



SINGLE LAYER CAPACITORS

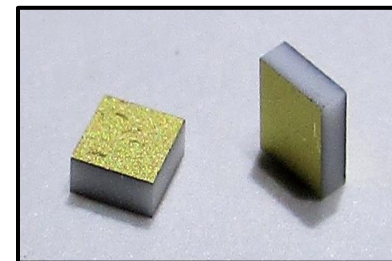
- **Edge to Edge**
- **Border Cap**
- **Twin Cap**
- **Arrays**



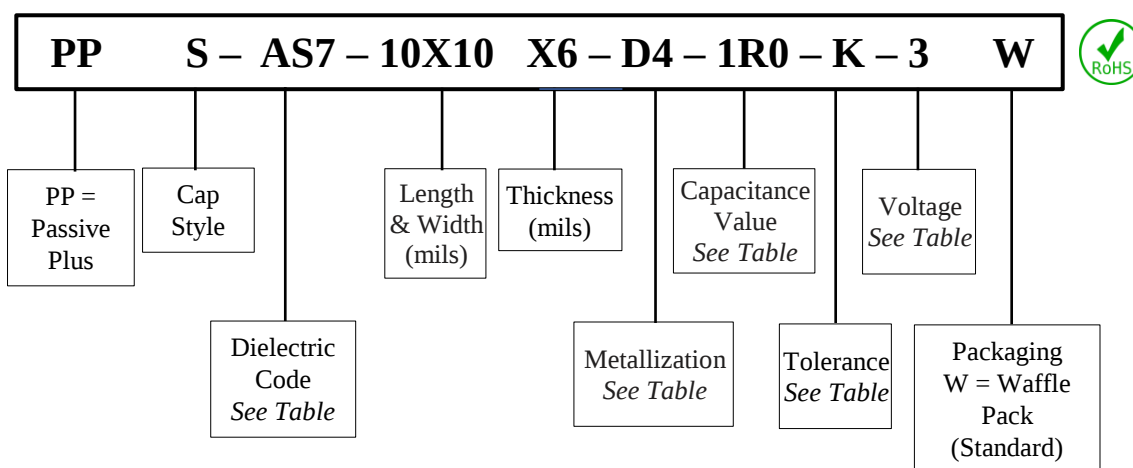
≠ Product Features

PPI offers Standard Edge to Edge SLC with tight tolerances to the required size, shape and value. Thicknesses of up to 25+ mils are available utilizing temperature-stable low-loss materials and special terminations to improve the all solder process. Chip size, shape and electrical properties may be determined from the dielectric material.

- Capacitance: 0.04 to 10,000pF
- Square or rectangle, length or width .005" and up



≠ Part Numbering



≠ Substrates

Substrates can be supplied as follows:

- **Bare**
- **Metallized:**
 - Gold over Platinum, Palladium, or Nickel
 - Silver over Platinum
 - Custom schemes and patterns to Customer specifications

Thickness Range 3 mils +

Length and Width Up to 4" depending on material

≠ Standard Electrode Metallizations

Gold (D4) This metallization consists of a minimum of 70 micro-inches of Gold over Platinum or Nickel which is ideal for all wirebonding methodologies.

Silver (S7) This metallization consists of 20 micro-inches of Silver over Platinum which is ideal for all solder applications whenever the use of Gold is unacceptable.

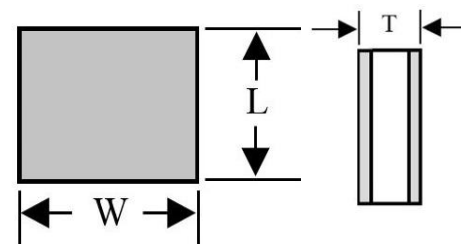
**≠ Metallization Codes**

Code	Description
D4	Ti/Pt/Au Titanium/Platinum/Gold (70 μ in Gold)
S7	Ti/Pt/Ag Titanium/Platinum/Silver (20 μ in Silver)
K2	Ta/Pd/Au Tantalum/Palladium/Gold (75 μ in Gold)
L3	Ta/Pd/Au Tantalum/Palladium/Gold (100 μ in Gold)

Contact PPI for available metallizations.

≠ Capacitance Codes

Value	Code
<10pF	1R0 = 1.0pF
>10pF	101 = 100pF

**≠ Capacitance Tolerance & Dimensional Tolerances Codes**

Class I Dielectrics: AS1 - KS2			
Tolerance	Code	Tolerance	Code
$\pm .50$ pF	D	$\pm 20\%$	M
$\pm .25$ pF	C	$\pm 15\%$	L
$\pm .10$ pF	B	$\pm 10\%$	K
$\pm .05$ pF	A	$\pm 5\%$	J
$\pm .01$ pF	P	$\pm 3\%$	H
		$\pm 2\%$	G

Class II Dielectrics: MS1 - ZS4			
Tolerance	Code	Tolerance	Code
-10% thru +40%	Y	$\pm 20\%$	M
-20% thru +80%	Z	$\pm 15\%$	L
0% thru +100%	V	$\pm 10\%$	K
Guaranteed Min. Value	GMV	$\pm 5\%$	J

Material	L or W Dimension	Tolerance
AS1 - ZS1	< 20 mils	$\pm 15\%$
	≥ 20 mils	$\pm 10\%$

Material	L or W Dimension	Tolerance
ZS4 - ZS6	≤ 15 mils	± 2 mils
	> 15 mils; ≤ 30 mils	± 3 mils
	> 30 mils	± 5 mils

≠ Rated Voltage Codes

Code	Voltage	Dielectric Thickness
2	50V	4 mils
3	100V	6 mils

≠ Packaging

PPI SLCs are available in Waffle Packs (Standard).
Other packaging options may be available.
Please contact PPI.

**≠ Dielectric Materials – Class I**

Dielectrics below consist of material exhibiting very low losses, extremely low or closely controlled temperature coefficients, negligible voltage and frequency coefficients, negligible aging effects and high insulation and dielectric breakdown.

Type	IR Min @ 25°C	Temperature Coefficient (-25 to 125°C)	Dissipation Factor (@ 10GHz)	Dielectric Constant (K)	Material
AS1	10 ¹²	Negligible	0.0001	3.8	Quartz
AS2	10 ¹²	Negligible	0.0001	3.9	Si
AS3	10 ¹²	Negligible	0.0001	6.6	BeO
AS6	10 ¹²	P120 ± 25ppm	0.0001	8.7	AlN
AS7	10 ¹²	P180 ± 50ppm	0.0006	9.6	Alumina 96
AS8	10 ¹²	P180 ± 50ppm	0.0006	9.8	Alumina 99.6
BS2	10 ¹²	NP0 ± 30ppm	0.0001	12.6	Titanate
CS1	10 ¹²	0 ± 30ppm	0.001	20	Titanate
ES1	10 ¹²	0 ± 30ppm	0.002	40	Titanate
FS1	10 ¹²	0 ± 30ppm	0.005	50	Titanate
IS1	10 ¹⁵	0 ± 30ppm	0.005	84	Titanate
KS3	10 ⁶	N1500 ± 500ppm	0.0025	160	Titanate

**⚡ Dielectric Materials – Class II**

Dielectrics below are characterized by high dielectric constants, increased losses and higher temperature coefficients. These properties are inherent with this class of material, but the high dielectric constants permit the use of smaller size to achieve low series inductance and meet dimensional requirements. Capacitors made with these materials are often used for coupling of microstrip line circuits where a small chip is necessary. Used as a bypass capacitor, the small size provides low series inductance and dielectric losses are typically of little concern.

Type	IR (MEG-OHMs) 100VDC @ 25°C	Temperature Coefficient (-55 to 125°C)	Dissipation Factor (@ 1 MHz)	Aging (%) HR/Decade	Dielectric Constant (K)
MS1	10 ⁵	5 to -10	0.010	2.0	300
PS1	10 ⁴	± 10%	0.025	3.0	700
SS3	10 ⁵	3 to -10	0.015	3.5	2,200
US1	10 ⁵	0 to -35	0.020	3.0	4,000
US3	10 ⁵	3.0	0.025	3.0	5,000
RS2	10 ⁴	± 10%	0.025	3.0	1250
ZS1	10 ⁵	0 to -80	0.025	3.0	11,000
ZS4	Contact PPI	15 to -15	0.035	3.0	25,000
ZS6	Contact PPI	15 to -15	0.035	3.0	35,000
US3	10 ⁵	± 15%	0.030	3.0	4500



