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金属绕线型片状功率电感器 (MCOIL™ ME 系列)



■型号标示法

※使用温度范围: -40~+125℃ (包含产品本身发热)



①类型

代码	类型
ME	金属绕线型片状功率电感器

代码	尺寸 (T) [mm]
KK	1.0

③尺寸 (L×W)

代码	尺寸 (L×W) [mm]
2016	2.0 × 1.6
2520	2.5 × 2.0

小与壮

代码	包装					
Т	卷盘带装					

⑤标称电感值

代码 (例)	标称电感值 [µH]
R47	0.47
1R0	1.0
4R7	4.7
※R=小数点	

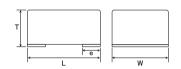
6 电感量公差	
代码	电感量公差
М	+20%

⑦个别规格

O I Mayoria	
代码	个别规格
Δ	标准品

⑧本公司管理记号

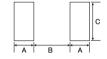
■标准外型尺寸 / 标准数量



推荐焊盘图案

实装上的注意

- ·请确认实装状态后使用。
- ·本产品焊法限定为回流焊法。



Type	Α	В	С
2016	0.7	0.8	1.8
2520	0.9	1.0	2.2
			单位: mm

Type	L	W	Т	е	标准数量 [pcs] 卷盘带装
MEKK2016	2.0±0.2 (0.079±0.008)	1.6±0.2 (0.063±0.008)	1.0 max (0.039 max)	0.5 ± 0.3 (0.020±0.012)	3000
MEKK2520	2.5±0.2 (0.098±0.008)	2.0±0.2 (0.079±0.008)	1.0 max (0.039 max)	0.65±0.3 (0.026±0.012)	3000

单位: mm (inch)

■型号一览

●MEKK2016 型		【厚度:1.0mm max.】	-					
		标称电感值		自共振频率	±>±++===		[mA] (max.)	VIII VALLET THE
型号	EHS	你你电想值 [µH]	电感量公差	[MHz] (min.)	直流电阻 [Ω] (max.)	直流重叠允许电流 Idc1	温度上升允许电流 ldc2	测试频率 [MHz]
MEKK2016TR47M	RoHS	0.47	±20%	-	0.030	4,500	4,300	1
MEKK2016T1R0M	RoHS	1.0	±20%	-	0.060	3,600	3,100	1
MEKK2016T2R2M	RoHS	2.2	±20%	-	0.150	2,400	1,900	1

【厚度:1.0mm max.】 ■MEKK2520型

型号	EHS	标称电感值 [μH]	电感量公差	自共振频率 [MHz] (min.)	直流电阻 [Ω] (max.)	额定电流 ※) 直流重叠允许电流 Idc1	[mA] (max.) 温度上升允许电流 Idc2	测试频率 [MHz]
MEKK2520TR33M	RoHS	0.33	±20%	-	0.022	6,400	5,100	1
MEKK2520TR47M	RoHS	0.47	±20%	-	0.025	5,900	4,800	1
MEKK2520T1R0M	RoHS	1.0	±20%	-	0.053	4,300	3,300	1

- ※)直流重叠允许电流(Idc1)为直流重叠带来的电感值下降,范围在30%以内的直流电感值(at 20°)》)温度上升允许电流(Idc2)为温度上升到 40° 时的直流电感值(at 20°))
- ※)最大额定电流值为能够满足直流重叠允许电流和温度上升允许电流的直流电流值

※) Idc2 测试基板规格 材料:FR4

基板尺寸: 100×50×1.6t mm 焊盘尺寸: 45×45 mm (双面基板) 焊盘厚度: 70μm

[▶] 由于篇幅有限,本产品目录中只记载了有代表性的产品规格,若考虑使用弊司产品时,请确认交货规格说明书中的详细规格。 另外,有关各产品的详细信息(特性图、可靠性信息、使用时的注意事项等),请参阅弊司网站(http://www.ty-top.com/)。

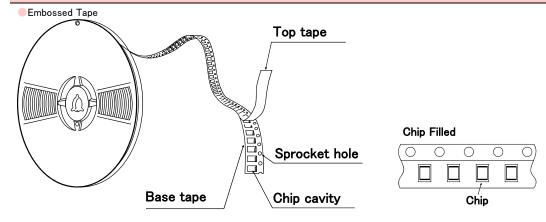
METAL WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ ME SERIES)

PACKAGING

1 Minimum Quantity

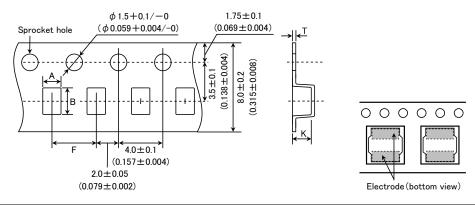
Туре	Standard Quantity [pcs]
	Tape & Reel
MEKK2016	3000
MEKK2520	3000

2Tape Material



3Taping dimensions

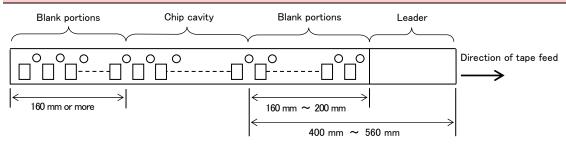
Embossed tape 8mm wide (0.315 inches wide)



T	Chip	cavity	Insertion pitch	Tape thickness	
Туре	Α	В	F	T	K
MEKKOO16	1.9±0.1	2.45±0.1	4.0±0.1	0.25±0.05	1.2 max
MEKK2016	(0.075 ± 0.004)	(0.097 ± 0.004)	(0.157 ± 0.004)	(0.009 ± 0.002)	(0.047 max)
MENNOEOO	2.4±0.1	2.9±0.1	4.0±0.1	0.25±0.05	1.1 max
MEKK2520	(0.094 ± 0.004)	(0.114 ± 0.004)	(0.157 ± 0.004)	(0.009 ± 0.002)	(0.043 max)
					11.11 (1.11)

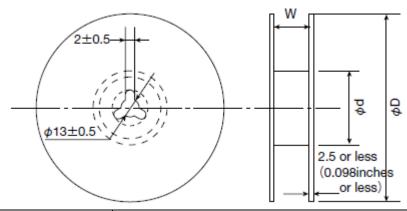
Unit:mm(inch)

4 Leader and Blank portion



This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/).

⑤Reel size

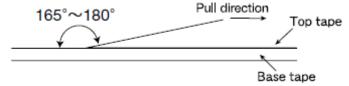


Type	Reel size (Reference values)				
Туре	ϕ D	ϕ d	W		
MEKK2016	180+0/-3	60+1/-0	10.0±1.5		
MEKK2520	(7.087+0/-0.118)	(2.36+0.039/0)	(0.394 ± 0.059)		

Unit:mm(inch)

6Top Tape Strength

The top The top tape requires a peel-off force of 0.1 to 1.0N in the direction of the arrow as illustrated below.



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METAL WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ ME SERIES)

■RELIABILITY DATA

1 One T	vehius Denos	
1. Operating Tempe		401.105°0
Specified Value	ME series	-40~+125°C
Test Methods and Remarks	Including self-generated heat	
2. Storage Tempera	ture Range	
Specified Value	ME series	-40~+85°C
Test Methods and Remarks	0 to 40°C for the product with taping.	
3. Rated current		
Specified Value	ME series	Within the specified tolerance
opcomed value	ME 30103	Main the specified tolerance
4. Inductance		
Specified Value	ME series	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4 Measuring frequency : 1MHz, 0.5V	
5. DC Resistance		
Specified Value	ME series	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HI	IOKI 3227 or equivalent)
6 C-1t t		
6. Self resonance fr		_
Specified Value	ME series	-
7. Temperature cha	uo atauiatia	
Specified Value	ME series	Inductance change : Within ±15%
Test Methods and		temperature range within $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$.
Remarks	With reference to inductance value at $+20^{\circ}$	
8. Resistance to flex	yura of cubatrata	
Specified Value	ME series	No damage
Test Methods and Remarks	The test samples shall be soldered to the test until deflection of the test board reaches to the test board size and the solder size are to the solder cream thickness and the solder cream thickness are solder cream thickness.	mm Force Rod 10 20
		R5 Test Sample 45±2mm
9. Insulation resista	nce : between wires	
Specified Value	ME series	-
		1
10. Insulation resist	ance : between wire and over-coating	
Specified Value	ME series	DC25V 100k Ωmin
11 Withstanding vo	Itage : between wire and over-coating	
Specified Value	ME series	_
		1

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Specified Value	ME series		No abnormality.
	The test samples shall be s	soldered to the tes	st board by the reflow.
Test Methods and	Applied force	: 10N to X and \	Y directions.
Remarks	Duration	: 5s.	
	Solder cream thickness	: 0.12mm.	
13. Resistance to v		: 0.12mm.	
	ibration	: 0.12mm.	Inductance change : Within ±10%
13. Resistance to v		: 0.12mm.	Inductance change : Within ±10% No significant abnormality in appearance.
	ibration		No significant abnormality in appearance.

Test Methods and Remarks

10 TI I I

Frequency Range	10~55	10~55Hz		
Total Amplitude	1.5mm	(May not exceed acceleration 196m/s²)		
Sweeping Method	10Hz to 55Hz to 10Hz for 1min.			
	Χ			
Time	Υ	For 2 hours on ach X, Y, and Z axis.		
	Z			

Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

14. Solderability			
Specified Value	ME series		At least 90% of surface of terminal electrode is covered by new solder.
Test Methods and Remarks	The test samples shall be dip Flux: Methanol solution cont Solder Temperature Time **Immersion depth: All sides*	aining rosin 25%. 245±5°C 5±0.5 sec.	then immersed in molten solder as shown in below table.

15. Resistance to se	oldering heat	
Specified Value	ME series	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
Test Methods and Remarks	Test board material : Glass epoxy-resin Test board thickness : 1.0mm	ren at 230°C for 40 seconds, with peak temperature at $260+0/-5$ °C for 5 seconds, 2 times. The standard condition after the test, followed by the measurement within 48hrs.

16. Thermal shock				
Specified Value	ME series		Inductance change : No significant abnorm	
		•	•	the test samples shall be placed at specified temperature for specified emperature cycle shall be repeated 100 cycles.
		Conditions of 1 c	ycle	
To at Mother decemb	Step	Temperature (°C)	Duration (min)	
Test Methods and Remarks	1	-40 ± 3	30±3	
Remarks	2	Room temperature	Within 3	
	3	+85±2	30±3	
	4	Room temperature	Within 3	
	<u> </u>	ALL LOL C	11 1 1 P.C	

Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

17. Damp heat			
Specified Value	ME series		Inductance change : Within ±10% No significant abnormality in appearance.
T . M .!	·	hall be soldered to the te hall be placed in thermost	st board by the reflow. atic oven set at specified temperature and humidity as shown in below table.
Test Methods and Remarks	Temperature	60±2°C	
Remarks	Humidity	90∼95%RH	
	Time $500+24/-0$ hour		
	Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.		

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18. Loading under d	amp heat		
Specified Value	ME series		Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and	The test samples si continuously as show	n in below table.	ost board by the reflow. Inostatic oven set at specified temperature and humidity and applied the rated current
Remarks	Temperature Humidity Applied current Time Recovery: At least 2	60±2°C 90~95%RH Rated current 500+24/-0 hour hrs of recovery under th	ne standard condition after the test, followed by the measurement within 48hrs.
	-	<u> </u>	
19. Low temperatur	e life test		
Specified Value	ME series		Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
Test Methods and Remarks	in below table.	,	t board by the reflow. After that, the test samples shall be placed at test conditions as shown
Remarks			ne standard condition after the test, followed by the measurement within 48hrs.
20. High temperatur	e life test		
Specified Value	ME series		Inductance change : Within ±10% No significant abnormality in appearance.
Test Methods and Remarks	in below table. Temperature Time	125±2°C 500+24/-0 hour	t board by the reflow. After that, the test samples shall be placed at test conditions as shown The standard condition after the test, followed by the measurement within 48hrs.
	Theody of y . At least 2	ins of recovery under the	to standard condition after the test, followed by the measurement within 40ms.
21. Loading at high	temperature life test		
Specified Value	ME series		_
22. Standard condit	ion		
Specified Value	ME series		Standard test condition: Unless otherwise specified, temperature is 20±15°C and 65±20% of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2°C of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value.

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METAL WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ ME SERIES)

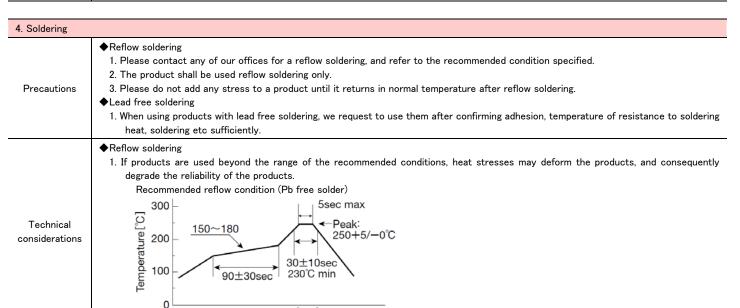
damage. For such uses, contact TAIYO YUDEN Sales Department in advance.

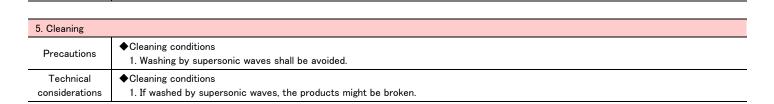
■PRECAUTIONS

1. Circuit Design Operating environment 1. The products described in this specification are intended for use in general electronic equipment, (office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or

2. PCB Design	
Precautions	◆Land pattern design 1. Please refer to a recommended land pattern.
Technical considerations	 ◆Land pattern design Surface Mounting • Mounting and soldering conditions should be checked beforehand. • Applicable soldering process to this products is reflow soldering only.

3. Considerations	for automatic placement
Precautions	◆Adjustment of mounting machine 1. Excessive impact load should not be imposed on the products when mounting onto the PC boards. 2. Mounting and soldering conditions should be checked beforehand.
Technical considerations	◆Adjustment of mounting machine 1. When installing products, care should be taken not to apply distortion stress as it may deform the products.





Heating Time [sec]

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6. Handling ◆Handling 1. Keep the product away from all magnets and magnetic objects. ◆Breakaway PC boards (splitting along perforations) 1. When splitting the PC board after mounting product, care should be taken not to give any stresses of deflection or twisting to the board. 2. Board separation should not be done manually, but by using the appropriate devices. ◆Mechanical considerations Precautions 1. Please do not give the product any excessive mechanical shocks. 2. Please do not add any shock and power to a product in transportation. ◆Pick-up pressure 1. Please do not push to add any pressure to a winding part. Please do not give any shock and push into a ferrite core exposure part. ◆Packing 1. Please avoid accumulation of a packing box as much as possible. 1. There is a case that a characteristic varies with magnetic influence. ◆Breakaway PC boards (splitting along perforations) 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs. ◆Mechanical considerations Technical 1. There is a case to be damaged by a mechanical shock. considerations 2. There is a case to be broken by the handling in transportation. ◆Pick-up pressure 1. Damage and a characteristic can vary with an excessive shock or stress. **♦**Packing 1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.

7. Storage condi	tions
Precautions	 ♦ Storage 1. To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled. • Recommended conditions Ambient temperature : 0~40°C Humidity : Below 70° RH • The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, product should be used within 6 months from the time of delivery. In case of storage over 6 months, solderability shall be checked before actual usage.
Technical considerations	◆Storage 1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.

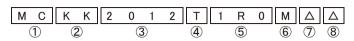
金属多层片状功率电感器 (MCOIL™ MC 系列)



回流焊

■型号标示法

※使用温度范围: -40~+125℃ (包含产品本身发热)



△=空格

①类型

代码	类型
MC	金属多层片状功率电感器

②产品厚度 (T)

O1 HH1312	
代码	产品厚度 (T) [mm]
FK	0.60 max
FE	0.65 max
HK	0.80 max
KK	1.0 max

③尺寸 (L×W)

代码	外型 (inch)	尺寸 (L×W) [mm]		
1608	1608 (0603)	1.6 × 0.8		
2012	2012 (0805)	2.0 × 1.25		

④包装

代码	包装
T	卷盘带装

⑤标称电感值

代码 (例)	标称电感值 [µH]
R24	0.24
R47	0.47
1R0	1.0
N/5 1 W/5	·

※R=小数点

6 电感量公差

·	
代码	电感量公差
М	±20%

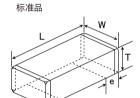
⑦本公司管理记号1

代码	本公司管理记号 1
Δ	标准品
G	电极5面品

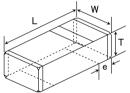
⑧本公司管理记号2

代码	本公司管理记号 2
Δ	无表示
N	有极性表示

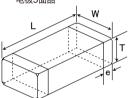
■标准外型尺寸 / 标准数量











	1	w	т		标准数量	[pcs]	
空亏		VV		е	纸带	压纹带	
MCFK1608	1.6±0.2	0.8±0.2	0.60 max	0.3 ± 0.2	4000		
(0603)	(0.063 ± 0.008)	(0.031 ± 0.008)	(0.024 max)	(0.012 ± 0.008)	4000		
MCFE1608	1.6±0.2	0.8 ± 0.2	0.65 max	0.3 ± 0.2	4000	_	
(0603)	(0.063 ± 0.008)	(0.031 ± 0.008)	(0.026 max)	(0.012 ± 0.008)	4000		
MCKK1608	1.6±0.2	0.8 ± 0.2	1.0 max	0.3 ± 0.2	_	3000	
(0603)	(0.063 ± 0.008)	(0.031 ± 0.008)	(0.039 max)	(0.012 ± 0.008)	_	3000	
MCHK2012	2.0 ± 0.2	1.25±0.2	0.80 max	0.5 ± 0.3	4000		
(0805)	(0.079 ± 0.008)	(0.049 ± 0.008)	(0.031 max)	(0.02 ± 0.012)	4000	_	
MCKK2012	2.0±0.2	1.25±0.2	1.0 max	0.5±0.3	_	3000	
(0805)	(0.079 ± 0.008)	(0.049 ± 0.008)	(0.039 max)	(0.02 ± 0.012)	_	3000	

单位: mm (inch)

[▶] 由于篇幅有限,本产品目录中只记载了有代表性的产品规格,若考虑使用弊司产品时,请确认交货规格说明书中的详细规格。 另外,有关各产品的详细信息(特性图、可靠性信息、使用时的注意事项等),请参阅弊司网站(http://www.ty-top.com/)。

MC1608

型号	EHS	EHS	EHS	EHS	EHS	EHS	EHS	EHS	EHS	EHS	标称电感值 [μH]	电感量公差	直流电阻 [Ω]		额定电流 (ldc1)	额定电流 (Idc2)	测试频率 [MHz]	厚度 [mm] (max.)
		tpiii		(max.)	(typ.)	[A] (max.)	[A] (max.)	. ,	[mm] (maxa)									
MCFK1608TR24M	RoHS	0.24	±20%	0.050	0.040	2.30	2.10	1	0.60									
MCFK1608TR47M	RoHS	0.47	±20%	0.085	0.069	1.90	1.60	1	0.60									
MCFK1608T1R0M	RoHS	1.0	±20%	0.224	0.182	1.50	0.90	1	0.60									
MCFE1608TR24MG	RoHS	0.24	±20%	0.100	0.075	2.60	1.50	1	0.65									
MCFE1608TR47MG	RoHS	0.47	±20%	0.150	0.114	2.00	1.20	1	0.65									
MCFE1608T1R0MG	RoHS	1.0	±20%	0.340	0.270	1.40	0.80	1	0.65									
MCKK1608TR24M N	RoHS	0.24	±20%	0.038	0.035	2.80	2.60	1	1.00									
MCKK1608TR47M N	RoHS	0.47	±20%	0.055	0.044	2.40	2.00	1	1.00									
MCKK1608T1R0M N	RoHS	1.0	±20%	0.123	0.100	2.00	1.30	1	1.00									

MC2012

型号	型号 EHS 标称电感值 [µH]		电感量公差	直流电阻 [Ω]		额定电流 (Idc1)	额定电流 (Idc2)	测试频率 [MHz]	厚度
		[μн]		(max.)	(typ.)	[A] (max.)	[A] (max.)	[1411 12]	[mm] (max.)
MCHK2012TR24M	RoHS	0.24	±20%	0.024	0.019	4.32	3.60	1	0.80
MCHK2012TR47M	RoHS	0.47	±20%	0.036	0.030	3.21	3.15	1	0.80
MCHK2012T1R0M	RoHS	1.0	±20%	0.111	0.900	2.26	1.47	1	0.80
MCKK2012TR24M	RoHS	0.24	±20%	0.025	0.020	6.20	4.00	1	1.00
MCKK2012TR47M	RoHS	0.47	±20%	0.039	0.032	4.50	3.10	1	1.00
MCKK2012T1R0M	RoHS	1.0	±20%	0.090	0.073	3.60	2.10	1	1.00

^{※)} 直流重叠允许电流 (Idc1) 为直流重叠带来的电感值下降,范围在30%以内的直流电感值 (at 20%) 额定电流(Idc2): 直流电流负载时,由自发热引起的温度上升达40%以下的电流值 (20%)

