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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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Please read this notice before using the TAIYO YUDEN products.

REMINDERS

- Product information in this catalog is as of October 2017. All of the contents specified herein are subject to change without notice due to technical improvements, etc. Therefore, please check for the latest information carefully before practical application or use of our products.

Please note that TAIYO YUDEN shall not be in any way responsible for any damages and defects in products or equipment incorporating our products, which are caused under the conditions other than those specified in this catalog or individual product specification sheets.

- Please contact TAIYO YUDEN for further details of product specifications as the individual product specification sheets are available.
- Please conduct validation and verification of our products in actual condition of mounting and operating environment before using our products.
- The products listed in this catalog are intended for use in general electronic equipment (e.g., AV equipment, OA equipment, home electric appliances, office equipment, information and communication equipment including, without limitation, mobile phone, and PC) and medical equipment classified as Class I or II by IMDRF. Please be sure to contact TAIYO YUDEN for further information before using the products for any equipment which may directly cause loss of human life or bodily injury (e.g., transportation equipment including, without limitation, automotive powertrain control system, train control system, and ship control system, traffic signal equipment, disaster prevention equipment, medical equipment classified as Class III by IMDRF, highly public information network equipment including, without limitation, telephone exchange, and base station).

Please do not incorporate our products into any equipment requiring high levels of safety and/or reliability (e.g., aerospace equipment, aviation equipment*, medical equipment classified as Class IV by IMDRF, nuclear control equipment, undersea equipment, military equipment).

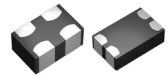
*Note: There is a possibility that our products can be used only for aviation equipment that does not directly affect the safe operation of aircraft (e.g., in-flight entertainment, cabin light, electric seat, cooking equipment) if such use meets requirements specified separately by TAIYO YUDEN. Please be sure to contact TAIYO YUDEN for further information before using our products for such aviation equipment.

When our products are used even for high safety and/or reliability-required devices or circuits of general electronic equipment, it is strongly recommended to perform a thorough safety evaluation prior to use of our products and to install a protection circuit as necessary.

Please note that unless you obtain prior written consent of TAIYO YUDEN, TAIYO YUDEN shall not be in any way responsible for any damages incurred by you or third parties arising from use of the products listed in this catalog for any equipment requiring inquiry to TAIYO YUDEN or prohibited for use by TAIYO YUDEN as described above.

- Information contained in this catalog is intended to convey examples of typical performances and/or applications of our products and is not intended to make any warranty with respect to the intellectual property rights or any other related rights of TAIYO YUDEN or any third parties nor grant any license under such rights.
- Please note that the scope of warranty for our products is limited to the delivered our products themselves and TAIYO YUDEN shall not be in any way responsible for any damages resulting from a fault or defect in our products. Notwithstanding the foregoing, if there is a written agreement (e.g., supply and purchase agreement, quality assurance agreement) signed by TAIYO YUDEN and your company, TAIYO YUDEN will warrant our products in accordance with such agreement.
- The contents of this catalog are applicable to our products which are purchased from our sales offices or authorized distributors (hereinafter "TAIYO YUDEN's official sales channel"). Please note that the contents of this catalog are not applicable to our products purchased from any seller other than TAIYO YUDEN's official sales channel.
- Caution for Export
Some of our products listed in this catalog may require specific procedures for export according to "U.S. Export Administration Regulations", "Foreign Exchange and Foreign Trade Control Law" of Japan, and other applicable regulations. Should you have any questions on this matter, please contact our sales staff.

MULTILAYER COMMON MODE CHOKE COILS(MC SERIES F TYPE)



REFLOW

■ PARTS NUMBER

* Operating Temp.: -40~+85°C

M	C	F	0	8	0	6	2	G	1	2	0	-	T	△
①			②				③	④			⑤		⑥	⑦

△=Blank space

① Series name

Code	Series name
MCF	Multilayer common mode choke coil

② Dimensions

Code	Dimensions [mm]
0605	0.65 × 0.50
0806	0.85 × 0.65
1210	1.25 × 1.0
2010	2.0 × 1.0

③ No. of Lines

Code	No. of Lines
2	2 lines
4	4 lines

④ Material

Code	Material
G	Refer to impedance curves for material differences
E	
H	

⑤ Nominal common impedance

Code (example)	Nominal common impedance [Ω]
120	12
900	90

⑥ Packaging

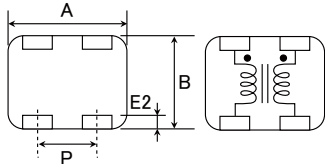
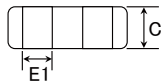
Code	Packaging
-T	Taping

⑦ Internal code

Code	Internal code
△	Standard

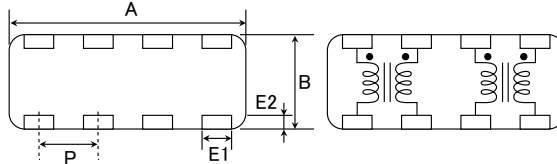
■ STANDARD EXTERNAL DIMENSIONS / STANDARD QUANTITY / EQUIVALENT CIRCUIT

2 LINES



Equivalent Circuit
• No polarity

4 LINES



Equivalent Circuit
• No polarity

Type	A	B	C	E1	E2	P	Standard quantity [pcs] Taping
MCF0605	0.65±0.05 (0.026±0.002)	0.50±0.05 (0.020±0.002)	0.30±0.05 (0.012±0.002)	0.15±0.1 (0.006±0.004)	0.12±0.1 (0.005±0.004)	0.40±0.10 (0.016±0.004)	15000
MCF0806	0.85±0.05 (0.033±0.002)	0.65±0.05 (0.026±0.002)	0.40±0.05 (0.016±0.002)	0.27±0.1 (0.011±0.004)	0.2 +0.05/-0.1 (0.008 +0.002/-0.004)	0.50±0.10 (0.020±0.004)	10000
MCF1210	1.0±0.15 (0.039±0.006)	1.25±0.15 (0.049±0.006)	0.55±0.1 (0.022±0.004)	0.3±0.1 (0.012±0.004)	0.2±0.1 (0.008±0.004)	0.55±0.10 (0.022±0.004)	5000
MCF2010	2.0±0.15 (0.079±0.006)	1.0±0.15 (0.039±0.006)	0.45±0.1 (0.018±0.004)	0.25 +0.15/-0.1 (0.010 +0.006/-0.004)	0.25±0.15 (0.010±0.006)	0.50±0.10 (0.020±0.004)	4000

Unit: mm (inch)

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■ PARTS NUMBER

● MCF0605 type

Parts number	EHS	No. of Lines	Common mode impedance [Ω]	Measuring frequency [MHz]	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V]	Insulation resistance [MΩ] (min.)
MCF0605 2G120-T	RoHS	2	12±5	100	2.5	0.05	5	100
MCF0605 2G350-T	RoHS	2	35±20%	100	5.0	0.05	5	100
MCF0605 2E600-T	RoHS	2	60±25%	100	3.5	0.05	5	100
MCF0605 2E900-T	RoHS	2	90±20%	100	3.9	0.05	5	100

● MCF0806 type

Parts number	EHS	No. of Lines	Common mode impedance [Ω]	Measuring frequency [MHz]	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V]	Insulation resistance [MΩ] (min.)
MCF0806 2G120-T	RoHS	2	12±5	100	2.5	0.13	5	100
MCF0806 2G470-T	RoHS	2	47±20%	100	4.0	0.10	5	100
MCF0806 2G900-T	RoHS	2	90±20%	100	5.0	0.10	5	100
MCF0806 2E300-T	RoHS	2	30±25%	100	1.5	0.15	5	100

