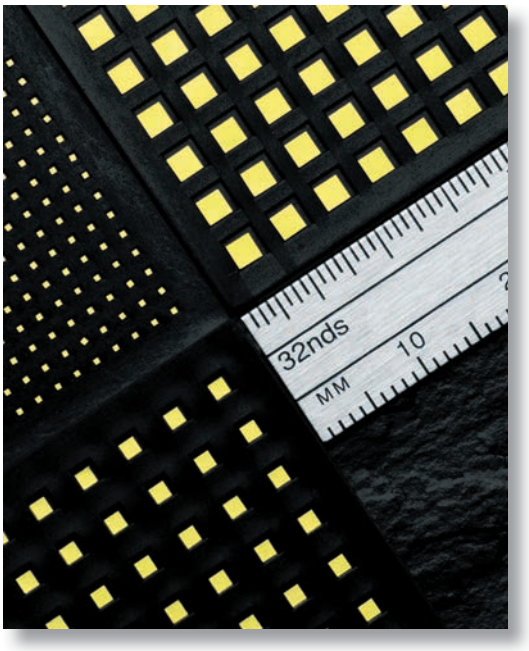
SLC Microwave / Millimeterwave Capacitors



Key Features

- Ceramic SLC Low Profile Devices Exhibit Very High-Q / Low Insertion Loss, SRFs to 50 GHz
- Thin Film Gold Electrodes Provide Superior Wire Bonding & Die Attach Performance
- Four SLC Device Types to Fit Many Applications:
  - Standard (Die) SLCs
  - Bar SLC Arrays
  - Border SLCs
  - Custom SLC Products
- RoHS - Available on all dielectrics
- Custom sizes are available - please consult factory

Applications

- Microwave Integrated Components
- GaAs Integrated Circuits
- RF/Microwave Components
- DC Block, Bypass, Tuning

Dielectric Characteristics

DIELECTRIC CODE	CONSTANT (K)	TEMPERATURE COEFFICIENT	TEMPERATURE RANGE	DISSIPATION FACTOR	INSULATION RESISTANCE	TEST COND.	AVAILABLE TOLERANCES
C	23	0 ± 30 ppm	-55°C to +125°C	≤ 0.15%	> 1000 GΩ	1	B,C,D (A, <2pF)
K	37	0 ± 30 ppm	-55°C to +125°C	≤ 0.15%	> 1000 GΩ	1	B,C,D (A, <2pF)
N	80	0 ± 30 ppm	-55°C to +125°C	≤ 0.15%	> 1000 GΩ	1	B,C,D (A, <2pF) (F - K, >10 pF)
U	120	-750 ± 120 ppm	-55°C to +125°C	≤ 0.25%	> 1000 GΩ	1	J,K (B-D)
V	160	-1500 ± 500 ppm	-55°C to +125°C	≤ 0.25%	> 1000 GΩ	1	J,K (B-D)
R	280	-2200 ± 500 ppm	-55°C to +125°C	≤ 0.25%	> 1000 GΩ	1	J,K (B-D)
L	350	-3300 ± 500 ppm	-55°C to +125°C	≤ 1.50%	> 1000 GΩ	1	J,K,M (B-D)
D	600	± 10%	-55°C to +125°C	≤ 2.50%	> 100 GΩ	2	K,M
B	1200	± 10%	-55°C to +125°C	≤ 2.50%	> 100 GΩ	2	K,M
W	2000	± 15%	-55°C to +125°C	≤ 2.50%	> 100 GΩ	2	K,M
X	2700	± 15%	-55°C to +125°C	≤ 2.50%	> 100 GΩ	2	K,M
T	4000	± 15%	-55°C to +125°C	≤ 2.50%	> 100 GΩ	2	K,M
Z	8000	+22% -56%	+10°C to +85°C	≤ 4.00%	> 10 GΩ	2	M,Z
Y	12000	+22% -82%	-30°C to +85°C	≤ 4.00%	> 10 GΩ	2	M,Z

