

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

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

## 签署交货规格说明书

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

## 实装前的事前评估

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

## 用途的限定

### 1. 可以使用的设备

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

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

### 2. 需要另行确认的设备

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

- (1) 运输用设备 (汽车驱动控制设备、火车控制设备、船舶控制设备等)
- (2) 交通信号设备
- (3) 防灾 / 保安设备
- (4) 医疗设备 (国际 (GHTF) 第二类)
- (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<sup>(注释1)</sup>
- (3) 医疗设备 (国际 (GHTF) 第四类)、植体 (体内植入型) 医疗设备<sup>(注释2)</sup>
- (4) 发电控制设备 (面向核能 / 水力 / 火力发电厂等的设备)
- (5) 海底设备 (海底中继设备、海中的作业设备等)
- (6) 军事设备
- (7) 其他与上述设备有同等品质与可靠性要求的设备

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

注释 2：包括注入人体内的部分和与此相连接的体外部分。

## 4. 责任的限制

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

## 安全设计

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

## 有关知识产权

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

## 保证范围

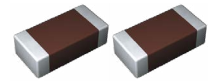
敝公司产品的保证范围仅限于已经交付的敝公司产品本身，由敝公司产品的故障或不良情况所诱发的损害，敝公司不承担任何责任，敬请知悉。但是，以书面形式另行签署了交易基本合同书、品质保证协定书等时，敝公司将根据该合同的条件提供保证。

## 正规销售渠道

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

## 出口时的注意事项

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



波峰焊

回流焊

## ■ 型号标示法

J	M	K	3	1	6	△	B	J	1	0	6	M	L	—	T	△
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫					

△=空格

## ① 额定电压

代码	额定电压 [VDC]
P	2.5
A	4
J	6.3
L	10
E	16
T	25
G	35
U	50
H	100
Q	250
S	630
X	2000

## ② 系列名称

代码	系列名称
M	多层电容器
V	高频用多层电容器
W	LW 逆转型多层电容器

## ③ 端接类型

代码	端接类型
K	电镀
S	Cu 内部电极 (高频波用)

## ④ 外型尺寸

规格	L×W [mm]	EIA (inch)
021	0.25 × 0.125	008004
042	0.4 × 0.2	01005
063	0.6 × 0.3	0201
105	1.0 × 0.5	0402
	0.52 × 1.0 ※	0204
107	1.6 × 0.8	0603
	0.8 × 1.6 ※	0306
212	2.0 × 1.25	0805
	1.25 × 2.0 ※	0508
316	3.2 × 1.6	1206
325	3.2 × 2.5	1210
432	4.5 × 3.2	1812

注: ※LW 逆转型 (□WK)

## ⑤ 产品尺寸公差

代码	规格	L [mm]	W [mm]	T [mm]
△	所有规格	标准	标准	标准
A	063	0.6±0.05	0.3±0.05	0.3±0.05
	105	1.0±0.10	0.5±0.10	0.5±0.10
	107	1.6+0.15/-0.05	0.8+0.15/-0.05	0.8+0.15/-0.05
	212	2.0+0.15/-0.05	1.25+0.15/-0.05	0.45±0.05 0.85±0.10 1.25+0.15/-0.05
	316	3.2±0.20	1.6±0.20	0.85±0.10 1.6±0.20
	325	3.2±0.30	2.5±0.30	2.5±0.30
B	063	0.6±0.09	0.3±0.09	0.3±0.09
	105	1.0+0.15/-0.05	0.5+0.15/-0.05	0.5+0.15/-0.05
	107	1.6+0.20/-0	0.8+0.20/-0	0.45±0.05 0.8+0.20/-0
	212	2.0+0.20/-0	1.25+0.20/-0	0.45±0.05 0.85±0.10 1.25+0.20/-0
	316	3.2±0.30	1.6±0.30	1.6±0.30
C	105	1.0+0.20/-0	0.5+0.20/-0	0.5+0.20/-0
E	063	0.6+0.25/-0	0.3+0.25/-0	0.3+0.25/-0
	105	1.0+0.30/-0	0.5+0.30/-0	0.5+0.30/-0

注: 参照标准产品的尺寸

△=空格

## ⑥ 温度特性

## ■ 高介电常数【超低失真多层陶瓷电容器 除外】

代码	适用标准	温度范围 [°C]	基准温度 [°C]	静电容量变化率	静电容量允许偏差	允许偏差代码
BJ	JIS	B	-25~+85	20	±10%	K
	EIA	X5R	-55~+85	25	±15%	±10% ±20% K M
B7	EIA	X7R	-55~+125	25	±15%	±10% K
						±20% M
C6	EIA	X6S	-55~+105	25	±22%	±10% K
						±20% M
C7	EIA	X7S	-55~+125	25	±22%	±10% K
						±20% M
LD(※)	EIA	X5R	-55~+85	25	±15%	±10% K
						±20% M

注: ※LD 低失真大容量多层陶瓷电容器

△=空格

▶ 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/>)。

## ■温度补偿用

代码	适用标准		温度范围 [°C]	基准温度 [°C]	静电容量变化率	静电容量允许偏差	允许偏差代码
CG	EIA	C0G	-55~+125	25	0±30ppm/°C	±0.05pF	A
						±0.1pF	B
						±0.25pF	C
						±0.5pF	D
						±5%	J
UJ	JIS	UJ	-55~+125	20	-750±120ppm/°C	±0.25pF	C
						±0.5pF	D
	EIA	U2J		25		±5%	J
UK	JIS	UK	-55~+125	20	-750±250ppm/°C	±0.25pF	C
	EIA	U2K	-55~+125	25			

## ⑥系列名称

· 超低失真多层陶瓷电容器

代码	系列名称
SD	标准品

· 中高耐压多层陶瓷电容器

代码	系列名称
SD	标准品

## ⑦静电容量

代码 (例)	静电容量
0R5	0.5pF
010	1pF
100	10pF
101	100pF
102	1,000pF
103	10,000pF
104	0.1 μF
105	1.0 μF
106	10 μF
107	100 μF

注: R=小数点

## ⑧静电容量允许偏差

代码	静电容量允许偏差
A	±0.05pF
B	±0.1pF
C	±0.25pF
D	±0.5pF
F	±1pF
G	±2%
J	±5%
K	±10%
M	±20%
Z	+80/-20%

## ⑨产品厚度

代码	产品厚度 [mm]
K	0.125
H	0.13
E	0.18
C	0.2
D	
P	0.3
T	
K	0.45 (107 型以上)
V	0.5
W	
A	0.8
D	0.85 (212 型以上)
F	1.15
G	1.25
L	1.6
N	1.9
Y	2.0 max
M	2.5

## ⑩个别规格

代码	个别规格
-	标准

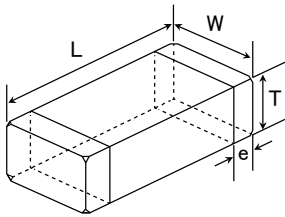
## ⑪包装

代码	包装规格
F	φ178mm 卷盘带装 (2mm 间距)
T	φ178mm 卷盘带装 (4mm 间距)
P	φ178mm 卷盘带装 (4mm 间距, 1000 个/卷盘) 325 规格 (厚度代码M)
R	φ178mm 卷盘带装 (2mm 间距) 105 规格 (厚度代码E,H)
W	φ178mm 压纹带 (1mm 间距) 021/042 规格专用

## ⑫管理记号

代码	管理记号
△	标准

## ■ 标准产品尺寸



※ LW逆转型

Type (EIA)	标准产品尺寸[mm]				
	L	W	T	*1	e
□MK021(008004)	0.25±0.013	0.125±0.013	0.125±0.013	K	0.0675±0.0275
□VS021(008004)	0.25±0.013	0.125±0.013	0.125±0.013	K	0.0675±0.0275
□MK042(01005)	0.4±0.02	0.2±0.02	0.2±0.02	C	0.1±0.03
□VS042(01005)	0.4±0.02	0.2±0.02	0.2±0.02	D	
□MK063(0201)	0.6±0.03	0.3±0.03	0.3±0.03	P	0.15±0.05
				T	
□MK105(0402)	1.0±0.05	0.5±0.05	0.13±0.02	H	0.25±0.10
			0.18±0.02	E	
			0.2±0.02	C	
			0.3±0.03	P	
			0.5±0.05	V	
□VK105(0402)	1.0±0.05	0.5±0.05	0.5±0.05	W	0.25±0.10
□WK105(0204)※	0.52±0.05	1.0±0.05	0.3±0.05	P	0.18±0.08
□MK107(0603)	1.6±0.10	0.8±0.10	0.45±0.05	K	0.35±0.25
			0.8±0.10	A	
□WK107(0306)※	0.8±0.10	1.6±0.10	0.5±0.05	V	0.25±0.15
□MK212(0805)	2.0±0.10	1.25±0.10	0.45±0.05	K	0.5±0.25
			0.85±0.10	D	
			1.25±0.10	G	
□WK212(0508)※	1.25±0.15	2.0±0.15	0.85±0.10	D	0.3±0.2
□MK316(1206)	3.2±0.15	1.6±0.15	0.85±0.10	D	0.5+0.35/-0.25
			1.15±0.10	F	
			1.6±0.20	L	
□MK325(1210)	3.2±0.30	2.5±0.20	0.85±0.10	D	0.6±0.3
			1.15±0.10	F	
			1.9±0.20	N	
			1.9+0.1/-0.2	Y	
			2.5±0.20	M	
□MK432(1812)	4.5±0.40	3.2±0.30	2.0+0/-0.30	Y	0.6±0.4
			2.5±0.20	M	0.9±0.6

注: ※LW 逆转型、\*1 产品厚度代码

## ■ 标准包装

规格	EIA (inch)	产品厚度		标准数量 [pcs]	
		[mm]	代码	纸带	压纹带
021	008004	0.125	K	—	50000
042	01005	0.2	C	—	40000
			D		
063	0201	0.3	P	15000	—
			T		
105	0402	0.13	H	—	20000
		0.18	E	—	15000
		0.2	C	20000	—
		0.3	P	15000	—
		0.5	V	10000	—
	W				
	0204 ※	0.30	P		
107	0603	0.45	K	4000	—
		0.8	A		
	0306 ※	0.50	V	—	4000
212	0805	0.45	K	4000	—
		0.85	D		
		1.25	G		
	0508 ※	0.85	D	4000	—
316	1206	0.85	D	4000	—
		1.15	F	—	3000
		1.6	L	—	2000
325	1210	0.85	D	—	2000
		1.15	F		
		1.9	N		
		2.0 max	Y		
		2.5	M	—	1000
432	1812	2.0 max	Y	—	1000
		2.5	M	—	500

注: ※LW 逆转型 (□WK)

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多层陶瓷电容器 (温度补偿用)

● 021型

【温度特性 CG : CG/COG (-55~+125°C)】厚度 0.125mm (K)

