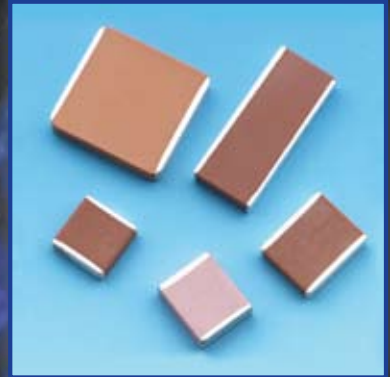




UNION TECHNOLOGY CORP.



M u l t i l a y e r

C e r a m i c C h i p

C a p a c i t o r s

OVERVIEW

Union Technology Corp. (UTC) is a global provider for the design and manufacture of multilayer ceramic capacitors for use in: commercial, industrial and high reliability applications.

Product offering:

- SMT multilayer ceramic chips
- SMT High Voltage MLCC
- SMT Large Body Size MLCC
- Radial Leaded High Voltage Capacitors
- Switch Mode Power Supply Capacitors (SMPS)
- Planar Arrays & Discoidal Capacitors

QUALITY

UTC integrates quality throughout its supply chain system by building quality into our designs and manufacturing process. Supplier control systems ensure the highest quality materials and service to our customers. Our manufacturing facility is ISO 9001:2000 certified and MIL-STD-790 approved.

UTC is equipped for performing testing in accordance with MIL-PRF-39014, MIL-PRF-20, and MIL-PRF-55681 as required by some customers. Our quality assurance system and procedures are based upon the requirements of MIL-I-45208 and MIL-STD-790, with the calibration program in accordance with MIL-STD-45662A.

OPERATIONS

Established in 1991, UTC is a Corporation headquartered in Monterey Park, California. Within this 25,000 square foot facility, UTC houses its technology center, manufacturing operations along with the sales and customer support staff. UTC also maintains a fully staffed, highly qualified engineering department to support customer applications, product design, and new product development.

UTC's global network of sales representatives and distributors are prepared to assist you with designing our products to meet your application requirements.

ENVIROMENT

UTC is fully committed to helping the cause of achieving and maintaining a clean environment. The complete UTC offering of commercial ceramic chips within this catalog are designed and produced to be lead-free and are fully RoHS compliant.



**ISO 9001: 2000
CERTIFIED**



PRODUCT OVERVIEW

Union Technology Corp. is a global supplier of ceramic chip capacitors and other specialty multilayer ceramic (MLC) products used by electronic manufacturers.

UTC formulates the materials used in the manufacture of its MLCs, including ceramic dielectric powders, electrode materials, resins, and inks. Precise raw material characterization and tight process control maintains UTC's quality reputation as a state-of-the-art manufacturer of ceramic capacitor products.

UTC offers the full range of standard popular EIA sizes from a 0402 up to 2225. They are available in; NPO, X7R, X5R, and Y5V dielectrics from 6.3 volts up to ratings of 5,000 volts.

In addition to our standard chip products UTC does support many custom application specific designs which include capacitors that have voltage ratings up to 10 KV and chip sizes as large as 6560. Our Advanced Products Group is staffed and equipped to assist customers with developing these MLC solutions for their specific applications requiring cost effective, volumetric efficient designs.

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SMT MULTILAYER CERAMIC CAPACITORS

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Outline	Size Inch (mm)	Length L (mm)	Width W (mm)	Termination A (mm)	Thickness Designation T (mm)/Symbol	Packaging Qty/Reel	
	0402 (1005)	1.00±0.05	0.50±0.05	0.25+0.05/-0.10	N	0.50±0.05	10,000
	0603 (1608)	1.60±0.10	0.80±0.10	0.40±0.15	S	0.80±0.07	4,000
		1.60+0.15/-0.10	0.80+0.15/-0.10		X	0.80+0.15/-0.10	4,000
	0805 (2012)	2.00±0.15	1.25±0.10	0.50±0.20	A	0.60±0.10	4,000
					B	0.80±0.10	4,000
		2.00±0.20	1.25±0.20		D	1.25±0.10	3,000
	1206 (3216)	3.20±0.15	1.60±0.15	0.60±0.20	B	0.80±0.10	4,000
					C	0.95±0.10	3,000
			J		1.15±0.15	3,000	
		D	1.25±0.10		3,000		
		3.20+0.30/-0.10	1.60+0.30/-0.10		G	1.60±0.20	2,000
	1210 (3225)	3.20±0.30	2.50±0.20	0.75±0.25	C	0.95±0.10	3,000
					D	1.25±0.10	3,000
		3.20±0.40	2.50±0.30		G	1.60±0.20	2,000
					K	2.00±0.20	1,000
	1808 (4520)	4.50±0.40	2.03±0.25	0.75±0.25	M	2.50±0.30	1,000
					D	1.25±0.10	2,000
	1812 (4532)	4.50±0.40	3.20±0.30	0.75±0.25*	K	2.00±0.20	1,000
D					1.25±0.10	1,000	
2220	5.70±	4.50±	.50±	D	2.50±	1,000	
				K	2.50±	1,000	
2225	5.70±	6.35±	.50±	D	3.05±	1,000	
				K	3.05±	1,000	

HOW TO ORDER

C

L

0805

X5R

105

K

W

T

UTC P/N STYLE
C = MLCC CHIP S = MLCC SAFETY CERTIFIED CHIP

VOLTAGE
A = 6.3V N = 400V C = 10V S = 500V E = 16V K = 600V L = 25V K = 630V G = 50V T = 1000V B = 100V W = 2000V R = 200V X = 3000V H = 250V Y = 4000V J = 300V Z = 5000V

BODY SIZE
0402 1825 0603 2220 0805 2225 1206 3530 1210 4040 1808 5550 1812

TEMPERATURE COEFFICIENT
NPO X7R X5R Y5V

CAPACITANCE CODE
2 significant digits are used plus the third character then represents the number of zeros to follow

TOLERANCE
F = 1% G = 2% J = 5% K = 10% M = 20% Z = -20% / +80% *Cap values < 10pF B = +/-0.10pF C = +/-0.25pF D = +/-0.50pF

TERMINATION
W = 100% tin termination & RoHS - Lead Free compliant product B = Soft Termination [consult factory]

PACKAGE STYLE
T = Tape & Reel



NPO-COG DIELECTRIC MONOLITHIC CERAMIC CAPACITORS

APPLICATION

Suited for precision circuits, requiring stable capacitor characteristics. No aging effects, low dielectric loss.

PERFORMANCE SPECIFICATIONS

Temperature Coefficient:

< 30 ppm/°C, -55°C to 125°C.

Dissipation Factor:

< 0.1 % @ 1 MHz, 25°C.



Insulation Resistance:

1000ΩF or 100GΩ, whichever is less @ rated voltage 25°C. At 125°C IR is 10% of 25°C value.

Dielectric Strength:

2.5 times rated voltage D.C.
1.5 times rated voltage for 500V devices.

Quality Factor:

> 1000 @ MHz 25°C.

Test Parameters:

Cap ≤ 100pF 1.0 ± 0.2Vrms, 1MHz ± 10%
Cap > 100pF 1.0 ± 0.2Vrms, 1KHz ± 10%

Capacitance Tolerances

Available:

B, C, D, F, G, J, K, M

HOW TO ORDER

C

B

0805

NPO

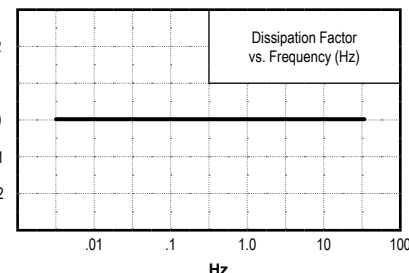
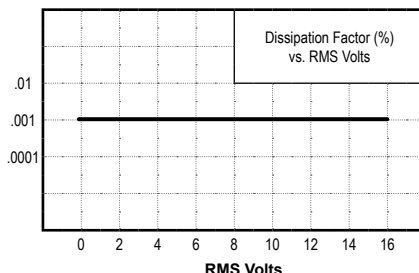
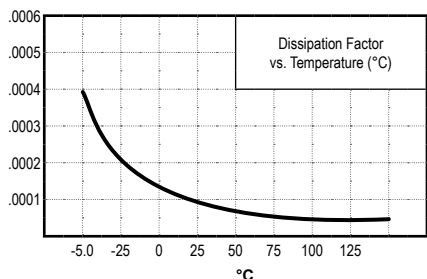
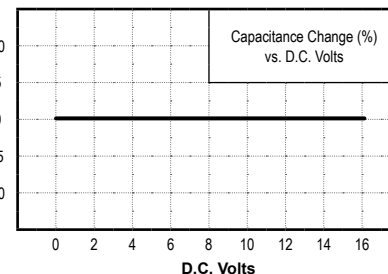
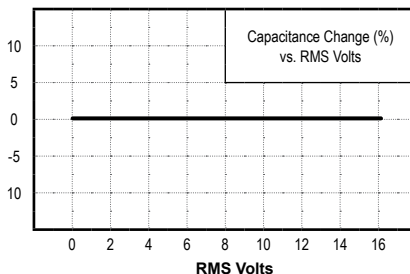
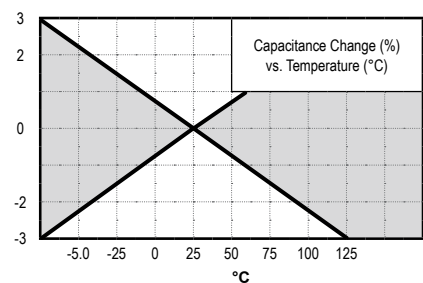
101

