



Features:

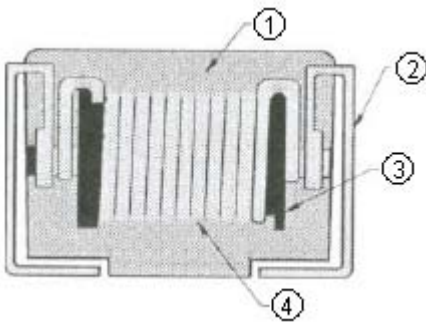
- Very strong solderability by flow soldering, soldering iron or wave soldering.
- Highly accurate dimensions, can be mounted automatically.
- Terminals are highly resistant to pull forces.
- Highly resistant to mechanical shocks and pressure.
- Highly reliable in environments of sudden temperature change and humidity. Super Q characteristics.

Applications

- Macro televisions, liquid crystal televisions, video cameras, portable VCRs, car radios, car stereos, thin tape radios, television tuners, mobile telephones, radio and other electronic Devices.

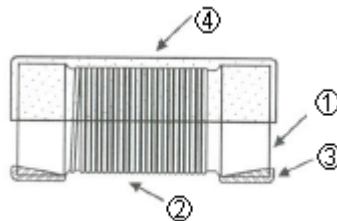
Construction

Moulding Type (1210, 1812, 2220)



1	Moulded resin
2	Electrode (Ag)
3	Ferrite core
4	Magnet wire

Open Type (0603, 0805, 1008)



1	Ferrite core
2	Magnet wire
3	Electrode (Ag/Pd+Ni+Sn)
4	UV Glue

1. These revolutionary, highly reliable wound chip inductors for automatic mounting, have been developed in response to the trend toward high density in electronic equipment.

