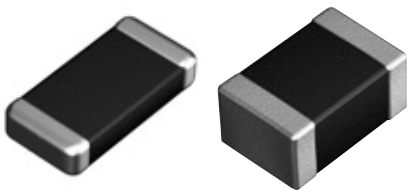
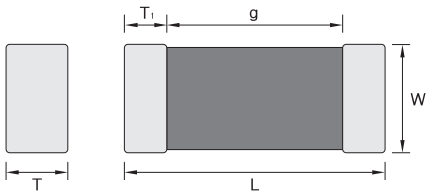
SMD Type

Shape & Dimensions





(Unit : mm)

Code(inch)	Dimensions				
	Length		Width		T1(min)
	L	Tol(±)	W	Tol(±)	
0603(0201)	0.60	0.03	0.30	0.03	0.05
1005(0402)	1.00	0.05	0.50	0.05	0.05
1608(0603)	1.60	0.15	0.80	0.10	0.10
2012(0805)	2.00	0.20	1.25	0.15	0.10
3216(1206)	3.20	0.30	1.60	0.20	0.15
3225(1210)	3.20	0.40	2.50	0.25	0.15
4520(1808)	4.50	0.40	2.00	0.25	0.20
4532(1812)	4.50	0.40	3.20	0.30	0.20
5750(2220)	5.70	0.50	5.00	0.40	0.30

*1608 Size ≥ 10㎌ ⇒ W : 0.8±0.15, T : 0.8±0.15

How to Order(Product Identification)

CS 1608 X7R 104 K 160 N R B

1 2 3 4 5 6 7 8 9

1 Type

CS : SMD

SA : ARRAY

2 Size Code

This is expressed in tens of a millimeter.

The first two digits are the length, the last two digits are width.

Size(mm)	0603	1005	1608	2012	3216	3225	4520	4532	5750

3 Temperature Coefficient Code

Temperature Characteristice	Temperature Range	Capacitance Change or Temperature Coefficient	Operating Temperature Range
C0G	−55 to 125℃	0±30ppm/℃	−55 to 125℃
X7R	−55 to 125℃	±15%	−55 to 125℃
X5R	−55 to 85℃	±15%	−55 to 85℃
Y5V	−30 to 85℃	+22, −82%	−30 to 85℃

4 Capacitance Code(Pico Farads)

The nominal capacitance value in pF is expressed by three digit numbers.
The first two digits represents significant figures and the last digit denotes the number of zero
Ex.) 104 = 100000pF R denotes decimal 8R2 = 8.2pF

5 Capacitance Tolerance Code

Code	Tolerance	Code	Tolerance
B	±0.1pF	M	±20%
C	±0.25pF	P	+100, −0%
D	±0.5pF	Z	+80, −20%
F	±1.0%	H	+0.25/−0pF
G	±2.0%	I	+0/−0.25pF
J	±5%	U	+5/−0%
K	±10%	V	+0/−5%

6 Voltage Code

Code	6R3	100	160	250	500	101	201	251	631	302
Vol.	DC 6.3V	DC 10V	DC 16V	DC 25V	DC 50V	DC 100V	DC 200V	DC 250V	DC 630V	DC 3000V

7 Termination Code

Ex.) N : Ni-Sn(Nickel-Tin Plate)

8 Packing Code

Ex.) R : Reel Type B : Bulk Type

9 Thickness Option

Thickness(mm)		Code	Thickness(mm)		Code
t	Tol(±)		t	Tol(±)	
0.30	0.03	Blank	1.30	0.20	E
0.50	0.05	Blank	1.35	0.20	H
0.60	0.10	A	1.60	0.20	I
0.80	0.10	B	1.80	0.20	J
0.85	0.15	B	2.00	0.25	K
1.00	0.15	E	2.50	0.25	L
1.10	0.15	E	2.80	0.30	M
1.15	0.15	E	3.20	0.30	N
1.25	0.15	E	5.00	0.40	O

Typical Performance Characteristics

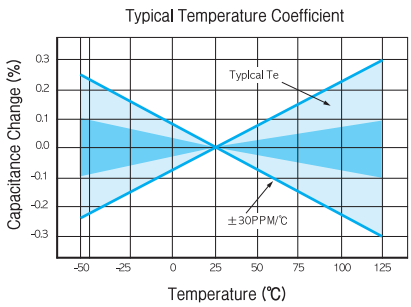
COG

Application

Suited for precision circuits, requiring stable dielectric characteristics, negligible dependence of capacitance and dissipation factor on time, voltage and frequency.