K

W

T

UTC P/N STYLE	VOLTAGE	BODY SIZE	TEMPERATURE COEFFICIENT	CAPACITANCE CODE	TOLERANCE	TERMINATION	PACKAGE STYLE
C = MLCC CHIP	E = 16V L = 25V G = 50V B = 100V R = 200V H = 250V	0402 0603 0805 1206 1210 1808 1812 2220 2225	NPO	2 significant digits are used plus the third character then represents the number of zeros to follow	F = 1% G = 2% J = 5% K = 10% M = 20% <small>*Cap values < 10pF B = +/-0.10pF C = +/-0.25pF D = +/-0.50pF</small>	W = 100% tin termination & RoHS - Lead Free compliant product B = Soft Termination [consult factory]	T = Tape & Reel



These typical curves are for 50 volt parts.



NPO-COG DIELECTRIC

Size	0402				0603					0805					1206					1210					EIA Code		
	16V	25V	50V	100V	16V	25V	50V	100V	200V	250V	16V	25V	50V	100V	200V	250V	16V	50V	100V	200V	250V	16V	50V	100V		200V	250V
0.5pF			N	N	S	S	S					A	A	A	A												(0R5)
0.6pF			N	N	S	S	S					A	A	A	A												(0R6)
0.7pF			N	N	S	S	S					A	A	A	A												(0R7)
0.8pF			N	N	S	S	S					A	A	A	A												(0R8)
0.9pF			N	N	S	S	S					A	A	A	A												(0R9)
1.0pF			N	N	S	S	S					A	A	A	A												(1R0)
1.2pF			N	N	S	S	S					A	A	A	A												(1R2)
1.5pF			N	N	S	S	S					A	A	A	A		B	B	B	B							(1R5)
1.8pF			N	N	S	S	S					A	A	A	A		B	B	B	B							(1R8)
2.2pF			N	N	S	S	S					A	A	A	A		B	B	B	B							(2R2)
2.7pF			N	N	S	S	S					A	A	A	A		B	B	B	B							(2R7)
3.3pF			N	N	S	S	S					A	A	A	A		B	B	B	B							(3R3)
3.9pF			N	N	S	S	S					A	A	A	A		B	B	B	B							(3R9)
4.7pF			N	N	S	S	S					A	A	A	A		B	B	B	B							(4R7)
5.6pF			N	N	S	S	S					A	A	A	A		B	B	B	B							(5R6)
6.8pF			N	N	S	S	S					A	A	A	A		B	B	B	B							(6R8)
8.2pF			N	N	S	S	S					A	A	A	B		B	B	B	B							(8R2)
10pF			N	N	S	S	S					A	A	A	B		B	B	B	B				C	C	C	100
12pF			N	N	S	S	S					A	A	A	D		B	B	B	B			C	C	C	C	120
15pF			N	N	S	S	S					A	A	A	D		B	B	B	B			C	C	C	C	150
18pF			N	N	S	S	S					A	A	A	D		B	B	B	B			C	C	C	C	180
22pF			N	N	S	S	S	S	S			A	A	A	D		B	B	B	B		C	C	C	C	C	220
27pF			N	N	S	S	S	S	S			A	A	A	D		B	B	B	B		C	C	C	C	C	270
33pF			N	N	S	S	S	S	S			A	A	A	D		B	B	B	B		C	C	C	C	C	330
39pF			N	N	S	S	S	S	S			A	A	A			B	B	B	B		C	C	C	C	C	390
47pF			N	N	S	S	S	S	S			A	A	A			B	B	B	B		C	C	C	C	C	470
56pF			N		S	S	S	S	S			A	A	A			B	B	B	B		C	C	C	C	C	560
68pF			N		S	S	S	S	S			A	A	A			B	B	B	B		C	C	C	C	C	680
82pF			N		S	S	S	S	S			A	A	A			B	B	B	B		C	C	C	C	C	820
100pF			N		S	S	S	S	S			A	A	A			B	B	B	B		C	C	C	C	C	101
120pF			N		S	S	S					A	A	A			B	B	B	B		C	C	C	C	C	121
150pF			N		S	S	S					A	A	A			B	B	B	B		C	C	C	C	C	151
180pF			N	N	S	S	S					A	A	A			B	B	B	B		C	C	C	C	C	181
220pF			N	N	S	S	S					A	A	A			B	B	B	B		C	C	C	C	C	221
270pF	N				S	S	S					A	A	A			B	B	B	C		C	C	C	C	C	271
330pF	N				S	S	S					A	A	A			B	B	B	C		C	C	C	C	C	331
390pF	N				S	S	S					A	A	A			B	B	B	C		C	C	C	C	C	391
470pF	N				S	S	S					A	A	B			B	B	C	C		C	C	C	C	C	471
560pF					S	S	S					A	A	B			B	B	C	C		C	C	C	C	C	561
680pF					S	S	S					A	A	D			B	B	C	C		C	C	C	C	C	681
820pF					S	S						A	A	D			B	B	C	D		C	C	C	C	C	821
1000pF					S	S						A	A				B	B	C	G		C	C	C	C	C	102
1200pF					S	S						B	B				B	B	C			C	C	D	D	D	122
1500pF					S	S						B	B				B	B	C			C	C	D	D	D	152
1800pF					S	S						B	B				B	B	D			C	C	D	D	D	182
2200pF					S	S						B	B				B	B	D			C	C	D	D	D	222
2700pF					S	S						D	D				B	B				C	C	D	D	D	272
3300pF					S	S						D	D				B	B				C	C	D			332
3900pF					S	S						D	D				B	B				C	C	D			392
4700pF					S							D	D				B	B				C	C				472
5600pF										D							B	B				C	C				562
6800pF										D							C	C				C	C				682
8200pF										D							C	C				C	C				822
0.010µF										D							D					C	C				103
0.012µF										D							D	P				C	D	D			123
0.015µF										D							D	P				C	D	D			153
0.018µF																	D										183
0.022µF																	D										223
0.027µF																	D										273
0.033µF																	D										333
0.039µF																	D										393
0.047µF																											473
0.056µF																											683
0.068µF																											563
0.082µF																											823
0.010µF																											104
0.012µF																											124

Note: Please refer to the chart on page 3 for the corresponding thickness designation.



NPO-COG DIELECTRIC

Size	1808					1812					2220					2225					EIA Code		
	Rated Voltage (VDC)	25V	50V	100V	200V	250V	25V	50V	100V	200V	250V	25V	50V	100V	200V	250V	25V	50V	100V	200V		250V	
Capacitance	0.5pF																					(0R5)	
	0.6pF																						(0R6)
	0.7pF																						(0R7)
	0.8pF																						(0R8)
	0.9pF																						(0R9)
	1.0pF																						(1R0)
	1.2pF																						(1R2)
	1.5pF																						(1R5)
	1.8pF																						(1R8)
	2.2pF																						(2R2)
	2.7pF																						(2R7)
	3.3pF																						(3R3)
	3.9pF																						(3R9)
	4.7pF																						(4R7)
	5.6pF																						(5R6)
	6.8pF																						(6R8)
	8.2pF																						(8R2)
	10pF	D	D	D	D	D			D	D	D												100
	12pF	D	D	D	D	D			D	D	D												120
	15pF	D	D	D	D	D			D	D	D												150
	18pF	D	D	D	D	D			D	D	D												180
	22pF	D	D	D	D	D			D	D	D												220
	27pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	270
	33pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	330
	39pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	390
	47pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	470
	56pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	560
	68pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	680
	82pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	820
	100pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	101
	120pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	121
	150pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	151
	180pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	181
	220pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	221
	270pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	271
	330pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	331
	390pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	391
	470pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	471
	560pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	561
	680pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	681
	820pF	D	D	D	D	D			D	D	D	D	D	D	D	D	D	D	D	D	D	D	821
	1000pF	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	102
	1200pF	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	122
	1500pF	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	152
	1800pF	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	182
2200pF	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	222	
2700pF	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	272	
3300pF	D	D	D	D	D	D	D	D	D	D												332	
3900pF	D	D	D	D	D	D	D	D	D													392	
4700pF	D	D	D	D	D	D	D	D	D													472	
5600pF	D	D	D	D	D	D	D	D	D													562	
6800pF	D	D	D	D	D	D	D	D														682	
8200pF	D	D	D	D																		822	
0.010µF	D	D	D	D		D	D	D														103	
0.012µF	D	D	D			D	D	D														123	
0.015µF	D	D	D			D	D	D														153	
0.018µF	D	D				D	D	D														183	
0.022µF	D	D				D	D	D														223	
0.027µF	D					D	D	D														273	
0.033µF	D					D	D															333	
0.039µF						D	D															393	
0.047µF						D																473	
0.056µF						D																563	
0.068µF																						683	
0.082µF																						823	
0.10µF																						104	
0.12µF																						124	

Note: Please refer to the chart on page 3 for the corresponding thickness designation.



