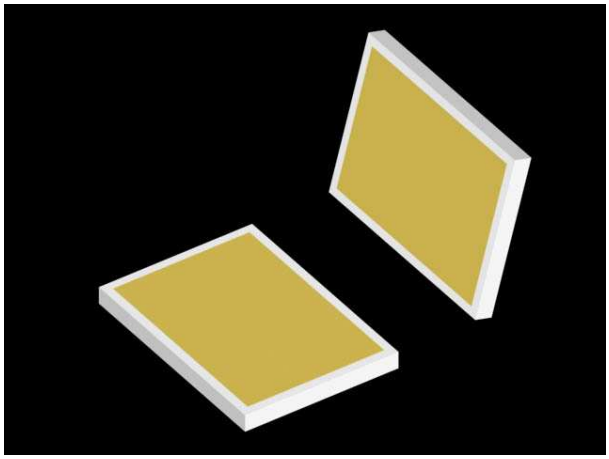
Single layer –Broadband Microwave ceramic capacitors



Temex Ceramics is offering a large range of single layer capacitors (thin film technology) for very high frequency applications based on a wide choice of dielectrics,case sizes and metallized pad configurations widely used on the market .
Those parts are exhibiting very high Q factor up to 50GHz depending upon their size, capacitance values and dielectric types.
Two types of metallization (thin film gold above nickel or not) allow high performance and reliability when using wire bonding & die attach methods.
Mounting is also easy thanks to several mechanical versions (U, B & V): both sides fully metallized (U version), one side fully metallized and the other recessed (B version) and both sides recessed (V version)
Those capacitors are intended for:

- **DC block ,Bypass ,tuning**
- **Line adjustment**
- **Ga-As IC's decoupling**
- **RF/microwave applications**
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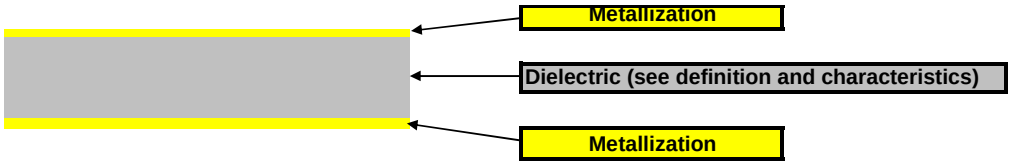
Basic mechanical and environmental parameters comply with :

Requirements	Specification	
Attachment parameters		
Bond strength	> MIL-S-883	Method 2011
Shear strength		Method 2019
Solder heat resistance	MIL-S-202	Method 210-C
Solderability		Method 208
Thermal shock		Method 107-A
Mechanical parameters		
Shock	MIL-S-202	Method 213-I
Vibration		Method 204-G
Environmental parameters		
Low voltage humidity	MIL-S-49464	Clause 3.17
Burn-in/life test	MIL-S-202	Method 108-A/F
Barometric pressure		Method 105-B
Immersion -Salt spray		Method 104-B
Moisture resistance		Method 106

Selection of dielectric and terminations (metallizations)



Note For

Dielectric characteristics

Dielectric constant (K)	Dielectric code	Dielectric class	Temperature coefficient	Rated temperature coefficient ppm/℃	Tolerance (+/-) ppm /℃	Maximum variation of capacitance over temperature range(ΔC/C)	Temperature range	Maximum dissipation factor (Tg δ)	Measuring frequency	Measuring voltage (Vrms) @ 25℃	Minimum Insulation resistance (GΩ)
23	C	1	Defined	0	30		-55℃ to +125℃	0,15%	1MHz		1000
37	K	1	Defined	0	30		-55℃ to +125℃	0,15%	1MHz		1000
80	N	1	Defined	0	30		-55℃ to +125℃	0,15%	1MHz		1000
120	U	1	Defined	-750	120		-55℃ to +125℃	0,25%	1MHz	1,0+/-0,2 @1MHz	1000
160	V	1	Defined	-1500	300		-55℃ to +125℃	0,25%	1MHz		1000
280	R	1	Defined	-2200	500		-55℃ to +125℃	0,25%	1MHz		1000
350	L	1	Defined	-3300	500		-55℃ to +125℃	1,50%	1MHz		1000
600	D	2	Non defined			+/- 10%	-55℃ to +125℃	2,50%	1KHz		100
1200	B	2	Non defined			+/- 10%	-55℃ to +125℃	2,50%	1KHz	C<=100pF	100
2000	W	2	Non defined			+/- 10%	-55℃ to +125℃	2,50%	1KHz	=1,0+/-0,2 @	100
2700	X	2	Non defined			+/- 10%	-55℃ to +125℃	2,50%	1KHz	1MHz	100
4000	T	2	Non defined			+/- 15%	-55℃ to +125℃	2,50%	1KHz	C<100pF =1,0+/	100
8000	Z	2	Non defined			+22%/-56%	+10℃ to +85℃	4,0%	1KHz	0,2 @ 1KHz	10
12000	Y	2	Non defined			+22%/-82%	-30℃ to +85℃	4,0%	1KHz		10