VOLTAGE RATINGS: 50 &100 WVDC

DIELECTRIC STRENGTH: 2.5 x WVDC min, 25°C, 50 mA max

TEST CONDITIONS: 1) 1.0±0.2 VRMS @1MHz, 25°C
2) for values ≤100pF: 1.0±0.2 VRMS @1MHz, 25°C; for ALL other values: 1.0±0.2 VRMS @1KHZ, 25°C

V-Series & B-Series Border SLC Capacitors

Recessed SLC electrode borders help prevent shorting from conductive epoxy squeeze-up and aid visual recognition equipment. The V-Series SLCs feature dual borders (top & bottom) while the B-Series SLCs feature a single border (top-only.)

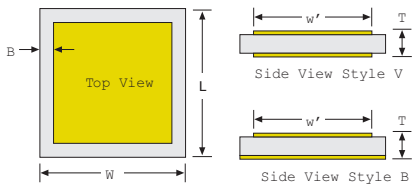
V-Series & B-Series Capacitance Selection

CAP. CODE	CAP. VALUE	V10 100V	V12 100V	V15 100V	V20 100V	V25 100V	V30 100V	V40 100V	V50 100V
0R1	0.1 pF	C	C	C					
0R2	0.2 pF	N	K	C	C				
0R3	0.3 pF	N	N	K	C	C			
0R4	0.4 pF	V	N	N	K	C			
0R5	0.5 pF	V	N	N	K	C	C		
0R6	0.6 pF	V	V	N	K	K	C		
0R7	0.7 pF	V	V	V	N	K	C		
0R8	0.8 pF	R	V	V	N	K	C		
0R9	0.9 pF	R	V	V	N	K	C	C	
1R0	1.0 pF	R	V	V	N	K	K	C	
1R1	1.1 pF	R	R	V	N	N	K	C	
1R2	1.2 pF	L	R	V	N	N	K	C	
1R3	1.3 pF	L	R	R	N	N	K	C	
1R4	1.4 pF	L	R	R	N	N	K	C	C
1R5	1.5 pF	L	R	R	V	N	K	C	C
1R6	1.6 pF	D	R	R	V	N	K	K	C
1R7	1.7 pF	D	R	R	V	N	K	K	C
1R8	1.8 pF	D	L	R	V	N	K	K	C
1R9	1.9 pF	D	L	L	V	N	N	K	C
2R0	2.0 pF	D	L	L	V	N	N	K	C
2R1	2.1 pF	D	L	L	V	N	N	K	C
2R2	2.2 pF	D	L	L	V	V	N	K	C
2R4	2.4 pF	D	L	L	V	V	N	K	K
2R7	2.7 pF	D	D	L	V	V	N	K	K
3R0	3.0 pF	B	D	D	L	V	N	K	K
3R3	3.3 pF	B	D	D	L	V	N	N	K
3R6	3.6 pF	B	D	D	L	V	N	N	K
3R9	3.9 pF	B	D	D	L	V	V	N	K
4R3	4.3 pF	B	D	D	L	R	V	N	K
4R7	4.7 pF	B	B	D	L	R	V	N	K
5R1	5.1 pF	B	B	D	L	R	V	N	K
5R6	5.6 pF	B	B	B	L	R	V	N	N
6R2	6.2 pF	W	B	B	D	R	V	V	N
6R8	6.8 pF	W	B	B	D	R	V	V	N