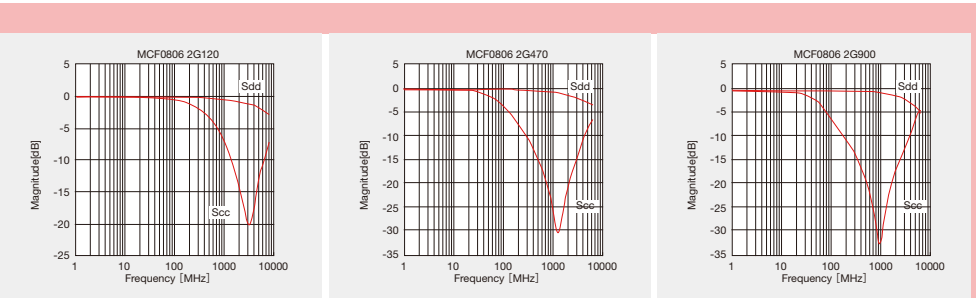
● MCF1210 type

Parts number	EHS	No. of Lines	Common mode impedance [Ω]	Measuring frequency [MHz]	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V]	Insulation resistance [MΩ] (min.)
MCF1210 2G400-T	RoHS	2	40±25%	100	2.5	0.10	5	100
MCF1210 2G900-T	RoHS	2	90±25%	100	4.5	0.10	5	100
MCF1210 2H500-T	RoHS	2	50±25%	100	1.5	0.16	5	100
MCF1210 2H900-T	RoHS	2	90±20%	100	2.5	0.15	5	100

● MCF2010 type

Parts number	EHS	No. of Lines	Common mode impedance [Ω]	Measuring frequency [MHz]	DC Resistance [Ω] (max.)	Rated current [A] (max.)	Rated voltage [V]	Insulation resistance [MΩ] (min.)
MCF2010 4G900-T	RoHS	4	90±25%	100	4.5	0.10	5	100

■ ELECTRICAL CHARACTERISTICS



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Multilayer chip inductors

Multilayer chip inductors for high frequency, Multilayer chip bead inductors

Multilayer common mode choke coils (MC series F type)

Metal Multilayer Chip Power Inductors (MCOIL™ MC series)

PACKAGING

① Minimum Quantity

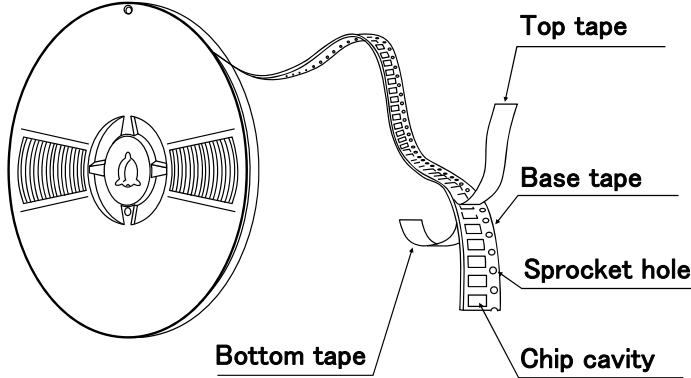
● Tape & Reel Packaging

Type	Thickness mm (inch)	Standard Quantity [pcs]	
		Paper Tape	Embossed Tape
CK1608(0603)	0.8 (0.031)	4000	—
CK2125(0805)	0.85(0.033)	4000	—
	1.25(0.049)	—	2000
CKS2125(0805)	0.85(0.033)	4000	—
	1.25(0.049)	—	2000
CKP1608(0603)	0.8 (0.031)	4000	—
CKP2012(0805)	0.9 (0.035)	—	3000
CKP2016(0806)	0.9 (0.035)	—	3000
CKP2520(1008)	0.7 (0.028)	—	3000
	0.9 (0.035)	—	3000
	1.1 (0.043)	—	2000
NM2012(0805)	0.9 (0.035)	—	3000
NM2520(1008)	0.9 (0.035)	—	3000
	1.1 (0.043)	—	2000
LK1005(0402)	0.5 (0.020)	10000	—
LK1608(0603)	0.8 (0.031)	4000	—
LK2125(0805)	0.85(0.033)	4000	—
	1.25(0.049)	—	2000
HK0603(0201)	0.3 (0.012)	15000	—
HK1005(0402)	0.5 (0.020)	10000	—
HK1608(0603)	0.8 (0.031)	4000	—
HK2125(0805)	0.85(0.033)	—	4000
	1.0 (0.039)	—	3000
HKQ0402(01005)	0.2 (0.008)	20000	40000
HKQ0603W(0201)	0.3 (0.012)	15000	—
HKQ0603S(0201)	0.3 (0.012)	15000	—
HKQ0603U(0201)	0.3 (0.012)	15000	—
AQ105(0402)	0.5 (0.020)	10000	—
BK0402(01005)	0.2 (0.008)	20000	—
BK0603(0201)	0.3 (0.012)	15000	—
BK1005(0402)	0.5 (0.020)	10000	—
BKH0603(0201)	0.3 (0.012)	15000	—
BKH1005(0402)	0.5 (0.020)	10000	—
BK1608(0603)	0.8 (0.031)	4000	—
BK2125(0805)	0.85(0.033)	4000	—
	1.25(0.049)	—	2000
BK2010(0804)	0.45(0.018)	4000	—
BK3216(1206)	0.8 (0.031)	—	4000
BKP0402(01005)	0.2 (0.008)	20000	—
BKP0603(0201)	0.3 (0.012)	15000	—
BKP1005(0402)	0.5 (0.020)	10000	—
BKP1608(0603)	0.8 (0.031)	4000	—
BKP2125(0805)	0.85(0.033)	4000	—
MCF0605(0202)	0.3 (0.012)	15000	—
MCF0806(0302)	0.4 (0.016)	—	10000
MCF1210(0504)	0.55(0.022)	—	5000
MCF2010(0804)	0.45(0.018)	—	4000
MCFK1608(0603)	0.6 (0.024)	4000	—
MCFE1608(0603)	0.65(0.026)	4000	—
MCKK1608(0603)	1.0(0.039)	—	3000
MCHK2012(0806)	0.8 (0.031)	4000	—
MCKK2012(0805)	1.0(0.039)	—	3000

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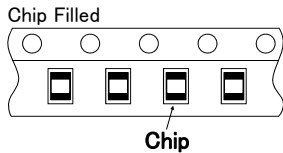
② Taping material

● Card board carrier tape

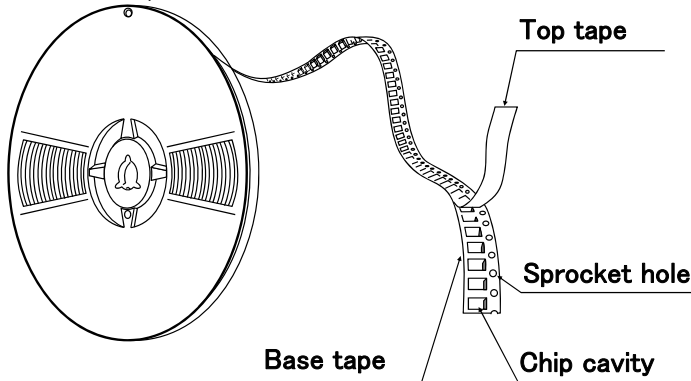


CK	1608
CKP	1608
CK	2125
CKS	2125
LK	1005
LK	1608
LK	2125
HK	0603
HK	1005
HK	1608
HKQ	0402
HKQ	0603
AQ	105

BK	0402
BK	0603
BK	1005
BK	1608
BK	2125
BK	2010
BKP	0402
BKP	0603
BKP	1005
BKP	1608
BKP	2125
BKH	0603
BKH	1005
MCF	0605
MC	1608
MC	2012

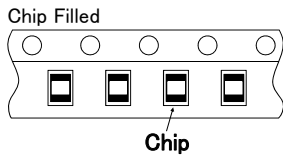


● Embossed Tape



CK	2125
CKS	2125
CKP	2012
CKP	2016
CKP	2520
NM	2012
NM	2520
LK	2125
HKQ	0402
HK	2125

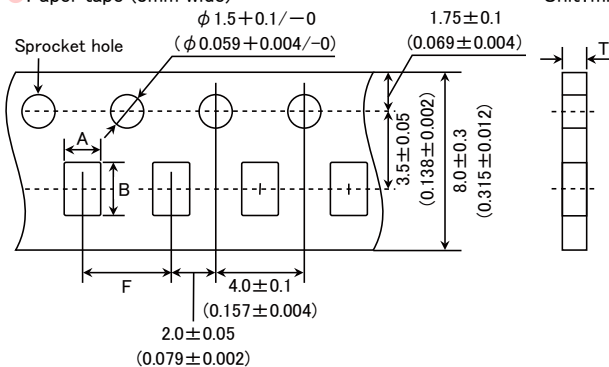
BK	2125
BK	3216
MCF	0806
MCF	1210
MCF	2010
MC	1608
MC	2012