2. With metal terminals and a body of heat resistant resin, these inductors offer many superior features.

Part Numbering

MC

NL

05

K

T

C

1R0

Product Type

Dimensions

Inductance Tolerance

Packaging Code

Current

Inductance

03 : 0603
05 : 0805
08 : 1008
10 : 1210
12 : 1812
20 : 2220

J : $\pm 5\%$
K : $\pm 10\%$
M : $\pm 20\%$

T : Taping Reel

Standard
C : Large Current
L : Low Profile

R12: 120nH
R27: 270nH
2R7: 2700nH
100: 10 μ H

Dimensions

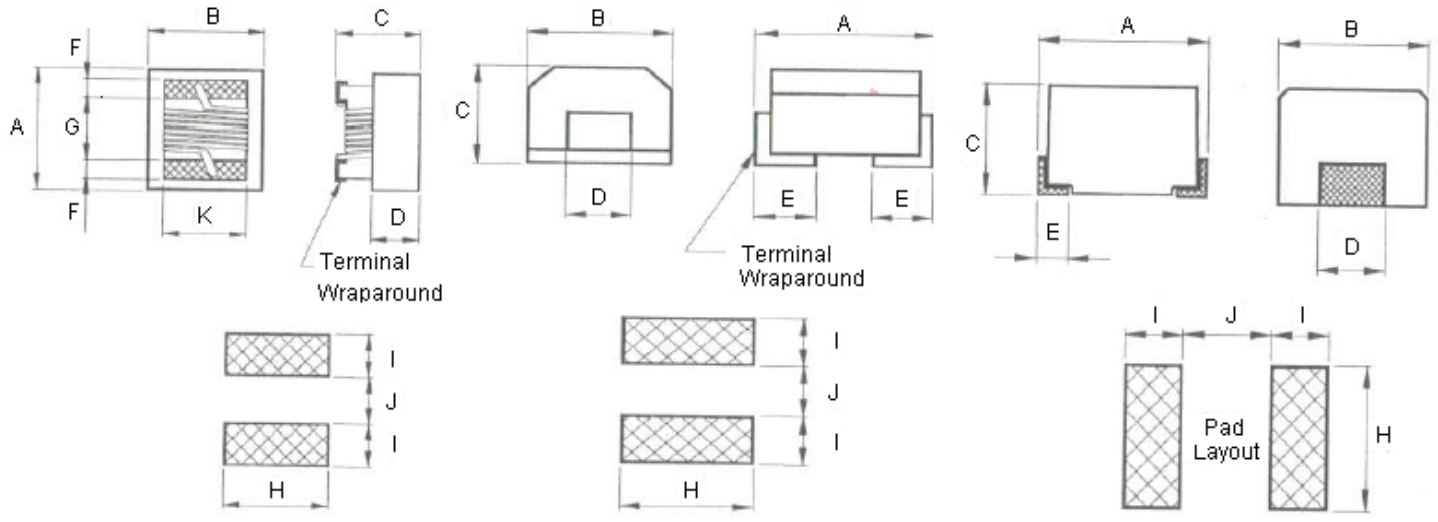


Figure 1

Figure 2

Figure 3

Type	Size (Inch)	Figure	A Maximum	B Maximum	C Maximum	D Reference	E	F	G	H	I	J	K	Weight (g) (1000 Pieces)
MCNL03	0603	1	1.80	1.20	1.00	0.45	-	0.33	0.95	1.02	1.64	0.64	1.05	9.6
MCNL05	0805	1	2.40	1.71	1.45	0.65	-	0.44	1.02	1.78	1.02	0.76	1.27	14
MCNL08	1008	1	2.92	2.79	2.10	1.20	-	0.45	1.52	2.54	1.02	1.27	2.03	30
MCNL10	1210	2	3.50	2.80	2.50	1.60	0.8	-	-	2.00	1.20	1.60	-	40
MCNL12	1812	2	4.80	3.50	3.50	1.80	1.1	-	-	2.80	1.50	3.00	-	160
MCNL20	2220	3	5.90	5.20	4.30	4 ±0.2	0.7 ±0.2	-	-	4.50	2.00	4.00	-	300

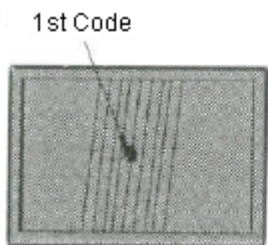
Unit: mm

Colour Coding

0603 / 0805 / 1008 Type

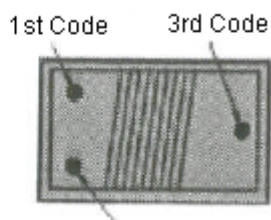
Because of small sizes, these parts are marked with a single colour dot. The inductance value represented by the dot is shown on the data page for each type.

0603 / 0805



Colour Coding

1008



Colour Coding

Wire Wound Inductors



Standard Electrical Specifications

MCNL03 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Test Frequency (MHz)	Q Typical	SRF (MHz) Typical	DCR (Ω) maximum	IDC (mA) maximum	Colour Code
1R0	1.0	±10, ±20%	7.96	16	390	0.416	860	Black
1R5	1.5	±10, ±20%	7.96	16	160	0.520	720	Brown
1R8	1.8	±10, ±20%	7.96	16	121	0.559	640	Red
2R2	2.2	±10, ±20%	7.96	16	103	0.728	600	Orange
2R7	2.7	±10, ±20%	7.96	16	72	0.806	540	Yellow
3R3	3.3	±10, ±20%	7.96	16	66	0.910	500	Green
3R9	3.9	±10, ±20%	7.96	16	61	1.079	460	Blue
4R7	4.7	±10, ±20%	7.96	16	51	1.261	400	Violet
5R6	5.6	±10, ±20%	7.96	16	47	1.430	380	Grey
6R8	6.8	±10, ±20%	7.96	16	43	1.950	340	White
8R2	8.2	±10, ±20%	7.96	16	40	2.184	300	Black
100	10	±10, ±20%	2.52	14	36	2.405	280	Brown
120	12	±10, ±20%	2.52	14	32	2.964	260	Red
150	15	±10, ±20%	2.52	14	29	3.380	240	Orange
180	18	±10, ±20%	2.52	14	28	3.770	220	Yellow
220	22	±10, ±20%	2.52	14	24	4.693	200	Green
270	27	±10, ±20%	2.52	14	20	6.760	140	Blue
330	33	±10, ±20%	2.52	14	15	8.580	120	Violet

