

Multilayer Chip Inductors For High-frequency Circuits And Modules, MLG series 0603S type

Conforming to RoHS Directive
 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.

MLG Series 0603 type — Responding to the advanced design needs of next-generation small digital device RF circuits. The lineup of characteristics has been enhanced in further refined and powerful ways.

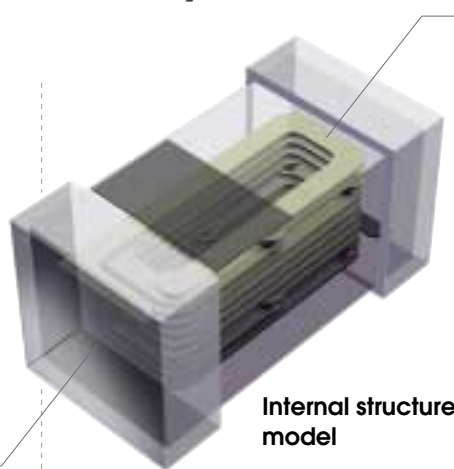
The 0603 type has realized 100nH.

The industry's smallest size 0603 type (0.6 x 0.3 x 0.3mm) product has the industry's highest-level inductance value of 100nH (at 100MHz). This characteristic enhancement has allowed replacement of almost all 1005 type (1.0 x 0.5 x 0.5mm) units for the choke integrated in the RF circuits of small digital devices such as mobile phones.

The nickel + high-purity Sn gilding terminal electrodes allow lead-free soldering/high-temperature reflow processes.

Plus, the products of the 1-10nH range have been re-organized in a more detailed way.

Also, the lower limit of the inductance value has been extended to 0.6nH from 1nH. Plus, the product lineup for those 10nH or lower (1 to 5.6nH: ±0.3nH/6.8 to 10nH: ±5%), which belonged to the E12 series, has been segmented to the E24 series (0.6 to 3.9nH: ±0.2nH/4.3 to 5.6nH: ±0.3nH/6.2-10nH: ±5%). A single 0603 chip can set up the optimal inductance value, allowing straightforward simplification of the matching circuit.

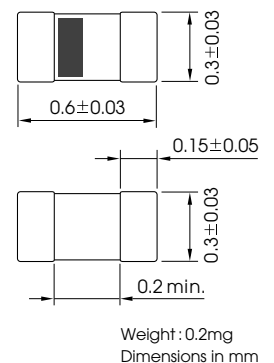


The 0603 type allows reduction of the dimension by 64% (68%, if implementation area, including the land pattern, is considered), and of the volume by 78% compared to the 1005 type.

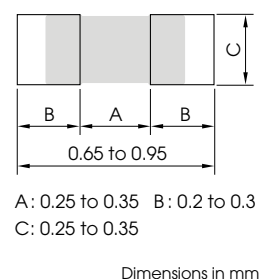
The advanced LTCC (Low Temperature Cofire Ceramic system) process, which promotes further high inductance and high Q, with optimized sheet physical properties, low profiling and multi layering, and finely drawn internal conductor patterns, is integrated with the super tiny chip, establishing a processing technology for highly stable mass production of spiral internal conductors that's more detailed and precise than the conventional pattern formation accuracy.

A process-controlling technology has been established to rigorously manage characteristic parameters such as conductor width, thickness, interlayer size, terminal electrode distance, and so forth, promoting a narrow tolerance interval and low Rdc, as well as making it a high inductance product.

Shapes and dimensions



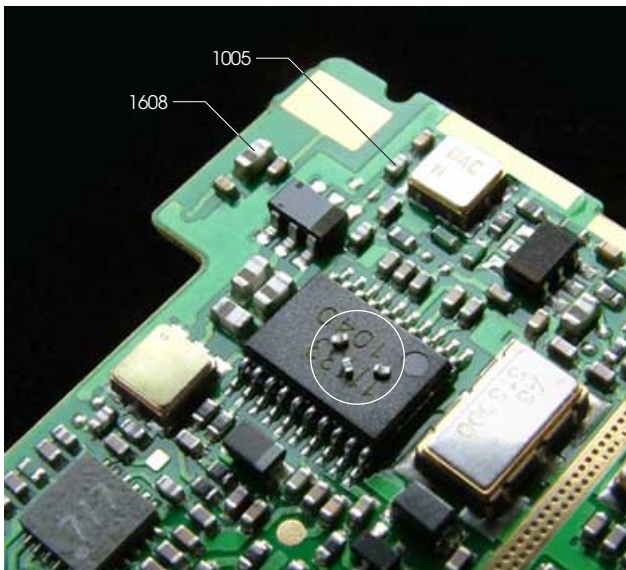
Recommended PC board pattern (Reflow process)



The advantage and merits of the new lineup MLG0603S

- The implementation dimension (the area occupied by the circuit board including the land pattern) of the 1005 series has been reduced by about 68%, enabling drastic downsizing and low profiling.
- The upper limit of the inductance has been expanded to 100nH (at 100MHz), the industry's highest level, from the conventional level of 56nH. This has allowed replacement of almost all 1005 types for the choke used in the RF circuits of small digital devices such as mobile phones.
- The E24 series, with its narrow tolerance interval, offers a range between 0.6nH and 10nH, which is frequently used for matching purposes, in a comprehensive manner, allowing optimization and simplification of diverse RF matching circuits.

MLG0603S



The 0603 type allows reduction of the dimension by 64% (68%, if implementation area, including the land pattern, is considered), and of the volume by 78% compared to the 1005 type. The advanced LTCC (Low Temperature Cofired Ceramic) process, which promotes further high inductance and high Q, with optimized sheet physical properties, low profiling and multi layering, and finely drawn internal conductor patterns, is integrated with the super tiny chip, establishing a processing technology for highly stable mass production of spiral internal conductors that's more detailed and precise than the conventional pattern formation accuracy.

