

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2021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。

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，品质保证协定书等时，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。

■ 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

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3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。

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。

一般民生用 多层陶瓷电容器

回流焊

■型号标示法

M	S	A	S	U	3	1	L	B	B	5	1	0	6	K	T	N	A	0	1
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩										

①系列

代码 (1) (2) (3) (4)	
MSAS	一般民生用 多层陶瓷电容器 (高介电常数) 一般民生用 多层陶瓷电容器 (温度补偿用) 一般民生用 中高耐压多层陶瓷电容器
MSAR	一般民生用 高频/低损耗中高耐压多层陶瓷电容器
MSAY	一般民生用 低失真设计/声音/良好偏置多层陶瓷电容器
MSRL	一般民生用 LW 反转/低 ESL 多层陶瓷电容器 (LWDC™)

(1) 产品群

代码	
M	多层陶瓷电容器

(2) 范畴

代码	推荐设备	品质等级
S	一般民生用电子设备	3

(3) 类型

代码	
A	2 端接
R	LW 反转

(4) 特效 / 特性

代码	
S	标准/一般
R	高频/低损耗
Y	低失真设计/声音/良好偏置
L	低 ESL

②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

④产品厚度

代码	产品厚度 [mm]
1	0.125
H	0.13 (1.5 max ※)
E	0.18 (1.1 max ※)
2	0.2
3	0.3
K	0.45
5	0.5
8	0.8
9	0.85
Q	1.15
G	1.25
L	1.6
N	1.9 (0.088 ※)
Y	2.0 max
M	2.5

③外型尺寸

代码	L×W [mm]	JIS (mm)	EIA (inch)
02	0.25 × 0.125	0201	008004
04	0.4 × 0.2	0402	01005
06	0.6 × 0.3	0603	0201
1L	1.0 × 0.5	1005	0402
10	1.0 × 0.5	1005	0402
	0.52 × 1.0 ※	0510	0204
16	1.6 × 0.8	1608	0603
	0.8 × 1.6 ※	0816	0306
21	2.0 × 1.25	2012	0805
	1.25 × 2.0 ※	1220	0508
31	3.2 × 1.6	3216	1206
32	3.2 × 2.5	3225	1210
45	4.5 × 3.2	4532	1812

注: ※LW 反转型 (MSRL)

注: ※LW 反转型 (MSRL)

⑤产品尺寸公差

代码	外型尺寸记号	L [mm]	W [mm]	T [mm]	产品厚度代
A	06	0.6±0.05	0.3±0.05	0.3±0.05	3
	10	1.0±0.10	0.5±0.10	0.5±0.10	5
	16	1.6±0.15/-0.05	0.8±0.15/-0.05	0.8±0.15/-0.05	8
	21	2.0±0.15/-0.05	1.25±0.15/-0.05	1.25±0.15/-0.05	G
	31	3.2±0.20	1.6±0.20	1.6±0.20	L
	32	3.2±0.30	2.5±0.30	2.5±0.30	M
B	06	0.6±0.09	0.3±0.09	0.3±0.09	3
	10	1.0±0.15/-0.05	0.5±0.15/-0.05	0.5±0.15/-0.05	5
	16	1.6±0.20/-0	0.8±0.20/-0	0.8±0.20/-0	8
	21	2.0±0.20/-0	1.25±0.20/-0	1.25±0.20/-0	G
	31	3.2±0.30	1.6±0.30	1.6±0.30	L
	32	3.2±0.30	2.5±0.20	1.9±0.1/-0.20	Y
C	10	1.0±0.20/-0	0.5±0.20/-0	0.5±0.20/-0	5
E	06	0.6±0.25/-0	0.3±0.25/-0	0.3±0.25/-0	3
	10	1.0±0.30/-0	0.5±0.30/-0	0.5±0.30/-0	5
H	31	3.2±0.15	1.6±0.15	0.85±0.10	9
				1.15±0.10	Q
J	16	1.6±0.20/-0	0.8±0.20/-0	0.45±0.05	K
	21	2.0±0.15/-0.05	1.25±0.15/-0.05	0.85±0.10	9
	32	3.2±0.30	2.5±0.20	0.85±0.10	9
L	21	2.0±0.20/-0	1.25±0.20/-0	0.85±0.10	9
	31	3.2±0.20	1.6±0.20	0.85±0.10	9
S	02	0.25±0.013	0.125±0.013	0.125±0.013	1
	04	0.4±0.02	0.2±0.02	0.2±0.02	2
	06	0.6±0.03	0.3±0.03	0.3±0.03	3
	10	1.0±0.05	0.5±0.05	0.5±0.05	5
		0.52±0.05 ※	1.0±0.05	0.3±0.05	3
	16	1.6±0.10	0.8±0.10	0.8±0.10	8
		0.8±0.10 ※	1.6±0.10	0.5±0.05	5
	21	2.0±0.10	1.25±0.10	0.85±0.10	9
		1.25±0.15 ※	2.0±0.15	1.25±0.10	G
	31	3.2±0.15	1.6±0.15	0.85±0.10	9
	32	3.2±0.30	2.5±0.20	1.6±0.20	L
			2.5±0.20	M	
45	4.5±0.40	3.2±0.30	1.9±0.20	N	
			2.5±0.20	M	
T	16	1.6±0.10	0.8±0.10	0.45±0.05	K
X	1L	1.0±0.05	0.5±0.05	0.13±0.02	H
				0.18±0.02	E
				0.2±0.02	2
Y	1L	1.0±0.05	0.5±0.05	0.3±0.03	3

注：※LW 反转型 (MSRL)

⑥温度特性

■高介电常数【SD: 低失真设计/声音/良好偏置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
B5	JIS	B	-25~+ 85	20	±10%	±10%	K
						±20%	M
EIA	X5R	-55~+ 85	25	±15%	±10%	K	
						±20%	M
B7	EIA	X7R	-55~+125	25	±15%	±10%	K
						±20%	M
G6	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: 低失真设计/声音/良好偏置多层陶瓷电容器

■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	JIS	CG	-55~+125	20	0±30ppm/°C	±0.05pF	A	
						±0.1pF	B	
	±0.25pF	C						
	±0.5pF	D						
EIA	COG	25	±2%	G				
			±5%	J				
	JIS		CH	-55~+125	20	0±60ppm/°C	±0.05pF	A
							±0.1pF	B
±0.25pF	C							
±0.5pF	D							
EIA	COH	25	±2%	G				
			±5%	J				
JIS	CJ		-55~+125	20	0±120ppm/°C	±0.05pF	A	
						±0.1pF	B	
±0.25pF	C							
±0.5pF	A							
EIA	COJ	25	±0.1pF	B				
			±0.25pF	C				
JIS	CK		-55~+125	20	0±250ppm/°C	±0.05pF	A	
						±0.1pF	B	
±0.25pF	C							
±0.25pF	C							
EIA	COK	25	±0.25pF	C				

④系列名称

·低失真设计/声音/良好偏置多层陶瓷电容器

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	0.01μF
104	0.1μF
105	1μF
106	10μF
107	100μF

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
G	±2%
J	±5%
K	±10%
M	±20%

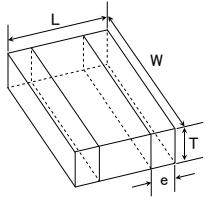
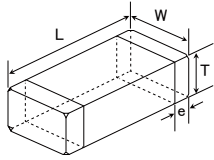
⑨包装

代码	包装规格
F	φ178mm 卷盘带装 (2mm 间隔)
T	φ178mm 卷盘带装 (4mm 间隔)
P	φ178mm 卷盘带装 (4mm 间隔, 1000 个/卷盘) 3225 规格 (厚度代码 M)
R	φ178mm 压模带 1005 规格 (2mm 间隔) 1608 规格 (4mm 间隔)
W	φ178mm 压模带 (1mm 间隔) 0201/0402 规格

⑩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/>)。

■标准产品尺寸



※LW 反转型

Type	JIS (mm)	EIA (inch)	标准产品尺寸 [mm]				
			L	W	T	*1	e
MSAS□02	0201	008004	0.25±0.013	0.125±0.013	0.125±0.013	1	0.0675±0.0275
MSAR□02	0201	008004	0.25±0.013	0.125±0.013	0.125±0.013	1	0.0675±0.0275
MSAS□04	0402	01005	0.4±0.02	0.2±0.02	0.2±0.02	2	0.1±0.03
MSAR□04	0402	01005	0.4±0.02	0.2±0.02	0.2±0.02	2	0.1±0.03
MSAS□06	0603	0201	0.6±0.03	0.3±0.03	0.3±0.03	3	0.15±0.05
MSAS□1L	1005	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	2	
					0.3±0.03	3	
MSAS□10	1005	0402	1.0±0.05	0.5±0.05	0.5±0.05	5	0.25±0.10
MSAY□1L	1005	0402	1.0±0.05	0.5±0.05	0.3±0.03	3	0.25±0.10
MSAY□10	1005	0402	1.0±0.05	0.5±0.05	0.5±0.05	5	0.25±0.10
MSRL□10 ※	0510	0204	0.52±0.05	1.0±0.05	0.3±0.05	3	0.18±0.08
MSAS□16	1608	0603	1.6±0.10	0.8±0.10	0.45±0.05	K	0.35±0.25
					0.8±0.10	8	
MSAY□16	1608	0603	1.6±0.10	0.8±0.10	0.8±0.10	8	0.35±0.25
MSRL□16 ※	0816	0306	0.8±0.10	1.6±0.10	0.5±0.05	5	0.25±0.15
MSAS□21	2012	0805	2.0±0.10	1.25±0.10	0.85±0.10	9	0.5±0.25
					1.25±0.10	G	
MSAY□21	2012	0805	2.0±0.10	1.25±0.10	1.25±0.10	9	0.5±0.25
MSRL□21 ※	1220	0508	1.25±0.15	2.0±0.15	0.85±0.10	9	0.3±0.2
MSAS□31	3216	1206	3.2±0.15	1.6±0.15	0.85±0.10	9	0.5+0.35/-0.25
					1.15±0.10	Q	
					1.6±0.20	L	
MSAY□31	3216	1206	3.2±0.15	1.6±0.15	1.15±0.10	Q	0.5+0.35/-0.25
					1.6±0.20	L	
					0.85±0.10	9	
MSAS□32	3225	1210	3.2±0.30	2.5±0.20	1.15±0.10	Q	0.6±0.3
					1.9±0.20	N	
					1.9+0.1/-0.20	Y	
					2.5±0.20	M	
MSAY□32	3225	1210	3.2±0.30	2.5±0.20	1.9±0.20	N	0.6±0.3
					2.5±0.20	M	
MSAS□45	4532	1812	4.5±0.40	3.2±0.30	2.0+0/-0.30	Y	0.6±0.4
					2.5±0.20	M	

注： ※LW 反转型 (MSRL)、*1 产品厚度代码

■ 标准包装

外型			产品厚度		标准数量 [pcs]	
代码	JIS(mm)	EIA(inch)	[mm]	代码	纸带	压模带
02	0201	008004	0.125	1	—	50000
04	0402	01005	0.2	2	—	40000
06	0603	0201	0.3	3	15000	—
1L	1005	0402	0.13	H	—	20000
			0.18	E	—	15000
			0.2	2	20000	—
			0.3	3	15000	—
10	1005	0402	0.5	5	10000	—
	0510 ※	0204 ※	0.3	3		
16	1608	0603	0.45	K	4000	—
			0.8	8		
	0816 ※	0306 ※	0.5	5	—	4000
21	2012	0805	0.85	9	4000	—
			1.25	G	—	3000
	1220 ※	0508 ※	0.85	9	4000	—
31	3216	1206	0.85	9	4000	—
			1.15	Q	—	3000
			1.6	L	—	2000
32	3225	1210	0.85	9	—	2000
			1.15	Q		
			1.9	N		
			2.0 max	Y		
			2.5	M		
45	4532	1812	2.0 max	Y	—	1000
			2.5	M	—	500

注：※LW 反转型 (MSRL)

■ 型号一览

- 产品目录中的多层陶瓷电容器全部属于RoHS对应品。
- 型号的 [] 中将会记入静电容量允许偏差代码。
- 产品目录中的多层陶瓷电容器全部属于回流焊对应品。波峰焊的对应品请咨询。

注)

*1 根据个别规格的约定, 将存在对应X7R/X7S规格的情况。

*2 根据使用电路和机器, 需要按照相应规格处理。请务必咨询正规销售渠道。

*3 关于寸规格, 请参照 型号标示法的外型尺寸、产品厚度、产品尺寸公差、以及标准产品的尺寸。

一般民生用 多层陶瓷电容器 (高介电常数)

● 0201规格

【温度特性 B5 (BJ) : X5R (-55~+85°C)】 0.125mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASE021SB5221 [] WNA01	EMK021 BJ221 [] C-W	16	X5R	220 p	±10, ±20	10	150		0.125±0.013	
MSASE021SB5471 [] WNA01	EMK021 BJ471 [] K-W	16	X5R	470 p	±10, ±20	10	150		0.125±0.013	
MSASE021SB5102 [] WNA01	EMK021 BJ102 [] K-W	16	X5R	1000 p	±10, ±20	10	150		0.125±0.013	
MSASJ021SB5222 [] WNA01	JMK021 BJ222 [] C-W	6.3	X5R	2200 p	±10, ±20	10	150		0.125±0.013	
MSASJ021SB5472 [] WNA01	JMK021 BJ472 [] K-W	6.3	X5R	4700 p	±10, ±20	10	150		0.125±0.013	
MSASJ021SB5103 [] WNA01	JMK021 BJ103 [] K-W	6.3	X5R	0.01 μ	±10, ±20	10	150		0.125±0.013	
MSASA021SB5223MNA01	AMK021 BJ223MK-W	4	X5R	0.022 μ	±20	10	150		0.125±0.013	

● 0402规格

【温度特性 B5 (BJ) : B (-25~+85°C) / X5R (-55~+85°C)】 0.2mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASE042SB5101 [] WNA01	EMK042 BJ101 [] C-W	16	X5R	100 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB5151 [] WNA01	EMK042 BJ151 [] C-W	16	X5R	150 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB5221 [] WNA01	EMK042 BJ221 [] C-W	16	X5R	220 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB5331 [] WNA01	EMK042 BJ331 [] C-W	16	X5R	330 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB5471 [] WNA01	EMK042 BJ471 [] C-W	16	X5R	470 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB5681 [] WNA01	EMK042 BJ681 [] C-W	16	X5R	680 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB5102 [] WNA01	EMK042 BJ102 [] C-W	16	B X5R	1000 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB5152 [] WNA01	EMK042 BJ152 [] C-W	16	X5R	1500 p	±10, ±20	10	150		0.2±0.02	
MSASE042SB5222 [] WNA01	EMK042 BJ222 [] C-W	16	X5R	2200 p	±10, ±20	10	150		0.2±0.02	
MSASE042SB5332 [] WNA01	EMK042 BJ332 [] C-W	16	X5R	3300 p	±10, ±20	10	150		0.2±0.02	
MSASE042SB5472 [] WNA01	EMK042 BJ472 [] C-W	16	X5R	4700 p	±10, ±20	10	150		0.2±0.02	
MSASE042SB5682 [] WNA01	EMK042 BJ682 [] C-W	16	X5R	6800 p	±10, ±20	10	150		0.2±0.02	
MSASE042SB5103 [] WNA01	EMK042 BJ103 [] C-W	16	X5R	0.01 μ	±10, ±20	10	150		0.2±0.02	
MSASL042SB5101 [] WNA01	LMK042 BJ101 [] C-W	10	X5R ^{T1}	100 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB5151 [] WNA01	LMK042 BJ151 [] C-W	10	X5R ^{T1}	150 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB5221 [] WNA01	LMK042 BJ221 [] C-W	10	X5R ^{T1}	220 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB5331 [] WNA01	LMK042 BJ331 [] C-W	10	X5R ^{T1}	330 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB5471 [] WNA01	LMK042 BJ471 [] C-W	10	X5R ^{T1}	470 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB5681 [] WNA01	LMK042 BJ681 [] C-W	10	X5R ^{T1}	680 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB5102 [] WNA01	LMK042 BJ102 [] C-W	10	B X5R ^{T1}	1000 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB5152 [] WNA01	LMK042 BJ152 [] C-W	10	X5R	1500 p	±10, ±20	10	150		0.2±0.02	
MSASL042SB5222 [] WNA01	LMK042 BJ222 [] C-W	10	X5R	2200 p	±10, ±20	10	150		0.2±0.02	
MSASL042SB5332 [] WNA01	LMK042 BJ332 [] C-W	10	X5R	3300 p	±10, ±20	10	150		0.2±0.02	
MSASL042SB5472 [] WNA01	LMK042 BJ472 [] C-W	10	X5R	4700 p	±10, ±20	10	150		0.2±0.02	
MSASL042SB5682 [] WNA01	LMK042 BJ682 [] C-W	10	X5R	6800 p	±10, ±20	10	150		0.2±0.02	
MSASL042SB5103 [] WNA01	LMK042 BJ103 [] C-W	10	X5R	0.01 μ	±10, ±20	10	150		0.2±0.02	
MSASJ042SB5152 [] WNA01	JMK042 BJ152 [] C-W	6.3	X5R ^{T1}	1500 p	±10, ±20	10	150		0.2±0.02	
MSASJ042SB5222 [] WNA01	JMK042 BJ222 [] C-W	6.3	X5R ^{T1}	2200 p	±10, ±20	10	150		0.2±0.02	
MSASJ042SB5332 [] WNA01	JMK042 BJ332 [] C-W	6.3	X5R ^{T1}	3300 p	±10, ±20	10	150		0.2±0.02	
MSASJ042SB5472 [] WNA01	JMK042 BJ472 [] C-W	6.3	X5R ^{T1}	4700 p	±10, ±20	10	150		0.2±0.02	
MSASJ042SB5682 [] WNA01	JMK042 BJ682 [] C-W	6.3	X5R ^{T1}	6800 p	±10, ±20	10	150		0.2±0.02	
MSASJ042SB5103 [] WNA01	JMK042 BJ103 [] C-W	6.3	X5R ^{T1}	0.01 μ	±10, ±20	10	150		0.2±0.02	
MSASJ042SB5223 [] WNA01	JMK042 BJ223 [] C-W	6.3	X5R	0.022 μ	±10, ±20	10	150		0.2±0.02	
MSASJ042SB5473 [] WNA01	JMK042 BJ473 [] C-W	6.3	X5R	0.047 μ	±10, ±20	10	150		0.2±0.02	
MSASJ042SB5104 [] WNA01	JMK042 BJ104 [] C-W	6.3	X5R	0.1 μ	±10, ±20	10	150		0.2±0.02	
MSASA042SB5473 [] WNA01	AMK042 BJ473 [] C-W	4	X5R	0.047 μ	±10, ±20	10	150		0.2±0.02	
MSASA042SB5104 [] WNA01	AMK042 BJ104 [] C-W	4	X5R	0.1 μ	±10, ±20	10	150		0.2±0.02	

■型号一览

【温度特性 B7 : X7R (−55~+125°C)】 0.2mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASE042SB7101 [] WNA01	EMKO42 B7101 [] C-W	16	X7R	100 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB7151 [] WNA01	EMKO42 B7151 [] C-W	16	X7R	150 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB7221 [] WNA01	EMKO42 B7221 [] C-W	16	X7R	220 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB7331 [] WNA01	EMKO42 B7331 [] C-W	16	X7R	330 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB7471 [] WNA01	EMKO42 B7471 [] C-W	16	X7R	470 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB7681 [] WNA01	EMKO42 B7681 [] C-W	16	X7R	680 p	±10, ±20	5	200		0.2±0.02	
MSASE042SB7102 [] WNA01	EMKO42 B7102 [] C-W	16	X7R	1000 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB7101 [] WNA01	LMKO42 B7101 [] C-W	10	X7R	100 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB7151 [] WNA01	LMKO42 B7151 [] C-W	10	X7R	150 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB7221 [] WNA01	LMKO42 B7221 [] C-W	10	X7R	220 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB7331 [] WNA01	LMKO42 B7331 [] C-W	10	X7R	330 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB7471 [] WNA01	LMKO42 B7471 [] C-W	10	X7R	470 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB7681 [] WNA01	LMKO42 B7681 [] C-W	10	X7R	680 p	±10, ±20	5	200		0.2±0.02	
MSASL042SB7102 [] WNA01	LMKO42 B7102 [] C-W	10	X7R	1000 p	±10, ±20	5	200		0.2±0.02	

●0603规格

【温度特性 B5 (BJ) : B (−25~+85°C) /X5R (−55~+85°C)】 0.3mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASU063SB5101 [] FNA01	UMKO63 BJ101 [] P-F	50	B X5R ²¹	100 p	±10, ±20	3.5	200		0.3±0.03	
MSASU063SB5151 [] FNA01	UMKO63 BJ151 [] P-F	50	B X5R ²¹	150 p	±10, ±20	3.5	200		0.3±0.03	
MSASU063SB5221 [] FNA01	UMKO63 BJ221 [] P-F	50	B X5R ²¹	220 p	±10, ±20	3.5	200		0.3±0.03	
MSASU063SB5331 [] FNA01	UMKO63 BJ331 [] P-F	50	B X5R ²¹	330 p	±10, ±20	3.5	200		0.3±0.03	
MSASU063SB5471 [] FNA01	UMKO63 BJ471 [] P-F	50	B X5R ²¹	470 p	±10, ±20	3.5	200		0.3±0.03	
MSASU063SB5681 [] FNA01	UMKO63 BJ681 [] P-F	50	B X5R ²¹	680 p	±10, ±20	3.5	200		0.3±0.03	
MSASU063SB5102 [] FNA01	UMKO63 BJ102 [] P-F	50	B X5R ²¹	1000 p	±10, ±20	3.5	200		0.3±0.03	
MSASU063SB5152 [] FNA01	UMKO63 BJ152 [] P-F	50	B X5R	1500 p	±10, ±20	5	200		0.3±0.03	
MSASU063SB5222 [] FNA01	UMKO63 BJ222 [] P-F	50	B X5R	2200 p	±10, ±20	5	200		0.3±0.03	
MSASU063SB5332 [] FNA01	UMKO63 BJ332 [] P-F	50	B X5R	3300 p	±10, ±20	5	200		0.3±0.03	
MSASU063SB5472 [] FNA01	UMKO63 BJ472 [] P-F	50	B X5R	4700 p	±10, ±20	5	200		0.3±0.03	
MSASU063SB5682 [] FNA01	UMKO63 BJ682 [] P-F	50	B X5R	6800 p	±10, ±20	5	200		0.3±0.03	
MSASU063SB5103 [] FNA01	UMKO63 BJ103 [] P-F	50	B X5R	0.01 μ	±10, ±20	5	200		0.3±0.03	
MSASG063SB5104 [] FNA01	GMKO63 BJ104 [] P-F	35	X5R	0.1 μ	±10, ±20	10	150		0.3±0.03	
MSAST063SB5152 [] FNA01	TMKO63 BJ152 [] P-F	25	B X5R	1500 p	±10, ±20	5	200		0.3±0.03	
MSAST063SB5222 [] FNA01	TMKO63 BJ222 [] P-F	25	B X5R	2200 p	±10, ±20	5	200		0.3±0.03	
MSAST063SB5332 [] FNA01	TMKO63 BJ332 [] P-F	25	B X5R	3300 p	±10, ±20	5	200		0.3±0.03	
MSAST063SB5472 [] FNA01	TMKO63 BJ472 [] P-F	25	B X5R	4700 p	±10, ±20	5	200		0.3±0.03	
MSAST063SB5682 [] FNA01	TMKO63 BJ682 [] P-F	25	B X5R	6800 p	±10, ±20	5	200		0.3±0.03	
MSAST063SB5103 [] FNA01	TMKO63 BJ103 [] P-F	25	B X5R	0.01 μ	±10, ±20	5	200		0.3±0.03	
MSAST063SB5223 [] FNA01	TMKO63 BJ223 [] P-F	25	B X5R	0.022 μ	±10, ±20	7.5	200		0.3±0.03	
MSAST063AB5104 [] FNA01	TMKO63ABJ104 [] P-F	25	X5R	0.1 μ	±10, ±20	10	150		0.3±0.05	
MSASE063SB5152 [] FNA01	EMKO63 BJ152 [] P-F	16	B X5R ²¹	1500 p	±10, ±20	5	200		0.3±0.03	
MSASE063SB5222 [] FNA01	EMKO63 BJ222 [] P-F	16	B X5R ²¹	2200 p	±10, ±20	5	200		0.3±0.03	
MSASE063SB5332 [] FNA01	EMKO63 BJ332 [] P-F	16	B X5R ²¹	3300 p	±10, ±20	5	200		0.3±0.03	
MSASE063SB5472 [] FNA01	EMKO63 BJ472 [] P-F	16	B X5R ²¹	4700 p	±10, ±20	5	200		0.3±0.03	
MSASE063SB5682 [] FNA01	EMKO63 BJ682 [] P-F	16	B X5R ²¹	6800 p	±10, ±20	5	200		0.3±0.03	
MSASE063SB5103 [] FNA01	EMKO63 BJ103 [] P-F	16	B X5R ²¹	0.01 μ	±10, ±20	5	200		0.3±0.03	
MSASE063SB5153 [] FNA01	EMKO63 BJ153 [] P-F	16	X5R	0.015 μ	±10, ±20	7.5	200		0.3±0.03	
MSASE063SB5223 [] FNA01	EMKO63 BJ223 [] P-F	16	B X5R	0.022 μ	±10, ±20	7.5	200		0.3±0.03	
MSASE063SB5333 [] FNA01	EMKO63 BJ333 [] P-F	16	X5R	0.033 μ	±10, ±20	7.5	150		0.3±0.03	
MSASE063SB5473 [] FNA01	EMKO63 BJ473 [] P-F	16	X5R	0.047 μ	±10, ±20	7.5	150		0.3±0.03	
MSASE063SB5683 [] FNA01	EMKO63 BJ683 [] P-F	16	X5R	0.068 μ	±10, ±20	10	150		0.3±0.03	
MSASE063SB5104 [] FNA01	EMKO63 BJ104 [] P-F	16	X5R	0.1 μ	±10, ±20	10	150		0.3±0.03	
MSASE063SB5224 [] FNA01	EMKO63 BJ224 [] P-F	16	X5R	0.22 μ	±10, ±20	10	150		0.3±0.03	
MSASE063BB5474 [] FNB33	EMKO63BBJ474 [] PLF	16	X5R	0.47 μ	±10, ±20	10	150		0.3±0.09	
MSASL063SB5223 [] FNA01	LMKO63 BJ223 [] P-F	10	B X5R	0.022 μ	±10, ±20	7.5	150		0.3±0.03	
MSASL063SB5333 [] FNA01	LMKO63 BJ333 [] P-F	10	X5R	0.033 μ	±10, ±20	7.5	150		0.3±0.03	
MSASL063SB5473 [] FNA01	LMKO63 BJ473 [] P-F	10	X5R	0.047 μ	±10, ±20	7.5	150		0.3±0.03	
MSASL063SB5683 [] FNA01	LMKO63 BJ683 [] P-F	10	X5R	0.068 μ	±10, ±20	10	150		0.3±0.03	
MSASL063SB5104 [] FNA01	LMKO63 BJ104 [] P-F	10	X5R	0.1 μ	±10, ±20	10	150		0.3±0.03	
MSASL063SB5224 [] FNA01	LMKO63 BJ224 [] P-F	10	X5R	0.22 μ	±10, ±20	10	150		0.3±0.03	
MSASL063BB5474 [] FNB33	LMKO63BBJ474 [] PLF	10	X5R	0.47 μ	±10, ±20	10	150		0.3±0.09	
MSASL063BB5105MFB33	LMKO63BBJ105MPLF	10	X5R	1 μ	±20	10	150		0.3±0.09	
MSASJ063SB5104 [] FNA01	JMKO63 BJ104 [] P-F	6.3	X5R	0.1 μ	±10, ±20	10	150		0.3±0.03	
MSASJ063SB5224 [] FNA01	JMKO63 BJ224 [] P-F	6.3	X5R	0.22 μ	±10, ±20	10	150		0.3±0.03	
MSASJ063SB5334MFA01	JMKO63 BJ334MP-F	6.3	X5R	0.33 μ	±20	10	150		0.3±0.03	
MSASJ063SB5474 [] FNA01	JMKO63 BJ474 [] P-F	6.3	X5R	0.47 μ	±10, ±20	10	150		0.3±0.03	
MSASJ063AB5105 [] FNA01	JMKO63ABJ105 [] P-F	6.3	X5R	1 μ	±10, ±20	10	150		0.3±0.05	
MSASAP063EB5475MFA01	AMKO63EBJ475MP-F	4	X5R	4.7 μ	±20	10	150		0.3+0.25/-0	
MSASAP063EB5475MFA01	PMKO63EBJ475MP-F	2.5	X5R	4.7 μ	±20	10	150		0.3+0.25/-0	

