristic tendencies 1**

Comparative example of representative products of L 2.5 x W2.0 x T1.8 mm

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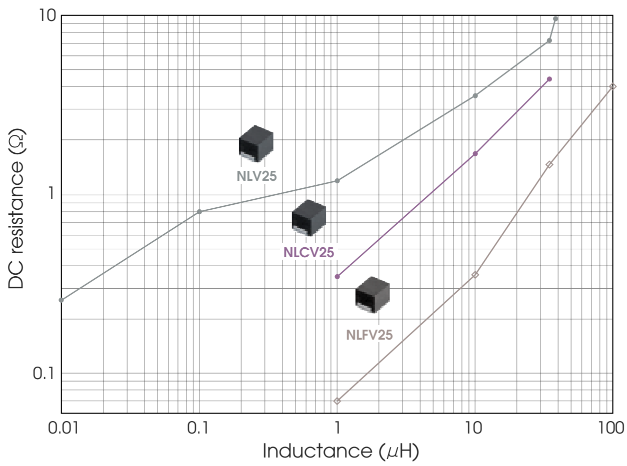
**Comparison of characteristic tendencies 2**

Comparative example of representative products of L 2.5 x W2.0 x T1.8 mm




The NL family of products have been expanded in variety through a system which quickly responds to needs since the development of NL453232 (in the year 1981), which was optimized for the filter circuits of AV devices. The family continues to improve its world-wide reputation through its cumulative production total of over 34 billion units*, with three characteristic groups and four shapes covering 0.01-10000μH.

With its original reliability-possessing structural design, and excellent cost performance via its original, automated, mass production line –which was the world's first built line of this kind– the products' two advantages are the backbone of reliability and an outstanding adaptation achievement.

Also, in order to respond to ever-increasing global needs, the NL series continues to develop new technologies by greatly reducing Rdc and shifting to resin materials for reduced environmental burdens, or by improving production processes.

Among the following three characteristic types, the series with a "V" suffix are the latest achievements. Replacement has been underway continuously, starting from the shapes with the greatest versatility.


**Three characteristic groups respond to diverse circuit design needs**

NL/NLV series : A total of 155 products were made in a series of four shapes with high Q-characteristics in the high-frequency region for filtering signal lines, covering 0.01-10000μH, with a narrow tolerance of ±5% using the E12 series.

NLC/NLCV series : Developed for the chokes of DC power lines. In four shapes, a total of 97 products are lined up, achieving 1.5 - 2 times larger current capacity than the same shape NL/NLV series with the originally developed high Bs, high μ ferrite core, and optimized windings.

NLFC/NLFV series : Responding to the need for making low loss power line chokes. A great reduction of Rdc was achieved using the original magnetic mold resin mixed with ferrite particles. With three versatile shapes, a total of 48 products are included in the line.

All products conform to the RoHS Directive.**

* 1982.12 - 2006.12

** Conformity to RoHS Directive : This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

# Three characteristic categories support the optimized design of diverse devices. The NL family's original technologies and superior advantages are incorporated in all of them.

TDK has developed super-small drum-shaped cores allowing the best balance between winding diameter and number of windings by utilizing its original magnetic path analytical simulation reinforced with significant accumulated data. In addition to this, the original high µ-high B ferrite material is used to expand the NL family of products beginning with the NL series.

The structure directly integrating ferrite cores with processed winding ends and metal terminals is another original technological advance, confirming the advantages of the family in size and low loss. Moreover, building an automated manufacturing system that can control the center location when mounting the coils to metal terminals to an accuracy of ± a several tens µm, a mass-production system was early established for the industry's smallest 2016 products, supporting cost-saving and the downsizing of devices.

Also, to respond to the requests for battery-driven small, mobile device designs with reduced power consumption, the Rdc values of conventional choke products were improved by as much as 50-20% using a high-efficiency closed-magnetic path structure (practical reinforcement of µ), where high µ ferrite particles of superior magnetic flux convergence are spread over the mold material covering the coils. The NL family remains at the industry's top level in terms of power saving effect.

## Wide L-value range / High Q / Narrow tolerances — For signal lines — NL / NLV

Application example of digital TV tuner and tuner IC signal lines

### Superb characteristic optimal for filtering and matching purposes

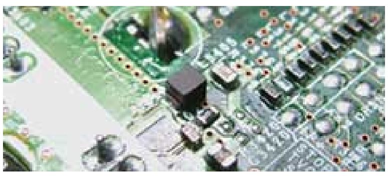
- Industry's top-notch high-frequency high-Q characteristic
- Covering 0.01-10000 µH with four shapes
- E12 series, tolerance of ±5% was standardized

**NLV25** — Inductance(µH) ±5% E12 series
0.01 1 33 100 470 1000 1200 10000
Rdc : 21 Ω/Idc : 60 mA
Rdc : 0.26 Ω/Idc : 530 mA
Thermoplastic resin mold
L2.5×W2.0×T1.8 mm

**NLV32** — Inductance(µH) ±5% E12 series
0.01 1 33 100 470 1000 1200 10000
Rdc : 40 Ω/Idc : 25 mA
Rdc : 0.13 Ω/Idc : 450 mA
Thermoplastic resin mold
L3.2×W2.5×T2.2 mm

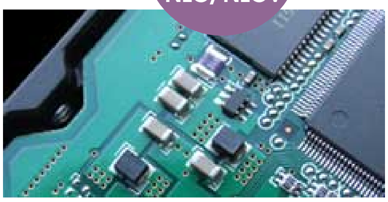
**NL453232** — Inductance(µH) ±5% E12 series
0.01 1 33 100 470 1000 1200 10000
Rdc : 40 Ω/Idc : 30 mA
Rdc : 0.5 Ω/Idc : 450 mA
L4.5×W3.2×T3.2 mm

**NL565050** — Inductance(µH) ±5% E12 series
0.01 1 33 100 470 1000 1200 10000
Rdc : 17 Ω/Idc : 75 mA
Rdc : 150 Ω/Idc : 25 mA
L5.6×W5.0×T5.0 mm



Application example of Analogue TV tuner (Analogue video signal input lines)

## Large current choke — For power lines — NLC/NLCV



Application example of ATA-compatible HDD and HDD controller VDD line

### World standard SMD choke for power lines

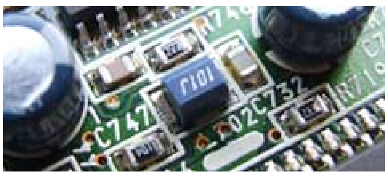
- Realizing 1.5 - 2 times larger electric current capacity than NL/NLV
- Covering 0.15-1000 µH with four shapes
- Established a cutting-edge low-cost mass production system

**NLCV25** — Inductance(µH) E6 series
0.15 1 33 330 1000
Rdc : 4.2 Ω/Idc : 120 mA
Rdc : 0.34 Ω/Idc : 475 mA
Thermoplastic resin mold
L2.5×W2.0×T1.8 mm ～6.8 µH : ±20% / 10 µH～ : ±10%

**NLCV32** — Inductance(µH) E6 series
0.15 1 33 330 1000
Rdc : 12.3 Ω/Idc : 70 mA
Rdc : 0.028 Ω/Idc : 1450 mA
Thermoplastic resin mold
L3.2×W2.5×T2.2 mm ～6.8 µH : ±20% / 10 µH～ : ±10%

**NLC453232** — Inductance(µH) ±10% E12 series
0.15 1 33 330 1000
Rdc : 13 Ω/Idc : 90 mA
Rdc : 0.11 Ω/Idc : 1050 mA
L4.5×W3.2×T3.2 mm

**NLC565050** — Inductance(µH) ±10% E12 series
0.15 1 33 330 1000
Rdc : 15 Ω/Idc : 85 mA
Rdc : 0.03 Ω/Idc : 1800 mA
L5.6×W5.0×T5.0 mm



Application example of Car navigation system (DC power line)

## Low Rdc choke — For power lines — NLFC/NLFV

Application example of digital still camera and Vcc line

### Power-saving choke with maximized low-Rdc

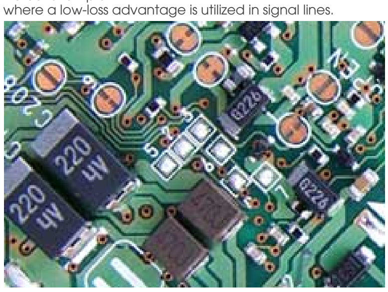
- Reduced Rdc of NLC/NLCV by 50-20%
- Compatible with 1-1000 µH with three downsized shapes
- Optimal for the power lines of handy devices

**NLFV25** — Inductance(µH) E6 series
1 22 100 330 1000
Rdc : 4 Ω/Idc : 40 mA
Rdc : 0.07 Ω/Idc : 455 mA
Thermoplastic resin mold
L2.5×W2.0×T1.8 mm ～6.8 µH : ±20% / 10 µH～ : ±10%

**NLFC322522** — Inductance(µH) E6 series
1 22 100 330 1000
Rdc : 24 Ω/Idc : 15 mA
Rdc : 0.06 Ω/Idc : 500 mA
L3.2×W2.5×T2.2 mm ～6.8 µH : ±20% / 10 µH～ : ±10%

**NLFC453232** — Inductance(µH) E6 series
1 22 100 330 1000
Rdc : 6 Ω/Idc : 45 mA
Rdc : 0.05 Ω/Idc : 800 mA
L4.5×W3.2×T3.2 mm ～6.8 µH : ±20% / 10 µH～ : ±10%

Actual example where a low-loss advantage is utilized in signal lines.



Potable CD player/Audio output line (Configuring LPF)

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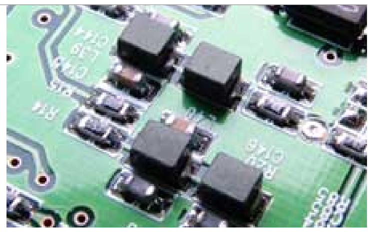


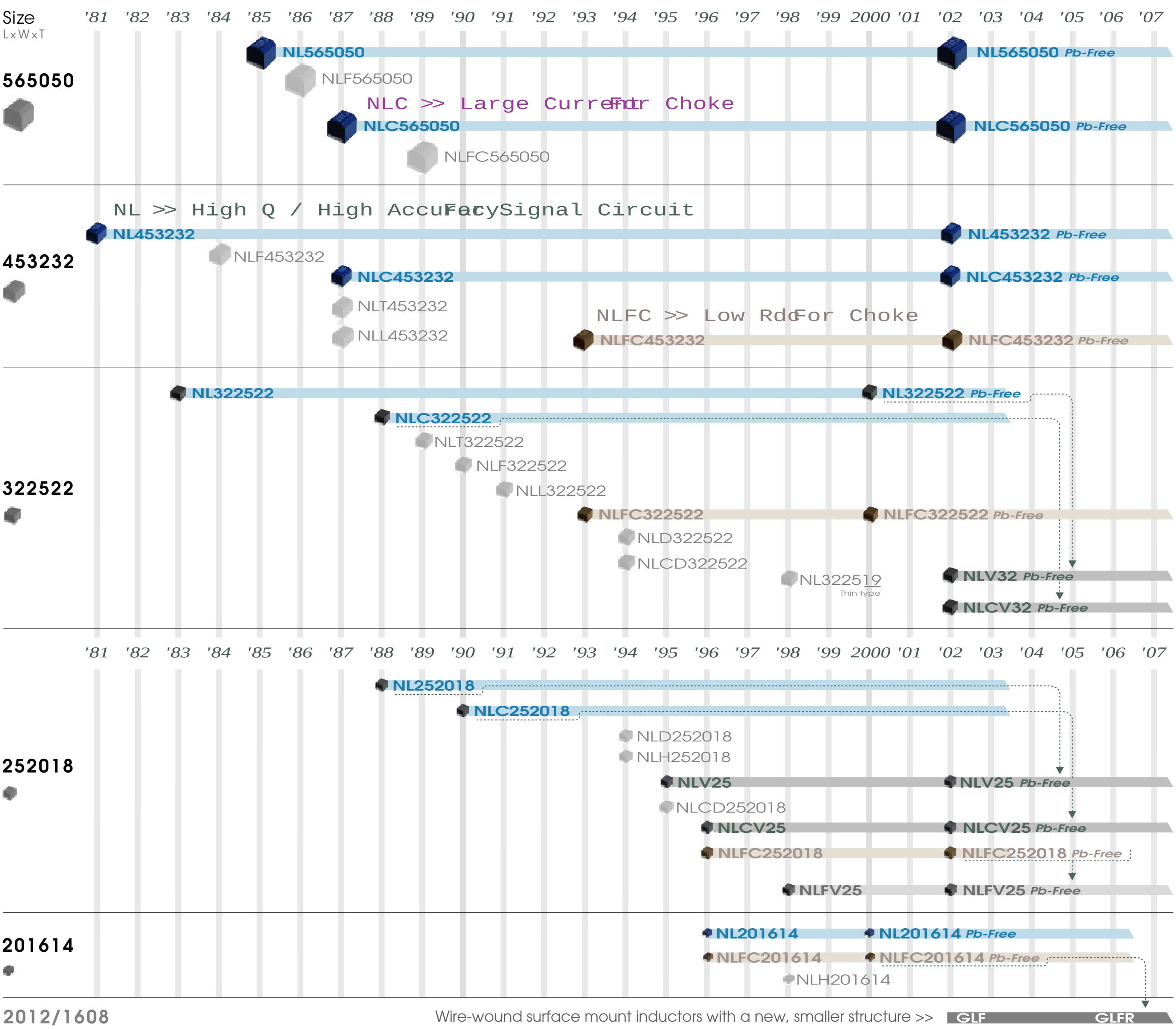
## Expansion of product variety and downsizing complying with increased circuit design needs

**The first NL was included in a TV tuner in 1981.**
**NL has also evolved with the remarkable technological evolution since then.**

The onslaught of digitization coincides with the surface implementation of analog circuits. New portable devices have been repeatedly launched. Accelerated downsizing and thinning have grown. Rapidly increased powersaving needs are everywhere. There are myriad successful electronic devices for auto-mobiles. The evolution of home information appliances continues. And all of this with designs that recognize the sensitivity of the environment to the toxicity of materials. Although these trends, in retrospect, are themselves mind-boggling technological evolutions, it was the circuit design needs that were the driving force in making the NL family what it is today.
"A product lineup that canrespond to the latest circuit design needs right away" — has been the unchanged development creed of the NL family since the commencement of its technological efforts.

TV tuner, LD player, Portable CD player, Notebook PC, Cellular phone, Digital video camera, ADSL modem
Home VCR, Video camera, Portable video camera, Printer, MD player, CS digital broadcasting tuner, DVD video recorder
Word processor, PC, CD player, LCD TV(TV tuner), ISDN(DSU), CS/BS tuner, Car navigation system for VICS, HDD/DVD car navigation system
HDD, Fax machine, Video game machine, Car CD player, Cordless phone, CD-ROM car navigation system, PDA, Terrestrial digital broadcasting tuner
Portable tape-recorder, DAT player, GPS car navigation system, DVD player, Plasma TV, Large-scale LCD TV(TV tuner)
Car audio, CATV tuner, DAT recorder, High-definition television, DVD car navigation system, Multi-display for car

Analog circuit >> For signal matching and various filter circuits >> Responding to low Rdc and downsizing needs >>
Seeking environmental responsiveness and small, rationalized structures >>
Digital circuit >> Countermeasures for decoupling and power line EMI >> Responding to large current, low Rdc, and downsizing needs >>



## TDK's original rational production line was the world's first. Now, the NL family is making an effort to switch to further simplification of resource-saving automated production lines.

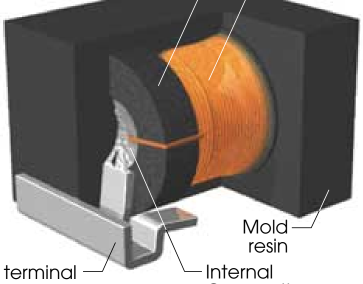
The molding processes shown on the bottom right are the conventional processes using thermosetting resin.

A new molding process shown on the bottom left deletes processes such as "thermosetting promotion", "omitting burrs", and "smoothing processes" from these conventional processes and uses thermoplastic resin which can be collected and reused. With a process design skillfully utilizing the physical properties of this resin, which allows the control of viscosity through temperature control, a fully automated production line was built.

The series with the "V" suffix in its title is the new product type from this line. Shifting to the new product type is underway in order to respond to cost-saving needs and for maximized environmental conservation.

### Internal structure

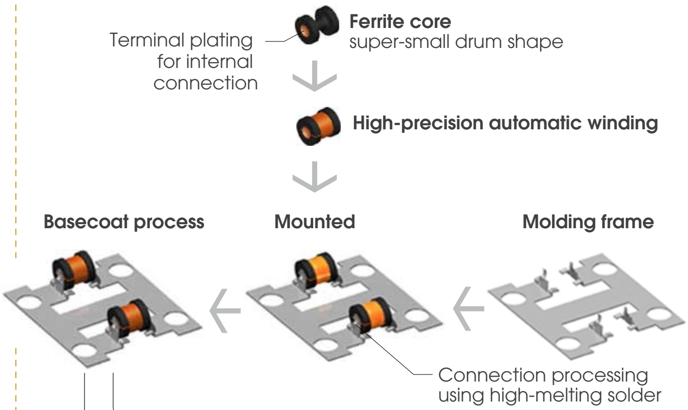
TDK's original design know-how is integrated in the structure as well. For example, an examination of the drawing point of the windings: 360 degrees is useful. It can be drawn from any angle and inductance value configurations performed, which are delicate and subtle with much freedom and precision. Also, simple yet sophisticated original know-how, such as a method of unifying the sides of drum cores, winding ends, and connection terminals, and a shape design for connection terminals seeking implementation reliability, are integrated everywhere.




* Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

** High-melting solder conforming to the RoHS Directive exemption application regulation

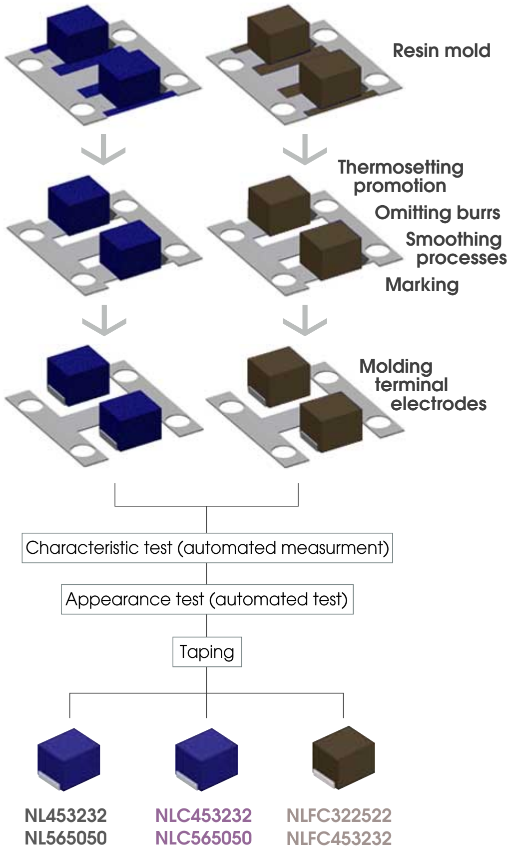
### Production process




**Thermosetting resin mold product types**

NL / NLC
100% resin

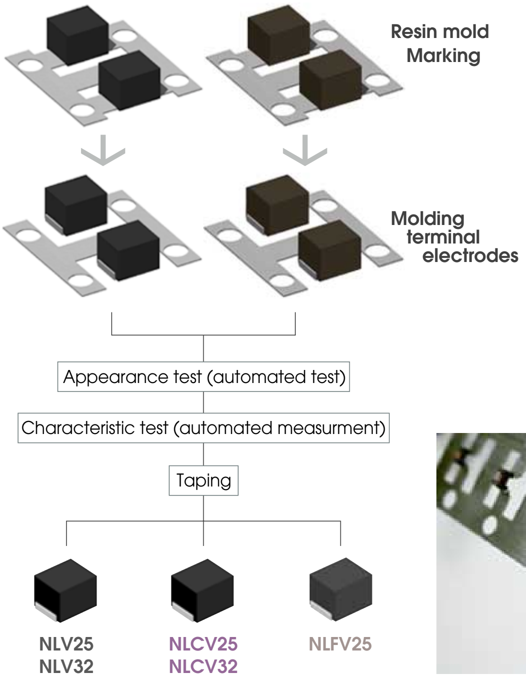
NLFC
F : Mixed with ferrite fine powder
(closed-magnetic path)



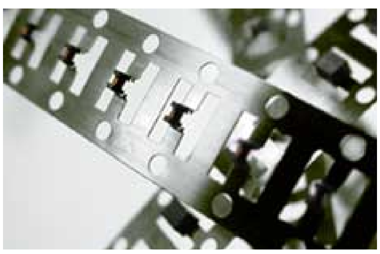

**Thermoplastic resin mold product types**

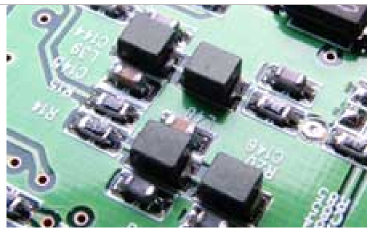
NLV/ NLCV
100% resin

NLFV
F : Mixed with ferrite fine powder
(closed-magnetic path)









Wire-wound Surface Mount Small Inductors
For Signal Lines And DC Power Lines

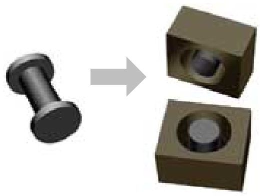
# NL/NLV, NLC/NLCV, NLFC/NLFV series

**Latest series development concept Industry's first efforts**

## Original low-Rdc structure using magnetic particle compound resin

### NLFC series

For the NLFC series, which responds to low-Rdc needs with unprecedented effectiveness, TDK's original inductance characteristic reinforcement measure is taken where mixing ferrite particles with formed mold resin optimizes the material properties and shapes of the drum-shaped cores.



Forming closed magnetic path structures equivalent to those of the pot-shaped cores

Adding ferrite particles, a magnetic element, to the mold resin adhering to both sides of the drum core, and covering the whole coil body, a closed magnetic path structure equivalent to the coil with the pot-shaped core was realized. As a result, the magnetic flux occurring on the coil is reinforced, offering a similar inductance value to the same shape conventional product molded with non-magnetic resin, without enlarging its core shape in a coil of a larger diameter (smaller number of windings).

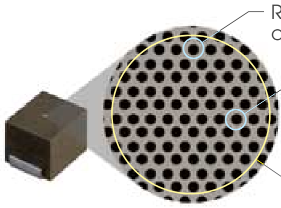
## Establishing the industry's first resource-saving and waste-free consistent production line

### NLV, NLCV, NLFV series

Thermosetting resin, which has been widely used, has the disadvantage of generating unrecycleable waste materials (runners, burrs on the gates, etc.) resulting from production processes. These have been collected and disposed of, so creating an environmental burden.

On the other hand, thermoplastic resin, because of its physical properties, is easy to collect and reuse, allowing recycling of all runner parts, which comprises a large quantity of the material, eradicating unwanted burrs by optimizing viscosity control. Also, by skillfully utilizing the advantages of thermoplastic resin, allowing reversible control of viscosity through temperature control, the leadtimes of conventional production lines can be greatly reduced when thermosetting resin is used.

In developing the NLV, NLCV, and NLFV series, new processing methods and process control technologies were developed to make full use of the advantages of thermoplastic resin. A high efficiency, consistent, production line was built which permitted a great reduction in production leadtime and increased power-saving, not to mention the ability to recycle the runner part.




Also, as shown in the model above, for the NLFV series, characteristic improvements, such as magnetic characteristic reinforcement of ferrite particles, and optimization of particle diameter and mix ratio, were promoted, realizing further reduction of Rdc while maintaining compatibility with the early series (NLFC) in major characteristics and shape.

**Comparison of mold resins**

| Series | NL NLC | NLV NLCV | NLFC | NLFV |
|---|---|---|---|---|
| Mold resin | Thermosetting resin | Thermoplastic resin | Thermosetting resin + Ferrite particles | Thermoplastic resin +Ferrite particles |
| Resin color | Blue | Black | Brown | Dark brown |
| Marking | Print | Laser print or no print | Print | No print |

**Structural common specification**

| |
|---|
| Core material : Ferrite |
| Winding : 2 UEW |
| Internal connection : Soldering (Sn-90Pb*) |
| Connection terminals : Copper alloy |
| Coating of connection terminals : Sn (lead-free) |
| Characteristic measurement : Automated total measurement |
| Appearance test : Visual examination (total inspection) |

* High-melting solder conforming to the RoHS Directive exemption application regulation)

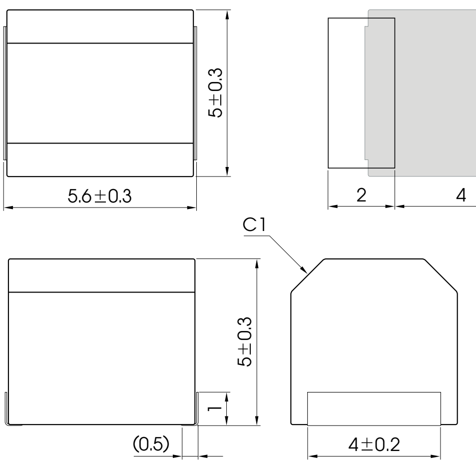
# NL's four shapes are virtually the de facto standard of resin mold fixed small inductors.

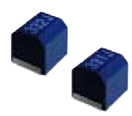
Although the shape design is the de facto standard, TDK's original technologies and know-how are integrated in the internal structure. In short, inductance ranges configured for each three characteristic groups are available in the industry's smallest class shapes. Smaller shapes and better frequency characteristics than competitors' products are found when used with the same inductance value.

All products are also compatible with flow processes at 260°C peak temperatures, not to mention the lead-free high-temperature reflow process, achieving the industry's top level in terms of implementation reliability.

## Shapes and dimensions
## Recommende PC board pattern

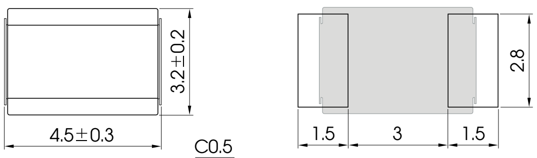
### NL565050 NLC565050

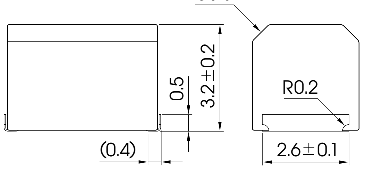


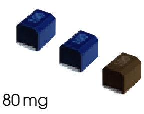



Weight : 380 mg
Dimensions in mm

### NL453232 NLC453232 NLFC453232

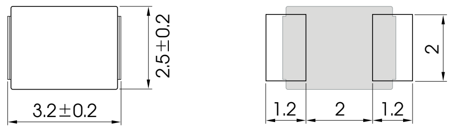


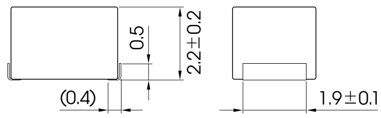



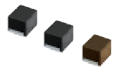



Weight : 180 mg
Dimensions in mm

### NLV32 NLCV32 NLFC322522

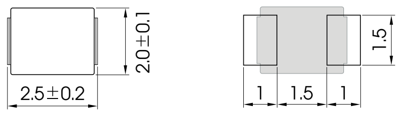


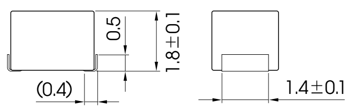



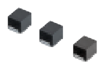



Weight : 50 mg
Dimensions in mm


### NLV25 NLCV25 NLFV25



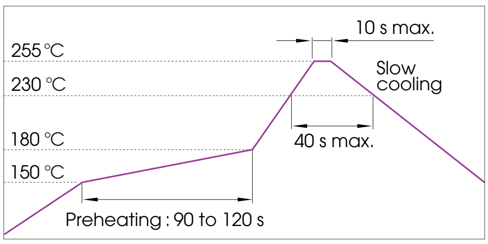



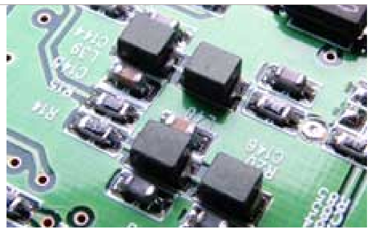



Weight : 25 mg
Dimensions in mm

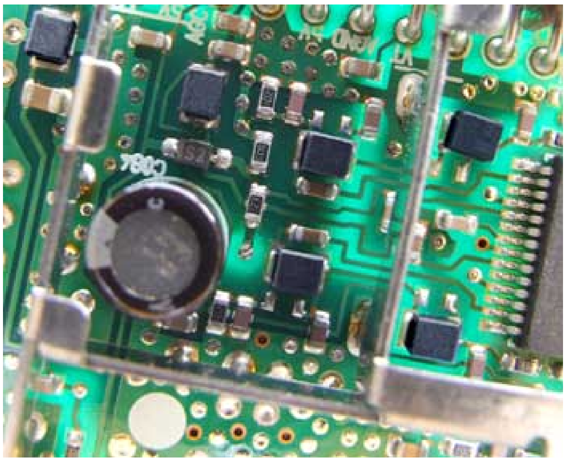
## Recommended soldering conditions

Lead-free solder
High-temperature reflow process



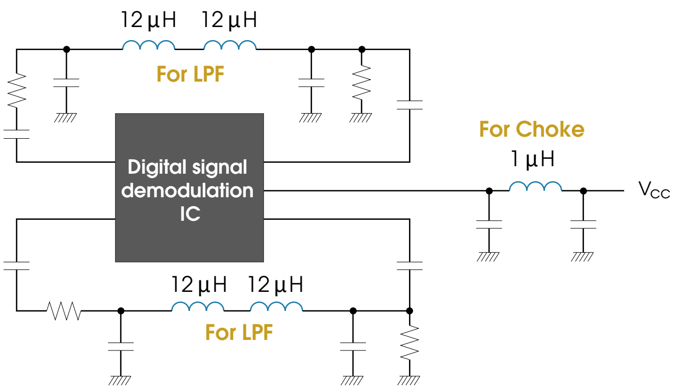


# Application examples



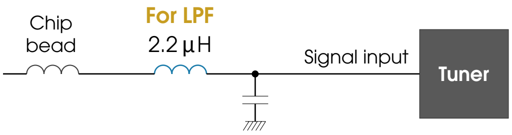
## DIGITAL TV TUNER

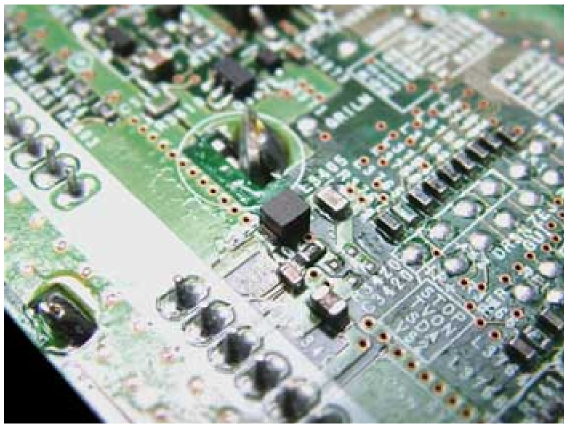
Signal lines of tuner ICs and DC power lines