L, Q: HP4291

SRF: HP4291

RDC: Agilent 34401A

MCNL05 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Test Frequency (MHz)	Q Typical	SRF (MHz) Typical	DCR (Ω) maximum	IDC (mA) maximum	Colour Code
R47	0.47	±10, ±20%	25.2	14	850	0.156	1400	Blue
R68	0.68	±10, ±20%	25.2	14	765	0.195	1200	Grey
1R0	1.00	±10, ±20%	7.96	14	208	0.169	1100	Black
1R2	1.20	±10, ±20%	7.96	14	159	0.208	960	Red
1R5	1.50	±10, ±20%	7.96	14	159	0.221	920	Brown
1R8	1.80	±10, ±20%	7.96	14	112	0.260	860	Orange
2R2	2.20	±10, ±20%	7.96	13	87	0.286	740	Red
2R7	2.70	±10, ±20%	7.96	13	72	0.325	680	Yellow
3R3	3.30	±10, ±20%	7.96	12	70	0.364	620	Orange
3R9	3.90	±10, ±20%	7.96	14	61	0.494	580	Green

<http://www.farnell.com>
<http://www.newark.com>
<http://www.cpc.co.uk>



Wire Wound Inductors



Standard Electrical Specifications

MCNL05 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Test Frequency (MHz)	Q typ.	SRF (MHz) Typical	DCR (Ω) maximum	IDC (mA) maximum	Colour Code
4R7	4.70	±10, ±20%	7.96	14	51	0.559	520	Yellow
5R6	5.60	±10, ±20%	7.96	12	47	0.650	480	Blue
6R8	6.80	±10, ±20%	7.96	14	46	0.884	420	Green
8R2	8.20	±10, ±20%	7.96	13	33	0.949	400	Violet
100	10	±5, ±10, ±20%	2.52	14	31	1.105	360	Blue
120	12	±5, ±10, ±20%	2.52	14	30	1.17	340	Grey
150	15	±5, ±10, ±20%	2.52	15	28	1.82	300	Violet
180	18	±5, ±10, ±20%	2.52	15	27	2.01	280	White
220	22	±5, ±10, ±20%	2.52	15	20	2.28	240	Grey
270	27	±5, ±10, ±20%	2.52	15	17	2.60	220	Black
330	33	±5, ±10, ±20%	2.52	15	17	3.05	200	White
470	47	±5, ±10, ±20%	2.52	14	15	4.42	160	Black
560	56	±5, ±10, ±20%	2.52	14	10	5.74	150	Yellow
680	68	±5, ±10, ±20%	2.52	14	10	5.78	140	Brown
820	82	±5, ±10, ±20%	2.52	14	10	9.75	100	Orange
101	100	±5, ±10, ±20%	1	10	9	9.75	100	Red

L, Q: HP4291

SRF: HP4291

RDC: Agilent 34401A

MCNL08 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Q Minimum	Test Frequency (MHz)	SRF (MHz) Minimum	DCR (Ω) Maximum	IDC (mA) Maximum	Colour Code		
R12	0.12	±5, ±10%	25.2	26	800	0.30	1000	Brown	Red	Brown
R18	0.18	±5, ±10%	25.2	30	600	0.30	960	Red	Grey	Brown
R20	0.20	±5, ±10%	25.2	30	735	0.30	960	Red	Black	Brown
R22	0.22	±5, ±10%	25.2	27	600	0.40	880	Red	Red	Brown
R27	0.27	±5, ±10%	25.2	29	425	0.42	900	Red	Violet	Brown
R33	0.33	±5, ±10%	25.2	30	400	0.42	900	Orange	Orange	Brown
R39	0.39	±5, ±10%	25.2	30	375	0.45	700	Orange	White	Brown
R47	0.47	±5, ±10%	25.2	30	350	0.50	900	Yellow	Violet	Brown
R56	0.56	±5, ±10%	25.2	30	325	0.55	850	Green	Blue	Brown
R62	0.62	±5, ±10%	25.2	30	460	0.55	900	Blue	Red	Brown
R68	0.68	±5, ±10%	25.2	30	300	0.55	800	Blue	Grey	Brown
R75	0.75	±5, ±10%	25.2	30	420	0.65	880	Violet	Green	Brown

