echanics / Hilkka Saar	1 10x +300-(0)2047001-	14 tel +358-(0)2047	
ONE Corpor			
Department/Handled by/fa: AT / ATO Nieminen / 3	x/tel 183 / 3215		2. Date 14.1.1997
KONE material number 264682	4. Document data	EC 0838	
Description (max 40, for SA	P R/3), includes both description	on and specification	
Description (max 30, for ED Chip-ker. kond. / Chip	мs) cer capacitor	7. Specification (max 3 50V-22pF-10%-NPC	0, for EDMS) 0-0805
. Additional specification (m	aax 32)		9. KONE recommendation class 1 = Standard
0. Material group B142. I	11. Basic material	12. Industry standard	2 = Special 3 = Not in new designs
3. Base unit of measure	14. Net weight n.5	15. Gross weight n.5	16. Unit of weight mg
7. Manufacturer (max 30)	Type (max 30)	Testing status*	Note
	2222 861 1/7 6 229	A	1/7=Packaging (1)
Philips	MCH21 5 A 220 K P/K	Α	C0G=NP0; P/K=Packaging (
Rohm			L/T=Packaging (3)
Vitramon	VJ0805 A 220 K X A L/T M	A	
Murata	GRM40 C0G 220 J 50 PT	Α	C0G=NP0
*Testing status:	A = chosen by databook, B = functional test C =	not tested type test D = life test	
18. More information			
Philips PA06 1996 pag	e 31	(1) 1: reel:d=180mm, 400	0pcs / 7: reel:d=330mm, 10000pc
Rohm Capacitors 95-9		(2) P=plastic, d=180mm, 3000pcs / K=paper, d=180mm, 4	
Vitramon monolithic (cer cap 94 page 14	(3) L=reel d=180mm, 400	10pcs / T=reel d=330mm, 12000pc
Murata Chip product	s (K01E-21) 95 page 3		
	(FO A T/I	AVX Chin canacit	ors 95 (6T9503TYA2651E) po
AVX: CM 21 CG 220 k		Kemet SMD catalo	
Kemet: C 0805 C 220		TDK Product catalo	oque 95 (HEC-001C) page
	20 K I		
TDK: C2012 C0G 1H 2 Syfer: 0805 J 050 0220		Syfer cer cap 96 p	age 12,33

ONE Corp			
Department/Handled b	py/fax/tel n / 3183 / 3215		2. Date 14.1.1997
KONE material number 264683		EC 0838	
. Description (max 40, fo	or SAP R/3), includes both descriptio	on and specification	
. Description (max 30, fo Chip-ker. kond. / C	or EDMS) hip cer capacitor	7. Specification (max 50V-33pF-10%-NP	
. Additional specificatio	on (max 32)		9. KONE recommendation class
0. Material group	11. Basic material	12. Industry standard	1 = Standard 2 = Special 3 = Not in new designs
 Base unit of measure 	n.5	15. Gross weight n.5	16. Unit of weight mg
oc	n.5	ľ	
OC 17. Manufacturer (max 3	n.5 Type (max 30)	n.5	mg
OC 17. Manufacturer (max 3 Philips	n.5 Type (max 30) 2222 861 1/7 6 339	n.5 Testing status*	Mg Note
OC 17. Manufacturer (max 3	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K	Testing status* A A	Note 1/7=Packaging (1) COG=NP0; P/K=Packaging (2)
OC 17. Manufacturer (max 3 Philips	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K VJ0805 A 330 K X A L/T M	n.5 Testing status* A A	Note 1/7=Packaging (1) COG=NPO; P/K=Packaging (2) L/T=Packaging (3)
OC 17. Manufacturer (max : Philips Rohm	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K VJ0805 A 330 K X A L/T M GRM40 COG 330 J 50 PT A = chosen by databook, n	n.5 Testing status* A A A	Note 1/7=Packaging (1) COG=NP0; P/K=Packaging (2)
OC 17. Manufacturer (max 3 Philips Rohm Vitramon Murata	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K VJ0805 A 330 K X A L/T M GRM40 COG 330 J 50 PT A = chosen by databook, n	n.5 Testing status* A A A A A pot tested type test D = life test	Mote 1/7=Packaging (1) COG=NP0; P/K=Packaging (2) L/T=Packaging (3) COG=NP0
Philips Rohm Vitramon Murata *Testing status: 18. More information Philips PA06 1996 p	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K VJ0805 A 330 K X A L/T M GRM40 COG 330 J 50 PT A = chosen by databook, n B = functional test	In.5 Testing status* A A A A A not tested type test D = life test (1) 1: reel:d=180mm, 400	mg Note 1/7=Packaging (1) C0G=NP0; P/K=Packaging (2) L/T=Packaging (3) C0G=NP0 Oopcs / 7: reel:d=330mm, 10000pcs
Philips Rohm Vitramon Murata *Testing status: 18. More information Philips PA06 1996 p	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K VJ0805 A 330 K X A L/T M GRM40 COG 330 J 50 PT A = chosen by databook, n B = functional test	n.5 Testing status* A A A A A Out tested type test D = life test (1) 1: reel:d=180mm, 400 (2) P=plastic, d=180mm	Mote 1/7=Packaging (1) C0G=NP0; P/K=Packaging (2) L/T=Packaging (3) C0G=NP0 C0pcs / 7: reel:d=330mm, 10000pcs 3000pcs / K=paper, d=180mm, 4000
Philips Rohm Vitramon Murata *Testing status: 18. More information Philips PA06 1996 p Rohm Capacitors Vitramon monolith	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K VJ0805 A 330 K X A L/T M GRM40 COG 330 J 50 PT A = chosen by databook, n B = functional test	n.5 Testing status* A A A A A Out tested type test D = life test (1) 1: reel:d=180mm, 400 (2) P=plastic, d=180mm	mg Note 1/7=Packaging (1) C0G=NP0; P/K=Packaging (2) L/T=Packaging (3) C0G=NP0 C0Opcs / 7: reel:d=330mm, 10000pcs
Philips Rohm Vitramon Murata *Testing status: 18. More information Philips PA06 1996 p Rohm Capacitors Vitramon monolith Murata Chip prod	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K VJ0805 A 330 K X A L/T M GRM40 COG 330 J 50 PT A = chosen by databook, n B = functional test	In.5 Testing status* A A A A A A (1) 1: reel:d=180mm, 400 (2) P=plastic, d=180mm (3) L=reel d=180mm, 400	Mote 1/7=Packaging (1) C0G=NP0; P/K=Packaging (2) L/T=Packaging (3) C0G=NP0 C0Pcs / 7: reel:d=330mm, 10000pcs 3000pcs / K=paper, d=180mm, 400000pcs / T=reel d=330mm, 12000pcs
Philips Rohm Vitramon Murata *Testing status: 18. More information Philips PA06 1996 p Rohm Capacitors Vitramon monolith Murata Chip prod	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K VJ0805 A 330 K X A L/T M GRM40 COG 330 J 50 PT A = chosen by databook, n B = functional test	In.5 Testing status* A A A A A Out tested by the status of the st	Mote 1/7=Packaging (1) C0G=NP0; P/K=Packaging (2) L/T=Packaging (3) C0G=NP0 C0G=NP0
Philips Rohm Vitramon Murata *Testing status: 18. More information Philips PA06 1996 p Rohm Capacitors Vitramon monolith Murata Chip prod AVX: CM 21 CG 3 Kemet: C 0805 C	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K VJ0805 A 330 K X A L/T M GRM40 COG 330 J 50 PT A = chosen by databook, n B = functional test	In.5 Testing status* A A A A A (1) 1: reel:d=180mm, 400 (2) P=plastic, d=180mm (3) L=reel d=180mm, 400 AVX Chip capacit Kemet SMD catalogue	Mote 1/7=Packaging (1) C0G=NP0; P/K=Packaging (2) L/T=Packaging (3) C0G=NP0 C0G=NP0
Philips Rohm Vitramon Murata *Testing status: 18. More information Philips PA06 1996 p Rohm Capacitors Vitramon monolith Murata Chip prod	n.5 Type (max 30) 2222 861 1/7 6 339 MCH21 5 A 330 K P/K VJ0805 A 330 K X A L/T M GRM40 COG 330 J 50 PT A = chosen by databook, n B = functional test	In.5 Testing status* A A A A A (1) 1: reel:d=180mm, 400 (2) P=plastic, d=180mm (3) L=reel d=180mm, 400 AVX Chip capacit Kemet SMD catalogue	Note 1/7=Packaging (1) C0G=NP0; P/K=Packaging (2) L/T=Packaging (3) C0G=NP0 C0G=NP0

echanics / Hiikka Saaii	fax +358-(0)20475314			
ONE Corpor FOR NEW MATER				
Department/Handled by/fax	c/tel		2. Date 14.1.1997	
AT / ATO Nieminen / 31	183 / 3215			
KONE material number 26 4 68 H	4. Document data	EC0838		
. Description (max 40, for SAP	R/3), includes both descriptio	n and specification		
. Description (max 30, for EDN Chip-ker. kond. / Chip (us) cer capacitor	7. Specification (max 30 50V-47pF-10%-NP0-	, for EDMS) 0805	
. Additional specification (mo			9. KONE recommendation class	
			1 = Standard	
0. Material group	11. Basic material	12. Industry standard	2 = Special	
U. Malerial group			3 = Not in new designs	
	7	15. Gross weight	16. Unit of weight	
13. Base unit of measure	14. Net weight n.5	n.5	mg	
OC	11.0		·	
17. Manufacturer (max 30)	Type (max 30)	Testing status*	Note	
Philips	2222 861 1/7 6 479	Α	1/7=Packaging (1)	
Rohm	MCH21 5 A 470 K P/K	Α	C0G=NP0; P/K=Packaging (2	
KOIIII	-	A	L/T=Packaging (3)	
Vitramon	VJ0805 A 470 K X A L/T M		COG=NP0	
Murata	GRM40 C0G 470 J 50 PT	A	C0G-1410	
*Testing status:	A = chosen by databook, r B = functional test	type test D = life test		
18. More information			10000	
Philips PA06 1996 page		(1) 1: reel:d=180mm, 4000	pcs / 7: reel:d=330mm, 10000pcs	
Rohm Capacitors 95-96 page 19			.000pcs / K=paper, d=180mm, 40 pcs / T=reel d=330mm, 12000pcs	
	er cap 94 page 14	(3) L=reel d=180mm, 4000	pcs / 1-1661 u-00011111, 12000poo	
Vitramon monolithic c				
	s (KOTE-21) 95 page 3			
Vitramon monolithic c Murata Chip products		AVX Chip capacito	rs 95 (6T9503TYA2651E) pc	
Vitramon monolithic of Murata Chip products AVX: CM 21 CG 470 K	(50 A T/L	AVX Chip capacito	rs 95 (6T9503TYA2651E) pa g F-3102 page31	
Vitramon monolithic c Murata Chip products AVX: CM 21 CG 470 K Kemet: C 0805 C 470	(50 A T/L K 5 G A C	Kemet SMD catalog	rs 95 (6T9503TYA2651E) pc g F-3102 page31 que 95 (HEC-001C) page	
Vitramon monolithic of Murata Chip products AVX: CM 21 CG 470 K	C 50 A T/L K 5 G A C 70 K T	Kemet SMD catalog TDK Product catalog Syfer cer cap 96 pa	g F-3102 page31 que 95 (HEC-001C) page	

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KONE Corpor			
. Department/Handled by/fax HAT / ATO Nieminen / 3			2. Date 14.1.1997
. KONE material number 264685	4. Document data	EC0838	
. Description (max 40, for SAP	P R/3), includes both description	on and specification	
i. Description (max 30, for EDN Chip-ker. kond. / Chip c		7. Specification (max 30 50V-100pF-10%-NP0	
3. Additional specification (mo	ax 32)		9. KONE recommendation class
10. Material group	11. Basic material	12. Industry standard	1 = Standard 2 = Special 3 = Not in new designs
13. Base unit of measure PC	14. Net weight n.5	15. Gross weight n.5	16. Unit of weight mg
17. Manufacturer (max 30)	Type (max 30)	Testing status*	Note
Philips	2222 861 1/7 6 101	Α	1/7=Packaging (1)
Rohm	MCH21 5 A 101 K P/K	Α	COG=NP0; P/K=Packaging (2)
Vitramon	VJ0805 A 101 K X A L/T M	А	L/T=Packaging (3)
Murata	GRM40 C0G 101 J 50 PT	A	COG=NP0
*Testing status:	A = chosen by databook, r	not tested type test D = life test	
18. More information Philips PA06 1996 page			pcs / 7: reel:d=330mm, 10000pcs
Philips PA06 1996 page Rohm Capacitors 95-9	6 page 19	(2) P=plastic, d=180mm, 3	3000pcs / K=paper, d=180mm, 400
Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic c	6 page 19 er cap 94 page 14	(2) P=plastic, d=180mm, 3	
Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic co Murata Chip products	6 page 19 er cap 94 page 14 s (K01E-21) 95 page 3	(2) P=plastic, d=180mm, 3 (3) L=reel d=180mm, 4000	3000pcs / K=paper, d=180mm, 400 pcs / T=reel d=330mm, 12000pcs
Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic co Murata Chip products AVX: CM 21 CG 101 K	6 page 19 er cap 94 page 14 (K01E-21) 95 page 3	(2) P=plastic, d=180mm, 3 (3) L=reel d=180mm, 4000 AVX Chip capacito	3000pcs / K=paper, d=180mm, 400 apcs / T=reel d=330mm, 12000pcs rs 95 (6T9503TYA2651E) pag
Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic co Murata Chip products AVX: CM 21 CG 101 K Kemet: C 0805 C 101 k	6 page 19 er cap 94 page 14 (K01E-21) 95 page 3 50 A T/L	(2) P=plastic, d=180mm, 3 (3) L=reel d=180mm, 4000 AVX Chip capacito Kemet SMD catalog	3000pcs / K=paper, d=180mm, 400 pcs / T=reel d=330mm, 12000pcs rs 95 (6T9503TYA2651E) pag g F-3102 page31
Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic co Murata Chip products AVX: CM 21 CG 101 K	6 page 19 er cap 94 page 14 6 (K01E-21) 95 page 3 50 A T/L K 5 G A C	(2) P=plastic, d=180mm, 3 (3) L=reel d=180mm, 4000 AVX Chip capacito Kemet SMD catalog	1000pcs / K=paper, d=180mm, 4000 1pcs / T=reel d=330mm, 12000pcs 1rs 95 (6T9503TYA2651E) pag 1g F-3102 page31 1g que 95 (HEC-001C) page 1

Mechanics / Hilkka Saar			
KONE Corpor			
. Department/Handled by/fax	x/tel		2. Date
IAT / ATO Nieminen / 3			14.1.1997
. KONE material number 264686	4. Document data	EC0838	
. Description (max 40, for SAF	R/3), includes both description	on and specification	
o. Description (max 30, for EDN Chip-ker, kond. / Chip (7. Specification (max 30 50V-220pF-10%-NPC	
s. Additional specification (m	ax 32)		9. KONE recommendation class
			1 = Standard X
10. Material group	11. Basic material	12. Industry standard	2 = Special 3 = Not in new designs
13. Base unit of measure	14. Net weight n.5	15. Gross weight n.5	16. Unit of weight
17. Manufacturer (max 30)	Type (max 30)	Testing status*	Note
Philips	2222 861 1/7 6 221	Α	1/7=Packaging (1)
Rohm	MCH21 5 A 221 K P/K	A	COG=NP0; P/K=Packaging (2)
Vitramon	VJ0805 A 221 K X A L/T M	Α	L/T=Packaging (3)
Murata	GRM40 COG 221 J 50 PT	Α	C0G=NP0
*Testing status:	A = chosen by databook, i B = functional test	not tested type test D = life test	
18. More information	. 21	(1) 1-rookd=180mm 4000r	ocs / 7: reel:d=330mm, 10000pcs
Philips PA06 1996 page			ocs / 7: reel:d=330mm, 10000pcs 000pcs / K=paper, d=180mm, 4000pc
Philips PA06 1996 page Rohm Capacitors 95-9	6 page 19	(2) P=plastic, d=180mm, 30	
Philips PA06 1996 page	6 page 19 er cap 94 page 14	(2) P=plastic, d=180mm, 30	000pcs / K=paper, d=180mm, 4000pc
Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic c Murata Chip products	6 page 19 er cap 94 page 14 (K01E-21) 95 page 3	(2) P=plastic, d=180mm, 30 (3) L=reel d=180mm, 4000p	000pcs / K=paper, d=180mm, 4000pc ocs / T=reel d=330mm, 12000pcs
Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic c Murata Chip products AVX: CM 21 CG 221 K	6 page 19 er cap 94 page 14 (K01E-21) 95 page 3 50 A T/L	(2) P=plastic, d=180mm, 30 (3) L=reel d=180mm, 4000p	000pcs / K=paper, d=180mm, 4000pc ocs / T=reel d=330mm, 12000pcs s 95 (6T9503TYA2651E) page
Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic c Murata Chip products	6 page 19 er cap 94 page 14 (K01E-21) 95 page 3 50 A T/L (5 G A C	(2) P=plastic, d=180mm, 30 (3) L=reel d=180mm, 4000p AVX Chip capacitors Kemet SMD catalog	000pcs / K=paper, d=180mm, 4000pc ocs / T=reel d=330mm, 12000pcs s 95 (6T9503TYA2651E) page 7

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KONE Corpor					
. Department/Handled by/fa: HAT / ATO Nieminen / 3				2. Date 14.1.199	97
. KONE material number 264687	4. Document data	EC 0838			
	P R/3), includes both description	on and specification			
5. Description (max 30, for EDI Chip-ker. kond. / Chip		7. Specification (max 50V-470pF-10%-N			
3. Additional specification (m	ax 32)			9. KONE recommendation	
10. Material group	11. Basic material	12. Industry standard		1 = Standard 2 = Special 3 = Not in new designs	X
13. Base unit of measure PC	14. Net weight n.5	15. Gross weight n.5		16. Unit of weight mg	
	1 1		No		
рс	n.5	n.5		mg	
pc 17. Manufacturer (max 30)	1ype (max 30)	n.5 Testing status*	1/ C	mg /7=Packaging (1) 0G=NP0; P/K=Packaging	(2)
Philips	n.5 Type (max 30) 2222 4747-861 1/7 6 471 MCH21 5 A 471 K P/K VJ0805 A 471 K X A L/T M	Testing status* A A	1/ C	mg /7=Packaging (1) OG=NP0; P/K=Packaging /T=Packaging (3)	(2)
Philips Rohm	Type (max 30) 2323 4747-861 1/7 6 471 MCH21 5 A 471 K P/K VJ0805 A 471 K X A L/T M GRM40 COG 471 J 50 PT A = chosen by databook, i	n.5 Testing status* A A A	1/ C	mg /7=Packaging (1) 0G=NP0; P/K=Packaging	(2)
Philips Rohm Vitramon Murata	n.5 Type (max 30) 2323 4747-861 1/7 6 471 MCH21 5 A 471 K P/K VJ0805 A 471 K X A L/T M GRM40 COG 471 J 50 PT A = chosen by databook, 1 B = functional test C = 1	Testing status* A A A A A Inot tested type test D = life test (1) 1: reel:d=180mm, 40	1// C L/ C	mg 7=Packaging (1) 0G=NP0; P/K=Packaging T=Packaging (3) 0G=NP0 7: reel:d=330mm, 10000pc	cs
Philips Rohm Vitramon Murata *Testing status:	Type (max 30) 2323 4747-861 1/7 6 471 MCH21 5 A 471 K P/K VJ0805 A 471 K X A L/T M GRM40 COG 471 J 50 PT A = chosen by databook, I B = functional test	Testing status* A A A A A (1) 1: reel:d=180mm, 40 (2) P=plastic, d=180mm	1// C L/ C	mg 7=Packaging (1) 0G=NP0; P/K=Packaging T=Packaging (3) 0G=NP0	es 4000p
Philips Rohm Vitramon Murata *Testing status: 18. More information Philips PA06 1996 page Rohm Capacitors 95-9	n.5 Type (max 30) 2222 4747-861 1/7 6 471 MCH21 5 A 471 K P/K VJ0805 A 471 K X A L/T M GRM40 COG 471 J 50 PT A = chosen by databook, I B = functional test	Testing status* A A A A A Inot tested hype test D = life test (1) 1: reel:d=180mm, 40 (2) P=plastic, d=180mm, 40 (3) L=reel d=180mm, 40	1/ CC L/ CO 000pcs /	mg 7=Packaging (1) 0G=NP0; P/K=Packaging 7=Packaging (3) 0G=NP0 7: reel:d=330mm, 10000pc cs / K=paper, d=180mm, 4 T=reel d=330mm, 12000pc	cs 4000p
Philips Rohm Vitramon Murata *Testing status: 18. More information Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic of Murata Chip products AVX: CM 21 CG 471 K	Type (max 30) 2323 4747-861 1/7 6 471 MCH21 5 A 471 K P/K VJ0805 A 471 K X A L/T M GRM40 COG 471 J 50 PT A = chosen by databook, I B = functional test	In.5 Testing status* A A A A A Inot tested hype test D = life test (1) 1: reel:d=180mm, 40 (2) P=plastic, d=180mm, 40 (3) L=reel d=180mm, 40 AVX Chip capacit Kemet SMD catalogue	1/ C L/ C 000pcs / 000pcs / tors 95	mg 7=Packaging (1) 0G=NP0; P/K=Packaging 7=Packaging (3) 0G=NP0 7: reel:d=330mm, 10000pc cs / K=paper, d=180mm, 4 T=reel d=330mm, 12000pc (6T9503TYA2651E) p 102 page31	es 4000p es
Philips Rohm Vitramon Murata *Testing status: 18. More information Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic c Murata Chip products	Type (max 30) 2323 4747-861 1/7 6 471 MCH21 5 A 471 K P/K VJ0805 A 471 K X A L/T M GRM40 COG 471 J 50 PT A = chosen by databook, I B = functional test	In.5 Testing status* A A A A A Inot tested hype test D = life test (1) 1: reel:d=180mm, 40 (2) P=plastic, d=180mm, 40 (3) L=reel d=180mm, 40 AVX Chip capacit Kemet SMD catalogue	1// C L/ C 000pcs / 000pcs / tors 95 og F-3	mg 7=Packaging (1) 0G=NP0; P/K=Packaging 7=Packaging (3) 0G=NP0 7: reel:d=330mm, 10000pc cs / K=paper, d=180mm, 4 T=reel d=330mm, 12000pc (6T9503TYA2651E) p 102 page31 95 (HEC-001C) page	es 4000p es

