

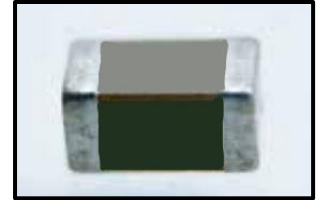


Smythson[®]

**GMC SERIES
GENERAL PURPOSE CAPACITORS**

≠ Features

- Large capacitance values in small sizes
- Excellent high frequency characteristics
- All PPI Caps conform to EIA Specifications



≠ Applications

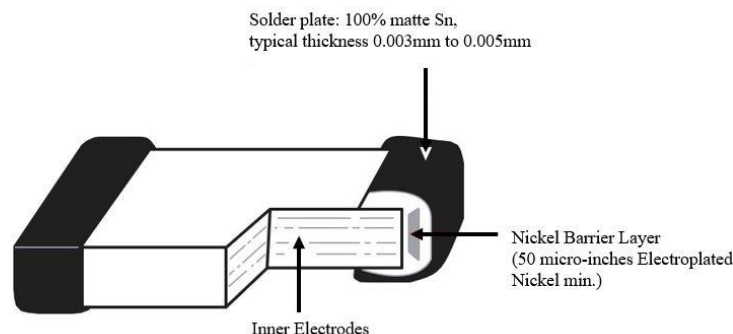
- Can be used on surface mount assembly equipment
- Our fully integrated manufacturing and total quality control systems ensure unprecedented high standards of quality and reliability.

≠ Notes

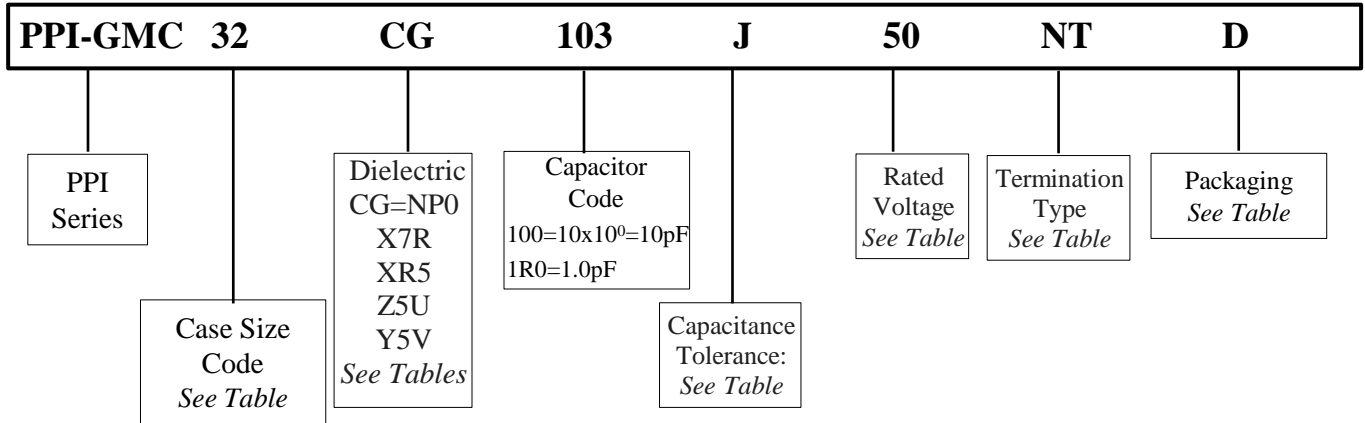
- Capacitance Value & Tolerance are determined by circuit requirements
- Voltage is determined by circuit requirements
- Capacitor Size select the smallest unit permitted by the circuit constraints that provides the required capacitance and voltage rating
- Nickel Barrier is standard and recommended for units exposed to repeated solder cycles, to minimize leaching of the termination.
- All capacitors conform to EIA specifications.

≠ Construction

Constructed by screen printing alternative layers of internal metallic electrodes onto ceramic dielectric materials and firing into a concrete monolithic body, then completed by application of metal end terminations which are fired to assure permanent bonding with the individual internal electrodes.

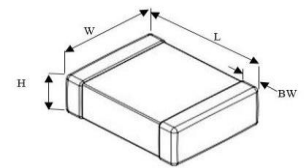


≠ Part Numbering



≠ Dimensions (mm)

Dimensions (mm)						
Code	Size	L	W	T	BW	
01	01005	0.40 ± 0.02	0.20 ± 0.02	0.20 ± 0.02	0.07 ~ 0.14	
02	0201	0.60 ± 0.03	0.30 ± 0.03	0.30 ± 0.03	0.15 ± 0.05	
04	0402	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.10	0.10 ~ 0.35	
10	0603	1.60 ± 0.20	0.80 ± 0.20	1.0 max	0.10 ~ 0.40	
21	0805	2.00 ± 0.30	1.25 ± 0.20	1.40	0.25 ~ 0.75	
31	1206	3.20 ± 0.30	2.50 ± 0.20	2.20	0.25 ~ 0.75	
32	1210	3.20 ± 0.30	1.60 ± 0.20	1.80	0.25 ~ 0.75	
40	1808	4.50 ± 0.35	3.20 ± 0.30	2.20	0.25 ~ 0.75	
43	1812	3.20 ± 0.30	1.6 ± 0.20	1.80	0.25 ~ 0.75	
45	1825	5.70 ± 0.40	5.01 ± 0.40	1.80	0.25 ~ 0.75	
55	2220	5.70 ± 0.40	6.30 ± 0.40	2.20	0.25 ~ 0.75	
57	2225	4.50 ± 0.35	6.30 ± 0.40	2.20	0.25 ~ 0.75	



≠ Capacitance Code

Cap Code	Value	Cap Code	Value	Cap Code	Value	Cap Code	Value
0R5	0.5pF	100	10pF	104	0.1uF	106	10uF
5R0	5.0pF	103	0.01uF	105	1.0uF	107	100uF

≠ Capacitance Tolerances

Code	B	C	D	F	G	J	K	M	Z
Tol.	±0.1pF	±0.25pF	±0.5pF	±1%	±2%	±5%	±10%	±20%	-20% + 80%

≠ Rated Voltages

Code	Voltage	Code	Voltage
4R0	4.0V	350	35V
6R3	6.3V	500	50V
100	10V	630	63V
160	16V	101	100V
250	25V	201	200V

≠ Terminations

Nickel barrier is standard and recommended for units exposed to repeated solder cycles to minimize leaching of the termination.

Code	Description
NT	Sn/Ni
PT	Pd/Ag



**≠ Ultra Stable Class I Dielectric**

Linear temperature coefficient, low loss, negligible change of electrical properties with time, voltage and frequency.

≠ Electrical Specifications

Operating Temperature Range	-55°C to +125°C
Temperature Coefficient (TC)	0±30ppm/°C
Temperature Voltage Coefficient (Δc_{Max} @ V_{DCW})	0±30ppm/°C
Dissipation Factor	0.1% Max, 0.02% Typical
Insulation Resistance (IR)	25°C, V_{DCW} ; > 100GOF or 1000QF, whichever is less 125°C V_{DCW} ; > 10GQF or 100QF, whichever is less
Dielectric Withstanding Voltage	3 X V_{DCW}
Aging Rate	0% per decade hour
Test Parameters	$C \leq 1000pF$, $f = 1MHz$, $V = 1.0 V_{rms} \pm 0.2V_{rms}$, $T = 25^\circ C$ $C > 1000pF$, $f = 1KHz$, $V = 1.0V_{rms} \pm 0.2V_{rms}$, $T = 25^\circ C$

≠ Stable Class II Dielectric

Temperature variation of capacitance is within ±15% from -55°C to +125°C for X7R (-55°C to +85°C for X5R). The capacitance change is non-linear.

≠ Electrical Specifications

Operating Temperature Range	X7R -55°C to +125°C X5R -55°C to +85°C
Temperature Coefficient (TC)	±15%
Temperature Voltage Coefficient (Δc_{Max} @ V_{DCW})	Not Applicable
Dissipation Factor	2.5% Max, 1.80% Typical
Insulation Resistance (IR)	25°C, V_{DCW} ; > 100GQF or 1000QF, whichever is less 125°C V_{DCW} ; > 10GQF or 100QF, whichever is less
Dielectric Withstanding Voltage	2.5 X V_{DCW}
Aging Rate	< 2% per decade hour
Test Parameters	1KHz 1.0Vrms ±0.2Vrms 25°C values > or = to 10uF 1.0 Vrms 120Hz



≠ Z5U

Despite their capacitance instability, Z5U formulations are very popular because of their small size, temperature range, low ESL, low ESR and excellent frequency response. These features are particularly important for decoupling application where only a minimum capacitance value is required.

≠ Y5V

Y5V formulations are for general purpose use in a limited temperature range. They have a wide temperature characteristic of +22% - 82% capacitance change over the operating temperature range of -30°C to +85°C. Y5Vs high dielectric constant allows the manufacture of very high capacitance values (up to 22MF) in small physical sizes.

High capacitance per unit volume: General Purpose product

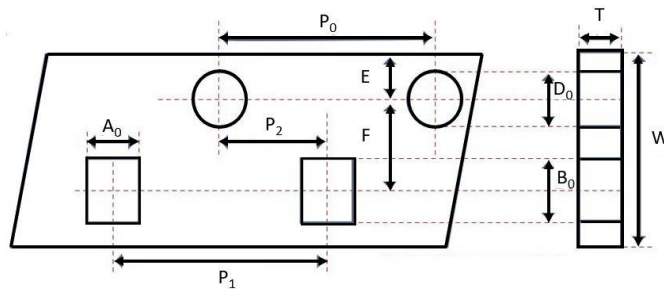
≠ Electrical Specifications

Operating Temperature Range	-30°C to +85°C
Temperature Coefficient (TC)	±22% - 82%
Temperature Voltage Coefficient (ΔcMax @ V _{DCW})	Not Applicable
Dissipation Factor	3.0% Max, 2.00% Typical
Insulation Resistance (IR)	10GQ or 100QF, whichever is less 25°C V _{DCW}
Dielectric Withstanding Voltage	2.5 X V _{DCW}
Aging Rate	3% per decade hour
Test Parameters	1KHz 1.0Vrms 25°C values > or = to 10uF 1.0 Vrms 120Hz

⚡ Packaging

Size	Code		Description	
	D	G	Q	
	<i>Qty per 7" Reel</i>		<i>Qty per 10/13" Reel</i>	
01005	20K	50K		
0201	10K/ 15K	50K		
0402	10K	40K	50K	
0603	4K	10K	15K	
0805	2K, 3K, 4K	10K	15K	20K
1206	2K, 3K, 4K	10K	15K	20K
1210	500, 1K, 2K, 3K	4K	8K	
1808	1K, 2K, 3K			
1812	500, 1K	3K		
1825	500, 1K			
2220	500, 1K			
2225	500, 750			

⚡ Tape & Reel Specifications

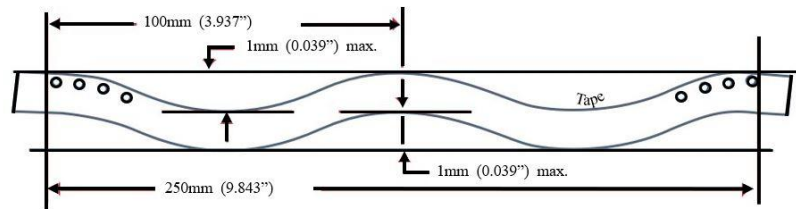
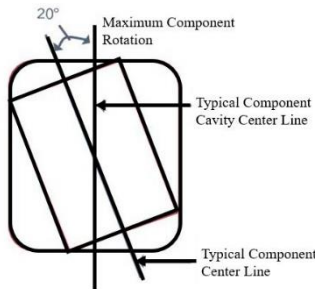
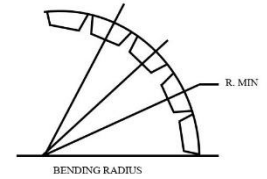
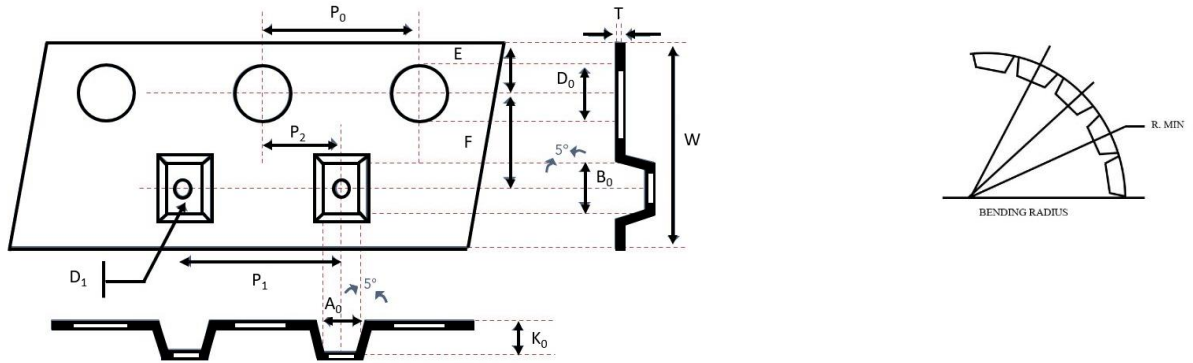


