有关敝公司产品的注意事项

请务必在使用敝公司产品之前阅读。

注 注意

■产品目录中的记载内容

本产品目录中所记载的内容为2019年10月的内容。因产品改良等原因,可能会不经预告而变更其记载内容,或是停止供应本产品目录中所记载的产品。所以,请务必在使用前先确认最新的产品信息。

未按照本产品目录中所记载的内容或交货规格说明书使用敝公司产品,即便其致使用设备发生损害、不良情况等时,敝公司也不承担任何责任,敬请知悉。

■签署交货规格说明书

就本产品目录中所记载产品的产品规格等相关内容,敝公司备有交货规格说明书,详情请向敝公司咨询。在使用敝公司产品前请务必就交货规格说明书之内容确认并批准之。

实装前的事前评估

使用敝公司产品时,请务必事先安装到使用设备之后,在实际使用的环境下进行评估和确认。

■用途的限定

1. 可以使用的设备

本产品目录中所记载的产品预设为使用于一般电子设备 [音像设备、办公自动化设备、家电产品、办公设备、信息通讯设备 (手机、电脑等)]以及面向本产品目录或是交货规格说明书中另行注明的设备的通用性、标准性用途。

另外,面向汽车用电子设备、电信基础设施/工业设备、医疗设备 (国际 (GHTF) 第一类、第二类、第三类) 方面的应用,敝公司也备 有预设的产品线,请参考本产品目录或是交货规格说明书的内容, 使用相对应的产品。

2. 需要另行确认的设备

若考虑将本产品目录中所记载的产品使用于当产品发生故障、品质不良,或是由此引起的运转失常而可能会危及生命、身体或是财产,以及有可能给社会造成深刻影响的以下设备(不包括本产品目录或是交货规格说明书中另行注明可以使用设备)等时,请务必事先向敝公司咨询。

- (1)运输用设备(汽车驱动控制设备、火车控制设备、船舶控制设备等)
- (2)交通信号设备
- (3) 防灾 / 保安设备
- (4)医疗设备 (国际 (GHTF)第三类)
- (5)高公共性信息通讯设备 / 信息处理设备 (电话交换机、电话 / 无线 / 广播电视基站等)
- (6)其他与上述设备有同等品质与可靠性要求的设备

3. 禁止使用的设备

请勿将敝公司产品使用于对安全性和可靠性有着极高要求的以下设备。

- (1) 航天设备 (人工卫星、火箭等)
- (2)航空设备 (注释1)
- (3) 医疗设备 (国际 (GHTF) 第四类)、植体 (体内植入型) 医疗设备 (注释2)
- (4)发电控制设备 (面向核能 / 水力 / 火力发电厂等的设备)
- (5)海底设备(海底中继设备、海中的作业设备等)
- (6) 军事设备
- (7)其他与上述设备有同等品质与可靠性要求的设备

注释1: 仅限于对航空设备的安全运行不产生直接干扰的设备 (机内娱乐设备、机内 照明设备、电动座椅、餐饮设备等), 在满足敝公司另行指定的相关条件时, 亦可将敝公司产品用于以上用途。在贵公司考虑将敝公司的产品用于以上 用途时, 请务必事先向敝公司咨询相关的信息。

注释 2:包括注入人体内的部分和与此相连接的体外部分。

4. 责任的限制

未经敝公司的事先书面同意,把本产品目录中所记载的产品使用于非敝公司预设用途的设备、前述需要向敝公司咨询的设备或敝公司禁止使用的设备,从而给客户或第三方造成损害的,敝公司不承担任何责任,敬请知悉。

安全设计

需将敝公司的产品使用于对安全性和可靠性要求较高的设备、电路上时,请进行充分的安全性评估和可靠性评估。另外,请通过设置保护电路、保护装置的系统,设置冗余电路不会被单一故障影响安全性的系统等失效导向安全(fail-safe)设计,确保充分的安全性。

■有关知识产权

本产品目录中所记载的信息是用于说明相关产品的典型操作以及相关应 用。此类信息的使用不代表对于敝公司以及第三方的知识产权以及其他 权利的使用许可或是不侵权保证。

保证范围

敝公司产品的保证范围仅限于已经交付的敝公司产品本身,由敝公司产品的故障或不良情况所诱发的损害,敝公司不承担任何责任,敬请知悉。 但是,以书面形式另行签署了交易基本合同书、品质保证协定书等时,敝公司将根据该合同的条件提供保证。

正规销售渠道

本产品目录中所记载的内容适用于从敝公司营业所、销售子公司、销售 代理店(即"正规销售渠道")购买的敝公司产品,并不适用于从其他渠道 购买的敝公司产品、敬请知悉。

■出口时的注意事项

本产品目录中所记载的部分产品在出口时须事先确认《外汇和对外贸易 法》以及美国在出口管理方面的相关法规,并办理相关手续。如有不明之 处、请向敝公司咨询。

功率电感器

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)

МЕ	КК	2 0	1	6 T	1	R	0	М	Δ	Δ	△=空格
(1)	(2)	(3	3)	(4)		(5)		6	(7)	(8)	

	Ŧ

代码	类型
ME	金属绕线型片状功率电感器

(I) LY	
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

900表	
代码	包装
Т	卷盘带装

⑤标称电感值

© MANUTE E	
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

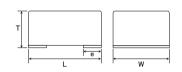
②七心主ム 在	
代码	电感量公差
M	±20%

⑦个别抑格

שושאנינו ו	
代码	个别规格
Δ	标准品

⑧本公司管理记号

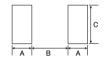
■标准外型尺寸 / 标准数量



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

Туре	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

■MFKK2016型

【厚度:1.0mm max.】

THERREDIO ±		I/F/X.1.0IIIII IIIUX. I							
		标称电感值		自共振频率	±>±+±===	额定电流 ※)	[mA] (max.)	and harmen	
型号	EHS	你你电感值 [µH]	电感量公差	[MHz]	直流电阻	直流重叠允许电流	温度上升允许电流	测试频率 [MHz]	
		[hu]		(min.)	[Ω] (max.)	ldc1	ldc2	[1411 12]	
MEKK2016TR47M	RoHS	0.47	±20%	-	0.030	4,500	4,300	1	
MEKK2016TR68M	RoHS	0.68	±20%	-	0.052	3,800	3,300	1	
MEKK2016T1R0M	RoHS	1.0	±20%	ı	0.060	3,600	3,100	1	
MEKK2016T2R2M	RoHS	2.2	±20%	-	0.150	2,400	1,900	1	

● MEKK2520 型

【厚度:1.0mm max.】

		标称电感值		自共振频率	直流电阻	额定电流 ※)	额定电流 ※)[mA] (max.)	
型号	EHS	[µH]	电感量公差	[MHz] (min.)	国加电阻 [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]
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
MEKK2520T1R5M	RoHS	1.5	±20%	-	0.069	3,200	2,800	1
MEKK2520T2R2M	RoHS	2.2	±20%	-	0.097	3,100	2,400	1
MEKK2520T4R7M	RoHS	4.7	±20%	-	0.240	1,600	1,500	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° C)
- ※)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: 70 μ m

[▶]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,若考虑使用敝公司产品时,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),请参阅敝公司网站 (http://www.ty-top.com/)。

金属绕线型片状功率电感器 (MCOIL™ ME-H 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)

М	Ε	K	K	2	0	1	6	Н	1	R	0	М	Δ	Δ
(1)	(2	2		(3)		4		(5)			7	

△=空桁	3
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_		
(1)	米刑	

<u> </u>	
代码	类型
ME	金属绕线型片状功率电感器

②尺寸 (T)

<u> </u>	
代码	尺寸 (T) [mm]
HK	0.8
KK	1.0

③尺寸 (I x W)

@/CJ (E:: VV)	
代码	尺寸 (L×W) [mm]
2012	2.0 × 1.2
2016	2.0 × 1.6
2520	2.5 × 2.0

④包装

⊕ ⊡ 4€	
代码	包装
Н	编带 (高特性规格)

⑤标称电感值

O 13113 O O O O O O	
代码 (例)	标称电感值 [µH]
R47	0.47
1R0	1.0
2R2	2.2
※R=小数点	·

⑥电感量公差

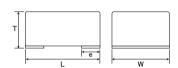
代码	电感量公差
М	±20%

⑦个别规格

1	少门为规格	
	代码	个别规格
	Δ	标准品

⑧本公司管理记号

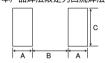
■标准外型尺寸 / 标准数量



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
2012	0.7	0.8	1.4
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
MEHK2012H	2.0±0.2 (0.079±0.008)	1.2±0.2 (0.047±0.008)	0.8 max (0.031 max)	0.5±0.3 (0.020±0.012)	3000
MEKK2012H	2.0±0.2 (0.079±0.008)	1.2±0.2 (0.047±0.008)	1.0 max (0.039 max)	0.5±0.3 (0.020±0.012)	3000
MEKK2016H	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
MEKK2520H	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)

[▶] 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,若考虑使用敝公司产品时,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),请参阅敝公司网站(http://www.ty-top.com/)。

●MEHK2012H型		【厚度:0.8mm max.】						
		+= 45 中 (本		自共振频率		额定电流 ※)	[mA] (max.)	and between
型号	EHS	标称电感值 [μH]	电感量公差	[MHz]	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]
MEHK2012HR47M	RoHS	0.47	±20%	-	0.035	4,100	3,700	1

●MEKK2012H型		【厚度:1.0mm max.】						
		标称电感值		自共振频率	± >± + m	额定电流 ※) [mA] (max.)		701-0-0-7
型号	EHS	你称电感值 [µH]	电感量公差	[MHz] (min.)	直流电阻 [Ω](max.)	直流重叠允许电流 ldc1	温度上升允许电流 Idc2	测试频率 [MHz]
MEKK2012HR47M	R₀HS	0.47	±20%	-	0.030	4,500	4,200	1

MEKK2016H型		【厚度:1.0mm max.】						
	1= 16 do ct /t			自共振频率	直流电阻	额定电流 ※) [mA] (max.)		
型 号	EHS	标称电感值 [μH]	电感量公差	[MHz] (min.)	且派电阻 [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]
MEKK2016HR47M	RoHS	0.47	±20%	-	0.026	5,300	4,700	1
MEKK2016H1R0M	RoHS	1.0	±20%	-	0.048	4,000	3,500	1
MEKK2016H2R2M	RoHS	2.2	±20%	-	0.100	2,300	2,300	1

●MEKK2520H型		【厚度:1.0mm max.】						
		+ 40 + 4		自共振频率	主 法由加	额定电流 ※) [mA] (max.)		
型 号	EHS	标称电感值 [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]
MEKK2520H1R0M	R₀HS	1	±20%	-	0.039	4,400	3,800	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

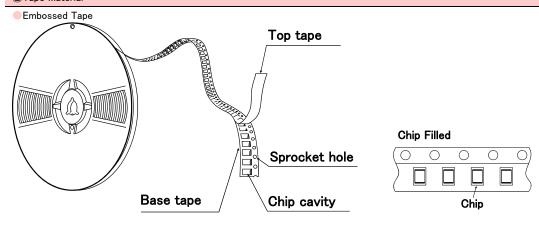
METAL WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ ME SERIES / MCOIL™ ME-H SERIES)

■PACKAGING

1 Minimum Quantity

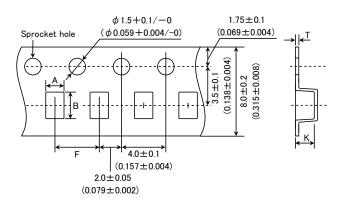
Туре	Standard Quantity [pcs]
туре	Tape & Reel
MEHK2012	3000
MEKK2012	3000
MEKK2016	3000
MEKK2520	3000

2Tape Material



3 Taping dimensions

Embossed tape 8mm wide (0.315 inches wide)

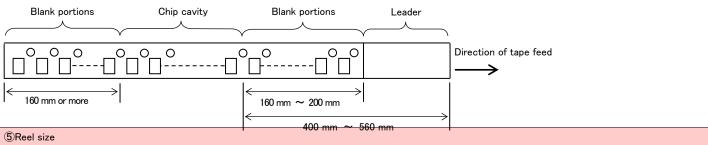


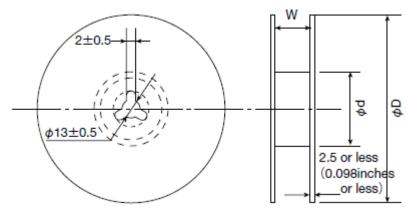
Туре	Chip cavity		Insertion pitch	Tape thickness	
Туре	Α	В	F	Т	K
MEHK2012	1.45±0.1	2.25±0.1	4.0±0.1	0.25±0.05	1.1±0.1
MERKZUIZ	(0.057 ± 0.004)	(0.089 ± 0.004)	(0.157 ± 0.004)	(0.009 ± 0.002)	(0.043 ± 0.004)
MEKK2012	1.45±0.1	2.25±0.1	4.0±0.1	0.25±0.05	1.1±0.1
MERRZUIZ	(0.057 ± 0.004)	(0.089 ± 0.004)	(0.157 ± 0.004)	(0.009 ± 0.002)	(0.043 ± 0.004)
MEKKOO16	1.9±0.1	2.45±0.1	4.0±0.1	0.25±0.05	1.2±0.1
MEKK2016	(0.075 ± 0.004)	(0.097 ± 0.004)	(0.157 ± 0.004)	(0.009 ± 0.002)	(0.047 ± 0.004)
MEKK2520	2.4±0.1	2.9±0.1	4.0±0.1	0.25±0.05	1.1±0.1
MEKKZJZU	(0.094 ± 0.004)	(0.114 ± 0.004)	(0.157 ± 0.004)	(0.009 ± 0.002)	(0.043 ± 0.004)

Unit:mm(inch)

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/).





