

# Inductors for Standard Circuits

Multilayer/STD • magnetic shielded

## MLF series

Type:	MLF1005L	[0402 inch]*
	MLF1608	[0603 inch]
	MLF2012	[0805 inch]
		* Dimensions Code [EIA]

Issue date: September 2011

- All specifications are subject to change without notice.
  - 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.
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# Inductors for Standard Circuits

## Multilayer/STD • Magnetic Shielded

Conformity to RoHS Directive

### MLF Series MLF1005L

Various digital devices are required to be further downsized yet remain highly functional, and to excel in low power consumption, and parts mounted on the devices are also required to have lower resistance.

The MLF1005L type is a new line of inductors that have been developed to meet such requirements: their resistance has been lowered by up to 35% in comparison with that of the existing MLF1005 type.

In addition, the new inductors use similar magnetic shielding, which enables their high-density mounting.

#### FEATURES

- The resistance of the MLF1005L type has been lowered by up to 35% in comparison with that of the existing MLF1005 type.
- Magnetically shielded configuration allowing for high-density mounting.
- Does not contain lead and is compatible with lead-free soldering.
- It is a product conforming to RoHS directive.

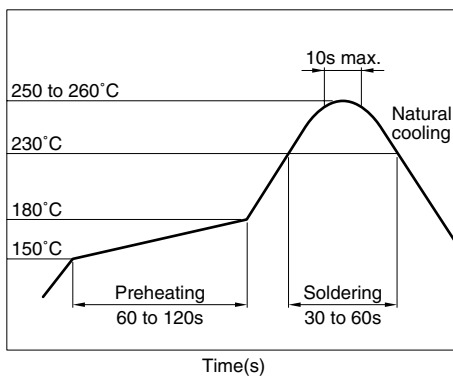
#### APPLICATIONS

Signal processing modules such as cellular phones and tuners

#### SPECIFICATIONS

Operating temperature range	-40 to +85°C
Storage temperature range	-40 to +85°C

#### RECOMMENDED SOLDERING CONDITION REFLOW SOLDERING



#### PRODUCT IDENTIFICATION

MLF	1005	L	R10	K	T
(1)	(2)	(3)	(4)	(5)	(6)

(1) Series name

(2) Dimensions L×W

1005	1.0×0.5×0.5
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(3) Material code

L	Low-resistance type
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(4) Inductance value

R10	0.1μH
1R0	1.0μH

(5) Inductance tolerance

K	±10%
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(6) Packaging style

T	Taping [reel]
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#### PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	10000 pieces/reel

#### HANDLING AND PRECAUTIONS

- Before soldering, be sure to preheat components.  
The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- The inductance value may change due to magnetic saturation if the current exceeds the rated maximum.
- Do not expose the inductors to stray magnetic fields.
- Avoid static electricity discharge during handling.
- When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

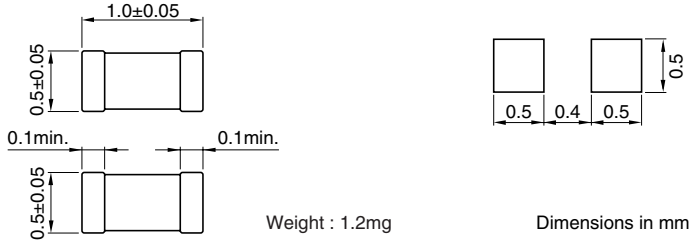
• Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

• Please contact our Sales office when your application is considered the following:

The device's failure or malfunction may directly endanger human life (e.g. application for automobile/aircraft/medical/nuclear power devices, etc.)

• All specifications are subject to change without notice.

## SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERN

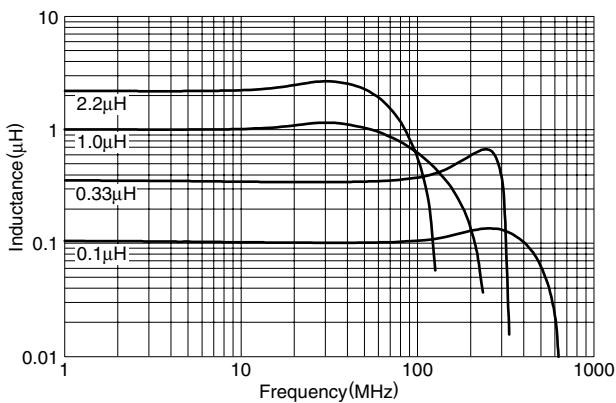


## ELECTRICAL CHARACTERISTICS

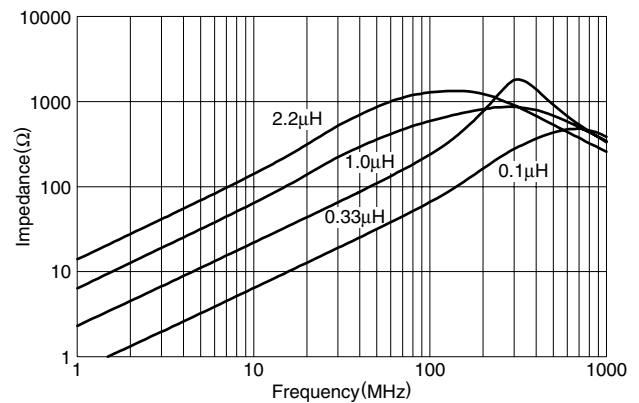
Inductance (μH)	Inductance tolerance	Test frequency L, Q (MHz)	Test current L, Q (mA)	Q min.	Self-resonant frequency (MHz)min.	DC resistance (Ω)max.	Rated current (mA)max.	Part No.
0.1	±10%	25	1.0	10	450	0.51	150	MLF1005LR10KT
0.12	±10%	25	1.0	10	400	0.59	140	MLF1005LR12KT
0.15	±10%	25	1.0	10	350	0.63	130	MLF1005LR15KT
0.18	±10%	25	1.0	10	320	0.76	120	MLF1005LR18KT
0.22	±10%	25	1.0	10	290	0.79	110	MLF1005LR22KT
0.27	±10%	25	1.0	10	260	0.91	100	MLF1005LR27KT
0.33	±10%	25	1.0	10	230	1.05	90	MLF1005LR33KT
0.39	±10%	10	1.0	25	210	0.41	50	MLF1005LR39KT
0.47	±10%	10	1.0	25	190	0.42	50	MLF1005LR47KT
0.56	±10%	10	1.0	25	170	0.47	45	MLF1005LR56KT
0.68	±10%	10	1.0	25	150	0.55	40	MLF1005LR68KT
0.82	±10%	10	1.0	25	130	0.59	35	MLF1005LR82KT
1.0	±10%	10	1.0	25	120	0.64	35	MLF1005L1R0KT
1.2	±10%	10	1.0	25	110	0.79	35	MLF1005L1R2KT
1.5	±10%	10	1.0	25	100	0.95	30	MLF1005L1R5KT
1.8	±10%	10	1.0	25	90	1.05	20	MLF1005L1R8KT
2.2	±10%	10	1.0	25	80	1.15	15	MLF1005L2R2KT

## TYPICAL ELECTRICAL CHARACTERISTICS

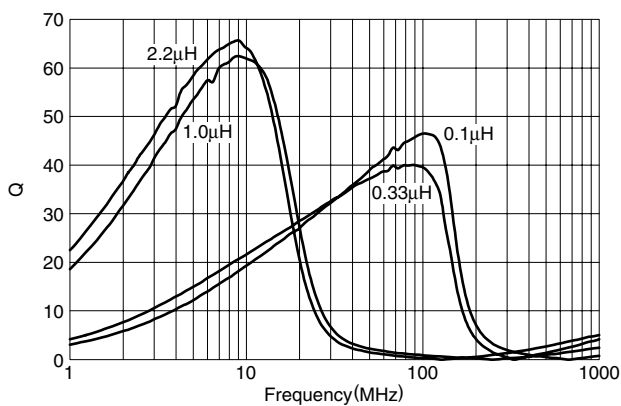
### INDUCTANCE vs. FREQUENCY CHARACTERISTICS