型号1	型号2	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差	Q值 (at 1MHz) (min)	高温负载	厚度*3 [mm]	焊接方式 R: 回流焊 W: 波峰焊
							额定电压 x %		
TMK021 CG010□K-W		25	CG COG	1 p	±0.1pF, ±0.25pF	420	200	0.125±0.013	R
TMK021 CG1R1□K-W			CG COG	1.1 p	±0.1pF, ±0.25pF	422	200	0.125±0.013	R
TMK021 CG1R2□K-W			CG COG	1.2 p	±0.1pF, ±0.25pF	424	200	0.125±0.013	R
TMK021 CG1R3□K-W			CG COG	1.3 p	±0.1pF, ±0.25pF	426	200	0.125±0.013	R
TMK021 CG1R4□K-W			CG COG	1.4 p	±0.1pF, ±0.25pF	428	200	0.125±0.013	R
TMK021 CG1R5□K-W			CG COG	1.5 p	±0.1pF, ±0.25pF	430	200	0.125±0.013	R
TMK021 CG1R6□K-W			CG COG	1.6 p	±0.1pF, ±0.25pF	432	200	0.125±0.013	R
TMK021 CG1R7□K-W			CG COG	1.7 p	±0.1pF, ±0.25pF	434	200	0.125±0.013	R
TMK021 CG1R8□K-W			CG COG	1.8 p	±0.1pF, ±0.25pF	436	200	0.125±0.013	R
TMK021 CG1R9□K-W			CG COG	1.9 p	±0.1pF, ±0.25pF	438	200	0.125±0.013	R
TMK021 CG020□K-W			CG COG	2 p	±0.1pF, ±0.25pF	440	200	0.125±0.013	R
TMK021 CG2R1□K-W			CG COG	2.1 p	±0.1pF, ±0.25pF	442	200	0.125±0.013	R
TMK021 CG2R2□K-W			CG COG	2.2 p	±0.1pF, ±0.25pF	444	200	0.125±0.013	R
TMK021 CG2R3□K-W			CG COG	2.3 p	±0.1pF, ±0.25pF	446	200	0.125±0.013	R
TMK021 CG2R4□K-W			CG COG	2.4 p	±0.1pF, ±0.25pF	448	200	0.125±0.013	R
TMK021 CG2R5□K-W			CG COG	2.5 p	±0.1pF, ±0.25pF	450	200	0.125±0.013	R
TMK021 CG2R6□K-W			CG COG	2.6 p	±0.1pF, ±0.25pF	452	200	0.125±0.013	R
TMK021 CG2R7□K-W			CG COG	2.7 p	±0.1pF, ±0.25pF	454	200	0.125±0.013	R
TMK021 CG2R8□K-W			CG COG	2.8 p	±0.1pF, ±0.25pF	456	200	0.125±0.013	R
TMK021 CG2R9□K-W			CG COG	2.9 p	±0.1pF, ±0.25pF	458	200	0.125±0.013	R
TMK021 CG030□K-W			CG COG	3 p	±0.1pF, ±0.25pF	460	200	0.125±0.013	R
TMK021 CG3R1□K-W			CG COG	3.1 p	±0.1pF, ±0.25pF	462	200	0.125±0.013	R
TMK021 CG3R2□K-W			CG COG	3.2 p	±0.1pF, ±0.25pF	464	200	0.125±0.013	R
TMK021 CG3R3□K-W			CG COG	3.3 p	±0.1pF, ±0.25pF	466	200	0.125±0.013	R
TMK021 CG3R4□K-W			CG COG	3.4 p	±0.1pF, ±0.25pF	468	200	0.125±0.013	R
TMK021 CG3R5□K-W			CG COG	3.5 p	±0.1pF, ±0.25pF	470	200	0.125±0.013	R
TMK021 CG3R6□K-W			CG COG	3.6 p	±0.1pF, ±0.25pF	472	200	0.125±0.013	R
TMK021 CG3R7□K-W			CG COG	3.7 p	±0.1pF, ±0.25pF	474	200	0.125±0.013	R
TMK021 CG3R8□K-W			CG COG	3.8 p	±0.1pF, ±0.25pF	476	200	0.125±0.013	R
TMK021 CG3R9□K-W			CG COG	3.9 p	±0.1pF, ±0.25pF	478	200	0.125±0.013	R
TMK021 CG040□K-W			CG COG	4 p	±0.1pF, ±0.25pF	480	200	0.125±0.013	R
TMK021 CG4R1□K-W			CG COG	4.1 p	±0.1pF, ±0.25pF	482	200	0.125±0.013	R
TMK021 CG4R2□K-W			CG COG	4.2 p	±0.1pF, ±0.25pF	484	200	0.125±0.013	R
TMK021 CG4R3□K-W			CG COG	4.3 p	±0.1pF, ±0.25pF	486	200	0.125±0.013	R
TMK021 CG4R4□K-W			CG COG	4.4 p	±0.1pF, ±0.25pF	488	200	0.125±0.013	R
TMK021 CG4R5□K-W			CG COG	4.5 p	±0.1pF, ±0.25pF	490	200	0.125±0.013	R
TMK021 CG4R6□K-W			CG COG	4.6 p	±0.1pF, ±0.25pF	492	200	0.125±0.013	R
TMK021 CG4R7□K-W			CG COG	4.7 p	±0.1pF, ±0.25pF	494	200	0.125±0.013	R
TMK021 CG4R8□K-W			CG COG	4.8 p	±0.1pF, ±0.25pF	496	200	0.125±0.013	R
TMK021 CG4R9□K-W			CG COG	4.9 p	±0.1pF, ±0.25pF	498	200	0.125±0.013	R
TMK021 CG050□K-W			CG COG	5 p	±0.1pF, ±0.25pF	500	200	0.125±0.013	R
TMK021 CG5R1□K-W			CG COG	5.1 p	±0.25pF, ±0.5pF	502	200	0.125±0.013	R
TMK021 CG5R2□K-W			CG COG	5.2 p	±0.25pF, ±0.5pF	504	200	0.125±0.013	R
TMK021 CG5R3□K-W			CG COG	5.3 p	±0.25pF, ±0.5pF	506	200	0.125±0.013	R
TMK021 CG5R4□K-W			CG COG	5.4 p	±0.25pF, ±0.5pF	508	200	0.125±0.013	R
TMK021 CG5R5□K-W			CG COG	5.5 p	±0.25pF, ±0.5pF	510	200	0.125±0.013	R
TMK021 CG5R6□K-W			CG COG	5.6 p	±0.25pF, ±0.5pF	512	200	0.125±0.013	R
TMK021 CG5R7□K-W			CG COG	5.7 p	±0.25pF, ±0.5pF	514	200	0.125±0.013	R
TMK021 CG5R8□K-W			CG COG	5.8 p	±0.25pF, ±0.5pF	516	200	0.125±0.013	R
TMK021 CG5R9□K-W			CG COG	5.9 p	±0.25pF, ±0.5pF	518	200	0.125±0.013	R
TMK021 CG060□K-W			CG COG	6 p	±0.25pF, ±0.5pF	520	200	0.125±0.013	R
TMK021 CG6R1□K-W			CG COG	6.1 p	±0.25pF, ±0.5pF	522	200	0.125±0.013	R
TMK021 CG6R2□K-W			CG COG	6.2 p	±0.25pF, ±0.5pF	524	200	0.125±0.013	R
TMK021 CG6R3□K-W			CG COG	6.3 p	±0.25pF, ±0.5pF	526	200	0.125±0.013	R
TMK021 CG6R4□K-W			CG COG	6.4 p	±0.25pF, ±0.5pF	528	200	0.125±0.013	R
TMK021 CG6R5□K-W			CG COG	6.5 p	±0.25pF, ±0.5pF	530	200	0.125±0.013	R
TMK021 CG6R6□K-W			CG COG	6.6 p	±0.25pF, ±0.5pF	532	200	0.125±0.013	R
TMK021 CG6R7□K-W			CG COG	6.7 p	±0.25pF, ±0.5pF	534	200	0.125±0.013	R
TMK021 CG6R8□K-W		CG COG	6.8 p	±0.25pF, ±0.5pF	536	200	0.125±0.013	R	
TMK021 CG6R9□K-W		CG COG	6.9 p	±0.25pF, ±0.5pF	538	200	0.125±0.013	R	
TMK021 CG070□K-W		CG COG	7 p	±0.25pF, ±0.5pF	540	200	0.125±0.013	R	
TMK021 CG7R1□K-W		CG COG	7.1 p	±0.25pF, ±0.5pF	542	200	0.125±0.013	R	
TMK021 CG7R2□K-W		CG COG	7.2 p	±0.25pF, ±0.5pF	544	200	0.125±0.013	R	
TMK021 CG7R3□K-W		CG COG	7.3 p	±0.25pF, ±0.5pF	546	200	0.125±0.013	R	
TMK021 CG7R4□K-W		CG COG	7.4 p	±0.25pF, ±0.5pF	548	200	0.125±0.013	R	
TMK021 CG7R5□K-W		CG COG	7.5 p	±0.25pF, ±0.5pF	550	200	0.125±0.013	R	
TMK021 CG7R6□K-W		CG COG	7.6 p	±0.25pF, ±0.5pF	552	200	0.125±0.013	R	
TMK021 CG7R7□K-W		CG COG	7.7 p	±0.25pF, ±0.5pF	554	200	0.125±0.013	R	
TMK021 CG7R8□K-W		CG COG	7.8 p	±0.25pF, ±0.5pF	556	200	0.125±0.013	R	
TMK021 CG7R9□K-W		CG COG	7.9 p	±0.25pF, ±0.5pF	558	200	0.125±0.013	R	
TMK021 CG080□K-W		CG COG	8 p	±0.25pF, ±0.5pF	560	200	0.125±0.013	R	
TMK021 CG8R1□K-W		CG COG	8.1 p	±0.25pF, ±0.5pF	562	200	0.125±0.013	R	
TMK021 CG8R2□K-W		CG COG	8.2 p	±0.25pF, ±0.5pF	564	200	0.125±0.013	R	
TMK021 CG8R3□K-W		CG COG	8.3 p	±0.25pF, ±0.5pF	566	200	0.125±0.013	R	
TMK021 CG8R4□K-W		CG COG	8.4 p	±0.25pF, ±0.5pF	568	200	0.125±0.013	R	
TMK021 CG8R5□K-W		CG COG	8.5 p	±0.25pF, ±0.5pF	570	200	0.125±0.013	R	
TMK021 CG8R6□K-W		CG COG	8.6 p	±0.25pF, ±0.5pF	572	200	0.125±0.013	R	
TMK021 CG8R7□K-W		CG COG	8.7 p	±0.25pF, ±0.5pF	574	200	0.125±0.013	R	
TMK021 CG8R8□K-W		CG COG	8.8 p	±0.25pF, ±0.5pF	576	200	0.125±0.013	R	
TMK021 CG8R9□K-W		CG COG	8.9 p	±0.25pF, ±0.5pF	578	200	0.125±0.013	R	
TMK021 CG090□K-W		CG COG	9 p	±0.25pF, ±0.5pF	580	200	0.125±0.013	R	
TMK021 CG9R1□K-W		CG COG	9.1 p	±0.25pF, ±0.5pF	582	200	0.125±0.013	R	
TMK021 CG9R2□K-W		CG COG	9.2 p	±0.25pF, ±0.5pF	584	200	0.125±0.013	R	
TMK021 CG9R3□K-W		CG COG	9.3 p	±0.25pF, ±0.5pF	586	200	0.125±0.013	R	
TMK021 CG9R4□K-W		CG COG	9.4 p	±0.25pF, ±0.5pF	588	200	0.125±0.013	R	

▶ 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/>)。

型号一览

型号1	型号2	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差	Q值 (at 1MHz) (min)	高温负载	厚度*3 [mm]	焊接方式 R: 回流焊 W: 波峰焊
								额定电压 x %		
TMK021 CG9R5□K-W		25	CG	C0G	9.5 p	±0.25pF, ±0.5pF	590	200	0.125±0.013	R
TMK021 CG9R6□K-W			CG	C0G	9.6 p	±0.25pF, ±0.5pF	592	200	0.125±0.013	R
TMK021 CG9R7□K-W			CG	C0G	9.7 p	±0.25pF, ±0.5pF	594	200	0.125±0.013	R
TMK021 CG9R8□K-W			CG	C0G	9.8 p	±0.25pF, ±0.5pF	596	200	0.125±0.013	R
TMK021 CG9R9□K-W			CG	C0G	9.9 p	±0.25pF, ±0.5pF	598	200	0.125±0.013	R
TMK021 CG100DK-W			CG	C0G	10 p	±0.5pF	600	200	0.125±0.013	R
TMK021 CG120JK-W			CG	C0G	12 p	±5%	640	200	0.125±0.013	R
TMK021 CG150JK-W			CG	C0G	15 p	±5%	700	200	0.125±0.013	R
TMK021 CG180JK-W			CG	C0G	18 p	±5%	760	200	0.125±0.013	R
TMK021 CG220JK-W			CG	C0G	22 p	±5%	840	200	0.125±0.013	R
TMK021 CG270JK-W			CG	C0G	27 p	±5%	940	200	0.125±0.013	R
EMK021 CG330JK-W			CG	C0G	33 p	±5%	1000	150	0.125±0.013	R
EMK021 CG390JK-W			CG	C0G	39 p	±5%	1000	150	0.125±0.013	R
EMK021 CG470JK-W			CG	C0G	47 p	±5%	1000	150	0.125±0.013	R
EMK021 CG560JK-W			CG	C0G	56 p	±5%	1000	150	0.125±0.013	R
LMK021 CG680JK-W			CG	C0G	68 p	±5%	1000	200	0.125±0.013	R
LMK021 CG820JK-W		CG	C0G	82 p	±5%	1000	200	0.125±0.013	R	
LMK021 CG101JK-W		CG	C0G	100 p	±5%	1000	200	0.125±0.013	R	

042型

【温度特性 CG : CG/C0G (-55~+125°C) 厚度 0.2mm (C,D)