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CONE Corp	oration		
EPORT FOR NEW MA	TERIAL		•
. Department/Handled by	//tax/tel		2. Date 14.1.1997
IAT / ATO Nieminen	/ 3183 / 3215		14.1.1777
. KONE material number	4. Document data	EC0838	
264688		EC0838	
	and the least the description	n and specification	
. Description (max 40, for	SAP R/3), includes both description	if and specimentics.	
. Description (max 30, for	EDMS)	7. Specification (max 30), for EDMS)
Chip-ker, kond. / Ch	ip cer capacitor	50V-1nF-10%-NP0-0	0805
10. 11.	(m. m. 20)		9. KONE recommendation
 Additional specification 	i (max 32)		class
			1 = Standard X
10. Material group	11. Basic material	12. Industry standard	2 = Special
			3 = Not in new designs
	14. Net weight	15. Gross weight	16. Unit of weight
13. Base unit of measure PC	n.5	n.5	mg
PC			
17. Manufacturer (max 30		Testing status*	Note
Philips	222 3 4747 861 1/7 6 102	Α	1/7=Packaging (1)
7 Thinps	MCH21 5 A 102 K P/K	A	C0G=NP0; P/K=Packaging (2)
	MCH219A 102 KT/K		L/T=Packaging (3)
Rohm		A	Ly 1 dokagin ig (1)
Rohm Vitramon	VJ0805 A 102 K X A L/T M		COC-NDO
	GRM40 C0G 102 J 50 PT	A	COG=NP0
Vitramon	GRM40 C0G 102 J 50 PT A = chosen by databook, n	A not tested	COG=NP0
Vitramon Murata	GRM40 C0G 102 J 50 PT A = chosen by databook, n	A not tested	COG=NP0
Vitramon Murata *Testing status:	GRM40 C0G 102 J 50 PT A = chosen by databook, n	A not tested ype test D = life test	
Vitramon Murata *Testing status: 18. More information	GRM40 COG 102 J 50 PT A = chosen by databook, n B = functional test	A not tested type test D = life test (1) 1: reel:d=180mm, 4000	pcs / 7: reel:d=330mm, 10000pcs
Vitramon Murata *Testing status:	GRM40 COG 102 J 50 PT A = chosen by databook, n B = functional test	A not tested ype test D = life test (1) 1: reel:d=180mm, 4000 (2) P=plastic, d=180mm, 3	pcs / 7: reel:d=330mm, 10000pcs 3000pcs / K=paper, d=180mm, 4000p
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 p. Rohm Capacitors S Vitramon monolith	GRM40 COG 102 J 50 PT A = chosen by databook, n B = functional test	A not tested ype test D = life test (1) 1: reel:d=180mm, 4000 (2) P=plastic, d=180mm, 3	pcs / 7: reel:d=330mm, 10000pcs
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 p. Rohm Capacitors S Vitramon monolith	GRM40 COG 102 J 50 PT A = chosen by databook, n B = functional test	A not tested ype test D = life test (1) 1: reel:d=180mm, 4000 (2) P=plastic, d=180mm, 3	pcs / 7: reel:d=330mm, 10000pcs 3000pcs / K=paper, d=180mm, 4000p
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 por Rohm Capacitors Solution Vitramon monolithic Murata Chip produces	GRM40 COG 102 J 50 PT A = chosen by databook, n B = functional test	A not tested ype test	pcs / 7: reel:d=330mm, 10000pcs 3000pcs / K=paper, d=180mm, 4000p 3pcs / T=reel d=330mm, 12000pcs
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 por Rohm Capacitors Solution Vitramon monolithic Murata Chip productions AVX: CM 21 CG 10	GRM40 COG 102 J 50 PT A = chosen by databook, n B = functional test	A not tested type test D = life test (1) 1: reel:d=180mm, 4000 (2) P=plastic, d=180mm, 4000 (3) L=reel d=180mm, 4000 AVX Chip capacito	pcs / 7; reel:d=330mm, 10000pcs 3000pcs / K=paper, d=180mm, 4000p pcs / T=reel d=330mm, 12000pcs rs 95 (6T9503TYA2651E) page
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 por Rohm Capacitors Sovitramon monolithic Murata Chip produced AVX: CM 21 CG 10 Kemet: C 0805 C 1	GRM40 COG 102 J 50 PT A = chosen by databook, not be a functional test	A not tested ype test D = life test (1) 1: reel:d=180mm, 4000 (2) P=plastic, d=180mm, 3 (3) L=reel d=180mm, 4000 AVX Chip capacito Kemet SMD catalog	pcs / 7: reel:d=330mm, 10000pcs 3000pcs / K=paper, d=180mm, 4000p 3pcs / T=reel d=330mm, 12000pcs 3rs 95 (6T9503TYA2651E) page 3rs 7s page31
Murata *Testing status: 18. More information Philips PA06 1996 por Rohm Capacitors 9 Vitramon monolithi Murata Chip productions AVX: CM 21 CG 10	GRM40 COG 102 J 50 PT A = chosen by databook, n B = functional test	A not tested ype test D = life test (1) 1: reel:d=180mm, 4000 (2) P=plastic, d=180mm, 3 (3) L=reel d=180mm, 4000 AVX Chip capacito Kemet SMD catalog	pcs / 7: reel:d=330mm, 10000pcs 3000pcs / K=paper, d=180mm, 4000p 3pcs / T=reel d=330mm, 12000pcs rs 95 (6T9503TYA2651E) page g F-3102 page31 que 95 (HEC-001C) page 1.1

KONE Corpor		44 tel +358-(0)20475			
EPORT FOR NEW MATER					
Department/Handled by/fax			2. Date 14.1.19	97	
AT / ATO Nieminen / 3	100 / 3210				
. KONE material number	4. Document data	EC0838			
264689		7000-			
. Description (max 40, for SAF	R/3), includes both descripti	on and specification			
. Description (max 40; for 67)	10,00,1				
5. Description (max 30, for EDM		7. Specification (max 30 50V-1,5nF-10%-X7R			
Chip-ker. kond. / Chip o	cer capaciloi	1004-1,0111 1070 7011			
B. Additional specification (m	ax 32)		9. KONE recommendati	on	
			class 1 = Standard	- x	
	11. Basic material	12. Industry standard	2 = Special		
10. Material group	11. Basic material	12. madshy sidhadid	3 = Not in new designs		
13. Base unit of measure	14. Net weight	15. Gross weight	16. Unit of weight		
pc	n.5	n.5	Img		
17. Manufacturer (max 30)	Type (max 30)	Testing status*	Note		
Philips	2222 580 6 6 6 16	A	X=Packaging (1)		
	MCH21 5 C 152 K	A	P/K=Packaging (2)		
Rohm			L/T=Packaging (3)		
Vitramon	VJ0805 Y 152 K X A	A	L/1-i dekaging (e)		
Murata	GRM40 X7R 152 K 50	A	·		
*Testing status:	A = chosen by databook, B = functional test	type test D = life test			
18. More information			oo (V 7l.d 220mm 10	0000000	
Philips PA06 1996 page			00pcs / X=7; reel:d=330mm, 10		
Rohm Capacitors 95-9		(2) P=plastic, d=180mm, 3000pcs / K=paper, d=180mm, 4000pcs (3) L=reel d=180mm, 4000pcs / T=reel d=330mm, 12000pcs			
Vitramon monolithic c		(3) L=reel d=180mm, 4000	pcs / 1-1991 d-00011111, 12000p		
Murata Chip products	(KUTE-21) 95 page 3				
AVX: CM 21 X7R 152 K	50 A 👼	AVX Chip capacito	rs 95 (6T9503TYA2651E) p	oage/	
		Kemet SMD catalog	g F-3102 page31		
	CORAC	TDK Product catalogue 95 (HEC-001C) page 1.1			
Kemet: C 0805 C 152 k				<u>je 1.1</u>	
	2 K T	Syfer cer cap 96 pa			

CONE Corpoi			
. Department/Handled by/fa	x/tel		2. Date
AAT / ATO Nieminen / 3			14.1.1997
. KONE material number 264698	4. Document data	EC 0838	
5. Description (max 40, for SAF	R/3), includes both descript	ion and specification	
5. Description (max 30, for EDI Chip-ker, kond. / Chip		7. Specification (max 30 50V-2,2nF-10%-X7R-	
O Additional analytication (av 32)		9. KONE recommendation
3. Additional specification (m	UA 92)		class
			1 = Standard X
10. Material group	11. Basic material	12. Industry standard	2 = Special 3 = Not in new designs
13. Base unit of measure	14. Net weight	15. Gross weight	16. Unit of weight
рс	n.5	n.5	[mg
17. Manufacturer (max 30)	Type (max 30)	Testing status*	Note
	2222 580 1/ 8 6 6 18	A	X=Packaging (1)
Philips			
Rohm	MCH21 5 C 222 K P/K	Α	P/K=Packaging (2)
Vitramon	VJ0805 Y 222 K X A L/T	A	L/T=Packaging (3)
Murata	GRM40 X7R 222 K 50 PT	A	
*Testing status:	A = chosen by databook, B = functional test	not tested type test D = life test	
18. More information	40.54	(1) V. 1	00pcs / X=7; reel:d=330mm, 10000pcs
Philips PA06 1996 page			000pcs / K=paper, d=180mm, 4000pcs
Rohm Capacitors 95-96 Vitramon monolithic co			ocs / T=reel d=330mm, 12000pcs
Murata Chip products		(0) L-1001 Q-10011111, 4000F	,
marara criip producis	(No IL ZI) 70 page 0		•
AVX: CM 21 X7R 222 K	50 A T/L	AVX Chip capacitors	s 95 (6T9503TYA2651E) page X
Kemet: C 0805 C 222 K		Kemet SMD catalog	
			que 95 (HEC-001C) page 1.1
ITDK: C2012 X7R 1H 222			
TDK: C2012 X7R 1H 222 Syfer: 0805 J 050 0222 F		Syfer cer cap 96 pag	ge 13, 33

		44 tel +358-(0)204753	
CONE Corpoi			
. Department/Handled by/fa	x/tel		2. Date
IAT / ATO Nieminen / 3	183 / 3215		14.1.1997
. KONE material number 26469/	4. Document data	EC 0838	
. Description (max 40, for SA	P R/3), includes both description	on and specification	
i, Description (max 30, for EDI Chip-ker, kond. / Chip	мs) cer capacitor	7. Specification (max 30, 50V-4,7nF-10%-X7R-(
3. Additional specification (m	ax 32)		KONE recommendation class
10. Material group	11. Basic material	12. Industry standard	1 = Standard > 2 = Special
3			3 = Not in new designs
13. Base unit of measure PC	14. Net weight n.5	15. Gross weight n.5	16. Unit of weight mg
17. Manufacturer (max 30)	Type (max 30)	Testing status*	Note
	2222 580 1/\$ 6 6 23	A	X=Packaging (1)
Philips	MCH21 5 C 472 K P/K	A	P/K=Packaging (2)
Rohm			L/T=Packaging (3)
Rohm Vitramon	VJ0805 Y 472 K X A L/T	Α	L/1=1 dekaging te/
Vitramon	VJ0805 Y 472 K X A L/T GRM40 X7R 472 K 50 PT	A A	t/1-i dekaging to/
	GRM40 X7R 472 K 50 PT A = chosen by databook,	A	L) dekagii g (o)
Vitramon Murata *Testing status: 18. More information	GRM40 X7R 472 K 50 PT A = chosen by databook, B = functional test C =	A not tested type test D = life test	
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 page	GRM40 X7R 472 K 50 PT A = chosen by databook, B = functional test	A not tested type test D = life test (1) X=1; reel:d=180mm, 400	0pcs / X=7; reel:d=330mm, 10000p
Vitramon Murata *Testing status: 18. More information Phillips PA06 1996 page Rohm Capacitors 95-9	GRM40 X7R 472 K 50 PT A = chosen by databook, B = functional test	A not tested type test D = life test (1) X=1; reel:d=180mm, 400 (2) P=plastic, d=180mm, 30	
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 page	GRM40 X7R 472 K 50 PT A = chosen by databook, B = functional test	A not tested type test D = life test (1) X=1; reel:d=180mm, 400 (2) P=plastic, d=180mm, 30	Opcs / X=7; reel:d=330mm, 10000p 00pcs / K=paper, d=180mm, 4000p
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic of Murata Chip products	GRM40 X7R 472 K 50 PT A = chosen by databook, B = functional test	A not tested type test	Opcs / X=7; reel:d=330mm, 10000p 00pcs / K=paper, d=180mm, 4000p cs / T=reel d=330mm, 12000pcs
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic of Murata Chip products AVX: CM 21 X7R 472 k	GRM40 X7R 472 K 50 PT A = chosen by databook, B = functional test	not tested type test D = life test (1) X=1; reel:d=180mm, 400 (2) P=plastic, d=180mm, 30 (3) L=reel d=180mm, 4000p	Opcs / X=7; reel:d=330mm, 10000p 00pcs / K=paper, d=180mm, 4000p cs / T=reel d=330mm, 12000pcs 5 95 (6T9503TYA2651E) page
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic of Murata Chip product: AVX: CM 21 X7R 472 k Kemet: C 0805 C 472	GRM40 X7R 472 K 50 PT A = chosen by databook, B = functional test	not tested type test D = life test (1) X=1; reel:d=180mm, 4000 (2) P=plastic, d=180mm, 30 (3) L=reel d=180mm, 4000p AVX Chip capacitors Kemet SMD catalog	Opcs / X=7; reel:d=330mm, 10000p 00pcs / K=paper, d=180mm, 4000p cs / T=reel d=330mm, 12000pcs 3 95 (6T9503TYA2651E) page F-3102 page31
Vitramon Murata *Testing status: 18. More information Philips PA06 1996 page Rohm Capacitors 95-9 Vitramon monolithic of Murata Chip products AVX: CM 21 X7R 472 k	GRM40 X7R 472 K 50 PT A = chosen by databook, B = functional test	not tested type test D = life test (1) X=1; reel:d=180mm, 4000 (2) P=plastic, d=180mm, 30 (3) L=reel d=180mm, 4000p AVX Chip capacitors Kemet SMD catalog	Opcs / X=7; reel:d=330mm, 10000p 00pcs / K=paper, d=180mm, 4000p cs / T=reel d=330mm, 12000pcs 5 95 (6T9503TYA2651E) page F-3102 page31 ue 95 (HEC-001C) page 1.

ONE Corpoi			
Department/Handled by/fa	x/tel		2. Date
AT / ATO Nieminen / 3	183 / 3215		14.1.1997
KONE material number 264692	4. Document data	EC 0838	
. Description (max 40, for SA	P R/3), includes both descripti	on and specification	
. Description (max 30, for ED Chip-ker. kond. / Chip	мs) cer capacitor	7. Specification (max 30 50V-10nF-10%-X7R-	
3. Additional specification (max 32)			9. KONE recommendation class 1 = Standard X
		12. Industry standard	1 = Standard X 2 = Special
0. Material group	11. Basic material	72. Industry standard	3 = Not in new designs
3. Base unit of measure	14. Net weight n.5	15. Gross weight n.5	16. Unit of weight mg
17. Manufacturer (max 30)	Type (max 30)	Testing status*	Note
	2222 580 1/6 6 6 27	A	X=Packaging (1)
Philips	MCH21 5 C 103 K P/K	A	P/K=Packaging (2)
Rohm			L/T=Packaging (3)
Vitramon	VJ0805 Y 103 K X A L/T	A	L) I = I dokaging (s)
Murata	GRM40 X7R 103 K 50 PT A = chosen by databook,	A not tested	
*Testing status:		type test D = life test	
18. More information			1000 1000 1000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000
Philips PA06 1996 pag			000pcs / X=7; reel:d=330mm, 10000pcs 0000pcs / K=paper, d=180mm, 4000pc
Rohm Capacitors 95-9			pcs / T=reel d±330mm, 12000pcs
Vitramon monolithic o	s (K01E-21) 95 page 3	(5) 2 1001 4 10011111	
Ividiala Chip product	V (
AVX: CM 21 X7R 103 k	< 50 A T/L		rs 95 (6T9503TYA2651E) page/
Kemet: C 0805 C 103	K 5 R A C	Kemet SMD catalog	y F-3102 page31
TDK: C2012 X7R 1H 10		TDK Product catalo	que 95 (HEC-001C) page 1.1
Syfer: 0805 J 050 0103	K X T/R	Syfer cer cap 96 pc	mponents 96; 5 page 7

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Department/Handled by/fa	v /tel		2. Date
AT / ATO Nieminen / 3	183 / 3215		14.1.1997
KONE material number 264693	4. Document data	EC 0838	
Description (max 40, for SA	P R/3), includes both description	on and specification	
. Description (max 30, for EDI Chip-ker. kond. / Chip	MS)	7. Specification (max 3 0 50V-22nF-10%-X7R-	0, for EDMS) -0805
s. Additional specification (m			9. KONE recommendation
			1 = Standard X
10. Material group	11. Basic material	12. Industry standard	2 = Special 3 = Not in new designs
13. Base unit of measure	14. Net weight n.5	15. Gross weight n.5	16. Unit of weight mg
рс			1,
17. Manufacturer (max 30)	Type (max 30)	Testing status*	Note
Philips	2222 580 1/\$ 6 6 32	A	X=Packaging (1)
Rohm	MCH21 5 C 223 K P/K	Α	P/K=Packaging (2)
	VJ0805 Y 223 K X A L/T	Α	L/T=Packaging (3)
Vitramon	GRM40 X7R 223 K 50 PT	Α	
Murata *Testing status:	A = chosen by databook,		
18. More information			
Philips PA06 1996 pag	je 48,54	(1) X=1; reel:d=180mm, 40	000pcs / X=7; reel:d=330mm, 10000pc
Rohm Capacitors 95-	96 page 19	(2) P=plastic, d=180mm,	3000pcs / K=paper, d=180mm, 4000p
Vitramon monolithic	cer cap 94 page 15	(3) L=reel d=180mm, 4000	Opcs / T=reel d=330mm, 12000pcs
Murata Chip product	ts (K01E-21) 95 page 3		
AVX: CM 21 X7R 223 I	K 50 A T/L	AVX Chip capacito	ors 95 (6T9503TYA2651E) page
Kemet: C 0805 C 223		Kemet SMD catalog	g F-3102 page31
INCHIEN - 0000		TDK Product catalo	oque 95 (HEC-001C) page 1.1
	23 K I		
TDK: C2012 X7R 1H 22 Syfer: 0805 J 050 0223		Syfer cer cap 96 pc	age 13, 33 omponents 96; 5 page 7

ONE Corpor	ation		
PORT FOR NEW MATER	IAL		
Department/Handled by/fax	r/tel		2. Date
AT / ATO Nieminen / 3	183 / 3215		14.1.1997
KONE material number	4. Document data	EC 0838	
264694			
	(a) to the description	on and specification	
Description (max 40, for SAF	R/3), includes both description	on and speciments.	
Description (max 30, for EDM	MS)	7. Specification (max 30,	, for EDMS)
hip-ker. kond. / Chip	cer capacitor	50V-47nF-10%-X7R-0	0805
			- VONE
Additional specification (m	ax 32)		9. KONE recommendation class
			1 = Standard X
	and the second of the second o	12. Industry standard	2 = Special
). Material group	11. Basic material	12. madsily standard	3 = Not in new designs
3. Base unit of measure	14. Net weight	15. Gross weight	16. Unit of weight
OC	n.5	n.5	mg
			Note
7. Manufacturer (max 30)	Type (max 30)	Testing status*	Note
hilips	2222 580 1/\$ 6 6 36	Α	X=Packaging (1)
	MCH21 5 C 473 K P/K	Α	P/K=Packaging (2)
lohm			L/T=Packaging (3)
/itramon	VJ0805 Y 473 K X A L/T	A	L/1-i dekagii ig (e)
Murata	GRM40 X7R 473 K 50 PT	A	
Testing status:	A = chosen by databook,		
	B = functional test C =	type test D = life test	
18. More information	~ 10 F1	(1) X=1: reel:d=180mm, 40	00pcs / X=7; reel:d=330mm, 10000pcs
Philips PA06 1996 page		(2) P=plastic, d=180mm, 3	000pcs / K=paper, d=180mm, 4000pcs
Rohm Capacitors 95-9 Vitramon monolithic c	cor cap 94 page 15		pcs / T=reel d=330mm, 12000pcs
Murata Chip product	(KN1F-21) 95 page 3		
Muraia Chip piodaen	3 (1012 21) 70 10 00		
AVX: CM 21 X7R 473 k	(50 A T/I	AVX Chip capacito	rs 95 (6T9503TYA2651E) page <i>A</i>
Kemet: C 0805 C 473		Kemet SMD catalog	F-3102 page31
TDK: C2012 X7R 1H 47		TDK Product catalog	que 95 (HEC-001C) page 1.1
		Syfer cer cap 96 pa	
Syfer: 0805 J 050 0473	K A I/K		

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EPORT FOR NEW MATE	RIAL 		
. Department/Handled by/fa	nx/tel		2. Date
AT / ATO Nieminen / 3	3183 / 3215		14.1.1997
. KONE material number	4. Document data	EC 0838	
264695		2000	
Description (max 40, for SA	.P R/3), includes both description	on and specification	
. Description (max representation)			2 4 FD146\
Description (max 30, for ED	MS)	7. Specification (max 30 50V-100nF-10%-X70	
Chip-ker. kond. / Chip	cer capacitor		
3. Additional specification (n	nax 32)		9. KONE recommendation
			class 1 = Standard X
	11. Basic material	12. Industry standard	2 = Special
10. Material group	11. Busic filaterias	,	3 = Not in new designs
	_	lu oiah	16. Unit of weight
13. Base unit of measure	14. Net weight n.5	15. Gross weight	mg
pc	11.0		
17. Manufacturer (max 30)	Type (max 30)	Testing status*	Note
Philips	2222 580 1/\$ 6 6 41	A	X=Packaging (1)
Rohm	MCH21 5 C 104 K P/K	Ei ole saatavilla !!!	P/K=Packaging (2)
Vitramon	VJ0805 Y 104 K X A L/T	Α	L/T=Packaging (3)
	GRM40 X7R 104 K 50 PT	Ei ole saatavilla !!!	
Murata *Testing status:	A = chosen by databook,	not tested	
	B = functional test C =	type test D = life test	
18. More information Philips PA06 1996 pag	ue 48.54	(1) X=1; reel:d=180mm, 40	000pcs / X=7; reel:d=330mm, 10000pcs
Rohm Capacitors 95-			3000pcs / K=paper, d=180mm, 4000pc
Vitramon monolithic		(3) L=reel d=180mm, 4000	Opcs / T=reel d=330mm, 12000pcs
	ts (K01E-21) 95 page 3		
			- 05 (4T0503T)/A 2651E) page
AVX: CM 21 X7R 104 I		AVX Chip capacito Kemet SMD catalog	ors 95 (6T9503TYA2651E) page,
Kemet: C 0805 C 104		TDV Product catalog	oque 95 (HEC-001C) page 1.1
TDK: C2012 X7R 1H 10		Syfer cer cap 96 pc	
Syfer: 0805 J 050 0104	+ N ∧ 1/K	0710, 00, 00p 70 pc	enchip components 96; 5 pag

Product specification

FEATURES

- Seven standard sizes
- High capacitance per unit volume
- Supplied in tape on reel or in bulk case (case sizes 0402, 0603 and 0805 only); loose in bag available on request
- For high frequency applications
- NiSn terminations (AgPd on request).