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

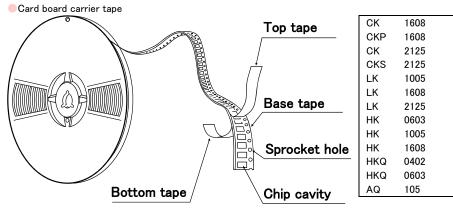
1 Minimum Quantity

Tape & Reel Packaging

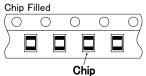
Tape & Reel Packaging			
Type	Thickness		uantity [pcs]
	mm(inch)	Paper Tape	Embossed Tape
CK1608(0603)	0.8 (0.031)	4000	_
CK2125 (0805)	0.85(0.033)	4000	_
	1.25(0.049)	_	2000
CKS2125 (0805)	0.85(0.033)	4000	_
	1.25(0.049)	_	2000
CKP1608 (0603)	0.8 (0.031)	4000	_
CKP2012 (0805)	0.9 (0.035)	_	3000
CKP2016 (0806)	0.9 (0.035)	_	3000
	0.7 (0.028)	_	3000
CKP2520 (1008)	0.9 (0.035)	_	3000
	1.1 (0.043)	_	2000
NM2012 (0805)	0.9 (0.035)	_	3000
NM2520(1008)	0.9 (0.035)	_	3000
141412020 (1000)	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	_
LN2123(0003)	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	_
LU(040E (000E)	0.85(0.033)	_	4000
HK2125(0805)	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	_
Bit 1000 (0000)	0.85(0.033)	4000	_
BK2125(0805)	1.25(0.049)	_	2000
BK2010(0804)	0.45(0.018)	4000	_
BK3216(1206)	0.8 (0.031)	-	4000
BKP0402 (01005)	()	20000	-
BKP0603 (0201)	0.2 (0.008) 0.3 (0.012)	15000	_
BKP1005 (0402)	0.5 (0.020)	10000	_
BKP1608 (0603)	0.8 (0.031)	4000	
BKP2125 (0805)		4000	
	0.85 (0.033)		
MCF0605 (0202)	0.3 (0.012)	15000	10000
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

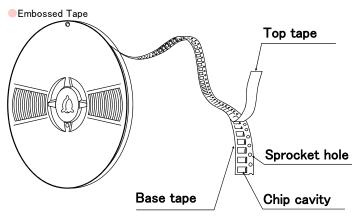
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2Taping material



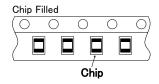
BK	0402	
BK	0603	
вк	1005	
BK	1608	
BK	2125	
BK	2010	
BKP	0402	
BKP	0603	
BKP	1005	
BKP	1608	
BKP	2125	
BKH	0603	
BKH	1005	
MCF	0605	
MC	1608	
MC	2012	



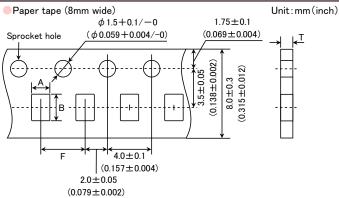


CK	2125	
CKS	2125	
CKP	2012	
CKP	2016	
CKP	2520	
NM	2012	
NM	2520	
LK	2125	
HKQ	0402	
HK	2125	

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



3Taping Dimensions

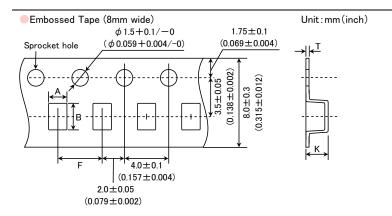


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_	Thickness	Chip	cavity	Insertion Pitch	Tape Thickness
Туре	mm(inch)	А	В	F	Т
CK1608(0603)	0.8 (0.031)	1.0±0.2	1.8±0.2	4.0±0.1	1.1max
	0.0 (0.001)	(0.039 ± 0.008)	(0.071 ± 0.008)	(0.157 ± 0.004)	(0.043max)
CK2125(0805)	0.85(0.033)	1.5±0.2	2.3±0.2	4.0±0.1	1.1max
		(0.059±0.008)	(0.091 ± 0.008)	(0.157±0.004)	(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)
		1.0±0.2	1.8±0.2	4.0±0.1	1.1max
CKP1608 (0603)	0.8 (0.031)	(0.039 ± 0.008)	(0.071 ± 0.008)	(0.157 ± 0.004)	(0.043max)
L K100E (0400)	0.5 (0.000)	0.65±0.1	1.15±0.1	2.0±0.05	0.8max
LK1005 (0402)	0.5 (0.020)	(0.026 ± 0.004)	(0.045 ± 0.004)	(0.079 ± 0.002)	(0.031max)
LK1608(0603)	0.8 (0.031)	1.0±0.2	1.8±0.2	4.0±0.1	1.1max
	0.0 (0.001)	(0.039 ± 0.008)	(0.071 ± 0.008)	(0.157±0.004)	(0.043max)
LK2125(0805)	0.85(0.033)	1.5±0.2 (0.059±0.008)	2.3±0.2	4.0±0.1 (0.157±0.004)	1.1max (0.043max)
		0.40±0.06	(0.091±0.008) 0.70±0.06	2.0±0.05	0.45max
HK0603(0201)	0.3 (0.012)	(0.016±0.002)	(0.028 ± 0.002)	(0.079 ± 0.002)	(0.018max)
	/>	0.65±0.1	1.15±0.1	2.0±0.05	0.8max
HK1005(0402)	0.5 (0.020)	(0.026 ± 0.004)	(0.045 ± 0.004)	(0.079 ± 0.002)	(0.031max)
HK1608(0603)	0.8 (0.031)	1.0±0.2	1.8±0.2	4.0±0.1	1.1max
HK1006(0003)	0.6 (0.031)	(0.039 ± 0.008)	(0.071 ± 0.008)	(0.157 ± 0.004)	(0.043max)
HKQ0402(01005)	0.2 (0.008)	0.25±0.04	0.45±0.04	2.0±0.05	0.36max
	0.2 (0.000)	(0.010±0.002)	(0.018±0.002)	(0.079 ± 0.002)	(0.014max)
HKQ0603W(0201)	0.3 (0.012)	0.40±0.06	0.70±0.06	2.0±0.05	0.45max
		(0.016±0.002)	(0.028±0.002)	(0.079±0.002)	(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)
		0.40±0.06	0.70±0.06	2.0±0.05	0.45max
HKQ0603U(0201)	0.3 (0.012)	(0.016±0.002)	(0.028 ± 0.002)	(0.079 ± 0.002)	(0.018max)
	()	0.75±0.1	1.15±0.1	2.0±0.05	0.8max
AQ105(0402)	0.5 (0.020)	(0.030 ± 0.004)	(0.045 ± 0.004)	(0.079 ± 0.002)	(0.031max)
BK0402(01005)	0.2 (0.008)	0.25±0.04	0.45±0.04	2.0±0.05	0.36max
BR0402 (01003)	0.2 (0.006)	(0.010±0.002)	(0.018±0.002)	(0.079 ± 0.002)	(0.014max)
BK0603(0201)	0.3 (0.012)	0.40 ± 0.06	0.70±0.06	2.0±0.05	0.45max
	0.0 (0.0.2)	(0.016±0.002)	(0.028 ± 0.002)	(0.079±0.002)	(0.018max)
BK1005(0402)	0.5 (0.020)	0.65±0.1	1.15±0.1	2.0±0.05	0.8max
_		(0.026±0.004) 1.0±0.2	(0.045±0.004) 1.8±0.2	(0.079±0.002) 4.0±0.1	(0.031max) 1.1max
BK1608(0603)	0.8 (0.031)	(0.039 ± 0.008)	(0.071 ± 0.008)	(0.157 ± 0.004)	(0.043max)
		1.5±0.2	2.3±0.2	4.0±0.1	1.1max
BK2125 (0805)	0.85(0.033)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.043max)
BK2010(0804)	0.45(0.018)	1.2±0.1	2.17±0.1	4.0±0.1	0.8max
BR2010(0004)	0.43(0.016)	(0.047 ± 0.004)	(0.085 ± 0.004)	(0.157 ± 0.004)	(0.031max)
BKP0402(01005)	0.2 (0.008)	0.25±0.04	0.45±0.04	2.0±0.05	0.36max
	_ (======,	(0.010±0.002)	(0.018±0.002)	(0.079 ± 0.002)	(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)
		0.65±0.1	1.15±0.1	2.0±0.05	0.8max
BKP1005(0402)	0.5 (0.020)	(0.026 ± 0.004)	(0.045 ± 0.004)	(0.079 ± 0.002)	(0.031max)
DVD1600 (0600)	0.0 (0.001)	1.0±0.2	1.8±0.2	4.0±0.1	1.1max
BKP1608 (0603)	0.8 (0.031)	(0.039 ± 0.008)	(0.071 ± 0.008)	(0.157 ± 0.004)	(0.043max)
BKP2125 (0805)	0.85(0.033)	1.5±0.2	2.3±0.2	4.0±0.1	1.1max
	5.55 (5.550)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157±0.004)	(0.043max)
BKH0603(0201)	0.3 (0.012)	0.40 ± 0.06	0.70±0.06	2.0±0.05	0.45max
		(0.016±0.002)	(0.028±0.002)	(0.079±0.002)	(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)
		0.62±0.03	0.77±0.03	2.0±0.05	0.45max
MCF0605 (0202)	0.3 (0.012)	(0.02±0.00 (0.024±0.001)	(0.030 ± 0.001)	(0.079 ± 0.002)	(0.018max)
MOEK1000 (0000)	0.0 (0.004)	1.1±0.05	1.9±0.05	4.0±0.1	0.72max
MCFK1608 (0603)	0.6 (0.024)	(0.043 ± 0.002)	(0.075 ± 0.002)	(0.157 ± 0.004)	(0.028max)
MCFE1608(0603)	0.65(0.026)	1.1±0.05	1.9±0.05	4.0±0.1	0.9max
MOI L1000 (0003)	0.03 (0.020)	(0.043 ± 0.002)	(0.075 ± 0.002)	(0.157±0.004)	(0.035max)
MCHK2012 (0805)	0.8 (0.031)	1.55±0.2	2.3±0.2	4.0±0.1	0.9max
-	<u> </u>	(0.061 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.035max)

Unit: mm(inch)

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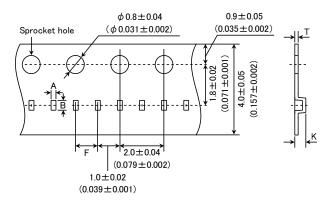
Thickness		Chip	cavity	Insertion Pitch	Tape Ti	Tape Thickness	
Туре	mm(inch)	А	В	F	K	Т	
OV010E (000E)	1.05(0.040)	1.5±0.2	2.3±0.2	4.0±0.1	2.0	0.3	
CK2125(0805) 1.25(0.049)		(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.079)	(0.012)	
OV0010E (000E)	1.05(0.040)	1.5±0.2	2.3±0.2	4.0±0.1	2.0	0.3	
CKS2125(0805) 1.25(0.049)	1.25(0.049)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.079)	(0.012)	
OKD0010 (000E)	0.9 (0.035)	1.55±0.2	2.3±0.2	4.0±0.1	1.3	0.3	
CKP2012 (0805)	0.9 (0.035)	(0.061 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.051)	(0.012)	
CKP2016 (0806)	0.9 (0.035)	1.8±0.1	2.2±0.1	4.0±0.1	1.3	0.25	
CKP2010 (0800)	0.9 (0.035)	(0.071 ± 0.004)	(0.087 ± 0.004)	(0.157 ± 0.004)	(0.051)	(0.01)	
	0.7 (0.000)				1.4		
	0.7 (0.028)				(0.055)		
OKD0E00 (1000)	0.0 (0.035)	2.3±0.1	2.8±0.1	4.0 ± 0.1	1.4	0.3	
CKP2520 (1008)	0.9 (0.035)	(0.091 ± 0.004)	(0.110 ± 0.004)	(0.157 ± 0.004)	(0.055)	(0.012)	
	1.1 (0.042)				1.7		
	1.1 (0.043)				(0.067)		
NIMAGO 1 G (GGGE)	0.0 (0.005)	1.55±0.2	2.3±0.2	4.0±0.1	1.3	0.3	
NM2012 (0805)	0.9 (0.035)	(0.061 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.051)	(0.012)	
	0.9 (0.035)				1.4		
NM2520(1008)	0.9 (0.035)	2.3±0.1	2.8±0.1	4.0±0.1	(0.055)	0.3	
	1.1 (0.040)	(0.091 ± 0.004)	(0.110 ± 0.004)	(0.157 ± 0.004)	1.7	(0.012)	
	1.1 (0.043)				(0.067)		
LK2125 (0805) 1.25 (0.049)	1.05(0.040)	1.5±0.2	2.3±0.2	4.0±0.1	2.0	0.3	
	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.079)	(0.012)		
0.05/0	0.05(0.000)				1.5		
	0.85(0.033)	1.5±0.2	2.3±0.2	4.0±0.1	(0.059)	0.3	
HK2125(0805)	4.0 (0.000)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	2.0	(0.012)	
	1.0 (0.039)				(0.079)		
DI(010E (000E)	1.05(0.040)	1.5±0.2	2.3±0.2	4.0±0.1	2.0	0.3	
BK2125 (0805)	1.25(0.049)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.079)	(0.012)	
DI(0010(1000)	0.0(0.004)	1.9±0.1	3.5±0.1	4.0±0.1	1.4	0.3	
BK3216(1206)	0.8(0.031)	(0.075 ± 0.004)	(0.138 ± 0.004)	(0.157 ± 0.004)	(0.055)	(0.012)	
14050000(0000)	0.4 (0.040)	0.75±0.05	0.95±0.05	2.0±0.05	0.55	0.3	
MCF0806(0302)	0.4 (0.016)	(0.030 ± 0.002)	(0.037 ± 0.002)	(0.079 ± 0.002)	(0.022)	(0.012)	
	0.55 (0.000)	1.15±0.05	1.40±0.05	4.0±0.1	0.65	0.3	
MCF1210 (0504)	0.55 (0.022)	(0.045 ± 0.002)	(0.055 ± 0.002)	(0.157 ± 0.004)	(0.026)	(0.012)	
	()	1.1±0.1	2.3±0.1	4.0±0.1	0.85	0.3	
MCF2010 (0804)	0.45 (0.018)	(0.043 ± 0.004)	(0.091 ± 0.004)	(0.157 ± 0.004)	(0.033)	(0.012)	
		1.1±0.1	1.95±0.1	4.0±0.1	1.4	0.25	
MCKK1608(0603)	1.0 (0.039)	(0.043 ± 0.004)	(±0.004)	(0.157 ± 0.004)	(0.055)	(0.01)	
		1.55±0.2	2.3±0.2	4.0±0.1	1.35	0.25	
MCKK2012 (0805)	1.0 (0.039)	(0.061 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.053)	(0.010)	
		(0.001 = 0.000)	(0.001 = 0.000)	(0.107 = 0.004)	(0.000)		

Unit: mm(inch)

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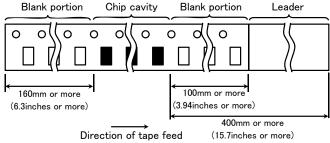
Embossed Tape (4mm wide)

Unit:mm(inch)

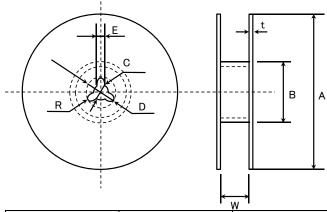


T	Thickness	Chip cavity		Insertion Pitch	Tape Th	nickness
Туре	mm(inch)	Α	В	F	K	Т
HKQ0402 (01005)	0.2 (0.008)	0.23	0.43	1.0±0.02	0.5max.	0.25max.
					Unit	: mm

4 LEADER AND BLANK PORTION



5Reel Size



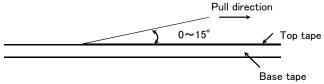
A	В	С	D	E	R
ϕ 178 ± 2.0	ϕ 50 or more	ϕ 13.0 \pm 0.2	ϕ 21.0 ± 0.8	2.0±0.5	1.0

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

(Unit : mm)

6Top tape strength

The top tape requires a peel-off force of $0.1 \sim 0.7 N$ 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)

REL	Iabi	LITY	' DA	٩ТА

1. Operating Tempe	rature Range				
F	BK0402				
	BK0603				
	BK1005				
	BKH0603				
	BKH1005				
	BK1608				
	BK2125				
		BK2010			
	ARRAY	BK3216			
	BKP0402	BROZTO			
	BKP0603				
	BKP1005				
	BKP1608				
	BKP2125				
MCF 060					
	MCF 0806				
	MCF 1210		—————————————————————————————————————		
	MCF 2010		\dashv		
	CK1608				
	CK2125				
	CKS2125				
Specified Value	CKP1608		7		
	CKP2012		-		
	CKP2016				
	CKP2520		-40~+85°C		
	NM2012				
	NM2520				
	LK1005				
	LK1608				
	LK2125		-		
	HKQ0402				
	HK0603				
	HK1005				
	HK1608				
	HK2125		-40~+85°C		
	HKQ0603W/HKQ	0603S/HKQ0603U			
	AQ105				
	MCFK1608				
	MCFE1608				
	MCKK1608				
	MCHK2012		-40~+125°C (Including self-generated heat)		
			†		
	MCKK2012				

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0 Ct T	t D				
2. Storage Tempera	BK0402				
	BK0603				
	BK1005 BKH0603				
			FF 140500		
	BKH1005		55~+125°C		
	BK1608				
	BK2125	1			
	ARRAY	BK2010			
		BK3216			
	BKP0402				
	BKP0603				
	BKP1005				
	BKP1608				
	BKP2125				
	MCF 0605				
	MCF 0806		-40~+85°C		
	MCF 1210				
	MCF 2010				
	CK1608				
	CK2125				
Specified Value	CKS2125				
	CKP1608		_		
	CKP2012				
	CKP2016		-40∼+85°C		
	CKP2520				
	NM2012				
	NM2520				
	LK1005				
	LK1608				
	LK2125				
	HKQ0402				
	HK0603				
	HK1005				
	HK1608		-40~+85°C		
	HK2125		10 1000		
		KQ0603S/HKQ0603U			
	AQ105				
	MCFK1608				
	MCFE1608				
	MCKK1608		-40~+85°C		
	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			
	ARRAT	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			
Specified Value	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			
	1		1			

Definition of rated current:

MCHK2012

MCKK2012

- •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.