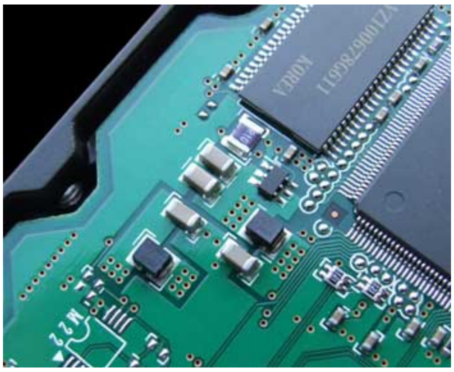



## ANALOGUE TV TUNER

Analogue video signal input lines

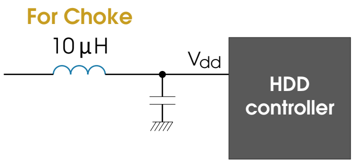


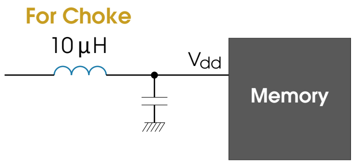


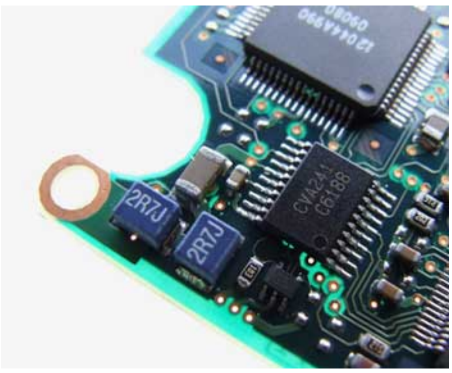
## ATA-COMPATIBLE HDD

DC power lines of HDD controllers



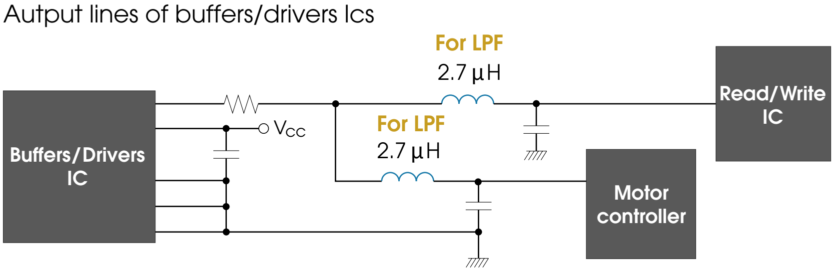

DC power lines of memories



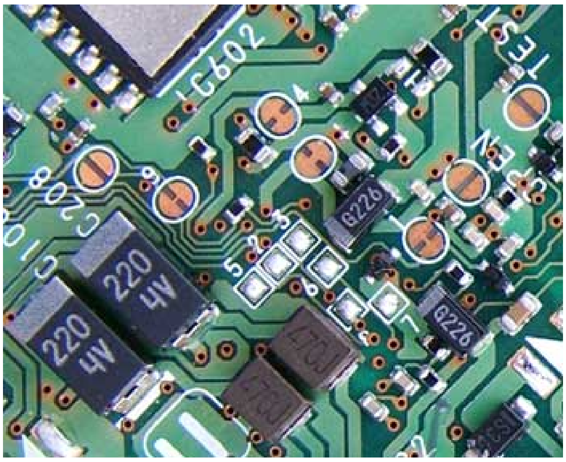



## BUILT-IN HDD OF LAPTOP PC

Autput lines of buffers/drivers Ics

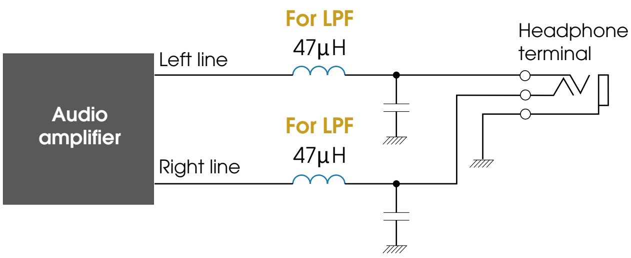


# Application examples

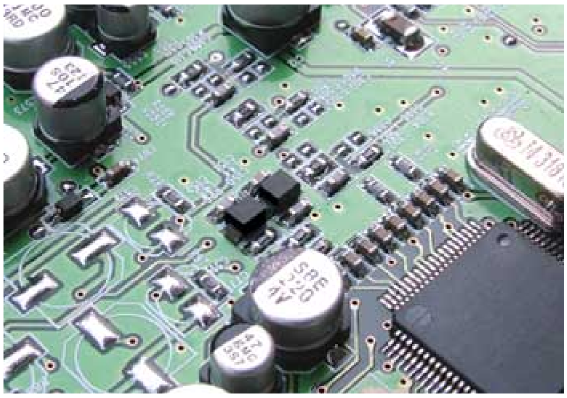


## PORTABLE CD PLAYER

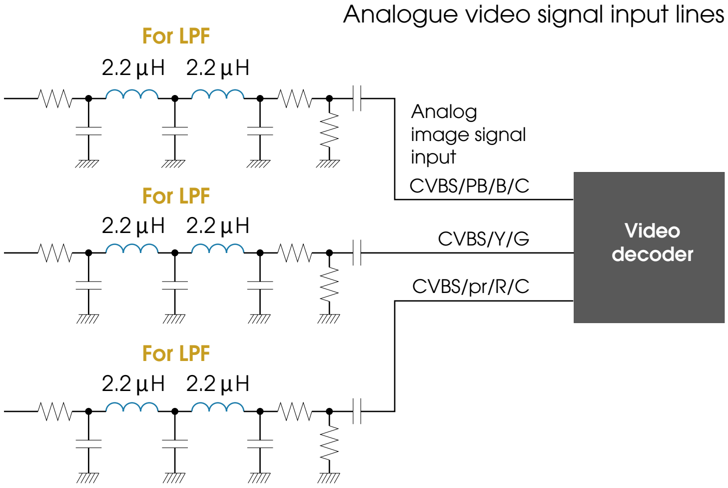
Audio output lines

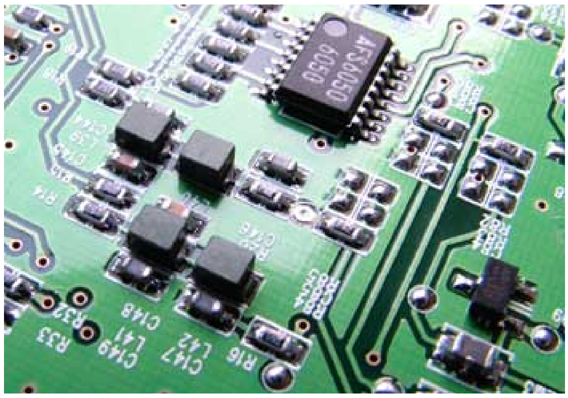



## PORTABLE DVD PLAYER

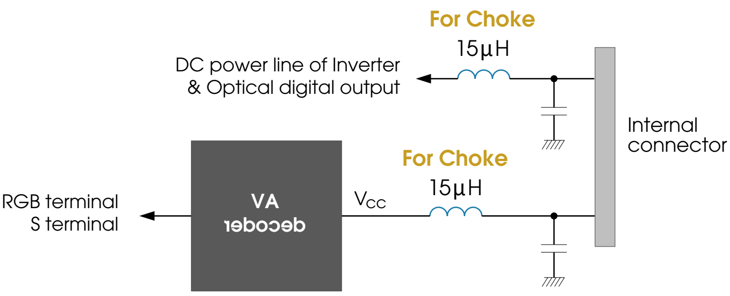


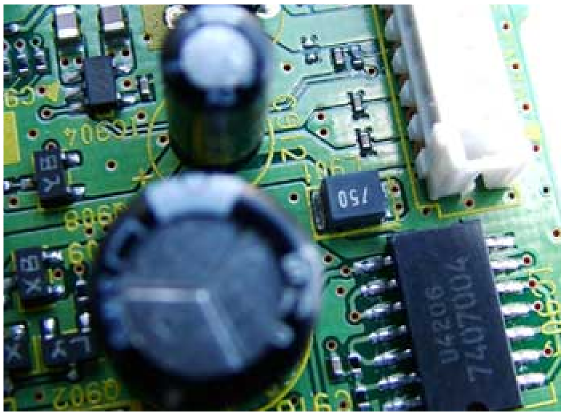
Analogue video signal input lines

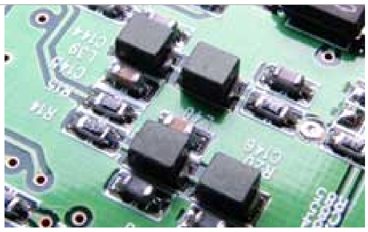


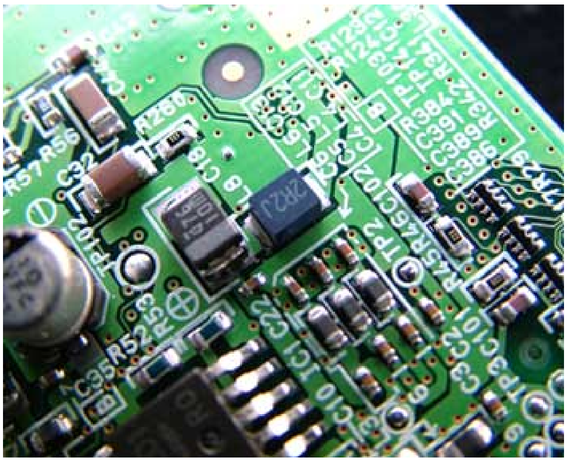



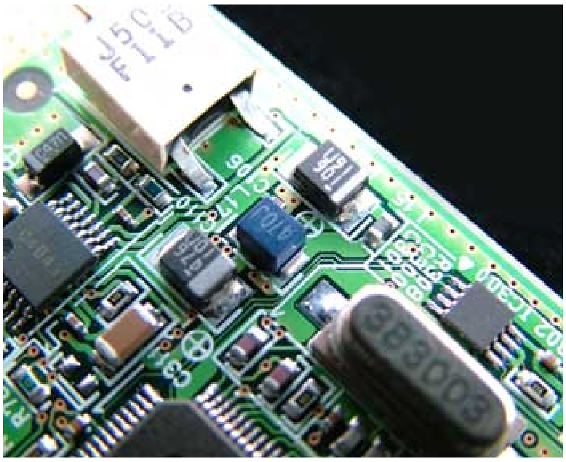
DC power lines



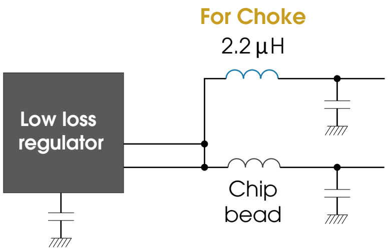


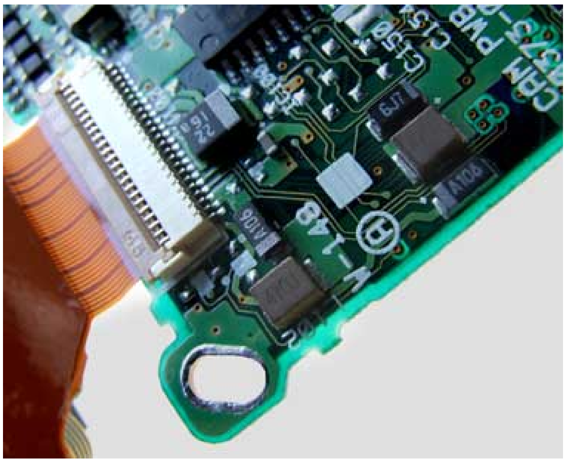




## MULTI DISPLAY FOR AUTOMOBILES

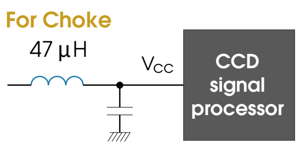
Voltage control circuits

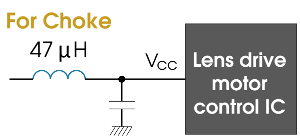


## DIGITAL STILL CAMERA

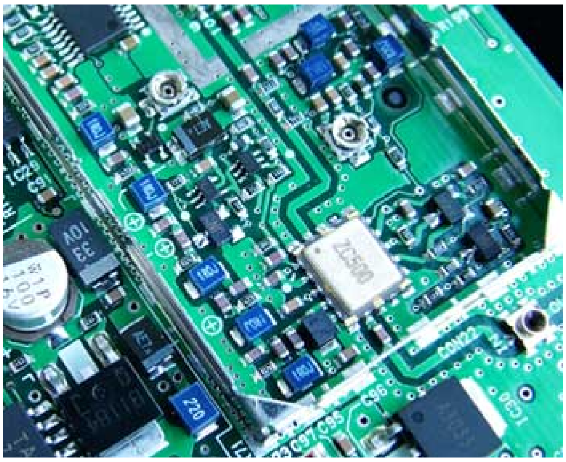
DC power lines

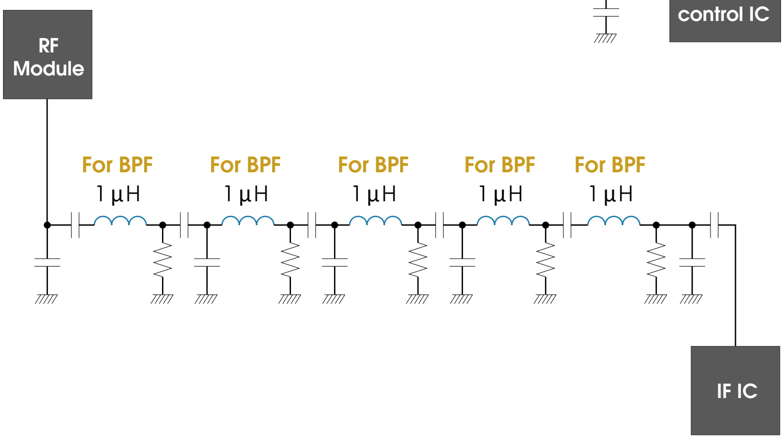



## ETC ON-BOARD UNIT

Receiving circuit IF signal lines

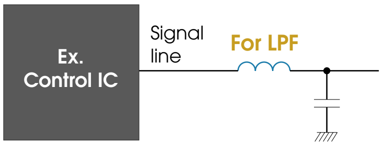


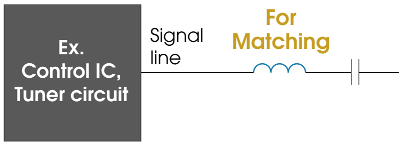


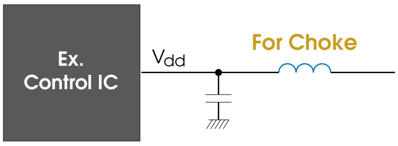
## Application examples

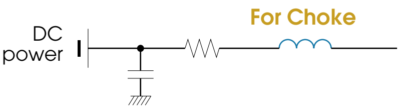
**CAR NAVIGATION SYSTEM**

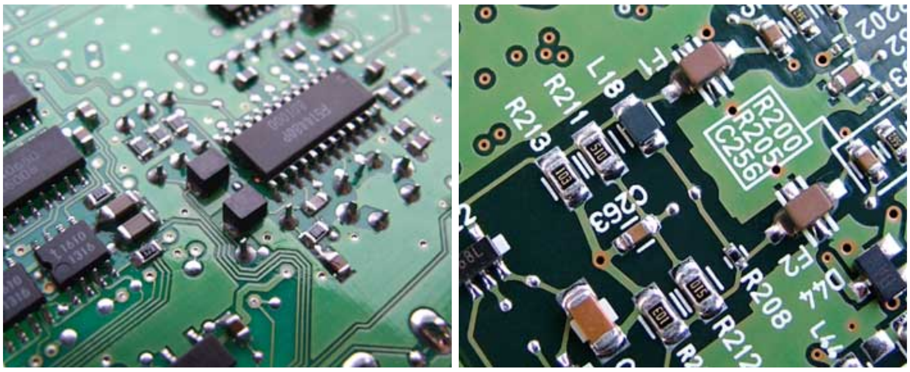
Power supply circuit
DC power line
GPS receiving circuit
Digital TV tuner
Video signal processing circuit
and so forth.

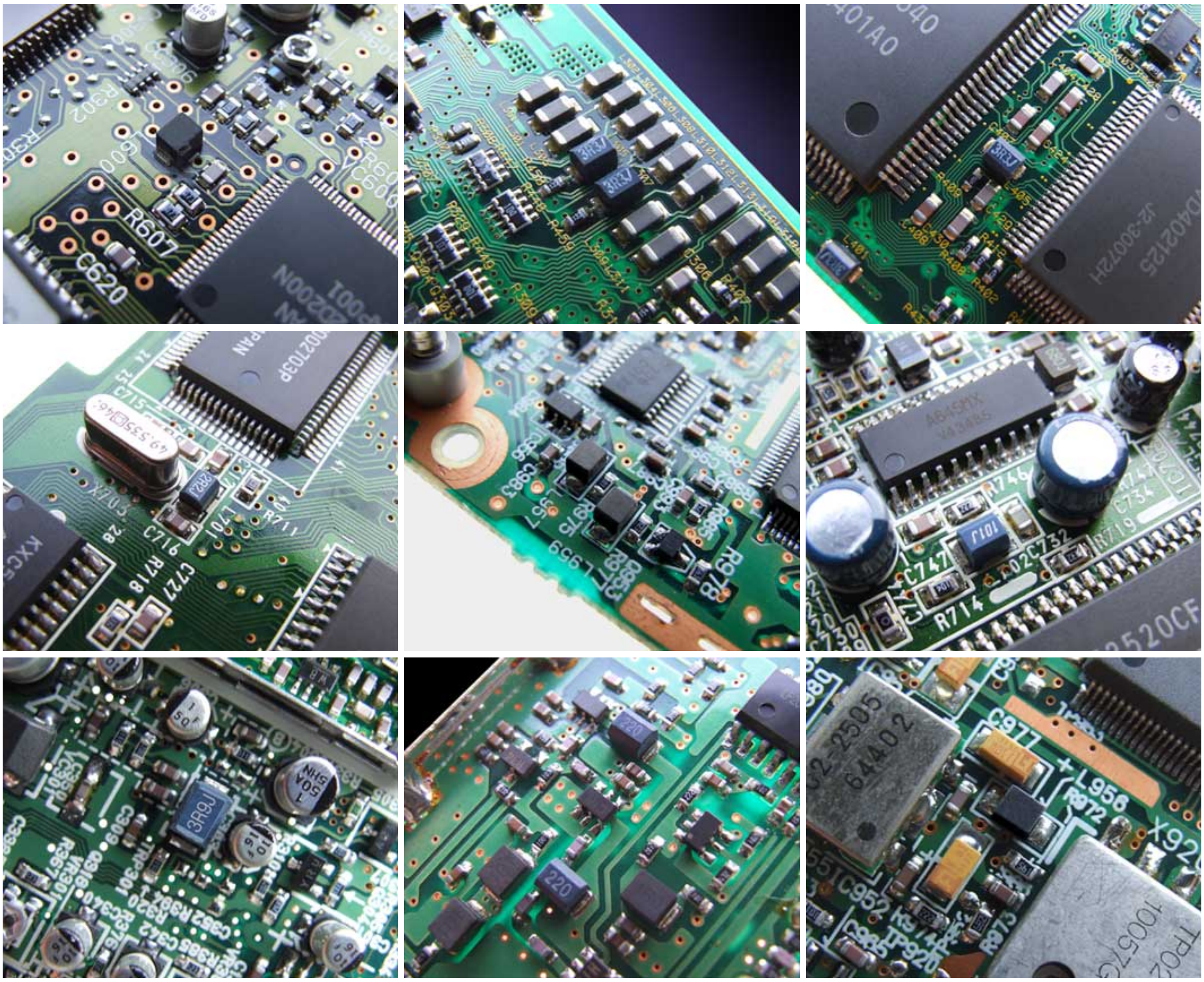


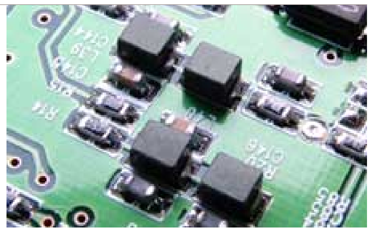





# Product type data

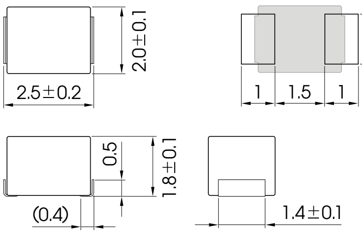
Wire-wound Surface Mount Small Inductors
For Signal Lines And DC Power Lines