APPLICATIONS

- Consumer electronics
- Telecommunications
- Automotive
- Data processing.

DESCRIPTION

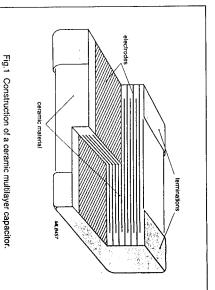
in which a number of interleaved The capacitor consists of a a high capacitance per unit volume. contained. This structure gives rise to precious metal electrodes are rectangular block of ceramic dielectric

covered with a layer of plated tin the two terminations, either by silver The inner electrodes are connected to structure is shown in Fig.1. layer of plated nickel and finally 65 : 35, or silver dipped with a barrier (NiSn). A cross section of the palladium (AgPd) alloy in the ratio

QUICK REFERENCE DATA

DESCRIPTION	VALUE
Rated voltage U _R (DC)	50 V, 100 V, 200 V and 500 V (IEC)
Capacitance range (E12 series);	
note 1:	
general purpose; 50 V; note 2	0.47 pF to 10000 pF
general purpose; 100 V	0.47 pF to 4700 pF
narrow tolerance; 50 V	0.47 pF to 3300 pF
high voltage; 200 V	10 pF to 1500 pF
high voltage; 500 V	10 pF to 1000 pF
Tolerance on capacitance:	
C ≥ 10 pF	±10%, ±5%, ±2% and ±1%
C < 10 pF	±0.5 pF, ±0.25 pF and ±0.1 pF
Test voltage (DC) for 1 minute:	
50 V and 100 V	2.5 × ∪ _R
200 V	3×U _R
500 V	2×U _R
Sectional specifications	IEC 384-10, second edition 1989-04; also based on CECC 32 100
Detailed specification	based on CECC 32 101-801
Climatic category (IEC 68)	55/125/56

- Notes 1. Other values below 10 pF and non E12 series are available on request.
- 2. Also applicable for applications up to 63 V.



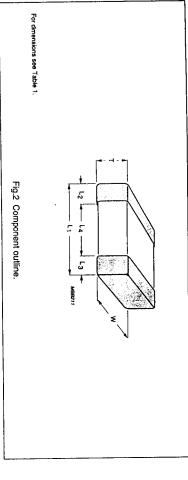
Philips Components

Product specification

multilayer capacitors Surface mounted ceramic

Class 1, NP0

MECHANICAL DATA



Physical dimensions

Table 1 Capacitor dimensions

			_	7	L ₂ and L ₃	nd L ₃	Ľ
CASE SIZE	(mm)	(mm)	MIN.	MAX.	MIN.	MAX. (mm)	MIN. (mm)
2000	1 0 ±0 05	0.5 ±0.05	0.45	0.55	0.15	0.30	0.4
0603	1.6 ±0.1	0.8 ±0.07	0.73	0.87	0.25	0.65	0.4
0805	2.0 ±0.1	1.25 ±0.1	0.51	1.35	0.25	0.75	0.55
1206	3.2 ±0.15	1.6 ±0.15	0.51	1.75	0.25	0.75	1.4
1210	3.2 ±0.2	2.5 ±0.2	0.51	1.8	0.25	0.75	1.4
1812	4.5 ±0.2	3.2 ±0.2	0.51	1.8	0.25	0.75	2.2
2220	5.7 ±0.2	5.0 ±0.2	0.51	1.8	0.25	0.75	2.9

multilayer capacitors Surface mounted ceramic

general purpose series Class 1, NP0 50 V

SELECTION CHART FOR 50 VOLT GENERAL PURPOSE SERIES

10000	8200	6800	5600	4700	3900	3300	2700	2200	1800	1500	1200	1000	820	686	580	470	390	330	270	220	180	158	120	100	82	68	56	47	39	33	27	22	18	15	12	10	8.2	6.8	5.6	4.7	3.9	3.3	2.7	2.2	1.8	1.5	1.2	1.0	0.82	0.68	0.56	0.47		<u> </u>	,
103	822	682	562	472	392	332	272	222	182	152	122	102	821	681	561	471	391	331	271	221	181	151	121	101	829	689	569	479	399	339	279	229	189	159	129	109	828	688	568	478	398	338	278	228	188	158	128	108	827	687	567	477	1210	DIGITS OF	LAST TWO
	Thick	Values in																					10	10	10	10	10	10	10	10	10	10	. 10	10	10	10	70	10	10	10	10	10	10	10	10	10	10	10	5	10	10	10		NiSn	0402
	ness classification	shaded cells indi																				4	4	•	4	4	4	4	4	4	4	4		4	٨	4	•	4	4	4	4	4	4	4	4	4	4	4	•	•		•		NiSn	0603
	"Thickness classification and packaging quantities".	cate thickness cli										2	2	2	2	Α3	-	_	_	-	_	1	-	_		_	_	-	_	- 1	1	1	1		1	1	1	1	1	•	1	1	1		-	1	-	_	-	-	-	-	8 mm TAPE WIDTH	NISIN	0805
	quantities".	assification, see				5	26	26	26	28	1	-	-	-	-	-	-	_	_	_		-	-		_	_	-	_		-	1	1	-	1	1	1	1	1	1	-	1	1	1	_	1	1	_	-	_	-	-	_	Ť	ı	1206
				5	3	3	3	ω	ü	3	3	a distribution	. u	3	3	3	3	3	3	3	ω ω	3	3	3	3	ú	ω	ω																										NISh	1210
_			3	ω	3	3	u	3	a	u	3	4	ω ω	3	u	3	ш	3																																			12 mm TAPE	NES	1812
3	3	s	3	3	3	a	3	w	u	3			3	L C	3			-																			İ					-											APE WIDTH	AgPd	2220

1996 May 03

Philips Components

Surface mounted ceramic

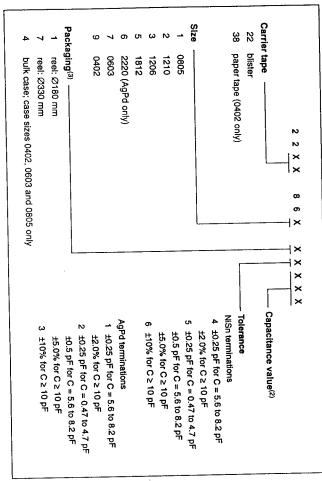
Surface mounted ceramic multilayer capacitors

> general purpose series Class 1, NP0 50 V

Thickness classification and packaging quantities

		1 11045	10 mm TA	DE WINTH	_		
THICKNESS	8 mm TAPE WIDTH	PER REEL	AMOUNT PER REEL	PER REEL	<u> </u>	AMOUNT	m
CLASSIFICATION			Ø180 mm	0 mm			
(mm)	Ø180 mm	Ø330 mm	1812	2220	0402	0603	0805
1 = 0.51 to 0.7	4000	10000	,	ı	-	1	10000
					1	1	ŝ
2 = 0.85 ±0.1	4000	10000	,	,			0000
	3	10000	1	1		,	,
25 = 0.8 to 1.0	4000	10000		1500		•	,
3 = 0.51 to 1.0	4000	10000	2000	1000			ľ
4=08+007	4000	15000	1	-	,	1000	
				,	ı	1	,
5=0.9 to 1.3	3000	8000					
	1000	50000		-	20000	,	

COMPOSITION OF THE ORDERING CODE (12NC); note 1



Notes

- 1. For details of the 15-digit code refer to this handbook, Section "General", Chapter "Composition of the 15-digit code".
- 2. Refer to Chapter "Selection chart for 50 volt general purpose series"
- 3. Amount on reel depends on thickness classification see Chapter "Selection chart for 50 volt general purpose series".

multilayer capacitors

narrow tolerance series Class 1, NP0 50 V

SELECTION CHART FOR 50 VOLT NARROW TOLERANCE SERIES

CC LAST TWO DIGITS NISn NISn NISn NISn NISn 0.47 477 4 3 mm TAPE WIDTH 1 0.65 587 4 1 1 0.68 687 4 1 1 1.1 108 4 1 1 1.1 118 189 4 1 1 1.1 12 128 4 1 1 1 1.1 1.2 128 4 1 1 1 1.1 1.2 128 4 1 1 1 1.1 1.2 128 4 1 1 1 2.7 278 4 4 1 1 1 3.3 388 4 4 1 1 1 4.7 478 4 1 1 1 8.2 48 4 1 1 1 <	5				
LAST TWO DIGIT'S NISn USSn	24	and packaging quantities".	Thickness classification	272	2700
LAST TWO DIGITS NISn UISn	28	ate thickness classification, see	Values in shaded cells indica	222	2200
LAST TWO DIGIT'S NISn USn	2			182	1800
LAST TWO DIGITS NISn B mm TAPE WIDTH 0.47 477 4 1 0.68 587 4 1 1 1.2 128 4 1 1 1.2 128 4 1 1 1.2 228 4 1 1 2.2 228 4 1 1 2.7 278 4 1 1 1.2 128 4 1 1 2.2 228 4 1 1 3.3 398 4 1 1 4.6 588 4 1 1 5.8 589 4 1 1 6.8 589 4 1 1 7.7 479 4 1 1 8.2 159 4 1 1 9.0 151 4 1 1 1.0 121 4 </td <td>8</td> <td></td> <td></td> <td>152</td> <td>1500</td>	8			152	1500
LAST TWO DIGITS NISn B mm TAPE WIDTH 0.47 477 4 1 0.68 567 4 1 1 1.6 687 4 1 1 1.6 10827 4 1 1 1.5 159 4 1 1 1.8 198 4 1 1 2.7 278 4 1 1 4.7 478 4 1 1 4.7 478 4 1 1 4.7 478 4 1 1 5.6 589 4 1 1 6.2 689 4 1 1 6.2 629 4 1 1 6.2 629 4 1 1 7 179 4 1 1 8 189 4 1 1 9 4 1	-			122	1200
LAST TWO DIGITS NISN B mm TAPE WIDTH 0.47 477 4 1 0.68 587 4 1 1.2 128 4 1 1.5 128 4 1 1.5 128 4 1 1.5 128 4 1 1.5 128 4 1 1.5 128 4 1 1.5 128 4 1 1.5 128 4 1 1.5 129 4 1 2.7 278 4 1 4.7 17 1 2.7 28 4 1 3.3 39 4 1 4.7 1 1 1 2.7 28 4 1 1 3.9 4 1 1 4. 1 1 1 5. 128 4 </td <td>-</td> <td>2</td> <td></td> <td>102</td> <td>1000</td>	-	2		102	1000
AST TWO DIGITS	1	2		821	820
LAST IMO DIGITS OF 12NC NISn NISn NISn 0.47 4 1 1 0.68 687 4 1 1 1.5 193 4 1 1 1.5 193 4 1 1 2.7 228 4 1 1 2.7 278 4 1 1 2.7 278 4 1 1 2.7 278 4 1 1 2.7 278 4 1 1 2.7 478 4 1 1 2.7 478 4 1 1 3.3 3.38 4 1 1 2.7 478 4 1 1 3.6 688 4 1 1 4 1 1 1 1 5.6 129 4 1 1 6.8 689	-	2		681	680
LAST IMO DIGITS OF TANC NISn NISn NISn 0.47 477 4 1 0.68 687 4 1 0.68 687 4 1 1.0 108 4 1 1.1 1189 4 1 1.2 128 4 1 1.2 128 4 1 1.2 128 4 1 1.2 128 4 1 1.2 128 4 1 2.7 278 4 1 4 1 1 2.7 278 4 1 4 1 1 1 2.7 278 4 1 1 3.3 38 4 1 1 4. 1 1 1 1 5. 159 4 1 1 6. 1.0 1 1	-	2		561	560
LAST IPWO DIGITS OF 12NC NISn NISn NISn 0.047 477 4 1 1 0.086 6877 4 1 1 0.082 6877 4 1 1 1.0 108 4 1 1 1.2 128 4 1 1 1.2 128 4 1 1 1.2 128 4 1 1 1.2 128 4 1 1 1.2 128 4 1 1 1.2 128 4 1 1 2.7 278 4 1 1 2.7 278 4 1 1 3.3 338 4 1 1 4.7 473 4 1 1 5. 169 4 1 1 6.6 169 4 1 1 7		2		471	470
LAST IMO DIGITS OF 12NC NISn NISn NISn 0.47 4 1 1 0.56 567 4 1 1 0.62 627 4 1 1 1.6 128 4 1 1 1.1 198 4 1 1 1.2 128 4 1 1 1.2 128 4 1 1 1.2 128 4 1 1 1.2 128 4 1 1 2.7 278 4 1 1 2.7 278 4 1 1 2.7 278 4 1 1 3.9 398 4 1 1 4.7 478 4 1 1 4. 1 1 1 1 5. 159 4 1 1 6.6 589				391	390
LAST TWO DIGITS NISn	-			33	330
LASTIWO DIGITS OF T2NC OF 12NC OF 12		•			200
LASTTWO DIGITS NISn	4			271	270
LAST TWO DIGITS NISn	1	1		227	990
LASTIWO DIGITS OF T2NC OF 12NC OF 12	1	-		181	180
LASTTWO DIGITS NISn	_	-	4	151	150
LAST TWO DIGITS NISn NISn NISn NISn ONSn OUSn A TI	1	1	4	121	120
LASTIWO DIGITS OF T2NC OF 12NC OF 12	-	_	٨	101	100
LAST TWO DIGITS OF T2NC OF 12NC OF 1	-	_		829	83
LAST TWO DIGITS OF 12NC OF 12NC 8 mm TAPE WIDTH 0.47 4 1 1 1 0.88 687 4 4 1 1 1 0.82 827 4 4 1 1 1 1.0 1.0 1.0 1.0 1.0 1.0 1	-	1	*	689	68
LAST TWO DIGITS OF 12NC 8 mm TAPE WIDTH 0.47 477 4 1 1 0.88 887 4 1 1 1.0 1.10 1.12 1.2 1.2 1.2 1.2	-			369	æ
LAST TWO DIGITS OF T2NC OF 12NC OF 1				1/8	*
LAST TWO DIGITS OF 12NC OF 1				330	
LAST TWO DIGITS OF 12NC OF 1	-	-	•	388	30 :
LAST TWO DIGITS OF 12NC OF 1	-	-1	*	339	33
LAST TWO DIGITS NISn NISn NISn 0.47 4.77 4 1 0.56 587 4 1 1 0.68 687 4 1 1 1.0 108 4 1 1 1.2 128 4 1 1 1.5 159 4 1 1 2.2 228 4 1 1 2.7 278 4 1 1 2.7 278 4 1 1 2.7 338 4 1 1 2.7 478 4 1 1 3.3 338 4 1 1 4.7 478 4 1 1 4.7 478 4 1 1 5.6 588 4 1 1 6.8 689 4 1 1 7 159	1.0%	1	4	279	27
LASTTWO DIGITS OF 12NC OF 12	_	1	4	229	22
LAST TWO DIGITS OF 12NC OF 1	_	1	4	189	18
LAST TWO DIGITS OF 12NC OF 1	-	_	4	159	15
LAST TWO DIGITS OF 12NC OF 1	-	-	4	129	12
LAST TWO DIGITS OF 12NC 0 8 mm TAPE WIDTH 0.47 4 1 1 1 0.86 687 4 1 1 1 0.82 687 4 1 1 1 1 1 1 1 1 1 1 1 1 2 1 128 4 1 1 1 1 2 1 128 4 1 1 1 1 2 2 28 4 1 1 8 2 28 4 1 1 9 3 3 338 4 1 3 3 338 4 1 3 3 338 4 1 5 6 568 688 4 1 1 1 1 1 3 3 388 4 1 1 1 3 3 388 4 1 1 1 3 3 388 4 1 5 6 6 688 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-			103	10
LAST TWO DIGITS OF 12NC 8 mm TAPE WIDTH 8 mm TAPE WIDTH 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		4		100	
LAST TWO DIGITS OF 12NC 8 mm TAPE WIDTH 0.47 4 1 1 1 0.88 687 4 1 1 1 1.0 1.10 1.12 1.2 1.2 1.2 1.2	-	1	4	808	80 5
LAST TWO DIGITS OF 12NC OF 12NC 8 mm TAPE WIDTH 0.47 4 1 0.86 687 4 1 1 1 0.82 687 4 1 1 1 1.0 1.0 1.0 1.0 1.0 1.0 1	_	1	4	688	6.8
LAST TWO DIGITS NISn NISn NISn 0.47 4 1 1 0.56 587 4 1 1 0.68 687 4 1 1 0.02 827 4 1 1 1.0 108 4 1 1 1.2 128 4 1 1 1.5 158 4 1 1 2.2 228 4 1 1 2.7 278 4 1 1 3.3 3.98 4 1 1 4.7 4.78 4 1 1	1	1	4	568	5.6
LAST TWO DIGITS OF 12NC OF 1	-	1	4	478	4.7
LAST TWO DIGITS OF 12NC OF 1	-	1	4	398	3.9
LAST TWO DIGITS OF 12NC OF 12NC NISn N			•	338	3.3
LAST TWO DIGITS NISn NISn NISn 0.47 4 1 1 0.56 887 4 1 1 0.82 827 4 1 1 0.82 827 4 1 1 1.0 108 4 1 1 1.2 128 4 1 1 1.5 158 4 1 1 1.8 188 4 1 1 2.2 228 4 1 1	_	_	4	278	2.7
LAST TWO DIGITS OF 12NC OF 12NC 0 mm TAPE WIDTH 0.47 4 1 0.88 687 4 1 0.82 627 4 1 1 1 1.5 1.8 1.8 1.8 1.8 1.8 1.8 1.	_		*	228	2.2
LAST TWO DIGITS OF 12NC OF 12NC NISN N			4	188	1.8
LAST TWO DIGITS OF 12NC OF 12NC NISn N	-			8	.5
LAST TWO DIGITS OF 12NC 0 ann TAPE WIDTH 0.47 477 4 1 0.56 567 4 1 0.68 687 4 1 0.68 687 4 1 1 0 1 0 1 0 1 0 1 0 1 0 1 0				150	
LAST TWO DIGITS OF 12NC 8 mm TAPE WIDTH 0.47 0.47 0.55 0.56 0.68 0.87 4 1 0.082 0.827 4 1 0.82 0.827 4 1 0.83 0.84 0.85 1 0.85 0.85 1 0.85 0.85 1 0.85 0.85 1 0.85 0.85 1 0.85	-	4	4	128	10
LAST TWO DIGITS	1	1	4	108	1.0
LAST TWO DIGITS OF 12NC OF 12NC 8 mm TAPE WIDTH 0.47 4 1 0.58 587 4 1 1 0.68	_		4	827	0.82
AST TWO DIGITS OF 12NC OF 12NC 8 mm TAPE WIDTH 0.47 477 4 1 1 0.56 567 4 1	-		4	687	0.68
LAST TWO DIGITS OF 12NC NISn NISN NISN NISN NISN NISN 1 A 1 1	1		•	567	0.56
OF 12NC NISA NISA NISA OF 12NC 8 mm TAPE WIDTH	_	1	•	477	0.47
OF 12NC NISn NISn		8 mm TAPE WIDTH			
LAST TWO DIGITS	NEW	NISH	NUS	OF 12NC	(PF)
	100	VIC.			