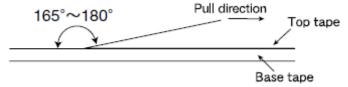


Type	Reel size (Reference values)				
i ype	ΦD	ϕ d	W		
MEHK2012					
MEKK2012	180+0/-3	60+1/-0	10.0±1.5		
MEKK2016	(7.087+0/-0.118)	(2.36+0.039/0)	(0.394 ± 0.059)		
MEKK2520					
		115			

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 ∕ MCOIL™ ME-H SERIES)

■RELIABILITY DATA

1. Operating Tempe	rature Range	
Specified Value	ME series	
	ME-H series	40 11200
Test Methods and Remarks	Including self-generated heat	
0.00 T		
2. Storage Tempera		
Specified Value	ME series	-40~+85°C
	ME-H series	
Test Methods and Remarks	0 to 40°C for the product with taping.	
3. Rated current		
5. Nated Current	ME series	
Specified Value	ME-H series	Within the specified tolerance
	ME-H series	
4. Inductance		
	ME series	
Specified Value	ME-H series	Within the specified tolerance
Test Methods and		I l294A or equivalent)
Remarks	Measuring frequency : 1MHz, 0.5V	
5. DC Resistance		
5. DC Resistance	NE .	
Specified Value	ME series	Within the specified tolerance
Test Methods and	ME-H series Measuring equipment : DC ohmmeter (HI	 IOKI 3227 or equivalent)
Remarks		
C C-14		
6. Self resonance fr	<u> </u>	
Specified Value	ME series	_
	ME-H series	
7 Tamma	un at a viatio	
7. Temperature cha		
Specified Value	ME series	Inductance change : Within ±15%
	ME-H series	1000 14000
Test Methods and Remarks	Measurement of inductance shall be taken at With reference to inductance value at +20°C	t temperature range within −40°C~+125°C.
Romans	man reference to inductance value at +200	S., Shango rate shall be calculated.
8. Resistance to fle	xure of substrate	
	ME series	
Specified Value	ME-H series	No damage
		Let board by the reflow. As illustrated below, apply force in the direction of the arrow indicating
	until deflection of the test board reaches to	
	Test board size : 100 × 40 × 1.0	10
Toot Mothoda and	Test board material : Glass epoxy-r	resin R230
Test Methods and Remarks	Solder cream thickness : 0.12 mm	$\bigvee \mathcal{V}$
		Board
		R5 Test Sample
		45±2mm 45±2mm

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9. Insulation resista	nce : between wires		
0 :5 17/1	ME series		
Specified Value	ME-H series	_	
10. Insulation resist	ance : between wire and over-coating		
Specified Value	ME series		
	ME-H series		
44 14011			
11. Withstanding vol	tage : between wire and over-coating		
Specified Value	ME series	_	
	ME-H series		
12. Adhesion of terr	ninal electrode		
Specified Value	ME series	No abnormality.	
	ME-H series	·	
Test Methods and	The test samples shall be soldered to the test Applied force : 10N to X and	•	
Remarks	Applied force : 10N to X and Duration : 5s.	it directions.	
rtomarito	Solder cream thickness : 0.12mm.		
13. Resistance to vi	bration		
	ME series	Inductance change : Within ±10%	
Specified Value	ME-H series	No significant abnormality in appearance.	
	The test samples shall be soldered to the test	st board by the reflow.	
	Then it shall be submitted to below test cond	ditions.	
	Frequency Range 10~55Hz		
Test Methods and		exceed acceleration 196m/s²)	
Remarks	Sweeping Method 10Hz to 55Hz to	o 10Hz for 1min.	
	X		
	Time Y Z	For 2 hours on ach X, Y, and Z axis.	
		he 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.	
opcomed value	ME-H series	Actions 50 /0 of surface of terminal electrone is covered by new soluer.	
		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.	_	
	※Immersion depth : All sides of mounting ter	I rminal shall be immersed.	
15. Resistance to se	oldering heat		
0 :5 !!!	ME series	Inductance change : Within ±10%	
Specified Value	ME-H series	No significant abnormality in appearance.	
Test Methods and Remarks	The test sample shall be exposed to reflow over Test board material : Glass epoxy-resing Test board thickness : 1.0mm	ven at 230°C for 40 seconds, with peak temperature at 260 \pm 0 $/$ \pm 5°C for 5 seconds, 2 times	

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

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16. Thermal shock				
	ME series		Inductance chan	ge : Within ±10%
Specified Value	Value ME-H series			pnormality in appearance.
	The test samples s	shall be soldered to	the test board by the refl	ow. The test samples shall be placed at specified temperature for specifie
	-			The temperature cycle shall be repeated 100 cycles.
	Conditions of 1 cycle		cycle	
Test Methods and	 	nperature (°C)	Duration (min)	
Remarks	1	-40±3	30±3	
	2 Roo	m temperature +85±2	Within 3 30±3	
	-	n temperature	Within 3	
	Recovery : At leas	t 2hrs of recovery ι	inder the standard condit	ion after the test, followed by the measurement within 48hrs.
17. Damp heat				
	ME series		Inductance chan	ge : Within ±10%
Specified Value	ME-H series			pnormality in appearance.
		shall he soldered to	the test board by the ref	low
	=			pecified temperature and humidity as shown in below table.
Test Methods and	Temperature	60±2°C		
Remarks	Humidity	90∼95%RH		
	Time	500+24/-0 h		
	Recovery : At leas	t 2hrs of recovery ι	ınder the standard condit	ion after the test, followed by the measurement within 48hrs.
18. Loading under d	amp heat			
Specified Value	ME series		Inductance chan	ge: Within ±10%
opcomed value	ME-H series		No significant ab	pnormality in appearance.
	The test samples	shall be soldered to	the test board by the ref	low.
	•	· ·	thermostatic oven set	at specified temperature and humidity and applied the rated current
Test Methods and		own in below table.		
Remarks	Temperature 60±2°C Humidity 90~95%RH			
	Applied current	Rated current		
	Time	500+24/-0 h	our	
	Recovery : At leas	t 2hrs of recovery ι	ınder the standard condit	ion after the test, followed by the measurement within 48hrs.
19. Low temperatur	e life test			
0 :5 17/1	ME series		Inductance chan	ge : Within ±10%
Specified Value	ME-H series		No significant ab	onormality in appearance.
	The test samples s	shall be soldered to t	he test board by the refle	ow. After that, the test samples shall be placed at test conditions as show
Test Methods and	in below table.			
Remarks	Temperature	-40±2°C		
	Time	500+24/-0 h		
	Recovery : At leas	t 2hrs of recovery t	inder the standard condit	ion after the test, followed by the measurement within 48hrs.
20. High temperatur	e life test		1	
Specified Value	ME series		Inductance chan	ge: Within ±10%
opcomou value	ME-H series		No significant ab	pnormality in appearance.
	The test samples	shall be soldered to t	the test board by the refle	ow. After that, the test samples shall be placed at test conditions as show
Test Methods and	in below table.	105 : 205		
Remarks	Temperature	125±2°C 500+24/-0 h	0115	
	Time Recovery : At leas			ion after the test, followed by the measurement within 48hrs.
	. NOOOVERY . At leas	c zins or recovery t	the standard confult	and area, the test, renormed by the medistrement within 40115.
01 1				
21. Loading at high	-			
21. Loading at high Specified Value	temperature life tes ME series ME-H series			

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22. Standard condition					
Specified Value	ME series Standard test condition: Unless otherwise specified, temperature is 20±15°C and 65±20% of relative				
	ME-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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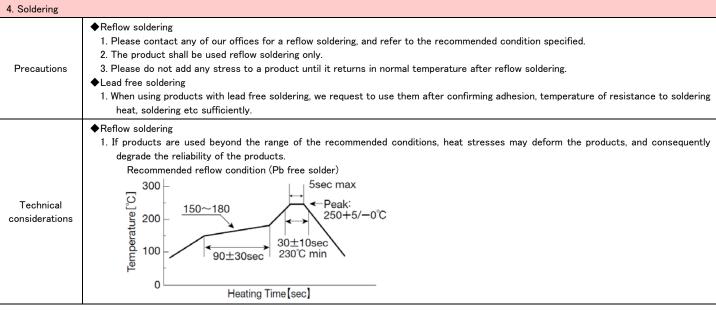
METAL WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ ME SERIES ∕ MCOIL™ ME-H SERIES)

PRECAUTIONS

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

2. PCB Design			
Precautions			
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					
 ◆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. 					
Technical					



5. Cleaning				
Precautions	Precautions Occupancy 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 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.						

