

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。



注意

产品目录中的记载内容

本产品目录中所记载的内容为2023年3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的，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民用电子设备〔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或是敝公司另行承诺的设备的通用性，标准性用途。另外，面向下述设备的应用，敝公司也备有预设的产品系列，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。

用途	产品系列		品质等级 ^(注释3)
	对象设备 ^(注释1)	规格号 (型号标记 ^(注释2))	
车载	汽车用电子设备（控制系 / 安全系）	A	1
	汽车用电子设备（车身系 / 情报系）	C	2
工业	通信基础设备·工业设备	B	2
医疗	医疗设备（国际（GHTF）第三类）	M	2
	医疗设备（国际（GHTF）第一类、第二类）	L	3
民用	一般电子设备	S	3
	移动设备专用 ^(注释4)	E	4

注释1：基于敝公司所认知的该类设备对于电子元器件所需的一般要求规格，对于该产品系列进行的应用推荐。在讨论将各个产品系列使用在对象设备以外的设备上时，请务必事先向敝公司咨询。

注释2：在产品型号中左起第2位标注有上表中所记载的“规格号”。对于相关的详细内容，请参照有关各产品型号标示法的说明资料。

注释3：在各产品系列中，都设定了从上至下1至4的“品质等级”。另外，在未得到敝公司的事前书面承诺之前，请勿将敝公司的产品使用于相对于该产品的品质等级被设定为上位品质等级的设备。

注释4：本产品系列仅可应用于一般民用电子设备中的移动设备（智能手机、平板电脑、智能手表、掌上游戏机等）。由于其设计、规格和使用环境与面向“一般电子设备”的产品系列（规格号：S）不同，有关本产品系列的详细信息请参照交货规格说明书。另外，面向“一般电子设备”的产品系列（规格号：S）也可以应用于移动设备。

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符合交货规格说明书中所记载的产品规格且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，仅限于敝公司的产品作为通用性，标准性用途使用于本产品目录或是交货规格说明书中另行注明的设备，且以书面形式另行签署了交易基本合同书，品质保证协定时，敝公司将根据该合同等的条件提供保证。

■ 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。

▶ 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/>)。

车载用途使用指引

敕公司将汽车用电子设备划分为如下四个分类。而对于敕公司的每个产品，敕公司都设定了其可以被使用的分类，以及相对应的产品系列（左起第二位的产品型号的记号为“A”或是“C”）。因此，需在汽车用电子设备上使用敕公司的产品之前，请务必事先确认该产品系列是否适合使用该用途上。如有不明之处，请与敕公司取得联系。

产品系列 (左起第二位的产品型号的记号)	分类	汽车用电子设备（代表实例）
A	控制系	<ul style="list-style-type: none"> • 发动机引擎控制装置（ECU） • 巡航定速控制装置 • 四轮转向系统（4WS） • 自动变速箱（AT） • 动力转向装置 • HEV/PHV/EV 基础控制（电池 / 逆变器 / DC-DC） • 汽车定位器（车辆位置情报提供装置） 等
	安全系	<ul style="list-style-type: none"> • 防锁死刹车系统（ABS） • 车身动态稳定系统（ESC） • 安全气囊 • ADAS（直接控制走动 / 转向 / 停车的装置） 等
C	车身系	<ul style="list-style-type: none"> • 雨刷 • 自动门锁 • 电动车窗 • 无钥匙进入系统（智能钥匙） • 电动后视镜 • 汽车电子后视镜 • 车内照明 • 车内空调系统 • 轮胎压力监测系统（TPMS） • 防盗装置 • ADAS（与传感，安全 / 传动系统没有关联的装置） 等
	情报系	<ul style="list-style-type: none"> • 车载信息娱乐装置（汽车导航 / 音响等） • 情报通讯装置（ITS/T-BOX） • 汽车仪表盘 • 行车记录仪（车厂原装配件） 等

车载(车身系 / 情报系)用途 绕线型铁氧体系功率电感器 LCXN/LCXP 系列

系列前的记号来自型号, 用来区分产品的种类和特性等。

AEC-Q200 Grade 3 (已完成 Grade 3 条件下的评价测试。)

*使用环境温度: -40~85°C

回流焊

AEC-Q200

■ 型号标示法

*使用温度范围 : -40~125°C (包含产品本身发热)

L	C	X	N	D	4	0	4	0	T	K	L	1	0	0	M	D	G
①	②	③	④	⑤	⑥	⑦	⑧										

① 系列

代码 (1) (2) (3) (4)	
LCXN	车载(车身系 / 情报系)用途 绕线型铁氧体系功率电感器
LCXP	车载(车身系 / 情报系)用途 绕线型铁氧体系功率电感器

(1) 产品群

代码	
L	电感器

(2) 范畴

代码	推荐设备	品质等级
C	汽车用电子设备(车身系 / 情报系)	2

② 特征

代码	特征
D	底面电极 (银×焊料)
E	底面电极 (铜×焊料)
H	底面电极 (框型)

③ 尺寸 (L×W)

代码	尺寸 (L×W) [mm]
2020	2.0×2.0
2424	2.4×2.4
3030	3.0×3.0
4040	4.0×4.0
5050	5.0×5.0
6060	6.0×6.0
8080	8.0×8.0

④ 尺寸 (H)

代码	尺寸 (H) [mm]
KK	1.0
MK	1.2
PK	1.4
QK	1.5
TK	1.8
WK	2.0
WD	2.4
WE	2.5
WH	2.8
XK	3.0
XA	3.1
YK	4.0
YA	4.1
YB	4.2
YE	4.5

(3) 类型

代码	
X	绕线型铁氧体系 鼓型

(4) 特效 / 特性

代码	
N	一般功率扼流
P	大电流功率扼流

⑤ 包装

代码	包装
T	卷盘带装
L	卷盘带装

⑥ 标称电感值

代码 (例)	标称电感值 [μH]
2R2	2.2
100	10
101	100

※R=小数点

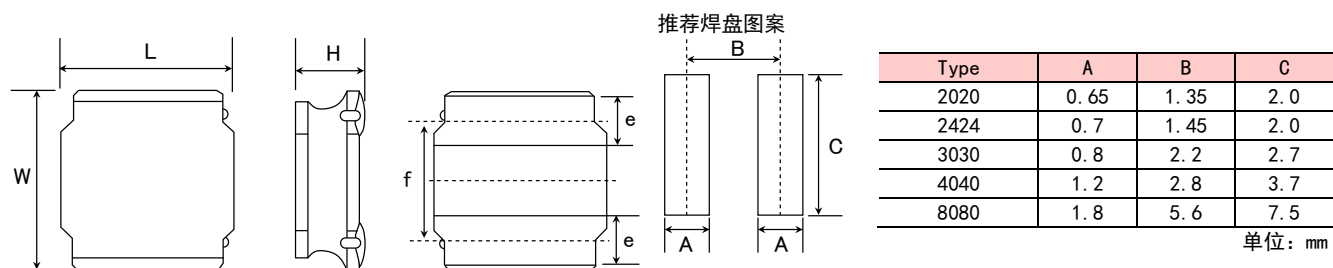
⑦ 电感量公差

代码	电感量公差
M	±20%
N	±30%

⑧ 管理记号

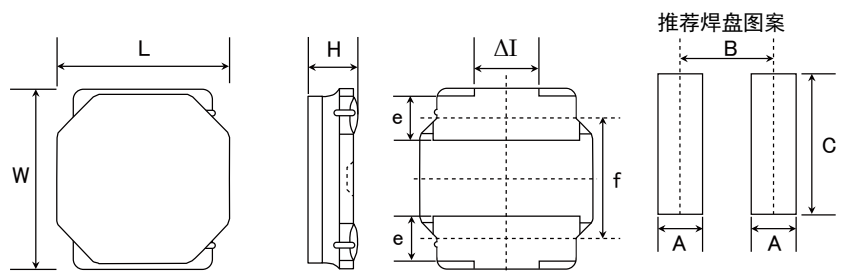
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■标准外型尺寸 / 标准数量



Type	L	W	H	e	f	标准数量 [pcs] 卷盘带装
2020KK	2.0±0.1 (0.079±0.004)	2.0±0.1 (0.079±0.004)	1.0 max (0.039 max)	0.5±0.2 (0.020±0.008)	1.25±0.2 (0.050±0.008)	2500
2020MK	2.0±0.1 (0.079±0.004)	2.0±0.1 (0.079±0.004)	1.2 max (0.047 max)	0.5±0.2 (0.020±0.008)	1.25±0.2 (0.050±0.008)	2500
2424KK	2.4±0.1 (0.095±0.004)	2.4±0.1 (0.095±0.004)	1.0 max (0.039 max)	0.6±0.2 (0.024±0.008)	1.45±0.2 (0.057±0.008)	2500
2424MK	2.4±0.1 (0.095±0.004)	2.4±0.1 (0.095±0.004)	1.2 max (0.047 max)	0.6±0.2 (0.024±0.008)	1.45±0.2 (0.057±0.008)	2500
3030KK	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.0 max (0.039 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
3030MK	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.2 max (0.047 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
3030QK	3.0±0.1 (0.118±0.004)	3.0±0.1 (0.118±0.004)	1.5 max (0.059 max)	0.9±0.2 (0.035±0.008)	1.9±0.2 (0.075±0.008)	2000
4040KK	4.0±0.2 (0.158±0.008)	4.0±0.2 (0.158±0.008)	1.0 max (0.039 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	5000
4040MK	4.0±0.2 (0.158±0.008)	4.0±0.2 (0.158±0.008)	1.2 max (0.047 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	4500
4040TK	4.0±0.2 (0.158±0.008)	4.0±0.2 (0.158±0.008)	1.8 max (0.071 max)	1.1±0.2 (0.043±0.008)	2.5±0.2 (0.098±0.008)	3500
8080XK	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	3.0 max (0.118 max)	1.60±0.3 (0.063±0.012)	5.6±0.3 (0.22±0.012)	1000
8080YK	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	4.0 max (0.158 max)	1.60±0.3 (0.063±0.012)	5.6±0.3 (0.22±0.012)	1000
8040YB	8.0±0.2 (0.315±0.008)	8.0±0.2 (0.315±0.008)	4.2 max (0.165 max)	1.60±0.3 (0.063±0.012)	5.6±0.3 (0.22±0.012)	1000

单位: mm (inch)



Type	A	B	C
5050	1.5	3.6	4.0
6060	1.6	4.7	5.7

单位: mm

Type	L	W	H	e	f	ΔI	标准数量[pcs] 卷盘带装
5050KK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	1.0 max (0.039 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1000
5050MK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	1.2 max (0.047 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1000
5050PK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	1.4 max (0.055 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1000
5050WK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	2.0 max (0.079 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	800
5050WD	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	2.4max (0.095 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	2500
5050WE	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	2.5 max (0.098 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	2500
5050XK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	3.0 max (0.118 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	500
5050XA	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	3.1 max (0.122 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	500
5050YK	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	4.0 max (0.158 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1500
5050YA	4.9±0.2 (0.193±0.008)	4.9±0.2 (0.193±0.008)	4.1 max (0.161 max)	1.2±0.2 (0.047±0.008)	3.3±0.2 (0.130±0.008)	1.3typ (0.051typ)	1500
6060KK	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	1.0 max (0.039 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	1000
6060MK	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	1.2 max (0.047 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	1000
6060PK	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	1.4 max (0.055 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	1000
6060WK	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	2.0 max (0.079 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	2500
6060WH	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	2.8 max (0.110 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	2000
6060YE	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	4.5 max (0.177 max)	1.35±0.2 (0.053±0.008)	4.0±0.2 (0.158±0.008)	2.3typ (0.091typ)	1500

单位: mm (inch)

PART NUMBER

• All the Wire-wound Ferrite Power Inductors of the catalog lineup are RoHS compliant.

Notes)

- The exchange of individual specifications is necessary depending on your application and/or circuit condition. Please contact TAIYO YUDEN's official sales channel.
- For Automotive (AEC-Q200 Qualified) products for BODY & CHASSIS, and INFOTAINMENT. Please check "Automotive Application Guide" for further details before using the products.

< AEC-Q200 : AEC-Q200 qualified >

All the Wire-wound Ferrite Power Inductors for Automotive products are tested based on the test conditions and methods defined in AEC-Q200 by family item.

Please consult with TAIYO YUDEN's official sales channel for the details of the product specifications and AEC-Q200 test results, etc., and please review and approve the product specifications before ordering.

● 2020KK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXPD2020KKT4R7N0G	NRV2010T R47N GFV	0.47	$\pm 30\%$	-	0.052	2,100	2,000	100
LCXPD2020KKT4R68N0G	NRV2010T R68N GFV	0.68	$\pm 30\%$	-	0.060	1,850	1,850	100
LCXPD2020KKT1R0N0G	NRV2010T 1R0N GFV	1.0	$\pm 30\%$	-	0.080	1,550	1,600	100
LCXPD2020KKT1R5M0G	NRV2010T 1R5M GFV	1.5	$\pm 20\%$	-	0.100	1,350	1,450	100
LCXPD2020KKT2R2M0G	NRV2010T 2R2M GFV	2.2	$\pm 20\%$	-	0.175	1,100	1,100	100
LCXPD2020KKT3R3M0G	NRV2010T 3R3M GFV	3.3	$\pm 20\%$	-	0.250	880	1,000	100
LCXPD2020KKT4R7M0G	NRV2010T 4R7M GFV	4.7	$\pm 20\%$	-	0.320	760	820	100

● 2020MK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXPD2020MKT1R0N0G	NRV2012T 1R0N GFV	1.0	$\pm 30\%$	-	0.073	2,200	1,650	100
LCXPD2020MKT1R5N0G	NRV2012T 1R5N GFV	1.5	$\pm 30\%$	-	0.100	1,800	1,400	100
LCXPD2020MKT2R2M0G	NRV2012T 2R2M GFV	2.2	$\pm 20\%$	-	0.129	1,600	1,200	100
LCXPD2020MKT3R3M0G	NRV2012T 3R3M GFV	3.3	$\pm 20\%$	-	0.227	1,250	900	100
LCXPD2020MKT4R7M0G	NRV2012T 4R7M GFV	4.7	$\pm 20\%$	-	0.325	1,100	750	100

● 2020MK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND2020MKT1R0N0G	NRS2012T 1R0N GJV	1.0	$\pm 30\%$	-	0.070	1,900	1,700	100
LCXND2020MKT1R5N0G	NRS2012T 1R5N GJV	1.5	$\pm 30\%$	-	0.090	1,650	1,500	100
LCXND2020MKT2R2M0G	NRS2012T 2R2M GJV	2.2	$\pm 20\%$	-	0.107	1,350	1,370	100
LCXND2020MKT3R3M0G	NRS2012T 3R3M GJV	3.3	$\pm 20\%$	-	0.190	1,000	1,020	100
LCXND2020MKT4R7M0G	NRS2012T 4R7M GJV	4.7	$\pm 20\%$	-	0.241	900	910	100

● 2424KK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNE2424KKT4R68N	NRH2410T R68NN 4V	0.68	$\pm 30\%$	120	0.060	2,200	1,570	100
LCXNE2424KKT1R0NN	NRH2410T 1R0NN 4V	1.0	$\pm 30\%$	106	0.070	1,800	1,410	100
LCXNE2424KKT1R5MN	NRH2410T 1R5MN V	1.5	$\pm 20\%$	94	0.110	1,550	1,160	100
LCXNE2424KKT2R2MN	NRH2410T 2R2MN V	2.2	$\pm 20\%$	77	0.150	1,290	970	100
LCXNE2424KKT3R3MN	NRH2410T 3R3MN V	3.3	$\pm 20\%$	56	0.220	1,000	770	100
LCXNE2424KKT4R7MN	NRH2410T 4R7MN V	4.7	$\pm 20\%$	50	0.290	880	670	100
LCXNE2424KKT6R8MN	NRH2410T 6R8MN V	6.8	$\pm 20\%$	43	0.410	750	570	100
LCXNE2424KKT100MN	NRH2410T 100MN V	10	$\pm 20\%$	32	0.690	550	450	100
LCXNE2424KKT150MN	NRH2410T 150MN V	15	$\pm 20\%$	27	1.02	470	370	100
LCXNE2424KKT220MN	NRH2410T 220MN V	22	$\pm 20\%$	22	1.47	390	300	100

● 2424MK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNE2424MKT4R7NNG	NRH2412T R47NNGJV	0.47	$\pm 30\%$	180	0.050	2,900	2,100	100
LCXNE2424MKT1R0NNG	NRH2412T 1R0NNGHV	1.0	$\pm 30\%$	101	0.077	2,350	1,300	100
LCXNE2424MKT1R5NNG	NRH2412T 1R5NNGHV	1.5	$\pm 30\%$	89	0.100	2,100	1,150	100
LCXNE2424MKT2R2MNG	NRH2412T 2R2MNGHV	2.2	$\pm 20\%$	72	0.140	1,700	1,000	100
LCXNE2424MKT3R3MNG	NRH2412T 3R3MNGHV	3.3	$\pm 20\%$	56	0.225	1,400	750	100
LCXNE2424MKT4R7MNG	NRH2412T 4R7MNGHV	4.7	$\pm 20\%$	45	0.300	1,150	650	100
LCXNE2424MKT6R8MNG	NRH2412T 6R8MNGHV	6.8	$\pm 20\%$	34	0.420	950	550	100
LCXNE2424MKT100MNG	NRH2412T 100MNGHV	10	$\pm 20\%$	29	0.600	810	450	100

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

PART NUMBER

3030KK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNE3030KKT1R2NN	NRH3010T 1R2NN V	1.2	$\pm 30\%$	120	0.065	1,700	1,480	100
LCXNE3030KKT1R5NN	NRH3010T 1R5NN V	1.5	$\pm 30\%$	99	0.075	1,440	1,370	100
LCXNE3030KKT2R2MN	NRH3010T 2R2MN V	2.2	$\pm 20\%$	86	0.083	1,300	1,300	100
LCXNE3030KKT3R3MN	NRH3010T 3R3MN V	3.3	$\pm 20\%$	64	0.130	1,000	1,030	100
LCXNE3030KKT4R7MN	NRH3010T 4R7MN V	4.7	$\pm 20\%$	50	0.170	850	900	100
LCXNE3030KKT6R8MN	NRH3010T 6R8MN V	6.8	$\pm 20\%$	44	0.250	700	745	100
LCXNE3030KKT100MN	NRH3010T 100MN V	10	$\pm 20\%$	34	0.350	600	620	100
LCXNE3030KKT150MN	NRH3010T 150MN V	15	$\pm 20\%$	25	0.550	450	480	100
LCXNE3030KKT220MN	NRH3010T 220MN V	22	$\pm 20\%$	22	0.770	380	410	100
LCXNE3030KKT470MN	NRH3010T 470MN V	47	$\pm 20\%$	17	2.05	250	285	100

3030MK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNE3030MKTR47NN	NRH3012T R47NN V	0.47	$\pm 30\%$	160	0.033	2,600	1,900	100
LCXNE3030MKT1R0NN	NRH3012T 1R0NN V	1.0	$\pm 30\%$	111	0.048	2,200	1,710	100
LCXNE3030MKT1R5NN	NRH3012T 1R5NN V	1.5	$\pm 30\%$	95	0.055	1,700	1,600	100
LCXNE3030MKT2R2MN	NRH3012T 2R2MN V	2.2	$\pm 20\%$	78	0.075	1,500	1,370	100
LCXNE3030MKT3R3MN	NRH3012T 3R3MN V	3.3	$\pm 20\%$	61	0.100	1,200	1,210	100
LCXNE3030MKT4R7MN	NRH3012T 4R7MN V	4.7	$\pm 20\%$	50	0.130	1,000	1,060	100
LCXNE3030MKT6R8MN	NRH3012T 6R8MN V	6.8	$\pm 20\%$	43	0.190	850	890	100
LCXNE3030MKT100MN	NRH3012T 100MN V	10	$\pm 20\%$	32	0.270	730	720	100
LCXNE3030MKT150MN	NRH3012T 150MN V	15	$\pm 20\%$	26	0.450	530	570	100
LCXNE3030MKT220MN	NRH3012T 220MN V	22	$\pm 20\%$	22	0.630	500	500	100

3030MK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXPD3030MKT1R0N	NRV3012T 1R0N V	1.0	$\pm 30\%$	110	0.065	2,500	1,600	100
LCXPD3030MKT1R5N	NRV3012T 1R5N V	1.5	$\pm 30\%$	92	0.075	2,100	1,400	100
LCXPD3030MKT2R2M	NRV3012T 2R2M V	2.2	$\pm 20\%$	70	0.120	1,800	1,100	100
LCXPD3030MKT3R3M	NRV3012T 3R3M V	3.3	$\pm 20\%$	55	0.150	1,600	1,000	100
LCXPD3030MKT4R7M	NRV3012T 4R7M V	4.7	$\pm 20\%$	48	0.190	1,250	850	100
LCXPD3030MKT6R8M	NRV3012T 6R8M V	6.8	$\pm 20\%$	40	0.300	950	650	100
LCXPD3030MKT100M	NRV3012T 100M V	10	$\pm 20\%$	32	0.470	800	550	100

3030QK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND3030QKT1R0NNG	NRS3015T 1R0NNGHV	1.0	$\pm 30\%$	100	0.030	2,100	2,100	100
LCXND3030QKT1R5NNG	NRS3015T 1R5NNGHV	1.5	$\pm 30\%$	87	0.038	1,800	1,820	100
LCXND3030QKT2R2MNG	NRS3015T 2R2MNGHV	2.2	$\pm 20\%$	64	0.058	1,480	1,500	100
LCXND3030QKT3R3MNG	NRS3015T 3R3MNGHV	3.3	$\pm 20\%$	49	0.078	1,210	1,230	100
LCXND3030QKT4R7MNG	NRS3015T 4R7MNGHV	4.7	$\pm 20\%$	40	0.120	1,020	1,040	100
LCXND3030QKT6R8MNG	NRS3015T 6R8MNGHV	6.8	$\pm 20\%$	36	0.160	870	880	100
LCXND3030QKT100MNG	NRS3015T 100MNGHV	10	$\pm 20\%$	28	0.220	700	710	100
LCXND3030QKT220MNG	NRS3015T 220MNGHV	22	$\pm 20\%$	20	0.520	470	470	100
LCXND3030QKT330MNG	NRS3015T 330MNGHV	33	$\pm 20\%$	18	0.780	400	440	100

4040KK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND4040KKL1R0NDG	NRS4010T 1R0NDGGV	1.0	$\pm 30\%$	116	0.056	2,000	1,900	100
LCXND4040KKL2R2MDG	NRS4010T 2R2MDGGV	2.2	$\pm 20\%$	73	0.085	1,200	1,500	100
LCXND4040KKL3R3MDG	NRS4010T 3R3MDGGV	3.3	$\pm 20\%$	58	0.100	1,100	1,400	100
LCXND4040KKL4R7MDG	NRS4010T 4R7MDGGV	4.7	$\pm 20\%$	47	0.140	950	1,200	100
LCXND4040KKL6R8MDG	NRS4010T 6R8MDGGV	6.8	$\pm 20\%$	38	0.200	800	1,000	100
LCXND4040KKL100MDG	NRS4010T 100MDGGV	10	$\pm 20\%$	31	0.300	620	750	100
LCXND4040KKL150MDG	NRS4010T 150MDGGV	15	$\pm 20\%$	24	0.430	540	600	100
LCXND4040KKL220MDG	NRS4010T 220MDGGV	22	$\pm 20\%$	19	0.570	450	500	100