型号1	型号2	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差	Q值 (at 1MHz) (min)	高温负载	厚度*3 [mm]	焊接方式 R: 回流焊 W: 波峰焊
								额定电压 x %		
TMK042 CG010□D-W		25	CG	C0G	1 p	±0.05pF, ±0.1pF, ±0.25pF	420	200	0.2±0.02	R
TMK042 CG1R1□D-W			CG	C0G	1.1 p	±0.05pF, ±0.1pF, ±0.25pF	422	200	0.2±0.02	R
TMK042 CG1R2□D-W			CG	C0G	1.2 p	±0.05pF, ±0.1pF, ±0.25pF	424	200	0.2±0.02	R
TMK042 CG1R3□D-W			CG	C0G	1.3 p	±0.05pF, ±0.1pF, ±0.25pF	426	200	0.2±0.02	R
TMK042 CG1R4□D-W			CG	C0G	1.4 p	±0.05pF, ±0.1pF, ±0.25pF	428	200	0.2±0.02	R
TMK042 CG1R5□D-W			CG	C0G	1.5 p	±0.05pF, ±0.1pF, ±0.25pF	430	200	0.2±0.02	R
TMK042 CG1R6□D-W			CG	C0G	1.6 p	±0.05pF, ±0.1pF, ±0.25pF	432	200	0.2±0.02	R
TMK042 CG1R7□D-W			CG	C0G	1.7 p	±0.05pF, ±0.1pF, ±0.25pF	434	200	0.2±0.02	R
TMK042 CG1R8□D-W			CG	C0G	1.8 p	±0.05pF, ±0.1pF, ±0.25pF	436	200	0.2±0.02	R
TMK042 CG1R9□D-W			CG	C0G	1.9 p	±0.05pF, ±0.1pF, ±0.25pF	438	200	0.2±0.02	R
TMK042 CG020□D-W			CG	C0G	2 p	±0.05pF, ±0.1pF, ±0.25pF	440	200	0.2±0.02	R
TMK042 CG2R1□D-W			CG	C0G	2.1 p	±0.05pF, ±0.1pF, ±0.25pF	442	200	0.2±0.02	R
TMK042 CG2R2□D-W			CG	C0G	2.2 p	±0.05pF, ±0.1pF, ±0.25pF	444	200	0.2±0.02	R
TMK042 CG2R3□D-W			CG	C0G	2.3 p	±0.05pF, ±0.1pF, ±0.25pF	446	200	0.2±0.02	R
TMK042 CG2R4□D-W			CG	C0G	2.4 p	±0.05pF, ±0.1pF, ±0.25pF	448	200	0.2±0.02	R
TMK042 CG2R5□D-W			CG	C0G	2.5 p	±0.05pF, ±0.1pF, ±0.25pF	450	200	0.2±0.02	R
TMK042 CG2R6□D-W			CG	C0G	2.6 p	±0.05pF, ±0.1pF, ±0.25pF	452	200	0.2±0.02	R
TMK042 CG2R7□D-W			CG	C0G	2.7 p	±0.05pF, ±0.1pF, ±0.25pF	454	200	0.2±0.02	R
TMK042 CG2R8□D-W			CG	C0G	2.8 p	±0.05pF, ±0.1pF, ±0.25pF	456	200	0.2±0.02	R
TMK042 CG2R9□D-W			CG	C0G	2.9 p	±0.05pF, ±0.1pF, ±0.25pF	458	200	0.2±0.02	R
TMK042 CG030□D-W			CG	C0G	3 p	±0.05pF, ±0.1pF, ±0.25pF	460	200	0.2±0.02	R
TMK042 CG3R1□D-W			CG	C0G	3.1 p	±0.1pF, ±0.25pF	462	200	0.2±0.02	R
TMK042 CG3R2□D-W			CG	C0G	3.2 p	±0.1pF, ±0.25pF	464	200	0.2±0.02	R
TMK042 CG3R3□D-W			CG	C0G	3.3 p	±0.1pF, ±0.25pF	466	200	0.2±0.02	R
TMK042 CG3R4□D-W			CG	C0G	3.4 p	±0.1pF, ±0.25pF	468	200	0.2±0.02	R
TMK042 CG3R5□D-W			CG	C0G	3.5 p	±0.1pF, ±0.25pF	470	200	0.2±0.02	R
TMK042 CG3R6□D-W			CG	C0G	3.6 p	±0.1pF, ±0.25pF	472	200	0.2±0.02	R
TMK042 CG3R7□D-W			CG	C0G	3.7 p	±0.1pF, ±0.25pF	474	200	0.2±0.02	R
TMK042 CG3R8□D-W			CG	C0G	3.8 p	±0.1pF, ±0.25pF	476	200	0.2±0.02	R
TMK042 CG3R9□D-W			CG	C0G	3.9 p	±0.1pF, ±0.25pF	478	200	0.2±0.02	R
TMK042 CG040□D-W			CG	C0G	4 p	±0.1pF, ±0.25pF	480	200	0.2±0.02	R
TMK042 CG4R1□D-W			CG	C0G	4.1 p	±0.1pF, ±0.25pF	482	200	0.2±0.02	R
TMK042 CG4R2□D-W			CG	C0G	4.2 p	±0.1pF, ±0.25pF	484	200	0.2±0.02	R
TMK042 CG4R3□D-W			CG	C0G	4.3 p	±0.1pF, ±0.25pF	486	200	0.2±0.02	R
TMK042 CG4R4□D-W			CG	C0G	4.4 p	±0.1pF, ±0.25pF	488	200	0.2±0.02	R
TMK042 CG4R5□D-W			CG	C0G	4.5 p	±0.1pF, ±0.25pF	490	200	0.2±0.02	R
TMK042 CG4R6□D-W			CG	C0G	4.6 p	±0.1pF, ±0.25pF	492	200	0.2±0.02	R
TMK042 CG4R7□D-W			CG	C0G	4.7 p	±0.1pF, ±0.25pF	494	200	0.2±0.02	R
TMK042 CG4R8□D-W			CG	C0G	4.8 p	±0.1pF, ±0.25pF	496	200	0.2±0.02	R
TMK042 CG4R9□D-W			CG	C0G	4.9 p	±0.1pF, ±0.25pF	498	200	0.2±0.02	R
TMK042 CG050□D-W			CG	C0G	5 p	±0.1pF, ±0.25pF	500	200	0.2±0.02	R
TMK042 CG5R1□D-W			CG	C0G	5.1 p	±0.1pF, ±0.25pF, ±0.5pF	502	200	0.2±0.02	R
TMK042 CG5R2□D-W			CG	C0G	5.2 p	±0.1pF, ±0.25pF, ±0.5pF	504	200	0.2±0.02	R
TMK042 CG5R3□D-W			CG	C0G	5.3 p	±0.1pF, ±0.25pF, ±0.5pF	506	200	0.2±0.02	R
TMK042 CG5R4□D-W			CG	C0G	5.4 p	±0.1pF, ±0.25pF, ±0.5pF	508	200	0.2±0.02	R
TMK042 CG5R5□D-W			CG	C0G	5.5 p	±0.1pF, ±0.25pF, ±0.5pF	510	200	0.2±0.02	R
TMK042 CG5R6□D-W			CG	C0G	5.6 p	±0.1pF, ±0.25pF, ±0.5pF	512	200	0.2±0.02	R
TMK042 CG5R7□D-W			CG	C0G	5.7 p	±0.1pF, ±0.25pF, ±0.5pF	514	200	0.2±0.02	R
TMK042 CG5R8□D-W			CG	C0G	5.8 p	±0.1pF, ±0.25pF, ±0.5pF	516	200	0.2±0.02	R
TMK042 CG5R9□D-W			CG	C0G	5.9 p	±0.1pF, ±0.25pF, ±0.5pF	518	200	0.2±0.02	R
TMK042 CG060□D-W			CG	C0G	6 p	±0.1pF, ±0.25pF, ±0.5pF	520	200	0.2±0.02	R
TMK042 CG6R1□D-W			CG	C0G	6.1 p	±0.1pF, ±0.25pF, ±0.5pF	522	200	0.2±0.02	R
TMK042 CG6R2□D-W			CG	C0G	6.2 p	±0.1pF, ±0.25pF, ±0.5pF	524	200	0.2±0.02	R
TMK042 CG6R3□D-W			CG	C0G	6.3 p	±0.1pF, ±0.25pF, ±0.5pF	526	200	0.2±0.02	R
TMK042 CG6R4□D-W			CG	C0G	6.4 p	±0.1pF, ±0.25pF, ±0.5pF	528	200	0.2±0.02	R
TMK042 CG6R5□D-W			CG	C0G	6.5 p	±0.1pF, ±0.25pF, ±0.5pF	530	200	0.2±0.02	R
TMK042 CG6R6□D-W			CG	C0G	6.6 p	±0.1pF, ±0.25pF, ±0.5pF	532	200	0.2±0.02	R
TMK042 CG6R7□D-W			CG	C0G	6.7 p	±0.1pF, ±0.25pF, ±0.5pF	534	200	0.2±0.02	R
TMK042 CG6R8□D-W			CG	C0G	6.8 p	±0.1pF, ±0.25pF, ±0.5pF	536	200	0.2±0.02	R
TMK042 CG6R9□D-W			CG	C0G	6.9 p	±0.1pF, ±0.25pF, ±0.5pF	538	200	0.2±0.02	R
TMK042 CG070□D-W			CG	C0G	7 p	±0.1pF, ±0.25pF, ±0.5pF	540	200	0.2±0.02	R
TMK042 CG7R1□D-W			CG	C0G	7.1 p	±0.1pF, ±0.25pF, ±0.5pF	542	200	0.2±0.02	R
TMK042 CG7R2□D-W			CG	C0G	7.2 p	±0.1pF, ±0.25pF, ±0.5pF	544	200	0.2±0.02	R
TMK042 CG7R3□D-W			CG	C0G	7.3 p	±0.1pF, ±0.25pF, ±0.5pF	546	200	0.2±0.02	R

▶ 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/>)。

陶瓷电容器  
多层陶瓷电容器

型号1	型号2	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差	Q值 (at 1MHz) (min)	高温负载	厚度*3 [mm]	焊接方式 R: 回流焊 W: 波峰焊
							额定电压 x %		
TMK042 CG7R4[D-W]		25	CG C0G	7.4 p	±0.1pF, ±0.25pF, ±0.5pF	548	200	0.2±0.02	R
TMK042 CG7R5[D-W]			CG C0G	7.5 p	±0.1pF, ±0.25pF, ±0.5pF	550	200	0.2±0.02	R
TMK042 CG7R6[D-W]			CG C0G	7.6 p	±0.1pF, ±0.25pF, ±0.5pF	552	200	0.2±0.02	R
TMK042 CG7R7[D-W]			CG C0G	7.7 p	±0.1pF, ±0.25pF, ±0.5pF	554	200	0.2±0.02	R
TMK042 CG7R8[D-W]			CG C0G	7.8 p	±0.1pF, ±0.25pF, ±0.5pF	556	200	0.2±0.02	R
TMK042 CG7R9[D-W]			CG C0G	7.9 p	±0.1pF, ±0.25pF, ±0.5pF	558	200	0.2±0.02	R
TMK042 CG8R0[D-W]			CG C0G	8 p	±0.1pF, ±0.25pF, ±0.5pF	560	200	0.2±0.02	R
TMK042 CG8R1[D-W]			CG C0G	8.1 p	±0.1pF, ±0.25pF, ±0.5pF	562	200	0.2±0.02	R
TMK042 CG8R2[D-W]			CG C0G	8.2 p	±0.1pF, ±0.25pF, ±0.5pF	564	200	0.2±0.02	R
TMK042 CG8R3[D-W]			CG C0G	8.3 p	±0.1pF, ±0.25pF, ±0.5pF	566	200	0.2±0.02	R
TMK042 CG8R4[D-W]			CG C0G	8.4 p	±0.1pF, ±0.25pF, ±0.5pF	568	200	0.2±0.02	R
TMK042 CG8R5[D-W]			CG C0G	8.5 p	±0.1pF, ±0.25pF, ±0.5pF	570	200	0.2±0.02	R
TMK042 CG8R6[D-W]			CG C0G	8.6 p	±0.1pF, ±0.25pF, ±0.5pF	572	200	0.2±0.02	R
TMK042 CG8R7[D-W]			CG C0G	8.7 p	±0.1pF, ±0.25pF, ±0.5pF	574	200	0.2±0.02	R
TMK042 CG8R8[D-W]			CG C0G	8.8 p	±0.1pF, ±0.25pF, ±0.5pF	576	200	0.2±0.02	R
TMK042 CG8R9[D-W]			CG C0G	8.9 p	±0.1pF, ±0.25pF, ±0.5pF	578	200	0.2±0.02	R
TMK042 CG9R0[D-W]			CG C0G	9 p	±0.1pF, ±0.25pF, ±0.5pF	580	200	0.2±0.02	R
TMK042 CG9R1[D-W]			CG C0G	9.1 p	±0.1pF, ±0.25pF, ±0.5pF	582	200	0.2±0.02	R
TMK042 CG9R2[D-W]			CG C0G	9.2 p	±0.1pF, ±0.25pF, ±0.5pF	584	200	0.2±0.02	R
TMK042 CG9R3[D-W]			CG C0G	9.3 p	±0.1pF, ±0.25pF, ±0.5pF	586	200	0.2±0.02	R
TMK042 CG9R4[D-W]			CG C0G	9.4 p	±0.1pF, ±0.25pF, ±0.5pF	588	200	0.2±0.02	R
TMK042 CG9R5[D-W]			CG C0G	9.5 p	±0.1pF, ±0.25pF, ±0.5pF	590	200	0.2±0.02	R
TMK042 CG9R6[D-W]			CG C0G	9.6 p	±0.1pF, ±0.25pF, ±0.5pF	592	200	0.2±0.02	R
TMK042 CG9R7[D-W]			CG C0G	9.7 p	±0.1pF, ±0.25pF, ±0.5pF	594	200	0.2±0.02	R
TMK042 CG9R8[D-W]			CG C0G	9.8 p	±0.1pF, ±0.25pF, ±0.5pF	596	200	0.2±0.02	R
TMK042 CG9R9[D-W]			CG C0G	9.9 p	±0.1pF, ±0.25pF, ±0.5pF	598	200	0.2±0.02	R
TMK042 CG100DD-W			CG C0G	10 p	±5%	600	200	0.2±0.02	R
TMK042 CG110JD-W			CG C0G	11 p	±5%	620	200	0.2±0.02	R
TMK042 CG120JD-W			CG C0G	12 p	±5%	640	200	0.2±0.02	R
TMK042 CG130JD-W			CG C0G	13 p	±5%	660	200	0.2±0.02	R
TMK042 CG150JD-W			CG C0G	15 p	±5%	700	200	0.2±0.02	R
TMK042 CG160JC-W			CG C0G	16 p	±5%	720	200	0.2±0.02	R
TMK042 CG180JC-W			CG C0G	18 p	±5%	760	200	0.2±0.02	R
TMK042 CG200JC-W			CG C0G	20 p	±5%	800	200	0.2±0.02	R
TMK042 CG220JC-W			CG C0G	22 p	±5%	840	200	0.2±0.02	R
TMK042 CG240JC-W			CG C0G	24 p	±5%	880	200	0.2±0.02	R
TMK042 CG270JC-W			CG C0G	27 p	±5%	940	200	0.2±0.02	R
TMK042 CG300JC-W			CG C0G	30 p	±5%	1000	200	0.2±0.02	R
TMK042 CG330JC-W			CG C0G	33 p	±5%	1000	200	0.2±0.02	R
TMK042 CG360JC-W			CG C0G	36 p	±5%	1000	200	0.2±0.02	R
TMK042 CG390JC-W			CG C0G	39 p	±5%	1000	200	0.2±0.02	R
TMK042 CG430JC-W			CG C0G	43 p	±5%	1000	200	0.2±0.02	R
TMK042 CG470JC-W			CG C0G	47 p	±5%	1000	200	0.2±0.02	R
TMK042 CG510JC-W			CG C0G	51 p	±5%	1000	200	0.2±0.02	R
TMK042 CG560JC-W			CG C0G	56 p	±5%	1000	200	0.2±0.02	R
TMK042 CG620JC-W			CG C0G	62 p	±5%	1000	200	0.2±0.02	R
TMK042 CG680JC-W			CG C0G	68 p	±5%	1000	200	0.2±0.02	R
TMK042 CG750JC-W			CG C0G	75 p	±5%	1000	200	0.2±0.02	R
TMK042 CG820JC-W			CG C0G	82 p	±5%	1000	200	0.2±0.02	R
TMK042 CG910JC-W			CG C0G	91 p	±5%	1000	200	0.2±0.02	R
TMK042 CG101JC-W		CG C0G	100 p	±5%	1000	200	0.2±0.02	R	