An enormous condensation effect is offered for the RF modules of small mobile devices, such as laptop PCs, PDAs, handheld audiovisual devices, and so forth; for downsizing the design of digital terrestrial television tuners; as well as for the matching circuits of RF modules and RF circuit units of the next-generation mobile phones, which are increasingly becoming multi-functional and smaller and thinner.

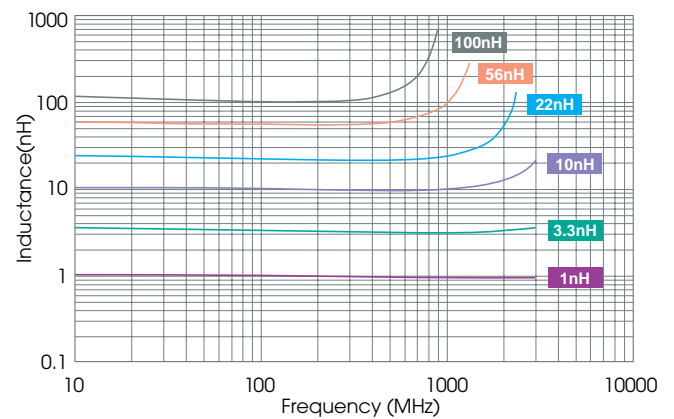
Frequency characteristics

Reference data

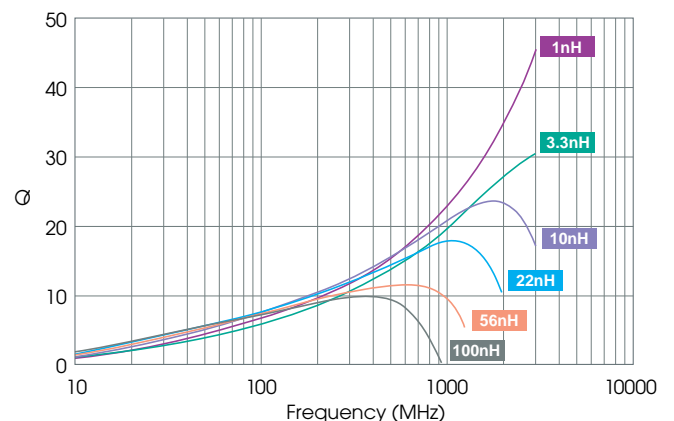
A measuring instrument

L,Q : Impedance/gain-phase analyzer HP4291A+16197A

Inductance vs. frequency characteristics



Q vs. frequency characteristics



Of course, a thorough consideration of the environment is in hand.

Supporting the RoHS (Restriction on Hazardous Substances) directive of the European Union.

In accordance with the RoHS directive (EU Directive 2002/95/EC), the MLG series uses no lead, mercury, cadmium, hexavalent chromium, or specified bromine containing fire-retardant materials, PBB and PBDE, as well as minute amounts of the additives in the dielectric materials, internal conductors, terminal electrodes, and glass frit.

Reflow process is supported by advanced implementation reliability.

Sn gilded layers on the surface of the terminal electrodes are high in purity and of great precision, providing good hydrophilicity to lead-free soldering components, and flux, such as Sn-Ag-Cu and Sn-Zn. In diverse reliability evaluation tests, the results of soldering heat resistance, occurrence of whiskers, and the joining strength after thermal cycling, were on a similar level as those of conventional Sn-Pb gilded terminal electrode products in terms of implementation reliability.

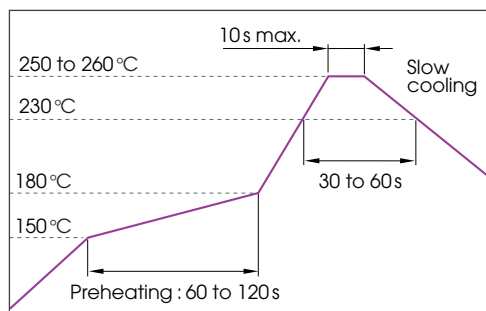
Temperature & humidity range

Operating	-55 to +125°C
Storage*	-55 to +125°C

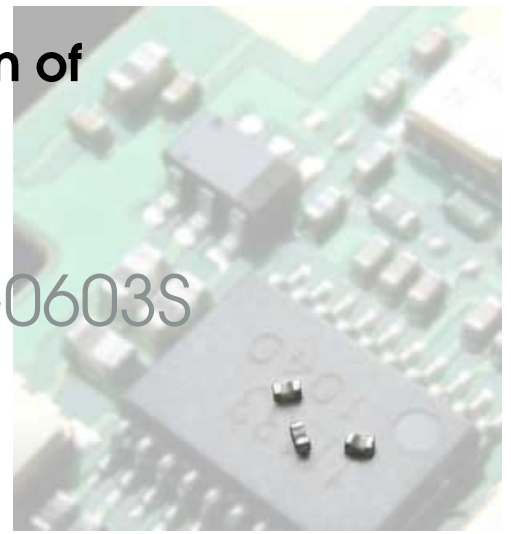
*Single product

Recommended soldering conditions

Lead-free solder/High-temperature reflow process



MLG0603S



INFORMATION

Please utilize the simulation model of the TDK multi-layered chip inductor.



The characteristics of the TDK multi-layered chip inductor implemented on the circuit can be realistically simulated by just installing it in a high-frequency circuit simulator.

The equivalent circuit is edited according to the format of each simulator (below) and can be easily installed by simply following the manual.