Cardboard carrier tape for EIA case sizes: 01005, 0201, 0402, 0603, 0805, 1206

Unit: mm

Size	A ₀	B ₀	T	K ₀	W	P ₀	10XP ₀	P ₁	P ₂	Do	D ₁	E	F
01005	0.25 ± 0.04	0.45 ± 0.04	0.36 ± 0.05	*	8.00 ± 0.30	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	*	1.75 ± 0.10	3.50 ± 0.05
0201	0.39 ± 0.07	0.69 ± 0.07	<0.50	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0402	0.70 ± 0.20	1.20 ± 0.20	<0.80	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0603	1.10 ± 0.20	1.90 ± 0.20	<1.20	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0805	1.65 ± 0.20	2.40 ± 0.20	<1.30	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
1206	2.00 ± 0.20	3.60 ± 0.20	<1.30	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05

≠ Tape & Reel Specifications



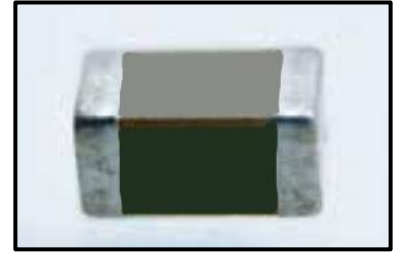
Embossed plastic carrier tape for case sizes: 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225

Unit: mm

Size	A ₀	B ₀	T	K ₀	W	P ₀	10XP ₀	P ₁	P ₂	D ₀	D ₁	E	F
0805	<1.80	<2.70	0.23 ± 0.10	<2.50	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1206	<2.30	<4.00	0.23 ± 0.10	<2.50	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1210	<3.20	<3.95	0.23 ± 0.10	<3.00	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1808	<2.50	<5.30	0.25 ± 0.10	<2.50	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
1812	<3.90	<5.30	0.25 ± 0.10	<3.50	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
1825	<6.80	<5.30	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
2220	<5.80	<6.50	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
2225	<6.80	<6.50	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10

⚡ Features

- Large capacitance values in small sizes
- Excellent high frequency characteristics
- All PPI Caps conform to EIA Specifications



⚡ Applications

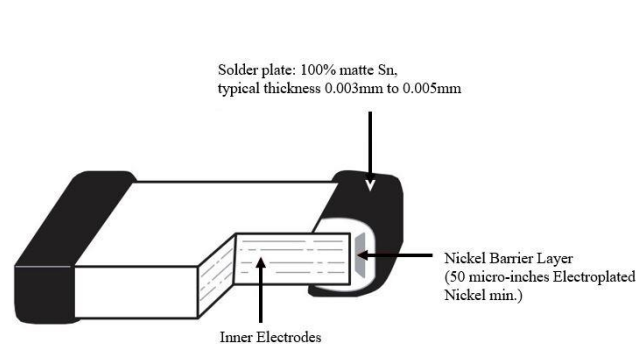
- Can be used on surface mount assembly equipment
- Our fully integrated manufacturing and total quality control systems ensure unprecedented high standards of quality and reliability.

⚡ Notes

- Capacitance Value & Tolerance are determined by circuit requirements
- Voltage is determined by circuit requirements
- Capacitor Size select the smallest unit permitted by the circuit constraints that provides the required capacitance and voltage rating
- Nickel Barrier is standard and recommended for units exposed to repeated solder cycles, to minimize leaching of the termination.
- All capacitors conform to EIA specifications.

⚡ Construction

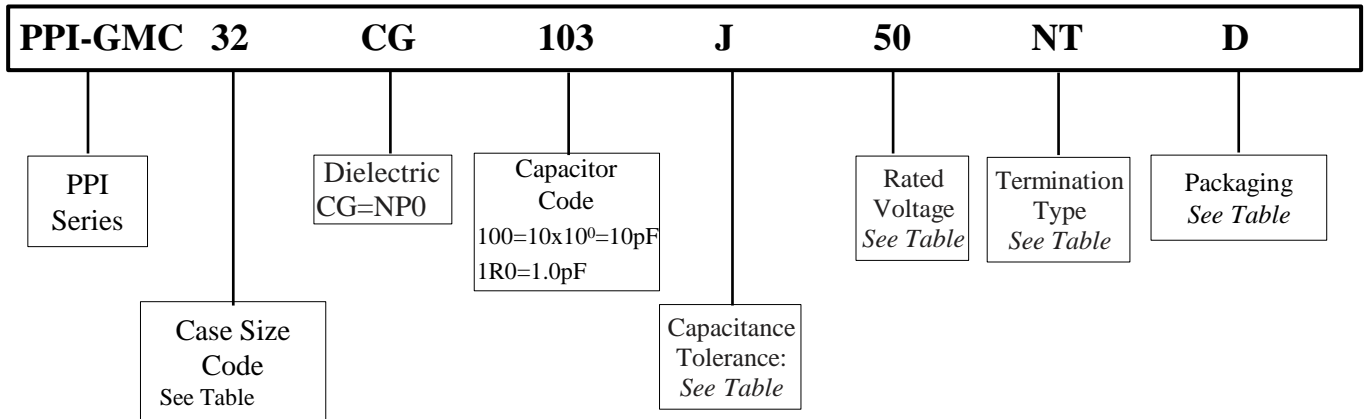
Constructed by screen printing alternative layers of internal metallic electrodes onto ceramic dielectric materials and firing into a concrete monolithic body, then completed by application of metal end terminations which are fired to assure permanent bonding with the individual internal electrodes.



≠ NP0/ COG

Capacitance change with temperature is 0-30ppm/°C which is less than -0.3%/°C from -55°C to +125°C. Typical capacitance change with life is less than -0.1% for NP0s, one-fifth that shown by most other dielectrics. NP0 formulations show no aging characteristics.

≠ Part Numbering

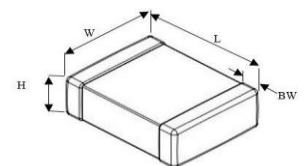


≠ Dielectric

Ultra Stable Class I Dielectric: Linear temperature coefficient, low loss, negligible change of electrical properties with time, voltage and frequency.

≠ Dimensions (mm)

Dimensions (mm)					
Code	Size	L	W	T	BW
01	01005	0.40 ± 0.02	0.20 ± 0.02	0.20 ± 0.02	0.07 ~ 0.14
02	0201	0.60 ± 0.03	0.30 ± 0.03	0.30 ± 0.03	0.15 ± 0.05
04	0402	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.10	0.10 ~ 0.35
10	0603	1.60 ± 0.20	0.80 ± 0.20	1.0 max	0.10 ~ 0.40
21	0805	2.00 ± 0.30	1.25 ± 0.20	1.40	0.25 ~ 0.75
31	1206	3.20 ± 0.30	2.50 ± 0.20	2.20	0.25 ~ 0.75
32	1210	3.20 ± 0.30	1.60 ± 0.20	1.80	0.25 ~ 0.75
40	1808	4.50 ± 0.35	3.20 ± 0.30	2.20	0.25 ~ 0.75
43	1812	3.20 ± 0.30	1.6 ± 0.20	1.80	0.25 ~ 0.75
45	1825	5.70 ± 0.40	5.01 ± 0.40	1.80	0.25 ~ 0.75
55	2220	5.70 ± 0.40	6.30 ± 0.40	2.20	0.25 ~ 0.75
57	2225	4.50 ± 0.35	6.30 ± 0.40	2.20	0.25 ~ 0.75



≠ Capacitance Code

Cap Code	Value	Cap Code	Value	Cap Code	Value	Cap Code	Value
0R5	0.5pF	100	10pF	104	0.1uF	106	10uF
5R0	5.0pF	103	0.01uF	105	1.0uF	107	100uF

≠ Capacitance Tolerances

Code	B	C	D	F	G	J	K	M	Z
Tol.	±0.1pF	±0.25pF	±0.5pF	±1%	±2%	±5%	±10%	±20%	-20% + 80%

≠ Rated Voltages

Code	Voltage	Code	Voltage
4R0	4.0V	350	35V
6R3	6.3V	500	50V
100	10V	630	63V
160	16V	101	100V
250	25V	201	200V

≠ Terminations

Nickel barrier is standard and recommended for units exposed to repeated solder cycles to minimize leaching of the termination.

Code	Description
NT	Sn/Ni
PT	Pd/Ag





Dielectric NP0/COG

⚡ Electrical Specifications

Operating Temperature Range	-55°C to +125°C
Temperature Coefficient (TC)	0±30ppm/°C
Temperature Voltage Coefficient (ΔcMax @ VDCW)	0±30ppm/°C
Dissipation Factor	0.1% Max, 0.02% Typical
Insulation Resistance (IR)	25°C, VDCW; > 100 GWF or 1000WF, whichever is less 125°C VDCW; > 10 GWF or 100 WF, whichever is less
Dielectric Withstanding Voltage	3 X VDCW
Aging Rate	0% per decade hour
Test Parameters	C<=1000pF, f = 1MHz, V = 1.0 Vrms ±0.2Vrms, T = 25°C C>1000pF, f = 1KHz, V = 1.0Vrms ±0.2Vrms, T = 25°C

01005: PPI-GMC01

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
0.5 pF	0R5	B,C	6.3V or 16V	6.8	6R8	B,C	6.3V or 16V	33	330	F,G,J,K	6.3V or 16V
1.0	1R0			8.2	8R2			39	390		
1.2	1R2			10	100			43	430		
1.5	1R5			11	110	47		470			
1.8	1R8			12	120	51		510			
2.2	2R2			15	150	56		560			
2.7	2R7			18	180	62		620			
3.3	3R3			20	200	68		680			
3.9	3R9			22	220	82		820			
4.7	4R7			27	270	100		101			
5.6	5R6			30	300						6.3V

0201: PPI-GMC02

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
0.5 pF	0R5	B,C	25V or 50V	6.8	6R8	B,C	25V or 50V	33	330	F,G,J,K	25V or 50V
1.0	1R0			8.2	8R2			39	390		
1.2	1R2			10	100			43	430		
1.5	1R5			11	110	47		470			
1.8	1R8			12	120	51		510			
2.2	2R2			15	150	56		560			
2.7	2R7			18	180	62		620			
3.3	3R3			20	200	68		680			
3.9	3R9			22	220	82		820			
4.7	4R7			27	270	100		101			
5.6	5R6			30	300	120		121			



Dielectric NP0/COG

0402: PPI-GMC04

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
0.5 pF	0R5	B,C	10V or 16V or 25V or 50V or 100V or 200V	8.0	8R0	B,C	10V or 16V or 25V or 50V or 100V or 200V	82	820	F,G,J,K	10V or 16V or 25V or 50V or 100V
1.0	1R0			8.2	8R2			91	910		
1.2	1R2			9.0	9R0			100	101		
1.5	1R5			9.1	9R1			110	111		
1.8	1R8			10	100			120	121		
2.0	2R0			11	110			130	131		
2.2	2R2			12	120			150	151		
2.4	2R4			13	130			180	181		
2.7	2R7			15	150			200	201		
3.0	3R0			18	180			220	221		
3.3	3R3			20	200	240		241			
3.5	3R5			22	220	270		271			
3.6	3R6			24	240	300		301			
3.9	3R9			27	270	330		331			
4.0	4R0			30	300	390		391			
4.3	4R3			33	330	430		431			
4.7	4R7			36	360	470		471			
5.0	5R0			39	390	560		561			
5.1	5R1			43	430	680		681			
5.6	5R6			47	470	820		821			
6.0	6R0	51	510	1.0 nF	102						
6.3	6R3	56	560	1.2	122						
6.8	6R8	62	620	1.5	152						
7.0	7R0	68	680	1.8	182						
7.5	7R5	75	750	2.2	222						