X7R DIELECTRIC MONOLITHIC CERAMIC CAPACITORS

APPLICATION

Suited for By-Pass and Coupling Application, Filtering, D.C. Blocking and Transient Suppression.

PERFORMANCE SPECIFICATIONS

Temperature Coefficient:

±15% ΔC, -55°C to 125°C.
maximum -55 to 125° at WVdc.

Dissipation Factor:

Maximum DF; 25V - 3.5%
Maximum DF; 50V - 2.5%
Maximum DF; 100V - 2.5%
Maximum DF; 250V - 2.5%

Insulation Resistance:

1000ΩF or 100GΩ, whichever is less @ rated voltage 25°C. At 125°C IR is 10% of 25°C value.

Dielectric Strength:

2.5 times rated voltage D.C.
1.5 times rated voltage for 500V devices.

Aging:

Maximum 2% per decade hour, for X7R.

Test Parameters:

1 kHz and 1 vms if capacitance ≤ 10μF
120 Hz and 0.5 vms if capacitance > 10μF

Capacitance Tolerances

Available:

J, K, M



HOW TO ORDER

C

B

0805

X7R

104

K

W

T

UTC P/N STYLE

C = MLCC CHIP

VOLTAGE

C = 10V
E = 16V
L = 25V
G = 50V
B = 100V
R = 200V
H = 250V

BODY SIZE

0402
0603
0805
1206
1210
1812
2220

TEMPERATURE COEFFICIENT

X7R

CAPACITANCE CODE

2 significant digits are used plus the third character then represents the number of zeros to follow

TOLERANCE

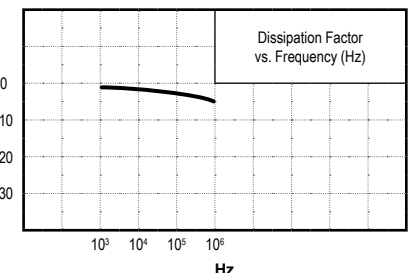
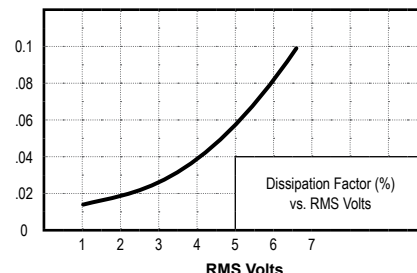
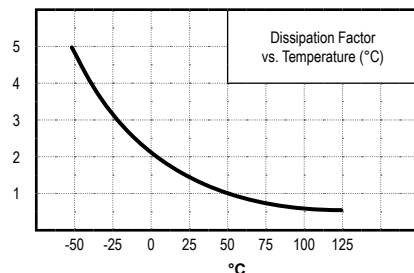
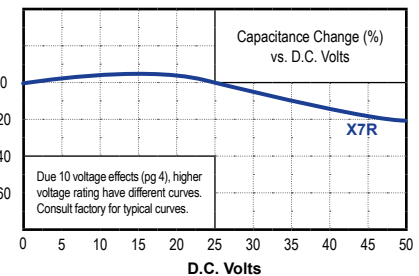
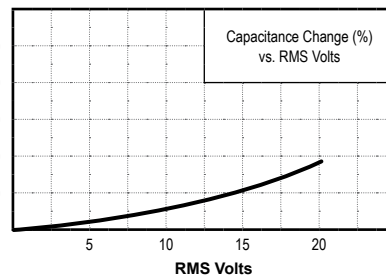
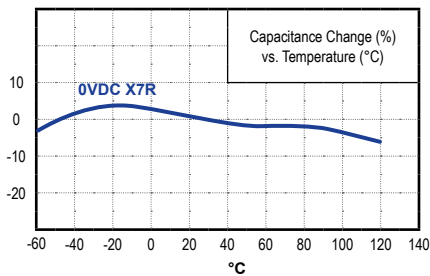
J = 5%
K = 10%
M = 20%

TERMINATION

W = 100% tin termination & RoHS - Lead Free compliant product
B = Soft Termination [consult factory]

PACKAGE STYLE

T = Tape & Reel



These typical curves are for 50 volt parts.



X7R DIELECTRIC

Size	0402				0603						0805						1206						EIA Code			
	10V	16V	25V	50V	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V	200V	250V	10V	16V	25V	50V	100V		200V	250V	
Capacitance	100pF			N				S	S	S				B	B	B	B									101
	120pF			N				S	S	S				B	B	B	B									121
	150pF			N				S	S	S				B	B	B	B				B	B	B	B	B	151
	180pF			N				S	S	S				B	B	B	B				B	B	B	B	B	181
	220pF			N				S	S	S				B	B	B	B				B	B	B	B	B	221
	270pF			N				S	S	S				B	B	B	B				B	B	B	B	B	271
	330pF			N				S	S	S				B	B	B	B				B	B	B	B	B	331
	390pF			N				S	S	S				B	B	B	B				B	B	B	B	B	391
	470pF			N				S	S	S				B	B	B	B				B	B	B	B	B	471
	560pF			N				S	S	S				B	B	B	B				B	B	B	B	B	561
	680pF			N				S	S	S				B	B	B	B				B	B	B	B	B	681
	820pF			N				S	S	S				B	B	B	B				B	B	B	B	B	821
	1000pF			N				S	S	S				B	B	B	B				B	B	B	B	B	102
	1200pF			N				S	S	S				B	B	B	B				B	B	B	B	B	122
	1500pF			N				S	S	S				B	B	B	B				B	B	B	B	B	152
	1800pF			N				S	S	S				B	B	B	B				B	B	B	B	B	182
	2200pF			N				S	S	S				B	B	B	B				B	B	B	B	B	222
	2700pF			N				S	S	S				B	B	B	B				B	B	B	B	B	272
	3300pF			N				S	S	S				B	B	B	B				B	B	B	B	B	332
	3900pF			N				S	S	S				B	B	B	B				B	B	B	B	B	392
	4700pF			N				S	S	S				B	B	B	B				B	B	B	B	B	472
	5600pF			N				S	S	X				B	B	D	D				B	B	B	B	B	562
	6800pF			N				S	S	X				B	B	D	D				B	B	B	B	B	682
	8200pF			N				S	S	X				B	B	D	D				B	B	B	B	B	822
	0.010µF			N				S	S	X				B	B	D	D				B	B	B	B	B	103
	0.012µF		N	N				S	X	X				B	B	D	D				B	B	B	B	B	123
	0.015µF		N	N				S	X	X				B	B	D	D				B	B	B	C	C	153
	0.018µF		N	N				S	X	X				B	B	D	D				B	B	B	C	C	183
	0.022µF		N					S	X	X				B	B	D	D				B	B	B	C	C	223
	0.027µF	N						S						B	D	D	D				B	B	B	C	C	273
	0.033µF	N						S	X					B	D						B	B	B	C	C	333
	0.039µF	N						S	X					B	D						B	B	B	C	C	393
	0.047µF	N						S	X					B	D						B	B	B	C	C	473
	0.056µF	N						S	X					B	D						B	B	B	C	C	563
	0.068µF	N						S	X					B	D						B	B	B	C	C	683
	0.082µF	N						S	S	X				B	B	D					B	B	D	C	C	823
	0.10µF	N						S	S	X				B	B	D					B	B	D	C	C	104
	0.12µF							S	S	S				B	D						B	B	D			124
	0.15µF							S	S	S				D	D						C	C	G			154
	0.18µF							S	S	S				D							C	C	G			184
	0.22µF							S	S					D							C	C	G			224
	0.27µF							X	X					D							C	D	D			274
	0.33µF							X	X					D							C	D	D			334
	0.39µF							X	X					D	D					C	J	P	P			394
	0.47µF							X	X					D	D					J	J	P	P			474
	0.56µF													D	D					J	J	P	P			564
	0.68µF													D	D	D				J	J	P	P			684
0.82µF													D	D	D				J	J	P	P			824	
1.0µF													D	D					J	J	P	P			105	
1.5µF													D							G					155	
2.2µF													D							P					225	
3.3µF																									335	
4.7µF																									475	

Note: Please refer to the chart on page 3 for the corresponding thickness designation.