### IMPEDANCE vs. FREQUENCY CHARACTERISTICS



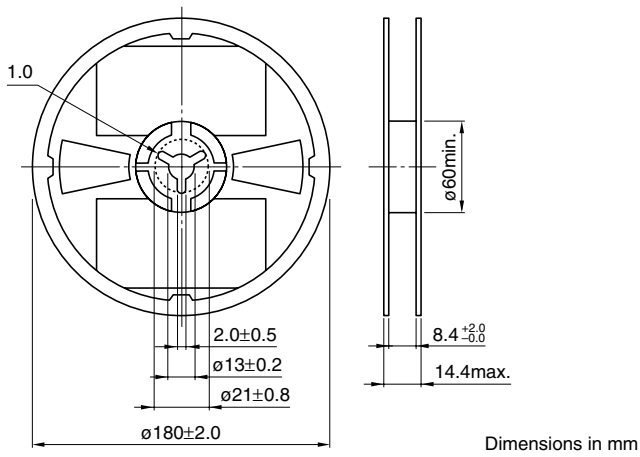
### Q vs. FREQUENCY CHARACTERISTICS



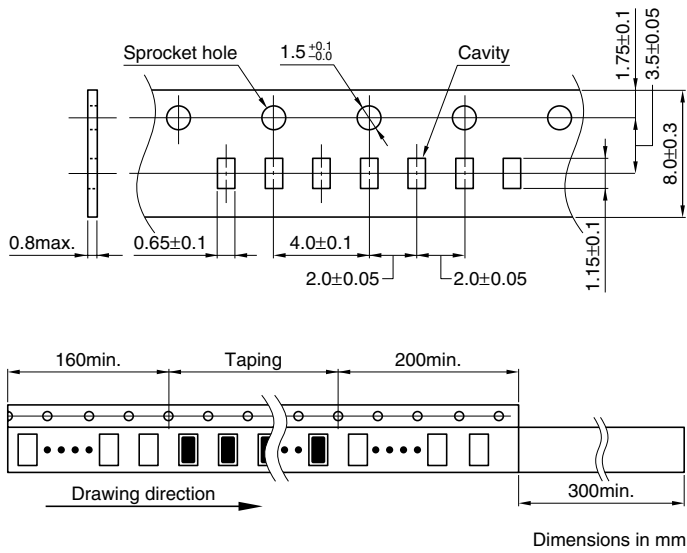
• All specifications are subject to change without notice.

### PACKAGING STYLES

#### REEL DIMENSIONS



#### TAPE DIMENSIONS



• All specifications are subject to change without notice.

# Inductors for Standard Circuits Multilayer/STD • Magnetic Shielded

Conformity to RoHS Directive

## MLF Series MLF1608

### FEATURES

- High-reliability monolithic structure.
- Ferrite core and magnetic shielding enables the design of compact circuits with high density mounting.
- Excellent solderability and high heat resistance permits either flow or reflow soldering.
- The products contain no lead and also support lead-free soldering.
- It is a product conforming to RoHS directive.

### APPLICATIONS

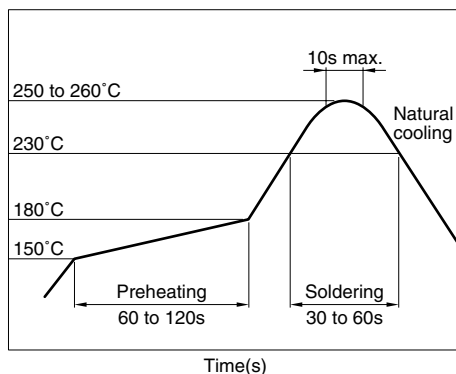
Digital cellular phone, tuner, personal computers, audio, or various electronic appliances

### SPECIFICATIONS

Operating temperature range	-40 to +85°C
Storage temperature range	-40 to +85°C

### RECOMMENDED SOLDERING CONDITION

#### REFLOW SOLDERING



### PRODUCT IDENTIFICATION

MLF	1608	A	1R0	K	T
(1)	(2)	(3)	(4)	(5)	(6)

(1) Series name

(2) Dimensions L×W

1608	1.6×0.8mm
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(3) Material code

(4) Inductance value

47N	47nH[0.047μH]
R15	0.15μH
1R0	1μH

(5) Inductance tolerance

K	±10%
M	±20%

(6) Packaging style

T	Taping [reel]
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### PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	4000 pieces/reel

### HANDLING AND PRECAUTIONS

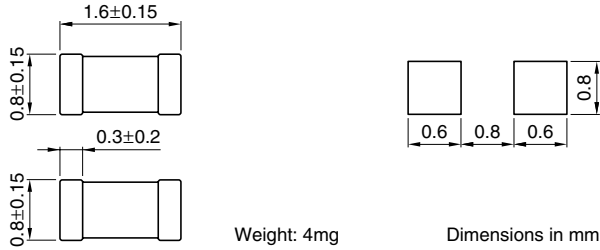
- Before soldering, be sure to preheat components.  
The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- The inductance value may change due to magnetic saturation if the current exceeds the rated maximum.
- Do not expose the inductors to stray magnetic fields.
- Avoid static electricity discharge during handling.
- When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

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## SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERN