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■ 型号一览

【温度特性 C6 : X6S (-55~+105°C)】 0.3mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAST063SC6104 FNA01	TMKO63 C6104 P-F	25	X6S	0.1 μ	±10, ±20	10	150	0.3±0.03	
MSASE063AC6104 FNA01	EMKO63AC6104 P-F	16	X6S	0.1 μ	±10, ±20	10	150	0.3±0.05	
MSASL063SC6104 FNA01	LMKO63 C6104 P-F	10	X6S	0.1 μ	±10, ±20	10	150	0.3±0.03	
MSASL063SC6224 FNA01	LMKO63 C6224 P-F	10	X6S	0.22 μ	±10, ±20	10	150	0.3±0.03	
MSASL063BC6474 FNB33	LMKO63BC6474 PLF	10	X6S	0.47 μ	±10, ±20	10	150	0.3±0.09	
MSASJ063SC6104 FNA01	JMKO63 C6104 P-F	6.3	X6S	0.1 μ	±10, ±20	10	150	0.3±0.03	
MSASJ063SC6224 FNA01	JMKO63 C6224 P-F	6.3	X6S	0.22 μ	±10, ±20	10	150	0.3±0.03	
MSASJ063BC6474 FNA01	JMKO63BC6474 P-F	6.3	X6S	0.47 μ	±10, ±20	10	150	0.3±0.09	
MSASJ063BC6105M FNA01	JMKO63BC6105MP-F	6.3	X6S	1 μ	±20	10	150	0.3±0.09	
MSASA063SC6474 FNA01	AMKO63 C6474 P-F	4	X6S	0.47 μ	±10, ±20	10	150	0.3±0.03	
MSASA063AC6105 FNA01	AMKO63AC6105 P-F	4	X6S	1 μ	±10, ±20	10	150	0.3±0.05	

【温度特性 B7 : X7R (-55~+125°C)】 0.3mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASU063SB7101 FNA01	UMKO63 B7101 P-F	50	X7R	100 p	±10, ±20	3.5	200	0.3±0.03	
MSASU063SB7151 FNA01	UMKO63 B7151 P-F	50	X7R	150 p	±10, ±20	3.5	200	0.3±0.03	
MSASU063SB7221 FNA01	UMKO63 B7221 P-F	50	X7R	220 p	±10, ±20	3.5	200	0.3±0.03	
MSASU063SB7331 FNA01	UMKO63 B7331 P-F	50	X7R	330 p	±10, ±20	3.5	200	0.3±0.03	
MSASU063SB7471 FNA01	UMKO63 B7471 P-F	50	X7R	470 p	±10, ±20	3.5	200	0.3±0.03	
MSASU063SB7681 FNA01	UMKO63 B7681 P-F	50	X7R	680 p	±10, ±20	3.5	200	0.3±0.03	
MSASU063SB7102 FNA01	UMKO63 B7102 P-F	50	X7R	1000 p	±10, ±20	3.5	200	0.3±0.03	
MSAST063SB7152 FNA01	TMKO63 B7152 P-F	25	X7R	1500 p	±10, ±20	5	200	0.3±0.03	
MSAST063SB7222 FNA01	TMKO63 B7222 P-F	25	X7R	2200 p	±10, ±20	5	200	0.3±0.03	
MSAST063SB7332 FNA01	TMKO63 B7332 P-F	25	X7R	3300 p	±10, ±20	5	200	0.3±0.03	
MSAST063SB7472 FNA01	TMKO63 B7472 P-F	25	X7R	4700 p	±10, ±20	5	200	0.3±0.03	
MSAST063SB7682 FNA01	TMKO63 B7682 P-F	25	X7R	6800 p	±10, ±20	5	200	0.3±0.03	
MSAST063SB7103 FNA01	TMKO63 B7103 P-F	25	X7R	0.01 μ	±10, ±20	5	200	0.3±0.03	
MSASE063SB7152 FNA01	EMKO63 B7152 P-F	16	X7R	1500 p	±10, ±20	5	200	0.3±0.03	
MSASE063SB7222 FNA01	EMKO63 B7222 P-F	16	X7R	2200 p	±10, ±20	5	200	0.3±0.03	
MSASE063SB7332 FNA01	EMKO63 B7332 P-F	16	X7R	3300 p	±10, ±20	5	200	0.3±0.03	
MSASE063SB7472 FNA01	EMKO63 B7472 P-F	16	X7R	4700 p	±10, ±20	5	200	0.3±0.03	
MSASE063SB7682 FNA01	EMKO63 B7682 P-F	16	X7R	6800 p	±10, ±20	5	200	0.3±0.03	
MSASE063SB7103 FNA01	EMKO63 B7103 P-F	16	X7R	0.01 μ	±10, ±20	5	200	0.3±0.03	
MSASE063SB7223 FNA01	EMKO63 B7223 P-F	16	X7R	0.022 μ	±10, ±20	7.5	150	0.3±0.03	

● 1005规格

【温度特性 B5 (BJ) : B (-25~+85°C) / X5R (-55~+85°C)】 0.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASU105SB5223 FNA01	UMK105 BJ223 V-F	50	X5R	0.022 μ	±10, ±20	5	200	0.5±0.05	
MSASU105SB5473 FNA01	UMK105 BJ473 V-F	50	X5R	0.047 μ	±10, ±20	5	200	0.5±0.05	
MSASU105SB5104 FNA01	UMK105 BJ104 V-F	50	X5R	0.1 μ	±10, ±20	10	150	0.5±0.05	
MSASU105SB5224 FNA01	UMK105 BJ224 V-F	50	X5R	0.22 μ	±10, ±20	10	150	0.5±0.05	
MSASU105AB5474 FNA01	UMK105ABJ474 V-F	50	X5R	0.47 μ	±10, ±20	10	150	0.5±0.10	
MSASU105CB5105 FNA01	UMK105CBJ105 V-F	50	X5R	1 μ	±10, ±20	10	150	0.5+0.20/-0	
MSASU105SB5104 FNA01	GMK105 BJ104 V-F	35	B	X5R	0.1 μ	±10, ±20	5	150	0.5±0.05
MSASU105AB5105 FNA01	GMK105ABJ105 V-F	35	B	X5R	1 μ	±10, ±20	10	150	0.5±0.10
MSAST105SB5153 FNA01	TMK105 BJ153 V-F	25	B	X5R ^{T1}	0.015 μ	±10, ±20	3.5	200	0.5±0.05
MSAST105SB5223 FNA01	TMK105 BJ223 V-F	25	B	X5R ^{T1}	0.022 μ	±10, ±20	3.5	200	0.5±0.05
MSAST105SB5333 FNA01	TMK105 BJ333 V-F	25	B	X5R ^{T1}	0.033 μ	±10, ±20	3.5	150	0.5±0.05
MSAST105SB5473 FNA01	TMK105 BJ473 V-F	25	B	X5R ^{T1}	0.047 μ	±10, ±20	3.5	150	0.5±0.05
MSAST105SB5104 FNA01	TMK105 BJ104 V-F	25	B	X5R	0.1 μ	±10, ±20	5	150	0.5±0.05
MSAST105SB5224 FNA01	TMK105 BJ224 V-F	25	X5R	0.22 μ	±10, ±20	10	200	0.5±0.05	
MSAST105AB5474 FNA01	TMK105ABJ474 V-F	25	X5R	0.47 μ	±10, ±20	10	200	0.5±0.10	
MSAST105CB5105 FNA01	TMK105 CBJ105 V-F	25	X5R	1 μ	±10, ±20	10	150	0.5±0.05	
MSAST105CB5225 FNA01	TMK105CBJ225 V-F	25	X5R	2.2 μ	±10, ±20	10	150	0.5+0.20/-0	
MSASE105SB5224 FNA01	EMK105 BJ224 V-F	16	B	X5R	0.22 μ	±10, ±20	5	150	0.5±0.05
MSASE105AB5474 FNA01	EMK105ABJ474 V-F	16	B	X5R	0.47 μ	±10, ±20	10	200	0.5±0.10
MSASE105CB5105 FNA01	EMK105 CBJ105 V-F	16	B	X5R	1 μ	±10, ±20	10	150	0.5±0.05
MSASE105AB5225 FNA01	EMK105ABJ225 V-F	16	B	X5R	2.2 μ	±10, ±20	10	150	0.5±0.10
MSASL105SB5225 FNA01	LMK105 BJ225 V-F	10	X5R	2.2 μ	±10, ±20	10	150	0.5±0.05	
MSASL105BB5475M FNB33	LMK105BBJ475MVL	10	X5R	4.7 μ	±20	10	150	0.5+0.15/-0.05	
MSASJ105SB5225 FNA01	JMK105 BJ225 V-F	6.3	X5R	2.2 μ	±10, ±20	10	150	0.5±0.05	
MSASJ105BB5475M FNA01	JMK105BBJ475MV-F	6.3	X5R	4.7 μ	±20	10	150	0.5+0.15/-0.05	
MSASA105EB5225M FNA01	AMK105EBJ225MV-F	4	X5R	2.2 μ	±20	20	150	0.5+0.30/-0	

【温度特性 B5 (BJ) : B (-25~+85°C) / X5R (-55~+85°C)】 0.3mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASU1L3YB5104 FNA01	UMK105 BJ104 P-F	50	X5R	0.1 μ	±10, ±20	10	150	0.3±0.03	
MSAST1L3YB5103 FNA01	TMK105 BJ103 P-F	25	B	X5R	0.01 μ	±10, ±20	5	150	0.3±0.03
MSAST1L3YB5104 FNA01	TMK105 BJ104 P-F	25	B	X5R	0.1 μ	±10, ±20	10	150	0.3±0.03
MSAST1L3YB5224 FNA01	TMK105 BJ224 P-F	25	B	X5R	0.22 μ	±10, ±20	10	150	0.3±0.03
MSAST1L3YB5474 FNA01	TMK105 BJ474 P-F	25	B	X5R	0.47 μ	±10, ±20	10	150	0.3±0.03
MSASE1L3YB5474 FNA01	EMK105 BJ474 P-F	16	B	X5R	0.47 μ	±10, ±20	10	150	0.3±0.03
MSASL1L3YB5105 FNB33	LMK105 BJ105 PLF	10	B	X5R	1 μ	±10, ±20	10	150	0.3±0.03
MSASJ1L3YB5105 FNA01	JMK105 BJ105 P-F	6.3	B	X5R	1 μ	±10, ±20	10	150	0.3±0.03
MSASA1L3YB5225M FNA01	AMK105 BJ225MP-F	4	B	X5R	2.2 μ	±20	10	150	0.3±0.03

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■型号一览

【温度特性 B5 (BJ) : X5R (-55~+85°C)】 0.2mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASL1L2XB5104[F]FNA01	LMK105 BJ104[C-F]	10	X5R	0.1 μ	±10, ±20	10	150	0.2±0.02		
MSASJ1L2XB5224[F]FNA01	JMK105 BJ224[C-F]	6.3	X5R	0.22 μ	±10, ±20	10	150	0.2±0.02		
MSASJ1L2XB5474[F]FNA01	JMK105 BJ474[C-F]	6.3	X5R	0.47 μ	±10, ±20	10	150	0.2±0.02		
MSASJ1L2XB5105MFNA01	JMK105 BJ105MC-F	6.3	X5R	1 μ	±20	10	150	0.2±0.02		

【温度特性 B5 (BJ) : X5R (-55~+85°C)】 0.18mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASL1LEXB5104[R]RNA01	LMK105 BJ104[E-R]	10	X5R	0.1 μ	±10, ±20	10	150	0.18±0.02		
MSASJ1LEXB5224[R]RNA01	JMK105 BJ224[E-R]	6.3	X5R	0.22 μ	±10, ±20	10	150	0.18±0.02		
MSASJ1LEXB5474[R]RNA01	JMK105 BJ474[E-R]	6.3	X5R	0.47 μ	±10, ±20	10	150	0.18±0.02		
MSASA1LEXB5105MRNA01	AMK105 BJ105ME-R	4	X5R	1 μ	±20	10	150	0.18±0.02		

【温度特性 B5 (BJ) : X5R (-55~+85°C)】 0.13mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASL1LHXB5104MRNA01	LMK105 BJ104MH-R	10	X5R	0.1 μ	±20	10	150	0.13±0.02		
MSASJ1LHXB5224MRNA01	JMK105 BJ224MH-R	6.3	X5R	0.22 μ	±20	10	150	0.13±0.02		
MSASA1LHXB5474MRNA01	AMK105 BJ474MH-R	4	X5R	0.47 μ	±20	10	150	0.13±0.02		

【温度特性 C6 : X6S (-55~+105°C)】 0.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASG105CC6105[F]FNA01	GMK105CC6105[V-F]	35	X6S	1 μ	±10, ±20	10	150	0.5+0.20/-0		
MSAST105AC6105[F]FNA01	TMK105AC6105[V-F]	25	X6S	1 μ	±10, ±20	10	150	0.5±0.10		
MSAST105CC6105MFNA01	TMK105CC6105MV-F	25	X6S	1 μ	±20	10	150	0.5+0.20/-0		
MSASE105SC6105[F]FNA01	EMK105 C6105[V-F]	16	X6S	1 μ	±10, ±20	10	150	0.5±0.05		
MSASE105CC6225[F]FNA01	EMK105CC6225[V-F]	16	X6S	2.2 μ	±10, ±20	10	150	0.5+0.20/-0		
MSASL105SC6105[F]FNA01	LMK105 C6105[V-F]	10	X6S	1 μ	±10, ±20	10	200	0.5±0.05		
MSASL105AC6225[F]FNA01	LMK105AC6225[V-F]	10	X6S	2.2 μ	±10, ±20	10	150	0.5±0.10		
MSASJ105SC6225[F]FNA01	JMK105 C6225[V-F]	6.3	X6S	2.2 μ	±10, ±20	10	150	0.5±0.05		
MSASJ105BC6475MFNA01	JMK105BC6475MV-F	6.3	X6S	4.7 μ	±20	10	150	0.5+0.15/-0.05		
MSASJ105BC6475MFNA01	AMK105BC6475MV-F	4	X6S	4.7 μ	±20	10	200	0.5+0.15/-0.05		
MSASP105EC6226MFNA01	PMK105EC6226MV-F	2.5	X6S	22 μ	±20	20	150	0.5+0.30/-0		

【温度特性 B7 : X7R (-55~+125°C)】 0.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASU105SB7152[F]FNA01	UMK105 B7152[V-F]	50	X7R	1500 p	±10, ±20	2.5	200	0.5±0.05		
MSASU105SB7222[F]FNA01	UMK105 B7222[V-F]	50	X7R	2200 p	±10, ±20	2.5	200	0.5±0.05		
MSASU105SB7332[F]FNA01	UMK105 B7332[V-F]	50	X7R	3300 p	±10, ±20	2.5	200	0.5±0.05		
MSASU105SB7472[F]FNA01	UMK105 B7472[V-F]	50	X7R	4700 p	±10, ±20	2.5	150	0.5±0.05		
MSASU105SB7682[F]FNA01	UMK105 B7682[V-F]	50	X7R	6800 p	±10, ±20	2.5	150	0.5±0.05		
MSASU105SB7103[F]FNA01	UMK105 B7103[V-F]	50	X7R	0.01 μ	±10, ±20	3.5	150	0.5±0.05		
MSASU105SB7223[F]FNB25	UMK105 B7223[V-FR]	50	X7R	0.022 μ	±10, ±20	10	200	0.5±0.05		
MSASU105SB7473[F]FNB25	UMK105 B7473[V-FR]	50	X7R	0.047 μ	±10, ±20	10	200	0.5±0.05		
MSASU105SB7104[F]FNB25	UMK105 B7104[V-FR]	50	X7R	0.1 μ	±10, ±20	10	150	0.5±0.05		
MSAST105SB7223[F]FNA01	TMK105 B7223[V-F]	25	X7R	0.022 μ	±10, ±20	3.5	150	0.5±0.05		
MSAST105SB7473[F]FNA01	TMK105 B7473[V-F]	25	X7R	0.047 μ	±10, ±20	3.5	150	0.5±0.05		
MSAST105SB7104[F]FNB25	TMK105 B7104[V-FR]	25	X7R	0.1 μ	±10, ±20	10	200	0.5±0.05		
MSAST105SB7224[F]FNB25	TMK105 B7224[V-FR]	25	X7R	0.22 μ	±10, ±20	10	150	0.5±0.05		
MSASE105SB7223[F]FNA01	EMK105 B7223[V-F]	16	X7R	0.022 μ	±10, ±20	3.5	200	0.5±0.05		
MSASE105SB7473[F]FNA01	EMK105 B7473[V-F]	16	X7R	0.047 μ	±10, ±20	3.5	200	0.5±0.05		
MSASE105SB7104[F]FNA01	EMK105 B7104[V-F]	16	X7R	0.1 μ	±10, ±20	5	150	0.5±0.05		
MSASE105SB7224[F]FNB25	EMK105 B7224[V-FR]	16	X7R	0.22 μ	±10, ±20	10	150	0.5±0.05		
MSASL105SB7224[F]FNB25	LMK105 B7224[V-FR]	10	X7R	0.22 μ	±10, ±20	10	150	0.5±0.05		
MSASL105SB7474[F]FNA01	LMK105 B7474[V-F]	10	X7R	0.47 μ	±10, ±20	10	150	0.5±0.05		
MSASJ105SB7224[F]FNA01	JMK105 B7224[V-F]	6.3	X7R	0.22 μ	±10, ±20	5	150	0.5±0.05		
MSASJ105SB7474[F]FNA01	JMK105 B7474[V-F]	6.3	X7R	0.47 μ	±10, ±20	10	150	0.5±0.05		

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■ 型号一览

● 1608规格

【温度特性 X5R (-55~+85°C)】 0.8mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASU168AB5474 □ TNA01	UMK107ABJ474 □ A-T	50	X5R	0.47 μ	±10, ±20	10	150		0.8+0.15/-0.05	
MSASU168SB5105 □ TNA01	UMK107 BJ105 □ A-T	50	X5R	1 μ	±10, ±20	10	150		0.8±0.10	
MSASU168BB5225 □ TNA01	UMK107BBJ225 □ A-T	50	X5R	2.2 μ	±10, ±20	10	150		0.8+0.20/-0	
MSASG168BB5475 □ TNA01	GMK107BBJ475 □ A-T	35	X5R	4.7 μ	±10, ±20	10	150		0.8+0.20/-0	
MSAST168AB5225 □ TNA01	TMK107ABJ225 □ A-T	25	X5R	2.2 μ	±10, ±20	10	150		0.8+0.15/-0.05	
MSAST168BB5475 □ TNA01	TMK107BBJ475 □ A-T	25	X5R	4.7 μ	±10, ±20	10	150		0.8+0.20/-0	
MSAST168BB5106MTNA01	TMK107BBJ106MA-T	25	X5R	10 μ	±20	10	150		0.8+0.20/-0	
MSASE168AB5475 □ TNA01	EMK107ABJ475 □ A-T	16	X5R	4.7 μ	±10, ±20	10	150		0.8+0.15/-0.05	
MSASE168BB5106MTNA01	EMK107BBJ106MA-T	16	X5R	10 μ	±20	10	150		0.8+0.20/-0	
MSASL168BB5106 □ TNB33	LMK107BBJ106 □ ALT	10	X5R	10 μ	±10, ±20	10	150		0.8+0.20/-0	
MSASL168BB5226MTNA01	LMK107BBJ226MA-T	10	X5R	22 μ	±20	10	150		0.8+0.20/-0	
MSASJ168AB5106 □ TNA01	JMK107ABJ106 □ A-T	6.3	X5R	10 μ	±10, ±20	10	150		0.8+0.15/-0.05	
MSASJ168BB5226MTNA01	JMK107BBJ226MA-T	6.3	X5R	22 μ	±20	10	150		0.8+0.20/-0	
MSASJ168BB5476MRCOA1	JMK107BBJ476MA-RE	6.3	X5R	47 μ	±20	15	150		0.8+0.20/-0	
MSASA168BB5476MRCOA1	AMK107BBJ476MA-RE	4	X5R	47 μ	±20	20	150		0.8+0.20/-0	

【温度特性 X5R (-55~+85°C)】 0.45mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSAST16KT B5105 □ TNA01	TMK107 BJ105 □ K-T	25	X5R	1 μ	±10, ±20	10	150		0.45±0.05	
MSASE16KT B5105 □ TNA01	EMK107 BJ105 □ K-T	16	X5R	1 μ	±10, ±20	10	150		0.45±0.05	
MSASE16KJB5225 □ TNA01	EMK107BBJ225 □ K-T	16	X5R	2.2 μ	±10, ±20	10	150		0.45±0.05	
MSASL16KT B5105 □ TNA01	LMK107 BJ105 □ K-T	10	X5R	1 μ	±10, ±20	10	150		0.45±0.05	
MSASL16KT B5225 □ TNA01	LMK107 BJ225 □ K-T	10	X5R	2.2 μ	±10, ±20	10	150		0.45±0.05	
MSASL16KJB5475MTNB33	LMK107BBJ475MKL-T	10	X5R	4.7 μ	±20	10	150		0.45±0.05	
MSASJ16KT B5105 □ TNA01	JMK107 BJ105 □ K-T	6.3	X5R	1 μ	±10, ±20	10	150		0.45±0.05	
MSASJ16KT B5225 □ TNA01	JMK107 BJ225 □ K-T	6.3	X5R	2.2 μ	±10, ±20	10	150		0.45±0.05	
MSASJ16KT B5475MTNA01	JMK107 BJ475MK-T	6.3	X5R	4.7 μ	±20	10	150		0.45±0.05	
MSASJ16KJB5106MTNC12	JMK107BBJ106MK-TT	6.3	X5R	10 μ	±20	10	150		0.45±0.05	