【温度特性 CG : CG/C0G (-55~+125°C)】厚度 0.2mm (C,D)

型号1	型号2	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差	Q值 (at 1MHz) (min)	高温负载	厚度*3 [mm]	焊接方式 R: 回流焊 W: 波峰焊
							额定电压 x %		
EMK042 CG010[D-W]		16	CG C0G	1 p	±0.05pF, ±0.1pF, ±0.25pF	420	200	0.2±0.02	R
EMK042 CG1R1[D-W]			CG C0G	1.1 p	±0.05pF, ±0.1pF, ±0.25pF	422	200	0.2±0.02	R
EMK042 CG1R2[D-W]			CG C0G	1.2 p	±0.05pF, ±0.1pF, ±0.25pF	424	200	0.2±0.02	R
EMK042 CG1R3[D-W]			CG C0G	1.3 p	±0.05pF, ±0.1pF, ±0.25pF	426	200	0.2±0.02	R
EMK042 CG1R4[D-W]			CG C0G	1.4 p	±0.05pF, ±0.1pF, ±0.25pF	428	200	0.2±0.02	R
EMK042 CG1R5[D-W]			CG C0G	1.5 p	±0.05pF, ±0.1pF, ±0.25pF	430	200	0.2±0.02	R
EMK042 CG1R6[D-W]			CG C0G	1.6 p	±0.05pF, ±0.1pF, ±0.25pF	432	200	0.2±0.02	R
EMK042 CG1R7[D-W]			CG C0G	1.7 p	±0.05pF, ±0.1pF, ±0.25pF	434	200	0.2±0.02	R
EMK042 CG1R8[D-W]			CG C0G	1.8 p	±0.05pF, ±0.1pF, ±0.25pF	436	200	0.2±0.02	R
EMK042 CG1R9[D-W]			CG C0G	1.9 p	±0.05pF, ±0.1pF, ±0.25pF	438	200	0.2±0.02	R
EMK042 CG020[D-W]			CG C0G	2 p	±0.05pF, ±0.1pF, ±0.25pF	440	200	0.2±0.02	R
EMK042 CG2R1[D-W]			CG C0G	2.1 p	±0.05pF, ±0.1pF, ±0.25pF	442	200	0.2±0.02	R
EMK042 CG2R2[D-W]			CG C0G	2.2 p	±0.05pF, ±0.1pF, ±0.25pF	444	200	0.2±0.02	R
EMK042 CG2R3[D-W]			CG C0G	2.3 p	±0.05pF, ±0.1pF, ±0.25pF	446	200	0.2±0.02	R
EMK042 CG2R4[D-W]			CG C0G	2.4 p	±0.05pF, ±0.1pF, ±0.25pF	448	200	0.2±0.02	R
EMK042 CG2R5[D-W]			CG C0G	2.5 p	±0.05pF, ±0.1pF, ±0.25pF	450	200	0.2±0.02	R
EMK042 CG2R6[D-W]			CG C0G	2.6 p	±0.05pF, ±0.1pF, ±0.25pF	452	200	0.2±0.02	R
EMK042 CG2R7[D-W]			CG C0G	2.7 p	±0.05pF, ±0.1pF, ±0.25pF	454	200	0.2±0.02	R
EMK042 CG2R8[D-W]			CG C0G	2.8 p	±0.05pF, ±0.1pF, ±0.25pF	456	200	0.2±0.02	R
EMK042 CG2R9[D-W]			CG C0G	2.9 p	±0.05pF, ±0.1pF, ±0.25pF	458	200	0.2±0.02	R
EMK042 CG030[D-W]			CG C0G	3 p	±0.05pF, ±0.1pF, ±0.25pF	460	200	0.2±0.02	R
EMK042 CG3R1[D-W]			CG C0G	3.1 p	±0.1pF, ±0.25pF	462	200	0.2±0.02	R
EMK042 CG3R2[D-W]			CG C0G	3.2 p	±0.1pF, ±0.25pF	464	200	0.2±0.02	R
EMK042 CG3R3[D-W]			CG C0G	3.3 p	±0.1pF, ±0.25pF	466	200	0.2±0.02	R
EMK042 CG3R4[D-W]			CG C0G	3.4 p	±0.1pF, ±0.25pF	468	200	0.2±0.02	R
EMK042 CG3R5[D-W]			CG C0G	3.5 p	±0.1pF, ±0.25pF	470	200	0.2±0.02	R
EMK042 CG3R6[D-W]			CG C0G	3.6 p	±0.1pF, ±0.25pF	472	200	0.2±0.02	R
EMK042 CG3R7[D-W]			CG C0G	3.7 p	±0.1pF, ±0.25pF	474	200	0.2±0.02	R
EMK042 CG3R8[D-W]			CG C0G	3.8 p	±0.1pF, ±0.25pF	476	200	0.2±0.02	R
EMK042 CG3R9[D-W]			CG C0G	3.9 p	±0.1pF, ±0.25pF	478	200	0.2±0.02	R
EMK042 CG040[D-W]			CG C0G	4 p	±0.1pF, ±0.25pF	480	200	0.2±0.02	R
EMK042 CG4R1[D-W]			CG C0G	4.1 p	±0.1pF, ±0.25pF	482	200	0.2±0.02	R
EMK042 CG4R2[D-W]			CG C0G	4.2 p	±0.1pF, ±0.25pF	484	200	0.2±0.02	R

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型号1	型号2	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差	Q值 (at 1MHz) (min)	高温负载	厚度*3 [mm]	焊接方式 R: 回流焊 W: 波峰焊
								额定电压 x %		
EMK042 CG4R3□D-W		16	CG	C0G	4.3 p	±0.1pF, ±0.25pF	486	200	0.2±0.02	R
EMK042 CG4R4□D-W			CG	C0G	4.4 p	±0.1pF, ±0.25pF	488	200	0.2±0.02	R
EMK042 CG4R5□D-W			CG	C0G	4.5 p	±0.1pF, ±0.25pF	490	200	0.2±0.02	R
EMK042 CG4R6□D-W			CG	C0G	4.6 p	±0.1pF, ±0.25pF	492	200	0.2±0.02	R
EMK042 CG4R7□D-W			CG	C0G	4.7 p	±0.1pF, ±0.25pF	494	200	0.2±0.02	R
EMK042 CG4R8□D-W			CG	C0G	4.8 p	±0.1pF, ±0.25pF	496	200	0.2±0.02	R
EMK042 CG4R9□D-W			CG	C0G	4.9 p	±0.1pF, ±0.25pF	498	200	0.2±0.02	R
EMK042 CG050□D-W			CG	C0G	5 p	±0.1pF, ±0.25pF	500	200	0.2±0.02	R
EMK042 CG5R1□D-W			CG	C0G	5.1 p	±0.1pF, ±0.25pF, ±0.5pF	502	200	0.2±0.02	R
EMK042 CG5R2□D-W			CG	C0G	5.2 p	±0.1pF, ±0.25pF, ±0.5pF	504	200	0.2±0.02	R
EMK042 CG5R3□D-W			CG	C0G	5.3 p	±0.1pF, ±0.25pF, ±0.5pF	506	200	0.2±0.02	R
EMK042 CG5R4□D-W			CG	C0G	5.4 p	±0.1pF, ±0.25pF, ±0.5pF	508	200	0.2±0.02	R
EMK042 CG5R5□D-W			CG	C0G	5.5 p	±0.1pF, ±0.25pF, ±0.5pF	510	200	0.2±0.02	R
EMK042 CG5R6□D-W			CG	C0G	5.6 p	±0.1pF, ±0.25pF, ±0.5pF	512	200	0.2±0.02	R
EMK042 CG5R7□D-W			CG	C0G	5.7 p	±0.1pF, ±0.25pF, ±0.5pF	514	200	0.2±0.02	R
EMK042 CG5R8□D-W			CG	C0G	5.8 p	±0.1pF, ±0.25pF, ±0.5pF	516	200	0.2±0.02	R
EMK042 CG5R9□D-W			CG	C0G	5.9 p	±0.1pF, ±0.25pF, ±0.5pF	518	200	0.2±0.02	R
EMK042 CG060□D-W			CG	C0G	6 p	±0.1pF, ±0.25pF, ±0.5pF	520	200	0.2±0.02	R
EMK042 CG6R1□D-W			CG	C0G	6.1 p	±0.1pF, ±0.25pF, ±0.5pF	522	200	0.2±0.02	R
EMK042 CG6R2□D-W			CG	C0G	6.2 p	±0.1pF, ±0.25pF, ±0.5pF	524	200	0.2±0.02	R
EMK042 CG6R3□D-W			CG	C0G	6.3 p	±0.1pF, ±0.25pF, ±0.5pF	526	200	0.2±0.02	R
EMK042 CG6R4□D-W			CG	C0G	6.4 p	±0.1pF, ±0.25pF, ±0.5pF	528	200	0.2±0.02	R
EMK042 CG6R5□D-W			CG	C0G	6.5 p	±0.1pF, ±0.25pF, ±0.5pF	530	200	0.2±0.02	R
EMK042 CG6R6□D-W			CG	C0G	6.6 p	±0.1pF, ±0.25pF, ±0.5pF	532	200	0.2±0.02	R
EMK042 CG6R7□D-W			CG	C0G	6.7 p	±0.1pF, ±0.25pF, ±0.5pF	534	200	0.2±0.02	R
EMK042 CG6R8□D-W			CG	C0G	6.8 p	±0.1pF, ±0.25pF, ±0.5pF	536	200	0.2±0.02	R
EMK042 CG6R9□D-W			CG	C0G	6.9 p	±0.1pF, ±0.25pF, ±0.5pF	538	200	0.2±0.02	R
EMK042 CG070□D-W			CG	C0G	7 p	±0.1pF, ±0.25pF, ±0.5pF	540	200	0.2±0.02	R
EMK042 CG7R1□D-W			CG	C0G	7.1 p	±0.1pF, ±0.25pF, ±0.5pF	542	200	0.2±0.02	R
EMK042 CG7R2□D-W			CG	C0G	7.2 p	±0.1pF, ±0.25pF, ±0.5pF	544	200	0.2±0.02	R
EMK042 CG7R3□D-W			CG	C0G	7.3 p	±0.1pF, ±0.25pF, ±0.5pF	546	200	0.2±0.02	R
EMK042 CG7R4□D-W			CG	C0G	7.4 p	±0.1pF, ±0.25pF, ±0.5pF	548	200	0.2±0.02	R
EMK042 CG7R5□D-W			CG	C0G	7.5 p	±0.1pF, ±0.25pF, ±0.5pF	550	200	0.2±0.02	R
EMK042 CG7R6□D-W			CG	C0G	7.6 p	±0.1pF, ±0.25pF, ±0.5pF	552	200	0.2±0.02	R
EMK042 CG7R7□D-W			CG	C0G	7.7 p	±0.1pF, ±0.25pF, ±0.5pF	554	200	0.2±0.02	R
EMK042 CG7R8□D-W			CG	C0G	7.8 p	±0.1pF, ±0.25pF, ±0.5pF	556	200	0.2±0.02	R
EMK042 CG7R9□D-W		CG	C0G	7.9 p	±0.1pF, ±0.25pF, ±0.5pF	558	200	0.2±0.02	R	
EMK042 CG080□D-W		CG	C0G	8 p	±0.1pF, ±0.25pF, ±0.5pF	560	200	0.2±0.02	R	
EMK042 CG8R1□D-W		CG	C0G	8.1 p	±0.1pF, ±0.25pF, ±0.5pF	562	200	0.2±0.02	R	
EMK042 CG8R2□D-W		CG	C0G	8.2 p	±0.1pF, ±0.25pF, ±0.5pF	564	200	0.2±0.02	R	
EMK042 CG8R3□D-W		CG	C0G	8.3 p	±0.1pF, ±0.25pF, ±0.5pF	566	200	0.2±0.02	R	
EMK042 CG8R4□D-W		CG	C0G	8.4 p	±0.1pF, ±0.25pF, ±0.5pF	568	200	0.2±0.02	R	
EMK042 CG8R5□D-W		CG	C0G	8.5 p	±0.1pF, ±0.25pF, ±0.5pF	570	200	0.2±0.02	R	
EMK042 CG8R6□D-W		CG	C0G	8.6 p	±0.1pF, ±0.25pF, ±0.5pF	572	200	0.2±0.02	R	
EMK042 CG8R7□D-W		CG	C0G	8.7 p	±0.1pF, ±0.25pF, ±0.5pF	574	200	0.2±0.02	R	
EMK042 CG8R8□D-W		CG	C0G	8.8 p	±0.1pF, ±0.25pF, ±0.5pF	576	200	0.2±0.02	R	
EMK042 CG8R9□D-W		CG	C0G	8.9 p	±0.1pF, ±0.25pF, ±0.5pF	578	200	0.2±0.02	R	
EMK042 CG090□D-W		CG	C0G	9 p	±0.1pF, ±0.25pF, ±0.5pF	580	200	0.2±0.02	R	
EMK042 CG9R1□D-W		CG	C0G	9.1 p	±0.1pF, ±0.25pF, ±0.5pF	582	200	0.2±0.02	R	
EMK042 CG9R2□D-W		CG	C0G	9.2 p	±0.1pF, ±0.25pF, ±0.5pF	584	200	0.2±0.02	R	
EMK042 CG9R3□D-W		CG	C0G	9.3 p	±0.1pF, ±0.25pF, ±0.5pF	586	200	0.2±0.02	R	
EMK042 CG9R4□D-W		CG	C0G	9.4 p	±0.1pF, ±0.25pF, ±0.5pF	588	200	0.2±0.02	R	
EMK042 CG9R5□D-W		CG	C0G	9.5 p	±0.1pF, ±0.25pF, ±0.5pF	590	200	0.2±0.02	R	
EMK042 CG9R6□D-W		CG	C0G	9.6 p	±0.1pF, ±0.25pF, ±0.5pF	592	200	0.2±0.02	R	
EMK042 CG9R7□D-W		CG	C0G	9.7 p	±0.1pF, ±0.25pF, ±0.5pF	594	200	0.2±0.02	R	
EMK042 CG9R8□D-W		CG	C0G	9.8 p	±0.1pF, ±0.25pF, ±0.5pF	596	200	0.2±0.02	R	
EMK042 CG9R9□D-W		CG	C0G	9.9 p	±0.1pF, ±0.25pF, ±0.5pF	598	200	0.2±0.02	R	
EMK042 CG100DD-W		CG	C0G	10 p	±0.5pF	600	200	0.2±0.02	R	
EMK042 CG110JD-W		CG	C0G	11 p	±5%	620	200	0.2±0.02	R	
EMK042 CG120JD-W		CG	C0G	12 p	±5%	640	200	0.2±0.02	R	
EMK042 CG130JD-W		CG	C0G	13 p	±5%	660	200	0.2±0.02	R	
EMK042 CG150JD-W		CG	C0G	15 p	±5%	700	200	0.2±0.02	R	
EMK042 CG160JC-W		CG	C0G	16 p	±5%	720	200	0.2±0.02	R	
EMK042 CG180JC-W		CG	C0G	18 p	±5%	760	200	0.2±0.02	R	
EMK042 CG200JC-W		CG	C0G	20 p	±5%	800	200	0.2±0.02	R	
EMK042 CG220JC-W		CG	C0G	22 p	±5%	840	200	0.2±0.02	R	
EMK042 CG240JC-W		CG	C0G	24 p	±5%	880	200	0.2±0.02	R	
EMK042 CG270JC-W		CG	C0G	27 p	±5%	940	200	0.2±0.02	R	
EMK042 CG300JC-W		CG	C0G	30 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG330JC-W		CG	C0G	33 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG360JC-W		CG	C0G	36 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG390JC-W		CG	C0G	39 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG430JC-W		CG	C0G	43 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG470JC-W		CG	C0G	47 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG510JC-W		CG	C0G	51 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG560JC-W		CG	C0G	56 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG620JC-W		CG	C0G	62 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG680JC-W		CG	C0G	68 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG750JC-W		CG	C0G	75 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG820JC-W		CG	C0G	82 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG910JC-W		CG	C0G	91 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG1010JC-W		CG	C0G	100 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG221JC-W		CG	C0G	220 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG241JC-W		CG	C0G	240 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG271JC-W		CG	C0G	270 p	±5%	1000	200	0.2±0.02	R	
EMK042 CG331JC-W		CG	C0G	330 p	±5%	1000	200	0.2±0.02	R	