## ELECTRICAL CHARACTERISTICS

Inductance ( $\mu\text{H}$ )	Inductance tolerance	Q		Test frequency L, Q (MHz)	Test current L, Q (mA)	Self-resonant frequency (MHz)		DC resistance ( $\Omega$ )		Rated current (mA)max.	Part No.
		min.	typ.			min.	typ.	max.	typ.		
0.047	$\pm 20\%$	10	20	50	1.0	600	900	0.20	0.10	200	MLF1608D47N*1MT
0.068	$\pm 20\%$	10	20	50	1.0	550	700	0.30	0.15	200	MLF1608D68NMT
0.082	$\pm 20\%$	10	20	50	1.0	500	650	0.30	0.15	200	MLF1608D82NMT
0.1	$\pm 20, \pm 10\%$	15	25	25	1.0	450	600	0.35	0.20	200	MLF1608DR10□*2T
0.12	$\pm 20, \pm 10\%$	15	25	25	1.0	400	550	0.40	0.20	200	MLF1608DR12□T
0.15	$\pm 20, \pm 10\%$	15	25	25	1.0	350	500	0.45	0.25	200	MLF1608DR15□T
0.18	$\pm 20, \pm 10\%$	15	25	25	1.0	320	450	0.50	0.25	150	MLF1608DR18□T
0.22	$\pm 20, \pm 10\%$	15	25	25	1.0	290	400	0.55	0.30	150	MLF1608DR22□T
0.27	$\pm 20, \pm 10\%$	15	25	25	1.0	260	350	0.60	0.35	150	MLF1608DR27□T
0.33	$\pm 20, \pm 10\%$	15	25	25	1.0	230	320	0.75	0.40	100	MLF1608DR33□T
0.39	$\pm 20, \pm 10\%$	15	25	25	1.0	210	290	0.85	0.45	100	MLF1608DR39□T
0.47	$\pm 20, \pm 10\%$	15	30	25	1.0	190	260	0.95	0.50	100	MLF1608DR47□T
0.56	$\pm 20, \pm 10\%$	15	30	25	1.0	170	230	1.05	0.55	100	MLF1608DR56□T
0.68	$\pm 20, \pm 10\%$	15	30	25	1.0	150	210	1.25	0.65	70	MLF1608DR68□T
0.82	$\pm 20, \pm 10\%$	15	30	25	1.0	130	190	1.40	0.75	70	MLF1608DR82□T
1	$\pm 20, \pm 10\%$	35	50	10	1.0	120	170	0.50	0.25	50	MLF1608A1R0□T
1.2	$\pm 20, \pm 10\%$	35	50	10	1.0	110	150	0.65	0.25	50	MLF1608A1R2□T
1.5	$\pm 20, \pm 10\%$	35	55	10	1.0	100	140	0.70	0.30	50	MLF1608A1R5□T
1.8	$\pm 20, \pm 10\%$	35	55	10	1.0	90	130	0.85	0.35	50	MLF1608A1R8□T
2.2	$\pm 20, \pm 10\%$	35	55	10	1.0	80	120	1.00	0.45	30	MLF1608A2R2□T
2.7	$\pm 20, \pm 10\%$	35	55	10	1.0	70	110	1.15	0.50	30	MLF1608A2R7□T
3.3	$\pm 20, \pm 10\%$	35	60	10	1.0	65	100	1.30	0.55	30	MLF1608A3R3□T
3.9	$\pm 20, \pm 10\%$	35	60	10	1.0	60	90	1.45	0.65	30	MLF1608A3R9□T
4.7	$\pm 20, \pm 10\%$	35	60	10	1.0	55	80	1.60	0.75	30	MLF1608A4R7□T
5.6	$\pm 20, \pm 10\%$	35	60	4	0.1	45	70	1.10	0.55	15	MLF1608E5R6□T
6.8	$\pm 20, \pm 10\%$	35	60	4	0.1	40	60	1.30	0.65	15	MLF1608E6R8□T
8.2	$\pm 20, \pm 10\%$	35	60	4	0.1	35	55	1.50	0.80	10	MLF1608E8R2□T
10	$\pm 20, \pm 10\%$	30	55	2	0.1	30	50	1.70	1.00	10	MLF1608E100□T
12	$\pm 20, \pm 10\%$	30	55	2	0.1	25	45	1.80	1.20	10	MLF1608E120□T
15	$\pm 20, \pm 10\%$	20	40	1	0.1	22	42	1.50	0.80	2	MLF1608C150□T
18	$\pm 20, \pm 10\%$	20	40	1	0.1	20	40	1.60	0.85	2	MLF1608C180□T
22	$\pm 20, \pm 10\%$	20	40	1	0.1	18	38	1.70	0.90	2	MLF1608C220□T
27	$\pm 20, \pm 10\%$	20	40	1	0.1	15	35	1.80	1.20	2	MLF1608C270□T
33	$\pm 20, \pm 10\%$	20	40	1	0.1	10	30	2.20	1.40	2	MLF1608C330□T

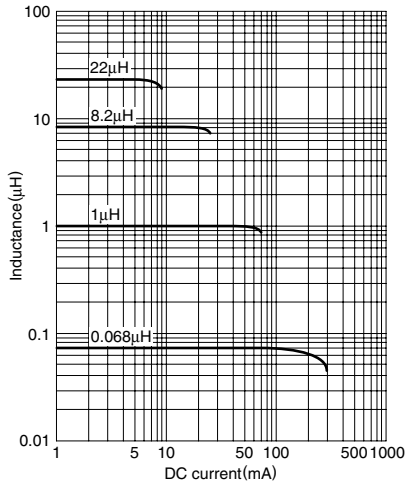
\*1 47N means for 47nH (0.047 $\mu\text{H}$ ).