③ Taping Dimensions

● Paper tape (8mm wide)

Unit: mm (inch)



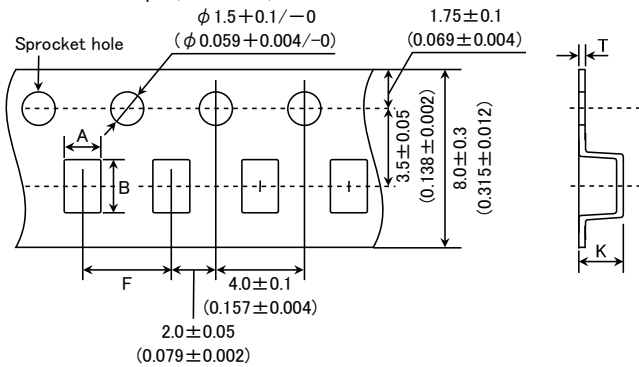
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Type	Thickness mm (inch)	Chip cavity		Insertion Pitch	Tape Thickness
		A	B	F	T
CK1608(0603)	0.8 (0.031)	1.0±0.2 (0.039±0.008)	1.8±0.2 (0.071±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
CK2125(0805)	0.85(0.033)	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
CKS2125(0805)	0.85(0.033)	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
CKP1608(0603)	0.8 (0.031)	1.0±0.2 (0.039±0.008)	1.8±0.2 (0.071±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
LK1005(0402)	0.5 (0.020)	0.65±0.1 (0.026±0.004)	1.15±0.1 (0.045±0.004)	2.0±0.05 (0.079±0.002)	0.8max (0.031max)
LK1608(0603)	0.8 (0.031)	1.0±0.2 (0.039±0.008)	1.8±0.2 (0.071±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
LK2125(0805)	0.85(0.033)	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
HK0603(0201)	0.3 (0.012)	0.40±0.06 (0.016±0.002)	0.70±0.06 (0.028±0.002)	2.0±0.05 (0.079±0.002)	0.45max (0.018max)
HK1005(0402)	0.5 (0.020)	0.65±0.1 (0.026±0.004)	1.15±0.1 (0.045±0.004)	2.0±0.05 (0.079±0.002)	0.8max (0.031max)
HK1608(0603)	0.8 (0.031)	1.0±0.2 (0.039±0.008)	1.8±0.2 (0.071±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
HKQ0402(01005)	0.2 (0.008)	0.25±0.04 (0.010±0.002)	0.45±0.04 (0.018±0.002)	2.0±0.05 (0.079±0.002)	0.36max (0.014max)
HKQ0603W(0201)	0.3 (0.012)	0.40±0.06 (0.016±0.002)	0.70±0.06 (0.028±0.002)	2.0±0.05 (0.079±0.002)	0.45max (0.018max)
HKQ0603S(0201)	0.3 (0.012)	0.40±0.06 (0.016±0.002)	0.70±0.06 (0.028±0.002)	2.0±0.05 (0.079±0.002)	0.45max (0.018max)
HKQ0603U(0201)	0.3 (0.012)	0.40±0.06 (0.016±0.002)	0.70±0.06 (0.028±0.002)	2.0±0.05 (0.079±0.002)	0.45max (0.018max)
AQ105(0402)	0.5 (0.020)	0.75±0.1 (0.030±0.004)	1.15±0.1 (0.045±0.004)	2.0±0.05 (0.079±0.002)	0.8max (0.031max)
BK0402(01005)	0.2 (0.008)	0.25±0.04 (0.010±0.002)	0.45±0.04 (0.018±0.002)	2.0±0.05 (0.079±0.002)	0.36max (0.014max)
BK0603(0201)	0.3 (0.012)	0.40±0.06 (0.016±0.002)	0.70±0.06 (0.028±0.002)	2.0±0.05 (0.079±0.002)	0.45max (0.018max)
BK1005(0402)	0.5 (0.020)	0.65±0.1 (0.026±0.004)	1.15±0.1 (0.045±0.004)	2.0±0.05 (0.079±0.002)	0.8max (0.031max)
BK1608(0603)	0.8 (0.031)	1.0±0.2 (0.039±0.008)	1.8±0.2 (0.071±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
BK2125(0805)	0.85(0.033)	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
BK2010(0804)	0.45(0.018)	1.2±0.1 (0.047±0.004)	2.17±0.1 (0.085±0.004)	4.0±0.1 (0.157±0.004)	0.8max (0.031max)
BKP0402(01005)	0.2 (0.008)	0.25±0.04 (0.010±0.002)	0.45±0.04 (0.018±0.002)	2.0±0.05 (0.079±0.002)	0.36max (0.014max)
BKP0603(0201)	0.3 (0.012)	0.40±0.06 (0.016±0.002)	0.70±0.06 (0.028±0.002)	2.0±0.05 (0.079±0.002)	0.45max (0.018max)
BKP1005(0402)	0.5 (0.020)	0.65±0.1 (0.026±0.004)	1.15±0.1 (0.045±0.004)	2.0±0.05 (0.079±0.002)	0.8max (0.031max)
BKP1608(0603)	0.8 (0.031)	1.0±0.2 (0.039±0.008)	1.8±0.2 (0.071±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
BKP2125(0805)	0.85(0.033)	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
BKH0603(0201)	0.3 (0.012)	0.40±0.06 (0.016±0.002)	0.70±0.06 (0.028±0.002)	2.0±0.05 (0.079±0.002)	0.45max (0.018max)
BKH1005(0402)	0.5 (0.020)	0.65±0.1 (0.026±0.004)	1.15±0.1 (0.045±0.004)	2.0±0.05 (0.079±0.002)	0.8max (0.031max)
MCF0605(0202)	0.3 (0.012)	0.62±0.03 (0.024±0.001)	0.77±0.03 (0.030±0.001)	2.0±0.05 (0.079±0.002)	0.45max (0.018max)
MCFK1608(0603)	0.6 (0.024)	1.1±0.05 (0.043±0.002)	1.9±0.05 (0.075±0.002)	4.0±0.1 (0.157±0.004)	0.72max (0.028max)
MCFE1608(0603)	0.65(0.026)	1.1±0.05 (0.043±0.002)	1.9±0.05 (0.075±0.002)	4.0±0.1 (0.157±0.004)	0.9max (0.035max)
MCHK2012(0805)	0.8 (0.031)	1.55±0.2 (0.061±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	0.9max (0.035max)

Unit : mm (inch)

● Embossed Tape (8mm wide)

Unit : mm (inch)