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■ 型号一览

● 063型

【温度特性 CG : CG/C0G (-55~+125°C)】厚度 0.3mm (T)

型号1	型号2	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差	Q值 (at 1MHz) (min)	高温负载	厚度*3 [mm]	焊接方式 R: 回流焊 W: 波峰焊
							额定电压 x %		
UMK063 CG200JT-F		50	CG C0G	20 p	±5%	800	200	0.3±0.03	R
UMK063 CG220JT-F			CG C0G	22 p	±5%	840	200	0.3±0.03	R
UMK063 CG240JT-F			CG C0G	24 p	±5%	880	200	0.3±0.03	R
UMK063 CG270JT-F			CG C0G	27 p	±5%	940	200	0.3±0.03	R
UMK063 CG300JT-F			CG C0G	30 p	±5%	1000	200	0.3±0.03	R
UMK063 CG330JT-F			CG C0G	33 p	±5%	1000	200	0.3±0.03	R
UMK063 CG360JT-F			CG C0G	36 p	±5%	1000	200	0.3±0.03	R
UMK063 CG390JT-F			CG C0G	39 p	±5%	1000	200	0.3±0.03	R
UMK063 CG430JT-F			CG C0G	43 p	±5%	1000	200	0.3±0.03	R
UMK063 CG470JT-F			CG C0G	47 p	±5%	1000	200	0.3±0.03	R
UMK063 CG510JT-F			CG C0G	51 p	±5%	1000	200	0.3±0.03	R
UMK063 CG560JT-F			CG C0G	56 p	±5%	1000	200	0.3±0.03	R
UMK063 CG620JT-F			CG C0G	62 p	±5%	1000	200	0.3±0.03	R
UMK063 CG680JT-F			CG C0G	68 p	±5%	1000	200	0.3±0.03	R
UMK063 CG750JT-F			CG C0G	75 p	±5%	1000	200	0.3±0.03	R
UMK063 CG820JT-F			CG C0G	82 p	±5%	1000	200	0.3±0.03	R
UMK063 CG910JT-F			CG C0G	91 p	±5%	1000	200	0.3±0.03	R
UMK063 CG101JT-F			CG C0G	100 p	±5%	1000	200	0.3±0.03	R
UMK063 CG111JT-F			CG C0G	110 p	±5%	1000	200	0.3±0.03	R
UMK063 CG121JT-F			CG C0G	120 p	±5%	1000	200	0.3±0.03	R
UMK063 CG131JT-F			CG C0G	130 p	±5%	1000	200	0.3±0.03	R
UMK063 CG151JT-F			CG C0G	150 p	±5%	1000	200	0.3±0.03	R
UMK063 CG181JT-F			CG C0G	180 p	±5%	1000	200	0.3±0.03	R
UMK063 CG201JT-F			CG C0G	200 p	±5%	1000	200	0.3±0.03	R
UMK063 CG221JT-F			CG C0G	220 p	±5%	1000	200	0.3±0.03	R
TMK063 CG241JT-F			CG C0G	240 p	±5%	1000	200	0.3±0.03	R
TMK063 CG271JT-F			CG C0G	270 p	±5%	1000	200	0.3±0.03	R
TMK063 CG301JT-F			CG C0G	300 p	±5%	1000	200	0.3±0.03	R
TMK063 CG331JT-F			CG C0G	330 p	±5%	1000	200	0.3±0.03	R
TMK063 CG361JT-F			CG C0G	360 p	±5%	1000	200	0.3±0.03	R
TMK063 CG391JT-F			CG C0G	390 p	±5%	1000	200	0.3±0.03	R
TMK063 CG431JT-F			CG C0G	430 p	±5%	1000	200	0.3±0.03	R
TMK063 CG471JT-F		CG C0G	470 p	±5%	1000	200	0.3±0.03	R	
TMK063 CG511JT-F		CG C0G	510 p	±5%	1000	200	0.3±0.03	R	
TMK063 CG561JT-F		CG C0G	560 p	±5%	1000	200	0.3±0.03	R	
TMK063 CG621JT-F		CG C0G	620 p	±5%	1000	200	0.3±0.03	R	
TMK063 CG681JT-F		CG C0G	680 p	±5%	1000	200	0.3±0.03	R	
TMK063 CG751JT-F		CG C0G	750 p	±5%	1000	200	0.3±0.03	R	
TMK063 CG821JT-F		CG C0G	820 p	±5%	1000	200	0.3±0.03	R	
TMK063 CG911JT-F		CG C0G	910 p	±5%	1000	200	0.3±0.03	R	
TMK063 CG102JT-F		CG C0G	1000 p	±5%	1000	200	0.3±0.03	R	

● 105型

【温度特性 UΔ : UΔ/U2Δ (-55~+125°C)】厚度 0.5mm (V)

型号1	型号2	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差	Q值 (at 1MHz) (min)	高温负载	厚度*3 [mm]	焊接方式 R: 回流焊 W: 波峰焊
							额定电压 x %		
UMK105 UK0R5CV-F		50	UK U2K	0.5 p	±0.25pF	410	200	0.5±0.05	R
UMK105 UK010CV-F			UK U2K	1 p	±0.25pF	420	200	0.5±0.05	R
UMK105 UK1R5CV-F			UK U2K	1.5 p	±0.25pF	430	200	0.5±0.05	R
UMK105 UK020CV-F			UK U2K	2 p	±0.25pF	440	200	0.5±0.05	R
UMK105 UK030CV-F			UK U2K	3 p	±0.25pF	460	200	0.5±0.05	R
UMK105 UJ040CV-F			UJ U2J	4 p	±0.25pF	480	200	0.5±0.05	R
UMK105 UJ050CV-F			UJ U2J	5 p	±0.25pF	500	200	0.5±0.05	R
UMK105 UJ060DV-F			UJ U2J	6 p	±0.5pF	520	200	0.5±0.05	R
UMK105 UJ070DV-F			UJ U2J	7 p	±0.5pF	540	200	0.5±0.05	R
UMK105 UJ080DV-F			UJ U2J	8 p	±0.5pF	560	200	0.5±0.05	R
UMK105 UJ090DV-F			UJ U2J	9 p	±0.5pF	580	200	0.5±0.05	R
UMK105 UJ100DV-F			UJ U2J	10 p	±0.5pF	600	200	0.5±0.05	R
UMK105 UJ120JV-F			UJ U2J	12 p	±5%	640	200	0.5±0.05	R
UMK105 UJ150JV-F			UJ U2J	15 p	±5%	700	200	0.5±0.05	R
UMK105 UJ180JV-F			UJ U2J	18 p	±5%	760	200	0.5±0.05	R
UMK105 UJ220JV-F			UJ U2J	22 p	±5%	840	200	0.5±0.05	R
UMK105 UJ270JV-F			UJ U2J	27 p	±5%	940	200	0.5±0.05	R
UMK105 UJ330JV-F			UJ U2J	33 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ390JV-F			UJ U2J	39 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ470JV-F			UJ U2J	47 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ560JV-F			UJ U2J	56 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ680JV-F			UJ U2J	68 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ820JV-F			UJ U2J	82 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ101JV-F			UJ U2J	100 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ121JV-F			UJ U2J	120 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ151JV-F			UJ U2J	150 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ181JV-F			UJ U2J	180 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ221JV-F			UJ U2J	220 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ271JV-F			UJ U2J	270 p	±5%	1000	200	0.5±0.05	R
UMK105 UJ331JV-F			UJ U2J	330 p	±5%	1000	200	0.5±0.05	R

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# Multilayer Ceramic Capacitors

## PACKAGING

### ① Minimum Quantity

#### ● Taped package

Type(EIA)	Thickness		Standard quantity [pcs]	
	mm	code	Paper tape	Embossed tape
<input type="checkbox"/> MK021(008004)	0.125	K	—	50000
<input type="checkbox"/> VS021(008004)				
<input type="checkbox"/> MK042(01005)	0.2	C, D	—	40000
<input type="checkbox"/> VS042(01005)				
<input type="checkbox"/> MK063(0201)	0.3	P, T	15000	—
<input type="checkbox"/> WK105(0204) ※	0.3	P	10000	—
<input type="checkbox"/> MK105(0402) <input type="checkbox"/> MF105(0402)	0.13	H	—	20000
	0.18	E	—	15000
	0.2	C	20000	—
	0.3	P	15000	—
	0.5	V	10000	—
<input type="checkbox"/> VK105(0402)	0.5	W	10000	—
<input type="checkbox"/> MK107(0603)	0.45	K	4000	—
<input type="checkbox"/> WK107(0306) ※				
<input type="checkbox"/> MF107(0603)	0.5	V	—	4000
<input type="checkbox"/> VS107(0603)	0.8	A	4000	—
<input type="checkbox"/> MJ107(0603)	0.7	C	4000	—
<input type="checkbox"/> MK212(0805)	0.85	D	4000	—
<input type="checkbox"/> WK212(0508) ※				
<input type="checkbox"/> MF212(0805)				
<input type="checkbox"/> VS212(0805)	1.25	G	—	3000
<input type="checkbox"/> MJ212(0805)	0.85	D	4000	—
	1.25	G	—	2000
<input type="checkbox"/> MK316(1206) <input type="checkbox"/> MF316(1206)	0.85	D	4000	—
	1.15	F	—	3000
	1.6	L	—	2000
<input type="checkbox"/> MJ316(1206)	1.15	F	—	3000
	1.6	L	—	2000
<input type="checkbox"/> MK325(1210) <input type="checkbox"/> MF325(1210)	0.85	D	—	2000
	1.15	F		
	1.9	N		
	2.0max.	Y		
<input type="checkbox"/> MJ325(1210)	2.5	M	—	1000
	1.9	N	—	2000
	2.5	M	—	500(T), 1000(P)
<input type="checkbox"/> MK432(1812)	2.5	M	—	500

Note : ※ LW Reverse type.