<http://www.farnell.com>
<http://www.newark.com>
<http://www.cpc.co.uk>



Standard Electrical Specifications

MCNL08 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Test Frequency (MHz)	Q Typical	SRF (MHz) Typical	DCR (Ω) Maximum	IDC (mA) Maximum	Colour Code		
R82	0.82	±5, ±10%	25.2	30	260	0.65	700	Grey	Red	Brown
R91	0.91	±5, ±10%	25.2	30	400	0.65	840	White	Brown	Brown
1R0	1.0	±5, ±10%	7.96	25	245	0.60	600	Brown	Black	Red
1R2	1.2	±5, ±10%	7.96	25	230	0.74	600	Brown	Red	Red
1R5	1.5	±5, ±10%	7.96	25	182	0.85	550	Brown	Green	Red
1R8	1.8	±5, ±10%	7.96	25	135	0.92	500	Brown	Grey	Red
2R2	2.2	±5, ±10%	7.96	25	105	1.10	500	Red	Red	Red
2R7	2.7	±5, ±10%	7.96	25	70	1.22	350	Red	Violet	Red
3R3	3.3	±5, ±10%	7.96	25	55	1.37	350	Orange	Orange	Red
3R9	3.9	±5, ±10%	7.96	25	48	1.66	310	Orange	White	Red
4R7	4.7	±5, ±10%	7.96	25	43	1.68	300	Yellow	Violet	Red
5R6	5.6	±5, ±10%	7.96	25	42	1.75	300	Green	Blue	Red
6R8	6.8	±5, ±10%	7.96	25	39	1.85	300	Blue	Grey	Red
8R2	8.2	±5, ±10%	7.96	25	36	2.00	250	Grey	Red	Red
100	10	±5, ±10%	2.52	20	33	2.32	250	Brown	Black	Orange
120	12	±5, ±10%	2.52	15	28	2.99	200	Brown	Red	Orange
150	15	±5, ±10%	2.52	15	24	3.42	200	Brown	Green	Orange
180	18	±5, ±10%	2.52	15	20	4.65	180	Brown	Grey	Orange
220	22	±5, ±10%	2.52	15	18	5.12	180	Red	Red	Orange
270	27	±5, ±10%	2.52	15	17	5.76	160	Red	Violet	Orange
330	33	±5, ±10%	2.52	15	16	6.44	120	Orange	Orange	Orange
390	39	±5, ±10%	2.52	15	15	6.85	120	Orange	White	Orange
470	47	±5, ±10%	2.52	14	13	9.94	110	Yellow	Violet	Orange
560	56	±5, ±10%	2.52	14	10	10.7	90	Green	Blue	Orange
680	68	±5, ±10%	2.52	14	8	12.8	90	Blue	Grey	Orange
820	82	±5, ±10%	2.52	14	8	18.3	80	Grey	Red	Orange
101	100	±5, ±10%	1	8	7	19.6	120	Brown	Black	Orange