 Idc1
 : 2260~4320mA DC,
 Idc2
 : 1470~3600mA DC

 Idc1
 : 3600~6200mA DC,
 Idc2
 : 2100~4000mA DC

- •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)

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### Specified Value BC4029	4.7			
BRK003	4. Impedance	DICOADO		10 0000 50(100 050(01)
BR(1005				
BRH-0003				
BRH1005				
BR1606 22~5000 ± 25%				
BR2125				
### ARRAV				
ARRAY				
BRP0402		ARRAY		
BKP0603			3210	
BRY1005				
BRF0108 33~4709 ±29% BRF0125 33~4309 ±29% MCF 0905 12~909 ±501120, ±204030;2800,±25460;0 MCF 1910 40~900 ±204(21900),±254(0ther) MCF 2101 50.000 50.000 MCF 2012 50.000 50.000 MCF 2014 50.000 50.000 MCF 2015 50.				
BRP2125 33~300 ± 29%				
MCF 0805				
MGF 1210 40 ~ 90 Ω ± 20 (219 0.0), ± 25 (20 0.0) MGF 2010 50 Ω ± 20 (219 0.0), ± 25 (20 0.0), ± 25 (20 0.0) MGF 2010 50 Ω ± 20 (219 0.0), ± 25 (20 0.0), ± 25 (20 0.0) CK1698 70				
MCF 1210				
McF 2010				
Ck 1608				
CK2125				0011 120%
Specified Value				-
CKP1608				
CKP2012	Specified Value			
CKP2507				1
CKP2507				
NM2520				1
LK1005		NM2012		
LK1508		NM2520		
LK2125		LK1005		
HKQ0402		LK1608		
HK0603		LK2125		_
HK1005		HKQ0402		
HK1608		HK0603		
HK2125		HK1005		
HKQ0603K/HKQ0603S/HKQ0603U				
AQ105				
MCFK1608			S/HKQ0603U	
MCKK1608				
MCKK2012 MCKK2012 BK0402Series, BKP0402Series Measuring frequency : 100±1MHz Measuring ig : 16197A(or its equivalent) Measuring frequency : 100±1MHz Measuring ig : 16193A(or its equivalent) Measuring ig : 16193A(or its equivalent) Measuring ig : 16193A(or its equivalent) Measuring frequency : 100±1MHz Measuring ig : 16192A(or its equivalent), 16193A(or its equivalent) Measuring frequency : 100±1MHz Measuring frequency : 100±1MHz Measuring frequency : 100±1MHz Measuring ig : 16092A(or its equivalent) or 16192A(or its equivalent)/HW Measuring frequency : 100±1MHz				_
MCKK2012 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) Measuring jig : 16193A(or its equivalent) Measuring jig : 16193A(or its equivalent) BK1005Series, BKP1005Series, BKH1005Series Measuring frequency : 100±1MHz Measuring gequipment : 4291A(or its equivalent), 16193A(or its equivalent) Measuring jig : 16192A(or its equivalent), 16193A(or its equivalent) Measuring frequency : 100±1MHz Measuring gequipment : 4291A(or its equivalent), 16192A(or its equivalent) Measuring jig : 16092A(or its equivalent), 16192A(or its equivalent) Measuring jig : 16092A(or its equivalent) or 16192A(or its equivalent)/HW BK2010·3216Series, MCF Series Measuring frequency : 100±1MHz Measuring frequency : 100±1MHz Measuring equipment : 4291A(or its equivalent), 4195A(or its equivalent)				_
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BK0402Series, BKP0402Series Measuring frequency : 100±1MHz Measuring gequipment : E4991A (or its equivalent) Measuring jig : 16197A (or its equivalent) BK0603Series, BKP0603Series Measuring frequency : 100±1MHz Measuring gequipment : 4291A (or its equivalent) Measuring jig : 16193A (or its equivalent) Measuring jig : 16193A (or its equivalent) Measuring frequency : 100±1MHz Measuring frequency : 100±1MHz Measuring gequipment : 4291A (or its equivalent), 16193A (or its equivalent) Measuring frequency : 100±1MHz Measuring equipment : 4291A (or its equivalent), 4195A (or its equivalent)				-
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Measuring jig : 16197A(or its equivalent) BK0603Series, BKP0603Series Measuring frequency : 100±1MHz Measuring giquipment : 4291A(or its equivalent) Measuring jig : 16193A(or its equivalent) Measuring jig : 16193A(or its equivalent) BK1005Series, BKP1005Series BKH1005Series BK1005Series, BKH1005Series Measuring frequency : 100±1MHz Measuring gequipment : 4291A(or its equivalent), 16193A(or its equivalent) Measuring jig : 16192A(or its equivalent), 16193A(or its equivalent) BK1608·2125Series, BKP1608·2125Series Measuring frequency : 100±1MHz Measuring jig : 16092A(or its equivalent), 4195A(or its equivalent)/HW BK2010·3216Series, MCF Series Measuring frequency : 100±1MHz Measuring frequency : 100±1MHz Measuring frequency : 100±1MHz Measuring frequency : 100±1MHz Measuring frequency : 4291A(or its equivalent), 4195A(or its equivalent)				uivalent)
BK0603Series, BKP0603Series Measuring frequency : 100±1MHz Measuring equipment : 4291A(or its equivalent) Measuring jig : 16193A(or its equivalent) BK1005Series, BKP1005Series BKH1005Series Test Methods and Remarks Measuring frequency : 100±1MHz Measuring gequipment : 4291A(or its equivalent), 16193A(or its equivalent) Measuring jig : 16192A(or its equivalent), 16193A(or its equivalent) BK1608*2125Series, BKP1608*2125Series Measuring frequency : 100±1MHz Measuring frequency : 100±1MHz 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 frequency : 100±1MHz Measuring equipment : 4291A(or its equivalent) Measuring jig : 16193A(or its equivalent) BK1005Series, BKP1005Series BKH1005Series Test Methods and Remarks 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 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 frequency : 100±1MHz Measuring equipment : 4291A(or its equivalent), 4195A(or its equivalent)				
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Test Methods and Remarks Measuring frequency : 100±1MHz Measuring jig : 16192A(or its equivalent), 16193A(or its equivalent) BK1608·2125Series, BKP1608·2125Series Measuring frequency : 100±1MHz Measuring frequency : 100±1MHz Measuring jig : 16092A(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 frequency : 100±1MHz Measuring equipment : 4291A(or its equivalent), 4195A(or its equivalent)				uivalent)
Remarks 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)				
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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)	Remarks			
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)				uivalent), 16193A(or its equivalent)
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)		The state of the s		
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)				ivalent) 4195A(or its equivalent)
BK2010•3216Series, MCF Series Measuring frequency : 100±1MHz Measuring equipment : 4291A(or its equivalent), 4195A(or its equivalent)				
Measuring frequency : 100±1MHz Measuring equipment : 4291A(or its equivalent), 4195A(or its equivalent)			· ·	analy of 101001(or to oquitalone)/1111
Measuring equipment : 4291A(or its equivalent), 4195A(or its equivalent)				
Measuring jig : 16192A(or its equivalent)				ivalent), 4195A(or its equivalent)
		Measuring jig	: 16192A(or its equ	uivalent)

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5. Inductance			
	BK0402		
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		†
	BK2125		-
	BK2010		-
	ARRAY BK3216		
	BKP0402		-
	BKP0603		-
			-
	BKP1005 BKP1608		-
			-
	BKP2125		-
	MCF 0605		-
	MCF 0806		-
	MCF 1210		-
	MCF 2010		47 100 11 1000
	CK1608		4.7~10.0 µH: ±20%
	CK2125		0.1~10.0 µH: ±20%
	CKS2125		1.0~10.0 µH: ±20%
	CKP1608		0.33~2.2 µH: ±20%
Specified Value	CKP2012		0.47~4.7 µH: ±20%
	CKP2016		0.47~4.7 µH: ±20%
	CKP2520		0.47~4.7 µH: ±20%
	NM2012		0.82~1.0 µH: ±20%
	NM2520		1.0~2.2 µH: ±20%
	LK1005		0.12~2.2 μH: ±10 or 20%
	LK1608		0.047~33.0 \(\mu\)H: \(\pm 20\)% \(0.10~12.0 \(\mu\)H: \(\pm 10\)%
	LK2125		0.047~33.0 \(\mu\)H: \(\pm 20\)% \(0.10~12.0 \(\mu\)H: \(\pm 10\)%
	HK0603		1.0~6.2nH: ±0.3nH 6.8~100nH: ±5%
	HK1005		1.0~6.2nH: ±0.3nH 6.8~270nH: ±5%
	HK1608		1.0~5.6nH: ±0.3nH 6.8~470nH: ±5%
	HK2125		1.5~5.6nH: ±0.3nH 6.8~470nH: ±5%
	HKQ0402		0.5~3.9nH: ±0.1 or 0.2 or 0.3nH 4.3~5.6nH: ±0.3nH or 3% or 5%
			6.2~47nH: ±3 or 5%
	HKQ0603W		$0.6 \sim 3.9$ nH: ± 0.1 or 0.2 or 0.3 nH $4.3 \sim 6.2$ nH: ± 0.2 or 0.3 nH or 3 or 5%
	HKQ0603S		6.8~30nH: ±3 or 5% 33~100nH: ±5%
	HKQ0603U		0.6~6.2nH: ±0.2 or 0.3nH 6.8~22nH: ±3 or 5% 0.6~4.2nH: ±0.1 or 0.2 or 0.3nH 4.3~6.5nH: ±0.2 or 0.3nH 6.8~22nH: ±3 or 5%
	AQ105		1.0~6.2nH: ±0.3nH 6.8~15nH: ±5%
	MCFK1608		0.24~1.0 µH: ±20%
	MCFE1608		0.24~1.0 µH: ±20%
	MCKK1608		0.24~1.0 µH: ±20% 0.24~1.0 µH: ±20%
	MCHK2012		
	MCKK2012		0.24~1.0 μH: ±20%
	CK, LK, CKP, NM, MC Series	: 2~4MHz(CK16	808)
	Measuring frequency Measuring frequency	: 2~4MHz(CK16 : 2~25MHz(CK2	
	Measuring frequency	: 2~25MHz(CK2	
	Measuring frequency	: 10~25MHz(LK	
	Measuring frequency	: 1~50MHz(LK1	
	Measuring frequency	: 0.4~50MHz(LH	
	Measuring frequency		8 • CKP2012 • CKP2016 • CKP2520 • NM2012 • NM2520 • MCFK1608 • MCFE1608 • MCHK2012 • MCKK2012)
	Measuring equipment /jig		B+16092A(or its equivalent) •4195A+41951+16092A(or its equivalent)
	, 5.6		2A(or its equivalent) ·4291A+16193A(or its equivalent)/LK1005
			11A + 42842C + 42851 - 61100 (or its equivalent) / CKP1608 · CKP2012 · CKP2016 · CKP2520 · NM2012 ·
		NM2520 · MCF	K1608·MCFE1608·MCKK1608·MCHK2012·MCKK2012
Test Methods and	Measuring current	:•1mA rms (0.047	7~4.7 μH)
Remarks		•0.1mA rms(5.6	6~33 (H)
	HK、HKQ、AQ Series	0.1110 (0.0	0 00 July
	Measuring frequency	: 100MHz(HK060	03+HK1005+AQ105)
	Measuring frequency	: 50/100MHz(Hk	
	Measuring frequency		603S • HKQ0603U)
	Measuring frequency	: 300/500MHz(H	
	Measuring frequency	: 100/500MHz(H	
	Measuring equipment /jig	:•4291A+16197	A(or its equivalent)/HK0603·AQ105
		•4291A + 16193	3A(or its equivalent)/HK1005
			97A(or its equivalent)/HKQ0603S+HKQ0603U+HKQ0603W
			2A + in-house made jig(or its equivalent)/HK1608 · HK2125
		•E4991A+161	96D (or its equivalent) / HKQ0402

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0.0			
6. Q	BK0402		
	BK0603		
	BK1005		
	BKH0603		
	BKH1005		
	BK1608		
	BK2125		
	BK2010		
	ARRAY BK3216		
	BKP0402		
	BKP0603		
	BKP1005		
	BKP1608		
	BKP2125		
	MCF 0605		
	MCF 0806		
	MCF 1210		
	MCF 2010		
	CK1608		
	CK2125	·	
	CKS2125		
Specified Value	CKP1608		
Spoomod Value	CKP2012		_
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005		10~20 min.
	LK1608		10~35 min.
	LK2125 HK0603		15~50 min.
	HK1005		4~5 min. 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		
	LK Series		
	Measuring frequency	: 10~25MHz(LK10 : 1~50MHz(LK160	
	Measuring frequency Measuring frequency	: 0.4~50MHz(LK160	
	Measuring requency Measuring equipment /jig		H16092A(or its equivalent)
	Weasuring equipment / Jig		16092A(or its equivalent)
			(or its equivalent)
			(or its equivalent)/LK1005
	Measuring current	•1mA rms(0.047~	~4.7 µH)
Test Methods and		•0.1mA rms(5.6~	γ33 μH)
Remarks	HK、HKQ、AQ Series		
Nomano	Measuring frequency	: 100MHz(HK0603•	
	Measuring frequency	: 50/100MHz(HK16	
	Measuring frequency : 500MHz(HKQ0603		
	Measuring frequency	: 300/500MHz(HKC : 100/500MHz(HKC	
	Measuring frequency Measuring equipment /jig		or its equivalent)/HK0603•AQ105
			(or its equivalent)/HK1005
			A(or its equivalent)/HKQ0603S+HKQ0603U+HKQ0603W
			+ in-house made jig(or its equivalent)/HK1608, HK2125
			D(or its equivalent)HKQ0402
		· ·	

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7. DC Resistance			
	BK0402		0.07∼1.2Ωmax.
	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∼1.10Ω max.
	BK2125		0.05~0.75Ω max.
		BK2010	0.10~0.90Ω max.
	ARRAY	BK3216	0.15~0.80 Ω max.
	BKP0402		0.05~0.15 Ω max.
	BKP0603		0.030~0.180Ω max.
	BKP1005		0.0273~0.220Ω max.
	BKP1608		0.025~0.18 Ω max.
	BKP2125		0.020~0.075Ω max.
	MCF 0605		2.5~5.0Ω max
	MCF 0806		1.5∼5.0 Ω max.
	MCF 1210		1.5~4.5 Ω max.
	MCF 2010		4.5Ω max.
	CK1608		$0.45 \sim 0.85 \Omega(\pm 30\%)$
	CK2125		0.16~0.65 Ω max.
	CKS2125		0.12~0.52 Ω max.
	CKP1608		0.15~0.35 Ω max.
Specified Value	CKP2012		0.08~0.28 Ω max.
	CKP2016		0.075~0.20 Ω max
	CKP2520		0.05~0.16 Ω max.
	NM2012		0.10~0.15Ω max.
	NM2520		0.11~0.22 Ω max.
	LK1005		0.41 ~ 1.16 Ω max.
	LK1608		$0.2\sim2.2\Omega$ max.
	LK2125		0.2 × 2.2 x max. 0.1 ~ 1.1 Ω max.
	HK0603		0.11~3.74Ω max.
	HK1005		0.08~4.8Ω max.
	HK1608		0.05~2.6 Ω max.
			0.05~2.6 Ω max. 0.10~1.5 Ω max.
	HK2125 HKQ0402		0.10~1.5 Ω max. 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		0.07~0.45Ω max.
	MCFK1608		0.050~0.224Ω max.
	MCFE1608		0.100~0.340Ω max.
	MCKK1608		0.038~0.123Ω max.
	MCHK2012		0.024~0.111Ω max.
	MCKK2012		0.025 ~ 0.090 Ω max.
Test Methods and Remarks	Measuring equipm	ent:VOAC-7412, VOA	AC-7512, VOAC-7521 (made by Iwasaki Tsushinki), HIOKI3227 (or its equivalent)

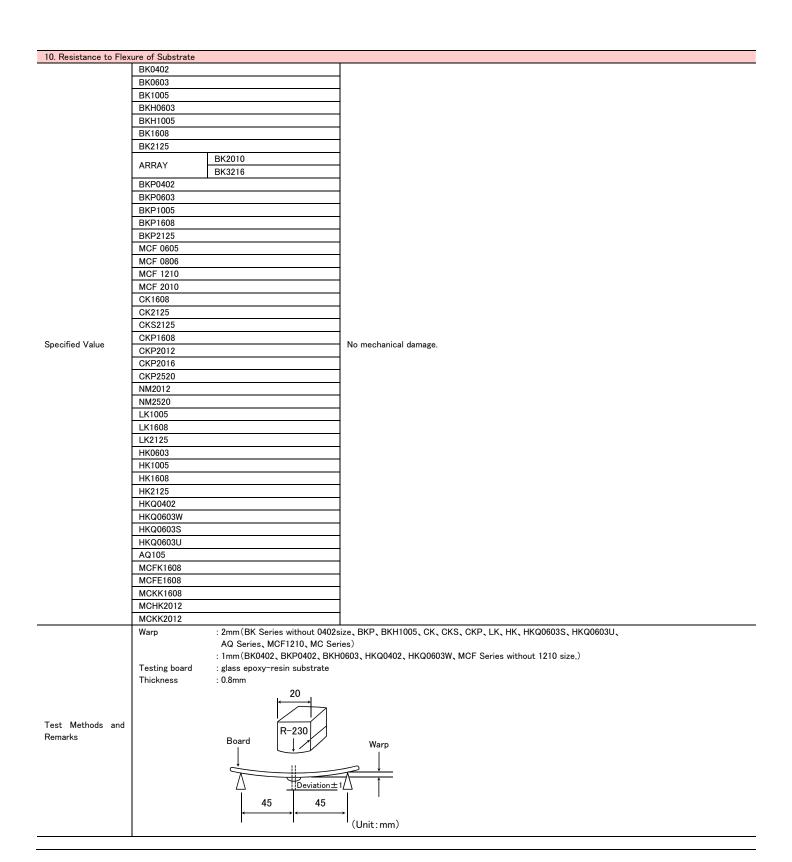
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8. Self Resonance Fre	conance Frequency(SRF)					
	BK0402					
	BK0603					
	BK1005					
	BKH0603					
	BKH1005					
	BK1608					
	BK2125					
		BK2010				
	ARRAY	BK3216				
	BKP0402			-		
	BKP0603					
	BKP1005					
	BKP1608					
	BKP2125					
	MCF 0605					
	MCF 0806					
	MCF 0800					
	MCF 2010			17∼25MHz min.		
	CK1608					
	CK2125			24~235MHz min. 24~75MHz min.		
	CKS2125			24~75WHz min.		
Specified Value	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					
	LK, CK Series :					
Test Methods and	Measuring equip	oment	: 4195A (or its equiv	valent)		
Remarks	Measuring jig		: 41951+16092A(o	r its equivalent)		
· tomanto	HK, HKQ, AQ Series:					
	Measuring equip	oment	: 8719C (or its equiv	valent) • 8753D (or its equivalent) / HK2125		

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9. Temperature Chara						
	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					
Specified Value	CKP1608					
_	CKP2012					
	CKP2016					
	CKP2520					
	NM2012					
	NM2520					
	LK1005					
	LK1608					
	LK2125					
	HK0603					
	HK1005					
	HK1608					
	HK2125					
	HKQ0402					
	HKQ0603W					
	HKQ0603S			Inductance change: Within ±10%		
	HKQ0603U			Industries strange that is a second		
	AQ105					
	MCFK1608					
	MCFE1608					
	MCKK1608					
	MCHK2012					
	MCKK2012					
	HK、HKQ、AQ Se					
-	Temperature rar		: −30~+85°C			
Test Methods and	Reference temp	perature	: +20°C			
Remarks	MC Series:		. —40 a. 1 05°C			
	Temperature range : -40~+85°C Reference temperature : +20°C					
	oror orros comp		200			

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11. Solderability	I =1/0./00		
	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		At least 90% of terminal electrode is covered by new solder.
Specified Value	CKP1608		
Specified Value	CKP2012		
	CKP2016		
	CKP2520		
	NM2012		
	NM2520		
	LK1005		
	LK1608		
	LK2125		
	HK0603		
	HK1005		
	HK1608		
	HK2125		
	HKQ0402		
	HKQ0603W		
	HKQ0603S		
	HKQ0603U		
	AQ105		
	MCFK1608		
	MCFE1608		
	MCKK1608		
	MCHK2012		
	MCKK2012		
Toot Mothede and	Solder temperatu	ure : 230±5°C (JIS Z 32	282 H60A or H63A)
Test Methods and Remarks	Solder temperatu	ure : 245±3°C (Sn/3.0A	.g/0.5Cu)
Nemarks	Duration	:4±1 sec.	

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12. Resistance to Soldering						
	BK0402					
	BK0603					
	BK1005					
	BKH0603					
	BKH1005					
	BK1608					
	BK2125			Appearance: No significant abnormality		
	ARRAY	BK2010		Impedance change:Within ±30%		
		BK3216				
	BKP0402					
	BKP0603					
	BKP1005					
	BKP1608					
	BKP2125					
	MCF 0605					
	MCF 0806			Appearance: No significant abnormality		
	MCF 1210			Impedance change: Within ±20%		
	MCF 2010					
	CK1608					
	CK2125			Appearance: No significant abnormality		
	CKS2125			Inductance change		
	CKP1608			R10~4R7: Within ±10%		
0 '6 17/1	CKP2012			6R8~100: Within ±15%		
Specified Value	CKP2016			CKS2125: Within ±20% CKP1608, CKP2012, CKP2016, CKP2520, NM2012, NM2520: Within ±30%		
	CKP2520					
	NM2012					
	NM2520			A N 1 100 A 1 100		
	LK1005			Appearance: No significant abnormality		
	LK1608			Inductance change: Within ±15%		
	LK 1608			Appearance: No significant abnormality Inductance change		
	LK2125			47N~4R7: Within ±10%		
	LIVETED			5R6~330: Within ±15%		
	HK0603					
	HK1005					
	HK1608					
	HK2125			Appearance: No significant abnormality		
	HKQ0402					
	HKQ0603W			Inductance change: Within ±5%		
	HKQ0603S					
	HKQ0603U					
	AQ105					
	MCFK1608					
	MCFE1608			A N 1 20 A 1 12		
	MCKK1608			Appearance: No significant abnormality		
	MCHK2012			Inductance change: Within ±10%		
	MCKK2012					
	Solder temperature : 260±5°C		:260±5°C			
	Duration		:10±0.5 sec.			
Test Methods and	Preheating tempe	erature :	:150 to 180°C			
Remarks	Preheating time :3 min.					
				nethanol solution with colophony for 3 to 5 sec.		
(1) (1) 12"				covery under the standard condition after the test.(See Note 1)		
(Note 1) When there a	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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12 Th 1 Cl							
13. Thermal Shock	DKO400		1				
	BK0402						
	BK0603						
	BK1005		-				
	BKH0603		-				
	BKH1005		-				
	BK1608						
	BK2125	T =		gnificant abnormality			
	ARRAY	BK2010	Impedance change	: Within ±30%			
		BK3216					
	BKP0402		-				
	BKP0603		-				
	BKP1005		-				
	BKP1608		-				
	BKP2125						
	MCF 0605						
	MCF 0806			gnificant abnormality			
	MCF 1210		Impedance change	: WITNIN ±20%			
	MCF 2010		A	20			
	CK1608			gnificant abnormality			
	CK2125			:Within ±20% Q change:Within ±30%			
	CKS2125		Appearance: No significant abnormality Inductance change: Within ±20%				
Specified Value	CKP1608						
•	CKP2012						
	CKP2016		Appearance: No sig	gnificant abnormality			
	CKP2520		Inductance change				
	NM2012						
	NM2520						
	LK1005		Appearance: No significant abnormality				
	LK1608						
	LK2125		Inductance change	: Within ±10% Q change: Within ±30%			
	HK0603						
	HK1005						
	HK1608						
	HK2125		Appearance: No significant abnormality				
	HKQ0402			minicant abnormanty :: Within ±10% Q change: Within ±20%			
	HKQ0603W		inductance change	. Muliii ±1070 & Change. Muliii ±2070			
	HKQ0603S]				
	HKQ0603U						
	AQ105						
	MCFK1608						
	MCFE1608		Annearance : No sis	gnificant abnormality			
	MCKK1608		Inductance change				
	MCHK2012			. main =1070			
	MCKK2012						
	Conditions for 1						
	Step	temperature(°C)		time (min.)			
	1	Minimum operating temperatur	e +0/-3	30±3			
Test Methods and	2	Room temperature		2~3			
Remarks	3	Maximum operating temperatur	re +3/-0	30±3			
	4	Room temperature		2~3			
	Number of cycle		al accordistant - O	test (See Note 1)			
	Recovery: 2 to 3 hrs of recovery under the standard condition after the test. (See Note 1)						