Metallizations characteristics

Type of metallization	Titatium-Tungsten/Gold TiW/Au	Titatium-Tungsten/Nickel/Gold TiW/Ni/Au
Metallization Code	T	N
Attachment characteristics	Wire /ribbon bonding Au/Ge or Au/Si eutectic preform Silver or gold conductive epoxy Non suitable for Pb/Sn or Au/Sn soldering Good high temperature resistance(400℃)	Au/Sn eutectic preform Convenient for Pb/Sn or Au/Sn soldering Moderate high temperature resistance (325℃) (Long term high temperature exposure may cause Ni diffusion and wire bonds problems on Au/Ge)

For Thick film versions referenced Uxx (UBB, UCC etc.) with termination code “G” & “9”, please consult us.

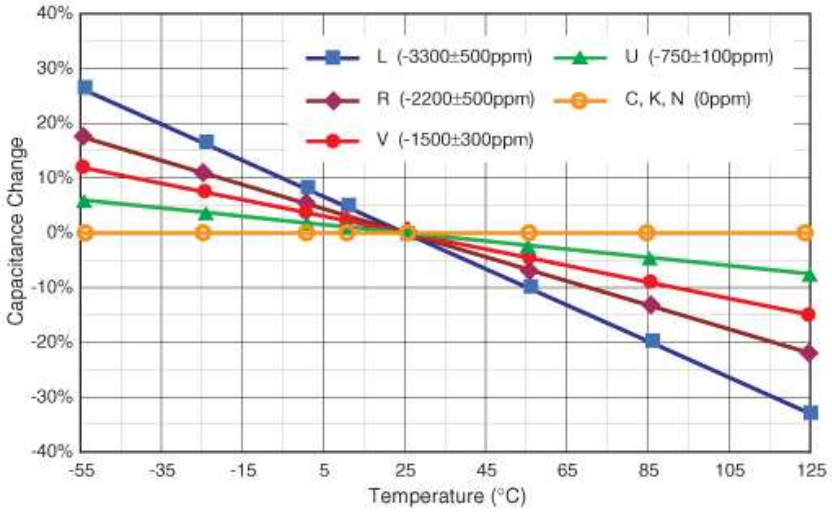
Selection of the capacitance, voltage and case size