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1996 May 03

1996 May 03

multilayer capacitors

Surface mounted ceramic

FEATURES

QUICK REFERENCE DATA

VALUE

- Seven standard sizes
- High capacitance per unit volume
- Supplied in tape on reel or in bulk case; loose in bag available on
- NiSn terminations (AgPd on

APPLICATIONS

- Consumer electronics, for example:
- Television receivers Tuners
- Video recorders
- All types of cameras
- Telecommunications
- Automotive

Sectional specifications

IEC 384-10, second edition 1989-04; also based on CECC 32 100

500 <

2×UR

2.5 × U_R

±20%, ±10%, ±5% 470 pF to 15 nF 180 pF to 120 nF 180 pF to 330 nF

Data processing.

DESCRIPTION

a high capacitance per unit volume. rectangular block of ceramic dielectric contained. This structure gives rise to precious metal electrodes are in which a number of interleaved The capacitor consists of a

structure is shown in Fig.1. (NiSn). A cross section of the covered with a layer of plated tin layer of plated nickel and finally 65: 35, or silver dipped with a barrier palladium (AgPd) alloy in the ratio the two terminations, either by silver The inner electrodes are connected to

Rated voltage U_R (DC) Capacitance range (E12 series); Test voltage (DC) for 1 minute: note 1: Tolerance on capacitance 16 V 200 V 25 V 200 V 500 V 100 V 16 V, 25 V, 50 V and 100 V 50 V; note 2 DESCRIPTION 16 V, 25 V, 50 V, 100 V, 200 V and 500 V (IEC) 3×U_R

100 pF to 1 μF 10 nF to 470 nF 22 nF to 680 nF

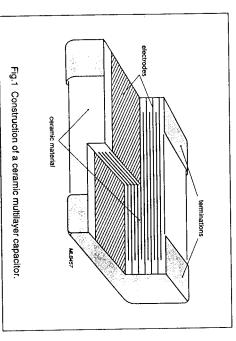
Climatic category (IEC 68)

55/125/56

based on CECC 32 101-801

Detailed specification

- Non E12 values are available on request.
- Also applicable for applications up to 63 V.



Class 2, X7R

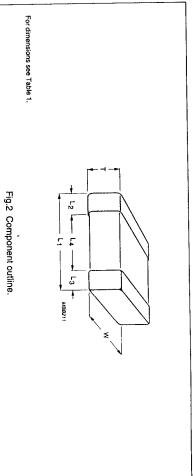
multilayer capacitors Surface mounted ceramic

Philips Components

Class 2, X7R

Product specification

MECHANICAL DATA



Physical dimensions

Table 1 Capacitor dimensions

	•	:	_		L ₂ and L ₃	d L ₃	Г
CASE SIZE	(mm)	(mm)	(mm)	MAX. (mm)	MIN. (mm)	MAX. (mm)	(mm)
0402	1.0 ±0.05	0.5±0.05	0.45	0.55	0.15	0.30	0.4
0603	1.6 ±0.1	0.8 ±0.07	0.73	0.87	0.25	0.65	0.4
0805	2.0 ±0.1	1.25 ±0.1	0.51	1.35	0.25	0.75	0.55
1206	3.2 ±0.15	1.6±0.15	0.51	1.75	0.25	0.75	1.4
1210	3.2 ±0.2	2.5±0.2	0.51	1.8	0.25	0.75	1.4
1812	4.5 ±0.2	3.2±0.2	0.51	1.8	0.25	0.75	2.2
2220	5.7 ±0.2	5.0±0.2	0.51	1.8	0.25	0.75	2.9

Philips Components

Product specification

Philips Components

multilayer capacitors Surface mounted ceramic

general purpose series

SELECTION CHART FOR 50 VOLT SERIES

MAST MISN	1							Ž.	1000000
LAST TWO NISN NIS	1	-	quantities".	and packaging o	ness classification	Thick		ಜ	000008
LAST TWO DAGS DAGS 1206 1210 LAST TWO DAGS	1		ssification, see	ate thickness clas	shaded cells indic	Values in s		52	580000
LAST TWO DAG2 DAG3 DAG5 1206 1210 LAST TWO DAG7 DAG6								51	560000
LAST TWO DAG2 DAG5 DAG6 DAG	L	,						49	470000
LAST TWO DAZ	L	10						48	390000
MAST TWYO MISA MI	1.	, (47	330000
CAST TWO CAST CAST CAST CAST TWO CAST CAST TWO CAST CA	\perp	,						46	270000
LAST TWO DAS2 DAS3 DAS5 1206 1210 DAS5 D		۵ (,					45	220 000
LAST TWO LAST TWO LAST WISA NISA N	┸	ω,	n					4	180000
LAST TWO _1.	3	J.	ľ				43	150000	
LAST TWO DAG2 DAG3 DAG5 MISA MIS	4	3	3	л (42	120000
LAST TWO NISA NIS	4	ω	3	n	·			4	100000
LAST TWO NISA NIS	4	3	3	2	n			39	82000
LAST TWO DAGZ DAGG DAGG MISA NISA NIS	4	3	3	2	5			8	68000
LAST TWO NISA NIS	-	3	3	22	50 1			٥	26000
LAST TWO DAG2 DAG3 DAG5 1206 1210	-	3	ω	2a	2			3 8	4/000
LAST TWO DAG2 DAG3 DAG5 1206 1210		3	3	2a	2			8	17000
LAST TWO DIGITS OF 1206 1210 1810	-	3	3	2a	2			3	2000
LAST TWO DAG2 DAG3 DAG5 1206 1210 DAG7TS OF 1210 DAG7TS OF 1210 DAG7TS OF -	з	w	2a	2			2	33000	
LAST TWO D402 D603 D805 1206 1210 D106TS OF D107 +		a	2a	2			33	27000	
LAST TWO D402 D603 D805 1206 1210	+			2a	2			32	22000
LAST TWO D402 D603 D805 1206 1210	+	, 4		2a	2			31	18000
LAST TWO DAG2 DAG3 DAG5 1206 1210	+			28	-			29	15000
LAST TWO NISA NIS	-+-	٥		Za	_			28	12000
LAST TWO NISN NIS	+	,	, ,	2	_	4		27	10000
LAST TWO NISN NIS	+	٥	٥	2 2	-	4		26	8200
LAST TWO NISA NIS	+	,		28		4		25	6800
LAST TWO D402 D603 D805 1206 1210	+	٥	ی د	28	-	4		24	5600
LAST TWO D402 D603 D805 1206 1210	+			28	_	4		23	4700
LAST TWO PIGHTS OF PIGHT	+	3	, 6	28	-	4		22	3900
LAST TWO D402 D603 D805 1206 1210	+		٥	3 6	-	4	ō	21	3300
LAST TWO D402 D603 D805 1206 1210	+		۵ (3	-	4	10	19	2700
LAST TWO D402 D603 D805 1206 1210	+		2	2			10	18	2200
LAST TWO D402 D603 D805 1206 1210 D1GITS OF NISn -+		3	22	•		ã	1	1800	
LAST TWO D402 D603 D805 1206 1210	+			22			5 6	ਰੰ	1500
LAST TWO D402 D603 D805 1206 1210	-1			2			5 2	5	1200
LAST TWO D402 D603 D805 1206 1210	十			200	-		10	*	1000
LAST TWO D402 D603 D805 1206 1210	+			2			5	13	820
LAST TWO D402 D603 D805 1206 1210	+			200	-		5 6	12	680
LAST TWO D402 D603 D805 1206 1210	+			22	-		5 2	=	88
LAST TWO D402 D603 D805 1206 1210	\dagger			2 2	. -		100	8	470
LAST TWO D402 D603 D805 1206 1210	+			3 5	-		10	8	390
LAST TWO D402 D603 D805 1206 1210 D106 T506 1210 D106 D10	+			3 8	-		ē	07	330
LAST TWO D402 D603 D805 1206 1210	+			22	-		ē	8	270
LAST TWO D402 D603 D805 1206 1210 D1GITS OF NISN ✝			29 5	- -	,	5 6	8	220	
LAST TWO D402 D603 D805 1206 1210 D1GITS OF NISN 7			2			5 6	\$	88	
LAST TWO D402 D603 D805 1206 1210 D1061TS OF NISN NISN	7						ē	8	156
LAST TWO D402 D603 D805 1206 1210 D106 T507 NISN NIS	+						đ	8	120
LAST TWO DIGITS OF NISh 7						ē	9	8	
LAST TWO	ヿ						5	2	
LAST TWO 0402 0603 0805 1206 1210 DIGITS OF NISA NISA NISA NISA NISA	2	12 mm TA			TAPE WIDTH	-		12NC	9
0402 0603 0805 1206 1210		NISn	NiSn	NISn	NISn	NiSn	NISn	DIGITS OF	ი
	Г	1812	1210	1206	0805	0603	0402		

Class 2, X7R 50 V

multilayer capacitors Surface mounted ceramic

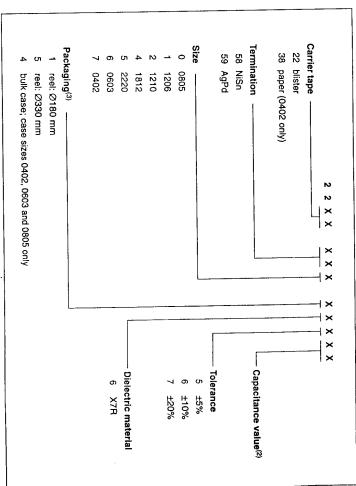
> general purpose series Class 2, X7R 50 V

Product specification

Thickness classification and packaging quantities

Ż	8 mm TAPE WIDTH	ER REEL	AMOUNT PER REEL	ER REEL		AMOUNT	
			Ø180 mm	mm			l l
	Ø180 mm	0330 mm	1812	2220	0402	0603	0805
	4000	10000	,	-	-	,	10000
	4000	10000	-	1	1	1	8000
	4000	10000	1	-	1	1	
	4000	10000	2000	1500	•	1	,
	4000	15000	ŀ	1		15000	
	3000	8000	1500	1500	ı		
	3000	8000	1	1	,	1	5000
	•	-	71200			1	1
10 = 0.45 to 0.55		50000	1	ı	50000	1	1

COMPOSITION OF THE ORDERING CODE (12NC); note 1



Notes

- 1. For details of the 15-digit code refer to this handbook, Section "General", Chapter "Composition of the 15-digit code".
- Refer to Chapter "Selection chart for 50 volt series".
- 3. Amount on reel depends on thickness classification see Chapter "Selection chart for 50 volt series".

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series class 2 dielectrics (Sheet 2 of 2)

	Units: mm	Capacitor thickness	6,800,000	4,700,000	3,300,000	2,200,000	1,500,000	1,000,000 (1 μF)	680,000	470,000	390,000	330,000	220,000	150,000	120,000	100,000 (0.1 μF)	68,000	47,000	33,000	22,000	15,000	10,000	6,800	4,700	3,300	2,200	1,500	1,000	Size (pF)	Tolerance	Voltage	Temperature	Product (EIA Size)
		SS	-		<u> </u>	L			L											供摊	17.00	enti-	100	1150		·				2	50	E (2	
			-																		e Kor		. :							2	25	E (Z5U)	MCS31 (1206)
	6.5	П	-											100	kr, vych	建	phole	NV S	SHAP	1506	(Coor			A)						7	50	FO	S31 (06)
	0.6 ±0.1 (0.024 ±0.004)		-											<u> </u>	-	· · ·													1	Z	25	F (Y5V)	
	.004)	Ц	-						L																					Š	50	CO	
	0.0		-						Н									_					-	· ·						X.	25	C (X7R)	MCS32 (1210)
	0.85 ±0.1 (0.033 ±0.004)		-						٠,												***									7	50	FO	MCS32 (1210)
	.004)		-					:						L_								•								7	25	F (Y5V)	
	8:		-				L _																		-		-			₹	50	CC	
	(0.039 - 008)		-		_																									S	25	C (X7H)	(1812)
	088)																										-			7	50	7	(1812)
	\ a =		ŀ	-	ľ						_																			7	25	F (Y5V)	
	(0.045 ±0.004)				<u> </u>																									Š	50	5	2
	0.004)		! -			_														.										3	_	(2/3)	
			-	_																								_			1	3 2	(2212)
Canacitors																														,	1 0	3	2) 2

Capacitors

ROKM

5

MCH series

Solder plated termination type

soldering methods. The many different capacitors to be used in many variations of this series allow these can be soldered either by flow or reflow applications. terminations that are solder plated. They This series of capacitors have

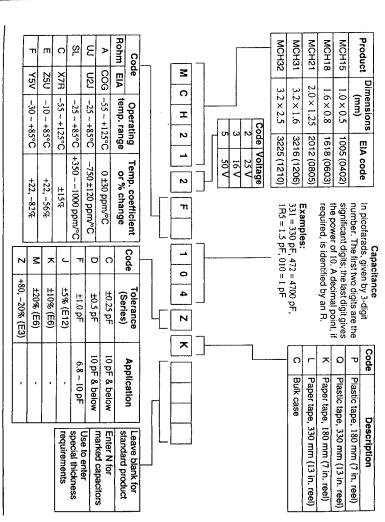
Features

mounted either by flow or reflow soldering methods

Product ordering codes

When ordering, please specify:

- The product name (MCH18, MCH21...)
- Complete the order number by adding Do not leave blanks in the order specified in the following table. digits to the order number as
- number. All characteristics must be character, where required. specified. Use a hyphen as a blank Code Plastic tape, 330 mm (13 in. reel) Plastic tape, 180 mm (7 in. reel) Paper tape, 180 mm (7 in. reel) Description



Available sizes of MCH series capacitors	of MCH s	eries capacit	ors	
	MCH15	MCH18	MCH21	MCH31
EIA (mm)	1005	1608	2012	3216

All di	S (min)	B (min)	⊣	¥		EIA (mm) (inches)	
All dimensions in mm	0.3	0.1	0.5 ± 0.05	0.5 ± 0.05	1.0 ± 0.05	1005 (0402)	MCH15
0	0.4	0.15	0.8 ± 0.1	0.8 ± 0.1	1.6 ± 0.1	1608 (0603)	MCH18
	0.6	0.2	0.60 ± 0.10 0.85 ± 0.10 1.25 ± 0.10	1.25 ± 0.15	2.00 ± 0.15	2012 (0805)	MCH21
	1.0	0.2	0.85 ± 0.10 1.15 ± 0.10	1.0 ± 0.10	3.2 ± 0.13	(1206)	мсн31
	1.0	10	1.00 ± 0.2 1.15 ± 0.1	2:0 ± 0:4	3.5 + 0.2	(1210)	MCH32

Table 1 MCH series class 1 dielectrics

Multi-layer ceramic chip capacitors MCH series

1. 25 ±0.1 (0.049 ±0.004)		1.15 ±0.1	1.15	1.0 to	1.0 L±	-	0855		,	-	5	5 5 5 6	0.4.	:	:
								3.	Ę.		П		Π̈́	nicknes	Capacitor thickness
		The first of SA Dealers for the same of th	The state of the s	the state of the s											
				1 											6.8 C, D, F
			The second second						MARKET STATE		 				0.5 1 1.5 C, D
															pF Tol.
2	5	و	ğ	å	50	50	50	50	50	50	50	50	50	50	Voltage
		150		(U2J)	(COG) (U2J)	ļ	25.5	(COG) (U2J)	L	(U2J)	(cog)	(-) ST	(LZN)	A UJ (COG) (U2J)	Temperature
2	(1210)	A	- 1		1	2	1000	1	2	16		Ι.	(2040)		(EIA SIZE)

Capacitors

20

Capacitors

22

Table 2 MCH series class 2 dielectrics (Sheet 1 of 2)

MCH15 (0402)

MCH18 (0603)

MCH21 (0805)

Temperature Size (EIA Size)

Tolerance Size (pF)

K/M K/M Z

K/M K/M Z 50 25 C (X7R)

Ν

N

K/M K/M Z 50 25 C (X7R)

220

330

470 680

Voltage

50 C (X7R) 25

50 F (Y5V)

25 7

> 50 25 E (Z5U)

50 F (Y5V)

25 7

50

25 Z

E (Z5U)

Multi-layer ceramic chip capacitors MCH series
Ń

3	1.25 ±0.1 (0.049 ±0.004)	1.25 ±0.1 (0.049 ±0	1.15 ±0.1 (0.045 ±0.004)	1.15 ±0.1 (0.045 ±0	$\begin{array}{c} 1.0 \stackrel{+0}{-0.2} \\ (0.039 \stackrel{+0}{-0.08}) \end{array}$	1.0 ±0. (0.039	0.85 ±0.1 (0.033 ±0.004)	0.85 ±0.1 (0.033 ±0	0.6 ±0.1 (0.024 ±0.004)	0.6 ±0.1 (0.024 ±	Units: mm (in.)
→ 16-V version		I								$\prod $	Capacitor thickness
			以			-	-				2,200,000
											1,500,000
									€:	·	1,000,000 (1 μF)
							9	-			470,000
									!	L	330,000
											220,000
			40)						*		180,000
			1 1					Grand Service	0'		150,000
				ins (de				ACC SAME			120,000
			(X+VŞ)	e di les					*		100,000 (0.1 μF)
			40.45							***	68,000
						7 .				7,000	47,000
										4.1	33,000
						5-12 1-13	14,041			May 1	
						i din	2-327	2 443		Y 17 '	
		1		344		De	(.#K#y.			8# 	10,000
						300	90000	Aires			6,800
				Ş.jo.			or in roles	485			4,700
				į.				kas in			3,300
							150.73	Page 1 of Sa			2,200
	•						55.36.5	žinės.	****		1,500
								2.0			1,000
			1				10.15	4 . 5			680
								N. C.			470
								Gr. C			330
								-112			220
							L				Size (pF)
7	X/X	X/S	7	Z	Z	2	K/M	K/M	Z	Z	Tolerance
50	25	50	25	50	25	50	25	50	25	50	Voltage
٦,	7R)	C (X7R)	F (Y5V)	FO	E (Z5U)	E (2	C (X7R)	၂၁	F (Y5V)	FQ	Temperature
9	(1210)				(1206)	(12			95	(0805)	(EIA size)
X	MCH32				MCH31	Z.O.			2	MCHOI	7-22-12-

Capacitors

Capacitors

NOHM!

23

22

Capacitor thickness

220,000 150,000 100,000 (0.1 μF)

68,000 47,000 33,000 22,000 15,000 10,000 6,800 4,700 3,900 3,300 2,200 1,500 1,000

*

100

Units: mm (in.)

0.5 ±0.05 0.6 ±0.1 0.8 ±0.1 0.85 ±0.1 1. 25 ±0.1 (0.020 ±0.002) (0.024 ±0.004) (0.031 ±0.004) (0.033 ±0.004) (0.049 ±0.004)

1

☆ 16-V version

NOHM

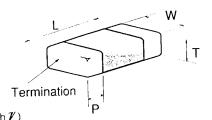


CHIP CAPACITORS NPO

Nickel Barrier or Silver Palladium Terminations € CECC 32 101-801

Ordering code:	e.g.	VJ 0805	Ť	101 T	Ţ	Ť	B T	T	Sp sp
Type —				-	1	-			
Dielectric A≙NP0 -	-1.4.13			ļ	1	1		1	
Capacitance acc. to E	:IA') ———					1			
Tolerance acc. to EIA							ļ		
Terminations: —	Oil Dalla	dium					1	Ιİ	
X≟ Nickel Barrier, F≙	Sliver Palic	2010111						ll	
Rated voltage: A=50/	63 V- B= II	JU V]]	_
Tape / Reel:	Bool or 190) mm						ì	Τe
L≟Reel ø 330 mm, T≟									
Marking: M≐ acc. to CECC (as V≐ VITRAMON Trade	from 0805 mark 1/ (w	with capaci without capac	itance citanc	e code e code	, as f e)	rom 1	206 a	add.w	rith 7)

Special types (e.g. 1825, 2225) and special voltages on request.



Dimensional Tolerances:

Туре	L+W	Р
0603	±0.15	0.3±0.2
0805	±0.2	0.5±0.25
1206	±0.2	0.5±0.25
1210	±0.2	0.5±0.25
1808	±0.2	0.5±0.25
1812	±0.2	0.5±0.25
2218	±0.2	0.5±0.25
2220	±0.2	0.5±0.25

in pF. The first two digits give the nominal value, the third digit the number of noughts.