Dielectric Characteristics

Temperature Characteristic	0±30ppm/℃
Operating Temperature	−55~125℃
Capacitance Tolerance	>10pF : ±5%, ±10%,(±1%, ±2%, ±20%) ≤10pF : ±0.1pF, ±0.25pF, ±0.5pF
Dissipation Factor & Q	≥30pF : DF≤0.1%, Q≥1000 <30pF : Q≥400+20×C
Insulation Resistance	More than 10,000MΩ or 500ΩF (Whichever is smaller)
Dielectric Strength	>3×RVDC
Test Voltage	0.5 to 5Vrms(≤1000pF), 1±0.2Vrms(>1000pF)
Test Frequency	1±0.1MHz(≤1000pF), 1±0.1kHz(>1000pF)



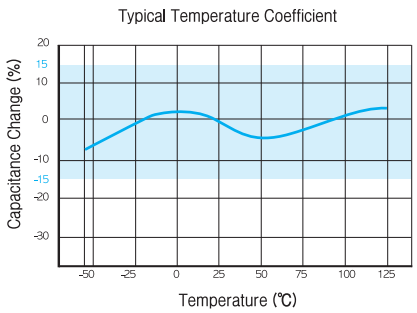
X7R

Application

Stable class II dielectric properties, suited for by-pass and coupling purposes, filtering, frequency discrimination, DC blockage, and as voltage transient suppression elements.

Dielectric Characteristics

Temperature Characteristic	±15%
Operating Temperature	−55~125℃
Capacitance Tolerance	±10%, ±20%,(±5%, +80~−20%)
Dissipation Factor & Q	50V Min. : 2.5% Max. 25V Min. : 3.0% Max. 16V Min. : 3.5% Max. 10V Min. : 5.0% Max. 6.3V Min. : 5.0% Max.(<3.3μF), 10% Max.(≥3.3μF) Thin layer lange capacitors type 10% Max.
Insulation Resistance	More than 10,000MΩ or 500ΩF(Whichever is smaller) Thin layer lange capacitors type 50ΩF Min.
Dielectric Strength	>2.5×RVDC
Test Voltage	1±0.2Vrms(≤10μF, 10V Min.) 0.5±0.1Vrms(≤10μF, 6.3V Max.) 0.5±0.1Vrms(>10μF)
Test Frequency	1±0.1kHz(≤10μF, 10V Min.) 1±0.1kHz(≤10μF, 6.3V Max.) 120±24Hz(>10μF)



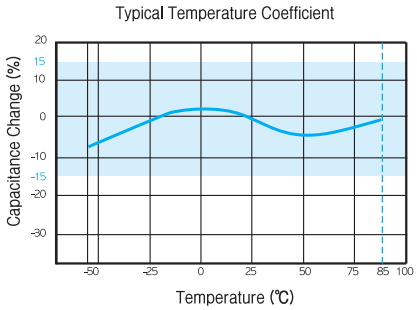
X5R

Application

Stable class II dielectric properties, suited for by-pass and coupling purposes, filtering, frequency discrimination, DC blockage, and as voltage transient suppression elements.