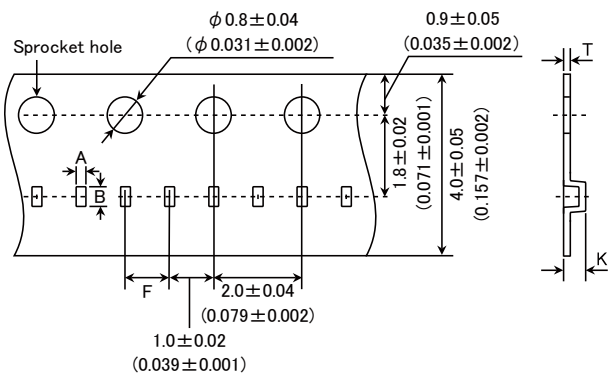
Type	Thickness mm (inch)	Chip cavity		Insertion Pitch F	Tape Thickness	
		A	B		K	T
CK2125(0805)	1.25 (0.049)	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	2.0 (0.079)	0.3 (0.012)
CKS2125(0805)	1.25 (0.049)	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	2.0 (0.079)	0.3 (0.012)
CKP2012(0805)	0.9 (0.035)	1.55±0.2 (0.061±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	1.3 (0.051)	0.3 (0.012)
CKP2016(0806)	0.9 (0.035)	1.8±0.1 (0.071±0.004)	2.2±0.1 (0.087±0.004)	4.0±0.1 (0.157±0.004)	1.3 (0.051)	0.25 (0.01)
CKP2520(1008)	0.7 (0.028)	2.3±0.1 (0.091±0.004)	2.8±0.1 (0.110±0.004)	4.0±0.1 (0.157±0.004)	1.4 (0.055)	0.3 (0.012)
	0.9 (0.035)				1.4 (0.055)	
	1.1 (0.043)				1.7 (0.067)	
NM2012(0805)	0.9 (0.035)	1.55±0.2 (0.061±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	1.3 (0.051)	0.3 (0.012)
NM2520(1008)	0.9 (0.035)	2.3±0.1 (0.091±0.004)	2.8±0.1 (0.110±0.004)	4.0±0.1 (0.157±0.004)	1.4 (0.055)	0.3 (0.012)
	1.1 (0.043)				1.7 (0.067)	
LK2125(0805)	1.25 (0.049)	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	2.0 (0.079)	0.3 (0.012)
HK2125(0805)	0.85 (0.033)	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	1.5 (0.059)	0.3 (0.012)
	1.0 (0.039)				2.0 (0.079)	
BK2125(0805)	1.25 (0.049)	1.5±0.2 (0.059±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	2.0 (0.079)	0.3 (0.012)
BK3216(1206)	0.8 (0.031)	1.9±0.1 (0.075±0.004)	3.5±0.1 (0.138±0.004)	4.0±0.1 (0.157±0.004)	1.4 (0.055)	0.3 (0.012)
MCF0806(0302)	0.4 (0.016)	0.75±0.05 (0.030±0.002)	0.95±0.05 (0.037±0.002)	2.0±0.05 (0.079±0.002)	0.55 (0.022)	0.3 (0.012)
MCF1210(0504)	0.55 (0.022)	1.15±0.05 (0.045±0.002)	1.40±0.05 (0.055±0.002)	4.0±0.1 (0.157±0.004)	0.65 (0.026)	0.3 (0.012)
MCF2010(0804)	0.45 (0.018)	1.1±0.1 (0.043±0.004)	2.3±0.1 (0.091±0.004)	4.0±0.1 (0.157±0.004)	0.85 (0.033)	0.3 (0.012)
MCKK1608(0603)	1.0 (0.039)	1.1±0.1 (0.043±0.004)	1.95±0.1 (±0.004)	4.0±0.1 (0.157±0.004)	1.4 (0.055)	0.25 (0.01)
MCKK2012(0805)	1.0 (0.039)	1.55±0.2 (0.061±0.008)	2.3±0.2 (0.091±0.008)	4.0±0.1 (0.157±0.004)	1.35 (0.053)	0.25 (0.010)

Unit : mm (inch)

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● Embossed Tape (4mm wide)

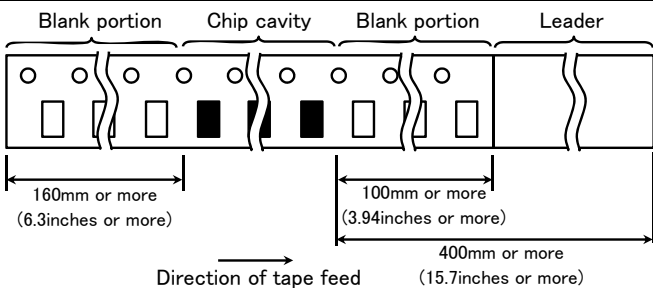
Unit : mm (inch)



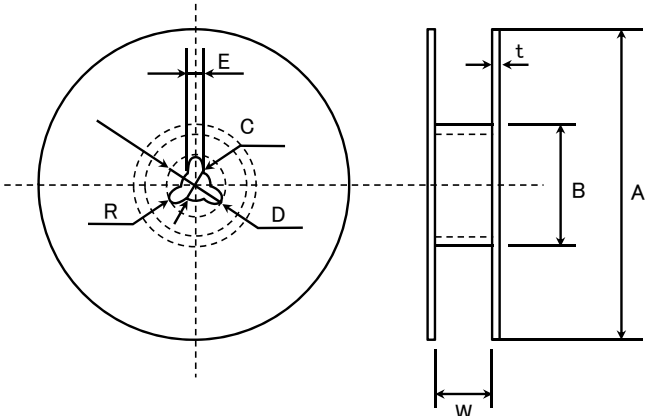
Type	Thickness mm (inch)	Chip cavity		Insertion Pitch F	Tape Thickness	
		A	B		K	T
HKQ0402 (01005)	0.2 (0.008)	0.23	0.43	1.0 ± 0.02	0.5max.	0.25max.

Unit : mm

④ LEADER AND BLANK PORTION



⑤ Reel Size



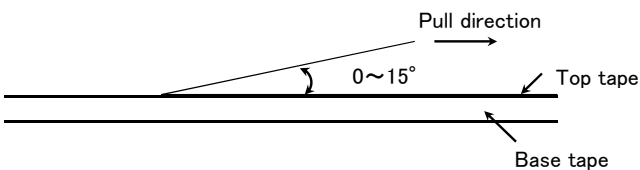
A	B	C	D	E	R
$\phi 178 \pm 2.0$	$\phi 50$ or more	$\phi 13.0 \pm 0.2$	$\phi 21.0 \pm 0.8$	2.0 ± 0.5	1.0

	t	W
4mm width tape	1.5max.	5 ± 1.0
8mm width tape	2.5max.	10 ± 1.5

(Unit : mm)

⑥ Top tape strength

The top tape requires a peel-off force of 0.1~0.7N in the direction of the arrow as illustrated below.



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Multilayer chip inductors

Multilayer chip inductors for high frequency, Multilayer chip bead inductors

Multilayer common mode choke coils (MC series F type)

Metal Multilayer Chip Power Inductors (MCOIL™ MC series)

RELIABILITY DATA

1. Operating Temperature Range			
Specified Value	BK0402	-55~+125°C	
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY		BK2010
			BK3216
	BKP0402		-55~+85°C
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605	-40~+85°C	
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608	-40~+85°C	
	CK2125		
	CKS2125		
	CKP1608		
	CKP2012		
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005		
	LK1608	-55~+125°C	
	LK2125		
	HKQ0402		
	HK0603	-40~+85°C	
HK1005			
HK1608	-55~+125°C		
HK2125			
HKQ0603W/HKQ0603S/HKQ0603U	-40~+125°C (Including self-generated heat)		
AQ105			
MCFK1608			
MCFE1608			
MCKK1608			
MCHK2012			
MCKK2012			

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2. Storage Temperature Range

Specified Value	BK0402	-55~+125°C	
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY		BK2010
			BK3216
	BKP0402		-55~+85°C
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605	-40~+85°C	
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608	-40~+85°C	
	CK2125		
	CKS2125		
	CKP1608		
	CKP2012		
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005		
	LK1608		
	LK2125		
	HKQ0402		-55~+125°C
	HK0603		
	HK1005		
	HK1608	-40~+85°C	
HK2125			
HKQ0603W/HKQ0603S/HKQ0603U	-55~+125°C		
AQ105			
MCFK1608	-40~+85°C		
MCFE1608			
MCKK1608			
MCHK2012			
MCKK2012			

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3. Rated Current

	BK0402	150~750mA DC
	BK0603	100~500mA DC
	BK1005	120~1000mA DC
	BKH0603	115~450mA DC
	BKH1005	200~300mA DC
	BK1608	150~1500mA DC
	BK2125	200~1200mA DC
	ARRAY	BK2010 100mA DC
		BK3216 100~200mA DC
	BKP0402	0.55~1.1A DC
	BKP0603	0.8~1.8A DC
	BKP1005	0.8~2.4A DC
	BKP1608	1.0~3.0A DC
	BKP2125	1.5~4.0A DC
	MCF 0605	0.05A DC
	MCF 0806	0.1~0.13A DC
	MCF 1210	0.1~0.16A DC
	MCF 2010	0.1A DC
	CK1608	50~60mA DC
	CK2125	60~500mA DC
	CKS2125	110~280mA DC
	CKP1608	0.35~0.9A DC
Specified Value	CKP2012	0.7~1.7A DC
	CKP2016	0.9~1.6A DC
	CKP2520	1.1~1.8A DC
	NM2012	1.0~1.2A DC
	NM2520	0.9~1.2A DC
	LK1005	20~25mA DC
	LK1608	1~150mA DC
	LK2125	5~300mA DC
	HK0603	60~470mA DC
	HK1005	110~300mA DC (-55~+125°C) 200~900mA DC (-55~+85°C)
	HK1608	150~300mA DC
	HK2125	300mA DC
	HKQ0402	100~500mA DC
	HKQ0603W	100~850mA DC
	HKQ0603S	130~600mA DC
	HKQ0603U	190~900mA DC
	AQ105	280~710mA DC
	MCFK1608	Idc1 : 1500~2300mA DC, Idc2 : 900~2100mA DC
	MCFE1608	Idc1 : 1400~2600mA DC, Idc2 : 800~1500mA DC
	MCKK1608	Idc1 : 2800~2000mA DC Idc2 : 1300~2600mA DC
	MCHK2012	Idc1 : 2260~4320mA DC, Idc2 : 1470~3600mA DC
	MCKK2012	Idc1 : 3600~6200mA DC, Idc2 : 2100~4000mA DC