金属多层片状功率电感器 (MCOIL™ MC 系列)



■型号标示法

※使用温度范围: -40~+125℃ (包含产品本身发热)

M C	K	K	2	0	1	2	Т	1	R	0	М	Δ	Δ
1	C	2)		(3)		4		⑤		6	7	8

△=空格

①类型

代码	类型
MC	金属多层片状功率电感器
②辛口原舟 (丁)	

产品厚度 (T) [mm]
0.50 max
0.55 max
0.60 max
0.65 max
0.80 max
1.0 max

③尺寸 (L×W)

	<u> </u>						
代码		外型 (inch)	尺寸 (L×W) [mm]				
	1005	1005(0402)	1.0 × 0.5				
	1210	1210(0504)	1.25 x 1.05				
	1608	1608 (0603)	1.6 × 0.8				
	2012	2012 (0805)	2.0 × 1.25				

4)包装

<u> </u>				
代码	包装			
Т	卷盘带装			

⑤标称电感值

O 101101 DIGNE	
代码 (例)	标称电感值 [µH]
R24	0.24
R47	0.47
1R0	1.0

※R=小数点

6 电感量公差

0001111	
代码	电感量公差
М	±20%

⑦本公司管理记号 1

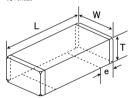
代码	本公司管理记号 1	
Δ	标准品	
G	电极5面品	
Н	+-\+ - (+\+\-1/\-\-1\-	
K	标准品 (内部代码)	

⑧本公司管理记号 2

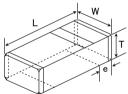
O 1 -1 -1 -1 -1	
代码	本公司管理记号 2
Δ	无表示
N	有极性表示

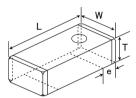
■标准外型尺寸 / 标准数量



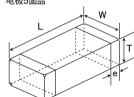












=10	1	w	Т	_	标准数量	[pcs]	
型号	L	VV		е	纸带	压纹带	
MCEE1005	1.0±0.2	0.5±0.2	0.55 max	0.25±0.15	10000		
(0402)	(0.039 ± 0.008)	(0.020 ± 0.008)	(0.022 max)	(0.010 ± 0.006)	10000		
MCEK1210	1.25±0.1	1.05±0.1	0.50 max	0.30 ± 0.2	5000		
(0504)	(0.049 ± 0.004)	(0.041 ± 0.004)	(0.020 max)	(0.012 ± 0.008)	5000		
MCFK1608	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	<u> </u>	
MCHK1608	1.6±0.2	0.8±0.2	0.80 max	0.4±0.2	4000		
(0603)	(0.063 ± 0.008)	(0.031 ± 0.008)	(0.031 max)	(0.016 ± 0.008)	4000	_	
MCKK1608	1.6±0.2	0.8±0.2	1.0 max	0.3 ± 0.2		2000	
(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		2000	
(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,若考虑使用敝公司产品时,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),请参阅敝公司网站 (http://www.ty-top.com/)。

■MC1005									
型믁	EHS	标称电感值 [μH]	电感量公差	直流 [m		额定电流 (Idc1)	额定电流 (Idc2)	测试频率 [MHz]	厚度 [mm] (max.)
		[hii]		(max.)	(typ.)	[A] (max.)	[A] (max.)	,	[IIIII] (IIIAX.)
MCEE1005TR10MHN	RoHS	0.10	±20%	50	41	2.00	2.00	1	0.55
MCEE1005TR22MHN	RoHS	0.22	±20%	80	65	1.60	1.60	1	0.55
MCEE1005TR47MHN	RoHS	0.47	±20%	140	114	1.20	1.20	1	0.55
MCEE1005T1R0MHN	RoHS	1.0	±20%	300	244	1.00	0.80	1	0.55

MC1210

型 무	EHS	标称电感值 [μH]	电感量公差	直流 [m		额定电流 (Idc1)	额定电流 (Idc2)	测试频率 [MHz]	厚度 [mm] (max.)
		[hu]		(max.)	(typ.)	[A] (max.)	[A] (max.)	[2]	[IIIII] (IIIax.)
MCEK1210TR47MHN	RoHS	0.47	±20%	82	70	2.30	1.60	1	0.50
MCEK1210T1R0MHN	RoHS	1.0	±20%	179	157	1.50	1.10	1	0.50
MCEK1210T1R5MHN	RoHS	1.5	±20%	240	200	1.20	0.90	1	0.50

MC1608

型号	EHS	标称电感值 [μH]	电感量公差		电阻 Ω]	额定电流 (Idc1)	额定电流 (ldc2)	测试频率 [MHz]	厚度 [mm] (max.)
		լµпյ		(max.)	(typ.)	[A] (max.)	[A] (max.)	[111112]	[IIIII] (IIIAX.)
MCFK1608TR24M	RoHS	0.24	±20%	50	40	2.30	2.10	1	0.60
MCFK1608TR47M	RoHS	0.47	±20%	85	69	1.90	1.60	1	0.60
MCFK1608T1R0M	RoHS	1.0	±20%	224	182	1.50	0.90	1	0.60
MCFE1608TR24MG	RoHS	0.24	±20%	100	75	2.60	1.50	1	0.65
MCFE1608TR47MG	RoHS	0.47	±20%	150	114	2.00	1.20	1	0.65
MCFE1608T1R0MG	RoHS	1.0	±20%	340	270	1.40	0.80	1	0.65
MCHK1608TR24MKN	RoHS	0.24	±20%	24	20	4.30	3.70	1	0.80
MCHK1608TR47MKN	RoHS	0.47	±20%	43	38	3.30	2.70	1	0.80
MCHK1608TR56MKN	RoHS	0.56	±20%	55	45	2.70	2.60	1	0.80
MCHK1608T1R0MKN	RoHS	1.0	±20%	110	89	2.20	1.60	1	0.80
MCHK1608T1R5MKN	RoHS	1.5	±20%	200	160	1.70	1.30	1	0.80
MCHK1608T2R2MKN	RoHS	2.2	±20%	292	237	1.50	1.20	1	0.80
MCKK1608TR24M N	RoHS	0.24	±20%	38	35	2.80	2.60	1	1.00
MCKK1608TR47M N	RoHS	0.47	±20%	55	44	2.40	2.00	1	1.00
MCKK1608T1R0M N	RoHS	1.0	±20%	123	100	2.00	1.30	1	1.00

MC2012

型号	EHS	标称电感值	电感量公差		电阻 Ω]	额定电流 (Idc1)	额定电流 (Idc2)	测试频率 [MHz]	厚度 [mm] (max.)
		[µH]		(max.)	(typ.)	[A] (max.)	[A] (max.)	[IVII IZ]	[IIIII] (IIIax.)
MCHK2012TR24M	RoHS	0.24	±20%	24	19	4.32	3.60	1	0.80
MCHK2012TR47M	RoHS	0.47	±20%	36	30	3.21	3.15	1	0.80
MCHK2012T1R0M	RoHS	1.0	±20%	111	90	2.26	1.47	1	0.80
MCKK2012TR24M	RoHS	0.24	±20%	25	20	6.20	4.00	1	1.00
MCKK2012TR47M	RoHS	0.47	±20%	39	32	4.50	3.10	1	1.00
MCKK2012T1R0M	RoHS	1.0	±20%	90	73	3.60	2.10	1	1.00

^{※)} 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° C) ※) 额定电流(ldc2): 直流电流负载时,由自发热引起的温度上升达 40° C以下的电流值 (20° C)

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)

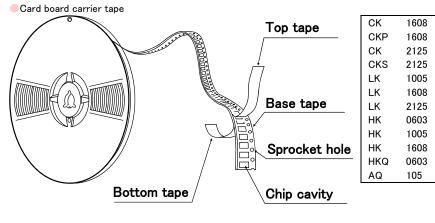
PACKAGING

1 Minimum Quantity

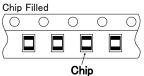
Tape & Reel Packaging			
Туре	Thickness	Standard Qu	uantity [pcs]
туре	mm(inch)	Paper Tape	Embossed Tape
CK1608 (0603)	0.8 (0.031)	4000	_
CK2125 (0805)	0.85 (0.033)	4000	_
GRZ123 (0003)	1.25 (0.049)	_	2000
CK5313E(000E)	0.85(0.033)	4000	_
CKS2125 (0805)	1.25 (0.049)	_	2000
CKP1608 (0603)	0.8 (0.031)	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
LK1005(0402)	0.5 (0.020)	10000	_
LK1608 (0603)	0.8 (0.031)	4000	_
11(0105(0005)	0.85(0.033)	4000	_
LK2125(0805)	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	_
	0.85 (0.033)	_	4000
HK2125(0805)	1.0 (0.039)	_	3000
HKQ0603S (0201)	0.3 (0.012)	15000	_
HKQ0603U(0201)	0.3 (0.012)	15000	_
AQ105(0402)	0.5 (0.020)	10000	_
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	_
DI(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
BKP0603 (0201)	0.3 (0.012)	15000	4000
BKP1005 (0402)	0.5 (0.020)	10000	_
BKP1608 (0603)	0.8 (0.031)	4000	_
BKP2125 (0805)	0.85 (0.033)	4000	_
MCF0605 (0202)	0.3 (0.012)	15000	_
MCF0806 (0302)	0.4 (0.016)	13000	10000
			5000
MCF1210 (0504)	0.55(0.022)		+
MCF2010(0804)	0.45(0.018)	10000	4000
MCEE1005 (0402)	0.55(0.022)	10000	
MCEK1210(0504)	0.5 (0.020)	5000	-
MCFK1608 (0603)	0.6 (0.024)	4000	-
MCFE1608 (0603)	0.65(0.026)	4000	
MCHK1608(0603)	0.8 (0.031)	4000	-
MCKK1608 (0603)	1.0 (0.039)	4000	3000
MCHK2012 (0806)	0.8 (0.031)	4000	
MCKK2012 (0805)	1.0 (0.039)	-	3000

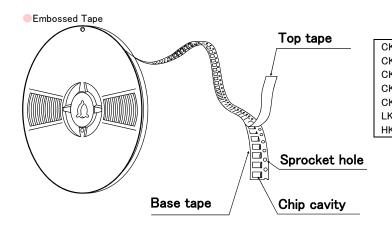
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2Taping material

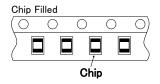


BK	0603
BK	1005
BK	1608
BK	2125
BK	2010
BKP	0603
BKP	1005
BKP	1608
BKP	2125
BKH	0603
BKH	1005
MCF	0605
MC	1005
MC	1210
MC	1608
MC	2012

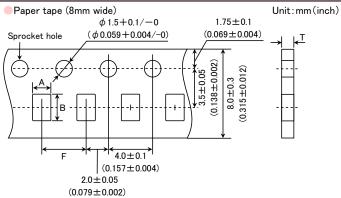




		_		
K	2125		BK	2125
KS	2125		BK	3216
KP	2012		MCF	0806
KP	2016		MCF	1210
KP	2520		MCF	2010
K	2125		MC	1608
K	2125		MC	2012