The series also supports the optimized features of Agilent Technologies Inc. "Advanced Design System (ADS)", which allows automated selection of component constant just by first entering target characteristics.

Supported simulators/modeling products (as of May 2006)

- Ansoft Corporation "Ansoft Designer[®]"
- Agilent Technologies, Inc. "Advanced Design System (ADS)"
- Applied Wave Research, Inc. "Microwave Office[™]"

MLG series : 0603(S type), 1005, 1608
MLK series : 0603, 1005

The new variety of the TDK multi-layered chip inductors will be modeled one by one.

Simulator models are available for download.
>> <http://www.tdk.co.jp/tvcl/index.htm>

For inquires on and requests for samples (CD-ROM) of these simulator models please contact one of our sales representatives.

Electrical characteristics



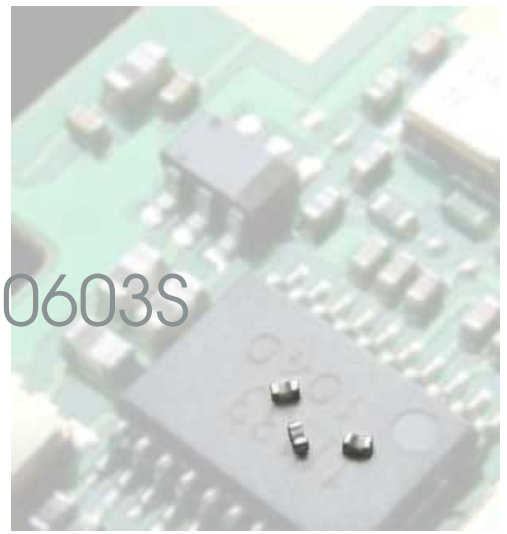
Measuring instruments

L, Q : Impedance/gain-phase analyzer HP4291A+16197A

SRF : HP8753C Network analyzer

Rdc : MATSUSHITA VP-2941A Digital milliohm meter

MLG0603S



Inductance (nH) at 100MHz	Inductance tolerance	Q min at 100MHz	Q typ. at 800MHz	Self-resonance frequency (GHz) min.	DC resistance Rdc (Ohm) max.	Rated current* I _{dc} (mA) max.	Part No.**
0.6	±0.2nH	-	21	10	0.1	300	MLG0603S0N6CT
0.7	±0.2nH	-	21	10	0.1	300	MLG0603S0N7CT
0.8	±0.2nH	-	22	10	0.1	300	MLG0603S0N8CT
0.9	±0.2nH	-	22	10	0.1	300	MLG0603S0N9CT
1.0	±0.2nH or ±0.3nH	4	22	10	0.2	300	MLG0603S1N0□T
1.1	±0.2nH or ±0.3nH	4	21	10	0.2	300	MLG0603S1N1□T
1.2	±0.2nH or ±0.3nH	4	21	10	0.2	300	MLG0603S1N2□T
1.3	±0.2nH or ±0.3nH	4	20	9	0.2	300	MLG0603S1N3□T
1.5	±0.2nH or ±0.3nH	4	20	9	0.3	300	MLG0603S1N5□T
1.6	±0.2nH or ±0.3nH	4	20	9	0.3	300	MLG0603S1N6□T
1.8	±0.2nH or ±0.3nH	4	20	8.5	0.3	300	MLG0603S1N8□T
2.0	±0.2nH or ±0.3nH	4	20	7.5	0.3	300	MLG0603S2N0□T
2.2	±0.2nH or ±0.3nH	4	20	7.5	0.4	300	MLG0603S2N2□T
2.4	±0.2nH or ±0.3nH	4	20	7	0.4	300	MLG0603S2N4□T
2.7	±0.2nH or ±0.3nH	4	20	6.5	0.4	300	MLG0603S2N7□T
3.0	±0.2nH or ±0.3nH	4	20	6	0.4	300	MLG0603S3N0□T
3.3	±0.2nH or ±0.3nH	4	20	5.5	0.5	300	MLG0603S3N3□T
3.6	±0.2nH or ±0.3nH	4	20	5	0.5	300	MLG0603S3N6□T
3.9	±0.2nH or ±0.3nH	5	20	5	0.5	300	MLG0603S3N9□T
4.3	±0.3nH	5	20	4.5	0.6	300	MLG0603S4N3ST
4.7	±0.3nH	5	19	4.5	0.6	300	MLG0603S4N7ST
5.1	±0.3nH	5	19	4.2	0.6	200	MLG0603S5N1ST
5.6	±0.3nH	5	19	4.2	0.6	200	MLG0603S5N6ST
6.2	±0.3nH	5	19	3.5	0.7	200	MLG0603S6N2ST
6.8	±5%	5	19	3.5	0.7	200	MLG0603S6N8JT
7.5	±5%	5	19	3.5	0.8	200	MLG0603S7N5JT
8.2	±5%	5	19	3.2	0.8	200	MLG0603S8N2JT
9.1	±5%	5	19	3	0.9	200	MLG0603S9N1JT
10	±5%	5	19	2.8	0.9	200	MLG0603S10NJT
12	±5%	6	19	2.4	1.1	150	MLG0603S12NJT
15	±5%	6	19	2.2	1.2	150	MLG0603S15NJT
18	±5%	6	18	2	1.4	150	MLG0603S18NJT
22	±5%	6	18	1.7	1.7	150	MLG0603S22NJT
27	±5%	6	17	1.5	1.7	100	MLG0603S27NJT
33	±5%	6	17	1.3	2.0	100	MLG0603S33NJT
39	±5%	6	14	1.1	2.2	50	MLG0603S39NJT
47	±5%	6	12	0.9	2.4	50	MLG0603S47NJT
56	±5%	5	11	0.6	4.0	50	MLG0603S56NJT
68	±5%	5	-	0.5	4.0	50	MLG0603S68NJT
82	±5%	5	-	0.5	4.0	50	MLG0603S82NJT
100	±5%	5	-	0.5	5.0	50	MLG0603SR10JT

*The value where the temperature of the inductor increases by 20 degrees C is applied.