Definition of rated current:

- In the CK, CKS and BK Series, the rated current is the value of current at which the temperature of the element is increased within 20°C.
- In the BK Series P type, CK Series P type, NM Series, the rated current is the value of current at which the temperature of the element is increased within 40°C.
- In the LK, HK, HKQ0603, and AQ Series, the rated current is either the DC value at which the initial L value is decreased within 5% with the application of DC bias, or the value of current at which the temperature of the element is increased within 20°C.
- In the HKQ0402(~9N1), the rated current is either the DC value at which the initial L value is decreased within 5% with the application of DC bias, or the value of current at which the temperature of the element is increased within 20°C.
- In the HKQ0402(10N~), the rated current is either the DC value at which the initial L value is decreased within 5% with the application of DC bias, or the value of current at which the temperature of the element is increased within 25°C.
- In the MC Series, Idc1 is the DC value at which the initial L value is decreased within 30% and Idc2 is the DC value at which the temperature of element is increased within 40°C by the application of DC bias. (at 20°C)

4. Impedance			
Specified Value	BK0402	10~330 Ω ±5 Ω(10 Ω), ±25%(Other)	
	BK0603	10~1200 Ω ±25%	
	BK1005	10~1800 Ω ±25%	
	BKH0603	25~1500 Ω ±25%	
	BKH1005	600~1800 Ω ±25%	
	BK1608	22~2500 Ω ±25%	
	BK2125	15~2500 Ω ±25%	
	ARRAY	BK2010	5~1000 Ω ±25%
		BK3216	60~1000 Ω ±25%
	BKP0402	10~33 Ω ±5 Ω(10 Ω), ±25%(Other)	
	BKP0603	10~120 Ω ±5 Ω(10 Ω), ±25%(Other)	
	BKP1005	10~330 Ω ±5 Ω(EM100), ±25%(Other)	
	BKP1608	33~470 Ω ±25%	
	BKP2125	33~330 Ω ±25%	
	MCF 0605	12~90 Ω ±5 Ω(12 Ω), ±20%(35 Ω90 Ω), ±25%(60 Ω)	
	MCF 0806	12~90 Ω ±5 Ω(12 Ω), ±20%(47 Ω90 Ω), ±25%(30 Ω)	
	MCF 1210	40~90 Ω ±20%(2H900), ±25%(Other)	
	MCF 2010	90 Ω ±25%	
	CK1608		
	CK2125		
	CKS2125		
	CKP1608		
	CKP2012		
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005		
	LK1608		
	LK2125		
	HKQ0402		
	HK0603		
	HK1005		
	HK1608		
	HK2125		
	HKQ0603W/HKQ0603S/HKQ0603U		
	AQ105		
	MCFK1608		
	MCFE1608		
	MCKK1608		
	MCHK2012		
	MCKK2012		
	Test Methods and Remarks	BK0402Series, BKP0402Series Measuring frequency : 100±1MHz Measuring equipment : E4991A (or its equivalent) Measuring jig : 16197A (or its equivalent)	
BK0603Series, BKP0603Series Measuring frequency : 100±1MHz Measuring equipment : 4291A (or its equivalent) Measuring jig : 16193A (or its equivalent)			
BK1005Series, BKP1005Series, BKH1005Series Measuring frequency : 100±1MHz Measuring equipment : 4291A (or its equivalent) Measuring jig : 16192A (or its equivalent), 16193A (or its equivalent)			
BK1608・2125Series, BKP1608・2125Series Measuring frequency : 100±1MHz Measuring equipment : 4291A (or its equivalent), 4195A (or its equivalent) Measuring jig : 16092A (or its equivalent) or 16192A (or its equivalent) /HW			
BK2010・3216Series, MCF Series Measuring frequency : 100±1MHz Measuring equipment : 4291A (or its equivalent), 4195A (or its equivalent) Measuring jig : 16192A (or its equivalent)			

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5. Inductance

Specified Value	BK0402		
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY	BK2010	
		BK3216	
	BKP0402		
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605		
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608	4.7~10.0 μ H: \pm 20%	
	CK2125	0.1~10.0 μ H: \pm 20%	
	CKS2125	1.0~10.0 μ H: \pm 20%	
	CKP1608	0.33~2.2 μ H: \pm 20%	
	CKP2012	0.47~4.7 μ H: \pm 20%	
	CKP2016	0.47~4.7 μ H: \pm 20%	
	CKP2520	0.47~4.7 μ H: \pm 20%	
	NM2012	0.82~1.0 μ H: \pm 20%	
	NM2520	1.0~2.2 μ H: \pm 20%	
	LK1005	0.12~2.2 μ H: \pm 10 or 20%	
	LK1608	0.047~33.0 μ H: \pm 20% 0.10~12.0 μ H: \pm 10%	
	LK2125	0.047~33.0 μ H: \pm 20% 0.10~12.0 μ H: \pm 10%	
	HK0603	1.0~6.2nH: \pm 0.3nH 6.8~100nH: \pm 5%	
	HK1005	1.0~6.2nH: \pm 0.3nH 6.8~270nH: \pm 5%	
	HK1608	1.0~5.6nH: \pm 0.3nH 6.8~470nH: \pm 5%	
	HK2125	1.5~5.6nH: \pm 0.3nH 6.8~470nH: \pm 5%	
	HKQ0402	0.5~3.9nH: \pm 0.1 or 0.2 or 0.3nH 4.3~5.6nH: \pm 0.3nH or 3% or 5% 6.2~47nH: \pm 3 or 5%	
	HKQ0603W	0.6~3.9nH: \pm 0.1 or 0.2 or 0.3nH 4.3~6.2nH: \pm 0.2 or 0.3nH or 3 or 5% 6.8~30nH: \pm 3 or 5% 33~100nH: \pm 5%	
	HKQ0603S	0.6~6.2nH: \pm 0.2 or 0.3nH 6.8~22nH: \pm 3 or 5%	
	HKQ0603U	0.6~4.2nH: \pm 0.1 or 0.2 or 0.3nH 4.3~6.5nH: \pm 0.2 or 0.3nH 6.8~22nH: \pm 3 or 5%	
	AQ105	1.0~6.2nH: \pm 0.3nH 6.8~15nH: \pm 5%	
	MCFK1608	0.24~1.0 μ H: \pm 20%	
	MCFE1608	0.24~1.0 μ H: \pm 20%	
	MCKK1608	0.24~1.0 μ H: \pm 20%	
	MCHK2012	0.24~1.0 μ H: \pm 20%	
	MCKK2012	0.24~1.0 μ H: \pm 20%	
	Test Methods and Remarks	CK, LK, CKP, NM, MC Series	
		Measuring frequency : 2~4MHz (CK1608) Measuring frequency : 2~25MHz (CK2125) Measuring frequency : 2~10MHz (CKS2125) Measuring frequency : 10~25MHz (LK1005) Measuring frequency : 1~50MHz (LK1608) Measuring frequency : 0.4~50MHz (LK2125) Measuring frequency : 1MHz (CKP1608·CKP2012·CKP2016·CKP2520·NM2012·NM2520·MCFK1608·MCFE1608·MCHK2012·MCKK2012) Measuring equipment /jig : 4194A + 16085B + 16092A (or its equivalent) 4195A + 41951 + 16092A (or its equivalent) 4294A + 16192A (or its equivalent) 4291A + 16193A (or its equivalent) /LK1005 4285A + 42841A + 42842C + 42851 - 61100 (or its equivalent) /CKP1608·CKP2012·CKP2016·CKP2520·NM2012·NM2520·MCFK1608·MCFE1608·MCKK1608·MCHK2012·MCKK2012	
	Test Methods and Remarks	Measuring current : 1mA rms (0.047~4.7 μ H) 0.1mA rms (5.6~33 μ H)	
		HK, HKQ, AQ Series Measuring frequency : 100MHz (HK0603·HK1005·AQ105) Measuring frequency : 50/100MHz (HK1608·HK2125) Measuring frequency : 500MHz (HKQ0603S·HKQ0603U) Measuring frequency : 300/500MHz (HKQ0603W) Measuring frequency : 100/500MHz (HKQ0402) Measuring equipment /jig : 4291A + 16197A (or its equivalent) /HK0603·AQ105 4291A + 16193A (or its equivalent) /HK1005 E4991A + 16197A (or its equivalent) /HKQ0603S·HKQ0603U·HKQ0603W 4291A + 16092A + in-house made jig (or its equivalent) /HK1608·HK2125 E4991A + 16196D (or its equivalent) /HKQ0402	