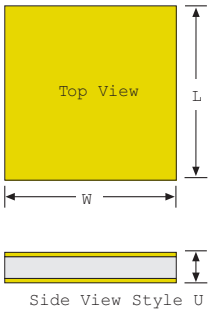
CAP. CODE	CAP. VALUE	V10 100V	V12 100V	V15 100V	V20 100V	V25 100V	V30 100V	V40 100V	V50 100V
6R8	6.8 pF	W	B	B	D	R	V	V	N
7R5	7.5 pF	W	B	B	D	L	R	V	N
8R2	8.2 pF	W	W	B	D	L	R	V	N
9R1	9.1 pF	W	W	B	D	D	R	V	N
100	10 pF	X	W	W	D	D	L	V	V
120	12 pF	X	W	W	B	D	L	R	V
150	15 pF	T	X	W	B	D	L	R	V
180	18 pF	T	X	X	B	D	D	R	R
200	20 pF	T	T	X	B	B	D	L	R
220	22 pF	Z	T	X	B	B	D	L	R
270	27 pF	Z	T	T	W	B	D	D	L
330	33 pF	Y	Z	T	W	B	B	D	L
390	39 pF	Y	Z	Z	X	W	B	D	L
470	47 pF	Y	Z	Z	X	W	B	D	D
500	50 pF	Y	Y	Z	X	W	B	D	D
510	51 pF	Y	Y	Z	T	X	B	D	D
560	56 pF	Y	Y	Z	T	X	B	B	D
680	68 pF		Y	Y	T	X	W	B	D
820	82 pF		Y	Y	Z	T	W	B	D
101	100 pF			Y	Z	T	X	W	B
121	120 pF				Z	T	X	W	B
151	150 pF				Y	Z	T	X	W
181	180 pF				Y	Z	T	T	W
201	200 pF				Y	Z	T	T	X
221	220 pF				Y	Y	Z	T	X
271	270 pF					Y	Z	T	X
331	330 pF					Y	Y	Z	T
391	390 pF						Y	Z	T
471	470 pF						Y	Z	T
561	560 pF						Y	Y	Z
681	680 pF							Y	Z
821	820 pF								Y
102	1000 pF								Y
122	1200 pF								Y

Color breaks used to highlight changes in dielectric material, letters indicate the specific material.

V-Series & B-Series Mechanical Characteristics



SIZE		V10	V12	V15	V20	V25	V30	V40	V50
W&L	±.001"	.010	.012	.015	.020	.025	.030	.040	.050
	(mm)	(0.25)	(0.30)	(0.38)	(0.51)	(0.64)	(0.76)	(1.02)	(1.27)
w'	NOM.	.007	.008	.011	.016	.020	.026	.036	.044
	(mm)	(0.17)	(0.20)	(0.28)	(0.41)	(0.51)	(0.66)	(0.91)	(1.12)
B	±.001"	.001*	.001*	.002	.002	.002	.002	.002	.003
	(mm)	(0.025)*	(0.025)*	(0.051)	(0.051)	(0.051)	(0.051)	(0.051)	(0.076)
T	±.002"	NOM. 0.004" ~ 0.008"							
	(mm)	(NOM. 0.10 ~ 0.20)							
*Min Border 0.0005"		Contact factory for other sizes, values or configurations							



SIZE		U10	U12	U15	U20	U25	U30	U35	U50	U70	U90
W	+.001"	.010	.012	.015	.020	.025	.030	.035	.050	.070	.090
(mm)	-.003"	(0.25)	(0.30)	(0.38)	(0.51)	(0.64)	(0.76)	(0.89)	(1.27)	(1.78)	(2.29)
L	MAX.	.012	.015	.020	.025	.030	.035	.040	.060	.080	.100
	(mm)	(0.30)	(0.38)	(0.51)	(0.64)	(0.76)	(0.89)	(1.02)	(1.52)	(2.03)	(2.54)
T	±.002"	NOM. 0.004" ~ 0.008"									
	(mm)	(NOM. 0.10 ~ 0.20)									