Single Layer Capacitors

Standard Edge to Edge

⚡ Capacitance, Case Size & Dielectric Availability - Class I Dielectrics

Cap (pF)	Size mils (mm)																	
	10x10		12x12		15x15		20x20		25x25		30x30		35x35		40x40		50x50	
	(.254 x .254)		(.305 x .305)		(.381 x .381)		(.508 x .508)		(.635 x .635)		(.762 x .762)		(.889 x .889)		(1.016 x 1.016)		(1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
0.04	AS7	5	AS7	6	AS7	10												
0.06	AS7	4	AS7	5	AS7	8	AS2	5	AS2	10								
0.08	ES1	10	AS7	4	AS7	6	AS7	10	AS2	7	AS2	9						
0.1	ES1	8	ES1	11	AS7	5	AS7	9	AS2	5	AS2	7	AS2	10				
0.2	ES1	5	ES1	7	ES1	10	AS7	4	AS7	7	AS7	10	AS2	5	AS2	7	AS2	10
0.3	IS1	6	ES1	4	ES1	6	ES1	11	AS7	4	AS7	7	AS7	9	AS2	5	AS2	7
0.4	IS1	5	IS1	7	ES1	5	ES1	9	ES1	15	AS7	5	AS7	7	AS7	9	AS2	5
0.5	IS1	4	IS1	5	ES1	4	ES1	7	ES1	11	AS7	5	AS7	5	AS7	7	AS2	4
0.6	KS2	6	IS1	5	IS1	7	ES1	6	ES1	10	ES1	15	AS7	4	AS7	6	AS7	9
0.8	MS1	8	KS2	6	IS1	5	ES1	5	ES1	7	ES1	10	ES1	15	AS7	4	AS7	7
1.0	MS1	7	KS2	5	IS1	4	IS1	7	ES1	6	ES1	8	ES1	10	AS7	4	AS7	5
1.2	MS1	6	KS2	4	IS1	4	IS1	6	ES1	5	ES1	7	ES1	9	AS7	3	AS7	5
1.5	MS1	5	MS1	7	KS2	5	IS1	5	ES1	4	ES1	6	ES1	7	ES1	10	AS7	4
1.8	MS1	4	MS1	5	KS2	4	IS1	4	IS1	6	ES1	5	ES1	6	ES1	8	ES1	11
2.0	MS1	4	MS1	5	KS2	4	KS2	7	IS1	6	ES1	4	ES1	5	ES1	7	ES1	11
2.2	RS1	4	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7	ES1	5	ES1	7	ES1	10
2.7	RS1	8	MS1	4	MS1	6	KS2	5	IS1	4	IS1	6	ES1	4	ES1	5	ES1	8
3.3	RS1	7	RS1	10	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7	ES1	4	ES1	7
3.9	RS1	6	RS1	9	MS1	4	MS1	7	KS2	5	IS1	4	IS1	6	IS1	8	ES1	6
4.7	RS1	5	RS1	7	RS1	11	MS1	6	KS2	4	KS2	6	IS1	5	IS1	6	ES1	5
5.6	RS1	4	RS1	6	RS1	10	MS1	5	MS1	7	KS2	5	IS1	4	IS1	5	ES1	4
6.8	RS1	4	RS1	5	RS1	8	MS1	4	MS1	6	KS2	5	KS2	6	IS1	4	IS1	7
8.2	SS3	6	RS1	4	RS1	7	MS1	4	MS1	5	KS2	4	KS2	5	KS2	7	KS2	10
10	SS3	5	RS1	4	RS1	5	RS1	9	MS1	4	MS1	6	KS2	4	KS2	5	KS2	8
12	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	5	MS1	7	KS2	4	KS2	7
15	US1	6	SS3	5	RS1	4	RS1	6	RS1	10	MS1	4	MS1	6	MS1	7	KS2	6
18	US1	5	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	4	MS1	6	KS2	5
20	US1	5	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	4	MS1	5	KS2	4
22	US1	4	US1	6	SS3	5	RS1	4	RS1	7	RS1	9	MS1	4	MS1	5	KS2	4

Shaded cells indicate Class II Dielectrics



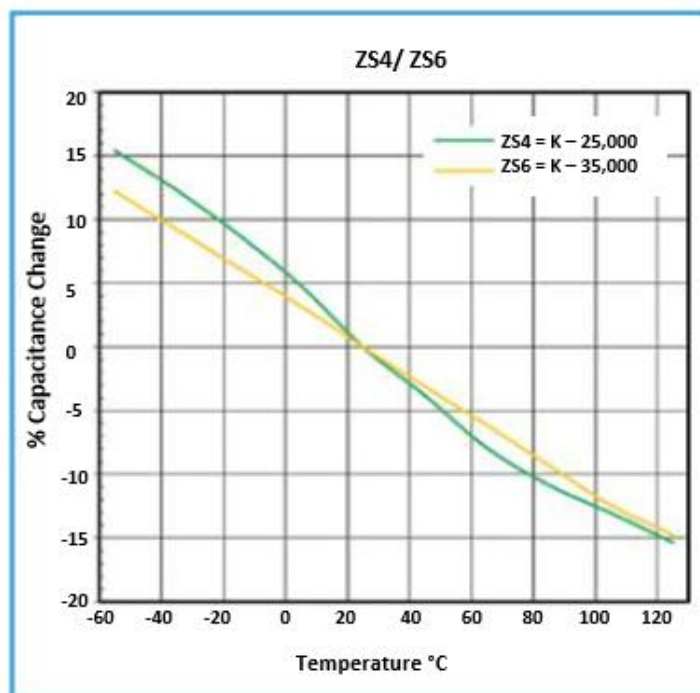
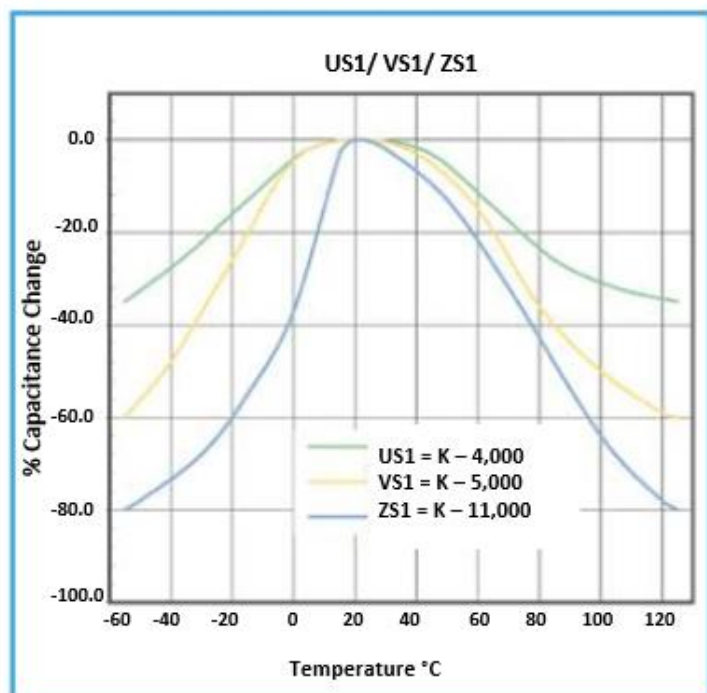
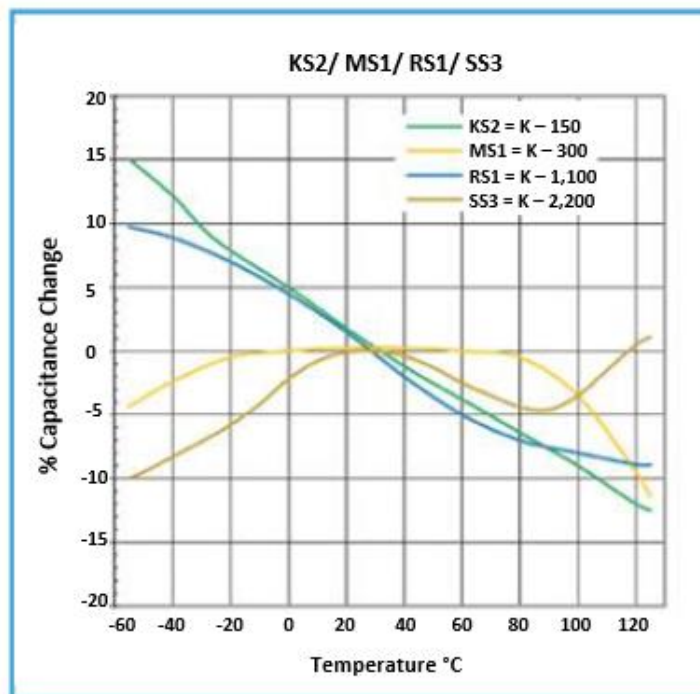
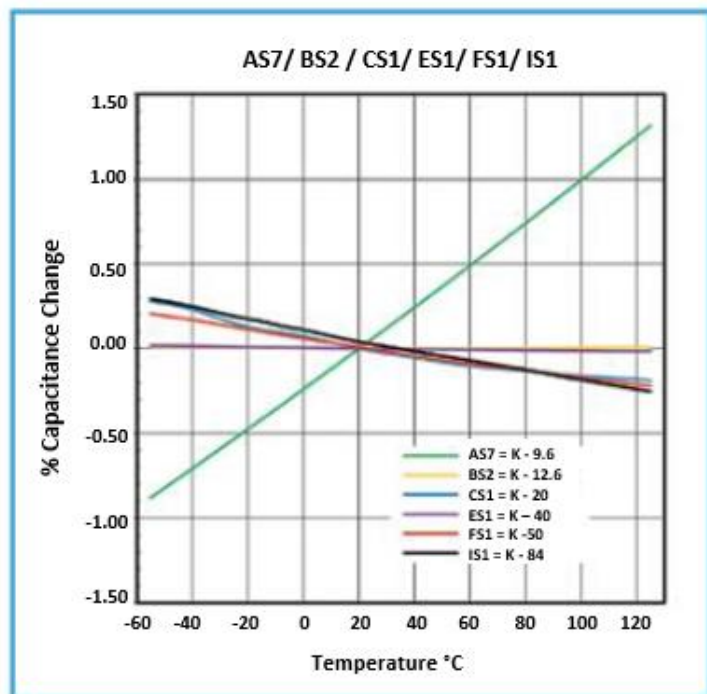
Single Layer Capacitors