Dielectric Characteristics

Temperature Characteristic	±15%
Operating Temperature	−55~85℃
Capacitance Tolerance	±10%, ±20%,(±5%, +80~−20%)
Dissipation Factor & Q	50V Min. : 2.5% Max. 25V Min. : 3.0% Max. 16V Min. : 3.5% Max. 10V Min. : 5.0% Max. 6.3V Min. : 5.0% Max.(<3.3㎌), 10% Max.(≥3.3㎌) Thin layer lange capacitors type 10% Max.
Insulation Resistance	More than 10,000MΩ or 500ΩF (Whichever is smaller) Thin layer lange capacitors type 50ΩF Min.
Dielectric Strength	>2.5×RVDC
Test Voltage	1±0.2Vrms(≤10㎌, 10V Min.) 0.5±0.1Vrms(≤10㎌, 6.3V Max.) 0.5±0.1Vrms(>10㎌)
Test Frequency	1±0.1kHz(≤10㎌, 10V Min.) 1±0.1kHz(≤10㎌, 6.3V Max.), 120±24Hz(>10㎌)



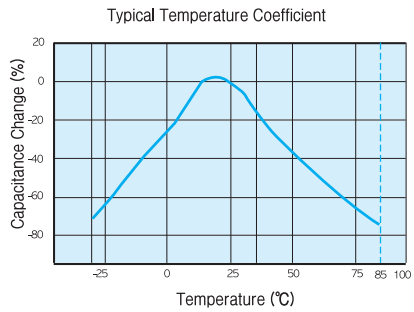
Y5V

Application

The Hi-K(Y5V) dielectrics deliver high capacitance density and are ideally suited for applications where space is at a premium, or as replacement for tantalum capacitors. Typically applications include use as by-pass or decoupling elements. Best performance is obtained at or near room temperature, with low DC bias.

Dielectric Characteristics

Temperature Characteristic	+22%~−82%
Operating Temperature	−30~85℃
Capacitance Tolerance	−20~+80%(±20%)
Dissipation Factor & Q	50V Min. : 5% Max. 25V Min. : 7% Max. 16V Min. : 9% Max. 10V Min. : 12.5% Max. 6.3V Min. : 15% Max. Thin layer lange capacitors type 20% Max.
Insulation Resistance	More than 10,000MΩ or 500ΩF(Whichever is smaller) Thin layer lange capacitors type 50ΩF Min.
Dielectric Strength	>2.5×RVDC
Test Voltage	1±0.2Vrms(≤10㎌, 10V Min.) 0.5±0.1Vrms(≤10㎌, 6.3V Max.) 0.5±0.1Vrms(>10㎌)
Test Frequency	1±0.1kHz(≤10㎌, 10V Min.) 1±0.1kHz(≤10㎌, 6.3V Max.), 120±24Hz(>10㎌)