## NL/NLV, NLC/NLCV, NLFC/NLFV series



### Shapes and dimensions / Recommended PC board pattern

# NLV25 series




Weight : 25 mg
Dimensions in mm

Wide L-value range
High Q
Narrow tolerances
For signal lines
**NL / NLV**

Large current choke
For power lines
**NLC/NLCV**

Low Rdc choke
For power lines
**NLFC/NLFV**

0.01 to 2.7$\mu$H

**Electrical characteristics**

| Inductance ($\mu$H) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **0.01** | ±5 | 15 | 100 | 2150 | 0.26 | 530 | NLV25T-010J-PF |
| **0.012** | ±5 | 15 | 100 | 2050 | 0.27 | 500 | NLV25T-012J-PF |
| **0.015** | ±5 | 15 | 100 | 2000 | 0.29 | 480 | NLV25T-015J-PF |
| **0.018** | ±5 | 15 | 100 | 1850 | 0.31 | 450 | NLV25T-018J-PF |
| **0.022** | ±5 | 15 | 100 | 1650 | 0.37 | 420 | NLV25T-022J-PF |
| **0.027** | ±5 | 15 | 100 | 1550 | 0.4 | 410 | NLV25T-027J-PF |
| **0.033** | ±5 | 20 | 100 | 1450 | 0.42 | 400 | NLV25T-033J-PF |
| **0.039** | ±5 | 20 | 100 | 1350 | 0.45 | 380 | NLV25T-039J-PF |
| **0.047** | ±5 | 20 | 100 | 1200 | 0.5 | 360 | NLV25T-047J-PF |
| **0.056** | ±5 | 20 | 100 | 1100 | 0.6 | 340 | NLV25T-056J-PF |
| **0.068** | ±5 | 20 | 100 | 1050 | 0.65 | 320 | NLV25T-068J-PF |
| **0.082** | ±5 | 20 | 100 | 900 | 0.75 | 300 | NLV25T-082J-PF |
| **0.1** | ±5 | 20 | 100 | 800 | 0.8 | 280 | NLV25T-R10J-PF |
| **0.12** | ±5 | 30 | 25.2 | 700 | 0.3 | 550 | NLV25T-R12J-PF |
| **0.15** | ±5 | 30 | 25.2 | 550 | 0.35 | 500 | NLV25T-R15J-PF |
| **0.18** | ±5 | 30 | 25.2 | 500 | 0.4 | 460 | NLV25T-R18J-PF |
| **0.22** | ±5 | 30 | 25.2 | 450 | 0.5 | 430 | NLV25T-R22J-PF |
| **0.27** | ±5 | 30 | 25.2 | 425 | 0.55 | 420 | NLV25T-R27J-PF |
| **0.33** | ±5 | 30 | 25.2 | 400 | 0.6 | 400 | NLV25T-R33J-PF |
| **0.39** | ±5 | 30 | 25.2 | 375 | 0.65 | 375 | NLV25T-R39J-PF |
| **0.47** | ±5 | 30 | 25.2 | 350 | 0.68 | 350 | NLV25T-R47J-PF |
| **0.56** | ±5 | 30 | 25.2 | 325 | 0.75 | 325 | NLV25T-R56J-PF |
| **0.68** | ±5 | 30 | 25.2 | 300 | 0.85 | 300 | NLV25T-R68J-PF |
| **0.82** | ±5 | 30 | 25.2 | 260 | 1 | 260 | NLV25T-R82J-PF |
| **1** | ±5 | 30 | 7.96 | 245 | 1.1 | 245 | NLV25T-1R0J-PF |
| **1.2** | ±5 | 30 | 7.96 | 230 | 1.2 | 230 | NLV25T-1R2J-PF |
| **1.5** | ±5 | 30 | 7.96 | 182 | 1.3 | 220 | NLV25T-1R5J-PF |
| **1.8** | ±5 | 30 | 7.96 | 135 | 1.45 | 210 | NLV25T-1R8J-PF |
| **2.2** | ±5 | 30 | 7.96 | 105 | 1.55 | 200 | NLV25T-2R2J-PF |
| **2.7** | ±5 | 30 | 7.96 | 70 | 1.7 | 195 | NLV25T-2R7J-PF |

* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

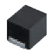
Measuring Instruments

L, Q (L≦0.1μH) : HP4191A Impedance/gain-phase analyzer (16092A) L, Q (L≧0.12μH) : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1)

SRF : HP8753C Network analyzer Rdc : MATSUSHITA VP-2941A Digital milliohm meter

# Product type data

## NLV25

 series

3.3 to 100µH

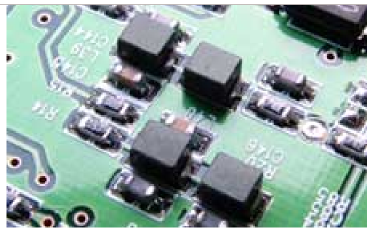
**Electrical characteristics**

| Inductance (µH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **3.3** | ±5 | 30 | 7.96 | 55 | 1.9 | 185 | NLV25T-3R3J-PF |
| **3.9** | ±5 | 30 | 7.96 | 48 | 2.1 | 180 | NLV25T-3R9J-PF |
| **4.7** | ±5 | 30 | 7.96 | 43 | 2.3 | 175 | NLV25T-4R7J-PF |
| **5.6** | ±5 | 25 | 7.96 | 42 | 2.5 | 170 | NLV25T-5R6J-PF |
| **6.8** | ±5 | 25 | 7.96 | 39 | 2.7 | 165 | NLV25T-6R8J-PF |
| **8.2** | ±5 | 25 | 7.96 | 36 | 3.05 | 160 | NLV25T-8R2J-PF |
| **10** | ±5 | 25 | 2.52 | 33 | 3.5 | 155 | NLV25T-100J-PF |
| **12** | ±5 | 25 | 2.52 | 30 | 3.8 | 150 | NLV25T-120J-PF |
| **15** | ±5 | 25 | 2.52 | 26 | 4.4 | 140 | NLV25T-150J-PF |
| **18** | ±5 | 25 | 2.52 | 24 | 4.8 | 130 | NLV25T-180J-PF |
| **22** | ±5 | 25 | 2.52 | 22 | 5.5 | 125 | NLV25T-220J-PF |
| **27** | ±5 | 25 | 2.52 | 21 | 6.3 | 115 | NLV25T-270J-PF |
| **33** | ±5 | 25 | 2.52 | 20 | 7.1 | 110 | NLV25T-330J-PF |
| **39** | ±5 | 20 | 2.52 | 18 | 9.5 | 90 | NLV25T-390J-PF |
| **47** | ±5 | 20 | 2.52 | 17 | 11.1 | 80 | NLV25T-470J-PF |
| **56** | ±5 | 20 | 2.52 | 16 | 12.1 | 75 | NLV25T-560J-PF |
| **68** | ±5 | 20 | 2.52 | 15 | 16.6 | 70 | NLV25T-680J-PF |
| **82** | ±5 | 20 | 2.52 | 13 | 19 | 66 | NLV25T-820J-PF |
| **100** | ±5 | 15 | 0.796 | 12 | 21 | 60 | NLV25T-101J-PF |

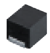
* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

Measuring Instruments

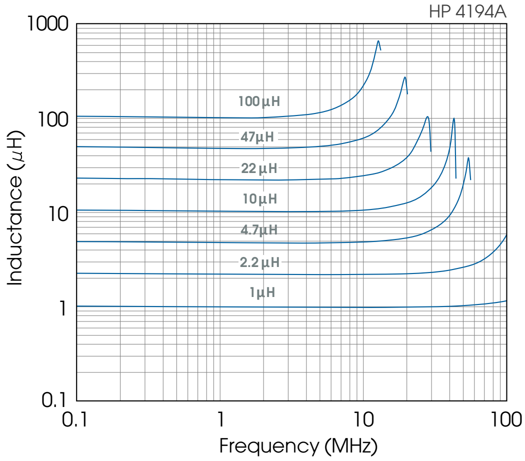
L、Q : HP4194A Impedance/gain-phase analyzer (16085A+16093B+TDK TF-1) SRF : HP8753C Network analyzer Rdc : MATSUSHITA VP-2941A Digital milliohm meter



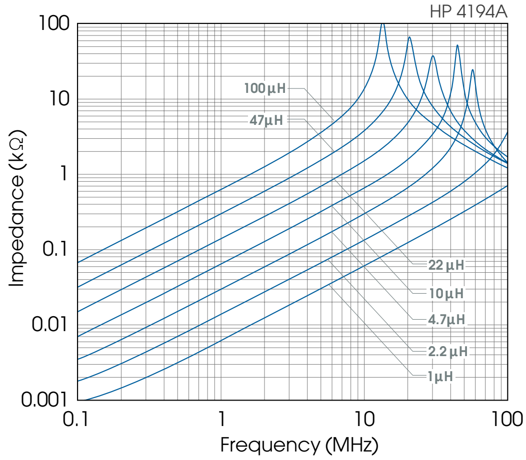
# NLV25

 series

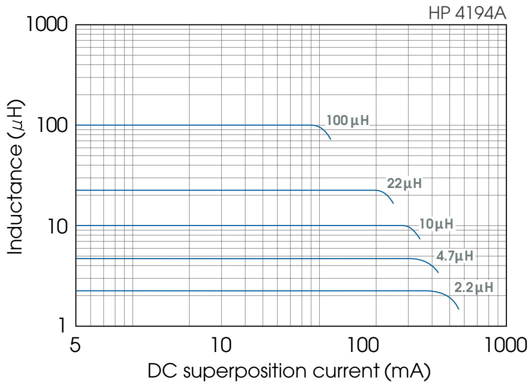
## Inductance vs. frequency characteristics



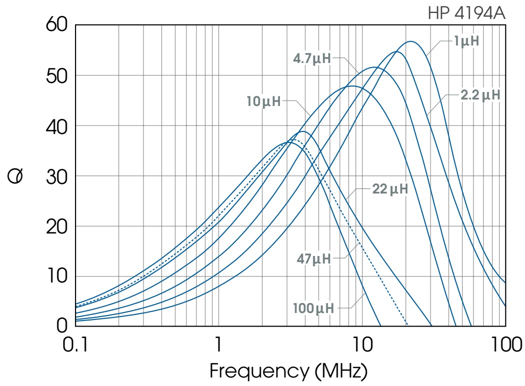

## Impedance vs. frequency characteristics




## Inductance change vs. DC superposition characteristics



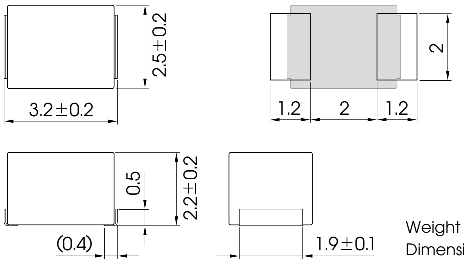

## Q vs. frequency characteristics



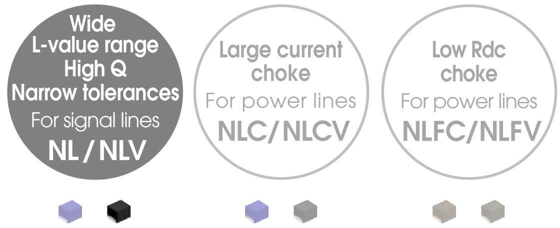
# Product type data

## Shapes and dimensions / Recommended PC board pattern

# NLV32 series




Weight : 50 mg
Dimensions in mm




0.01 to 0.82 μH

**Electrical characteristics**

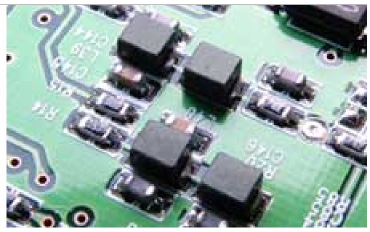
| Inductance (μH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **0.01** | ±5 | 15 | 100 | 2500 | 0.13 | 450 | NLV32T-010J-PF |
| **0.012** | ±5 | 17 | 100 | 2300 | 0.14 | 450 | NLV32T-012J-PF |
| **0.015** | ±5 | 19 | 100 | 2100 | 0.16 | 450 | NLV32T-015J-PF |
| **0.018** | ±5 | 21 | 100 | 1900 | 0.18 | 450 | NLV32T-018J-PF |
| **0.022** | ±5 | 23 | 100 | 1700 | 0.2 | 450 | NLV32T-022J-PF |
| **0.027** | ±5 | 23 | 100 | 1500 | 0.22 | 450 | NLV32T-027J-PF |
| **0.033** | ±5 | 25 | 100 | 1400 | 0.24 | 450 | NLV32T-033J-PF |
| **0.039** | ±5 | 25 | 100 | 1300 | 0.27 | 450 | NLV32T-039J-PF |
| **0.047** | ±5 | 26 | 100 | 1200 | 0.3 | 450 | NLV32T-047J-PF |
| **0.056** | ±5 | 26 | 100 | 1100 | 0.33 | 450 | NLV32T-056J-PF |
| **0.068** | ±5 | 27 | 100 | 1000 | 0.36 | 450 | NLV32T-068J-PF |
| **0.082** | ±5 | 27 | 100 | 900 | 0.4 | 450 | NLV32T-082J-PF |
| **0.1** | ±5 | 28 | 100 | 700 | 0.44 | 450 | NLV32T-R10J-PF |
| **0.12** | ±5 | 30 | 25.2 | 500 | 0.22 | 450 | NLV32T-R12J-PF |
| **0.15** | ±5 | 30 | 25.2 | 450 | 0.25 | 450 | NLV32T-R15J-PF |
| **0.18** | ±5 | 30 | 25.2 | 400 | 0.28 | 450 | NLV32T-R18J-PF |
| **0.22** | ±5 | 30 | 25.2 | 350 | 0.32 | 450 | NLV32T-R22J-PF |
| **0.27** | ±5 | 30 | 25.2 | 320 | 0.36 | 450 | NLV32T-R27J-PF |
| **0.33** | ±5 | 30 | 25.2 | 300 | 0.4 | 450 | NLV32T-R33J-PF |
| **0.39** | ±5 | 30 | 25.2 | 250 | 0.45 | 450 | NLV32T-R39J-PF |
| **0.47** | ±5 | 30 | 25.2 | 220 | 0.5 | 450 | NLV32T-R47J-PF |
| **0.56** | ±5 | 30 | 25.2 | 180 | 0.55 | 450 | NLV32T-R56J-PF |
| **0.68** | ±5 | 30 | 25.2 | 160 | 0.6 | 450 | NLV32T-R68J-PF |
| **0.82** | ±5 | 30 | 25.2 | 140 | 0.65 | 450 | NLV32T-R82J-PF |

* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

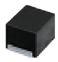
Measuring Instruments

L, Q (L≦0.1μH) : HP4191A Impedance/gain-phase analyzer(16092A) L, Q (L≧0.12μH) : HP4194A IImpedance/gain-phase analyzer(16085A+16093B+TDK TF-1)

SRF : HP8753C Network analyzer Rdc : MATSUSHITA VP-2941A Digital milliohm meter



# NLV32 series



1 to 470μH

**Electrical characteristics**

| Inductance (μH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **1** | ±5 | 30 | 7.96 | 120 | 0.7 | 400 | NLV32T-1R0J-PF |
| **1.2** | ±5 | 30 | 7.96 | 100 | 0.75 | 390 | NLV32T-1R2J-PF |
| **1.5** | ±5 | 30 | 7.96 | 85 | 0.85 | 370 | NLV32T-1R5J-PF |
| **1.8** | ±5 | 30 | 7.96 | 80 | 0.9 | 350 | NLV32T-1R8J-PF |
| **2.2** | ±5 | 30 | 7.96 | 75 | 1 | 320 | NLV32T-2R2J-PF |
| **2.7** | ±5 | 30 | 7.96 | 70 | 1.1 | 290 | NLV32T-2R7J-PF |
| **3.3** | ±5 | 30 | 7.96 | 60 | 1.2 | 260 | NLV32T-3R3J-PF |
| **3.9** | ±5 | 30 | 7.96 | 55 | 1.3 | 250 | NLV32T-3R9J-PF |
| **4.7** | ±5 | 30 | 7.96 | 50 | 1.5 | 220 | NLV32T-4R7J-PF |
| **5.6** | ±5 | 30 | 7.96 | 45 | 1.6 | 200 | NLV32T-5R6J-PF |
| **6.8** | ±5 | 30 | 7.96 | 40 | 1.8 | 180 | NLV32T-6R8J-PF |
| **8.2** | ±5 | 30 | 7.96 | 35 | 2 | 170 | NLV32T-8R2J-PF |
| **10** | ±5 | 30 | 2.52 | 30 | 2.1 | 150 | NLV32T-100J-PF |
| **12** | ±5 | 30 | 2.52 | 20 | 2.5 | 140 | NLV32T-120J-PF |
| **15** | ±5 | 30 | 2.52 | 20 | 2.8 | 130 | NLV32T-150J-PF |
| **18** | ±5 | 30 | 2.52 | 20 | 3.3 | 120 | NLV32T-180J-PF |
| **22** | ±5 | 30 | 2.52 | 20 | 3.7 | 110 | NLV32T-220J-PF |
| **27** | ±5 | 30 | 2.52 | 20 | 5 | 80 | NLV32T-270J-PF |
| **33** | ±5 | 30 | 2.52 | 17 | 5.6 | 70 | NLV32T-330J-PF |
| **39** | ±5 | 30 | 2.52 | 16 | 6.4 | 65 | NLV32T-390J-PF |
| **47** | ±5 | 30 | 2.52 | 15 | 7 | 60 | NLV32T-470J-PF |
| **56** | ±5 | 30 | 2.52 | 13 | 8 | 55 | NLV32T-560J-PF |
| **68** | ±5 | 30 | 2.52 | 12 | 9 | 50 | NLV32T-680J-PF |
| **82** | ±5 | 30 | 2.52 | 11 | 10 | 45 | NLV32T-820J-PF |
| **100** | ±5 | 20 | 0.796 | 10 | 10 | 40 | NLV32T-101J-PF |
| **120** | ±5 | 20 | 0.796 | 10 | 11 | 70 | NLV32T-121J-PF |
| **150** | ±5 | 20 | 0.796 | 8 | 15 | 65 | NLV32T-151J-PF |
| **180** | ±5 | 20 | 0.796 | 7 | 17 | 60 | NLV32T-181J-PF |
| **220** | ±5 | 20 | 0.796 | 7 | 21 | 50 | NLV32T-221J-PF |
| **270** | ±5 | 20 | 0.796 | 6 | 28 | 45 | NLV32T-271J-PF |
| **330** | ±5 | 20 | 0.796 | 5 | 34 | 40 | NLV32T-331J-PF |
| **390** | ±5 | 20 | 0.796 | 5 | 36 | 35 | NLV32T-391J-PF |
| **470** | ±5 | 20 | 0.796 | 4 | 40 | 25 | NLV32T-471J-PF |

* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

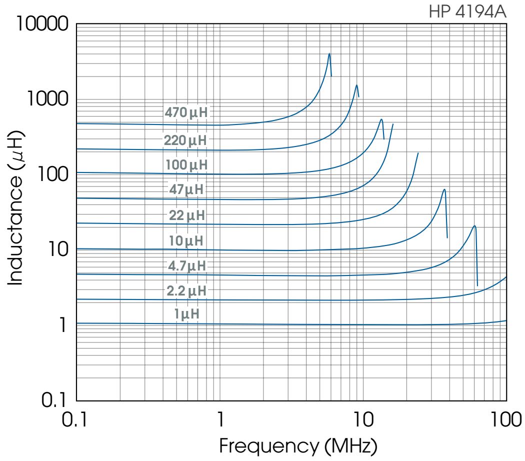
Measuring Instruments

L, Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1) SRF : HP8753C Network analyzer Rdc : MATSUSHITA VP-2941A Digital milliohm meter

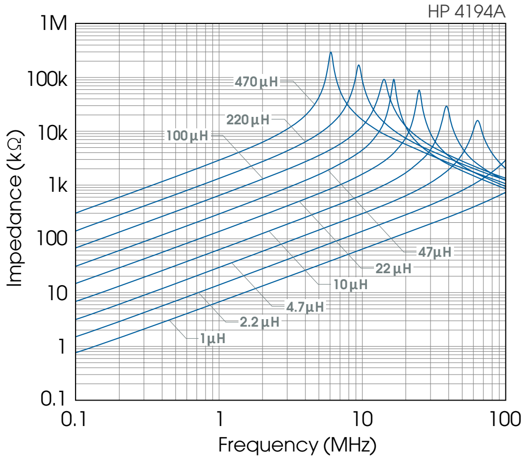
## Product type data

# NLV32 series

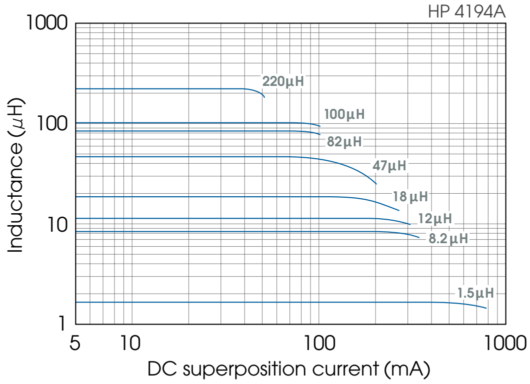
### Inductance vs. frequency characteristics



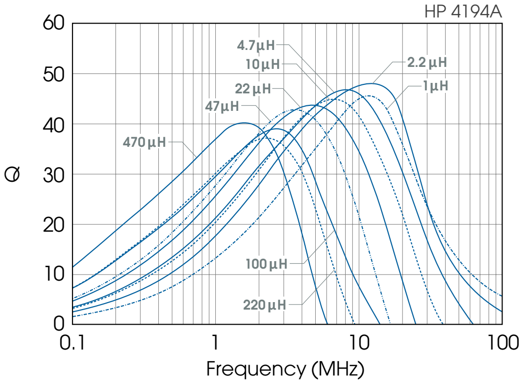

### Impedance vs. frequency characteristics

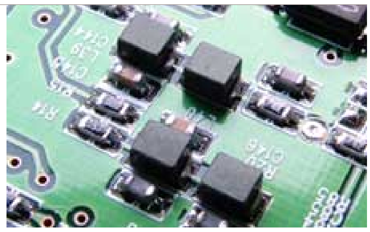



### Inductance change vs. DC superposition characteristics



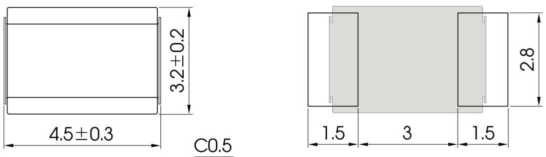

### Q vs. frequency characteristics

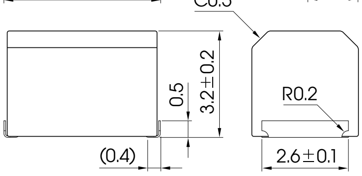




# NL453232 series

## Shapes and dimensions / Recommended PC board pattern




Weight : 180 mg
Dimensions in mm

**Wide L-value range High Q Narrow tolerances** For signal lines **NL / NLV**

Large current choke For power lines NLC/NLCV

Low Rdc choke For power lines NLFC/NLFV

1 to 100 μH

### Electrical characteristics

| Inductance (μH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **1** | ±5 | 50 | 7.96 | 100 | 0.5 | 450 | NL453232T-1R0J-PF |
| **1.2** | ±5 | 50 | 7.96 | 80 | 0.55 | 430 | NL453232T-1R2J-PF |
| **1.5** | ±5 | 50 | 7.96 | 70 | 0.6 | 410 | NL453232T-1R5J-PF |
| **1.8** | ±5 | 50 | 7.96 | 60 | 0.65 | 390 | NL453232T-1R8J-PF |
| **2.2** | ±5 | 50 | 7.96 | 55 | 0.7 | 380 | NL453232T-2R2J-PF |
| **2.7** | ±5 | 50 | 7.96 | 50 | 0.75 | 370 | NL453232T-2R7J-PF |
| **3.3** | ±5 | 50 | 7.96 | 45 | 0.8 | 355 | NL453232T-3R3J-PF |
| **3.9** | ±5 | 50 | 7.96 | 40 | 0.9 | 330 | NL453232T-3R9J-PF |
| **4.7** | ±5 | 50 | 7.96 | 35 | 1 | 315 | NL453232T-4R7J-PF |
| **5.6** | ±5 | 50 | 7.96 | 33 | 1.1 | 300 | NL453232T-5R6J-PF |
| **6.8** | ±5 | 50 | 7.96 | 27 | 1.2 | 285 | NL453232T-6R8J-PF |
| **8.2** | ±5 | 50 | 7.96 | 25 | 1.4 | 270 | NL453232T-8R2J-PF |
| **10** | ±5 | 50 | 2.52 | 20 | 1.6 | 250 | NL453232T-100J-PF |
| **12** | ±5 | 50 | 2.52 | 18 | 2 | 225 | NL453232T-120J-PF |
| **15** | ±5 | 50 | 2.52 | 17 | 2.5 | 200 | NL453232T-150J-PF |
| **18** | ±5 | 50 | 2.52 | 15 | 2.8 | 190 | NL453232T-180J-PF |
| **22** | ±5 | 50 | 2.52 | 13 | 3.2 | 180 | NL453232T-220J-PF |
| **27** | ±5 | 50 | 2.52 | 12 | 3.6 | 170 | NL453232T-270J-PF |
| **33** | ±5 | 50 | 2.52 | 11 | 4 | 160 | NL453232T-330J-PF |
| **39** | ±5 | 50 | 2.52 | 10 | 4.5 | 150 | NL453232T-390J-PF |
| **47** | ±5 | 50 | 2.52 | 10 | 5 | 140 | NL453232T-470J-PF |
| **56** | ±5 | 50 | 2.52 | 9 | 5.5 | 135 | NL453232T-560J-PF |
| **68** | ±5 | 50 | 2.52 | 9 | 6 | 130 | NL453232T-680J-PF |
| **82** | ±5 | 50 | 2.52 | 8 | 7 | 120 | NL453232T-820J-PF |
| **100** | ±5 | 40 | 0.796 | 8 | 8 | 110 | NL453232T-101J-PF |

*Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

Measuring Instruments
L, Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1)
SRF : HP8753C Network analyzer (Zin=Zout=50Ω) Rdc : MATSUSHITA VP-2941A Digital milliohm meter

# Product type data

## NL453232 series

120 to 1000μH

**Electrical characteristics**

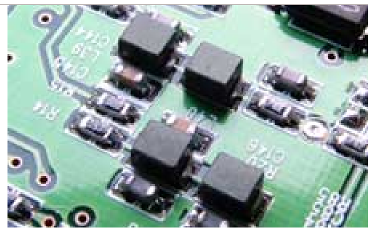
| Inductance (μH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **120** | ±5 | 40 | 0.796 | 6 | 8 | 110 | NL453232T-121J-PF |
| **150** | ±5 | 40 | 0.796 | 5 | 9 | 105 | NL453232T-151J-PF |
| **180** | ±5 | 40 | 0.796 | 5 | 9.5 | 102 | NL453232T-181J-PF |
| **220** | ±5 | 40 | 0.796 | 4 | 10 | 100 | NL453232T-221J-PF |
| **270** | ±5 | 40 | 0.796 | 4 | 12 | 92 | NL453232T-271J-PF |
| **330** | ±5 | 40 | 0.796 | 3.5 | 14 | 85 | NL453232T-331J-PF |
| **390** | ±5 | 40 | 0.796 | 3 | 16 | 80 | NL453232T-391J-PF |
| **470** | ±5 | 40 | 0.796 | 3 | 26 | 62 | NL453232T-471J-PF |
| **560** | ±5 | 30 | 0.796 | 3 | 30 | 50 | NL453232T-561J-PF |
| **680** | ±5 | 30 | 0.796 | 3 | 30 | 50 | NL453232T-681J-PF |
| **820** | ±5 | 30 | 0.796 | 2.5 | 35 | 30 | NL453232T-821J-PF |
| **1000** | ±5 | 30 | 0.252 | 2.5 | 40 | 30 | NL453232T-102J-PF |

*Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

Measuring Instruments

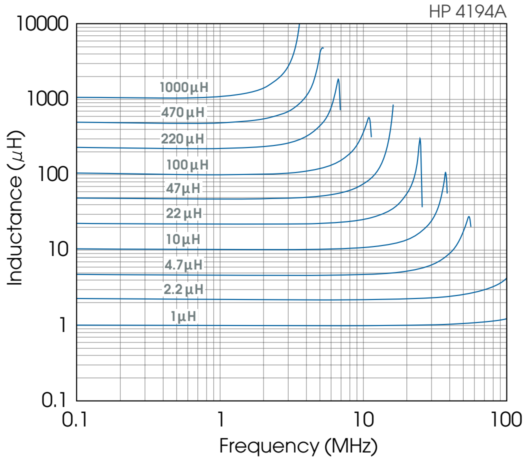
L、Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1)

SRF : HP8753C Network analyzer (Zin=Zout=50Ω) Rdc : MATSUSHITA VP-2941A Digital milliohm meter

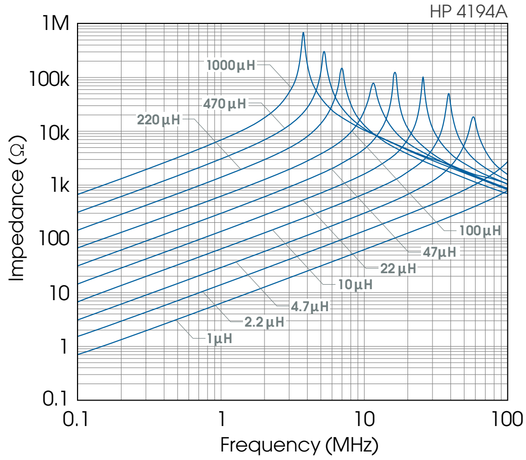


# NL453232 series

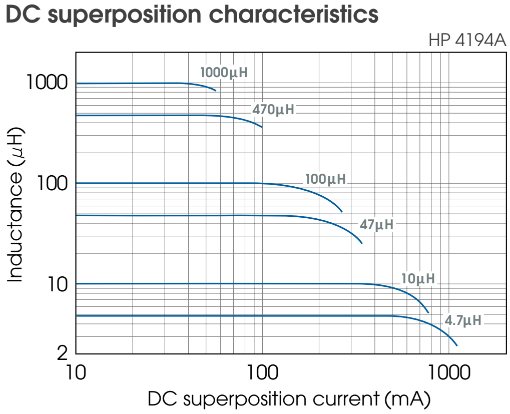
### Inductance vs. frequency characteristics



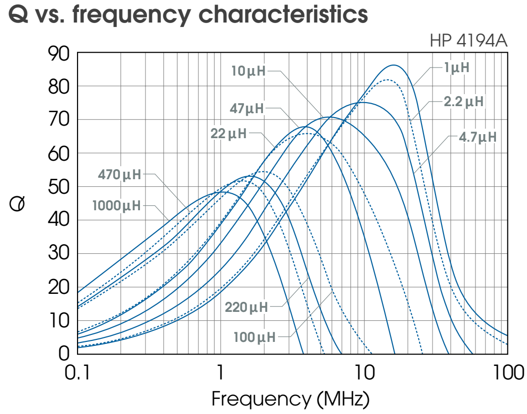

### Impedance vs. frequency characteristics




### Inductance change vs. DC superposition characteristics



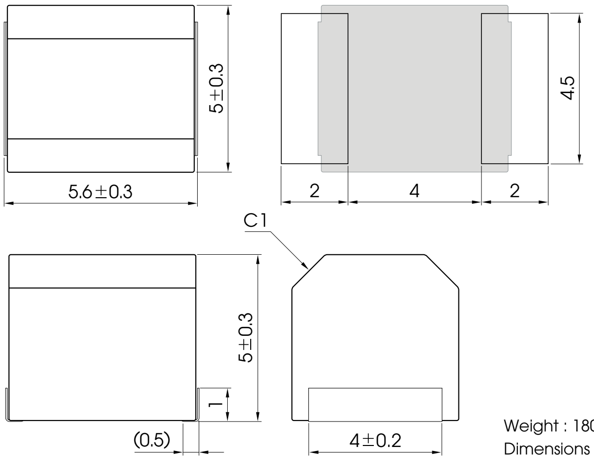

### Q vs. frequency characteristics



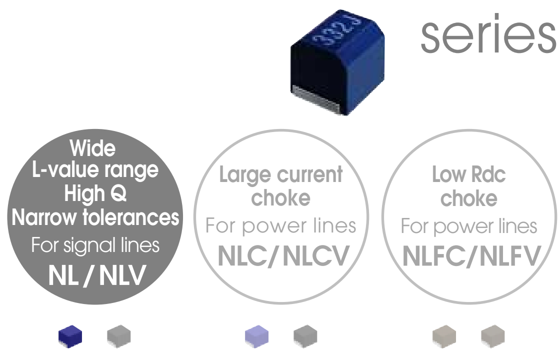
# Product type data

## NL565050 series

### Shapes and dimensions / Recommended PC board pattern




Weight : 180 mg
Dimensions in mm

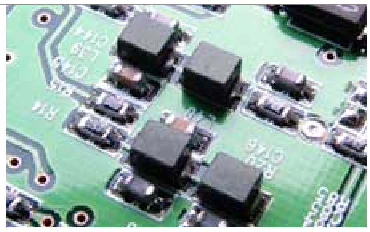



### Electrical characteristics

| Inductance (μH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **1200** | ±5 | 30 | 0.252 | 1.5 | 17 | 75 | NL565050T-122J-PF |
| **1500** | ±5 | 30 | 0.252 | 1.4 | 20 | 70 | NL565050T-152J-PF |
| **1800** | ±5 | 30 | 0.252 | 1.3 | 30 | 60 | NL565050T-182J-PF |
| **2200** | ±5 | 30 | 0.252 | 1.2 | 35 | 55 | NL565050T-222J-PF |
| **2700** | ±5 | 30 | 0.252 | 1.1 | 55 | 45 | NL565050T-272J-PF |
| **3300** | ±5 | 30 | 0.252 | 1 | 60 | 40 | NL565050T-332J-PF |
| **3900** | ±5 | 30 | 0.252 | 1 | 70 | 38 | NL565050T-392J-PF |
| **4700** | ±5 | 30 | 0.252 | 0.9 | 78 | 36 | NL565050T-472J-PF |
| **5600** | ±5 | 30 | 0.252 | 0.8 | 85 | 33 | NL565050T-562J-PF |
| **6800** | ±5 | 30 | 0.252 | 0.7 | 110 | 30 | NL565050T-682J-PF |
| **8200** | ±5 | 30 | 0.252 | 0.6 | 125 | 28 | NL565050T-822J-PF |
| **10000** | ±5 | 20 | 0.0796 | 0.5 | 150 | 25 | NL565050T-103J-PF |

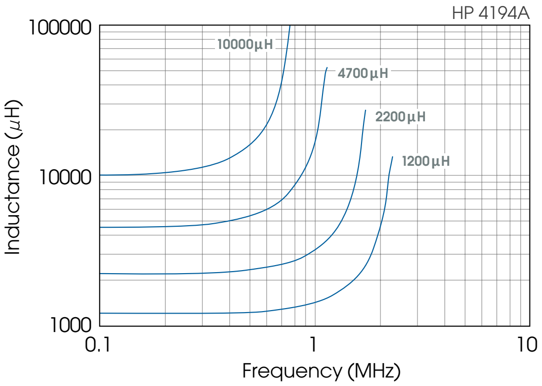
* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

Measuring Instruments
L、Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1)
SRF : HP8753C Network analyzer (Zin=Zout=50Ω) Rdc : MATSUSHITA VP-2941A Digital milliohm meter