\*2 □: Please specify inductance tolerance, M( $\pm 20\%$ ) or K( $\pm 10\%$ ).

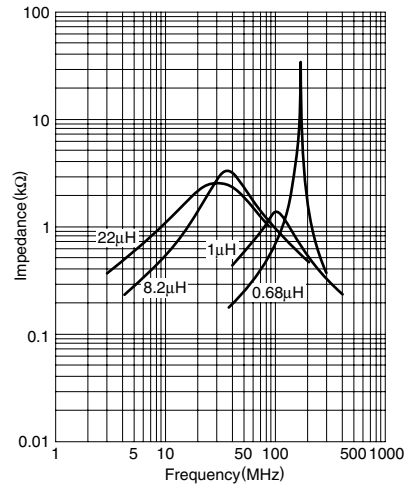
• Test equipment

Inductance, Q: Ag4294A-16034G

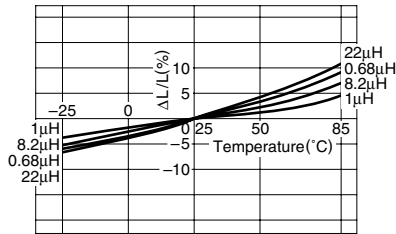
### TYPICAL ELECTRICAL CHARACTERISTICS INDUCTANCE CHANGE vs. DC SUPERPOSITION CHARACTERISTICS



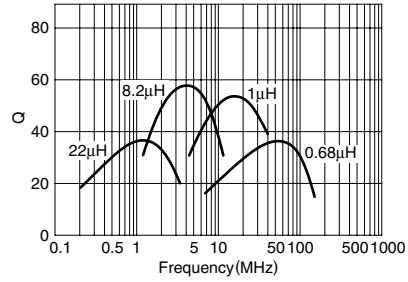
### IMPEDANCE vs. FREQUENCY CHARACTERISTICS



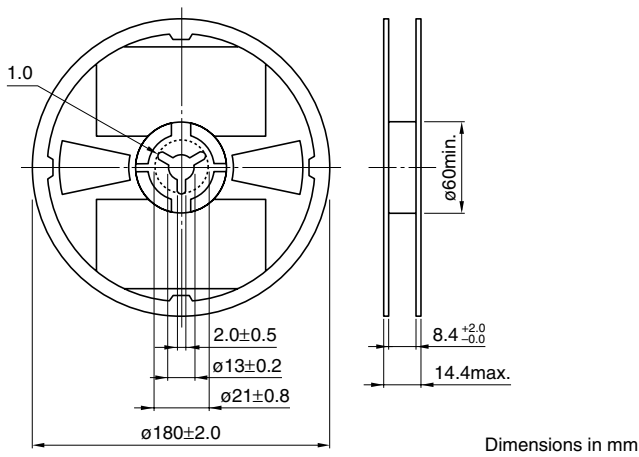
### INDUCTANCE CHANGE vs. TEMPERATURE CHARACTERISTICS



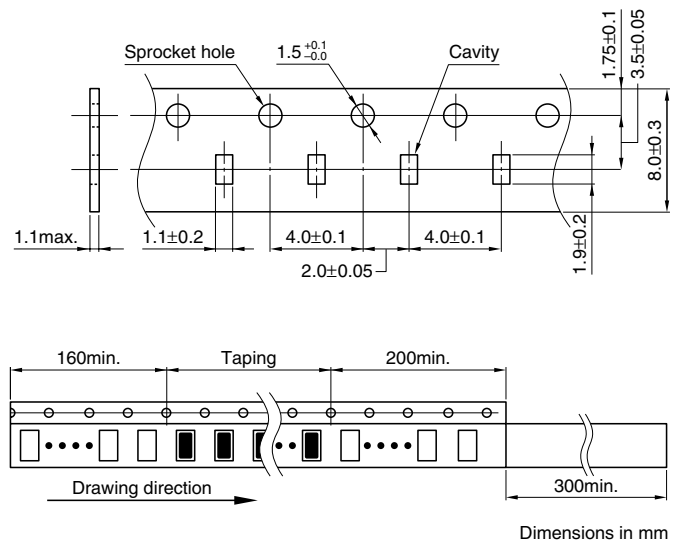
### Q vs. FREQUENCY CHARACTERISTICS



### PACKAGING STYLES REEL DIMENSIONS



### TAPE DIMENSIONS



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# Inductors for Standard Circuits Multilayer/STD • Magnetic Shielded

Conformity to RoHS Directive

## MLF Series MLF2012

### FEATURES

- High-reliability monolithic structure.
- Ferrite core and magnetic shielding enables the design of compact circuits with high density mounting.
- Excellent solderability and high heat resistance permits either flow or reflow soldering.
- The products contain no lead and also support lead-free soldering.
- It is a product conforming to RoHS directive.