Appendix |

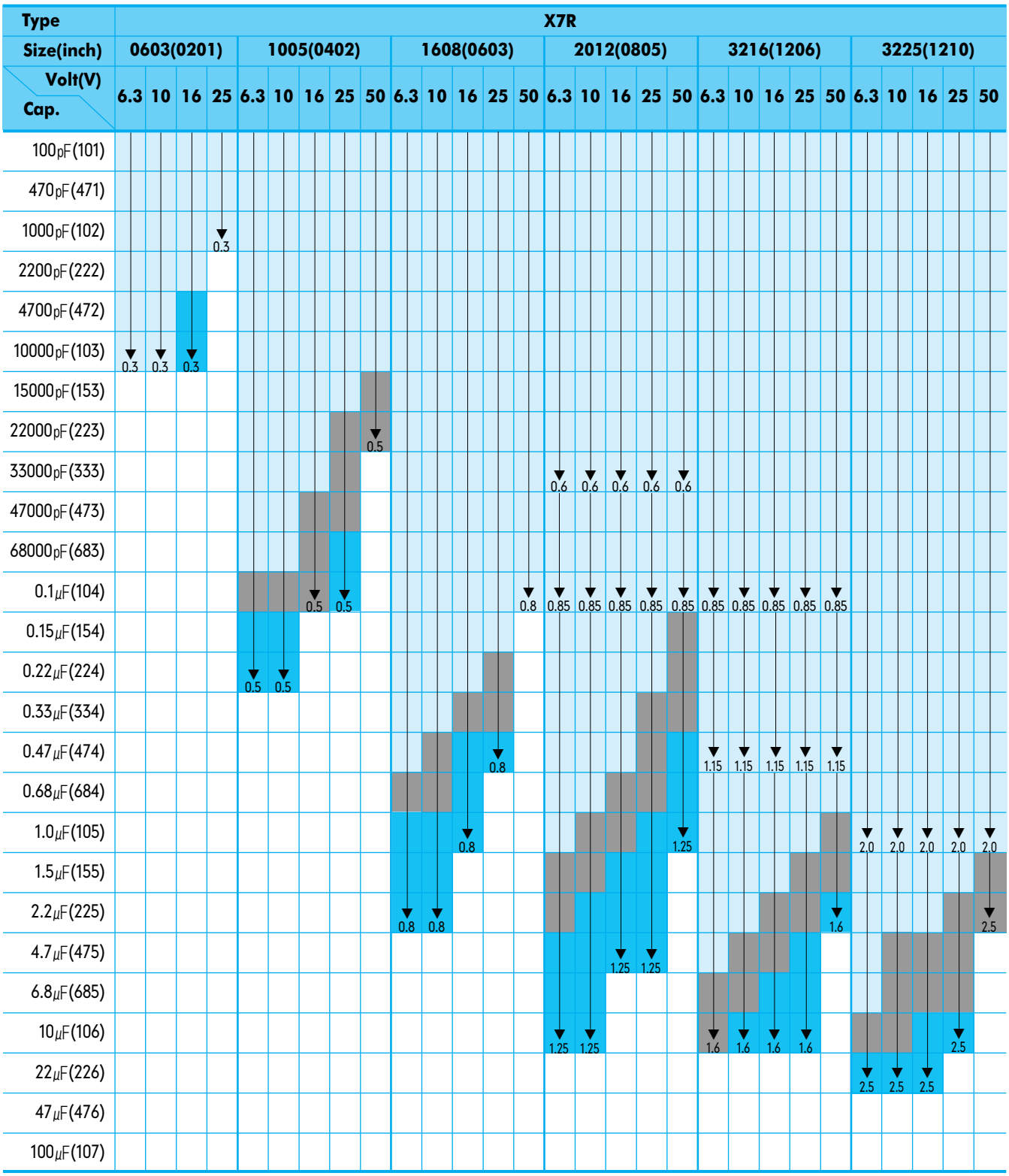
C0G-Temperature Compensating Type(0603~3216)

Type	C0G									
Size(inch)	0603(0201)	1005(0402)		1608(0603)		2012(0805)		3216(1206)	
Volt(V) / Cap.	25	25	50	25	50	25	50	25	50
0.5pF(0R5)									
1pF(010)									
2pF(020)									
3pF(030)									
4pF(040)									
5pF(050)									
6pF(060)									
7pF(070)									
8pF(080)									
9pF(090)									
10pF(100)									
12pF(120)									
15pF(150)									
18pF(180)									
22pF(220)									
27pF(270)									
33pF(330)									
39pF(390)									
47pF(470)									
56pF(560)									
68pF(680)									
82pF(820)									
100pF(101)	0.3								
120pF(121)									
150pF(151)									
180pF(181)									
220pF(221)									
270pF(271)									
330pF(331)									
390pF(391)									
470pF(471)									
560pF(561)									
680pF(681)									
820pF(821)									
1000pF(102)		0.5	0.5						
1200pF(122)									
1500pF(152)								1.15	1.15
1800pF(182)									
2200pF(222)						0.6	0.6		
2700pF(272)				0.8	0.8				
3300pF(332)									
3900pF(392)									
4700pF(472)									
5600pF(562)									
6800pF(682)									
8200pF(822)									
10000pF(103)						1.25	1.25		
12000pF(123)									
15000pF(153)									
18000pF(183)									
22000pF(223)									
27000pF(273)									
33000pF(333)									
47000pF(473)									
56000pF(563)								1.60	1.60
68000pF(683)									
82000pF(823)									
0.1μF(104)									

Temperature Compensating Type : Dissipation Factor Page 22 (No.5)