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 (Stea								
	BK0402							
	BK0603							
	BK1005							
	BKH0603							
	BKH1005							
	BK1608							
	BK2125	Appearance: No significant abnormality						
	ARRAY BK2010	Impedance change: Within ±30%						
	BK3216							
	BKP0402							
	BKP0603							
	BKP1005							
	BKP1608							
	BKP2125							
	MCF 0605							
	MCF 0806	Appearance: No significant abnormality						
	MCF 1210	Impedance change: Within ±20%						
	MCF 2010	Account No. 100 Count do not the						
	CK1608	Appearance: No significant abnormality						
	CK2125	Inductance change: Within ±20% Q change: Within ±30%						
	CKS2125	Appearance: No significant abnormality Inductance change: Within ±20%						
0 :5 17/1	CKP1608							
Specified Value	CKP2012							
	CKP2016	Appearance: No significant abnormality						
	CKP2520	Inductance change: Within ±30%						
	NM2012							
	NM2520							
	LK1005	Appearance: No significant abnormality						
	LK1608	Inductance change: Within ±10% Q change: Within ±30%						
	LK2125	Appearance: No significant abnormality						
	HK0603	Inductance change: Within ±20% Q change: Within ±30%						
	HK1005							
	HK1608							
	HK2125	A No. of the last						
	HKQ0402	Appearance: No significant abnormality						
	HKQ0603W	Inductance change: Within ±10% Q change: Within ±20%						
	HKQ0603S							
	HKQ0603U							
	AQ105							
	MCFK1608							
	MCFE1608	Appearance: No significant abnormality						
	MCKK1608	Appearance: No significant abnormality Inductance change: Within ±10%						
	MCHK2012	inductance change. Within ± 1070						
	MCKK2012							
<u> </u>	BK, BKP, BKH, LK, CK, CKS, (KP, NM Series, MCF Series:						
	Temperature :40±2°C							
	Humidity : 90 to 95%F							
	Duration : 500 +24/-0							
Test Methods and	Recovery : 2 to 3 hrs o	recovery under the standard condition after the removal from test chamber.(See Note 1)						
Remarks	HK, HKQ, AQ, MC Series:							
	Temperature : 60±2°C							
	Humidity :90 to 95%F	Н						
	Duration :500 +24/-0							
		recovery under the standard condition after the removal from test chamber.(See Note 1)						
(Note 1) When there a		ent result; measurement shall be made after 48±2 hrs of recovery under the standard condition.						
	and an appearance of the state							

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15. Loading under Dan	i			
	BK0402		4	
	BK0603		<u> </u>	
	BK1005		<u> </u>	
	BKH0603		<u> </u>	
	BKH1005			
	BK1608			
	BK2125		Appearance: No significant abnormality	
	ARRAY	K2010	Impedance change: Within ±30%	
	В	K3216		
	BKP0402			
	BKP0603			
	BKP1005			
	BKP1608			
	BKP2125			
	CK1608		Appearance: No significant abnormality	
	CK2125		Inductance change: Within ±20% Q change: Within ±30%	
	CKS2125		Appearance: No significant abnormality	
	ONOZIZO		Inductance change: Within ±20%	
	CKP1608			
	CKP2012			
	CKP2016		Appearance: No significant abnormality	
	CKP2520		Inductance change: Within ±30%	
Specified Value	NM2012			
	NM2520			
	LK1005		Appearance: No significant abnormality	
	LICTOGO		Inductance change: Within ±10% Q change: Within ±30%	
			Appearance: No significant abnormality	
	LK1608		Inductance change: $0.047 \sim 12.0 \mu\text{H}$: Within $\pm 10\%$ $15.0 \sim 33.0 \mu\text{H}$: Within $\pm 15\%$	
			Q change: Within ±30%	
	LK2125		Appearance: No significant abnormality	
	LUCOCOC		Inductance change: Within ±20% Q change: Within ±30%	
	HK0603		-	
	HK1005		-	
	HK1608 HK2125		-	
			Appearance: No significant abnormality	
	HKQ0402		Inductance change: Within ±10% Q change: Within ±20%	
	HKQ0603W		4	
	HKQ0603S		-	
	HKQ0603U		4	
	AQ105			
	MCFK1608※		-	
	MCFE1608※		Appearance: No significant abnormality	
	MCKK1608※		Inductance change: Within ±10%	
	MCHK2012※ MCKK2012※		-	
		OK OKE OKE NIM C:		
	Temperature	CK、CKS、CKP、NM Series: :40±2°C		
	Humidity	: 90 to 95%RH		
	Applied current	: Rated current		
	Duration	:500 +24/-0 hrs		
	Recovery		der the standard condition after the removal from test chamber.(See Note 1)	
Test Methods and		o		
Remarks	HK, HKQ, AQ, MC S	Series:		
	Temperature	:60±2°C		
	Humidity	:90 to 95%RH		
	Applied current	:Rated current ※MC ser	ies ; Idc2max	
	Duration	:500 +24/-0 hrs		
	Recovery	:2 to 3 hrs of recovery un	der the standard condition after the removal from test chamber.(See Note 1)	
Make an akandandaan	Indition: "etandard condition" referred to have in in defined as follows:			

Note on standard condition: "standard condition" referred to herein is defined as follows:

5 to $35^{\circ}\!\text{C}\,$ 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 $20\pm2^{\circ}C$ 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.

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16. Loading at High Te	mperature	
	BK0402	
	BK0603	
	BK1005	
	BKH0603	
	BKH1005	
	BK1608	
	BK2125	Appearance: No significant abnormality
	BK2010	Impedance change: Within ±30%
	ARRAY BK3216	
	BKP0402	
	BKP0603	
	BKP1005	
	BKP1608	
	BKP2125	
	MCF 0605	
	MCF 0806	Appearance: No significant abnormality
	MCF 1210	Impedance change: Within ±20%
	MCF 2010	impedance diange. Within 120%
	CK1608	Annayana Na cimificant shawnality
	CK2125	Appearance: No significant abnormality Inductance change: Within ±20% Q change: Within ±30%
	GK2125	
	CKS2125	Appearance: No significant abnormality Inductance change: Within ±20%
	CKP1608	inductance change: Within ±2070
	CKP2012	
Specified Value	CKP2012	Annual Marsini Grant share well to
Specified Value		Appearance: No significant abnormality Inductance change: Within ±30%
	CKP2520	inductance change: Within ±30%
	NM2012	
	NM2520	A N. C. C. L. E.
	LK1005	Appearance: No significant abnormality
		Inductance change: Within ±10% Q change: Within ±30%
	LK1608	Appearance: No significant abnormality Inductance change: 0.047~12.0 μH: Within ±10% 15.0~33.0 μH: Within ±15%
	LICTOOD	Q change: Within ±30%
		Appearance: No significant abnormality
	LK2125	Inductance change: Within ±20% Q change: Within ±30%
	HK0603	indeduced stange. Wall 12070 d charge. Wall 20070
	HK1005	
	HK1608	
	HK2125	
	HKQ0402	Appearance: No significant abnormality
	HKQ0603W	Inductance change: Within ±10% Q change: Within ±20%
	HKQ0603S	
	HKQ0603U	
	AQ105	
	MCFK1608%	
	MCFE1608%	
	MCKK1608%	Appearance: No significant abnormality
	MCHK2012※	Inductance change: Within ±10%
	MCKK2012%	
Test Methods and Remarks	Temperature : Maximum Applied current : Rated cu Duration : 500 +24/	of recovery under the standard condition after the removal from test chamber.

Note on standard condition: "standard condition" referred to herein is defined as follows:

5 to $35^{\circ}\!C\,$ 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 $20\pm2^{\circ}C$ 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.

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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 (MCOILTM MC series)

PRECAUTIONS

1. Circuit Design

- ◆ 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

Precautions

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.

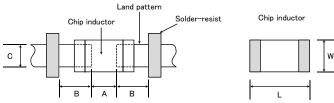
2. PCB Design

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)
 - 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.
- ◆Pattern configurations(Design of Land-patterns)
 - 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)

Ту	ре	1608	2012	2125	2016	2520	3216
Size	┙	1.6	2.0	2.0	2.0	2.5	3.2
Size	W	0.8	1.25	1.25	1.6	2.0	1.6
A	١	0.8~1.0	1.0~1.4	1.0~1.4	1.0~1.4	1.0~1.4	1.8~2.5
Е	3	0.5~0.8	0.8~1.5	0.8~1.5	0.8~1.5	0.6~1.0	0.8~1.7
(0.6~0.8	0.9~1.2	0.9~1.2	1.3~1.6	1.6~2.0	1.2~1.6

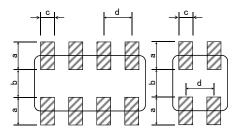
Technical considerations

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

T	уре	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	2.0	2.5	3.2
Size	W	0.2	0.3	0.5	0.6	0.8	1.25	1.25	1.6	2.0	1.6
	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
	В	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
	С	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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Excess solder can affect the ability of chips to withstand mechanical stresses. Therefore, please take proper precautions when designing land-patterns.



Recommended land dimension for Reflow-soldering

Ту	ре	3216	2010	1210	0806	0605
c. L		3.2	2.0	1.25	0.85	0.65
Size	W	1.6	1.0	1.0	0.65	0.50
а	1	0.7~0.9	0.5~0.6	0.45~0.55	0.25~0.35	0.27~0.33
b)	0.8~1.0	0.5~0.6	0.7~0.8	0.25~0.35	0.17~0.23
С	;	0.4~0.5	0.2~0.3	0.25~0.35	0.25~0.35	0.20~0.26
d		0.8	0.5	0.55	0.5	0.4

(Unit:mm)

((2) Examples of good and bad solder application

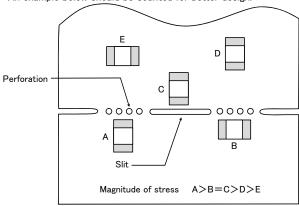
۷.	xamples of good and bad solder application					
	Item	Not recommended	Recommended			
	Mixed mounting of SMD and leaded components	Lead wire of component	Solder-resist			
	Component placement close to the chassis	Chassis Solder (for grounding) Electrode pattern	Solder-resist			
	Hand-soldering of leaded components near mounted components	Lead wire of component Soldering iron	Solder-resist -			
	Horizontal component placement		Solder-resist			

- ◆Pattern configurations (Inductor layout on panelized[breakaway] PC boards)
 - 1-1. The following are examples of good and bad inductor layout; SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection.

Item Not recommended		Recommended		
Deflection of the board		Position the component at a right angle to the direction of the mechanical stresses that are anticipated.	of	

1-2. To layout the inductors for the breakaway PC board, it should be noted that the amount of mechanical stresses given will vary depending on inductor layout.

An example below should be counted for better design.



1-3. When breaking PC boards along their perforations, the amount of mechanical stress on the inductors can vary according to the method used. The following methods are listed in order from least stressful to most stressful: push-back, slit, V-grooving, and perforation. Thus, any ideal SMD inductor layout must also consider the PCB splitting procedure.

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3. Considerations for automatic placement

- ◆Adjustment of mounting machine
 - 1. Excessive impact load should not be imposed on the inductors when mounting onto the PC boards.
 - 2. The maintenance and inspection of the mounter should be conducted periodically.

Precautions

◆Selection of Adhesives

- 1. Mounting inductors with adhesives in preliminary assembly, before the soldering stage, may lead to degraded inductor characteristics unless the following factors are appropriately checked; the size of land patterns, type of adhesive, amount applied, hardening temperature and hardening period. Therefore, it is imperative to consult the manufacturer of the adhesives on proper usage and amounts of adhesive to use.
- ◆Adjustment of mounting machine
 - 1. If the lower limit of the pick-up nozzle is low, too much force may be imposed on the inductors, causing damage. To avoid this, the following points should be considered before lowering the pick-up nozzle:
 - The lower limit of the pick-up nozzle should be adjusted to the surface level of the PC board after correcting for deflection of the board.
 - (2) The pick-up pressure should be adjusted between 1 and 3N static loads.
 - (3) To reduce the amount of deflection of the board caused by impact of the pick-up nozzle, supporting pins or back-up pins should be used under the PC board. The following diagrams show some typical examples of good pick-up nozzle placement:

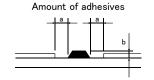
Item	Improper method	Proper method
Single-sided mounting	chipping or cracking	supporting pins or back-up pins
Double-sided mounting	chipping or cracking	supporting pins or back-up pins

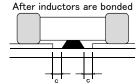
Technical considerations

- 2. As the alignment pin wears out, adjustment of the nozzle height can cause chipping or cracking of the inductors because of mechanical impact on the inductors. To avoid this, the monitoring of the width between the alignment pin in the stopped position, and maintenance, inspection and replacement of the pin should be conducted periodically.
- ◆Selection of Adhesives
 - 1. Some adhesives may cause reduced insulation resistance. The difference between the shrinkage percentage of the adhesive and that of the inductors may result in stresses on the inductors and lead to cracking. Moreover, too little or too much adhesive applied to the board may adversely affect component placement, so the following precautions should be noted in the application of adhesives.
 - (1) Required adhesive characteristics
 - a. The adhesive should be strong enough to hold parts on the board during the mounting & solder process.
 - b. The adhesive should have sufficient strength at high temperatures.
 - c. The adhesive should have good coating and thickness consistency.
 - d. The adhesive should be used during its prescribed shelf life.
 - e. The adhesive should harden rapidly.
 - f. The adhesive must not be contaminated.
 - g. The adhesive should have excellent insulation characteristics.
 - h. The adhesive should not be toxic and have no emission of toxic gasses.
 - (2) When using adhesives to mount inductors on a PCB, inappropriate amounts of adhesive on the board may adversely affect component placement. Too little adhesive may cause the inductors to fall off the board during the solder process. Too much adhesive may cause defective soldering due excessive flow of adhesive on to the land or solder pad.

[Recommended conditions]

Figure	0805 case sizes as examples
а	0.3mm min
b	100∼120 μm
С	Area with no adhesive





4. Soldering

Precautions

◆Selection of Flux

- 1. Since flux may have a significant effect on the performance of inductors, it is necessary to verify the following conditions prior to use;
 - (1) Flux used should be with less than or equal to 0.1 wt% (Chlorine conversion method) of halogenated content. Flux having a strong acidity content should not be applied.
 - (2) When soldering inductors on the board, the amount of flux applied should be controlled at the optimum level.
 - (3) When using water-soluble flux, special care should be taken to properly clean the boards.

◆Soldering

1. Temperature, time, amount of solder, etc. are specified in accordance with the following recommended conditions, and please contact us about peak temperature when you use lead-free paste.

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◆Selection of Flux

- 1-1. When too much halogenated substance (Chlorine, etc.) content is used to activate the flux, or highly acidic flux is used, an excessive amount of residue after soldering may lead to corrosion of the terminal electrodes or degradation of insulation resistance on the surface of the Inductor.
- 1-2. Flux is used to increase solderability in flow soldering, but if too much is applied, a large amount of flux gas may be emitted and may detrimentally affect solderability. To minimize the amount of flux applied, it is recommended to use a flux-bubbling system.
- 1-3. Since the residue of water-soluble flux is easily dissolved by water content in the air, the residue on the surface of Inductor in high humidity conditions may cause a degradation of insulation resistance and therefore affect the reliability of the components. The cleaning methods and the capability of the machines used should also be considered carefully when selecting water-soluble flux.

Soldering

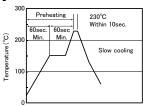
1-1. Preheating when soldering

Heating: Chip inductor components should be preheated to within $100 \text{ to } 130^{\circ}\text{C}$ of the soldering. Cooling: The temperature difference between the components and cleaning process should not be greater than 100°C .

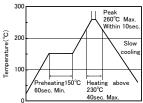
Chip inductors are susceptible to thermal shock when exposed to rapid or concentrated heating or rapid cooling. Therefore, the soldering process must be conducted with a great care so as to prevent malfunction of the components due to excessive thermal shock.

[Reflow soldering]

[Recommended conditions for eutectic soldering]



[Recommended condition for Pb-free soldering]



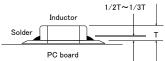
- %Ceramic chip components should be preheated to within 100 to 130°C of the soldering.
- *Assured to be reflow soldering for 2 times.
- *MC series; Peak 230°C(eutectic soldering), 260°C(Pb-free soldering)max within 5sec.

Caution

Technical

considerations

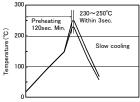
1. The ideal condition is to have solder mass (fillet) controlled to 1/2 to 1/3 of the thickness of the inductor, as shown below:



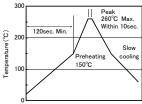
2. Because excessive dwell times can detrimentally affect solderability, soldering duration should be kept as close to recommended times as possible.

[Wave soldering]

[Recommended conditions for eutectic soldering]



[Recommended condition for Pb-free soldering]



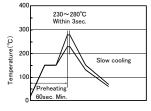
- $\mbox{\%}$ Ceramic chip components should be preheated to within 100 to 130°C of the soldering.
- XAssured to be wave soldering for 1 time.
- Except for reflow soldering type.

Caution

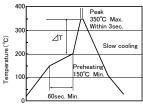
- 1. Make sure the inductors are preheated sufficiently.
- 2. The temperature difference between the inductor and melted solder should not be greater than 100 to 130°C .
- 3. Cooling after soldering should be as gradual as possible.
- 4. Wave soldering must not be applied to the inductors designated as for reflow soldering only.

[Hand soldering]

[Recommended conditions for eutectic soldering



[Recommended condition for Pb-free soldering]



- (**※**⊿T≦190°C(3216Type max), ⊿T≦130°C(3225 Type min)
- \times It is recommended to use 20W soldering iron and the tip is 1 ϕ or less.
- XThe soldering iron should not directly touch the components.
- *Assured to be soldering iron for 1 time

Note: The above profiles are the maximum allowable soldering condition, therefore these profiles are not always recommended.

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Caution 1. Use a 20W soldering iron with a maximum tip diameter of 1.0 mm. 2. The soldering iron should not directly touch the inductor.

5. Cleaning ◆Cleaning conditions 1. When cleaning the PC board after the Inductors are all mounted, select the appropriate cleaning solution according to the type of flux Precautions

used and purpose of the cleaning (e.g. to remove soldering flux or other materials from the production process.) 2. Cleaning conditions should be determined after verifying, through a test run, that the cleaning process does not affect the inductor's

characteristics. Cleaning conditions

> 1. The use of inappropriate solutions can cause foreign substances such as flux residue to adhere to the inductor, resulting in a degradation of the inductor's electrical properties (especially insulation resistance).

2. Inappropriate cleaning conditions (insufficient or excessive cleaning) may detrimentally affect the performance of the inductors.

(1) Excessive cleaning

a. In the case of ultrasonic cleaning, too much power output can cause excessive vibration of the PC board which may lead to the cracking of the inductor or the soldered portion, or decrease the terminal electrodes' strength. Thus the following conditions should be carefully checked:

Ultrasonic output Below 20W/Q Ultrasonic frequency Below 40kHz 5 min. or less Ultrasonic washing period

6. Post cleaning processes

◆Application of resin coatings, moldings, etc. to the PCB and components.

Precautions

Technical

considerations

- 1. With some type of resins a decomposition gas or chemical reaction vapor may remain inside the resin during the hardening period or while left under normal storage conditions resulting in the deterioration of the inductor's performance.
- 2. When a resin's hardening temperature is higher than the inductor's operating temperature, the stresses generated by the excess heat may lead to inductor damage or destruction.
- 3. Stress caused by a resin's temperature generated expansion and contraction may damage inductors.

The use of such resins, molding materials etc. is not recommended.

7. Handling

- ◆Breakaway PC boards (splitting along perforations)
 - 1. When splitting the PC board after mounting inductors and other components, care is required so as not to give any stresses of deflection or twisting to the board.
 - 2. Board separation should not be done manually, but by using the appropriate devices.
- General handling precautions
 - 1. Always wear static control bands to protect against ESD.
 - 2. Keep the inductors away from all magnets and magnetic objects.
- 3. Use non-magnetic tweezers when handling inductors. Precautions
 - 4. Any devices used with the inductors (soldering irons, measuring instruments) should be properly grounded.
 - 5. Keep bare hands and metal products (i.e., metal desk) away from chip electrodes or conductive areas that lead to chip electrodes.
 - 6. Keep inductors away from items that generate magnetic fields such as speakers or coils.
 - Mechanical considerations
 - 1. Be careful not to subject the inductors to excessive mechanical shocks.
 - (1) If inductors are dropped on the floor or a hard surface they should not be used.
 - (2) When handling the mounted boards, be careful that the mounted components do not come in contact with or bump against other boards or components.