Contact factory for other sizes, values or configurations

CAPACITANCE		U10	U12	U15		U20		U25		U30		U35		U50	U70	U90	CAPACITANCE	
CODE	VALUE	50V	50V	50V	100 V	50V	100 V	50V	100 V	50V	100 V	50V	100V	100V	100V	100V	CODE	VALUE
0R1	0.1 pF	C															0R1	0.1 pF
0R2	0.2 pF	K	C		C												0R2	0.2 pF
0R3	0.3 pF	N	K	C	K		C										0R3	0.3 pF
0R4	0.4 pF	N	N	K	K	C	C		C								0R4	0.4 pF
0R5	0.5 pF	U	N	K	N	C	K		C								0R5	0.5 pF
0R6	0.6 pF	V	N	K	N	C	K	C	C				C				0R6	0.6 pF
0R7	0.7 pF	V	N	N	N	K	K	C	K		C		C				0R7	0.7 pF
0R8	0.8 pF	V	U	N	N	K	N	C	K		C		C				0R8	0.8 pF
0R9	0.9 pF	R	V	N	U	K	N	C	K	C	C		C				0R9	0.9 pF
1R0	1.0 pF	R	V	N	U	K	N	K	K	C	K		C	C			1R0	1.0 pF
1R1	1.1 pF	R	V	N	V	K	N	K	K	C	K	C	C	C			1R1	1.1 pF
1R2	1.2 pF	R	V	N	V	N	N	K	N	C	K	C	C	C			1R2	1.2 pF
1R3	1.3 pF	R	V	N	V	N	N	K	N	C	K	C	K	C			1R3	1.3 pF
1R4	1.4 pF	L	V	U	V	N	N	K	N	K	K	C	K	C			1R4	1.4 pF
1R5	1.5 pF	L	V	U	V	N	N	K	N	K	K	C	K	C			1R5	1.5 pF
1R6	1.6 pF	L	R	U	V	N	U	K	N	K	N	C	K	C			1R6	1.6 pF
1R7	1.7 pF	L	R	U	V	N	U	K	N	K	N	C	K	C			1R7	1.7 pF
1R8	1.8 pF	L	R	U	R	N	U	N	N	K	N	K	K	C			1R8	1.8 pF
1R9	1.9 pF	L	R	V	R	N	U	N	N	K	N	K	K	C			1R9	1.9 pF
2R0	2.0 pF	D	R	V	R	N	U	N	N	K	N	K	K	K			2R0	2.0 pF
2R1	2.1 pF	D	L	V	R	N	V	N	N	K	N	K	K	K	C		2R1	2.1 pF
2R2	2.2 pF	D	L	V	R	U	V	N	U	K	N	K	N	K	C		2R2	2.2 pF
2R4	2.4 pF	D	L	V	R	U	V	N	U	K	N	K	N	K	C		2R4	2.4 pF
2R7	2.7 pF	D	L	R	L	U	V	N	U	N	N	K	N	K	C	C	2R7	2.7 pF
3R0	3.0 pF	D	L	R	L	U	V	N	U	N	N	K	N	K	C	C	3R0	3.0 pF
3R3	3.3 pF	D	L	R	L	V	R	N	V	N	U	K	N	K	C	C	3R3	3.3 pF
3R6	3.6 pF	D	D	R	L	V	R	U	V	N	U	K	N	K	C	C	3R6	3.6 pF
3R9	3.9 pF	B	D	R	L	V	R	U	V	N	U	N	N	N	C	C	3R9	3.9 pF
4R3	4.3 pF	B	D	R	D	V	R	U	V	N	V	N	N	N	C	C	4R3	4.3 pF
4R7	4.7 pF	B	D	L	D	R	R	U	R	N	V	N	N	N	K	C	4R7	4.7 pF
5R1	5.1 pF	B	D	L	D	R	R	V	R	U	V	N	U	N	K	C	5R1	5.1 pF
5R6	5.6 pF	B	D	L	D	R	L	V	R	U	V	N	U	N	K	K	5R6	5.6 pF
6R2	6.2 pF	B	D	D	D	R	L	V	R	U	V	N	V	N	K	K	6R2	6.2 pF
6R8	6.8 pF	B	B	D	D	R	L	R	R	V	R	N	V	N	K	K	6R8	6.8 pF
7R5	7.5 pF	W	B	D	D	R	D	R	L	V	R	U	V	N	K	K	7R5	7.5 pF
8R2	8.2 pF	W	B	D	B	L	D	R	L	V	R	U	V	N	N	K	8R2	8.2 pF
9R1	9.1 pF	W	B	D	B	L	D	R	L	V	R	U	R	N	N	N	9R1	9.1 pF
100	10 pF	X	B	D	B	L	D	R	L	R	L	V	R	V	N	N	100	10 pF