Standard Edge to Edge

± Capacitance, Case Size & Dielectric Availability – Class II Dielectrics

Cap (pF)	Size mils (mm)																	
	10x10		12x12		15x15		20x20		25x25		30x30		35x35		40x40		50x50	
	(.254 x .254)		(.305 x .305)		(.381 x .381)		(.508 x .508)		(.635 x .635)		(.762 x .762)		(.889 x .889)		(1.016 x 1.016)		(1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
27	US1	4	US1	5	SS3	4	RS1	4	RS1	6	RS1	8	MS1	3	MS1	4	MS1	6
33	VS1	4	US1	4	US1	6	SS3	6	RS1	5	RS1	6	RS1	11	MS1	4	MS1	5
39	ZS1	6	US1	4	US1	5	SS3	5	RS1	4	RS1	5	RS1	7	RS1	10	MS1	4
47	ZS1	5	ZS1	7	US1	5	SS3	4	SS3	6	RS1	5	RS1	6	RS1	8	MS1	4
56	ZS1	4	ZS1	6	VS1	5	US1	7	SS3	5	RS1	4	RS1	5	RS1	7	RS1	10
68	ZS1	4	ZS1	5	VS1	4	US1	6	SS3	5	SS3	6	RS1	4	RS1	6	RS1	9
82	ZS4	7	ZS1	4	ZS1	7	VS1	6	SS3	4	SS3	5	SS3	7	SS3	10	RS1	7
100	ZS4	6	ZS4	8	ZS1	6	VS1	5	US1	6	SS3	5	SS3	6	SS3	8	RS1	6
120	ZS4	5	ZS4	7	ZS1	5	ZS1	8	VS1	6	SS3	4	SS3	5	SS3	7	RS1	5
150	ZS4	4	ZS4	5	ZS1	4	ZS1	7	VS1	5	VS1	7	SS3	4	SS3	5	RS1	4
180	ZS6	4	ZS4	5	ZS4	7	ZS1	6	VS1	4	VS1	6	VS1	8	US1	8	SS3	7
200	ZS6	4	ZS4	4	ZS4	6	ZS1	5	ZS1	8	VS1	5	VS1	7	US1	7	SS3	6
220	ZS6	4	ZS6	5	ZS4	6	ZS1	4	ZS1	7	VS1	5	VS1	6	US1	6	SS3	6
270			ZS6	4	ZS4	5	ZS4	8	ZS1	6	VS1	4	VS1	5	US1	5	SS3	5
330					ZS4	4	ZS4	7	ZS1	5	ZS1	7	VS1	4	US1	4	US1	7
390					ZS6	4	ZS4	6	ZS1	4	ZS1	6	ZS1	7	ZS1	10	US1	6
470					ZS6	4	ZS4	5	ZS4	7	ZS1	5	ZS1	6	ZS1	8	US1	5
560							ZS4	4	ZS4	6	ZS1	4	ZS1	5	ZS1	7	US1	4
680							ZS6	5	ZS4	5	ZS4	8	ZS1	5	ZS1	6	VS1	4
820							ZS6	4	ZS6	6	ZS4	6	ZS1	4	ZS1	5	ZS1	7
1000									ZS6	5	ZS4	5	ZS4	7	ZS1	4	ZS1	6
1200									ZS6	4	ZS4	4	ZS4	6	ZS4	7	ZS1	5
1500											ZS6	5	ZS4	5	ZS4	6	ZS1	4
1800											ZS6	4	ZS6	6	ZS4	5	ZS4	8
2200													ZS6	5	ZS4	4	ZS4	6
2700													ZS6	4	ZS6	5	ZS4	5
3300																	ZS6	6

Typical Temperature Characteristics

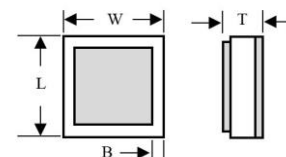




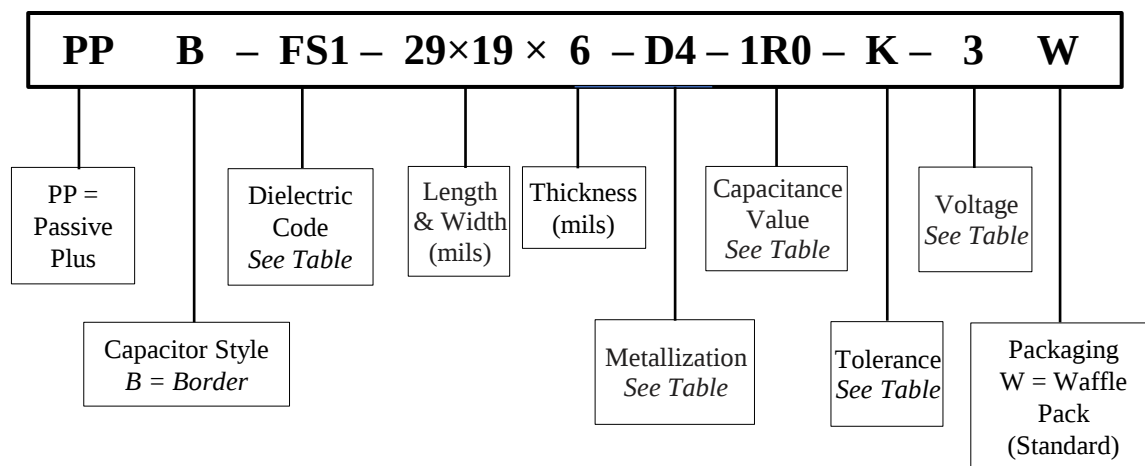
≠ Product Features

Border Caps have the topside electrode withdrawn from the edges in order to increase the distance between electrodes and dramatically decrease the possibilities of shorting when epoxy die-mounting. This style is also widely used for optical recognition-based assembly.

Increased margin sizes and special terminations are available for high power LC filter applications. Border Caps can be customized to any sized square or rectangle. Contact PPI for more information.



≠ Part Numbering



≠ Thicknesses (mils)

Length & Width	L or W Tolerance	Margin Nominal	Thickness
≤ .010	± .002	0.001	± .0015
.011 - .029	± .002	0.002	
≥ .030	± .003	0.002	
All dimensions given are inches			

≠ Metallization Codes

Code	Description
D4	Ti/Pt/Au
	Titanium/Platinum/Gold (70 μin Gold)
S7	Ti/Pt/Ag
	Titanium/Platinum/Silver (20 μin Silver)
K2	Ta/Pd/Au
	Tantalum/Palladium/Gold (75 μin Gold)
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	Tantalum/Palladium/Gold (100 μin Gold)

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≡ Capacitance Tolerance Codes

Class I Dielectrics: AS1 - KS2			
Tolerance	Code	Tolerance	Code
± .50pF	D	± 20%	M
± .25pF	C	± 15%	L
± .10pF	B	± 10%	K
± .05pF	A	± 5%	J
± .01pF	P	± 3%	H
		± 2%	G

Class II Dielectrics: MS1 – ZS6			
Tolerance	Code	Tolerance	Code
-10% thru +40%	Y	± 20%	M
-20% thru +80%	Z	± 15%	L
0% thru +100%	V	± 10%	K
Guaranteed Min. Value	GMV	± 5%	J

≡ Capacitance Codes

Value	Code
<10pF	1R0 = 1.0pF
>10pF	101 = 100pF

≡ Rated Voltage Codes

Code	Voltage	Dielectric Thickness
2	50V	4 mils
3	100V	6 mils

≡ Packaging

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≠ Dielectric Materials – Class I

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AS8	10 ¹²	P180 ± 50ppm	0.0006	9.8	Alumina 99.6
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CS1	10 ¹²	0 ± 30ppm	0.001	20	Titanate
ES1	10 ¹²	0 ± 30ppm	0.002	40	Titanate
FS1	10 ¹²	0 ± 30ppm	0.005	50	Titanate
IS1	10 ¹⁵	0 ± 30ppm	0.005	84	Titanate
KS3	10 ⁶	N1500 ± 500ppm	0.0025	160	Titanate



⚡ Dielectric Materials – Class II

Dielectrics below are characterized by high dielectric constants, increased losses and higher temperature coefficients. These properties are inherent with this class of material but the high dielectric constants permit the use of smaller size to achieve low series inductance and meet dimensional requirements. Capacitors made with these materials are often used for coupling of microstrip line circuits where a small chip is necessary. Used as a bypass capacitor, the small size provides low series inductance and dielectric losses are typically of little concern.