X7R DIELECTRIC

Size	1210					1808					1812					2220					2225					EIA Code							
	25V	50V	100V	200V	250V	25V	50V	100V	200V	250V	25V	50V	100V	200V	250V	25V	50V	100V	200V	250V	25V	50V	100V	200V	250V								
Capacitance	100pF					D	D	D	D																								101
	120pF					D	D	D	D																								121
	150pF					D	D	D	D																								151
	180pF					D	D	D	D																								181
	220pF					D	D	D	D																								221
	270pF					D	D	D	D																								271
	330pF					D	D	D	D																								331
	390pF					D	D	D	D																								391
	470pF					D	D	D	D								D	D	D	D	D												471
	560pF					D	D	D	D								D	D	D	D	D												561
	680pF					D	D	D	D								D	D	D	D	D												681
	820pF					D	D	D	D								D	D	D	D	D												821
	1000pF		C	C	C	C	D	D	D	D		D	D	D	D		D	D	D	D	D												102
	1200pF		C	C	C	C	D	D	D	D		D	D	D	D		D	D	D	D	D												122
	1500pF		C	C	C	C	D	D	D	D		D	D	D	D		D	D	D	D	D												152
	1800pF		C	C	C	C	D	D	D	D		D	D	D	D		D	D	D	D	D												182
	2200pF		C	C	C	C	D	D	D	D		D	D	D	D		D	D	D	D	D												222
	2700pF		C	C	C	C	D	D	D	D		D	D	D	D		D	D	D	D	D												272
	3300pF		C	C	C	C	D	D	D	D		D	D	D	D		D	D	D	D	D												332
	3900pF		C	C	C	C	D	D	D	D		D	D	D	D		D	D	D	D	D												392
	4700pF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D				D	D	D	D	D		472
	5600pF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		562
	6800pF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		682
	8200pF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		822
	0.010μF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		103
	0.012μF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		123
	0.015μF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		153
	0.018μF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		183
	0.022μF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		223
	0.027μF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		273
	0.033μF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		333
	0.039μF		C	C	C	C	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D		393
	0.047μF		C	C	D	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D	D		473
	0.056μF		C	C	D	D	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D	D		563
	0.068μF		C	C	G	G	D	D	D	D		D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D	D		683
	0.082μF		C	C	G	G	D	D	D			D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D	D		823
	0.10μF		C	C	G	G	D	D	D			D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D	D		104
	0.12μF		C	C	G	G	D	D				D	D	D	D		D	D	D	D	D	D			D	D	D	D	D	D	D		124
	0.15μF		C	D	M	M	D	D				D	D	K	K		D	D	D	D	D	D			D	D	D	D	D	D	D		154
	0.18μF		C	D	M	M						D	D	K	K		D	D	D	D	D	D			D	D	D	D	D	D	D		184
0.22μF		C	D	M	M						D	D	K	K		D	D	D	D	D	D			D	D	D	D	D	D	D		224	
0.27μF		C	G								D	D	K	K		D	D	D	D	D	D			D	D	D	D	D	D	D		274	
0.33μF	C	D	G								D	D	K	K		D	D	D	D	D	D			D	D	D	D	D	D	D		334	
0.39μF	C	D	M								D	D	K	K		D	D	D	D	D	D			D	D	D	D	D	D	D		394	
0.47μF	C	D	M								D	K	K	K		D	D	D	D	D	D			D	D	D	D	D	D	D		474	
0.56μF	D	D	M								D	K				D	D	D	D	D	D			D	D	D	D	D	D	D		564	
0.68μF	D	D									D	K	K			D	D	D	D	K			D	D	D	D	D					684	
0.82μF	D	D									D	K	K			D	D	D	K	K			D	D	D	D	D					824	
1.0μF	D	D									D	K	K			D	D	D	K	K			D	D	D	D	D					105	
1.5μF											K	K	K			D	D	D						D	D	D						155	
2.2μF											K	K	K			D	D	D						D	D	D						225	
3.3μF																D	D	D						D	D							335	
4.7μF																D	D	D						D	D							475	

Note: Please refer to the chart on page 3 for the corresponding thickness designation.

APPLICATION

Hi-K Dielectric suited for applications where PCB real estate is at a premium and usage is at near room temperature with low DC bias.



PERFORMANCE SPECIFICATIONS

Temperature Coefficient:

X5R +15% -15% ΔC, -55°C to 85°C
Y5V +22% -82% ΔC, -30°C to 85°C

Dissipation Factor:

X5R	Y5V
Maximum DF; 6.3V~10V - 3.5%	Maximum DF; 6.3V~10V - 10%
16V~25V - 3.5%	16V~25V - 7%
50V - 2.5%	50V~100V - 5%

Insulation Resistance:

100ΩF or 10GΩ, whichever is less @ Rated Voltage 25°C.

Dielectric Strength:

2.5 times rated voltage D.C.

Aging:

X5R Maximum 2.5% per decade hour.
Y5V Maximum 7% per decade hour.

Test parameters:

(X5R) 1 kHz and 1 vms if capacitance ≤ 10μF
120 Hz and 0.5 vms if capacitance > 10μF
(Y5V) 1 kHz and 1 vms if capacitance ≤ 10μF
120 Hz and 0.5 vms if capacitance > 10μF
1 kHz and 1 vms

Capacitance Tolerance Available:

M, Z

HOW TO ORDER

C

L

0805

X5R

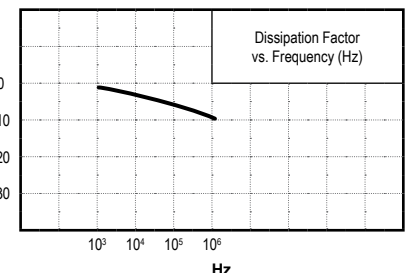
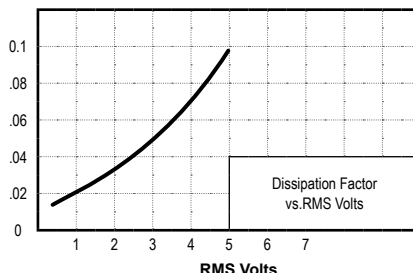
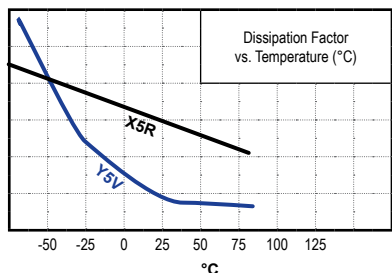
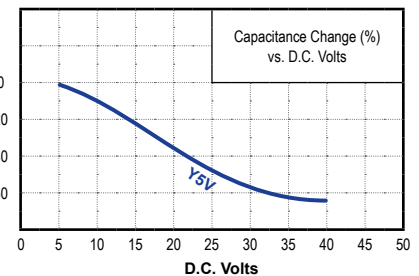
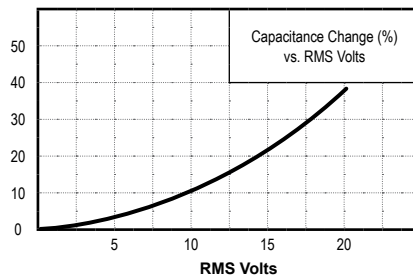
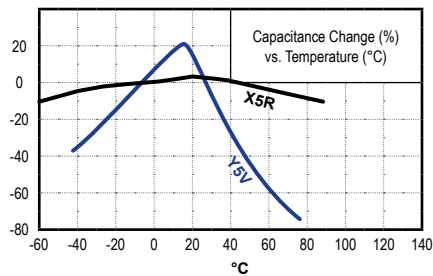
105

K

W

T

UTC P/N STYLE	VOLTAGE	BODY SIZE	TEMPERATURE COEFFICIENT	CAPACITANCE CODE	TOLERANCE	TERMINATION	PACKAGE STYLE
C = MLCC CHIP	A = 6.3V C = 10V E = 16V L = 25V G = 50V B = 100V	0402 0603 0805 1206 1210 1812	X5R Y5V	2 significant digits are used plus the third character then represents the number of zeros to follow	K = 10% M = 20% Z = -20% / +80%	W = 100% tin termination & RoHS - Lead Free compliant product B = Soft Termination [consult factory]	T = Tape & Reel



These typical curves are for 50 volt parts.