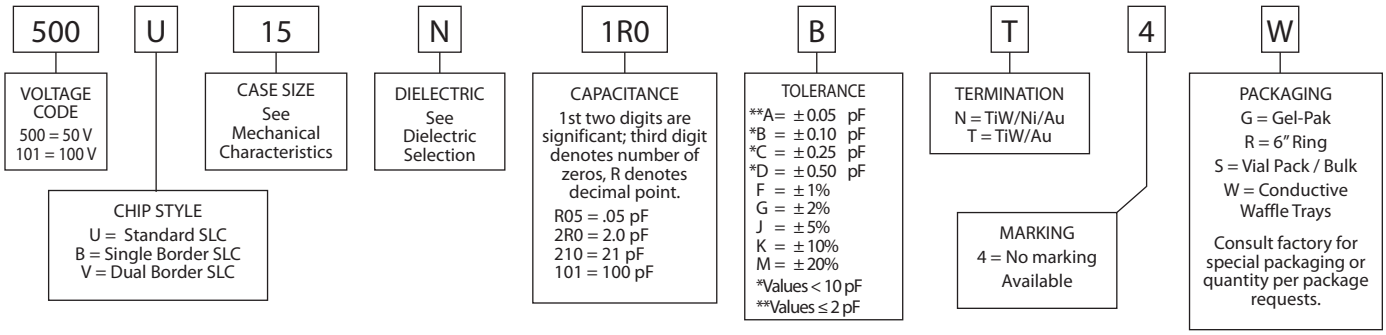
Color breaks used to highlight changes in dielectric material, letters indicate the specific material

U Series SLC Capacitance Selection (cont.)