**In each product name, an inductance tolerance symbol (C : ±0.2nH / S : ±0.3nH) is specified where □ is shown (1.0-3.9nH products)

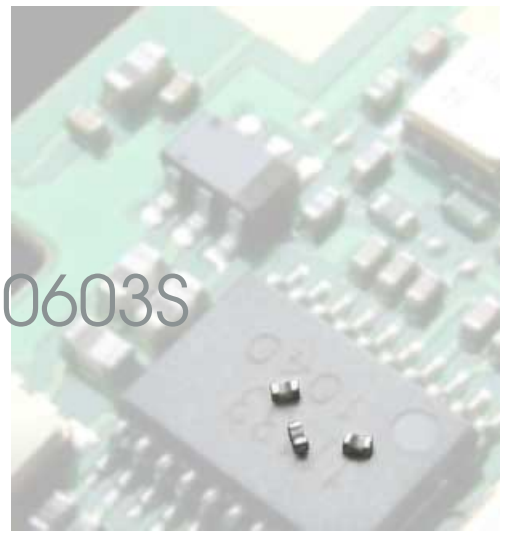
Inductance & Q vs. frequency characteristics



A measuring instrument


L, Q : Impedance/gain-phase analyzer HP4291A+16197A

MLG0603S

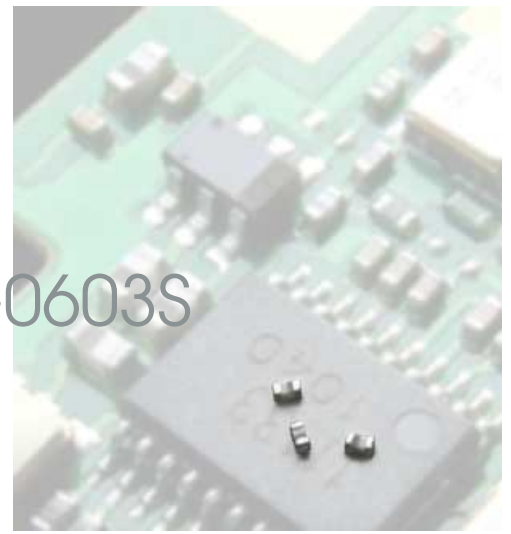


Part No.	■ Inductance(nH) typ.		■ Q typ.		at 800MHz		at 900MHz		at 1.8GHz		at 2.0GHz		at 2.4GHz	
	L	Q	L	Q	L	Q	L	Q	L	Q	L	Q	L	Q
	MLG0603S0N6CT	0.6	21	0.6	23	0.5	33	0.5	35	0.5	38	0.5	38	0.5
MLG0603S0N7CT	0.7	21	0.7	22	0.7	33	0.7	34	0.7	37	0.7	37	0.7	37
MLG0603S0N8CT	0.7	22	0.7	23	0.7	34	0.7	36	0.7	39	0.7	39	0.7	39
MLG0603S0N9CT	0.8	22	0.8	24	0.8	33	0.8	35	0.8	38	0.8	38	0.8	38
MLG0603S1N0□T	0.9	22	0.9	24	0.9	33	0.9	34	0.9	37	0.9	37	0.9	37
MLG0603S1N1□T	1.0	21	1.0	23	1.0	32	1.0	33	1.0	36	1.0	36	1.0	36
MLG0603S1N2□T	1.1	21	1.1	22	1.1	31	1.1	32	1.1	35	1.1	35	1.1	35
MLG0603S1N3□T	1.2	20	1.2	22	1.2	30	1.2	31	1.2	34	1.2	34	1.2	34
MLG0603S1N5□T	1.4	20	2.0	21	1.4	30	1.4	31	1.4	34	1.4	34	1.4	34
MLG0603S1N6□T	1.5	20	1.5	22	1.5	31	1.5	32	1.5	34	1.5	34	1.5	34
MLG0603S1N8□T	1.7	20	1.7	21	1.7	30	1.7	31	1.7	33	1.7	33	1.7	33
MLG0603S2N0□T	1.9	20	1.9	21	1.9	30	1.9	31	1.9	34	2.0	34	2.0	34
MLG0603S2N2□T	2.1	20	2.1	21	2.1	29	2.2	30	2.2	32	2.2	32	2.2	32
MLG0603S2N4□T	2.2	20	2.2	21	2.3	30	2.3	31	2.3	33	2.3	33	2.3	33
MLG0603S2N7□T	2.5	20	2.5	21	2.6	30	2.6	30	2.6	32	2.7	32	2.7	32
MLG0603S3N0□T	2.8	20	2.8	21	2.9	30	2.9	30	2.9	33	2.9	33	2.9	33
MLG0603S3N3□T	3.1	20	3.1	21	3.2	30	3.3	30	3.3	32	3.3	32	3.3	32
MLG0603S3N6□T	3.3	20	3.3	21	3.5	29	3.5	29	3.5	30	3.6	30	3.6	30
MLG0603S3N9□T	3.6	20	3.6	21	3.8	30	3.9	30	4.0	31	4.0	31	4.0	31
MLG0603S4N3ST	4.1	20	4.1	21	4.3	28	4.4	29	4.6	30	4.6	30	4.6	30
MLG0603S4N7ST	4.4	19	4.4	20	4.7	28	4.9	28	5.1	29	5.1	29	5.1	29
MLG0603S5N1ST	4.8	19	4.8	20	5.1	27	5.3	28	5.6	29	5.6	29	5.6	29
MLG0603S5N6ST	5.3	19	5.3	20	5.7	27	5.9	28	6.3	28	6.3	28	6.3	28
MLG0603S6N2ST	6.0	19	6.0	20	6.6	26	6.9	27	7.4	26	7.4	26	7.4	26
MLG0603S6N8JT	6.5	19	6.5	20	7.3	26	7.7	27	8.4	26	8.4	26	8.4	26
MLG0603S7N5JT	7.1	19	7.1	20	7.7	26	7.9	27	8.4	27	8.4	27	8.4	27
MLG0603S8N2JT	7.9	19	7.9	20	8.8	25	9.3	25	10.2	24	10.2	24	10.2	24
MLG0603S9N1JT	8.6	19	8.7	20	9.7	24	10.2	24	11.2	23	11.2	23	11.2	23
MLG0603S10NJT	10	19	10	20	11	23	12	23	14	21	14	21	14	21
MLG0603S12NJT	12	19	12	20	14	23	16	23	-	20	-	20	-	20
MLG0603S15NJT	15	19	15	20	20	20	23	18	-	13	-	13	-	13
MLG0603S18NJT	18	18	18	19	27	17	-	15	-	9	-	9	-	9
MLG0603S22NJT	23	18	23	18	39	13	-	11	-	2	-	2	-	2
MLG0603S27NJT	29	17	30	16	-	7	-	3	-	-	-	-	-	-
MLG0603S33NJT	37	17	39	16	-	3	-	-	-	-	-	-	-	-
MLG0603S39NJT	47	14	-	13	-	-	-	-	-	-	-	-	-	-
MLG0603S47NJT	60	12	-	12	-	-	-	-	-	-	-	-	-	-
MLG0603S56NJT	-	11	-	10	-	-	-	-	-	-	-	-	-	-
MLG0603S68NJT	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MLG0603S82NJT	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MLG0603SR10JT	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Application example