3Taping Dimensions

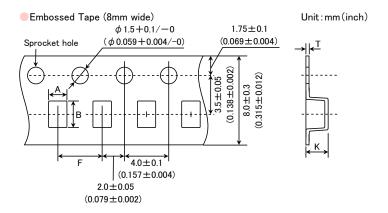


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Туре	Thickness	·	cavity	Insertion Pitch	Tape Thickness
. , , , ,	mm(inch)	Α	В	F	Т
CK1608(0603)	0.8 (0.031)	1.0±0.2	1.8±0.2	4.0±0.1	1.1max
01(1000(0000)	0.0 (0.001)	(0.039 ± 0.008)	(0.071 ± 0.008)	(0.157±0.004)	(0.043max)
CK2125(0805)	0.85(0.033)	1.5±0.2	2.3±0.2	4.0±0.1	1.1max
ON2123 (0003)	0.00 (0.000)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157±0.004)	(0.043max)
CKS2125(0805)	0.85(0.033)	1.5±0.2	2.3±0.2	4.0±0.1	1.1max
01(32123 (0003)	0.00 (0.000)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157±0.004)	(0.043max)
CKP1608(0603)	0.8 (0.031)	1.0±0.2	1.8±0.2	4.0±0.1	1.1max
OKF 1000 (0003)	0.0 (0.031)	(0.039 ± 0.008)	(0.071 ± 0.008)	(0.157 ± 0.004)	(0.043max)
LK1005(0402)	0.5 (0.020)	0.65 ± 0.1	1.15±0.1	2.0±0.05	0.8max
LK1003 (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
LI(1000 (0000)	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	2.3 ± 0.2	4.0±0.1	1.1max
LN2123(0003)	0.65 (0.033)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.043max)
HK0603(0201)	0.3 (0.012)	0.40 ± 0.06	0.70±0.06	2.0±0.05	0.45max
HKU003 (UZU1)	0.3 (0.012)	(0.016 ± 0.002)	(0.028 ± 0.002)	(0.079 ± 0.002)	(0.018max)
HK1005(0402)	0.5 (0.020)	0.65±0.1	1.15±0.1	2.0±0.05	0.8max
HK1003 (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
111(1000(0003)	0.0 (0.031)	(0.039 ± 0.008)	(0.071 ± 0.008)	(0.157±0.004)	(0.043max)
HKU06036 (0304)	0.2 (0.012)	0.40±0.06	0.70±0.06	2.0±0.05	0.45max
HKQ0603S(0201)	0.3 (0.012)	(0.016±0.002)	(0.028 ± 0.002)	(0.079±0.002)	(0.018max)
HKQ0603U(0201)	0.3 (0.012)	0.40±0.06	0.70±0.06	2.0±0.05	0.45max
HKQ00030 (0201)	0.3 (0.012)	(0.016 ± 0.002)	(0.028 ± 0.002)	(0.079 ± 0.002)	(0.018max)
A O 1 0 E (0 4 0 0)	0 F (0 000)	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)
DV0602 (0201)	0.2 (0.012)	0.40±0.06	0.70±0.06	2.0±0.05	0.45max
BK0603(0201)	0.3 (0.012)	(0.016 ± 0.002)	(0.028 ± 0.002)	(0.079 ± 0.002)	(0.018max)
DV1005 (0402)	0.5 (0.020)	0.65±0.1	1.15±0.1	2.0±0.05	0.8max
BK1005(0402)	0.5 (0.020)	(0.026 ± 0.004)	(0.045 ± 0.004)	(0.079 ± 0.002)	(0.031max)
DK1600 (0602)	0.0 (0.021)	1.0±0.2	1.8±0.2	4.0±0.1	1.1max
BK1608(0603)	0.8 (0.031)	(0.039 ± 0.008)	(0.071 ± 0.008)	(0.157 ± 0.004)	(0.043max)
DK010E (000E)	0.05(0.000)	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)
DK0010(0004)	0.45(0.010)	1.2±0.1	2.17±0.1	4.0±0.1	0.8max
BK2010(0804)	0.45 (0.018)	(0.047 ± 0.004)	(0.085 ± 0.004)	(0.157 ± 0.004)	(0.031max)
DVD0000 (0001)	0.0 (0.010)	0.40±0.06	0.70±0.06	2.0±0.05	0.45max
BKP0603 (0201)	0.3 (0.012)	(0.016 ± 0.002)	(0.028 ± 0.002)	(0.079 ± 0.002)	(0.018max)
DI/D1005 (0100)	0.5 (0.000)	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)
DI(D1000 (0000)	0.0 (0.004)	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)
DI/D010E (000E)	0.05 (0.000)	1.5±0.2	2.3±0.2	4.0±0.1	1.1max
BKP2125 (0805)	0.85(0.033)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157±0.004)	(0.043max)
DI(10000 (0004)	0.0 (0.0:5)	0.40±0.06	0.70±0.06	2.0±0.05	0.45max
BKH0603(0201)	0.3 (0.012)	(0.016±0.002)	(0.028 ± 0.002)	(0.079 ± 0.002)	(0.018max)
DI(11400E (0.400)	0.5 (0.055)	0.65±0.1	1.15±0.1	2.0±0.05	0.8max
BKH1005(0402)	0.5 (0.020)	(0.026 ± 0.004)	(0.045 ± 0.004)	(0.079±0.002)	(0.031max)
MOE000E (0000)	00 (0010)	0.62±0.03	0.77±0.03	2.0±0.05	0.45max
MCF0605 (0202)	0.3 (0.012)	(0.024 ± 0.001)	(0.030 ± 0.001)	(0.079 ± 0.002)	(0.018max)
MOEI(4000 (0000)	0.0 (0.001)	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)
10551005/0105	0.55/0.0513	0.8±0.05	1.3±0.05	2.0±0.05	0.64max
MCEE1005 (0402)	0.55(0.021)	(0.031 ± 0.002)	(0.051 ± 0.002)	(0.079±0.002)	(0.025max)
105(1015/555)	0.5 (2.2)	1.3±0.1	1.55±0.1	4.0±0.1	0.64max
MCEK1210 (0504)	0.5 (0.020)	(0.051 ± 0.004)	(0.061 ± 0.004)	(0.157±0.004)	(0.025max)
		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)
		1.1±0.05	1.9±0.05	4.0±0.1	0.72max
MCFE1608 (0603)	0.65(0.026)	(0.043 ± 0.002)	(0.075±0.002)	(0.157±0.004)	(0.028max)
		1.2±0.05	2.0±0.05	4.0±0.1	0.9max
MCHK1608 (0603)	0.8 (0.031)	(0.047 ± 0.002)	(0.079 ± 0.002)	(0.157±0.004)	(0.035max)
MCHK2012 (0805)	0.8 (0.031)	1.65 ± 0.1	2.4 ± 0.1	4.0±0.1	0.9max
		(0.065 ± 0.004)	(0.094 ± 0.004)	(0.157 ± 0.004)	(0.035max)

 $\mathsf{Unit}:\mathsf{mm}(\mathsf{inch})$

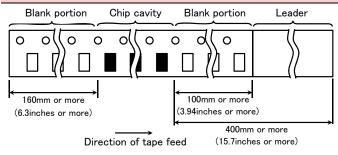
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-	Thickness	Chip	cavity	Insertion Pitch	Tape Th	nickness
Туре	mm (inch)	Α	В	F	K	Т
01/0405 (0005)	4.05(0.040)	1.5±0.2	2.3±0.2	4.0±0.1	2.0	0.3
CK2125 (0805)	1.25(0.049)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.079)	(0.012)
01/00105 (0005)	4.05 (0.040)	1.5±0.2	2.3±0.2	4.0±0.1	2.0	0.3
CKS2125 (0805)	1.25(0.049)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.079)	(0.012)
OKD0010 (000E)	0.0 (0.005)	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)
OKD0016 (0006)	0.0 (0.035)	1.8±0.1	2.2±0.1	4.0±0.1	1.3	0.25
CKP2016 (0806)	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)	
	0.0 (0.005)				1.4	
OKD0E00 (1000)	0.9 (0.035)	2.3±0.1	2.8±0.1	4.0±0.1	(0.055)	0.3
CKP2520 (1008)	1.1 (0.043)	(0.091 ± 0.004)	(0.110 ± 0.004)	(0.157 ± 0.004)	1.7	(0.012)
	1.1 (0.043)				(0.067)	
	11 (0.042)				1.7	
	1.1 (0.043)				(0.067)	
L K010E (000E)	1.05(0.040)	1.5±0.2	2.3±0.2	4.0±0.1	2.0	0.3
LK2125 (0805)	1.25(0.049)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	(0.079)	(0.012)
	0.05(0.000)				1.5	
LUKO10E (000E)	0.85(0.033)	1.5±0.2	2.3 ± 0.2	4.0 ± 0.1	(0.059)	0.3
HK2125(0805)	1.0 (0.000)	(0.059 ± 0.008)	(0.091 ± 0.008)	(0.157 ± 0.004)	2.0	(0.012)
	1.0 (0.039)				(0.079)	
DV010F (000F)	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 (0.001)	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)
MOE0000 (0000)	0.4 (0.010)	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)
MOE1010(0504)	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)
MOE0010 (0004)	0.45(0.010)	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)
MOKK1000 (0000)	1.0 (0.000)	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)
MOV(0010 (000E)	4.0 (0.000)	1.55±0.1	2.35±0.1	4.0±0.1	1.35	0.25
MCKK2012 (0805)	1.0 (0.039)	(0.061 ± 0.004)	(0.093 ± 0.004)	(0.157 ± 0.004)	(0.053)	(0.010)

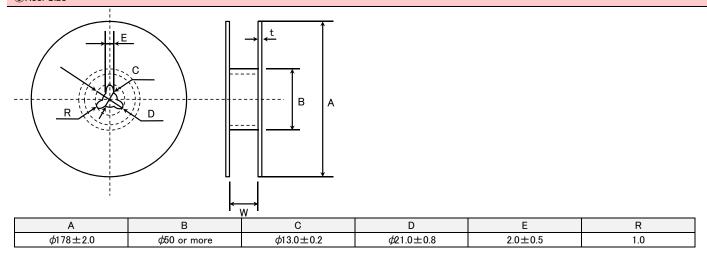
 $\mathsf{Unit}:\mathsf{mm}(\mathsf{inch})$

4LEADER AND BLANK PORTION



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⑤Reel Size

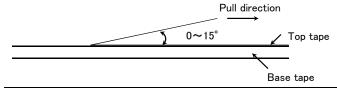


	t	W
4mm width tape	1.5max.	5±1.0
8mm width tape	2.5max.	10±1.5

(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.



Multilayer chip inductors

Multilayer chip inductors for high frequency, Multilayer chip bead inductors

Multilayer common mode choke coils (MC series F type)

Metal Multilayer Chip Power Inductors (MCOIL™ MC series)

RELIABILITY DATA

	erature Range		
	BK series		
	BKH series	FF 1.05%	
	BKP series	-55~+85°C	
	MCF series	-40~+85°C	
	CK series		
Specified Value	CKS series	-40∼+85°C	
	CKP series		
	LK series	FF 1405°0	
	HK0603, HK1005	-55~+125°C	
	HK1608, HK2125	-40~+85°C	
	HKQ0603		
	AQ105		
	MCOIL [™] MC series	-40~+125°C (Including self-generated heat)	
2. Storage Temper	ratura Ranga		
L. Otorage Temper	BK series		
	BKH series		
	BKP series	_55~+85°C	
	MCF series	-40~+85°C	
	CK series	40 1000	
	CKS series		
Specified Value	CKP series		
Specified value	LK series		
	HK0603, HK1005	-55∼+125°C	
	HK1608, HK2125	-40~+85°C	
	HKQ0603	-407-700 C	
	AQ105		
	MCOIL [™] MC series	-40~+85°C	
	MGOIL MG series	-40~+85 C	
3. Rated Current			
	BK series	TI	
	BKH series	The temperature of the element is increased within 20°C.	
	BKP series	The temperature of the element is increased within 40°C	
	MCF series	Refer to each specification.	
	CK series	TI	
	CKS series	The temperature of the element is increased within 20°C.	
	CKP series	The temperature of the element is increased within 40°C	
Specified Value	LK series	The decreasing-rate of inductance value is within 5 %	
	HK0603, HK1005		
	HK1608, HK2125	The decreasing-rate of inductance value is within 5 %, or the temperature of the element	
	HKQ0603	increased within 20°C	
	AQ105		
		Idc1: The decreasing-rate of inductance value is within 30 %	
	MCOIL [™] MC series		

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4. Impedance	T		
	BK series		
Specified Value	BKH series		Refer to each specification.
opcomed value	BKP series		Total to oddi opodinodion.
	MCF series		
	BK0603Series, BKP0603	Series, BKH Series	
	Measuring frequency	: 100±1MHz	
	Measuring equipment	: 4991A(or its ed	quivalent)
	Measuring jig	: 16193A(or its e	equivalent)
	BK1005Series, BKP1005	Series ,BKH1005Ser	ries
	Measuring frequency	: 100±1MHz	
	Measuring equipment	: 4291A(or its equivalent)	
	Measuring jig	: 16192A (or its equivalent), HW:16193A (or its	
		equivalent)	
Test Methods and	BK1608 • 2125 Series, BKP1608 • 2125 Series		
Remarks	Measuring frequency	: 100±1MHz	
	Measuring equipment	: 4291A(or its ed	quivalent), 4195A (or its equivalent)
	Measuring jig	: 16192A(or its e	equivalent), HW:16193A(or its equivalent)
	BK2010 • 3216Series		
	Measuring frequency	: 100±1MHz	
	Measuring equipment	: 4291A(or its ed	quivalent), 4195A (or its equivalent)
	Measuring jig	: 16192A(or its e	equivalent)
	MCF Series		
	Measuring frequency	: 100±1MHz	
	Measuring equipment	: 4291A(or its ed	quivalent)
5. Inductance			
	CK series		
	CKS series		
	01/5		

5. Inductance				
	CK series			
	CKS series			
	CKP series			
	LK series			
Specified Value	HK0603, HK1005		Refer to each specification.	
	HK1608, HK2125			
	HKQ0603			
	AQ105			
	MCOIL [™] MC series			
	CK, CKS, LK Series			
	Measuring frequency : Refer to each		n specification.	
			l294A+16092A(or its equivalent) .+16193A(or its equivalent)	
	Measuring current : 047~4.7 μ H		⇒1mArms 、 5.6~33 μH ⇒0.1mArms	
	CKP、MCOIL™ MC Series			
	Measuring frequency	: 1MHz		
	Measuring equipment	: 4285A(or its	equivalent)	
Test Methods and Remarks	HK0603、HK1005、AQ Series	S		
Remarks	Measuring frequency	: 100MHz		
	5 55		· E4991A+16197A(or its equivalent),AQ105⇒4291A+16197A(or its equivalent) · 4291A+16193A(or its equivalent)	
	HK1608、HK2125 Series			
	Measuring frequency	: ~100nH⇒10	00MHz 、120nH~⇒50MHz	
	Measuring equipment /jig	: 4291A+1609	2A(or its equivalent)	
	HKQ Series			
	Measuring frequency	: 500MHz		
	Measuring equipment /jig	: E4991A+161	97A(or its equivalent)	