8. Storage conditions

temperature and humidity in the storage area. Humidity should especially be kept as low as possible.

Recommended conditions

Ambient temperature: Below 30°C Humidity: Below 70% RH

The ambient temperature must be kept below 40°C. Even under ideal storage conditions, solderability of inductor is deteriorated as time passes, so inductors should be used within 6 months from the time of delivery.

1. To maintain the solderability of terminal electrodes and to keep the packaging material in good condition, care must be taken to control

•Inductor should be kept where no chlorine or sulfur exists in the air.

Technical considerations

Precautions

◆Storage

1. If the parts are stocked in a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place. For this reason, components should be used within 6 months from the time of delivery. If exceeding the above period, please check solderability before using the inductors.

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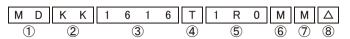
金属磁芯 SMD 功率电感器(MCOIL™ MD 系列)



回流焊

■型号标示法

※使用温度范围: -40~+125℃ (包含产品本身发热)



类型

基本金属线圈规格

①类型	
代码)

MD

②尺寸 (H)	
代码	尺寸 (H) [mm]
JE	0.95
KK	1.0
MK	1.2
PK	1.4
WK	2.0

③尺寸 (L×W)

@1/C1 (FV AA)	
代码	尺寸 (L×W) [mm]
1616	1.6 × 1.6
2020	2.0 × 2.0
3030	3.0 × 3.0
4040	4.0 × 4.0
5050	4.9 × 4.9

④包装

代码	包装
Т	卷盘带装

⑤标称电感值

△=空格

代码 (例)	标称电感值 [µH]
R47	0.47
1R0	1.0
4R7	4.7

※R=小数点

⑥电感量公差

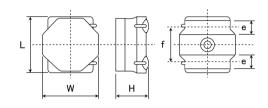
代码	电感量公差
М	±20%
N	±30%

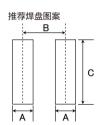
⑦个别规格

O 1 2337901H	
代码	个别规格
F	铁氧体外塗品
М	金属外塗品

8本公司管理记号

■标准外型尺寸/标准数量





Туре	Α	В	С
1616	0.5	1.10	1.65
2020	0.65	1.35	2.0
3030	0.8	2.2	2.7
4040	1.2	2.8	3.7
5050	1.5	3.6	4.2

单位: mm

Туре	L	W	Н	е	f	标准数量 [pcs] 卷盘带装
MDKK1616	1.64±0.1 (0.065±0.004)	1.64±0.1 (0.065±0.004)	1.0 max (0.039 max)			2500
MDJE2020	2.0±0.15 (0.079±0.006)			0.50±0.2 (0.02±0.008)	1.25±0.2 (0.049±0.008)	2500
MDKK2020	2.0±0.15 (0.079±0.006)	2.0±0.15 1.0 max 0.50±0.2 (0.079±0.006) (0.039 max) (0.02±0.008)		1.25±0.2 (0.049±0.008)	2500	
MDMK2020	2.0±0.15 (0.079±0.006)	2.0±0.15 (0.079±0.006)			1.25±0.2 (0.049±0.008)	2500
MDKK3030	3.0±0.1 (0.118±0.004)			0.90 ± 0.2 1.9 ± 0.2 (0.035 ± 0.008) (0.075 ± 0.008)		2000
MDMK3030	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.2 max (0.047 max)	0.90±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
MDJE4040	4.0±0.2 (0.157±0.008)	4.0±0.2 (0.157±0.008)	0.95 max (0.037 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	1000
MDMK4040	4.0±0.2 (0.157±0.008)	4.0±0.2 (0.157±0.008)	1.2 max (0.047 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	1000
MDWK4040	4.0±0.2 (0.157±0.008)			1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	700
MDPK5050	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	1.4 max (0.055 max)	1.20±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1000
	•			•		单位: mm (inch)

[▶] 由于篇幅有限,本产品目录中只记载了有代表性的产品规格,若考虑使用弊司产品时,请确认交货规格说明书中的详细规格。 另外,有关各产品的详细信息 (特性图、可靠性信息、使用时的注意事项等),请参阅弊司网站 (http://www.ty-top.com/)。

● MDKK1616 型 【厚度:1.0mm max.】

型号	七 初中 献/古		力共伝体数	表达中Ⅲ [O]			and a but the				
	EHS	标称电感值 [μH]		自共振频率 [MHz] (min.)	直流电阻 [Ω]		直流重叠允许电流:Idc1		温度上升允许电流:Idc2		· 测试频率 · [MHz]
		[[1]		[IVITIZ] (ITIIII.)	Max.	Тур.	Max.	Typ.	Max.	Тур.	[IVITIZ]
MDKK1616TR47MM	RoHS	0.47	±20%	-	0.095	0.080	3,300	4,100	1,500	1,780	1
MDKK1616T1R0MM	RoHS	1.0	±20%	-	0.140	0.120	2,200	2,750	1,200	1,490	1
MDKK1616T1R5MM	RoHS	1.5	±20%	-	0.185	0.160	1,750	2,200	1,100	1,330	1
MDKK1616T2R2MM	RoHS	2.2	±20%	-	0.250	0.215	1,500	1,800	950	1,110	1
MDKK1616T3R3MM	RoHS	3.3	±20%	-	0.515	0.450	1,150	1,450	650	730	1
MDKK1616T4R7MM	RoHS	4.7	±20%	-	0.640	0.550	950	1,200	550	630	1
MDKK1616T6R8MM	RoHS	6.8	±20%	-	0.820	0.710	630	880	520	600	1
MDKK1616T100MM	RoHS	10	±20%	-	1.120	0.970	550	800	450	500	1
MDKK1616T150MM	RoHS	15	±20%	-	1.800	1.600	460	640	400	440	1

●MDJE2020 型 【厚度:0.95mm max.】

型号		标称电感值	电感量公差	自共振频率 [MHz] (min.)				and a but a stee			
	EHS	你你电恩恒 [µH]					直流重叠允许电流:ldc1		温度上升允许电流:ldc2		测试频率 [MHz]
		[hu]			Max.	Typ.	Max.	Тур.	Max.	Тур.	[IVITZ]
MDJE2020T1R0MM	RoHS	1.0	±20%	-	0.121	0.106	3,100	3,800	1,550	1,800	1
MDJE2020T2R2MM	RoHS	2.2	±20%	-	0.266	0.230	1,550	1,900	1,050	1,200	1
MDJE2020T3R3MM	RoHS	3.3	±20%	-	0.340	0.290	1,350	1,600	950	1,100	1
MDJE2020T4R7MM	RoHS	4.7	±20%	-	0.475	0.410	1,200	1,550	850	950	1
MDJE2020T6R8MM	RoHS	6.8	±20%	-	0.630	0.550	800	1,100	750	850	1
MDJE2020T100MM	RoHS	10	±20%	-	1.040	0.910	700	900	550	600	1

●MDKK2020 型 【厚度:1.0mm max.】

								额定电	流 ※) [mA]			
型号		标称电感值		自共振频率 [MHz] (min.)	直流电阻 [Ω]		直流重叠允许电流:ldc1		温度上升允许电流:ldc2		- 测试频率 - [MHz]	
		[µH]		[IVITIZ] (IIIIII.)	Max.	Тур.	Max.	Тур.	Max.	Тур.	[IVITIZ]	
MDKK2020TR47MM	RoHS	0.47	±20%	-	0.046	0.040	3,500	4,150	2,200	2,500	1	
MDKK2020TR68MM	RoHS	0.68	±20%	-	0.060	0.052	3,200	3,650	2,000	2,100	1	
MDKK2020T1R0MM	RoHS	1.0	±20%	-	0.085	0.074	2,900	3,400	1,700	1,900	1	
MDKK2020T1R5MM	RoHS	1.5	±20%	-	0.133	0.115	1,900	2,250	1,350	1,500	1	
MDKK2020T2R2MM	RoHS	2.2	±20%	-	0.165	0.139	1,650	1,950	1,200	1,350	1	
MDKK2020T3R3MM	RoHS	3.3	±20%	-	0.275	0.240	1,300	1,550	940	1,050	1	
MDKK2020T4R7MM	RoHS	4.7	±20%	-	0.435	0.375	1,050	1,250	750	850	1	
MDKK2020T100MM	RoHS	10	±20%	-	0.690	0.600	750	900	630	680	1	
MDKK2020T150MM	RoHS	15	±20%	-	1.180	1.020	550	750	480	550	1	

●MDMK2020 型 【厚度:1.2mm max.】

		标称电感值		自共振频率	直流电	E [0]		额定电流	流 ※) [mA]		测试频率	
型号	型号 EHS 小林屯改道 [μH]	电感量公差	「MHz」(min.)			直流重叠允许电流:ldc1		温度上升允许电流:Idc2		测试频 率 [MHz]		
		[hii]		[141112] (111111./	Max.	Typ.	Max.	Typ.	Max.	Тур.	[IVII IZ]	
MDMK2020TR47MM	RoHS	0.47	±20%	-	0.046	0.040	4,200	4,800	2,300	2,450	1	
MDMK2020TR68MM	RoHS	0.68	±20%	-	0.058	0.050	3,500	4,100	2,000	2,200	1	
MDMK2020T1R0MM	RoHS	1.0	±20%	-	0.064	0.056	2,550	2,900	1,900	2,050	1	
MDMK2020T1R5MM	RoHS	1.5	±20%	-	0.086	0.075	2,000	2,300	1,650	1,750	1	
MDMK2020T2R2MM	RoHS	2.2	±20%	-	0.109	0.095	1,750	2,000	1,450	1,550	1	
MDMK2020T3R3MM	RoHS	3.3	±20%	-	0.178	0.155	1,350	1,550	1,150	1,200	1	
MDMK2020T4R7MM	RoHS	4.7	±20%	-	0.242	0.210	1,150	1,300	950	1,050	1	

●MDKK3030型 【厚度:1.0mm max.】

● 1410人と2020 至		17-12 I I I I I I I I I I I I I I I I I I I									
		标称电感值		自共振频率	直流电阻	E [0]		额定电	流 ※) [mA]		测试频率
型号	EHS	小小电池值 [µH]	电感量公差	「MHz」(min.)	且川屯	且 [17]	直流重叠允许电流:ldc1 温度上升		温度上升允	许电流:ldc2	/则氏/贝华 [MHz]
		[[11]		[141112] (111111.)	Max.	Typ.	Max.	Typ.	Max.	Тур.	[IVII72]
MDKK3030TR47MM	RoHS	0.47	±20%	-	0.039	0.033	5,400	6,500	3,900	4,500	1
MDKK3030T1R0MM	RoHS	1.0	±20%	-	0.086	0.074	4,400	5,200	2,400	2,800	1
MDKK3030T1R5MM	RoHS	1.5	±20%	-	0.100	0.087	3,000	3,500	2,100	2,400	1
MDKK3030T2R2MM	RoHS	2.2	±20%	-	0.144	0.125	2,500	3,000	1,900	2,200	1
MDKK3030T3R3MM	RoHS	3.3	±20%	-	0.248	0.215	2,000	2,400	1,350	1,500	1
MDKK3030T4R7MM	RoHS	4.7	±20%	-	0.345	0.300	1,700	2,000	1,150	1,300	1
MDKK3030T6R8MM	RoHS	6.8	±20%	-	0.437	0.380	1,400	1,700	1,000	1,150	1
MDKK3030T100MM	RoHS	10	±20%	-	0.575	0.500	1,100	1,300	850	1,000	1

		仁 护由 献		自共振频率	直流电	7E [O]		额定电流	充 ※)[mA]		测试频率
型号	EHS	标称电感值 [μH]	电感量公差	「MHz」(min.)	且加电	进[[1]]	直流重叠允	直流重叠允许电流:Idc1		温度上升允许电流:ldc2	
		[hii]		[141112] (111111.)	Max.	Тур.	Max.	Тур.	Max.	Тур.	[MHz]
MDMK3030TR30MM	RoHS	0.30	±20%	-	0.020	0.017	7,600	9,200	5,500	6,400	1
MDMK3030TR33MM	RoHS	0.33	±20%	-	0.020	0.017	6,400	8,700	5,500	6,400	1
MDMK3030TR47MM	RoHS	0.47	±20%	-	0.027	0.023	6,300	7,500	4,700	5,500	1
MDMK3030T1R0MM	RoHS	1.0	±20%	-	0.050	0.043	4,300	5,100	3,300	3,900	1
MDMK3030T1R5MM	RoHS	1.5	±20%	-	0.074	0.064	3,400	4,100	2,500	3,000	1
MDMK3030T2R2MM	RoHS	2.2	±20%	-	0.112	0.097	2,800	3,600	2,100	2,400	1
MDMK3030T3R3MM	RoHS	3.3	±20%	-	0.167	0.145	2,100	2,700	1,650	1,900	1
MDMK3030T4R7MM	RoHS	4.7	±20%	-	0.263	0.228	1,800	2,300	1,350	1,550	1

[▶] 由于篇幅有限,本产品目录中只记载了有代表性的产品规格,若考虑使用弊司产品时,请确认交货规格说明书中的详细规格。 另外,有关各产品的详细信息(特性图、可靠性信息、使用时的注意事项等),请参阅弊司网站(http://www.ty-top.com/)。

【厚度:0.95mm max.】 ● MDJE4040 型

		标称电感值		自共振频率	直流电	ID [0]		额定电	流 ※) [mA]		测试频率	
型 号	EHS [µH]	电感量公差	「MHz] (min.)	且流电	DH [11]	直流重叠允许电流:ldc1		温度上升允许电流:Idc2		测虹频率 [MHz]		
		[hii]		[IVII 12] (ITIIII.)	Max.	Typ.	Max.	Тур.	Max.	Тур.	[1711 12]	
MDJE4040TR47MM	RoHS	0.47	±20%	-	0.040	0.035	6,000	7,900	4,000	4,500	1	
MDJE4040T1R0MM	RoHS	1.0	±20%	-	0.069	0.060	4,700	5,700	3,000	3,500	1	
MDJE4040T1R5MM	RoHS	1.5	±20%	-	0.084	0.073	3,000	4,000	2,700	3,100	1	
MDJE4040T2R2MM	RoHS	2.2	±20%	-	0.115	0.100	2,400	3,100	2,400	2,700	1	
MDJE4040T3R3MM	RoHS	3.3	±20%	-	0.200	0.175	2,000	2,600	1,800	2,000	1	
MDJE4040T4R7MM	RoHS	4.7	±20%	-	0.250	0.220	1,900	2,300	1,600	1,900	1	
MDJE4040T6R8MM	RoHS	6.8	±20%	-	0.370	0.320	1,500	1,800	1,300	1,500	1	
MDJE4040T100MM	RoHS	10	±20%	=	0.510	0.440	1,400	1,700	1,100	1,300	1	

【厚度:1.2mm max.】 ●MDMK4040F型

型号 EHS		标称电感值 [μH]	电感量公差	自共振频率	直流电	直流电阻 [Ω]		额定电 许电流:ldc1	l流 ※)[mA] 温度上升允许电流:ldc2		测试频率
		[µп]		[MHz] (min.)	Max.	Тур.	Max.	Typ.	Max.	Typ.	[kHz]
MDMK4040TR47MF	RoHS	0.47	±20%	-	0.029	0.025	7,500	10,000	4,600	5,400	100
MDMK4040T1R0MF	RoHS	1.0	±20%	-	0.047	0.041	5,200	7,500	3,500	4,200	100
MDMK4040T1R2MF	RoHS	1.2	±20%	-	0.047	0.041	4,200	6,200	3,500	4,200	100
MDMK4040T1R5MF	RoHS	1.5	±20%	-	0.065	0.056	3,700	5,400	3,300	3,600	100
MDMK4040T2R2MF	RoHS	2.2	±20%	-	0.092	0.080	3,200	4,500	2,500	2,900	100

【厚度:1.2mm max.】 ● MDMK4040 型

		标称电感值		自共振频率	直流电	ID [0]		额定电流	充 ※) [mA]		测试频率
型号	EHS	1水水电池值 [µH]	电感量公差	日共振频率 [MHz] (min.)	旦灬屯	PE [11]	直流重叠允许电流:ldc1		温度上升允许电流:Idc2		/则氏·则华 [MHz]
		[21]		[141112] (111111.)	Max.	Тур.	Max.	Typ.	Max.	Тур.	[1411.12]
MDMK4040TR68MM	RoHS	0.68	±20%	-	0.029	0.025	6,700	7,800	5,000	5,700	1
MDMK4040T1R0MM	RoHS	1.0	±20%	-	0.036	0.031	5,000	6,200	4,500	5,100	1
MDMK4040T1R5MM	RoHS	1.5	±20%	-	0.065	0.056	4,500	5,600	3,200	3,600	1
MDMK4040T2R2MM	RoHS	2.2	±20%	=	0.079	0.069	3,800	4,500	2,800	3,200	1
MDMK4040T3R3MM	RoHS	3.3	±20%	=	0.130	0.113	3,200	4,000	2,200	2,500	1
MDMK4040T4R7MM	RoHS	4.7	±20%	=	0.160	0.140	2,500	3,000	1,900	2,200	1
MDMK4040T6R8MM	RoHS	6.8	±20%	-	0.230	0.200	1,900	2,200	1,600	1,800	1
MDMK4040T100MM	RoHS	10	±20%	=	0.330	0.280	1,700	2,000	1,400	1,600	1

【厚度:2.0mm max.】 ●MDWK4040 型

		1=16 + +		自共振频率	丰 法由	III [0]		额定电	流 ※) [mA]		
型号	EHS	标称电感值 [μH]	电感量公差	「MHz」(min.)	直流电	DH [11]	直流重叠允	许电流:ldc1	温度上升允	许电流:ldc2	[MHz]
		[hii]		[101112] (111111./	Max.	Тур.	Max.	Typ.	Max.	Тур.	[2]
MDWK4040TR33NM	RoHS	0.33	±30%	-	0.013	0.011	16,000	21,000	7,800	8,800	1
MDWK4040TR47NM	RoHS	0.47	±30%	-	0.013	0.011	10,000	15,000	7,800	8,800	1
MDWK4040TR56NM	RoHS	0.56	±30%	-	0.016	0.014	9,000	13,000	6,500	7,500	1
MDWK4040TR68MM	RoHS	0.68	±20%	-	0.016	0.014	8,000	12,000	7,300	8,300	1
MDWK4040T1R0MM	RoHS	1.0	±20%	-	0.027	0.023	7,000	9,400	5,100	5,800	1
MDWK4040T1R5MM	RoHS	1.5	±20%	-	0.041	0.035	7,000	9,400	4,100	4,700	1
MDWK4040T2R2MM	RoHS	2.2	±20%	-	0.054	0.047	5,400	7,500	3,500	4,000	1
MDWK4040T3R3MM	RoHS	3.3	±20%	-	0.075	0.066	3,700	5,200	3,000	3,300	1
MDWK4040T4R7MM	RoHS	4.7	±20%	-	0.107	0.093	3,500	5,000	2,500	2,800	1
MDWK4040T6R8MM	RoHS	6.8	±20%	-	0.158	0.138	2,900	4,000	2,000	2,300	1
MDWK4040T100MM	RoHS	10	±20%	-	0.194	0.169	2,200	3,100	1,600	1,900	1
MDWK4040T220MM	RoHS	22	±20%	-	0.460	0.400	1,500	2,100	1,200	1,400	1
MDWK4040T330MM	RoHS	33	±20%	-	0.720	0.625	1,200	1,700	800	1,000	1

【厚度:1.4mm max.】 ●MDPK5050 型

● 1.101 K2020 ±											
		标称电感值		自共振频率	直流电阻	ID [0]		额定电			测试频率
型 号	EHS	[µH]	电感量公差	「MHz] (min.)	T N	11 [12]	直流重叠允许	午电流:ldc1	温度上升允许电流:ldc2		[MHz]
		Į.		[IVITIZ] (ITIIII.)	Max.	Typ.	Max.	Typ.	Max.	Тур.	[1411 12]
MDPK5050T1R0MM	RoHS	1.0	±20%	-	0.040	0.034	8,500	10,000	4,300	4,700	1
MDPK5050T2R2MM	RoHS	2.2	±20%	-	0.055	0.047	4,100	5,000	3,600	4,200	1
MDPK5050T3R3MM	RoHS	3.3	±20%	-	0.086	0.073	3,800	4,500	2,900	3,400	1
MDPK5050T4R7MM	RoHS	4.7	±20%	-	0.102	0.088	3,500	4,200	2,500	3,000	1
MDPK5050T6R8MM	RoHS	6.8	±20%	-	0.138	0.12	2,700	3,200	2,200	2,500	1
MDPK5050T100MM	RoHS	10	±20%	-	0.225	0.19	2,200	2,600	1,700	2,000	1

- ※)直流重叠允许电流(Idc1)为直流重叠带来的电感值下降,范围在30%以内的直流电感值(at 20℃) ※)温度上升允许电流(Idc2)为温度上升到40℃时的直流电感值(at 20℃) ※)最大额定电流值为能够满足直流重叠允许电流和温度上升允许电流的直流电流值

