

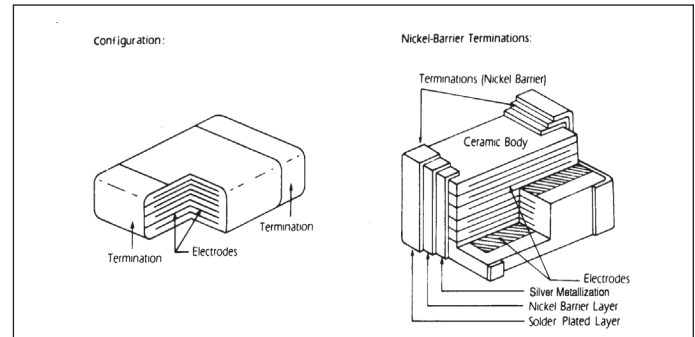
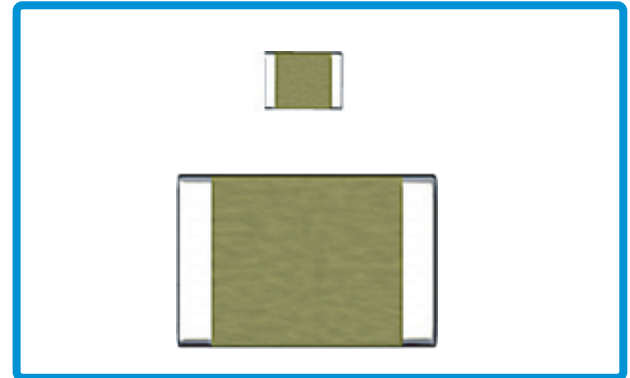
Multilayer Ceramic Chip Capacitors

MA Series

MERITEK

FEATURES AND APPLICATIONS

Dielectric	Features	Applications
NPO	Ultra-stable Low dissipation factor Tight tolerance available Good frequency performance No aging of capacitance	LC and RC tuned circuit Filtering Timing
X7R	Semi-stable high K High volumetric efficiency Highly reliable in high temperature applications High insulation resistance	Blocking Coupling Timing Bypassing Frequency discriminating Filtering
Y5V	Highest volumetric efficiency Non-polar construction General purpose, high K	Bypassing Decoupling Filtering



PART NUMBERING SYSTEM

				MA	1206	XR	103	K	500
Meritek Series									
Size									
Dielectric									
CODE	CG	XR	YV						
	NPO	X7R	Y5V						
Capacitance									
CODE	8R2	101	223	104					
pF	8.2	100	22000	100000					
nF	--	0.1	22	100					
μF	--	--	0.022	0.1					
Tolerance									
CODE	Tolerance	CODE	Tolerance	CODE	Tolerance				
B	±.1pF	C	±.25pF	D	±.5pF				
F	±1%	G	± 2%	J	± 5%				
K	±10%	M	±20%	Z	+80/- 20%				
For values less than 10 pF C or D tolerance preferred									
Rated Voltage									
2 significant digits + number of zeros.									
Code	006	100	160	250	500	101			
	6.3V	10V	16V	25V	50V	100V			

EIA CASE SIZE	0402	0603	0805	1206	1210	1812	2225
Length (L)	1.0 ±0.05	1.6 ±0.15	2.0 ±0.2	3.2 ±0.2	3.2 ±0.3	4.5 ±0.3	5.7 ±0.4
Width (W)	0.5 ±0.05	0.8 ±0.15	1.25 ±0.2	1.6 ±0.12	2.5 ±0.3	3.2 ±0.3	6.35 ±0.25
Max. Thickness (T)	0.60	1.0	1.30	1.50	1.70	1.70	1.78
Termination Width (E)	0.2 ±0.1	0.4 ±0.2	0.5 ±0.2	0.5 ±0.2	0.5 ±0.2	0.64 ±0.38	0.64 ±0.38