4040MK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND4040MKL1R0NDG	NRS4012T 1R0NDGGV	1.0	$\pm 30\%$	100	0.042	2,800	2,200	100
LCXND4040MKL2R2MDG	NRS4012T 2R2MDGJV	2.2	$\pm 20\%$	70	0.060	1,650	1,900	100
LCXND4040MKL3R3MDG	NRS4012T 3R3MDGJV	3.3	$\pm 20\%$	60	0.070	1,400	1,700	100
LCXND4040MKL4R7MDG	NRS4012T 4R7MDGJV	4.7	$\pm 20\%$	45	0.095	1,200	1,500	100
LCXND4040MKL6R8MDG	NRS4012T 6R8MDGJV	6.8	$\pm 20\%$	35	0.125	900	1,300	100
LCXND4040MKL100MDG	NRS4012T 100MDGJV	10	$\pm 20\%$	30	0.170	800	1,100	100
LCXND4040MKL150MDG	NRS4012T 150MDGJV	15	$\pm 20\%$	24	0.260	650	750	100
LCXND4040MKL220MDG	NRS4012T 220MDGJV	22	$\pm 20\%$	18	0.400	500	620	100

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

PART NUMBER

4040TK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND4040TKL1R0NDG	NRS4018T 1R0NDGJV	1.0	$\pm 30\%$	90	0.027	4,000	3,200	100
LCXND4040TKL1R5NDG	NRS4018T 1R5NDGJV	1.5	$\pm 30\%$	75	0.037	3,300	2,400	100
LCXND4040TKL2R2MDG	NRS4018T 2R2MDGJV	2.2	$\pm 20\%$	60	0.042	3,000	2,200	100
LCXND4040TKL3R3MDG	NRS4018T 3R3MDGJV	3.3	$\pm 20\%$	45	0.055	2,300	2,000	100
LCXND4040TKL4R7MDG	NRS4018T 4R7MDGJV	4.7	$\pm 20\%$	35	0.070	2,000	1,700	100
LCXND4040TKL6R8MDG	NRS4018T 6R8MDGJV	6.8	$\pm 20\%$	30	0.098	1,600	1,450	100
LCXND4040TKL100MDG	NRS4018T 100MDGJV	10	$\pm 20\%$	25	0.150	1,300	1,200	100
LCXND4040TKL150MDG	NRS4018T 150MDGJV	15	$\pm 20\%$	18	0.210	1,100	850	100
LCXND4040TKL220MDG	NRS4018T 220MDGJV	22	$\pm 20\%$	15	0.290	900	720	100
LCXND4040TKL330MDG	NRS4018T 330MDGJV	33	$\pm 20\%$	12	0.460	700	550	100
LCXND4040TKL470MDG	NRS4018T 470MDGJV	47	$\pm 20\%$	10	0.650	600	440	100
LCXND4040TKL680MDG	NRS4018T 680MDGJV	68	$\pm 20\%$	8.3	1.00	520	320	100
LCXND4040TKL101MDG	NRS4018T 101MDGJV	100	$\pm 20\%$	6.5	1.45	420	280	100
LCXND4040TKL151MDG	NRS4018T 151MDGJV	150	$\pm 20\%$	5.5	2.30	340	220	100
LCXND4040TKL221MDG	NRS4018T 221MDGJV	220	$\pm 20\%$	4.0	3.80	275	170	100

5050KK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050KKT1R0NMG	NRS5010T 1R0NMGFV	1.0	$\pm 30\%$	95	0.070	2,350	1,750	100
LCXND5050KKT2R2NMG	NRS5010T 2R2NMGFV	2.2	$\pm 30\%$	65	0.105	1,500	1,400	100
LCXND5050KKT3R3MMG	NRS5010T 3R3MMGFV	3.3	$\pm 20\%$	42	0.125	1,400	1,250	100
LCXND5050KKT4R7MMG	NRS5010T 4R7MMGFV	4.7	$\pm 20\%$	37	0.145	1,200	1,150	100
LCXND5050KKT6R8MMG	NRS5010T 6R8MMGFV	6.8	$\pm 20\%$	33	0.185	1,000	1,000	100
LCXND5050KKT100MMG	NRS5010T 100MMGFV	10	$\pm 20\%$	23	0.250	850	900	100
LCXND5050KKT150MMG	NRS5010T 150MMGFV	15	$\pm 20\%$	19	0.400	680	650	100
LCXND5050KKT220MMG	NRS5010T 220MMGFV	22	$\pm 20\%$	15	0.600	550	450	100

5050MK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050MKT1R0NMG	NRS5012T 1R0NMGFV	1.0	$\pm 30\%$	100	0.053	4,500	2,300	100
LCXND5050MKT1R5NMG	NRS5012T 1R5NMGFV	1.5	$\pm 30\%$	86	0.070	3,800	2,200	100
LCXND5050MKT2R2MMG	NRS5012T 2R2MMGFV	2.2	$\pm 20\%$	70	0.085	3,100	2,000	100
LCXND5050MKT3R3MMG	NRS5012T 3R3MMGFV	3.3	$\pm 20\%$	48	0.160	2,400	1,450	100
LCXND5050MKT4R7MMG	NRS5012T 4R7MMGFV	4.7	$\pm 20\%$	40	0.180	2,200	1,400	100
LCXND5050MKT6R8MMG	NRS5012T 6R8MMGFV	6.8	$\pm 20\%$	36	0.260	1,700	1,100	100
LCXND5050MKT100MMG	NRS5012T 100MMGFV	10	$\pm 20\%$	26	0.420	1,400	850	100
LCXND5050MKT150MMG	NRS5012T 150MMGFV	15	$\pm 20\%$	22	0.670	1,200	640	100

5050PK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050PKTR47NMG	NRS5014T R47NMGJV	0.47	$\pm 30\%$	185	0.025	5,800	3,300	100
LCXND5050PKT1R2NMG	NRS5014T 1R2NMGJV	1.2	$\pm 30\%$	86	0.045	3,800	2,400	100
LCXND5050PKT2R2NMG	NRS5014T 2R2NMGJV	2.2	$\pm 30\%$	56	0.065	2,800	2,000	100
LCXND5050PKT3R3NMG	NRS5014T 3R3NMGJV	3.3	$\pm 30\%$	48	0.080	2,350	1,700	100
LCXND5050PKT4R7NMG	NRS5014T 4R7NMGJV	4.7	$\pm 30\%$	41	0.100	2,050	1,400	100
LCXND5050PKT6R8MMG	NRS5014T 6R8MMGJV	6.8	$\pm 20\%$	33	0.150	1,600	1,200	100
LCXND5050PKT100MMG	NRS5014T 100MMGJV	10	$\pm 20\%$	27	0.200	1,400	1,050	100
LCXND5050PKT150MMG	NRS5014T 150MMGJV	15	$\pm 20\%$	20	0.320	1,100	650	100
LCXND5050PKT220MMG	NRS5014T 220MMGJV	22	$\pm 20\%$	16	0.450	900	550	100

5050WK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND5050WKT4R7NMG	NRS5020T R47NMGJV	0.47	$\pm 30\%$	230	0.012	6,100	5,000	100
LCXND5050WKT1R0NMG	NRS5020T 1R0NMGJV	1.0	$\pm 30\%$	81	0.021	4,000	3,600	100
LCXND5050WKT1R5NMG	NRS5020T 1R5NMGJV	1.5	$\pm 30\%$	68	0.026	3,350	3,200	100
LCXND5050WKT2R2NMG	NRS5020T 2R2NMGJV	2.2	$\pm 30\%$	57	0.035	2,900	2,900	100
LCXND5050WKT3R3NMG	NRS5020T 3R3NMGJV	3.3	$\pm 30\%$	46	0.048	2,400	2,400	100
LCXND5050WKT4R7MMG	NRS5020T 4R7MMGJV	4.7	$\pm 20\%$	37	0.060	2,000	2,000	100
LCXND5050WKT6R8MMG	NRS5020T 6R8MMGJV	6.8	$\pm 20\%$	30	0.090	1,600	1,650	100
LCXND5050WKT100MMG	NRS5020T 100MMGJV	10	$\pm 20\%$	24	0.120	1,300	1,450	100
LCXND5050WKT150MMG	NRS5020T 150MMGJV	15	$\pm 20\%$	20	0.165	1,100	1,200	100
LCXND5050WKT220MMG	NRS5020T 220MMGJV	22	$\pm 20\%$	17	0.260	900	1,000	100
LCXND5050WKT470MMG	NRS5020T 470MMGJV	47	$\pm 20\%$	12	0.435	630	560	100
LCXND5050WKT101MMG	NRS5020T 101MMGJV	100	$\pm 20\%$	7	0.850	420	400	100

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■ PART NUMBER

● 5050WE/5050WD type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LXND5050WEL1R0NMG	NRS5024T 1R0NMGJV	1.0	±30%	85	0.016	5,800	4,400	100
LXND5050WEL1R5NMG	NRS5024T 1R5NMGJV	1.5	±30%	67	0.022	5,200	3,600	100
LXND5050WDL2R2NMG	NRS5024T 2R2NMGJV	2.2	±30%	51	0.029	4,100	3,100	100
LXND5050WDL3R3NMG	NRS5024T 3R3NMGJV	3.3	±30%	41	0.043	3,100	2,400	100
LXND5050WDL4R7MMG	NRS5024T 4R7MMGJV	4.7	±20%	37	0.055	2,700	2,000	100
LXND5050WDL6R8MMG	NRS5024T 6R8MMGJV	6.8	±20%	28	0.080	2,200	1,600	100
LXND5050WDL100MMG	NRS5024T 100MMGJV	10	±20%	21	0.125	1,700	1,200	100
LXND5050WDL150MMG	NRS5024T 150MMGJV	15	±20%	18	0.170	1,400	1,000	100
LXND5050WDL220MMG	NRS5024T 220MMGJV	22	±20%	15	0.230	1,200	820	100
LXND5050WDL330MMG	NRS5024T 330MMGJV	33	±20%	11	0.370	1,000	630	100

● 5050XA/5050XK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LXND5050XATR47NMG	NRS5030T R47NMGJV	0.47	±30%	185	0.010	9,000	5,000	100
LXND5050XAT1R0NMG	NRS5030T 1R0NMGJV	1.0	±30%	110	0.015	6,600	4,000	100
LXND5050XAT2R2NMG	NRS5030T 2R2NMGJV	2.2	±30%	46	0.023	4,200	3,500	100
LXND5050XAT3R3MMG	NRS5030T 3R3MMGJV	3.3	±20%	36	0.030	3,600	3,000	100
LXND5050XAT4R7MMG	NRS5030T 4R7MMGJV	4.7	±20%	31	0.035	3,100	2,600	100
LXND5050XAT6R8MMG	NRS5030T 6R8MMGJV	6.8	±20%	22	0.052	2,500	2,300	100
LXND5050XAT100MMG	NRS5030T 100MMGJV	10	±20%	20	0.070	2,100	1,700	100
LXND5050XAT150MMG	NRS5030T 150MMGJV	15	±20%	14	0.125	1,600	1,400	100
LXND5050XKT220MMG	NRS5030T 220MMGJV	22	±20%	13	0.180	1,400	1,050	100
LXND5050XKT330MMG	NRS5030T 330MMGJV	33	±20%	10	0.225	1,150	800	100
LXND5050XKT470MMG	NRS5030T 470MMGJV	47	±20%	9	0.325	950	700	100

● 5050YA/5050YK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LXND5050YAL1R5NMG	NRS5040T 1R5NMGJV	1.5	±30%	60	0.017	6,400	4,500	100
LXND5050YAL2R2NMG	NRS5040T 2R2NMGJV	2.2	±30%	42	0.022	5,000	3,700	100
LXND5050YAL3R3NMG	NRS5040T 3R3NMGJV	3.3	±30%	32	0.027	4,000	3,300	100
LXND5050YAL4R7NMG	NRS5040T 4R7NMGJV	4.7	±30%	28	0.029	3,300	3,100	100
LXND5050YAL6R8MMG	NRS5040T 6R8MMGJV	6.8	±20%	21	0.049	2,800	2,400	100
LXND5050YAL100MMG	NRS5040T 100MMGJV	10	±20%	18	0.056	2,300	2,100	100
LXND5050YAL150MMG	NRS5040T 150MMGJV	15	±20%	13	0.080	2,000	1,800	100
LXND5050YKL220MMG	NRS5040T 220MMGJV	22	±20%	9	0.126	1,500	1,400	100
LXND5050YKL330MMG	NRS5040T 330MMGJV	33	±20%	7	0.180	1,300	1,200	100
LXND5050YKL470MMG	NRS5040T 470MMGJV	47	±20%	6	0.310	1,100	900	100

● 6060KK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LXND6060KKT1R5MMG	NRS6010T 1R5MMGFV	1.5	±20%	77	0.090	2,400	1,900	100
LXND6060KKT2R2MMG	NRS6010T 2R2MMGFV	2.2	±20%	56	0.110	1,900	1,700	100
LXND6060KKT3R3MMG	NRS6010T 3R3MMGFV	3.3	±20%	42	0.135	1,600	1,500	100
LXND6060KKT4R7MMG	NRS6010T 4R7MMGFV	4.7	±20%	36	0.165	1,300	1,400	100
LXND6060KKT6R8MMG	NRS6010T 6R8MMGFV	6.8	±20%	30	0.220	1,200	1,200	100
LXND6060KKT100MMG	NRS6010T 100MMGFV	10	±20%	25	0.270	1,000	1,100	100
LXND6060KKT220MMG	NRS6010T 220MMGFV	22	±20%	12	0.580	650	700	100

● 6060MK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LXND6060MKT1R0NMG	NRS6012T 1R0NMGJV	1.0	±30%	95	0.050	3,000	2,400	100
LXND6060MKT1R5NMG	NRS6012T 1R5NMGJV	1.5	±30%	69	0.067	2,600	2,100	100
LXND6060MKT2R5NMG	NRS6012T 2R5NMGJV	2.5	±30%	45	0.090	2,100	1,800	100
LXND6060MKT3R3NMG	NRS6012T 3R3NMGJV	3.3	±30%	42	0.105	1,800	1,700	100
LXND6060MKT4R7MMG	NRS6012T 4R7MMGJV	4.7	±20%	36	0.125	1,600	1,550	100
LXND6060MKT5R3MMG	NRS6012T 5R3MMGJV	5.3	±20%	34	0.125	1,500	1,550	100
LXND6060MKT6R8MMG	NRS6012T 6R8MMGJV	6.8	±20%	30	0.165	1,300	1,350	100
LXND6060MKT100MMG	NRS6012T 100MMGJV	10	±20%	22	0.200	1,000	1,200	100
LXND6060MKT150MMG	NRS6012T 150MMGJV	15	±20%	18	0.295	800	800	100
LXND6060MKT220MMG	NRS6012T 220MMGJV	22	±20%	12	0.465	760	650	100
LXND6060MKT330MMG	NRS6012T 330MMGJV	33	±20%	8	0.580	590	550	100
LXND6060MKT470MMG	NRS6012T 470MMGJV	47	±20%	6	0.965	520	460	100
LXND6060MKT680MMG	NRS6012T 680MMGJV	68	±20%	3	1.16	440	410	100
LXND6060MKT101MMG	NRS6012T 101MMGJV	100	±20%	1	1.67	350	320	100

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■ PART NUMBER

● 6060PK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND6060PKT1R2NMG	NRS6014T 1R2NMGV	1.2	±30%	77	0.042	4,000	2,750	100
LCXND6060PKT2R2NMG	NRS6014T 2R2NMGV	2.2	±30%	61	0.055	3,000	2,300	100
LCXND6060PKT3R3NMG	NRS6014T 3R3NMGV	3.3	±30%	41	0.075	2,500	2,000	100
LCXND6060PKT4R7MMG	NRS6014T 4R7MMGV	4.7	±20%	36	0.090	2,000	1,900	100
LCXND6060PKT6R8MMG	NRS6014T 6R8MMGV	6.8	±20%	30	0.115	1,700	1,650	100
LCXND6060PKT100MMG	NRS6014T 100MMGV	10	±20%	24	0.140	1,400	1,400	100
LCXND6060PKT150MMG	NRS6014T 150MMGV	15	±20%	20	0.210	1,150	1,200	100
LCXND6060PKT220MMG	NRS6014T 220MMGV	22	±20%	16	0.300	950	1,000	100

● 6060WK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±20%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND6060WKL0R8NMG	NRS6020T 0R8NMGV	0.8	±30%	110	0.020	6,400	4,100	100
LCXND6060WKL1R5NMG	NRS6020T 1R5NMGV	1.5	±30%	93	0.026	4,300	3,600	100
LCXND6060WKL2R2NMG	NRS6020T 2R2NMGV	2.2	±30%	73	0.034	3,200	2,900	100
LCXND6060WKL3R3NMG	NRS6020T 3R3NMGV	3.3	±30%	55	0.040	2,800	2,750	100
LCXND6060WKL4R7NMG	NRS6020T 4R7NMGV	4.7	±30%	43	0.058	2,400	2,150	100
LCXND6060WKL6R8NMG	NRS6020T 6R8NMGV	6.8	±30%	30	0.085	2,000	1,800	100
LCXND6060WKL100MMG	NRS6020T 100MMGV	10	±20%	18	0.125	1,900	1,500	100
LCXND6060WKL220MMG	NRS6020T 220MMGV	22	±20%	11	0.290	1,250	950	100

● 6060WH type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND6060WHL0R9NMG	NRS6028T 0R9NMGV	0.9	±30%	90	0.013	6,700	4,600	100
LCXND6060WHL1R5NMG	NRS6028T 1R5NMGV	1.5	±30%	78	0.016	5,100	4,200	100
LCXND6060WHL2R2NMG	NRS6028T 2R2NMGV	2.2	±30%	68	0.020	4,200	3,700	100
LCXND6060WHL3R0NMG	NRS6028T 3R0NMGV	3.0	±30%	55	0.023	3,600	3,400	100
LCXND6060WHL4R7MMG	NRS6028T 4R7MMGV	4.7	±20%	39	0.031	2,700	3,000	100
LCXND6060WHL6R8MMG	NRS6028T 6R8MMGV	6.8	±20%	25	0.043	2,600	2,500	100
LCXND6060WHL100MMG	NRS6028T 100MMGV	10	±20%	20	0.065	1,900	1,900	100
LCXND6060WHL150MMG	NRS6028T 150MMGV	15	±20%	17	0.095	1,600	1,800	100
LCXND6060WHL220MMG	NRS6028T 220MMGV	22	±20%	12	0.135	1,300	1,400	100
LCXND6060WHL330MMG	NRS6028T 330MMGV	33	±20%	10	0.220	1,100	1,100	100
LCXND6060WHL470MMG	NRS6028T 470MMGV	47	±20%	8	0.300	1,000	920	100
LCXND6060WHL680MMG	NRS6028T 680MMGV	68	±20%	5	0.420	800	770	100
LCXND6060WHL101MMG	NRS6028T 101MMGV	100	±20%	3	0.600	650	660	100

● 6060YE type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXND6060YEL1R0NMG	NRS6045T 1R0NMGV	1.0	±30%	110	0.014	9,800	4,500	100
LCXND6060YEL1R3NMG	NRS6045T 1R3NMGV	1.3	±30%	95	0.016	8,200	4,200	100
LCXND6060YEL1R8NMG	NRS6045T 1R8NMGV	1.8	±30%	80	0.019	7,200	3,900	100
LCXND6060YEL2R3NMG	NRS6045T 2R3NMGV	2.3	±30%	60	0.022	6,400	3,600	100
LCXND6060YEL3R0NMG	NRS6045T 3R0NMGV	3.0	±30%	45	0.024	5,600	3,300	100
LCXND6060YEL4R5MMG	NRS6045T 4R5MMGV	4.5	±20%	25	0.030	4,400	3,100	100
LCXND6060YEL6R3MMG	NRS6045T 6R3MMGV	6.3	±20%	15	0.036	3,600	3,000	100
LCXND6060YEL100MMG	NRS6045T 100MMGV	10	±20%	12	0.046	3,100	2,400	100
LCXND6060YEL150MMG	NRS6045T 150MMGV	15	±20%	10	0.070	2,500	1,900	100
LCXND6060YEL220MMG	NRS6045T 220MMGV	22	±20%	7	0.107	2,000	1,600	100
LCXND6060YEL330MMG	NRS6045T 330MMGV	33	±20%	6	0.141	1,650	1,400	100
LCXND6060YEL470MMG	NRS6045T 470MMGV	47	±20%	5	0.211	1,400	1,150	100
LCXND6060YEL680MMG	NRS6045T 680MMGV	68	±20%	4	0.304	1,100	950	100
LCXND6060YEL101MMG	NRS6045T 101MMGV	100	±20%	3	0.466	900	750	100

● 8080XK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] (±30%)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNH8080XKL1R0NMG	NRS8030T 1R0NMGV	1.0	±30%	120	0.009	7,800	6,200	100
LCXNH8080XKL1R5NMG	NRS8030T 1R5NMGV	1.5	±30%	80	0.012	6,200	5,300	100
LCXNH8080XKL2R2NMG	NRS8030T 2R2NMGV	2.2	±30%	60	0.015	4,900	4,800	100
LCXNH8080XKL3R3NMG	NRS8030T 3R3NMGV	3.3	±20%	50	0.019	4,200	4,300	100
LCXNH8080XKL4R7MMG	NRS8030T 4R7MMGV	4.7	±20%	40	0.022	3,600	4,000	100
LCXNH8080XKL6R8MMG	NRS8030T 6R8MMGV	6.8	±20%	32	0.029	3,000	3,400	100
LCXNH8080XKL100MMG	NRS8030T 100MMGV	10	±20%	27	0.033	2,400	3,000	100
LCXNH8080XKL150MMG	NRS8030T 150MMGV	15	±20%	20	0.060	2,000	2,200	100
LCXNH8080XKL220MMG	NRS8030T 220MMGV	22	±20%	16	0.070	1,750	1,900	100
LCXNH8080XKL330MMG	NRS8030T 330MMGV	33	±20%	13	0.120	1,300	1,500	100
LCXNH8080XKL470MMG	NRS8030T 470MMGV	47	±20%	11	0.170	1,100	1,300	100

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

▶ 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/>).