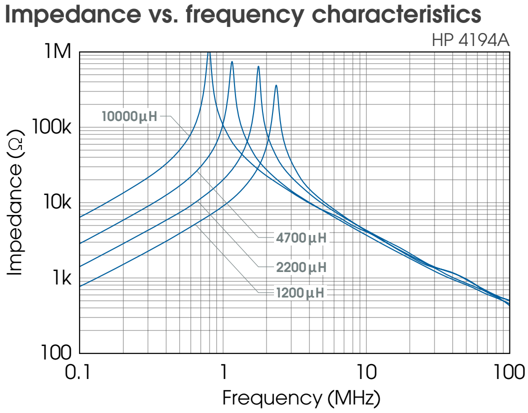


# NL565050 series

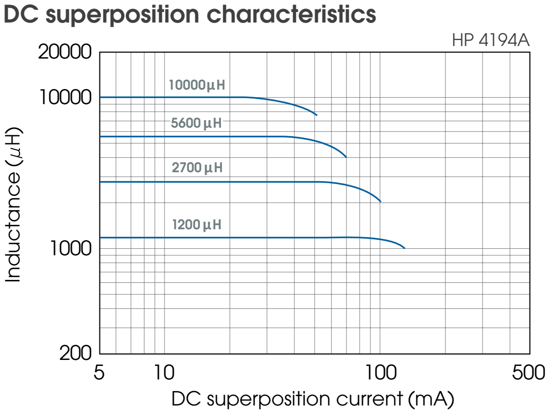
## Inductance vs. frequency characteristics



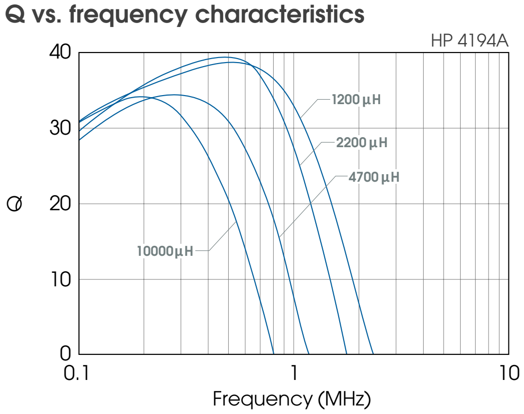

## Impedance vs. frequency characteristics




## Inductance change vs. DC superposition characteristics



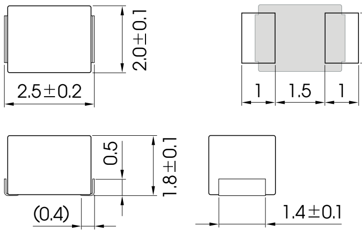

## Q vs. frequency characteristics



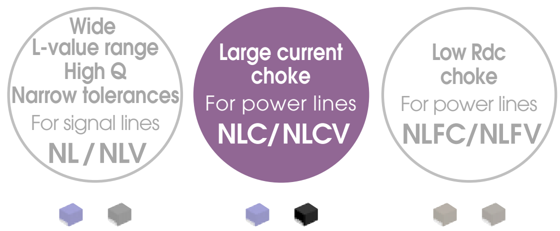
# Product type data

## Shapes and dimensions / Recommended PC board pattern

# NLCV25 series




Weight : 25 mg
Dimensions in mm




## Electrical characteristics

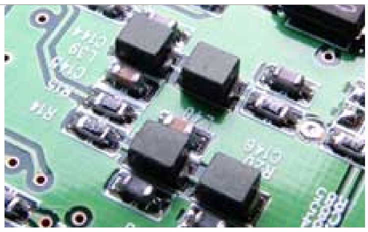
| Inductance (μH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **1** | ±20 | 20 | 7.96 | 200 | 0.34 | 475 | NLCV25T-1R0M-PF |
| **1.5** | ±20 | 20 | 7.96 | 165 | 0.42 | 435 | NLCV25T-1R5M-PF |
| **2.2** | ±20 | 20 | 7.96 | 95 | 0.5 | 390 | NLCV25T-2R2M-PF |
| **3.3** | ±20 | 20 | 7.96 | 55 | 0.65 | 340 | NLCV25T-3R3M-PF |
| **4.7** | ±20 | 20 | 7.96 | 43 | 0.8 | 285 | NLCV25T-4R7M-PF |
| **6.8** | ±20 | 20 | 7.96 | 39 | 1 | 275 | NLCV25T-6R8M-PF |
| **10** | ±10 | 30 | 2.52 | 32 | 1.69 | 210 | NLCV25T-100K-PF |
| **15** | ±10 | 30 | 2.52 | 21 | 2.2 | 175 | NLCV25T-150K-PF |
| **22** | ±10 | 30 | 2.52 | 18 | 2.8 | 160 | NLCV25T-220K-PF |
| **33** | ±10 | 30 | 2.52 | 16 | 4.2 | 120 | NLCV25T-330K-PF |

±10

* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

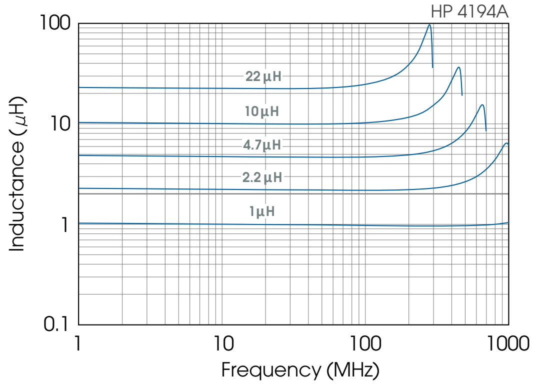
Measuring Instruments

L、Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1) SRF : HP8753C Network analyzer Rdc : MATSUSHITA VP-2941A Digital milliohm meter

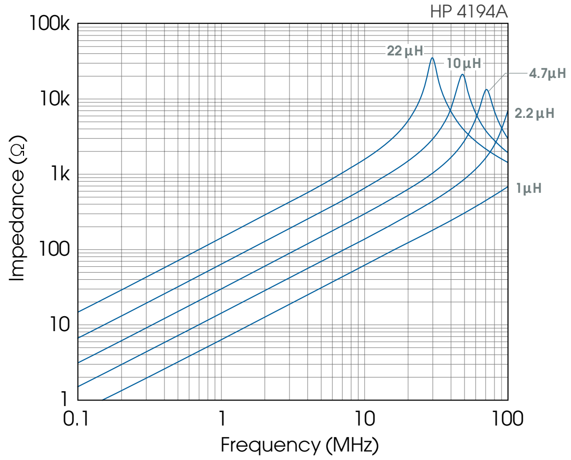


# NLCV25 series

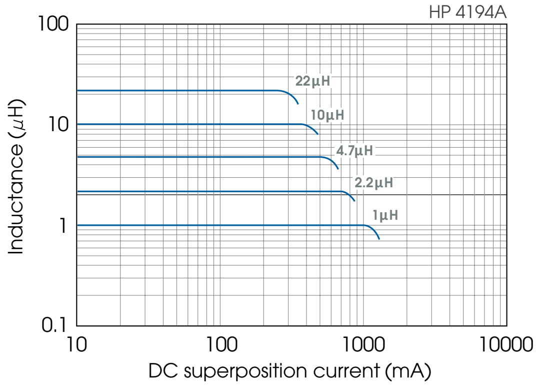
## Inductance vs. frequency characteristics



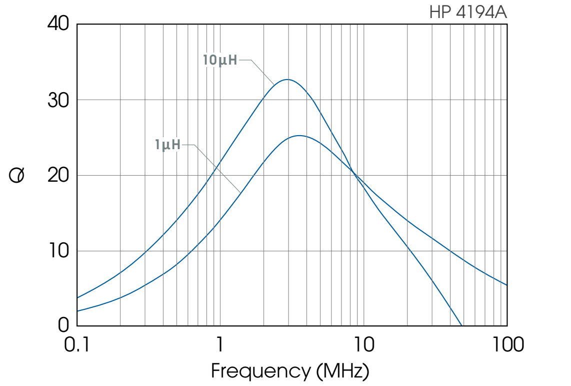

## Impedance vs. frequency characteristics




## Inductance change vs. DC superposition characteristics

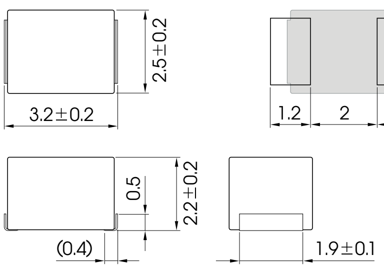



## Q vs. frequency characteristics



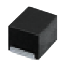
# Product type data

## Shapes and dimensions / Recommended PC board pattern

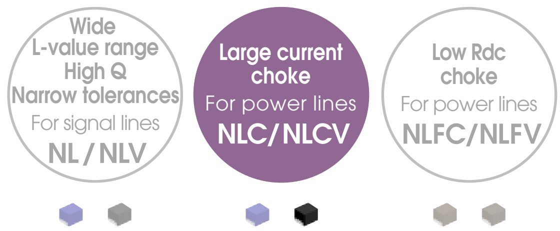



Weight : 50 mg
Dimensions in mm

# NLCV32



# series



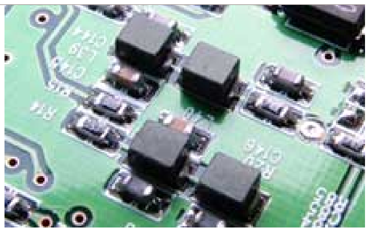

## Electrical characteristics

| Inductance ($\mu$H) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance ($\Omega$) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **0.15** | ±20 | 5 | 25.2 | 400 | 0.028 | 1450 | NLCV32T-R15M-PF |
| **0.22** | ±20 | 5 | 25.2 | 250 | 0.034 | 1250 | NLCV32T-R22M-PF |
| **0.47** | ±20 | 5 | 25.2 | 150 | 0.042 | 1100 | NLCV32T-R47M-PF |
| **1** | ±20 | 10 | 7.96 | 100 | 0.06 | 1000 | NLCV32T-1R0M-PF |
| **1.5** | ±20 | 10 | 7.96 | 80 | 0.11 | 830 | NLCV32T-1R5M-PF |
| **2.2** | ±20 | 10 | 7.96 | 68 | 0.13 | 770 | NLCV32T-2R2M-PF |
| **3.3** | ±20 | 10 | 7.96 | 54 | 0.16 | 690 | NLCV32T-3R3M-PF |
| **4.7** | ±20 | 15 | 7.96 | 46 | 0.2 | 620 | NLCV32T-4R7M-PF |
| **6.8** | ±20 | 15 | 7.96 | 38 | 0.27 | 530 | NLCV32T-6R8M-PF |
| **10** | ±10 | 15 | 2.52 | 30 | 0.36 | 450 | NLCV32T-100K-PF |
| **15** | ±10 | 15 | 2.52 | 26 | 0.56 | 370 | NLCV32T-150K-PF |
| **22** | ±10 | 15 | 2.52 | 21 | 0.77 | 300 | NLCV32T-220K-PF |
| **33** | ±10 | 15 | 2.52 | 17 | 1.1 | 240 | NLCV32T-330K-PF |
| **47** | ±10 | 15 | 2.52 | 14 | 1.64 | 180 | NLCV32T-470K-PF |
| **68** | ±10 | 15 | 2.52 | 12 | 2.8 | 140 | NLCV32T-680K-PF |
| **100** | ±10 | 15 | 0.796 | 10 | 3.7 | 120 | NLCV32T-101K-PF |
| **150** | ±10 | 20 | 0.796 | 8 | 6.1 | 100 | NLCV32T-151K-PF |
| **220** | ±10 | 20 | 0.796 | 7 | 8.4 | 80 | NLCV32T-221K-PF |
| **330** | ±10 | 20 | 0.796 | 6 | 12.3 | 70 | NLCV32T-331K-PF |

* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

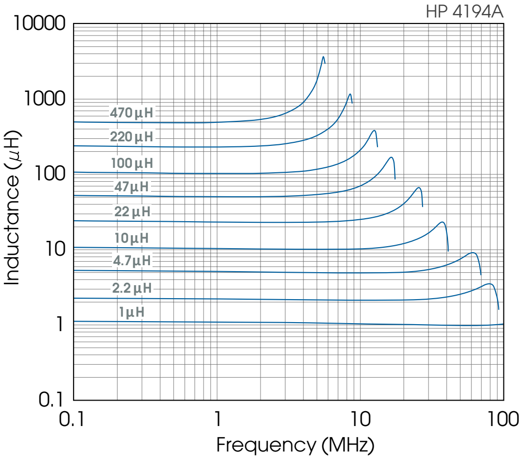
Measuring Instruments

L、Q : YHP4194A Impedance analyzer+YHP16085A+YHP16093B+TF-1   SRF : HP8753C Network analyzer   Rdc : MATSUSHITA VP-2941A Digital milliohm meter

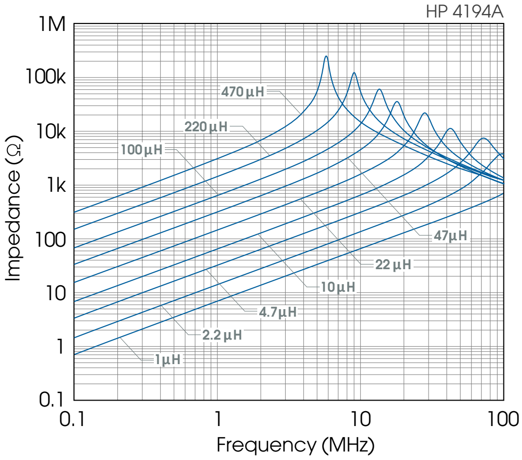


# NLCV32 series

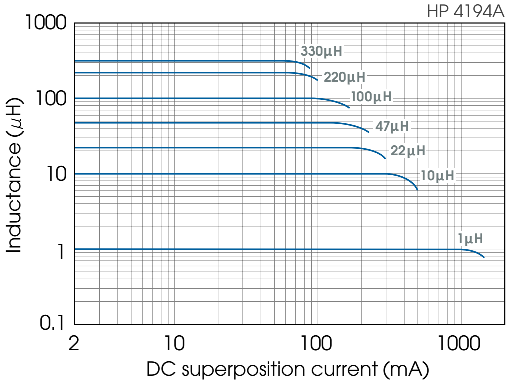
## Inductance vs. frequency characteristics



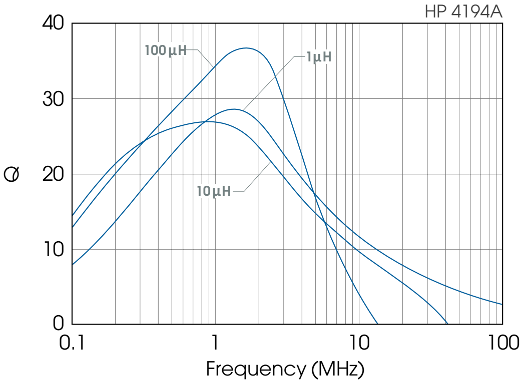

## Impedance vs. frequency characteristics




## Inductance change vs. DC superposition characteristics

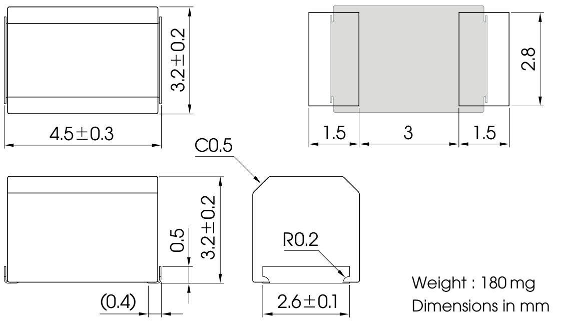



## Q vs. frequency characteristics



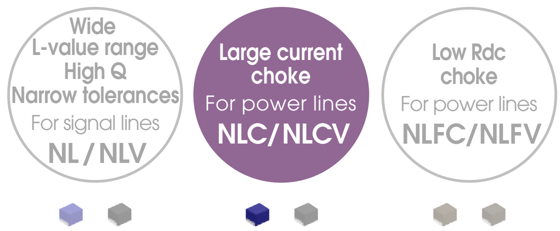
# Product type data

## Shapes and dimensions / Recommended PC board pattern




Weight : 180 mg
Dimensions in mm

# NLC453232 series

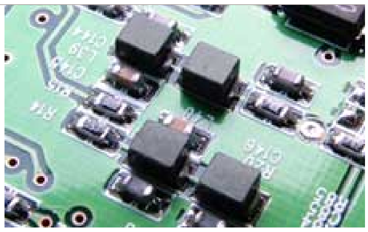



## Electrical characteristics

| Inductance (μH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **1** | ±10 | 10 | 7.96 | 200 | 0.11 | 1050 | NLC453232T-1R0K-PF |
| **1.2** | ±10 | 10 | 7.96 | 160 | 0.12 | 1000 | NLC453232T-1R2K-PF |
| **1.5** | ±10 | 10 | 7.96 | 130 | 0.15 | 950 | NLC453232T-1R5K-PF |
| **1.8** | ±10 | 10 | 7.96 | 100 | 0.16 | 900 | NLC453232T-1R8K-PF |
| **2.2** | ±10 | 10 | 7.96 | 80 | 0.18 | 850 | NLC453232T-2R2K-PF |
| **2.7** | ±10 | 10 | 7.96 | 60 | 0.2 | 800 | NLC453232T-2R7K-PF |
| **3.3** | ±10 | 10 | 7.96 | 45 | 0.22 | 750 | NLC453232T-3R3K-PF |
| **3.9** | ±10 | 10 | 7.96 | 40 | 0.24 | 700 | NLC453232T-3R9K-PF |
| **4.7** | ±10 | 10 | 7.96 | 35 | 0.27 | 650 | NLC453232T-4R7K-PF |
| **5.6** | ±10 | 10 | 7.96 | 30 | 0.3 | 650 | NLC453232T-5R6K-PF |
| **6.8** | ±10 | 10 | 7.96 | 28 | 0.35 | 600 | NLC453232T-6R8K-PF |
| **8.2** | ±10 | 10 | 7.96 | 25 | 0.4 | 600 | NLC453232T-8R2K-PF |
| **10** | ±10 | 10 | 2.52 | 22 | 0.5 | 550 | NLC453232T-100K-PF |
| **12** | ±10 | 10 | 2.52 | 21 | 0.6 | 500 | NLC453232T-120K-PF |
| **15** | ±10 | 10 | 2.52 | 20 | 0.7 | 450 | NLC453232T-150K-PF |
| **18** | ±10 | 10 | 2.52 | 19 | 0.8 | 400 | NLC453232T-180K-PF |
| **22** | ±10 | 10 | 2.52 | 18 | 0.9 | 370 | NLC453232T-220K-PF |
| **27** | ±10 | 10 | 2.52 | 16 | 1.2 | 330 | NLC453232T-270K-PF |
| **33** | ±10 | 10 | 2.52 | 14 | 1.4 | 300 | NLC453232T-330K-PF |
| **39** | ±10 | 10 | 2.52 | 12 | 1.6 | 280 | NLC453232T-390K-PF |
| **47** | ±10 | 10 | 2.52 | 11.5 | 1.9 | 260 | NLC453232T-470K-PF |
| **56** | ±10 | 10 | 2.52 | 11 | 2.2 | 240 | NLC453232T-560K-PF |
| **68** | ±10 | 10 | 2.52 | 10 | 2.6 | 220 | NLC453232T-680K-PF |
| **82** | ±10 | 10 | 2.52 | 9 | 3.5 | 200 | NLC453232T-820K-PF |
| **100** | ±10 | 20 | 0.796 | 8 | 4 | 180 | NLC453232T-101K-PF |
| **120** | ±10 | 20 | 0.796 | 7.5 | 4.5 | 160 | NLC453232T-121K-PF |
| **150** | ±10 | 20 | 0.796 | 7 | 6.5 | 140 | NLC453232T-151K-PF |
| **180** | ±10 | 20 | 0.796 | 6.5 | 7.5 | 120 | NLC453232T-181K-PF |
| **220** | ±10 | 20 | 0.796 | 5.5 | 9 | 120 | NLC453232T-221K-PF |
| **270** | ±10 | 20 | 0.796 | 5 | 11 | 100 | NLC453232T-271K-PF |
| **330** | ±10 | 20 | 0.796 | 4 | 13 | 90 | NLC453232T-331K-PF |