Type	IR (MEG-OHMs) 100VDC @ 25°C	Temperature Coefficient (-55 to 125°C)	Dissipation Factor (@ 1 MHz)	Aging (%) HR/Decade	Dielectric Constant (K)
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PS1	10 ⁴	± 10%	0.025	3.0	700
SS3	10 ⁵	3 to -10	0.015	3.5	2,200
US1	10 ⁵	0 to -35	0.020	3.0	4,000
US3	10 ⁵	3.0	0.025	3.0	5,000
RS2	10 ⁴	± 10%	0.025	3.0	1250
ZS1	10 ⁵	0 to -80	0.025	3.0	11,000
ZS4	Contact PPI	15 to -15	0.035	3.0	25,000
ZS6	Contact PPI	15 to -15	0.035	3.0	35,000
US3	10 ⁵	± 15%	0.030	3.0	4500



Single Layer Capacitors

Border Cap

⚡ Capacitance, Case Size & Dielectric Availability - Class I Dielectrics

Cap (pF)	Size mils (mm)																	
	10x10		12x12		15x15		20x20		25x25		30x30		35x35		40x40		50x50	
	(.254 x .254)		(.305 x .305)		(.381 x .381)		(.508 x .508)		(.635 x .635)		(.762 x .762)		(.889 x .889)		(1.016 x 1.016)		(1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
0.04	AS7	5	AS7	6	AS7	10												
0.06	AS7	4	AS7	5	AS7	8	AS2	5	AS2	10								
0.08	ES1	10	AS7	4	AS7	6	AS7	10	AS2	7	AS2	9						
0.1	ES1	8	ES1	11	AS7	5	AS7	9	AS2	5	AS2	7	AS2	10				
0.2	ES1	5	ES1	7	ES1	10	AS7	4	AS7	7	AS7	10	AS2	5	AS2	7	AS2	10
0.3	IS1	6	ES1	4	ES1	6	ES1	11	AS7	4	AS7	7	AS7	9	AS2	5	AS2	7
0.4	IS1	5	IS1	7	ES1	5	ES1	9	ES1	15	AS7	5	AS7	7	AS7	9	AS2	5
0.5	IS1	4	IS1	5	ES1	4	ES1	7	ES1	11	AS7	5	AS7	5	AS7	7	AS2	4
0.6	KS2	6	IS1	5	IS1	7	ES1	6	ES1	10	ES1	15	AS7	4	AS7	6	AS7	9
0.8	MS1	8	KS2	6	IS1	5	ES1	5	ES1	7	ES1	10	ES1	15	AS7	4	AS7	7
1.0	MS1	7	KS2	5	IS1	4	IS1	7	ES1	6	ES1	8	ES1	10	AS7	4	AS7	5
1.2	MS1	6	KS2	4	IS1	4	IS1	6	ES1	5	ES1	7	ES1	9	AS7	3	AS7	5
1.5	MS1	5	MS1	7	KS2	5	IS1	5	ES1	4	ES1	6	ES1	7	ES1	10	AS7	4
1.8	MS1	4	MS1	5	KS2	4	IS1	4	IS1	6	ES1	5	ES1	6	ES1	8	ES1	11
2.0	MS1	4	MS1	5	KS2	4	KS2	7	IS1	6	ES1	4	ES1	5	ES1	7	ES1	11
2.2	RS1	4	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7	ES1	5	ES1	7	ES1	10
2.7	RS1	8	MS1	4	MS1	6	KS2	5	IS1	4	IS1	6	ES1	4	ES1	5	ES1	8
3.3	RS1	7	RS1	10	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7	ES1	4	ES1	7
3.9	RS1	6	RS1	9	MS1	4	MS1	7	KS2	5	IS1	4	IS1	6	IS1	8	ES1	6
4.7	RS1	5	RS1	7	RS1	11	MS1	6	KS2	4	KS2	6	IS1	5	IS1	6	ES1	5
5.6	RS1	4	RS1	6	RS1	10	MS1	5	MS1	7	KS2	5	IS1	4	IS1	5	ES1	4
6.8	RS1	4	RS1	5	RS1	8	MS1	4	MS1	6	KS2	5	KS2	6	IS1	4	IS1	7
8.2	SS3	6	RS1	4	RS1	7	MS1	4	MS1	5	KS2	4	KS2	5	KS2	7	KS2	10
10	SS3	5	RS1	4	RS1	5	RS1	9	MS1	4	MS1	6	KS2	4	KS2	5	KS2	8
12	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	5	MS1	7	KS2	4	KS2	7
15	US1	6	SS3	5	RS1	4	RS1	6	RS1	10	MS1	4	MS1	6	MS1	7	KS2	6
18	US1	5	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	4	MS1	6	KS2	5
20	US1	5	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	4	MS1	5	KS2	4
22	US1	4	US1	6	SS3	5	RS1	4	RS1	7	RS1	9	MS1	4	MS1	5	KS2	4

Shaded cells indicate Class II Dielectrics



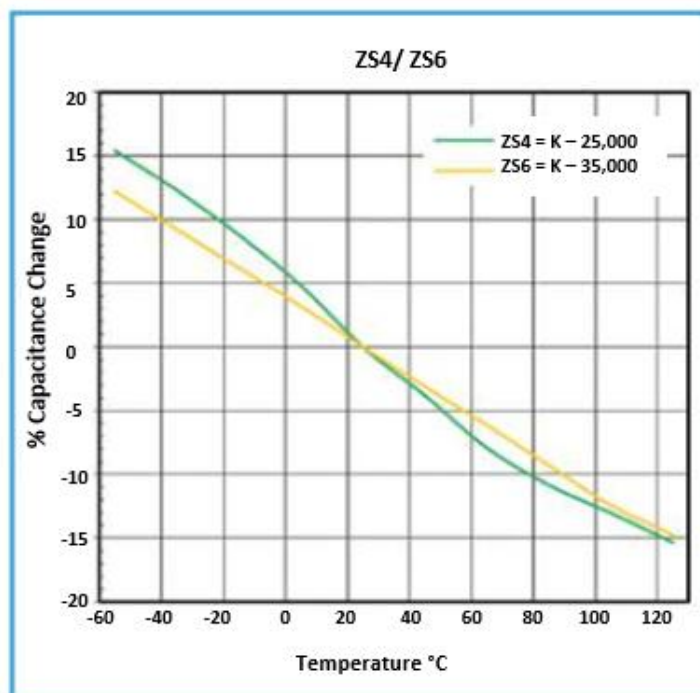
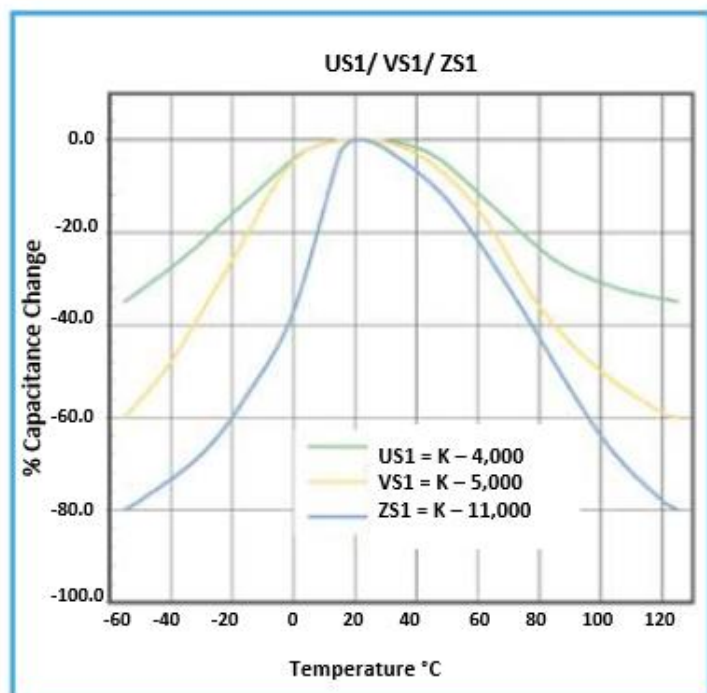
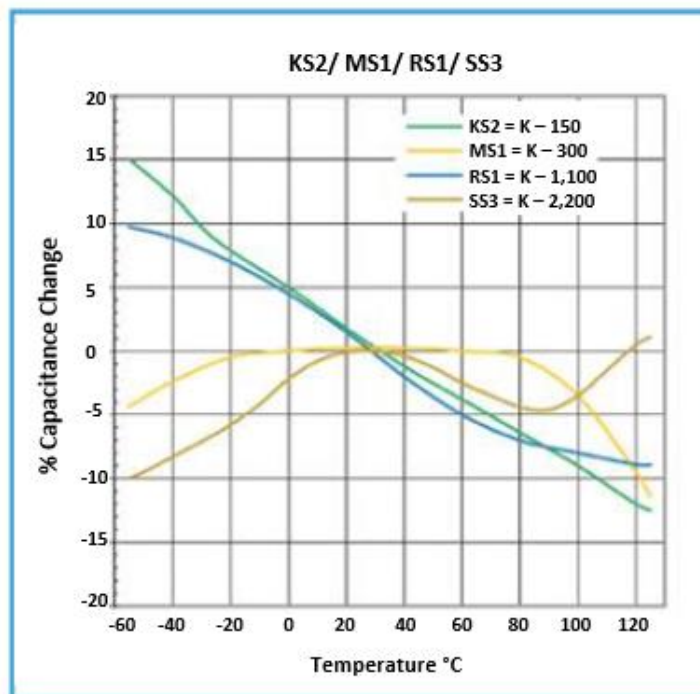
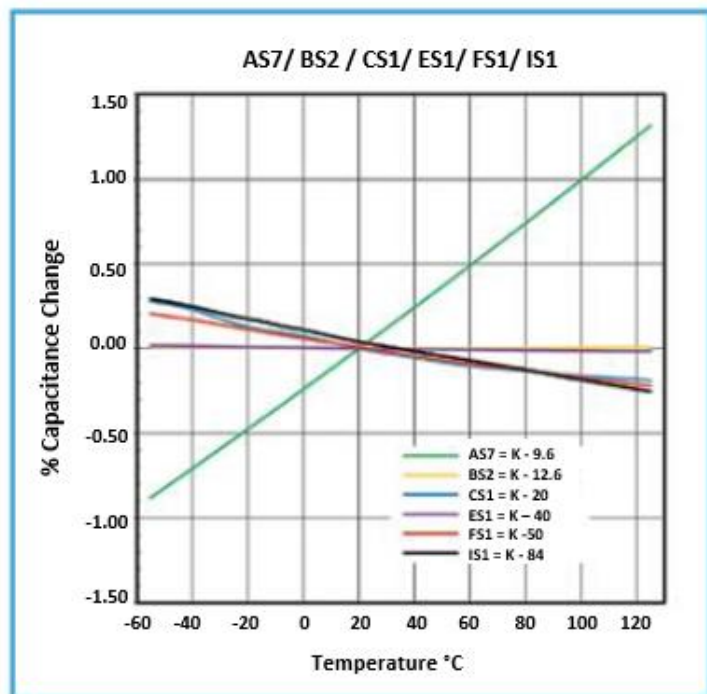
Single Layer Capacitors