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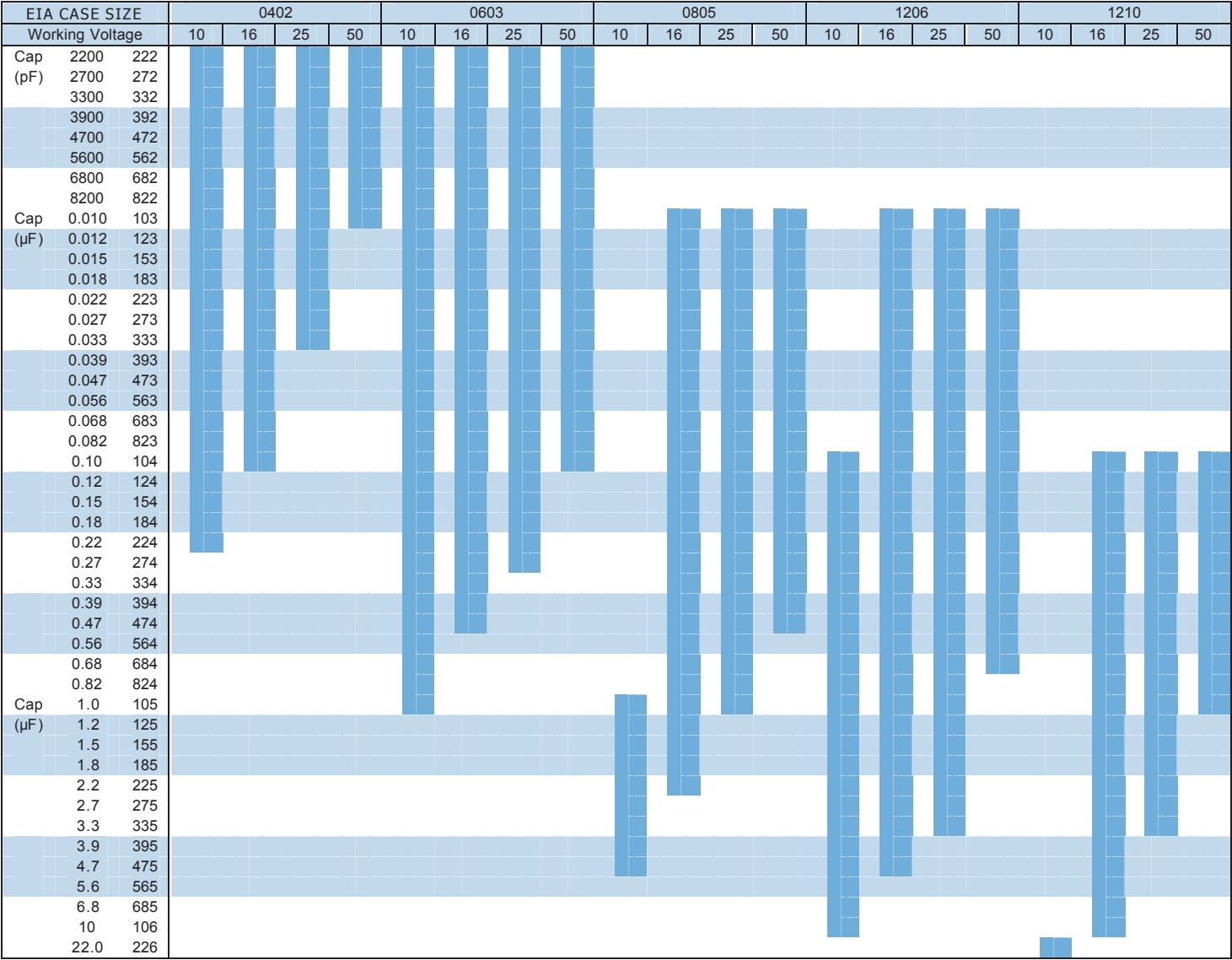
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X7R CAPACITANCE RANGE CHART (1210 to 2225)