L, Q: HP4291
 SRF: HP4291
 RDC: Agilent 34401A

Wire Wound Inductors



Standard Electrical Specifications

MCNL10 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Q Minimum	Test Frequency (MHz)	SRF(MHz) Minimum	DCR (Ω) Maximum	IDC (mA) Maximum
R18	0.18	±20%	25.2	30	400	0.28	450
R22	0.22	±20%	25.2	30	350	0.32	450
R27	0.27	±20%	25.2	30	320	0.36	450
R33	0.33	±20%	25.2	30	300	0.40	450
R39	0.39	±20%	25.2	30	250	0.45	450
R47	0.47	±20%	25.2	30	220	0.50	450
R56	0.56	±20%	25.2	30	180	0.55	450
R68	0.68	±20%	25.2	30	160	0.60	450
R82	0.82	±20%	25.2	30	140	0.65	450
1R0	1.0	±10%	7.96	30	120	0.70	400
1R2	1.2	±10%	7.96	30	100	0.75	390
1R5	1.5	±10%	7.96	30	85	0.85	370
1R8	1.8	±10%	7.96	30	80	0.90	350
2R2	2.2	±10%	7.96	30	75	1.00	320
2R7	2.7	±10%	7.96	30	70	1.10	290
3R3	3.3	±10%	7.96	30	60	1.20	260
3R9	3.9	±10%	7.96	30	55	1.30	250
4R7	4.7	±10%	7.96	30	50	1.50	220
5R6	5.6	±10%	7.96	30	45	1.60	200
6R8	6.8	±10%	7.96	30	40	1.80	180
8R2	8.2	±10%	7.96	30	35	2.00	170
100	10	±10%	2.52	30	30	2.10	150
120	12	±10%	2.52	30	20	2.50	140
150	15	±10%	2.52	30	20	2.80	130
180	18	±10%	2.52	30	20	3.30	120
220	22	±10%	2.52	30	20	3.70	110
270	27	±10%	2.52	30	20	5.00	80
330	33	±10%	2.52	30	17	5.60	70
390	39	±10%	2.52	30	16	6.40	65
470	47	±10%	2.52	30	15	7.00	60
560	56	±10%	2.52	30	13	8.00	55
680	68	±10%	2.52	30	12	9.00	50
820	82	±10%	2.52	30	11	10.00	45

Wire Wound Inductors



Standard Electrical Specifications

MCNL10 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Q Minimum	Test Frequency (MHz)	SRF (MHz) Minimum	DCR (Ω) Maximum	IDC (mA) Maximum
101	100	±10%	0.796	20	10	10.00	40
121	120	±10%	0.796	20	10	11.00	70
151	150	±10%	0.796	20	8	15.00	65
181	180	±10%	0.796	20	7	17.00	60
221	220	±10%	0.796	20	7	21.00	50

L, Q: HP4291 for 0.18μH to 82 μH; HP4284 for 100μH to 220μH

SRF: HP4291

RDC: Agilent 34401A

MCNL12 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Q Minimum	Test Frequency (MHz)	SRF (MHz) Minimum	DCR (Ω) Maximum	IDC (mA) Maximum
R18	0.18	±20%	25.2	30	220	0.24	700
R22	0.22	±20%	25.2	30	200	0.25	665
R27	0.27	±20%	25.2	30	180	0.26	635
R33	0.33	±20%	25.2	30	165	0.28	605
R39	0.39	±20%	25.2	30	150	0.30	575
R47	0.47	±20%	25.2	30	145	0.32	545
R56	0.56	±20%	25.2	30	140	0.36	520
R68	0.68	±20%	25.2	30	135	0.40	500
R82	0.82	±20%	25.2	30	130	0.45	475
1R0	1.0	±10%	7.96	50	100	0.50	450
1R2	1.2	±10%	7.96	50	80	0.55	430
1R5	1.5	±10%	7.96	50	70	0.60	410
1R8	1.8	±10%	7.96	50	60	0.65	390
2R2	2.2	±10%	7.96	50	55	0.70	380
2R7	2.7	±10%	7.96	50	50	0.75	370
3R3	3.3	±10%	7.96	50	45	0.80	355
3R9	3.9	±10%	7.96	50	40	0.90	330
4R7	4.7	±10%	7.96	50	35	1.00	315
5R6	5.6	±10%	7.96	50	33	1.10	300
6R8	6.8	±10%	7.96	50	27	1.20	285
8R2	8.2	±10%	7.96	50	25	1.40	270
100	10	±10%	2.52	50	20	1.60	250
120	12	±10%	2.52	50	18	2.00	225