X5R																									
Size	0402					0603					0805					1206					1210				EIA Code
Rated Voltage (VDC)	6.3V	10V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	EIA Code			
Capacitance	0.010μF																					103			
	0.015μF																						153		
	0.022μF																						223		
	0.033μF																						333		
	0.047μF	N		S	S	S					D	D											473		
	0.068μF																							683	
	1.0μF	N		S	S	S		D	D	D	D			G			P						105		
	1.5μF																							155	
	2.2μF			S	S	S	S			D	D	D		G			P							225	
	3.3μF													G										335	
	4.7μF			S					D	D	D			P	P	P	P							475	
	6.8μF																							685	
	10μF	N		S	S			D	D	D				P	P	P	P	P	K					106	
	15μF																							156	
22μF	N							D	D				P	P	P					K	K		226		
47μF								D					P	P				K	K	K			476		
100μF													P					K					107		

Y5V																								
Size	0402					0603					0805				1206				1210		1812			EIA Code
Rated Voltage (VDC)	6.3V	10V	16V	25V	50V	10V	16V	25V	50V	16V	25V	50V	100V	10V	25V	50V	100V	50V	100V	10V	50V	100V	EIA Code	
Capacitance	0.010μF				N				S			A	B		B	B	B		C			D	103	
	0.015μF				N				S			A	B		B	B	B		C			D	153	
	0.022μF				N				S			A	B		B	B	B		C			D	223	
	0.033μF				N				S			A	B		B	B	B		C			D	333	
	0.047μF				N				S			A	B		B	B	B		C			D	473	
	0.068μF			N	N				S			A	B		B	B	B		C			D	683	
	0.10μF		N	N	N				S			A	B		B	B	B	C	C			D	D	104
	0.15μF		N						S			A	B		B	B	C	C	C			D	D	154
	0.22μF		N						S			A	B		B	B	C	C	C			D	D	224
	0.33μF	N	N						S			A			B	B			C	C		D	D	334
	0.47μF	N	N						S			B			B	B			C			D	D	474
	0.68μF	N						S			B	B			B	B			C			D	D	684
	1.0μF	N					S	X			B	D			B	B			C			D	D	105
	3.3μF						S	X			B	D				C	C			C			D	D
10μF																								106
22μF														P										226
47μF																					K			476

Note: Please refer to the chart on page 3 for the corresponding thickness designation.

The “S” Series X2/Y3 & X1/Y2 safety capacitors are designed for applications in; modem, facsimile, and various other electronic communication equipment. They are also well suited for use in lighting, surge protection, and EMI filter isolation circuits.

Features & Applications:

- Small size & high cap values
- Surface mountable
- Safety standard approved by EN132400+A4:01 & UL60950
- RoHS Compliant
- Lead Free



Cap Value	1808 X1 / Y2		1808 X2 / Y3		1812 X1 / Y2		1812 X2 / Y3		2208 X1 / Y2		2211 X1 / Y2		2220 X1 / Y2	
	NPO	X7R	NPO	X7R	NPO	X7R	NPO	X7R	NPO	X7R	NPO	X7R	NPO	X7R
2R0pF	D		D						D		D		D	
5R0pF	D		D						D		D		D	
6R8pF	D		D						D		D		D	
8R2pF	D		D						D		D		D	
100pF	D		D						D		D		D	
120pF	D		D						D		D		D	
150pF	D		D						D		D		D	
180pF	D		D						D		D		D	
220pF	D		D						D		D		D	
270pF	D		D						D		D		D	
330pF	D		D						D		D		D	
360pF	D		D						D	D	D		D	
390pF	D		D						D	D	D		D	
470pF	D		D						D	D	D		D	
560pF	D		D						D	D	D		D	
680pF	D		D						D	D	D	D	D	
820pF	D		D						D	D	D	D	D	
101pF	D		D						D	D	D	D	D	
121pF	D		D						D	D	D	D	D	
131pF	D		D						D	D	D	D	D	D
151pF	D	D	D	D		D			D	D	D	D	D	D
181pF		D	D	D		D			D	D	D	D	D	D
221pF		D	D	D		D			D	D	D	D	D	D
271pF		D	D	D		D			D	D	D	D	D	D
331pF		D	D	D		D			D	D	D	D	D	D
391pF		D	D	D		D			D	D	D	D	D	D
471pF		D	D	D		D			D	D	D	D	D	D
561pF		D	D	D		D			D	D	D	D	D	D
681pF		D	D	D		D			D	D	D	D	D	D
821pF		D	D	D		D			D		D	D	D	D
102pF		D	D	D		D		D		D		D	D	D
122pF		D		D				D		D		D	D	D
152pF				D				D		D		D	D	D
182pF				D				D		D		D		D
222pF								D		D		D		D
272pF								D						D
332pF														D
472pF														D

Note: Please refer to the chart on page 3 for the corresponding thickness designation.

HOW TO ORDER

S	X	1808	X7R	102	K	W	T
UTC P/N STYLE	VOLTAGE	BODY SIZE	TEMPERATURE COEFFICIENT	CAPACITANCE CODE	TOLERANCE	TERMINATION	PACKAGE STYLE
S = MLCC SAFETY CERTIFIED CHIP	X = X2/Y3 Z = X1/Y2	1808 1812 2208 2211 2220	NPO X7R	2 significant digits are used plus the third character then represents the number of zeros to follow	J = 5% K = 10% M = 20%	W = 100% tin termination & RoHS - Lead Free compliant product	T = Tape & Reel



HIGH VOLTAGE CHIP CAPACITORS 500VDC TO 5000VDC

UTC offers a wide variety of sizes, voltages, and capacitance values in our series of High Voltage Ceramic Chips.

Features & Applications:

- Specialized internal electrode designs offer an enhanced product performance.
- Ideally, suited for telecommunication devices in LAN interface (IEEE 802.3) products.
- Performs well as a ballast capacitor for backlighting inverter applications.
- UTC also supports many applications for both custom sizes and voltages beyond those listed.
- RoHS Compliant
- Lead Free



HOW TO ORDER							
C	T	1812	X7R	102	K	W	T
UTC P/N STYLE	VOLTAGE	BODY SIZE	TEMPERATURE COEFFICIENT	CAPACITANCE CODE	TOLERANCE	TERMINATION	PACKAGE STYLE
C = MLCC CHIP	S = 500V K = 600V K = 630V T = 1,000V W = 2,000V X = 3,000V Y = 4,000V Z = 5,000V	1206 1210 1808 1812 1825 2220 2225 3530 4040 5550	NPO X7R	2 significant digits are used plus the third character then represents the number of zeros to follow	J = 5% K = 10% M = 20%	W = 100% tin termination & RoHS - Lead Free compliant product B = Soft Termination [consult factory]	T = Tape & Reel

Dimension

Size		1206	1210	1808	1812	1825	2220	2225	3530	4040	5550
Min Cap		10pF	10pF	10pF	10pF	47pF	47pF	47pF	47pF	47pF	100pF
500V	NPO	1500pF	1800pF	3300pF	.01μF	.022μF	.022μF	.027μF	.068μF	.1μF	.18μF
	X7R	.039μF	.047μF	.047μF	.1μF	.33μF	.27μF	.33μF	1.0μF	1.8μF	2.2μF
1000V	NPO	1000pF	2200pF	2200pF	4700pF	.01μF	.01μF	.015μF	.027μF	.056μF	.1μF
	X7R	4700pF	.033μF	.01μF	.027μF	.1μF	.1μF	.1μF	.33μF	.56μF	1.0μF
2000V	NPO	220pF	560pF	330pF	1800pF	2700pF	2700pF	3900pF	.015μF	.027μF	.047μF
	X7R	1000pF	1800pF	2200pF	4700pF	.012μF	.01μF	.015μF	.068μF	.15μF	.27μF
3000V	NPO	39pF	220pF	1000pF	820pF	1200pF	1200pF	1800pF	.01μF	.018μF	.033μF
	X7R	_____	_____	1800pF	1500pF	4700pF	4700pF	5600pF	.027μF	.068μF	.12μF
4000V	NPO	_____	_____	220pF	470pF	680pF	680pF	1000pF	5600pF	.012μF	.018μF
	X7R	_____	_____	330pF	680pF	1500pF	1500pF	1500pF	.015μF	.022μF	.047μF
5000V	NPO	_____	_____	_____	_____	390pF	151pF	560pF	3300pF	6800pF	.012μF
	X7R	_____	_____	_____	_____	820pF	820pF	1000pF	.01μF	.012μF	.033μF

* TOLERANCE \pm .010 or 7% WHICHEVER IS GREATER.