Tolerances available: Values <10 pF: B = ± 0.1 pF, C = ± 0.2 5pF, D = ± 0.5 pF

				305	1	206	1210	noughts, e.g. 2R2 ≙ :	1000		1812	221			20
pe		03				3.20	3.20		4.50	_	4.50	5.7		5.7	
ngth L		60		00		.60	2.50		2 50		3.20	4.5		5.0	
dth W	0.			25		1.1	1.2		1 -		1.2	1.1		1.1	
ickness T		95		.1			50/63	00	50/63 100	50/6	3 100	50/63	100	50/63	100
ted Voltage	50/63	100	50/63	100	50/63										
ър. (pF)	"	_	<u> </u>	1 0	(_13
1.0															_
1.2				1		1 6				AgPd-	Termination	for reflow	ı solderir	٦g.	-
1.5									<u> </u>				مح مال مماد	doring	-
1.8 2.2	-										Barrier teri	nination to	ir all soic	remig	
2.7							!		-	metho	ds.				
3.3									<u> </u>						F
3.9	_			4								<u></u>		 -	
4.7									Available	range	of capac	illance			
5.6 6.8							1		values ac	c. to (JEUU 32	101-002			
8.2									see page	9.					
10									7					_	
12		1, 1, 1							CECC 32	101-8	301		<u> </u>	 	
15									_ capacita	nce va	alues acc.	OJ	-	+	+
18 22									CECC 32	101-00)2			 	+
27															
33													ļ		+
39															
47							1								-
56 68							<u> </u>						1		
82															
100													1		
120														_	
150	_						1						+		-
180 220										_			-	+	
270							<u> </u>								
330														_	
390															
470								Pr 127		(100)					
560 680 _						اكري	1	\$	38	-			+		
820															
1,000															
1,200	_		65		f-4:										
1,500									J 4				-		
1,800 2,200										Time!					
2,700															
3,300									, , , , , , , , , , , , , , , , , , ,						
3,900							1.20								
4,700 5,600			-1				33								3 3
6,800								كحسن		73.7					
8,200							-								
10,000]				ا کو کنا			
12,000															
15,000															
18,000 22,000	1	-						-							
22,000	1		- 1		ı	1		1	•						



CHIP CAPACITORS X7R

Nickel Barrier or Silver Palladium Terminations € CECC 32 101-801

Ordering code:	e.g.	VJ 0805	Ϋ́Τ	103 T	J T	X	B T	Т Т	M T	Sp
Type			1		- 1					
Dielectric Y=X7R					1			1		
Capacitance acc. to El	A')									
Tolerance acc. to EIA							1			
Terminations:										
X\(\(\) Nickel Barrier, F\(\) S										
Rated voltage: X≜25 V	- A≐50/63 '	V- B≟100 V-								
Tape / Reel:									ł	
L≐Reel ø 330 mm, T≙F		mm.								T
Marking:										
M≜ acc. to CECC (as f V≜ VITRAMON Tradem	rom 0805 v					om 1	206	ado	d.with	7 ∕)

Special types (e.g. 1825, 2225) and special voltages on request.

Termination

Dimensional Tolerances:

Туре	L+W	P
0603	±0.15	0.3±0.2
0805	±0.2	0.5±0.25
1206	±0.2	0.5±0.25
1210	±0.2	0.5±0.25
1808	±0.2	0.5±0.25
1812	±0.2	0.5±0.25
2218	±0.2	0.5±0.25
2220	±0.2	0.5±0.25

Dimensions in mm

) Capacitance values are in pF. The first two digits give the nominal value, the third digit the number of noughts,

Tolerances available:

e.g. 103 ≜ 10 nF.		- -	, ,	the number of nought			J = ±5 %, K	$= \pm 10$ %, $M = \pm 20$
'pe	0603	0805	1206	1210	1808	1812	2218	2220
-ength L	1.60	2.00	3.20	3.20	4.50	4.50	5.70	5.70
Width W	0.80	1.25	1.60	2.50	2.00	3.20	4,50	5.00
Thickness T	0.95	1.25	1.1 1.3 1.5	1.1 1.3 1.5	1.3 1.5	1.1 1.3 1.7	1.3 1.5	1.5
Rated Voltage	25 50/63 100	25 50/63 100	25 50/63 100	25 50/63 100	50/63 100	25 50/63 100	50/63 100	50/63 100
Cap. (pF)	Œ.D	E33	I					
100	Normally	Normally	Normally	i				
120	Normally made in NPO	Normally made in NPO	Normally made in NPO					
150					Ac	pPd-Termination for	or reflow solderin	a
180						,		J
220					Ni Ni	ckel Barrier Termi	nation for all	
270						Idering methods		
330						idening methods		
390					Ni.	ckel Barrier Termi	nation only for	
470						flow soldering	riadion only for].
560						now coldering		
680								
820					1	· · · · · · · · · · · · · · · · · · ·	<u></u>	
1,000 1,200					Available	e range of capa	citance —	
			open Kron		1 1	cc. to CECC 32	101-003,	
1,500 1,800					-008 see	page 9.		
2,200					 L	1 0	,	
2,700					 			
3,300					:	 		
3,900								
4,700					<u> </u>			
5,600						 		1
6,800								
8,200					1			
10,000								
12,000								
15,000	G.							
18,000					1			
22,000								
27,000								
33,000								
39,000								
47,000							 	
56,000						!	ļ	-
68,000								
82,000							d i	
100,000 120,000	- 							
150,000	 	 						l
180,000				1 6			l	
220,000					181			
270,000					15			
330,000								3
390,000								
470,000								
560,000						O.	3	(2) (2) (3) (4)
680,000								Q.
820,000						(O)		O.
1,000,000						3		
1,200,000								
1,500,000	1 1 1							
1,800,000								
2,200,000								
2,700,000		.						
3,300,000								I 1 -

Nickel Barriered Termination Type GRM Series for General Electronic Equipment

FEATURES

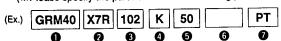
- 1. Terminations are made of metall highly resistant to migration.
- 2. The GRM series is a complete line of chip ceramic capacitors in 16V, 25V and 50V ratings. These capacitors have temperature characteristics ranging from C0G to Y5V.
- 3. A wide selection of sizes is available, from the miniature GRM36(LxWxT:1.0x0.5x0.5mm) to the larger sized GRM44-1(LxWxT:5.7x5.0x2.0mm). GRM39,GRM40 and GRM42-6 types are suited to flow and reflow soldering. GRM36, GRM42-2 and larger types are suited to reflow soldering.
- 4. Stringent dimensional tolerances allow highly reliable, high speed automatic chip placements on PCBs.
- 5. The GRM series is available in both paper and plastic embossed tape and reel packaging for automatic placement. Bulk case packaging is also available. (GRM36, GRM39, GRM40 (T:0.7, 1.25))

APPLICATION

• General electronic equipment.

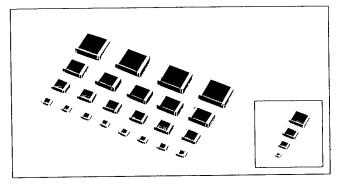
PART NUMBERING

(%Please specify the part number when ordering.)

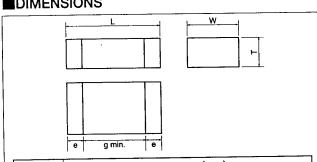


- Type
- Temperature Characteristics (Please refer Table right)
- Capacitance
- Ocapacitance Tolerance
- 6 Rated Voltage
- **6**Murata's control No.
- Packaging

(Bulk:PB, Tape:PT, Bulk Case:PC)



IDIMENSIONS



Type		Dime	nsions (m	m)	
(EIA Code)	L	W	Т	е	g
GRM36 (0402)	1.0±0.05	0.5±0.05	0.5±0.05	0.15~0.3	0.4
GRM39 (0603)	1.6±0.1	0.8±0.1	0.8±0.1	0.2~0.5	0.5
GRM40 (0805)	2.0±0.1	1.25±0.1	0.7±8. ₂ 1.0±8. ₂ 1.25±0.1	0.2~0.7	0.7
GRM42-6 (1206)	3.2±0.15	1.6±0.15	1.0±8. ₂ 1.25±8. ₂	0.3~0.8	1.5
GRM42-2 (1210)	3.2±0.3	2.5±0.2	1.5±8 ^{.3}	0.3max.	1.0
GRM43-2 (1812)	4.5±0.4	3.2±0.3	2.0max.	0.3max.	2.0
GRM44-1 (2220)	5.7±0.4	5.0±0.4	2.0max.	0.3max.	2.0

TEMPERATURE CHARACTERISTIC

• Temperature Compensating Type

			····
Code	Temp. Coeff.	Temp. Range	Reference Temp.
COG	0±30ppm/℃	-55 to 125℃	25℃

• High Dielectric Constant Type

Code	Cap. Change	Temp. Range	Reference Temp.
X7R	±15%	-55 to 125℃	25℃
X5R	±15%	-55 to 85℃	25℃
Z5U	土器%	+10 to 85℃	25°C
Y5V	±83%	-30 to 85℃	25℃

ECAPACITANCE RANGE

(Temperatur Compensating Type)

(in pF)

(10111611111111111111111111111111111111	temperatur compensating 13pc/ (mpr)									
	Temp. Char	COG								
Type(EIA Code)	Thickness Rated Voltage T(mm)	50VDC								
GRM36(0402)	0.5±0.05	0.5~160								
GRM39(0603)	0.8±0.1	0.5~510								
	0.7±8.2	0.5~560								
GRM40(0805)	1.0±8.2	620~1500								
	1.25±0.1	1600~2400								
ODMAC CARRON	1.0±8.2	2700~3600								
GRM42-6(1206)	1.25±%2	3900~6200								
GRM42-2(1210)	1.5±8. ₃	6800~7500								
GRM43-2(1812)	2.0max.	8200~13000								
GRM44-1(2220)	2.0max.	15000~43000								
Capacitance	Capacitance Tolerance									

■ CAPACITANCE RANGE (High Dielectric Constant Type)

(in pF)

Typogram	Temp. Char		X7R		X	5R
Type(EIA Code)	Thickness Rated Voltage	50VDC	25VDC	16VDC	16VDC	10VDC
GRM36(0402)	0.5±0.05	220~3900	4700~6800	8200~10000		
GRM39(0603)	0.8±0.1	220~18000	22000~27000	33000~100000		
GRM40(0805)	0.7±8.2	330~22000	27000~33000	39000~56000		
	1.0±8.2	27000~39000	39000~68000	68000~100000		
	1.25±0.1	47000~68000	82000~150000	120000~330000	470000	1000000*
ODIMA (4000)	1.0±8.2	82000~100000				
GRM42-6(1206)	1.25±8.2	120000~150000	180000~330000		1000000	
GRM42-2(1210)	1.5±%3	180000~220000				
GRM43-2(1812)	2.0max.	270000~470000				
GRM44-1(2220)	2.0max.	560000~1200000				
Capacitan	ce Tolerance	К	:±10%, M:±20	%		

^{*} L=2.0±0.15、W=1.25±0.15、T=1.25±0.15

(in pF)

Timorria	Temp. Char	Z5U
Type(EIA Code)	Thickness Rated Voltage T(mm)	50VDC
GRM39(0603)	0.8±0.1	1500~10000
	0.7±8.2	4700~22000
GRM40(0805)	1.0±8.2	33000
Š _P .	1.25±0.1	47000~100000
GRM42-6(1206)	1.25±% ₂	150000~220000
GRM42-2(1210)	1.25±8.2	330000
GRM43-2(1812)	2.0max.	470000~1000000
GRM44-1(2220)	2.0max.	1500000
Capacitance	Tolerance	M:±20%, Z:±80%

(in pF)

Typogramos del	Temp. Char		Y	5V	
Type(EIA Code)	Thickness Rated Voltage T(mm)	50VDC	25VDC	16VDC	10VDC
GRM36(0402)	0.5±0.05	2200~15000	22000	33000~47000 100000	
GRM39(0603)	0.8±0.1	10000~47000	68000~100000	150000~220000	1000000
	0.7±8.2	10000~68000	100000~150000		
GRM40(0805)	1.0±8.2	100000~150000	220000		
	1.25±0.1	220000	330000	470000~1000000	2200000
CDM40 6(4000)	1.0±8.2	330000			
GRM42-6(1206)	1.25±8.2	470000	680000~1000000	1500000~2200000	4700000
GRM42-2(1210)	1.5±8. ₃	680000			
GRM43-2(1812)	2.0max.	1000000~1500000			
GRM44-1(2220)	2.0max.	2200000~4700000			
Capacitano	e Tolerance		z:±	-80 % -20 %	



CM Series; Nickel Barrier Terminations for Flow and Reflow Soldering.

CAPACITANCE RANGE

EIA DIELECTRIC CODE									Х7	R								
SIZE					o				0				С	3				
SIZE CODE		0402			0603				0805				120)6			1210	
VOLTAGE	16	25	50	16	25	50	10	16	25	50	100	16	25	50	100	25	50	100
Cap in Cap pF or nF code		·																
220 — 221 330 — 331 470 — 471						: :												
680 — 681 1000 — 102 1500 — 152			4:4							5								
2200 — 222 3300 — 332 4700 — 472			總数															
6800 — 682 10 — 103 15 — 153	42:20	100 mg			300					5	P.				ً مِ			
$\begin{array}{r} 3 = 135 \\ 22 = 223 \\ 33 = 333 \\ 47 = 473 \end{array}$					**			- 3							σ			(3 (3
68 — 683 100 — 104 150 — 154				15 B 15 G					<i>?</i> ☆	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			∜ρ * ρ				¢	ALC: Y
220 — 224 330 — 334 470 — 474													φο • σ	77.4			¢	
680 — 684 1000 — 105							***											

*: $tan\delta = 3.5\%$ MAX.

TAPING

THICKNESS	0402	0603	0805	1206	1210
<1.0mm (•, +, ■, ρ)	Paper	Paper	Paper	Paper	N/A
≥1.0mm (#, σ, ♠, ¢)	N/A	N/A	Plastic	Plastic	Plastic

Standard Thicknesses

• = 0.5mm±0.05mm + = 0.8mm±0.1mm = 0.6mm±0.1mm

= 0.85mm±0.1mm

ρ σ

1.15mm±0.1mm 1.25mm±0.1mm

1.4mm MAX.



CM Series; Nickel Barrier Terminations for Flow and Reflow Soldering.

CAPACITANCE RANGE

EIA IELECTRIC CODE						cog					
SIZE	D	c	3		0			0		ſ]
SIZE CODE	0402	060	03		0805			1206		12	210
VOLTAGE	50	50	100	25	50	100	25	50	100	50	100
Cap in Cap pF code											
0.5 — R50 1.0 — 1R0	:	+ +	++		=		· · · · ·				
1.5 1R5	•	+	+								
2.0 2R0 3.0 3R0	•	+	+		B	a ·					
4.0 4R0	:	+ +	++		=						
5.0 — 5R0	•	+	+		•	•					
6.0 — 6R0 7.0 — 7R0		++	+ +			:					
8.0 8R0	•	+	+		-	-					
9.0 — 9R0 10 — 100	:	+	+								l
12 120	•	+	+		=	=					
15 — 150 18 — 180	:	++	+		=						1
22 — 220	•	+	+		-	-					
27 — 270	•	+	+		•						ĺ
33 — 330 39 — 390	-:-	+ +	+								
47 470	.	+	+		=	■					i
56 — 560 68 — 680	-:-	+	+ -		-						
82 — 820		 	+		:						
100 — 101 120 — 121	-:	+	+			-					
150 151	•	+	++								ĺ
180 — 181		+	+			# 195 . ■					l
220 — 221 270 — 271		+	+		-						
330 — 331		+	+		-						
390 — 391 470 — 471		+			•	=					
560 — 561		+			=						}
680 — 681					ρ	ρ		•			
820 — 821 1000 — 102		Ì			ρ ρ	ρ					i
1200 122		~			ρ	1 1			-		
1500 — 152 1800 — 182					P P			=	=		
2200 — 222					ρ ρ			ρ	ρ		
2700 — 272 3300 — 332				ρ.	,			ρ	·		c
3900 — 392				/51 ▲		+		ρ		¢	e e
4700 — 472 5600 — 562				A				·ρ		¢	
6800 682						 	ρ			¢	
8200 — 822 10000 — 103						1	ρ			¢	i

TAPING

THICKNESS	0402	0603	0805	1206	1210
<1.0mm (•, +, ■, ρ)	Paper	Paper	Paper	Paper	N/A
≥1.0mm (σ, ♠, ¢)	N/A	N/A	Plastic	Plastic	Plastic

Standard Thicknesses

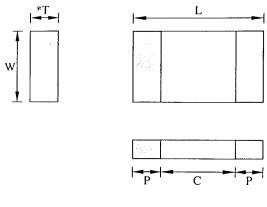
= 0.5mm±0.05mm = 0.8mm±0.1mm = 0.6mm±0.1mm

= 0.5mm±0.05mm = 0.8mm±0.1mm = 0.6mm±0.1mm = 0.85mm±0.1mm = 1.15mm±0.1mm = 1.25mm±0.1mm = 1.4mm MAX.

+ ■ ρ σ ▲ ¢



Dimensions



Indicates Termination Area

For Tape & Reel Package

Size Code	I (mm)	W ()	*2 T]	P	С	
Size Code	L(mm)	W(mm)	Max(mm)	Min(mm)	Max(mm)	Min(mm)	
0402	1.0±0.05	0.5±0.05	0.55	0.15	0.35	0.30	
0603	1.6±0.15*1	0.8±0.15*1	0.95	0.20	0.60	0.50	
0805	2.0±0.2 *1	1.25±0.2*1	1.35	0.25	0.75	0.50	
1206	3.2±0.2 *1	1.6±0.2 *1	1.6	0.25	0.85	1.50	
1210	3.2±0.3	2.5±0.2	2.0	0.30	1.00	1.00	
1808	4.5±0.4	2.0±0.2	2.0	0.15	0.80	2.00	
1812	4.5±0.4	3.2±0.3	2.5	*3 0.50	*3 1.10	2.00	
2208	5.7±0.4	2.0±0.2	2.0	0.15	0.85	2.00	
2220	5.7±0.4	5.0±0.4	2.5	0.50	1.40	2.00	

* For Bulk Case Package

C: CI-	T ()	W/()	any)	1	P	С
Size Code	L(mm)	W(mm)	T(mm)	Min(mm)	Max(mm)	Min(mm)
0603	1.6±0.07	0.8±0.07	0.8±0.07	0.10	0.60	0.50
0805	2.0±0.1	1.25±0.1	0.6±0.1/1.25±0.1	0.25	0.75	0.50
1206	3.2±0.1	1.6±0.1	0.6±0.1	0.25	0.85	1.50

^{*2} T (Thickness) depends on capacitance value.

Standard thickness is shown on the appropriate product pages.

^{*3} CF series 1000V~3000V; P dimensions 0.15mm to 0.80mm.



Available Tolerances

Dielectric materials, capacitance values and tolerances are available in the following combinations only:

***				and community only.		
EIA DIELECTRIC	AVAILABLE TOLERANCE		ITANCE	TOLERANCE CODE		
	±0.25pF, ±0.5pF	≤10pF	*2	10.4		
* COG	±1%	>10pF		$*^{3}B = \pm 0.1 pF$ $C = \pm 0.25 pF$		
NTC	±2%		E-12 Series	$D = \pm 0.5 pF$		
	±5%, ±10%, ±20%			$F = \pm 1\%$ $G = \pm 2\%$		
X7R	*4 ±10%, ±20%	E-6 Series		$J = \pm 5\%$ $K = \pm 10\%$		
Y5V	-20% to +80%	E-3 S	Series	$M = \pm 20\%$ Z = -20 to +80%		

NOTE:

^{*1} NTC: Negative Temperature Coefficient types are available on request as shown on page 27

^{*2} Nominal values below 10pF are available in the standard values of 0.5pF, 1.0pF, 1.5pF, 2.0pF, 3.0pF, 4.0pF, 5.0pF, 6.0pF, 7.0pF, 8.0pF, 9.0pF, 10pF.

^{*} 3 B= ± 0.1 pF is available for 5pF and below on request.

^{*} 4 J= $\pm 5\%$ for X7R is available on request.



Classifications

Kyocera Ceramic Chip Capacitors are available for different applications as classified below:

Series	Dielectric	Application	Features	Terminations	Available Size (EIA)
СМ	COG (NPO) X7R	General Purpose	Wide Cap Range	Nickel Barrier	0402, 0603, 0805 1206, 1210
	Y5V NTC*			Silver Palladium	0603, 0805, 1206 1210, 1812, 2220
CF	COG (NPO)	High Voltage	High Voltage 500V 1000V 2000V	Nickel Barrier	1206, 1210, 1808 1812, 2208
	X7R	Power Circuits	3000V	Silver Palladium	1206, 1210, 1808 1812, 2208, 2220
ст	COG (NPO) X7R	PLCC	Low Profile	Nickel Barrier	0805, 1206, 1210
	Y5V	(Decoupling)	See Page 18	Silver Palladium	0805, 1200, 1210
DN	COG (NPO) U (N750) X7R Y5V	Automotive	Thermal shock Resistivity High Reliability	Silver Palladium	0805, 1206, 1210 1812, 2220

NOTE:

Pa (N150), Ra (N220), Sa (N330), Ta (N470) & Ua (N750)

Details are shown on Page 27

^{*}NTC:Negative Temperature Coefficient types are available on request as shown below.



Ordering Information

KYOCERA PART NUMBER:

	CM	21	X7R	103	K	50	Α	T
--	----	----	-----	-----	---	----	---	---

SERIES CODE

See Page 1

SIZE CODE

See Page 3

_							
SIZE	<u>_</u>	EIACODE	S	IZE	<u>E</u>	[A COD]	<u>E_</u>
05	=	0402		32	=	1210	
105	=	0603		42	=	1808	
21	=	0805		43	=	1812	
316	=	1206		52	=	2208	
				55		2220	

DIELECTRIC CODE

See Page 27

CODE	=_	EIA CODE	
CG	=	COG (NPO)	
X7R	=	X7R	
Y5V	=	Y5V	

Negative dielectric types are available on request.

CAPACITANCE CODE

Capacitance Expressed In pF. 2 Significant Digits and

Number of Zeros in pF.