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6. Q			
	CK series		
	CKS series	_	
	CKP series		
	LK series		
Specified Value	HK0603, HK1005		
opcomed value	HK1608, HK2125	Refer to each specification.	
	HKQ0603	Note: to each specification.	
	AQ105 MCOIL™ MC series		
		_	
	LK Series		
	Measuring frequency : Refer to each s	·	
	Measuring equipment /jig : 1608,2125⇒429		
		16193A(or its equivalent)	
	Measuring current : $047 \sim 4.7 \mu\text{H} \Rightarrow$	1mArms 、 5.6~33 μH ⇒0.1mArms	
	HK0603, HK1005, AQ Series		
Test Methods and	Measuring frequency : 100MHz		
Remarks	Measuring equipment /jig : HK0603⇒E49	991A+16197A(or its equivalent), AQ105⇒4291A+16197A(or its equivalent)	
	HK1005⇒429	11A+16193A(or its equivalent)	
	HK1608、HK2125 Series		
	Measuring frequency : ~100nH⇒10	00MHz 、120nH~⇒50MHz	
	Measuring equipment /jig : 4291A+1609	2A (or its equivalent)	
	HKQ Series		
	Measuring frequency : 500MHz		
		97A(or its equivalent)	
7. DC Resistance			
7. 50 110010141100	BK series		
	BKH series		
	BKP series		
	MCF series		
	CK series		
	CKS series	Refer to each specification.	
Specified Value	CKP series		
	LK series		
	HK0603, HK1005		
	HK1608, HK2125		
	HKQ0603		
	AQ105		
	MCOIL™ MC series		
To at Mathematical	WIGOIL WIG series		
Test Methods and	Measuring equipment: IWATSU VOAC7512, H	IIOKI RM3545 (or its equivalent)	
Remarks			
0.0.10.0	r (ODF)		
8. Self Resonance I			
	BK series		
	BKH series	 	
	BKP series		
	MCF series		
	CK series	Defaute and annifortion	
	CKS series	Refer to each specification.	
Specified Value	CKP series	-	
	LK series		
	HK0603, HK1005		
	HK1608, HK2125	Refer to each specification.	
	HKQ0603	Training to dust oppositionation.	
	AQ105		
	MCOIL™ MC series	_	
	LK, CK Series:	(فعمان شر	
Test Methods and	Measuring equipment : 4195A(or its eq		
Remarks	Measuring jig : 16092A (or its e	equivalent)	
	HK, HKQ, AQ Series :		
	Measuring equipment : 8719C (or its ed	quivalent)	

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9. Resistance to Flexure of Substrate BK series BKH series BKP series MCF series CK series CKS series Specified Value CKP series No mechanical damage. LK series HK0603, HK1005 HK1608, HK2125 HKQ0603 AQ105 MCOIL[™] MC series : 2mm(BK Series, BKP, BKH1005, CK, CKS, CKP, LK, HK, HKQ0603S, HKQ0603U, AQ Series, MCF1210, MC Warp : 1mm(BKH0603, MCF Series without 1210 size,) Testing board : glass epoxy-resin substrate Thickness : 0.8mm Test Methods and Remarks Board Warp Deviation±1/ 45 45 (Unit:mm)

10. Solderability				
_	BK series			
	BKH series			
	BKP series			
	MCF series			
	CK series			
	CKS series			
Specified Value	CKP series		At least 90% of terminal electrode is covered by new solder.	
	LK series			
	HK0603, HK1005			
	HK1608, HK2125			
	HKQ0603			
	AQ105			
	MCOIL [™] MC series			
Test Methods and	Solder temperature	:230±5°C (JIS Z	3282 H60A or H63A)	
Remarks	Solder temperature	:245±3°C (Sn/3.0	0Ag/0.5Cu)	
Remarks	Duration :4±1 sec.			

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11. Resistance to S	Soldering		
	BK series		A
	BKH series		Appearance: No significant abnormality
	BKP series		Impedance change:Within ±30%
	MCF series		Appearance: No significant abnormality Impedance change: Within ±20%
	CK series		Appearance: No significant abnormality Inductance change: R10~4R7⇒Within ±10%、6R8~100⇒Within ±15%
	CKS series		Appearance: No significant abnormality Inductance change: Within ±20%
Specified Value	CKP series		Appearance: No significant abnormality Inductance change: Within ±30%
	LK series		Appearance: No significant abnormality Inductance change: 1005⇒Within ±15% 1608,2125⇒ 47N~4R7: Within ±10% 5R6~330: Within ±15%
	HK0603, HK1005		
	HK1608, HK2125		Appearance: No significant abnormality
	HKQ0603		Inductance change: Within ±5%
	AQ105		
	MCOIL [™] MC series		Appearance: No significant abnormality Inductance change: Within ±10%
	Solder temperature	:260±5°C	
	Duration	:10±0.5 sec.	
Test Methods and	Preheating temperature	:150 to 180°C	
Remarks	Preheating time : 3 min.		
	Flux :Immersion int		o methanol solution with colophony for 3 to 5 sec.
	Recovery :2 to 3 hrs of		recovery under the standard condition after the test. (See Note 1)

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

12. Thermal Shock					
	BK serie	s	A N. 1.100		
	BKH ser	BKH series		Appearance: No significant abnormality	
	BKP seri	ies	Impedance chang	Impedance change: Within ±30%	
	MCF ser	ies	Appearance: No significant abnormality Impedance change: Within ±20%		
	CK serie	s	Appearance: No	significant abnormality	
	CKS ser	ies	Inductance chan	ge:Within ±20%	
Specified Value	CKP ser	ies		significant abnormality ge:Within ±30%	
	LK series		Appearance: No significant abnormality Inductance change: Within ±10% Q change: Within ±30%		
	HK0603, HK1005				
	HK1608, HK2125		Appearance: No significant abnormality		
	HKQ0603		Inductance change: Within ±10% Q change: Within ±20%		
	AQ105				
	MCOIL [™] MC series		Appearance: No significant abnormality Inductance change: Within ±10%		
	Conditions for 1 cycle				
	Step	temperature (°C))	time (min.)	
	1	Minimum operating temperate	ure $+0/-3$	30±3	
Test Methods and	2	Room temperatur	e	2~3	
Remarks	3	Maximum operating temperat	ture $+3/-0$	30±3	
	4	Room temperatur	e	2~3	
	Number	of cycles:5			
	Recover	y:2 to 3 hrs of recovery under the s	standard condition a	after the test.(See Note 1)	

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

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13. Damp Heat (St	eady state)			
	BK series		A 100 100 100 100 100 100 100 100 100 10	
	BKH series		Appearance: No significant abnormality	
	BKP series		Impedance change: Within ±30%	
	MCF series		Appearance: No significant abnormality Impedance change: Within ±20%	
	CK series		Appearance: No significant abnormality	
	CKS series		Inductance change: Within ±20%	
O .c 17/1	CKP series		Appearance: No significant abnormality Inductance change: Within ±30%	
Specified Value	LK series		Appearance: No significant abnormality Inductance change: 1005,1608⇒Within ±10% 2125⇒Within ±20% Q change: Within ±30%	
	HK0603, HK1005			
	HK1608, HK2125		Appearance: No significant abnormality Inductance change: Within $\pm 10\%$ Q change: Within $\pm 20\%$	
	HKQ0603			
	AQ105			
	MCOIL [™] MC series		Appearance: No significant abnormality Inductance change: Within ±10%	
	BK, BKP, BKH, LK, CK.	CKS, CKP, MCF S	•	
	Temperature :40±2			
	Humidity : 90 to	95%RH		
	Duration : 500 +2	4/−0 hrs		
Test Methods and	Recovery :2 to 3 hrs of recovery under		er the standard condition after the removal from test chamber.(See Note 1)	
Remarks	HK, HKQ, AQ, MCOIL™	MC series:		
	Temperature :60±2°C			
	Humidity : 90 to 9	95%RH		
	Duration : 500 +2	4/-0 hrs		
	Recovery :2 to 3	hrs of recovery und	er the standard condition after the removal from test chamber. (See Note 1)	

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

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DIC :			
BK series		Appearance: No significant abnormality	
BKH series		1	
BKP series		Impedance change: Within ±30%	
MCF series		-	
CK series		Appearance: No significant abnormality	
CKS series		Inductance change: Within ±20%	
CKP series		Appearance: No significant abnormality Inductance change: Within ±30%	
LK series		Appearance: No significant abnormality Inductance change: 1005⇒Within ±10% 1608⇒0.047∼12.0 μH: Within ±10% 15.0∼33.0 μH: Within ± 15% 2125⇒Within ±20% Q change: Within ±30%	
HK0603, HK1005			
HK1608, HK2125		Appearance: No significant abnormality	
HKQ0603		Inductance change: Within ±10% Q change: Within ±20%	
AQ105			
MCOIL [™] MC series※		Appearance: No significant abnormality Inductance change: Within ±10%	
BK, BKP, BKH, LK	CK, CKS, CKP Series:	•	
Temperature	:40±2°C		
Humidity	:90 to 95%RH		
Applied current	: Rated current		
Duration	:500 +24/-0 hrs		
Recovery	:2 to 3 hrs of recovery	under the standard condition after the removal from test chamber.(See Note 1)	
HK HKO AO MCO	OII ™ MC Series:		
•			
•		series : Idc2max	
• •		501150 ; 140±1141.	
	BKP series MCF series CK series CKS series CKP series LK series HK0603, HK1005 HK1608, HK2125 HKQ0603 AQ105 MCOIL™ MC series BK, BKP, BKH, LK, Temperature Humidity Applied current Duration Recovery HK, HKQ, AQ, MCC Temperature Humidity Applied current Duration Recovery	MCF series CK series CKS series CKP series CKP series LK series HK0603, HK1005 HK1608, HK2125 HKQ0603 AQ105 MCOIL™ MC series BK, BKP, BKH, LK, CK, CKS, CKP Series Temperature :40±2°C Humidity :90 to 95%RH Applied current :Rated current Duration :500 +24/−0 hrs Recovery :2 to 3 hrs of recovery HK, HKQ, AQ, MCOIL™ MC Series: Temperature :60±2°C Humidity :90 to 95%RH Applied current :Rated current Series: Temperature :60±2°C Humidity :90 to 95%RH Applied current :Rated current :MC Duration :500 +24/−0 hrs	

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

5 to 35°C of temperature, 45 to 85% relative humidity, and 86 to 106kPa of air pressure.

When there are questions concerning measurement results:

In order to provide correlation data, the test shall be conducted under condition of $20\pm2^{\circ}C$ 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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	BK series	
	BKH series	Appearance: No significant abnormality
	BKP series	Impedance change: Within ±30%
	MCF series	Appearance: No significant abnormality Impedance change: Within ±20%
	CK series	Appearance: No significant abnormality
Specified Value	CKS series	Inductance change: Within ±20%
	CKP series	Appearance: No significant abnormality Inductance change: Within ±30%
	LK series	Appearance: No significant abnormality Inductance change: 1005⇒Within ±10% 1608⇒0.047 ~ 12.0 μH: Within ±10% 15.0 ~ 33.0 μH: Within ± 15% 2125⇒Within ±20% Q change: Within ±30%
	HK0603, HK1005	
	HK1608, HK2125	Appearance: No significant abnormality
	HKQ0603	Inductance change: Within ±10% Q change: Within ±20%
	AQ105	
	MCOIL [™] MC series※	Appearance: No significant abnormality Inductance change: Within ±10%
Test Methods and Remarks	ng temperature MC series ; Idc2max very under the standard condition after the removal from test chamber. (See Note 1)	

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

5 to 35°C of temperature, 45 to 85% relative humidity, and 86 to 106kPa of air pressure.