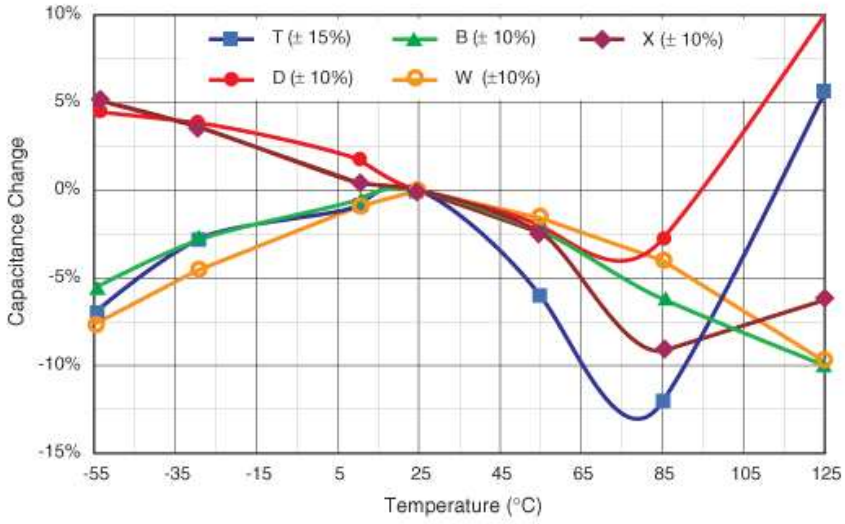
Capacitance tolerance

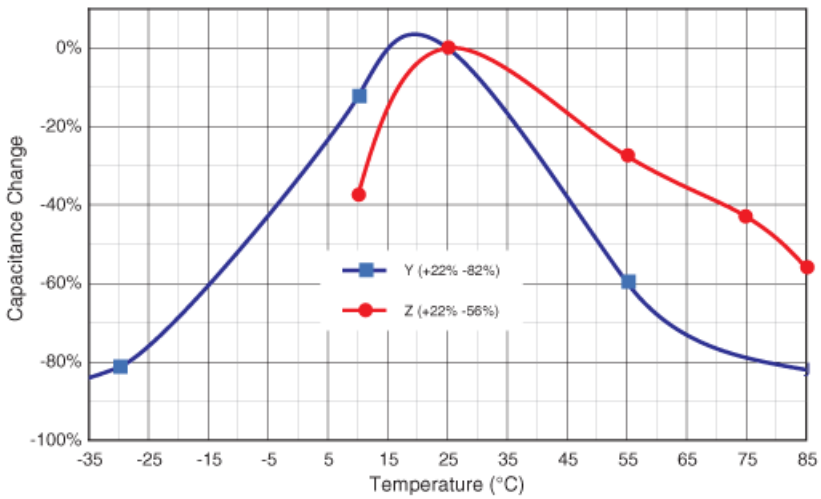
Dielectric constant (K)	Dielectric code	Capacitance tolerance code	Note
23	C	A B C D	(A=for Cr<2pF only)
37	K	A B C D	(A=for Cr<2pF only)
80	N	A B C D F G J K	(A=for Cr<2pF only /F to K for C>10pF)
120	U	B C D J K	B-D for C<=10pF/ others for C>10pF
160	V	B C D J K	B-D for C<=10pF/ others for C>10pF
280	R	B C D J K	B-D for C<=10pF/ others for C>10pF
350	L	B C D J K M	B-D for C<=10pF/ others for C>10pF
600	D	K M	
1200	B	K M	
2000	W	K M	
2700	X	K M	
4000	T	K M	
8000	Z	M Z	
12000	Y	M Z	

A	+/-	0,050 pF	
B	+/-	0,10 pF	
C	+/-	0,25 pF	
D	+/-	0,50 pF	
F	+/-	1 %	
G	+/-	2 %	
J	+/-	5 %	
K	+/-	10 %	
M	+/-	20 %	
Z	-	20 + 80 %	