PART NUMBER

8080YB/8080YK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	Self-resonant frequency [MHz] (min.)	DC Resistance [Ω] ($\pm 30\%$)	Rated current ※) [mA]		Measuring frequency [kHz]
						Saturation current Idc1	Temperature rise current Idc2	
LCXNH8080YBL0R9NJG	NRS8040T 0R9NJGJV	0.9	$\pm 30\%$	85	0.006	13,000	7,800	100
LCXNH8080YBL1R4NJG	NRS8040T 1R4NJGJV	1.4	$\pm 30\%$	63	0.007	10,000	7,000	100
LCXNH8080YBL2R0NJG	NRS8040T 2R0NJGJV	2.0	$\pm 30\%$	50	0.009	8,100	6,300	100
LCXNH8080YBL3R6NJG	NRS8040T 3R6NJGJV	3.6	$\pm 30\%$	34	0.015	6,400	4,900	100
LCXNH8080YBL4R7NJG	NRS8040T 4R7NJGJV	4.7	$\pm 30\%$	30	0.018	5,400	4,100	100
LCXNH8080YBL6R8NJG	NRS8040T 6R8NJGJV	6.8	$\pm 30\%$	24	0.025	4,400	3,700	100
LCXNH8080YKL100MJG	NRS8040T 100MJGJV	10	$\pm 20\%$	22	0.034	3,800	3,100	100
LCXNH8080YKL150MJG	NRS8040T 150MJGJV	15	$\pm 20\%$	16	0.050	2,900	2,400	100
LCXNH8080YKL220MJG	NRS8040T 220MJGJV	22	$\pm 20\%$	13	0.066	2,400	2,200	100
LCXNH8080YKL330MJG	NRS8040T 330MJGKV	33	$\pm 20\%$	12	0.100	2,000	1,700	100
LCXNH8080YKL470MJG	NRS8040T 470MJGKV	47	$\pm 20\%$	8	0.140	1,500	1,500	100
LCXNH8080YKL680MJG	NRS8040T 680MJGKV	68	$\pm 20\%$	7	0.210	1,300	1,200	100
LCXNH8080YKL101MJG	NRS8040T 101MJGKV	100	$\pm 20\%$	6	0.280	1,100	1,000	100

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

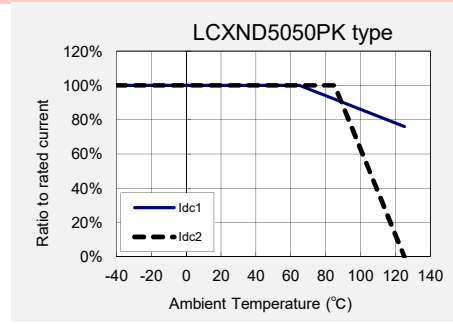
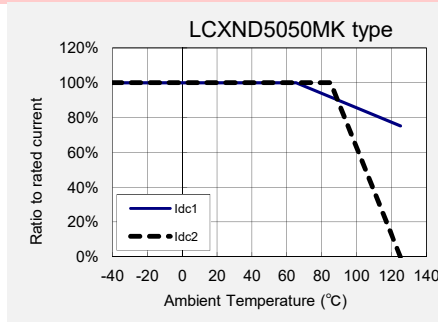
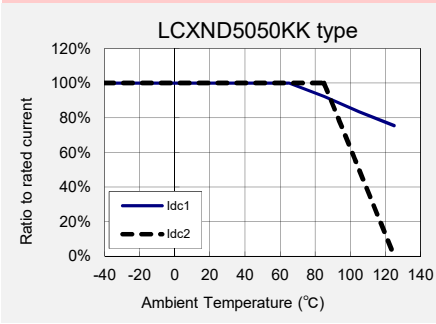
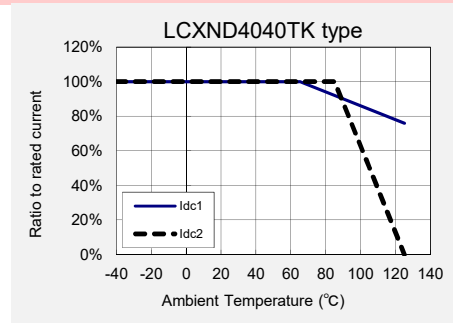
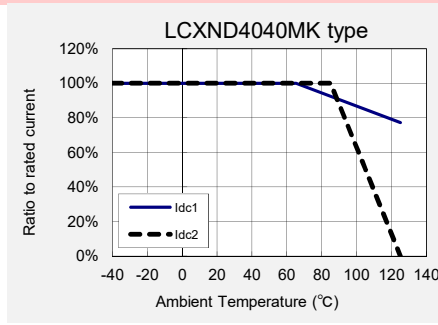
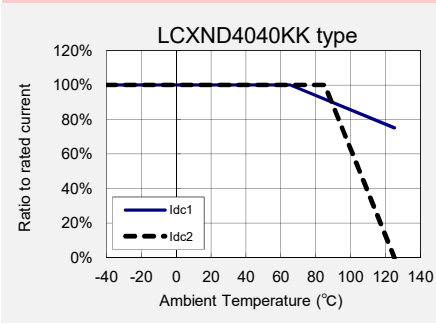
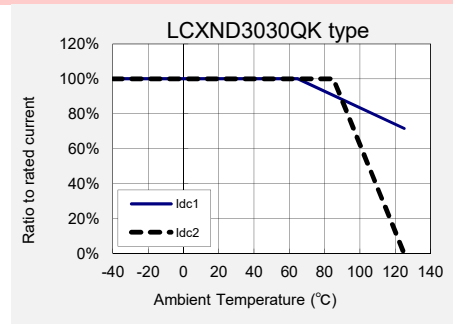
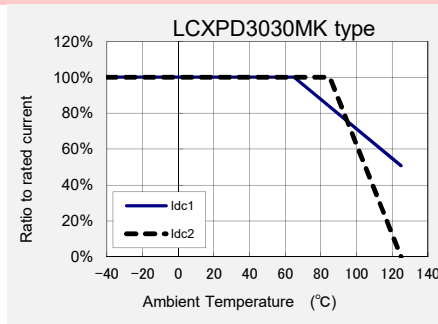
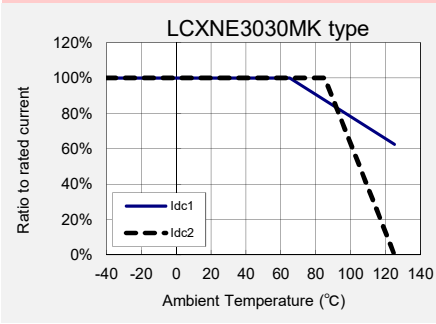
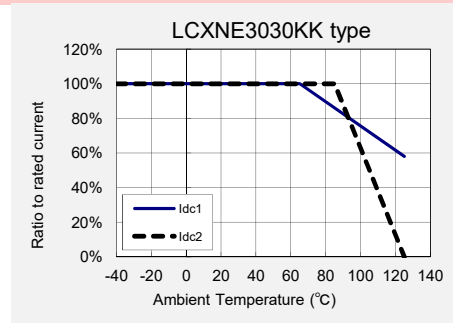
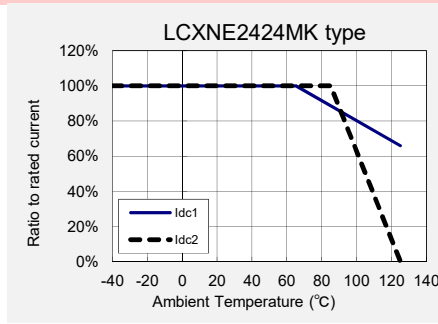
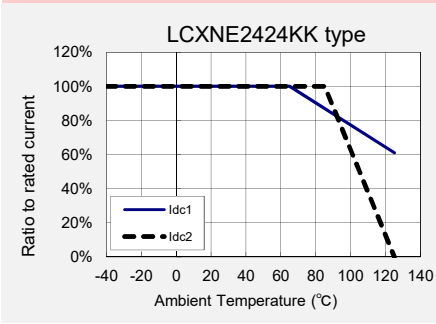
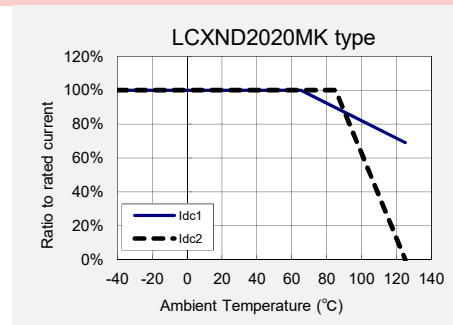
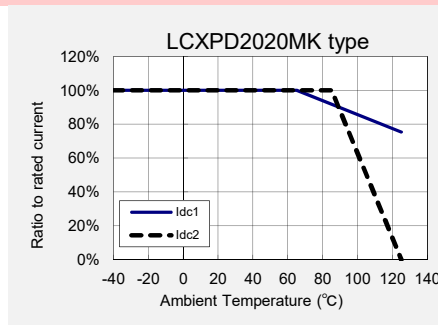
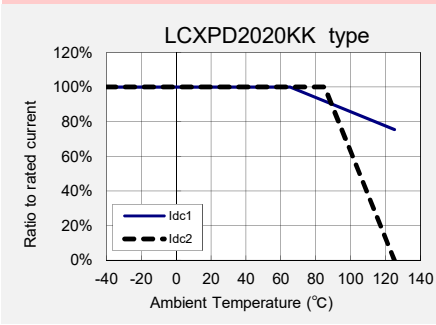
※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

Derating of Rated Current

LCXN/LCXP series

Derating of current is necessary for LCXN/LCXP series depending on ambient temperature. Please refer to the chart shown below for appropriate derating of current.

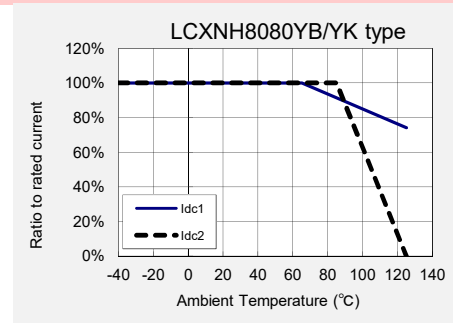
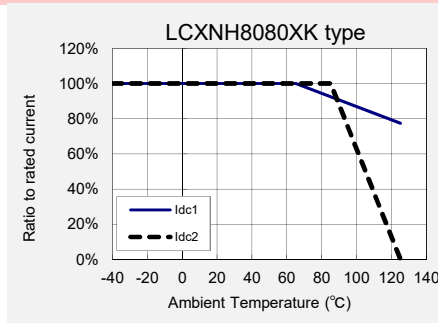
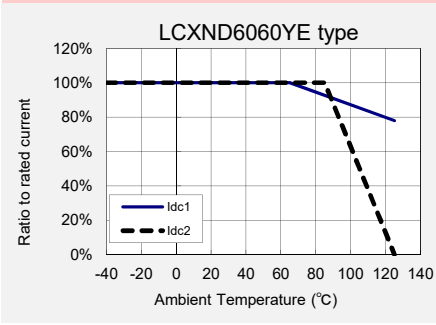
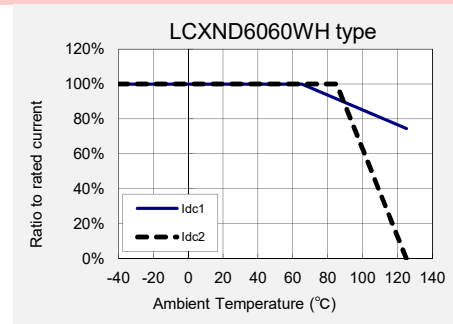
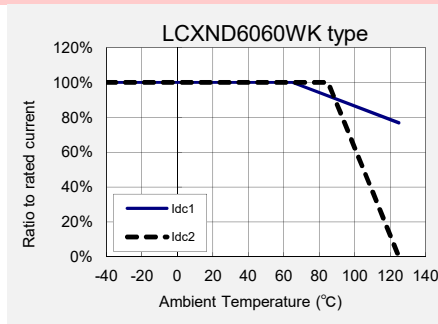
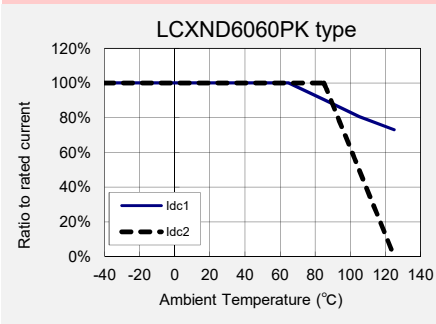
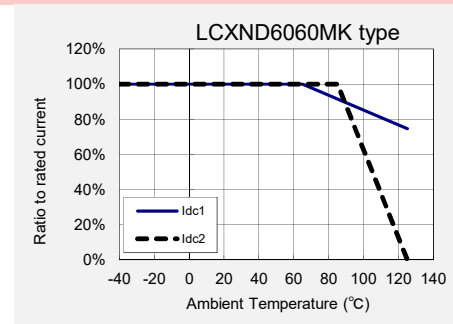
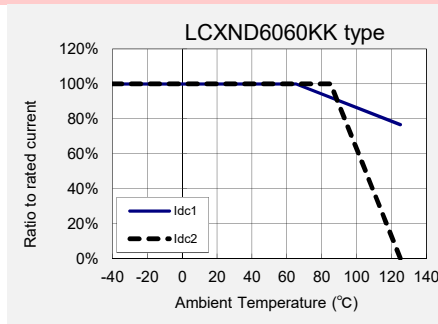
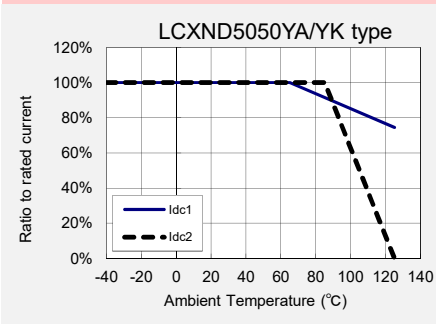
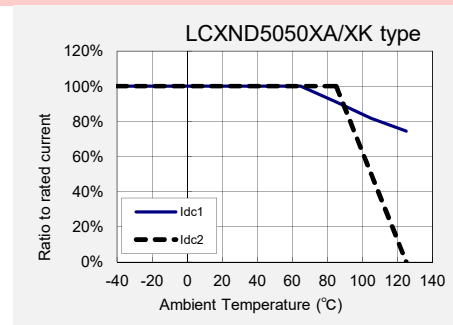
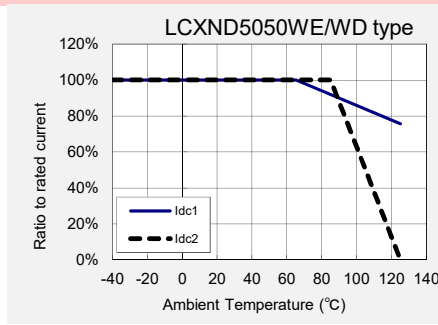
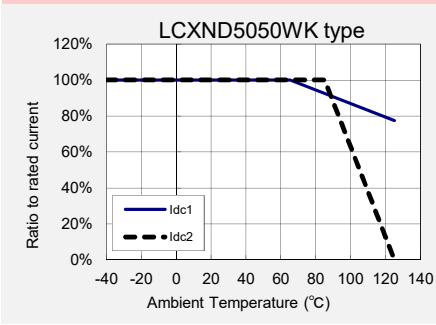


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Derating of Rated Current

LCXN/LCXP series

Derating of current is necessary for LCXN/LCXP series depending on ambient temperature. Please refer to the chart shown below for appropriate derating of current.



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Wire-wound Ferrite Power Inductors LSXN/LSXP/LCXN/LCXP/LBXN/LBXP/
 LLXN/LLXP/LMXN/LMXP series
 Wire-wound Ferrite Power Inductors LAXH/LCXH/LBXH/LMXH series
 Wire-wound Ferrite Inductors for Class D Amplifier LCXA

■ PACKAGING

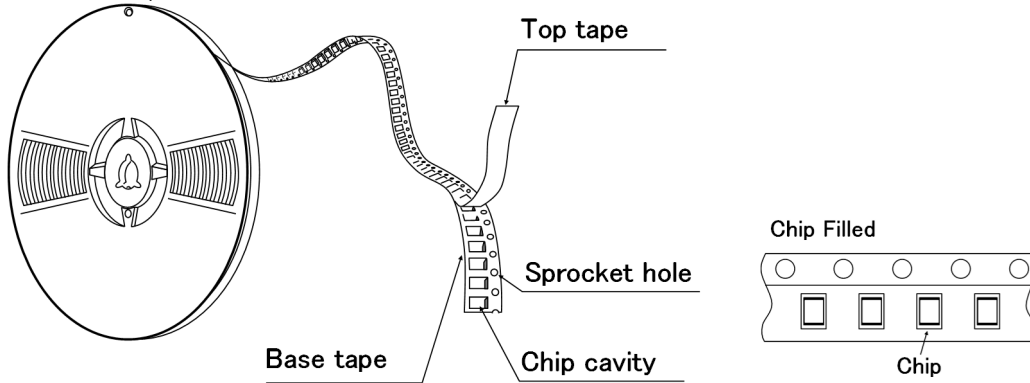
① Minimum Quantity

Type	Standard Quantity [pcs]
	Tape & Reel
2020KK	2500
2020MK	2500
2424KK	2500
2424MK	2500
3030KK	2000
3030MK	2000
3030QK	2000
4040KK	5000
4040MK	4500
4040TK	3500
4040WK	700

Type	Standard Quantity [pcs]
	Tape & Reel
5050KK	1000
5050MK	1000
5050PK	1000
5050WB	800
5050WK	800
5050WD	2500
5050WE	2500
5050XK	500
5050XA	500
5050YA	1500
5050YK	1500
6060KK	1000
6060MK	1000
6060PK	1000
6060WK	2500
6060WH	2000
6060XK	2000
6060YE	1500
8080XK	1000
8080YK	1000
8080YB	1000

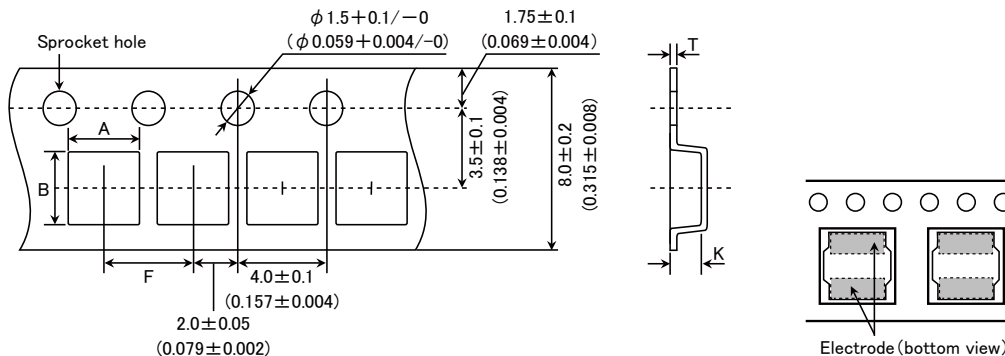
② Tape Material

● Embossed Tape



③ Taping dimensions

● Embossed tape 8mm wide (0.315 inches wide)

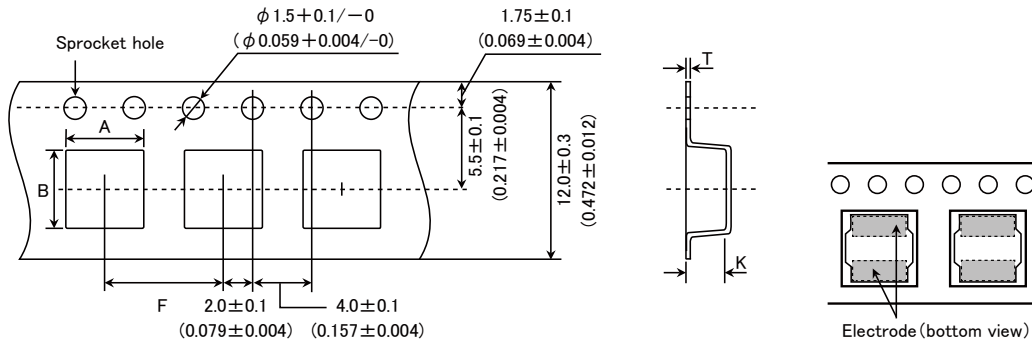


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Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B		T	K
2020KK 2020MK	2.2±0.1 (0.102±0.004)	2.2±0.1 (0.102±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
2424KK 2424MK	2.6±0.1 (0.087±0.004)	2.6±0.1 (0.102±0.004)		0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
3030KK	3.2±0.1 (0.126±0.004)	3.2±0.1 (0.126±0.004)		0.3±0.05 (0.012±0.002)	1.4±0.1 (0.055±0.004)
3030MK					1.6±0.1 (0.063±0.004)
3030QK					1.9±0.1 (0.075±0.004)

Unit: mm (inch)

● Embossed tape 12mm wide (0.47 inches wide)

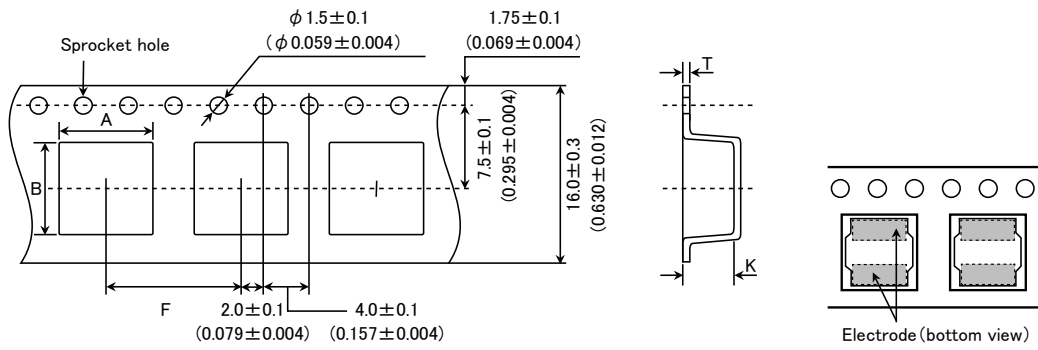


Type	Chip cavity		Insertion pitch	Tape thickness			
	A	B		T	K		
4040KK	4.3±0.1 (0.169±0.004)	4.3±0.1 (0.169±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.1 (0.012±0.004)	1.4±0.1 (0.055±0.004)		
4040MK					1.6±0.1 (0.063±0.004)		
4040TK 4040WK					2.1±0.1 (0.083±0.004)		
5050KK	5.25±0.1 (0.207±0.004)	5.25±0.1 (0.207±0.004)			1.4±0.1 (0.055±0.004)		
5050MK					1.4±0.1 (0.055±0.004)		
5050PK					1.6±0.1 (0.063±0.004)		
5050WB 5050WK					2.3±0.1 (0.091±0.004)		
5050WD 5050WE					2.7±0.1 (0.106±0.004)		
5050XK 5050XA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)			0.4±0.1 (0.016±0.004)	0.4±0.1 (0.016±0.004)	3.2±0.1 (0.126±0.004)
5050YK 5050YA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)					4.2±0.1 (0.165±0.004)
6060KK	6.3±0.1 (0.248±0.004)	6.3±0.1 (0.248±0.004)	1.4±0.1 (0.055±0.004)				
6060MK			1.6±0.1 (0.063±0.004)				
6060PK			1.6±0.1 (0.063±0.004)				
6060WK			2.3±0.1 (0.090±0.004)				
6060WH 6060XK			3.1±0.1 (0.122±0.004)				
6060YE			4.7±0.1 (0.185±0.004)				
			4.7±0.1 (0.185±0.004)				

Unit: mm (inch)

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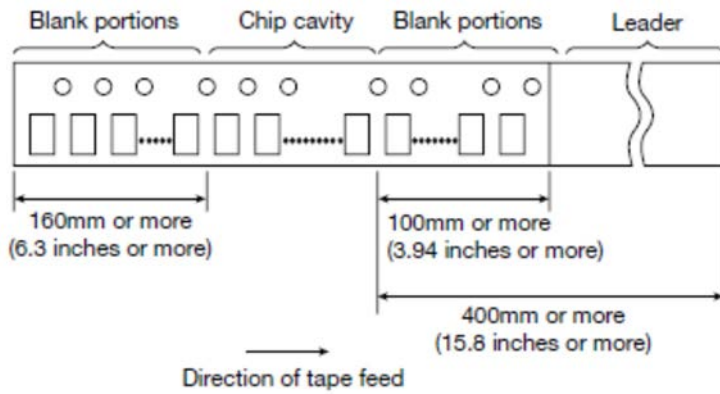
● Embossed tape 16mm wide (0.63 inches wide)