Dielectric NP0/COG

0603: PPI-GMC10																
Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC					
0.5 pF	0R5	B,C	25V or 50V or 100V or 200V	9.1	9R1	F,G,J,K	25V or 50V or 100V or 200V	160	161	F,G,J,K	25V or 50V or 100V or 200V					
1.0	1R0			10	100			180	181							
1.2	1R2			11	110			200	201							
1.3	1R3			12	120			220	221							
1.5	1R5			13	130			240	241							
1.8	1R8			15	150			270	271							
2.0	2R0			18	180			300	301							
2.2	2R2			20	200			330	331							
2.4	2R4			22	220			390	391							
2.7	2R7			24	240			430	431							
3.0	3R0			27	270			470	471							
3.3	3R3			30	300			510	511							
3.6	3R6			33	330			560	561							
3.9	3R9			36	360			680	681							
4.0	4R0			39	390			750	751							
4.3	4R3			43	430			820	821							
4.7	4R7			47	470			910	911							
5.0	5R0			51	510			1.0 nF	102							
5.1	5R1			56	560			1.2	122							
5.6	5R6			62	620			1.5	152							
6.0	6R0			68	680			1.8	182							
6.2	6R2			75	750			2.2	222							
6.8	6R8			82	820			2.7	272							
7.0	7R0			91	910			3.3	332							
7.5	7R5			100	101			3.9	392							
8.0	8R0			120	121			4.7	472							
8.2	8R2			130	131			5.6	562							
9.0	9R0			150	151			10	103							
											25V or 50V					



Dielectric NP0/COG

0805: PPI-GMC21																	
Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC						
0.5 pF	0R5	B,C	16V or 25V or 50V or 100V or 200V	11	110	F,G,J,K	16V or 25V or 50V or 100V or 200V	270	271	F,G,J,K	16V or 25V or 50V or 100V or 200V						
1.0	1R0			12	120			300	301								
1.1	1R1			13	130			330	331								
1.2	1R2			15	150			360	361								
1.3	1R3			16	160			390	391								
1.5	1R5			18	180			430	431								
1.6	1R6			20	200			470	471								
1.8	1R8			22	220			510	511								
2.0	2R0			24	240			560	561								
2.2	2R2			27	270			680	681								
2.4	2R4			30	300			750	751								
2.7	2R7			33	330			820	821								
3.0	3R0			36	360			910	911								
3.3	3R3			39	390			1.0 nF	102								
3.6	3R6			43	430			1.2	122								
3.9	3R9			47	470			1.5	152								
4.0	4R0			51	510			1.8	182								
4.3	4R3			56	560			2.2	222								
4.7	4R7			62	620			2.4	242								
5.0	5R0			68	680			2.7	272								
5.1	5R1			75	750			3.3	332								
5.6	5R6			82	820			3.9	392								
6.0	6R0			91	910			4.7	472								
6.2	6R2			100	101			5.6	562								
6.8	6R8			120	121			6.8	682								
7.0	7R0			130	131			8.2	822								
7.5	7R5			150	151			10	103								
8.0	8R0			160	161			15	153								
8.2	8R2			180	181			22	223								
9.0	9R0			200	201			33	333								
9.1	9R1			220	221												
10	100			F,G,J,K				240	241								16V or 25V or 50V or 100V



Dielectric NP0/COG

1206: PPI-GMC31											
Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
0.5 pF	0R5	B,C	25V or 50V or 100V or 200V	13	130	F,G,J,K	25V or 50V or 100V or 200V	390	391	F,G,J,K	25V or 50V or 100V or 200V
1.0	1R0			15	150			430	431		
1.1	1R1			16	160			470	471		
1.2	1R2			18	180			510	511		
1.3	1R3			20	200			560	561		
1.5	1R5			22	220			680	681		
1.6	1R6			24	240			750	751		
1.8	1R8			27	270			820	821		
2.0	2R0			30	300			910	911		
2.2	2R2			33	330			1.0 nF	102		
2.4	2R4			36	360			1.2	122		
2.7	2R7			39	390			1.5	152		
3.0	3R0			43	430			1.8	182		
3.3	3R3			47	470			2.2	222		
3.6	3R6			51	510			2.4	242		
3.9	3R9			56	560			2.7	272		
4.0	4R0			62	620			3.3	332		
4.3	4R3			68	680			3.9	392		
4.7	4R7			75	750			4.7	472		
5.0	5R0			82	820			5.6	562		
5.1	5R1			91	910			6.8	682		
5.6	5R6			100	101			8.2	822		
6.0	6R0			120	121			10	103		
6.2	6R2			130	131			15	153		
6.8	6R8			150	151			18	183		
7.0	7R0			160	161			22	223		
7.5	7R5			180	181			27	273		
8.0	8R0			200	201			33	333		
8.2	8R2			220	221			39	393		
9.0	9R0			240	241			49	473		
9.1	9R1			270	271			56	563		
10	100			300	301			68	683		
11	110			330	331			82	823		
12	120	360	361	100	104						



Dielectric NP0/COG

1210: PPI-GMC32											
Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
1.0 pF	1R0	B,C	16V or 25V or 50V or 100V or 200V	18	180	F,G,J,K	16V or 25V or 50V or 100V or 200V	680	681	F,G,J,K	16V or 25V or 50V or 100V or 200V
1.1	1R1			20	200			750	751		
1.2	1R2			22	220			820	821		
1.3	1R3			24	240			910	911		
1.5	1R5			27	270			1.0 nF	102		
1.6	1R6			30	300			1.2	122		
1.8	1R8			33	330			1.5	152		
2.0	2R0			36	360			1.8	182		
2.2	2R2			39	390			2.2	222		
2.4	2R4			43	430			2.4	242		
2.7	2R7			47	470			2.7	272		
3.0	3R0			51	510			3.3	332		
3.3	3R3			56	560			3.9	392		
3.6	3R6			62	620			4.7	472		
3.9	3R9			68	680			5.6	562		
4.0	4R0			75	750			6.8	682		
4.3	4R3			82	820			8.2	822		
4.7	4R7			91	910			10	103		
5.0	5R0			100	101			12	123		
5.1	5R1			120	121			15	153		
5.6	5R6			130	131			18	183		
6.0	6R0			150	151			22	223		
6.2	6R2			160	161			27	273		
6.8	6R8			180	181			33	333		
7.0	7R0			200	201			39	393		
7.5	7R5			220	221			47	473		
8.0	8R0			240	241			56	563		
8.2	8R2			270	271			68	683		
9.0	9R0			300	301			82	823		
9.1	9R1			330	331			100	104		
10	100			360	361			120	124		
11	110			390	391			150	154		
12	120			430	431			180	184		
13	130	470	471	220	224						
15	150	510	511								
16	160	560	561								



Dielectric NP0/COG

1808: PPI-GMC40																
Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC					
10 pF	100	F,G,J,K	50V or 100V or 200V	68	680	F,G,J,K	50V or 100V or 200V	510	511	F,G,J,K	50V or 100V or 200V					
11	110			75	750			560	561							
12	120			82	820			680	681							
13	130			91	910			750	751							
15	150			100	101			820	821							
16	160			120	121			910	911							
18	180			130	131			1.0 nF	102							
20	200			150	151			1.2	122							
22	220			160	161			1.5	152							
24	240			180	181			1.8	182							
27	270			200	201			2.2	222							
30	300			220	221			2.4	242							
33	330			240	241			2.7	272							
36	360			270	271			3.3	332							
39	390			300	301			3.9	392							
43	430			330	331			4.7	472							
47	470			360	361			5.6	562							
51	510			390	391			6.8	682							
56	560			430	431			8.2	822							
62	620			470	471											
											50V or 100V					
											50V					



Dielectric NP0/COG

1812: PPI-GMC43											
Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
10 pF	100	F,G,J,K	50V or 100V or 200V	130	131	F,G,J,K	50V or 100V or 200V	2.7	272	F,G,J,K	50V or 100V or 200V
11	110			150	151			3.3	332		
12	120			160	161			3.9	392		
13	130			180	181			4.7	472		
15	150			200	201			5.6	562		
16	160			220	221			6.8	682		
18	180			240	241			8.2	822		
20	200			270	271			10	103		
22	220			300	301			12	123		
24	240			330	331			15	153		
27	270			360	361			18	183		
30	300			390	391			22	223		
33	330			430	431			27	273		
36	360			470	471			33	333		
39	390			510	511			39	393		
43	430			560	561			47	473		
47	470			680	681			56	563		
51	510			750	751			68	683		
56	560			820	821			82	823		
62	620			910	911			100	104		
68	680			1.0 nF	102			120	124		
75	750			1.2	122			150	154		
82	820			1.5	152			180	184		
91	910			1.8	182			220	224		
100	101			2.2	222						
120	121			2.4	242						



Dielectric NP0/COG

1825: PPI-GMC45

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC					
10 pF	100	F,G,J,K	50V or 100V or 200V	100	101	F,G,J,K	50V or 100V or 200V	1.5	152	F,G,J,K	50V or 100V or 200V					
11	110			120	121			1.8	182							
12	120			130	131			2.2	222							
13	130			150	151			2.4	242							
15	150			160	161			2.7	272							
16	160			180	181			3.3	332							
18	180			200	201			3.9	392							
20	200			220	221			4.7	472							
22	220			240	241			5.6	562							
24	240			270	271			6.8	682							
27	270			300	301			8.2	822							
30	300			330	331			10	103							
33	330			360	361			12	123							
36	360			390	391			15	153							
39	390			430	431			18	183							
43	430			470	471			22	223							
47	470			510	511			27	273							
51	510			560	561			33	333							
56	560			680	681			39	393							
62	620			750	751			47	473							
68	680			820	821			56	563							
75	750			910	911			68	683							
82	820			1.0 nF	102			82	823							
91	910			1.2	122			100	104							
											50V or 100V					

2220: PPI-GMC55

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
270 pF	271	F,G,J,K	50V or 100V or 200V	1.8	182	F,G,J,K	50V or 100V or 200V	33	333	F,G,J,K	50V or 100V
300	301			2.2	222			39	393		
330	331			2.4	242			47	473		
360	361			2.7	272			56	563		
390	391			3.3	332			68	683		
430	431			3.9	392			82	823		
470	471			4.7	472			100	104		
510	511			5.6	562			120	124		
560	561			6.8	682			150	154		
680	681			8.2	822			180	184		
750	751			10	103			220	224		
820	821			12	123			270	274		
910	911			15	153			330	334		
1.0 nF	102			18	183			470	474		
1.2	122			22	223						
1.5	152			27	273						



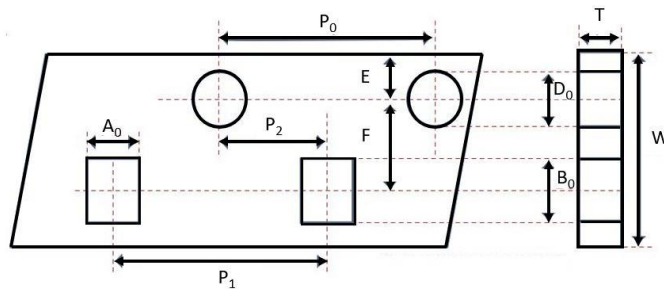


2225: PPI-GMC57																
Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC					
270 pF	271	F,G,J,K	50V or 100V or 200V	1.0 nF	102	F,G,J,K	50V or 100V or 200V	10	103	F,G,J,K	50V or 100V or 200V					
300	301			1.2	122			12	123							
330	331			1.5	152			15	153							
360	361			1.8	182			18	183							
390	391			2.2	222			22	223							
430	431			2.4	242			27	273							
470	471			2.7	272			33	333							
510	511			3.3	332			39	393							
560	561			3.9	392			47	473							
680	681			4.7	472			56	563							
750	751			5.6	562			68	683							
820	821			6.8	682			82	823							
910	911			8.2	822										50V or 100V	
																50V