Border Cap

≠ Capacitance, Case Size & Dielectric Availability – Class II Dielectrics

Cap (pF)	Size mils (mm)																	
	10x10		12x12		15x15		20x20		25x25		30x30		35x35		40x40		50x50	
	(.254 x .254)		(.305 x .305)		(.381 x .381)		(.508 x .508)		(.635 x .635)		(.762 x .762)		(.889 x .889)		(1.016 x 1.016)		(1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
27	US1	4	US1	5	SS3	4	RS1	4	RS1	6	RS1	8	MS1	3	MS1	4	MS1	6
33	VS1	4	US1	4	US1	6	SS3	6	RS1	5	RS1	6	RS1	11	MS1	4	MS1	5
39	ZS1	6	US1	4	US1	5	SS3	5	RS1	4	RS1	5	RS1	7	RS1	10	MS1	4
47	ZS1	5	ZS1	7	US1	5	SS3	4	SS3	6	RS1	5	RS1	6	RS1	8	MS1	4
56	ZS1	4	ZS1	6	VS1	5	US1	7	SS3	5	RS1	4	RS1	5	RS1	7	RS1	10
68	ZS1	4	ZS1	5	VS1	4	US1	6	SS3	5	SS3	6	RS1	4	RS1	6	RS1	9
82	ZS4	7	ZS1	4	ZS1	7	VS1	6	SS3	4	SS3	5	SS3	7	SS3	10	RS1	7
100	ZS4	6	ZS4	8	ZS1	6	VS1	5	US1	6	SS3	5	SS3	6	SS3	8	RS1	6
120	ZS4	5	ZS4	7	ZS1	5	ZS1	8	VS1	6	SS3	4	SS3	5	SS3	7	RS1	5
150	ZS4	4	ZS4	5	ZS1	4	ZS1	7	VS1	5	VS1	7	SS3	4	SS3	5	RS1	4
180	ZS6	4	ZS4	5	ZS4	7	ZS1	6	VS1	4	VS1	6	VS1	8	US1	8	SS3	7
200	ZS6	4	ZS4	4	ZS4	6	ZS1	5	ZS1	8	VS1	5	VS1	7	US1	7	SS3	6
220	ZS6	4	ZS6	5	ZS4	6	ZS1	4	ZS1	7	VS1	5	VS1	6	US1	6	SS3	6
270			ZS6	4	ZS4	5	ZS4	8	ZS1	6	VS1	4	VS1	5	US1	5	SS3	5
330					ZS4	4	ZS4	7	ZS1	5	ZS1	7	VS1	4	US1	4	US1	7
390					ZS6	4	ZS4	6	ZS1	4	ZS1	6	ZS1	7	ZS1	10	US1	6
470					ZS6	4	ZS4	5	ZS4	7	ZS1	5	ZS1	6	ZS1	8	US1	5
560							ZS4	4	ZS4	6	ZS1	4	ZS1	5	ZS1	7	US1	4
680							ZS6	5	ZS4	5	ZS4	8	ZS1	5	ZS1	6	VS1	4
820							ZS6	4	ZS6	6	ZS4	6	ZS1	4	ZS1	5	ZS1	7
1000									ZS6	5	ZS4	5	ZS4	7	ZS1	4	ZS1	6
1200									ZS6	4	ZS4	4	ZS4	6	ZS4	7	ZS1	5
1500											ZS6	5	ZS4	5	ZS4	6	ZS1	4
1800											ZS6	4	ZS6	6	ZS4	5	ZS4	8
2200													ZS6	5	ZS4	4	ZS4	6
2700													ZS6	4	ZS6	5	ZS4	5
3300																	ZS6	6

Typical Temperature Characteristics



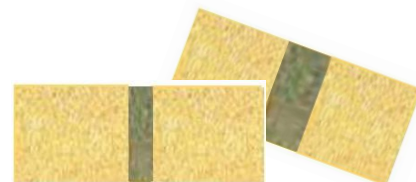


Single Layer Capacitors

Twin Cap

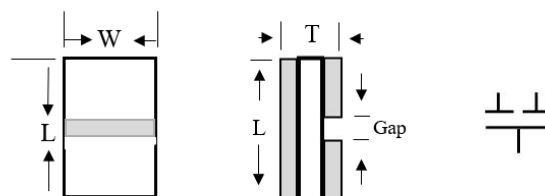
≠ Product Features

A single full electrode is provided on one side of the capacitor and split electrodes on the other side. This is a three-terminal capacitor which can be used as a two capacitor with a common electrode or as serially connected capacitors so that connections may be made on one side of the chip only (surface mount). This design is often used in microstrip coupling to eliminate lead inductance and raise the self resonant frequency.



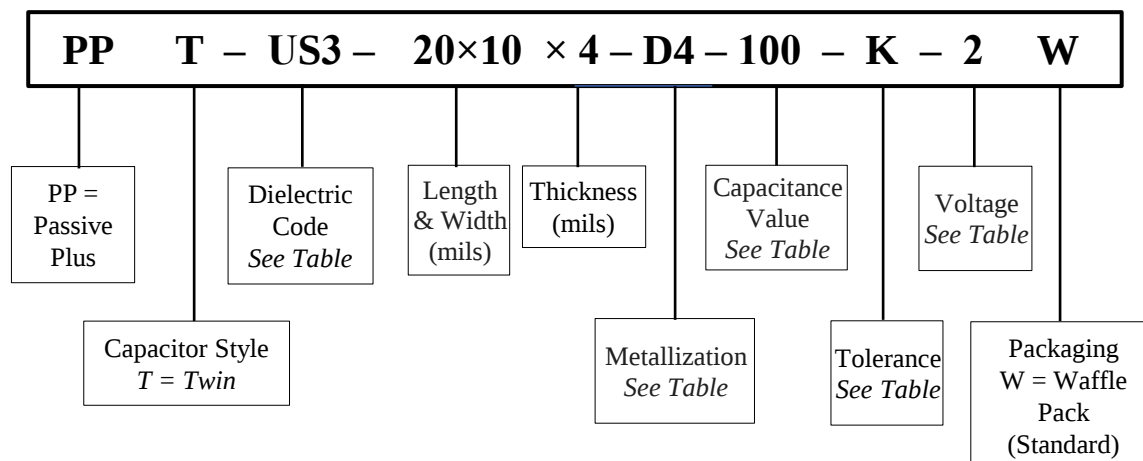
≠ Product Characteristics

Capacitance: 0.06 picofarads and up
 Chip shape: Twin pads with gap
 Gap widths: 5, 10, 15, 20 mil or custom



Standard dimensional tolerance for length and width is $\pm 15\%$ up to 20 mils. For dimensions greater than 20 mils, standard tolerance is $\pm 10\%$. In cases where dimension cannot be exceeded, insert "M" to signify a maximum dimension. The thickness tolerance is ± 1.5 mils.

≠ Part Numbering



**⚡ Substrates**

Substrates can be supplied as follows:

- **Bare**
- **Metallized:**
 - Gold over Platinum, Palladium, or Nickel
 - Silver over Platinum
 - Custom schemes and patterns to Customer specifications

Thickness Range	3 mils +
------------------------	----------

⚡ Standard Electrode Metallizations

Gold (D4) This metallization consists of a minimum of 70 micro-inches of Gold over Platinum or Nickel which is ideal for all wirebonding methodologies.

Silver (S7) This metallization consists of 20 micro-inches of Silver over Platinum which is ideal for all solder applications whenever the use of Gold is unacceptable.

⚡ Capacitance Tolerance Codes

Class I Dielectrics: AS1 - KS2	
Tolerance	Code
± 20%	M
± 15%	L
± 10%	K
± 5%	J

Class II Dielectrics: MS1 – ZS6			
Tolerance	Code	Tolerance	Code
-10% thru +40%	Y	± 20%	M
-20% thru +80%	Z	± 15%	L
0% thru +100%	V	± 10%	K
Guaranteed Min. Value	GMV		

⚡ Metallization Codes

Code	Description
D4	Ti/Pt/Au Titanium/Platinum/Gold (70 μ in Gold)
S7	Ti/Pt/Ag Titanium/Platinum/Silver (20 μ in Silver)
K2	Ta/Pd/Au Tantalum/Palladium/Gold (75 μ in Gold)
L3	Ta/Pd/Au Tantalum/Palladium/Gold (100 μ in Gold)

Contact PPI for available metallizations.

⚡ Capacitance Codes

Value	Code
<10pF	1R0 = 1.0pF
>10pF	101 = 100pF

⚡ Rated Voltage Codes

Code	Voltage	Dielectric Thickness
2	50V	4 mils
3	100V	6 mils

⚡ Packaging

PPI SLCs are available in Waffle Packs (Standard). Other packaging options may be available. Please contact PPI.

