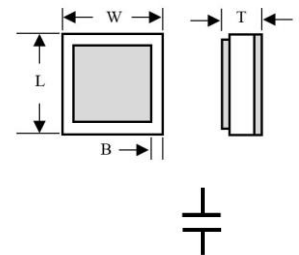


Border Cap

Border Caps have the topside electrode withdrawn from the edges in order to increase the distance between electrodes and dramatically decrease the possibilities of shorting when epoxy die-mounting.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**

PP B-FS1 -29×19 ×6 - D4-1R0-K-3 W

PP = Passive Plus

Capacitor Style

Border 1.5 mils typical

Dielectric Code K= 50

See tables on next pages

Length and Width (mils)

Thickness (mils) = 6

Packaging

W = Waffle Pack (Standard)

Voltage = 100

See table on next page

Tolerance = K = ±10%

See tables on next pages

Capacitance Value = 1.0pF

See tables on next pages

Metallization = Au

See table on next page

◆ **Capacitance Tolerance & Dimensional Tolerances Codes**

Class I Dielectrics: AS1 - KS2				Class II Dielectrics: MS1 – ZS6			
Tolerance	Code	Tolerance	Code	Tolerance	Code	Tolerance	Code
± .50pF	D	± 20%	M	-10% thru +40%	Y	± 20%	M
± .25pF	C	± 15%	L	-20% thru +80%	Z	± 15%	L
±.10pF	B	± 10%	K	0% thru +100%	V	± 10%	K
± .05pF	A	± 5%	J	Guaranteed Min. Value	GMV	± 5%	J
± .01pF	P	± 3%	H				
		± 2%	G				

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

Product Specifications

◆ **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 Code

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.

◆ Rated Voltage Code

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

◆ Capacitance Code

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

◆ Packaging

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

Dielectric Materials

◆ Class I

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
KS2	10 ¹²	N1500 ± 30ppm	0.0025	150	Titanate

◆ **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
RS1	10 ⁵	10 to -10	0.015	3.0	1,100
SS3	10 ⁵	3 to -10	0.015	3.5	2,200
US1	10 ⁵	0 to -35	0.020	3.0	4,000
VS1	10 ⁵	0 to -60	0.025	3.0	5,000
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

◆ Capacitance, Case Size & Dielectric Availability

Cap (pF)	Size mils (mm)																	
	10x10 (.254 x .254)		12x12 (.305 x .305)		15x15 (.381 x .381)		20x20 (.508 x .508)		25x25 (.635 x .635)		30x30 (.762 x .762)		35x35 (.889 x .889)		40x40 (1.016 x 1.016)		50x50 (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	4	AS7	4	AS7	5	AS1	5										
0.06	ES1	10	AS7	4	AS7	6	AS1	5	AS1	8	AS1	10						
0.08	ES1	7	ES1	10	AS7	5	AS7	10	AS1	6	AS1	8	AS1	11				
0.1	ES1	6	ES1	9	AS7	4	AS7	7	AS1	5	AS1	7	AS1	10				
0.2	IS1	4	ES1	4	ES1	5	AS7	4	AS7	5	AS7	7	AS1	4	AS1	5	AS1	10
0.3	KS2	6	IS1	5	ES1	4	ES1	8	AS7	4	AS7	5	AS7	7	AS1	4	AS1	6
0.4	KS2	4	IS1	4	IS1	6	ES1	6	ES1	10	AS7	4	AS7	5	AS7	7	AS1	5
0.5	MS1	5	KS2	4	IS1	5	ES1	4	ES1	7	ES1	10	AS7	4	AS7	6	AS7	10
0.6	MS1	5	KS2	5	IS1	4	ES1	4	ES1	6	ES1	10	AS7	4	AS7	5	AS7	7
0.8	MS1	5	MS1	5	KS2	5	IS1	6	ES1	5	ES1	7	ES1	10	AS7	4	AS7	6
1.0	MS1	4	MS1	5	KS2	4	IS1	5	ES1	4	ES1	6	ES1	8	ES1	10	AS7	5
1.2	RS1	6	MS1	5	MS1	7	IS1	4	IS1	7	ES1	5	ES1	7	ES1	10	AS7	4
1.5	RS1	7	MS1	4	MS1	6	KS2	6	IS1	6	IS1	8	ES1	6	ES1	7	ES1	15
1.8	RS1	6	MS1	4	MS1	5	KS2	5	IS1	5	IS1	7	ES1	5	ES1	7	ES1	10
2.0	RS1	6	RS1	8	MS1	4	KS2	5	IS1	5	IS1	6	ES1	4	ES1	6	ES1	10
2.2	RS1	5	RS1	7	MS1	4	MS1	7	KS2	7	IS1	6	ES1	4	ES1	5	ES1	10
2.7	RS1	5	RS1	6	MS1	4	MS1	6	KS2	6	IS1	6	IS1	8	ES1	5	ES1	8
3.3	SS3	6	RS1	6	RS1	8	MS1	5	KS2	5	IS1	4	IS1	6	IS1	7	ES1	6
3.9	SS3	5	RS1	5	RS1	7	MS1	4	KS2	4	KS2	6	IS1	5	IS1	6	ES1	5
4.7	SS3	5	RS1	5	RS1	7	MS1	4	MS1	6	KS2	5	IS1	4	IS1	5	IS1	8
5.6	SS3	5	SS3	6	RS1	5	MS1	4	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7
6.8	US1	5	SS3	6	RS1	5	RS1	8	MS1	5	MS1	7	KS2	5	KS2	7	IS1	6
8.2	US1	4	SS3	5	RS1	4	RS1	7	MS1	4	MS1	6	KS2	4	KS2	5	IS1	5
10	US1	5	SS3	4	SS3	6	RS1	6	MS1	4	MS1	5	MS1	6	KS2	5	IS1	4
12	US1	5	US1	6	SS3	5	RS1	5	RS1	8	MS1	4	MS1	6	KS2	4	KS2	6
15	US1	4	US1	5	SS3	5	RS1	5	RS1	7	MS1	4	MS1	5	MS1	6	KS2	5
18	VS1	4	VS1	6	US1	7	SS3	7	RS1	5	RS1	9	MS1	4	MS1	5	KS2	4
20	ZS1	5	VS1	5	US1	6	SS3	6	RS1	5	RS1	8	MS1	4	MS1	5	KS2	4

Class I Dielectrics

Shaded cells indicate Class II Dielectrics

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

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

◆ Typical Temperature Characteristics