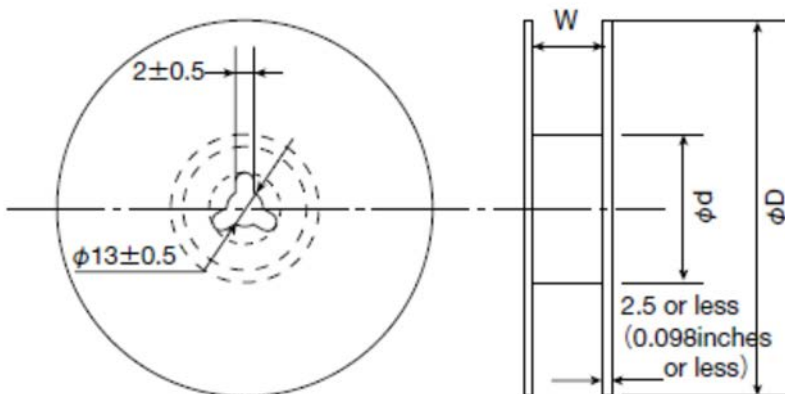
Type	Chip cavity		Insertion pitch F	Tape thickness	
	A	B		T	K
8080XK	8.3 ± 0.1 (0.327 ± 0.004)	8.3 ± 0.1 (0.327 ± 0.004)	12.0 ± 0.1 (0.472 ± 0.004)	0.5 ± 0.1 (0.020 ± 0.004)	3.4 ± 0.1 (0.134 ± 0.004)
8080YK					4.5 ± 0.1 (0.177 ± 0.004)
8080YB					4.5 ± 0.1 (0.177 ± 0.004)

Unit: mm (inch)

④ Leader and Blank portion



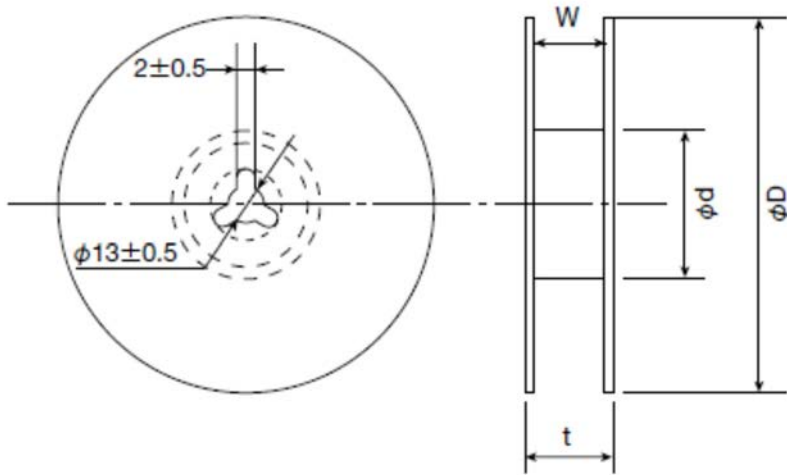
⑤ Reel size



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Type	Reel size (Reference values)		
	ϕD	ϕd	W
2020KK	180±0.5 (7.087±0.019)	60±1.0 (2.36±0.04)	10.0±1.5 (0.394±0.059)
2020MK			
2424KK			
2424MK			
3030KK			
3030MK			
3030QK			
4040WK	180±3.0 (7.087±0.118)	60±2.0 (2.36±0.08)	14.0±1.5 (0.551±0.059)
5050KK			
5050MK			
5050PK			
5050WB			
5050WK			
5050XK			
5050XA			
6060KK			
6060MK			
6060PK			

Unit: mm (inch)

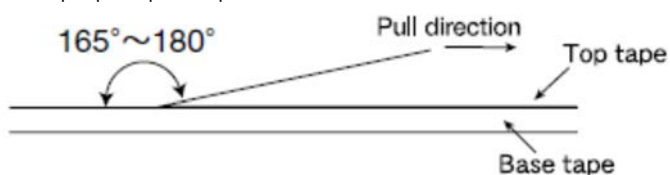


Type	Reel size (Reference values)			
	ϕD	ϕd	t (max.)	W
4040KK	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
4040MK				
4040TK				
5050WD				
5050WE				
5050YA				
5050YK				
6060WK				
6060WH				
6060XK				
6060YE				
8080XK			22.5 (0.89)	17.5±1.0 (0.689±0.04)
8080YK				
8080YB				
8080YB				

Unit: mm (inch)

⑥ Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



Wire-wound Ferrite Power Inductors LCXN/LCXP series

RELIABILITY DATA

1. Operating Temperature Range	
Specified Value	-40~+125°C (Including self-generated heat)
Test Methods and Remarks	Including self-generated heat
2. Storage Temperature Range	
Specified Value	-40~+85°C
Test Methods and Remarks	-5 to 40°C for the product with taping.
3. Rated current	
Specified Value	Within the specified tolerance
4. Inductance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 100kHz, 1V
5. DC Resistance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)
6. High Temperature Exposure (Storage)	
Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 hours at 85 deg C Unpowered
7. Temperature Cycling	
Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 cycles (-40 deg C to +85 deg C) 30 min. maximum dwell time at each temperature extreme. 1 min. maximum transition time.
8. Biased Humidity	
Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 hours, 85 deg C/85% RH. Unpowered
9. Operational Life	
Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 hours, 85 deg C Rated current

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10. Resistance to Solvents

Specified Value	Appearance : No significant abnormality in appearance.
Test Methods and Remarks	① Soak a test sample in isopropyl alcohol (IPA) at 25 ± 5 deg C for 3 to 3.5 minutes. ② Take the test sample out and brush 10 times using a brush soaked in IPA. ③ Repeat ① and ② twice more.

11. Mechanical Shock

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Apply 3 shocks in each direction along 3 mutually perpendicular axes of the test specimen (18 shocks in total). Peak value: 100g Duration: 6ms Test pulse: Half-sine Velocity change: 3.7m/s.

12. Vibration

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	5g's for 20 min., 12 cycles each of 3 orientations (36 cycles in total) Test from: 10 Hz to 2000 Hz

13. Resistance to Soldering Heat (Reflow)

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Reflow peak temperature: 260 ± 5 deg C Duration time: 10 ± 1 sec. Measure after inductors are kept at room temperature for 24 ± 4 hours.

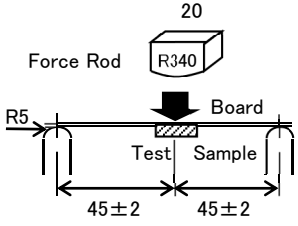
14. ESD

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Per AEC-Q200-002

15. Solderability

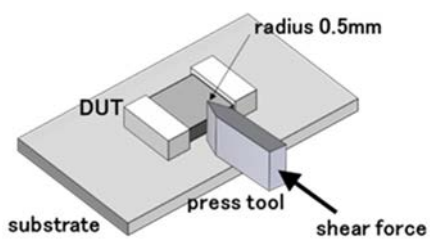
Specified Value	More than 90% of terminal electrode shall be covered with fresh solder.
Test Methods and Remarks	Per J-STD-002 a) Method B Solder at 235 ± 5 deg C for 5 sec. c) Method D Solder at 260 ± 5 deg C for 30 sec.

16. Board Flex

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Solder the test samples to the test boards by the reflow soldering. Apply a force in a downward direction until amount of deflection reaches 2mm. The 2-mm deflection shall be held for 60 sec. Test board dimensions: 100mm × 40mm × 1.6mm. 

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17. Terminal Strength (SMD)

Specified Value	Appearance : No significant abnormality in appearance.
Test Methods and Remarks	Apply a force of 17.7N for 60±5 sec. 

18. Standard condition

Specified Value	Standard test condition : Unless otherwise specified, temperature is 20±15°C and 65±20% of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2°C of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value.
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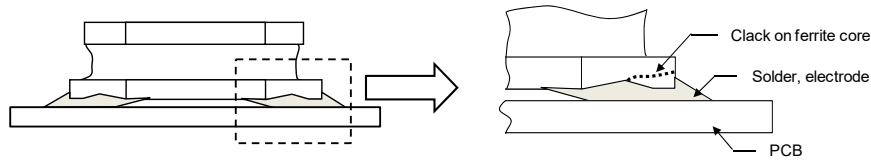
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Wire-wound Ferrite Power Inductors LAYP series for Automotive Powertrain and safety
 Wire-wound Ferrite Power Inductors LAXH series for Automotive Powertrain and safety
 Wire-wound Ferrite Power Inductors LCXN/LCXP series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LCXH series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Inductors for Class D Amplifier LCXA for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LBXN/LBXP series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LBXH series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LBRN series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LMXN/LMXP series
 for Medical Devices classified as GHTF Class C (Japan Class III)
 Wire-wound Ferrite Power Inductors LMXH series
 for Medical Devices classified as GHTF Class C (Japan Class III)
 Wire-wound Ferrite Power Inductors LMRN series
 for Medical Devices classified as GHTF Class C (Japan Class III)

■ PRECAUTIONS

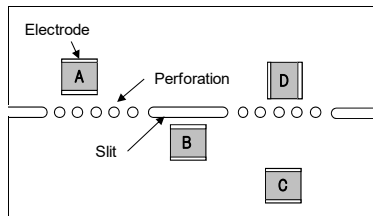
1. Circuit Design	
Precautions	<ul style="list-style-type: none"> ◆ Verification of operating environment, electrical rating and performance <ol style="list-style-type: none"> 1. A malfunction in medical equipment, spacecraft, nuclear reactors, etc. may cause serious harm to human life or have severe social ramifications. As such, any inductors to be used in such equipment may require higher safety and/or reliability considerations and should be clearly differentiated from components used in general purpose applications. 2. When inductors are used in places where dew condensation develops and/or where corrosive gas such as hydrogen sulfide, sulfurous acid, or chlorine exists in the air, characteristic deterioration may occur. Please do not use inductors under such environmental conditions. ◆ Operating Current (Verification of Rated current) <ol style="list-style-type: none"> 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. ◆ Temperature rise <p>Temperature rise of power choke coil depends on the installation condition in end products. Make sure that temperature rise of power choke coils in actual end products is within the specified temperature range.</p>
2. PCB Design	
Precautions	<ul style="list-style-type: none"> ◆ Land pattern design <ol style="list-style-type: none"> 1. Please refer to a recommended land pattern. 2. There is stress, which has been caused by distortion of a PCB, to the inductor. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 3. Please consider the arrangement of parts on a PCB. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)
Technical considerations	<ul style="list-style-type: none"> ◆ Land pattern design <p>Surface Mounting</p> <ol style="list-style-type: none"> 1. Mounting and soldering conditions should be checked beforehand. 2. Applicable soldering process to this products is reflow soldering only. 3. Please use the recommended land pattern shown as below. Electrical characteristics and the mounting ability of the product are being considered in the recommended land pattern. If a PCB is designed with other dimensions, defective soldering and stress to a product may occur due to misalignment. The performance of the product may not be brought out. If an adopted land pattern is different from the recommended land pattern, stress to the product will increase. It may cause cracks or defective electrical characteristics of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 4. As coefficients of thermal expansion between an inductor and a PCB differs, cracks may occur on a ferrite core when thermal stress is applied to them after mounting an inductor. (Please refer to the drawings below.) Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)

▶ 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/>)



5. SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection. 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.

(LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



A product tends to undergo stress in order "A>C>B≡D". Please consider the layouts of a product to minimize any stresses.

3. Considerations for automatic placement

Precautions	<ul style="list-style-type: none"> ◆ 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	<ul style="list-style-type: none"> ◆ Adjustment of mounting machine 1. When installing products, care should be taken not to apply distortion stress as it may deform the products. 2. Stress may be applied to a product with a warp or a twist in handling of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. <p>(LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><Wrap></p> </div> <div style="text-align: center;"> <p><Twist></p> </div> </div>

4. Soldering

Precautions	<ul style="list-style-type: none"> ◆ 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 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(Repair) <ul style="list-style-type: none"> • 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.
Technical considerations	<ul style="list-style-type: none"> ◆ 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. <p>Recommended reflow condition (Pb free solder) <u>LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP,</u> <u>LCXH/LCXA/LBXH/LMXH, LCRN/LBRN/LMRN</u></p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div>

▶ 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/>)

5. Cleaning	
Precautions	<ul style="list-style-type: none"> ◆ Cleaning conditions 1. Washing by supersonic waves shall be avoided.
Technical considerations	<ul style="list-style-type: none"> ◆ Cleaning conditions 1. If washed by supersonic waves, the products might be broken.
6. Handling	
Precautions	<ul style="list-style-type: none"> ◆ 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.
Technical considerations	<ul style="list-style-type: none"> ◆ 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. ◆ 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	<ul style="list-style-type: none"> ◆ 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. <ul style="list-style-type: none"> ▪ Storage conditions Ambient temperature : $-5\sim 40^{\circ}\text{C}$ Humidity : Below 70% RH ▪ The recommended ambient temperature is 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	<ul style="list-style-type: none"> ◆ 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.

车载(车身系 / 情报系)用途 绕线型铁氧体系功率电感器 LCXH 系列

系列前的记号来自型号, 用来区分产品的种类和特性等。

AEC-Q200 Grade 2 (已完成 Grade 2 条件下的评价测试。)

*使用环境温度: -40~105°C

回流焊

AEC-Q200

■ 型号标示法

*使用温度范围 : -40~125°C (包含产品本身发热)

L	C	X	H	F	6	0	6	0	Y	E	L	1	0	0	M	M	R
①	②	③	④	⑤	⑥	⑦	⑧										

① 系列

代码 (1)(2)(3)(4)	
LCXH	车载(车身系 / 情报系)用途 绕线型铁氧体系功率电感器

(1) 产品群

代码	
L	电感器

(2) 范畴

代码	推荐设备	品质等级
C	汽车用电子设备(车身系 / 情报系)	2

② 特征

代码	特征
F	底面电极(银×焊料)对应充填物

③ 尺寸(L×W)

代码	尺寸(L×W) [mm]
3030	3.0×3.0
4040	4.0×4.0
5050	5.0×5.0
6060	6.0×6.0

④ 尺寸(H)

代码	尺寸(H) [mm]
QK	1.5
WK	2.0
WB	2.2
XK	3.0
XA	3.1
YE	4.5

(3) 类型

代码	
X	绕线型铁氧体系 鼓型

(4) 特效 / 特性

代码	
H	混合功率扼流

⑤ 包装

代码	包装
T	卷盘带装
L	卷盘带装

⑥ 标称电感值

代码(例)	标称电感值 [μH]
2R2	2.2
100	10
101	100

※R=小数点

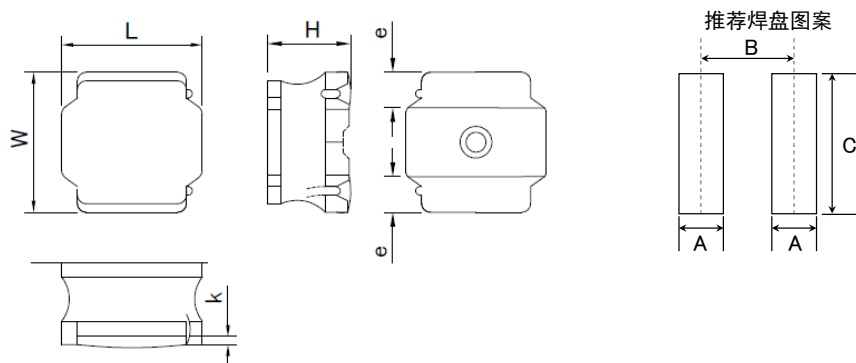
⑦ 电感量公差

代码	电感量公差
M	±20%
N	±30%

⑧ 管理记号

▶ 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/>)。

■标准外型尺寸 / 标准数量

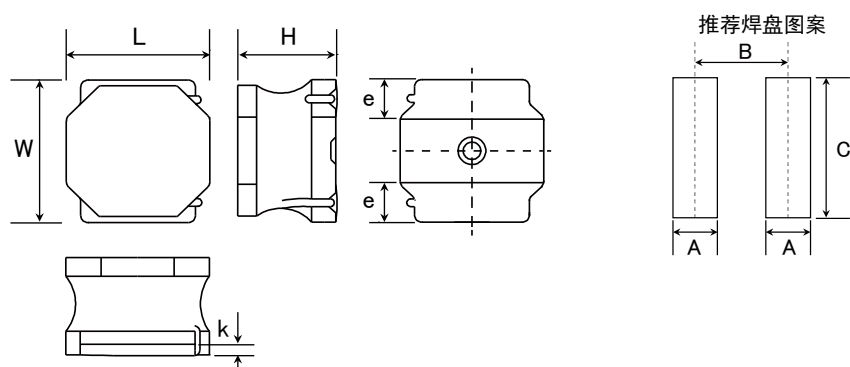


Type	A	B	C
3030	1.3	2.3	2.7
4040	1.5	3.3	3.5
5050	1.9	4.2	3.8
6060	2.4	5.0	4.8

单位: mm

Type	L	W	H	e	k(参考值)	标准数量[pcs] 卷盘带装
3030QK	3.0±0.2 (0.118±0.008)	3.0±0.2 (0.118±0.008)	1.5 max (0.059 max)	0.8±0.3 (0.031±0.012)	0.1 min (0.004 min)	2000
4040WK	4.0±0.2 (0.158±0.008)	4.0±0.2 (0.158±0.008)	2.0 max (0.079 max)	1.0±0.3 (0.039±0.012)	0.1 min (0.004 min)	700
5050WB	5.0±0.2 (0.197±0.008)	5.0±0.2 (0.197±0.008)	2.2 max (0.088 max)	1.3±0.3 (0.051±0.012)	0.2 min (0.008 min)	800
5050XA	5.0±0.2 (0.197±0.008)	5.0±0.2 (0.197±0.008)	3.1 max (0.122 max)	1.3±0.3 (0.051±0.012)	0.2 min (0.008 min)	500
6060XK	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	3.0 max (0.118 max)	1.65±0.3 (0.053±0.012)	0.3 min (0.012 min)	2000

单位: mm(inch)



Type	A	B	C
6060	2.4	5.0	4.8

单位: mm

Type	L	W	H	e	k(参考值)	标准数量[pcs] 卷盘带装
6060YE	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	4.5 max (0.177 max)	1.65±0.3 (0.053±0.012)	0.3 min (0.012 min)	1500

单位: mm(inch)

■ PART NUMBER

• All the Wire-wound Ferrite Power Inductors of the catalog lineup are RoHS compliant.

Notes)

- The exchange of individual specifications is necessary depending on your application and/or circuit condition. Please contact TAIYO YUDEN's official sales channel.
- For Automotive (AEC-Q200 Qualified) products for BODY & CHASSIS, and INFOTAINMENT. Please check "Automotive Application Guide" for further details before using the products.

< AEC-Q200 : AEC-Q200 qualified >

All the Wire-wound Ferrite Power Inductors for Automotive products are tested based on the test conditions and methods defined in AEC-Q200 by family item.

Please consult with TAIYO YUDEN's official sales channel for the details of the product specifications and AEC-Q200 test results, etc., and please review and approve the product specifications before ordering.

● 3030QK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [mΩ] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF3030QKT47MNR	NRM3015T R47MNRSV	0.47	±20%	23 (18)	3.10 (4.50)	2.20 (2.60)	4.00 (4.55)	0.1
LCXHF3030QKT1R0MNR	NRM3015T 1R0MNRSV	1	±20%	33 (28)	2.30 (3.20)	1.70 (2.10)	3.20 (3.60)	0.1
LCXHF3030QKT1R5MNR	NRM3015T 1R5MNRSV	1.5	±20%	46 (38)	1.80 (2.25)	1.60 (2.00)	2.60 (2.95)	0.1
LCXHF3030QKT2R2MNR	NRM3015T 2R2MNRSV	2.2	±20%	72 (60)	1.50 (1.90)	1.40 (1.80)	2.30 (2.60)	0.1
LCXHF3030QKT3R3MNR	NRM3015T 3R3MNRSV	3.3	±20%	96 (80)	1.20 (1.63)	1.20 (1.60)	1.90 (2.20)	0.1
LCXHF3030QKT4R7MNR	NRM3015T 4R7MNRSV	4.7	±20%	120 (100)	1.00 (1.40)	1.00 (1.40)	1.70 (1.90)	0.1
LCXHF3030QKT6R8MNR	NRM3015T 6R8MNRSV	6.8	±20%	168 (140)	0.90 (1.15)	0.85 (1.20)	1.40 (1.60)	0.1
LCXHF3030QKT100MNR	NRM3015T 100MNRSV	10	±20%	228 (190)	0.76 (0.91)	0.75 (1.00)	1.24 (1.40)	0.1
LCXHF3030QKT220MNR	NRM3015T 220MNRSV	22	±20%	504 (420)	0.51 (0.66)	0.53 (0.70)	0.85 (0.95)	0.1
LCXHF3030QKT470MNR	NRM3015T 470MNRSV	47	±20%	980 (820)	0.29 (0.39)	0.38 (0.50)	0.60 (0.65)	0.1
LCXHF3030QKT101MNR	NRM3015T 101MNRSV	100	±20%	2028 (1690)	0.21 (0.27)	0.24 (0.33)	0.40 (0.45)	0.1

● 4040WK type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [mΩ] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF4040WKT1R0MNR	NRM4020T 1R0MNRV	1	±20%	31 (26)	4.60 (5.30)	2.43 (3.36)	3.66 (4.15)	0.1
LCXHF4040WKT2R2MNR	NRM4020T 2R2MNRV	2.2	±20%	52 (43)	3.00 (3.40)	1.91 (2.65)	3.00 (3.37)	0.1
LCXHF4040WKT4R7MNR	NRM4020T 4R7MNRV	4.7	±20%	84 (70)	2.00 (2.40)	1.50 (2.08)	2.27 (2.60)	0.1
LCXHF4040WKT100MNR	NRM4020T 100MNRV	10	±20%	156 (130)	1.50 (1.70)	1.05 (1.45)	1.63 (1.85)	0.1
LCXHF4040WKT220MNR	NRM4020T 220MNRV	22	±20%	360 (300)	1.00 (1.20)	0.71 (0.99)	1.09 (1.25)	0.1
LCXHF4040WKT470MNR	NRM4020T 470MNRV	47	±20%	660 (550)	0.70 (0.80)	0.53 (0.73)	0.80 (0.85)	0.1
LCXHF4040WKT101MNR	NRM4020T 101MNRV	100	±20%	1512 (1260)	0.46 (0.57)	0.34 (0.48)	0.53 (0.56)	0.1
LCXHF4040WKT221MNR	NRM4020T 221MNRV	220	±20%	3360 (2800)	0.33 (0.37)	0.23 (0.32)	0.36 (0.375)	0.1

● 5050WB type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [mΩ] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF5050WBT47MNR	NRM5020T R47MNRV	0.47	±30%	14.4 (12)	6.60 (7.40)	3.60 (5.00)	6.00 (6.80)	0.1
LCXHF5050WBT1R0MNR	NRM5020T 1R0MNRV	1	±30%	24 (20)	5.00 (5.50)	2.60 (3.60)	4.40 (4.90)	0.1
LCXHF5050WBT1R5MNR	NRM5020T 1R5MNRV	1.5	±30%	32 (27)	4.00 (4.50)	2.40 (3.30)	4.00 (4.50)	0.1
LCXHF5050WBT2R2MNR	NRM5020T 2R2MNRV	2.2	±30%	36 (30)	3.20 (3.60)	2.10 (2.90)	3.50 (4.00)	0.1
LCXHF5050WBT3R3MNR	NRM5020T 3R3MNRV	3.3	±30%	49 (42)	2.50 (2.90)	1.90 (2.60)	3.10 (3.60)	0.1
LCXHF5050WBT4R7MNR	NRM5020T 4R7MNRV	4.7	±20%	69.6 (58)	2.10 (2.40)	1.50 (2.10)	2.60 (2.90)	0.1
LCXHF5050WBT100MNR	NRM5020T 100MNRV	10	±20%	127.2 (106)	1.50 (1.70)	1.10 (1.50)	1.80 (2.00)	0.1
LCXHF5050WBT220MNR	NRM5020T 220MNRV	22	±20%	280 (230)	1.10 (1.20)	0.80 (1.10)	1.30 (1.50)	0.1
LCXHF5050WBT470MNR	NRM5020T 470MNRV	47	±20%	520 (435)	0.73 (0.81)	0.58 (0.80)	0.97 (1.00)	0.1
LCXHF5050WBT101MNR	NRM5020T 101MNRV	100	±20%	1020 (850)	0.50 (0.56)	0.42 (0.58)	0.69 (0.78)	0.1