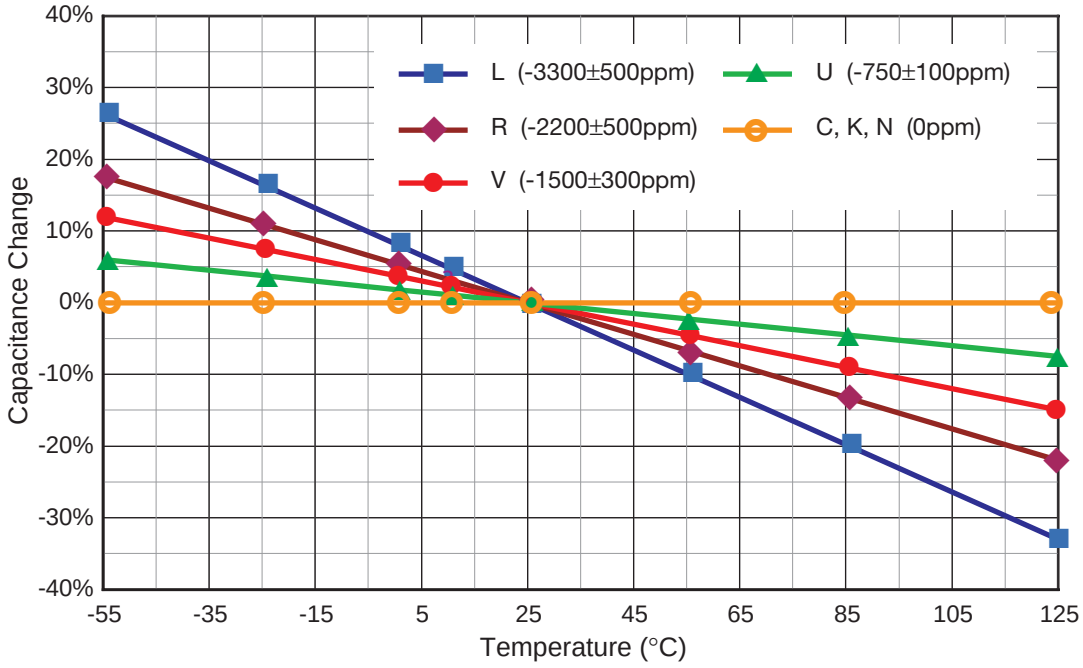
CAPACITANCE		U10	U12	U15		U20		U25		U30		U35		U50	U70	U90	CAPACITANCE	
CODE	VALUE	50V	50V	50V	100 V	50V	100 V	50V	100 V	50V	100 V	50V	100V	100V	100V	100V	CODE	VALUE
100	10 pF	X	B	D	B	L	D	R	L	R	L	V	R	V	N	N	100	10 pF
120	12 pF	X	W	B	B	D	D	L	D	R	L	V	R	V	N	N	120	12 pF
150	15 pF	T	W	B	W	D	B	L	D	R	L	R	L	V	N	N	150	15 pF
180	18 pF	T	W	B	W	D	B	D	D	L	D	R	L	V	V	N	180	18 pF
200	20 pF	T	X	W	W	D	B	D	D	L	D	R	D	R	V	N	200	20 pF
220	22 pF	T	X	W	X	B	B	D	B	L	D	R	D	R	V	N	220	22 pF
270	27 pF	Z	T	W	X	B	W	D	B	D	D	L	D	R	V	U	270	27 pF
330	33 pF	Z	T	X	T	B	W	B	B	D	B	L	D	L	R	U	330	33 pF
390	39 pF	Z	T	X	T	W	X	B	W	D	B	D	B	L	R	V	390	39 pF
470	47 pF	Y	Z	T	T	W	X	B	W	D	B	D	B	D	R	V	470	47 pF
500	50 pF	Y	Z	T	Z	W	X	B	W	B	B	D	B	D	R	V	500	50 pF
510	51 pF	Y	Z	T	Z	W	X	B	W	B	B	D	B	D	R	R	510	51 pF
560	56 pF	Y	Z	T	Z	X	T	B	X	B	W	D	B	D	R	R	560	56 pF
680	68 pF		Z	Z	Z	X	T	W	X	B	W	B	W	D	L	R	680	68 pF
820	82 pF		Y	Z	Y	T	Z	W	T	B	X	B	X	B	D	R	820	82 pF
101	100 pF		Y	Z	Y	T	Z	X	T	W	X	B	X	B	D	L	101	100 pF
121	120 pF			Y	Y	T	Z	T	T	W	T	W	X	B	D	D	121	120 pF
151	150 pF			Y		Z	Y	T	Z	X	T	W	X	B	B	D	151	150 pF
181	180 pF			Y		Z	Y	T	Z	T	T	W	T	W	B	D	181	180 pF
201	200 pF					Z	Y	Z	Z	T	Z	X	T	W	B	B	201	200 pF
221	220 pF					Y	Y	Z	Z	T	Z	X	T	W	B	B	221	220 pF
271	270 pF					Y		Z	Y	T	Z	T	Z	X	W	B	271	270 pF
331	330 pF					Y		Y	Y	Z	Z	T	Z	X	W	W	331	330 pF
391	390 pF							Y		Z	Y	T	Z	T	X	W	391	390 pF
471	470 pF							Y		Z	Y	Z	Y	T	X	W	471	470 pF
561	560 pF							Y		Y		Z	Y	T	T	X	561	560 pF
681	680 pF									Y		Z	Y	Z	T	X	681	680 pF
821	820 pF											Y		Z	T	X	821	820 pF
102	1000 pF											Y		Z	T	T	102	1000 pF
122	1200 pF													Y	Z	T	122	1200 pF
152	1500 pF													Y	Y	Z	152	1500 pF
182	1800 pF														Y	Z	182	1800 pF
202	2000 pF														Y	Z	202	2000 pF
252	2500 pF														Y	Y	252	2500 pF
402	4000 pF															Y	402	4000 pF