When there are questions concerning measurement results:

In order to provide correlation data, the test shall be conducted under condition of $20\pm2^{\circ}C$ 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

1. Circuit Design

Precautions

◆Verification of operating environment, electrical rating and performance

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

2. PCB Design

Precautions

◆Pattern configurations (Design of Land-patterns)

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.
- ◆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.

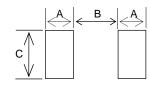
◆Pattern configurations (Design of Land-patterns)

The following diagrams and tables show some examples of recommended patterns to prevent excessive solder amounts. Examples of improper pattern designs are also shown.

(1) Recommended land dimensions for a typical chip inductor land patterns for PCBs

(Unit:mm)

				,	
Туре	1005	1210	1608 (Except MCHK)	1608 (MCHK)	2012
Α	0.4	0.45	0.45	0.55	0.5
В	0.5	0.6	1.0	0.8	1.2
С	0.7	1.15	1.0	1.0	1.45



(2) Examples 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

Technical considerations

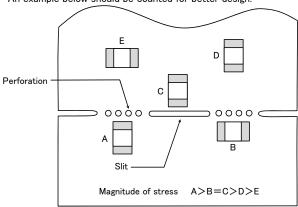
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- ◆Pattern configurations (Inductor layout on panelized[breakaway] PC boards)
 - 1. The following are examples of good and bad inductor layout; SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection.

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

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.



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.

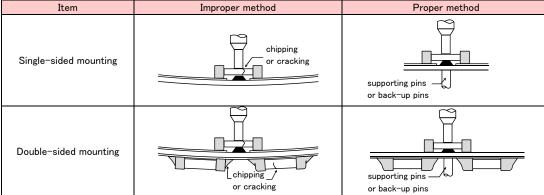
3. Considerations for automatic placement

Precautions

- ◆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.

◆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:
 - (1) 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:



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.

4. Soldering

Precautions

◆Reflow soldering

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

◆Lead free soldering

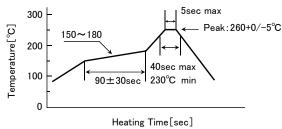
 When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.

◆Reflow soldering

• 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

· Washing by supersonic waves shall be avoided.

Technical considerations

◆Cleaning conditions

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

6. Resin coating and mold

Precautions

- 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. Thermal expansion and thermal shrinkage characteristics of resins may lead to the deterioration of inductors' performance.
- 3. When a resin hardening temperature is higher than inductor operating temperature, the stresses generated by the excessive heat may lead to damage in inductors.

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
 - ·Always wear static control bands to protect against ESD.
 - · Keep the inductors away from all magnets and magnetic objects.
- Precautions
- Use non-magnetic tweezers when handling inductors.
- Any devices used with the inductors (soldering irons, measuring instruments) should be properly grounded.
- · Keep bare hands and metal products (i.e., metal desk) away from inductor electrodes or conductive areas that lead to chip electrodes.
- · Keep inductors away from items that generate magnetic fields such as speakers or coils.
- ◆Mechanical considerations

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.

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8. Storage conditions ◆Storage To maintain the solderability of terminal electrodes and to keep the packaging material in good condition, care must be taken to control temperature and humidity in the storage area. Humidity should especially be kept as low as possible. Recommended conditions Precautions Ambient temperature: 30°C or below Humidity: 70% RH or below 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. •Inductor should be kept where no chlorine or sulfur exists in the air. **♦**Storage Technical If the parts are stocked in a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of considerations 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)



■型号标示法

※使用温度范围: -40~+125℃ (包含产品本身发热)

М	D	K	Κ	1	6	1	6	Т	1	R	0	М	М	Δ
(1	D	(2	2		(3)				(5)		6		

类型

2.0

①类型	<u>U</u>
	代码

MD	基本金属线圈规格				
②尺寸 (H)					
代码	尺寸 (H) [mm]				
JE	0.95				
KK	1.0				
MK	1.2				
DK	1./				

WK ③尺寸 (L×W)

<u> </u>	
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

· E48	
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

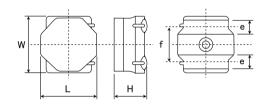
代码	电感量公差
М	±20%
N	±30%

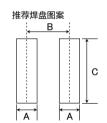
⑦个别规格

O 1 237201H	
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

Type	L	W	Н	е	f	标准数量 [pcs] 卷盘带装
MDKK1616	1.64±0.1	1.64±0.1	1.0 max	0.40 +0.2/-0.1	1.0±0.2	2500
	(0.065±0.004)	(0.065±0.004)	(0.039 max)	(0.016 +0.008/-0.004)	(0.039±0.008)	
MDJE2020	2.0±0.15 (0.079±0.006)	2.0±0.15 (0.079±0.006)	0.95 max (0.037 max)	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 (0.079±0.006)	1.0 max (0.039 max)	0.50±0.2 (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)	1.2 max (0.047 max)	0.50 ± 0.2 (0.02 \pm 0.008)	1.25±0.2 (0.049±0.008)	2500
MDKK3030	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.0 max (0.039 max)	0.90±0.2 (0.035±0.008)	1.9±0.2 (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)	4.0±0.2 (0.157±0.008)	2.0 max (0.079 max)	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)

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■ MDKK1616 型	【厚度:1.0mm max.】

		FUC 标称电感值		电感量公差 直流电阻 [Ω]				测试频率 [MHz]		
型号	EHS	你你电感值 [μH]	电感量公差			直流重叠允许电流:ldc1			温度上升允许电流:Idc2	
		[hii]		Max.	Тур.	Max.	Тур.	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.】

	Fue 标称电感值		古法由	直流电阻 [Ω]		额定电流 ※) [mA]				
型号	EHS	你你电感值 [μH]	电感量公差	旦川屯阻[11]		直流重叠允许电流:ldc1		温度上升允许电流:Idc2		测试频率 [MHz]
		[hii]		Max.	Тур.	Max.	Тур.	Max.	Тур.	[IVITIZ]
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.】

		标称电感值		古法由	70 [O]		额定电流	※) [mA]		测试频率
型号	EHS	がが电影値 [μH]	电感量公差	电感量公差 直流电阻 [Ω]		直流重叠允	直流重叠允许电流:ldc1		温度上升允许电流:Idc2	
		[Pii]		Max.	Тур.	Max.	Тур.	Max.	Тур.	[MHz]
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.】

	FUE 标称电感值			直流电阻 [Ω]			测试频率			
型号	EHS	标称电感阻 [μH]	电感量公差	电感量公差		直流重叠允许电流:ldc1		温度上升允许电流:Idc2		· [MHz]
		[pii]		Max.	Тур.	Max.	Тур.	Max.	Typ.	[1711 12]
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.】

■ MDKK3030 型		/子及.I.UIIIII IIIdx.』									
		标称电感值		古法由	直流电阻 [Ω]		额定电流 ※)[mA]				
型 号	EHS	(pH)	电感量公差	且流电	PH [11]	直流重叠允许电流:ldc1		温度上升允许电流:Idc2		测试频率 [MHz]	
		[hii]		Max.	Тур.	Max.	Тур.	Max.	Тур.	[IVITZ]	
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	

●MDMK3030型 【厚度:1.2mm max.】

		七		古法由	70 [O]			—— 测试频率 —— [MHz]		
型号	EHS	标称电感值 [μH]	电感量公差	直流电	PH [11]	直流重叠允许电流:ldc1			温度上升允许电流:Idc2	
		נייין		Max.	Typ.	Max.	Тур.	Max.	Тур.	[IVITZ]
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

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【厚度:0.95mm max.】 ● MDJE4040 型

	TIE 标称电感值			直流电阻 [Ω]			额定电流 ※)[mA]				
型 号	EHS	你你电感值 [μH]	电感量公差	且派电	PH [11]	直流重叠允	直流重叠允许电流:ldc1		温度上升允许电流:ldc2		
		[hii]		Max.	Тур.	Max.	Тур.	Max.	Тур.	[MHz]	
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	

●MDMK4040F型

【厚度:1.2mm max.】

	● 1 151 II (10 101 <u>1</u>											
Ì	케므 F		标称电感值		直流由	直流电阻 [Ω]		额定电流 ※) [mA]				
	型 묵	EHS		电感量公差	五//10-0			直流重叠允许电流:ldc1		温度上升允许电流:ldc2		
			[µH]		Max.	Тур.	Max.	Тур.	Max.	Тур.	[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	

■ MDMK4040 型

【厚度:1.2mm max.】

MDMK4040 ±	七		±				额定电流 ※)[mA]				
型号	EHS	标称电感值 [H]	电感量公差	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]		Max.	Тур.	Max.	Тур.	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	

●MDWK4040 型

【厚度:2.0mm max.】

							额定电流 ※)[mA]				
型号	EHS	标称电感值	电感量公差	直流电	阻 [Ω]	直流重叠允	许电流:ldc1		许电流:ldc2	测试频率 [MHz]	
		[µH]		Max.	Тур.	Max.	Тур.	Max.	Тур.	[IVII IZ]	
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	

●MDPK5050 型

【厚度:1.4mm max.】

■ MD5K2020 至	-										
		+- 45 中 d /s		主 法由	去达中四 [O]		额定电流 ※)[mA]				
型号	EHS	标称电感值 [μH]	电感量公差	直流电阻 [Ω]		直流重叠允许电流:ldc1		温度上升允许电流:Idc2		测试频率 [MHz]	
		լիոյ		Max.	Тур.	Max.	Тур.	Max.	Тур.	[IVII IZ]	
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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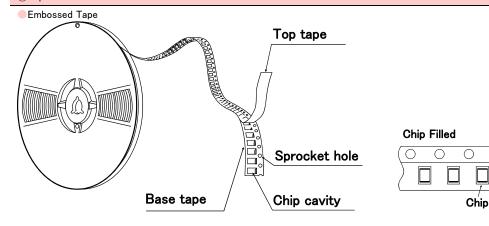
METAL CORE SMD POWER INDUCTORS (MCOIL™ MD SERIES)

■PACKAGING

1)Minimum Quantity

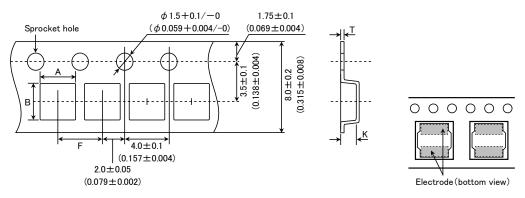
Type	Standard Quantity [pcs]
туре	Tape & Reel
MDKK1616	2500
MDJE2020	
MDKK2020	2500
MDMK2020	
MDKK3030	2000
MDMK3030	2000
MDJE4040	1000
MDMK4040	1000
MDWK4040	700
MDPK5050	1000

2Tape Material



3 Taping dimensions

Embossed tape 8mm wide (0.315 inches wide)

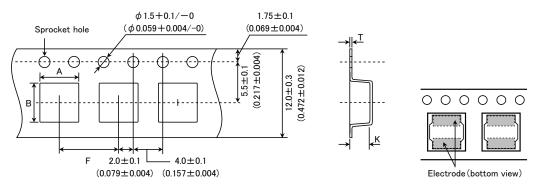


Туре	Chip cavity		Insertion pitch	Tape thickness	
	A	В	F	Т	K
MDKK1616	1.79±0.1	1.79±0.1	4.0±0.1	0.25±0.05	1.1±0.1
	(0.071 ± 0.004)	(0.071 ± 0.004)	(0.157 ± 0.004)	(0.010 ± 0.002)	(0.043 ± 0.004)
MDJE2020	2.2±0.1	2.2±0.1	4.0±0.1	0.25±0.05	1.3±0.1
MDKK2020	(0.102 ± 0.004)	(0.102 ± 0.004)	(0.157 ± 0.004)	(0.009 ± 0.002)	(0.051 ± 0.004)
MDMK2020	(0.102 ± 0.004)	(0.102 ± 0.004)	(0.137 ± 0.004)	(0.009 ± 0.002)	(0.001 ± 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)
					11.11 /1 1.1