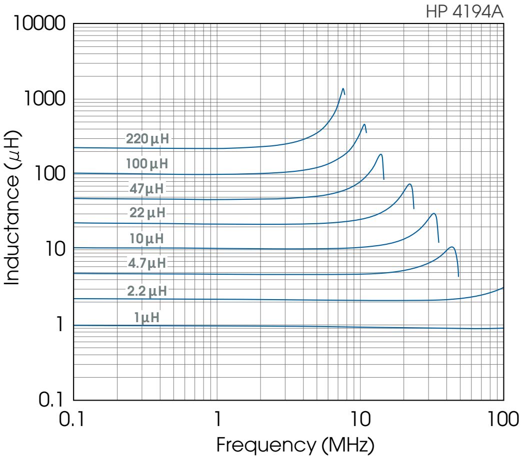
* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

Measuring Instruments L, Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1) SRF : HP8753C Network analyzer (Zin=Zout=50Ω)
Rdc : MATSUSHITA VP-2941A Digital milliohm meter

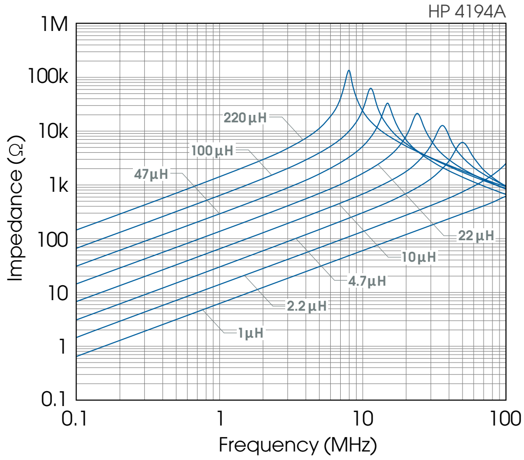


# NLC453232 series

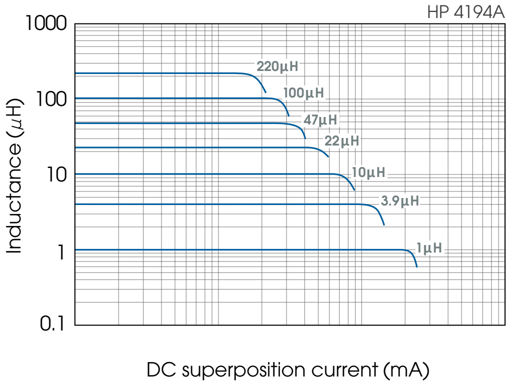
## Inductance vs. frequency characteristics



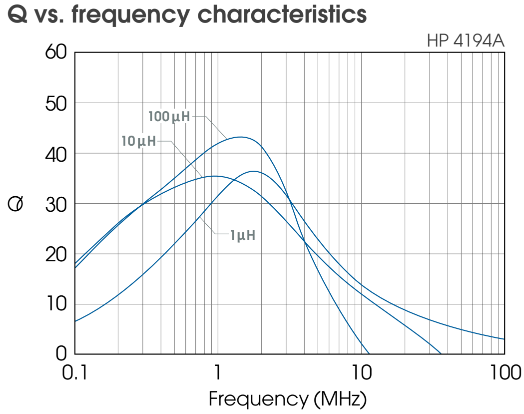

## Impedance vs. frequency characteristics




## Inductance change vs. DC superposition characteristics

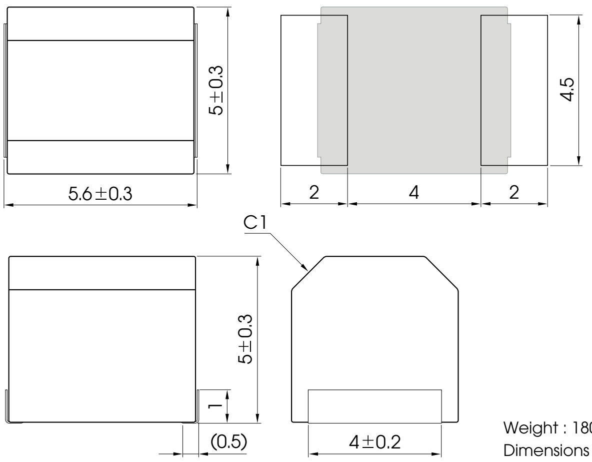



## Q vs. frequency characteristics



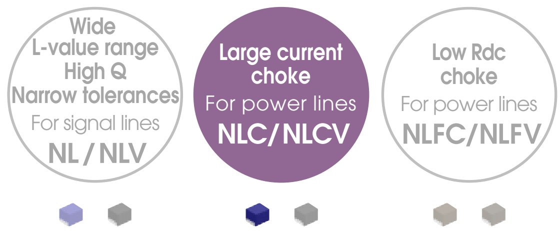
# Product type data

## Shapes and dimensions / Recommended PC board pattern




Weight : 180 mg
Dimensions in mm

# NLC565050 series



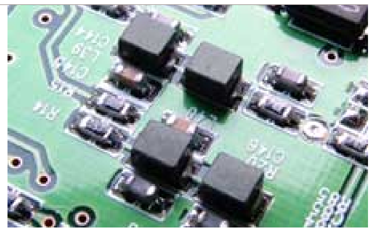

1 to 220 μH

**Electrical characteristics**

| Inductance (μH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **1** | ±10 | 10 | 7.96 | 95 | 0.03 | 1800 | NLC565050T-1R0K-PF |
| **1.2** | ±10 | 10 | 7.96 | 70 | 0.035 | 1700 | NLC565050T-1R2K-PF |
| **1.5** | ±10 | 10 | 7.96 | 55 | 0.04 | 1600 | NLC565050T-1R5K-PF |
| **1.8** | ±10 | 10 | 7.96 | 47 | 0.05 | 1400 | NLC565050T-1R8K-PF |
| **2.2** | ±10 | 10 | 7.96 | 42 | 0.06 | 1300 | NLC565050T-2R2K-PF |
| **2.7** | ±10 | 10 | 7.96 | 37 | 0.07 | 1200 | NLC565050T-2R7K-PF |
| **3.3** | ±10 | 10 | 7.96 | 34 | 0.08 | 1120 | NLC565050T-3R3K-PF |
| **3.9** | ±10 | 10 | 7.96 | 32 | 0.09 | 1050 | NLC565050T-3R9K-PF |
| **4.7** | ±10 | 10 | 7.96 | 29 | 0.11 | 950 | NLC565050T-4R7K-PF |
| **5.6** | ±10 | 10 | 7.96 | 26 | 0.13 | 880 | NLC565050T-5R6K-PF |
| **6.8** | ±10 | 10 | 7.96 | 24 | 0.15 | 810 | NLC565050T-6R8K-PF |
| **8.2** | ±10 | 10 | 7.96 | 22 | 0.18 | 750 | NLC565050T-8R2K-PF |
| **10** | ±10 | 10 | 2.52 | 19 | 0.21 | 690 | NLC565050T-100K-PF |
| **12** | ±10 | 10 | 2.52 | 17 | 0.25 | 630 | NLC565050T-120K-PF |
| **15** | ±10 | 10 | 2.52 | 16 | 0.3 | 580 | NLC565050T-150K-PF |
| **18** | ±10 | 10 | 2.52 | 14 | 0.36 | 530 | NLC565050T-180K-PF |
| **22** | ±10 | 10 | 2.52 | 13 | 0.43 | 480 | NLC565050T-220K-PF |
| **27** | ±10 | 10 | 2.52 | 11.5 | 0.52 | 440 | NLC565050T-270K-PF |
| **33** | ±10 | 10 | 2.52 | 10.5 | 0.62 | 400 | NLC565050T-330K-PF |
| **39** | ±10 | 10 | 2.52 | 9.5 | 0.72 | 370 | NLC565050T-390K-PF |
| **47** | ±10 | 10 | 2.52 | 8.5 | 0.85 | 340 | NLC565050T-470K-PF |
| **56** | ±10 | 10 | 2.52 | 7.8 | 1 | 310 | NLC565050T-560K-PF |
| **68** | ±10 | 10 | 2.52 | 7 | 1.2 | 290 | NLC565050T-680K-PF |
| **82** | ±10 | 10 | 2.52 | 6.4 | 1.4 | 270 | NLC565050T-820K-PF |
| **100** | ±10 | 20 | 0.796 | 6 | 1.6 | 250 | NLC565050T-101K-PF |
| **120** | ±10 | 20 | 0.796 | 5.4 | 1.9 | 230 | NLC565050T-121K-PF |
| **150** | ±10 | 20 | 0.796 | 4.8 | 2.2 | 210 | NLC565050T-151K-PF |
| **180** | ±10 | 20 | 0.796 | 4.4 | 2.8 | 190 | NLC565050T-181K-PF |
| **220** | ±10 | 20 | 0.796 | 3.9 | 3.4 | 170 | NLC565050T-221K-PF |

* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

Measuring Instruments L, Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1) SRF : HP8753C Network analyzer (Zin=Zout=50Ω)
Rdc : MATSUSHITA VP-2941A Digital milliohm meter



# NLC565050 series


270 to 1000 μH

## Electrical characteristics

| Inductance (μH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **270** | ±10 | 20 | 0.796 | 3.6 | 4.2 | 155 | NLC565050T-271K-PF |
| **330** | ±10 | 20 | 0.796 | 3.2 | 4.9 | 140 | NLC565050T-331K-PF |
| **390** | ±10 | 20 | 0.796 | 2.9 | 5.8 | 130 | NLC565050T-391K-PF |
| **470** | ±10 | 20 | 0.796 | 2.6 | 7 | 120 | NLC565050T-471K-PF |
| **560** | ±10 | 20 | 0.796 | 2.4 | 8.5 | 110 | NLC565050T-561K-PF |
| **680** | ±10 | 20 | 0.796 | 2.2 | 10 | 100 | NLC565050T-681K-PF |
| **820** | ±10 | 20 | 0.796 | 2 | 13 | 90 | NLC565050T-821K-PF |
| **1000** | ±10 | 20 | 0.252 | 1.8 | 15 | 85 | NLC565050T-102K-PF |

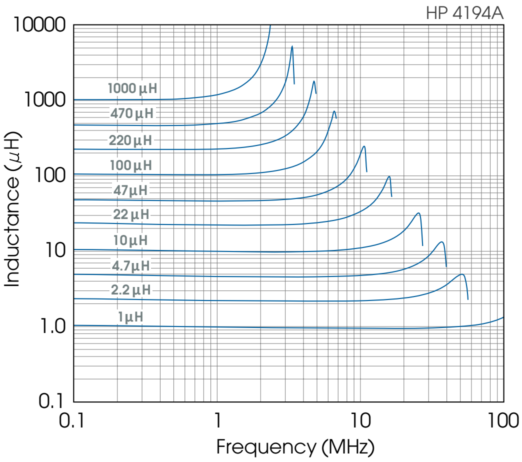
* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

Measuring Instruments

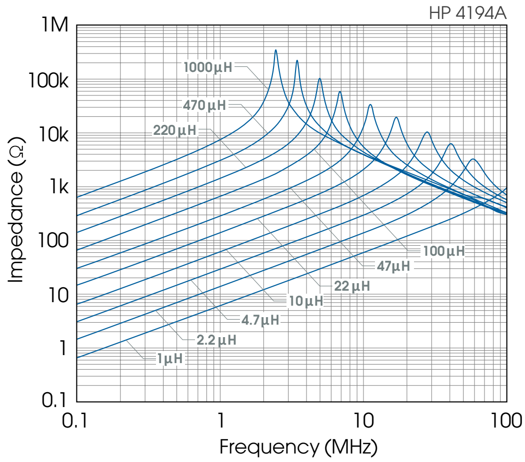
L、Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1) SRF : HP8753C Network analyzer (Zin=Zout=50Ω)

Rdc : MATSUSHITA VP-2941A Digital milliohm meter

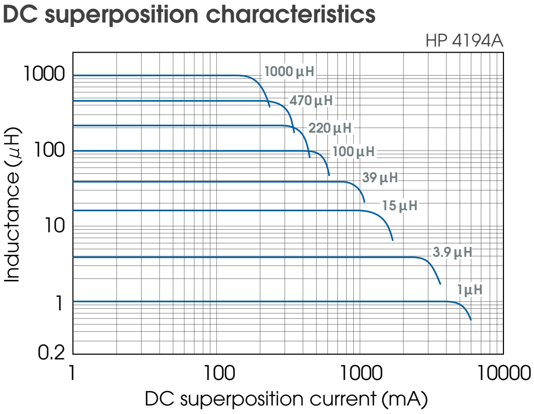
### Inductance vs. frequency characteristics



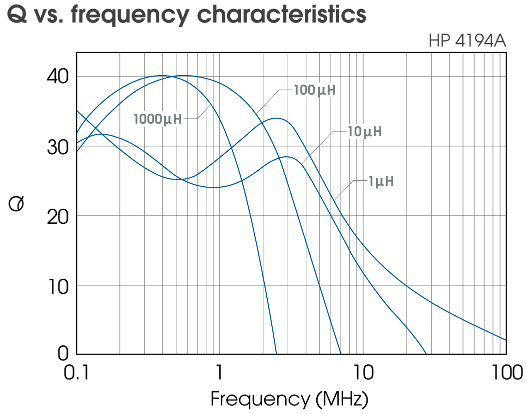

### Impedance vs. frequency characteristics




### Inductance change vs. DC superposition characteristics

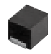



### Q vs. frequency characteristics

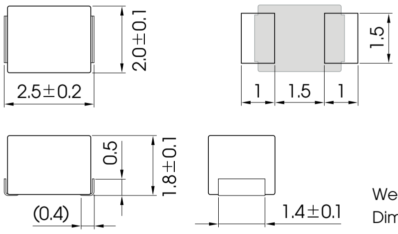


# Product type data

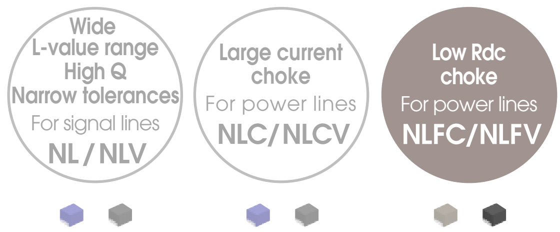
## NLFV25 series



### Shapes and dimensions / Recommended PC board pattern




Weight : 25 mg
Dimensions in mm



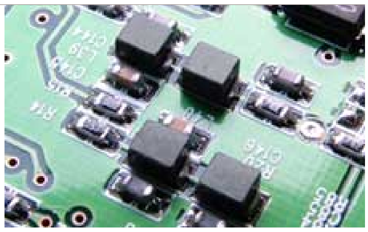

### Electrical characteristics

| Inductance (µH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **1** | ±20 | 5 | 7.96 | 100 | 0.07 | 455 | NLFV25T-1R0M-PF |
| **1.5** | ±20 | 5 | 7.96 | 80 | 0.09 | 350 | NLFV25T-1R5M-PF |
| **2.2** | ±20 | 5 | 7.96 | 70 | 0.1 | 315 | NLFV25T-2R2M-PF |
| **3.3** | ±20 | 5 | 7.96 | 55 | 0.2 | 280 | NLFV25T-3R3M-PF |
| **4.7** | ±20 | 5 | 7.96 | 45 | 0.24 | 210 | NLFV25T-4R7M-PF |
| **6.8** | ±20 | 5 | 7.96 | 38 | 0.29 | 175 | NLFV25T-6R8M-PF |
| **10** | ±10 | 10 | 2.52 | 32 | 0.36 | 155 | NLFV25T-100K-PF |
| **15** | ±10 | 10 | 2.52 | 28 | 0.75 | 130 | NLFV25T-150K-PF |
| **22** | ±10 | 10 | 2.52 | 16 | 1 | 105 | NLFV25T-220K-PF |
| **33** | ±10 | 10 | 2.52 | 14 | 1.4 | 85 | NLFV25T-330K-PF |
| **47** | ±10 | 10 | 2.52 | 11 | 1.7 | 60 | NLFV25T-470K-PF |
| **68** | ±10 | 10 | 2.52 | 10 | 3.3 | 50 | NLFV25T-680K-PF |
| **100** | ±10 | 10 | 0.796 | 8 | 4 | 40 | NLFV25T-101K-PF |

*Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

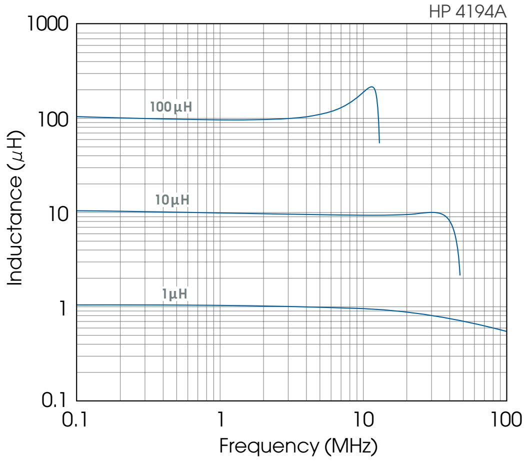
Measuring Instruments

L, Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1) SRF : HP8753C Network analyzer Rdc : MATSUSHITA VP-2941A Digital milliohm meter

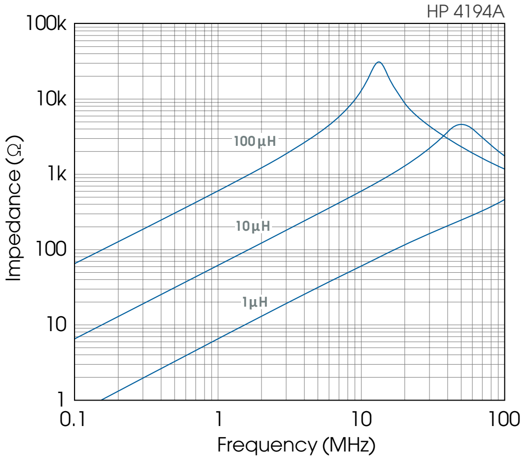


# NLFV25 series

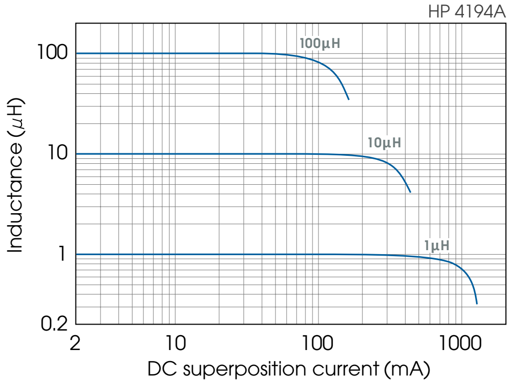
## Inductance vs. frequency characteristics



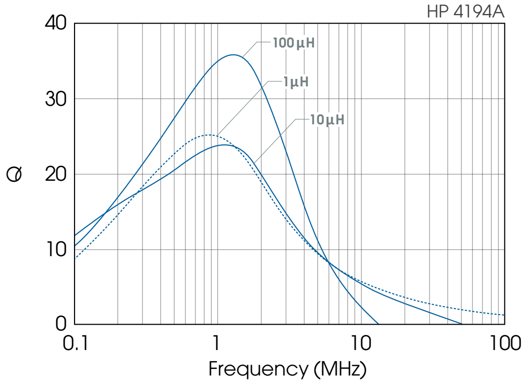

## Impedance vs. frequency characteristics




## Inductance change vs. DC superposition characteristics

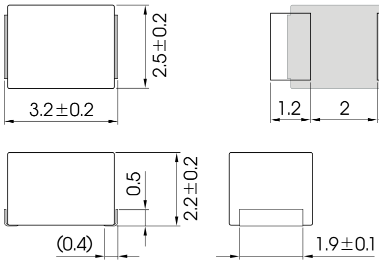



## Q vs. frequency characteristics



# Product type data

## Shapes and dimensions / Recommended PC board pattern




Weight : 50 mg
Dimensions in mm

# NLFC322522 series

Wide L-value range High Q Narrow tolerances — For signal lines — NL / NLV

Large current choke — For power lines — NLC/NLCV

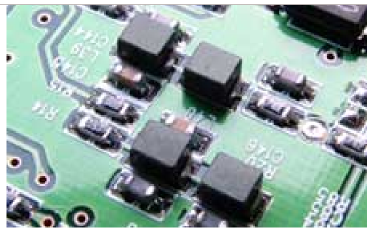
Low Rdc choke — For power lines — NLFC/NLFV

## Electrical characteristics

| Inductance (μH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **1** | ±20 | 5 | 7.96 | 100 | 0.06 | 500 | NLFC322522T-1R0M-PF |
| **1.5** | ±20 | 5 | 7.96 | 80 | 0.08 | 400 | NLFC322522T-1R5M-PF |
| **2.2** | ±20 | 5 | 7.96 | 68 | 0.09 | 340 | NLFC322522T-2R2M-PF |
| **3.3** | ±20 | 5 | 7.96 | 54 | 0.11 | 270 | NLFC322522T-3R3M-PF |
| **4.7** | ±20 | 5 | 7.96 | 46 | 0.13 | 240 | NLFC322522T-4R7M-PF |
| **6.8** | ±20 | 5 | 7.96 | 38 | 0.17 | 195 | NLFC322522T-6R8M-PF |
| **10** | ±10 | 10 | 2.52 | 30 | 0.26 | 165 | NLFC322522T-100K-PF |
| **15** | ±10 | 10 | 2.52 | 26 | 0.32 | 145 | NLFC322522T-150K-PF |
| **22** | ±10 | 10 | 2.52 | 21 | 0.5 | 115 | NLFC322522T-220K-PF |
| **33** | ±10 | 10 | 2.52 | 17 | 0.75 | 95 | NLFC322522T-330K-PF |
| **47** | ±10 | 10 | 2.52 | 14 | 0.95 | 85 | NLFC322522T-470K-PF |
| **68** | ±10 | 10 | 2.52 | 12 | 1.5 | 70 | NLFC322522T-680K-PF |
| **100** | ±10 | 10 | 0.796 | 10 | 2.5 | 55 | NLFC322522T-101K-PF |
| **150** | ±10 | 10 | 0.796 | 8 | 3.2 | 45 | NLFC322522T-151K-PF |
| **220** | ±10 | 10 | 0.796 | 7 | 5.4 | 35 | NLFC322522T-221K-PF |
| **330** | ±10 | 10 | 0.796 | 5 | 7 | 30 | NLFC322522T-331K-PF |
| **470** | ±10 | 10 | 0.796 | 4 | 16 | 25 | NLFC322522T-471K-PF |
| **680** | ±10 | 10 | 0.796 | 3 | 20 | 20 | NLFC322522T-681K-PF |
| **1000** | ±10 | 10 | 0.252 | 2.4 | 24 | 15 | NLFC322522T-102K-PF |

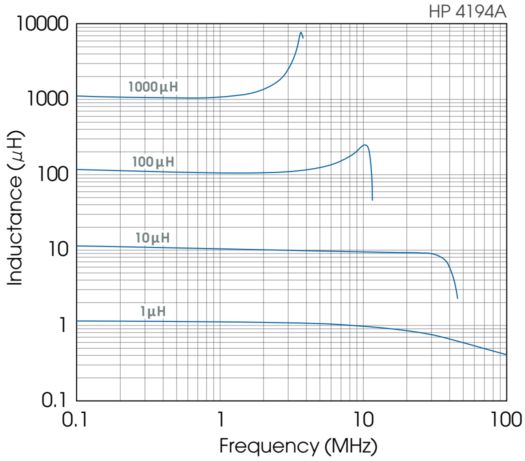
* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

Measuring Instruments
L, Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1)
SRF : HP8753C Network analyzer (Zin=Zout=50Ω) Rdc : MATSUSHITA VP-2941A Digital milliohm meter

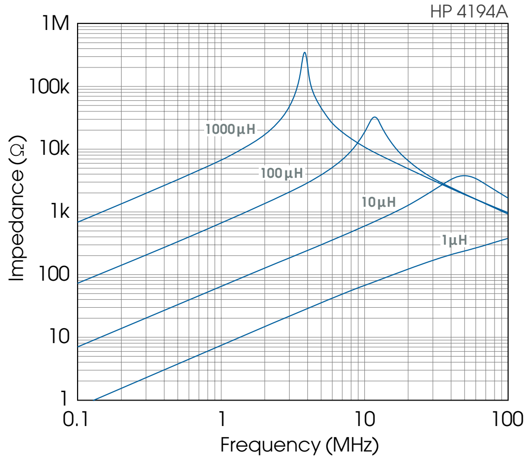


# NLFC322522 series

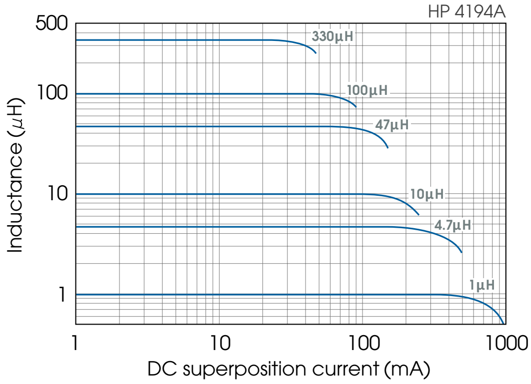
## Inductance vs. frequency characteristics



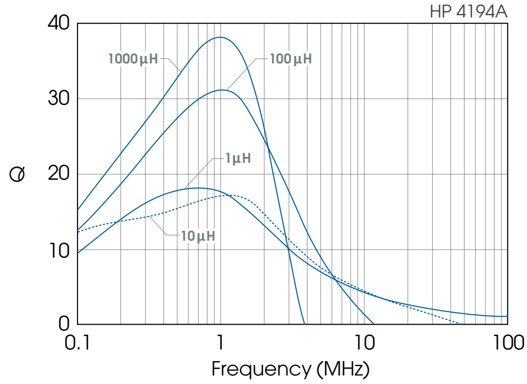

## Impedance vs. frequency characteristics




## Inductance change vs. DC superposition characteristics

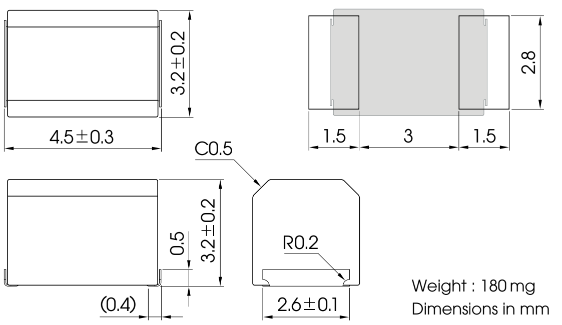



## Q vs. frequency characteristics



# Product type data

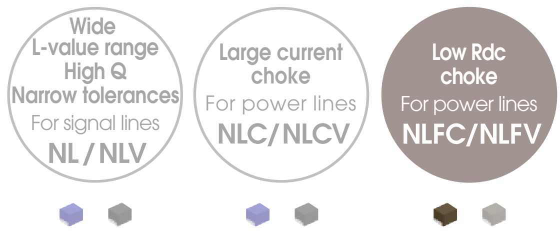
### Shapes and dimensions / Recommended PC board pattern




Weight : 180 mg
Dimensions in mm

# NLFC453232

series

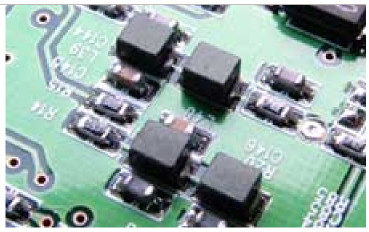



### Electrical characteristics

| Inductance (µH) | Inductance tolerance (%) | Q min. | L, Q test frequency (MHz) | Self-resonance frequency (MHz) min. | DC resistance (Ω) max. | Rated current* (mA) max. | Part No. |
|---|---|---|---|---|---|---|---|
| **1** | ±20 | 10 | 7.96 | 200 | 0.05 | 800 | NLFC453232T-1R0M-PF |
| **1.5** | ±20 | 10 | 7.96 | 130 | 0.06 | 700 | NLFC453232T-1R5M-PF |
| **2.2** | ±20 | 10 | 7.96 | 80 | 0.07 | 600 | NLFC453232T-2R2M-PF |
| **3.3** | ±20 | 10 | 7.96 | 45 | 0.09 | 460 | NLFC453232T-3R3M-PF |
| **4.7** | ±20 | 10 | 7.96 | 35 | 0.1 | 400 | NLFC453232T-4R7M-PF |
| **6.8** | ±20 | 10 | 7.96 | 28 | 0.14 | 300 | NLFC453232T-6R8M-PF |
| **10** | ±10 | 10 | 2.52 | 22 | 0.21 | 250 | NLFC453232T-100K-PF |
| **15** | ±10 | 10 | 2.52 | 20 | 0.3 | 200 | NLFC453232T-150K-PF |
| **22** | ±10 | 10 | 2.52 | 18 | 0.46 | 170 | NLFC453232T-220K-PF |
| **33** | ±10 | 10 | 2.52 | 14 | 0.63 | 140 | NLFC453232T-330K-PF |
| **47** | ±10 | 10 | 2.52 | 11.5 | 0.85 | 120 | NLFC453232T-470K-PF |
| **68** | ±10 | 10 | 2.52 | 10 | 1.2 | 100 | NLFC453232T-680K-PF |
| **100** | ±10 | 10 | 0.796 | 8 | 1. | 90 | NLFC453232T-101K-PF |
| **150** | ±10 | 10 | 0.796 | 7 | 2.3 | 65 | NLFC453232T-151K-PF |
| **220** | ±10 | 10 | 0.796 | 5.5 | 3.8 | 55 | NLFC453232T-221K-PF |
| **330** | ±10 | 10 | 0.796 | 4 | 6 | 45 | NLFC453232T-331K-PF |

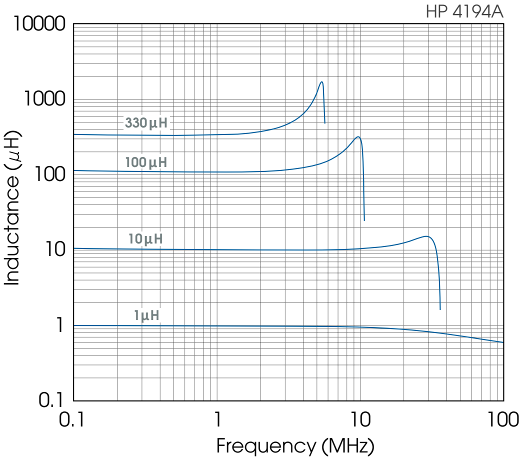
* Rated current : The smaller value is applied between the values based on inductance change rate (decreased by 10% compared to the nominal inductance value) and the one based on temperature rise (20°C temperature rise by self-heating).

Measuring Instruments
L、Q : HP4194A Impedance/gain-phase analyzer(16085A+16093B+TDK TF-1)
SRF : HP8753C Network analyzer (Zin=Zout=50 Ω)    Rdc : MATSUSHITA VP-2941A Digital milliohm meter

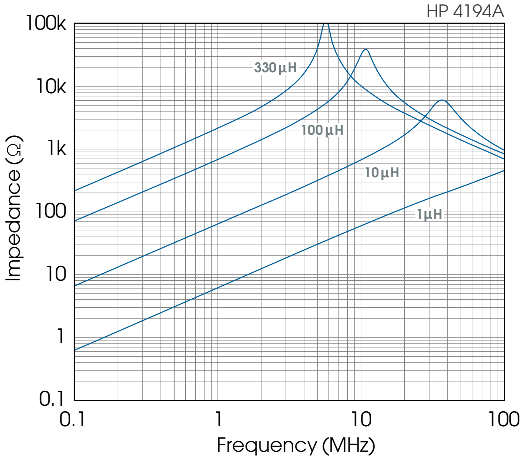


# NLFC453232 series

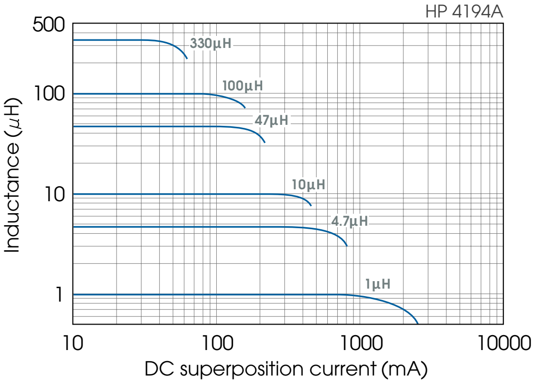
### Inductance vs. frequency characteristics




### Impedance vs. frequency characteristics




### Inductance change vs. DC superposition characteristics




### Q vs. frequency characteristics