⚡ Packaging

Size	Code		Description	
	<i>Qty per 7" Reel</i>	D	G	Q
		<i>Qty per 10/13" Reel</i>		
01005	20K	50K		
0201	10K/ 15K	50K		
0402	10K	40K	50K	
0603	4K	10K	15K	
0805	2K, 3K, 4K	10K	15K	20K
1206	2K, 3K, 4K	10K	15K	20K
1210	500, 1K, 2K, 3K	4K	8K	
1808	1K, 2K, 3K			
1812	500, 1K	3K		
1825	500, 1K			
2220	500, 1K			
2225	500, 750			

⚡ Tape & Reel Specifications

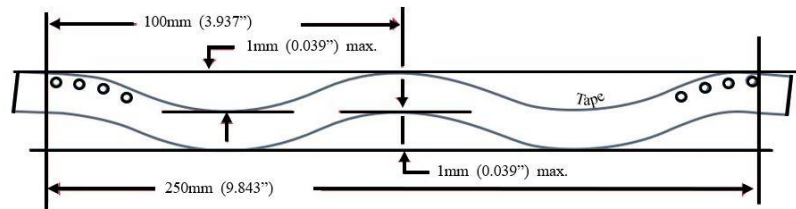
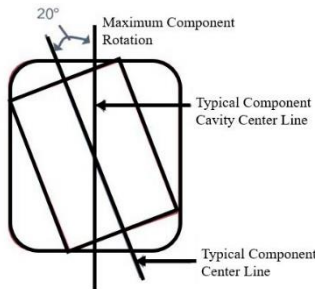
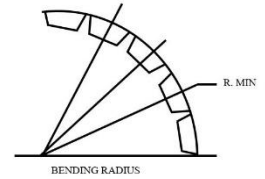
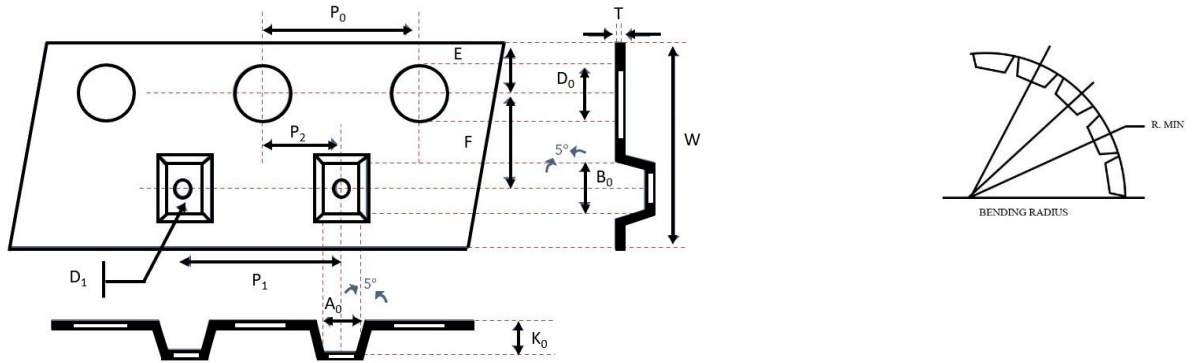


Cardboard carrier tape for EIA case sizes: 01005, 0201, 0402, 0603, 0805, 1206

Unit: mm

Size	A_0	B_0	T	K_0	W	P_0	10XPo	P_1	P_2	D_0	D_1	E	F
01005	0.25 ± 0.04	0.45 ± 0.04	0.36 ± 0.05	*	8.00 ± 0.30	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	*	1.75 ± 0.10	3.50 ± 0.05
0201	0.39 ± 0.07	0.69 ± 0.07	<0.50	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0402	0.70 ± 0.20	1.20 ± 0.20	<0.80	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0603	1.10 ± 0.20	1.90 ± 0.20	<1.20	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0805	1.65 ± 0.20	2.40 ± 0.20	<1.30	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
1206	2.00 ± 0.20	3.60 ± 0.20	<1.30	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05

≠ Tape & Reel Specifications



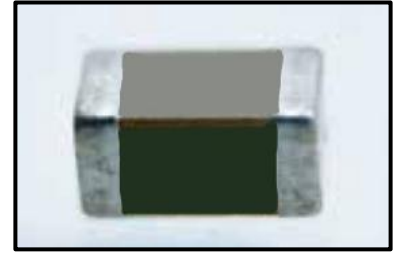
Embossed plastic carrier tape for case sizes: 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225

Unit: mm

Size	A ₀	B ₀	T	K ₀	W	P ₀	10XP ₀	P ₁	P ₂	D ₀	D ₁	E	F
0805	<1.80	<2.70	0.23 ± 0.10	<2.50	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1206	<2.30	<4.00	0.23 ± 0.10	<2.50	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1210	<3.20	<3.95	0.23 ± 0.10	<3.00	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1808	<2.50	<5.30	0.25 ± 0.10	<2.50	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
1812	<3.90	<5.30	0.25 ± 0.10	<3.50	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
1825	<6.80	<5.30	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
2220	<5.80	<6.50	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
2225	<6.80	<6.50	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10

⚡ Features

- Large capacitance values in small sizes
- Excellent high frequency characteristics
- All PPI Caps conform to EIA Specifications



⚡ Applications

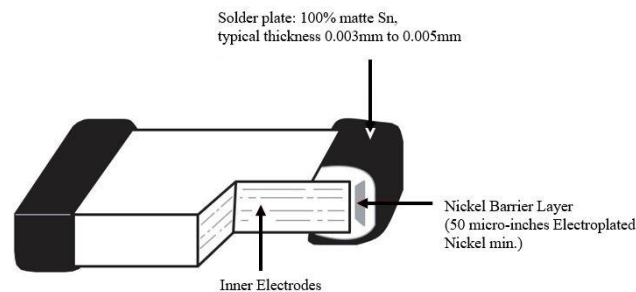
- Can be used on surface mount assembly equipment
- Our fully integrated manufacturing and total quality control systems ensure unprecedented high standards of quality and reliability.

⚡ Notes

- Capacitance Value & Tolerance are determined by circuit requirements
- Voltage is determined by circuit requirements
- Capacitor Size select the smallest unit permitted by the circuit constraints that provides the required capacitance and voltage rating
- Nickel Barrier is standard and recommended for units exposed to repeated solder cycles, to minimize leaching of the termination.
- All capacitors conform to EIA specifications.

⚡ Construction

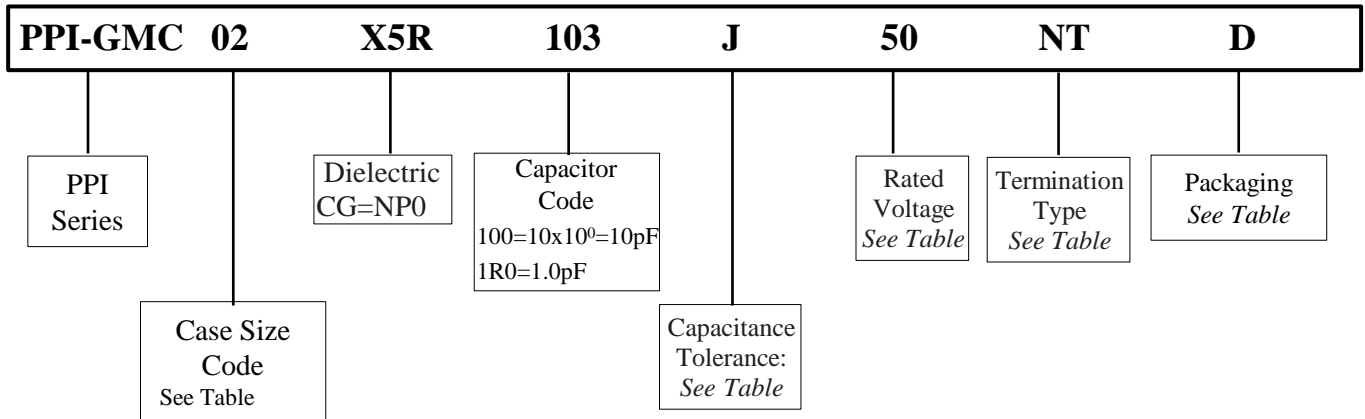
Constructed by screen printing alternative layers of internal metallic electrodes onto ceramic dielectric materials and firing into a concrete monolithic body, then completed by application of metal end terminations which are fired to assure permanent bonding with the individual internal electrodes.



≠ NP0/ COG

Capacitance change with temperature is 0-30ppm/°C which is less than -0.3%/°C from -55°C to +125°C. Typical capacitance change with life is less than -0.1% for NP0s, one-fifth that shown by most other dielectrics. NP0 formulations show no aging characteristics.

≠ Part Numbering

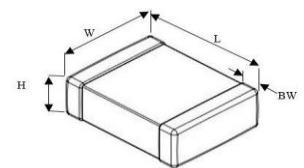


≠ Dielectric

Ultra Stable Class I Dielectric: Linear temperature coefficient, low loss, negligible change of electrical properties with time, voltage and frequency.

≠ Dimensions (mm)

Dimensions (mm)					
Code	Size	L	W	T	BW
01	01005	0.40 ± 0.02	0.20 ± 0.02	0.20 ± 0.02	0.07 ~ 0.14
02	0201	0.60 ± 0.03	0.30 ± 0.03	0.30 ± 0.03	0.15 ± 0.05
04	0402	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.10	0.10 ~ 0.35
10	0603	1.60 ± 0.20	0.80 ± 0.20	1.0 max	0.10 ~ 0.40
21	0805	2.00 ± 0.30	1.25 ± 0.20	1.40	0.25 ~ 0.75
31	1206	3.20 ± 0.30	2.50 ± 0.20	2.20	0.25 ~ 0.75
32	1210	3.20 ± 0.30	1.60 ± 0.20	1.80	0.25 ~ 0.75
40	1808	4.50 ± 0.35	3.20 ± 0.30	2.20	0.25 ~ 0.75
43	1812	3.20 ± 0.30	1.6 ± 0.20	1.80	0.25 ~ 0.75
45	1825	5.70 ± 0.40	5.01 ± 0.40	1.80	0.25 ~ 0.75
55	2220	5.70 ± 0.40	6.30 ± 0.40	2.20	0.25 ~ 0.75
57	2225	4.50 ± 0.35	6.30 ± 0.40	2.20	0.25 ~ 0.75



≠ Capacitance Code

Cap Code	Value	Cap Code	Value	Cap Code	Value	Cap Code	Value
0R5	0.5pF	100	10pF	104	0.1uF	106	10uF
5R0	5.0pF	103	0.01uF	105	1.0uF	107	100uF

≠ Capacitance Tolerances

Code	B	C	D	F	G	J	K	M	Z
Tol.	±0.1pF	±0.25pF	±0.5pF	±1%	±2%	±5%	±10%	±20%	-20% + 80%

≠ Rated Voltages

Code	Voltage	Code	Voltage
4R0	4.0V	350	35V
6R3	6.3V	500	50V
100	10V	630	63V
160	16V	101	100V
250	25V	201	200V

≠ Terminations

Nickel barrier is standard and recommended for units exposed to repeated solder cycles to minimize leaching of the termination.

Code	Description
NT	Sn/Ni
PT	Pd/Ag





± Stable Class II Dielectric

Temperature variation of capacitance is within $\pm 15\%$ from -55°C to $+125^{\circ}\text{C}$ for X7R (-55°C to $+85^{\circ}\text{C}$ for X5R). The capacitance change is non-linear.