Twin Caps are available in a wide range of size configurations, dielectric and termination materials to fit your application. Please contact PPI for designs not listed in this catalog.

≠ Dielectric Materials – Class I

Dielectrics below consist of material exhibiting very low losses, extremely low or closely controlled temperature coefficients, negligible voltage and frequency coefficients, negligible aging effects and high insulation and dielectric breakdown.

Type	IR Min @ 25°C	Temperature Coefficient (-25 to 125°C)	Dissipation Factor (@ 10GHz)	Dielectric Constant (K)	Material
AS1	10 ¹²	Negligible	0.0001	3.8	Quartz
AS2	10 ¹²	Negligible	0.0001	3.9	Si
AS3	10 ¹²	Negligible	0.0001	6.6	BeO
AS6	10 ¹²	P120 ± 25ppm	0.0001	8.7	AlN
AS7	10 ¹²	P180 ± 50ppm	0.0006	9.6	Alumina 96
AS8	10 ¹²	P180 ± 50ppm	0.0006	9.8	Alumina 99.6
BS2	10 ¹²	NP0 ± 30ppm	0.0001	12.6	Titanate
CS1	10 ¹²	0 ± 30ppm	0.001	20	Titanate
ES1	10 ¹²	0 ± 30ppm	0.002	40	Titanate
FS1	10 ¹²	0 ± 30ppm	0.005	50	Titanate
IS1	10 ¹⁵	0 ± 30ppm	0.005	84	Titanate
KS3	10 ⁶	N1500 ± 500ppm	0.0025	160	Titanate



⚡ Dielectric Materials – Class II

Dielectrics below are characterized by high dielectric constants, increased losses and higher temperature coefficients. These properties are inherent with this class of material but the high dielectric constants permit the use of smaller size to achieve low series inductance and meet dimensional requirements. Capacitors made with these materials are often used for coupling of microstrip line circuits where a small chip is necessary. Used as a bypass capacitor, the small size provides low series inductance and dielectric losses are typically of little concern.

Type	IR (MEG-OHMs) 100VDC @ 25°C	Temperature Coefficient (-55 to 125°C)	Dissipation Factor (@ 1 MHz)	Aging (%) HR/Decade	Dielectric Constant (K)
MS1	10 ⁵	5 to -10	0.010	2.0	300
PS1	10 ⁴	± 10%	0.025	3.0	700
SS3	10 ⁵	3 to -10	0.015	3.5	2,200
US1	10 ⁵	0 to -35	0.020	3.0	4,000
US3	10 ⁵	3.0	0.025	3.0	5,000
RS2	10 ⁴	± 10%	0.025	3.0	1250
ZS1	10 ⁵	0 to -80	0.025	3.0	11,000
ZS4	Contact PPI	15 to -15	0.035	3.0	25,000
ZS6	Contact PPI	15 to -15	0.035	3.0	35,000
US3	10 ⁵	± 15%	0.030	3.0	4500



Single Layer Capacitors

Twin Cap

⚡ Capacitance, Case Size & Dielectric Availability

Capacitance (pF)	Case Size							
	Mils (mm)							
	20x10 (.508 x .254)		40x20 (1.016 x .508)		60x30 (1.524 x .762)		80x40 (2.032 x 1.016)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
Class I Dielectrics								
0.06	ES1	6	AS7	6	AS1	6	AS1	8
0.08	ES1	4	AS7	4	AS1	4	AS1	7
0.1	IS1	7	ES1	15	AS7	8	AS1	5
0.2	KS3	6	ES1	7	AS7	4	AS7	7
0.3	MS1	8	ES1	5	ES1	10	AS7	4
0.4	MS1	6	IS1	7	ES1	8	ES1	15
0.5	MS1	5	IS1	6	ES1	7	ES1	10
0.6	MS1	4	IS1	5	ES1	6	ES1	9
0.8	PS1	11	KS3	6	IS1	4	ES1	7
1	PS1	9	KS3	5	IS1	7	ES1	6
1.2	PS1	7	KS3	4	IS1	6	ES1	5
1.5	PS1	6	MS1	7	IS1	5	IS1	8
1.8	PS1	5	MS1	6	IS1	4	IS1	6
2	PS1	4	MS1	5	IS1	4	IS1	6
2.2	PS1	4	MS1	5	KS3	6	IS1	5
2.7	SS3	7	MS1	4	KS3	5	IS1	4
3.3	SS3	6	PS1	11	KS3	4	KS3	6
3.9	SS3	5	PS1	9	MS1	7	KS3	5
4.7	SS3	4	PS1	8	MS1	5	KS3	4
5.6	US1	6	PS1	6	MS1	5	MS1	7
6.8	US1	5	PS1	5	MS1	4	MS1	6
8.2	US3	5	PS1	4	PS1	11	MS1	5
10	US3	4	SS3	7	PS1	9	MS1	4
12	ZS1	8	SS3	6	PS1	7	PS1	11

Capacitance, Case Size & Dielectric Availability chart continues on the next page.



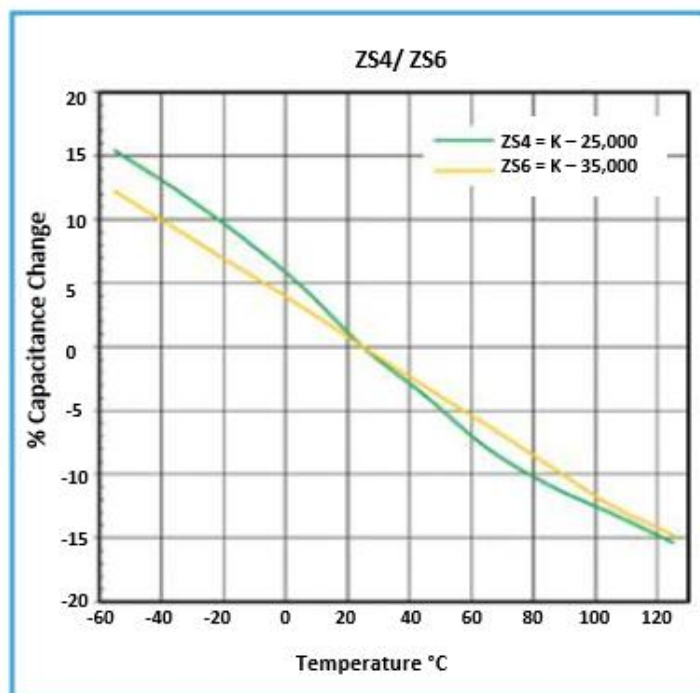
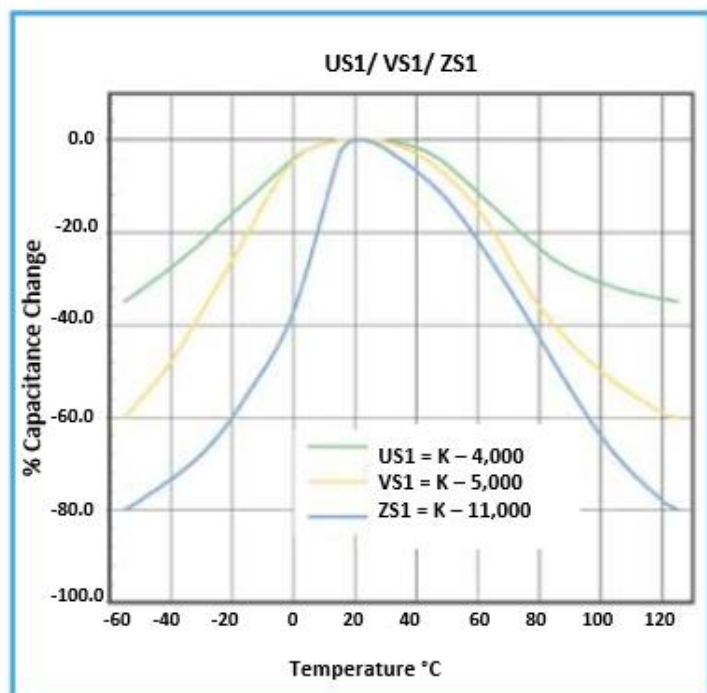
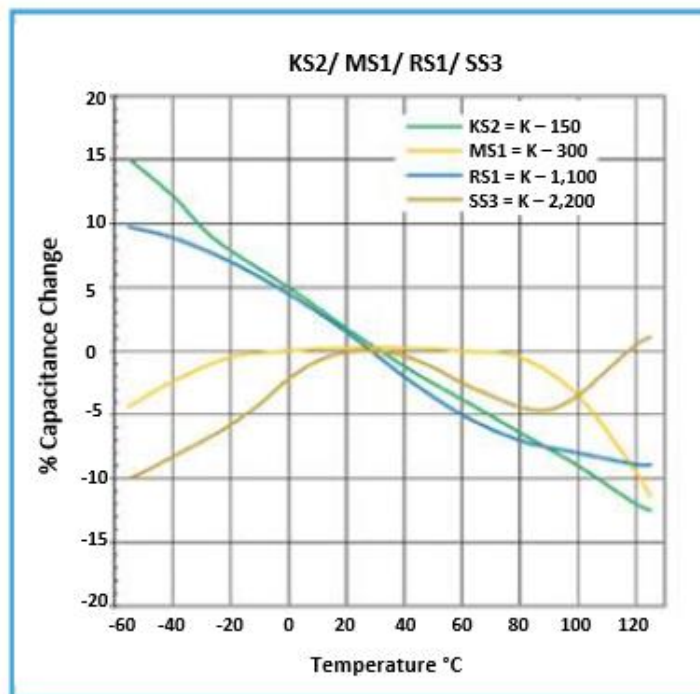
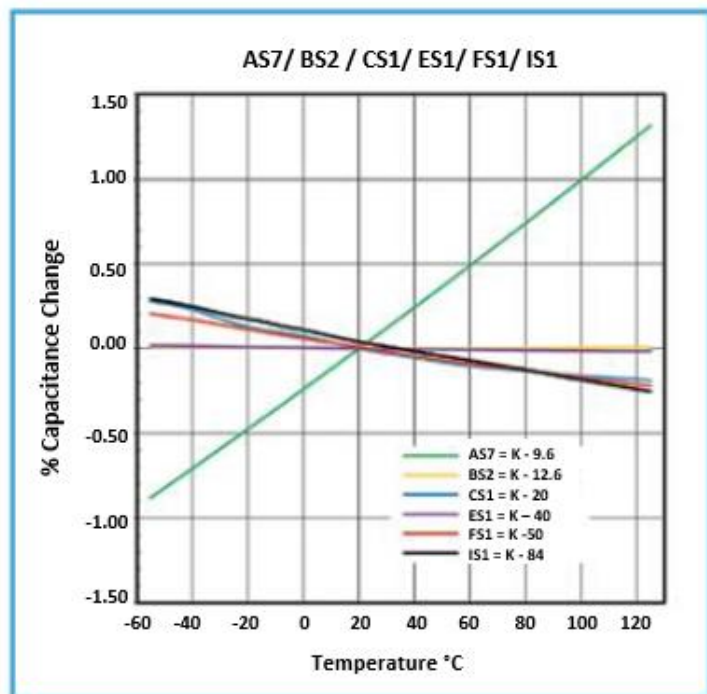
Single Layer Capacitors