Standard Electrical Specifications

MCNL12 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Q Minimum	Test Frequency (MHz)	SRF (MHz) Minimum	DCR (Ω) Maximum	IDC (mA) Maximum
150	15	±10%	2.52	50	17	2.50	200
180	18	±10%	2.52	50	15	2.80	190
220	22	±10%	2.52	50	13	3.20	180
270	27	±10%	2.52	50	12	3.60	170
330	33	±10%	2.52	50	11	4.00	160
390	39	±10%	2.52	50	10	4.50	150
470	47	±10%	2.52	50	10	5.00	140
560	56	±10%	2.52	50	9	5.50	135
680	68	±10%	2.52	50	9	6.00	130
820	82	±10%	2.52	50	8	7.00	120
101	100	±10%	0.796	40	8	8.00	110
121	120	±10%	0.796	40	6	8.00	110
151	150	±10%	0.796	40	5	9.00	105
181	180	±10%	0.796	40	5	9.50	102
221	220	±10%	0.796	40	4	10.0	100
271	270	±10%	0.796	30	4	15.0	92
331	330	±10%	0.796	30	3.5	15.0	85
391	390	±10%	0.796	30	3	18.0	80
471	470	±10%	0.796	30	3	26.0	62
561	560	±10%	0.796	30	3	30.0	50
681	680	±10%	0.796	30	3	30.0	50
821	820	±10%	0.796	30	2.5	43.0	30

L, Q: HP4291 for 0.18μH to 82μH; HP4284 for 100μH to 820μH

SRF: HP4291

RDC: Agilent 34401A

MCNL20 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Q Minimum	Test Frequency (MHz)	SRF (MHz) Minimum	DCR (Ω) Maximum	IDC (mA) Maximum
122	1.2	±5, ±10%	0.252	20	1.5	17	75
152	1.5	±5, ±10%	0.252	20	1.4	20	70
182	1.8	±5, ±10%	0.252	20	1.3	30	60
222	2.2	±5, ±10%	0.252	20	1.2	35	55
272	2.7	±5, ±10%	0.252	20	1.1	55	45

Standard Electrical Specifications

MCNL20 Wire Wound Chip Inductors (Ferrite) / Standard Type

Codes	Inductance (μH)	Tolerance	Q Minimum	Test Frequency (MHz)	SRF (MHz) Minimum	DCR (Ω) Maximum	IDC (mA) Maximum
332	3.3	±5, ±10%	0.252	20	1.0	60	40
392	3.9	±5, ±10%	0.252	20	1.0	70	38
472	4.7	±5, ±10%	0.252	20	0.9	78	36
562	5.6	±5, ±10%	0.252	20	0.8	85	33
682	6.8	±5, ±10%	0.252	20	0.7	110	30
822	8.2	±5, ±10%	0.252	20	0.6	125	28
103	10	±5, ±10%	0.0796	15	0.5	150	25

L, Q: HP4284

SRF: HP4291

RDC: Agilent 34401A

Environmental Characteristics

Electrical Performance Test

Item	Requirement	Test Method
Inductance	Refer to standard electrical characteristic specification.	HP4291 or HP4284
Q		HP4291 or HP4284
SRF		HP4291
DC Resistance DCR		Agilent 34401A
Rated Current IDC		Applied the current to coils, the inductance change should be less than 10% to initial value

Mechanical Performance Test

Item	Requirement	Test Method
Solderability	The electrodes shall be at least 90% covered with new solder coating	Lead-free inductor: after fluxing (alpha 100 or equivalent), inductor shall be dipped in a melted solder bath at 245 ±5°C, 5 ±0.5 seconds
Resistance to soldering heat	Appearance: No damage	Pre-heating: 150°C, 1 minute Solder temperature : 260 ±5°C Immersion time : 10 ±1 seconds
Vibration	Appearance: No damage L change: within ±10% Q change: within ±30% DCR: within specification	Test device shall be soldered on the substrate Oscillation frequency : 10 to 55 to 10Hz for 1 minute Amplitude : 1.5mm Time : 2 hours for each axis (X, Y and Z), total 6 hours