● 5050XA type

New part number	Old part number (for reference)	Nominal inductance [μH]	Inductance tolerance	DC Resistance [mΩ] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF5050XAT47MNR	NRM5030T R47MNRV	0.47	±30%	13 (10)	11.00 (12.00)	4.10 (5.50)	6.80 (7.70)	0.1
LCXHF5050XAT1R0MNR	NRM5030T 1R0MNRV	1	±30%	18.5 (14)	7.50 (8.00)	3.10 (4.30)	5.10 (5.80)	0.1
LCXHF5050XAT1R5MNR	NRM5030T 1R5MNRV	1.5	±30%	21.6 (18)	6.30 (6.80)	2.80 (3.70)	4.50 (5.10)	0.1
LCXHF5050XAT2R2MNR	NRM5030T 2R2MNRV	2.2	±30%	29 (24)	5.10 (5.60)	2.50 (3.40)	4.00 (4.60)	0.1
LCXHF5050XAT3R3MNR	NRM5030T 3R3MNRV	3.3	±30%	37 (32)	4.30 (4.80)	2.10 (2.90)	3.50 (3.90)	0.1
LCXHF5050XAT4R7MNR	NRM5030T 4R7MNRV	4.7	±20%	52 (43)	3.50 (3.90)	1.90 (2.50)	3.00 (3.40)	0.1
LCXHF5050XAT6R8MNR	NRM5030T 6R8MNRV	6.8	±20%	78 (65)	3.00 (3.40)	1.35 (1.95)	2.25 (2.50)	0.1
LCXHF5050XAT100MNR	NRM5030T 100MNRV	10	±20%	115 (96)	2.50 (2.75)	1.10 (1.60)	1.90 (2.10)	0.1
LCXHF5050XAT220MNR	NRM5030T 220MNRV	22	±20%	228 (190)	1.70 (1.90)	0.80 (1.10)	1.30 (1.50)	0.1
LCXHF5050XAT470MNR	NRM5030T 470MNRV	47	±20%	360 (300)	1.00 (1.00)	0.60 (0.85)	1.00 (1.20)	0.1
LCXHF5050XAT101MNR	NRM5030T 101MNRV	100	±20%	733 (611)	0.55 (0.60)	0.45 (0.60)	0.70 (0.80)	0.1
LCXHF5050XAT221MNR	NRM5030T 221MNRV	220	±20%	1692 (1412)	0.38 (0.41)	0.28 (0.38)	0.46 (0.53)	0.1
LCXHF5050XAT471MNR	NRM5030T 471MNRV	470	±20%	3672 (3060)	0.25 (0.28)	0.17 (0.24)	0.30 (0.35)	0.1

- ※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)
- ※) The temperature rise current value (Idc2)① is the DC current value having temperature increase up to 20°C. (at 20°C)
- ※) The temperature rise current value (Idc2)② is the DC current value having temperature increase up to 40°C. (at 20°C)
- ※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

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PART NUMBER

6060XK type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [m Ω] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF6060XKL1R0NMR	NRM6030T 1R0NMRPV	1	\pm 30%	17 (14)	7.50 (8.10)	3.40 (4.90)	5.80 (6.60)	0.1
LCXHF6060XKL2R2NMR	NRM6030T 2R2NMRPV	2.2	\pm 30%	24 (20)	4.80 (6.00)	2.90 (4.00)	4.70 (5.40)	0.1
LCXHF6060XKL4R7MMR	NRM6030T 4R7MMRRV	4.7	\pm 20%	36 (30)	3.30 (3.80)	2.30 (3.30)	3.80 (4.40)	0.1
LCXHF6060XKL100MMR	NRM6030T 100MMRRV	10	\pm 20%	72 (60)	2.20 (2.60)	1.60 (2.25)	2.70 (3.10)	0.1
LCXHF6060XKL220MMR	NRM6030T 220MMRRV	22	\pm 20%	150 (125)	1.50 (1.80)	1.10 (1.60)	1.90 (2.20)	0.1
LCXHF6060XKL470MMR	NRM6030T 470MMRRV	47	\pm 20%	320 (270)	1.00 (1.20)	0.76 (1.10)	1.27 (1.48)	0.1
LCXHF6060XKL101MMR	NRM6030T 101MMRRV	100	\pm 20%	660 (550)	0.73 (0.85)	0.53 (0.74)	0.88 (0.99)	0.1

6060YE type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [m Ω] Max (Typ)	Rated current ※) [A]			Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current① Idc2 Max (Typ)	Temperature rise current② Idc2 Max (Typ)	
LCXHF6060YEL1R0NMR	NRM6045T 1R0NMRRV	1	\pm 30%	13 (10)	13.50 (14.50)	4.00 (6.00)	6.20 (7.00)	0.1
LCXHF6060YEL1R5NMR	NRM6045T 1R5NMRRV	1.5	\pm 30%	19 (14)	10.00 (11.00)	3.40 (4.70)	5.50 (6.40)	0.1
LCXHF6060YEL2R2NMR	NRM6045T 2R2NMRRV	2.2	\pm 30%	23 (18)	8.50 (9.50)	3.00 (4.00)	4.40 (5.10)	0.1
LCXHF6060YEL3R3MMR	NRM6045T 3R3MMRSV	3.3	\pm 20%	27.6(23)	7.00 (7.50)	2.50 (3.50)	4.00 (4.50)	0.1
LCXHF6060YEL4R7MMR	NRM6045T 4R7MMRRV	4.7	\pm 20%	36 (30)	6.00 (6.50)	2.20 (3.00)	3.60 (3.90)	0.1
LCXHF6060YEL6R8MMR	NRM6045T 6R8MMRRV	6.8	\pm 20%	52 (43)	5.10 (5.60)	1.90 (2.60)	3.10 (3.50)	0.1
LCXHF6060YEL100MMR	NRM6045T 100MMRSV	10	\pm 20%	60 (50)	4.00 (4.40)	1.80 (2.40)	2.60 (3.20)	0.1
LCXHF6060YEL150MMR	NRM6045T 150MMRRV	15	\pm 20%	105 (87)	3.10 (3.50)	1.40 (1.80)	2.15 (2.45)	0.1
LCXHF6060YEL220MMR	NRM6045T 220MMRRV	22	\pm 20%	132 (110)	2.50 (3.00)	1.20 (1.60)	1.80 (2.00)	0.1
LCXHF6060YEL330MMR	NRM6045T 330MMRRV	33	\pm 20%	216 (180)	1.75 (1.95)	0.75 (0.95)	1.25 (1.35)	0.1
LCXHF6060YEL470MMR	NRM6045T 470MMRRV	47	\pm 20%	272 (227)	1.55 (1.70)	0.70 (0.90)	1.20 (1.30)	0.1
LCXHF6060YEL680MMR	NRM6045T 680MMRRV	68	\pm 20%	385 (320)	1.20 (1.30)	0.65 (0.85)	1.05 (1.20)	0.1
LCXHF6060YEL101MMR	NRM6045T 101MMRRV	100	\pm 20%	600 (475)	1.05 (1.15)	0.55 (0.70)	0.85 (0.95)	0.1
LCXHF6060YEL151MMR	NRM6045T 151MMRRV	150	\pm 20%	816 (680)	0.83 (0.90)	0.48 (0.65)	0.76 (0.85)	0.1
LCXHF6060YEL221MMR	NRM6045T 221MMRRV	220	\pm 20%	1320 (1100)	0.70 (0.75)	0.35 (0.50)	0.57 (0.65)	0.1
LCXHF6060YEL331MMR	NRM6045T 331MMRRV	330	\pm 20%	1872 (1580)	0.55 (0.60)	0.29 (0.39)	0.45 (0.54)	0.1
LCXHF6060YEL471MMR	NRM6045T 471MMRRV	470	\pm 20%	2760 (2300)	0.45 (0.50)	0.22 (0.30)	0.38 (0.45)	0.1

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2①) is the DC current value having temperature increase up to 20°C. (at 20°C)

※) The temperature rise current value (Idc2②) is the DC current value having temperature increase up to 40°C. (at 20°C)

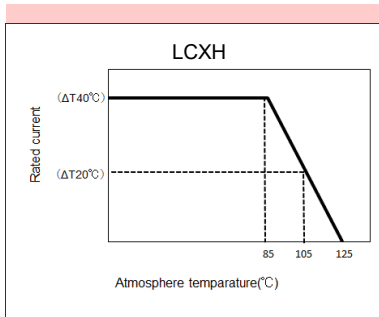
※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

Derating of Rated Current

LCXH series

Derating of current is necessary for LCXH series depending on ambient temperature.

Please refer to the chart shown below for appropriate derating of current.



▶ 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/>）。

Wire-wound Ferrite Power Inductors LSXN/LSXP/LCXN/LCXP/LBXN/LBXP/
 LLXN/LLXP/LMXN/LMXP series
 Wire-wound Ferrite Power Inductors LAXH/LCXH/LBXH/LMXH series
 Wire-wound Ferrite Inductors for Class D Amplifier LCXA

■ PACKAGING

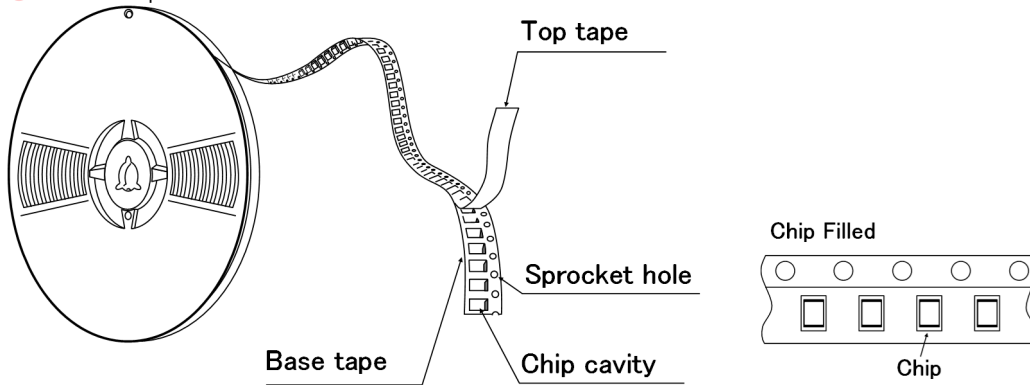
① Minimum Quantity

Type	Standard Quantity [pcs]
	Tape & Reel
2020KK	2500
2020MK	2500
2424KK	2500
2424MK	2500
3030KK	2000
3030MK	2000
3030QK	2000
4040KK	5000
4040MK	4500
4040TK	3500
4040WK	700

Type	Standard Quantity [pcs]
	Tape & Reel
5050KK	1000
5050MK	1000
5050PK	1000
5050WB	800
5050WK	800
5050WD	2500
5050WE	2500
5050XK	500
5050XA	500
5050YA	1500
5050YK	1500
6060KK	1000
6060MK	1000
6060PK	1000
6060WK	2500
6060WH	2000
6060XK	2000
6060YE	1500
8080XK	1000
8080YK	1000
8080YB	1000

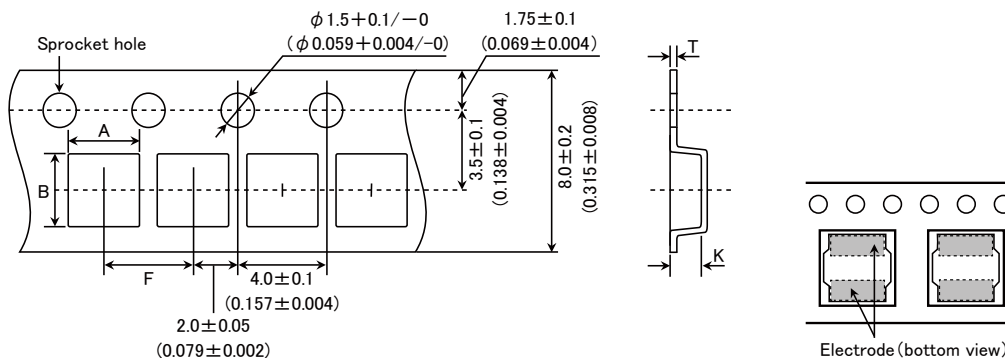
② Tape Material

● Embossed Tape



③ Taping dimensions

● Embossed tape 8mm wide (0.315 inches wide)

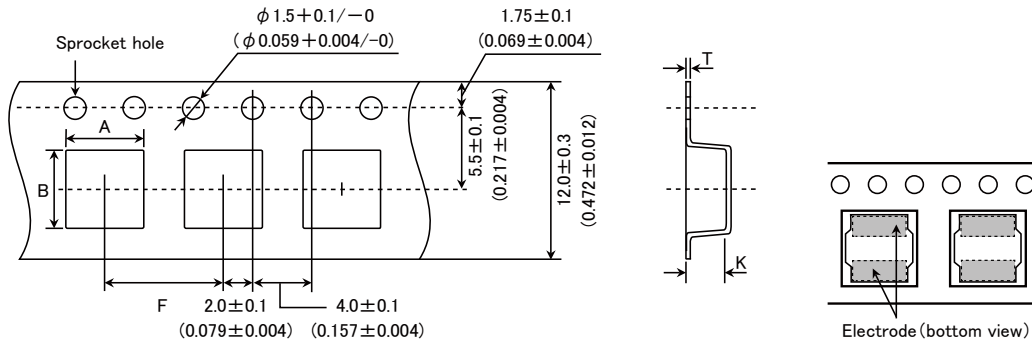


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Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B		T	K
2020KK 2020MK	2.2±0.1 (0.102±0.004)	2.2±0.1 (0.102±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
2424KK 2424MK	2.6±0.1 (0.087±0.004)	2.6±0.1 (0.102±0.004)		0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
3030KK	3.2±0.1 (0.126±0.004)	3.2±0.1 (0.126±0.004)		0.3±0.05 (0.012±0.002)	1.4±0.1 (0.055±0.004)
3030MK					1.6±0.1 (0.063±0.004)
3030QK					1.9±0.1 (0.075±0.004)

Unit: mm (inch)

● Embossed tape 12mm wide (0.47 inches wide)

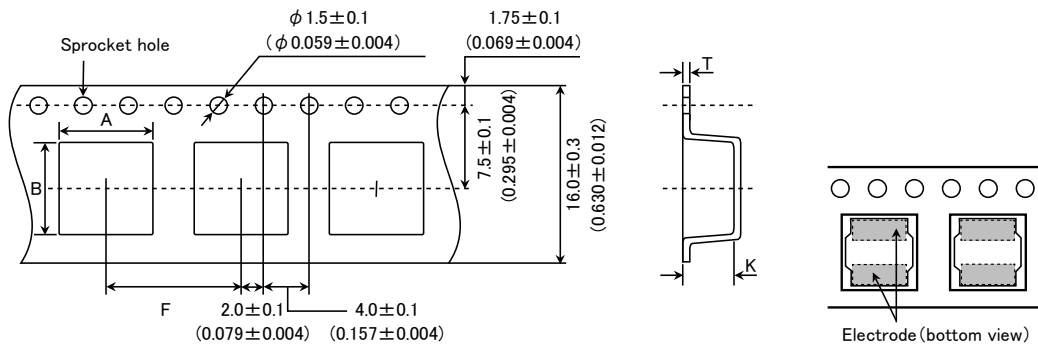


Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B		T	K
4040KK	4.3±0.1 (0.169±0.004)	4.3±0.1 (0.169±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.1 (0.012±0.004)	1.4±0.1 (0.055±0.004)
4040MK					1.6±0.1 (0.063±0.004)
4040TK 4040WK					2.1±0.1 (0.083±0.004)
5050KK	1.4±0.1 (0.055±0.004)				
5050MK	1.4±0.1 (0.055±0.004)				
5050PK	1.6±0.1 (0.063±0.004)				
5050WB 5050WK	2.3±0.1 (0.091±0.004)				
5050WD 5050WE	2.7±0.1 (0.106±0.004)				
5050XK 5050XA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)		0.4±0.1 (0.016±0.004)	3.2±0.1 (0.126±0.004)
5050YK 5050YA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)			4.2±0.1 (0.165±0.004)
6060KK	6.3±0.1 (0.248±0.004)	6.3±0.1 (0.248±0.004)	1.4±0.1 (0.055±0.004)		1.4±0.1 (0.055±0.004)
6060MK					1.6±0.1 (0.063±0.004)
6060PK					1.6±0.1 (0.063±0.004)
6060WK					2.3±0.1 (0.090±0.004)
6060WH 6060XK					3.1±0.1 (0.122±0.004)
6060YE					4.7±0.1 (0.185±0.004)

Unit: mm (inch)

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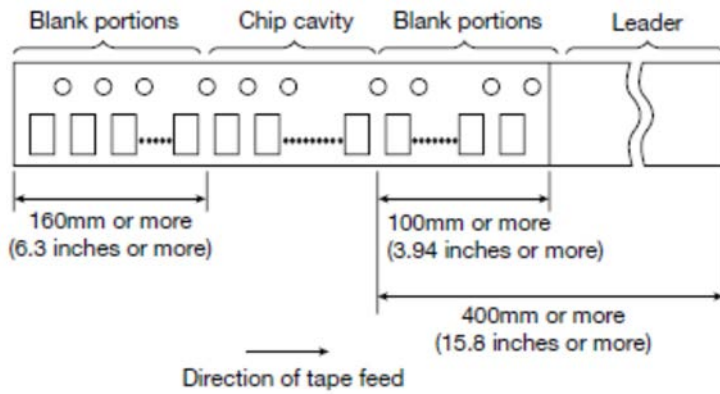
● Embossed tape 16mm wide (0.63 inches wide)



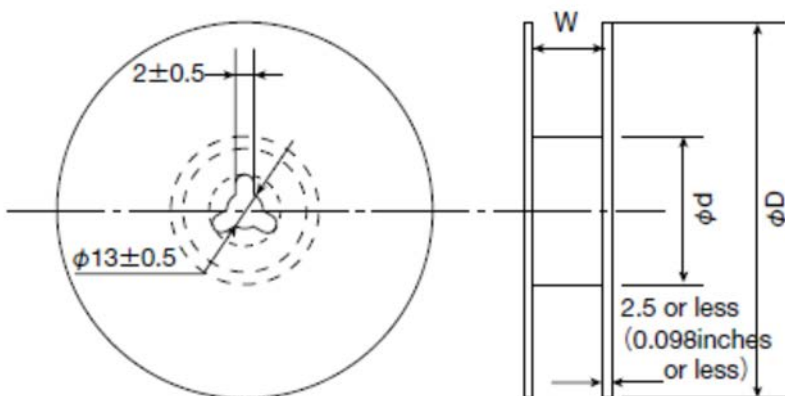
Type	Chip cavity		Insertion pitch F	Tape thickness	
	A	B		T	K
8080XK	8.3 ± 0.1 (0.327 ± 0.004)	8.3 ± 0.1 (0.327 ± 0.004)	12.0 ± 0.1 (0.472 ± 0.004)	0.5 ± 0.1 (0.020 ± 0.004)	3.4 ± 0.1 (0.134 ± 0.004)
8080YK					4.5 ± 0.1 (0.177 ± 0.004)
8080YB					4.5 ± 0.1 (0.177 ± 0.004)

Unit: mm (inch)

④ Leader and Blank portion



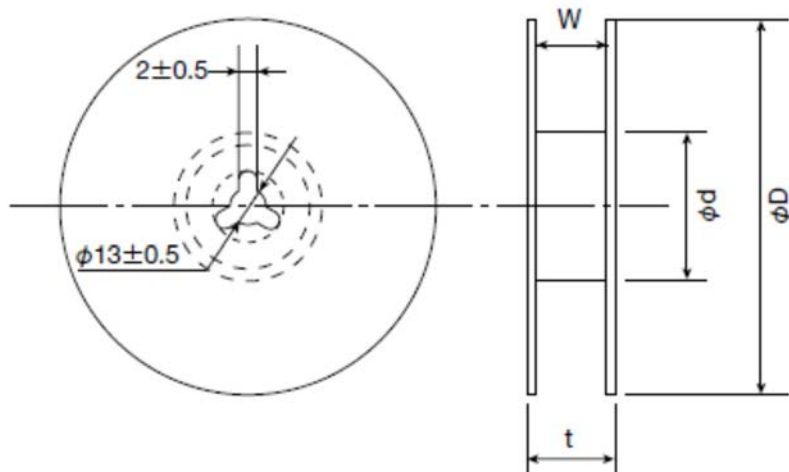
⑤ Reel size



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Type	Reel size (Reference values)		
	ϕD	ϕd	W
2020KK	180±0.5 (7.087±0.019)	60±1.0 (2.36±0.04)	10.0±1.5 (0.394±0.059)
2020MK			
2424KK			
2424MK			
3030KK			
3030MK			
3030QK			
4040WK	180±3.0 (7.087±0.118)	60±2.0 (2.36±0.08)	14.0±1.5 (0.551±0.059)
5050KK			
5050MK			
5050PK			
5050WB			
5050WK			
5050XK			
5050XA			
6060KK			
6060MK			
6060PK			

Unit: mm (inch)

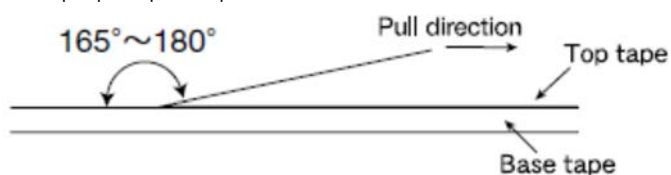


Type	Reel size (Reference values)			
	ϕD	ϕd	t (max.)	W
4040KK	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
4040MK				
4040TK				
5050WD				
5050WE				
5050YA				
5050YK				
6060WK				
6060WH				
6060XK				
6060YE				
8080XK			22.5 (0.89)	17.5±1.0 (0.689±0.04)
8080YK				
8080YB				
8080YB				

Unit: mm (inch)

⑥ Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



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Wire-wound Ferrite Power Inductors LCXH series

RELIABILITY DATA

1. Operating Temperature Range

Specified Value	-40~+125°C (Including self-generated heat)
Test Methods and Remarks	Including self-generated heat

2. Storage Temperature Range

Specified Value	-40~+125°C
Test Methods and Remarks	-5 to 40°C for the product with taping.

3. Rated current

Specified Value	Within the specified tolerance
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4. Inductance

Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 100kHz, 1V

5. DC Resistance

Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)

6. High Temperature Exposure (Storage)

Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 hours at 125 deg C Unpowered

7. Temperature Cycling

Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 cycles (-40 deg C to +105 deg C) 30 min. maximum dwell time at each temperature extreme. 1 min. maximum transition time.

8. Biased Humidity

Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 hours, 85 deg C/85% RH. Unpowered

9. Operational Life

Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 hours, 105 deg C Rated current

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10. Resistance to Solvents

Specified Value	Appearance : No significant abnormality in appearance.
Test Methods and Remarks	① Soak a test sample in isopropyl alcohol (IPA) at 25 ± 5 deg C for 3 to 3.5 minutes. ② Take the test sample out and brush 10 times using a brush soaked in IPA. ③ Repeat ① and ② twice more.