SLC Temperature Characteristics



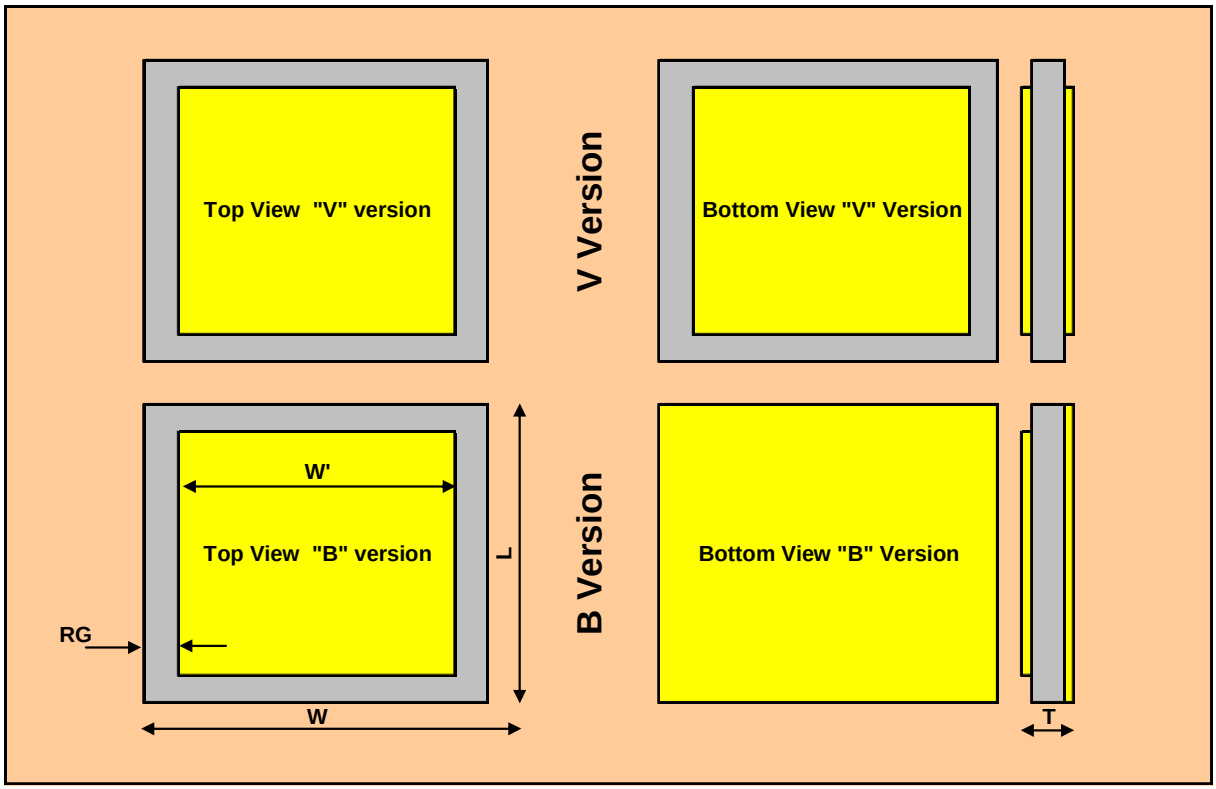




Single layer: B& V Versions –Capacitance range vs case size & dielectric type

Rated Voltage		100V							
Cap.value (pF)	Cap.code	V10	V12	V15	V20	V25	V30	V40	V50
0,1	0R1	C	C	C					
0,2	0R2	N	K	C	C				
0,3	0R3	N	N	K	C	C			
0,4	0R4	V	N	N	K	C			
0,5	0R5	V	N	N	K	C	C		
0,6	0R6	V	V	N	K	K	C		
0,7	0R7	V	V	V	N	K	C		
0,8	0R8	R	V	V	N	K	C		
0,9	0R9	R	V	V	N	K	C	C	
1,0	1R0	R	V	V	N	K	K	C	
1,1	1R1	R	R	V	N	N	K	C	
1,2	1R2	L	R	V	N	N	K	C	
1,3	1R3	L	R	R	N	N	K	C	
1,4	1R4	L	R	R	N	N	K	C	C
1,5	1R5	L	R	R	V	N	K	C	C
1,6	1R6	D	R	R	V	N	K	K	C
1,7	1R7	D	R	R	V	N	K	K	C
1,8	1R8	D	L	R	V	N	K	K	C
1,9	1R9	D	L	L	V	N	N	K	C
2,0	2R0	D	L	L	V	N	N	K	C
2,1	2R1	D	L	L	V	N	N	K	C
2,2	2R2	D	L	L	V	V	N	K	C
2,4	2R4	D	L	L	V	V	N	K	K
2,7	2R7	D	D	L	V	V	N	K	K
3,0	3R0	B	D	D	L	V	N	K	K
3,3	3R3	B	D	D	L	V	N	N	K
3,6	3R6	B	D	D	L	V	N	N	K