For Values < 10pF, Letter R Denote Decimal Point.

e.g.
$$100000 \text{pF} = 104$$
 $33 \text{pF} = 330$
 $100 \text{nF} = 104$ $1.5 \text{pF} = 1R5$
 $0.1 \mu \text{F} = 104$ $0.5 \text{pF} = R50$
 $4700 \text{pF} = 472$

TOLERANCE CODE

See Page 4 for explanation and availability

VOLTAGE CODE

10	=	10VDC	200	=	200VDC
16	=	16VDC	500	=	500VDC
25	=	25VDC	1000	=	1000VDC
50	=	50VDC	2000	=	2000VDC
100	=	100VDC	3000	=	3000VDC

TERMINATION CODE

A = Nickel Barrier

B = Silver Palladium

PACKAGING CODE

B = Bulk

C = Bulk Case, See Page 21, 22

T = 7" Reel Taping & 4mm Cavity pitch

L = 13" Reel Taping & 4mm Cavity pitch

H = 7" Reel Taping & 2mm Cavity pitch, See Page 5

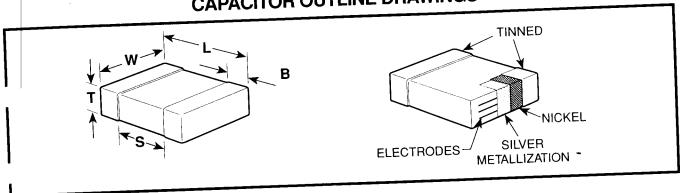
N = 13" Reel Taping & 2mm Cavity pitch, See Page 5

CERAMIC CHIP/STANDARD

FEATURES

- Eleven chip sizes
- COG (NPO), X7R and Z5U Dielectrics
- 50,100 and 200 Volts
- Standard End Metalizations-tin-plated nickel barrier
- ±0.25 pF; ±0.5 pF; ±1%; ±2%; ±3%; ±5%; ±10%; ±20%; and +80%-20% capacitance tolerance avail-
- Tape and reel packaging per EIA481-1. (See page 35 for specific tape and reel information.)

CAPACITOR OUTLINE DRAWINGS

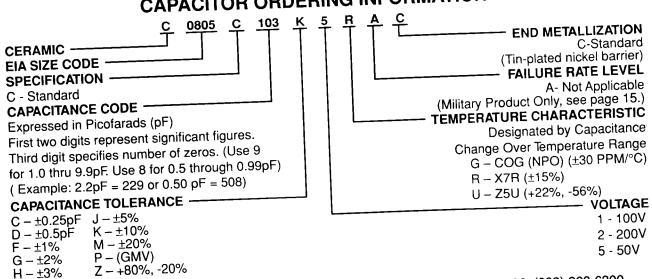


DIMENSIONS—MILLIMETERS AND (INCHES)

	EIA		M. NICOLOGICAL STATE OF THE STA	T	BANDWIDTH	S MIN. SEPARATION	MOUNTING TECHNIQUE
METRIC SIZE CODE	SIZE CODE	LENGTH	WIDTH"	THICKNESS MAX.	0.35 (.014) ±0.15 (.006)	0.7 (.028)	· 35
	77 (+47) C 1 7	1.6 (.063) ±0.15 (.006)	0.8 (.032). ±0.15 (.006)	0.9 (.035)		0.75 (.030)	Solder Wave
1608	0603	2.0 (.079) ± 0.2 (.008)	1.25 (049) ±0.2 (.008)	1.3 (.051)*	0.5 (.02) ± .25 (.010)	N/A	or
2012	⇒0805		1.25 (.049) ±0.2 (.008)	1.5 (.059)	0.5 (.02) ± .25 (.010)		Solder Reflov
2520	1005	2.5 (.098) ± 0.2 (.008)		1.5 (.059)	0.5 (.02) ± .25 (.010)	N/A	20ider Hellor
3216	1206	3.2 (.126) ±0.2 (.008)	1.6 (.063) ±0.2 (.008)	1,7 (.067)	0.5 (.02) ± .25 (.010)	N/A	18
3225	1210	3.2 (.126) ± 0.2 (.008)	2.5 (.098) ± 0.2 (.008)		0.6 (.024) ±.35 (.014)	N/A	
4512	1805	4.5 (.177) ± 0.3 (.012)	1.25 (.049) ±0.3 (.012)	1.7 (.067)	0.6 (,024) ± .35 (.014)	N/A	Solder
<u> </u>	1808	4.5 (.177) ±0.3 (.012)	2.0 (.079) ±0.3 (.012)	1.7 (.067)		N/A	Reflow
4520	7.75	45 (177) ±0.3 (012)	3.2 (.126) ±0.3 (.012)	1.7 (.067)	0.6 (.024) ±.35 (.014)	N/A	
4532	1812		6.4 (.252) ±0.4 (.016)	1.7 (.067)	0.6 (.024) ±.35 (.014)		
4564	1825	4.5 (377) ±0.3 (.012)		1.8 (.071)	0.6 (.024) ±.35 (.014)	N/A	1
5650	2220	5.6 (.220) ± 0.4 (.016)	5.0 (.197) ±0.4 (.016)	2.0 (.079)	0.6 (.024) ± .35 (.014)	N/A	
5664	2225	5,6 (.220) ± 0.4 (.016)	6.3 (.248) ±0.4 (.016)	2.0 (.0/9)	TOTAL SPECIAL PROPERTY OF THE		

^{*} Extended value maximum thickness 1.3 (.051).

CAPACITOR ORDERING INFORMATION



letric size code given for reference only.

COG CAPACITANCE RANGE - C0603, C0805, C1005, C1206 & C1210

	the second secon	4663610	00000		0000	• • • •	15/962	04005	i svetche	ilasvi	01000	4 50L 51 °		24040	
CAP.	5 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5	CAP.	C0603*						200V					21210	
PF	KEMET PART NUMBER	TOL.		_	TOUY	2004	304	Ports :	1000	BUT.	1007	2004	0U V	1004	2000
.50		C _i D	508		or other	4	-	264	260,000,000	3200	24	902.0			
.75	C (1)C758 (2) (3) GAC	C,D	758	1	400	40(49)	100 100	4 100	109	109	109	109			
1.0	C (1)C109 (2) (3) GAC	C;D	109	109	109 129	109	109 129	109	129	129	129	129			├
1.2	C (1)C129 (2) (3) GAC	C,D	129 159	129 159	159	129	159	159	159	159	159	159			├
1.5	C (1)C159 (2) (3) GAC	C,D	189	189	189	159	189	189	189	189	189	189			
1.8	C (1)C189 (2) (3) GAC	C,D	229	229	229	189	229	229	229	229	229	229	-	1.77	
2.2	C(1)C229 (2) (3) GAC	C,D	279	279	279	229	279	279	279	279	279	279		1. 27	├──
2.7	C(1)C279 (2) (3) GAC	C,D K		339	339	279	339	339	339	339	339	339	-	- 10 kg	
3.3	C(1)C339 (2) (3) GAC	C,D K	339 399	399	399	339	399	399	399	399	399	399		- 1	
		C,D K				399	479	479	479	479	479	479	 		
4.7	C(1)C479 (2) (3) GAC	C,D K	479	479	479	479			569	569	569	569	<u> </u>		├
5.6	C (1)C569 (2) (3) GAC	C'D 1'K	569	569	569	569	569	569	T. T. T. T. T.		689	689	 -		
6.8		C,D J,K	689	689	689	689	689	689	689	689		2.7			
8.2	C(1)C829 (2) (3) GAC	C,D J,K	829	829	829	829	829	829	829	829	829	829	100	100	100
10.0	C (1)C100 (2) (3) GAC	C,D H,J,K	100	100	100	100	100	100	100	100	100	100	100	100	100
		C,D H,J,K	120	120	120	120_	120	120	120		120	120	120	120	120
15.0		C,D G,H,J,K	150	150	150	150	150	150	150		150	150	150	150	150
18.0		C,D. G,H,J,K	180	180	180	180		180	180	180		180	180	180	180
22.0		C,D, G,H,J,K	220	220	220	220	220	220	220			220	220	220	220
27.0		D,F,G,H,J,K	270	270	270	270	270	270	270			270	270	270	270
33.0		D,F,G,H,J,K	330	330	330	330	330	330	330	200		.330	330	330	330
39.0		D,F,G,H,J,K	390	390	390	390	390		390			390	390	390	390
47.0		D,F,G,H,J,K	470	470	470	470	470	470	470	470		470	470	470	470
56.0	C(1)C560 (2) (3) GAC	F,G,H,J,K	560	560	560	560	560		560			560	560	560	560
68.0	C(1)C680 (2) (3) GAC	F,G,H,J,K	680	680	680	680	680		680			680	680	680	680
82.0	C(1)C820 (2) (3) GAC	F,G,H,J,K	820	820	820	820	820	820	820		820	820	820	820	820
100.0	C_ (1) _ C101 (2) (3) GAC	F,G,H,J,K	101	101	101	101	101	101	101	2000	101	101	101	101	101
120.0	C(1)C121 (2) (3) GAC	F,G,H,J,K	121	121	121	121	121	121	121	121		121	121	121	121
150.0	C(1)C151 (2) (3) GAC	F,G,H,J,K	151	151	151	151	151	151	151			151	151	151	151
180.0	C(1)C181 (2) (3) GAC	F,G,H,J,K	181	181	181	181	181	181	181	181		⊌181	181	181	181
220.0	C(1)C221 (2) (3) GAC	F,G,H,J,K	221	221	221	221	221	221	221	221		221	221	221	221
270.0	C(1)C271 (2) (3) GAC	F,G,H,J,K		271	271	271#		271	271	271		271	271	271	271
330.0	C(1)C331 (2) (3) GAC	F,G,H,J,K		331	331	331#		331	331	331		331	331	331	331
390.0	C(1)C391 (2) (3) GAC	F,G,H,J,K		391	391	391#	391	391	391	391		391	391	391	391
470.0	C(1)C471 (2) (3) GAC	F,G,H,J,K	I	471	471	471#	471	471	471	471	471	471	471	471	471
560.0	C(1)C561 (2) (3) GAC	F,G,H,J,K	I	561	561		561	561	HER.	561		561	561	561	561
680.0	C(1)C681 (2) (3) GAC	F,G,H,J,K		681	681		681	681	100	681	681	681	681	681	681
820.0	C (1)C821 (2) (3) GAC	F,G,H,J,K		821	821#		821		gar.	821		821	821	821	821
1000.0	C(1)C102 (2) (3) GAC	F,G,H,J,K		102	102	100	102	102	1,686.0	102		102	102	102	102
1200.0	C(1)C122 (2) (3) GAC	F,G,H,J,K		122			1900		1 160 7	122		122	122	122	122
1500.0	C(1)C152 (2) (3) GAC	F,G,H,J,K		152	<u> </u>					152		152	152	152	152
1800.0	C(1)C182 (2) (3) GAC	F,G,H,J,K		182		1.5				182		182	182	182	182
2200.0		F,G,H,J,K	L	_			24	1000	115.5	222			222	222	222
2700.0	C (1)C272 (2) (3) GAC	F,G,H,J,K		127	ļ	14.2				272		333	272		272
3300.0	C(1)C332 (2) (3) GAC	F,G,H,J,K			1	1,000	0.00		1 612	332			332		332
3900.0	C(1)C392 (2) (3) GAC	F,G,H,J,K				- 10				392			392		1
4700.0	C(1)C472 (2) (3) GAC	F,G,H,J,K					14.5		1.00	472		1000	472		1
5600.0		F,G,H,J,K		17.		1 150			.075	562			562		1
6800.0		F,G,H,J,K				10,748	Let V		1 4 7	19.35		85	682		1
8200.0		F,G,H,J,K		100				9-5	7.0	6.4	-	100	822		1
10,000.0		F,G,H,J,K				4 4 4	1.0	4				: A			
12,000.0		F,G,H,J,K			1		960 4		1-23		9	200	123	1	1

C1805, C1808, C1812, C1825, C2220 & C2225

CAP.		CAP.	1.50	C180)5	15.5	C180	8	Gr.	C181	2* 😘	ers, s	C1825	· Maria	C22	220	3 (4)	C2225	
PF	KEMET PART NUMBER	TOL.	50V	100V	200V	50V	100V	200V	50V	100V	200V	50V	100V	200V	50V	100V	50V	100V	200V
220.0	C_ (1) _ C221 (2) (3) GAC	F,G,H,J,K	221	221	221			14.77	1469	44	1100.5	45.4		8.25				أحصط	
270.0	C_ (1) _ C271 (2) (3) GAC	F,G,H,J,K	271	271	271			1.198	Tiv.		3.67		75	- 0.48	380				1.8019
330.0	C_ (1) _ C331 (2) (3) GAC		331	331	331	331	331	331		4	F 10		8. 20.	2. 经报金	3				1.650
390.0	C_ (1) _ C391 (2) (3) GAC	F,G,H,J,K	391	391	391	391	391	391		hg/t	110			100		:	1		1 12
470.0	C (1)C471 (2) (3) GAC	F,G,H,J,K	471	471	471	471	471	471	471	471	471			12.0	10.0	:			
560.0	C(1)C561 (2) (3) GAC	F,G,H,J,K	561	561	561	561	561	561	561	561	561		SCT.	- 1	W-				1.466
680.0	C (1) C681 (2) (3) GAC	F,G,H,J,K	681	681	681	681	681	681	681	681	681	14		1720	7				
820.0	C(1)C821 (2) (3) GAC	F,G,H,J,K	821	821	821	821	821	821	821	821	821	0.01	igi.	100	35/			<u> </u>	
1000.0	C (1)C102 (2) (3) GAC	F,G,H,J,K	102	102	102	102	102	102			102	12.13	3	1.0			-	<u> </u>	100
1200.0	C (1)C122 (2) (3) GAC	F,G,H,J,K	122	122		122	122	122	122	122	122	iers.	<u> </u>	1450					100
1500.0			152	152	L	152	152	152	152	152	152	× .		- 440686					
1800.0	C_ (1) _ C182 (2) (3) GAC	F,G,H,J,K	182	182		182	182	182	182	182	182		4	* 94				<u> </u>	
2200.0	C(1)C222 (2) (3) GAC		222	222		222	222	222	222	222	222			70.2	100			Ь—-	
2700.0			272	272		272	272	272	272	272	272		31	200 34000	Mr.		<u> </u>	├ ──	
3300.0					<u> </u>	332	332	-	332	332	332		-	12.00	<u> </u>	:			
3900.0			↓	ļ		392	392		392	392		392	392	392			472	472	472
4700.0			ļ	ļ	ļ	472	472		472	472	472	472		472			562		562
5600.0			<u> </u>	<u> </u>	-	 	ļ		562	562	562	562		562		682	682		682
6800.0			ļ	<u> </u>	1	 	ļ	-	682	682	682	682		682	682 822	822	822	822	822
8200.0			_			 			822	822	. 192	822		822	103	103	103		103
10,000.0			_		ļ	↓		ļ	103	103	14-132	103		103		123	123		123
12,000.0				<u> </u>		<u> </u>	ļ		-		7-00	123	123	123	123		153		153
15,000.0				<u> </u>	_	↓	ļ	1	1		# # 17 HALE	153		1200	153	153			153
18,000.0				1	<u> </u>	4	<u> </u>	1	1	1		183	183		183	183	183 223		+
22,000.0						<u> </u>	1		-			223	223	-	223	<u> </u>	273		
27,000.0				ـــــ		 			1	-	1 -	273	273	┼	273	-	333		
33,000.0	C_ (1) _ C333 (2) (3) GAC	F,G,H,J,K			.1	I	1	<u>i</u>		1		1	<u> </u>			<u> </u>	333		Щ

(1) To complete part number, insert four digit number for KEMET style desired: 0603, 0805, 1005, 1206, 1210, 1805, 1808, 1812, 1825, 2220 or 2225.

(2) To complete part number, insert appropriate letter for capacitance tolerance desired per table.

(3) To complete part number, insert appropriate number for voltage desired: "2" for 200 volts, "1" for 100 volts and "5" for 50 volts.

*EIA preferred chip sizes #DF Limit for Extented Range is 0.15%.

NOTE: For non-standard capacitance values or voltages, contact your local KEMET sales representative. 50 Volt Ceramic Chips can be used for 63 volt applications.

CERAMIC CHIP/STANDARD

X7R CAPACITANCE RANGE - C0603, C0805, C1005, C1206 & C1210

CAP.	A CONTRACT OF STATE O	CAP.	C0603*	123	C080	5*		C100)5		C120	5*		C121	
PF	KEMET PART NUMBER	TOL.	50V	50V	100V	200V	50V			50V	100V	200V	50V	100V	200V
	C(1)C181 (2) (3) RAC	K,M,J	181	- 4	1, 71										·
	C (1) C221 (2) (3) RAC	K,M,J	221	221	221	221									
270.0	C (1)C271 (2) (3) RAC		271	271	271	271						<u> </u>			
330.0	C (1) C331 (2) (3) RAC	K,M,J	331	331	331	331			<u> </u>	_					
390.0	C(1)C391 (2) (3) RAC	K,M,J	391	391	391	391			<u> </u>			└	_		ļ
470.0	C (1)C471 (2) (3) RAC	K,M,J	471	471	471	471						ļ			
560.0	C (1)C561 (2) (3) RAC	K,M,J	561	561	561	561		- 201	004			-			
680.0	C (1)C681 (2) (3) RAC	K,M,J	681	681	681	681	681	681	681 821	<u> </u>	<u> </u>	├	ļ	 	├
820.0	C (1)C821 (2) (3) RAC			821	821	821	821	821		400	102	102			
1000.0	C (1)C102 (2) (3) RAC	K,M,J	102	102	102	102	102	102	102	102	122	122	- 10		
1200.0	C(1)C122 (2) (3) RAC	K,M,J	122	122	122	122	122	122 152	122 152	122 152	152	152	-		
1500.0	C(1)C152 (2) (3) RAC	K,M,J	152	152	152	152	152	182	182	182	182	182	 	 	-
	C(1)C182 (2) (3) RAC	K,M,J	182	182	182	182	182 222	222	222	222	222	222	222	222	222
	C(1)C222 (2) (3) RAC	K,M,J	222	222	272	272	272	272	222	272	272	272	272	272	272
	C(1)C272 (2) (3) RAC			272	332	332	332	332	 	332	332	332	332	332	332
	C(1)C332 (2) (3) RAC	K,M,J	332	332	392	392	392	392	 	392	392	392	392	392	392
	C(1)C392 (2) (3) RAC	K,M,	392	392 472	472	472	472	472		472	472	472	472	472	472
	C(1)C472 (2) (3) RAC				562	562	562	562	 	562	562	562	562	562	562
	C (1)C562 (2) (3) RAC			562			682	682	 	682	682	682	682	682	682
	C(1) 2_C682 (2) (3) RAC			682	682 822	682	822	822	 	822	822	822	822	822	822
	C(1)C822 (2) (3) RAC	IK,M,	822	822		1	103	103	 	103	103	103	103	103	103
	C(1)C103 (2) (3) RAC			103			123		 	123	123	123	123	123	123
	C(1)C123 (2) (3) RAC	K,M,	123	153		┼	153			153	153	153	153	153	153
15,000.0				183		+	183	155	+	183	183	183	183	183	183
18,000.0	C(1)C183 (2) (3) RAC			223		1-	223		 	223	223	223	223		223
22,000.0		IN,M,	4	273		+	273		 	273		1	273		273
27,000.0				333		+	333		1	333		1	333		333
33,000.0				393		1	393		 	393			393		393
39,000.0	C(1)C393 (2) (3) RAC	1,M,	1	473		+	1000	-	+	473		1	473	473	473
47,000.0		17,141	 	563		 	+	1	1	563		1	563	563	
56,000.0		L'W'	1	683		+-	1	1	1	683		1	683	_	1
68,000.0				823			1-	1 -	+	823		\top	823		1
82,000.0				104		1	1	+ -	t	104		t	104		T
100,000.0				1104	+	+		+	+	124		1	124		T^{-}
120,000.0				+-	-	+-	100	1-	+	154		+	154		1
150,000.0				+	1-	1			+	184		 	184		1
180,000.0	C(1)C184 (2) (3) RAC	K,M,		1-	1 70.2	1 57		+-	+-	224		1	224		+
220,000.0				+	+	+-	+	1	+-	+==	1	1	274		1
270,000.0				+	1000	4	10.5	+-	+	+-		7	334		1
330,000.0	C(1)C334 (2) (3) RAC	ĮΚ,Μ,	ال ال	1	1200	Jak 1	100	4	1		فيا	ك	1-5	1.5	

C1805, C1808, C1812, C1825, C2220, & C2225

242	THE PART OF SALES	CAP.		C180	15		C180	8	-sQA	C181:	2*		C1825	5*	C22	220	C	2225	
CAP. PF	KEMET PART NUMBER	CAP.	50V	100V	200V	50V	100V	200V	50V	100V	200V	50V	100V	200V	50V	100V	50V	100V	200
2700.0	C(1)C272 (2) (3) RAC	K,M,J	272	272	272		History)			E Style		Ш	1,345			-			
3300.0	C(1)C332 (2) (3) RAC	K,M,J	332	332	332				984	9.1			- '						-
3900.0	C (1)C392 (2) (3) RAC	K,M,J	392	392	392		and the	14.5				\square				-	-		-
4700.0	C(1)C472 (2) (3) RAC	K,M,J	472	472		472	472	472	1,000		L				-				-
5600.0	C (1) C562 (2) (3) RAC	K,M,J	562	562	562	562	562	562	LONGE!					<u> </u>	<u> </u>		-		—
6800.0	C (1) C682 (2) (3) RAC	K,M,J	682	682	1.4	682	682	682	682	682	682		- 1	<u> </u>	\vdash				-
8200.0	C (1) C822 (2) (3) RAC	K,M,J	822	822	Qh.	822	822	822	822	822	822	<u> </u>		 	\vdash		\vdash		┢
10.000.0	C (1) C103 (2) (3) RAC	K,M,J	103	103		103		103	103		103	_					\vdash		╁┈
12,000.0	C (1) C123 (2) (3) RAC	IK,M,J	123	123		123	123	123	123		123	_			Н				├
15,000.0	C (1) C153 (2) (3) RAC	K,M,J	153	153			153	153			153	1-			Н	- 1			\vdash
18,000.0	C (1) C183 (2) (3) RAC	[K,M,J	183	183			183	183	183		183	000	223	223			Н		╁
22,000.0	C (1) C223 (2) (3) RAC	K,M,J	223	223	1	223		ļ	223		223	223 273	273	273	-		-		╁
27,000.0	C (1)C273 (2) (3) RAC	K,M,J	273	273		273		 	273	273	273		333	333	\vdash		-		┼─
33,000.0	C (1)C333 (2) (3) RAC	K,M,J	333	<u> </u>	3 .		333	ļ	333		333	333	393	393	H		 		+-
39,000.0	C(1)C393 (2) (3) RAC	K,M,J	393	↓			393	 	393 473		473	473	473	473	1	++-	473	473	4
47,000.0	C(1)C473 (2) (3) RAC	K,M,J	473	<u> </u>		473		-			4/3	563	563	563	-	7	563		5
56,000.0		K,M,	563	1	-		563	-	683		┼─	683	683	683	-		683		16
68,000.0	C (1)C683 (2) (3) RAC	K,M,	683	1	 	683		├	823		┼	823	823	823	1		823		8
82,000.0		K,M,	823	1	_	823			104			104	104	104	├-		104		1
100,000.0				'	-	104		├	124		 	124	124	1 :5.	╁	 	124		11
120,000.0				↓	-	124		+	154		╂	154	154	+	 	 	154		11
150,000.0	C(1)C154 (2) (3) RAC			↓ —		184		+	184		+-	184	184	 	+		184		T
180,000.0				ļ	+	1104	1	+	224			224	224	+	t		224	224	T
220,000.0	C(1)C224 (2) (3) RAC			+	+	+	+	+	274		+	274		+	274	274	274	274	1
270,000.0	C(1) _ C274 (2) (3) RAC	I N.M.	 	+	+	+-	┼	 	334		1	334		1	334	334	334	334	Т
330,000.0		K M	;├	+	+	+-	 	1-	394		1	394		1	394	394	394	394	Τ
390,000.0				+	+-	+-	1-	1	474			474			474	474	474		\Box
470,000.0				-	+-	+-	-	1	\top	1		564			564		564		I
560,000.0 680,000.0		KW.	il - li	+	+	+-	1	1	1	1		684			684		684		
820,000.0				+	+	1-	1	1	1			1		I	824		824		L
.000.000.0				+-	+	1	1		1		T				105		105		
200,000.0	C(1)C125 (2) (3) RAC	K M	1	 	1	1	—	1		1	T	T	1		125	I			1

(1) To complete part number, insert four digit number for KEMET style desired: 0603, 0805, 1005, 1206, 1210, 1805, 1808, 1812, 1825, 2220 or 2225.
(2) To complete part number, insert appropriate letter for capacitance tolerance desired per table.
(3) To complete part number, insert appropriate number for voltage desired: "2" for 200 volts, "1" for 100 volts and "5" for 50 volts.