Twin Cap

⚡ Capacitance, Case Size & Dielectric Availability - continued

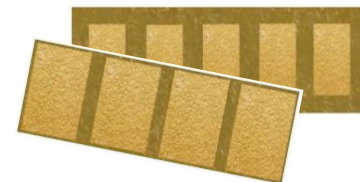
15	ZS1	6	SS3	5	PS1	6	PS1	9
18	ZS1	5	SS3	4	PS1	5	PS1	8
20	ZS1	5	US1	7	PS1	4	PS1	7
22	ZS1	4	US1	6	PS1	4	PS1	6
27	ZS4	8	US1	5	SS3	7	PS1	5
33	ZS4	6	US3	5	SS3	6	SS3	9
39	ZS4	5	US3	4	SS3	5	SS3	8
47	US3	6	ZS1	8	SS3	4	SS3	6
56	US3	5	ZS1	7	US1	6	SS3	5
68	US3	4	ZS1	5	US1	5	US1	8
82			ZS1	4	US3	5	US3	8
100			ZS4	8	US3	4	US3	7
120			ZS4	7	ZS1	8	US3	6
150			ZS4	5	ZS1	6	US3	5
180			ZS4	5	ZS1	5	ZS1	8
200			ZS6	6	ZS1	5	ZS1	7
220			ZS6	5	ZS4	9	ZS1	7
270			ZS6	4	ZS4	8	ZS1	6
330					ZS4	6	ZS1	5
390					ZS4	5	ZS4	9
470					ZS6	6	ZS4	7
560					ZS6	5	ZS4	6
680					ZS6	4	ZS4	5
820							ZS6	6
1000							ZS6	5
1200							ZS6	4
Class II Dielectrics								

Typical Temperature Characteristics



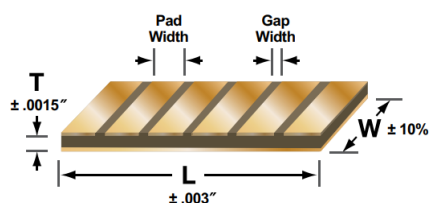
Product Features

Array Caps are used where arrays of capacitors are needed, usually for decoupling or bypass of GaAs integrated circuits. Standard arrays can contain up to 10 capacitors starting at 0.04pF. Typical overall dimensions range start at 20x10 mils. Array Caps can be fully customized to meet Customer's application requirements.

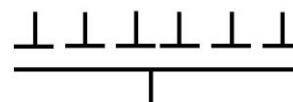


Array Caps are available with (B) or without borders (A) surrounding the edges to help prevent epoxy shorts and aid optical recognition systems.

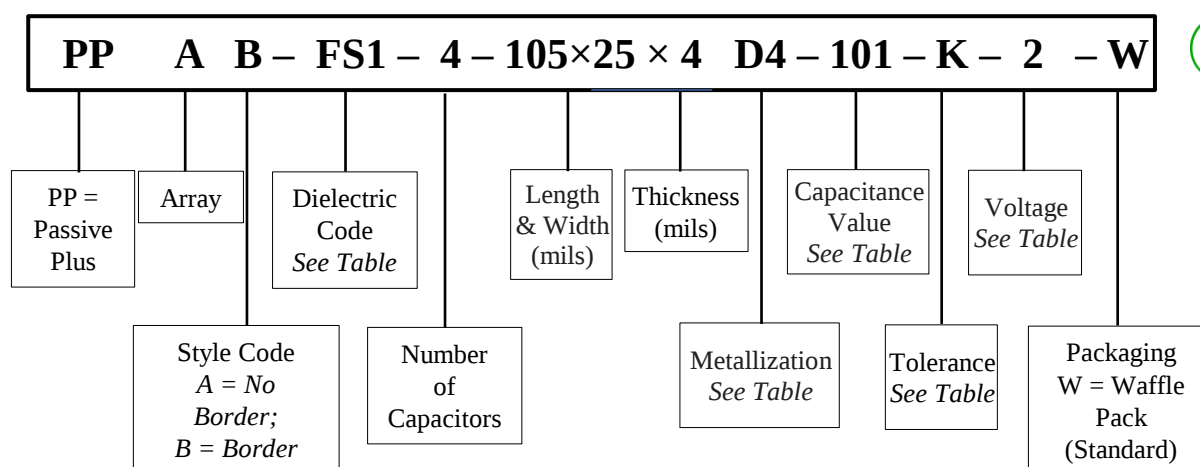
Dimensions and Electrode Configuration



Standard border is 2 mils and the gap is between 4 – 6 mils depending on the capacitance required.



Part Numbering



**≠ Substrates**

Substrates can be supplied as follows:

- **Bare**
- **Metallized:**
 - Gold over Platinum, Palladium, or Nickel
 - Silver over Platinum
 - Custom schemes and patterns to Customer specifications

Thickness Range	3 mils +
------------------------	----------

≠ Standard Electrode Metallizations

Gold (D4) This metallization consists of a minimum of 70 micro-inches of Gold over Platinum or Nickel which is ideal for all wirebonding methodologies.

Silver (S7) This metallization consists of 20 micro-inches of Silver over Platinum which is ideal for all solder applications whenever the use of Gold is unacceptable.

≠ Metallization Codes

Code	Description
D4	Ti/Pt/Au Titanium/Platinum/Gold (70 μ in Gold)
S7	Ti/Pt/Ag Titanium/Platinum/Silver (20 μ in Silver)
K2	Ta/Pd/Au Tantalum/Palladium/Gold (75 μ in Gold)
L3	Ta/Pd/Au Tantalum/Palladium/Gold (100 μ in Gold)

Contact PPI for available metallizations.

≠ Capacitance Tolerance Codes

Class I Dielectrics: AS1 - KS2	
Tolerance	Code
$\pm 20\%$	M
$\pm 15\%$	L
$\pm 10\%$	K

Class II Dielectrics: MS1 - ZS4			
Tolerance	Code	Tolerance	Code
-10% thru +40%	Y	$\pm 20\%$	M
-20% thru +80%	Z	$\pm 15\%$	L
0% thru +100%	V	$\pm 10\%$	K
Guaranteed Min. Value	GMV		

≠ Capacitance Codes

Value	Code
<10pF	1R0 = 1.0pF
>10pF	101 = 100pF

≠ Rated Voltage Codes

Code	Voltage	Dielectric Thickness
2	50V	4 mils
3	100V	6 mils

≠ Packaging

PPI SLCs are available in Waffle Packs (Standard).
Other packaging options may be available.
Please contact PPI.

≠ Dielectric Materials – Class I

Dielectrics below consist of material exhibiting very low losses, extremely low or closely controlled temperature coefficients, negligible voltage and frequency coefficients, negligible aging effects and high insulation and dielectric breakdown.