3,9	3R9	B	D	D	L	V	V	N	K
4,3	4R3	B	D	D	L	R	V	N	K
4,7	4R7	B	B	D	L	R	V	N	K
5,1	5R1	B	B	D	L	R	V	N	K
5,6	5R6	B	B	B	L	R	V	N	N
6,2	6R2	W	B	B	D	R	V	V	N
6,8	6R8	W	B	B	D	R	V	V	N
7,5	7R5	W	B	B	D	L	R	V	N
8,2	8R2	W	W	B	D	L	R	V	N
9,1	9R1	W	W	B	D	D	R	V	N
10	100	X	W	W	D	D	L	V	V
12	120	X	W	W	B	D	L	R	V
15	150	T	X	W	B	D	L	R	V
18	180	T	X	X	B	D	D	R	R
20	200	T	T	X	B	B	D	L	R
22	220	Z	T	X	B	B	D	L	R
27	270	Z	T	T	W	B	D	D	L
33	330	Y	Z	T	W	B	B	D	L
39	390	Y	Z	Z	X	W	B	D	L
47	470	Y	Z	Z	X	W	B	D	D
50	500	Y	Y	Z	X	W	B	D	D
51	510	Y	Y	Z	T	X	B	D	D
56	560	Y	Y	Z	T	X	B	B	D
68	680		Y	Y	T	X	W	B	D
82	820		Y	Y	Z	T	W	B	D
100	101			Y	Z	T	X	W	B
120	121				Z	T	X	W	B
150	151				Y	Z	T	X	W
180	181				Y	Z	T	T	W
200	201				Y	Z	T	T	X
220	221				Y	Y	Z	T	X
270	271					Y	Z	T	X
330	331					Y	Y	Z	T
390	391						Y	Z	T
470	471						Y	Z	T
560	561						Y	Y	Z
680	681							Y	Z
820	821								Y
1000	102								Y
1200	122								Y