【温度特性 X6S (-55~+105°C)】 0.8mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSAST168BC6225 □ TNA01	TMK107BC6225 □ A-T	25	X6S	2.2 μ	±10, ±20	10	150		0.8+0.20/-0	
MSASE168SC6105 □ TNA01	EMK107 C6105 □ A-T	16	X6S	1 μ	±10, ±20	5	150		0.8±0.10	
MSASE168BC6225 □ TNA01	EMK107BC6225 □ A-T	16	X6S	2.2 μ	±10, ±20	10	150		0.8+0.20/-0	
MSASE168BC6475 □ TNA01	EMK107BC6475 □ A-T	16	X6S	4.7 μ	±10, ±20	10	150		0.8+0.20/-0	
MSASL168SC6105 □ TNA01	LMK107 C6105 □ A-T	10	X6S	1 μ	±10, ±20	5	150		0.8±0.10	
MSASL168AC6475 □ TNA01	LMK107AC6475 □ A-T	10	X6S	4.7 μ	±10, ±20	10	150		0.8+0.15/-0.05	
MSASL168BC6106MTNA01	LMK107BC6106MA-T	10	X6S	10 μ	±20	10	150		0.8+0.20/-0	
MSASJ168SC6475 □ TNA01	JMK107 C6475 □ A-T	6.3	X6S	4.7 μ	±10, ±20	10	150		0.8±0.10	
MSASJ168BC6106MTNA01	JMK107BC6106MA-T	6.3	X6S	10 μ	±20	10	150		0.8+0.20/-0	
MSASJ168BC6226MTNA01	JMK107BC6226MA-T	6.3	X6S	22 μ	±20	10	150		0.8+0.20/-0	
MSASA168BC6226MTNA01	AMK107BC6226MA-T	4	X6S	22 μ	±20	10	150		0.8+0.20/-0	
MSASA168BC6476MRCOA1	AMK107BC6476MA-RE	4	X6S	47 μ	±20	20	150		0.8+0.20/-0	

【温度特性 B7 : X7R (-55~+125°C)】 0.8mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASU168SB7224 □ TNB25	UMK107 B7224 □ A-TR	50	X7R	0.22 μ	±10, ±20	10	150		0.8±0.10	
MSASU168SB7474 □ TNB25	UMK107 B7474 □ A-TR	50	X7R	0.47 μ	±10, ±20	10	150		0.8±0.10	
MSASU168AB7105 □ TNA01	UMK107ABJ105 □ A-T	50	X7R	1 μ	±10, ±20	10	150		0.8+0.15/-0.05	
MSAST168SB7474 □ TNB25	TMK107 B7474 □ A-TR	25	X7R	0.47 μ	±10, ±20	10	150		0.8±0.10	
MSAST168SB7105 □ TNA01	TMK107 B7105 □ A-T	25	X7R	1 μ	±10, ±20	10	150		0.8±0.10	
MSASE168SB7474 □ TNA01	EMK107 B7474 □ A-T	16	X7R	0.47 μ	±10, ±20	3.5	150		0.8±0.10	
MSASE168SB7105 □ TNA01	EMK107 B7105 □ A-T	16	X7R	1 μ	±10, ±20	5	150		0.8±0.10	
MSASE168BB7225 □ TNA01	EMK107BBJ225 □ A-T	16	X7R	2.2 μ	±10, ±20	10	150		0.8+0.20/-0	
MSASL168SB7225 □ TNB25	LMK107 B7225 □ A-TR	10	X7R	2.2 μ	±10, ±20	10	150		0.8±0.10	
MSASJ168SB7225 □ TNB25	JMK107 B7225 □ A-TR	6.3	X7R	2.2 μ	±10, ±20	10	200		0.8±0.10	
MSASJ168SB7475 □ TNA01	JMK107BB7475 □ A-T	6.3	X7R	4.7 μ	±10, ±20	10	150		0.8+0.20/-0	

■型号一览

●2012规格

【温度特性 B5 (BJ) : X5R (-55~+85°C)】 1.25mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASU21GBB5475 TNA01	UMK212BBJ475 G-T	50	X5R	4.7 μ	±10, ±20	10	150		1.25±0.20/-0	
MSASG21GBB5106 TNA01	GMK212BBJ106 G-T	35	X5R	10 μ	±10, ±20	10	150		1.25±0.20/-0	
MSAST21GAB5475 TNA01	TMK212ABJ475 G-T	25	X5R	4.7 μ	±10, ±20	10	150		1.25±0.15/-0.05	
MSAST21GBB5106 TNA01	TMK212BBJ106 G-T	25	X5R	10 μ	±10, ±20	10	150		1.25±0.20/-0	
MSAST21GBB5226MTCN12	TMK212BBJ226MG-TT	25	X5R	22 μ	±20	10	150		1.25±0.20/-0	
MSASE21GAB5106 TNA01	EMK212ABJ106 G-T	16	X5R	10 μ	±10, ±20	10	150		1.25±0.15/-0.05	
MSASE21GBB5226MTNA01	EMK212BBJ226MG-T	16	X5R	22 μ	±20	10	150		1.25±0.20/-0	
MSASL21GBB5226MTNA01	LMK212BBJ226MG-T	10	X5R	22 μ	±20	10	150		1.25±0.20/-0	
MSASL21GBB5476MTNA01	LMK212BBJ476MG-T	10	X5R	47 μ	±20	10	150		1.25±0.20/-0	
MSASJ21GAB5226 TNA01	JMK212ABJ226 G-T	6.3	X5R	22 μ	±10, ±20	10	150		1.25±0.15/-0.05	
MSASJ21GBB5476MTNA01	JMK212BBJ476MG-T	6.3	X5R	47 μ	±20	10	150		1.25±0.20/-0	
MSASJ21GBB5107MTGA01	JMK212BBJ107MG-TE	6.3	X5R	100 μ	±20	20	150		1.25±0.20/-0	
MSASA21GBB5107MTGA01	AMK212BBJ107MG-TE	4	X5R	100 μ	±20	20	150		1.25±0.20/-0	
MSASP21GBB5107MTNA01	PMK212BBJ107MG-T	2.5	X5R	100 μ	±20	10	150		1.25±0.20/-0	

【温度特性 B5 (BJ) : B (-25~+85°C) /X5R (-55~+85°C)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASU219JB5105 TNA01	UMK212ABJ105 D-T	50	X5R	1 μ	±10, ±20	10	150		0.85±0.10	
MSASU219LB5225 TNA01	UMK212BBJ225 D-T	50	X5R	2.2 μ	±10, ±20	10	150		0.85±0.10	
MSASG219LB5475 TNA01	GMK212BBJ475 D-T	35	X5R	4.7 μ	±10, ±20	10	150		0.85±0.10	
MSAST219SB5474 TNA01	TMK212 BJ474 D-T	25	B X5R	0.47 μ	±10, ±20	3.5	200		0.85±0.10	
MSAST219SB5105 TNA01	TMK212 BJ105 D-T	25	B X5R	1 μ	±10, ±20	5	200		0.85±0.10	
MSAST219JB5225 TNA01	TMK212ABJ225 D-T	25	X5R	2.2 μ	±10, ±20	5	150		0.85±0.10	
MSAST219LB5475 TNA01	TMK212BBJ475 D-T	25	X5R	4.7 μ	±10, ±20	10	150		0.85±0.10	
MSAST219LB5106 TNA01	TMK212BBJ106 D-T	25	X5R	10 μ	±10, ±20	10	150		0.85±0.10	
MSASE219SB5105 TNA01	EMK212 BJ105 D-T	16	B X5R ^{*1}	1 μ	±10, ±20	5	200		0.85±0.10	
MSASE219JB5225 TNA01	EMK212ABJ225 D-T	16	X5R ^{*1}	2.2 μ	±10, ±20	5	200		0.85±0.10	
MSASE219SB5475 TNA01	EMK212 BJ475 D-T	16	X5R	4.7 μ	±10, ±20	10	150		0.85±0.10	
MSASE219JB5106 TNA01	EMK212ABJ106 D-T	16	X5R	10 μ	±10, ±20	10	150		0.85±0.10	
MSASL219SB5105 TNA01	LMK212 BJ105 D-T	10	B X5R ^{*1}	1 μ	±10, ±20	3.5	200		0.85±0.10	
MSASL219SB5225 TNA01	LMK212 BJ225 D-T	10	X5R ^{*1}	2.2 μ	±10, ±20	5	200		0.85±0.10	
MSASL219JB5106 TNA01	LMK212ABJ106 D-T	10	X5R	10 μ	±10, ±20	10	150		0.85±0.10	
MSASL219LB5226MTNA01	LMK212BBJ226MG-T	10	X5R	22 μ	±20	10	150		0.85±0.10	
MSASJ219JB5106 TNA01	JMK212ABJ106 D-T	6.3	X5R	10 μ	±10, ±20	10	200		0.85±0.10	
MSASJ219JB5226MTNA01	JMK212ABJ226MG-T	6.3	X5R	22 μ	±20	10	150		0.85±0.10	
MSASA219LB5476MTNA01	AMK212BBJ476MG-T	4	X5R	47 μ	±20	10	150		0.85±0.10	

【温度特性 C6 : X6S (-55~+105°C)】 1.25mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSAST21GBC6106 TNA01	TMK212BC6106 G-T	25	X6S	10 μ	±10, ±20	10	150		1.25±0.20/-0	
MSASE21GBC6226MTCN12	EMK212BC6226MG-TT	16	X6S	22 μ	±20	10	150		1.25±0.20/-0	
MSASL21GBC6226MTNA01	LMK212BC6226MG-T	10	X6S	22 μ	±20	10	150		1.25±0.20/-0	
MSASJ21GBC6226MTNA01	JMK212BC6226MG-T	6.3	X6S	22 μ	±20	10	150		1.25±0.20/-0	
MSASJ21GBC6476MTNA01	JMK212BC6476MG-T	6.3	X6S	47 μ	±20	10	150		1.25±0.20/-0	
MSASA21GBC6476MTNA01	AMK212BC6476MG-T	4	X6S	47 μ	±20	10	150		1.25±0.20/-0	
MSASA21GBC6107MTGA01	AMK212BC6107MG-TE	4	X6S	100 μ	±20	20	150		1.25±0.20/-0	

【温度特性 C6 : X6S (-55~+105°C)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASL219JC6106 TNA01	LMK212AC6106 D-T	10	X6S	10 μ	±10, ±20	10	150		0.85±0.10	
MSASA219LC6226MTNA01	AMK212BC6226MG-T	4	X6S	22 μ	±20	10	150		0.85±0.10	

【温度特性 B7 : X7R (-55~+125°C)】 1.25mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASU21GSB7224 TNA01	UMK212 B7224 G-T	50	X7R	0.22 μ	±10, ±20	3.5	150		1.25±0.10	
MSASU21GSB7474 TNA01	UMK212 B7474 G-T	50	X7R	0.47 μ	±10, ±20	3.5	150		1.25±0.10	
MSASU21GSB7105 TNA01	UMK212 B7105 G-T	50	X7R	1 μ	±10, ±20	10	150		1.25±0.10	
MSASU21GBB7225 TNA01	UMK212BB7225 G-T	50	X7R	2.2 μ	±10, ±20	10	150		1.25±0.20/-0	
MSASG21GSB7105 TNA01	GMK212 B7105 G-T	35	X7R	1 μ	±10, ±20	10	150		1.25±0.10	
MSAST21GSB7225 TNA01	TMK212 B7225 G-TR	25	X7R	2.2 μ	±10, ±20	10	150		1.25±0.10	
MSAST21GAB7475 TNA01	TMK212AB7475 G-T	25	X7R	4.7 μ	±10, ±20	10	150		1.25±0.15/-0.05	
MSASE21GSB7475 TNA01	EMK212 B7475 G-T	16	X7R	4.7 μ	±10, ±20	10	150		1.25±0.10	
MSASE21GBB7106MTNA01	EMK212BB7106MG-T	16	X7R	10 μ	±20	10	150		1.25±0.20/-0	
MSASL21GAB7106 TNA01	LMK212AB7106 G-T	10	X7R	10 μ	±10, ±20	10	150		1.25±0.15/-0.05	
MSASJ21GAB7106 TNA01	JMK212AB7106 G-T	6.3	X7R	10 μ	±10, ±20	10	150		1.25±0.15/-0.05	

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■ 型号一览

【温度特性 B7 : X7R (-55~+125°C)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASU219JB7104 [] TNA01	UMK212AB7104 [] D-T	50		X7R	0.1 μ	±10, ±20	10	150	0.85±0.10	
MSASU219JB7224 [] TNA01	UMK212AB7224 [] D-T	50		X7R	0.22 μ	±10, ±20	10	150	0.85±0.10	
MSASU219JB7474 [] TNA01	UMK212AB7474 [] D-T	50		X7R	0.47 μ	±10, ±20	10	150	0.85±0.10	
MSASU219JB7105 [] TNA01	UMK212AB7105 [] D-T	50		X7R	1 μ	±10, ±20	10	150	0.85±0.10	
MSAST219JB7225 [] TNB25	TMK212AB7225 [] D-TR	25		X7R	2.2 μ	±10, ±20	10	150	0.85±0.10	
MSASE219SB7474 [] TNA01	EMK212 B7474 [] D-T	16		X7R	0.47 μ	±10, ±20	3.5	200	0.85±0.10	
MSASE219SB7105 [] TNA01	EMK212 B7105 [] D-T	16		X7R	1 μ	±10, ±20	5	200	0.85±0.10	
MSASE219JB7225 [] TNA01	EMK212AB7225 [] D-T	16		X7R	2.2 μ	±10, ±20	5	150	0.85±0.10	
MSASE219LB7475MTNA01	EMK212BB7475MD-T	16		X7R	4.7 μ	±20	10	150	0.85±0.10	
MSASL219SB7105 [] TNA01	LMK212 B7105 [] D-T	10		X7R	1 μ	±10, ±20	3.5	200	0.85±0.10	
MSASL219JB7225 [] TNA01	LMK212AB7225 [] D-T	10		X7R	2.2 μ	±10, ±20	5	200	0.85±0.10	
MSASL219JB7475 [] TNB25	LMK212AB7475 [] D-TR	10		X7R	4.7 μ	±10, ±20	10	150	0.85±0.10	

● 3216规格

【温度特性 B5 (BJ) : X5R (-55~+85°C)】 1.6mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASU31LB5475 [] TNA01	UMK316 BJ475 [] L-T	50		X5R	4.7 μ	±10, ±20	10	150	1.6±0.20	
MSASU31LB5106 [] TNA01	UMK316BBJ106 [] L-T	50		X5R	10 μ	±10, ±20	10	150	1.6±0.30	
MSAST31LB5226MTNA01	TMK316BBJ226ML-T	25		X5R	22 μ	±20	10	150	1.6±0.30	
MSASE31LB5476MTNA01	EMK316BBJ476ML-T	16		X5R	47 μ	±20	10	150	1.6±0.30	
MSASL31LB5476MTNA01	LMK316ABJ476ML-T	10		X5R	47 μ	±20	10	150	1.6±0.20	
MSASJ31LB5107MTNA01	JMK316ABJ107ML-T	6.3		X5R	100 μ	±20	10	150	1.6±0.20	
MSASJ31LB5227MTCA01	JMK316BBJ227ML-TE	6.3		X5R	220 μ	±20	20	150	1.6±0.30	
MSASA31LB5107MTNA01	AMK316ABJ107ML-T	4		X5R	100 μ	±20	10	150	1.6±0.20	
MSASA31LB5157MTNA01	AMK316BBJ157ML-T	4		X5R	150 μ	±20	10	150	1.6±0.30	
MSASA31LB5227MTCA01	AMK316BBJ227ML-TE	4		X5R	220 μ	±20	10	150	1.6±0.30	
MSASP31LB5227MTNA01	PMK316BBJ227ML-T	2.5		X5R	220 μ	±20	10	150	1.6±0.30	

【温度特性 B5 (BJ) : B (-25~+85°C) / X5R (-55~+85°C)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASU319HB5105 [] TNA01	UMK316 BJ105 [] D-T	50	B	X5R	1 μ	±10, ±20	3.5	150	0.85±0.10	
MSASU319HB5225 [] TNA01	UMK316 BJ225 [] D-T	50	B	X5R	2.2 μ	±10, ±20	3.5	150	0.85±0.10	
MSASU319LB5475 [] TNA01	UMK316ABJ475 [] D-T	50		X5R	4.7 μ	±10, ±20	10	150	0.85±0.10	
MSAST319HB5105 [] TNA01	TMK316 BJ105 [] D-T	25	B	X5R	1 μ	±10, ±20	3.5	200	0.85±0.10	
MSAST319HB5225 [] TNA01	TMK316 BJ225 [] D-T	25	B	X5R	2.2 μ	±10, ±20	3.5	150	0.85±0.10	
MSAST319HB5475 [] TNA01	TMK316 BJ475 [] D-T	25		X5R	4.7 μ	±10, ±20	5	150	0.85±0.10	
MSAST319LB5106 [] TNA01	TMK316ABJ106 [] D-T	25		X5R	10 μ	±10, ±20	10	150	0.85±0.10	
MSASE319HB5225 [] TNA01	EMK316 BJ225 [] D-T	16	B	X5R	2.2 μ	±10, ±20	3.5	200	0.85±0.10	
MSASE319HB5475 [] TNA01	EMK316 BJ475 [] D-T	16	B	X5R	4.7 μ	±10, ±20	5	200	0.85±0.10	
MSASE319HB5106 [] TNA01	EMK316 BJ106 [] D-T	16		X5R	10 μ	±10, ±20	10	150	0.85±0.10	
MSASE319LB5226MTNA01	EMK316ABJ226MD-T	16		X5R	22 μ	±20	10	150	0.85±0.10	
MSASL319HB5475 [] TNA01	LMK316 BJ475 [] D-T	10	B	X5R	4.7 μ	±10, ±20	5	200	0.85±0.10	
MSASL319HB5106 [] TNA01	LMK316 BJ106 [] D-T	10		X5R	10 μ	±10, ±20	10	200	0.85±0.10	
MSASL319LB5226MTNA01	LMK316ABJ226MD-T	10		X5R	22 μ	±20	10	150	0.85±0.10	
MSASJ319HB5106 [] TNA01	JMK316 BJ106 [] D-T	6.3		X5R	10 μ	±10, ±20	10	200	0.85±0.10	
MSASJ319LB5226MTNA01	JMK316ABJ226MD-T	6.3		X5R	22 μ	±20	10	150	0.85±0.10	
MSASJ319LB5476MTNA01	JMK316ABJ476MD-T	6.3		X5R	47 μ	±20	10	150	0.85±0.10	

【温度特性 C6 : X6S (-55~+105°C)】 1.6mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSAST31LB6226MTNA01	TMK316BC6226ML-T	25		X6S	22 μ	±20	10	150	1.6±0.30	
MSASE31LB6226MTNA01	EMK316BC6226ML-T	16		X6S	22 μ	±20	10	150	1.6±0.30	
MSASL31LB6476MTNA01	LMK316BC6476ML-T	10		X6S	47 μ	±20	10	150	1.6±0.30	
MSASJ31LAC6476MTNA01	JMK316AC6476ML-T	6.3		X6S	47 μ	±20	10	150	1.6±0.20	
MSASA31LAC6476MTNA01	AMK316AC6476ML-T	4		X6S	47 μ	±20	10	200	1.6±0.20	
MSASA31LAC6107MTNA01	AMK316AC6107ML-T	4		X6S	100 μ	±20	10	150	1.6±0.20	
MSASA31LB6227MTCA01	AMK316BC6227ML-TE	4		X6S	220 μ	±20	20	150	1.6±0.30	

【温度特性 C7 : X7S (-55~+125°C)】 1.6mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASJ31LAC7476MTNA01	JMK316AC7476ML-T	6.3		X7S	47 μ	±20	10	150	1.6±0.20	
MSASA31LAC7476MTNA01	AMK316AC7476ML-T	4		X7S	47 μ	±20	10	150	1.6±0.20	

■型号一览

【温度特性 B7 : X7R (-55~+125°C)】 1.6mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASU31LSB7225[]TNA01	UMK316 B7225[]L-T	50		X7R	2.2 μ	±10, ±20	10	150	1.6±0.20	
MSASU31LAB7475[]TNA01	UMK316AB7475[]L-T	50		X7R	4.7 μ	±10, ±20	10	150	1.6±0.20	
MSASG31LAB7106[]TNB25	GMK316AB7106[]L-TR	35		X7R	10 μ	±10, ±20	10	150	1.6±0.20	
MSAST31LAB7475[]TNA01	TMK316AB7475[]L-T	25		X7R	4.7 μ	±10, ±20	10	200	1.6±0.20	
MSAST31LAB7106[]TNA01	TMK316AB7106[]L-T	25		X7R	10 μ	±10, ±20	10	150	1.6±0.20	
MSASE31LSB7475[]TNA01	EMK316 B7475[]L-T	16		X7R	4.7 μ	±10, ±20	5	200	1.6±0.20	
MSASE31LAB7106[]TNA01	EMK316AB7106[]L-T	16		X7R	10 μ	±10, ±20	10	200	1.6±0.20	
MSASE31LB7226MTNA01	EMK316BB7226ML-T	16		X7R	22 μ	±20	10	150	1.6±0.30	
MSASL31LAB7106[]TNA01	LMK316AB7106[]L-T	10		X7R	10 μ	±10, ±20	10	200	1.6±0.20	
MSASL31LAB7226[]TNB25	LMK316AB7226[]L-TR	10		X7R	22 μ	±10, ±20	10	150	1.6±0.20	

【温度特性 B7 : X7R (-55~+125°C)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASU319HB7225[]TNA01	UMK316 B7225[]D-T	50		X7R	2.2 μ	±10, ±20	10	150	0.85±0.10	
MSAST319LB7475[]TNA01	TMK316AB7475[]D-T	25		X7R	4.7 μ	±10, ±20	10	150	0.85±0.10	
MSASL319LB7106MTNA01	LMK316AB7106MD-T	10		X7R	10 μ	±20	10	150	0.85±0.10	

●3225规格

【温度特性 B5 : X5R (-55~+85°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASU32MSB5106[]PNA01	UMK325 BJ106[]M-P	50		X5R	10 μ	±10, ±20	5	150	2.5±0.20	
MSASG32MSB5226MPNA01	GMK325 BJ226MM-P	35		X5R	22 μ	±20	5	150	2.5±0.20	
MSAST32MAB5476MPNDT1	TMK325ABJ476MM-P	25		X5R	47 μ	±20	10	150	2.5±0.30	
MSASE32MAB5107MPNA01	EMK325ABJ107MM-P	16		X5R	100 μ	±20	10	150	2.5±0.30	
MSASL32MAB5107MPNA01	LMK325ABJ107MM-P	10		X5R	100 μ	±20	10	150	2.5±0.30	
MSASJ32MAB5157MPNDT1	JMK325ABJ157MM-P	6.3		X5R	150 μ	±20	10	150	2.5±0.30	
MSASJ32MAB5227MPNDT1	JMK325ABJ227MM-P	6.3		X5R	220 μ	±20	10	150	2.5±0.30	
MSASJ32MAB5337MPNDT1	JMK325ABJ337MM-PE	6.3		X5R	330 μ	±20	10	150	2.5±0.30	
MSASA32MAB5157MPNDT1	AMK325ABJ157MM-P	4		X5R	150 μ	±20	10	150	2.5±0.30	
MSASA32MAB5227MPNDT1	AMK325ABJ227MM-P	4		X5R	220 μ	±20	10	150	2.5±0.30	
MSASA32MAB5337MPNDT1	AMK325ABJ337MM-P	4		X5R	330 μ	±20	10	150	2.5±0.30	

【温度特性 B5 : B (-25~+85°C) / X5R (-55~+85°C)】 1.9mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASU32NSB5475[]TNA01	UMK325 BJ475[]N-T	50		X5R	4.7 μ	±10, ±20	10	150	1.9±0.20	
MSASG32NSB5225[]TNA01	GMK325 BJ225[]N-T	35	B	X5R	2.2 μ	±10, ±20	3.5	200	1.9±0.20	
MSASG32NSB5475[]TNA01	GMK325 BJ475[]N-T	35		X5R	4.7 μ	±10, ±20	10	150	1.9±0.20	
MSASG32NSB5106[]TNA01	GMK325 BJ106[]N-T	35		X5R	10 μ	±10, ±20	5	150	1.9±0.20	
MSAST32NSB5335MTNA01	TMK325 BJ335MN-T	25	B	X5R ¹⁾	3.3 μ	±20	3.5	200	1.9±0.20	
MSAST32NSB5475[]TNA01	TMK325 BJ475[]N-T	25	B	X5R ¹⁾	4.7 μ	±10, ±20	3.5	200	1.9±0.20	
MSAST32NSB5106[]TNA01	TMK325 BJ106[]N-T	25		X5R	10 μ	±10, ±20	5	200	1.9±0.20	
MSASE32NSB5475[]TNA01	EMK325 BJ475[]N-T	16	B	X5R ¹⁾	4.7 μ	±10, ±20	3.5	200	1.9±0.20	
MSASE32NSB5106[]TNA01	EMK325 BJ106[]N-T	16		X5R	10 μ	±10, ±20	3.5	200	1.9±0.20	
MSASE32YBB5476MTNA01	EMK325 BJ476MY-T	16		X5R	47 μ	±20	10	150	1.9+0.1/-0.2	
MSASL32NSB5106[]TNA01	LMK325 BJ106[]N-T	10		X5R	10 μ	±10, ±20	3.5	200	1.9±0.20	
MSASL32YBB5226MTNA01	LMK325 BJ226MY-T	10	B	X5R	22 μ	±20	5	150	1.9+0.1/-0.2	
MSASJ32YBB5226MTNA01	JMK325 BJ226MY-T	6.3	B	X5R	22 μ	±20	5	200	1.9+0.1/-0.2	
MSASJ32NSB5476MTNA01	JMK325 BJ476MN-T	6.3		X5R	47 μ	±20	10	150	1.9±0.20	
MSASJ32YBB5107MTNA01	JMK325 BJ107MY-T	6.3		X5R	100 μ	±20	10	150	1.9+0.1/-0.2	