11. Mechanical Shock

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Apply 3 shocks in each direction along 3 mutually perpendicular axes of the test specimen (18 shocks in total). Peak value: 100g Duration: 6ms Test pulse: Half-sine Velocity change: 3.7m/s.

12. Vibration

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	5g's for 20 min., 12 cycles each of 3 orientations (36 cycles in total) Test from: 10 Hz to 2000 Hz

13. Resistance to Soldering Heat (Reflow)

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	The test sample shall be exposed to reflow oven at 183°C for 90–120 seconds, with peak temperature at $250 \pm 5^{\circ}\text{C}$ for 30 ± 5 seconds, 3 times. Measure after inductors are kept at room temperature for 24 ± 4 hours.

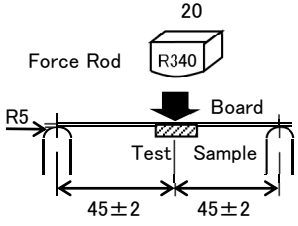
14. ESD

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Per AEC-Q200-002

15. Solderability

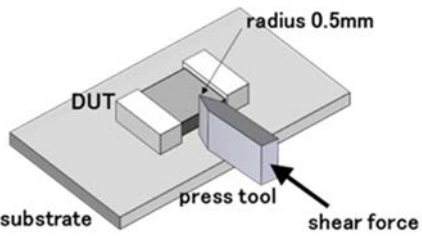
Specified Value	More than 90% of terminal electrode shall be covered with fresh solder.
Test Methods and Remarks	Per J-STD-002 a) Method B Solder at 235 ± 5 deg C for 5 sec. c) Method D Solder at 260 ± 5 deg C for 30 sec.

16. Board Flex

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Solder the test samples to the test boards by the reflow soldering. Apply a force in a downward direction until amount of deflection reaches 2mm. The 2-mm deflection shall be held for 60 sec. Test board dimensions: 100mm × 40mm × 1.6mm. 

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17. Terminal Strength (SMD)

Specified Value	Appearance :No significant abnormality in appearance.
Test Methods and Remarks	Apply a force of 17.7N for 60±5 sec. 

18. Standard condition

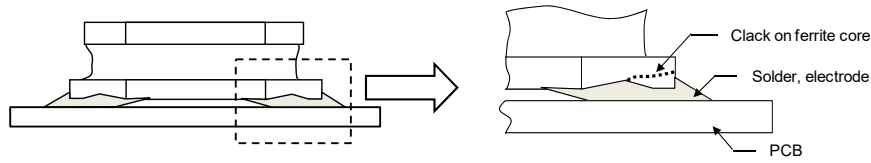
Specified Value	Standard test condition : Unless otherwise specified, temperature is 20±15°C and 65±20%of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2°C of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value.
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Wire-wound Ferrite Power Inductors LAYP series for Automotive Powertrain and safety
 Wire-wound Ferrite Power Inductors LAXH series for Automotive Powertrain and safety
 Wire-wound Ferrite Power Inductors LCXN/LCXP series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LCXH series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Inductors for Class D Amplifier LCXA for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LBXN/LBXP series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LBXH series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LBRN series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LMXN/LMXP series
 for Medical Devices classified as GHTF Class C (Japan Class III)
 Wire-wound Ferrite Power Inductors LMXH series
 for Medical Devices classified as GHTF Class C (Japan Class III)
 Wire-wound Ferrite Power Inductors LMRN series
 for Medical Devices classified as GHTF Class C (Japan Class III)

■ PRECAUTIONS

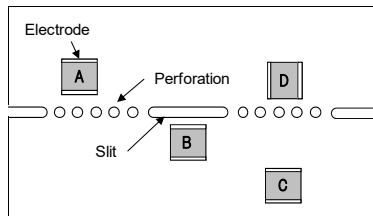
1. Circuit Design	
Precautions	<ul style="list-style-type: none"> ◆ Verification of operating environment, electrical rating and performance <ol style="list-style-type: none"> 1. A malfunction in medical equipment, spacecraft, nuclear reactors, etc. may cause serious harm to human life or have severe social ramifications. As such, any inductors to be used in such equipment may require higher safety and/or reliability considerations and should be clearly differentiated from components used in general purpose applications. 2. When inductors are used in places where dew condensation develops and/or where corrosive gas such as hydrogen sulfide, sulfurous acid, or chlorine exists in the air, characteristic deterioration may occur. Please do not use inductors under such environmental conditions. ◆ Operating Current (Verification of Rated current) <ol style="list-style-type: none"> 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. ◆ Temperature rise <p>Temperature rise of power choke coil depends on the installation condition in end products. Make sure that temperature rise of power choke coils in actual end products is within the specified temperature range.</p>
2. PCB Design	
Precautions	<ul style="list-style-type: none"> ◆ Land pattern design <ol style="list-style-type: none"> 1. Please refer to a recommended land pattern. 2. There is stress, which has been caused by distortion of a PCB, to the inductor. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 3. Please consider the arrangement of parts on a PCB. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)
Technical considerations	<ul style="list-style-type: none"> ◆ Land pattern design <p>Surface Mounting</p> <ol style="list-style-type: none"> 1. Mounting and soldering conditions should be checked beforehand. 2. Applicable soldering process to this products is reflow soldering only. 3. Please use the recommended land pattern shown as below. Electrical characteristics and the mounting ability of the product are being considered in the recommended land pattern. If a PCB is designed with other dimensions, defective soldering and stress to a product may occur due to misalignment. The performance of the product may not be brought out. If an adopted land pattern is different from the recommended land pattern, stress to the product will increase. It may cause cracks or defective electrical characteristics of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 4. As coefficients of thermal expansion between an inductor and a PCB differs, cracks may occur on a ferrite core when thermal stress is applied to them after mounting an inductor. (Please refer to the drawings below.) Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)

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5. SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection. 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.

(LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



A product tends to undergo stress in order "A>C>B≡D". Please consider the layouts of a product to minimize any stresses.

3. Considerations for automatic placement

Precautions	<ul style="list-style-type: none"> ◆ Adjustment of mounting machine <ol style="list-style-type: none"> 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	<ul style="list-style-type: none"> ◆ Adjustment of mounting machine <ol style="list-style-type: none"> 1. When installing products, care should be taken not to apply distortion stress as it may deform the products. 2. Stress may be applied to a product with a warp or a twist in handling of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><Wrap></p> </div> <div style="text-align: center;"> <p><Twist></p> </div> </div>

4. Soldering

Precautions	<ul style="list-style-type: none"> ◆ Reflow soldering <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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(Repair) <ul style="list-style-type: none"> • 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.
Technical considerations	<ul style="list-style-type: none"> ◆ Reflow soldering <ol style="list-style-type: none"> 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) <u>LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP,</u> <u>LCXH/LCXA/LBXH/LMXH, LCRN/LBRN/LMRN</u> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div>

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5. Cleaning	
Precautions	<ul style="list-style-type: none"> ◆ Cleaning conditions 1. Washing by supersonic waves shall be avoided.
Technical considerations	<ul style="list-style-type: none"> ◆ Cleaning conditions 1. If washed by supersonic waves, the products might be broken.
6. Handling	
Precautions	<ul style="list-style-type: none"> ◆ 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.
Technical considerations	<ul style="list-style-type: none"> ◆ 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. ◆ 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	<ul style="list-style-type: none"> ◆ 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. <ul style="list-style-type: none"> ▪ Storage conditions Ambient temperature : $-5\sim 40^{\circ}\text{C}$ Humidity : Below 70% RH ▪ The recommended ambient temperature is 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	<ul style="list-style-type: none"> ◆ 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.

车载(车身系 / 情报系)用途 绕线型 D 类放大器用电感器 LCXA

系列前的记号来自型号, 用来区分产品的种类和特性等。

AEC-Q200 Grade 3 (已完成 Grade 3 条件下的评价测试。)

*使用环境温度: -40~85°C

回流焊

AEC-Q200

■ 型号标示法

*使用温度范围 : -40~125°C (包含产品本身发热)

L	C	X	A	F	6	0	6	0	Y	E	L	3	R	3	M	M	R
①	②	③	④	⑤	⑥	⑦	⑧										

① 系列

代码 (1) (2) (3) (4)	
LCXA	车载(车身系 / 情报系)用途 绕线型 D 类放大器用电感器

(1) 产品群

代码	
L	电感器

(3) 类型

代码	
X	绕线型铁氧体系 鼓型

(2) 范畴

代码	推荐设备	品质等级
C	汽车用电子设备(车身系 / 情报系)	2

(4) 特效 / 特性

代码	
A	音频滤波器用

② 特征

代码	特征
F	底面电极(银×焊料)对应充填物

⑤ 包装

代码	包装
L	卷盘带装

③ 尺寸(L×W)

代码	尺寸(L×W) [mm]
6060	6.0×6.0

⑥ 标称电感值

代码(例)	标称电感值 [μH]
3R3	3.3

※R=小数点

④ 尺寸(H)

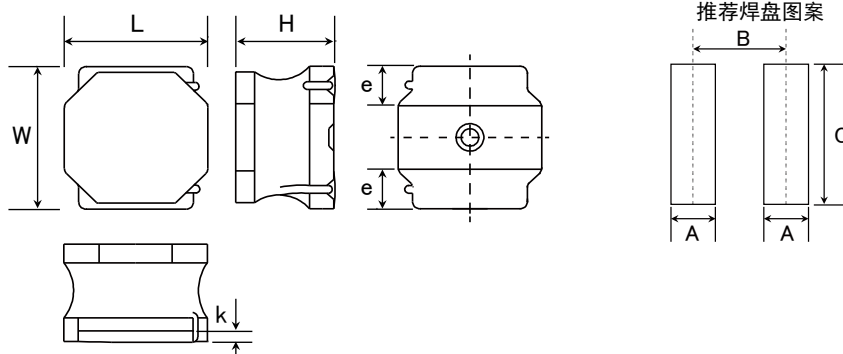
代码	尺寸(H) [mm]
YE	4.5

⑦ 电感量公差

代码	电感量公差
M	±20%

⑧ 管理记号

■ 标准外型尺寸 / 标准数量



Type	A	B	C
6060	2.4	5.0	4.8

单位: mm

Type	L	W	H	e	k(参考值)	标准数量[pcs] 卷盘带装
6060YE	6.0±0.2 (0.236±0.008)	6.0±0.2 (0.236±0.008)	4.5 max (0.177 max)	1.65±0.3 (0.053±0.012)	0.3 min (0.012 min)	1500

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/>)。

■ PART NUMBER

• All the Wire-wound Ferrite Inductors for Class D Amplifier of the catalog lineup are RoHS compliant.

Notes)

- The exchange of individual specifications is necessary depending on your application and/or circuit condition. Please contact TAIYO YUDEN's official sales channel.
 - For Automotive (AEC-Q200 Qualified) products for BODY & CHASSIS, and INFOTAINMENT. Please check "Automotive Application Guide" for further details before using the products.
 - < AEC-Q200 : AEC-Q200 qualified >
- All the Wire-wound Ferrite Inductors for Class D Amplifier for Automotive products are tested based on the test conditions and methods defined in AEC-Q200 by family item. Please consult with TAIYO YUDEN's official sales channel for the details of the product specifications and AEC-Q200 test results, etc., and please review and approve the product specifications before ordering.

● Inductors for Class D Amplifier LCXAF6060YE type

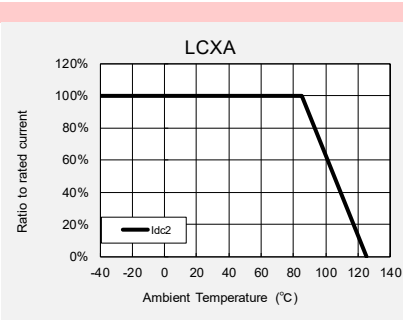
New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [m Ω] Max (Typ)	Rated current ※) [A]		Measuring frequency [MHz]
					Saturation current Idc1 Max (Typ)	Temperature rise current Idc2 Max (Typ)	
LCXAF6060YEL3R3MMR	NRC6045T 3R3MMRUV	3.3	\pm 20%	32 (26)	9.00 (9.60)	3.80 (4.30)	0.1

- ※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)
- ※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)
- ※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■ Derating of Rated Current

● LCXA

Derating of current is necessary for LCXA depending on ambient temperature. Please refer to the chart shown below for appropriate derating of current.



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Wire-wound Ferrite Power Inductors LSXN/LSXP/LCXN/LCXP/LBXN/LBXP/
 LLXN/LLXP/LMXN/LMXP series
 Wire-wound Ferrite Power Inductors LAXH/LCXH/LBXH/LMXH series
 Wire-wound Ferrite Inductors for Class D Amplifier LCXA

■ PACKAGING

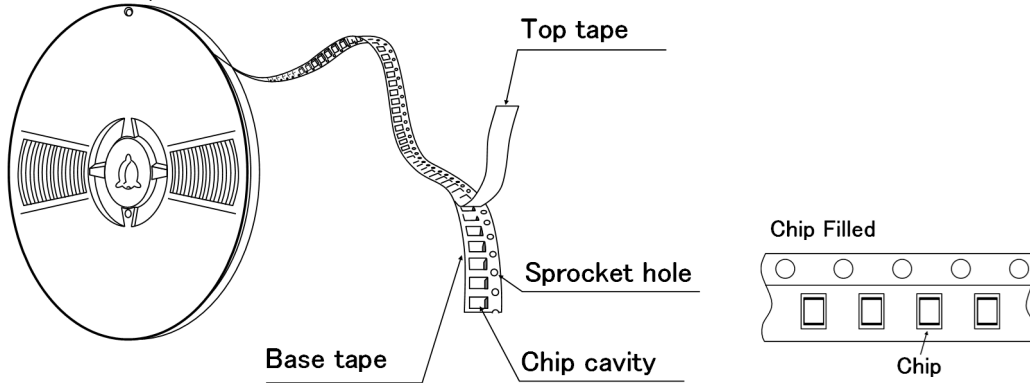
① Minimum Quantity

Type	Standard Quantity [pcs]
	Tape & Reel
2020KK	2500
2020MK	2500
2424KK	2500
2424MK	2500
3030KK	2000
3030MK	2000
3030QK	2000
4040KK	5000
4040MK	4500
4040TK	3500
4040WK	700

Type	Standard Quantity [pcs]
	Tape & Reel
5050KK	1000
5050MK	1000
5050PK	1000
5050WB	800
5050WK	800
5050WD	2500
5050WE	2500
5050XK	500
5050XA	500
5050YA	1500
5050YK	1500
6060KK	1000
6060MK	1000
6060PK	1000
6060WK	2500
6060WH	2000
6060XK	2000
6060YE	1500
8080XK	1000
8080YK	1000
8080YB	1000

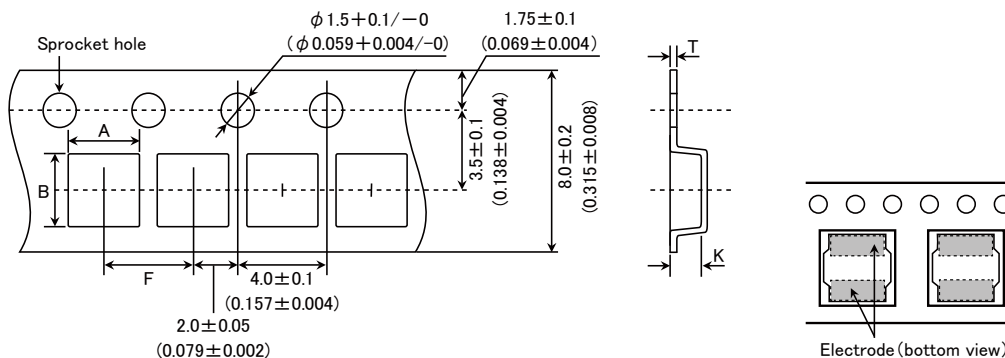
② Tape Material

● Embossed Tape



③ Taping dimensions

● Embossed tape 8mm wide (0.315 inches wide)

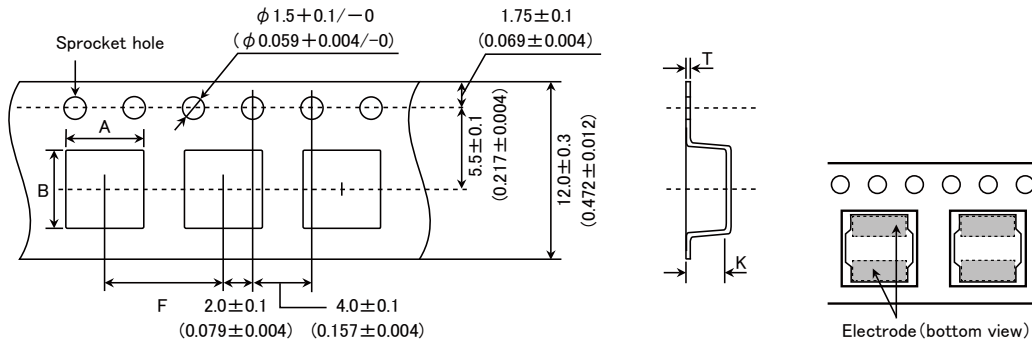


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Type	Chip cavity		Insertion pitch F	Tape thickness	
	A	B		T	K
2020KK 2020MK	2.2±0.1 (0.102±0.004)	2.2±0.1 (0.102±0.004)	4.0±0.1 (0.157±0.004)	0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
2424KK 2424MK	2.6±0.1 (0.087±0.004)	2.6±0.1 (0.102±0.004)		0.25±0.05 (0.009±0.002)	1.3±0.1 (0.051±0.004)
3030KK	3.2±0.1 (0.126±0.004)	3.2±0.1 (0.126±0.004)		0.3±0.05 (0.012±0.002)	1.4±0.1 (0.055±0.004)
3030MK					1.6±0.1 (0.063±0.004)
3030QK					1.9±0.1 (0.075±0.004)

Unit: mm (inch)

● Embossed tape 12mm wide (0.47 inches wide)

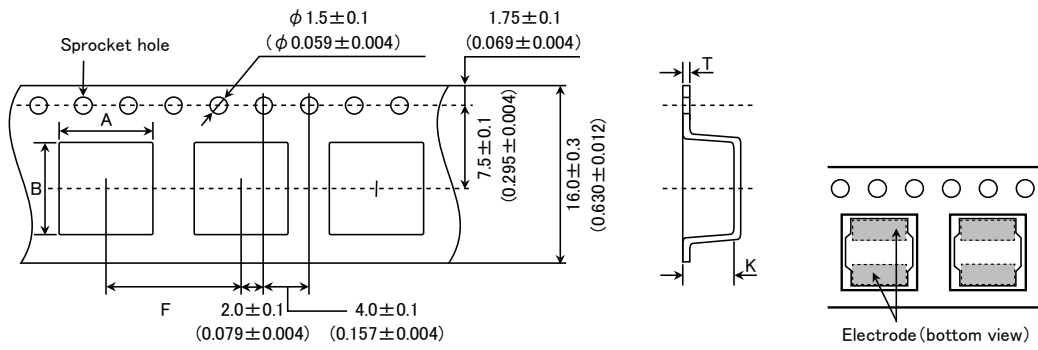


Type	Chip cavity		Insertion pitch F	Tape thickness	
	A	B		T	K
4040KK	4.3±0.1 (0.169±0.004)	4.3±0.1 (0.169±0.004)	8.0±0.1 (0.315±0.004)	0.3±0.1 (0.012±0.004)	1.4±0.1 (0.055±0.004)
4040MK					1.6±0.1 (0.063±0.004)
4040TK 4040WK					2.1±0.1 (0.083±0.004)
5050KK	1.4±0.1 (0.055±0.004)				
5050MK	1.4±0.1 (0.055±0.004)				
5050PK	1.6±0.1 (0.063±0.004)				
5050WB 5050WK	2.3±0.1 (0.091±0.004)				
5050WD 5050WE	2.7±0.1 (0.106±0.004)				
5050XK 5050XA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)		0.4±0.1 (0.016±0.004)	3.2±0.1 (0.126±0.004)
5050YK 5050YA	5.15±0.1 (0.203±0.004)	5.15±0.1 (0.203±0.004)			4.2±0.1 (0.165±0.004)
6060KK	6.3±0.1 (0.248±0.004)	6.3±0.1 (0.248±0.004)	1.4±0.1 (0.055±0.004)		1.4±0.1 (0.055±0.004)
6060MK					1.6±0.1 (0.063±0.004)
6060PK					1.6±0.1 (0.063±0.004)
6060WK					2.3±0.1 (0.090±0.004)
6060WH 6060XK					3.1±0.1 (0.122±0.004)
6060YE					4.7±0.1 (0.185±0.004)

Unit: mm (inch)

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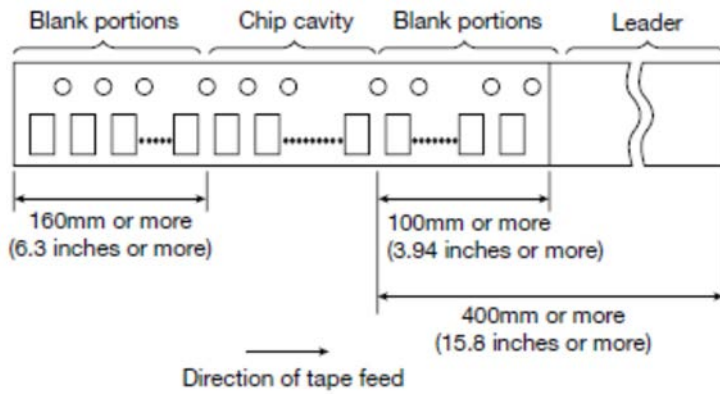
● Embossed tape 16mm wide (0.63 inches wide)



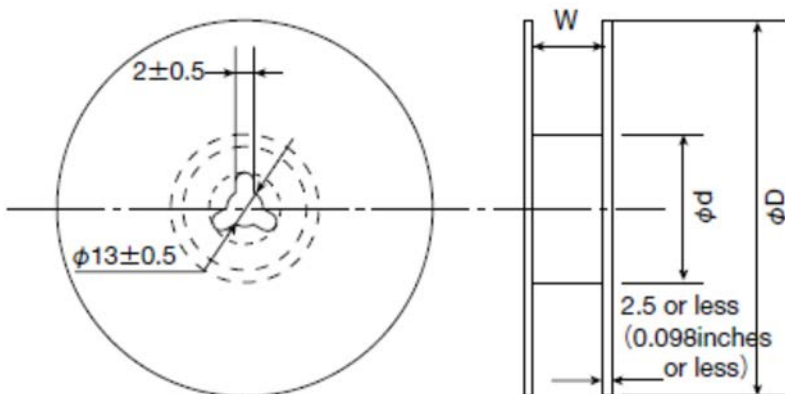
Type	Chip cavity		Insertion pitch F	Tape thickness	
	A	B		T	K
8080XK	8.3 ± 0.1 (0.327 ± 0.004)	8.3 ± 0.1 (0.327 ± 0.004)	12.0 ± 0.1 (0.472 ± 0.004)	0.5 ± 0.1 (0.020 ± 0.004)	3.4 ± 0.1 (0.134 ± 0.004)
8080YK					4.5 ± 0.1 (0.177 ± 0.004)
8080YB					4.5 ± 0.1 (0.177 ± 0.004)

Unit: mm (inch)

④ Leader and Blank portion



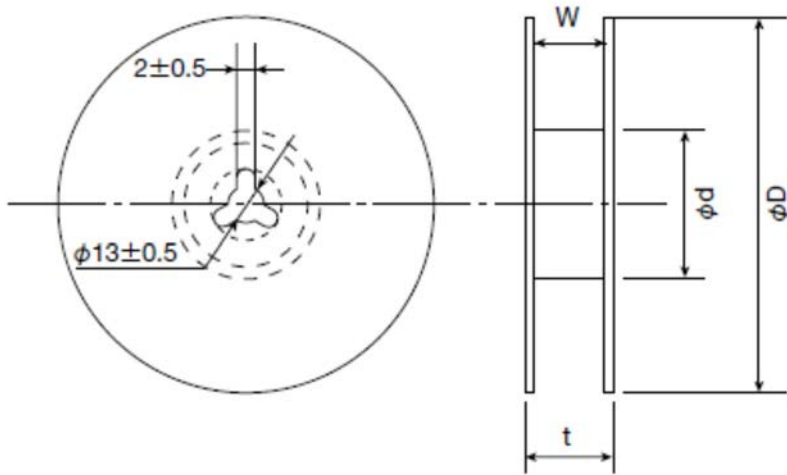
⑤ Reel size



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Type	Reel size (Reference values)		
	ϕD	ϕd	W
2020KK	180±0.5 (7.087±0.019)	60±1.0 (2.36±0.04)	10.0±1.5 (0.394±0.059)
2020MK			
2424KK			
2424MK			
3030KK			
3030MK			
3030QK			
4040WK	180±3.0 (7.087±0.118)	60±2.0 (2.36±0.08)	14.0±1.5 (0.551±0.059)
5050KK			
5050MK			
5050PK			
5050WB			
5050WK			
5050XK			
5050XA			
6060KK			
6060MK			
6060PK			

Unit: mm (inch)

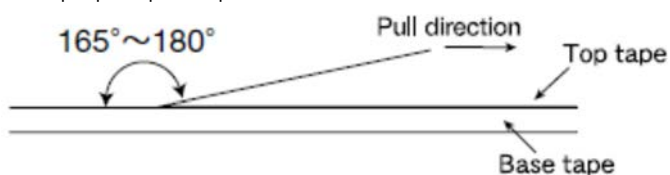


Type	Reel size (Reference values)			
	ϕD	ϕd	t (max.)	W
4040KK	330±3.0 (12.99±0.118)	80±2.0 (3.15±0.078)	18.5 (0.72)	13.5±1.0 (0.531±0.04)
4040MK				
4040TK				
5050WD				
5050WE				
5050YA				
5050YK				
6060WK				
6060WH				
6060XK				
6060YE				
8080XK			22.5 (0.89)	17.5±1.0 (0.689±0.04)
8080YK				
8080YB				

Unit: mm (inch)

⑥ Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



Wire-wound Ferrite Inductors for Class D Amplifier LCXA for Automotive Body & Chassis and Infotainment

RELIABILITY DATA

1. Operating Temperature Range

Specified Value	-40~+125°C (Including self-generated heat)
Test Methods and Remarks	Including self-generated heat

2. Storage Temperature Range

Specified Value	-40~+125°C
Test Methods and Remarks	-5 to 40°C for the product with taping.