V & B Versions –Drawings & Dimensions



Dimensions (inch)

SIZE	Tolerance	V10	V12	V15	V20	V25	V30	V40	V50
W & L	+/-0,001''	0,010	0,012	0,015	0,020	0,025	0,030	0,040	0,050
W'	nominal	0,008	0,010	0,011	0,016	0,020	0,026	0,036	0,044
RG	+/-0,001''	0,001*	0,001*	0,002	0,002	0,002	0,002	0,002	0,003
T	+/-0,001''	0,006	0,006	0,006	0,006	0,006	0,006	0,006	0,006

*** minimum 0,005"**

Dimensions (mm)

SIZE	Tolerance	V10	V12	V15	V20	V25	V30	V40	V50
W & L	+/-0,025	0,250	0,300	0,380	0,510	0,640	0,760	1,020	1,270
W'	nominal	0,200	0,250	0,280	0,410	0,510	0,660	0,910	1,120
RG	+/-0,025	0,025*	0,025*	0,051	0,051	0,051	0,051	0,051	0,076
T	+/-0,025	0,150	0,150	0,150	0,150	0,150	0,150	0,150	0,150

***minimum 0,127**

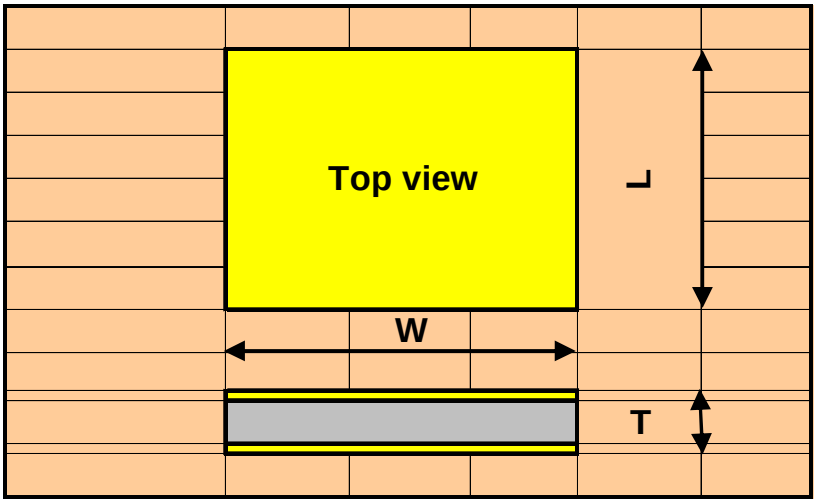
RG =ring guard

Single layer : U version –Capacitance range vs case size & dielectric-50V

Rated Voltage		50V						
Cap.value (pF)	Cap.code	U10	U12	U15	U20	U25	U30	U35
0,1	0R1	C						
0,2	0R2	K	C					
0,3	0R3	N	K	C				
0,4	0R4	N	N	K	C			
0,5	0R5	U	N	K	C			
0,6	0R6	V	N	K	C	C		
0,7	0R7	V	N	N	K	C		
0,8	0R8	V	U	N	K	C		
0,9	0R9	R	V	N	K	C	C	
1,0	1R0	R	V	N	K	K	C	
1,1	1R1	R	V	N	K	K	C	C
1,2	1R2	R	V	N	N	K	C	C
1,3	1R3	R	V	N	N	K	C	C
1,4	1R4	L	V	U	N	K	K	C
1,5	1R5	L	V	U	N	K	K	C
1,6	1R6	L	R	U	N	K	K	C
1,7	1R7	L	R	U	N	K	K	C
1,8	1R8	L	R	U	N	N	K	K
1,9	1R9	L	R	V	N	N	K	K
2,0	2R0	D	R	V	N	N	K	K
2,1	2R1	D	L	V	N	N	K	K
2,2	2R2	D	L	V	U	N	K	K
2,4	2R4	D	L	V	U	N	K	K
2,7	2R7	D	L	R	U	N	N	K
3,0	3R0	D	L	R	U	N	N	K
3,3	3R3	D	L	R	V	N	N	K
3,6	3R6	D	D	R	V	U	N	K
3,9	3R9	B	D	R	V	U	N	N
4,3	4R3	B	D	R	V	U	N	N
4,7	4R7	B	D	L	R	U	N	N
5,1	5R1	B	D	L	R	V	U	N
5,6	5R6	B	D	L	R	V	U	N
6,2	6R2	B	D	D	R	V	U	N
6,8	6R8	B	B	D	R	R	V	N
7,5	7R5	W	B	D	R	R	V	U
8,2	8R2	W	B	D	L	R	V	U
9,1	9R1	W	B	D	L	R	R	U
10	100	X	B	D	L	R	R	V
12	120	X	W	B	D	L	R	V
15	150	T	W	B	D	L	R	R
18	180	T	W	B	D	D	L	R
20	200	T	X	W	D	D	L	R
22	220	T	X	W	B	D	L	R
27	270	Z	T	W	B	D	D	L
33	330	Z	T	X	B	B	D	L
39	390	Z	T	X	W	B	D	D
47	470	Y	Z	T	W	B	D	D
50	500	Y	Z	T	W	B	B	D
51	510	Y	Z	T	W	B	B	D
56	560	Y	Z	T	X	B	B	D
68	680		Z	Z	X	W	B	B
82	820		Y	Z	T	W	B	B
100	101		Y	Z	T	X	W	B
120	121			Y	T	T	W	W
150	151			Y	Z	T	X	W
180	181			Y	Z	T	T	W
200	201				Z	Z	T	X
220	221				Y	Z	T	X
270	271				Y	Z	T	T
330	331				Y	Y	Z	T
390	391					Y	Z	T
470	471					Y	Z	Z
560	561					Y	Y	Z
680	681						Y	Z
820	821							Y
1000	102							Y