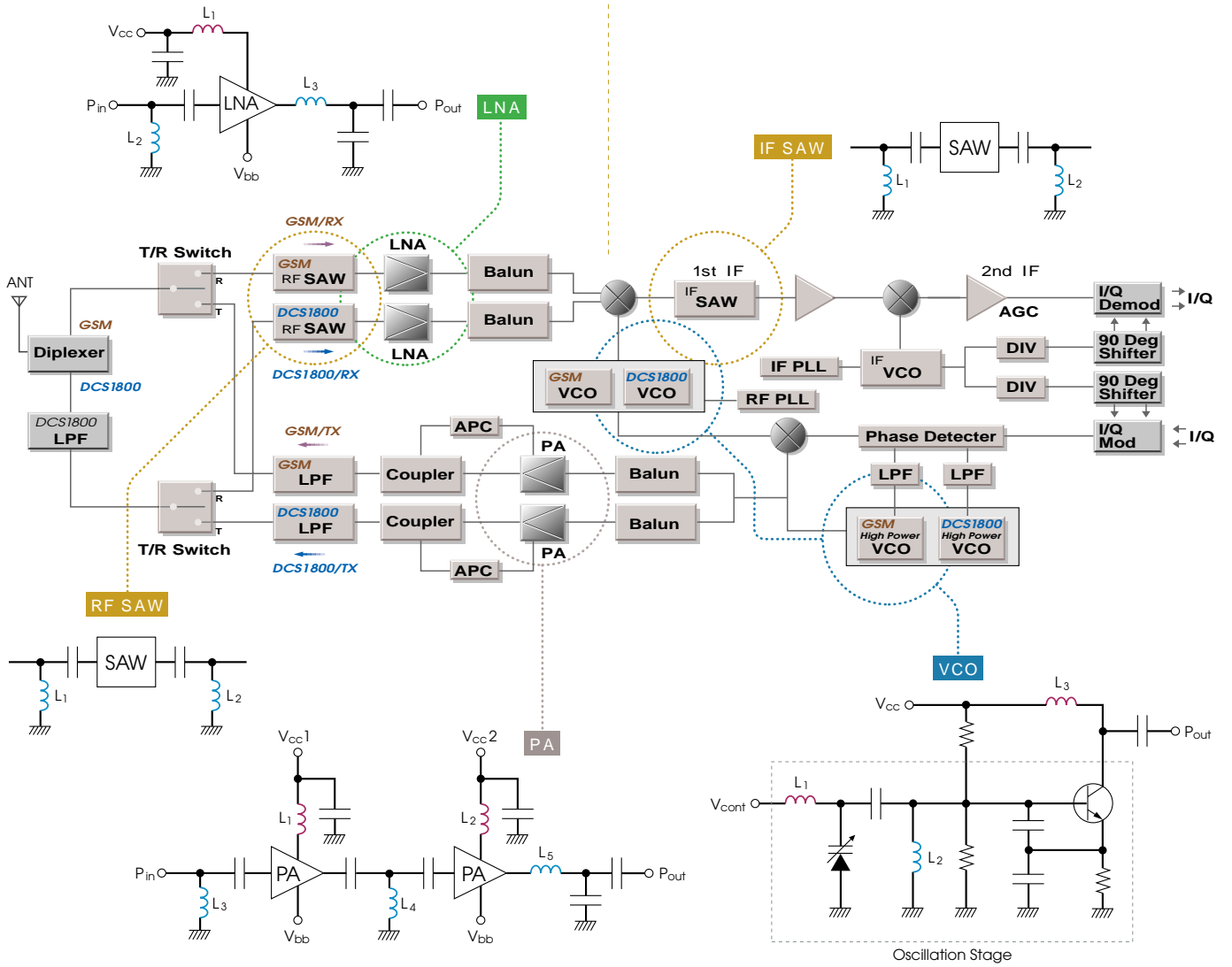
 For Matching

 For Choke

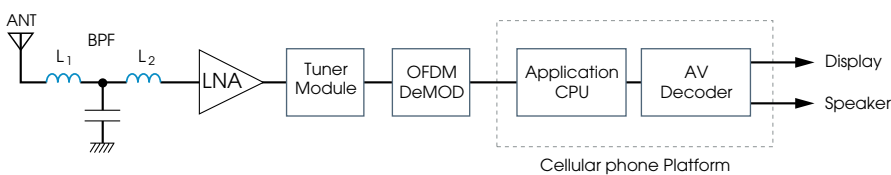


MLG0603S

GSM/DCS1800 Dual-band System

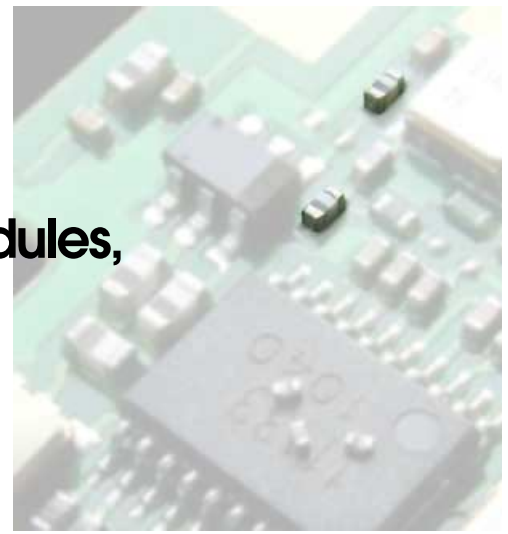


Digital TV Turner



Multilayer Chip Inductors For High-frequency Circuits And Modules, MLG series 1005S type

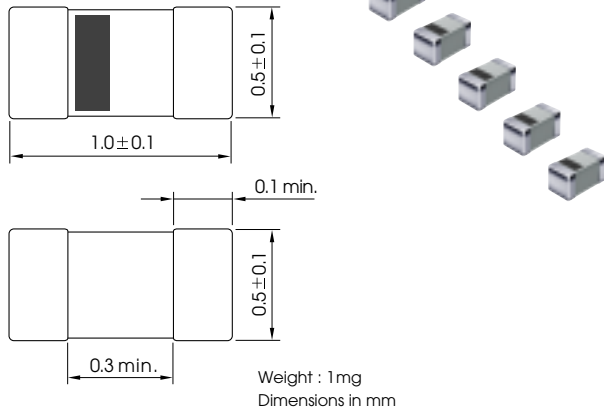
The 1005 type for high-frequency circuits with the industry's lowest level of R_{dc} and highest Q characteristic, has been reorganized in a rich new lineup, covering 0.6–270nH in a detailed manner. Similar to the 1005 type, 10nH and lower were segmentalized to the E24 series, making it easier to simplify and rationalize diverse matching circuits.



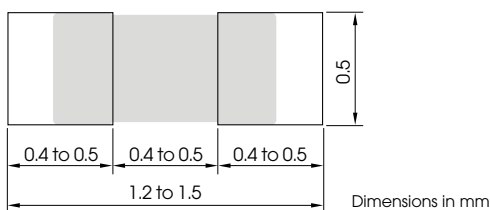
Conforming to RoHS Directive

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.

Shapes and dimensions

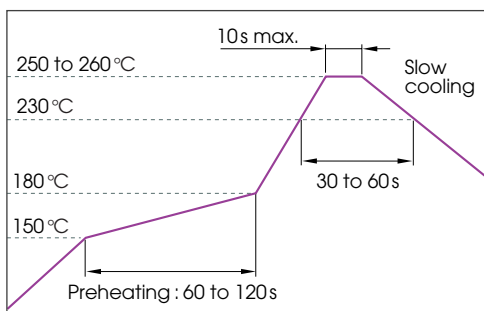


Recommended PC board pattern (Reflow process)