### ② Taping material

※No bottom tape for pressed carrier tape

#### ● Card board carrier tape



#### ● Embossed tape



▶ 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/>).



### ③ Representative taping dimensions

● Paper Tape (8mm wide)

● Pressed carrier tape ( 2mm pitch)

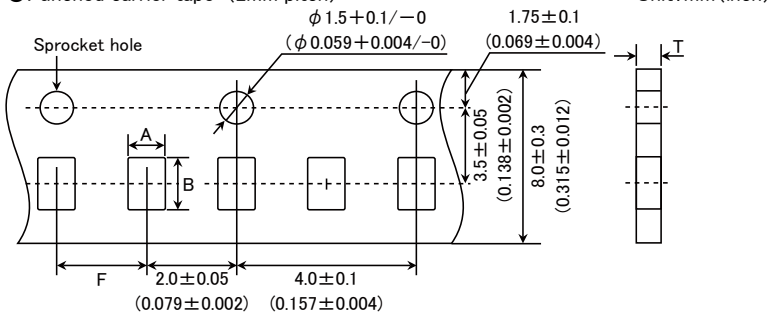


Type(EIA)	Chip Cavity		Insertion Pitch F	Tape Thickness	
	A	B		T	T1
□MK063(0201)	0.37	0.67	2.0±0.05	0.45max.	0.42max.
□WK105(0204) ※	0.65	1.15		0.4max.	0.3max.
□MK105(0402) (*1 C)				0.45max.	0.42max.
□MK105(0402) (*1 P)					

Note \*1 Thickness, C: 0.2mm ,P: 0.3mm. ※ LW Reverse type.

Unit: mm

● Punched carrier tape (2mm pitch)



Type(EIA)	Chip Cavity		Insertion Pitch F	Tape Thickness T
	A	B		T
□MK105 (0402)	0.65	1.15	2.0±0.05	0.8max.
□MF105 (0402)				
□VK105 (0402)				

Unit: mm

● Punched carrier tape (4mm pitch)



Type(EIA)	Chip Cavity		Insertion Pitch	Tape Thickness
	A	B	F	T
□MK107(0603) □WK107(0306) ※ □MF107(0603)	1.0	1.8	4.0±0.1	1.1max.
□MK212(0805) □WK212(0508) ※ □MK316(1206)	1.65	2.4		1.1max.
	2.0	3.6		

Note: Taping size might be different depending on the size of the product. ※ LW Reverse type.

Unit: mm



Type(EIA)	Chip Cavity		Insertion Pitch	Tape Thickness	
	A	B	F	K	T
□MK021(008004) □VS021(008004) □MK042(01005) □VS042(01005)	0.135	0.27	1.0±0.02	0.5max.	0.25max.

Unit: mm



Type(EIA)	Chip Cavity		Insertion Pitch	Tape Thickness	
	A	B	F	K	T
□MK105(0402) □WK107(0306) ※ □MK212(0805) □MF212(0805)	0.6	1.1	2.0±0.1	0.6max.	0.2±0.1
□MK316(1206) □MF316(1206)	2.0	3.6	4.0±0.1	3.4max.	0.6max.
□MK325(1210) □MF325(1210)	2.8	3.6			

Note: ※ LW Reverse type.

Unit: mm



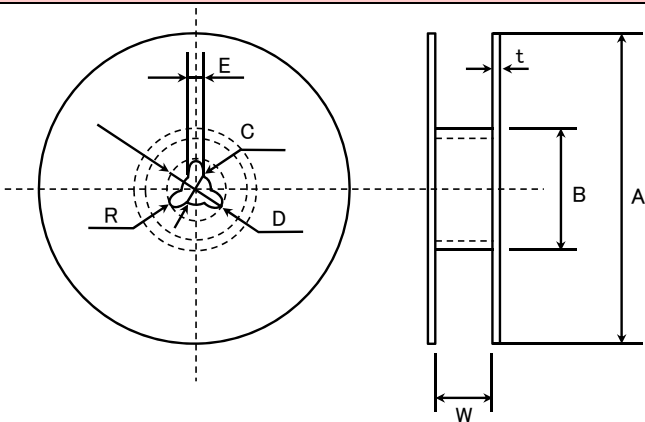
Type(EIA)	Chip Cavity		Insertion Pitch	Tape Thickness	
	A	B	F	K	T
□MK325(1210)	3.1	4.0	8.0±0.1	4.0max.	0.6max.
□MK432(1812)	3.7	4.9	8.0±0.1	4.0max.	0.6max.

Unit: mm

#### ④Trailer and Leader



#### ⑤Reel size

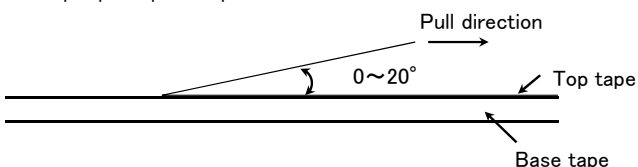


A	B	C	D	E	R
φ178±2.0	φ50min.	φ13.0±0.2	φ21.0±0.8	2.0±0.5	1.0
	T	W			
4mm wide tape	1.5max.	5±1.0			
8mm wide tape	2.5max.	10±1.5			
12mm wide tape	2.5max.	14±1.5			

Unit: mm

#### ⑥Top Tape Strength

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



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# Multilayer Ceramic Capacitors

## RELIABILITY DATA

### 1. Operating Temperature Range

Specified Value	Temperature Compensating(Class1)	Standard	-55 to +125°C	
		High Frequency Type		
Specified Value	High Permittivity (Class2)		Specification	Temperature Range
		BJ	B	-25 to +85°C
			X5R	-55 to +85°C
		B7	X7R	-55 to +125°C
		C6	X6S	-55 to +105°C
		C7	X7S	-55 to +125°C
	LD(※)	X5R	-55 to +85°C	

Note: ※LD Low distortion high value multilayer ceramic capacitor

### 2. Storage Conditions

Specified Value	Temperature Compensating(Class1)	Standard	-55 to +125°C	
		High Frequency Type		
Specified Value	High Permittivity (Class2)		Specification	Temperature Range
		BJ	B	-25 to +85°C
			X5R	-55 to +85°C
		B7	X7R	-55 to +125°C
		C6	X6S	-55 to +105°C
		C7	X7S	-55 to +125°C
	LD(※)	X5R	-55 to +85°C	

Note: ※LD Low distortion high value multilayer ceramic capacitor

### 3. Rated Voltage

Specified Value	Temperature Compensating(Class1)	Standard	50VDC, 25VDC, 16VDC
		High Frequency Type	50VDC, 25VDC, 16VDC
	High Permittivity (Class2)		50VDC, 35VDC, 25VDC, 16VDC, 10VDC, 6.3VDC, 4VDC, 2.5VDC

### 4. Withstanding Voltage (Between terminals)

Specified Value	Temperature Compensating(Class1)	Standard	No breakdown or damage
		High Frequency Type	
Test Methods and Remarks	High Permittivity (Class2)		
		Class 1	Class 2
	Applied voltage	Rated voltage × 3	Rated voltage × 2.5
	Duration	1 to 5 sec.	
	Charge/discharge current	50mA max.	

### 5. Insulation Resistance

Specified Value	Temperature Compensating(Class1)	Standard	10000 MΩ min.
		High Frequency Type	
Specified Value	High Permittivity (Class2) Note 1		C ≤ 0.047 F : 10000 MΩ min. C > 0.047 μF : 500MΩ · μF
	Test Methods and Remarks	Applied voltage : Rated voltage Duration : 60 ± 5 sec. Charge/discharge current : 50mA max.	

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6. Capacitance (Tolerance)				
Specified Value	Temperature Compensating(Class1)	Standard	C□	0.2pF ≤ C ≤ 5pF : ±0.25pF
			U□	0.2pF ≤ C ≤ 10pF : ±0.5pF C > 10pF : ±5% or ±10%
High Permittivity (Class2)		High Frequency Type	CG	0.2pF ≤ C ≤ 2pF : ±0.1pF C > 2pF : ±5%
				±10% or ±20%
Test Methods and Remarks			Class 1	
			Standard	High Frequency Type
			Class 2	
			C ≤ 10 μF	C > 10 μF
			Thermal treatment (at 150°C for 1hr) Note 2	
	Preconditioning	None		
	Measuring frequency	1MHz ± 10%		1kHz ± 10%      120 ± 10Hz
	Measuring voltage Nte	0.5 to 5Vrms		1 ± 0.2Vrms      0.5 ± 0.1Vrms
	Bias application	None		

7. Q or Dissipation Factor				
Specified Value	Temperature Compensating(Class1)	Standard	C < 30pF : Q ≥ 400 + 20C C ≥ 30pF : Q ≥ 1000 (C: Nominal capacitance)	
			High Frequency Type	Refer to detailed specification
	High Permittivity (Class2) Note 1		BJ, B7, C6, C7: 2.5% max.	
Test Methods and Remarks			Class 1	
			Standard	High Frequency Type
			Class 2	
			C ≤ 10 μF	C > 10 μF
			Thermal treatment (at 150°C for 1hr) Note 2	
	Preconditioning	None		
	Measuring frequency	1MHz ± 10%	1GHz	1kHz ± 10%      120 ± 10Hz
	Measuring voltage Note 1	0.5 to 5Vrms		1 ± 0.2Vrms      0.5 ± 0.1Vrms
	Bias application	None		
	High Frequency Type	Measuring equipment : HP4291A Measuring jig : HP16192A		

8. Temperature Characteristic (Without voltage application)						
Specified Value	Temperature Compensating(Class1)	Standard	Temperature Characteristic [ppm/°C]		Tolerance [ppm/°C]	
			C□ : 0	CG	G : ±30	
			U□ : -750	UJ, UK	J : ±120 K : ±250	
High Permittivity (Class2)		High Frequency Type	Temperature Characteristic [ppm/°C]		Tolerance [ppm/°C]	
			C□ : 0	CG	G : ±30	
			Specification	Capacitance change	Reference temperature	Temperature Range
			B	±10%	20°C	-25 to +85°C
			X5R	±15%	25°C	-55 to +85°C
			B7	±15%	25°C	-55 to +125°C
			X7R	±15%	25°C	-55 to +125°C
			C6	±22%	25°C	-55 to +105°C
			XS	±22%	25°C	-55 to +105°C
			C7	±22%	25°C	-55 to +125°C
			X7S	±22%	25°C	-55 to +125°C
			LD(※)	±15%	25°C	-55 to +85°C
			Note : ※LD Low distortion high value multilayer ceramic capacitor			
Test Methods and Remarks	Class 1					
	Capacitance at 20°C and 85°C shall be measured in thermal equilibrium, and the temperature characteristic shall be calculated from the following equation.					
	$\frac{(C_{85} - C_{20})}{C_{20} \times \Delta T} \times 10^6 (\text{ppm}/^\circ\text{C}) \quad \Delta T = 65$					
	Class 2					
	Capacitance at each step shall be measured in thermal equilibrium, and the temperature characteristic shall be calculated from the following equation.					
	Step	B	X5R, X7R, X6S, X7S			
	1	Minimum operating temperature				
	2	20°C	25°C			
	3	Maximum operating temperature				
	$\frac{(C - C_2)}{C_2} \times 100 (\%)$		C : Capacitance in Step 1 or Step 3 C <sub>2</sub> : Capacitance in Step 2			

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9. Deflection																				
Specified Value	Temperature Compensating(Class1)	Standard	Appearance : No abnormality Capacitance change : Within $\pm 5\%$ or $\pm 0.5$ pF, whichever is larger.																	
		High Frequency Type	Appearance : No abnormality Capacitance change : Within $\pm 0.5$ pF																	
	High Permittivity (Class2)		Appearance : No abnormality Capacitance change : Within $\pm 12.5\%$																	
Test Methods and Remarks	<table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Multilayer Ceramic Capacitors</th> </tr> <tr> <th>021, 042, 063, *105 Type</th> <th>The other types</th> </tr> </thead> <tbody> <tr> <td>Board</td> <td colspan="2">Glass epoxy-resin substrate</td> </tr> <tr> <td>Thickness</td> <td>0.8mm</td> <td>1.6mm</td> </tr> <tr> <td>Warp</td> <td colspan="2">1mm</td> </tr> <tr> <td>Duration</td> <td colspan="2">10 sec.</td> </tr> </tbody> </table> <p>*105 Type thickness, C: 0.2mm ,P: 0.3mm.</p>			Multilayer Ceramic Capacitors		021, 042, 063, *105 Type	The other types	Board	Glass epoxy-resin substrate		Thickness	0.8mm	1.6mm	Warp	1mm		Duration	10 sec.		 <p>(Unit: mm) Capacitance measurement shall be conducted with the board bent</p>
		Multilayer Ceramic Capacitors																		
021, 042, 063, *105 Type		The other types																		
Board	Glass epoxy-resin substrate																			
Thickness	0.8mm	1.6mm																		
Warp	1mm																			
Duration	10 sec.																			