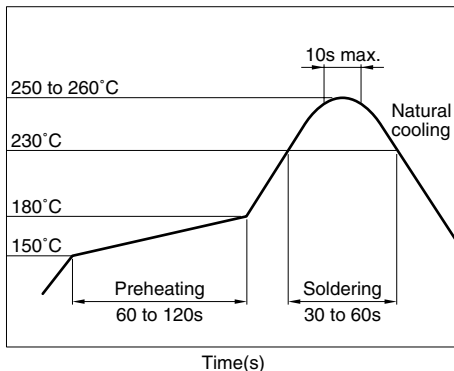
### APPLICATIONS

Digital cellular phone, car audio, TV, personal computers, or various electronic appliances

### SPECIFICATIONS

Operating temperature range	-40 to +85°C
Storage temperature range	-40 to +85°C

### RECOMMENDED SOLDERING CONDITION REFLOW SOLDERING



### PRODUCT IDENTIFICATION

MLF	2012	A	1R0	K	T
(1)	(2)	(3)	(4)	(5)	(6)

(1) Series name

(2) Dimensions L×W

2012	2.0×1.25mm
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(3) Material code

(4) Inductance value

47N	47nH[0.047μH]
R15	0.15μH
1R0	1μH
100	10μH

(5) Inductance tolerance

K	±10%
M	±20%

(6) Packaging style

T	Taping [reel]
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### PACKAGING STYLE AND QUANTITIES

Packaging style	Product's thickness	Quantity
Taping	0.85mm	4000 pieces/reel
	1.25mm	2000 pieces/reel

### HANDLING AND PRECAUTIONS

- Before soldering, be sure to preheat components.  
The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- The inductance value may change due to magnetic saturation if the current exceeds the rated maximum.
- Do not expose the inductors to stray magnetic fields.
- Avoid static electricity discharge during handling.
- When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

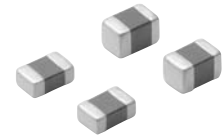
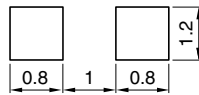
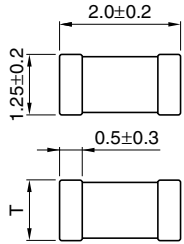
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## SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERN



T(Thickness)	Weight(mg)
0.85±0.2	10
1.25±0.2	14

Dimensions in mm

## ELECTRICAL CHARACTERISTICS

Inductance ( $\mu$ H)	Inductance tolerance	Q		Test frequency L, Q (MHz)	Test current L, Q (mA)	Self-resonant frequency (MHz)		DC resistance ( $\Omega$ )		Rated current (mA)max.	Thickness T (mm)	Part No.
		min.	typ.			min.	typ.	max.	typ.			
0.047	±20%	15	25	50	1.0	550	700	0.10	0.05	300	0.85	MLF2012D47N*1MT
0.068	±20%	15	25	50	1.0	500	600	0.15	0.08	300	0.85	MLF2012D68NMT
0.082	±20%	15	25	50	1.0	450	550	0.15	0.08	300	0.85	MLF2012D82NMT
0.1	±20, ±10%	20	30	25	1.0	400	500	0.15	0.10	300	0.85	MLF2012DR10□*2T
0.12	±20, ±10%	20	30	25	1.0	360	450	0.20	0.12	300	0.85	MLF2012DR12□T
0.15	±20, ±10%	20	30	25	1.0	320	410	0.20	0.13	300	0.85	MLF2012DR15□T
0.18	±20, ±10%	20	30	25	1.0	280	370	0.25	0.15	300	0.85	MLF2012DR18□T
0.22	±20, ±10%	20	30	25	1.0	250	330	0.30	0.16	250	0.85	MLF2012DR22□T
0.27	±20, ±10%	20	30	25	1.0	220	300	0.35	0.18	250	0.85	MLF2012DR27□T
0.33	±20, ±10%	20	30	25	1.0	200	270	0.40	0.23	250	0.85	MLF2012DR33□T
0.39	±20, ±10%	25	35	25	1.0	180	250	0.45	0.25	200	0.85	MLF2012DR39□T
0.47	±20, ±10%	25	35	25	1.0	160	230	0.50	0.25	200	1.25	MLF2012DR47□T
0.56	±20, ±10%	25	35	25	1.0	150	210	0.55	0.30	150	1.25	MLF2012DR56□T
0.68	±20, ±10%	25	35	25	1.0	140	190	0.60	0.35	150	1.25	MLF2012DR68□T
0.82	±20, ±10%	25	35	25	1.0	130	170	0.65	0.40	150	1.25	MLF2012DR82□T
1	±20, ±10%	45	55	10	1.0	120	160	0.30	0.15	80	0.85	MLF2012A1R0□T
1.2	±20, ±10%	45	55	10	1.0	110	150	0.35	0.15	80	0.85	MLF2012A1R2□T
1.5	±20, ±10%	45	60	10	1.0	100	140	0.40	0.18	80	0.85	MLF2012A1R5□T
1.8	±20, ±10%	45	60	10	1.0	90	130	0.45	0.20	80	0.85	MLF2012A1R8□T
2.2	±20, ±10%	45	60	10	1.0	80	120	0.50	0.22	50	0.85	MLF2012A2R2□T
2.7	±20, ±10%	45	70	10	1.0	70	100	0.55	0.25	50	1.25	MLF2012A2R7□T
3.3	±20, ±10%	45	70	10	1.0	60	90	0.60	0.28	50	1.25	MLF2012A3R3□T
3.9	±20, ±10%	45	70	10	1.0	55	80	0.65	0.30	30	1.25	MLF2012A3R9□T
4.7	±20, ±10%	45	70	10	1.0	50	70	0.70	0.35	30	1.25	MLF2012A4R7□T
5.6	±20, ±10%	50	75	4	0.1	45	65	0.60	0.30	15	1.25	MLF2012E5R6□T
6.8	±20, ±10%	50	75	4	0.1	40	60	0.65	0.32	15	1.25	MLF2012E6R8□T
8.2	±20, ±10%	50	75	4	0.1	35	55	0.70	0.35	15	1.25	MLF2012E8R2□T
10	±20, ±10%	50	75	2	0.1	30	50	0.80	0.40	15	1.25	MLF2012E100□T
12	±20, ±10%	50	75	2	0.1	25	45	0.90	0.50	15	1.25	MLF2012E120□T
15	±20, ±10%	30	45	1	0.1	22	40	0.70	0.35	5	1.25	MLF2012C150□T
18	±20, ±10%	30	45	1	0.1	20	38	0.80	0.38	5	1.25	MLF2012C180□T
22	±20, ±10%	30	45	1	0.1	18	35	0.90	0.45	5	1.25	MLF2012C220□T
27	±20, ±10%	30	45	1	0.1	17	33	1.00	0.50	5	1.25	MLF2012C270□T
33	±20, ±10%	30	45	0.4	0.1	15	28	1.10	0.55	5	1.25	MLF2012C330□T
39	±20, ±10%	35	55	2	0.1	13	23	2.40	1.30	4	1.25	MLF2012K390□T
47	±20, ±10%	35	55	2	0.1	11	20	2.70	1.60	4	1.25	MLF2012K470□T
56	±20, ±10%	35	55	2	0.1	10	18	2.80	1.80	4	1.25	MLF2012K560□T
68	±20, ±10%	25	45	1	0.1	9	16	2.90	2.00	2	1.25	MLF2012C680□T
82	±20, ±10%	25	45	1	0.1	8	14	3.00	2.40	2	1.25	MLF2012C820□T
100	±20, ±10%	25	45	1	0.1	7	12	3.10	2.50	2	1.25	MLF2012C101□T

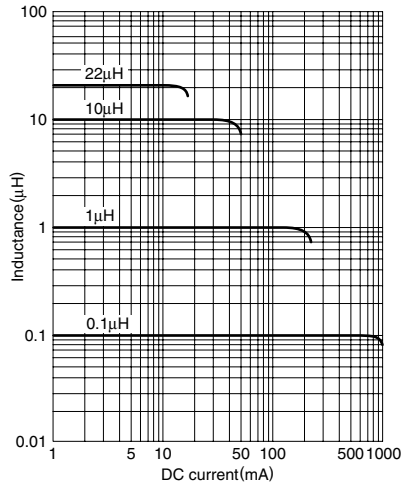
\*1 47N means for 47nH (0.047 $\mu$ H).