【温度特性 B5 : B (-25~+85°C) / X5R (-55~+85°C)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSAST329JB5106[]TNA01	TMK325 BJ106[]D-T	25		X5R	10 μ	±10, ±20	5	150	0.85±0.10	
MSASE329JB5106[]TNA01	EMK325 BJ106[]D-T	16		X5R	10 μ	±10, ±20	5	150	0.85±0.10	
MSASE329JB5226MTNA01	EMK325 BJ226MD-T	16		X5R	22 μ	±20	10	150	0.85±0.10	
MSASL329JB5335[]TNA01	LMK325 BJ335[]D-T	10	B	X5R	3.3 μ	±10, ±20	3.5	200	0.85±0.10	
MSASL329JB5475[]TNA01	LMK325 BJ475[]D-T	10	B	X5R	4.7 μ	±10, ±20	5	200	0.85±0.10	
MSASL329JB5106[]TNA01	LMK325 BJ106[]D-T	10		X5R	10 μ	±10, ±20	5	150	0.85±0.10	

【温度特性 G6 : X6S (-55~+105°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASE32MAC6476MPNDT1	EMK325AC6476MM-P	16		X6S	47 μ	±20	10	150	2.5±0.30	
MSASL32MAC6107MPNA01	LMK325AC6107MM-P	10		X6S	100 μ	±20	10	150	2.5±0.30	
MSASA32MAC6157MPNDT1	AMK325AC6157MM-P	4		X6S	150 μ	±20	10	150	2.5±0.30	
MSASA32MAC6227MPNDT1	AMK325AC6227MM-P	4		X6S	220 μ	±20	10	150	2.5±0.30	
MSASA32MAC6337MPNDT1	AMK325AC6337MM-PE	4		X6S	330 μ	±20	10	150	2.5±0.30	
MSASP32MAC6227MPNDT1	PMK325AC6227MM-P	2.5		X6S	220 μ	±20	10	200	2.5±0.30	
MSASP32MAC6337MPNDT1	PMK325AC6337MM-P	2.5		X6S	330 μ	±20	10	150	2.5±0.30	

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■ 型号一览

【温度特性 C7 : X7S (-55~+125°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASJ32MAC7107MPNA01	JMK325AC7107MM-P	6.3	X7S	100 μ	±20	10	150		2.5±0.30	

【温度特性 B7 : X7R (-55~+125°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASU32MSB7335 [] PNA01	UMK325 B7335 [] M-P	50	X7R	3.3 μ	±10, ±20	3.5	200		2.5±0.20	
MSASU32MSB7475 [] PNA01	UMK325 B7475 [] M-P	50	X7R	4.7 μ	±10, ±20	5	150		2.5±0.20	
MSASU32MAB7106 [] PNA01	UMK325AB7106 [] M-P	50	X7R	10 μ	±10, ±20	10	150		2.5±0.30	
MSAST32MAB7106 [] PNA01	TMK325AB7106 [] M-P	25	X7R	10 μ	±10, ±20	10	200		2.5±0.30	
MSAST32MSB7226 [] PNB25	TMK325 B7226 [] M-PR	25	X7R	22 μ	±10, ±20	10	150		2.5±0.20	
MSASE32MSB7226 [] PNB25	EMK325 B7226 [] M-PR	16	X7R	22 μ	±10, ±20	10	150		2.5±0.20	
MSASL32MSB7476 [] PNB25	LMK325 B7476 [] M-PR	10	X7R	47 μ	±10, ±20	10	150		2.5±0.20	
MSASJ32MSB7476 [] PNB25	JMK325 B7476 [] M-PR	6.3	X7R	47 μ	±10, ±20	10	200		2.5±0.20	

【温度特性 B7 : X7R (-55~+125°C)】 1.9mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASU32NSB7475 [] TNB25	UMK325 B7475 [] N-TR	50	X7R	4.7 μ	±10, ±20	10	150		1.9±0.20	
MSAST32NSB7335 [] TNA01	TMK325 B7335 [] N-T	25	X7R	3.3 μ	±10, ±20	3.5	200		1.9±0.20	
MSAST32NSB7475 [] TNA01	TMK325 B7475 [] N-T	25	X7R	4.7 μ	±10, ±20	3.5	150		1.9±0.20	
MSAST32NSB7106 [] TNB25	TMK325 B7106 [] N-TR	25	X7R	10 μ	±10, ±20	10	150		1.9±0.20	
MSASE32NSB7475 [] TNA01	EMK325 B7475 [] N-T	16	X7R	4.7 μ	±10, ±20	3.5	200		1.9±0.20	
MSASE32NSB7106 [] TNA01	EMK325 B7106 [] N-T	16	X7R	10 μ	±10, ±20	3.5	150		1.9±0.20	
MSASL32NSB7106 [] TNA01	LMK325 B7106 [] N-T	10	X7R	10 μ	±10, ±20	3.5	200		1.9±0.20	

● 4532规格

【温度特性 B5 : X5R (-55~+85°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASA45MSB5477MTNA01	AMK432 BJ477MM-T	4	X5R	470 μ	±20	10	150		2.5±0.20	

【温度特性 C6 : X6S (-55~+105°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASP45MSC6477MTNA01	PMK432 C6477MM-T	2.5	X6S	470 μ	±20	10	150		2.5±0.20	

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■ 型号一览

Table with columns: 新型号, 旧型号(参考用), 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 (额定电压 x %), 厚度*3 [mm], 注释. Lists various capacitor models and specifications.

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

Table with columns: 新型号, 旧型号(参考用), 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 (额定电压 x %), 厚度*3 [mm], 注释. Lists capacitor models with temperature characteristics.

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■ 型号一览

新型号	旧型号(参考用)	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]	注释
								额定电压 x %		
MSAST021SCG5R2 [] WNA01	TMKO21 CG5R2 [] K-W	25	CG	COG	5.2 p	±0.25pF, ±0.5pF	504	200	0.125±0.013	
MSAST021SCG5R3 [] WNA01	TMKO21 CG5R3 [] K-W	25	CG	COG	5.3 p	±0.25pF, ±0.5pF	506	200	0.125±0.013	
MSAST021SCG5R4 [] WNA01	TMKO21 CG5R4 [] K-W	25	CG	COG	5.4 p	±0.25pF, ±0.5pF	508	200	0.125±0.013	
MSAST021SCG5R5 [] WNA01	TMKO21 CG5R5 [] K-W	25	CG	COG	5.5 p	±0.25pF, ±0.5pF	510	200	0.125±0.013	
MSAST021SCG5R6 [] WNA01	TMKO21 CG5R6 [] K-W	25	CG	COG	5.6 p	±0.25pF, ±0.5pF	512	200	0.125±0.013	
MSAST021SCG5R7 [] WNA01	TMKO21 CG5R7 [] K-W	25	CG	COG	5.7 p	±0.25pF, ±0.5pF	514	200	0.125±0.013	
MSAST021SCG5R8 [] WNA01	TMKO21 CG5R8 [] K-W	25	CG	COG	5.8 p	±0.25pF, ±0.5pF	516	200	0.125±0.013	
MSAST021SCG5R9 [] WNA01	TMKO21 CG5R9 [] K-W	25	CG	COG	5.9 p	±0.25pF, ±0.5pF	518	200	0.125±0.013	
MSAST021SCG6060 [] WNA01	TMKO21 CG606 [] K-W	25	CG	COG	6 p	±0.25pF, ±0.5pF	520	200	0.125±0.013	
MSAST021SCG6R1 [] WNA01	TMKO21 CG6R1 [] K-W	25	CG	COG	6.1 p	±0.25pF, ±0.5pF	522	200	0.125±0.013	
MSAST021SCG6R2 [] WNA01	TMKO21 CG6R2 [] K-W	25	CG	COG	6.2 p	±0.25pF, ±0.5pF	524	200	0.125±0.013	
MSAST021SCG6R3 [] WNA01	TMKO21 CG6R3 [] K-W	25	CG	COG	6.3 p	±0.25pF, ±0.5pF	526	200	0.125±0.013	
MSAST021SCG6R4 [] WNA01	TMKO21 CG6R4 [] K-W	25	CG	COG	6.4 p	±0.25pF, ±0.5pF	528	200	0.125±0.013	
MSAST021SCG6R5 [] WNA01	TMKO21 CG6R5 [] K-W	25	CG	COG	6.5 p	±0.25pF, ±0.5pF	530	200	0.125±0.013	
MSAST021SCG6R6 [] WNA01	TMKO21 CG6R6 [] K-W	25	CG	COG	6.6 p	±0.25pF, ±0.5pF	532	200	0.125±0.013	
MSAST021SCG6R7 [] WNA01	TMKO21 CG6R7 [] K-W	25	CG	COG	6.7 p	±0.25pF, ±0.5pF	534	200	0.125±0.013	
MSAST021SCG6R8 [] WNA01	TMKO21 CG6R8 [] K-W	25	CG	COG	6.8 p	±0.25pF, ±0.5pF	536	200	0.125±0.013	
MSAST021SCG6R9 [] WNA01	TMKO21 CG6R9 [] K-W	25	CG	COG	6.9 p	±0.25pF, ±0.5pF	538	200	0.125±0.013	
MSAST021SCG070 [] WNA01	TMKO21 CG070 [] K-W	25	CG	COG	7 p	±0.25pF, ±0.5pF	540	200	0.125±0.013	
MSAST021SCG7R1 [] WNA01	TMKO21 CG7R1 [] K-W	25	CG	COG	7.1 p	±0.25pF, ±0.5pF	542	200	0.125±0.013	
MSAST021SCG7R2 [] WNA01	TMKO21 CG7R2 [] K-W	25	CG	COG	7.2 p	±0.25pF, ±0.5pF	544	200	0.125±0.013	
MSAST021SCG7R3 [] WNA01	TMKO21 CG7R3 [] K-W	25	CG	COG	7.3 p	±0.25pF, ±0.5pF	546	200	0.125±0.013	
MSAST021SCG7R4 [] WNA01	TMKO21 CG7R4 [] K-W	25	CG	COG	7.4 p	±0.25pF, ±0.5pF	548	200	0.125±0.013	
MSAST021SCG7R5 [] WNA01	TMKO21 CG7R5 [] K-W	25	CG	COG	7.5 p	±0.25pF, ±0.5pF	550	200	0.125±0.013	
MSAST021SCG7R6 [] WNA01	TMKO21 CG7R6 [] K-W	25	CG	COG	7.6 p	±0.25pF, ±0.5pF	552	200	0.125±0.013	
MSAST021SCG7R7 [] WNA01	TMKO21 CG7R7 [] K-W	25	CG	COG	7.7 p	±0.25pF, ±0.5pF	554	200	0.125±0.013	
MSAST021SCG7R8 [] WNA01	TMKO21 CG7R8 [] K-W	25	CG	COG	7.8 p	±0.25pF, ±0.5pF	556	200	0.125±0.013	
MSAST021SCG7R9 [] WNA01	TMKO21 CG7R9 [] K-W	25	CG	COG	7.9 p	±0.25pF, ±0.5pF	558	200	0.125±0.013	
MSAST021SCG080 [] WNA01	TMKO21 CG080 [] K-W	25	CG	COG	8 p	±0.25pF, ±0.5pF	560	200	0.125±0.013	
MSAST021SCG8R1 [] WNA01	TMKO21 CG8R1 [] K-W	25	CG	COG	8.1 p	±0.25pF, ±0.5pF	562	200	0.125±0.013	
MSAST021SCG8R2 [] WNA01	TMKO21 CG8R2 [] K-W	25	CG	COG	8.2 p	±0.25pF, ±0.5pF	564	200	0.125±0.013	
MSAST021SCG8R3 [] WNA01	TMKO21 CG8R3 [] K-W	25	CG	COG	8.3 p	±0.25pF, ±0.5pF	566	200	0.125±0.013	
MSAST021SCG8R4 [] WNA01	TMKO21 CG8R4 [] K-W	25	CG	COG	8.4 p	±0.25pF, ±0.5pF	568	200	0.125±0.013	
MSAST021SCG8R5 [] WNA01	TMKO21 CG8R5 [] K-W	25	CG	COG	8.5 p	±0.25pF, ±0.5pF	570	200	0.125±0.013	
MSAST021SCG8R6 [] WNA01	TMKO21 CG8R6 [] K-W	25	CG	COG	8.6 p	±0.25pF, ±0.5pF	572	200	0.125±0.013	
MSAST021SCG8R7 [] WNA01	TMKO21 CG8R7 [] K-W	25	CG	COG	8.7 p	±0.25pF, ±0.5pF	574	200	0.125±0.013	
MSAST021SCG8R8 [] WNA01	TMKO21 CG8R8 [] K-W	25	CG	COG	8.8 p	±0.25pF, ±0.5pF	576	200	0.125±0.013	
MSAST021SCG8R9 [] WNA01	TMKO21 CG8R9 [] K-W	25	CG	COG	8.9 p	±0.25pF, ±0.5pF	578	200	0.125±0.013	
MSAST021SCG090 [] WNA01	TMKO21 CG090 [] K-W	25	CG	COG	9 p	±0.25pF, ±0.5pF	580	200	0.125±0.013	
MSAST021SCG9R1 [] WNA01	TMKO21 CG9R1 [] K-W	25	CG	COG	9.1 p	±0.25pF, ±0.5pF	582	200	0.125±0.013	
MSAST021SCG9R2 [] WNA01	TMKO21 CG9R2 [] K-W	25	CG	COG	9.2 p	±0.25pF, ±0.5pF	584	200	0.125±0.013	
MSAST021SCG9R3 [] WNA01	TMKO21 CG9R3 [] K-W	25	CG	COG	9.3 p	±0.25pF, ±0.5pF	586	200	0.125±0.013	
MSAST021SCG9R4 [] WNA01	TMKO21 CG9R4 [] K-W	25	CG	COG	9.4 p	±0.25pF, ±0.5pF	588	200	0.125±0.013	
MSAST021SCG9R5 [] WNA01	TMKO21 CG9R5 [] K-W	25	CG	COG	9.5 p	±0.25pF, ±0.5pF	590	200	0.125±0.013	
MSAST021SCG9R6 [] WNA01	TMKO21 CG9R6 [] K-W	25	CG	COG	9.6 p	±0.25pF, ±0.5pF	592	200	0.125±0.013	
MSAST021SCG9R7 [] WNA01	TMKO21 CG9R7 [] K-W	25	CG	COG	9.7 p	±0.25pF, ±0.5pF	594	200	0.125±0.013	
MSAST021SCG9R8 [] WNA01	TMKO21 CG9R8 [] K-W	25	CG	COG	9.8 p	±0.25pF, ±0.5pF	596	200	0.125±0.013	
MSAST021SCG9R9 [] WNA01	TMKO21 CG9R9 [] K-W	25	CG	COG	9.9 p	±0.25pF, ±0.5pF	598	200	0.125±0.013	
MSAST021SCG100 [] WNA01	TMKO21 CG100 [] K-W	25	CG	COG	10 p	±0.25pF, ±0.5pF	600	200	0.125±0.013	
MSAST021SCG120JWNA01	TMKO21 CG120JK-W	25	CG	COG	12 p	±5%	640	200	0.125±0.013	
MSAST021SCG150JWNA01	TMKO21 CG150JK-W	25	CG	COG	15 p	±5%	700	200	0.125±0.013	
MSAST021SCG180JWNA01	TMKO21 CG180JK-W	25	CG	COG	18 p	±5%	760	200	0.125±0.013	
MSAST021SCG220JWNA01	TMKO21 CG220JK-W	25	CG	COG	22 p	±5%	840	200	0.125±0.013	
MSAST021SCG270JWNA01	TMKO21 CG270JK-W	25	CG	COG	27 p	±5%	940	200	0.125±0.013	
MSASE021SCG330JWNA01	EMKO21 CG330JK-W	16	CG	COG	33 p	±5%	1000	150	0.125±0.013	
MSASE021SCG390JWNA01	EMKO21 CG390JK-W	16	CG	COG	39 p	±5%	1000	150	0.125±0.013	
MSASE021SCG470JWNA01	EMKO21 CG470JK-W	16	CG	COG	47 p	±5%	1000	150	0.125±0.013	
MSASE021SCG560JWNA01	EMKO21 CG560JK-W	16	CG	COG	56 p	±5%	1000	150	0.125±0.013	
MSASL021SCG680JWNA01	LMKO21 CG680JK-W	10	CG	COG	68 p	±5%	1000	200	0.125±0.013	
MSASL021SCG820JWNA01	LMKO21 CG820JK-W	10	CG	COG	82 p	±5%	1000	200	0.125±0.013	
MSASL021SCG101JWNA01	LMKO21 CG101JK-W	10	CG	COG	100 p	±5%	1000	200	0.125±0.013	

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■型号一览

Table with columns: 新型号, 旧型号(参考用), 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 1GHz), 高温负载(额定电压 x %), 厚度*3 [mm], 注释. Contains multiple rows of capacitor specifications.

一般民生用

多层陶瓷电容器

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■ 型号一览

新型号	旧型号(参考用)	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 1GHz) (min)	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSART042SCG8R6 []WRA01	TVS042 CG8R6 []C-W	25	CG	COG	8.6 p	±0.1pF, ±0.25pF, ±0.5pF	50	200	0.2±0.02	
MSART042SCG8R7 []WRA01	TVS042 CG8R7 []C-W	25	CG	COG	8.7 p	±0.1pF, ±0.25pF, ±0.5pF	50	200	0.2±0.02	
MSART042SCG8R8 []WRA01	TVS042 CG8R8 []C-W	25	CG	COG	8.8 p	±0.1pF, ±0.25pF, ±0.5pF	50	200	0.2±0.02	
MSART042SCG8R9 []WRA01	TVS042 CG8R9 []C-W	25	CG	COG	8.9 p	±0.1pF, ±0.25pF, ±0.5pF	50	200	0.2±0.02	
MSART042SCG090 []WRA01	TVS042 CG090 []C-W	25	CG	COG	9 p	±0.1pF, ±0.25pF, ±0.5pF	50	200	0.2±0.02	
MSART042SCG9R1 []WRA01	TVS042 CG9R1 []C-W	25	CG	COG	9.1 p	±0.1pF, ±0.25pF, ±0.5pF	45	200	0.2±0.02	
MSART042SCG9R2 []WRA01	TVS042 CG9R2 []C-W	25	CG	COG	9.2 p	±0.1pF, ±0.25pF, ±0.5pF	45	200	0.2±0.02	
MSART042SCG9R3 []WRA01	TVS042 CG9R3 []C-W	25	CG	COG	9.3 p	±0.1pF, ±0.25pF, ±0.5pF	45	200	0.2±0.02	
MSART042SCG9R4 []WRA01	TVS042 CG9R4 []C-W	25	CG	COG	9.4 p	±0.1pF, ±0.25pF, ±0.5pF	45	200	0.2±0.02	
MSART042SCG9R5 []WRA01	TVS042 CG9R5 []C-W	25	CG	COG	9.5 p	±0.1pF, ±0.25pF, ±0.5pF	45	200	0.2±0.02	
MSART042SCG9R6 []WRA01	TVS042 CG9R6 []C-W	25	CG	COG	9.6 p	±0.1pF, ±0.25pF, ±0.5pF	45	200	0.2±0.02	
MSART042SCG9R7 []WRA01	TVS042 CG9R7 []C-W	25	CG	COG	9.7 p	±0.1pF, ±0.25pF, ±0.5pF	45	200	0.2±0.02	
MSART042SCG9R8 []WRA01	TVS042 CG9R8 []C-W	25	CG	COG	9.8 p	±0.1pF, ±0.25pF, ±0.5pF	45	200	0.2±0.02	
MSART042SCG9R9 []WRA01	TVS042 CG9R9 []C-W	25	CG	COG	9.9 p	±0.1pF, ±0.25pF, ±0.5pF	45	200	0.2±0.02	
MSART042SCG100 []WRA01	TVS042 CG100 []C-W	25	CG	COG	10 p	±2%, ±5%	45	200	0.2±0.02	
MSART042SCG110JWRA01	TVS042 CG110JC-W	25	CG	COG	11 p	±5%	40	200	0.2±0.02	
MSART042SCG120JWRA01	TVS042 CG120JC-W	25	CG	COG	12 p	±5%	40	200	0.2±0.02	
MSART042SCG130JWRA01	TVS042 CG130JC-W	25	CG	COG	13 p	±5%	40	200	0.2±0.02	
MSART042SCG150JWRA01	TVS042 CG150JC-W	25	CG	COG	15 p	±5%	40	200	0.2±0.02	
MSART042SCG160JWRA01	TVS042 CG160JC-W	25	CG	COG	16 p	±5%	40	200	0.2±0.02	
MSART042SCG180JWRA01	TVS042 CG180JC-W	25	CG	COG	18 p	±5%	40	200	0.2±0.02	
MSART042SCG220JWRA01	TVS042 CG220JC-W	25	CG	COG	22 p	±5%	30	200	0.2±0.02	

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■型号一览

一般民生用 低歪設計/声音/良好偏置多层陶瓷电容器 (GFCAP)

●1005规格

【温度特性 SD : Standard (-55~+125°C)】 0.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAYU105SSD391KFA01	UMK105 SD391KV-F	50	Standard Type	390 p	±10	0.1	200	0.5±0.05	
MSAYU105SSD471KFA01	UMK105 SD471KV-F	50	Standard Type	470 p	±10	0.1	200	0.5±0.05	
MSAYU105SSD561KFA01	UMK105 SD561KV-F	50	Standard Type	560 p	±10	0.1	200	0.5±0.05	
MSAYT105SSD681KFA01	TMK105 SD681KV-F	25	Standard Type	680 p	±10	0.1	200	0.5±0.05	
MSAYT105SSD821KFA01	TMK105 SD821KV-F	25	Standard Type	820 p	±10	0.1	200	0.5±0.05	
MSAYT105SSD102KFA01	TMK105 SD102KV-F	25	Standard Type	1000 p	±10	0.1	200	0.5±0.05	
MSAYT105SSD122KFA01	TMK105 SD122KV-F	25	Standard Type	1200 p	±10	0.1	200	0.5±0.05	
MSAYE105SSD152KFA01	EMK105 SD152KV-F	16	Standard Type	1500 p	±10	0.1	200	0.5±0.05	
MSAYE105SSD182KFA01	EMK105 SD182KV-F	16	Standard Type	1800 p	±10	0.1	200	0.5±0.05	
MSAYE105SSD222KFA01	EMK105 SD222KV-F	16	Standard Type	2200 p	±10	0.1	200	0.5±0.05	
MSAYE105SSD272KFA01	EMK105 SD272KV-F	16	Standard Type	2700 p	±10	0.1	200	0.5±0.05	
MSAYL105SSD323KFA01	LMK105 SD323KV-F	10	Standard Type	3300 p	±10	0.1	200	0.5±0.05	
MSAYL105SSD392KFA01	LMK105 SD392KV-F	10	Standard Type	3900 p	±10	0.1	200	0.5±0.05	
MSAYL105SSD472KFA01	LMK105 SD472KV-F	10	Standard Type	4700 p	±10	0.1	200	0.5±0.05	

【温度特性 SD : Standard (-55~+125°C)】 0.3mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAYL1L3YSD152KFA01	LMK105 SD152KP-F	10	Standard Type	1500 p	±10	0.1	200	0.3±0.03	
MSAYJ1L3YSD272KFA01	JMK105 SD272KP-F	6.3	Standard Type	2700 p	±10	0.1	200	0.3±0.03	

●1608规格

【温度特性 SD : Standard (-55~+125°C)】 0.8mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAYU168SSD102KTA01	UMK107 SD102KA-T	50	Standard Type	1000 p	±10	0.1	200	0.8±0.10	
MSAYU168SSD122KTA01	UMK107 SD122KA-T	50	Standard Type	1200 p	±10	0.1	200	0.8±0.10	
MSAYU168SSD152KTA01	UMK107 SD152KA-T	50	Standard Type	1500 p	±10	0.1	200	0.8±0.10	
MSAYU168SSD182KTA01	UMK107 SD182KA-T	50	Standard Type	1800 p	±10	0.1	200	0.8±0.10	
MSAYU168SSD222KTA01	UMK107 SD222KA-T	50	Standard Type	2200 p	±10	0.1	200	0.8±0.10	
MSAYU168SSD272KTA01	UMK107 SD272KA-T	50	Standard Type	2700 p	±10	0.1	200	0.8±0.10	
MSAYU168SSD323KTA01	UMK107 SD323KA-T	50	Standard Type	3300 p	±10	0.1	200	0.8±0.10	
MSAYT168SSD392KTA01	TMK107 SD392KA-T	25	Standard Type	3900 p	±10	0.1	200	0.8±0.10	
MSAYT168SSD472KTA01	TMK107 SD472KA-T	25	Standard Type	4700 p	±10	0.1	200	0.8±0.10	
MSAYE168SSD562KTA01	EMK107 SD562KA-T	16	Standard Type	5600 p	±10	0.1	200	0.8±0.10	
MSAYE168SSD682KTA01	EMK107 SD682KA-T	16	Standard Type	6800 p	±10	0.1	200	0.8±0.10	
MSAYE168SSD822KTA01	EMK107 SD822KA-T	16	Standard Type	8200 p	±10	0.1	200	0.8±0.10	
MSAYE168SSD103KTA01	EMK107 SD103KA-T	16	Standard Type	0.01 μ	±10	0.1	200	0.8±0.10	
MSAYL168SSD123KTA01	LMK107 SD123KA-T	10	Standard Type	0.012 μ	±10	0.1	200	0.8±0.10	
MSAYL168SSD153KTA01	LMK107 SD153KA-T	10	Standard Type	0.015 μ	±10	0.1	200	0.8±0.10	
MSAYL168SSD183KTA01	LMK107 SD183KA-T	10	Standard Type	0.018 μ	±10	0.1	200	0.8±0.10	
MSAYL168SSD223KTA01	LMK107 SD223KA-T	10	Standard Type	0.022 μ	±10	0.1	200	0.8±0.10	