*EIA preferred chip sizes
NOTE: For non-standard capacitance values or voltages, contact your local KEMET sales representative. 50 Volt Ceramic Chips can be used for 63 volt applications.



C Series

Features

Multilayer Ceramic Chip Capacitors nickel barrier type.

Class I and class II.

Delivered as standard on tape and reel.

Electrical Specifications

Capacitance range

0.5pF to 4.7µF

Capacitance measuring conditions

Class 1

5Vrms max, 1MHz ±10% 1000pF and less 5Vrms max, 1kHz ±10% >1000pF

Class 2

 $1kHz \pm 10\%$

 $1.0 \pm 0.2 \, \text{Vrms}$

Q or Dielectric dissipation factor (tan∂)

COG 30pF min

Q > = 1000

less than 30pF Q>=400+20xC where C is the

nominal capacitance

3.0% Max X7R

4.0% Max Z5U

5.0% Max

Withstand voltage 1-5 seconds

COG 3 x rated voltage

Others 2.5 x rated voltage

Insulation resistance

 $10G\Omega$ or $500M\Omega$ x capacitance in μF whichever

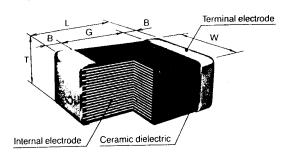
 $10G\Omega$ or $500M\Omega$ x capacitance in μF whichever 25V is the smaller

 $10G\Omega$ or $100M\Omega$ x capacitance in μF whichever is the smaller

Product Identification

Į	153542 1	2	3	4	5	6
1	15:512	A view	3	101	5	i,

Shapes and Dimensions



1 Product symbol

						1.5
C1608	1.6±0.1	0.8±0.1	0.9	0.2	0.3	
[0603]	[.063±.004]	[.031±.004]	[.035]	[.008]	[.012]	
C2012	2.0±0.2	1.25±0.2	1.45	0.2	0.5	
[0805]	[.079±.008]	[.049±.008]	[.057]	[.008]	[. 02 0]	
C3216	3.2±0.2	1.6±0.2	1.30	0.2	1.0	
[1206]	[.126±.008]	[.063±.008]	[.051]	[.008]	[.039]	

Dimensions in mm (inches)

2 Capacitance temperature characteristics

			Arriva a	
COG	0 ±30 pp	m/°C	-55 to +125 [-67 to +257]	
X7R	±15%		-55 to +125 [-67 to +257]	
Z 5U	+22% -56%		+10 to +85 [+50 to +185]	
Y 5V	+22% -82%		-30 to +85 [-22 to +185]	

1400

3 Rated voltage

	#ET 1
16	1C
25	1E
50	1H

4 Nominal capacitance

Stated in three digits and in units of pico farads (pF). The first and second digits identify the first and second significant figures of the capacitance, the third digit identifies the multiplier. However, when there are decimal digits included they are stated as R.

C Series (Continued)

Examples

	132216000 10000 10000 1000 1000 1000 1000	CZOTACOOTHONISCT
1	010	
10	100	
1000	102	
0.5	0R5	· · · · · · · · · · · · · · · · · · ·
3.5	3R5	

Capacitance tolerance

	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
±0.25pF	С	10pF max.		
±0.5pF	D			
±5%	J	12pF min.	1913.3	
10%	K		* * **, *	
±20%	M :		1907-190	
+80,-20%	Z		•	

6 Tape and reel

For taping specification please refer to pages 6.1 - 6.4.



Class 1 50 Vdc

ale "		Charles and the second of the	Examples
0.5±0.25pF	C1608C0G1H0R5CT	C2012C0G1H0R5CT	C3216C0G1H0R5CT
1.0±0.25pF	C1608C0G1H010CT	C2012C0G1H010CT	C3216C0G1H010CT
1.5±0.25pF	C1608C0G1H1R5CT	C2012C0G1H1R5CT	C3216C0G1H1R5CT
2.0±0.25pF	C1608C0G1H020CT	C2012C0G1H020CT	C3216C0G1H020CT
2.5±0.25pF	C1608C0G1H2R5CT	C2012C0G1H2R5CT	C3216C0G1H2R5CT
3.0±0.25pF	C1608C0G1H030CT	C2012C0G1H030CT	C3216C0G1H030CT
3.5±0.25pF	C1608C0G1H3R5CT	C2012C0G1H3R5CT	C3216C0G1H3R5CT
4.0±0.25pF	C1608C0G1H040CT	C2012C0G1H040CT	C3216C0G1H040CT
4.5±0.25pF	C1608C0G1H4R5CT	C2012C0G1H4R5CT	C3216C0G1H4R5CT
5.0±0.5pF	C1608C0G1H050DT	C2012C0G1H050DT	C3216C0G1H050DT
6.0±0.5pF	C1608C0G1H060DT	C2012C0G1H060DT	C3216C0G1H060DT
7.0±0.5pF	C1608C0G1H070DT	C2012C0G1H070DT	C3216C0G1H070DT
8.0±0.5pF	C1608C0G1H080DT	C2012C0G1H080DT	C3216C0G1H080DT
9.0±0.5pF	C1608C0G1H090DT	C2012C0G1H090DT	C3216C0G1H090DT
10±0.5pF	C1608C0G1H100DT	C2012C0G1H100DT	C3216C0G1H100DT
12±5%	C1608C0G1H120JT	C2012C0G1H120JT	C3216C0G1H120JT
15±5%	C1608C0G1H150JT	C2012C0G1H150JT	C3216C0G1H150JT
18±5%	C1608C0G1H180JT	C2012C0G1H180JT	C3216C0G1H180JT
22±5%	C1608C0G1H220JT	C2012C0G1H220JT	C3216C0G1H220JT
27±5%	C1608C0G1H270JT	C2012C0G1H270JT	C3216C0G1H270JT
33±5%	C1608C0G1H330JT	C2012C0G1H330JT	C3216C0G1H330JT
39±5%	C1608C0G1H390JT	C2012C0G1H390JT	C3216C0G1H390JT
47±5%	C1608C0G1H470JT	C2012C0G1H470JT	C3216C0G1H470JT
56±5%	C1608C0G1H560JT	C2012C0G1H560JT	C3216C0G1H560JT
68±5%	C1608C0G1H680JT	C2012C0G1H680JT	C3216C0G1H680JT
82±5%	C1608C0G1H820JT	C2012C0G1H820JT	C3216C0G1H820JT
100±5%	C1608C0G1H101JT	C2012C0G1H101JT	C3216C0G1H101JT
120±5%	C1608C0G1H121JT	C2012C0G1H121JT	C3216C0G1H121JT
150±5%	C1608C0G1H151JT	C2012C0G1H151JT	C3216C0G1H151JT
180±5%	C1608C0G1H181JT	C2012C0G1H181JT	C3216C0G1H181JT
220±5%	C1608C0G1H221JT	C2012C0G1H221JT	C3216C0G1H221JT
270±5%	C1608C0G1H271JT	C2012C0G1H271JT	C3216C0G1H271JT
330±5%	C1608C0G1H331JT	C2012C0G1H331JT	C3216C0G1H331JT
390±5%	C1608COG1H391JT	C2012C0G1H391JT	C3216C0G1H391JT
470±5%	C1608COG1H471JT	C2012C0G1H471JT	C3216C0G1H471JT
560±5%		C2012C0G1H561JT	C3216C0G1H561JT
680±5%		C2012C0G1H681JT	C3216C0G1H681JT
820±5%		C2012C0G1H821JT	C3216C0G1H821JT
1000±5%		C2012C0G1H102JT	C3216C0G1H102JT



Class 2 50 Vdc

220±10%	C1608X7R1H221KT		
270±10%	C1608X7R1H271KT		
330±10%	C1608X7R1H331KT		
390±10%	C1608X7R1H391KT		
470±10%	C1608X7R1H471KT	C2012X7R1H471KT	C3216X7R1H471KT
560±10%	C1608X7R1H561KT	C2012X7R1H561KT	C3216X7R1H561KT
680±10%	C1608X7R1H681KT	C2012X7R1H681KT	C3216X7R1H681KT
820±10%	C1608X7R1H821KT	C2012X7R1H821KT	C3216X7R1H821KT
1000±10%	C1608X7R1H102KT	C2012X7R1H102KT	C3216X7R1H102KT
1200±10%	C1608X7R1H122KT	C2012X7R1H122KT	C3216X7R1H122KT
1500±10%	C1608X7R1H152KT	C2012X7R1H152KT	C3216X7R1H152KT
1800±10%	C1608X7R1H182KT	C2012X7R1H182KT	C3216X7R1H182KT
2200±10%	C1608X7R1H222KT	C2012X7R1H222KT	C3216X7R1H222KT
2700±10%	C1608X7R1H272KT	C2012X7R1H272KT	C3216X7R1H272KT
3300±10%	C1608X7R1H332KT	C2012X7R1H332KT	C3216X7R1H332KT
3900±10%	C1608X7R1H392KT	C2012X7R1H392KT	C3216X7R1H392KT
4700±10%	C1608X7R1H472KT	C2012X7R1H472KT	C3216X7R1H472KT
5600±10%	C1608X7R1H562KT	C2012X7R1H562KT	C3216X7R1H562KT
6800±10%	C1608X7R1H682KT	C2012X7R1H682KT	C3216X7R1H682KT
3200±10%	C1608X7R1H822KT	C2012X7R1H822KT	C3216X7R1H822KT
10000±10%	C1608X7R1H103KT	C2012X7R1H103KT	C3216X7R1H103KT
12000±10%	C1608X7R1H123KT	C2012X7R1H123KT	C3216X7R1H123KT
15000±10%	C1608X7R1H153KT	C2012X7R1H153KT	C3216X7R1H153KT
18000±10%		C2012X7R1H183KT	C3216X7R1H183KT
22000±10%		C2012X7R1H223KT	C3216X7R1H223KT
27000±10%		C2012X7R1H273KT	C3216X7R1H273KT
33000±10%		C2012X7R1H333KT	C3216X7R1H333KT
39000±10%		C2012X7R1H393KT	C3216X7R1H393KT
47000±10%		C2012X7R1H473KT	C3216X7R1H473KT
56000±10%		C2012X7R1H563KT	C3216X7R1H563KT
68000±10%			C3216X7R1H683KT
82000±10%			C3216X7R1H823KT
100000±10%		C2012X7R1H104KT	C3216X7R1H104KT
120000±10%			C3216X7R1H124KT
150000±10%			C3216X7R1H154KT

Surface Mount Chip Capacitors

Application notes

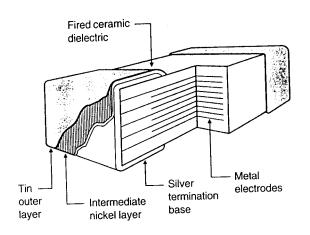
Leaching

Leaching is the term for the dissolution of silver into the solder during the soldering operation. This weakens the terminations leading to an increase in equivalent series resistance (esr), tan δ and open circuit faults as well as the possibility of the chip becoming detached from the substrate.

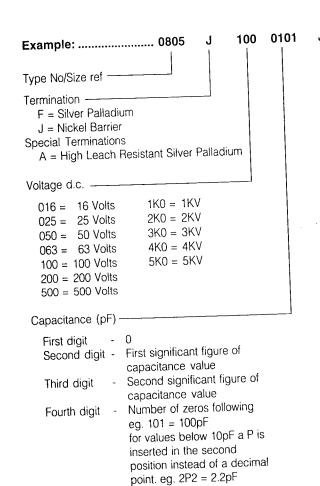
To prevent leaching, the following should be observed:-

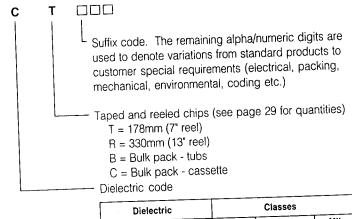
- 1. Prework should be kept to a minimum.
- 2. An adequate preheat period is essential.
- 3. Solder temperature should be held at the lower end of the normal range.
- 4. Dwell time should be kept to a minimum.
- Use ceramic chip capacitors with an "anti-leaching layer".
 We incorporate a "barrier layer" of Nickel in the end terminations to prevent leaching.

Multilayer ceramic chip - with Nickel barrier termination



Ordering information for Surface Mount Chip Capacitors





Dielectric		Classes								
Class	Code	CECC	EIA	MIL						
Ultra stable	С	1B/CG	COG(NPO)	CG/(BP)						
Stable	X	2R1	X7R							
General purpose	Z	2F4	Z5U							
Ultra High Frequency	Q			<u> </u>						
To special order				1						
Stable	В	2X1	1	BX						
Stable	R	2C1		BZ						

Note: For 0402 size only, ultra stable dielectric material is COH which has a TC of 0 ± 60 ppm/°C. The dielectric code is 'H'.

Capacitance tolerance code

Ultra st	Stable class			
Cr < 10pF	± 0.10 pF	В	± 5%	J
01 1 100	± 0.25 pF	c	± 10%	ļκ
	± 0.5 pF	D	± 20%	М
Cr ≥ 10pF	± 1%	F	G.P. class	
01 <u>2</u> 10pi	± 2%	G	± 20%	М
	± 5%	J	-20% + 80%	Z
	± 10%	Ιĸ		

Surface Mount Chip Capacitors - 50/63, 100, 200V

Size & Capacitance Table - Ultra-stable dielectric



Туре	0805	0907	1206	1210	1812	2220	2225	
Dimensions	t.3	О	D		0			
Length (L ₁) mm inches	2.0±0.3	2.3±0.3	3.2±0.3	3.2±0.3	4.5±0.35	5.7±0.4	5.7±0.4	
	0.08±0.012	0.09±0.012	0.125±0.012	0.125±0.012	0.18±0.014	0.225±0.016	0.225±0.016	
Width (W)Max mm inches	1.25±0.2	1.8±0.3	1.6±0.2	2.5±0.3	3.2±0.3	5.0±0.4	6.3±0.4	
	0.05±0.008	0.071±0.012	0.063±0.008	0.10±0.012	0.125±0.012	0.197±0.016	0.25±0.016	
Thickness (H) Max mm inches	1.3	1.3	1.6	1.8	1.8	1.8	1.8	
	0.051	0.051	0.063	0.07	0.07	0.07	0.07	
Termination Band (L ₂ and L ₃) mm inches	Min Max	Min Max	Min Max	Min Max	Min Max	Min Max	Min Max	
	0.25 0.75	0.25 0.75	0.25 0.75	0.25 0.75	0.25 0.75	0.25 0.75	0.25 0.75	
	0.01 0.03	0.01 0.03	0.01 0.03	0.01 0.03	0.01 0.03	0.01 0.03	0.01 0.03	
Band Gap (L ₄) Min mm inches	0.5	0.5	1.4	1.4	2.2	2.9	2.9	
	0.019	0.019	0.055	0.055	0.087	0.114	0.114	
Rated voltage d.c.	50 63 100 200	⁵⁰ 63 100 200	50 63 100 200	⁵⁰ 63 100 200	⁵⁰ ₆₃ 100 200	⁵⁰ 63 100 200	⁵⁰ ₆₃ 100 200	
Cap. range Code		N	linimum and Max	imum capacitano	ce values availab	le		
1.0pF			《《···································					

- Notes: 1. For details of ordering see page 33.
 2. Capacitance values to the E24 range also available.
 3. Higher capacitance values may be available with a corresponding increase in thickness.
 - 4. Sizes 1005 and 1808 are available as a special requirement.
 - 5. Chips to a specified thickness can be supplied as a special requirement.

Surface Mount Chip Capacitors - 50/63, 100, 200V

Size & Capacitance Table - Stable dielectric



Type	0805	0907	1206	1210	1812	2220	2225
Dimensions	D						
Length (L ₁) mm inches	2.0±0.3	2.3±0.3	3.2±0.3	3.2±0.3	4.5±0.35	5.7±0.4	5.7±0.4
	0.08±0.012	0.09±0.012	0.125±0.012	0.125±0.012	0.18±0.014	0.225±0.016	0.225±0.016
Width (W)Max mm inches	1.25±0.2	1.8±0.3	1.6±0.2	2.5±0.3	3.2±0.3	5.0±0.4	6.3±0.4
	0.05±0.008	0.071±0.012	0.063±0.008	0.10±0.012	0.125±0.012	0.197±0.016	0.25±0.016
Thickness (H) Max mm inches	1.3	1.3	1.6	1.8	1.8	1.8	1.8
	0.051	0.051	0.063	0.07	0.07	0.07	0.07
Termination Band (L ₂ and L ₃) mm inches	Min Max	Min Max	Min Max	Min Max	Min Max	Min Max	Min Max
	0.25 0.75	0.25 0.75	0.25 0.75	0.25 0.75	0.25 0.75	0.25 0.75	0.25 0.75
	0.01 0.03	0.01 0.03	0.01 0.03	0.01 0.03	0.01 0.03	0.01 0.03	0.01 0.03
Band Gap (L ₄) Min mm inches	0.5	0.5	1.4	1.4	2.2	2.9	2.9
	0.019	0.019	0.055	0.055	0.087	0.114	0.114
Rated voltage d.c.	50 63 100 200	63 100 200	50 63 100 200 Minimum and Max		63 100 200	<u> </u>	50 63 100 200
Cap. range Code						î l	
120					→ 一		

Maximum values by dielectric class (in capacitance code)

Maximum values	Maximum values by dielectric class (iii Capacitarioc Gods) Code B 153 562 182 333 103 392 473 183 682 124 333 153 224 683 273 564 154 563 684 184 683 683 684 684 683 684 684 683 684 6																					
BY/2Y1	Code B	153	562	182	333	103	392	473	183	682	124	333	153	224	683	273	564	154	563	684	184	683
DAZAT		ļ		ļ						400	104	C02	222	304	124	303	824	274	823	105	394	104
2C1	Code R	333	103	332	563	223	562	104	333	103	184	003	223	354	124	030	02,		020			\vdash
	Code X	 			-	-		404	104	562	224	184	104	564	334	184	125	684	394	155	105	564
X7R/2R1	Code X	104	273	153	104	563	333	184	104	303	334	104		00,				L	L.,		L	L
	1	1		┸	ــــــــــــــــــــــــــــــــــــــ		1	Ь										-1		ont		

Notes: 1. For details of ordering see page 33.

- 2. Higher capacitance values may be available with a corresponding increase in thickness.
- 3. Sizes 1005, 1808 are available as a special requirement
- 4. Chips to a specified thickness can be supplied as a special requirement



Pd系電極積層磁器コンデンサ

PU BASED ELECTRODE MULTI LAYER CERAMIC CAPACITORS



この積層磁器コンデンサは従来,一般に使用されているバラジウムを内部および外部電極に使用したもので,高密度自動実装に適した信頼性の高いチップ部品で品種には105形,107形,212形,316形の4種があります。

These highly reliable chip type multi layer ceramic capacitors, which have been currently provided with palladium internal and external electrodes, are available in four types as the 105, 107, 212 and 316 that are suitable for high density automatic mounting operations.