EIA CASE SIZE			1210					1812					2225		
Working Voltage			6.3	10	16	25	50	10	16	25	50	100	25	50	100
Cap (pF)	1000	102													
	1200	122													
	1500	152													
	1800	182													
	2200	222													
	2700	272													
	3300	332													
Cap (μF)	3900	392													
	4700	472													
	5600	562													
	6800	682													
	8200	822													
	0.010	103													
	0.012	123													
	0.015	153													
	0.018	183													
	0.022	223													
	0.027	273													
	0.033	333													
	0.039	393													
	0.047	473													
Cap (μF)	0.056	563													
	0.068	683													
	0.082	823													
	0.10	104													
	0.12	124													
	0.15	154													
	0.18	184													
	0.22	224													
	0.27	274													
	0.33	334													
	0.39	394													
	0.47	474													
	0.56	564													
	0.68	684													
	0.82	824													
Cap (μF)	1.0	105													
	1.5	155													
	1.8	185													
	2.2	225													
	2.7	275													
	3.3	335													
	3.9	395													
	4.7	475													
	5.6	565													
	6.8	685													
Cap (μF)	10.0	106													
	22	226													

Other capacitance values, voltages and sizes are available upon request

Y5V CAPACITANCE RANGE CHART

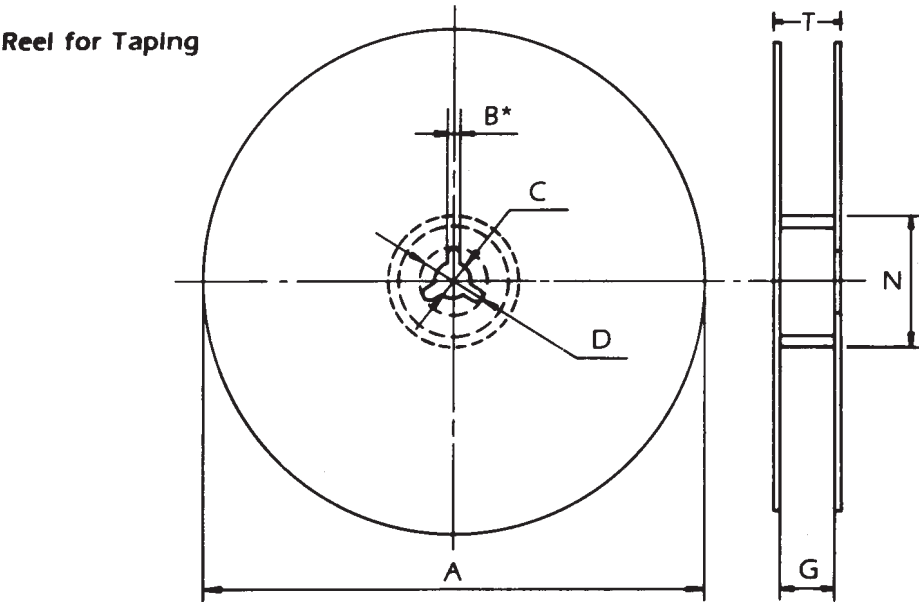


Other capacitance values, voltages and sizes are available upon request

PACKAGING

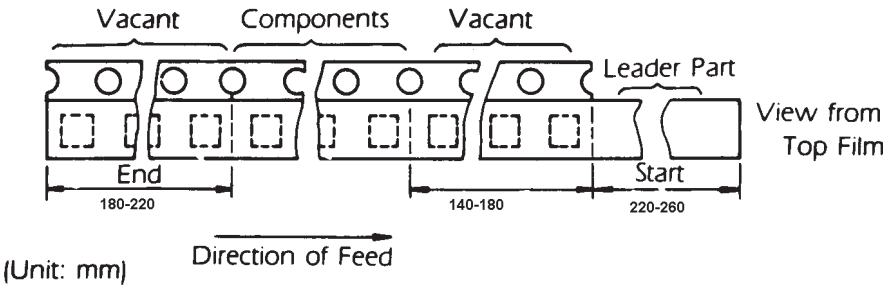
1. Tape and Reel Package

Taping is in accordance with EIA RS-481 or IEC 286-3



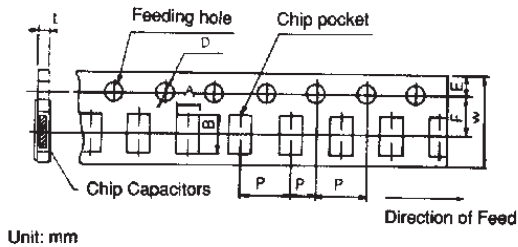
Unit: mm

Symbol	A	N	C	D	B*	G	T
Dimension	178 ± 2.0	50 min.	13.0 ± 0.5	20 min	2.0	10.0 ± 1.5	14.9 max.