Environmental Characteristics

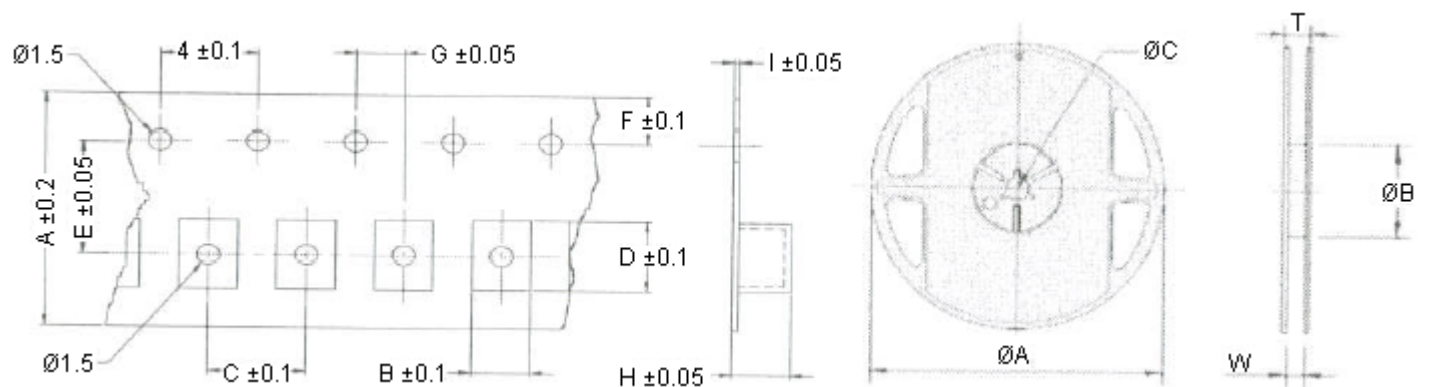
Climatic Test

Item	Requirement	Test Method															
Temperature cycle	Appearance: No damage L change: within $\pm 10\%$ Q change: within $\pm 30\%$ DCR: within specification	One Cycle: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Step</th> <th>Temperature ($^{\circ}\text{C}$)</th> <th>Time (Minimum)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25 ± 3</td> <td>30</td> </tr> <tr> <td>2</td> <td>25 ± 2</td> <td>3</td> </tr> <tr> <td>3</td> <td>85 ± 3</td> <td>30</td> </tr> <tr> <td>4</td> <td>25 ± 2</td> <td>3</td> </tr> </tbody> </table> Total: 100 cycles Measured after exposure in the room condition for 24 hours	Step	Temperature ($^{\circ}\text{C}$)	Time (Minimum)	1	-25 ± 3	30	2	25 ± 2	3	3	85 ± 3	30	4	25 ± 2	3
Step		Temperature ($^{\circ}\text{C}$)	Time (Minimum)														
1		-25 ± 3	30														
2		25 ± 2	3														
3	85 ± 3	30															
4	25 ± 2	3															
Damp heat with load	Temperature : $40 \pm 2^{\circ}\text{C}$ Relative humidity : 90 to 95% Time : 1000 hours Measured after exposure in the room condition for 24 hours																
High temperature storage	Temperature : $85 \pm 3^{\circ}\text{C}$ Relative humidity : 20% Applied current : rated current Time : 1000 hours Measured after exposure in the room condition for 24 hours																
Low temperature storage	Temperature : $-25 \pm 3^{\circ}\text{C}$ Relative humidity : 0% Time : 1000 hours Measured after exposure in the room condition for 24 hours																