Recommended soldering conditions

Lead-free solder/High-temperature reflow process



Temperature & humidity range

Operating	-55 to +125°C
Storage*	-55 to +125°C

*Single product

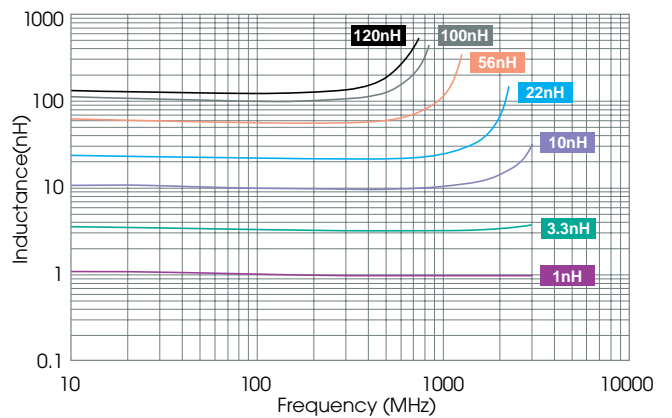
Frequency characteristics

Reference data

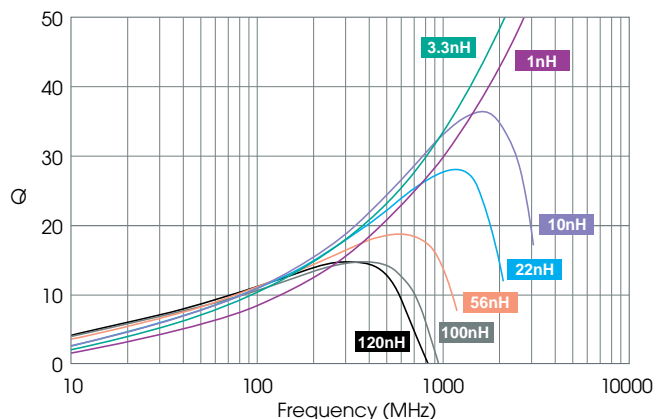
A measuring instrument

L,Q : Impedance/gain-phase analyzer HP4291A+16197A

Inductance vs. frequency characteristics



Q vs. frequency characteristics



Electrical characteristics



Measuring instruments

L, Q : Impedance/gain-phase analyzer HP4291A+16197A

SRF : HP8753C Network analyzer

Rdc : MATSUSHITA VP-2941A Digital milliohm meter

MLG1005S



Inductance (nH) at 100MHz	Inductance tolerance	Q min at 100MHz	Q typ. at 800MHz	Self-resonance frequency (GHz) min.	DC resistance Rdc (Ohm) max.	Rated current* I _{dc} (mA) max.	Part No.**
0.6	±0.2nH	-	27	10	0.1	1000	MLG1005S0N6CT
0.7	±0.2nH	-	28	10	0.1	1000	MLG1005S0N7CT
0.8	±0.2nH	-	29	10	0.1	1000	MLG1005S0N8CT
0.9	±0.2nH	-	29	10	0.1	1000	MLG1005S0N9CT
1.0	±0.2nH or ±0.3nH	7	29	10	0.1	1000	MLG1005S1N0□T
1.1	±0.2nH or ±0.3nH	7	29	10	0.1	1000	MLG1005S1N1□T
1.2	±0.2nH or ±0.3nH	7	29	10	0.1	1000	MLG1005S1N2□T
1.3	±0.2nH or ±0.3nH	7	29	8	0.1	1000	MLG1005S1N3□T
1.5	±0.2nH or ±0.3nH	7	29	8	0.1	1000	MLG1005S1N5□T
1.6	±0.2nH or ±0.3nH	7	29	7	0.15	1000	MLG1005S1N6□T
1.8	±0.2nH or ±0.3nH	7	29	8	0.15	900	MLG1005S1N8□T
2.0	±0.2nH or ±0.3nH	7	29	7	0.15	900	MLG1005S2N0□T
2.2	±0.2nH or ±0.3nH	7	29	6	0.15	900	MLG1005S2N2□T
2.4	±0.2nH or ±0.3nH	7	29	6	0.15	800	MLG1005S2N4□T
2.7	±0.2nH or ±0.3nH	7	30	5	0.15	800	MLG1005S2N7□T
3.0	±0.2nH or ±0.3nH	7	31	5	0.2	800	MLG1005S3N0□T
3.3	±0.2nH or ±0.3nH	8	31	5	0.2	800	MLG1005S3N3□T
3.6	±0.2nH or ±0.3nH	8	31	5	0.2	700	MLG1005S3N6□T
3.9	±0.2nH or ±0.3nH	8	31	5	0.2	700	MLG1005S3N9□T
4.3	±0.3nH	8	31	4	0.2	700	MLG1005S4N3ST
4.7	±0.3nH	8	31	4	0.25	700	MLG1005S4N7ST
5.1	±0.3nH	8	31	3.5	0.25	600	MLG1005S5N1ST
5.6	±0.3nH	8	30	3.5	0.25	600	MLG1005S5N6ST
6.2	±0.3nH	8	30	3	0.3	600	MLG1005S6N2JT
6.8	±5%	8	30	3	0.3	600	MLG1005S6N8JT
7.5	±5%	8	30	3	0.3	500	MLG1005S7N5JT
8.2	±5%	8	30	3	0.35	500	MLG1005S8N2JT
9.1	±5%	8	30	2.5	0.35	500	MLG1005S9N1JT
10	±5%	8	30	2.5	0.4	500	MLG1005S10NJT
12	±5%	8	29	2	0.45	400	MLG1005S12NJT
15	±5%	8	28	1.8	0.6	400	MLG1005S15NJT
18	±5%	8	28	1.5	0.7	350	MLG1005S18NJT
22	±5%	8	27	1.3	0.8	350	MLG1005S22NJT
27	±5%	8	23	1.2	0.9	300	MLG1005S27NJT
33	±5%	8	23	1	1	300	MLG1005S33NJT
39	±5%	8	21	1	1.2	250	MLG1005S39NJT
47	±5%	8	20	0.7	1.4	250	MLG1005S47NJT
56	±5%	8	18	0.7	1.4	200	MLG1005S56NJT
68	±5%	8	-	0.6	1.5	200	MLG1005S68NJT
82	±5%	8	-	0.5	1.6	200	MLG1005S82NJT
100	±5%	8	-	0.5	2	200	MLG1005SR10JT
120	±5%	8	-	0.5	2.2	150	MLG1005SR12JT
150	±5%	8	-	0.45	3.5	150	MLG1005SR15JT
180	±5%	8	-	0.4	3.8	150	MLG1005SR18JT
220	±5%	8	-	0.35	4.2	100	MLG1005SR22JT
270	±5%	8	-	0.3	4.8	100	MLG1005SR27JT

* The value where the temperature of the inductor increases by 20 degrees C is applied.