Item	Test Condition	Requirements																																																														
Visual and Mechanical	---	<ul style="list-style-type: none"> No remarkable defect. Dimensions to confirm to individual specification sheet 																																																														
Capacitance	Class I: NPO Cap≤100pF 1.0±0.2Vrms, 1MHz±10% Cap>100pF 1.0±0.2Vrms, 1KHz±10% Class II: X7R, X5R, Y5R Cap≤10μF, 1.0±0.2Vrms, 1KHz±10% Cap>10μF, 0.5±0.2Vrms, 120Hz±20%	<ul style="list-style-type: none"> Shall not exceed the limits given in the detailed spec. <p>NPO: Cap≥30pF, Q≥1000; Cap<30pF, Q≥400+20C X7R, X5R:</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <thead> <tr style="background-color: #cccccc;"> <th>Rated Voltage</th> <th>D.F.≤</th> <th colspan="2">Exception of D.F.≤</th> </tr> </thead> <tbody> <tr> <td>≥50V</td> <td>5.0%</td> <td>---</td> <td>---</td> </tr> <tr> <td rowspan="2">25V</td> <td rowspan="2">3.5%</td> <td>5.0%</td> <td>0805≥1μF; 1210≥10μF</td> </tr> <tr> <td>7.0%</td> <td>0603≥0.33μF; TT series & Cap≥1μF</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">3.5%</td> <td>5.0%</td> <td>0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF</td> </tr> <tr> <td>10%</td> <td>TT Series & Cap≥1μF</td> </tr> <tr> <td>10V</td> <td>5.0%</td> <td>10.0%</td> <td>TT Series & Cap≥1μF; 0805≥10μF</td> </tr> <tr> <td>6.3V</td> <td>10.0%</td> <td>15.0%</td> <td>0805≥22μF; 1210≥100μF</td> </tr> </tbody> </table> <p>Y5V:</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <thead> <tr style="background-color: #cccccc;"> <th>Rated Voltage</th> <th>D.F.≤</th> <th colspan="2">Exception of D.F.≤</th> </tr> </thead> <tbody> <tr> <td>≥50V</td> <td>5.0%</td> <td>---</td> <td>---</td> </tr> <tr> <td>35V</td> <td>7.0%</td> <td>---</td> <td>---</td> </tr> <tr> <td rowspan="2">25V</td> <td rowspan="2">5.0%</td> <td>7.0%</td> <td>0603≥0.1μF; 0805≥μF; 1206≥1μF; 1210≥4.7μF</td> </tr> <tr> <td>9.0%</td> <td>0402≥0.068μF</td> </tr> <tr> <td>16V (C<1.0μF)</td> <td>7.0%</td> <td>9.0%</td> <td>0402≥0.068μF; 0603≥0.68μF</td> </tr> <tr> <td>16V (C≤1.0μF)</td> <td>9.0%</td> <td>12.5%</td> <td>0805≥4.7μF; 1206≥10μF; 1210≥22μF</td> </tr> <tr> <td>10V</td> <td>12.5%</td> <td>---</td> <td>---</td> </tr> <tr> <td>6.3V</td> <td>20.0%</td> <td>---</td> <td>---</td> </tr> </tbody> </table>	Rated Voltage	D.F.≤	Exception of D.F.≤		≥50V	5.0%	---	---	25V	3.5%	5.0%	0805≥1μF; 1210≥10μF	7.0%	0603≥0.33μF; TT series & Cap≥1μF	16V	3.5%	5.0%	0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF	10%	TT Series & Cap≥1μF	10V	5.0%	10.0%	TT Series & Cap≥1μF; 0805≥10μF	6.3V	10.0%	15.0%	0805≥22μF; 1210≥100μF	Rated Voltage	D.F.≤	Exception of D.F.≤		≥50V	5.0%	---	---	35V	7.0%	---	---	25V	5.0%	7.0%	0603≥0.1μF; 0805≥μF; 1206≥1μF; 1210≥4.7μF	9.0%	0402≥0.068μF	16V (C<1.0μF)	7.0%	9.0%	0402≥0.068μF; 0603≥0.68μF	16V (C≤1.0μF)	9.0%	12.5%	0805≥4.7μF; 1206≥10μF; 1210≥22μF	10V	12.5%	---	---	6.3V	20.0%	---	---
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Dielectric Strength (for X1/Y2 & X2/Y3)	<ul style="list-style-type: none"> To apply 1500 VAC voltage. Duration: 60 sec. 	<ul style="list-style-type: none"> No evidence of damage or flash over during test. 																																																														
Insulation Resistance	To apply rated voltage for max. 120 sec. <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Rated Voltage: 100 ~ 500V</td> <td style="width: 30%;">To apply rated voltage for 60 sec.</td> <td style="width: 40%;">≥10GΩ</td> </tr> <tr> <td>Rated Voltage: > 500V</td> <td>To apply 500V for 60 sec.</td> <td>≥10GΩ</td> </tr> </table>	Rated Voltage: 100 ~ 500V	To apply rated voltage for 60 sec.	≥10GΩ	Rated Voltage: > 500V	To apply 500V for 60 sec.	≥10GΩ	≥10GΩ or RxC>500 Ω-F whichever is smaller.																																																								
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Adhesive Strength of Termination	<ul style="list-style-type: none"> Pressurizing force: 0402 & 0603: 5N >0603: 10N Test time: 10±1 sec. 	<ul style="list-style-type: none"> No remarkable damage or removal of the terminations. 																																																														
Vibration Resistance	<ul style="list-style-type: none"> Vibration frequency: 10~55 Hz/min. Total amplitude: 1.5mm Test time: 6 hrs. (Two hrs each in three mutually perpendicular directions.) 	<ul style="list-style-type: none"> No remarkable damage. Cap change and Q/D.F.: To meet initial spec. 																																																														