± Electrical Specifications

Operating Temperature Range	-55°C to $+85^{\circ}\text{C}$
Temperature Coefficient (TC)	$\pm 15\%$
Temperature Voltage Coefficient (ΔC_{Max} @ V_{DCW})	Not Applicable
Dissipation Factor	2.5% Max, 1.80% Typical
Insulation Resistance (IR)	25°C , V_{DCW} ; $> 100\text{GQF}$ or 1000QF , whichever is less 125°C V_{DCW} ; $> 10\text{GQF}$ or 100QF , whichever is less
Dielectric Withstanding Voltage	$2.5 \times V_{\text{DCW}}$
Aging Rate	$< 2\%$ per decade hour
Test Parameters	1KHz 1.0Vrms $\pm 0.2\text{Vrms}$ 25°C values $>$ or $=$ to 10uF 1.0 Vrms 120Hz



01005: PPI-GMC01

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
150 pF	151	K,M	10V	1.5	152	K,M	10V	15	153	K,M	10V
180	181			1.8	182			18	183		
220	221			2.2	222			22	223		
270	271			2.7	272			27	273		
330	331			3.3	332			33	333		
390	391			3.9	392			39	393		
470	471			4.7	472			47	473		
560	561			5.6	562			56	563		
680	681			6.8	682			68	683		
820	821			8.2	822			82	823		
1.0 nF	102			10	103			100	104		
1.2	122			12	123						

0201: PPI-GMC02

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
100 pF	101	K,M	6.3V or 10V or 16V or 25V	1.5	152	K,M	6.3V or 10V or 16V or 25V	27	273	K,M	6.3V or 10V or 16V or 25V
120	121			1.8	182			33	333		
150	151			2.2	222			39	393		
180	181			3.3	332			47	473		
220	221			3.9	392			56	563		
270	271			4.7	472			68	683		
330	331			5.6	562			82	823		
390	391			6.8	682			100	104		
470	471			8.2	822			220	224		
560	561			10	103			470	474		
680	681			12	123			1.0 uF	105		6.3V or 10V
820	821			15	153			2.2	225		6.3V or 10V or 16V or 25V
1.0 nF	102			18	183			4.7	475		6.3V
1.2	122			22	223						



0402: PPI-GMC04

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	
1.0 nF	102	K,M	6.3V or 10V or 16V or 25V or 35V or 50V	15	153	K,M	6.3V or 10V or 16V or 25V or 35V or 50V	270	274	K,M	6.3V or 10V or 16V or 25V or 35V	
1.2	122			18	183			390	394			
1.5	152			22	223			470	474			
1.8	182			27	273			560	564			
2.2	222			33	333			680	684			
2.7	272			39	393			820	824			
3.3	332			47	473			1.0 uF	105			
3.9	392			56	563			2.2	225			
4.7	472			68	683			3.3	335			
5.6	562			82	823			3.9	395			
6.8	682			100	103			4.7	475			
8.2	822			150	154			6.3V or 10V or 16V or 25V or 35V	10			106
10	103			220	224			6.3V or 10V or 16V or 25V or 35V or 50V	22			226
12	123											

0603: PPI-GMC10

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
100 nF	104	K,M	6.3V or 10V or 25V or 35V	560	564	K,M	6.3V or 10V or 25V or 35V	3.9	395	K,M	6.3V or 10V or 25V or 35V
120	124			680	684			4.7	475		
150	154			820	824			10	106		
220	224			1.0 uF	105			22	226		
270	274			2.2	225			47	476		
330	334			2.7	275						
470	474			3.3	335						



0805: PPI-GMC21

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
180 nF	184	K,M	4V or 6.3V or 10V or 16V or 25V or 35V or 50V	820	824	K,M	4V or 6.3V or 10V or 16V or 25V or 35V or 50V	15	156	K,M	4V or 6.3V or 10V or 16V or 25V or 35V
220*	224			1.0 uF*	105			22	226		
270	274			2.2*	225			33	336		
390	394			3.3	335			47	476		
470*	474			4.7*	475			100	107		
560	564			6.8	685						
680	684			10	106						
							4V or 6.3V or 10V or 16V or				

*Also available in 63V

1206: PPI-GMC31

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
180 nF	184	K,M	4V or 6.3V or 10V or 16V or 25V or 50V	820	824	K,M	4V or 6.3V or 10V or 16V or 25V or 50V	15	156	K,M	4V or 6.3V or 10V or 16V or 25V
220	224			1.0 uF	105			22	226		
270	274			2.2	225			33	336		
390	394			3.3	335			47	476		
470	474			4.7	475			100	107		4V or 6.3V or 10V
560	564			6.8	685			150	157		
680	684			10	106						

1210: PPI-GMC32

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
180 nF	184	K,M	4V or 6.3V or 10V or 16V or 25V or 50V	1.0 uF	105	K,M	4V or 6.3V or 10V or 16V or 25V or 50V	33	336	K,M	4V or 6.3V or 10V or 16V or 25V
220	224			2.2	225			47	476		
270	274			3.3	335			100	107		4V or 6.3V or 10V or 16V
390	394			4.7	475			150	157		
470	474			6.8	685			220	227		
560	564			10	106			330	337		4V
680	684			15	156						
820	824			22	226						
						4V or 6.3V or 10V or 16V or					

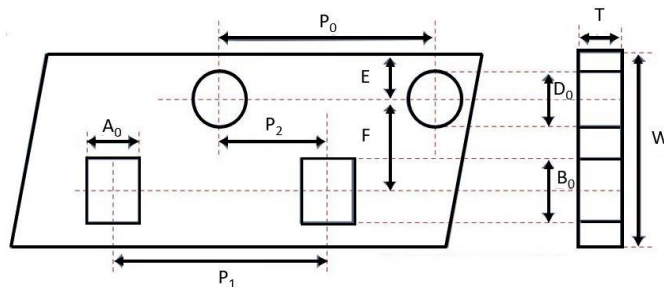
1812: PPI-GMC43

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
10 nF	106	K,M	10V or 16V or 25V	22	226	K,M	10V or 16V or 25V	47	476	K,M	6.3V or 10V
15	156			33	336		6.3V or 10V or 16V	100	107		

⚡ Packaging

Size	Code		Description	
	D	G	Q	
	<i>Qty per 7" Reel</i>		<i>Qty per 10/13" Reel</i>	
01005	20K	50K		
0201	10K/ 15K	50K		
0402	10K	40K	50K	
0603	4K	10K	15K	
0805	2K, 3K, 4K	10K	15K	20K
1206	2K, 3K, 4K	10K	15K	20K
1210	500, 1K, 2K, 3K	4K	8K	
1808	1K, 2K, 3K			
1812	500, 1K	3K		
1825	500, 1K			
2220	500, 1K			
2225	500, 750			

⚡ Tape & Reel Specifications

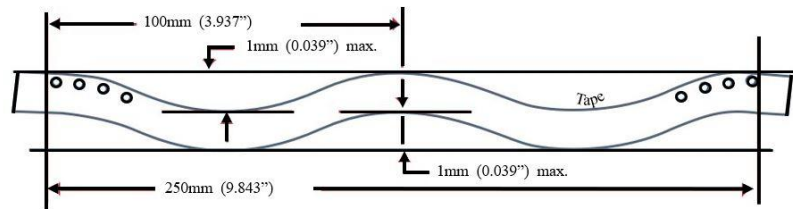
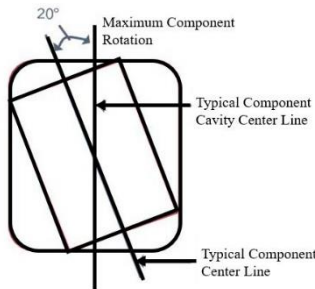
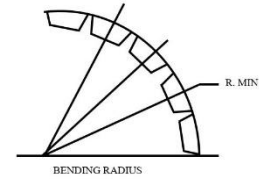
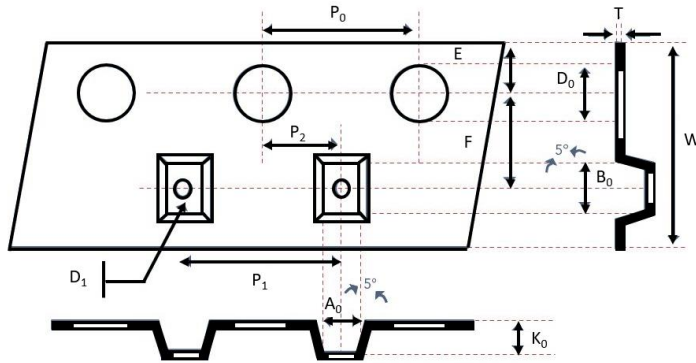


Cardboard carrier tape for EIA case sizes: 01005, 0201, 0402, 0603, 0805, 1206

Unit: mm

Size	A ₀	B ₀	T	K ₀	W	P ₀	10XP ₀	P ₁	P ₂	Do	D ₁	E	F
01005	0.25 ± 0.04	0.45 ± 0.04	0.36 ± 0.05	*	8.00 ± 0.30	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	*	1.75 ± 0.10	3.50 ± 0.05
0201	0.39 ± 0.07	0.69 ± 0.07	<0.50	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0402	0.70 ± 0.20	1.20 ± 0.20	<0.80	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0603	1.10 ± 0.20	1.90 ± 0.20	<1.20	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0805	1.65 ± 0.20	2.40 ± 0.20	<1.30	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
1206	2.00 ± 0.20	3.60 ± 0.20	<1.30	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05

≠ Tape & Reel Specifications



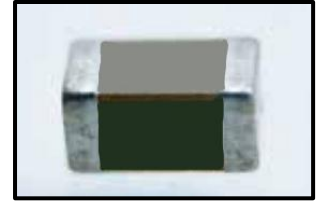
Embossed plastic carrier tape for case sizes: 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225

Unit: mm

Size	A ₀	B ₀	T	K ₀	W	P ₀	10XP ₀	P ₁	P ₂	D ₀	D ₁	E	F
0805	<1.80	<2.70	0.23 ± 0.10	<2.50	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1206	<2.30	<4.00	0.23 ± 0.10	<2.50	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1210	<3.20	<3.95	0.23 ± 0.10	<3.00	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1808	<2.50	<5.30	0.25 ± 0.10	<2.50	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
1812	<3.90	<5.30	0.25 ± 0.10	<3.50	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
1825	<6.80	<5.30	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
2220	<5.80	<6.50	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
2225	<6.80	<6.50	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10

≠ Features

- Large capacitance values in small sizes
- Excellent high frequency characteristics
- All PPI Caps conform to EIA Specifications



≠ Applications

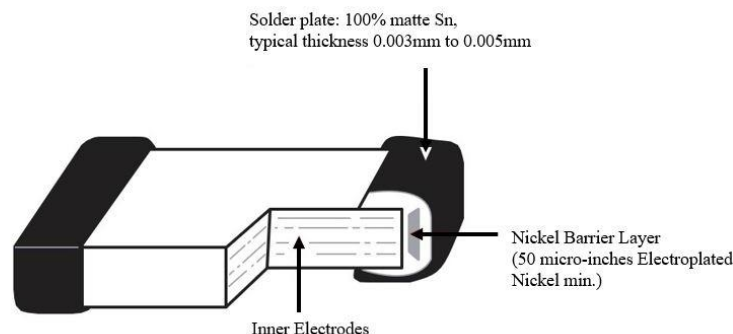
- Can be used on surface mount assembly equipment
- Our fully integrated manufacturing and total quality control systems ensure unprecedented high standards of quality and reliability.

≠ Notes

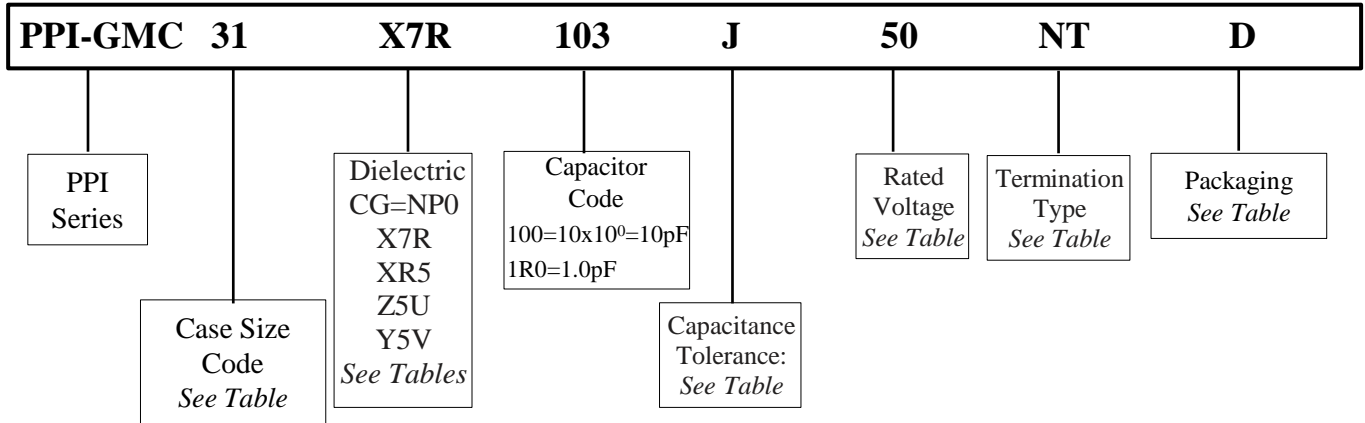
- Capacitance Value & Tolerance are determined by circuit requirements
- Voltage is determined by circuit requirements
- Capacitor Size select the smallest unit permitted by the circuit constraints that provides the required capacitance and voltage rating
- Nickel Barrier is standard and recommended for units exposed to repeated solder cycles, to minimize leaching of the termination.
- All capacitors conform to EIA specifications.