●2012规格

【温度特性 SD : Standard (-55~+125°C)】 1.25mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAYG21GSSD183KTA01	GMK212 SD183KG-T	35	Standard Type	0.018 μ	±10	0.1	200	1.25±0.10	
MSAYG21GSSD223KTA01	GMK212 SD223KG-T	35	Standard Type	0.022 μ	±10	0.1	200	1.25±0.10	
MSAYG21GSSD273KTA01	GMK212 SD273KG-T	35	Standard Type	0.027 μ	±10	0.1	200	1.25±0.10	
MSAYL21GSSD683KTA01	LMK212 SD683KG-T	10	Standard Type	0.068 μ	±10	0.1	200	1.25±0.10	
MSAYL21GSSD823KTA01	LMK212 SD823KG-T	10	Standard Type	0.082 μ	±10	0.1	200	1.25±0.10	
MSAYL21GSSD104KTA01	LMK212 SD104KG-T	10	Standard Type	0.1 μ	±10	0.1	200	1.25±0.10	

【温度特性 SD : Standard (-55~+125°C)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAYU219SSD392KTA01	UMK212 SD392KD-T	50	Standard Type	3900 p	±10	0.1	200	0.85±0.10	
MSAYU219SSD472KTA01	UMK212 SD472KD-T	50	Standard Type	4700 p	±10	0.1	200	0.85±0.10	
MSAYU219SSD562KTA01	UMK212 SD562KD-T	50	Standard Type	5600 p	±10	0.1	200	0.85±0.10	
MSAYU219SSD682KTA01	UMK212 SD682KD-T	50	Standard Type	6800 p	±10	0.1	200	0.85±0.10	
MSAYU219SSD822KTA01	UMK212 SD822KD-T	50	Standard Type	8200 p	±10	0.1	200	0.85±0.10	
MSAYU219SSD103KTA01	UMK212 SD103KD-T	50	Standard Type	0.01 μ	±10	0.1	200	0.85±0.10	
MSAYG219SSD123KTA01	GMK212 SD123KD-T	35	Standard Type	0.012 μ	±10	0.1	200	0.85±0.10	
MSAYG219SSD153KTA01	GMK212 SD153KD-T	35	Standard Type	0.015 μ	±10	0.1	200	0.85±0.10	
MSAYE219SSD333KTA01	EMK212 SD333KD-T	16	Standard Type	0.033 μ	±10	0.1	200	0.85±0.10	
MSAYL219SSD473KTA01	LMK212 SD473KD-T	10	Standard Type	0.047 μ	±10	0.1	200	0.85±0.10	

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■ 型号一览

● 3216规格

【温度特性 SD : Standard (-55~+125°C)】 1.6mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSAYT31LSSD823KTNA01	TMK316 SD823KL-T	25	Standard Type	0.082 μ	±10	0.1	200		1.6±0.20	
MSAYT31LSSD104KTNA01	TMK316 SD104KL-T	25	Standard Type	0.1 μ	±10	0.1	200		1.6±0.20	

【温度特性 SD : Standard (-55~+125°C)】 1.15mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSAYG31QHSD333KTNA01	GMK316 SD333KF-T	35	Standard Type	0.033 μ	±10	0.1	200		1.15±0.10	
MSAYG31QHSD393KTNA01	GMK316 SD393KF-T	35	Standard Type	0.039 μ	±10	0.1	200		1.15±0.10	
MSAYT31QHSD473KTNA01	TMK316 SD473KF-T	25	Standard Type	0.047 μ	±10	0.1	200		1.15±0.10	
MSAYT31QHSD563KTNA01	TMK316 SD563KF-T	25	Standard Type	0.056 μ	±10	0.1	200		1.15±0.10	
MSAYT31QHSD683KTNA01	TMK316 SD683KF-T	25	Standard Type	0.068 μ	±10	0.1	200		1.15±0.10	

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一般民生用 低歪設計/声音/良好偏置多层陶瓷电容器 (GF LD)

●1608规格

【温度特性 LD : X5R (-55~+85°C)】 0.8mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAYU168BLD224[]TNA01	UMK107BLD224[]A-T	50	X5R	0.22 μ	±10, ±20	10	150	0.8+0.20/-0	
MSAYT168BLD474[]TNA01	TMK107BLD474[]A-T	25	X5R	0.47 μ	±10, ±20	10	150	0.8+0.20/-0	
MSAYT168BLD105[]TNA01	TMK107BLD105[]A-T	25	X5R	1 μ	±10, ±20	10	150	0.8+0.20/-0	

●2012规格

【温度特性 LD : X5R (-55~+85°C)】 1.25mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAYG21GSLD105[]TNA01	GMK212 LD105[]G-T	35	X5R	1 μ	±10, ±20	10	150	1.25±0.10	
MSAYG21GBLD225[]TNA01	GMK212BLD225[]G-T	35	X5R	2.2 μ	±10, ±20	10	150	1.25+0.20/-0	

●3216规格

【温度特性 LD : X5R (-55~+85°C)】 1.6mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAYU31LSDL105[]TNA01	UMK316 LD105[]L-T	50	X5R	1 μ	±10, ±20	10	150	1.6±0.20	
MSAYG31LBLD475[]TNA01	GMK316BLD475[]L-T	35	X5R	4.7 μ	±10, ±20	10	150	1.6±0.30	
MSAYT31LBLD106[]TNA01	TMK316BLD106[]L-T	25	X5R	10 μ	±10, ±20	10	150	1.6±0.30	

●3225规格

【温度特性 LD : X5R (-55~+85°C)】 1.9mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAYU32NSLD105[]TNA01	UMK325 LD105[]N-T	50	X5R	1 μ	±10, ±20	10	200	1.9±0.20	

【温度特性 LD : X5R (-55~+85°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSAYU32MSLD475[]PNA01	UMK325 LD475[]M-P	50	X5R	4.7 μ	±10, ±20	10	200	2.5±0.20	

●型号一览

一般民生用 中高耐压多层陶瓷电容器

●1005规格

【温度特性 B7 : X7R (-55~+125℃)】 0.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASH105SB7221 [] FNA01	HMK105 B7221 [] V-F	100		X7R	220 p	±10, ±20	2.5	200	0.5±0.05	
MSASH105SB7331 [] FNA01	HMK105 B7331 [] V-F	100		X7R	330 p	±10, ±20	2.5	200	0.5±0.05	
MSASH105SB7471 [] FNA01	HMK105 B7471 [] V-F	100		X7R	470 p	±10, ±20	2.5	200	0.5±0.05	
MSASH105SB7681 [] FNA01	HMK105 B7681 [] V-F	100		X7R	680 p	±10, ±20	2.5	200	0.5±0.05	
MSASH105SB7102 [] FNA01	HMK105 B7102 [] V-F	100		X7R	1000 p	±10, ±20	2.5	200	0.5±0.05	
MSASH105SB7152 [] FNA01	HMK105 B7152 [] V-F	100		X7R	1500 p	±10, ±20	2.5	200	0.5±0.05	
MSASH105SB7222 [] FNA01	HMK105 B7222 [] V-F	100		X7R	2200 p	±10, ±20	2.5	200	0.5±0.05	
MSASH105SB7332 [] FNA01	HMK105 B7332 [] V-F	100		X7R	3300 p	±10, ±20	2.5	200	0.5±0.05	
MSASH105SB7472 [] FNA01	HMK105 B7472 [] V-F	100		X7R	4700 p	±10, ±20	2.5	200	0.5±0.05	

【温度特性 CΔ : CΔ/C0Δ (-55~+125℃)】 0.5mm厚度

新型号	旧型号(参考用)	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]	注释
								额定电压 x %		
MSASH105SCH080DFNA01	HMK105 CH080DV-F	100	CH	C0H	8 p	±0.5pF	560	200	0.5±0.05	
MSASH105SCH090DFNA01	HMK105 CH090DV-F	100	CH	C0H	9 p	±0.5pF	580	200	0.5±0.05	
MSASH105SCH100DFNA01	HMK105 CH100DV-F	100	CH	C0H	10 p	±0.5pF	600	200	0.5±0.05	
MSASH105SCH120JFNA01	HMK105 CH120JV-F	100	CH	C0H	12 p	±5%	640	200	0.5±0.05	
MSASH105SCH150JFNA01	HMK105 CH150JV-F	100	CH	C0H	15 p	±5%	700	200	0.5±0.05	
MSASH105SCH180JFNA01	HMK105 CH180JV-F	100	CH	C0H	18 p	±5%	760	200	0.5±0.05	
MSASH105SCH220JFNA01	HMK105 CH220JV-F	100	CH	C0H	22 p	±5%	840	200	0.5±0.05	
MSASH105SCH240JFNA01	HMK105 CH240JV-F	100	CH	C0H	24 p	±5%	880	200	0.5±0.05	
MSASH105SCH270JFNA01	HMK105 CH270JV-F	100	CH	C0H	27 p	±5%	940	200	0.5±0.05	
MSASH105SCH330JFNA01	HMK105 CH330JV-F	100	CH	C0H	33 p	±5%	1000	200	0.5±0.05	
MSASH105SCH390JFNA01	HMK105 CH390JV-F	100	CH	C0H	39 p	±5%	1000	200	0.5±0.05	
MSASH105SCH470JFNA01	HMK105 CH470JV-F	100	CH	C0H	47 p	±5%	1000	200	0.5±0.05	
MSASH105SCH560JFNA01	HMK105 CH560JV-F	100	CH	C0H	56 p	±5%	1000	200	0.5±0.05	
MSASH105SCH680JFNA01	HMK105 CH680JV-F	100	CH	C0H	68 p	±5%	1000	200	0.5±0.05	
MSASH105SCH820JFNA01	HMK105 CH820JV-F	100	CH	C0H	82 p	±5%	1000	200	0.5±0.05	
MSASH105SCH101JFNA01	HMK105 CH101JV-F	100	CH	C0H	100 p	±5%	1000	200	0.5±0.05	
MSASH105SCG080DFNA01	HMK105 CG080DV-F	100	CG	C0G	8 p	±0.5pF	560	200	0.5±0.05	
MSASH105SCG090DFNA01	HMK105 CG090DV-F	100	CG	C0G	9 p	±0.5pF	580	200	0.5±0.05	
MSASH105SCG100DFNA01	HMK105 CG100DV-F	100	CG	C0G	10 p	±0.5pF	600	200	0.5±0.05	
MSASH105SCG120JFNA01	HMK105 CG120JV-F	100	CG	C0G	12 p	±5%	640	200	0.5±0.05	
MSASH105SCG150JFNA01	HMK105 CG150JV-F	100	CG	C0G	15 p	±5%	700	200	0.5±0.05	
MSASH105SCG180JFNA01	HMK105 CG180JV-F	100	CG	C0G	18 p	±5%	760	200	0.5±0.05	
MSASH105SCG220JFNA01	HMK105 CG220JV-F	100	CG	C0G	22 p	±5%	840	200	0.5±0.05	
MSASH105SCG240JFNA01	HMK105 CG240JV-F	100	CG	C0G	24 p	±5%	880	200	0.5±0.05	
MSASH105SCG270JFNA01	HMK105 CG270JV-F	100	CG	C0G	27 p	±5%	940	200	0.5±0.05	
MSASH105SCG330JFNA01	HMK105 CG330JV-F	100	CG	C0G	33 p	±5%	1000	200	0.5±0.05	
MSASH105SCG390JFNA01	HMK105 CG390JV-F	100	CG	C0G	39 p	±5%	1000	200	0.5±0.05	
MSASH105SCG470JFNA01	HMK105 CG470JV-F	100	CG	C0G	47 p	±5%	1000	200	0.5±0.05	
MSASH105SCG560JFNA01	HMK105 CG560JV-F	100	CG	C0G	56 p	±5%	1000	200	0.5±0.05	
MSASH105SCG680JFNA01	HMK105 CG680JV-F	100	CG	C0G	68 p	±5%	1000	200	0.5±0.05	
MSASH105SCG820JFNA01	HMK105 CG820JV-F	100	CG	C0G	82 p	±5%	1000	200	0.5±0.05	
MSASH105SCG101JFNA01	HMK105 CG101JV-F	100	CG	C0G	100 p	±5%	1000	200	0.5±0.05	

●1608规格

【温度特性 B5 : B (-25~+85℃) / X5R (-55~+85℃)】 0.8mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASH168SB5102 [] TNA01	HMK107 BJ102 [] A-T	100	B	X5R ^{*1}	1000 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5152 [] TNA01	HMK107 BJ152 [] A-T	100	B	X5R ^{*1}	1500 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5222 [] TNA01	HMK107 BJ222 [] A-T	100	B	X5R ^{*1}	2200 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5332 [] TNA01	HMK107 BJ332 [] A-T	100	B	X5R ^{*1}	3300 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5472 [] TNA01	HMK107 BJ472 [] A-T	100	B	X5R ^{*1}	4700 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5682 [] TNA01	HMK107 BJ682 [] A-T	100	B	X5R ^{*1}	6800 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5103 [] TNA01	HMK107 BJ103 [] A-T	100	B	X5R ^{*1}	0.01 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5153 [] TNA01	HMK107 BJ153 [] A-T	100	B	X5R ^{*1}	0.015 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5223 [] TNA01	HMK107 BJ223 [] A-T	100	B	X5R ^{*1}	0.022 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5333 [] TNA01	HMK107 BJ333 [] A-T	100	B	X5R ^{*1}	0.033 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5473 [] TNA01	HMK107 BJ473 [] A-T	100	B	X5R ^{*1}	0.047 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5104 [] TNA01	HMK107 BJ104 [] A-T	100	B	X5R ^{*1}	0.1 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB5224 [] TCA01	HMK107 BJ224 [] A-TE	100	B	X5R ^{*1}	0.22 μ	±10, ±20	3.5	150	0.8±0.10	

【温度特性 C7 : X7S (-55~+125℃)】 0.8mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASH168SG7224 [] TCA01	HMK107 C7224 [] A-TE	100		X7S	0.22 μ	±10, ±20	3.5	150	0.8±0.10	

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■型号一览

【温度特性 B7 : X7R (-55~+125°C)】 0.8mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASH168SB7102 [T] TNA01	HMK107 B7102 [A-T]	100		X7R	1000 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7152 [T] TNA01	HMK107 B7152 [A-T]	100		X7R	1500 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7222 [T] TNA01	HMK107 B7222 [A-T]	100		X7R	2200 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7332 [T] TNA01	HMK107 B7332 [A-T]	100		X7R	3300 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7472 [T] TNA01	HMK107 B7472 [A-T]	100		X7R	4700 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7682 [T] TNA01	HMK107 B7682 [A-T]	100		X7R	6800 p	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7103 [T] TNA01	HMK107 B7103 [A-T]	100		X7R	0.01 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7153 [T] TNA01	HMK107 B7153 [A-T]	100		X7R	0.015 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7223 [T] TNA01	HMK107 B7223 [A-T]	100		X7R	0.022 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7333 [T] TNA01	HMK107 B7333 [A-T]	100		X7R	0.033 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7473 [T] TNA01	HMK107 B7473 [A-T]	100		X7R	0.047 μ	±10, ±20	3.5	200	0.8±0.10	
MSASH168SB7104 [T] TNA01	HMK107 B7104 [A-T]	100		X7R	0.1 μ	±10, ±20	3.5	200	0.8±0.10	

【温度特性 SD : Standard (-55~+125°C)】 0.8mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASH168SSD101KTNA01	HMK107 SD101KA-T	100	Standard	Type	100 p	±10	0.1	200	0.8±0.10	
MSASH168SSD121KTNA01	HMK107 SD121KA-T	100	Standard	Type	120 p	±10	0.1	200	0.8±0.10	
MSASH168SSD151KTNA01	HMK107 SD151KA-T	100	Standard	Type	150 p	±10	0.1	200	0.8±0.10	
MSASH168SSD181KTNA01	HMK107 SD181KA-T	100	Standard	Type	180 p	±10	0.1	200	0.8±0.10	
MSASH168SSD221KTNA01	HMK107 SD221KA-T	100	Standard	Type	220 p	±10	0.1	200	0.8±0.10	
MSASH168SSD271KTNA01	HMK107 SD271KA-T	100	Standard	Type	270 p	±10	0.1	200	0.8±0.10	
MSASH168SSD331KTNA01	HMK107 SD331KA-T	100	Standard	Type	330 p	±10	0.1	200	0.8±0.10	
MSASH168SSD391KTNA01	HMK107 SD391KA-T	100	Standard	Type	390 p	±10	0.1	200	0.8±0.10	
MSASH168SSD471KTNA01	HMK107 SD471KA-T	100	Standard	Type	470 p	±10	0.1	200	0.8±0.10	
MSASH168SSD561KTNA01	HMK107 SD561KA-T	100	Standard	Type	560 p	±10	0.1	200	0.8±0.10	
MSASH168SSD681KTNA01	HMK107 SD681KA-T	100	Standard	Type	680 p	±10	0.1	200	0.8±0.10	
MSASH168SSD821KTNA01	HMK107 SD821KA-T	100	Standard	Type	820 p	±10	0.1	200	0.8±0.10	
MSASH168SSD102KTNA01	HMK107 SD102KA-T	100	Standard	Type	1000 p	±10	0.1	200	0.8±0.10	

●2012规格

【温度特性 B5 : B (-25~+85°C) / X5R (-55~+85°C)】 1.25mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASH21GSB5103 [T] TNA01	HMK212 BJ103 [G-T]	100	B	X5R ⁺	0.01 μ	±10, ±20	3.5	200	1.25±0.10	
MSASH21GSB5153 [T] TNA01	HMK212 BJ153 [G-T]	100	B	X5R ⁺	0.015 μ	±10, ±20	3.5	200	1.25±0.10	
MSASH21GSB5223 [T] TNA01	HMK212 BJ223 [G-T]	100	B	X5R ⁺	0.022 μ	±10, ±20	3.5	200	1.25±0.10	
MSASH21GSB5333 [T] TNA01	HMK212 BJ333 [G-T]	100	B	X5R ⁺	0.033 μ	±10, ±20	3.5	200	1.25±0.10	
MSASH21GSB5473 [T] TNA01	HMK212 BJ473 [G-T]	100	B	X5R ⁺	0.047 μ	±10, ±20	3.5	200	1.25±0.10	
MSASH21GSB5683 [T] TNA01	HMK212 BJ683 [G-T]	100	B	X5R ⁺	0.068 μ	±10, ±20	3.5	200	1.25±0.10	
MSASH21GSB5104 [T] TNA01	HMK212 BJ104 [G-T]	100	B	X5R ⁺	0.1 μ	±10, ±20	3.5	200	1.25±0.10	
MSASH21GSB5224 [T] TNA01	HMK212 BJ224 [G-T]	100	B	X5R ⁺	0.22 μ	±10, ±20	3.5	200	1.25±0.10	
MSASH21GSB5474 [T] TCA01	HMK212 BJ474 [G-TE]	100	B	X5R ⁺	0.47 μ	±10, ±20	3.5	150	1.25±0.10	
MSASH21GSB5105 [T] TCA01	HMK212BBJ105 [G-TE]	100	B	X5R ⁺	1 μ	±10, ±20	3.5	150	1.25+0.20/-0	
MSASQ21GSB5472 [T] TNA01	QMK212 BJ472 [G-T]	250	B	X5R ⁺	4700 p	±10, ±20	2.5	150	1.25±0.10	
MSASQ21GSB5682 [T] TNA01	QMK212 BJ682 [G-T]	250	B	X5R ⁺	6800 p	±10, ±20	2.5	150	1.25±0.10	
MSASQ21GSB5103 [T] TNA01	QMK212 BJ103 [G-T]	250	B	X5R ⁺	0.01 μ	±10, ±20	2.5	150	1.25±0.10	
MSASQ21GSB5153 [T] TNA01	QMK212 BJ153 [G-T]	250	B	X5R ⁺	0.015 μ	±10, ±20	2.5	150	1.25±0.10	
MSASQ21GSB5223 [T] TNA01	QMK212 BJ223 [G-T]	250	B	X5R ⁺	0.022 μ	±10, ±20	2.5	150	1.25±0.10	

【温度特性 B5 : B (-25~+85°C) / X5R (-55~+85°C)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASQ219SB5102 [T] TNA01	QMK212 BJ102 [D-T]	250	B	X5R ⁺	1000 p	±10, ±20	2.5	150	0.85±0.10	
MSASQ219SB5152 [T] TNA01	QMK212 BJ152 [D-T]	250	B	X5R ⁺	1500 p	±10, ±20	2.5	150	0.85±0.10	
MSASQ219SB5222 [T] TNA01	QMK212 BJ222 [D-T]	250	B	X5R ⁺	2200 p	±10, ±20	2.5	150	0.85±0.10	
MSASQ219SB5332 [T] TNA01	QMK212 BJ332 [D-T]	250	B	X5R ⁺	3300 p	±10, ±20	2.5	150	0.85±0.10	

【温度特性 C7 : X7S (-55~+125°C)】 1.25mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
								额定电压 x %		
MSASH21GSC7474 [T] TCA01	HMK212 C7474 [G-TE]	100		X7S	0.47 μ	±10, ±20	3.5	150	1.25±0.10	
MSASH21GBC7105 [T] TCA01	HMK212BC7105 [G-TE]	100		X7S	1 μ	±10, ±20	3.5	150	1.25+0.20/-0	

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● 型号一览

【温度特性 B7 : X7R (-55~+125°C)】 1.25mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSASH21GSB7103 □ TNA01	HMK212 B7103 □ G-T	100		X7R	0.01 μ	±10, ±20	3.5	200	1.25±0.10		
MSASH21GSB7153 □ TNA01	HMK212 B7153 □ G-T	100		X7R	0.015 μ	±10, ±20	3.5	200	1.25±0.10		
MSASH21GSB7223 □ TNA01	HMK212 B7223 □ G-T	100		X7R	0.022 μ	±10, ±20	3.5	200	1.25±0.10		
MSASH21GSB7333 □ TNA01	HMK212 B7333 □ G-T	100		X7R	0.033 μ	±10, ±20	3.5	200	1.25±0.10		
MSASH21GSB7473 □ TNA01	HMK212 B7473 □ G-T	100		X7R	0.047 μ	±10, ±20	3.5	200	1.25±0.10		
MSASH21GSB7683 □ TNA01	HMK212 B7683 □ G-T	100		X7R	0.068 μ	±10, ±20	3.5	200	1.25±0.10		
MSASH21GSB7104 □ TNA01	HMK212 B7104 □ G-T	100		X7R	0.1 μ	±10, ±20	3.5	200	1.25±0.10		
MSASH21GSB7224 □ TNA01	HMK212 B7224 □ G-T	100		X7R	0.22 μ	±10, ±20	3.5	200	1.25±0.10		
MSASQ21GSB7472 □ TNA01	QMK212 B7472 □ G-T	250		X7R	4700 p	±10, ±20	2.5	150	1.25±0.10		
MSASQ21GSB7682 □ TNA01	QMK212 B7682 □ G-T	250		X7R	6800 p	±10, ±20	2.5	150	1.25±0.10		
MSASQ21GSB7103 □ TNA01	QMK212 B7103 □ G-T	250		X7R	0.01 μ	±10, ±20	2.5	150	1.25±0.10		
MSASQ21GSB7153 □ TNA01	QMK212 B7153 □ G-T	250		X7R	0.015 μ	±10, ±20	2.5	150	1.25±0.10		
MSASQ21GSB7223 □ TNA01	QMK212 B7223 □ G-T	250		X7R	0.022 μ	±10, ±20	2.5	150	1.25±0.10		

【温度特性 B7 : X7R (-55~+125°C)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSASQ219SB7102 □ TNA01	QMK212 B7102 □ D-T	250		X7R	1000 p	±10, ±20	2.5	150	0.85±0.10		
MSASQ219SB7152 □ TNA01	QMK212 B7152 □ D-T	250		X7R	1500 p	±10, ±20	2.5	150	0.85±0.10		
MSASQ219SB7222 □ TNA01	QMK212 B7222 □ D-T	250		X7R	2200 p	±10, ±20	2.5	150	0.85±0.10		
MSASQ219SB7332 □ TNA01	QMK212 B7332 □ D-T	250		X7R	3300 p	±10, ±20	2.5	150	0.85±0.10		