Item	Test Condition	Requirements																																										
Solderability	<ul style="list-style-type: none"> • Solder temperature: 235±5°C • Dipping time: 2±0.5 sec. 	95% min. coverage of all metalized area.																																										
Bending Test	<ul style="list-style-type: none"> • The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 1 mm and then the pressure shall be maintained for 5±1 sec. • Measurement to be made after keeping at room temp. for 24±2 hrs. 	<ul style="list-style-type: none"> • No remarkable damage. • Cap change: NPO: within ±5.0% or ±0.5pF whichever is larger. X7R, X5R: within ±12.5% Y5V: within ±30% (The capacitance change is measured under specified flexure of the substrate, versus the capacitance measured before the test). 																																										
Resistance to Soldering Heat	<ul style="list-style-type: none"> • Solder temperature: 270±5°C • Dipping time: 10±1 sec. • Preheating: 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder. • Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set for 48±4 hrs at room temp. • Measurement to be made after keeping at room temp. for 24±2 hrs. (Class I) or 48±4 hrs. (Class II). 	<ul style="list-style-type: none"> • No remarkable damage. • Cap change: NPO: within ±2.5% or ±0.25pF whichever is larger. X7R, X5R: within ±7.5% Y5V: within ±20% • Q/D.F., I.R. and dielectric strength: To meet initial requirements. 																																										
Temperature Cycle	<ul style="list-style-type: none"> • Conduct the five cycles according to the temperatures and time. <table border="1" style="margin-left: 20px; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #cccccc;"> <th>Step</th> <th>Temp. (°C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min. operating temp. +0/-3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>2-3</td> </tr> <tr> <td>3</td> <td>Max. operating temp. +3/-0</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>2-3</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set for 48±4 hrs at room temp. • Measurement to be made after keeping at room temp. for 24±2 hrs. (Class I) or 48±4 hrs. (Class II). 	Step	Temp. (°C)	Time (min.)	1	Min. operating temp. +0/-3	30±3	2	Room temp.	2-3	3	Max. operating temp. +3/-0	30±3	4	Room temp.	2-3	<ul style="list-style-type: none"> • No remarkable damage. • Cap change: NPO: within ±2.5% or ±0.25pF whichever is larger. X7R, X5R: within ±7.5% Y5V: within ±20% • Q/D.F., I.R. and dielectric strength: To meet initial requirements. 																											
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4	Room temp.	2-3																																										
Humidity (Steady State)	<ul style="list-style-type: none"> • Test temp.: 40±2°C • Humidity: 90-95% RH • Test time: 500+24/-0 hrs. • Measurement to be made after keeping at room temp. for 24±2 hrs. (Class I) or 48±4 hrs. (Class II). 	<ul style="list-style-type: none"> • No remarkable damage. • Cap change: NPO: within ±5.0% or ±0.5pF whichever is larger. X7R, X5R: ≥10V, within ±12.5% 6.3V, within ±25% Y5V: within ±30% • Q/D.F. Value: NPO: Cap≥30pF, Q≥350; 10pF≤Cap<30pF, Q≥275±2.5C. Cap<10pF; Q≥200+10C X7R, X5R: <table border="1" style="margin-left: 20px; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #cccccc;"> <th>Rated Voltage</th> <th>D.F.≤</th> <th>Exception of D.F.≤</th> </tr> </thead> <tbody> <tr> <td>≥50V</td> <td>3.0%</td> <td>6.0% 0603≥0.047µF; 0805≥0.18µF; 1206≥0.047µF</td> </tr> <tr> <td rowspan="2">25V</td> <td rowspan="2">5.0%</td> <td>10.0% 0805≥1µF, 1210≥10µF</td> </tr> <tr> <td>14.0% 0603≥0.33µF</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">5.0%</td> <td>10.0% 0402≥0.033µF; 0603≥0.15µF; 0805≥0.68µF; 1206≥2.2µF</td> </tr> <tr> <td>15.0% 0402≥0.033µF; 0603≥0.15µF; 0805≥0.68µF; 1206≥2.2µF; TT Series & Cap≥1µF</td> </tr> <tr> <td>6.3V</td> <td>15.0%</td> <td>30.0% 0805≥10µF; 1210≥100µF</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Y5V: <table border="1" style="margin-left: 20px; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #cccccc;"> <th>Rated Voltage</th> <th>D.F.≤</th> <th>Exception of D.F.≤</th> </tr> </thead> <tbody> <tr> <td>≥50V</td> <td>7.5%</td> <td>---</td> </tr> <tr> <td>35V</td> <td>10.0%</td> <td>---</td> </tr> <tr> <td rowspan="2">25V</td> <td rowspan="2">7.5%</td> <td>≤10.0% 0603≥0.1µF; 0805≥0.33µF; 1206≥1µF; 1210≥4.7µF</td> </tr> <tr> <td>≤12.5% 0402≥0.068µF</td> </tr> <tr> <td>16V (C<1.0µF)</td> <td>10.0%</td> <td>≤12.5% 0402≥0.068µF; 0603≥0.68µF</td> </tr> <tr> <td>16V (C≤1.0µF)</td> <td>12.5%</td> <td>---</td> </tr> <tr> <td>10V</td> <td>15.0%</td> <td>---</td> </tr> <tr> <td>6.3V</td> <td>30.0%</td> <td>---</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • I.R.: ≥10V 1GΩ or 50Ω-F whichever is smaller. 6.3V, 10Ω-F 	Rated Voltage	D.F.≤	Exception of D.F.≤	≥50V	3.0%	6.0% 0603≥0.047µF; 0805≥0.18µF; 1206≥0.047µF	25V	5.0%	10.0% 0805≥1µF, 1210≥10µF	14.0% 0603≥0.33µF	16V	5.0%	10.0% 0402≥0.033µF; 0603≥0.15µF; 0805≥0.68µF; 1206≥2.2µF	15.0% 0402≥0.033µF; 0603≥0.15µF; 0805≥0.68µF; 1206≥2.2µF; TT Series & Cap≥1µF	6.3V	15.0%	30.0% 0805≥10µF; 1210≥100µF	Rated Voltage	D.F.≤	Exception of D.F.≤	≥50V	7.5%	---	35V	10.0%	---	25V	7.5%	≤10.0% 0603≥0.1µF; 0805≥0.33µF; 1206≥1µF; 1210≥4.7µF	≤12.5% 0402≥0.068µF	16V (C<1.0µF)	10.0%	≤12.5% 0402≥0.068µF; 0603≥0.68µF	16V (C≤1.0µF)	12.5%	---	10V	15.0%	---	6.3V	30.0%	---
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SOLDERING—ROHS/PB FREE COMPONENTS

The UTC RoHS compliant ceramic chips incorporate termination bands which are compatible with Pb Free soldering systems.

PREHEAT CYCLE

The preheat cycle is performed to gradually increase the component to the higher reflow or wave solder temperature by minimizing the temperature differential the component is being exposed to prior to the reflow cycle beginning.

A higher preheat cycle temperature with wave soldering can help to reduce thermal shock issues and can further help if they are preheated from the bottom side of the board.

REFLOW SOLDER PROFILE

The recommended heating rate will depend on the body size of each component; however it should not exceed 3°C / second. While in the reflow phase the maximum recommended time should not exceed; 40 second time rates @ 230°C. Lastly, the reflow peak temperature should also not exceed 260° maximum / 10 seconds. Please refer to the reflow solder chart for assistance.

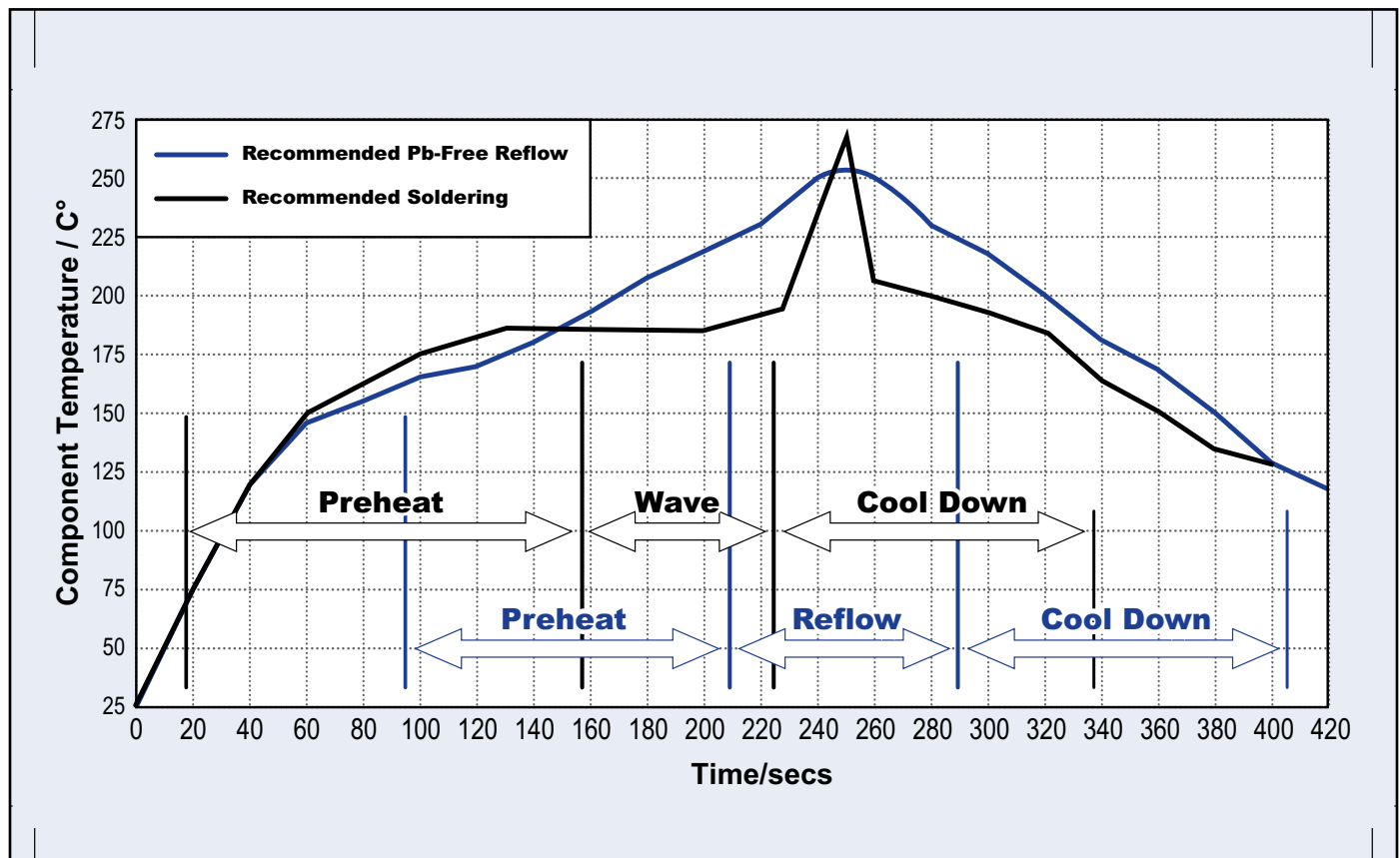
WAVE SOLDER PROFILE

Most components that are wave soldered use a solder at 230°C up to 250°C

Please refer to the charts for guidelines.