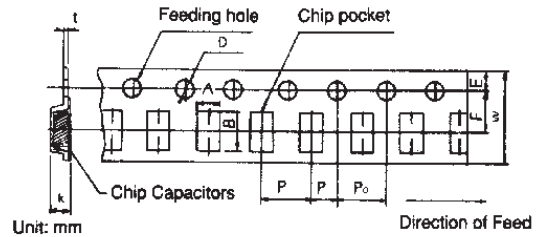


Note: 13" reel available upon request.

1. CARDBOARD TAPE DIMENSIONS



2. EMBOSSED TAPE DIMENSIONS



CARDBOARD TAPE

Unit: mm

SYMBOL CODE	A	B	W	F	E	P ₁	P ₂	P ₀	f D	t ₁
0603	1.25 ±0.2	2.05 ±0.2	8.0 ±0.2	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	1.5 +0.1/-0	1.1 max
0805	1.65 ±0.2	2.4 ±0.2								
1206	2.0 ±0.2	3.6 ±0.2								

EMBOSSED TAPE

Unit: mm

SYMBOL CODE	A	B	W	F	E	P ₁	P ₂	P ₀	fD	t ₁	K
0603	1.6 ±0.2	2.4 ±0.2	8.0 ±0.2	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	1.5 +0.1/-0	0.3 max	2.0 max
0805	1.95 ±0.2	3.6 ±0.2									
1206	2.8 ±0.2	3.7 ±0.2									
1812	3.6 ±0.2	4.9 ±0.2	1.20 ±0.3	5.5 ±0.1	1.75 ±0.1	8.0 ±0.1	2.0 ±0.1	8.0 ±0.1	1.5 +0.1/-0	0.3 max	2.5 max

Standard tape for 0805 and 1206 sizes is cardboard tape.

Embossed tape is only available upon special request.

Standard Package Quantity Per Reel

CHIP SIZE	CHIP THICKNESS MAX	CARDBOARD TAPE	EMBOSSED TAPE
0402	0.6	10,000	-
0603	1.0	4,000	-
0805			
1206			
1210	1.30	-	3,000
1812	1.30	-	1,500

PERFORMANCE SPECIFICATION

1. ELECTRICAL

DIELECTRIC CODE	EIA	NPO	X7R	Y5V
Temperature Characteristics *1		$0 \pm 30 \text{ ppm/}^\circ\text{C}$, $C > 20 \text{ pF}$ $0^{+120}_{-40} \text{ ppm/}^\circ\text{C}$, $C \leq 20 \text{ pF}$	$\Delta C \pm 15\%$ maximum over -55°C to $+125^\circ\text{C}$	$\Delta C + 22/-82\%$ maximum over -30°C to $+85^\circ\text{C}$
Operating Temperature Range		-55°C to $+125^\circ\text{C}$	-55°C to $+125^\circ\text{C}$	-30°C to $+85^\circ\text{C}$
Measuring Conditions for Capacitance and D.F. *2		1MHz, 1Vrms, $C \leq 1000 \text{ pF}$ 1 KHz, 1 Vrms, $C > 1000 \text{ pF}$	1KHz, 1Vrms	1KHz, 10Vrms
Dissipation Factor (D.F.) and Tangent of Loss Angle (tan)		$\leq 0.1\%$ for $C \geq 30 \text{ pF}$ $\leq \frac{100\%}{(400+20C)}$ for $C < 30 \text{ pF}$	$\leq 2.5\%$ at $\geq 50 \text{ V}$ rated $\leq 3.5\%$ at 16V, 25V rated $\leq 5.0\%$ at 6.3V, 10V rated	$\leq 5\%$ at 50V rated $\leq 7\%$ at 16V, 25V rated $\leq 10\%$ at 6.3V, 10V rated
Insulation Resistance (I.R.) after 60 secs. charging at rated voltage, 25°C, 55% RH max.		$\geq 100 \text{ G}\Omega$ or $\geq 1000 \text{ M}\Omega \mu\text{F}$ whichever is less	$\geq 10 \text{ G}\Omega$ or $\geq 100 \text{ M}\Omega \mu\text{F}$ whichever is less	$\geq 10 \text{ G}\Omega$ or $\geq 100 \text{ M}\Omega \mu\text{F}$ whichever is less
Voltage Proof, 25°C, 1-5 secs.		2.5 x Rated Voltage	2.5 x Rated Voltage	2.5 x Rated Voltage
Capacitance Aging		0	$\approx 2.5\%$ per decade hour	$\approx 7\%$ per decade hour