≠ Construction

Constructed by screen printing alternative layers of internal metallic electrodes onto ceramic dielectric materials and firing into a concrete monolithic body, then completed by application of metal end terminations which are fired to assure permanent bonding with the individual internal electrodes.

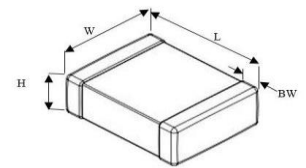


≠ Part Numbering



≠ Dimensions (mm)

Dimensions (mm)					
Code	Size	L	W	T	BW
01	01005	0.40 ± 0.02	0.20 ± 0.02	0.20 ± 0.02	0.07 ~ 0.14
02	0201	0.60 ± 0.03	0.30 ± 0.03	0.30 ± 0.03	0.15 ± 0.05
04	0402	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.10	0.10 ~ 0.35
10	0603	1.60 ± 0.20	0.80 ± 0.20	1.0 max	0.10 ~ 0.40
21	0805	2.00 ± 0.30	1.25 ± 0.20	1.40	0.25 ~ 0.75
31	1206	3.20 ± 0.30	2.50 ± 0.20	2.20	0.25 ~ 0.75
32	1210	3.20 ± 0.30	1.60 ± 0.20	1.80	0.25 ~ 0.75
40	1808	4.50 ± 0.35	3.20 ± 0.30	2.20	0.25 ~ 0.75
43	1812	3.20 ± 0.30	1.6 ± 0.20	1.80	0.25 ~ 0.75
45	1825	5.70 ± 0.40	5.01 ± 0.40	1.80	0.25 ~ 0.75
55	2220	5.70 ± 0.40	6.30 ± 0.40	2.20	0.25 ~ 0.75
57	2225	4.50 ± 0.35	6.30 ± 0.40	2.20	0.25 ~ 0.75



⚡ Capacitance Code

Cap Code	Value	Cap Code	Value	Cap Code	Value	Cap Code	Value
0R5	0.5pF	100	10pF	104	0.1uF	106	10uF
5R0	5.0pF	103	0.01uF	105	1.0uF	107	100uF

⚡ Capacitance Tolerances

Code	B	C	D	F	G	J	K	M	Z
Tol.	±0.1pF	±0.25pF	±0.5pF	±1%	±2%	±5%	±10%	±20%	-20% + 80%

⚡ Rated Voltages

Code	Voltage	Code	Voltage
4R0	4.0V	350	35V
6R3	6.3V	500	50V
100	10V	630	63V
160	16V	101	100V
250	25V	201	200V

⚡ Terminations

Nickel barrier is standard and recommended for units exposed to repeated solder cycles to minimize leaching of the termination.

Code	Description
NT	Sn/Ni
PT	Pd/Ag





± Stable Class II Dielectric

Temperature variation of capacitance is within ±15% from -55°C to +125°C for X7R (-55°C to +85°C for X5R). The capacitance change is non-linear.

± Electrical Specifications

Operating Temperature Range

X7R	-55°C to +125°C
X5R	-55°C to +85°C

Temperature Coefficient (TC)	±15%
Temperature Voltage Coefficient (ΔcMax @ VDCW)	Not Applicable
Dissipation Factor	2.5% Max, 1.80% Typical
Insulation Resistance (IR)	25°C, VDCW; > 100GQF or 1000QF, whichever is less 125°C VDCW; > 10GQF or 100QF, whichever is less
Dielectric Withstanding Voltage	2.5 X VDCW
Aging Rate	< 2% per decade hour
Test Parameters	1KHz 1.0Vrms ±0.2Vrms 25°C values > or = to 10uF 1.0 Vrms 120Hz

01005: PPI-GMC01

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
100 pF	101	J,K	6.3V or 10V	270	271	J,K	6.3V or 10V	680	681	J,K	6.3V or 10V
120	121			330	331			820	821		
150	151			390	391			1000	102		
180	181			470	470						
220	221			560	561						

0201: PPI-GMC02

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
100 pF	101	J,K	6.3V or 10V or 16V or 25V or 50V	560	561	J,K	6.3V or 10V or 16V or 25V or 50V	3.3	332	J,K	6.3V or 10V or 16V
120	121			680	681			3.9	392		
150	151			820	821			4.7	472		
180	181			1.0 nF	102			5.6	562		
220	221			1.2	122			6.8	682		
270	271			1.5	152			8.2	822		
330	331			1.8	182		10	103			
390	391			2.2	222						
470	471			2.7	272						



0402: PPI-GMC04

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC				
100 pF	101	J,K	10V or 25V or 50V or 100V or 200V	1.0 nF	102	J,K	10V or 25V or 50V or 100V	33	333	J,K	10V or 25V or 50V				
110	111			1.2	122			39	393						
120	121			1.5	152			47	473						
130	131			1.8	182			56	563						
150	151			2.2	222			68	683						
180	181			2.7	272			82	823						
200	221			3.3	332			100	104						
220	221			3.9	392			150	154						
240	241			4.7	472			220	224						
270	271			5.6	562			270	274						
300	301			6.8	682			390	394						
330	331			8.2	822			470	474						
390	391			10	103			560	564						
430	431			12	123			680	684						
470	471			15	153			820	824						
560	561			18	183			1uF	105						
680	681			22	223										
820	821			27	273										
							10V or 25V or 50V				10V				
											10V or 25V				

0603: PPI-GMC10

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC				
100 pF	101	J,K	6.3V or 10V or 16V or 25V or 50V or 100V or 200V	1.0 nF	102	J,K	6.3V or 10V or 16V or 25V or 50V or 100V or 200V	56	563	J,K	6.3V or 10V or 16V or 25V or 50V or 100V				
120	121			1.2	122			68	683						
130	131			1.5	152			82	823						
150	151			1.8	182			100	104						
160	161			2.2	222			120	124						
180	181			2.7	272			150	154						
200	221			3.3	332			220	224						
220	221			3.9	392			270	274						
240	241			4.7	472			330	334						
270	271			5.6	562			470	474						
300	301			6.8	682			560	564						
330	331			7.5	752			680	684						
390	391			8.2	822			820	824						
430	431			10	103			1.0 uF	105						
470	471			12	123			2.2	225						
510	511			15	153			2.7	275						
560	561			18	183			3.3	335						
620	621			22	223			3.9	395						
680	681			27	273		4.7	475							
750	751			33	333		10	106							
820	821			39	393										
910	911			47	473										
							6.3V or 10V or 16V or 25V or 50V or 100V				6.3V or 10V or 16V				
											6.3V or 10V				
											6.3V				



0805: PPI-GMC21

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
100 pF	101	J,K	6.3V or 10V or 16V or 25V or 35V or 50V or 100V or 200V	3.9	392	J,K	6.3V or 10V or 16V or 25V or 35V or 50V or 100V or 200V	150	154	J,K	6.3V or 10V or 16V or 25V or 35V or 50V or 100V
120	121			4.7	472			180	184		
150	151			5.6	562			220	224		
180	181			6.8	682			270	274		
220	221			8.2	822			330	334		
270	271			10	103			470	474		
330	331			12	123			560	564		
390	391			15	153			680	684		
470	471			18	183			820	824		
560	561			22	223			1.0 uF	105		
680	681			27	273		1.2	125			
820	821			33	333		1.5	155			
1.0 nF	102			39	393		1.8	185			
1.2	122			47	473		2.2	225			
1.5	152			56	563		3.3	335			
1.8	182			68	683		4.7	475			
2.2	222			82	823		6.8	685			
2.7	272			100	104		10	106			
3.3	332			120	124						
									6.3V or 10V or 16V or 25V		

1206: PPI-GMC31

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
100 pF	101	J,K	6.3V or 10V or 16V or 25V or 50V or 100V or 200V	3.9	392	J,K	6.3V or 10V or 16V or 25V or 50V or 100V or 200V	180	184	J,K	6.3V or 10V or 16V or 25V or 50V
120	121			4.7	472			220	224		
150	151			5.6	562			270	274		
180	181			6.8	682			330	334		
220	221			8.2	822			470	474		
270	271			10	103			560	564		
330	331			12	123			680	684		
390	391			15	153			820	824		
470	471			18	183			1.0 uF	105		
560	561			22	223			1.2	125		
680	681			27	273		1.5	155			
820	821			33	333		1.8	185			
1.0 nF	102			47	473		2.2	225			
1.2	122			56	563		3.3	335			
1.5	152			68	683		4.7	475			
1.8	182			82	823		6.8	685			
2.2	222			100	104		10	106			
2.7	272			120	124		22	226			
3.3	332			150	154						
									6.3V or 10V or 16V or 25V or 50V		
						6.3V or 10V or 16V					



1210: PPI-GMC32

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
100 pF	101	J,K	6.3V or 10V or 16V or 25V or 50V or 100V or 200V	4.7	472	J,K	6.3V or 10V or 16V or 25V or 50V or 100V or 200V	220	224	J,K	6.3V or 10V or 16V or 25V or 50V or 100V or 200V
120	121			5.6	562			270	274		
150	151			6.8	682			330	334		
180	181			8.2	822			470	474		
220	221			10	103			560	564		
270	271			12	123			680	684		
330	331			15	153			820	824		
390	391			18	183			1.0 uF	105		
470	471			22	223			1.2	125		
560	561			27	273			1.5	155		
680	681			33	333			1.8	185		
820	821			39	393			2.2	225		
1.0 nF	102			47	473			3.3	335		
1.2	122			56	563			4.7	475		
1.5	152			68	683			6.8	685		
1.8	182			82	823			10	106		
2.2	222			100	104			22	226		
2.7	272			120	124			47	476		
3.3	332			150	154						
3.9	392			180	184						
						6.3V or 10V or 16V or 25V or 50V					
						6.3V or 10V or 16V or 25V or 50V or 100V					
						6.3V or 10V					

1808: PPI-GMC40

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
100 pF	101	J,K	25V or 50V or 100V or 200V	1.8	182	J,K	25V or 50V or 100V or 200V	33	333	J,K	25V or 50V or 100V or 200V
120	121			2.2	222			39	393		
150	151			2.7	272			47	473		
180	181			3.3	332			56	563		
220	221			3.9	392			68	683		
270	271			4.7	472			82	823		
330	331			5.6	562			100	104		
390	391			6.8	682			120	124		
470	471			8.2	822			150	154		
560	561			10	103			180	184		
680	681			12	123			220	224		
820	821			15	153			270	274		
1.0 nF	102			18	183			330	334		
1.2	122			22	223			470	474		
1.5	152			27	273						
											25V or 50V
											25V



1812: PPI-GMC43

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
100 pF	101	J,K	10V or 16V or 25V or 50V or 100V or 200V	4.7	472	J,K	10V or 16V or 25V or 50V or 100V or 200V	220	224	J,K	10V or 16V or 25V or 50V or 100V or 200V
120	121			5.6	562			270	274		
150	151			6.8	682			330	334		
180	181			8.2	822			470	474		
220	221			10	103			560	564		
270	271			12	123			680	684		
330	331			15	153			820	824		
390	391			18	183			1.0 uF	105		
470	471			22	223			1.2	125		
560	561			27	273			1.5	155		
680	681			33	333			1.8	185		
820	821			39	393			2.2	225		
1.0 nF	102			47	473			3.3	335		
1.2	122			56	563			4.7	475		
1.5	152			68	683			6.8	685		
1.8	182			82	823			10	106		
2.2	222			100	104			22	226		
2.7	272			120	124			33	336		
3.3	332			150	154						
3.9	392			180	184						
						10V or 16V or 25V or 50V					
						10V or 16V or 25V					
						10V or 16V					