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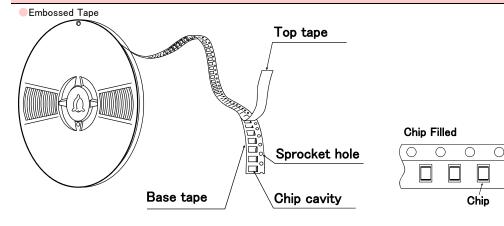
METAL CORE SMD POWER INDUCTORS (MCOIL™ MD SERIES)

■PACKAGING

1)Minimum Quantity

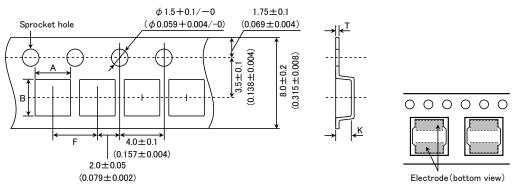
Туре	Standard Quantity [pcs]
туре	Tape & Reel
MDKK1616	2500
MDJE2020	
MDKK2020	2500
MDMK2020	
MDKK3030	2000
MDMK3030	2000
MDJE4040	1000
MDMK4040	1000
MDWK4040	700
MDPK5050	1000

2Tape Material



3 Taping dimensions

Embossed tape 8mm wide (0.315 inches wide)

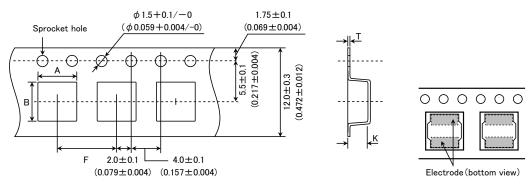


Turne	Chip	cavity	Insertion pitch	Tape th	Tape thickness		
Туре	Α	A B F		Т	K		
MDKK1616	1.79±0.1 (0.071±0.004)	1.79±0.1 (0.071±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.010±0.002)	1.1±0.1 (0.043±0.004)		
MDJE2020 MDKK2020 MDMK2020	2.2±0.1 (0.102±0.004)	2.2±0.1 (0.102±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)		
MDKK3030	3.2±0.1	3.2±0.1	4.0±0.1	0.3±0.05	1.4±0.1		
MDMK3030	(0.126 ± 0.004)	(0.126 ± 0.004)	(0.157 ± 0.004)	(0.012 ± 0.002)	(0.055 ± 0.004)		

Unit:mm(inch)

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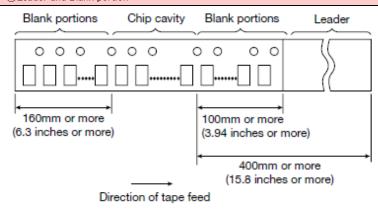
Embossed tape 12mm wide (0.47 inches wide)



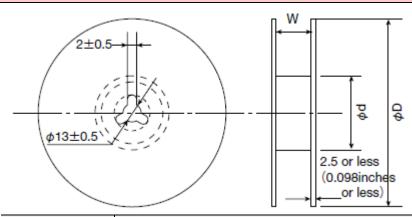
Tuna	Chip	cavity	Insertion pitch	Tape thickness		
Туре	Α	В	F	T	K	
MDJE4040 MDMK4040 MDWK4040	4.3±0.1 (0.169±0.004)	4.3±0.1 (0.169±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.1 (0.012±0.004)	1.6±0.1 (0.063±0.004)	
MDPK5050	5.25±0.1 (0.207±0.004)	5.25±0.1 (0.207±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.1 (0.012±0.004)	1.6±0.1 (0.063±0.004)	

Unit:mm(inch)

4 Leader and Blank portion



⑤Reel size



Type	R	eel size (Reference value	s)
туре	ϕ D	ϕ d	W
MDKK1616			
MDJE2020			
MDKK2020	180 ± 0.5	60±1.0	10.0 ± 1.5
MDMK2020	(7.087 ± 0.019)	(2.36 ± 0.04)	(0.394 ± 0.059)
MDKK3030			
MDMK3030			
MDJE4040			
MDMK4040	180 ± 3.0	60±2.0	14.0 ± 1.5
MDWK4040	(7.087 ± 0.118)	(2.36 ± 0.08)	(0.551 ± 0.059)
MDPK5050			

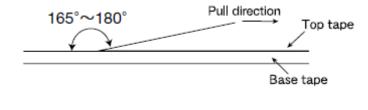
Unit:mm(inch)

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©Top Tape Strength

Top tape strength

Туре	Peel-off strength
MDKK1616	
MDJE2020	
MDKK2020	0.1N~1.0N
MDMK2020	0.1N~1.0N
MDKK3030	
MDMK3030	
MDJE4040	
MDMK4040	0.1N~1.3N
MDWK4040	0.11N~1.3N
MDPK5050	



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METAL CORE SMD POWER INDUCTORS (MCOIL™ MD SERIES)

■RELIABILITY DATA

RELIABILITY DA	IA	
1. Operating Tempe	erature Range	
Specified Value	MD series	-40~+125°C
Test Methods and Remarks	Including self-generated heat	
	_	
2. Storage Tempera		T -
Specified Value	MD series	
Test Methods and Remarks	-5 to 40°C for the product with taping.	
3. Rated current		
Specified Value	MD series	Within the specified tolerance
4. Inductance		
Specified Value	MD series	Within the specified tolerance
Test Methods and		1285A or equivalent)
Remarks	Measuring condition : Please see item li	st.
5. DC Resistance		
	MD series	Within the constitution of
Specified Value Test Methods and	MD series	Within the specified tolerance
Remarks	Measuring equipment : DC ohmmeter (H	IOKI 3227 or equivalent)
6. Self resonance fr	requency	
Specified Value	MD series	_
	I	
7. Temperature cha	racteristic	
Specified Value	MD series	Inductance change : Within ±10%
Test Methods and Remarks	Measurement of inductance shall be taken at With reference to inductance value at $\pm 20^\circ$	t temperature range within $-40^{\circ}\text{C}\!\sim\!+125^{\circ}\text{C}$. C., change rate shall be calculated.
0.0	6.1	
8. Resistance to fle	I	N. I
Specified Value	MD series	No damage
Test Methods and Remarks	until deflection of the test board reaches to Test board size : 100 × 40 × 1.0 Test board material : Glass epoxy— Solder cream thickness : 0.10 mm	mm Force Rod 10, 20
9. Insulation resista	nce : between wires	
Specified Value	MD series	-
		·
10. Insulation resist	ance : between wire and core	
Specified Value	MD series	_
11. Withstanding vo	ltage : between wire and core	
Specified Value	MD series	_

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Specified Value	MD series		Shall not come off PC board	
	The test samples shall be s	oldered to the tes	st board by the reflow.	
Test Methods and	Applied force	: 10N to X and	Y directions.	
Remarks	Duration	: 5s.		
	Solder cream thickness	: 0.10mm.		
13. Resistance to v	ibration			
Specified Value	MD series		Inductance change : Within ±10% No significant abnormality in appearance.	
			No significant abnormality in appearance.	
	The test samples shall be s	oldered to the tes	7 11	
	The test samples shall be s Then it shall be submitted		st board by the reflow.	
	•		st board by the reflow.	
T . M . I . I	Then it shall be submitted	to below test cond 10~55Hz	st board by the reflow.	
Test Methods and Remarks	Then it shall be submitted to Frequency Range	to below test cond 10~55Hz	exceed acceleration 196m/s²)	

14. Solderability			
Specified Value	MD series		At least 90% of surface of terminal electrode is covered by new solder.
	The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table. Flux: Methanol solution containing rosin 25%.		
Test Methods and Remarks	Solder Temperature	245±5°C	
Remarks	Time	5±1.0 sec.	
	XImmersion depth : All side	es of mounting ter	minal shall be immersed.

Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

15. Resistance to se	oldering heat	
Specified Value	MD series	Inductance change : Within ±10%
Specified value	MD series	No significant abnormality in appearance.
The test sample shall be exposed to reflow or		ven at 230±5°C for 40 seconds, with peak temperature at 260±5°C for 5 seconds, 2 times.
Test Methods and Remarks	Test board material : Glass epoxy-resin	
Remarks	Test board thickness : 1.0mm	

16. Thermal shock					
Specified Value	MD series			Inductance change : Within ±10% No significant abnormality in appearance.	
	· ·			-	he test samples shall be placed at specified temperature for specified emperature cycle shall be repeated 100 cycles.
		Conditions of 1 cycle Step Temperature (°C)			
Test Methods and	Step			Duration (min)	
Remarks	1	-40±3		30±3	
	2	Room temperature		Within 3	
	3	+85±2		30±3	
	4	Room temperature		Within 3	

17. Damp heat			
Specified Value	MD series		Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.
Test Methods and	The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table. Temperature 60±2°C		•
Remarks			
	Humidity	90~95%RH	
	Time	500+24/-0 hour	

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18. Loading under o	lamp heat		
Specified Value	MD series		Inductance change: Within ±10%
			No significant abnormality in appearance.
	The test samples shall be soldered to the te		•
	· ·	•	mostatic oven set at specified temperature and humidity and applied the rated currer
Test Methods and	continuously as show	60±2°C	
Remarks	Temperature	90~95%RH	_
	Humidity Applied current	Rated current	_
	Time	500+24/-0 hour	_
	Time	300 + 24/ - 0 riour	
40.1			
19. Low temperatur	re life test		
Specified Value	MD series		Inductance change : Within ±10%
·			No significant abnormality in appearance.
Test Methods and	1	all be soldered to the te	st board by the reflow. After that, the test samples shall be placed at test conditions as show
Remarks	in below table.		
	Temperature	-40±2°C	
	Time	500+24/-0 hour	
20. High temperatur	ra lifa taat		
20. High temperatu	re me test		
Specified Value	MD series		_
			_
Specified Value			_
Specified Value 21. Loading at high	MD series temperature life test		Inductance change : Within ±10%
Specified Value	MD series		Inductance change : Within ±10% No significant abnormality in appearance.
Specified Value 21. Loading at high	MD series temperature life test MD series	all be soldered to the te	No significant abnormality in appearance.
Specified Value 21. Loading at high Specified Value	MD series temperature life test MD series The test samples sha		No significant abnormality in appearance.
Specified Value 21. Loading at high Specified Value Test Methods and	MD series temperature life test MD series The test samples sha		No significant abnormality in appearance.
Specified Value 21. Loading at high Specified Value Test Methods and	MD series temperature life test MD series The test samples shall		No significant abnormality in appearance.
Specified Value 21. Loading at high Specified Value Test Methods and	MD series temperature life test MD series The test samples shabelow table.	all be placed in thermost	No significant abnormality in appearance.
Specified Value 21. Loading at high Specified Value Test Methods and	MD series temperature life test MD series The test samples shadelow table. Temperature	all be placed in thermost	No significant abnormality in appearance.
Specified Value 21. Loading at high Specified Value Test Methods and	MD series temperature life test MD series The test samples shadelow table. Temperature Applied current	all be placed in thermost 85±2°C Rated current	No significant abnormality in appearance.
Specified Value 21. Loading at high Specified Value Test Methods and	MD series temperature life test MD series The test samples shabelow table. Temperature Applied current Time	all be placed in thermost 85±2°C Rated current	No significant abnormality in appearance.
Specified Value 21. Loading at high Specified Value Test Methods and Remarks	MD series temperature life test MD series The test samples shabelow table. Temperature Applied current Time	all be placed in thermost 85±2°C Rated current	No significant abnormality in appearance.
Specified Value 21. Loading at high Specified Value Test Methods and Remarks	MD series temperature life test MD series The test samples shabelow table. Temperature Applied current Time	all be placed in thermost 85±2°C Rated current	No significant abnormality in appearance. est board by the reflow. tatic oven set at specified temperature and applied the rated current continuously as shown
Specified Value 21. Loading at high Specified Value Test Methods and Remarks	MD series temperature life test MD series The test samples shabelow table. Temperature Applied current Time	all be placed in thermost 85±2°C Rated current	No significant abnormality in appearance. est board by the reflow. tatic oven set at specified temperature and applied the rated current continuously as shown Standard test condition:
Specified Value 21. Loading at high Specified Value Test Methods and Remarks	MD series temperature life test MD series The test samples shabelow table. Temperature Applied current Time	all be placed in thermost 85±2°C Rated current	No significant abnormality in appearance. est board by the reflow. tatic oven set at specified temperature and applied the rated current continuously as shown Standard test condition: Unless otherwise specified, temperature is 20±15°C and 65±20% of relative humidity.

METAL CORE SMD POWER INDUCTORS (MCOIL™ MD SERIES)

■PRECAUTIONS

1. Circuit Design

◆Operating environment

Precautions

1. The products described in this specification are intended for use in general electronic equipment, (office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.

2. PCB Design Precautions ◆Land pattern design 1. Please refer to a recommended land pattern.

◆Land pattern design Surface Mounting

Technical considerations

Mounting and soldering conditions should be checked beforehand.

· Applicable soldering process to this products is reflow soldering only.

3. Considerations for automatic placement

Precautions

- ◆Adjustment of mounting machine
 - 1. Excessive impact load should not be imposed on the products when mounting onto the PC boards.
 - 2. Mounting and soldering conditions should be checked beforehand.

Technical considerations

- ◆Adjustment of mounting machine
 - 1. When installing products, care should be taken not to apply distortion stress as it may deform the products.

4. Soldering

Reflow soldering

- 1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.
- 2. The product shall be used reflow soldering only.
- 3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.

♦Lead free soldering

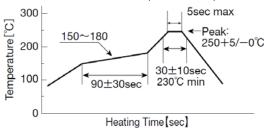
Precautions

- 1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.
- ◆Recommended conditions for using a soldering iron (NR10050 Type)
 - Put the soldering iron on the land-pattern.
 - Soldering iron's temperature Below 350°C
 - Duration 3 seconds or less
- · The soldering iron should not directly touch the inductor.

◆Reflow soldering

- 1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.
 - •NR30/40/50/60/80, NRV20/30, NRH24/30, NRS20/40/50/60/80 Type, NR10050 Type, NS101/125 Type Recommended reflow condition (Pb free solder)

Technical considerations



5. Cleaning

Precautions

♦Cleaning conditions

1. Washing by supersonic waves shall be avoided.

Technical considerations

♦Cleaning conditions

1. If washed by supersonic waves, the products might be broken.

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6. Handling Precautions

◆Handling

- 1. Keep the product away from all magnets and magnetic objects.
- ◆Breakaway PC boards (splitting along perforations)
- 1. When splitting the PC board after mounting product, care should be taken not to give any stresses of deflection or twisting to the board.
- 2. Board separation should not be done manually, but by using the appropriate devices.
- ◆Mechanical considerations
- 1. Please do not give the product any excessive mechanical shocks.
- 2. Please do not add any shock and power to a product in transportation.
- ◆Pick-up pressure
 - 1. Please do not push to add any pressure to a winding part. Please do not give any shock and push into a ferrite core exposure part.
- ◆Packing
- 1. Please avoid accumulation of a packing box as much as possible.
- ◆Board mounting
- 1. There shall be no pattern or via between terminals at the bottom of product.
- 2. Components which are located in peripheral of product shall not make contact with surface (top, side) of product.

◆Handling

- 1. There is a case that a characteristic varies with magnetic influence.
- ◆Breakaway PC boards (splitting along perforations)
 - 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs.
- ◆Mechanical considerations
 - 1. There is a case to be damaged by a mechanical shock.
 - 2. There is a case to be broken by the handling in transportation.
- Technical considerations

 Technical Pick-up pressure
 - 1. Damage and a characteristic can vary with an excessive shock or stress.
 - ◆Packing
 - 1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.
 - ◆Board mounting
 - 1. If there is pattern or via between terminals at the bottom of product, it may cause characteristics change.
 - 2. If components which are located in peripheral of product make contact with surface (top, side) of product, it may cause damage or characteristics change.

7. Storage conditions

♦Storage

- To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled.
 - · Recommended conditions

Ambient temperature : −5~40°C

Humidity: Below 70% RH

- The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may
 decrease as time passes.
 - For this reason, product should be used within 6 months from the time of delivery.
 - In case of storage over 6 months, solderability shall be checked before actual usage.

Technical considerations

Precautions

♦Storage

1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.

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金属磁芯绕线型片状功率电感器 (MCOIL™ MA 系列)



回流焊

■型号标示法

※使用温度范围: -40~+105℃ (包含产品本身发热)



(1) 类型		

代码	类型
MA	金属磁芯绕线型片状功率电感器

②尺寸 (T)

<u> </u>	
代码	尺寸 (T) [mm]
KK	1.0
MK	1.2

③尺寸 (L×W)

<u> </u>	
代码	尺寸 (L×W) [mm]
2016	2.0 × 1.6
2520	2.5 × 2.0

4)包装

代码	包装				
T	卷盘带装				

⑤标称电感值

代码 (例)	标称电感值 [µH]
R47	0.47
1R0	1.0
4R7	4.7
※R=小数点	

71000

⑥电感量公差

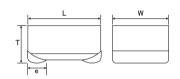
代码	电感量公差
М	±20%

⑦个别规格

O I Manual	
代码	个别规格
Δ	标准品

⑧本公司管理记号

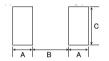
■标准外型尺寸 / 标准数量



推荐焊盘图案

实装上的注意

- ·请确认实装状态后使用。
- ·本产品焊法限定为回流焊法。



Type	Α	В	С
2016	0.7	0.8	1.8
2520	0.8	1.2	2.0
			单位: mm

Туре	L	W	Т	е	标准数量 [pcs] 卷盘带装
MAKK2016	2.0±0.1	1.6±0.1	1.0 max	0.5±0.3	3000
WINTERES	(0.079 ± 0.004)	(0.063 ± 0.004)	(0.039 max)	(0.020 ± 0.012)	0000
MAKK2520	2.5±0.2	2.0±0.2	1.0 max	0.5 ± 0.3	3000
MARKZJZU	(0.098 ± 0.008)	(0.079 ± 0.008)	(0.039 max)	(0.020 ± 0.012)	3000
MAMK2520	2.5±0.2	2.0±0.2	1.2 max	0.5±0.3	3000
MAMINZOZU	(0.098 ± 0.008)	(0.079 ± 0.008)	(0.047 max)	(0.020 ± 0.012)	3000

单位: mm (inch)

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【厚度:1.0mm max.】 ●MAKK2016 型

新定电流 					额定电流 ※	[mA] (max.)		
型号	EHS	标称电感值 [μH]	电感量公差	自共振频率 [MHz] (min.)	直流电阻 [Ω] (max.)	直流重叠允许电流 ldc1	温度上升允许电流 Idc2	测试频率 [MHz]
MAKK2016TR24M	RoHS	0.24	±20%	=	0.037	4,200	3,000	2
MAKK2016TR33M	RoHS	0.33	±20%	=	0.040	3,600	3,200	2
MAKK2016TR47M	RoHS	0.47	±20%	-	0.460	3,200	2,800	2
MAKK2016TR68M	RoHS	0.68	±20%	-	0.065	2,500	2,500	2
MAKK2016T1R0M	RoHS	1.0	±20%	-	0.075	2,200	2,200	2
MAKK2016T1R5M	RoHS	1.5	±20%	-	0.130	1,600	1,650	2
MAKK2016T2R2M	RoHS	2.2	±20%	-	0.160	1,500	1,500	2
MAKK2016T3R3M	RoHS	3.3	±20%	-	0.255	1,150	1,200	2
MAKK2016T4R7M	RoHS	4.7	±20%	-	0.380	1,000	950	2

●MAKK2520 型 【厚度:1.0mm max.】

		+= 1/2 ch ch /ch		± 11 1=4==	= \+ + m	额定电流 ※) [mA] (max.)		
型号	EHS	标称电感值 [μH]	电感量公差	自共振频率 [MHz] (min.)	直流电阻 [Ω] (max.)	直流重叠允许电流 ldc1	温度上升允许电流 ldc2	测试频率 [MHz]
MAKK2520TR33M	RoHS	0.33	±20%	-	0.038	4,700	3,500	2
MAKK2520TR47M	RoHS	0.47	±20%	-	0.046	3,900	3,200	2
MAKK2520TR68M	RoHS	0.68	±20%	-	0.059	3,700	2,900	2
MAKK2520T1R0M	RoHS	1.0	±20%	-	0.072	2,700	2,500	2
MAKK2520T1R5M	RoHS	1.5	±20%	-	0.125	2,300	1,800	2
MAKK2520T2R2M	RoHS	2.2	±20%	_	0.156	1,900	1,500	2
MAKK2520T3R3M	RoHS	3.3	±20%	_	0.200	1,550	1,300	2
MAKK2520T4R7M	RoHS	4.7	±20%	-	0.300	1,300	1,100	2

MAMK2520 型	【厚度:1.2mm max.】
------------	-----------------

■MAMK2520 型	●MAMK2520 型 【序及.1.2IIIII IIIdx.】							
		1-7-1-0		A44-4-4-		额定电流 ※) [mA] (max.)		
型号	EHS	标称电感值 [μH]	电感量公差	自共振频率 [MHz] (min.)	直流电阻 [Ω] (max.)	直流重叠允许电流 ldc1	温度上升允许电流 Idc2	测试频率 [MHz]
MAMK2520TR47M	RoHS	0.47	±20%	-	0.039	4,200	3,400	2
MAMK2520TR68M	RoHS	0.68	±20%	-	0.048	3,200	3,200	2
MAMK2520T1R0M	RoHS	1.0	±20%	-	0.059	3,100	2,700	2
MAMK2520T2R2M	RoHS	2.2	±20%	-	0.110	2,000	1,900	2
MAMK2520T3R3M	RoHS	3.3	±20%	-	0.156	1,800	1,700	2
MAMK2520T4R7M	RoHS	4.7	±20%	-	0.260	1,500	1,300	2