【温度特性 SD : Standard (-55~+125°C)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSASH219SSD222KTA01	HMK212 SD222KD-T	100	Standard Type		2200 p	±10	0.1	200	0.85±0.10		
MSASH219SSD472KTA01	HMK212 SD472KD-T	100	Standard Type		4700 p	±10	0.1	200	0.85±0.10		
MSASQ219SSD101KTA01	QMK212 SD101KD-T	250	Standard Type		100 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD121KTA01	QMK212 SD121KD-T	250	Standard Type		120 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD151KTA01	QMK212 SD151KD-T	250	Standard Type		150 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD181KTA01	QMK212 SD181KD-T	250	Standard Type		180 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD221KTA01	QMK212 SD221KD-T	250	Standard Type		220 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD331KTA01	QMK212 SD331KD-T	250	Standard Type		330 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD391KTA01	QMK212 SD391KD-T	250	Standard Type		390 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD471KTA01	QMK212 SD471KD-T	250	Standard Type		470 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD561KTA01	QMK212 SD561KD-T	250	Standard Type		560 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD681KTA01	QMK212 SD681KD-T	250	Standard Type		680 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD821KTA01	QMK212 SD821KD-T	250	Standard Type		820 p	±10	0.1	150	0.85±0.10		
MSASQ219SSD102KTA01	QMK212 SD102KD-T	250	Standard Type		1000 p	±10	0.1	150	0.85±0.10		

【温度特性 SD : Standard (-55~+125°C)】 1.25mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSASH21GSD392KTA01	HMK212 SD392KG-T	100	Standard Type		3900 p	±10	0.1	200	1.25±0.10		

● 3216规格

【温度特性 B5 : B (-25~+85°C) /X5R (-55~+85°C)】 1.6mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSASH31LSB5473 □ TNA01	HMK316 BJ473 □ L-T	100	B	X5R ^{±1}	0.047 μ	±10, ±20	3.5	200	1.6±0.20		
MSASH31LSB5683 □ TNA01	HMK316 BJ683 □ L-T	100	B	X5R ^{±1}	0.068 μ	±10, ±20	3.5	200	1.6±0.20		
MSASH31LSB5104 □ TNA01	HMK316 BJ104 □ L-T	100	B	X5R ^{±1}	0.1 μ	±10, ±20	3.5	200	1.6±0.20		
MSASH31LSB5154 □ TNA01	HMK316 BJ154 □ L-T	100	B	X5R ^{±1}	0.15 μ	±10, ±20	3.5	200	1.6±0.20		
MSASH31LSB5224 □ TNA01	HMK316 BJ224 □ L-T	100	B	X5R ^{±1}	0.22 μ	±10, ±20	3.5	200	1.6±0.20		
MSASH31LSB5334 □ TNA01	HMK316 BJ334 □ L-T	100	B	X5R ^{±1}	0.33 μ	±10, ±20	3.5	200	1.6±0.20		
MSASH31LSB5474 □ TNA01	HMK316 BJ474 □ L-T	100	B	X5R ^{±1}	0.47 μ	±10, ±20	3.5	200	1.6±0.20		
MSASH31LSB5105 □ TNA01	HMK316 BJ105 □ L-T	100	B	X5R ^{±1}	0.1 μ	±10, ±20	3.5	200	1.6±0.20		
MSASH31LAB5225 □ TCA01	HMK316ABJ225 □ L-TE	100	B	X5R ^{±1}	2.2 μ	±10, ±20	3.5	150	1.6±0.20		
MSASQ31LSB5333 □ TNA01	QMK316 BJ333 □ L-T	250	B	X5R ^{±1}	0.033 μ	±10, ±20	2.5	150	1.6±0.20		
MSASQ31LSB5473 □ TNA01	QMK316 BJ473 □ L-T	250	B	X5R ^{±1}	0.047 μ	±10, ±20	2.5	150	1.6±0.20		
MSASQ31LSB5683 □ TNA01	QMK316 BJ683 □ L-T	250	B	X5R ^{±1}	0.068 μ	±10, ±20	2.5	150	1.6±0.20		
MSASQ31LSB5104 □ TNA01	QMK316 BJ104 □ L-T	250	B	X5R ^{±1}	0.1 μ	±10, ±20	2.5	150	1.6±0.20		
MSASS31LSB5153 □ TNA01	SMK316 BJ153 □ L-T	630	B	X5R ^{±1}	0.015 μ	±10, ±20	2.5	120	1.6±0.20		
MSASS31LSB5223 □ TNA01	SMK316 BJ223 □ L-T	630	B	X5R ^{±1}	0.022 μ	±10, ±20	2.5	120	1.6±0.20		

【温度特性 B5 : B (-25~+85°C) /X5R (-55~+85°C)】 1.15mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSASS31QHB5102 □ TNA01	SMK316 BJ102 □ F-T	630	B	X5R ^{±1}	1000 p	±10, ±20	2.5	120	1.15±0.10		
MSASS31QHB5152 □ TNA01	SMK316 BJ152 □ F-T	630	B	X5R ^{±1}	1500 p	±10, ±20	2.5	120	1.15±0.10		
MSASS31QHB5222 □ TNA01	SMK316 BJ222 □ F-T	630	B	X5R ^{±1}	2200 p	±10, ±20	2.5	120	1.15±0.10		
MSASS31QHB5332 □ TNA01	SMK316 BJ332 □ F-T	630	B	X5R ^{±1}	3300 p	±10, ±20	2.5	120	1.15±0.10		
MSASS31QHB5472 □ TNA01	SMK316 BJ472 □ F-T	630	B	X5R ^{±1}	4700 p	±10, ±20	2.5	120	1.15±0.10		
MSASS31QHB5682 □ TNA01	SMK316 BJ682 □ F-T	630	B	X5R ^{±1}	6800 p	±10, ±20	2.5	120	1.15±0.10		
MSASS31QHB5103 □ TNA01	SMK316 BJ103 □ F-T	630	B	X5R ^{±1}	0.01 μ	±10, ±20	2.5	120	1.15±0.10		

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■型号一览

【温度特性 C7 : X7S (-55~+125°C)】 1.6mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASH31LAC7225 [T]CA01	HMK316AC7225 [L]L-TE	100	X7S	2.2 μ	±10, ±20	3.5	150	1.6±0.20	

【温度特性 B7 : X7R (-55~+125°C)】 1.6mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASH31LSB7473 [T]TNA01	HMK316 B7473 [L]L-T	100	X7R	0.047 μ	±10, ±20	3.5	200	1.6±0.20	
MSASH31LSB7683 [T]TNA01	HMK316 B7683 [L]L-T	100	X7R	0.068 μ	±10, ±20	3.5	200	1.6±0.20	
MSASH31LSB7104 [T]TNA01	HMK316 B7104 [L]L-T	100	X7R	0.1 μ	±10, ±20	3.5	200	1.6±0.20	
MSASH31LSB7154 [T]TNA01	HMK316 B7154 [L]L-T	100	X7R	0.15 μ	±10, ±20	3.5	200	1.6±0.20	
MSASH31LSB7224 [T]TNA01	HMK316 B7224 [L]L-T	100	X7R	0.22 μ	±10, ±20	3.5	200	1.6±0.20	
MSASH31LSB7334 [T]TNA01	HMK316 B7334 [L]L-T	100	X7R	0.33 μ	±10, ±20	3.5	200	1.6±0.20	
MSASH31LSB7474 [T]TNA01	HMK316 B7474 [L]L-T	100	X7R	0.47 μ	±10, ±20	3.5	200	1.6±0.20	
MSASH31LSB7105 [T]TNA01	HMK316 B7105 [L]L-T	100	X7R	1 μ	±10, ±20	3.5	200	1.6±0.20	
MSASQ31LSB7333 [T]TNA01	QMK316 B7333 [L]L-T	250	X7R	0.033 μ	±10, ±20	2.5	150	1.6±0.20	
MSASQ31LSB7473 [T]TNA01	QMK316 B7473 [L]L-T	250	X7R	0.047 μ	±10, ±20	2.5	150	1.6±0.20	
MSASQ31LSB7683 [T]TNA01	QMK316 B7683 [L]L-T	250	X7R	0.068 μ	±10, ±20	2.5	150	1.6±0.20	
MSASQ31LSB7104 [T]TNA01	QMK316 B7104 [L]L-T	250	X7R	0.1 μ	±10, ±20	2.5	150	1.6±0.20	
MSASS31LSB7153 [T]TNA01	SMK316 B7153 [L]L-T	630	X7R	0.015 μ	±10, ±20	2.5	120	1.6±0.20	
MSASS31LSB7223 [T]TNA01	SMK316 B7223 [L]L-T	630	X7R	0.022 μ	±10, ±20	2.5	120	1.6±0.20	
MSASS31LAB7333 [T]TNA01	SMK316AB7333 [L]L-T	630	X7R	0.033 μ	±10, ±20	2.5	120	1.6±0.20	
MSASS31LAB7473 [T]TNA01	SMK316AB7473 [L]L-T	630	X7R	0.047 μ	±10, ±20	2.5	120	1.6±0.20	

【温度特性 B7 : X7R (-55~+125°C)】 1.15mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASS31QHB7102 [T]TNA01	SMK316 B7102 [F]F-T	630	X7R	1000 p	±10, ±20	2.5	120	1.15±0.10	
MSASS31QHB7152 [T]TNA01	SMK316 B7152 [F]F-T	630	X7R	1500 p	±10, ±20	2.5	120	1.15±0.10	
MSASS31QHB7222 [T]TNA01	SMK316 B7222 [F]F-T	630	X7R	2200 p	±10, ±20	2.5	120	1.15±0.10	
MSASS31QHB7332 [T]TNA01	SMK316 B7332 [F]F-T	630	X7R	3300 p	±10, ±20	2.5	120	1.15±0.10	
MSASS31QHB7472 [T]TNA01	SMK316 B7472 [F]F-T	630	X7R	4700 p	±10, ±20	2.5	120	1.15±0.10	
MSASS31QHB7682 [T]TNA01	SMK316 B7682 [F]F-T	630	X7R	6800 p	±10, ±20	2.5	120	1.15±0.10	
MSASS31QHB7103 [T]TNA01	SMK316 B7103 [F]F-T	630	X7R	0.01 μ	±10, ±20	2.5	120	1.15±0.10	

【温度特性 SD : Standard (-55~+125°C)】 1.6mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASH31LSSD223K TNA01	HMK316 SD223KL-T	100	Standard Type	0.022 μ	±10	0.1	200	1.6±0.20	
MSASQ31LSSD103K TNA01	QMK316 SD103KL-T	250	Standard Type	0.01 μ	±10	0.1	150	1.6±0.20	

●3225规格

【温度特性 B5 : B (-25~+85°C) / X5R (-55~+85°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASH32MSB5225 [T]PNA01	HMK325 BJ225 [M]M-P	100	B X5R ⁺	2.2 μ	±10, ±20	3.5	200	2.5±0.20	
MSASH32MSB5475 [T]PCA01	HMK325 BJ475 [M]M-PE	100	B X5R ⁺	4.7 μ	±10, ±20	3.5	150	2.5±0.20	

【温度特性 B5 : B (-25~+85°C) / X5R (-55~+85°C)】 1.9mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASH32NSB5154 [T]TNA01	HMK325 BJ154 [N]N-T	100	B X5R ⁺	0.15 μ	±10, ±20	3.5	200	1.9±0.20	
MSASH32NSB5224 [T]TNA01	HMK325 BJ224 [N]N-T	100	B X5R ⁺	0.22 μ	±10, ±20	3.5	200	1.9±0.20	
MSASH32NSB5334 [T]TNA01	HMK325 BJ334 [N]N-T	100	B X5R ⁺	0.33 μ	±10, ±20	3.5	200	1.9±0.20	
MSASH32NSB5474 [T]TNA01	HMK325 BJ474 [N]N-T	100	B X5R ⁺	0.47 μ	±10, ±20	3.5	200	1.9±0.20	
MSASH32NSB5684 [T]TNA01	HMK325 BJ684 [N]N-T	100	B X5R ⁺	0.68 μ	±10, ±20	3.5	200	1.9±0.20	
MSASH32NSB5105 [T]TNA01	HMK325 BJ105 [N]N-T	100	B X5R ⁺	1 μ	±10, ±20	3.5	200	1.9±0.20	
MSASH32NSB5475 [T]TCA01	HMK325 BJ475 [N]N-TE	100	B X5R ⁺	4.7 μ	±10, ±20	3.5	150	1.9±0.20	
MSASQ32NSB5473 [T]TNA01	QMK325 BJ473 [N]N-T	250	B X5R ⁺	0.047 μ	±10, ±20	2.5	150	1.9±0.20	
MSASQ32NSB5104 [T]TNA01	QMK325 BJ104 [N]N-T	250	B X5R ⁺	0.1 μ	±10, ±20	2.5	150	1.9±0.20	
MSASQ32NSB5154 [T]TNA01	QMK325 BJ154 [N]N-T	250	B X5R ⁺	0.15 μ	±10, ±20	2.5	150	1.9±0.20	
MSASQ32NSB5224 [T]TNA01	QMK325 BJ224 [N]N-T	250	B X5R ⁺	0.22 μ	±10, ±20	2.5	150	1.9±0.20	
MSASS32NSB5223 [T]TNA01	SMK325 BJ223 [N]N-T	630	B X5R ⁺	0.022 μ	±10, ±20	2.5	120	1.9±0.20	
MSASS32NSB5333 [T]TNA01	SMK325 BJ333 [N]N-T	630	B X5R ⁺	0.033 μ	±10, ±20	2.5	120	1.9±0.20	
MSASS32NSB5473 [T]TNA01	SMK325 BJ473 [N]N-T	630	B X5R ⁺	0.047 μ	±10, ±20	2.5	120	1.9±0.20	

【温度特性 B5 : B (-25~+85°C) / X5R (-55~+85°C)】 1.15mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASH32QJB5104 [T]TNA01	HMK325 BJ104 [F]F-T	100	B X5R ⁺	0.1 μ	±10, ±20	3.5	200	1.15±0.10	

【温度特性 B7 : X7R (-55~+125°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载	厚度*3 [mm]	注释
							额定电压 x %		
MSASH32MSB7225 [T]PNA01	HMK325 B7225 [M]M-P	100	X7R	2.2 μ	±10, ±20	3.5	200	2.5±0.20	

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■型号一览

【温度特性 B7 : X7R (-55~+125°C)】 1.9mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASH32NSB7154 □ TNA01	HMK325 B7154 □ N-T	100	X7R	0.15 μ	±10, ±20	3.5	200		1.9±0.20	
MSASH32NSB7224 □ TNA01	HMK325 B7224 □ N-T	100	X7R	0.22 μ	±10, ±20	3.5	200		1.9±0.20	
MSASH32NSB7334 □ TNA01	HMK325 B7334 □ N-T	100	X7R	0.33 μ	±10, ±20	3.5	200		1.9±0.20	
MSASH32NSB7474 □ TNA01	HMK325 B7474 □ N-T	100	X7R	0.47 μ	±10, ±20	3.5	200		1.9±0.20	
MSASH32NSB7684 □ TNA01	HMK325 B7684 □ N-T	100	X7R	0.68 μ	±10, ±20	3.5	200		1.9±0.20	
MSASH32NSB7105 □ TNA01	HMK325 B7105 □ N-T	100	X7R	1 μ	±10, ±20	3.5	200		1.9±0.20	
MSASQ32NSB7473 □ TNA01	QMK325 B7473 □ N-T	250	X7R	0.047 μ	±10, ±20	2.5	150		1.9±0.20	
MSASQ32NSB7104 □ TNA01	QMK325 B7104 □ N-T	250	X7R	0.1 μ	±10, ±20	2.5	150		1.9±0.20	
MSASQ32NSB7154 □ TNA01	QMK325 B7154 □ N-T	250	X7R	0.15 μ	±10, ±20	2.5	150		1.9±0.20	
MSASQ32NSB7224 □ TNA01	QMK325 B7224 □ N-T	250	X7R	0.22 μ	±10, ±20	2.5	150		1.9±0.20	
MSASS32NSB7223 □ TNA01	SMK325 B7223 □ N-T	630	X7R	0.022 μ	±10, ±20	2.5	120		1.9±0.20	
MSASS32NSB7333 □ TNA01	SMK325 B7333 □ N-T	630	X7R	0.033 μ	±10, ±20	2.5	120		1.9±0.20	
MSASS32NSB7473 □ TNA01	SMK325 B7473 □ N-T	630	X7R	0.047 μ	±10, ±20	2.5	120		1.9±0.20	

【温度特性 C7 : X7S (-55~+125°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASH32MSC7475 □ PCA01	HMK325 C7475 □ M-PE	100	X7S	4.7 μ	±10, ±20	3.5	150		2.5±0.20	

【温度特性 C7 : X7S (-55~+125°C)】 1.9mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASH32NSG7475 □ TCA01	HMK325 C7475 □ N-TE	100	X7S	4.7 μ	±10, ±20	3.5	150		1.9±0.20	

【温度特性 B7 : X7R (-55~+125°C)】 1.15mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASH32QB7104 □ TNA01	HMK325 B7104 □ F-T	100	X7R	0.1 μ	±10, ±20	3.5	200		1.15±0.10	

●4532规格

【温度特性 B5 : B (-25~+85°C) / X5R (-55~+85°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASH45MSB5474 □ TNA01	HMK432 BJ474 □ M-T	100	B	X5R ⁻¹ 0.47 μ	±10, ±20	3.5	200		2.5±0.20	
MSASH45MSB5105 □ TNA01	HMK432 BJ105 □ M-T	100	B	X5R ⁻¹ 1 μ	±10, ±20	3.5	200		2.5±0.20	
MSASH45MSB5155 □ TNA01	HMK432 BJ155 □ M-T	100	B	X5R ⁻¹ 1.5 μ	±10, ±20	3.5	200		2.5±0.20	
MSASH45MSB5225 □ TNA01	HMK432 BJ225 □ M-T	100	B	X5R ⁻¹ 2.2 μ	±10, ±20	3.5	200		2.5±0.20	
MSASQ45MSB5104 □ TNA01	QMK432 BJ104 □ M-T	250	B	X5R ⁻¹ 0.1 μ	±10, ±20	2.5	150		2.5±0.20	
MSASQ45MSB5224 □ TNA01	QMK432 BJ224 □ M-T	250	B	X5R ⁻¹ 0.22 μ	±10, ±20	2.5	150		2.5±0.20	
MSASQ45MSB5334 □ TNA01	QMK432 BJ334 □ M-T	250	B	X5R ⁻¹ 0.33 μ	±10, ±20	2.5	150		2.5±0.20	
MSASQ45MSB5474 □ TNA01	QMK432 BJ474 □ M-T	250	B	X5R ⁻¹ 0.47 μ	±10, ±20	2.5	150		2.5±0.20	
MSASS45MSB5473 □ TNA01	SMK432 BJ473 □ M-T	630	B	X5R ⁻¹ 0.047 μ	±10, ±20	2.5	120		2.5±0.20	
MSASS45MSB5683 □ TNA01	SMK432 BJ683 □ M-T	630	B	X5R ⁻¹ 0.068 μ	±10, ±20	2.5	120		2.5±0.20	
MSASS45MSB5104 □ TNA01	SMK432 BJ104 □ M-T	630	B	X5R ⁻¹ 0.1 μ	±10, ±20	2.5	120		2.5±0.20	

【温度特性 B7 : X7R (-55~+125°C)】 2.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASH45MSB7474 □ TNA01	HMK432 B7474 □ M-T	100	X7R	0.47 μ	±10, ±20	3.5	200		2.5±0.20	
MSASH45MSB7105 □ TNA01	HMK432 B7105 □ M-T	100	X7R	1 μ	±10, ±20	3.5	200		2.5±0.20	
MSASH45MSB7155 □ TNA01	HMK432 B7155 □ M-T	100	X7R	1.5 μ	±10, ±20	3.5	200		2.5±0.20	
MSASH45MSB7225 □ TNA01	HMK432 B7225 □ M-T	100	X7R	2.2 μ	±10, ±20	3.5	200		2.5±0.20	
MSASQ45MSB7104 □ TNA01	QMK432 B7104 □ M-T	250	X7R	0.1 μ	±10, ±20	2.5	150		2.5±0.20	
MSASQ45MSB7224 □ TNA01	QMK432 B7224 □ M-T	250	X7R	0.22 μ	±10, ±20	2.5	150		2.5±0.20	
MSASQ45MSB7334 □ TNA01	QMK432 B7334 □ M-T	250	X7R	0.33 μ	±10, ±20	2.5	150		2.5±0.20	
MSASQ45MSB7474 □ TNA01	QMK432 B7474 □ M-T	250	X7R	0.47 μ	±10, ±20	2.5	150		2.5±0.20	
MSASS45MSB7473 □ TNA01	SMK432 B7473 □ M-T	630	X7R	0.047 μ	±10, ±20	2.5	120		2.5±0.20	
MSASS45MSB7683 □ TNA01	SMK432 B7683 □ M-T	630	X7R	0.068 μ	±10, ±20	2.5	120		2.5±0.20	
MSASS45MSB7104 □ TNA01	SMK432 B7104 □ M-T	630	X7R	0.1 μ	±10, ±20	2.5	120		2.5±0.20	

【温度特性 B7 : X7R (-55~+125°C)】 2.0mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性	静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
							额定电压 x %			
MSASX45YAB7222KCA01	XMK432 B7222KY-TE	2000	X7R	2200 p	±10	2.5	110		2.0+0/-0.30	
MSASX45YAB7472KCA01	XMK432 B7472KY-TE	2000	X7R	4700 p	±10	2.5	110		2.0+0/-0.30	

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一般民生用 LW反转/低 ESL多层陶瓷电容器(LWDC™)

●0510规格

【温度特性 B5 : X5R (-55~+85℃)】 0.3mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSRL103SB5104MFNA01	TWK105 BJ104MP-F	25		X5R	0.1 μ	±20	5	150	0.3±0.05		
MSRLE103SB5224MFNA01	EWK105 BJ224MP-F	16		X5R	0.22 μ	±20	10	150	0.3±0.05		
MSRLL103SB5474MFNA01	LWK105 BJ474MP-F	10		X5R	0.47 μ	±20	10	150	0.3±0.05		
MSRLJ103SB5104MFNA01	JWK105 BJ104MP-F	6.3		X5R ¹⁾	0.1 μ	±20	5	150	0.3±0.05		
MSRLJ103SB5474MFNA01	JWK105 BJ474MP-F	6.3		X5R ¹⁾	0.47 μ	±20	10	150	0.3±0.05		
MSRLJ103SB5105MFNA01	JWK105 BJ105MP-F	6.3		X5R	1 μ	±20	10	150	0.3±0.05		
MSRLJ103SB5225MFNA01	JWK105 BJ225MP-F	6.3		X5R	2.2 μ	±20	10	150	0.3±0.05		

【温度特性 C6 : X6S (-55~+105℃), C7 : X7S (-55~+125℃)】 0.3mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSRLE103SC6104MFNA01	EWK105 C6104MP-F	16		X6S	0.1 μ	±20	5	150	0.3±0.05		
MSRLL103SC7104MFNA01	LWK105 C7104MP-F	10		X7S	0.1 μ	±20	5	150	0.3±0.05		
MSRLL103SC6224MFNA01	LWK105 C6224MP-F	10		X6S	0.22 μ	±20	10	150	0.3±0.05		
MSRLJ103SC7104MFNA01	JWK105 C7104MP-F	6.3		X7S	0.1 μ	±20	5	150	0.3±0.05		
MSRLJ103SC7224MFNA01	JWK105 C7224MP-F	6.3		X7S	0.22 μ	±20	10	150	0.3±0.05		
MSRLJ103SC6474MFNA01	JWK105 C6474MP-F	6.3		X6S	0.47 μ	±20	10	150	0.3±0.05		
MSRLE103SC6224MFNA01	AWK105 C6224MP-F	4		X6S	0.22 μ	±20	10	150	0.3±0.05		
MSRLE103SC6474MFNA01	AWK105 C6474MP-F	4		X6S	0.47 μ	±20	10	150	0.3±0.05		
MSRLE103SC6105MFNA01	AWK105 C6105MP-F	4		X6S	1 μ	±20	10	150	0.3±0.05		
MSRLE103SC6225MFNA01	AWK105 C6225MP-F	4		X6S	2.2 μ	±20	10	150	0.3±0.05		

●0816规格

【温度特性 B5 : X5R (-55~+85℃)】 0.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSRL165SB5104MTNA01	TWK107 BJ104MV-T	25		X5R ¹⁾	0.1 μ	±20	5	150	0.5±0.05		
MSRLE165SB5224MTNA01	EWK107 BJ224MV-T	16		X5R ¹⁾	0.22 μ	±20	5	150	0.5±0.05		
MSRLE165SB5474MTNA01	EWK107 BJ474MV-T	16		X5R ¹⁾	0.47 μ	±20	5	150	0.5±0.05		
MSRLL165SB5105MTNA01	LWK107 BJ105MV-T	10		X5R	1 μ	±20	10	150	0.5±0.05		
MSRLL165SB5225MTNA01	LWK107 BJ225MV-T	10		X5R	2.2 μ	±20	10	150	0.5±0.05		
MSRLJ165SB5105MTNA01	JWK107 BJ105MV-T	6.3		X5R ¹⁾	1 μ	±20	10	150	0.5±0.05		
MSRLJ165SB5225MTNA01	JWK107 BJ225MV-T	6.3		X5R	2.2 μ	±20	10	150	0.5±0.05		
MSRLJ165SB5475MTNA01	JWK107 BJ475MV-T	6.3		X5R	4.7 μ	±20	10	150	0.5±0.05		
MSRL165SB5106MTNA01	AWK107 BJ106MV-T	4		X5R	10 μ	±20	10	150	0.5±0.05		