3. Rated current

Specified Value	Within the specified tolerance
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4. Inductance

Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4285A or equivalent) Measuring frequency : 100kHz, 1V

5. DC Resistance

Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)

6. High Temperature Exposure (Storage)

Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 hours at 125 deg C Unpowered

7. Temperature Cycling

Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 cycles (-40 deg C to +85 deg C) 30 min. maximum dwell time at each temperature extreme. 1 min. maximum transition time.

8. Biased Humidity

Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 hours, 85 deg C/85% RH. Unpowered

9. Operational Life

Specified Value	Appearance: No significant abnormality in appearance. Inductance change: Within $\pm 10\%$
Test Methods and Remarks	1000 hours, 85 deg C Rated current

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10. Resistance to Solvents

Specified Value	Appearance : No significant abnormality in appearance.
Test Methods and Remarks	① Soak a test sample in isopropyl alcohol (IPA) at 25 ± 5 deg C for 3 to 3.5 minutes. ② Take the test sample out and brush 10 times using a brush soaked in IPA. ③ Repeat ① and ② twice more.

11. Mechanical Shock

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Apply 3 shocks in each direction along 3 mutually perpendicular axes of the test specimen (18 shocks in total). Peak value: 100g Duration: 6ms Test pulse: Half-sine Velocity change: 3.7m/s.

12. Vibration

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	5g's for 20 min., 12 cycles each of 3 orientations (36 cycles in total) Test from: 10 Hz to 2000 Hz

13. Resistance to Soldering Heat (Reflow)

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	The test sample shall be exposed to reflow oven at 183°C for 90–120 seconds, with peak temperature at $250 \pm 5^{\circ}\text{C}$ for 30 ± 5 seconds, 3 times. Measure after inductors are kept at room temperature for 24 ± 4 hours.

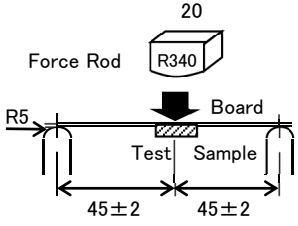
14. ESD

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Per AEC-Q200-002

15. Solderability

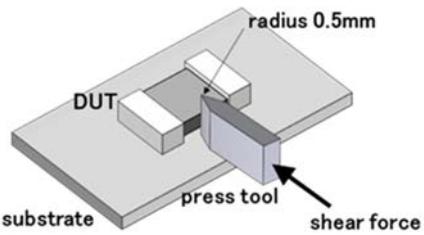
Specified Value	More than 90% of terminal electrode shall be covered with fresh solder.
Test Methods and Remarks	Per J-STD-002 a) Method B Solder at 235 ± 5 deg C for 5 sec. c) Method D Solder at 260 ± 5 deg C for 30 sec.

16. Board Flex

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Solder the test samples to the test boards by the reflow soldering. Apply a force in a downward direction until amount of deflection reaches 2mm. The 2-mm deflection shall be held for 60 sec. Test board dimensions: 100mm × 40mm × 1.6mm. 

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17. Terminal Strength (SMD)

Specified Value	Appearance :No significant abnormality in appearance.
Test Methods and Remarks	Apply a force of 17.7N for 60±5 sec. 

18. Standard condition

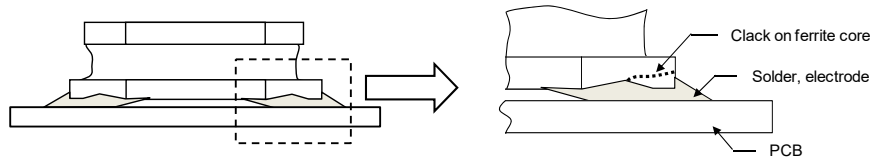
Specified Value	Standard test condition : Unless otherwise specified, temperature is 20±15°C and 65±20%of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2°C of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value.
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Wire-wound Ferrite Power Inductors LAYP series for Automotive Powertrain and safety
 Wire-wound Ferrite Power Inductors LAXH series for Automotive Powertrain and safety
 Wire-wound Ferrite Power Inductors LCXN/LCXP series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LCXH series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Inductors for Class D Amplifier LCXA for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LBXN/LBXP series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LBXH series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LBRN series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LMXN/LMXP series
 for Medical Devices classified as GHTF Class C (Japan Class III)
 Wire-wound Ferrite Power Inductors LMXH series
 for Medical Devices classified as GHTF Class C (Japan Class III)
 Wire-wound Ferrite Power Inductors LMRN series
 for Medical Devices classified as GHTF Class C (Japan Class III)

■ PRECAUTIONS

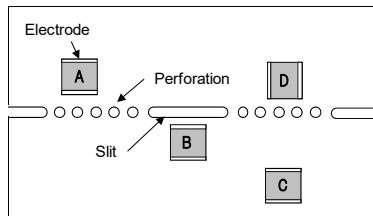
1. Circuit Design	
Precautions	<ul style="list-style-type: none"> ◆ Verification of operating environment, electrical rating and performance <ol style="list-style-type: none"> 1. A malfunction in medical equipment, spacecraft, nuclear reactors, etc. may cause serious harm to human life or have severe social ramifications. As such, any inductors to be used in such equipment may require higher safety and/or reliability considerations and should be clearly differentiated from components used in general purpose applications. 2. When inductors are used in places where dew condensation develops and/or where corrosive gas such as hydrogen sulfide, sulfurous acid, or chlorine exists in the air, characteristic deterioration may occur. Please do not use inductors under such environmental conditions. ◆ Operating Current (Verification of Rated current) <ol style="list-style-type: none"> 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. ◆ Temperature rise <p style="margin-left: 20px;">Temperature rise of power choke coil depends on the installation condition in end products. Make sure that temperature rise of power choke coils in actual end products is within the specified temperature range.</p>
2. PCB Design	
Precautions	<ul style="list-style-type: none"> ◆ Land pattern design <ol style="list-style-type: none"> 1. Please refer to a recommended land pattern. 2. There is stress, which has been caused by distortion of a PCB, to the inductor. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 3. Please consider the arrangement of parts on a PCB. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)
Technical considerations	<ul style="list-style-type: none"> ◆ Land pattern design <p>Surface Mounting</p> <ol style="list-style-type: none"> 1. Mounting and soldering conditions should be checked beforehand. 2. Applicable soldering process to this products is reflow soldering only. 3. Please use the recommended land pattern shown as below. Electrical characteristics and the mounting ability of the product are being considered in the recommended land pattern. If a PCB is designed with other dimensions, defective soldering and stress to a product may occur due to misalignment. The performance of the product may not be brought out. If an adopted land pattern is different from the recommended land pattern, stress to the product will increase. It may cause cracks or defective electrical characteristics of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 4. As coefficients of thermal expansion between an inductor and a PCB differs, cracks may occur on a ferrite core when thermal stress is applied to them after mounting an inductor. (Please refer to the drawings below.) Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)

▶ 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/>)



5. SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection. 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.

(LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)



A product tends to undergo stress in order "A>C>B≡D". Please consider the layouts of a product to minimize any stresses.

3. Considerations for automatic placement

Precautions	<ul style="list-style-type: none"> ◆ 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	<ul style="list-style-type: none"> ◆ Adjustment of mounting machine 1. When installing products, care should be taken not to apply distortion stress as it may deform the products. 2. Stress may be applied to a product with a warp or a twist in handling of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><Wrap></p> </div> <div style="text-align: center;"> <p><Twist></p> </div> </div>

4. Soldering

Precautions	<ul style="list-style-type: none"> ◆ 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 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(Repair) <ul style="list-style-type: none"> • 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.
Technical considerations	<ul style="list-style-type: none"> ◆ 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. <p style="text-align: center;">Recommended reflow condition (Pb free solder) <u>LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP,</u> <u>LCXH/LCXA/LBXH/LMXH, LCRN/LBRN/LMRN</u></p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div>

▶ 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/>)

5. Cleaning	
Precautions	<ul style="list-style-type: none"> ◆ Cleaning conditions 1. Washing by supersonic waves shall be avoided.
Technical considerations	<ul style="list-style-type: none"> ◆ Cleaning conditions 1. If washed by supersonic waves, the products might be broken.
6. Handling	
Precautions	<ul style="list-style-type: none"> ◆ 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.
Technical considerations	<ul style="list-style-type: none"> ◆ 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. ◆ 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	<ul style="list-style-type: none"> ◆ 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. <ul style="list-style-type: none"> ▪ Storage conditions Ambient temperature : $-5\sim 40^{\circ}\text{C}$ Humidity : Below 70% RH ▪ The recommended ambient temperature is 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	<ul style="list-style-type: none"> ◆ 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.

车载(车身系 / 情报系)用途 绕线型铁氧体系功率电感器 LCRN 系列

系列前的记号来自型号, 用来区分产品的种类和特性等。

AEC-Q200 Grade 3 (已完成 Grade 3 条件下的评价测试。)

*使用环境温度: -40~85°C

回流焊

AEC-Q200

■ 型号标示法

*使用温度范围 : -40~125°C (包含产品本身发热)

L	C	R	N	J	1	0	1	4	5	G	L	1	0	0	M	N	
①	②	③	④	⑤	⑥	⑦	⑧	⑨									

① 系列

代码 (1)(2)(3)(4)	
LCRN	车载(车身系 / 情报系)用途 绕线型铁氧体系功率电感器

(1) 产品群

代码	
L	电感器

(3) 类型

代码	
R	绕线型铁氧体系 鼓形筒状固定夹座型

(2) 范畴

代码	推荐设备	品质等级
C	汽车用电子设备(车身系 / 情报系)	2

(4) 特效 / 特性

代码	
N	一般功率扼流

② 特征

代码	特征
J	底面电极 (固定夹座型)

⑥ 包装

代码	包装
L	卷盘带装

③ 尺寸 (L×W)

代码	尺寸 (L×W) [mm]
101	10.1×10.1
125	12.5×12.5

⑦ 标称电感值

代码 (例)	标称电感值 [μH]
1R0	1.0
100	10
101	100

※R=小数点

④ 尺寸 (H)

代码	尺寸 (H) [mm]
45	4.5
55	5.5
65	6.5
75	7.5

⑧ 电感量公差

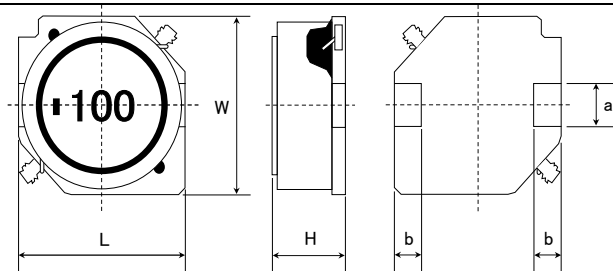
代码	电感量公差
M	±20%
N	±30%

⑤ 使用温度范围

代码	使用温度范围 [°C]
G	-40~+125

⑨ 管理记号

■标准外型尺寸 / 最小订货单位数量



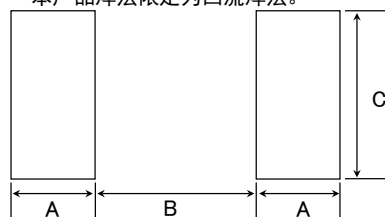
Type	L	W	H	a	b	最小订货单位数量 [pcs]
10145	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	4.5±0.35 (0.177±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
10155	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	5.5±0.35 (0.217±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
10165	10.1±0.3 (0.398±0.012)	10.1±0.3 (0.398±0.012)	6.5±0.35 (0.256±0.014)	2.8±0.1 (0.110±0.004)	2.0±0.15 (0.079±0.006)	2000
12555	12.5±0.3 (0.492±0.012)	12.5±0.3 (0.492±0.012)	5.5±0.35 (0.217±0.014)	3.0±0.1 (0.118±0.004)	2.0±0.15 (0.079±0.006)	2000
12565	12.5±0.3 (0.492±0.012)	12.5±0.3 (0.492±0.012)	6.5±0.35 (0.256±0.014)	3.0±0.1 (0.118±0.004)	2.0±0.15 (0.079±0.006)	2000
12575	12.5±0.3 (0.492±0.012)	12.5±0.3 (0.492±0.012)	7.5±0.35 (0.295±0.014)	3.0±0.1 (0.118±0.004)	2.0±0.15 (0.079±0.006)	2000

单位: mm (inch)

推荐焊盘图案

安装上的注意

- 请确认实装状态后使用。
- 本产品焊法限定为回流焊法。



Type	A	B	C
10145	2.5	5.6	3.2
10155	2.5	5.6	3.2
10165	2.5	5.6	3.2
12555	2.5	8.6	3.2
12565	2.5	8.6	3.2
12575	2.5	8.6	3.2

单位: mm

PART NUMBER

• All the Wire-wound Ferrite Power Inductors of the catalog lineup are RoHS compliant.

Notes)

- The exchange of individual specifications is necessary depending on your application and/or circuit condition. Please contact TAIYO YUDEN's official sales channel.
- For Automotive (AEC-Q200 Qualified) products for BODY & CHASSIS, and INFOTAINMENT. Please check "Automotive Application Guide" for further details before using the products.
< AEC-Q200 :AEC-Q200 qualified >
- All the Wire-wound Ferrite Power Inductors for Automotive products are tested based on the test conditions and methods defined in AEC-Q200 by family item.
Please consult with TAIYO YUDEN's official sales channel for the details of the product specifications and AEC-Q200 test results, etc.,
and please review and approve the product specifications before ordering.

● 10145 type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ10145GL1R0NN	NS 10145T 1R0NNVV	1.0	$\pm 30\%$	0.0049	12.54	8.90	100
LCRNJ10145GL1R5NN	NS 10145T 1R5NNVV	1.5	$\pm 30\%$	0.0060	10.34	7.99	100
LCRNJ10145GL2R2NN	NS 10145T 2R2NNVV	2.2	$\pm 30\%$	0.0085	8.91	6.64	100
LCRNJ10145GL3R3NN	NS 10145T 3R3NNVV	3.3	$\pm 30\%$	0.0100	7.33	6.10	100
LCRNJ10145GL4R7NN	NS 10145T 4R7NNVV	4.7	$\pm 30\%$	0.0144	6.69	5.03	100
LCRNJ10145GL5R6NN	NS 10145T 5R6NNVV	5.6	$\pm 30\%$	0.0181	5.85	4.45	100
LCRNJ10145GL6R8NN	NS 10145T 6R8NNVV	6.8	$\pm 30\%$	0.0230	5.05	4.22	100
LCRNJ10145GL100MN	NS 10145T 100MNVV	10	$\pm 20\%$	0.0270	4.22	3.10	100
LCRNJ10145GL150MN	NS 10145T 150MNVV	15	$\pm 20\%$	0.0381	3.44	3.00	100
LCRNJ10145GL220MN	NS 10145T 220MNVV	22	$\pm 20\%$	0.0570	2.87	2.30	100
LCRNJ10145GL330MN	NS 10145T 330MNVV	33	$\pm 20\%$	0.0880	2.36	1.90	100
LCRNJ10145GL470MN	NS 10145T 470MNVV	47	$\pm 20\%$	0.130	2.00	1.50	100
LCRNJ10145GL680MN	NS 10145T 680MNVV	68	$\pm 20\%$	0.150	1.66	1.45	100
LCRNJ10145GL101MN	NS 10145T 101MNVV	100	$\pm 20\%$	0.230	1.40	1.10	100
LCRNJ10145GL151MN	NS 10145T 151MNVV	150	$\pm 20\%$	0.350	1.11	0.86	100
LCRNJ10145GL221MN	NS 10145T 221MNVV	220	$\pm 20\%$	0.510	0.91	0.78	100
LCRNJ10145GL331MN	NS 10145T 331MNVV	330	$\pm 20\%$	0.700	0.71	0.64	100
LCRNJ10145GL471MN	NS 10145T 471MNVV	470	$\pm 20\%$	1.03	0.61	0.52	100
LCRNJ10145GL681MN	NS 10145T 681MNVV	680	$\pm 20\%$	1.57	0.50	0.42	100
LCRNJ10145GL102MN	NS 10145T 102MNVV	1000	$\pm 20\%$	2.58	0.41	0.32	100
LCRNJ10145GL152MN	NS 10145T 152MNVV	1500	$\pm 20\%$	3.70	0.36	0.27	100

● 10155 type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ10155GL1R5NN	NS 10155T 1R5NNVV	1.5	$\pm 30\%$	0.0060	11.90	8.39	100
LCRNJ10155GL2R2NN	NS 10155T 2R2NNVV	2.2	$\pm 30\%$	0.0072	10.00	7.61	100
LCRNJ10155GL3R3NN	NS 10155T 3R3NNVV	3.3	$\pm 30\%$	0.0097	8.50	6.49	100
LCRNJ10155GL4R7NN	NS 10155T 4R7NNVV	4.7	$\pm 30\%$	0.0112	7.40	6.01	100
LCRNJ10155GL6R8NN	NS 10155T 6R8NNVV	6.8	$\pm 30\%$	0.0159	6.00	4.98	100
LCRNJ10155GL100MN	NS 10155T 100MNVV	10	$\pm 20\%$	0.0200	4.49	4.40	100
LCRNJ10155GL150MN	NS 10155T 150MNVV	15	$\pm 20\%$	0.0310	4.03	3.40	100
LCRNJ10155GL220MN	NS 10155T 220MNVV	22	$\pm 20\%$	0.0430	3.37	2.80	100

● 10165 type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω] ($\pm 20\%$)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ10165GL1R5NN	NS 10165T 1R5NNVV	1.5	$\pm 30\%$	0.0062	13.60	8.04	100
LCRNJ10165GL2R2NN	NS 10165T 2R2NNVV	2.2	$\pm 30\%$	0.0074	10.80	7.32	100
LCRNJ10165GL3R3NN	NS 10165T 3R3NNVV	3.3	$\pm 30\%$	0.0086	9.30	6.76	100
LCRNJ10165GL4R7NN	NS 10165T 4R7NNVV	4.7	$\pm 30\%$	0.0112	7.70	5.88	100
LCRNJ10165GL6R8NN	NS 10165T 6R8NNVV	6.8	$\pm 30\%$	0.0140	6.00	5.22	100
LCRNJ10165GL100MN	NS 10165T 100MNVV	10	$\pm 20\%$	0.0174	5.20	4.66	100
LCRNJ10165GL150MN	NS 10165T 150MNVV	15	$\pm 20\%$	0.0280	3.60	3.84	100
LCRNJ10165GL220MN	NS 10165T 220MNVV	22	$\pm 20\%$	0.0350	3.10	3.41	100

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■ PART NUMBER

● 12555 type ● NS 12555 type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω]($\pm 20\%$)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ12555GL6R0NN	NS 12555T 6R0NN V	6.0	$\pm 30\%$	0.0140	5.01	5.60	100
LCRNJ12555GL100MN	NS 12555T 100MN V	10	$\pm 20\%$	0.0175	4.73	5.04	100
LCRNJ12555GL150MN	NS 12555T 150MN V	15	$\pm 20\%$	0.0233	3.89	4.18	100
LCRNJ12555GL220MN	NS 12555T 220MN V	22	$\pm 20\%$	0.0297	3.20	3.81	100
LCRNJ12555GL330MN	NS 12555T 330MN V	33	$\pm 20\%$	0.0415	2.64	3.16	100
LCRNJ12555GL470MN	NS 12555T 470MN V	47	$\pm 20\%$	0.0618	2.23	2.70	100
LCRNJ12555GL680MN	NS 12555T 680MN V	68	$\pm 20\%$	0.0832	1.81	2.14	100
LCRNJ12555GL101MN	NS 12555T 101MN V	100	$\pm 20\%$	0.117	1.53	1.86	100
LCRNJ12555GL151MN	NS 12555T 151MN V	150	$\pm 20\%$	0.215	1.10	1.30	100
LCRNJ12555GL221MN	NS 12555T 221MN V	220	$\pm 20\%$	0.270	1.00	1.18	100
LCRNJ12555GL331MN	NS 12555T 331MN V	330	$\pm 20\%$	0.410	0.82	0.96	100
LCRNJ12555GL471MN	NS 12555T 471MN V	470	$\pm 20\%$	0.520	0.68	0.80	100
LCRNJ12555GL681MN	NS 12555T 681MN V	680	$\pm 20\%$	0.870	0.48	0.61	100
LCRNJ12555GL102MN	NS 12555T 102MN V	1000	$\pm 20\%$	1.44	0.41	0.46	100
LCRNJ12555GL152MN	NS 12555T 152MN V	1500	$\pm 20\%$	1.73	0.40	0.44	100