1825: PPI-GMC45

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
100 pF	101	J,K	16V or 25V or 50V or 100V or 200V	3.3	332	J,K	16V or 25V or 50V or 100V or 200V	100	104	J,K	16V or 25V or 50V or 100V or 200V
120	121			3.9	392			120	124		
150	151			4.7	472			150	154		
180	181			5.6	562			180	184		
220	221			6.8	682			220	224		
270	271			8.2	822			270	274		
330	331			10	103			330	334		
390	391			12	123			470	474		
470	471			15	153			560	564		
560	561			18	183			680	684		
680	681			22	223			820	824		
820	821			27	273			1.0 uF	105		
1.0 nF	102			33	333			1.2	125		
1.2	122			39	393			1.5	155		
1.5	152			47	473			1.8	185		
1.8	182			56	563			2.2	225		
2.2	222			68	683						
2.7	272			82	823						
											16V or 25V or 50V or 100V
											16V or 25V or 50V



2220: PPI-GMC55

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
1.0 nF	102	J,K	16V or 25V or 50V or 100V or 200V	22	223	J,K	16V or 25V or 50V or 100V or 200V	560	564	J,K	16V or 25V or 50V or 100V or 200V
1.2	122			27	273			680	684		
1.5	152			33	333			820	824		
1.8	182			39	393			1.0 uF	105		
2.2	222			47	473			1.2	125		
2.7	272			56	563			1.5	155		
3.3	332			68	683			1.8	185		
3.9	392			82	823			2.2	225		
4.7	472			100	104			3.3	335		
5.6	562			120	124			4.7	475		
6.8	682			150	154			6.8	685		
8.2	822			180	184			10	106		
10	103			220	224			22	226		
12	123			270	274			33	336		
15	153			330	334			47	476		
18	183			470	474						

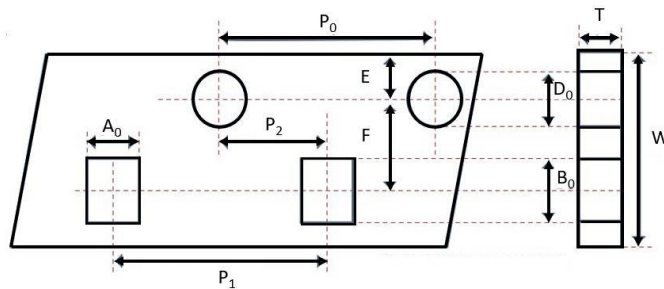
2225: PPI-GMC57

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
1.0 nF	102	J,K	16V or 25V or 50V or 100V or 200V	15	153	J,K	16V or 25V or 50V or 100V or 200V	220	224	J,K	16V or 25V or 50V or 100V or 200V
1.2	122			18	183			270	274		
1.5	152			22	223			330	334		
1.8	182			27	273			470	474		
2.2	222			33	333			560	564		
2.7	272			39	393			680	684		
3.3	332			47	473			820	824		
3.9	392			56	563			1.0 uF	105		
4.7	472			68	683			1.2	125		
5.6	562			82	823			1.5	155		
6.8	682			100	104			1.8	185		
8.2	822			120	124			2.2	225		
10	103	150	154	3.3	335						
12	123	180	184	4.7	475						

≠ Packaging

Size	Qty per 7" Reel	Code		
		D	G	Q
		Qty per 10/13" Reel		
01005	20K	50K		
0201	10K/ 15K	50K		
0402	10K	40K	50K	
0603	4K	10K	15K	
0805	2K, 3K, 4K	10K	15K	20K
1206	2K, 3K, 4K	10K	15K	20K
1210	500, 1K, 2K, 3K	4K	8K	
1808	1K, 2K, 3K			
1812	500, 1K	3K		
1825	500, 1K			
2220	500, 1K			
2225	500, 750			

≠ Tape & Reel Specifications

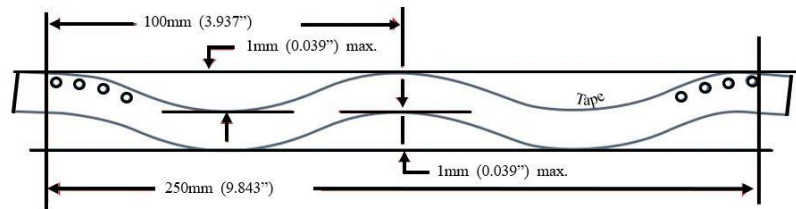
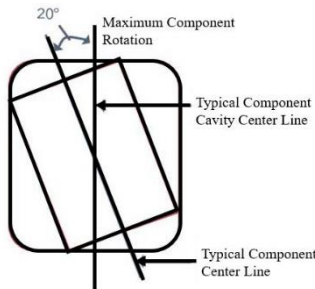
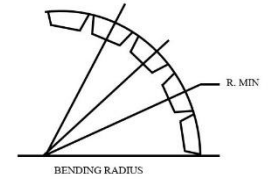
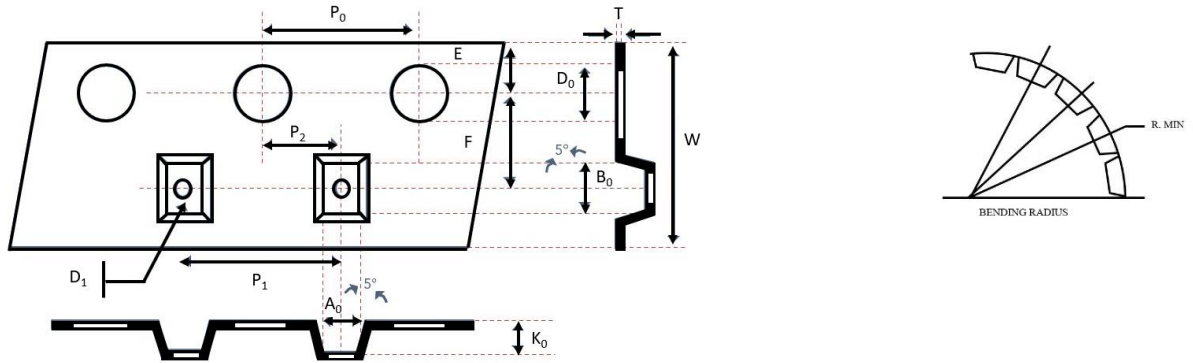


Cardboard carrier tape for EIA case sizes: 01005, 0201, 0402, 0603, 0805, 1206

Unit: mm

Size	A_0	B_0	T	K_0	W	P_0	10XPo	P_1	P_2	D_0	D_1	E	F
01005	0.25 ± 0.04	0.45 ± 0.04	0.36 ± 0.05	*	8.00 ± 0.30	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	*	1.75 ± 0.10	3.50 ± 0.05
0201	0.39 ± 0.07	0.69 ± 0.07	<0.50	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0402	0.70 ± 0.20	1.20 ± 0.20	<0.80	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0603	1.10 ± 0.20	1.90 ± 0.20	<1.20	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0805	1.65 ± 0.20	2.40 ± 0.20	<1.30	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
1206	2.00 ± 0.20	3.60 ± 0.20	<1.30	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05

≡ Tape & Reel Specifications



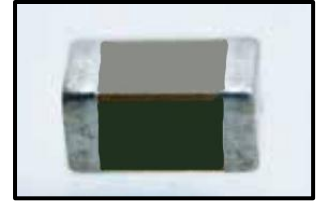
Embossed plastic carrier tape for case sizes: 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225

Unit: mm

Size	A ₀	B ₀	T	K ₀	W	P ₀	10XP ₀	P ₁	P ₂	D ₀	D ₁	E	F
0805	<1.80	<2.70	0.23 ± 0.10	<2.50	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1206	<2.30	<4.00	0.23 ± 0.10	<2.50	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1210	<3.20	<3.95	0.23 ± 0.10	<3.00	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1808	<2.50	<5.30	0.25 ± 0.10	<2.50	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
1812	<3.90	<5.30	0.25 ± 0.10	<3.50	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
1825	<6.80	<5.30	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
2220	<5.80	<6.50	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
2225	<6.80	<6.50	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10

≠ Features

- Large capacitance values in small sizes
- Excellent high frequency characteristics
- All PPI Caps conform to EIA Specifications



≠ Applications

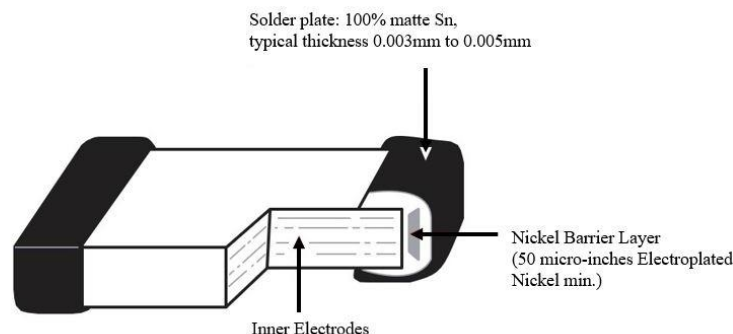
- Can be used on surface mount assembly equipment
- Our fully integrated manufacturing and total quality control systems ensure unprecedented high standards of quality and reliability.

≠ Notes

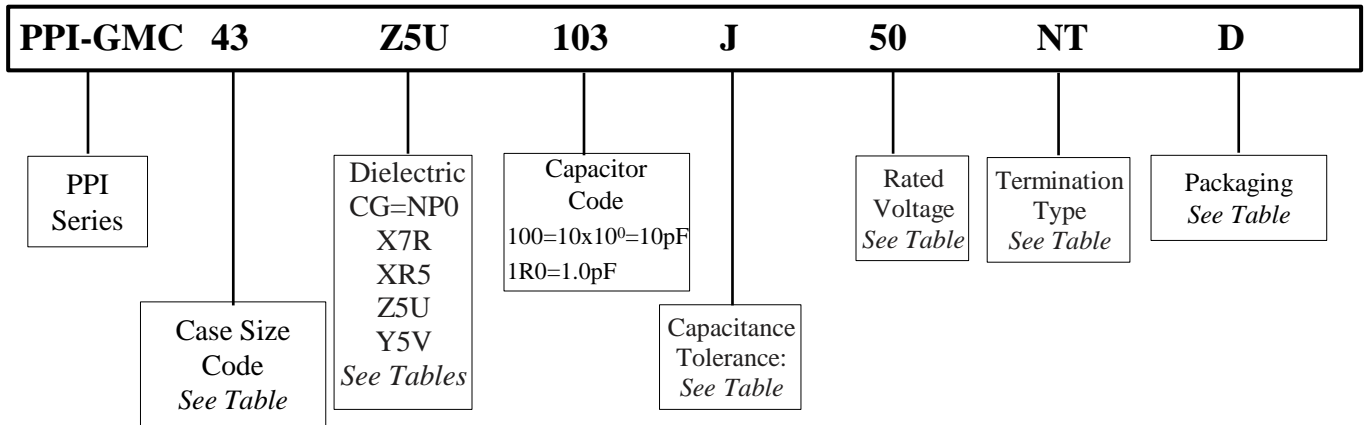
- Capacitance Value & Tolerance are determined by circuit requirements
- Voltage is determined by circuit requirements
- Capacitor Size select the smallest unit permitted by the circuit constraints that provides the required capacitance and voltage rating
- Nickel Barrier is standard and recommended for units exposed to repeated solder cycles, to minimize leaching of the termination.
- All capacitors conform to EIA specifications.

≠ Construction

Constructed by screen printing alternative layers of internal metallic electrodes onto ceramic dielectric materials and firing into a concrete monolithic body, then completed by application of metal end terminations which are fired to assure permanent bonding with the individual internal electrodes.