** In each product name, an inductance tolerance symbol (C : ±0.2nH / S : ±0.3nH) is specified where □ is shown (1.0-3.9nH products)

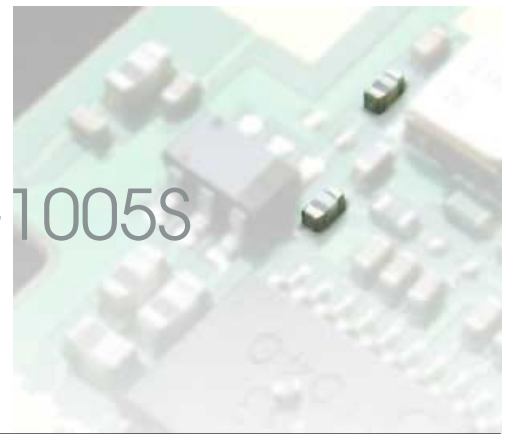
Inductance & Q vs. frequency characteristics



A measuring instrument

L/Q : Impedance/gain-phase analyzer HP4291A+16197A

MLG1005S



Part No.	■ Inductance(nH) typ.		■ Q typ.							
	at 800MHz		at 900MHz		at 1.8GHz		at 2.0GHz		at 2.4GHz	
	L	Q	L	Q	L	Q	L	Q	L	Q
MLG1005S0N6CT	0.54	27	0.54	30	0.54	47	0.54	49	0.54	55
MLG1005S0N7CT	0.63	28	0.63	29	0.62	47	0.62	49	0.62	55
MLG1005S0N8CT	0.74	29	0.74	30	0.74	48	0.74	49	0.74	57
MLG1005S0N9CT	0.82	29	0.82	31	0.82	49	0.82	50	0.82	57
MLG1005S1N0□T	1.0	29	1.0	31	1.0	49	1.0	50	1.0	57
MLG1005S1N1□T	1.10	29	1.10	31	1.10	49	1.11	50	1.11	58
MLG1005S1N2□T	1.2	29	1.2	31	1.2	49	1.2	50	1.2	57
MLG1005S1N3□T	1.19	29	1.19	31	1.19	49	1.19	50	1.20	57
MLG1005S1N5□T	1.5	29	1.5	31	1.5	49	1.5	50	1.5	57
MLG1005S1N6□T	1.50	29	1.50	31	1.53	47	1.53	49	1.55	55
MLG1005S1N8□T	1.7	29	1.7	30	1.7	44	1.7	45	1.7	52
MLG1005S2N0□T	1.9	29	1.9	30	1.9	45	1.9	46	1.9	51
MLG1005S2N2□T	2.1	29	2.1	30	2.1	45	2.1	47	2.1	53
MLG1005S2N4□T	2.3	29	2.3	31	2.4	45	2.4	46	2.4	52
MLG1005S2N7□T	2.5	30	2.5	32	2.6	46	2.6	47	2.7	52
MLG1005S3N0□T	2.8	31	2.8	33	2.9	48	3.0	49	3.1	55
MLG1005S3N3□T	3.1	31	3.2	33	3.3	47	3.3	48	3.5	53
MLG1005S3N6□T	3.4	31	3.4	33	3.6	45	3.6	47	3.8	50
MLG1005S3N9□T	3.7	31	3.7	33	3.8	44	3.9	45	4.0	50
MLG1005S4N3ST	4.1	31	4.1	32	4.3	47	4.4	49	4.6	53
MLG1005S4N7ST	4.4	31	4.5	32	4.5	46	4.8	47	5.1	51
MLG1005S5N1ST	4.9	31	4.9	32	5.4	43	5.5	44	6.0	45
MLG1005S5N6ST	5.4	30	5.4	32	5.8	42	5.9	43	6.3	46
MLG1005S6N2JT	6.0	30	6.0	32	6.7	42	6.9	43	7.6	43
MLG1005S6N8JT	6.6	30	6.6	32	7.4	41	7.6	41	8.4	41
MLG1005S7N5JT	7.3	30	7.4	32	8.6	41	8.9	41	10.3	39
MLG1005S8N2JT	8.0	30	8.1	32	9.3	41	9.7	40	11.1	37
MLG1005S9N1JT	8.9	30	9.0	32	10.7	40	11.2	39	13.3	35
MLG1005S10NJT	10	30	10	31	12	37	13	36	16	31
MLG1005S12NJT	12	29	12	30	16	32	17	31	-	22
MLG1005S15NJT	15	28	16	29	22	28	24	26	-	15
MLG1005S18NJT	18	28	19	29	29	25	-	22	-	9
MLG1005S22NJT	23	27	24	27	44	19	-	14	-	1
MLG1005S27NJT	30	23	31	23	-	8	-	3	-	-
MLG1005S33NJT	37	23	40	23	-	1	-	-	-	-
MLG1005S39NJT	47	21	-	21	-	-	-	-	-	-
MLG1005S47NJT	63	20	-	18	-	-	-	-	-	-
MLG1005S56NJT	-	18	-	16	-	-	-	-	-	-
MLG1005S68NJT	-	-	-	-	-	-	-	-	-	-
MLG1005S82NJT	-	-	-	-	-	-	-	-	-	-
MLG1005SR10JT	-	-	-	-	-	-	-	-	-	-
MLG1005SR12JT	-	-	-	-	-	-	-	-	-	-
MLG1005SR15JT	-	-	-	-	-	-	-	-	-	-
MLG1005SR18JT	-	-	-	-	-	-	-	-	-	-
MLG1005SR22JT	-	-	-	-	-	-	-	-	-	-
MLG1005SR27JT	-	-	-	-	-	-	-	-	-	-