Type	IR Min @ 25°C	Temperature Coefficient (-25 to 125°C)	Dissipation Factor (@ 10GHz)	Dielectric Constant (K)	Material
AS1	10 ¹²	Negligible	0.0001	3.8	Quartz
AS2	10 ¹²	Negligible	0.0001	3.9	Si
AS3	10 ¹²	Negligible	0.0001	6.6	BeO
AS6	10 ¹²	P120 ± 25ppm	0.0001	8.7	AlN
AS7	10 ¹²	P180 ± 50ppm	0.0006	9.6	Alumina 96
AS8	10 ¹²	P180 ± 50ppm	0.0006	9.8	Alumina 99.6
BS2	10 ¹²	NP0 ± 30ppm	0.0001	12.6	Titanate
CS1	10 ¹²	0 ± 30ppm	0.001	20	Titanate
ES1	10 ¹²	0 ± 30ppm	0.002	40	Titanate
FS1	10 ¹²	0 ± 30ppm	0.005	50	Titanate
IS1	10 ¹⁵	0 ± 30ppm	0.005	84	Titanate
KS3	10 ⁶	N1500 ± 500ppm	0.0025	160	Titanate



⚡ Dielectric Materials – Class II

Dielectrics below are characterized by high dielectric constants, increased losses and higher temperature coefficients. These properties are inherent with this class of material, but the high dielectric constants permit the use of smaller size to achieve low series inductance and meet dimensional requirements. Capacitors made with these materials are often used for coupling of microstrip line circuits where a small chip is necessary. Used as a bypass capacitor, the small size provides low series inductance and dielectric losses are typically of little concern.

Type	IR (MEG-OHMs) 100VDC @ 25°C	Temperature Coefficient (-55 to 125°C)	Dissipation Factor (@ 1 MHz)	Aging (%) HR/Decade	Dielectric Constant (K)
MS1	10 ⁵	5 to -10	0.010	2.0	300
PS1	10 ⁴	± 10%	0.025	3.0	700
SS3	10 ⁵	3 to -10	0.015	3.5	2,200
US1	10 ⁵	0 to -35	0.020	3.0	4,000
US3	10 ⁵	3.0	0.025	3.0	5,000
RS2	10 ⁴	± 10%	0.025	3.0	1250
ZS1	10 ⁵	0 to -80	0.025	3.0	11,000
ZS4	Contact PPI	15 to -15	0.035	3.0	25,000
ZS6	Contact PPI	15 to -15	0.035	3.0	35,000
US3	10 ⁵	± 15%	0.030	3.0	4500



Single Layer Capacitors

Array Cap

⚡ Capacitance, Case Size & Dielectric Availability - Class I Dielectrics

Cap (pF)	Size mils (mm)																	
	10x10		12x12		15x15		20x20		25x25		30x30		35x35		40x40		50x50	
	(.254 x .254)		(.305 x .305)		(.381 x .381)		(.508 x .508)		(.635 x .635)		(.762 x .762)		(.889 x .889)		(1.016 x 1.016)		(1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
0.04	AS7	5	AS7	6	AS7	10												
0.06	AS7	4	AS7	5	AS7	8	AS2	5	AS2	10								
0.08	ES1	10	AS7	4	AS7	6	AS7	10	AS2	7	AS2	9						
0.1	ES1	8	ES1	11	AS7	5	AS7	9	AS2	5	AS2	7	AS2	10				
0.2	ES1	5	ES1	7	ES1	10	AS7	4	AS7	7	AS7	10	AS2	5	AS2	7	AS2	10
0.3	IS1	6	ES1	4	ES1	6	ES1	11	AS7	4	AS7	7	AS7	9	AS2	5	AS2	7
0.4	IS1	5	IS1	7	ES1	5	ES1	9	ES1	15	AS7	5	AS7	7	AS7	9	AS2	5
0.5	IS1	4	IS1	5	ES1	4	ES1	7	ES1	11	AS7	5	AS7	5	AS7	7	AS2	4
0.6	KS2	6	IS1	5	IS1	7	ES1	6	ES1	10	ES1	15	AS7	4	AS7	6	AS7	9
0.8	MS1	8	KS2	6	IS1	5	ES1	5	ES1	7	ES1	10	ES1	15	AS7	4	AS7	7
1.0	MS1	7	KS2	5	IS1	4	IS1	7	ES1	6	ES1	8	ES1	10	AS7	4	AS7	5
1.2	MS1	6	KS2	4	IS1	4	IS1	6	ES1	5	ES1	7	ES1	9	AS7	3	AS7	5
1.5	MS1	5	MS1	7	KS2	5	IS1	5	ES1	4	ES1	6	ES1	7	ES1	10	AS7	4
1.8	MS1	4	MS1	5	KS2	4	IS1	4	IS1	6	ES1	5	ES1	6	ES1	8	ES1	11
2.0	MS1	4	MS1	5	KS2	4	KS2	7	IS1	6	ES1	4	ES1	5	ES1	7	ES1	11
2.2	RS1	4	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7	ES1	5	ES1	7	ES1	10
2.7	RS1	8	MS1	4	MS1	6	KS2	5	IS1	4	IS1	6	ES1	4	ES1	5	ES1	8
3.3	RS1	7	RS1	10	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7	ES1	4	ES1	7
3.9	RS1	6	RS1	9	MS1	4	MS1	7	KS2	5	IS1	4	IS1	6	IS1	8	ES1	6
4.7	RS1	5	RS1	7	RS1	11	MS1	6	KS2	4	KS2	6	IS1	5	IS1	6	ES1	5
5.6	RS1	4	RS1	6	RS1	10	MS1	5	MS1	7	KS2	5	IS1	4	IS1	5	ES1	4
6.8	RS1	4	RS1	5	RS1	8	MS1	4	MS1	6	KS2	5	KS2	6	IS1	4	IS1	7
8.2	SS3	6	RS1	4	RS1	7	MS1	4	MS1	5	KS2	4	KS2	5	KS2	7	KS2	10
10	SS3	5	RS1	4	RS1	5	RS1	9	MS1	4	MS1	6	KS2	4	KS2	5	KS2	8
12	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	5	MS1	7	KS2	4	KS2	7
15	US1	6	SS3	5	RS1	4	RS1	6	RS1	10	MS1	4	MS1	6	MS1	7	KS2	6
18	US1	5	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	4	MS1	6	KS2	5
20	US1	5	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	4	MS1	5	KS2	4
22	US1	4	US1	6	SS3	5	RS1	4	RS1	7	RS1	9	MS1	4	MS1	5	KS2	4

Shaded cells indicate Class II Dielectrics



Single Layer Capacitors

Array Cap

± Capacitance, Case Size & Dielectric Availability – Class II Dielectrics

Cap (pF)	Size mils (mm)																	
	10x10		12x12		15x15		20x20		25x25		30x30		35x35		40x40		50x50	
	(.254 x .254)		(.305 x .305)		(.381 x .381)		(.508 x .508)		(.635 x .635)		(.762 x .762)		(.889 x .889)		(1.016 x 1.016)		(1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
27	US1	4	US1	5	SS3	4	RS1	4	RS1	6	RS1	8	MS1	3	MS1	4	MS1	6
33	VS1	4	US1	4	US1	6	SS3	6	RS1	5	RS1	6	RS1	11	MS1	4	MS1	5
39	ZS1	6	US1	4	US1	5	SS3	5	RS1	4	RS1	5	RS1	7	RS1	10	MS1	4
47	ZS1	5	ZS1	7	US1	5	SS3	4	SS3	6	RS1	5	RS1	6	RS1	8	MS1	4
56	ZS1	4	ZS1	6	VS1	5	US1	7	SS3	5	RS1	4	RS1	5	RS1	7	RS1	10
68	ZS1	4	ZS1	5	VS1	4	US1	6	SS3	5	SS3	6	RS1	4	RS1	6	RS1	9
82	ZS4	7	ZS1	4	ZS1	7	VS1	6	SS3	4	SS3	5	SS3	7	SS3	10	RS1	7
100	ZS4	6	ZS4	8	ZS1	6	VS1	5	US1	6	SS3	5	SS3	6	SS3	8	RS1	6
120	ZS4	5	ZS4	7	ZS1	5	ZS1	8	VS1	6	SS3	4	SS3	5	SS3	7	RS1	5
150	ZS4	4	ZS4	5	ZS1	4	ZS1	7	VS1	5	VS1	7	SS3	4	SS3	5	RS1	4
180	ZS6	4	ZS4	5	ZS4	7	ZS1	6	VS1	4	VS1	6	VS1	8	US1	8	SS3	7
200	ZS6	4	ZS4	4	ZS4	6	ZS1	5	ZS1	8	VS1	5	VS1	7	US1	7	SS3	6
220	ZS6	4	ZS6	5	ZS4	6	ZS1	4	ZS1	7	VS1	5	VS1	6	US1	6	SS3	6
270			ZS6	4	ZS4	5	ZS4	8	ZS1	6	VS1	4	VS1	5	US1	5	SS3	5
330					ZS4	4	ZS4	7	ZS1	5	ZS1	7	VS1	4	US1	4	US1	7
390					ZS6	4	ZS4	6	ZS1	4	ZS1	6	ZS1	7	ZS1	10	US1	6
470					ZS6	4	ZS4	5	ZS4	7	ZS1	5	ZS1	6	ZS1	8	US1	5
560							ZS4	4	ZS4	6	ZS1	4	ZS1	5	ZS1	7	US1	4
680							ZS6	5	ZS4	5	ZS4	8	ZS1	5	ZS1	6	VS1	4
820							ZS6	4	ZS6	6	ZS4	6	ZS1	4	ZS1	5	ZS1	7
1000									ZS6	5	ZS4	5	ZS4	7	ZS1	4	ZS1	6
1200									ZS6	4	ZS4	4	ZS4	6	ZS4	7	ZS1	5
1500											ZS6	5	ZS4	5	ZS4	6	ZS1	4
1800											ZS6	4	ZS6	6	ZS4	5	ZS4	8
2200													ZS6	5	ZS4	4	ZS4	6
2700													ZS6	4	ZS6	5	ZS4	5
3300																	ZS6	6

⚡ Typical Temperature Characteristics