*1 Class II (X7R, Z5U, Y5V) capacitors shall be made a special pre-conditioning before a test or a sequence of tests under the following conditions: Exposure at $150 \pm 10^\circ\text{C}$ for 1 hr, followed by setting the capacitor at room temperature for 24 ± 1 hr.

*2 Capacitance is within specified tolerance; measured 1000 hours after date of manufacture because of capacitance aging of Class II capacitor.

2. ENVIRONMENTAL

Test	Test Conditions	Post-Test Inspection Requirements				
Solderability	IEC 384-10 4.11 /JIS C 5102 8.13 Solder 60 Sn/40 Pb, 235 ±5°C Immersed for 5 secs.	At least 75% of termination area should be well tinned No visible damage				
Resistance to Soldering Heat *1	IEC 384-10 4.10 /JIS C 5102 8.14 Immersed in solder bath at 260 ±5°C for 10 ±1 secs. Recovery: 6 to 24 hrs. (NPO) 24 ±2 hrs. (X7R, Y5V)	At least 75% of termination should be covered by solder No visible damage				
			NPO	X7R	Y5V	
		ΔC/C	≤0.5% or ±0.5pF whichever is greater	≤ +10/-5%	≤ +20/-10%	
Rapid Change of Temperature *2	IEC 384-10 4.12 /JIS C 5102 9.3 -55°C to +125°C, 5 cycles (NPO, X7R) Duration: 30 mins. Recovery: 6 to 24 hrs. (NPO) 24 ±2 hrs. (X7R)	No visible damage				
			NPO	X7R		
		ΔC/C	≤±1% or ±1pF whichever is greater		≤±10%	
		D.F	≤1.5 x initial requirement			
		I.R	≥0.25 x initial requirement			
Endurance (Life Test) *3	IEC 384-10 4.15 1000 hrs. at maximum temperature with x 1.5 rated voltage applied Recovery: 6 to 24 hrs. (NPO) 24 ±2 hrs. (X7R, Y5V)	No visible damage				
			NPO	X7R	Y5V	
		ΔC/C	≤±2% or ±1pF whichever is greater		≤ ±20% ≤ ±30%	
		D.F.	≤2.0 x initial requirement		≤1.5 x initial requirement	
		I.R.	≥0.25 x initial requirement			
Humidity Test (Damp heat, steady state) *4	IEC 384-10 4.14 /JIS C 5102 9.5 500 hrs. at 40 ±2°C, 90-95% RH Recovery: 6 to 24 hrs. (NPO) 24 ±2 hrs. (X7R, Y5V)	No visible damage				
			NPO	X7R	Y5V	
		ΔC/C	≤±2% or ±1pF whichever is greater		≤ ±10% ≤ ±30%	
		D.F.	≤2.0 x initial requirement		≤1.5 x initial requirement	
		I.R.	≥0.25 x initial requirement			
Adhesion	IEC 384-10 4.8 /JIS C 5102 8.11.2 Capacitors mounted on a substrate, a force of 5N applied perpendicular to the plane of substrate and parallel to the line joining the center of terminations for 10 +1 secs	No visible damage				

*1-4 Class II (X7R, Y5V) capacitors shall be made a special pre-conditioning before a test or a sequence of tests under the following conditions: Exposure at $150 \pm 10^\circ\text{C}$ for 1 hr, followed by setting the capacitor at room temperature for 24 ± 1 hr.