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Specified Value	BK0402	—			
	BK0603				
	BK1005				
	BKH0603				
	BKH1005				
	BK1608				
	BK2125				
	ARRAY		BK2010		
			BK3216		
	BKP0402		—		
	BKP0603				
	BKP1005				
	BKP1608				
	BKP2125				
	MCF 0605				
	MCF 0806				
	MCF 1210				
	MCF 2010				
	CK1608			—	
	CK2125				
	CKS2125				
	CKP1608				
	CKP2012				
	CKP2016				
	CKP2520				
	NM2012				
	NM2520				
	LK1005				10~20 min.
	LK1608				10~35 min.
	LK2125				15~50 min.
	HK0603				4~5 min.
	HK1005				8 min.
	HK1608				8~12 min.
	HK2125			10~18 min.	
	HKQ0402			3~8 min.	
	HKQ0603W			6~15 min.	
	HKQ0603S			10~13 min.	
	HKQ0603U			14 min.	
	AQ105			8 min.	
	MCFK1608			—	
	MCFE1608				
	MCKK1608				
	MCHK2012				
	MCKK2012				
	Test Methods and Remarks			LK Series	
				Measuring frequency	: 10~25MHz(LK1005)
				Measuring frequency	: 1~50MHz(LK1608)
				Measuring frequency	: 0.4~50MHz(LK2125)
				Measuring equipment /jig	·4194A+16085B+16092A(or its equivalent) ·4195A+41951+16092A(or its equivalent) ·4294A+16192A(or its equivalent) ·4291A+16193A(or its equivalent)/LK1005
				Measuring current	·1mA rms(0.047~4.7 μH) ·0.1mA rms(5.6~33 μH)
				HK、HKQ、AQ Series	
				Measuring frequency	: 100MHz(HK0603·HK1005·AQ105)
				Measuring frequency	: 50/100MHz(HK1608·HK2125)
				Measuring frequency	: 500MHz(HKQ0603S·HKQ0603U)
				Measuring frequency	: 300/500MHz(HKQ0603W)
				Measuring frequency	: 100/500MHz(HKQ0402)
				Measuring equipment /jig	·4291A+16197A(or its equivalent)/HK0603·AQ105 ·4291A+16193A(or its equivalent)/HK1005 ·E4991A+16197A(or its equivalent)/HKQ0603S·HKQ0603U·HKQ0603W ·4291A+16092A + in-house made jig(or its equivalent)/HK1608, HK2125 ·E4991A+16196D(or its equivalent)HKQ0402

7. DC Resistance			
Specified Value	BK0402	0.07~1.2 Ω max.	
	BK0603	0.065~1.50 Ω max.	
	BK1005	0.03~0.90 Ω max.	
	BKH0603	0.26~3.20 Ω max.	
	BKH1005	0.85~2.00 Ω max.	
	BK1608	0.05~1.10 Ω max.	
	BK2125	0.05~0.75 Ω max.	
	ARRAY	BK2010	0.10~0.90 Ω max.
		BK3216	0.15~0.80 Ω max.
	BKP0402	0.05~0.15 Ω max.	
	BKP0603	0.030~0.180 Ω max.	
	BKP1005	0.0273~0.220 Ω max.	
	BKP1608	0.025~0.18 Ω max.	
	BKP2125	0.020~0.075 Ω max.	
	MCF 0605	2.5~5.0 Ω max	
	MCF 0806	1.5~5.0 Ω max.	
	MCF 1210	1.5~4.5 Ω max.	
	MCF 2010	4.5 Ω max.	
	CK1608	0.45~0.85 Ω(±30%)	
	CK2125	0.16~0.65 Ω max.	
	CKS2125	0.12~0.52 Ω max.	
	CKP1608	0.15~0.35 Ω max.	
	CKP2012	0.08~0.28 Ω max.	
	CKP2016	0.075~0.20 Ω max	
	CKP2520	0.05~0.16 Ω max.	
	NM2012	0.10~0.15 Ω max.	
	NM2520	0.11~0.22 Ω max.	
	LK1005	0.41~1.16 Ω max.	
	LK1608	0.2~2.2 Ω max.	
	LK2125	0.1~1.1 Ω max.	
	HK0603	0.11~3.74 Ω max.	
	HK1005	0.08~4.8 Ω max.	
	HK1608	0.05~2.6 Ω max.	
	HK2125	0.10~1.5 Ω max.	
	HKQ0402	0.08~5.0 Ω max.	
	HKQ0603W	0.07~4.1 Ω max.	
	HKQ0603S	0.06~1.29 Ω max.	
	HKQ0603U	0.06~1.29 Ω max.	
	AQ105	0.07~0.45 Ω max.	
	MCFK1608	0.050~0.224 Ω max.	
	MCFE1608	0.100~0.340 Ω max.	
	MCKK1608	0.038~0.123 Ω max.	
	MCHK2012	0.024~0.111 Ω max.	
	MCKK2012	0.025~0.090 Ω max.	
	Test Methods and Remarks	Measuring equipment: VOAC-7412, VOAC-7512, VOAC-7521 (made by Iwasaki Tsushinki), HIOKI3227 (or its equivalent)	

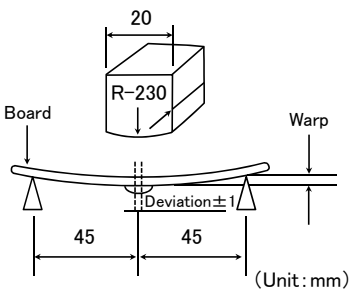
8. Self Resonance Frequency (SRF)

Specified Value	BK0402		
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY	BK2010	-
		BK3216	
	BKP0402		
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605		
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608	17~25MHz min.	
	CK2125	24~235MHz min.	
	CKS2125	24~75MHz min.	
	CKP1608		
	CKP2012		
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005	40~180MHz min.	
	LK1608	9~260MHz min.	
	LK2125	13~320MHz min.	
	HK0603	900~10000MHz min.	
	HK1005	400~10000MHz min.	
	HK1608	300~10000MHz min.	
HK2125	200~4000MHz min.		
HKQ0402	1200~10000MHz min.		
HKQ0603W	800~10000MHz min.		
HKQ0603S	1900~10000MHz min.		
HKQ0603U	1900~10000MHz min.		
AQ105	2300~10000MHz min.		
MCFK1608			
MCFE1608			
MCKK1608			
MCHK2012			
MCKK2012			
Test Methods and Remarks	LK, CK Series : Measuring equipment : 4195A (or its equivalent) Measuring jig : 41951 + 16092A (or its equivalent) HK, HKQ, AQ Series : Measuring equipment : 8719C (or its equivalent) • 8753D (or its equivalent) / HK2125		

9. Temperature Characteristic

Specified Value	BK0402	-	
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY		BK2010
			BK3216
	BKP0402		
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605		
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608		
	CK2125		
	CKS2125		
	CKP1608		
	CKP2012		
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005		
	LK1608		
	LK2125		
	HK0603		Inductance change: Within $\pm 10\%$
	HK1005		
	HK1608		
	HK2125		
	HKQ0402		
HKQ0603W			
HKQ0603S			
HKQ0603U			
AQ105			
MCFK1608			
MCFE1608			
MCKK1608			
MCHK2012			
MCKK2012			
Test Methods and Remarks	HK, HKQ, AQ Series: Temperature range : $-30 \sim +85^{\circ}\text{C}$ Reference temperature : $+20^{\circ}\text{C}$ MC Series: Temperature range : $-40 \sim +85^{\circ}\text{C}$ Reference temperature : $+20^{\circ}\text{C}$		