Unit:mm(inch)

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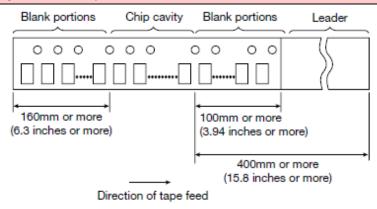
Embossed tape 12mm wide (0.47 inches wide)



Туре	Chip cavity		Insertion pitch	Tape thickness	
	Α	В	F	T	K
MDJE4040	4.3±0.1	4.3±0.1	8.0±0.1	0.3±0.05	1.6±0.1
MDMK4040	(0.169 ± 0.004)	(0.169 ± 0.004)	(0.315 ± 0.004)	(0.012 ± 0.002)	(0.063 ± 0.004)
MDWK4040	4.3±0.1	4.3±0.1	8.0±0.1	0.3±0.05	2.3±0.1
	(0.169 ± 0.004)	(0.169 ± 0.004)	(0.315 ± 0.004)	(0.012 ± 0.002)	(0.091 ± 0.004)
MDPK5050	5.25±0.1	5.25±0.1	8.0±0.1	0.3±0.1	1.6±0.1
	(0.207 ± 0.004)	(0.207 ± 0.004)	(0.315 ± 0.004)	(0.012 ± 0.004)	(0.063 ± 0.004)

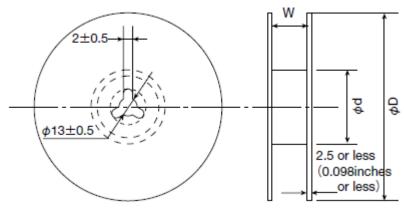
Unit:mm(inch)

4 Leader and Blank portion



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⑤Reel size



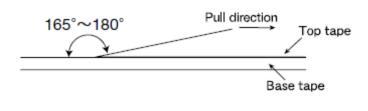
Tura	Reel size (Reference values)					
Туре	ϕ D	ϕ d	W			
MDKK1616						
MDJE2020						
MDKK2020	180 ± 0.5	60±1.0	10.0 ± 1.5			
MDMK2020	(7.087 ± 0.019)	(2.36 ± 0.04)	(0.394 ± 0.059)			
MDKK3030						
MDMK3030						
MDJE4040						
MDMK4040	180 ± 3.0	60±2.0	14.0 ± 1.5			
MDWK4040	(7.087 ± 0.118)	(2.36 ± 0.08)	(0.551 ± 0.059)			
MDPK5050						

Unit:mm(inch)

6Top 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	0.1N~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 the second
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 soldered to the t		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.
T . M	The test samples shall be d Flux : Methanol solution cor	• •	then immersed in molten solder as shown in below table.
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	15. Resistance to soldering heat			
Specified Value	MD series	Inductance change : Within ±10%		
Specified value	MD series	No significant abnormality in appearance.		
Test Methods and	The test sample shall be exposed to reflow oven at 230±5°C for 40 seconds, with peak temperature at 260±5°C for 5 seconds, 2 times.			
Remarks	Test board material : Glass epoxy-resin			
Remarks	Test board thickness : 1.0mm			

16. Thermal shock					
Specified Value	MD series			Inductance change : Within $\pm 10\%$ 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			
Test Methods and	Step	Temperature (°C)		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	•	all be soldered to the tes all be placed in thermosta	t board by the reflow. atic oven set at specified temperature and humidity as shown in below table.
Remarks	Temperature	60±2°C	
	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.
	1	all be soldered to the te	•
	·		mostatic oven set at specified temperature and humidity and applied the rated currer
Test Methods and	continuously as shown in below table. Temperature 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

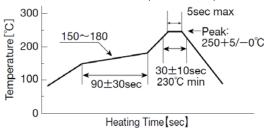
Precautions

- 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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电层型

功率电感器

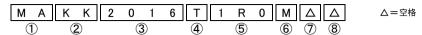
金属磁芯绕线型片状功率电感器 (MCOIL™ MA 系列)



回流焊

■型号标示法

※使用温度范围: -40~+105℃ (包含产品本身发热)



代码	类型
MA	金属磁芯绕线型片状功率电感器

②尺寸 (T)

(i)	
代码	尺寸 (T) [mm]
KK	1.0
MK	1.2

③尺寸 (L×W)

代码	外型 (inch)	尺寸 (L×W) [mm]
2016	2016(0806)	2.0 × 1.6
2520	2520(1008)	2.5 × 2.0

④包装

<u>♥ 🖰 表</u>	
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

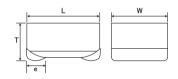
代码	电感量公差
М	±20%

⑦个别规格

וואלונת ו	
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
	(0.079 ± 0.004)	(0.063 ± 0.004)	(0.039 max)	(0.020 ± 0.012)	5555
MAKK2520	2.5±0.2	2.0±0.2	1.0 max	0.5 ± 0.3	3000
MAKKZOZU	(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)

[▶]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,若考虑使用敝公司产品时,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),请参阅敝公司网站 (http://www.ty-top.com/)。

【厚度:1.0mm max.】 ●MAKK2016(0806) 型

	1=15 th ct /t	1=15 to the total	+>/-+	自共振频率 直流电阻	额定电流 ※) [mA] (max.)			
型号	EHS	标称电感值 [μH]	电感量公差	日共振列李 [MHz] (min.)		直流重叠允许电流 ldc1	温度上升允许电流 ldc2	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	R₀HS	4.7	±20%	-	0.380	1,000	950	2

●MAKK2520(1008) 型

【厚度:1.0mm max.】

■INAKK2320(1000) ±		1/F/Q.1.0111111111111111.1						
		仁 初中成仿	电感量公差	自共振频率 [MHz] (min.)	直流电阻 [Ω] (max.)	额定电流 ※) [mA] (max.)		
<u> </u>	EHS	标称电感值 [μH]				直流重叠允许电流 Idc1	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(1008) 型

【厚度:1.2mm max.】

		17-12CILLIAN MONEY						
		1=16 d d /d		自共振频率	本 法由四	额定电流 ※)	[mA] (max.)	and have
型号	EHS	标称电感值 [μH]	电感量公差	日共振频率 [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	R₀HS	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℃)※)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℃)※)额定电流值为Idc1 或 Idc2 中较低的直流电流值。

电层黑

功率电感器

金属磁芯绕线型片状功率电感器 (MCOIL™ MA-H 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)

※使用温度范围: -40~+105℃(包含产品本身发热) ※1参照物料清单

△=空格



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$\frac{\bigcirc \wedge \bot}{}$	
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)

代码	外型 (inch)	尺寸 (L×W) [mm]
2016	2016 (0806)	2.0 × 1.6
2520	2520(1008)	2.5 × 2.0

4)包装

© 2-2 2					
	代码	包装及特殊规格			
	Н	盘带 (高特性规格)			

⑤标称电感值

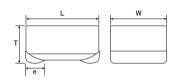
代码 (例)	标称电感值 [µH]
R47	0.47
1R0	1.0
4R7	4.7
※R=小数点	_

⑥电感量公差						
	代码	电感量公差				
	М	±20%				

⑦个别规格	
代码	个别规格
Δ	标准品

⑧本公司管理记号

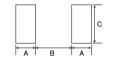
■标准外型尺寸 / 标准数量



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
MAKK2016H	2.0±0.1	1.6±0.1	1.0 max	0.5±0.3	3000
WARREDTOTT	(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
MAKKZSZUH	(0.098 ± 0.008)	(0.079 ± 0.008)	(0.039 max)	(0.020 ± 0.012)	3000
MAMK2520H	2.5±0.2	2.0±0.2	1.2 max	0.5±0.3	3000
	(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,若考虑使用敝公司产品时,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),请参阅敝公司网站 (http://www.ty-top.com/)。

■ MAKK2016H(0806) #	텐	【厚度:1.0mm max.】						
	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]
MAKK2016HR22M	RoHS	0.22	±20%	-	0.026	5,800	4,000	2
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	R₀HS	1.5	+20%	-	0 105	2 100	1 800	2

●MAKK2520H(1008) 型	Į	【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	R₀HS	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
MAKK2520H100M ※1	R₀HS	10	±20%	-	0.650	1100	750	2

● MAMK2520H(1008) ∄	민	【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

^{※)}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。

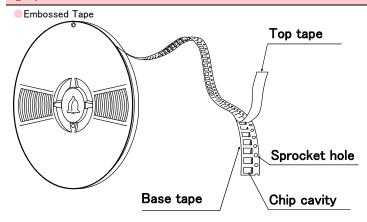
METAL CORE WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ MA SERIES / MCOIL™ MA-H SERIES)

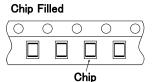
PACKAGING

1 Minimum Quantity

Tuna	Standard Quantity [pcs]
Туре	Tape & Reel
MAKK2016	3000
MAKK2520	3000
MAMK2520	3000

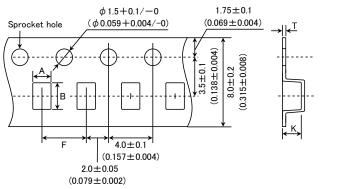
2Tape Material

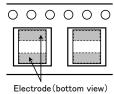




3 Taping dimensions

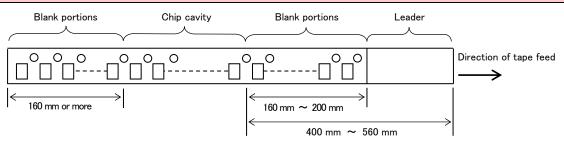
Embossed tape 8mm wide (0.315 inches wide)





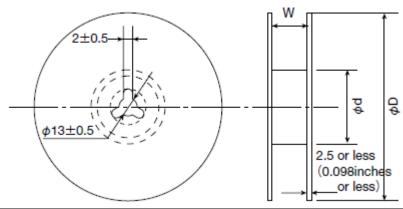
Туре	Chip	cavity	Insertion pitch	Tape thickness		
туре	A B		F	Т	K	
MAKK2016	1.9±0.1	2.3±0.1	4.0±0.1	0.25±0.05	1.2 max	
WIANNZUTO	(0.075 ± 0.004)	(0.091 ± 0.004)	(0.157 ± 0.004)	(0.009 ± 0.002)	(0.047 max)	
MAKK2520	2.3±0.1	2.8±0.1	4.0±0.1	0.3±0.05	1.25 max	
WARRZJZU	(0.091 ± 0.004)	(0.110 ± 0.004)	(0.157 ± 0.004)	(0.012 ± 0.002)	(0.049 max)	
MANIZOEOO	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



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

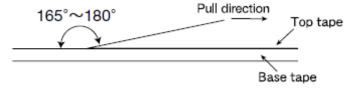


Type	Reel size (Reference values)					
Туре	ϕ D	ϕ d	W			
MAKK2016	100+0 / 2	60+1/-0	10.0±1.5			
MAKK2520	180+0/-3 (7.087+0/-0.118)	(2.36+0.039/0)	(0.394 ± 0.059)			
MAMK2520	(7.087+0/-0.118)	(2.30+0.039/0)	(0.394±0.059)			
•						

Unit:mm(inch)

6Top Tape Strength

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



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METAL CORE WIRE-WOUND CHIP POWER INDUCTORS $(MCOIL^{TM}\ MA\ SERIES\ /\ MCOIL^{TM}\ MA-H\ SERIES)$

■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	Aura Dance					
Z. Storage Tempera						
Specified Value	MA LL series	-40~+85°C				
Test Methods and Remarks	MA-H series 0 to 40°C for the product with taping.					
3. Rated current						
Specified Value	MA series	Within the specified tolerance				
Specified value	MA-H series	Within the Specified tolerance				
4. Inductance						
Specified Value	MA series	Within the specified tolerance				
Specified value	MA-H series	Within the Specified tolerance				
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 2MHz, 1V					
5. DC Resistance						
5. DO Resistance	MA series					
Specified Value		Within the specified tolerance				
Test Methods and Remarks	MA-H series Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)					
6. Self resonance fr	requency					
	MA series					
Specified Value	MA-H series	_				
	1					
7. Temperature cha	racteristic					
·	MA series					
Specified Value	MA-H series	Inductance change : Within ±15%				
Test Methods and Remarks	Measurement of inductance shall be taken at With reference to inductance value at $+20^{\circ}$ C	•				
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 3. Test board size : 100 × 40 × 1.0 Test board material : Glass epoxy-r Solder cream thickness : 0.12 mm	mm Force Rod 10 20				
		R5 Test Sample 45±2mm				