Rated Voltage		100V							
Cap.value (pF)	Cap.code	U15	U20	U25	U30	U35	U50	U70	U90
0,2	0R2	C							
0,3	0R3	K	C						
0,4	0R4	K	C	C					
0,5	0R5	N	K	C					
0,6	0R6	N	K	C					
0,7	0R7	N	K	K	C	C			
0,8	0R8	N	N	K	C	C			
0,9	0R9	U	N	K	C	C			
1,0	1R0	U	N	K	K	C	C		
1,1	1R1	V	N	K	K	C	C		
1,2	1R2	V	N	N	K	C	C		
1,3	1R3	V	N	N	K	K	C		
1,4	1R4	V	N	N	K	K	C		
1,5	1R5	V	N	N	K	K	C		
1,6	1R6	V	U	N	N	K	C		
1,7	1R7	V	U	N	N	K	C		
1,8	1R8	R	U	N	N	K	C		
1,9	1R9	R	U	N	N	K	C		
2,0	2R0	R	U	N	N	K	K		
2,1	2R1	R	V	N	N	K	K	C	
2,2	2R2	R	V	U	N	N	K	C	
2,4	2R4	R	V	U	N	N	K	C	
2,7	2R7	L	V	U	N	N	K	C	C
3,0	3R0	L	V	U	N	N	K	C	C
3,3	3R3	L	R	V	U	N	K	C	C
3,6	3R6	L	R	V	U	N	K	C	C
3,9	3R9	L	R	V	U	N	N	C	C
4,3	4R3	D	R	V	V	N	N	C	C
4,7	4R7	D	R	R	V	N	N	K	C
5,1	5R1	D	R	R	V	U	N	K	C
5,6	5R6	D	L	R	V	U	N	K	K
6,2	6R2	D	L	R	V	V	N	K	K
6,8	6R8	D	L	R	R	V	N	K	K
7,5	7R5	D	D	L	R	V	N	K	K
8,2	8R2	B	D	L	R	V	N	N	K
9,1	9R1	B	D	L	R	R	N	N	N
10	100	B	D	L	L	R	V	N	N
12	120	B	D	D	L	R	V	N	N
15	150	W	B	D	L	R	V	N	N
18	180	W	B	D	D	L	V	V	N
20	200	W	B	D	D	L	R	V	N
22	220	X	B	B	D	D	R	V	N
27	270	X	W	B	D	D	R	V	U
33	330	T	W	B	B	D	L	R	U
39	390	T	X	W	B	D	L	R	V
47	470	T	X	W	B	B	D	R	V
50	500	Z	X	W	B	B	D	R	V
51	510	Z	X	W	B	B	D	R	R
56	560	Z	T	X	W	B	D	R	R
68	680	Z	T	X	W	B	D	L	R
82	820	Y	Z	T	X	W	B	D	R
100	101	Y	Z	T	X	X	B	D	L
120	121	Y	Z	T	T	X	B	D	D
150	151		Y	Z	T	X	B	B	D
180	181		Y	Z	T	T	W	B	D
200	201		Y	Z	Z	T	W	B	B
220	221		Y	Z	Z	T	W	B	B
270	271			Y	Z	Z	X	W	B
330	331			Y	Z	Z	X	W	W
390	391				Y	Z	T	X	W
470	471				Y	Y	T	X	W
560	561					Y	T	T	X
680	681					Y	Z	T	X
820	821						Z	T	X
1000	102						Z	T	T
1200	122						Y	Z	T
1500	152						Y	Y	Z
1800	182							Y	Z
2000	202							Y	Z
2500	252							Y	Y
4000	402								Y

“U” Version -Drawing & Dimensions:



Dimensions (inch)										Dimensions (inch)								
SIZE	Tolerance	U10	U12	U15	U20	U25	U30	U35		SIZE	Tolerance	U15	U20	U25	U30	U35	U50	U70	U90
W	+ 0,001"- 0,003"	0,010	0,012	0,015	0,020	0,025	0,030	0,035		W	+ 0,001"- 0,003"	0,015	0,020	0,025	0,030	0,035	0,050	0,070	0,090
L	max	0,010	0,015	0,020	0,020	0,030	0,030	0,040		L	max	0,020	0,020	0,030	0,030	0,040	0,060	0,080	0,100
T	+/-0,001"	0,004	0,004	0,004	0,004	0,004	0,004	0,004		T	+/-0,001"	0,006	0,006	0,006	0,006	0,006	0,006	0,006	0,006
Dimensions (mm)										Dimensions (mm)								
SIZE	Tolerance	U10	U12	U15	U20	U25	U30	U35		SIZE	Tolerance	U15	U20	U25	U30	U35	U50	U70	U90
W	+0,025 0,076	0,25	0,30	0,38	0,51	0,64	0,76	0,89		W	+0,025 -0,076	0,380	0,510	0,640	0,760	0,890	1,270	1,780	2,290
L	max	0,25	0,38	0,51	0,51	0,76	0,76	1,02		L	max	0,510	0,510	0,760	0,760	1,020	1,520	2,030	2,540
T	+/-0,025	0,1	0,1	0,1	0,1	0,1	0,1	0,1		T	+/-0,025	0,150	0,150	0,150	0,150	0,150	0,150	0,150	0,150

How to order a single layer capacitor?

You need to know which geometry of metallization you need for a given case size (U , B or V) , then go to the right table and select the capacitance value and the voltage you are looking for :the correct dielectric type will be indicated for each value. For capacitance tolerance ,please consult the corresponding table since tolerance is closely linked to the type of dielectric (close tolerance are not available for dielectric showing large variation of capacitance with temperature for instance).