【温度特性 B7 : X7R (-55~+125℃), C6 : X6S (-55~+105℃), C7 : X7S (-55~+125℃)】 0.5mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSRL165SB7104MTNA01	TWK107 B7104MV-T	25		X7R	0.1 μ	±20	5	150	0.5±0.05		
MSRLE165SB7224MTNA01	EWK107 B7224MV-T	16		X7R	0.22 μ	±20	5	150	0.5±0.05		
MSRLE165SB7474MTNA01	EWK107 B7474MV-T	16		X7R	0.47 μ	±20	5	150	0.5±0.05		
MSRLJ165SC7105MTNA01	JWK107 C7105MV-T	6.3		X7S	1 μ	±20	10	150	0.5±0.05		
MSRLA165SC7225MTNA01	AWK107 C7225MV-T	4		X7S	2.2 μ	±20	10	150	0.5±0.05		
MSRLA165SC6475MTNA01	AWK107 C6475MV-T	4		X6S	4.7 μ	±20	10	150	0.5±0.05		
MSRLP165SC6106MTNA01	PKWK107 C6106MV-T	2.5		X6S	10 μ	±20	10	150	0.5±0.05		

●1220规格

【温度特性 B5 : X5R (-55~+85℃)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSRLT219SB5475[]TNA01	TWK212 BJ475[]D-T	25		X5R	4.7 μ	±10, ±20	10	150	0.85±0.10		
MSRLE219SB5106MTNA01	EWK212 BJ106MD-T	16		X5R	10 μ	±20	10	150	0.85±0.10		
MSRLL219SB5475[]TNA01	LWK212 BJ475[]D-T	10		X5R	4.7 μ	±10, ±20	10	150	0.85±0.10		
MSRLL219SB5106MTNA01	LWK212 BJ106MD-T	10		X5R	10 μ	±20	10	150	0.85±0.10		
MSRLJ219SB5226MTNA01	JWK212 BJ226MD-T	6.3		X5R	22 μ	±20	10	150	0.85±0.10		

【温度特性 B7 : X7R (-55~+125℃), C6 : X6S (-55~+105℃)】 0.85mm厚度

新型号	旧型号(参考用)	额定电压 [V]	温度特性		静电容量 [F]	静电容量允许偏差 [%]	tan δ [%]	高温负载		厚度*3 [mm]	注释
								额定电压 x %			
MSRLT219SB7225[]TNA01	TWK212 B7225[]D-T	25		X7R	2.2 μ	±10, ±20	5	150	0.85±0.10		
MSRLE219SC6475[]TNA01	EWK212 C6475[]D-T	16		X6S	4.7 μ	±10, ±20	10	150	0.85±0.10		
MSRLL219SC6106MTNA01	LWK212 C6106MD-T	10		X6S	10 μ	±20	10	150	0.85±0.10		
MSRLA219SC6226MTNA01	AWK212 C6226MD-T	4		X6S	22 μ	±20	10	150	0.85±0.10		

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Multilayer Ceramic Capacitors

PACKAGING

① Minimum Quantity

● Taped package

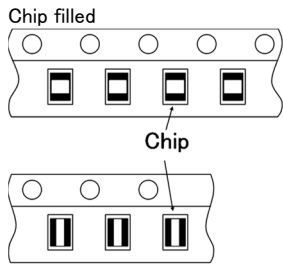
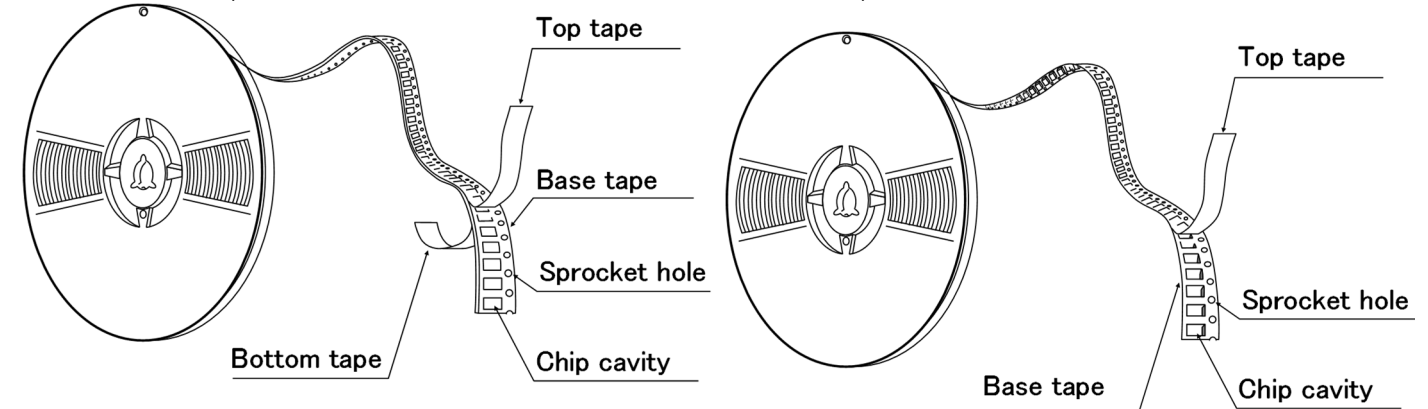
Type			Thickness		Standard Quantity [pcs]	
Code	JIS(mm)	EIA(inch)	[mm]	Code	Paper tape	Embossed tape
02	0201	008004	0.125	1	—	50000
04	0402	01005	0.2	2	—	40000
06	0603	0201	0.3	3	15000	—
1L	1005	0402	0.13	H	—	20000
			0.18	E	—	15000
			0.2	2	20000	—
			0.3	3	15000	—
10	1005	0402	0.5	5	10000	—
	0510 ※	0204	0.3	3	10000	—
16	1608	0603	0.45	K	4000	—
			0.7	7		
			0.8	8		
			0.8	8	3000 (Soft Termination)	3000 (Soft Termination)
	0816 ※	0306	0.5	5	—	4000
21	2012	0805	0.85	9	4000	—
			1.25	G	—	3000
			1.25	G	—	2000 (Soft Termination)
	1220 ※	0508	0.85	9	4000	—
31	3216	1206	0.85	9	4000	—
			1.15	Q	—	3000
			1.6	L	—	2000
32	3225	1210	0.85	9	—	2000
			1.15	Q		
			1.9	N		
			2.0 max	Y		
			2.5	M	—	500(T), 1000(P)
45	4532	1812	2.0 max	Y	—	1000
			2.5	M	—	500

注: ※LW Reverse type (MSRL, MCRL, MBRL, MLRL, MMRL)

② Taping material

※ No bottom tape for pressed carrier tape

- Card board carrier tape
- Embossed tape

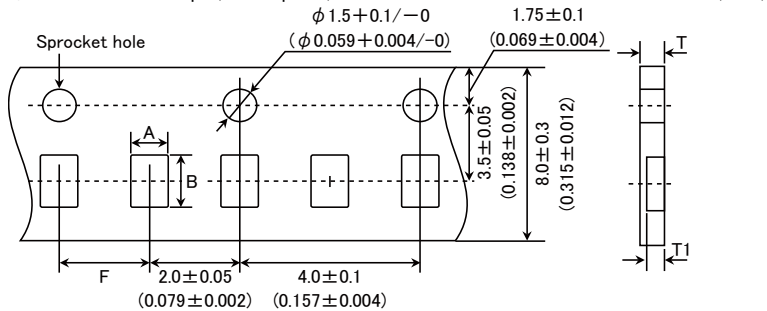


※ LW Reverse type.

③ Representative taping dimensions

● Paper Tape (8mm wide)

● Pressed carrier tape (2mm pitch)

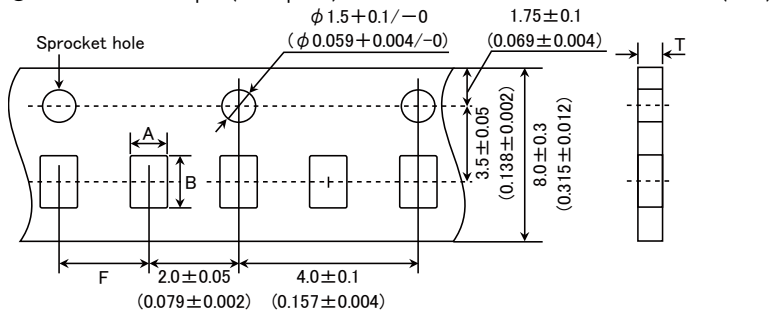


Type(EIA)	Chip Cavity		Insertion Pitch F	Tape Thickness	
	A	B		T	T1
0603 (0201)	0.37	0.67	2.0±0.05	0.45max.	0.42max.
0510 (0204) ※	0.65	1.15		0.4max.	0.3max.
1005 (0402) (*1 2)				0.45max.	0.42max.
1005 (0402) (*1 3)					

Note *1 Thickness, 2:0.2mm, 3:0.3mm. ※ LW Reverse type.

Unit: mm

● Punched carrier tape (2mm pitch)

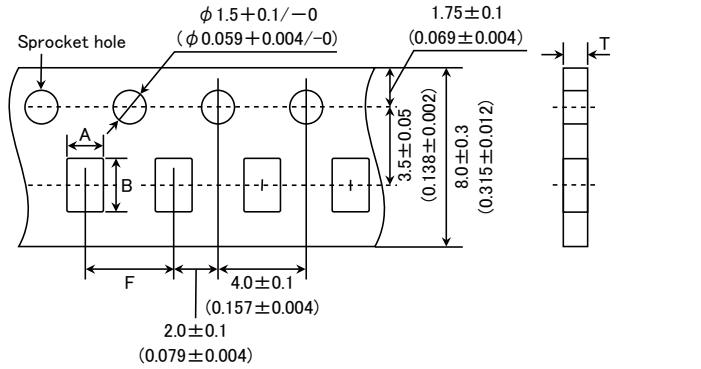


Type(EIA)	Chip Cavity		Insertion Pitch F	Tape Thickness
	A	B		T
1005 (0402)	0.65	1.15	2.0±0.05	0.8max.

Unit: mm

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● Punched carrier tape (4mm pitch)

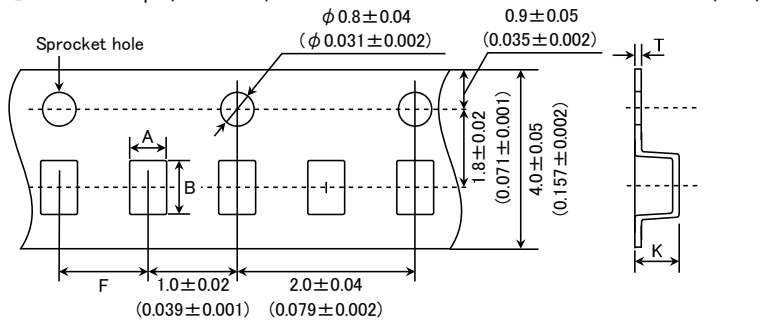


Type(EIA)	Chip Cavity		Insertion Pitch F	Tape Thickness	
	A	B		K	T
1608 (0603)	1.0	1.8	4.0 ± 0.1	1.1max.	1.1max.
0816 (0306) ※					
2012 (0805)					
1220 (0508) ※	1.65	2.4	4.0 ± 0.1	1.1max.	1.1max.
3216 (1206)	2.0	3.6			

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

Unit: mm

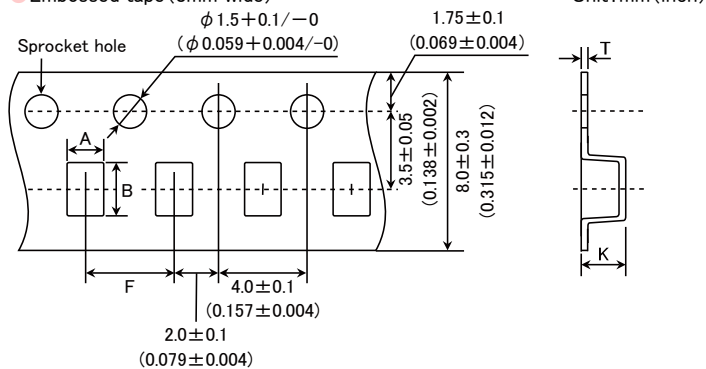
● Embossed tape (4mm wide)



Type(EIA)	Chip Cavity		Insertion Pitch F	Tape Thickness	
	A	B		K	T
0201 (008004)	0.135	0.27	1.0 ± 0.02	0.5max.	0.25max.
0402 (01005)					

Unit: mm

● Embossed tape (8mm wide)



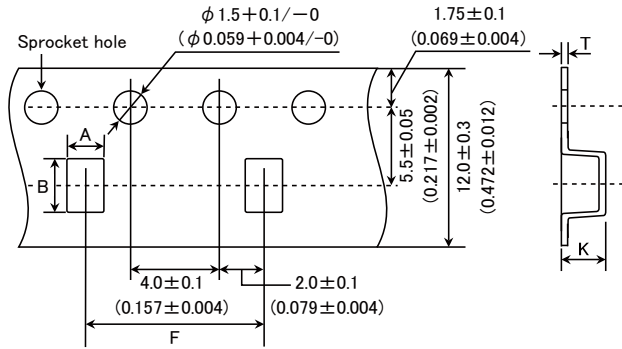
Type(EIA)	Chip Cavity		Insertion Pitch F	Tape Thickness	
	A	B		K	T
1005 (0402)	1.0	1.8	2.0 ± 0.1	0.6max	0.2 ± 0.1
0816 (0306) ※					
2012 (0805)			4.0 ± 0.1	1.3max.	0.25 ± 0.1
3216 (1206)					
3225 (1210)					

Note: ※ LW Reverse type.

Unit: mm

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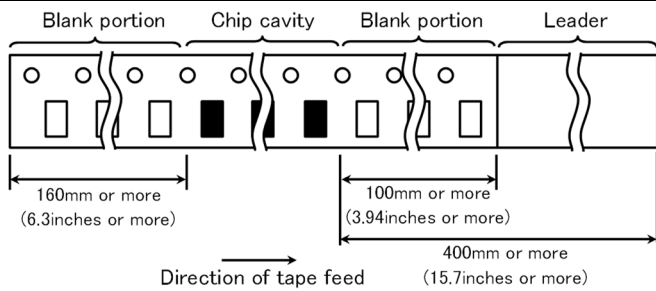
● Embossed tape (12mm wide) Unit: mm (inch)



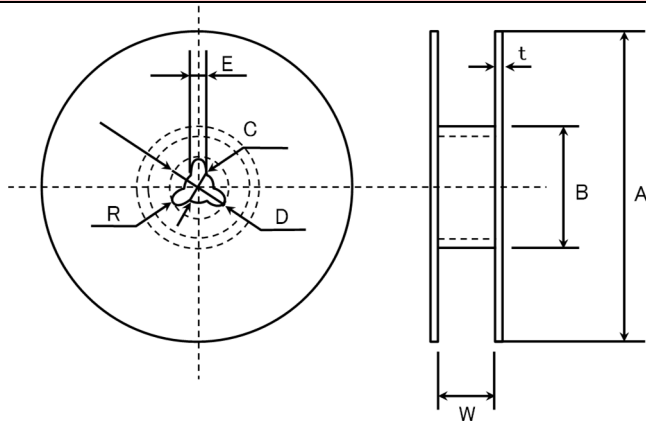
Type(EIA)	Chip Cavity		Insertion Pitch	Tape Thickness	
	A	B		K	T
3225 (1210)	3.1	4.0	8.0 ± 0.1	4.0max.	0.6max.
4532 (1812)	3.7	4.9	8.0 ± 0.1	4.0max.	0.6max.

Unit: mm

④ Trailer and Leader



⑤ Reel size



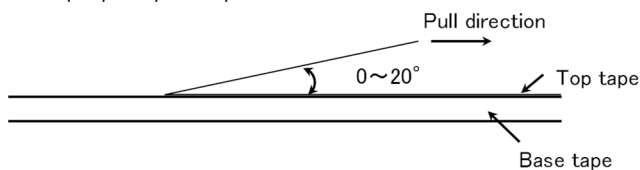
A	B	C	D	E	R
$\phi 178 \pm 2.0$	$\phi 50 \text{min.}$	$\phi 13.0 \pm 0.2$	$\phi 21.0 \pm 0.8$	2.0 ± 0.5	1.0

	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

⑥ Top 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 for General Electronic Equipment for Consumer
Multilayer Ceramic Capacitors
for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)

■ 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
		B5	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		

2. Storage Conditions

Specified Value	Temperature Compensating (Class1)	Standard	-55 to +125°C	
		High Frequency Type		
Specified Value	High Permittivity (Class2)		Specification	Temperature Range
		B5	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		

3. Rated Voltage

Specified Value	Temperature Compensating (Class1)	Standard	50VDC, 25VDC, 16VDC
		High Frequency Type	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	
Test Methods and Remarks	High Permittivity (Class2)	Note 1	$C \leq 0.047 \mu F$: 10000 MΩ min. $C > 0.047 \mu F$: $500 M\Omega \cdot \mu F$ (C: Nominal capacitance)
	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	$0.2\text{pF} \leq C \leq 5\text{pF} : \pm 0.25\text{pF}$ $5\text{pF} \leq C \leq 10\text{pF} : \pm 0.5\text{pF}$ $C > 10\text{pF} : \pm 5\%$	
		High Frequency Type	Refer to detailed specification	
	High Permittivity (Class2)		$\pm 10\%$ or $\pm 20\%$	
Test Methods and Remarks		Class 1		Class 2
		Standard	High Frequency Type	$C \leq 10 \mu\text{F}$ $C > 10 \mu\text{F}$
	Preconditioning	None		Thermal treatment (at 150°C for 1hr) Note 2
	Measuring frequency	1MHz \pm 10%	1GHz	$1\text{kHz} \pm 10\%$ $120 \pm 10\text{Hz}$
	Measuring voltage Note 1	0.5 to 5Vrms		$1 \pm 0.2\text{Vrms}$ $0.5 \pm 0.1\text{Vrms}$
	Bias application	None		

7. Q or Dissipation Factor

Specified Value	Temperature Compensating (Class1)	Standard	$C < 30\text{pF} : Q \geq 400 + 20C$ $C \geq 30\text{pF} : Q \geq 1000$ (C: Nominal capacitance)	
		High Frequency Type	Refer to detailed specification	
	High Permittivity (Class2) Note 1		2.5% max.	
Test Methods and Remarks		Class 1		Class 2
		Standard	High Frequency Type	$C \leq 10 \mu\text{F}$ $C > 10 \mu\text{F}$
	Preconditioning	None		Thermal treatment (at 150°C for 1hr) Note 2
	Measuring frequency	1MHz \pm 10%	1GHz	$1\text{kHz} \pm 10\%$ $120 \pm 10\text{Hz}$
	Measuring voltage Note 1	0.5 to 5Vrms		$1 \pm 0.2\text{Vrms}$ $0.5 \pm 0.1\text{Vrms}$
	Bias application	None		

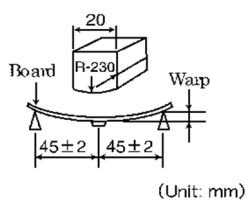
8. Temperature Characteristic (Without voltage application)

Specified Value	Temperature Compensating (Class1)	Standard	Temperature Characteristic [ppm/°C]		Tolerance [ppm/°C]		
			$C \square : 0$	CG(C0G) CH(C0H) CJ(C0J) CK(C0K)	G: ± 30 H: ± 60 J: ± 120 H: ± 250		
		High Frequency Type	Temperature Characteristic [ppm/°C]		Tolerance [ppm/°C]		
			$C \square : 0$	CG(C0G) CH(C0H)	G: ± 30 H: ± 60		
	High Permittivity (Class2)			Specification	Capacitance change	Reference temperature	Temperature Range
			B5	B X5R	$\pm 10\%$ $\pm 15\%$	20°C 25°C	-25 to +85°C -55 to +85°C
				X7R	$\pm 15\%$	25°C	-55 to +125°C
				X6S	$\pm 22\%$	25°C	-55 to +105°C
				X7S	$\pm 22\%$	25°C	-55 to +125°C

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 ₂ : Capacitance in Step 2		
	※Measuring frequency and voltage: Refer to detailed specification				

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9. Deflection

Specified Value	Temperature Compensating (Class1)	Standard	Appearance : No abnormality Capacitance change : Within $\pm 5\%$ or ± 0.5 pF, whichever is larger.	
		High Frequency Type	Appearance : No abnormality Capacitance change : Within ± 0.5 pF	
	High Permittivity (Class2)		Appearance : No abnormality Capacitance change : Within $\pm 12.5\%$	
Test Methods and Remarks	Multilayer Ceramic Capacitors		 <p style="font-size: small;">(Unit: mm) Capacitance measurement shall be conducted with the board bent</p>	
		0201, 0402, 0603, ※1005 Type		The other types
	Board	Glass epoxy-resin substrate		
	Thickness	0.8mm		1.6mm
	Warp	1mm		
	Duration	10 sec.		
	※1005 Type thickness, 2: 0.2mm, 3: 0.3mm.			

10. 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		0201Type	0402, 0603Type	1005Type or more
	Applied force	1N	2N	5N
	Duration	10 ± 1 sec		30 ± 5 sec

11. Vibration

Specified Value	Temperature Compensating (Class1)	Standard	Initial performance shall be satisfied.
		High Frequency Type	
	High Permittivity (Class2)		
Test Methods and Remarks	Preconditioning	: Thermal treatment (at 150°C for 1hr) Note2 (Only High permittivity)	
	Frequency range	: 10 to 55 Hz	
	Overall amplitude	: 1.5 mm	
	Sweeping method	: 10 to 55 to 10 Hz for 1 min	
		Two hours each in X, Y, Z directions: 6 hrs in total	

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		Eutectic solder	Lead-free solder
	Solder type	H60A or H63A	Sn-3.0Ag-0.5Cu
	Solder temperature	230 ± 5°C	
	Duration	4 ± 1 sec.	

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 $\pm 2.5\%$ or $\pm 0.25\text{pF}$, whichever is larger. 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			
		0201, 0402, 0603 Type	1005 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	24 \pm 2 hrs (Standard condition) Note 5		
	Class 2			
		0201, 0402, 0603 Type	1005, 1608, 2012 Type	3216, 3225, 4532 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 $\pm 2.5\%$ or $\pm 0.25\text{pF}$, whichever is larger. Q : Initial value Insulation resistance : Initial value Withstanding voltage (between terminals) : No abnormality	
	High 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	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: Nominal capacitance) Insulation resistance : 1000 M Ω min.
		High Frequency Type	Appearance : No abnormality Capacitance change : Within $\pm 5\%$ or $\pm 0.5\text{pF}$, whichever is larger. Insulation resistance : 1000 M Ω min.
	High Permittivity (Class2) Note 1		Appearance : No abnormality Capacitance change : Within $\pm 12.5\%$ Dissipation factor : 5.0% max. Insulation resistance : 50 M Ω μF or 1000 M Ω whichever is smaller.
Test Methods and Remarks	Preconditioning : Thermal treatment (at 150°C for 1hr) Note2 (Only High permittivity) Temperature : $40 \pm 2^\circ\text{C}$ Humidity : 90 to 95%RH Duration : 500 +24/-0 hrs Recovery : 24 ± 2 hrs under the standard condition Note 1,5		

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: Nominal capacitance) Insulation resistance : 500 M Ω min.
		High Frequency Type	Appearance : No abnormality Capacitance change : $C \leq 2\text{pF} : \text{Within } \pm 0.4 \text{ pF}$ $C > 2\text{pF} : \text{Within } \pm 0.75 \text{ pF}$ $C > 10\text{pF} : \text{Within } \pm 0.75\%$ (C: Nominal capacitance) Insulation resistance : 500 M Ω min.
	High Permittivity (Class2) Note 1		Appearance : No abnormality Capacitance change : Within $\pm 12.5\%$ Dissipation factor : 5.0% max. Insulation resistance : 25 M Ω μF or 500 M Ω , whichever is smaller.
Test Methods and Remarks	Preconditioning : Voltage treatment (Rated voltage are applied for 1 hour at 40°C) Note 1,3 (Only High permittivity) Temperature : $40 \pm 2^\circ\text{C}$ Humidity : 90 to 95%RH Duration : 500 +24/-0 hrs Applied voltage : Rated voltage Charge/discharge current : 50mA max. Recovery : 24 ± 2 hrs under the standard condition Note 1,5		

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 Ω 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 Ω min.
	High Permittivity (Class2) Note 1	Appearance : No abnormality Capacitance change : Within $\pm 12.5\%$ Dissipation factor : 5.0% max. Insulation resistance : 50 M Ω μF or 1000 M Ω , whichever is smaller.	
Test Methods and Remarks	Preconditioning : Voltage treatment (Twice the rated voltage shall be applied for 1 hour at 85°C, 105°C or 125°C) Note 1,3,4 (Only High permittivity) Temperature : Maximum operating temperature Duration : 1000 +24/-0 hrs Applied voltage : Rated voltage $\times 2$ Note 4 Charge/discharge current : 50mA max. Recovery : 24 \pm 2hrs under the standard condition Note 1,5		

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 \pm 0/-10°C for an hour and kept at room temperature for 24 \pm 2hours.

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 2hours.

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".

**Low distortion design/Audible/Good bias Multilayer Ceramic Capacitors
for General Electronic Equipment for Consumer**
**Low distortion design/Audible/Good bias Multilayer Ceramic Capacitors
for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)**

■ RELIABILITY DATA

1. Operating Temperature Range

Specified Value		Specification	Temperature Range
	LD	X5R	-55~+85°C
	SD	-	-55~+125°C

2. Storage Temperature Range

Specified Value		Specification	Temperature Range
	LD	X5R	-55~+85°C
	SD	-	-55~+125°C

3. Rated Voltage

Specified Value	6.3VDC, 10VDC, 16VDC, 25VDC, 35VDC, 50VDC
-----------------	---

4. Dielectric Withstanding Voltage (Between terminals)

Specified Value	No breakdown or damage	
Test Methods and Remarks	Applied voltage	: Rated voltage × 2.5(LD), Rated voltage × 3(SD)
	Duration	: 1 to 5 sec.
	Charge/discharge current	: 50mA max.