P1 107 24 12 15 15 1

- ●実装密度の向上が図れます。
- ●モノリシック構造のため,信頼性が高い。

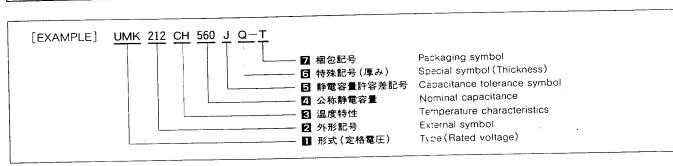
Aller Day

●同一形状,静電容量範囲が広い。

特 是/FEATURES

- Improve mounting density.
- High reliability assured by monolithic structure.
- A single configuration, wide range of capacitance.

形名《ORDERING》CODE





E CHAPAOTERISTICS!

■形式 (定格電圧)

TYPE (RATED VOLTAGE)

TICH SY	nbol Maria	以定格電圧(DC) Rated Voltage
EMK	:	16V
TMK	:	25V
UMK		50 V

2 外形記号

EXTERNAL SYMBOL

記号 Sym	bol	LXT [mm]
105	:	1.0×0.5 (EIA: CC0402)
107	:	1.6×0.8 (EIA: CC0603)
212	:	2.0×1.25 (EIA: CC0805)
316	:	3.2×1.6 (EIA: CC1206)

3 温度特性

TEMPERATURE CHARACTERISTICS

種類 1	(EIA準拠品)	Class 1 (EIA standard products)
退度特 SeTemper	性 建原体数範囲。ppn ature char, Temperature coeffic	n/C] * I 证使用温度範囲 ent range Operation temp range */
CK	0 ± 250	
င္ပ	0 ± 120	
СН	0 ± 60	·
CG	0 ± 30	
PK	-150 ± 250	
PJ	-150 ± 120	
PH	-150 ± 60	
RK	-220 ± 250	
RJ	-220 ± 120	
RH	-220 ± 60	-55~+125℃
SK	-330 ± 250	
SJ	-330 ± 120	
SH	-330 ± 60	
TK	-470 ± 250	
TJ	-470 ± 120	
TH	-470 ± 60	
UK	-750 ± 250	
ŲJ	-750 ± 120	
SL.	-1000~+350	

※1:20℃における静電容量を基準 Based on the capacitance at 20℃

種類 2

Class 2

温度特性 Temperatur	お見さ量変化率(以内)) char. Legacitance change (With	※) 使用温度範囲 ※ in) → Operation temp tange 。
В	±10% · or ±15%(EIA:X7R)	−25 − +85°C or −55 ~ +125°C(EIA∶X7R)
F	+30 ₉₆ -80 ⁹⁶	-25~+85°C

※1: 20℃における静電容量を基準 Based on the capacitance at 20℃

4 公称静電容量

NOMINAL CAPACITANCE

oF単位で表した3数字

pF unit in 3 digits

ALL MARKAGONET		1000
Etample capacitance (1.2.5)	4	
560 : 56pF		

▶電容量許容差記号 CAPACITANCE TOLERANCE SYMBOL

(id) Symbol		許智差 Tolerance。		区分 Foresitem
С	:	±0.25 pF	1	~10 pF
D	:	±0.5 pF	1	~10 pF
F	:	±1 pF	1	~10 pF
J	:	±5 %	1	11 pF-
К	:	±10%	1	11 pF~
İ			2	B Char.
М	:	±20%	2	B Char.
Z	:	+80 -20 [%]	2	F Char.

◎ 特殊記号(厚み)

SPECIAL SYMBOL (THICKNESS)

尼号 Sy	mbol 🖟	parking)	厚み Thicknes	s[mm]	
33 3 3 3 3 3 3 3 3 3	the state of	第105章	25-44: 107-44 4 84	AR 212 - 343	0.60
Q	:			0.60	
R	:			0.85	0.85
S	:				1.15
Т	:			1.25	
w	:	0.50			
z	:		0.80		

7 梱包記号

PACKAGING SYMBOL

RH S	mbol .		細包 Packaging Sylvery
Т	:	テーピング	Taped (4mm, 8mm pitch)
F	:	テーピング	Taped (2mm pitch)
В	:	バルク	Bulk

Q, tan δ

種類 1

Class 1

	区分 (fem y	
≥400+20·C *1	~27 pF	
≥1000	30 pF	

※1:C=公称静電容量 Nominal capacitance [pF]

※2:測定周波数 Measurement frequency=1±0.1MHz (C≤1000pF)

1±0.1 kHz (C>1000 pF)

Measurement voltage =0.5~5 Vrms (C ≤1000 pF) 測定電圧

 $1 \pm 0.2 \, \text{Vrms} \, (C > 1000 \, \text{pF})$

種類 2

Class 2

07, 212, 316	≦2.5%	B char.	
	≤ 5.0%	F Char.	
)5	≨2.5%	B char.	50V, 25V
	≤ 3.5%	B char.	16V
	≤5.0%	F char.	50V, 25V
	≦7.0%	F char.	0.033 µF, 0.047 µF
	≦9.0%	F char.	0.068µF~

※1:測定周波数 Measurement frequency=1±0.1kHz Measurement voltage =1±0.2Vrms 測定電圧

■212TYPE(リフロー、フローはんだ用/端子電極:メッキ Reflow, flowsoldering/terminal electrode:plating)

Diass 1 定格 電圧					(-)3 4-)3			Tem	E	nure	che	racte	1± erist	cs		Ĭ					公門。称 《静電容量	静電容量 許容差 Capacitance	厚み Thickness	
Rated Voltage (DC)	#ST Ordering code	CK	C O	TOI		P K	P		R K	R	Ŕ	s K	s J	s H	FΥ	C.1	т, н	ĸ	່ວ	S L	Capacitance (pF)	tolerance. (%)	(mm)	
<u> </u>	UMK 212 △ 0R5 □ Q	0	17.765	, N. J. S.	- 3-	0	-		0			0			0			0		0	0.5			
	UMK 212 △ 010 ☐ Q	0				0			0			0			0			()		0	1			
	UMK 212 △ 1R5 🗌 Q	0				0			0			0			0			0		0	1.5	±0.25pF		
	UMK 212 △ 020 🗌 Q	0		-		0			\circ			0			0			7		0	2	±0.5 pF		
	UMK 212 △ 030 ☐ Q		0				0			0			0			0			\circ	0	3			
	UMK 212 △ 040 🗌 Q			0				0			0			2			0		0	0	4			
	UMK 212 △ 050 🗌 Q			0				0			0			5			0		0	0	5			
	UMK 212 △ 060 🗌 Q			0				0			0			0			0		0		6			
	UMK 212 △ 070 🗌 Q			0				0		_	0			0		_	0	_	0	0	7	±0.5pF		
	UMK 212 △ 080 🗌 Q		<u></u>	0				이			0			0	<u> </u>		0		0	0	8	±1 pF		
	UMK 212 △ 090 ☐ Q			0				0			0			0	-		0		0	0	9			
	UMK 212 △ 100 🗌 Q			0	0			0			0			C	ļ		0	<u> </u>	0	0	10			
	UMK 212 △ 110 J Q			0	0			0			0			S	<u> </u>	_	0	<u> </u>	0	0	11	±5		
	UMK 212 △ 120 🗌 Q			0	0			0			0			C	<u> </u>	_	0	┡	0	0	12	±5, ±10		
	UMK 212 △ 130 J Q		L	0	0			0			0		<u> </u>	C	ļ		0	-	0	0	13	±5	ļ	
	UMK 212 △ 150 🗌 Q			0	0			0			0		L	2	_	ļ	0	-	0	0	15	±5, ±10		
	UMK 212 △ 160 J Q			0	0			0			\circ			0	ļ_	<u> </u>	0	ļ	0	0	16	±5 ·		
	UMK 212 △ 180 🗌 Q			0	0			0			0	L	_	C	<u> </u>	-	0	-	0	0	18	±5, ±10		
	UMK 212 △ 200 J Q	_	\perp	0	0						0			C	<u> </u>	1	0		10	0	20	±5		
	UMK 212 △ 220 🗌 Q			0	0					<u> </u>	0			C	1	ļ	0	-	C	0	22	±5, ±10	-	
	UMK 212 △ 240 J Q	1_		0	0			0			0		_	0	-	-	10		2	0	24	±5	-	
50V	UMK 212 △ 270 🗌 Q			0	0			0		L_	0	┞.	ļ	C	<u> </u>	╄	10	₩	10	0	27	±5, ±10	0.6±0.1	
50 V	UMK 212 △ 300 J Q		<u>.</u>	0	0			0		-	0	ļ	ļ	C	_	 	0	+	0	0	30	±5	-	
	UMK 212 △ 330 🔲 Q			0	0		_	0		<u> </u>	0	_		C	1	_	0	+	0	0	33	±5, ±10	-	
	UMK 212 △ 360 J Q			0	0			0			0	<u> </u>	_	C	┷-	₩	10	+	0	0	36	±5	1	
	UMK 212 △ 390 🔲 Q			0	0			0	<u></u>		0	<u> </u>	↓_	C	-	\bot	0	+	10	+	39	±5, ±10	-	
	UMK 212 △ 430 J Q			0	0	<u> </u>	_	0			0	_	ļ	C	\perp	4	10	+	0	+-	43	±5	-	
	UMK 212 △ 470 🗌 Q	\perp	\perp	0	0	$oxed{oxed}$		0	ļ	<u> </u>	0	┞	4_	C		-	10	+	10		47	±5, ±10	-	
	UMK 212 △ 510 J Q			0	0	ļ	ļ	0		-	10	_		C	-	+	10	+	10	+	51	±5 ±5, ±10	-	
	UMK 212 △ 560 ☐ Q	1	\perp	0	0	_	<u> </u>	0	 	-	10	-	\vdash	<u></u>	-	-	10	+	15	+	56	±5, ±10	1	
	UMK 212 △ 620 J Q		_	0	0	_	_	0	ļ	1_	0	ļ	\perp	C		┿	10	+	10		62	±5, ±10	1	
	UMK 212 △ 680 🗌 Q	\perp	4	0	10	-	_	10	Ļ.	\perp	2	1	-	1 <u>0</u>		-	10	+	10	-	68	±5, ±10	-	
	UMK 212 △ 750 J Q	\perp		0	0	1_	_	10	<u> </u>	ļ_	0	1	<u> </u>	C		-	0	+	10	-	75		-	
	UMK 212 △ 820 🗌 Q			С		1_	ļ	0		1_	0	1	\perp	С		1	10	<u> </u>	10		82	±5, ±10	-	
	UMK 212 △ 910 J Q			C			1	0	1	4_	0	<u>'</u>	\perp	C		+	15	1		-		±5	-	
	UMK 212 △ 101 🗌 Q	\perp	1	C		1_	1	0	+	-	0	+	4-	C		+	C	+	0	-		±5, ±10	-	
	UMK 212 △ 111 J Q	\perp		C) C)	\perp	10	+-	1_	0		\perp	10		-	0 0 0 110 ±5		-					
	UMK 212 △ 121 🗌 Q	\perp		C	-	—	1	0		-	10	-i	_	C		+-	C	-+-	0			-		
	UMK 212 △ 131 J Q	\perp	\bot	C	-	+	1	0		+	10	-	+	0		+			0			±5, ±10	-	
	UMK 212 △ 151 🗌 Q	\perp		<u>C</u>	-	-+-	\downarrow	10	+			+	+	- 0	_+	+		+-	-			±5, ±10	\dashv	
	UMK 212 △ 161 J Q		\perp	C		+-	-	0	-+	-	C		-	0	\rightarrow	+	C		-			±5, ±10		
	UMK 212 △ 181 🗌 Q			_ C		-	-	0		-	10		-	-	-	+-			-			±5, ±10		
	UMK 212 △ 201 J Q	_	\perp			4	1	0		4	C	-	-		1	+			_			±5, ±10		
	UMK 212 △ 221 ☐ Q						1	-0	1		C)		10	-_		\Box				220			

次ページへ続く Continued on next page



lass 1	24					Si	e la k	8		ZH	4	性				92 Y	v v			2 公外外及	# T #1	(車み)
定格 電圧 Rated g	形 Securing code (- 15)	0.		E I	ĊG	P P	Te in I	A Zi	15	cha R	rect Sol		5) 5) 1)	7.4	; ()	ağı.	(*	(a) رو		申電班里 Capacitance (pF)	Capacitar tolerari- (%)	Thickness in (mm)
(DC) 1	18 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	73			_	120 SE		399	4440	O	15/54/95	74020	0	100	*******	0		0	0	240	±5	
	UMK 212 △ 241 J Q			의	0	_	10	\vdash	++	ă	\dashv	-	0			0	1	ा	o	270	±5, ±10	
	UMK 212 △ 271 🗌 Q	_		9	0	-+-	18	-	-	0		-	<u></u>	\dashv	\neg	0	7	0	7	300	±5	
	UMK 212 △ 301 J Q			0	0		18	\vdash	+	0			5			ð	\dashv	0	त	330	±5, ±10	
	UMK 212 △ 331 🗌 Q	ļ.,		0	0	_		+-	+	허	\dashv	-	ó	-		ŏ	_	ō	0	360	±5	
	UMK 212 △ 361 J Q	<u> </u>		0	0		0	-	+	0			0			0		0	0	390	±5, ±10	0.6±0.
	UMK 212 △ 391 🗌 Q	ļ		0	0		9	+-	+	0			0			ŏ	_	0	0	430	±5	
	UMK 212 △ 431 J Q	<u> </u>	<u> </u>	0	0	-+	10	+-	+-	0	-	-	0 (\vdash	ŏ		ŏ	ő	470	±5, ±10	
	UMK 212 △ 471 🗌 Q	1_	<u> </u>	0	0	_	0	+	-			-) (0	\dashv	ŏ	Ö	510	±5	
	UMK 212 △ 511 J Q	_	_	0	0		C	-	╁	9			0	-	\vdash	0		0	Ö	560	±5, ±10	İ
	UMK 212 △ 561 🗌 Q	L	_	0	0		<u> </u>	+	<u> </u>	0			0		-	0	-	0	0	620	±5	
	UMK 212 △ 621 J Q	\perp	┺	0	0		C	-	┿-	0			0	-		0		0	0	680	±5, ±10	
	UMK 212 △ 681 🗌 💠	↓	<u> </u>	0	C		<u></u>		-	0			 	-	-	0		0	Ö	750	±5	0.85±
5017	UMK 212 △ 751 J ♦	\perp	<u> </u>	0	0		\downarrow C	+	-	0	_	├-	0		-	0		0	0	820	±5, ±10	UJ, SL
50V	UMK 212 △ 821 🗌 ♦		_	0	C		C		-	9	<u> </u>	<u> </u>	0	-	├-	0		6	0	910	+5	0.6±0
	UMK 212 △ 911 J ♦			0	C	$oxed{oxed}$	C	-	4-	0		<u> </u>	0	<u> </u>	-	1-	-	<u> </u>	0	1000	±5, ±10	1
	UMK 212 △ 102 🗌 ♦	1_	<u> </u>	0	0			1_		0		 _	0	-	-	0		0		1100	±5	
	UMK 212 △ 112 J Q	T	Ι.		<u> </u>			\perp		_	<u> </u>	_	 _	-	—	-	-	0	0	1200	±5, ±10	0.6±0
	UMK 212 △ 122 ☐ Q							\perp	_ _	_	1_	<u> </u>	_		_	ļ	-	0	0		±5, ±10 ±5	- V.∪⊥`
	UMK 212 △ 132 J Q	\top						\perp			_	1_	_	1	1_	_	_	0	0	. 1300	±5, ±10	
	UMK 212 △ 152 ☐ R			T		T				_		1_	1_	<u> </u>	1	_	<u> </u>	0	0	1500		+
	UMK 212 △ 162 J R	\top	1		T							L	ــــــــــــــــــــــــــــــــــــــ		1_	_	<u> </u>	0	0	1600	±5	0.85±
	UMK 212 △ 182 ☐ R			\top	\top		\neg					_	_	1	1	_	<u> </u>	0	10	1800	±5, ±10	J U.65 I
	UMK 212 △ 202 J R	+	1									1_	_	╽	1_	1_		10	0	2000	±5	4
	UMK 212 △ 222 ☐ R	+	\top	\top	\top									_	1	1	_	0	+	2200	±5, ±10	
	UMK 212 △ 242 J T	+	+	\top	+					T							1_	0	+	2400	±5	1.25±
	UMK 212 △ 272 ☐ T	+	+	+	+	1-1	\dashv	\top									<u>L</u> .	0	0	2700	±5, ±10	

UMK 212 △ 272 □ T

注: 彩名の △ には、温度特性、□ には静電容量許容差、◇には厚み記号が入ります。

Note: In the ordering code、△ is for temperature characteristics symbol and □ is for the capacitance tolerance symbol and ◇ is for the thickness symbol.

CHIP COMPONENTS 環層形成器コンテンサ

Class 2

定格 電圧 Rated /oltage	2. Concerno code	建度 特性 Toppe	企,如称 种型容量 Capacitance	許客差 Capacitance tolerance	厚みを Thickness (mm)
(00)			4	44(%)	原 沙粉
	UMK 212 B 681 □ Q		680	±10. ±20	
	UMK 212 B 821 K Q		820	±10	
	UMK 212 B 102 □ Q		1000	±10, ±20	
	UMK 212 B 122 K Q		1200	±10	
	UMK 212 B 152 □ Q		1500	±10. ±20	
	UMK 212 B 182 K Q		1800	±10	
	UMK 212 B 222 □ Q		2200	±10, ±20	
	UMK 212 B 272 K Q		2700	±10	
	UMK 212 B 332 □ Q		3300	±10, ±20	
	UMK 212 B 392 K Q		3900	±10	0.6±0.1
	UMK 212 B 472 □ Q		4700	±10. ±20	
50V	UMK 212 B 562 K Q		5600	±10	
	UMK 212 B 682 □ Q		6800	±10. ±20	
	UMK 212 B 822 K Q		8200	±10	
	UMK 212 B 103 □ Q		10000	$\pm 10. \pm 20$	
	UMK 212 B 123 K Q		12000	±10	
	UMK 212 B 153 🗌 Q		15000	$\pm 10, \pm 20$	
	UMK 212 B 183 K Q		18000	±10	
	UMK 212 B 223 □ Q		22000	±10, =20	
	UMK 212 B 273 K R		27000	±10	
	UMK 212 B 333 □ R		33000	±10, ±20	0.85 ± 0.1
	UMK 212 B 393 K R		39000	±10	
	UMK 212 B 473 □ T]	47000	±10, ±20	1.25 ± 0.1
	TMK 212 B 681 □ Q]	680	±10. ±20	
	TMK 212 B 821 K Q	В	820	±10	1
	TMK 212 B 102 🗆 Q		1000	±10, ±20	
	TMK 212 B 122 K Q		1200	±10]
	TMK 212 B 152 🗆 Q		1500	±10, =20	
	TMK 212 B 182 K Q		1800	±10	
	TMK 212 B 222 □ Q	1	2200	±10. =20	
	TMK 212 B 272 K Q		2700	±10	
	TMK 212 B 332 □ Q	1	3300	±10, =20	
	TMK 212 B 392 K Q		3900	±10	
	TMK 212 B 472 □ Q		4700	±10, ±20	0.6 ± 0.1
	TMK 212 B 562 K Q		5600	±10	
	TMK 212 B 682 □ Q		6800	±10, ±20	
25V	TMK 212 B 822 K Q		8200	±10	
	TMK 212 B 103 □ Q		10000	±10, =20	
	TMK 212 B 123 K Q]	12000	±10	
	TMK 212 B 153 🗆 Q		15000	±10, ±20	
!	TMK 212 B 183 K Q	7	18000	±10	
	TMK 212 B 223 🗆 Q		22000	±10. ±20	
	TMK 212 B 273 K Q	1	27000	±10] !
	TMK 212 B 333 □ Q	7	33000	±10, ±30	
	TMK 212 B 393 K R	7	39000	±10	_
	TMK 212 B 473 □ R		47000	±10. ±20	0.85 ± 0.1
	TMK 212 B 563 KR		56000	±10	0.03 ± 0.1
	TMK 212 B 683 □ R		68000	±10, ±20	1
	TMK 212 B 823 KT]	82000	±10	1.25±0.1
	TMK 212 B 104 □ T		100000	±10, ±20)

定格 電圧 Rated Voltage (DC)	Oriento) oda		Africa Security of the Control of th	静電容量 新容差 Capacitance tolerance	厚み Thickness (mm)
50 V	UMK 212 F 103 Z Q	F	10000	+80 -20 ⁹⁶	0.6 ± 0.1
	UMK 212 F 153 Z Q		15000		
	UMK 212 F 223 Z Q		22000		
	UMK 212 F 333 Z Q		33000		
	UMK 212 F 473 Z Q		47000		
	UMK 212 F 683 Z Q		68000		
	UMK 212 F 104 Z R		100000		0.85 ± 0.1
	UMK 212 F 154 Z R		150000		
	UMK 212 F 224 Z T		220000		$1.25 \pm 0.$
25 V	TMK 212 F 103 Z Q		10000		0.6 ± 0.1
	TMK 212 F 153 Z Q		15000		
	TMK 212 F 223 Z Q		22000		
	TMK 212 F 333 Z Q		33000		
	TMK 212 F 473 Z Q		47000		
	TMK 212 F 683 Z Q		68000		
	TMK 212 F 104 Z Q		100000		
	TMK 212 F 154 Z Q		150000		
	TMK 212 F 224 Z R		220000		$0.85 \pm 0.$
	TMK 212 F 334 Z T		330000		1.25±0.
	TMK 212 F 474 Z T		470000		1.23 = 0.

注:形名の□には静電容量許容差記号が入ります。 Note : In the ordering code, □ is for the capacitance tolerance symbol