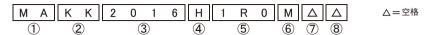
^{※)}直流重叠允许电流(Idc1)为直流重叠带来的电感值下降,范围在30%以内的直流电感值(at 20°C)※)温度上升允许电流(Idc2)为温度上升到40°C时的直流电感值(at 20°C)※)额定电流值为Idc1 或 Idc2 中较低的直流电流值。

金属磁芯绕线型片状功率电感器 (MCOIL™ MA-H 系列)



■型号标示法

※使用温度范围: -40~+125℃ (包含产品本身发热)



①类型

代码	类型
MA	金属磁芯绕线型片状功率电感器

②尺寸 (T)

代码	尺寸 (T) [mm]
KK	1.0
MK	1.2

③尺寸 (L×W)

O/ 13 (= 11)	
代码	尺寸 (L×W) [mm]
2016	2.0 × 1.6
2520	2.5 × 2.0

4)包装

· •	
代码	包装及特殊规格
Н	盘带 (高特性规格)

⑤标称电感值

代码 (例)	标称电感值 [µH]
R47	0.47
1R0	1.0
4R7	4.7
※R=小数点	

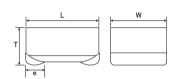
の 中 感 重 公 左	
代码	电感量公差
М	±20%

⑦ 个 即 加 枚

O L'Wayer	
代码	个别规格
Δ	标准品

⑧本公司管理记号

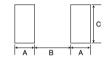
■标准外型尺寸 / 标准数量



推荐焊盘图案

实装上的注意

- ·请确认实装状态后使用。 ·本产品焊法限定为回流焊法。



Туре	Α	В	С
2016	0.7	0.8	1.8
2520	0.8	1.2	2.0
			单位: mm

T		14/	т		标准数量 [pcs]
Туре	L	W	1	е	卷盘带装
MAKK2016H	2.0±0.1	1.6±0.1	1.0 max	0.5±0.3	3000
WIARRZUTUH	(0.079 ± 0.004)	(0.063 ± 0.004)	(0.039 max)	(0.020 ± 0.012)	3000
MAKK2520H	2.5±0.2	2.0±0.2	1.0 max	0.5±0.3	3000
MAKK252UH	(0.098 ± 0.008)	(0.079 ± 0.008)	(0.039 max)	(0.020 ± 0.012)	3000
MAMKOFOOLI	2.5±0.2	2.0±0.2	1.2 max	0.5±0.3	2000
MAMK2520H	(0.098 ± 0.008)	(0.079 ± 0.008)	(0.047 max)	(0.020 ± 0.012)	3000

单位: mm (inch)

[▶] 由于篇幅有限,本产品目录中只记载了有代表性的产品规格,若考虑使用弊司产品时,请确认交货规格说明书中的详细规格。 另外,有关各产品的详细信息(特性图、可靠性信息、使用时的注意事项等),请参阅弊司网站(http://www.ty-top.com/)。

MAKK2016H型		【厚度:1.0mm max.】						
型 号	EHS	标称电感值 [µH]	电感量公差	自共振频率 [MHz] (min.)	直流电阻 [Ω] (max.)	额定电流 ※) 直流重叠允许电流 Idc1	[mA] (max.) 温度上升允许电流 Idc2	测试频率 [MHz]
MAKK2016HR24M	RoHS	0.24	±20%	-	0.026	5,800	4,000	2
MAKK2016HR33M	RoHS	0.33	±20%	-	0.030	4,700	3,500	2
MAKK2016HR47M	RoHS	0.47	±20%	-	0.036	4,300	3,300	2
MAKK2016HR68M	RoHS	0.68	±20%	-	0.050	3,200	2,700	2
MAKK2016H1R0M	RoHS	1.0	±20%	=	0.070	2,700	2,300	2
MAKK2016H1R5M	RoHS	1.5	±20%	-	0.105	2.100	1.800	2

■MAKK2520H 型		【厚度:1.0mm max.】						
型号	EHS	标称电感值 [µH]	电感量公差	自共振频率 [MHz] (min.)	直流电阻 [Ω] (max.)	额定电流 ※) 直流重叠允许电流 Idc1	[mA] (max.) 温度上升允许电流 Idc2	测试频率 [MHz]
MAKK2520HR22M	RoHS	0.22	±20%	-	0.021	7500	4900	2
MAKK2520HR33M	RoHS	0.33	±20%	-	0.026	6200	4300	2
MAKK2520HR47M	RoHS	0.47	±20%	-	0.029	5700	4000	2
MAKK2520HR68M	RoHS	0.68	±20%	-	0.043	4300	3400	2
MAKK2520H1R0M	RoHS	1.0	±20%	-	0.053	3800	3000	2
MAKK2520H1R5M	RoHS	1.5	±20%	-	0.078	3000	2400	2
MAKK2520H2R2M	RoHS	2.2	+20%	_	0.120	2500	1800	2

● MAMK2520H 型		【厚度:1.2mm max.】						
型믁	EHS	标称电感值 [μH]	电感量公差	自共振频率 [MHz] (min.)	直流电阻 [Ω] (max.)	额定电流 ※) 直流重叠允许电流 Idc1	[mA] (max.) 温度上升允许电流 Idc2	测试频率 [MHz]
MAMK2520HR22M	RoHS	0.22	±20%	-	0.021	7500	5000	2
MAMK2520HR33M	RoHS	0.33	±20%	-	0.023	6600	4400	2
MAMK2520HR47M	RoHS	0.47	±20%	-	0.026	5800	4100	2
MAMK2520HR68M	RoHS	0.68	±20%	-	0.036	5100	3500	2
MAMK2520H1R0M	RoHS	1.0	±20%	-	0.045	4300	3100	2
MAMK2520H1R5M	RoHS	1.5	±20%	-	0.065	3300	2600	2
MAMK2520H2R2M	RoHS	2.2	±20%	-	0.090	2800	2200	2
•						<u> </u>		<u> </u>

^{※)}直流重叠允许电流(Idc1)为直流重叠带来的电感值下降,范围在30%以内的直流电感值(at 20°C) ※)温度上升允许电流(Idc2)为温度上升到40°C时的直流电感值(at 20°C) ※)额定电流值为Idc1 或 Idc2 中较低的直流电流值。

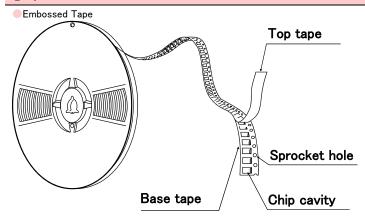
METAL CORE WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ MA SERIES / MCOIL™ MA-H SERIES)

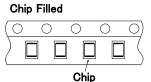
PACKAGING

1 Minimum Quantity

Type	Standard Quantity [pcs]
туре	Tape & Reel
MAKK2016	3000
MAKK2520	3000
MAMK2520	3000

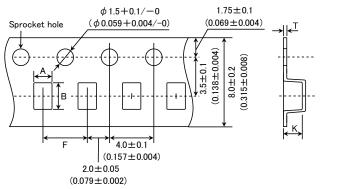
2Tape Material

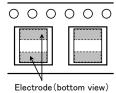




3 Taping dimensions

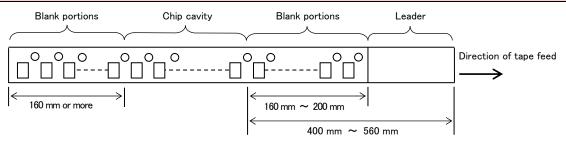
Embossed tape 8mm wide (0.315 inches wide)





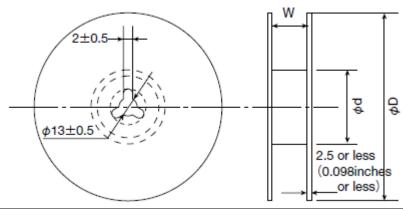
Type	Chip	cavity	Insertion pitch	Tape thickness	
туре	Α	В	F	Т	K
MAKK2016	1.9±0.1	2.3±0.1	4.0±0.1	0.25±0.05	1.2 max
MARKZUTO	(0.075 ± 0.004)	(0.091 ± 0.004)	(0.157 ± 0.004)	(0.009 ± 0.002)	(0.047 max)
MAKK2520	2.3±0.1	2.8±0.1	4.0±0.1	0.3±0.05	1.25 max
MAKK202U	(0.091 ± 0.004)	(0.110 ± 0.004)	(0.157 ± 0.004)	(0.012 ± 0.002)	(0.049 max)
MANIZOEGO	2.3±0.1	2.8±0.1	4.0±0.1	0.3±0.05	1.4 max
MAMK2520	(0.091 ± 0.004)	(0.110 ± 0.004)	(0.157 ± 0.004)	(0.012 ± 0.002)	(0.055 max)
					Unit:mm(inch)

4 Leader and Blank portion



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⑤Reel size

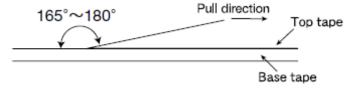


Type	Reel size (Reference values)		
Туре	ϕ D	ϕ d	W
MAKK2016	100+0 / 2	60+1/-0	10.0±1.5
MAKK2520	180+0/-3 (7.087+0/-0.118)	(2.36+0.039/0)	(0.394 ± 0.059)
MAMK2520			
•			

Unit:mm(inch)

6Top Tape Strength

The top The top tape requires a peel-off force of 0.1 to 1.2N in the direction of the arrow as illustrated below.



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METAL CORE WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ MA SERIES / MCOIL™ MA-H SERIES)

■RELIABILITY DATA

1. Operating Tempe	rature Range		
Specified Value	MA series	-40~+105°C	
Specified Value	MA-H series	-40~+125°C	
Test Methods and Remarks	Including self-generated heat		
2. Storage Tempera			
Specified Value	MA series	-40~+85°C	
Test Methods and	MA-H series		
Remarks	0 to 40°C for the product with taping.		
3. Rated current			
0	MA series		
Specified Value	MA-H series	Within the specified tolerance	
	W/ TI Solies	<u>I</u>	
4. Inductance			
0 10 111	MA series	West of the Control o	
Specified Value	MA-H series	Within the specified tolerance	
Test Methods and	Measuring equipment : LCR Meter (HP 4	285A or equivalent)	
Remarks	Measuring frequency : 2MHz、1V		
5. DC Resistance			
Specified Value	MA series	Within the specified tolerance	
	MA-H series		
Test Methods and Remarks	Measuring equipment : DC ohmmeter (H	IOKI 3227 or equivalent)	
6. Self resonance fr	requency		
Specified Value	MA series	_	
	MA-H series		
7. Temperature cha	racteristic		
Specified Value	MA series	Inductance change : Within ±15%	
	MA-H series		
Test Methods and Remarks	Measurement of inductance shall be taken at temperature range within $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$. With reference to inductance value at $+20^{\circ}\text{C}$, change rate shall be calculated.		
8. Resistance to fle			
Specified Value	MA series	No damage	
	MA-H series		
Test Methods and Remarks	The test samples shall be soldered to the test until deflection of the test board reaches to Test board size : 100 × 40 × 1.0 Test board material : Glass epoxy-rescriptions : 0.12 mm	resin Force Rod	
		R5 Board Test Sample 45±2mm 45±2mm	

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9. Insulation resista	nce : between wires		
0 :5 1)/1	MA series		
Specified Value	MA-H series	1 -	
10. Insulation resist	ance : between wire and core		
0 :5 1)/1	MA series	D00EV 400LO :	
Specified Value	MA-H series	DC25V 100kΩ min	
11. Withstanding vo	Itage : between wire and core		
0 :5 1)/1	MA series		
Specified Value	MA-H series	-	
12. Adhesion of terr	minal electrode		
	MA series		
Specified Value	MA-H series	No abnormality.	
	The test samples shall be soldered to the tes	st board by the reflow.	
Test Methods and	Applied force : 10N to X and	Y directions.	
Remarks	Duration : 5s. Solder cream thickness : 0.12mm.		
	Solder Greatif trilckness . 0.12mm.		
12 Desistance to v	ikustian		
13. Resistance to v			
Specified Value	MA series	Inductance change : Within ±10% No significant abnormality in appearance.	
	MA-H series	5 27	
	The test samples shall be soldered to the test. Then it shall be submitted to below test cond.	•	
	Frequency Range 10~55Hz		
Test Methods and	Total Amplitude 1.5mm (May not	exceed acceleration 196m/s²)	
Remarks	Sweeping Method 10Hz to 55Hz to	10Hz for 1min.	
	Time X	For 2 hours on each X, Y, and Z axis.	
	Z	Tot 2 flours on each X, T, and 2 axis.	
	Recovery : At least 2hrs of recovery under the	ne standard condition after the test, followed by the measurement within 48hrs.	
14. Solderability			
0 :0 17/1	MA series		
Specified Value	MA-H series	At least 90% of surface of terminal electrode is covered by new solder.	
	The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table.		
Test Methods and	Flux: Methanol solution containing rosin 25%.		
Remarks	Solder Temperature 245±5°C Time 5±0.5 sec.	_	
	Time 5±0.5 sec.		
	Action and a second a second and a second an		
15. Resistance to s	oldering heat		
	MA series	Inductance change : Within ±10%	
Specified Value	MA-H series	No significant abnormality in appearance.	
		ren at 230°C for 40 seconds, with peak temperature at $260+0/-5$ °C for 5 seconds, 3 times.	
Test Methods and	Test board material : Glass epoxy-resin		
Remarks	Test board thickness : 1.0mm		
	Recovery : At least 2hrs of recovery under the	ne standard condition after the test, followed by the measurement within 48hrs.	

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16. Thermal shock MA series Inductance change: Within ±10% Specified Value No significant abnormality in appearance. MA-H series The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence. The temperature cycle shall be repeated 100 cycles. Conditions of 1 cycle Duration (min) Step Temperature (°C) Test Methods and -40±3 30 ± 3 1 Remarks 2 Room temperature Within 3 3 +85±2 30 ± 3 Room temperature Within 3 Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. 17. Damp heat MA series Inductance change: Within ±10% Specified Value No significant abnormality in appearance. MA-H series The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table. Test Methods and 60±2°C Temperature Remarks Humidity 90~95%RH 500+24/-0 hour Time Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. 18. Loading under damp heat MA series Inductance change : Within $\pm 10\%$ Specified Value No significant abnormality in appearance. MA-H series The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity and applied the rated current continuously as shown in below table. Test Methods and Temperature 60±2°C Remarks Humidity 90∼95%RH Applied current Rated current Time 500+24/-0 hour Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. 19. Low temperature life test MA series Inductance change : Within $\pm 10\%$ Specified Value No significant abnormality in appearance. MA-H series The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table. Test Methods and Remarks Temperature -40±2°C Time 500+24/-0 hour Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. 20. High temperature life test MA series Inductance change: Within ±10% Specified Value No significant abnormality in appearance. MA-H series The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown Test Methods and in below table 85 ± 2°C Remarks Temperature 500+24/-0 hour Time Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. 21. Loading at high temperature life test MA series

Specified Value

MA-H series

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22. Standard condition		
	MA series	Standard test condition : Unless otherwise specified, temperature is 20±15°C and 65±20% of relative humidity.
Specified Value	MA-H series	When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of $20\pm2^{\circ}C$ of temperature, $65\pm5\%$ relative humidity. Inductance is in accordance with our measured value.

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METAL CORE WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ MA SERIES / MCOIL™ MA-H SERIES)

PRECAUTIONS 1. Circuit Design Operating environment 1. The products described in this specification are intended for use in general electronic equipment, office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical Precautions equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance. 2. PCB Design Land pattern design Precautions 1. Please refer to a recommended land pattern. ◆Land pattern design Technical Surface Mounting Mounting and soldering conditions should be checked beforehand. considerations · Applicable soldering process to this products is reflow soldering only. 3. Considerations for automatic placement Adjustment of mounting machine Precautions 1. Excessive impact load should not be imposed on the products when mounting onto the PC boards. 2. Mounting and soldering conditions should be checked beforehand. Adjustment of mounting machine considerations 1. When installing products, care should be taken not to apply distortion stress as it may deform the products. 4. Soldering ◆Reflow soldering 1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified. 2. The product shall be used reflow soldering only Precautions 3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering. ◆Lead free soldering 1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently. Reflow soldering 1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products. Recommended reflow condition (Pb free solder) 5sec max 300 - Peak∶260+0/−5°C $\mathsf{Cemperature}[\mathsf{^{\circ}C}]$ 150~180 Technical 200 considerations 40sec max 100 $90 \pm 30 sec$ 230°C min

5. Cleaning Cleaning conditions Precautions 1. Washing by supersonic waves shall be avoided. ◆Cleaning conditions **Technical** considerations 1. If washed by supersonic waves, the products might be broken.

Heating Time [sec]

0

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6. Handling ◆Handling 1. Keep the product away from all magnets and magnetic objects. ◆Breakaway PC boards (splitting along perforations) 1. When splitting the PC board after mounting product, care should be taken not to give any stresses of deflection or twisting to the board. 2. Board separation should not be done manually, but by using the appropriate devices. ◆Mechanical considerations Precautions 1. Please do not give the product any excessive mechanical shocks. 2. Please do not add any shock and power to a product in transportation. ◆Pick-up pressure 1. Please do not push to add any pressure to a winding part. Please do not give any shock and push into a ferrite core exposure part. ◆Packing 1. Please avoid accumulation of a packing box as much as possible. 1. There is a case that a characteristic varies with magnetic influence. ◆Breakaway PC boards (splitting along perforations) 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs. ◆Mechanical considerations Technical 1. There is a case to be damaged by a mechanical shock. considerations 2. There is a case to be broken by the handling in transportation. ◆Pick-up pressure 1. Damage and a characteristic can vary with an excessive shock or stress. **♦**Packing 1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.

7. Storage conditions		
Precautions	 ♦ Storage To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled. Recommended conditions	
Technical considerations	◆Storage 1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.	