● 12565 type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω]($\pm 20\%$)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ12565GL2R0NN	NS 12565T 2R0NN V	2.0	$\pm 30\%$	0.0080	13.91	7.60	100
LCRNJ12565GL4R2NN	NS 12565T 4R2NN V	4.2	$\pm 30\%$	0.0126	9.40	5.91	100
LCRNJ12565GL7R0NN	NS 12565T 7R0NN V	7.0	$\pm 30\%$	0.0162	7.80	5.21	100
LCRNJ12565GL100MN	NS 12565T 100MN V	10	$\pm 20\%$	0.0199	6.00	4.75	100
LCRNJ12565GL150MN	NS 12565T 150MN V	15	$\pm 20\%$	0.0237	5.60	4.33	100
LCRNJ12565GL220MN	NS 12565T 220MN V	22	$\pm 20\%$	0.0310	4.20	3.91	100
LCRNJ12565GL330MN	NS 12565T 330MN V	33	$\pm 20\%$	0.0390	3.80	3.22	100
LCRNJ12565GL470MN	NS 12565T 470MN V	47	$\pm 20\%$	0.0575	3.34	2.78	100
LCRNJ12565GL680MN	NS 12565T 680MN V	68	$\pm 20\%$	0.0775	2.70	2.30	100
LCRNJ12565GL101MN	NS 12565T 101MN V	100	$\pm 20\%$	0.123	2.23	1.81	100
LCRNJ12565GL151MN	NS 12565T 151MN V	150	$\pm 20\%$	0.173	1.80	1.54	100
LCRNJ12565GL221MN	NS 12565T 221MN V	220	$\pm 20\%$	0.273	1.39	1.18	100

● 12575 type

New part number	Old part number (for reference)	Nominal inductance [μ H]	Inductance tolerance	DC Resistance [Ω]($\pm 20\%$)	Rated current ※) [A]		Measuring frequency [kHz]
					Saturation current Idc1	Temperature rise current Idc2	
LCRNJ12575GL1R2NN	NS 12575T 1R2NN V	1.2	$\pm 30\%$	0.0058	18.08	9.15	100
LCRNJ12575GL2R7NN	NS 12575T 2R7NN V	2.7	$\pm 30\%$	0.0085	13.91	7.69	100
LCRNJ12575GL3R9NN	NS 12575T 3R9NN V	3.9	$\pm 30\%$	0.0099	12.10	7.38	100
LCRNJ12575GL5R6NN	NS 12575T 5R6NN V	5.6	$\pm 30\%$	0.0116	10.20	6.36	100
LCRNJ12575GL6R8NN	NS 12575T 6R8NN V	6.8	$\pm 30\%$	0.0131	9.50	5.84	100
LCRNJ12575GL100MN	NS 12575T 100MN V	10	$\pm 20\%$	0.0156	7.65	5.55	100
LCRNJ12575GL150MN	NS 12575T 150MN V	15	$\pm 20\%$	0.0184	6.30	5.22	100
LCRNJ12575GL220MN	NS 12575T 220MN V	22	$\pm 20\%$	0.0260	5.50	4.05	100
LCRNJ12575GL330MN	NS 12575T 330MN V	33	$\pm 20\%$	0.0390	4.30	3.48	100
LCRNJ12575GL470MN	NS 12575T 470MN V	47	$\pm 20\%$	0.0515	3.60	2.95	100
LCRNJ12575GL680MN	NS 12575T 680MN V	68	$\pm 20\%$	0.0900	2.78	2.10	100
LCRNJ12575GL101MN	NS 12575T 101MN V	100	$\pm 20\%$	0.110	2.50	2.01	100
LCRNJ12575GL151MN	NS 12575T 151MN V	150	$\pm 20\%$	0.161	1.90	1.51	100
LCRNJ12575GL221MN	NS 12575T 221MN V	220	$\pm 20\%$	0.300	1.60	1.10	100
LCRNJ12575GL102MN	NS 12575T 102MN V	1000	$\pm 20\%$	1.170	0.72	0.53	100

※) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%. (at 20°C)

※) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C. (at 20°C)

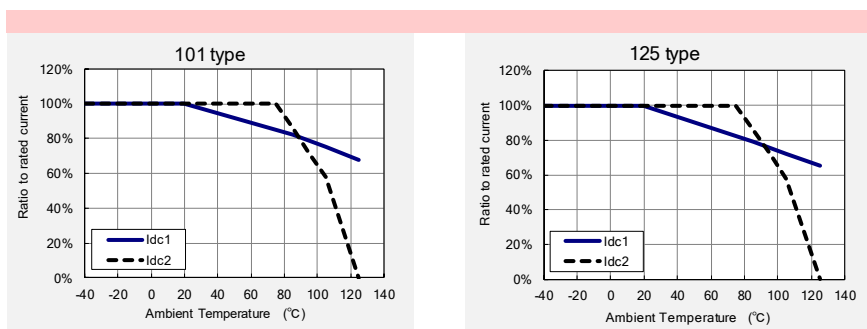
※) The rated current is the DC current value that satisfies both of current value saturation current value and temperature rise current value.

■ 定格電流のデレレーティ: ■ Derating of Rated Current

● LCRN series

Derating of current is necessary for LCRN series depending on ambient temperature.

Please refer to the chart shown below for appropriate derating of current.



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Wire-wound Ferrite Power Inductors LSRN/LCRN/LBRN/LLRN/LMRN series

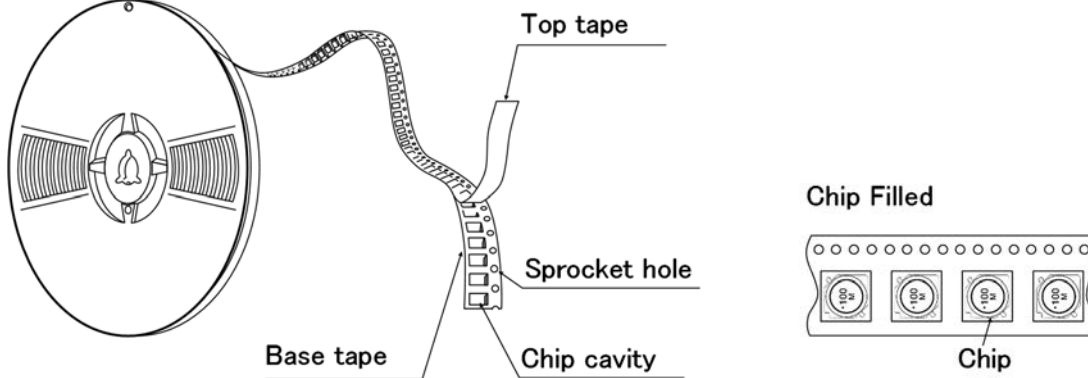
PACKAGING

① Packing Quantity

Type	Standard Quantity (1reel) [pcs]	Minimum Quantity [pcs]
	Embossed Tape	Embossed Tape
10145	500	2000
10155	500	2000
10165	500	2000
12555	500	2000
12565	500	2000
12575	500	2000

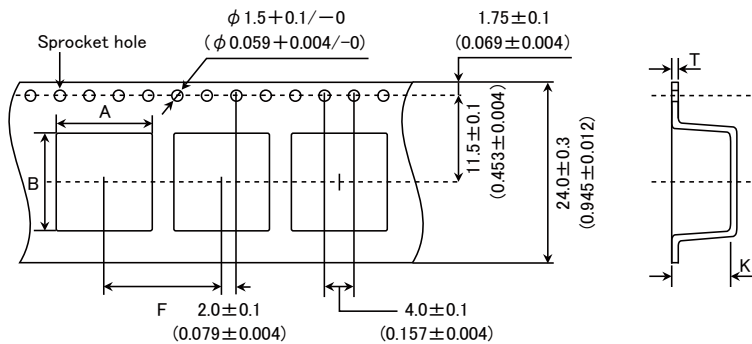
② Tape Material

● Embossed Tape



③ Taping dimensions

● Embossed tape 24mm wide (0.945 inches wide)

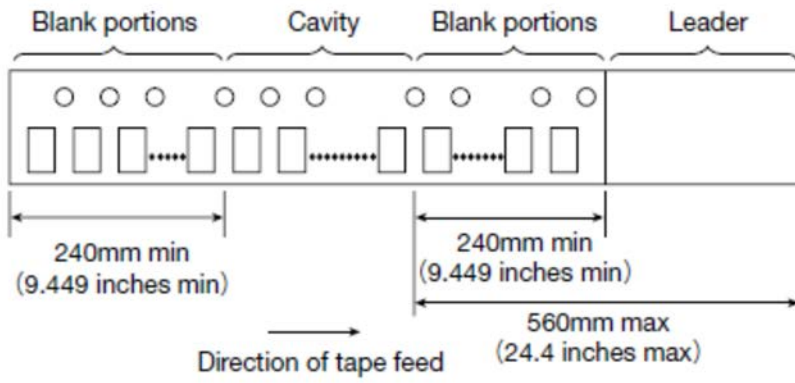


Type	Chip cavity		Insertion pitch	Tape thickness	
	A	B	F	T	K
10145	10.5 ± 0.1 (0.413 ± 0.004)	10.5 ± 0.1 (0.413 ± 0.004)	16.0 ± 0.1 (0.630 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	5.0 ± 0.1 (0.197 ± 0.004)
10155	10.5 ± 0.1 (0.413 ± 0.004)	10.5 ± 0.1 (0.413 ± 0.004)	16.0 ± 0.1 (0.630 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	6.0 ± 0.1 (0.236 ± 0.004)
10165	10.5 ± 0.1 (0.413 ± 0.004)	10.5 ± 0.1 (0.413 ± 0.004)	16.0 ± 0.1 (0.630 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	7.0 ± 0.1 (0.276 ± 0.004)
12555	13.0 ± 0.1 (0.512 ± 0.004)	13.0 ± 0.1 (0.512 ± 0.004)	16.0 ± 0.1 (0.630 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	6.1 ± 0.1 (0.240 ± 0.004)
12565	13.0 ± 0.1 (0.512 ± 0.004)	13.0 ± 0.1 (0.512 ± 0.004)	16.0 ± 0.1 (0.630 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	7.1 ± 0.1 (0.280 ± 0.004)
12575	13.0 ± 0.1 (0.512 ± 0.004)	13.0 ± 0.1 (0.512 ± 0.004)	16.0 ± 0.1 (0.630 ± 0.004)	0.4 ± 0.1 (0.016 ± 0.004)	8.0 ± 0.1 (0.315 ± 0.004)

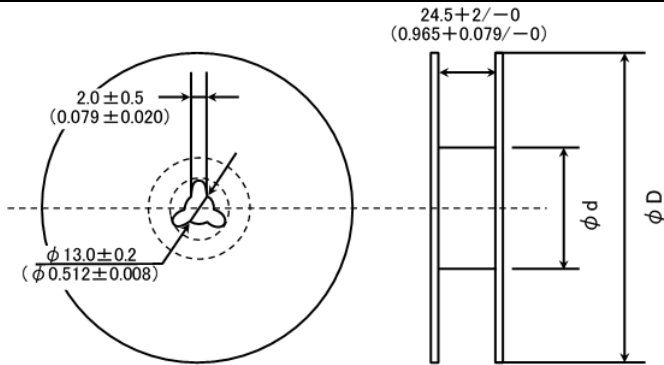
Unit : mm (inch)

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④ Leader and Blank portion



⑤ Reel size

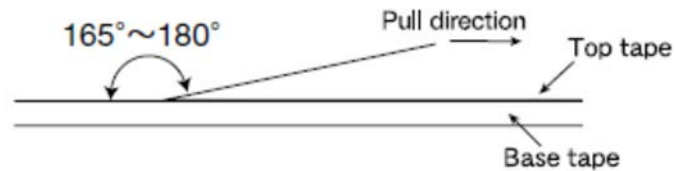


Type	Reel size (Reference values)	
	ϕD	ϕd
10145	330 ± 2 (12.99 ± 0.079)	100 ± 1 (3.937 ± 0.039)
10155		
10165		
12555		
12565		
12575		

Unit : mm (inch)

⑥ Top Tape Strength

The top tape requires a peel-off force of 0.1 to 1.3N in the direction of the arrow as illustrated below.



Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment

RELIABILITY DATA

1. Operating Temperature Range

Specified Value -40~+125°C (Including self-generated heat)

Test Methods and Remarks Including self-generated heat

2. Storage Temperature Range

Specified Value -40~+85°C

Test Methods and Remarks -5 to 40°C for the product with taping.

3. Rated current

Specified Value Within the specified tolerance

4. Inductance

Specified Value Within the specified tolerance

Test Methods and Remarks Measuring equipment : LCR Meter (HP 4285A or equivalent)
Measuring frequency : 100kHz, 1V

5. DC Resistance

Specified Value Within the specified tolerance

Test Methods and Remarks Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)

6. High Temperature Exposure (Storage)

Specified Value Appearance: No significant abnormality in appearance.
Inductance change: Within $\pm 10\%$

Test Methods and Remarks 1000 hours at 85 deg C
Unpowered

7. Temperature Cycling

Specified Value Appearance: No significant abnormality in appearance.
Inductance change: Within $\pm 10\%$

Test Methods and Remarks 1000 cycles (-40 deg C to +85 deg C)
30 min. maximum dwell time at each temperature extreme.
1 min. maximum transition time.

8. Biased Humidity

Specified Value Appearance: No significant abnormality in appearance.
Inductance change: Within $\pm 10\%$

Test Methods and Remarks 1000 hours, 85 deg C/85% RH.
Unpowered

9. Operational Life

Specified Value Appearance: No significant abnormality in appearance.
Inductance change: Within $\pm 10\%$

Test Methods and Remarks 1000 hours, 85 deg C
Rated current

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10. Resistance to Solvents

Specified Value	Appearance : No significant abnormality in appearance.
Test Methods and Remarks	① Soak a test sample in isopropyl alcohol (IPA) at 25 ± 5 deg C for 3 to 3.5 minutes. ② Take the test sample out and brush 10 times using a brush soaked in IPA. ③ Repeat ① and ② twice more.

11. Mechanical Shock

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Apply 3 shocks in each direction along 3 mutually perpendicular axes of the test specimen (18 shocks in total). Peak value: 100g Duration: 6ms Test pulse: Half-sine Velocity change: 3.7m/s.

12. Vibration

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	5g's for 20 min., 12 cycles each of 3 orientations (36 cycles in total) Test from: 10 Hz to 2000 Hz

13. Resistance to Soldering Heat (Reflow)

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Reflow peak temperature: 250 ± 5 deg C Duration time: 30 ± 5 sec. Measure after inductors are kept at room temperature for 24 ± 4 hours.

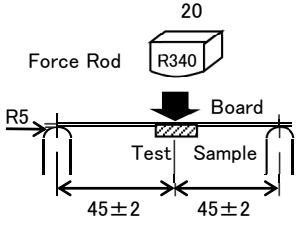
14. ESD

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Per AEC-Q200-002

15. Solderability

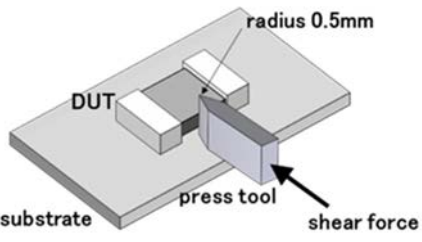
Specified Value	More than 90% of terminal electrode shall be covered with fresh solder.
Test Methods and Remarks	Per J-STD-002 a) Method B Solder at 235 ± 5 deg C for 5 sec. c) Method D Solder at 260 ± 5 deg C for 30 sec.

16. Board Flex

Specified Value	Appearance : No significant abnormality in appearance. Inductance change : Within $\pm 10\%$
Test Methods and Remarks	Solder the test samples to the test boards by the reflow soldering. Apply a force in a downward direction until amount of deflection reaches 2mm. The 2-mm deflection shall be held for 60 sec. Test board dimensions: 100mm × 40mm × 1.6mm. 

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17. Terminal Strength (SMD)

Specified Value	Appearance :No significant abnormality in appearance.
Test Methods and Remarks	<p>Apply a force of 17.7N for 60±5 sec.</p>  <p>The diagram shows a 3D perspective of the test setup. A rectangular substrate is shown in light gray. A small component, labeled 'DUT', is mounted on the substrate. A 'press tool' is positioned to apply force to the terminal of the DUT. The press tool has a rounded end with a 'radius 0.5mm'. An arrow labeled 'shear force' points to the terminal of the DUT, indicating the direction of the applied force.</p>

18. Standard condition

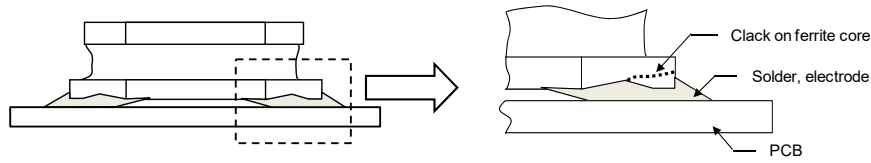
Specified Value	<p>Standard test condition : Unless otherwise specified, temperature is 20±15°C and 65±20%of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of 20±2°C of temperature, 65±5% relative humidity. Inductance is in accordance with our measured value.</p>
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Wire-wound Ferrite Power Inductors LAYP series for Automotive Powertrain and safety
 Wire-wound Ferrite Power Inductors LAXH series for Automotive Powertrain and safety
 Wire-wound Ferrite Power Inductors LCXN/LCXP series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LCXH series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Inductors for Class D Amplifier LCXA for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LCRN series for Automotive Body & Chassis and Infotainment
 Wire-wound Ferrite Power Inductors LBXN/LBXP series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LBXH series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LBRN series
 for Telecommunications Infrastructure and Industrial Equipment
 Wire-wound Ferrite Power Inductors LMXN/LMXP series
 for Medical Devices classified as GHTF Class C (Japan Class III)
 Wire-wound Ferrite Power Inductors LMXH series
 for Medical Devices classified as GHTF Class C (Japan Class III)
 Wire-wound Ferrite Power Inductors LMRN series
 for Medical Devices classified as GHTF Class C (Japan Class III)

■ PRECAUTIONS

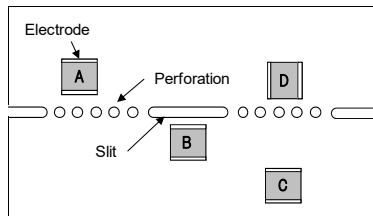
1. Circuit Design	
Precautions	<ul style="list-style-type: none"> ◆ Verification of operating environment, electrical rating and performance <ol style="list-style-type: none"> 1. A malfunction in medical equipment, spacecraft, nuclear reactors, etc. may cause serious harm to human life or have severe social ramifications. As such, any inductors to be used in such equipment may require higher safety and/or reliability considerations and should be clearly differentiated from components used in general purpose applications. 2. When inductors are used in places where dew condensation develops and/or where corrosive gas such as hydrogen sulfide, sulfurous acid, or chlorine exists in the air, characteristic deterioration may occur. Please do not use inductors under such environmental conditions. ◆ Operating Current (Verification of Rated current) <ol style="list-style-type: none"> 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. ◆ Temperature rise <p style="margin-left: 20px;">Temperature rise of power choke coil depends on the installation condition in end products. Make sure that temperature rise of power choke coils in actual end products is within the specified temperature range.</p>
2. PCB Design	
Precautions	<ul style="list-style-type: none"> ◆ Land pattern design <ol style="list-style-type: none"> 1. Please refer to a recommended land pattern. 2. There is stress, which has been caused by distortion of a PCB, to the inductor. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 3. Please consider the arrangement of parts on a PCB. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)
Technical considerations	<ul style="list-style-type: none"> ◆ Land pattern design <p>Surface Mounting</p> <ol style="list-style-type: none"> 1. Mounting and soldering conditions should be checked beforehand. 2. Applicable soldering process to this products is reflow soldering only. 3. Please use the recommended land pattern shown as below. Electrical characteristics and the mounting ability of the product are being considered in the recommended land pattern. If a PCB is designed with other dimensions, defective soldering and stress to a product may occur due to misalignment. The performance of the product may not be brought out. If an adopted land pattern is different from the recommended land pattern, stress to the product will increase. It may cause cracks or defective electrical characteristics of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) 4. As coefficients of thermal expansion between an inductor and a PCB differs, cracks may occur on a ferrite core when thermal stress is applied to them after mounting an inductor. (Please refer to the drawings below.) Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)

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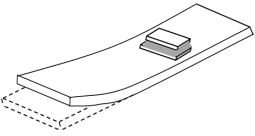
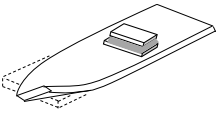
5. SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection. When splitting the PC board after mounting inductors and other components, care is required so as not to give any stresses of deflection or twisting to the board.

(LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH)

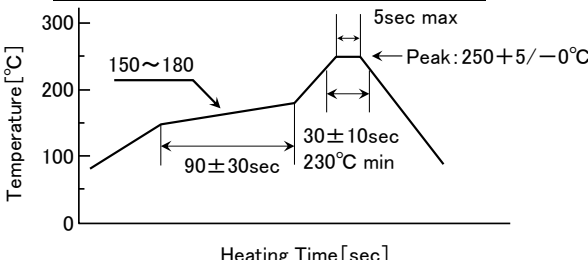
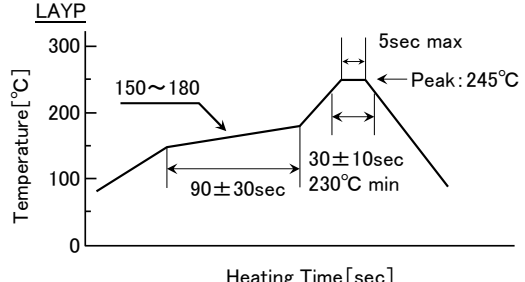


A product tends to undergo stress in order "A>C>B≡D". Please consider the layouts of a product to minimize any stresses.

3. Considerations for automatic placement

Precautions	<ul style="list-style-type: none"> ◆ Adjustment of mounting machine <ol style="list-style-type: none"> 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	<ul style="list-style-type: none"> ◆ Adjustment of mounting machine <ol style="list-style-type: none"> 1. When installing products, care should be taken not to apply distortion stress as it may deform the products. 2. Stress may be applied to a product with a warp or a twist in handling of the product. Please conduct validation completely before studying adoption of this product and please judge the pros and cons of adoption of this product with taking on responsibility. (LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP, LCXH/LCXA/LBXH/LMXH) <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><Wrap></p>  </div> <div style="text-align: center;"> <p><Twist></p>  </div> </div>

4. Soldering

Precautions	<ul style="list-style-type: none"> ◆ Reflow soldering <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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(Repair) <ul style="list-style-type: none"> • 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.
Technical considerations	<ul style="list-style-type: none"> ◆ Reflow soldering <ol style="list-style-type: none"> 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) <u>LAXH/LCXN/LCXP/LBXN/LBXP/LMXN/LMXP,</u> <u>LCXH/LCXA/LBXH/LMXH, LCRN/LBRN/LMRN</u> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>

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5. Cleaning	
Precautions	<ul style="list-style-type: none"> ◆ Cleaning conditions 1. Washing by supersonic waves shall be avoided.
Technical considerations	<ul style="list-style-type: none"> ◆ Cleaning conditions 1. If washed by supersonic waves, the products might be broken.
6. Handling	
Precautions	<ul style="list-style-type: none"> ◆ 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.
Technical considerations	<ul style="list-style-type: none"> ◆ 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. ◆ 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	<ul style="list-style-type: none"> ◆ 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. <ul style="list-style-type: none"> ▪ Storage conditions Ambient temperature : $-5\sim 40^{\circ}\text{C}$ Humidity : Below 70% RH ▪ The recommended ambient temperature is 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	<ul style="list-style-type: none"> ◆ 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.