10. Resistance to Flexure of Substrate

Specified Value	BK0402	No mechanical damage.	
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY		BK2010
			BK3216
	BKP0402		
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605		
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608		
	CK2125		
	CKS2125		
	CKP1608		
	CKP2012		
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005		
	LK1608		
	LK2125		
	HK0603		
	HK1005		
	HK1608		
	HK2125		
	HKQ0402		
HKQ0603W			
HKQ0603S			
HKQ0603U			
AQ105			
MCFK1608			
MCFE1608			
MCKK1608			
MCHK2012			
MCKK2012			
Test Methods and Remarks	<p>Warp : 2mm (BK Series without 0402size, BKP, BKH1005, CK, CKS, CKP, LK, HK, HKQ0603S, HKQ0603U, AQ Series, MCF1210, MC Series)</p> <p> : 1mm (BK0402, BKP0402, BKH0603, HKQ0402, HKQ0603W, MCF Series without 1210 size.)</p> <p>Testing board : glass epoxy-resin substrate</p> <p>Thickness : 0.8mm</p>  <p>(Unit: mm)</p>		

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11. Solderability

Specified Value	BK0402	At least 90% of terminal electrode is covered by new solder.	
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY		BK2010
			BK3216
	BKP0402		
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605		
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608		
	CK2125		
	CKS2125		
	CKP1608		
	CKP2012		
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005		
	LK1608		
	LK2125		
	HK0603		
	HK1005		
	HK1608		
	HK2125		
HKQ0402			
HKQ0603W			
HKQ0603S			
HKQ0603U			
AQ105			
MCFK1608			
MCFE1608			
MCKK1608			
MCHK2012			
MCKK2012			
Test Methods and Remarks	Solder temperature : 230±5°C (JIS Z 3282 H60A or H63A)		
	Solder temperature : 245±3°C (Sn/3.0Ag/0.5Cu)		
	Duration : 4±1 sec.		

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12. Resistance to Soldering			
Specified Value	BK0402	Appearance: No significant abnormality Impedance change: Within $\pm 30\%$	
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY		BK2010
			BK3216
	BKP0402		
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605		Appearance: No significant abnormality Impedance change: Within $\pm 20\%$
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608	Appearance: No significant abnormality Inductance change R10~4R7: Within $\pm 10\%$ 6R8~100: Within $\pm 15\%$ CKS2125 : Within $\pm 20\%$ CKP1608, CKP2012, CKP2016, CKP2520, NM2012, NM2520: Within $\pm 30\%$	
	CK2125		
	CKS2125		
	CKP1608		
	CKP2012		
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
LK1005	Appearance: No significant abnormality Inductance change: Within $\pm 15\%$		
LK1608	Appearance: No significant abnormality Inductance change		
LK2125	47N~4R7: Within $\pm 10\%$ 5R6~330: Within $\pm 15\%$		
HK0603	Appearance: No significant abnormality Inductance change: Within $\pm 5\%$		
HK1005			
HK1608			
HK2125			
HKQ0402			
HKQ0603W			
HKQ0603S			
HKQ0603U			
AQ105			
MCFK1608			
MCFE1608	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$		
MCKK1608			
MCHK2012			
MCKK2012			
Test Methods and Remarks	Solder temperature : $260 \pm 5^\circ\text{C}$ Duration : 10 ± 0.5 sec. Preheating temperature : 150 to 180°C Preheating time : 3 min. Flux : Immersion into methanol solution with colophony for 3 to 5 sec. Recovery : 2 to 3 hrs of recovery under the standard condition after the test. (See Note 1)		

(Note 1) When there are questions concerning measurement result; measurement shall be made after 48 ± 2 hrs of recovery under the standard condition.

13. Thermal Shock

Specified Value	BK0402	Appearance: No significant abnormality Impedance change: Within $\pm 30\%$		
	BK0603			
	BK1005			
	BKH0603			
	BKH1005			
	BK1608			
	BK2125			
	ARRAY		BK2010 BK3216	
	BKP0402			
	BKP0603			
	BKP1005			
	BKP1608			
	BKP2125			
	MCF 0605		Appearance: No significant abnormality Impedance change: Within $\pm 20\%$	
	MCF 0806			
	MCF 1210			
	MCF 2010			
	CK1608	Appearance: No significant abnormality Inductance change: Within $\pm 20\%$ Q change: Within $\pm 30\%$		
	CK2125			
	CKS2125	Appearance: No significant abnormality Inductance change: Within $\pm 20\%$		
	CKP1608			
	CKP2012	Appearance: No significant abnormality Inductance change: Within $\pm 30\%$		
	CKP2016			
	CKP2520			
	NM2012			
	NM2520			
	LK1005	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$ Q change: Within $\pm 30\%$		
	LK1608			
	LK2125			
	HK0603	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$ Q change: Within $\pm 20\%$		
	HK1005			
	HK1608			
	HK2125			
	HKQ0402			
	HKQ0603W			
	HKQ0603S			
	HKQ0603U			
	AQ105			
	MCFK1608			
	MCFE1608	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$		
	MCKK1608			
	MCHK2012			
	MCKK2012			
	Test Methods and Remarks	Conditions for 1 cycle		
		Step	temperature (°C)	time (min.)
		1	Minimum operating temperature +0/−3	30±3
		2	Room temperature	2~3
		3	Maximum operating temperature +3/−0	30±3
	4	Room temperature	2~3	
		Number of cycles: 5		
		Recovery: 2 to 3 hrs of recovery under the standard condition after the test. (See Note 1)		
		(Note 1) When there are questions concerning measurement result; measurement shall be made after 48±2 hrs of recovery under the standard condition.		

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14. Damp Heat (Steady state)			
Specified Value	BK0402	Appearance: No significant abnormality Impedance change: Within $\pm 30\%$	
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY		BK2010
			BK3216
	BKP0402		
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605		Appearance: No significant abnormality Impedance change: Within $\pm 20\%$
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608	Appearance: No significant abnormality Inductance change: Within $\pm 20\%$ Q change: Within $\pm 30\%$	
	CK2125		
	CKS2125	Appearance: No significant abnormality Inductance change: Within $\pm 20\%$	
	CKP1608		
	CKP2012	Appearance: No significant abnormality Inductance change: Within $\pm 30\%$	
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$ Q change: Within $\pm 30\%$	
	LK1608		
	LK2125	Appearance: No significant abnormality Inductance change: Within $\pm 20\%$ Q change: Within $\pm 30\%$	
	HK0603		
	HK1005	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$ Q change: Within $\pm 20\%$	
	HK1608		
HK2125			
HKQ0402			
HKQ0603W			
HKQ0603S			
HKQ0603U			
AQ105			
MCFK1608			
MCFE1608	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$		
MCKK1608			
MCHK2012			
MCKK2012			
Test Methods and Remarks	BK, BKP, BKH, LK, CK, CKS, CKP, NM Series, MCF Series: Temperature : $40 \pm 2^\circ\text{C}$ Humidity : 90 to 95%RH Duration : 500 +24/-0 hrs Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1)		
	HK, HKQ, AQ, MC Series: Temperature : $60 \pm 2^\circ\text{C}$ Humidity : 90 to 95%RH Duration : 500 +24/-0 hrs Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1)		
(Note 1) When there are questions concerning measurement result; measurement shall be made after 48 ± 2 hrs of recovery under the standard condition.			