10. Body Strength			
Specified Value	Temperature Compensating(Class1)	Standard	—
		High Frequency Type	No mechanical damage.
	High Permittivity (Class2)		—
Test Methods and Remarks	High Frequency 105Type Applied force : 5N Duration : 10 sec.		

11. Adhesive Strength of Terminal Electrodes														
Specified Value	Temperature Compensating(Class1)	Standard	No terminal separation or its indication.											
		High Frequency Type												
	High Permittivity (Class2)													
Test Methods and Remarks	<table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Multilayer Ceramic Capacitors</th> </tr> <tr> <th>021, 042, 063 Type</th> <th>105 Type or more</th> </tr> </thead> <tbody> <tr> <td>Applied force</td> <td>2N</td> <td>5N</td> </tr> <tr> <td>Duration</td> <td colspan="2">30±5 sec.</td> </tr> </tbody> </table>			Multilayer Ceramic Capacitors		021, 042, 063 Type	105 Type or more	Applied force	2N	5N	Duration	30±5 sec.		
		Multilayer Ceramic Capacitors												
		021, 042, 063 Type	105 Type or more											
Applied force	2N	5N												
Duration	30±5 sec.													

12. Solderability															
Specified Value	Temperature Compensating(Class1)	Standard	At least 95% of terminal electrode is covered by new solder.												
		High Frequency Type													
	High Permittivity (Class2)														
Test Methods and Remarks	<table border="1"> <thead> <tr> <th rowspan="2"></th> <th>Eutectic solder</th> <th>Lead-free solder</th> </tr> </thead> <tbody> <tr> <td>Solder type</td> <td>H60A or H63A</td> <td>Sn-3.0Ag-0.5Cu</td> </tr> <tr> <td>Solder temperature</td> <td>230±5°C</td> <td>245±3°C</td> </tr> <tr> <td>Duration</td> <td colspan="2">4±1 sec.</td> </tr> </tbody> </table>			Eutectic solder	Lead-free solder	Solder type	H60A or H63A	Sn-3.0Ag-0.5Cu	Solder temperature	230±5°C	245±3°C	Duration	4±1 sec.		
		Eutectic solder		Lead-free solder											
		Solder type	H60A or H63A	Sn-3.0Ag-0.5Cu											
	Solder temperature	230±5°C	245±3°C												
Duration	4±1 sec.														

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**13. Resistance to Soldering**

Specified Value	Temperature Compensating(Class1)	Standard	Appearance : No abnormality Capacitance change : Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , whichever is larger. Q : Initial value Insulation resistance : Initial value Withstanding voltage (between terminals) : No abnormality
		High Frequency Type	Appearance : No abnormality Capacitance change : Within $\pm 2.5\%$ Q : Initial value Insulation resistance : Initial value Withstanding voltage (between terminals) : No abnormality
	High Permittivity (Class2) Note 1		Appearance : No abnormality Capacitance change : Within $\pm 7.5\%$ Dissipation factor : Initial value Insulation resistance : Initial value Withstanding voltage (between terminals): No abnormality

Test Methods and Remarks	Class 1			
		021, 042, 063 Type	105 Type	
	Preconditioning	None		
	Preheating	150°C, 1 to 2 min.	80 to 100°C, 2 to 5 min. 150 to 200°C, 2 to 5 min.	
	Solder temp.	270 $\pm$ 5°C		
	Duration	3 $\pm$ 0.5 sec.		
	Recovery	6 to 24 hrs (Standard condition) Note 5		
	Class 2			
		021, 042, 063 Type	105, 107, 212 Type	316, 325, 432 Type
	Preconditioning	Thermal treatment (at 150°C for 1 hr) Note 2		
	Preheating	150°C, 1 to 2 min.	80 to 100°C, 2 to 5 min. 150 to 200°C, 2 to 5 min.	80 to 100°C, 5 to 10 min. 150 to 200°C, 5 to 10 min.
	Solder temp.	270 $\pm$ 5°C		
	Duration	3 $\pm$ 0.5 sec.		
	Recovery	24 $\pm$ 2 hrs (Standard condition) Note 5		

**14. Temperature Cycle (Thermal Shock)**

Specified Value	Temperature Compensating(Class1)	Standard	Appearance : No abnormality Capacitance change : Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , whichever is larger. Q : Initial value Insulation resistance : Initial value Withstanding voltage (between terminals) : No abnormality
		High Frequency Type	Appearance : No abnormality Capacitance change : Within $\pm 0.25\text{pF}$ Q : Initial value Insulation resistance : Initial value Withstanding voltage (between terminals) : No abnormality
	High Permittivity (Class2) Note 1		Appearance : No abnormality Capacitance change : Within $\pm 7.5\%$ Dissipation factor : Initial value Insulation resistance : Initial value Withstanding voltage (between terminals) : No abnormality

Test Methods and Remarks	Class 1		Class 2		
	Preconditioning	None		Thermal treatment (at 150°C for 1 hr) Note 2	
	1 cycle	Step	Temperature (°C)	Time (min.)	
		1	Minimum operating temperature	30 $\pm$ 3	
		2	Normal temperature	2 to 3	
3		Maximum operating temperature	30 $\pm$ 3		
4	Normal temperature	2 to 3			
Number of cycles	5 times				
Recovery	6 to 24 hrs (Standard condition) Note 5		24 $\pm$ 2 hrs (Standard condition) Note 5		

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15. Humidity (Steady State)

Specified Value	Temperature Compensating(Class1)	Standard	Appearance : No abnormality Capacitance change : Within $\pm 5\%$ or $\pm 0.5\text{pF}$ , whichever is larger. Q : $C < 10\text{pF} : Q \geq 200 + 10C$ $10 \leq C < 30\text{pF} : Q \geq 275 + 2.5C$ $C \geq 30\text{pF} : Q \geq 350 (C : \text{Nominal capacitance})$ Insulation resistance : $1000 \text{ M}\Omega$ min.
		High Frequency Type	Appearance : No abnormality Capacitance change : Within $\pm 0.5\text{pF}$ , Insulation resistance : $1000 \text{ M}\Omega$ min.
	High Permittivity (Class2) Note 1		Appearance : No abnormality Capacitance change : Within $\pm 12.5\%$ Dissipation factor : $5.0\%$ max. Insulation resistance : $50 \text{ M}\Omega \mu\text{F}$ or $1000 \text{ M}\Omega$ whichever is smaller.

Test Methods and Remarks		Class 1		Class 2
		Standard	High Frequency Type	All items
	Preconditioning	None		Thermal treatment ( at $150^\circ\text{C}$ for 1 hr) Note 2
	Temperature	$40 \pm 2^\circ\text{C}$	$60 \pm 2^\circ\text{C}$	$40 \pm 2^\circ\text{C}$
	Humidity	90 to 95%RH		90 to 95%RH
	Duration	$500 + 24 / - 0$ hrs		$500 + 24 / - 0$ hrs
	Recovery	6 to 24 hrs (Standard condition) Note 5		$24 \pm 2$ hrs (Standard condition) Note 5

16. Humidity Loading

Specified Value	Temperature Compensating(Class1)	Standard	Appearance : No abnormality Capacitance change : Within $\pm 7.5\%$ or $\pm 0.75\text{pF}$ , whichever is larger. Q : $C < 30\text{pF} : Q \geq 100 + 10C/3$ $C \geq 30\text{pF} : Q \geq 200 (C : \text{Nominal capacitance})$ Insulation resistance : $500 \text{ M}\Omega$ min.
		High Frequency Type	Appearance : No abnormality Capacitance change : $C \leq 2\text{pF} : \text{Within } \pm 0.4 \text{ pF}$ $C > 2\text{pF} : \text{Within } \pm 0.75 \text{ pF}$ (C:Nominal capacitance) Insulation resistance : $500 \text{ M}\Omega$ min.
	High Permittivity (Class2) Note 1		Appearance : No abnormality Capacitance change : Within $\pm 12.5\%$ Dissipation factor : $5.0\%$ max. Insulation resistance : $25 \text{ M}\Omega \mu\text{F}$ or $500 \text{ M}\Omega$ , whichever is smaller.

Test Methods and Remarks		Class 1		Class 2
		Standard	High Frequency Type	All items
	Preconditioning	None		Voltage treatment (Rated voltage are applied for 1 hour at $40^\circ\text{C}$ ) Note 3
	Temperature	$40 \pm 2^\circ\text{C}$	$60 \pm 2^\circ\text{C}$	$40 \pm 2^\circ\text{C}$
	Humidity	90 to 95%RH		90 to 95%RH
	Duration	$500 + 24 / - 0$ hrs		$500 + 24 / - 0$ hrs
	Applied voltage	Rated voltage		Rated voltage
	Charge/discharge current	50mA max.		50mA max.
Recovery	6 to 24 hrs (Standard condition) Note 5		$24 \pm 2$ hrs (Standard condition) Note 5	

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17. High Temperature Loading

Specified Value	Temperature Compensating(Class1)	Standard	Appearance : No abnormality Capacitance change : Within $\pm 3\%$ or $\pm 0.3\text{pF}$ , whichever is larger. Q : $C < 10\text{pF}$ : $Q \geq 200 + 10C$ $10 \leq C < 30\text{pF}$ : $Q \geq 275 + 2.5C$ $C \geq 30\text{pF}$ : $Q \geq 350$ (C: Nominal capacitance) Insulation resistance : 1000 M $\Omega$ min.
		High Frequency Type	Appearance : No abnormality Capacitance change : Within $\pm 3\%$ or $\pm 0.3\text{pF}$ , whichever is larger. Insulation resistance : 1000 M $\Omega$ min.
	High Permittivity (Class2) Note 1		Appearance : No abnormality Capacitance change : Within $\pm 12.5\%$ Dissipation factor : 5.0% max. Insulation resistance : 50 M $\Omega$ $\mu\text{F}$ or 1000 M $\Omega$ , whichever is smaller.

Test Methods and Remarks		Class 1		Class 2		
		Standard	High Frequency Type	BJ, LD(※)	C6	B7, C7
	Preconditioning	None		Voltage treatment (Twice the rated voltage shall be applied for 1 hour at 85°C, 105°C or 125°C) Note 3, 4		
	Temperature	Maximum operating temperature		Maximum operating temperature		
	Duration	1000+48/-0 hrs		1000+48/-0 hrs		
	Applied voltage	Rated voltage $\times 2$ Note 4		Rated voltage $\times 2$ Note 4		
	Charge/discharge current	50mA max.		50mA max.		
	Recovery	6 to 24hr (Standard condition) Note 5		24 $\pm 2$ hrs (Standard condition) Note 5		
Note: ※LD Low distortion high value multilayer ceramic capacitor						

Note 1 The figures indicate typical specifications. Please refer to individual specifications in detail.

Note 2 Thermal treatment : Initial value shall be measured after test sample is heat-treated at 150+0/-10°C for an hour and kept at room temperature for 24 $\pm 2$ hours.

Note 3 Voltage treatment : Initial value shall be measured after test sample is voltage-treated for an hour at both the temperature and voltage specified in the test conditions, and kept at room temperature for 24 $\pm 2$ hours.

Note 4 150% of rated voltage is applicable to some items. Please refer to their specifications for further information.

Note 5 Standard condition: Temperature: 5 to 35°C, Relative humidity: 45 to 85 % RH, Air pressure: 86 to 106kPa When there are questions concerning measurement results, in order to provide correlation data, the test shall be conducted under the following condition.  
Temperature: 20 $\pm 2$ °C, Relative humidity: 60 to 70 % RH, Air pressure: 86 to 106kPa Unless otherwise specified, all the tests are conducted under the "standard condition".

# Precautions on the use of Multilayer Ceramic Capacitors

## PRECAUTIONS

### 1. Circuit Design

- Precautions**
- ◆ Verification of operating environment, electrical rating and performance
    1. A malfunction of equipment in fields such as medical, aerospace, nuclear control, etc. may cause serious harm to human life or have severe social ramifications. Therefore, any capacitors to be used in such equipment may require higher safety and reliability, and shall be clearly differentiated from them used in general purpose applications.
  - ◆ Operating Voltage (Verification of Rated voltage)
    1. The operating voltage for capacitors must always be their rated voltage or less. If an AC voltage is loaded on a DC voltage, the sum of the two peak voltages shall be the rated voltage or less. For a circuit where an AC or a pulse voltage may be used, the sum of their peak voltages shall also be the rated voltage or less.
    2. Even if an applied voltage is the rated voltage or less reliability of capacitors may be deteriorated in case that either a high frequency AC voltage or a pulse voltage having rapid rise time is used in a circuit.