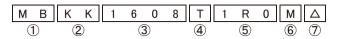
金属绕线型片状功率电感器 (MCOIL™ MB 系列)



回流焊

■型号标示法

※使用温度范围: -40~+105℃ (包含产品本身发热)



△=空格

1	迷	刑

代码	类型	
MB	金属绕线型片状功率电感器	

④包装	
代码	包装
Т	卷盘带装

②尺寸 (T)

代码	尺寸 (T) [mm]
KK	1.0
MK	1.2

⑤标称电感值

代码 (例)	标称电感值 [µH]
R24	0.24
1R0	1.0
4R7	4.7

※R=小数点

③尺寸 (L×W)

代码	外型 (inch)	尺寸 (L×W) [mm]
1608	1608 (0603)	1.6 × 0.8
2012	2012 (0805)	2.0 × 1.25
2520	2520(1008)	2.5 × 2.0

6 电感量公差

代码	电感量公差
М	±20%
N	±30%

⑦本公司管理记号

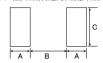
■标准外型尺寸/标准数量

T W W

推荐焊盘图案

实装上的注意

- ·请确认实装状态后使用。
- ·本产品焊法限定为回流焊法。



型号	Α	В	С
1608	0.55	0.70	1.00
2012	0.60	1.00	1.45
2520	0.60	1.50	2.00

单位: mm (inch)

型묵		W	W T		标准数		
至亏	L	VV	•	е	纸带	压纹带	
MBKK1608	1.6±0.2	0.8±0.2	1.0 max	0.45±0.15	_	3000	
MDVV1009	(0.063 ± 0.008)	(0.031 ± 0.008)	(0.040 max)	(0.016 ± 0.006)	_	3000	
MBKK2012	2.0±0.2	1.25±0.2	1.0 max	0.5±0.2	_	3000	
MDKKZU1Z	(0.079 ± 0.008)	(0.049 ± 0.008)	(0.040 max)	(0.020 ± 0.008)			
MBMK2520	2.5±0.2	2.0±0.2	1.2 max	0.5±0.2		3000	
INDINIVEDEN	(0.098 ± 0.008)	(0.079 ± 0.008)	(0.047 max)	(0.020 ± 0.008)	_	3000	
						单位: mm (inch)	

[▶] 由于篇幅有限,本产品目录中只记载了有代表性的产品规格,若考虑使用弊司产品时,请确认交货规格说明书中的详细规格。 另外,有关各产品的详细信息(特性图、可靠性信息、使用时的注意事项等),请参阅弊司网站(http://www.ty-top.com/)。

【厚度:1.0mm max.】 ●MBKK1608 (0603) 型

型号	EHS	标称电感值	电感量公差	自共振频率 [MHz]	直流电阻 [Ω] (max.)	额定电流 直流重叠允许电流	※)[mA] 温度上升允许电流	测试频率 [MHz]
		[µH]		(min.)	[11] (IIIax.)	ldc1	ldc2	[IVII IZ]
MBKK1608TR24N	RoHS	0.24	±30%	-	0.049	1,650	2,300	1.0
MBKK1608TR47N	RoHS	0.47	±30%	-	0.104	1,100	1,400	1.0
MBKK1608TR68N	RoHS	0.68	±30%	-	0.120	950	1,200	1.0
MBKK1608T1R0M	RoHS	1.0	±20%	-	0.150	800	1,150	1.0
MBKK1608T1R5M	RoHS	1.5	±20%	-	0.200	650	1,000	1.0
MBKK1608T2R2M	RoHS	2.2	±20%	-	0.345	520	750	1.0
MBKK1608T3R3M	RoHS	3.3	±20%	_	0.512	450	600	1.0
MBKK1608T4R7M	R₀HS	4.7	±20%	-	0.730	370	500	1.0

【厚度:1.0mm max.】 ●MBKK2012 (0805) 型

		标称电感值		自共振频率		额定电流	※) [mA]	No. 1
型목	EHS	你你电感值 [µH]	电感量公差	[MHz] (min.)	直流电阻 [Ω] (max.)	直流重叠允许电流 Idc1	温度上升允许电流 ldc2	测试频率 [MHz]
MBKK2012TR24N	RoHS	0.24	±30%	-	0.041	3,000	2,400	1.0
MBKK2012TR47N	RoHS	0.47	±30%	-	0.078	2,000	1,650	1.0
MBKK2012TR68N	RoHS	0.68	±30%	-	0.090	1,800	1,500	1.0
MBKK2012T1R0M	RoHS	1.0	±20%	1	0.106	1,500	1,450	1.0
MBKK2012T1R5M	RoHS	1.5	±20%	1	0.173	1,200	1,100	1.0
MBKK2012T2R2M	RoHS	2.2	±20%	1	0.290	900	850	1.0
MBKK2012T3R3M	RoHS	3.3	±20%	1	0.500	700	650	1.0
MBKK2012T4R7M	RoHS	4.7	±20%	-	0.615	600	600	1.0

●MBMK2520 (1008) 型	【厚度:1.2mm max.】
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PADAIRESEO (2000) E PAGE 21 E I I I I I I I I I I I I I I I I I I									
		标称电感值		自共振频率	直流电阻	额定电流	※) [mA]	测试频率	
型号	EHS	[µH]	电感量公差	[MHz] (min.)	[Ω] (max.)	直流重叠允许电流 ldc1	温度上升允许电流 ldc2	[MHz]	
MBMK2520TR24N	RoHS	0.24	±30%	-	0.026	4,750	3,500	1.0	
MBMK2520TR47N	RoHS	0.47	±30%	-	0.042	3,900	2,600	1.0	
MBMK2520TR68N	RoHS	0.68	±30%	-	0.058	3,150	2,150	1.0	
MBMK2520T1R0M	RoHS	1.0	±20%	-	0.072	2,350	1,850	1.0	
MBMK2520T1R5M	RoHS	1.5	±20%	-	0.106	2,050	1,500	1.0	
MBMK2520T2R2M	RoHS	2.2	±20%	-	0.159	1,800	1,250	1.0	
MBMK2520T3R3M	RoHS	3.3	±20%	-	0.260	1,400	970	1.0	
MBMK2520T4R7M	RoHS	4.7	±20%	-	0.380	1,150	800	1.0	

- ※) 直流重叠允许电流 (Idc1) 为直流重叠带来的电感值下降,范围在30%以内的直流电感值 (at 20%)
- ※)温度上升允许电流((dc2) 为温度上升到40°C时的直流电感值(dt 20°C) ※)额定电流值:Idc1或Idc2中低的一方的直流电流值当作额定电流值。

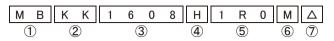
金属绕线型片状功率电感器 (MCOIL™ MB-H 系列)



回流焊

■型号标示法

※使用温度范围: -40~+105℃ (包含产品本身发热)



△=空格

1	迷	刑

代码	类型
MB	金属绕线型片状功率电感器

②尺寸 (T)

代码	尺寸 (T) [mm]	
KK	1.0	
MK	1.2	

③尺寸 (I×W)

(E∧VV)				
代码	外型 (inch)	尺寸 (L×W) [mm]		
1608	1608 (0603)	1.6 × 0.8		
2520	2520(1008)	2.5 × 2.0		

④包装

代码	包装
Н	胶带 (高特性规格)

⑤标称电感值

代码 (例)	标称电感值 [µH]
R24	0.24
1R0	1.0
4R7	4.7

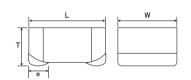
※R=小数点

⑥电感量公差

代码	电感量公差
М	±20%
N	±30%

⑦本公司管理记号

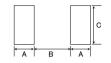
■标准外型尺寸 / 标准数量



推荐焊盘图案

实装上的注意

- ·请确认实装状态后使用。
- ·本产品焊法限定为回流焊法。



型号	Α	В	С
1608	0.55	0.70	1.00
2520	0.60	1.50	2.00

单位: mm (inch)

型 号		W T e			标准数	量 [pcs]
空亏	L	VV	'	е	纸带	压纹带
MBKK1608	1.6±0.2 (0.063±0.008)	0.8±0.2 (0.031±0.008)	1.0 max (0.040 max)	0.45±0.15 (0.016±0.006)	_	3000
MBMK2520	2.5±0.2 (0.098±0.008)	2.0±0.2 (0.079±0.008)	1.2 max (0.047 max)	0.5±0.2 (0.020±0.008)	_	3000
						单位: mm (inch)

[▶] 由于篇幅有限,本产品目录中只记载了有代表性的产品规格,若考虑使用弊司产品时,请确认交货规格说明书中的详细规格。 另外,有关各产品的详细信息(特性图、可靠性信息、使用时的注意事项等),请参阅弊司网站(http://www.ty-top.com/)。

【厚度:1.0mm max.】 ●MBKK1608H (0603) 型

			自共振频率	自共振频率 直流电阻		额定电流 ※)[mA]		
型号	EHS	标称电感值 [μH]	电感量公差	[MHz] (min.)	且加电阻 [Ω] (max.)	直流重叠允许电流 ldc1	温度上升允许电流 Idc2	测试频率 [MHz]
MBKK1608HR24N	RoHS	0.24	±30%	-	0.049	1,650	2,300	1.0
MBKK1608HR47N	RoHS	0.47	±30%	-	0.104	1,100	1,400	1.0
MBKK1608HR68N	RoHS	0.68	±30%	-	0.120	950	1,200	1.0
MBKK1608H1R0M	RoHS	1.0	±20%	ı	0.150	800	1,150	1.0
MBKK1608H1R5M	RoHS	1.5	±20%	ı	0.200	650	1,000	1.0
MBKK1608H2R2M	RoHS	2.2	±20%	-	0.345	520	750	1.0
MBKK1608H3R3M	RoHS	3.3	±20%	-	0.512	450	600	1.0
MBKK1608H4R7M	RoHS	4.7	±20%	-	0.730	370	500	1.0

●MBMK2520H (1008) 型

【厚度:1.2mm max.】

		自共振频率				额定电流	测试频率		
<u> </u>	EHS	标称电感值 [μH]	电感量公差	[MHz] (min.)	且 / (max.)	直流重叠允许电流 ldc1	温度上升允许电流 ldc2	[MHz]	
MBMK2520HR24N	RoHS	0.24	±30%	-	0.026	4,750	3,500	1.0	
MBMK2520HR47N	RoHS	0.47	±30%	-	0.042	3,900	2,600	1.0	
MBMK2520HR68N	RoHS	0.68	±30%	-	0.058	3,150	2,150	1.0	
MBMK2520H1R0M	RoHS	1.0	±20%	ı	0.072	2,350	1,850	1.0	
MBMK2520H1R5M	RoHS	1.5	±20%	ı	0.106	2,050	1,500	1.0	
MBMK2520H2R2M	RoHS	2.2	±20%	ı	0.159	1,800	1,250	1.0	
MBMK2520H3R3M	RoHS	3.3	±20%	1	0.260	1,400	970	1.0	
MBMK2520H4R7M	RoHS	4.7	±20%		0.380	1,150	800	1.0	

- ※) 直流重叠允许电流 (ldc1) 为直流重叠带来的电感值下降,范围在30%以内的直流电感值 (at 20℃) ※) 温度上升允许电流 (ldc2) 为温度上升到40℃时的直流电感值 (at 20℃)
- ※) 额定电流值: Idc1或Idc2中低的一方的直流电流值当作额定电流值。

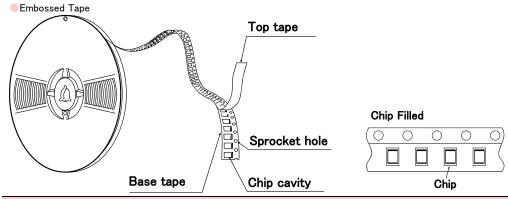
METAL WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ MB SERIES / MCOIL™ MB-H SERIES)

■PACKAGING

1 Minimum Quantity

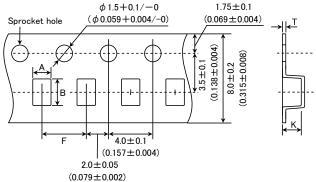
Type	Standard Quantity [pcs]
туре	Tape & Reel
MBKK1608/MBKK1608H	3000
MBKK2012	3000
MBMK2520/MBMK2520H	3000

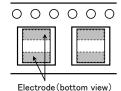
2Tape Material



3 Taping dimensions

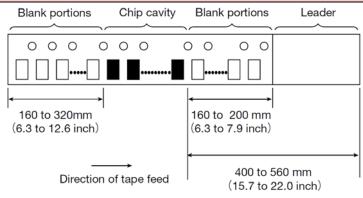
Embossed tape 8mm wide (0.315 inches wide)





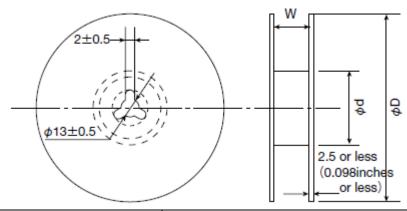
T	Chip cavity		Insertion pitch	Tape thickness	
Туре	Α	В	F	Т	K
MDKK1600 ZMDKK1600H	1.1	1.9	4.0±0.1	0.25±0.05	1.2 max
MBKK1608/MBKK1608H	(0.043)	(0.075)	(0.157 ± 0.004)	(0.010 ± 0.002)	(0.047 max)
MDKKOO10	1.45	2.2	4.0±0.1	0.25±0.05	1.2 max
MBKK2012	(0.057)	(0.087)	(0.157 ± 0.004)	(0.010 ± 0.002)	(0.047 max)
MDMK0500 ZMDMK0500U	2.3	2.8	4.0±0.1	0.3±0.05	1.45 max
MBMK2520/MBMK2520H	(0.091)	(0.110)	(0.157 ± 0.004)	(0.012 ± 0.002)	(0.057 max)
					Unit:mm(inch)

4 Leader and Blank portion



This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/).

⑤Reel size

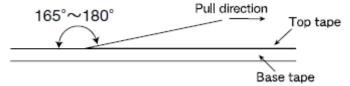


Type	Reel size (Reference values)			
Туре	ϕ D	ϕ d	W	
MBKK1608/MBKK1608H	180+0/-3	60+1/-0	100-15	
MBKK2012	(7.087+0/-0.118)	(2.36+0.039/0)	10.0±1.5 (0.394±0.059)	
MBMK2520/MBMK2520H	(7.067+0/-0.116)	(2.30+0.039/0)		

Unit:mm(inch)

6Top Tape Strength

The top The top tape requires a peel-off force of 0.2 to 0.7N in the direction of the arrow as illustrated below.



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METAL WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ MB SERIES ✓ MCOIL™ MB-H SERIES)

Specified Value

Remarks

Test Methods and

MB-H series

Measuring equipment

RELIABILITY DATA 1. Operating Temperature Range -40~+105°C MB series Specified Value -40~+125°C MB-H series Test Methods and Including self-generated heat Remarks 2. Storage Temperature Range MB series -40~+85°C Specified Value MB-H series Test Methods and 0 to 40° C for the product with taping. Remarks 3. Rated current MB series Specified Value Within the specified tolerance MB-H series 4. Inductance MB series Specified Value Within the specified tolerance MB-H series Test Methods and : LCR Meter (HP 4285A or equivalent) Measuring equipment Remarks Measuring frequency : 1MHz, 1V 5. DC Resistance MB series

6. Self resonance frequency				
Specified Value	MB series			
	MP-H corios			

: DC ohmmeter (HIOKI 3227 or equivalent)

Within the specified tolerance

7. Temperature characteristic				
Specified Value	MB series	Industrance change: Within + 15%		
Specified value	MB-H series Inductance change : Within ±15%			
Test Methods and				
Remarks				

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8. Resistance to flexure of substrate MB series Specified Value No damage MB-H series The test samples shall be soldered to the test board by the reflow. As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm. $: 100 \times 40 \times 1.0 \text{ mm} (1608:0.8 \text{mm})$ Test board size Test board material : Glass epoxy-resin Test Methods and Solder cream thickness : 0.1 mm Remarks Board 9. Insulation resistance : between wires MB series Specified Value MB-H series 10. Insulation resistance: between wire and core DC25V $100k\Omega$ min MB series Specified Value MB-H series DC50V $100k\Omega$ min 11. Withstanding voltage: between wire and core MB series Specified Value MB-H series 12. Adhesion of terminal electrode MB series Specified Value No abnormality. MB-H series The test samples shall be soldered to the test board by the reflow. Test Methods and Applied force : 10N (1608:5N) to X and Y directions. Remarks Duration : 5s. Solder cream thickness : 0.1mm 13. Resistance to vibration MB series Inductance change : Within $\pm 10\%$ Specified Value No significant abnormality in appearance. The test samples shall be soldered to the test board by the reflow. Then it shall be submitted to below test conditions. Frequency Range 10∼55Hz Total Amplitude 1.5mm (May not exceed acceleration 196m/s²) Test Methods and Sweeping Method 10Hz to 55Hz to 10Hz for 1min. Remarks Χ Υ Time For 2 hours on each X, Y, and Z axis. Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs. 14. Solderability MB series Specified Value At least 90% of surface of terminal electrode is covered by new solder. MB-H series The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table. Flux: Methanol solution containing rosin 25%. Solder Temperature 245±5°C Test Methods and Remarks Immersing speed 25mm/s Time 5 ± 0.5 sec.

XImmersion depth: All sides of mounting terminal shall be immersed.

This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/).

15. Resistance to soldering heat MB series Inductance change: Within ±10% Specified Value No significant abnormality in appearance. MB-H series The test sample shall be exposed to reflow oven at 230°C for 40 seconds, with peak temperature at 260 + 0/-5°C for 5 seconds, 3 times. Test Methods and Test board material : Glass epoxy-resin Remarks Test board thickness : 1.0mm Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

16. Thermal shock							
C:	MB series			Inductance change : Within ±10%			
Specified Value	MB-H se	eries		No significant a	bnorma	ality in app	earance.
Test Methods and Remarks	MB series The test The test specified sequence Step 1 2 3 4	s: samples shall be soldered samples shall be placed time by step 1 to step e. The temperature cycle s Conditions of 1 Temperature (°C) -40±3 Room temperature +85±2 Room temperature	ified temperatur wn in below tab beated 100 cycle ation (min) 30±3 Within 3 30±3 Within 3	e for ole in s.	Step 1 2 3 4	samples st samples st samples st samples st samples st samples. The term Temp	
	_						y:At leas test, follo

MB-H series:

The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence. The temperature cycle shall be repeated 100 cycles.

Conditions of 1 cycle					
Step	Temperature (°C)	Duration (min)			
1	-40±3	30±3			
2	Room temperature	Within 3			
3	+125±2	30±3			
4	Room temperature	Within 3			

Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.

17. Damp heat						
Specified Value	MB series		Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.			
	MB-H series					
Test Methods and	The test samples s	all be soldered to the tes shall be placed in therr e and humidity as shown	mostatic oven set at	·		
Remarks	Temperature	60±2°C		Temperature	85±2°C]
	Humidity	90∼95%RH		Humidity	85%RH	
	Time	1000+24/-0 hour		Time	1000+24/-0 hour	
	Recovery : At least 2hrs of recovery under the standard condition			Recovery: At least 2hrs of recovery under the standard condition		
	after the test, followed by the measurement within 48hrs.			after the test, followed by the measurement within 48hrs.		

18. Loading under damp heat						
C: E V-	MB series		Inductance change : Within ±10%			
Specified Value	MB-H series		No significant abnormality in appearance.			
	MB series:			MB-H series:		
	The test samples sh	all be soldered to the tes	t board by the reflow.	The test samples shall be soldered to the test board by the reflow.		
	The test samples shall be placed in thermostatic oven			The test samples shall be placed in thermostatic oven set at		
	specified temperature and humidity and applied the rated curre			specified temperature and humidity and applied the rated current		
Test Methods and Remarks	continuously as shown in below table.			continuously as shown in below table.		
	Temperature	60±2°C		Temperature	85±2°C	
	Humidity	90∼95%RH		Humidity	85%RH	
	Applied current	Rated current		Applied current	Rated current	
	Time	1000+24/-0 hour		Time	1000+24/-0 hour	
	Recovery: At least 2hrs of recovery under the standard condition			Recovery : At least 2hrs of recovery under the standard condition		
	after the test, followed by the measurement within 48hrs.			after the test, followed by the measurement within 48hrs.		

19. Low temperature life test				
Specified Value	MB series		Inductance change : Within ±10%	
Specified value	MB-H series		No significant abnormality in appearance.	
	The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown			
Test Methods and	in below table.			
Remarks	Temperature	-40±2°C		
	Time	1000+24/-0 hour		
Recovery: At least 2hrs of recovery under the standard condition after the test, follow			ne standard condition after the test, followed by the measurement within 48hrs.	

[▶] This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (http://www.ty-top.com/) .

20. High temperatur	re life test			
Specified Value	MB series		Inductance change : Within ±10%	
	MB-H series		No significant abnormality in appearance.	
Test Methods and	The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table.			
Remarks	Temperature 85±2°C			
	Time	1000+24/-0 hour		
	Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.			
21. Loading at high	temperature life test			
Specified Value	MB series			
	MB-H series			
22. Standard condit	ion			
Specified Value	MB series		Standard test condition: Unless otherwise specified, temperature is $20\pm15^{\circ}\text{C}$ and $65\pm20\%$ of relative humidity. When there is any question concerning measurement result: In order to provide correlatio data, the test shall be condition of $20\pm2^{\circ}\text{C}$ of temperature, $65\pm5\%$ relative humidity. Inductance is in accordance with our measured value.	
	MB-H series			

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METAL WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ MB SERIES ∕ MCOIL™ MB-H SERIES)

PRECAUTIONS

1. Circuit Design

Precautions

◆Operating environment

1. The products described in this specification are intended for use in general electronic equipment, (office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.

2. PCB Design

Precautions

- **♦**Land pattern design
- 1. Please refer to a recommended land pattern.

Technical considerations

◆Land pattern design Surface Mounting

- Mounting and soldering conditions should be checked beforehand.
- · Applicable soldering process to this products is reflow soldering only.

3. Considerations for automatic placement

Precautions

- Adjustment of mounting machine
 - 1. Excessive impact load should not be imposed on the products when mounting onto the PC boards.
- 2. Mounting and soldering conditions should be checked beforehand.

Technical considerations

- Adjustment of mounting machine
 - 1. When installing products, care should be taken not to apply distortion stress as it may deform the products.

4. Soldering

◆Reflow soldering

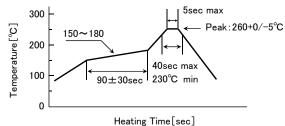
- 1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.
- 2. The product shall be used reflow soldering only.

Precautions

- 3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.
- **♦**Lead free soldering
 - 1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.
- ◆Reflow soldering
 - 1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.

Recommended reflow condition (Pb free solder)

Technical considerations



5. Cleaning

Precautions

- ◆Cleaning conditions
- 1. Washing by supersonic waves shall be avoided.

Technical considerations

♦Cleaning conditions

1. If washed by supersonic waves, the products might be broken.

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6. Handling ◆Handling 1. Keep the product away from all magnets and magnetic objects. ◆Breakaway PC boards (splitting along perforations) 1. When splitting the PC board after mounting product, care should be taken not to give any stresses of deflection or twisting to the board. 2. Board separation should not be done manually, but by using the appropriate devices. ◆Mechanical considerations Precautions 1. Please do not give the product any excessive mechanical shocks. 2. Please do not add any shock and power to a product in transportation. ◆Pick-up pressure 1. Please do not push to add any pressure to a winding part. Please do not give any shock and push into a ferrite core exposure part. ◆Packing 1. Please avoid accumulation of a packing box as much as possible. 1. There is a case that a characteristic varies with magnetic influence. ◆Breakaway PC boards (splitting along perforations) 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs. ◆Mechanical considerations Technical 1. There is a case to be damaged by a mechanical shock. considerations 2. There is a case to be broken by the handling in transportation. ◆Pick-up pressure 1. Damage and a characteristic can vary with an excessive shock or stress. **♦**Packing 1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products.

7. Storage condi	tions
Precautions	 ♦ Storage 1. To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled. • Recommended conditions Ambient temperature : 0~40°C Humidity : Below 70% RH • The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, product should be used within 6 months from the time of delivery. In case of storage over 6 months, solderability shall be checked before actual usage.
Technical considerations	◆Storage 1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.