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9. Insulation resista	nce : between wires				
0 :0 17/1	MA series				
Specified Value	MA-H series				
10. Insulation resist	ance : between wire and core				
	MA series				
Specified Value	MA-H series	-			
	L	I			
11. Withstanding vol	Itage : between wire and core				
	MA series				
Specified Value	MA-H series	_			
		<u> </u>			
12. Adhesion of terr	minal electrode				
12. Addiesion of cert	MA series				
Specified Value	MA-H series	No abnormality.			
	The test samples shall be soldered to the test	t heard by the reflew			
Test Methods and	Applied force : 10N to X and	•			
Remarks	Duration : 5s.				
	Solder cream thickness : 0.12mm.				
13. Resistance to vi	bration				
Specified Value	MA series	Inductance change : Within ±10%			
Specified Value	MA-H series	No significant abnormality in appearance.			
	The test samples shall be soldered to the tes				
	Then it shall be submitted to below test cond	litions.			
	Frequency Range 10~55Hz Total Amplitude 1.5mm (May not	exceed acceleration 196m/s²)			
Test Methods and	Sweeping Method 10Hz to 55Hz to				
Remarks	X				
	Time	For 2 hours on each 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	MA series	At least 90% of surface of terminal electrode is covered by new solder.			
•	MA-H series	, , , , , , , , , , , , , , , , , , ,			
		then immersed in molten solder as shown in below table.			
Test Methods and	Flux : Methanol solution containing rosin 25%. Solder Temperature 245±5°C	٦			
Remarks	Time $5\pm 0.5 \text{ sec.}$	-			
	XImmersion depth : All sides of mounting ter	ப minal shall be immersed.			
15. Resistance to so	oldering heat				
	MA series	Inductance change : Within ±10%			
Specified Value	MA-H series	No significant abnormality in appearance.			
		I en at 230°C for 40 seconds, with peak temperature at 260 \pm 0 $/\pm$ 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					
Specified Value	MA series	Standard test condition : Unless otherwise specified, temperature is 20±15°C and 65±20% of relative humidity.			
	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

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/)

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 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.

电感

功率电感器

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)

М	В	K	K	1	6	0	8	Т	1	R	0	М	Δ
(1)	(2	2			3)		4		⑤		6	7

△=空格

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 (L×W)

<u> </u>		
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

④包装

代码	包装
Т	卷盘带装

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 申感量公差

代码	电感量公差		
М	±20%		
N	±30%		

⑦本公司管理记号

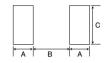
■标准外型尺寸 / 标准数量

L 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)

- 		W	т		标准数量 [pcs]		
空亏	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	
MDKK1000	(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	
MBKKZUIZ	(0.079 ± 0.008)	(0.049 ± 0.008)	(0.040 max)	(0.020 ± 0.008)	_	3000	
MBMK2520	2.5±0.2	2.0 ± 0.2	1.2 max	0.5±0.2	_	3000	
MIDIMINZOZU	(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,若考虑使用敝公司产品时,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),请参阅敝公司网站 (http://www.ty-top.com/)。

		生物中成 体		自共振频率	直流电阻	额定电流 ※) [mA] (max.)	and harmed
<u> </u>	EHS	标称电感值 [μH]	电感量公差	[MHz] (min.)	且派电阻 [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]
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%	ı	0.150	800	1,150	1.0
MBKK1608T1R5M	RoHS	1.5	±20%	ı	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	RoHS	4.7	±20%	-	0.730	370	500	1.0

●MBKK2012 (0805) 型 【厚度:1.0mm max.】

		标称电感值		自共振频率	直流电阻	额定电流 ※)	[mA] (max.)	No. Add to the
<u> </u>	EHS	你你电感值 [µH]	电感量公差	[MHz] (min.)	且派电阻 [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	R₀HS	0.47	±30%	-	0.078	2,000	1,650	1.0
MBKK2012TR68N	RoHS	0.68	±30%	ı	0.090	1,800	1,500	1.0
MBKK2012T1R0M	RoHS	1.0	±20%	ı	0.106	1,500	1,450	1.0
MBKK2012T1R5M	RoHS	1.5	±20%	ı	0.173	1,200	1,100	1.0
MBKK2012T2R2M	RoHS	2.2	±20%	ı	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

MBMI	K2520 (1008) 型	【厚度:1.2mm max.】
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● FIDE INCESED (1000) ±	-							
		标称电感值		自共振频率	直流电阻	额定电流 ※)	[mA] (max.)	North Name and the
型号	EHS	你你电感值 [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 ldc2	测试频率 [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 (Idc2) 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。

电层黑

功率电感器

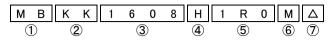
金属绕线型片状功率电感器 (MCOIL™ MB-H 系列)



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类型

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 x W)

9/C-1 (E × W)						
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

<u> </u>	
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

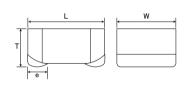
※R=小数点

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	т		标准数量 [pcs]		
空亏	L	VV	l l	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)

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【厚度:1.0mm max.】 ●MBKK1608H (0603) 型

		+= 10 m m²/s		自共振频率 [MHz] (min.)	直流电阻 [Ω] (max.)	额定电流 ※) [mA] (max.)		
型号	EHS	标称电感值 [μH]	电感量公差			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%	-	0.150	800	1,150	1.0
MBKK1608H1R5M	RoHS	1.5	±20%	-	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.】
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		七 秒中成体	你电感值 [μH] 电感量公差	自共振频率 [MHz] (min.)	直流电阻 [Ω] (max.)	额定电流 ※)[mA] (max.)		and harmen
型号						直流重叠允许电流 ldc1	温度上升允许电流 Idc2	测试频率 [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%	-	0.072	2,350	1,850	1.0
MBMK2520H1R5M	RoHS	1.5	±20%	-	0.106	2,050	1,500	1.0
MBMK2520H2R2M	RoHS	2.2	±20%	-	0.159	1,800	1,250	1.0
MBMK2520H3R3M	RoHS	3.3	±20%	-	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(I(dc1))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(I(dc2))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。

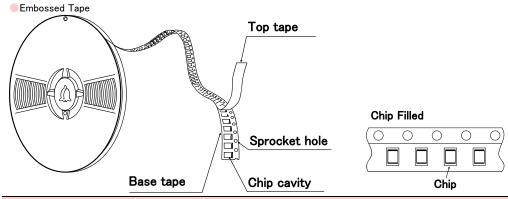
METAL WIRE-WOUND CHIP POWER INDUCTORS (MCOIL™ MB SERIES / MCOIL™ MB-H SERIES)

■PACKAGING

1 Minimum Quantity

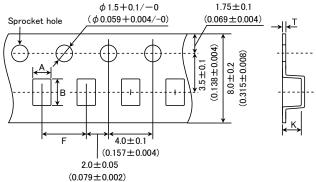
Type	Standard Quantity [pcs]
туре	Tape & Reel
MBKK1608/MBKK1608H	3000
MBKK2012	3000
MBMK2520/MBMK2520H	3000

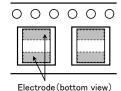
2Tape Material



3 Taping dimensions

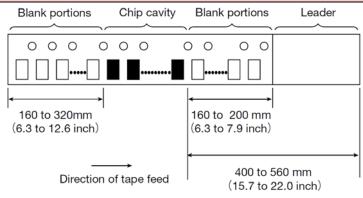
Embossed tape 8mm wide (0.315 inches wide)





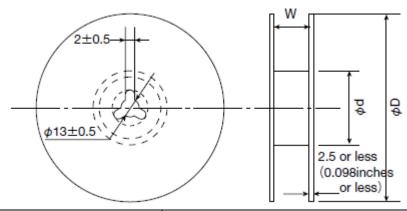
T	Chip cavity		Insertion pitch	Tape thickness	
Туре	Α	В	F	Т	K
MDKK1600 ZMDKK1600H	1.1	1.9	4.0±0.1	0.25±0.05	1.2 max
MBKK1608/MBKK1608H	(0.043)	(0.075)	(0.157 ± 0.004)	(0.010 ± 0.002)	(0.047 max)
MDKKOO10	1.45	2.2	4.0±0.1	0.25±0.05	1.2 max
MBKK2012	(0.057)	(0.087)	(0.157 ± 0.004)	(0.010 ± 0.002)	(0.047 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



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⑤Reel size

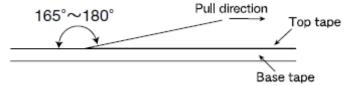


Type	Reel size (Reference values)				
Туре	ϕ D	ϕ d	W		
MBKK1608/MBKK1608H	180+0/-3	60+1/-0	10.0±1.5		
MBKK2012	(7.087+0/-0.118)	(2.36+0.039/0)	(0.394 ± 0.059)		
MBMK2520/MBMK2520H	(7.067+0/-0.116)	(2.30+0.039/0)	(0.394±0.039)		

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			
Specified Value	MP-H corios			

: DC ohmmeter (HIOKI 3227 or equivalent)

Within the specified tolerance

7. Temperature characteristic				
Specified Value	MB series	Inductance change : Within ±15%		
Specified value	MB-H series	☐ Inductance change : Within ± 10%		
Test Methods and	MB series : Measurement of inductance shall be taken at temperature range within $-40^{\circ}\text{C} \sim +105^{\circ}\text{C}$. With reference to inductance value at $+20^{\circ}\text{C}$., change rate shall be calculated.			
Remarks	MB-H series : Measurement of inductance shall be taken at With reference to inductance value at $\pm 20^{\circ}$ C	temperature range within $-40^{\circ}\text{C}\sim+125^{\circ}\text{C}$. C., change rate shall be calculated.		

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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.

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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							
Specified Value	MB series			Inductance change : Within ±10%			
	MB-H series			No significant abnormality in appearance.			
Test Methods and Remarks	MB series The test The test specified sequence Step 1 2 3 4	1					eries: samples s samples s t samples I time by e. The terr Temp - Room H Room
	Recovery: At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.						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 ±10%			
	MB-H series		No significant abnormality in appearance.			
Test Methods and	The test samples s	all be soldered to the tes shall be placed in therr e and humidity as shown	nostatic oven set at The test samples shall be placed in thermostatic oven			ostatic oven set at
Remarks	Temperature	60±2°C	The bolow cable.	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 therr	nostatic oven set at	The test samples shall be placed in thermostatic oven set at		
	specified temperatur	re and humidity and appl	lied the rated current	nt specified temperature and humidity and applied the rated current		
Test Methods and	continuously as show	vn in below table.		continuously as sho	wn in below table.	
Remarks	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, follow	ed by the measurement	within 48hrs.	after the test, follow	ved by the measurement wi	ithin 48hrs.

19. Low temperatur	e 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, followed by the measurement within					

[▶] 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				
0 :0 17/1	MB series		Inductance change : Within ±10%		
Specified Value	MB-H series		No significant abnormality in appearance.		
Test Methods and	The test samples shall be soldered to the test in below table.		t board by the reflow. After that, the test samples shall be placed at test conditions as shown		
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				
Specified value	MB-H series				
22. Standard condit	ion				
Specified Value	MB series		Standard test condition: Unless otherwise specified, temperature is 20±15°C and 65±20% of relative humidity.		
	MB-H series		When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of $20\pm2^{\circ}\text{C}$ of temperature, $65\pm5\%$ relative humidity. Inductance is in accordance with our measured value.		

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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

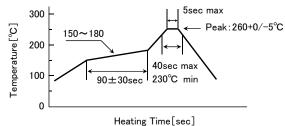
- 1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.
- 2. The product shall be used reflow soldering only.

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.