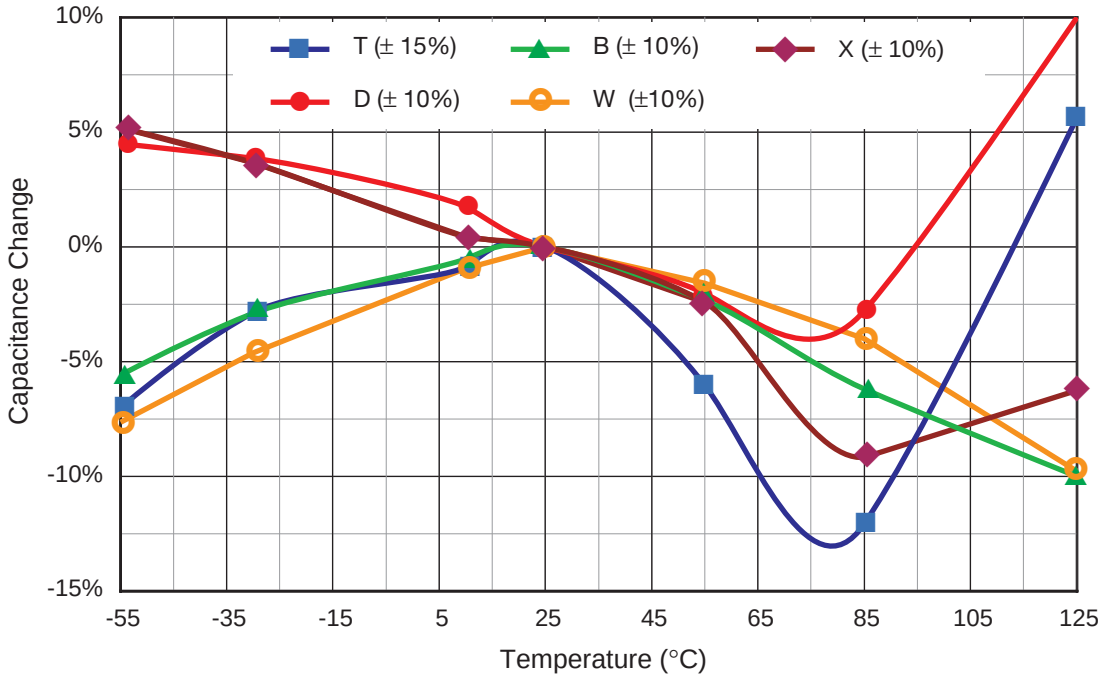
Color breaks used to highlight changes in dielectric material, letters indicate the specific material