Storage Temperature: $25 \pm 3^{\circ}\text{C}$; Humidity <80% RH

Packaging

Dimensions



Dimensions: Millimetres

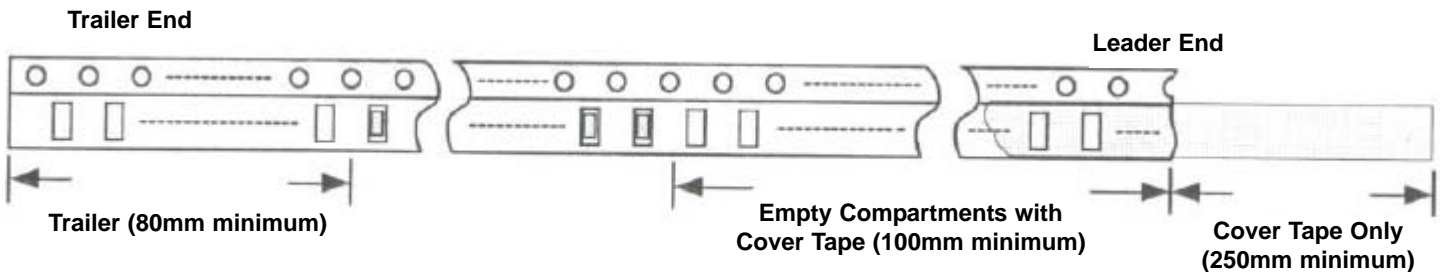
Wire Wound Inductors



Type	Tape Dimensions									Reel Dimensions					Quantity / Reel
	A	B	C	D	E	F	G	H	J	ØA	ØB	ØC	W	T	
MCNL03	8	1.25	4	1.90	3.5	1.75	2	1.00	0.23	178 ±2.0	60 ±0.5	13 ±0.3	9 ±0.3	12 ±1.0	4,000
MCNL05	8	1.85	4	2.55	3.5	1.75	2	1.45	0.23	178 ±2.0	60 ±0.5	13 ±0.3	9 ±0.3	12 ±1.0	2,000
MCNL08	8	2.80	4	2.95	3.5	1.75	2	2.22	0.23	178 ±2.0	60 ±0.5	13 ±0.3	9 ±0.3	12 ±1.0	2,000
MCNL10	8	2.96	4	3.60	3.5	1.75	2	2.40	0.23	178 ±2.0	60 ±0.5	13 ±0.3	9 ±0.3	12 ±1.0	2,000
MCNL12	12	3.30	8	5.00	5.5	1.75	2	3.50	0.30	178 ±2.0	80 ±0.5	13 ±0.3	13.2 ±0.3	16 ±1.0	500
MCNL20	16	5.35	12	6.10	7.5	1.75	2	5.50	0.35	330 ±2.0	100 ±0.5	13 ±0.3	17.4 ±0.3	22 ±1.0	1,000

Unit: mm

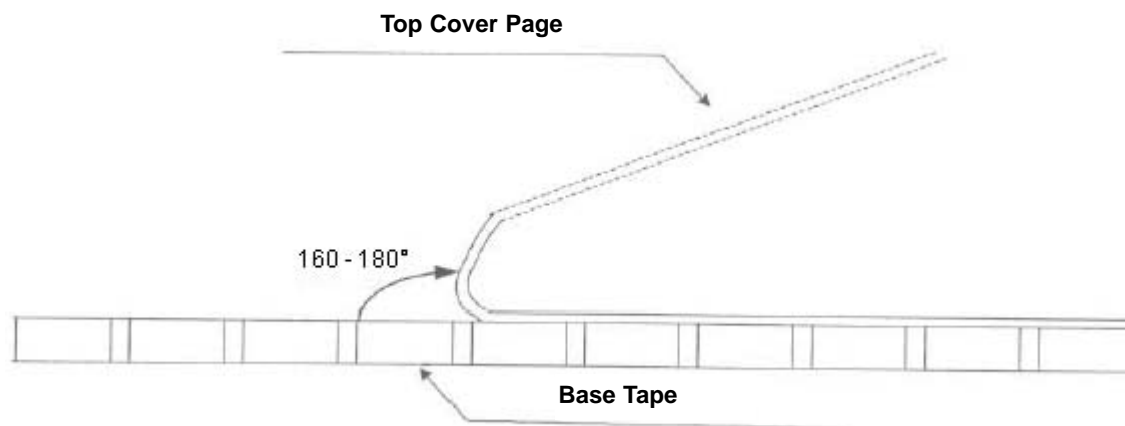
Leader / Trailer Tape



Cover Tape Peel Strength

The force for tearing off cover tape is 0.1 to 0.6 (N) in the arrow direction at the following conditions:

- Temperature : 5 to 35°C
- Humidity : 45 to 85%
- Atmospheric pressure : 860 to 1060hpa



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