15. Loading under Damp Heat

Specified Value	BK0402	Appearance: No significant abnormality Impedance change: Within $\pm 30\%$	
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY		BK2010
			BK3216
	BKP0402		
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	CK1608		Appearance: No significant abnormality
	CK2125	Inductance change: Within $\pm 20\%$ Q change: Within $\pm 30\%$	
	CKS2125	Appearance: No significant abnormality Inductance change: Within $\pm 20\%$	
	CKP1608	Appearance: No significant abnormality Inductance change: Within $\pm 30\%$	
	CKP2012		
	CKP2016		
	CKP2520		
	NM2012		
	NM2520	Appearance: No significant abnormality Inductance change: Within $\pm 30\%$	
	LK1005		
	LK1608		Appearance: No significant abnormality Inductance change: 0.047~12.0 μH : Within $\pm 10\%$ 15.0~33.0 μH : Within $\pm 15\%$ Q change: Within $\pm 30\%$
	LK2125	Appearance: No significant abnormality Inductance change: Within $\pm 20\%$ Q change: Within $\pm 30\%$	
	HK0603	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$ Q change: Within $\pm 20\%$	
	HK1005		
	HK1608		
	HK2125		
	HKQ0402		
	HKQ0603W		
HKQ0603S			
HKQ0603U			
AQ105			
MCFK1608※	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$		
MCFE1608※			
MCKK1608※			
MCHK2012※			
MCKK2012※			

Test Methods and Remarks

BK, BKP, BKH, LK, CK, CKS, CKP, NM Series:
 Temperature : $40 \pm 2^\circ\text{C}$
 Humidity : 90 to 95%RH
 Applied current : Rated current
 Duration : 500 +24/-0 hrs
 Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1)

HK, HKQ, AQ, MC Series:
 Temperature : $60 \pm 2^\circ\text{C}$
 Humidity : 90 to 95%RH
 Applied current : Rated current ※MC series ; I_{dc2max}
 Duration : 500 +24/-0 hrs
 Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1)

Note on standard condition: "standard condition" referred to herein is defined as follows:
 5 to 35°C of temperature, 45 to 85% relative humidity, and 86 to 106kPa of air pressure.
 When there are questions concerning measurement results:
 In order to provide correlation data, the test shall be conducted under condition of $20 \pm 2^\circ\text{C}$ of temperature, 60 to 70% relative humidity, and 86 to 106kPa of air pressure.
 Unless otherwise specified, all the tests are conducted under the "standard condition."
 (Note 1) Measurement shall be made after 48 ± 2 hrs of recovery under the standard condition.

16. Loading at High Temperature			
Specified Value	BK0402	Appearance: No significant abnormality Impedance change: Within $\pm 30\%$	
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	ARRAY		BK2010
			BK3216
	BKP0402		
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605		Appearance: No significant abnormality Impedance change: Within $\pm 20\%$
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608	Appearance: No significant abnormality Inductance change: Within $\pm 20\%$ Q change: Within $\pm 30\%$	
	CK2125		
	CKS2125	Appearance: No significant abnormality Inductance change: Within $\pm 20\%$	
	CKP1608		
	CKP2012	Appearance: No significant abnormality Inductance change: Within $\pm 30\%$	
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$ Q change: Within $\pm 30\%$	
	LK1608		
	LK2125	Appearance: No significant abnormality Inductance change: Within $\pm 20\%$ Q change: Within $\pm 30\%$	
	HK0603		
	HK1005	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$ Q change: Within $\pm 20\%$	
HK1608			
HK2125			
HKQ0402			
HKQ0603W			
HKQ0603S			
HKQ0603U			
AQ105			
MCFK1608※	Appearance: No significant abnormality Inductance change: Within $\pm 10\%$		
MCFE1608※			
MCKK1608※			
MCHK2012※			
MCKK2012※			

Test Methods and Remarks	Temperature : Maximum operating temperature Applied current : Rated current ※MC series ; I _{dc2max} Duration : 500 +24/-0 hrs Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1)
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Note on standard condition: "standard condition" referred to herein is defined as follows:
 5 to 35°C of temperature, 45 to 85% relative humidity, and 86 to 106kPa of air pressure.
 When there are questions concerning measurement results:
 In order to provide correlation data, the test shall be conducted under condition of 20±2°C of temperature, 60 to 70% relative humidity, and 86 to 106kPa of air pressure. Unless otherwise specified, all the tests are conducted under the "standard condition."
 (Note 1) Measurement shall be made after 48±2 hrs of recovery under the standard condition.

Precautions on the use of Multilayer chip inductors

Multilayer chip inductors for high frequency, Multilayer chip bead inductors

Multilayer common mode choke coils (MC series F type)

Metal Multilayer Chip Power Inductors (MCOIL™ MC series)

PRECAUTIONS

1. Circuit Design

- Precautions**
- ◆ Verification of operating environment, electrical rating and performance
 1. A malfunction in medical equipment, spacecraft, nuclear reactors, etc. may cause serious harm to human life or have severe social ramifications.

As such, any inductors to be used in such equipment may require higher safety and/or reliability considerations and should be clearly differentiated from components used in general purpose applications.
 - ◆ Operating Current (Verification of Rated current)
 1. The operating current including inrush current for inductors must always be lower than their rated values.
 2. Do not apply current in excess of the rated value because the inductance may be reduced due to the magnetic saturation effect.

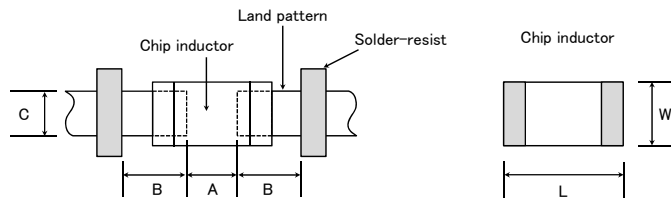
2. PCB Design

- Precautions**
- ◆ Pattern configurations (Design of Land-patterns)
 1. When inductors are mounted on a PCB, the size of land patterns and the amount of solder used (size of fillet) can directly affect inductor performance.

Therefore, the following items must be carefully considered in the design of solder land patterns:

 - (1) The amount of solder applied can affect the ability of chips to withstand mechanical stresses which may lead to breaking or cracking. Therefore, when designing land-patterns it is necessary to consider the appropriate size and configuration of the solder pads which in turn determines the amount of solder necessary to form the fillets.
 - (2) When more than one part is jointly soldered onto the same land or pad, the pad must be designed so that each component's soldering point is separated by solder-resist.
 - (3) The larger size of land patterns and amount of solder, the smaller Q value after mounting on PCB. It makes higher the Q value to design land patterns smaller than terminal electrode of chips.
 - ◆ Pattern configurations (Inductor layout on panelized [breakaway] PC boards)
 1. After inductors have been mounted on the boards, chips can be subjected to mechanical stresses in subsequent manufacturing processes (PCB cutting, board inspection, mounting of additional parts, assembly into the chassis, wave soldering the reflow soldered boards etc.) For this reason, planning pattern configurations and the position of SMD inductors should be carefully performed to minimize stress.

- Technical considerations**
- ◆ Pattern configurations (Design of Land-patterns)
 1. The following diagrams and tables show some examples of recommended patterns to prevent excessive solder amounts (larger fillets which extend above the component end terminations). Examples of improper pattern designs are also shown.
 - (1) Recommended land dimensions for a typical chip inductor land patterns for PCBs



Recommended land dimensions for wave-soldering (Unit: mm)

Type	1608	2012	2125	2016	2520	3216	
Size	L	1.6	2.0	2.0	2.0	2.5	3.2
	W	0.8	1.25	1.25	1.6	2.0	1.6
A	0.8~1.0	1.0~1.4	1.0~1.4	1.0~1.4	1.0~1.4	1.8~2.5	
B	0.5~0.8	0.8~1.5	0.8~1.5	0.8~1.5	0.6~1.0	0.8~1.7	
C	0.6~0.8	0.9~1.2	0.9~1.2	1.3~1.6	1.6~2.0	1.2~1.6	

Recommended land dimensions for reflow-soldering (Unit: mm)

Type	0402	0603	1005	105	1608	2012	2125	2016	2520	3216
Size	L	0.4	0.6	1.0	1.0	1.6	2.0	2.0	2.5	3.2
	W	0.2	0.3	0.5	0.6	0.8	1.25	1.25	1.6	2.0
A	0.15~0.25	0.20~0.30	0.45~0.55	0.50~0.55	0.8~1.0	0.8~1.2	0.8~1.2	0.8~1.2	1.0~1.4	1.8~2.5
B	0.10~0.20	0.20~0.30	0.40~0.50	0.30~0.40	0.6~0.8	0.8~1.2	0.8~1.2	0.8~1.2	0.6~1.0	0.6~1.5
C	0.15~0.30	0.25~0.40	0.45~0.55	0.60~0.70	0.6~0.8	0.9~1.6	0.9~1.6	1.2~2.0	1.8~2.2	1.2~2.0

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