\*2 □: Please specify inductance tolerance, M(±20%) or K(±10%)

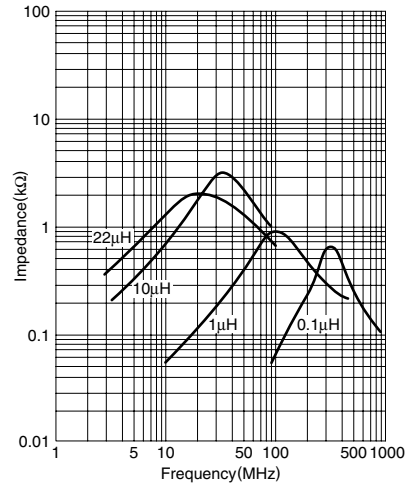
• Test equipment

Inductance, Q: Ag4294A-16034G

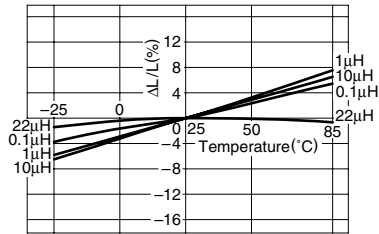
### TYPICAL ELECTRICAL CHARACTERISTICS INDUCTANCE CHANGE vs. DC SUPERPOSITION CHARACTERISTICS



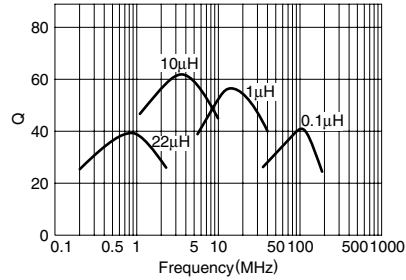
### IMPEDANCE vs. FREQUENCY CHARACTERISTICS



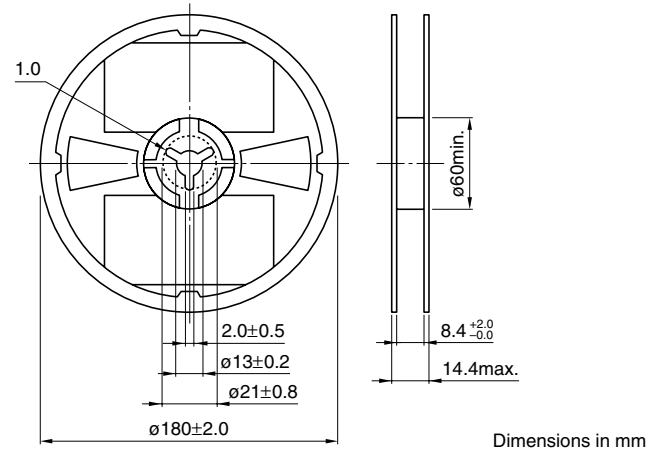
### INDUCTANCE CHANGE vs. TEMPERATURE CHARACTERISTICS



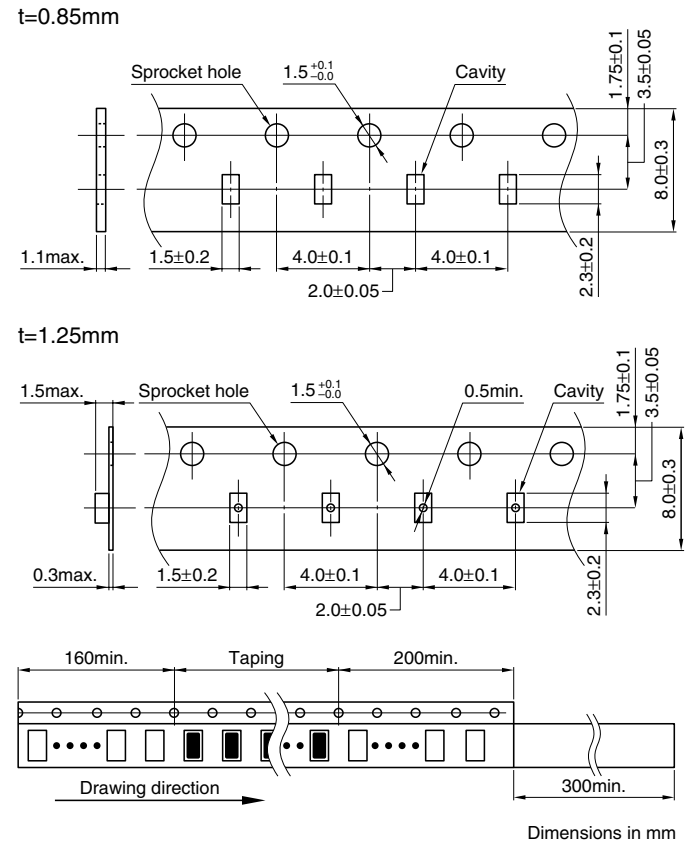
### Q vs. FREQUENCY CHARACTERISTICS



### PACKAGING STYLES REEL DIMENSIONS



### TAPE DIMENSIONS



• All specifications are subject to change without notice.