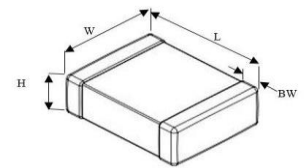


≠ Part Numbering



≠ Dimensions (mm)

Dimensions (mm)						
Code	Size	L	W	T	BW	
01	01005	0.40 ± 0.02	0.20 ± 0.02	0.20 ± 0.02	0.07 ~ 0.14	
02	0201	0.60 ± 0.03	0.30 ± 0.03	0.30 ± 0.03	0.15 ± 0.05	
04	0402	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.10	0.10 ~ 0.35	
10	0603	1.60 ± 0.20	0.80 ± 0.20	1.0 max	0.10 ~ 0.40	
21	0805	2.00 ± 0.30	1.25 ± 0.20	1.40	0.25 ~ 0.75	
31	1206	3.20 ± 0.30	2.50 ± 0.20	2.20	0.25 ~ 0.75	
32	1210	3.20 ± 0.30	1.60 ± 0.20	1.80	0.25 ~ 0.75	
40	1808	4.50 ± 0.35	3.20 ± 0.30	2.20	0.25 ~ 0.75	
43	1812	3.20 ± 0.30	1.6 ± 0.20	1.80	0.25 ~ 0.75	
45	1825	5.70 ± 0.40	5.01 ± 0.40	1.80	0.25 ~ 0.75	
55	2220	5.70 ± 0.40	6.30 ± 0.40	2.20	0.25 ~ 0.75	
57	2225	4.50 ± 0.35	6.30 ± 0.40	2.20	0.25 ~ 0.75	



≠ Capacitance Code

Cap Code	Value	Cap Code	Value	Cap Code	Value	Cap Code	Value
0R5	0.5pF	100	10pF	104	0.1uF	106	10uF
5R0	5.0pF	103	0.01uF	105	1.0uF	107	100uF

≠ Capacitance Tolerances

Code	B	C	D	F	G	J	K	M	Z
Tol.	±0.1pF	±0.25pF	±0.5pF	±1%	±2%	±5%	±10%	±20%	-20% + 80%

≠ Rated Voltages

Code	Voltage	Code	Voltage
4R0	4.0V	350	35V
6R3	6.3V	500	50V
100	10V	630	63V
160	16V	101	100V
250	25V	201	200V

≠ Terminations

Nickel barrier is standard and recommended for units exposed to repeated solder cycles to minimize leaching of the termination.

Code	Description
NT	Sn/Ni
PT	Pd/Ag





Product Specifications

≠ Z5U

Despite their capacitance instability, Z5U formulations are very popular because of their small size, temperature range, low ESL, low ESR and excellent frequency response. These features are particularly important for decoupling application where only a minimum capacitance value is required.

≠ Y5V

Y5V formulations are for general purpose use in a limited temperature range. They have a wide temperature characteristic of +22% - 82% capacitance change over the operating temperature range of -30°C to +85°C. Y5Vs high dielectric constant allows the manufacture of very high capacitance values (up to 22MF) in small physical sizes.

High capacitance per unit volume: General Purpose product

≠ Electrical Specifications

Operating Temperature Range	-30°C to +85°C
Temperature Coefficient (TC)	±22% - 82%
Temperature Voltage Coefficient (ΔcMax @ V _{DCW})	Not Applicable
Dissipation Factor	3.0% Max, 2.00% Typical
Insulation Resistance (IR)	10GQ or 100QF, whichever is less 25°C V _{DCW}
Dielectric Withstanding Voltage	2.5 X V _{DCW}
Aging Rate	3% per decade hour
Test Parameters	1KHz 1.0Vrms 25°C values > or = to 10uF 1.0 Vrms 120Hz



Dielectrics: Z5U & Y5V

01005: PPI-GMC01

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
10 nF	103	M, Z	16V	27	273	M, Z	16V	68	683	M, Z	16V
12	123			33	333			82	823		
15	153			39	393			100	104		
18	183			47	473						
22	223			56	563						

0201: PPI-GMC02

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	
10 nF	103	M, Z	6.3V	68	683	M, Z	6.3V	470	474	M, Z	6.3V	
12	123			82	823			560	564			
15	153			100	104			560	564			
18	183			120	124			680	684			
22	223			150	154			820	824			
27	273			180	184			1.0 uF	105			
33	333			220	224			2.2	225			
39	393			270	274			4.7	475			
47	473			330	334							
56	563			390	394							

0402: PPI-GMC04

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
10 nF	103	M, Z	6.3V or 10V or 16V or 25V or 50V	68	683	M, Z	6.3V or 10V or 16V or 25V or 50V	820	824	M, Z	6.3V or 10V or 16V
12	123			82	823			1.0 uF	105		6.3V or 10V or 16V or 25V
15	153			100	104			2.2	225		6.3V or 10V
18	183			150	154		3.3	335			
22	223			220	224		3.9	395			
27	273			270	274		4.7	475			
33	333			390	394		10	106			
39	393			470	474		22	226			
47	473			560	564						
56	563			680	684						



Dielectrics: Z5U & Y5V

0603: PPI-GMC10

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	
10 nF	103	M, Z	6.3V or 10V or 16V or 25V or 50V	82	823	M, Z	6.3V or 10V or 16V or 25V or 50V	1.0 uF	105	M, Z	6.3V or 10V or 16V or 25V or 50V	
12	123			100	104			2.2	225		6.3V or 10V or 16V	
15	153			120	124			2.7	275		6.3V or 10V	
18	183			150	154			3.3	335			
22	223			220	224			3.9	395			
27	273			270	274			4.7	475		6.3V or 10V or 16V	
33	333			330	334			10	106			
39	393			470	474			22	226			6.3V or 10V
47	473			560	564			47	476			6.3V
56	563			680	684							
68	683			820	824							

0805: PPI-GMC21

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	
10 nF	103	M, Z	6.3V or 10V or 16V or 25V or 50V	82	823	M, Z	6.3V or 10V or 16V or 25V or 50V	820	824	M, Z	6.3V or 10V or 16V or 25V or 50V	
12	123			100	104			1.0 uF	105			
15	153			120	124			2.2	225			
18	183			150	154			3.3	335			
22	223			180	184			4.7	475			
27	273			220	224			6.8	685		6.3V or 10V or 16V	
33	333			270	274			10	106			
39	393			330	334			22	226			
47	473			470	474			47	476			6.3V or 10V
56	563			560	564							
68	683			680	684							

1206: PPI-GMC31

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
10 nF	103	M, Z	6.3V or 10V or 16V or 25V or 50V	100	104	M, Z	6.3V or 10V or 16V or 25V or 50V	2.2	225	M, Z	6.3V or 10V or 16V or 25V or 50V
12	123			120	124			3.3	335		
15	153			150	154			4.7	475		
18	183			180	184			6.8	685		
22	223			220	224			10	106		
27	273			270	274			22	226		6.3V or 10V or 16V
33	333			330	334			33	336		
39	393			470	474			47	476		
47	473			560	564			68	686		
56	563			680	684			100	107		
68	683			820	824						6.3V or 10V
82	823			1.0 uF	105						



Dielectrics: Z5U & Y5V

1210: PPI-GMC32

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	
10 nF	103	M, Z	6.3V or 10V or 16V or 25V or 50V	100	104	M, Z	6.3V or 10V or 16V or 25V or 50V	2.2	225	M, Z	6.3V or 10V or 16V or 25V or 50V	
12	123			120	124			3.3	335			
15	153			150	154			4.7	475			
18	183			180	184			6.8	685			
22	223			220	224			10	106			
27	273			270	274			22	226			
33	333			330	334			33	336			
39	393			470	474			47	476			6.3V or 10V or 16V
47	473			560	564			68	686			
56	563			680	684			100	107			
68	683			820	824			220	227			
82	823			1.0 uF	105							6.3V

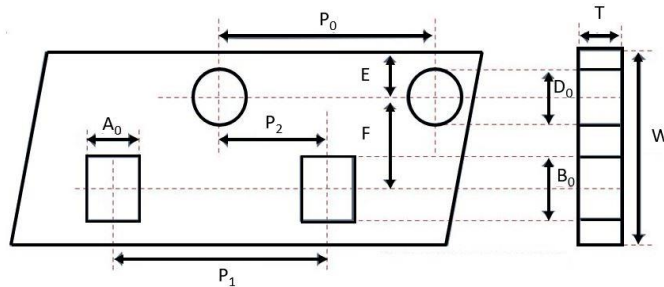
1812: PPI-GMC43

Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC	Value	Code	Tol.	Rated WVDC
47 nF	473	M, Z	6.3V or 10V or 16V or 25V or 50V	270	274	M, Z	6.3V or 10V or 16V or 25V or 50V	4.7	475	M, Z	6.3V or 10V or 16V or 25V or 50V
56	563			330	334			6.8	685		
68	683			470	474			10	106		
82	823			560	564			22	226		
100	104			680	684			33	336		
120	124			820	824			47	476		6.3V or 10V or 16V
150	154			1.0 uF	105			68	686		
180	184			2.2	225			100	107		6.3V or 10V
220	224			3.3	335						

≠ Packaging

Size	Code		Description	
	D	G	Q	
	<i>Qty per 7" Reel</i>		<i>Qty per 10/13" Reel</i>	
01005	20K	50K		
0201	10K/ 15K	50K		
0402	10K	40K	50K	
0603	4K	10K	15K	
0805	2K, 3K, 4K	10K	15K	20K
1206	2K, 3K, 4K	10K	15K	20K
1210	500, 1K, 2K, 3K	4K	8K	
1808	1K, 2K, 3K			
1812	500, 1K	3K		
1825	500, 1K			
2220	500, 1K			
2225	500, 750			

≠ Tape & Reel Specifications

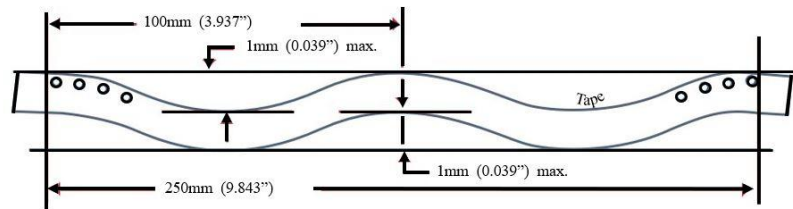
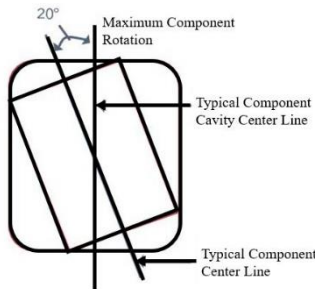
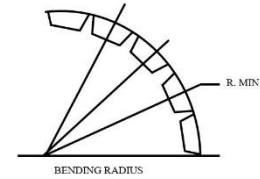
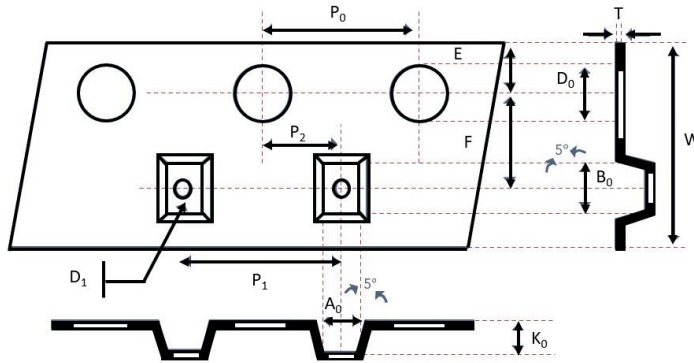


Cardboard carrier tape for EIA case sizes: 01005, 0201, 0402, 0603, 0805, 1206

Unit: mm

Size	A_0	B_0	T	K_0	W	P_0	10XPo	P_1	P_2	D_0	D_1	E	F
01005	0.25 ± 0.04	0.45 ± 0.04	0.36 ± 0.05	*	8.00 ± 0.30	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	*	1.75 ± 0.10	3.50 ± 0.05
0201	0.39 ± 0.07	0.69 ± 0.07	<0.50	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0402	0.70 ± 0.20	1.20 ± 0.20	<0.80	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0603	1.10 ± 0.20	1.90 ± 0.20	<1.20	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
0805	1.65 ± 0.20	2.40 ± 0.20	<1.30	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05
1206	2.00 ± 0.20	3.60 ± 0.20	<1.30	*	8.00 ± 0.10	4.00 ± 0.10	40.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	*	1.75 ± 0.05	3.50 ± 0.05

≠ Tape & Reel Specifications



Embossed plastic carrier tape for case sizes: 0805, 1206, 1210, 1808, 1812

Unit: mm

Size	A ₀	B ₀	T	K ₀	W	P ₀	10XP ₀	P ₁	P ₂	D ₀	D ₁	E	F
0805	<1.80	<2.70	0.23 ± 0.10	<2.50	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1206	<2.30	<4.00	0.23 ± 0.10	<2.50	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1210	<3.20	<3.95	0.23 ± 0.10	<3.00	8.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05
1808	<2.50	<5.30	0.25 ± 0.10	<2.50	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.00 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
1812	<3.90	<5.30	0.25 ± 0.10	<3.50	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
1825	<6.80	<5.30	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
2220	<5.80	<6.50	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10
2225	<6.80	<6.50	0.30 ± 0.10	<3.10	12.00 ± 0.20	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.05	2.00 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	5.50 ± 0.10

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