### 2. PCB Design

- Precautions**
- ◆ Pattern configurations (Design of Land-patterns)
    1. When capacitors are mounted on PCBs, the amount of solder used (size of fillet) can directly affect the capacitor performance. Therefore, the following items must be carefully considered in the design of land patterns:
      - (1) Excessive solder applied can cause mechanical stresses which lead to chip breaking or cracking. Therefore, please consider appropriate land-patterns for proper amount of solder.
      - (2) When more than one component are jointly soldered onto the same land, each component's soldering point shall be separated by solder-resist.
  - ◆ Pattern configurations (Capacitor layout on PCBs)
 After capacitors are mounted on boards, they can be subjected to mechanical stresses in subsequent manufacturing processes (PCB cutting, board inspection, mounting of additional parts, assembly into the chassis, wave soldering of the boards, etc.). For this reason, land pattern configurations and positions of capacitors shall be carefully considered to minimize stresses.

◆ Pattern configurations (Design of Land-patterns)  
The following diagrams and tables show some examples of recommended land patterns to prevent excessive solder amounts.

(1) Recommended land dimensions for typical chip capacitors

● Multilayer Ceramic Capacitors : Recommended land dimensions (unit: mm)

		Wave-soldering			
Type		107	212	316	325
Size	L	1.6	2.0	3.2	3.2
	W	0.8	1.25	1.6	2.5
A		0.8 to 1.0	1.0 to 1.4	1.8 to 2.5	1.8 to 2.5
B		0.5 to 0.8	0.8 to 1.5	0.8 to 1.7	0.8 to 1.7
C		0.6 to 0.8	0.9 to 1.2	1.2 to 1.6	1.8 to 2.5



Reflow-soldering

Type		021	042	063	105	107	212	316	325	432
Size	L	0.25	0.4	0.6	1.0	1.6	2.0	3.2	3.2	4.5
	W	0.125	0.2	0.3	0.5	0.8	1.25	1.6	2.5	3.2
A		0.095~0.135	0.15~0.25	0.20~0.30	0.45~0.55	0.6~0.8	0.8~1.2	1.8~2.5	1.8~2.5	2.5~3.5
B		0.085~0.125	0.10~0.20	0.20~0.30	0.40~0.50	0.6~0.8	0.8~1.2	1.0~1.5	1.0~1.5	1.5~1.8
C		0.110~0.150	0.15~0.30	0.25~0.40	0.45~0.55	0.6~0.8	0.9~1.6	1.2~2.0	1.8~3.2	2.3~3.5

Note: Recommended land size might be different according to the allowance of the size of the product.

● LWDC: Recommended land dimensions for reflow-soldering (unit: mm)

Type		105	107	212
Size	L	0.52	0.8	1.25
	W	1.0	1.6	2.0
A		0.18~0.22	0.25~0.3	0.5~0.7
B		0.2~0.25	0.3~0.4	0.4~0.5
C		0.9~1.1	1.5~1.7	1.9~2.1



Technical considerations

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(2) Examples of good and bad solder application

Item	Not recommended	Recommended
Mixed mounting of SMD and leaded components		
Component placement close to the chassis		
Hand-soldering of leaded components near mounted components		
Horizontal component placement		

◆ Pattern configurations (Capacitor layout on PCBs)

1-1. The following is examples of good and bad capacitor layouts ; capacitors shall be located to minimize any possible mechanical stresses from board warp or deflection.

Items	Not recommended	Recommended
Deflection of board		 Place the product at a right angle to the direction of the anticipated mechanical stress.

1-2. The amount of mechanical stresses given will vary depending on capacitor layout. Please refer to diagram below.



1-3. When PCB is split, the amount of mechanical stress on the capacitors can vary according to the method used. The following methods are listed in order from least stressful to most stressful: push-back, slit, V-grooving, and perforation. Thus, please consider the PCB, split methods as well as chip location.

3. Mounting

Precautions

◆ Adjustment of mounting machine

- When capacitors are mounted on PCB, excessive impact load shall not be imposed on them.
- Maintenance and inspection of mounting machines shall be conducted periodically.

◆ Selection of Adhesives

- When chips are attached on PCBs with adhesives prior to soldering, it may cause capacitor characteristics degradation unless the following factors are appropriately checked : size of land patterns, type of adhesive, amount applied, hardening temperature and hardening period. Therefore, please contact us for further information.

◆Adjustment of mounting machine

1. When the bottom dead center of a pick-up nozzle is too low, excessive force is imposed on capacitors and causes damages. To avoid this, the following points shall be considerable.
  - (1) The bottom dead center of the pick-up nozzle shall be adjusted to the surface level of PCB without the board deflection.
  - (2) The pressure of nozzle shall be adjusted between 1 and 3 N static loads.
  - (3) To reduce the amount of deflection of the board caused by impact of the pick-up nozzle, supporting pins or back-up pins shall be used on the other side of the PCB. The following diagrams show some typical examples of good and bad pick-up nozzle placement:

Item	Improper method	Proper method
Single-sided mounting		
Double-sided mounting		

Technical considerations

2. As the alignment pin is worn out, adjustment of the nozzle height can cause chipping or cracking of capacitors because of mechanical impact on the capacitors. To avoid this, the monitoring of the width between the alignment pins in the stopped position, maintenance, check and replacement of the pin shall be conducted periodically.

◆Selection of Adhesives

Some adhesives may cause IR deterioration. The different shrinkage percentage of between the adhesive and the capacitors may result in stresses on the capacitors and lead to cracking. Moreover, too little or too much adhesive applied to the board may adversely affect components. Therefore, the following precautions shall be noted in the application of adhesives.

- (1) Required adhesive characteristics
  - a. The adhesive shall be strong enough to hold parts on the board during the mounting & solder process.
  - b. The adhesive shall have sufficient strength at high temperatures.
  - c. The adhesive shall have good coating and thickness consistency.
  - d. The adhesive shall be used during its prescribed shelf life.
  - e. The adhesive shall harden rapidly.
  - f. The adhesive shall have corrosion resistance.
  - g. The adhesive shall have excellent insulation characteristics.
  - h. The adhesive shall have no emission of toxic gasses and no effect on the human body.
- (2) The recommended amount of adhesives is as follows;

[Recommended condition]

Figure	212/316 case sizes as examples
a	0.3mm min
b	100 to 120 $\mu$ m
c	Adhesives shall not contact land



4. Soldering

◆Selection of Flux

- Since flux may have a significant effect on the performance of capacitors, it is necessary to verify the following conditions prior to use;
- (1) Flux used shall be less than or equal to 0.1 wt% ( in Cl equivalent) of halogenated content. Flux having a strong acidity content shall not be applied.
  - (2) When shall capacitors are soldered on boards, the amount of flux applied shall be controlled at the optimum level.
  - (3) When water-soluble flux is used, special care shall be taken to properly clean the boards.

Precautions

◆Soldering

Temperature, time, amount of solder, etc. shall be set in accordance with their recommended conditions.  
Sn-Zn solder paste can adversely affect MLOC reliability.  
Please contact us prior to usage of Sn-Zn solder.

Technical considerations

◆Selection of Flux

- 1-1. When too much halogenated substance (Chlorine, etc.) content is used to activate flux, or highly acidic flux is used, it may lead to corrosion of terminal electrodes or degradation of insulation resistance on the surfaces of the capacitors.
- 1-2. Flux is used to increase solderability in wave soldering. However if too much flux is applied, a large amount of flux gas may be emitted and may adversely affect the solderability. To minimize the amount of flux applied, it is recommended to use a flux-bubbling system.
- 1-3. Since the residue of water-soluble flux is easily dissolved in moisture in the air, the residues on the surfaces of capacitors in high humidity conditions may cause a degradation of insulation resistance and reliability of the capacitors. Therefore, the cleaning methods and the capability of the machines used shall also be considered carefully when water-soluble flux is used.

▶ 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/>).

◆ Soldering

- Ceramic chip capacitors are susceptible to thermal shock when exposed to rapid or concentrated heating or rapid cooling.
- Therefore, the soldering must be conducted with great care so as to prevent malfunction of the components due to excessive thermal shock.
- Preheating : Capacitors shall be preheated sufficiently, and the temperature difference between the capacitors and solder shall be within 130°C.
- Cooling : The temperature difference between the capacitors and cleaning process shall not be greater than 100°C.

[Reflow soldering]

【Recommended conditions for eutectic soldering】



【Recommended condition for Pb-free soldering】



Caution

- ① The ideal condition is to have solder mass (fillet) controlled to 1/2 to 1/3 of the thickness of a capacitor.
- ② Because excessive dwell times can adversely affect solderability, soldering duration shall be kept as close to recommended times as possible. soldering for 2 times.



[Wave soldering]

【Recommended conditions for eutectic soldering】



【Recommended condition for Pb-free soldering】



Caution

- ① Wave soldering must not be applied to capacitors designated as for reflow soldering only. soldering for 1 times.

[Hand soldering]

【Recommended conditions for eutectic soldering】



【Recommended condition for Pb-free soldering】



316type or less	$\Delta T \leq 150^{\circ}\text{C}$
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325type or more	$\Delta T \leq 130^{\circ}\text{C}$
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Caution

- ① Use a 50W soldering iron with a maximum tip diameter of 1.0 mm.
- ② The soldering iron shall not directly touch capacitors. soldering for 1 times.

5. Cleaning	
Precautions	<p>◆Cleaning conditions</p> <ol style="list-style-type: none"> <li>When PCBs are cleaned after capacitors mounting, please select the appropriate cleaning solution in accordance with the intended use of the cleaning. (e.g. to remove soldering flux or other materials from the production process.)</li> <li>Cleaning condition shall be determined after it is verified by using actual cleaning machine that the cleaning process does not affect capacitor's characteristics.</li> </ol>
Technical considerations	<ol style="list-style-type: none"> <li>The use of inappropriate cleaning solutions can cause foreign substances such as flux residue to adhere to capacitors or deteriorate their outer coating, resulting in a degradation of the capacitor's electrical properties (especially insulation resistance).</li> <li>Inappropriate cleaning conditions (insufficient or excessive cleaning) may adversely affect the performance of the capacitors. In the case of ultrasonic cleaning, too much power output can cause excessive vibration of PCBs which may lead to the cracking of capacitors or the soldered portion, or decrease the terminal electrodes' strength. Therefore, the following conditions shall be carefully checked;            Ultrasonic output : 20 W/l or less                      Ultrasonic frequency : 40 kHz or less            Ultrasonic washing period : 5 min. or less</li> </ol>

6. Resin coating and mold	
Precautions	<ol style="list-style-type: none"> <li>With some type of resins, decomposition gas or chemical reaction vapor may remain inside the resin during the hardening period or while left under normal storage conditions resulting in the deterioration of the capacitor's performance.</li> <li>When a resin's hardening temperature is higher than capacitor's operating temperature, the stresses generated by the excessive heat may lead to damage or destruction of capacitors. The use of such resins, molding materials etc. is not recommended.</li> </ol>

7. Handling	
Precautions	<p>◆Splitting of PCB</p> <ol style="list-style-type: none"> <li>When PCBs are split after components mounting, care shall be taken so as not to give any stresses of deflection or twisting to the board.</li> <li>Board separation shall not be done manually, but by using the appropriate devices.</li> </ol> <p>◆Mechanical considerations</p> <p>Be careful not to subject capacitors to excessive mechanical shocks.</p> <p>(1) If ceramic capacitors are dropped onto a floor or a hard surface, they shall not be used.</p> <p>(2) Please be careful that the mounted components do not come in contact with or bump against other boards or components.</p>

8. Storage conditions	
Precautions	<p>◆Storage</p> <ol style="list-style-type: none"> <li>To maintain the solderability of terminal electrodes and to keep packaging materials in good condition, care must be taken to control temperature and humidity in the storage area. Humidity should especially be kept as low as possible.           <ul style="list-style-type: none"> <li>Recommended conditions                Ambient temperature : Below 30°C                      Humidity : Below 70% RH</li> <li>The ambient temperature must be kept below 40°C. Even under ideal storage conditions, solderability of capacitor is deteriorated as time passes, so capacitors shall be used within 6 months from the time of delivery.</li> <li>Ceramic chip capacitors shall be kept where no chlorine or sulfur exists in the air.</li> </ul> </li> <li>The capacitance values of high dielectric constant capacitors will gradually decrease with the passage of time, so care shall be taken to design circuits. Even if capacitance value decreases as time passes, it will get back to the initial value by a heat treatment at 150°C for 1 hour.</li> </ol>
Technical considerations	<p>If capacitors are stored in a high temperature and humidity environment, it might rapidly cause poor solderability due to terminal oxidation and quality loss of taping/packaging materials. For this reason, capacitors shall be used within 6 months from the time of delivery. If exceeding the above period, please check solderability before using the capacitors.</p>

※RCR-2335B (Safety Application Guide for fixed ceramic capacitors for use in electronic equipment) is published by JEITA.

Please check the guide regarding precautions for deflection test, soldering by spot heat, and so on.