5. Insulation Resistance

Specified Value Note 1	10000 MΩ or 500MΩ μF, whichever is smaller	
Test Methods and Remarks	Applied voltage	: Rated voltage
	Duration	: 60±5 sec.
	Charge/discharge current	: 50mA max.

6. Capacitance (Tolerance)

Specified Value	±10% or ±20%	
Test Methods and Remarks	Measuring frequency	: 1kHz±10%
	Measuring voltage	: 1±0.2Vrms
	Bias application	: None

7. Dissipation Factor

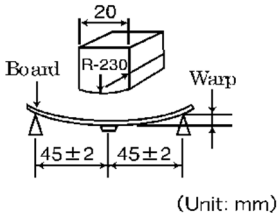
Specified Value	10% max (LD), 0.1% max (SD)	
Test Methods and Remarks	Measuring frequency	: 1kHz±10%
	Measuring voltage	: 1±0.2Vrms
	Bias application	: None

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8. Temperature Characteristic (Without voltage application)

Specified Value	Specification		Capacitance change	Reference temperature	Temperature Range
	LD	X5R	± 15%	25°C	-55 ~ +85°C
Test Methods and Remarks	Capacitance at each step shall be measured in thermal equilibrium, and the temperature characteristic shall be calculated from the following equation.				
	Step	X5R			
	1	Minimum operating temperature			
	2	25°C			
	3	Maximum operating temperature			
	$\frac{C-C_2}{C_2} \times 100(\%)$		C :Capacitance value in Step1 or Step3 C ₂ :Capacitance value in Step2		

9. Bending Strength

Specified Value	Appearance : No abnormality Capacitance change : Within ± 12.5% (LD), Within ± 5% (SD)
Test Methods and Remarks	<p>Warp : 1mm Speed : 0.5mm/second Duration : 10 seconds Test board : glass epoxy resin substrate Thickness : 1.6mm</p>  <p>(Unit: mm)</p> <p>Capacitance measurement shall be conducted with the board bent.</p>

10. Adhesive Force of Terminal Electrodes

Specified Value	Terminal electrodes shall be no exfoliation or a sign of exfoliation.
Test Methods and Remarks	Applied force : 5N Duration : 30 ± 5 seconds

11. Vibration

Specified Value	Initial performance shall be satisfied.
Test Methods and Remarks	Preconditioning : Thermal treatment (at 150°C for 1hr) Note2 (Only LD) Frequency range : 10 to 55 Hz Overall amplitude : 1.5 mm Sweeping method : 10 to 55 to 10 Hz for 1 min Two hours each in X, Y, Z directions: 6 hrs in total

12. Solderability

Specified Value	At least 95% of terminal electrode is covered by new solder.		
Test Methods and Remarks		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 Heat

Specified Value	Appearance	: No abnormality																																							
	Capacitance change	: Within $\pm 7.5\%$ (LD), Within $\pm 2.5\%$ (SD)																																							
Specified Value	Dissipation factor	: Initial value																																							
	Insulation resistance	: Initial value																																							
Specified Value	Withstanding voltage (between terminals)	: No abnormality																																							
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14. Temperature Cycle (Thermal Shock)

Specified Value	Appearance	: No abnormality																														
	Capacitance change	: Within $\pm 7.5\%$ (LD), Within $\pm 2.5\%$ (SD)																														
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15. Humidity (Steady state)

Specified Value Note 1	Appearance	: No abnormality																		
	Capacitance change	: Within $\pm 12.5\%$ (LD), $\pm 5\%$ Within(SD)																		
Specified Value	Dissipation factor	: 20%max(LD), 0.5%max(SD)																		
	Insulation resistance	: 50M Ω μ F or 1000M Ω , whichever is smaller																		
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16. Humidity Loading

Specified Value Note 1	Appearance	: No abnormality	
	Capacitance change	: Within $\pm 12.5\%$ (LD), Within $\pm 7.5\%$ (SD)	
	Dissipation factor	: 20%max (LD), 0.5%max (SD)	
	Insulation resistance	: 25M Ω μ F or 500M Ω , whichever is smaller	
Test Methods and Remarks		LD	SD
	Preconditioning	Voltage treatment (Rated voltage are applied for 1 hour at 40 °C) Note 3	
	Temperature	40 \pm 2°C	
	Humidity	90 to 95% RH	
	Duration	500 +24/−0 hrs	
	Applied voltage	Rated voltage	
	Charge/discharge current	50mA max	
	Measurement shall be conducted	24 \pm 2hrs under the standard condition Note 5	

17. High Temperature Loading

Specified Value Note 1	Appearance	: No abnormality	
	Capacitance change	: Within $\pm 12.5\%$ (LD), Within $\pm 3\%$ (SD)	
	Dissipation factor	: 20%max (LD), 0.35%max (SD)	
	Insulation resistance	: 50M Ω μ F or 1000M Ω , whichever is smaller	
Test Methods and Remarks		LD	SD
	Preconditioning	Voltage treatment (Twice the rated voltage shall be applied for 1 hour at 85°C or 125°C) Note 3, Note 4	
	Temperature	Maximum operating temperature	
	Duration	1000 +48/−0 hrs	
	Applied voltage	Rated voltage x 2 Note 4	Rated voltage x 2
	Charge/discharge current	50mA max	
	Measurement shall be conducted	24 \pm 2hrs under the standard condition Note 5	

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 2hours.

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 2hours.

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".

Medium-High Voltage Multilayer Ceramic Capacitor for General Electronic Equipment for Consumer
Medium-High Voltage Multilayer Ceramic Capacitor
for Medical Devices classified as GHTF Classes A or B (Japan Classes I or II)

■ RELIABILITY DATA

1. Operating Temperature Range		
Specified Value	Temperature Compensating(Class1)	C0G, C0H : -55 to +125°C
	High Permittivity (Class2)	X7R, X7S : -55 to +125°C X5R : -55 to +85°C B : -25 to +85°C SD : -55 to +125°C
2. Storage Temperature Range		
Specified Value	Temperature Compensating(Class1)	C0G, C0H : -55 to +125°C
	High Permittivity (Class2)	X7R, X7S : -55 to +125°C X5R : -55 to +85°C B : -25 to +85°C SD : -55 to +125°C
3. Rated Voltage		
Specified Value	Temperature Compensating(Class1)	100VDC(Code:H)
	High Permittivity (Class2)	100VDC(Code:H), 250VDC(Code:Q), 630VDC(Code:S), 2000VDC(Code:X)
4. Withstanding Voltage (Between terminals)		
Specified Value	No breakdown or damage	
Test Methods and Remarks	Applied voltage : Rated voltage (H) × 2.5, Rated voltage (Q) × 2, Rated voltage (S, X) × 1.2 Duration : 1 to 5sec. Charge/discharge current : 50mA max.	
5. Insulation Resistance		
Specified Value	Temperature Compensating(Class1)	10000 MΩ min.
	High Permittivity (Class2)	100MΩ · μF or 10GΩ, whichever is smaller.
Test Methods and Remarks	Applied voltage : Rated voltage (H, Q), 500V (S, X) Duration : 60 ± 5sec. Charge/discharge current : 50mA max.	
6. Capacitance (Tolerance)		
Specified Value	Temperature Compensating(Class1)	C ≤ 10pF : ±0.5pF C > 10pF : ±5% (C: Nominal capacitance)
	High Permittivity (Class2)	±10%, ±20%
Test Methods and Remarks	Temperature Compensating(Class1)	Measuring frequency : 1MHz ± 10% Measuring voltage : 0.5~5Vrms Bias application : None
	High Permittivity (Class2)	Measuring frequency : 1kHz ± 10%, 1MHz ± 10% (SD: 1608type(H), 2012type(Q)) Measuring voltage : 1 ± 0.2Vrms Bias application : None

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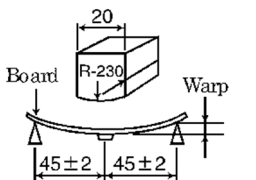
7. Q or Dissipation Factor

Specified Value	Temperature Compensating (Class1)	C < 30pF : Q ≥ 400 + 20C C ≥ 30pF : Q ≥ 1000 (C: Nominal capacitance)
	High Permittivity (Class2)	3.5%max (H: 1608type min), 2.5%max (H: 1005type, Q, S, X), 0.1type max (SD)
Test Methods and Remarks	Temperature Compensating (Class1)	Measuring frequency : 1MHz ± 10% Measuring voltage : 0.5 ~ 5Vrms Bias application : None
	High Permittivity (Class2)	Measuring frequency : 1kHz ± 10%, 1MHz ± 10% (SD: 1608type(H), 2012type(Q)) Measuring voltage : 1 ± 0.2Vrms Bias application : None

8. Temperature Characteristic of Capacitance

Specified Value	Temperature Compensating (Class1)	C0G : 0 ± 30ppm/°C (-55 to +125°C) C0H : 0 ± 60ppm/°C (-55 ~ +125°C)											
	High Permittivity (Class2)	B : ± 10% (-25 to +85°C) X5R : ± 15% (-55 to +85°C) X7R : ± 15% (-55 to +125°C) X7S : ± 22% (-55 to +125°C)											
Test Methods and Remarks	<p>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.</p> $\frac{(C_{85} - C_{20})}{C_{20} \times \Delta T} \times 10^6 \text{ (ppm/°C)} \quad \Delta T = 65$												
	<p>Class 2 Capacitance at each step shall be measured in thermal equilibrium, and the temperature characteristic shall be calculated from the following equation.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>B</th> <th>X5R, X7R, X7S</th> </tr> </thead> <tbody> <tr> <td>1</td> <td colspan="2">Minimum operating temperature</td> </tr> <tr> <td>2</td> <td>20°C</td> <td>25°C</td> </tr> <tr> <td>3</td> <td colspan="2">Maximum operating temperature</td> </tr> </tbody> </table> $\frac{(C - C_2)}{C_2} \times 100 \text{ (%)}$ <p>C : Capacitance value in Step 1 or Step 3 C2 : Capacitance value in Step 2</p>		Step	B	X5R, X7R, X7S	1	Minimum operating temperature		2	20°C	25°C	3	Maximum operating temperature
Step	B	X5R, X7R, X7S											
1	Minimum operating temperature												
2	20°C	25°C											
3	Maximum operating temperature												

9. Deflection

Specified Value	Temperature Compensating (Class1)	Appearance : No abnormality Capacitance change : Within ± 5% or ± 0.5 pF, whichever is larger.
	High Permittivity (Class2)	Appearance : No abnormality Capacitance change : ± 10%, ± 5%, (SD)
Test Methods and Remarks	<p>Warp : 1mm Duration : 10sec. Test board : Glass epoxy-resin substrate Thickness : 1.6mm</p>	 <p>(Unit: mm)</p>
	Capacitance measurement shall be conducted with the board bent.	

10. Adhesive Strength of Terminal Electrodes

Specified Value	Temperature Compensating (Class1)	No terminal separation or its indication.
	High Permittivity (Class2)	
Test Methods and Remarks	Applied force : 5N	
	Duration : 30 ± 5sec.	

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11. Vibration

Specified Value	Temperature Compensating(Class1)	Initial performance shall be satisfied.
	High Permittivity (Class2)	
Test Methods and Remarks	Preconditioning : Thermal treatment(at 150°C for 1hr) Note1 (Only High permittivity)	
	Frequency range : 10 to 55 Hz	
	Overall amplitude : 1.5 mm	
	Sweeping method : 10 to 55 to 10 Hz for 1 min	
	Two hours each in X, Y, Z directions: 6 hrs in total	

12. Solderability

Specified Value	Temperature Compensating(Class1)	At least 95% of terminal electrode is covered by new solder	
	High Permittivity (Class2)		
Test Methods and Remarks		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.	

13. Resistance to Soldering

Specified Value	Temperature Compensating(Class1)	Appearance : No abnormality
		Capacitance change : Within ±2.5% or ±0.25pF, whichever is larger.
Specified Value	High Permittivity (Class2)	Q : Initial value
		Insulation resistance : Initial value
Specified Value		Withstanding voltage (between terminals) : No abnormality
		Appearance : No abnormality
Specified Value		Capacitance change : Within ±7.5%(H: 1005type), ±15%(H: 1608type min) ±10%(Q, S, X), ±2.5%(SD)
		Dissipation facto : Initial value
Specified Value		Insulation resistance : Initial value
		Withstanding voltage (between terminals) : No abnormality
Test Methods and Remarks		Temperature Compensating(Class1)
	Preconditioning	None
	Solder temperature	270±5°C
	Duration	3±0.5sec.
	Preheating conditions	80 to 100°C, 2 to 5 min. 150 to 200°C, 2 to 5min.
	Recovery	24±2hrs under the standard condition Note3
		High Permittivity (Class2)
	Preconditioning	Thermal treatment(at 150°C for 1hr) Note1
	Solder temperature	270±5°C
	Duration	3±0.5sec.
	Preheating conditions	80 to 100°C, 2 to 5 min.(2012type max), 5 to 10 min(3216type min) 150 to 200°C, 2 to 5min.(2012type max), 5 to 10 min(3216type min)
	Recovery	24±2hrs under the standard condition Note3

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14. Temperature Cycle (Thermal Shock)

Specified Value	Temperature Compensating(Class1)	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 Permittivity (Class2)	Appearance : No abnormality Capacitance change : Within $\pm 7.5\%$ (H: 1005type), $\pm 15\%$ (H: 1608type min) $\pm 10\%$ (Q, S, X), $\pm 2.5\%$ (SD) Dissipation facto : 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 1		
	1 cycle	Step	Temperature(°C)
		1	Minimum operating temperature
2		Normal temperature	
3		Maximum operating temperature	
4	Normal temperature		
Number of cycles	5 times		
Recovery	24 \pm 2 hrs (Standard condition) Note 3		

15. Humidity (Steady state)

Specified Value	Temperature Compensating(Class1)	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:Nominal capacitance) Insulation resistance : 1000 M Ω min.
	High Permittivity (Class2)	Appearance : No abnormality Capacitance change : $\pm 12.5\%$ max(1005type), $\pm 15\%$ max(1608type min), $\pm 5\%$ max(SD) Dissipation factor : 5%max(H: 1005type,Q, S, X), 7%max(H: 1608type min), 0.5%max(SD). Insulation resistance : 25M Ω μ F or 1000M Ω , whichever is smaller.
Test Methods and Remarks	Preconditioning	: Thermal treatment(at 150°C for 1hr) Note1 (Only High permittivity)
	Temperature	: 40 \pm 2°C
	Humidity	: 90 to 95%RH
	Duration	: 500 +24/-0 hrs
	Recovery	: 24 \pm 2hrs under the standard condition Note3

16. Humidity Loading

Specified Value	Temperature Compensating(Class1)	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:Nominal capacitance) Insulation resistance : 500 M Ω min.
	High Permittivity (Class2)	Appearance : No abnormality Capacitance change : $\pm 12.5\%$ max(1005type), $\pm 15\%$ max(1608type min), $\pm 7.5\%$ max(SD) Dissipation factor : 5%max(H: 1005type,Q, S, X), 7%max(H: 1608type min), 0.5%max(SD) Insulation resistance : 10M Ω μ F or 500M Ω , whichever is smaller.
Test Methods and Remarks	Preconditioning	: Voltage treatment(Rated voltage are applied for 1 hour at 40°C)Note 2 (Only High permittivity)
	Temperature	: 40 \pm 2°C
	Humidity	: 90 to 95%RH
	Duration	: 500 +24/-0 hrs
	Applied voltage	: Rated voltage
	Charge/discharge current	: 50mA max.
	Recovery	: 24 \pm 2hrs under the standard condition Note3

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17. High Temperature Loading

Specified Value	Temperature Compensating(Class1)	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 : $1000 \text{ M}\Omega$ min.
	High Permittivity (Class2)	Appearance : No abnormality Capacitance change : $\pm 12.5\% \text{max}(1005\text{type})$, $\pm 15\% \text{max}(1608\text{type min})$, $\pm 3\% \text{max}(SD)$ Dissipation factor : $5\% \text{max}(H: 1005\text{type}, Q, S, X)$, $7\% \text{max}(H: 1608\text{type min})$, $0.35\% \text{max}(SD)$ Insulation resistance : $50 \text{ M}\Omega \mu\text{F}$ or $1000 \text{ M}\Omega$, whichever is smaller.
Test Methods and Remarks	Preconditioning : Voltage treatment(Twice the rated voltage shall be applied for 1 hour at 85°C or 125°C) Note 2 (Only High permittivity) Temperature : Maximum operating temperature Duration : $1000 + 24 / - 0$ hrs Applied voltage : Rated voltage(H) $\times 2$, Rated voltage(Q) $\times 1.5$, Rated voltage $\times 1.2$ (S, X) $\times 1.2$ Charge/discharge current : 50mA max. Recovery : 24 ± 2 hrs under the standard condition Note3	

Note1 Thermal treatment : Initial value shall be measured after test sample is heat-treated at $150 \pm 0 / - 10^\circ\text{C}$ for an hour and kept at room temperature for 24 ± 2 hours.

Note2 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 ± 2 hours.

Note3 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: $20 \pm 2^\circ\text{C}$, Relative humidity: 60 to 70% RH, Air pressure: 86 to 106kPa
 Unless otherwise specified, all the tests are conducted under the "standard condition".

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.

Technical considerations

- ◆ Pattern configurations (Design of Land-patterns)

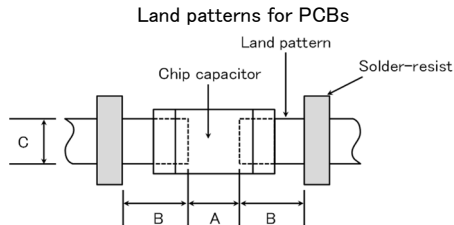
The following diagrams and tables show some examples of recommended land patterns to prevent excessive solder amounts.

(1) Recommended land dimensions for typical chip capacitors

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

Wave-soldering

Type	1608	2012	3216	3225	
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	



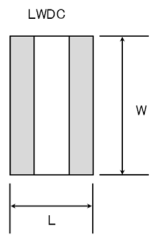
Reflow-soldering

Type	0201	0402	0603	1005	1608	2012	3216	3225	4532
Size	L	0.25	0.4	0.6	1.0	1.6	2.0	3.2	4.5
	W	0.125	0.2	0.3	0.5	0.8	1.25	1.6	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	0510	0816	1220	
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	



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(2) Examples of good and bad solder application

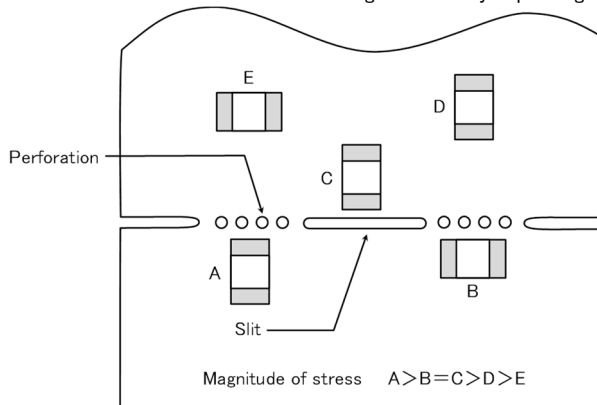
Item	Not recommended	Recommended
Mixed mounting of SMD and leaded components		
Component placement close to the chassis		
Hand-soldering of leaded components near mounted components		
Horizontal component placement		

◆ 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

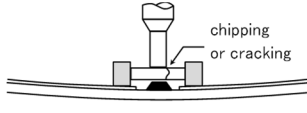
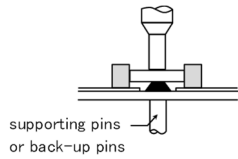
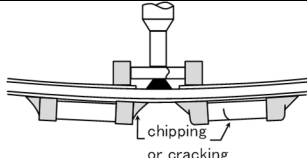
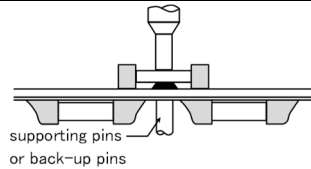
- When capacitors are mounted on PCB, excessive impact load shall not be imposed on them.
- Maintenance and inspection of mounting machines shall be conducted periodically.

◆ 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.

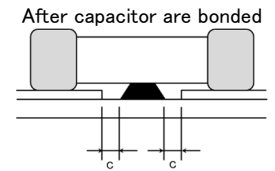
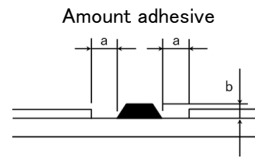
◆ Selection of Adhesives

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	2012/3216 case sizes as examples
a	0.3mm min
b	100 to 120 μm
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 MLCC 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

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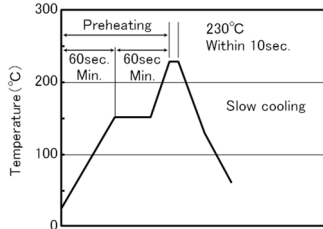
and the capability of the machines used shall also be considered carefully when water-soluble flux is used.

◆Soldering

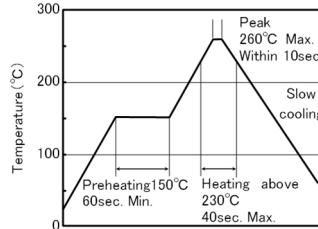
- Ceramic chip capacitors are susceptible to thermal shock when exposed to rapid or concentrated heating or rapid cooling.
- Therefore, the soldering must be conducted with great care so as to prevent malfunction of the components due to excessive thermal shock.
- Preheating : Capacitors shall be preheated 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】

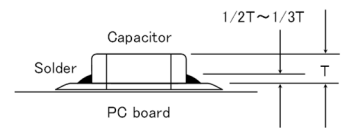


【Recommended condition for Pb-free soldering】



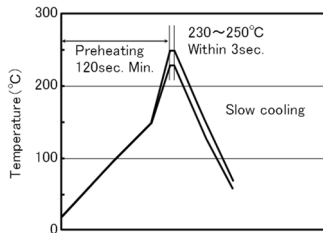
Caution

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

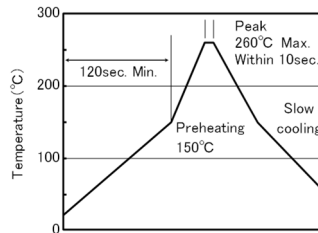


[Wave soldering]

【Recommended conditions for eutectic soldering】



【Recommended condition for Pb-free soldering】

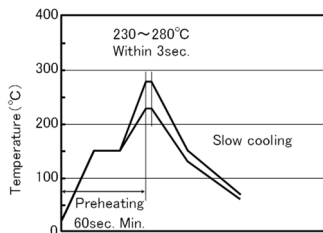


Caution

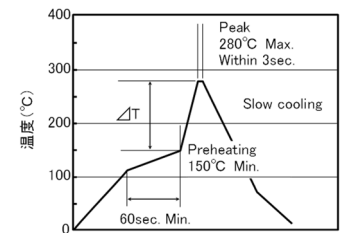
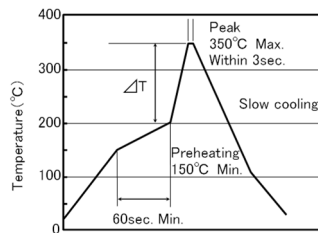
- ①Wave soldering must not be applied to capacitors designated as for reflow soldering only. soldering for 1 times.

[Hand soldering]

【Recommended conditions for eutectic soldering】



【Recommended condition for Pb-free soldering】



	ΔT
3216type or less	$\Delta T \leq 150^{\circ}\text{C}$

	ΔT
3225type or more	$\Delta T \leq 130^{\circ}\text{C}$

Caution

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

5. Cleaning	
Precautions	<p>◆Cleaning conditions</p> <ol style="list-style-type: none"> 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.) Cleaning condition shall be determined after it is verified by using actual cleaning machine that the cleaning process does not affect capacitor's characteristics.
Technical considerations	<ol style="list-style-type: none"> 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). 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

6. Resin coating and mold	
Precautions	<ol style="list-style-type: none"> 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. 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.

7. Handling	
Precautions	<p>◆Splitting of PCB</p> <ol style="list-style-type: none"> 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. Board separation shall not be done manually, but by using the appropriate devices. <p>◆Mechanical considerations</p> <p>Be careful not to subject capacitors to excessive mechanical shocks.</p> <ol style="list-style-type: none"> If ceramic capacitors are dropped onto a floor or a hard surface, they shall not be used. Please be careful that the mounted components do not come in contact with or bump against other boards or components.

8. Storage conditions	
Precautions	<p>◆Storage</p> <ol style="list-style-type: none"> 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"> Recommended conditions Ambient temperature : Below 30°C Humidity : Below 70% RH The ambient temperature must be kept below 40°C. Even under ideal storage conditions, solderability of capacitor is deteriorated as time passes, so capacitors shall be used within 6 months from the time of delivery. <ul style="list-style-type: none"> Ceramic chip capacitors shall be kept where no chlorine or sulfur exists in the air. 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 1hour.
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.

单击下面可查看定价，库存，交付和生命周期等信息

[>>Taiyo Yuden\(太阳诱电\)](#)