COOL DOWN CYCLE

Natural cooling in ambient air is recommended. If the chips are dipped into a solvent for cleaning, the temperature difference between the solvent and the chips must be less than 100°C. This phase should not be forced, and we recommend a rate $\leq 6^\circ\text{C} / \text{second}$.



SMPS (Switch Mode Power Supply) Capacitors

Manufactured in accordance with military series DSCC Drawing 87106, 88011, and MIL-PRF-49470 • Standard capacitance range of .056uF to 270uF • Voltages of 50VDC to 500VDC • Case sizes 1, 2, 3, 4, 5, and 6 with lead styles N, J, and L

High Voltage Radial Capacitors

Manufactured in accordance with military series DSCC Drawings 87046, 87043, 87040, 87114, 87047, 87076, 87044, 87077, 87070 and 87081 • Standard capacitance range of 10pF-0.47uF • Voltages of 1KV to 10KV

Feed-through Discoidal Capacitors

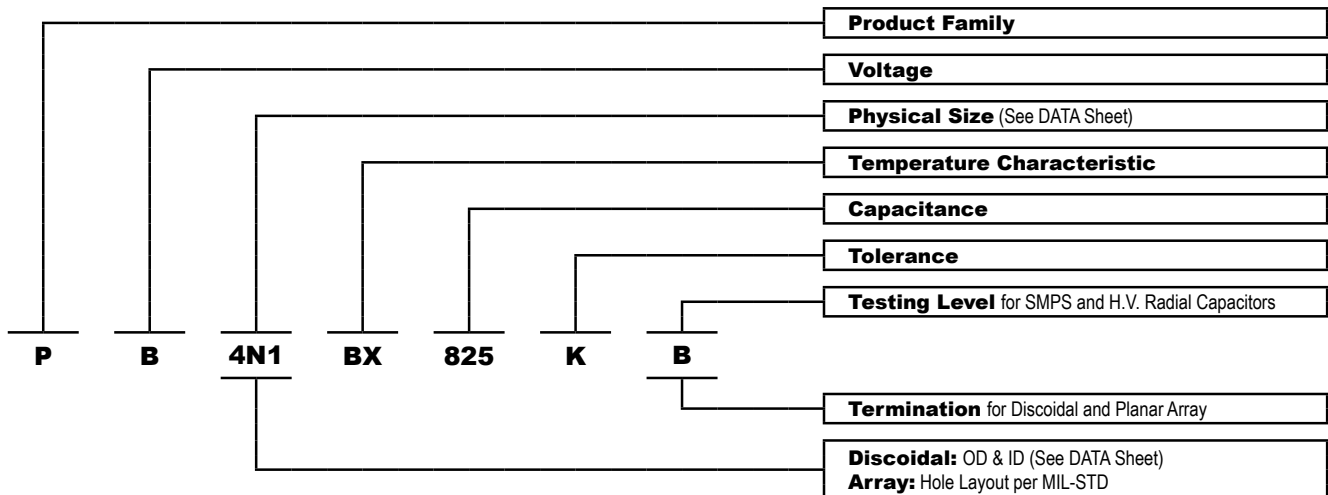
Manufactured in Outside Diameter (OD) sizes of .070" to .600" • Voltages of 50VDC to 3KV • Please contact factory for other variations, which include size, voltage, termination, dielectric, or special configuration

Planar Capacitor Array

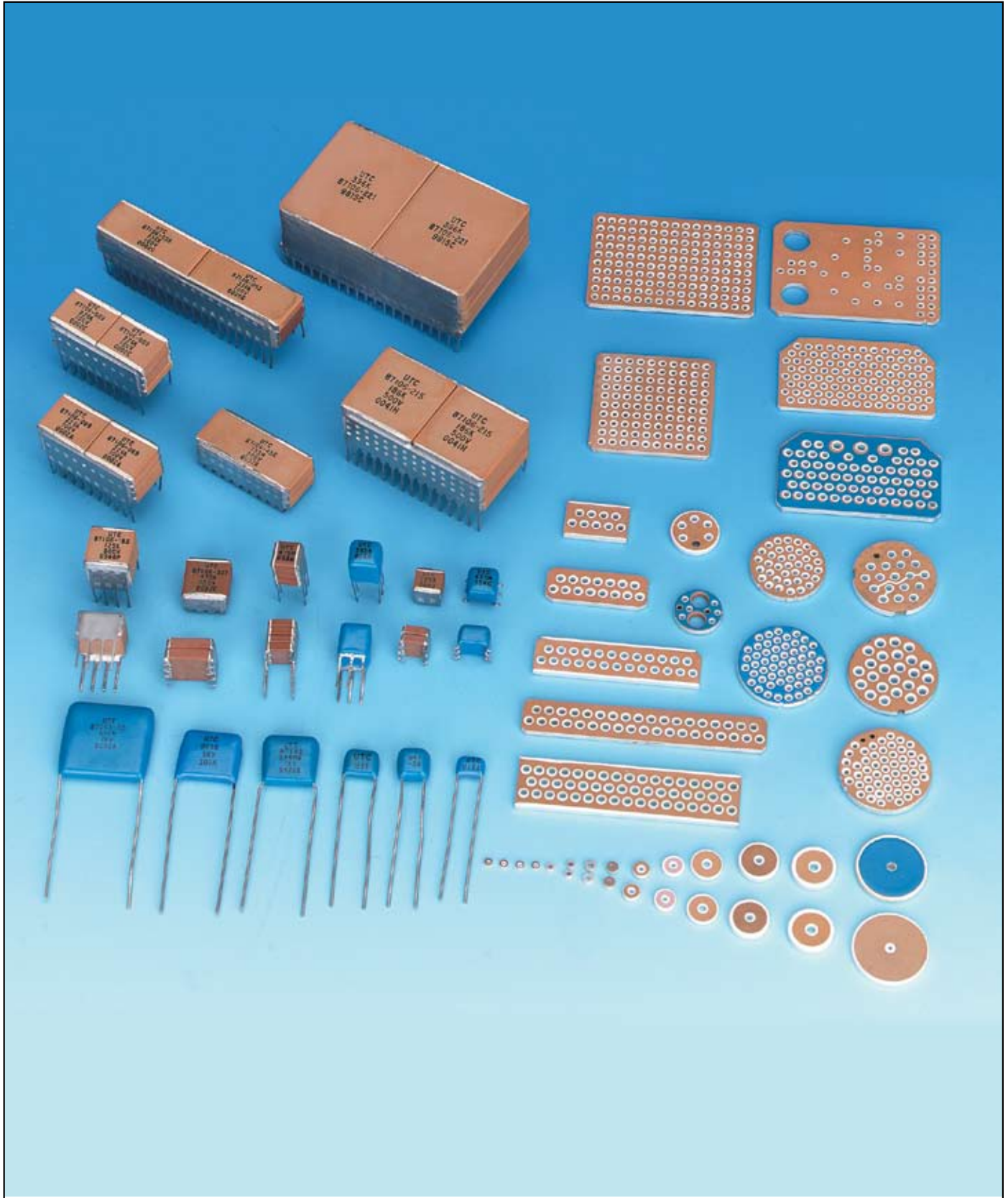
Manufactured in accordance with MIL-STD-1554, MIL-STD-1560A, MIL-STD-1669 • Style SUB-D, Microstyle SUB-D in accordance with MIL-C-24308

For more information on these products, contact the factory or visit the UTC website at:
<http://www.uniontechcorp.com>

Ordering Terminology



Product Family	Voltage	Temperature Characteristic		Tolerance	Testing Level	Termination
P = SMPS Capacitors H = High Voltage Radial Capacitors D = Discoidal A = Planar Array	G = 50V B = 100V R = 200V S = 500V T = 1000V W = 2000V X = 3000V Y = 4000V Z = 5000V	DSCC	EIA	J = ±5 % K = ±10% M = ±20% V = GMV Z = +80/-20%	A = Electrical Screening Only B = MIL-PRF-39014 Group A C = MIL-PRF-39014 Group B	P = Platinum Silver
		BX BR BG BP	X7R X7R X7R NPO (COG)			





UNION TECHNOLOGY CORP.

718 MONTEREY PASS RD., MONTEREY PARK, CA 91754

TEL: (323) 266-6603 FAX: (323) 266-7890

Email: info@uniontechcorp.com

<http://www.uniontechcorp.com>

Printed in U.S.A.
Catalog 1004