How to Order U, V, & B Series

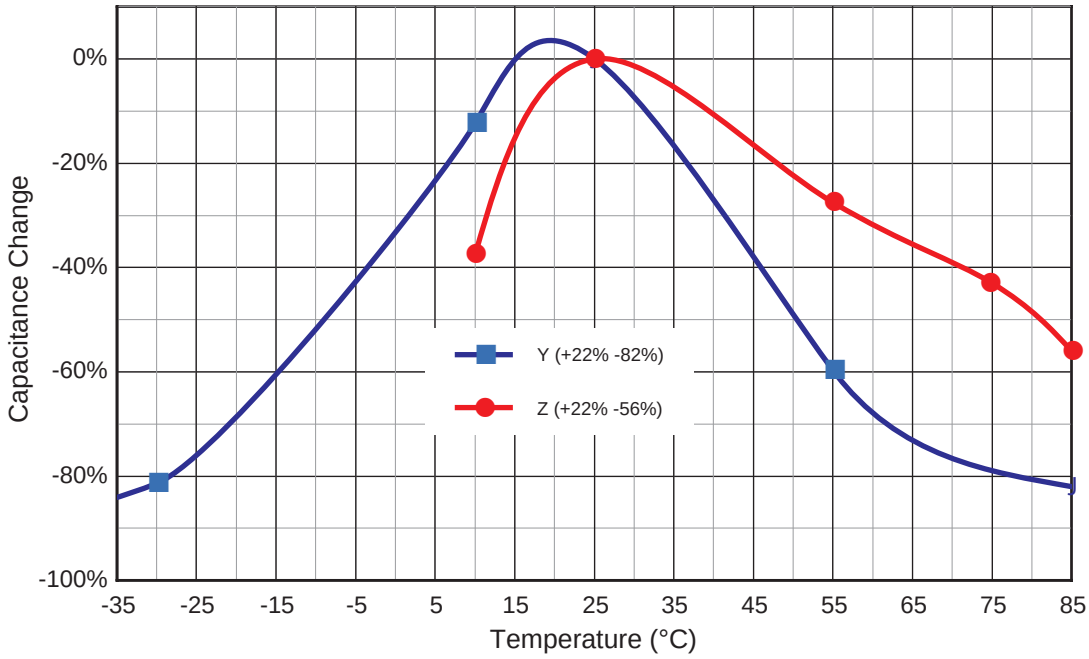


NOTE: The "U" series thick-film terminated SLC's are fully supported and orders may be placed using legacy part numbers. These parts are identified by alpha case size code and contain termination codes "G" or "9" i.e. 500UDDB200JG4W.


40%
30%
20%
10%
0%
-10%
-20%
-30%
-40%
Capacitance Change
L (-3300±500ppm)
U (-750±100ppm)
R (-2200±500ppm)
C, K, N (0ppm)
V (-1500±300ppm)
-55
-35
-15
5
25
45
65
85
105
125
Temperature (°C)


10%
5%
0%
-5%
-10%
-15%
Capacitance Change
T (± 15%)
B (± 10%)
X (± 10%)
D (± 10%)
W (±10%)
-55
-35
-15
5
25
45
65
85
105
125
Temperature (°C)

SLC Temperature Characteristics



Metallization Characteristics for GBBL / SLC

METALLIZATION TYPE	TiW/Au (Titanium-Tungsten/Gold)	TiW/Ni/Au (Titanium-Tungsten/Nickel/Gold)
TERMINATION CODE	T	N
ATTACHMENT COMPATIBILITY	Wire / Ribbon Bonding Silver or Gold Conductive Epoxy Au/Ge or Au/Si Eutectic Preform Excellent High Temperature Resistance (400°C) Unsuitable for Pb/Sn or Au/Sn Soldering	Pb/Sn or Au/Sn Soldering Au/Sn Eutectic Preform Moderate High Temp. Resistance (325°C) Long term high temperature may cause Ni diffusion and wire bond problems on Au/Ge

SLC thick-film terminations (legacy codes "G" and "9") are still supported. Contact the factory for compatibility information.

Environmental Characteristics for GBBL / SLC

BOND STRENGTH:	Exceeds MIL-S-883, Meth. 2011	VIBRATION:	MIL-S-202, Meth. 204-G, (30g, 10-2000 Hz)
SHEAR STRENGTH:	Exceeds MIL-S-883, Meth. 2019	BURN-IN/LIFE TEST:	MIL-S-202, Meth. 108, A/F
SOLDER HEAT RESISTANCE:	MIL-S-202, Meth. 210-C, (260±5°C, 5 sec.)	LOW VOLTAGE HUMIDITY:	Mil-C-49464, Para. 3.17
SOLDERABILITY:	MIL-S-202, Meth. 208, (245±5°C, 5 sec.)	BAROMETRIC PRESSURE:	MIL-S-202, Meth. 105, B
SHOCK:	MIL-S-202, Meth. 213-I, (100g, 6 msec.)	IMMERSION/SALT SPRAY:	MIL-S-202, Meth. 104, B
THERMAL SHOCK:	MIL-S-202, Meth. 107, A, (-55 to +125°C)	MOISTURE RESISTANCE:	MIL-S-202, Meth. 106