Appendix II

X7R-High Dielectric Constant Type(0603~3225) & Thin Layer Large-Capacitance Type

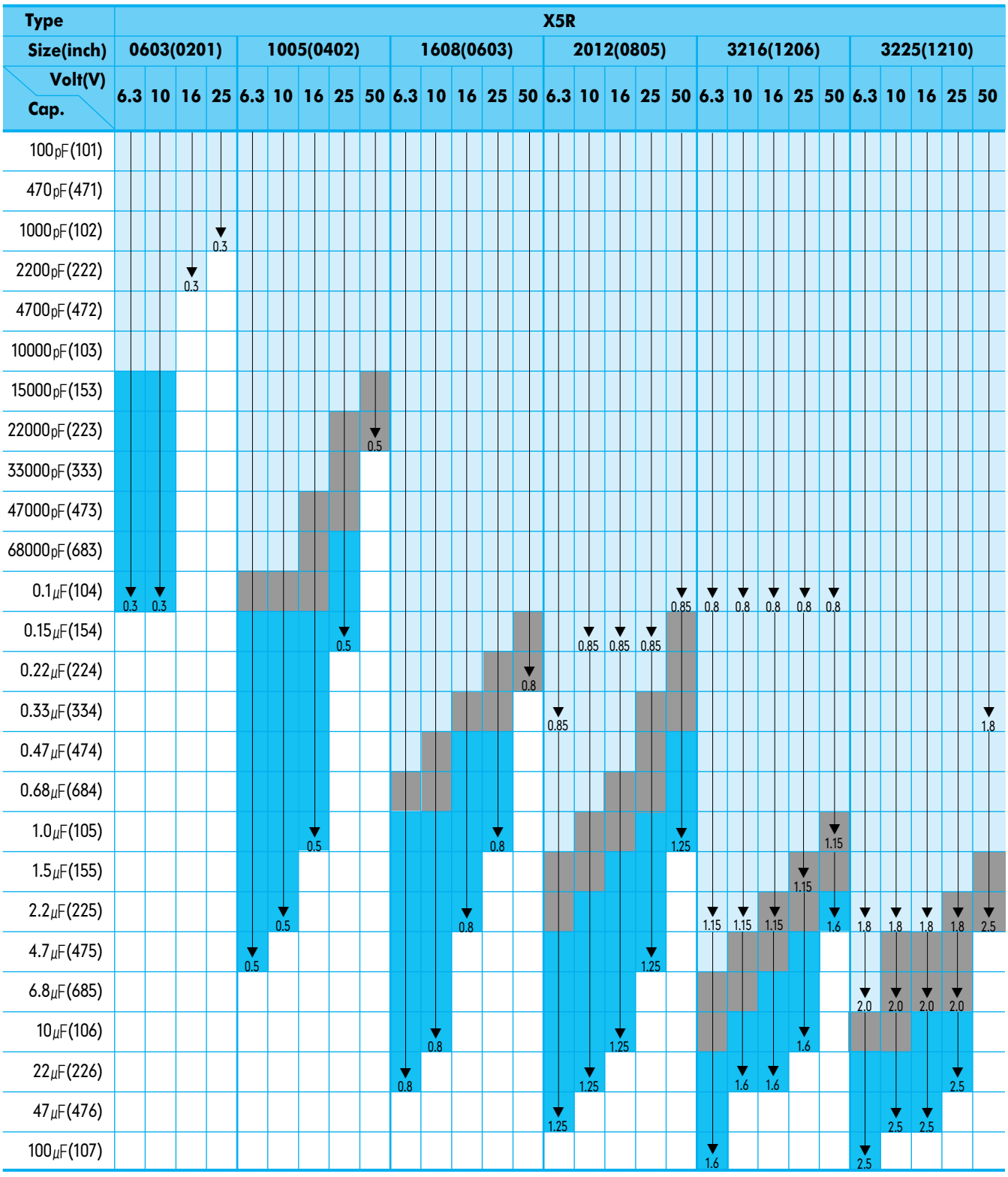


General Type : Dissipation Factor Page 22(No.5)

∗General Type : Dissipation Factor Page 22(No.5)

Thin Layer Large-Capacitance Type : Dissipation Factor Page 22(No.5)

X5R-High Dielectric Constant Type(0603~3225) & Thin Layer Large-Capacitance Type

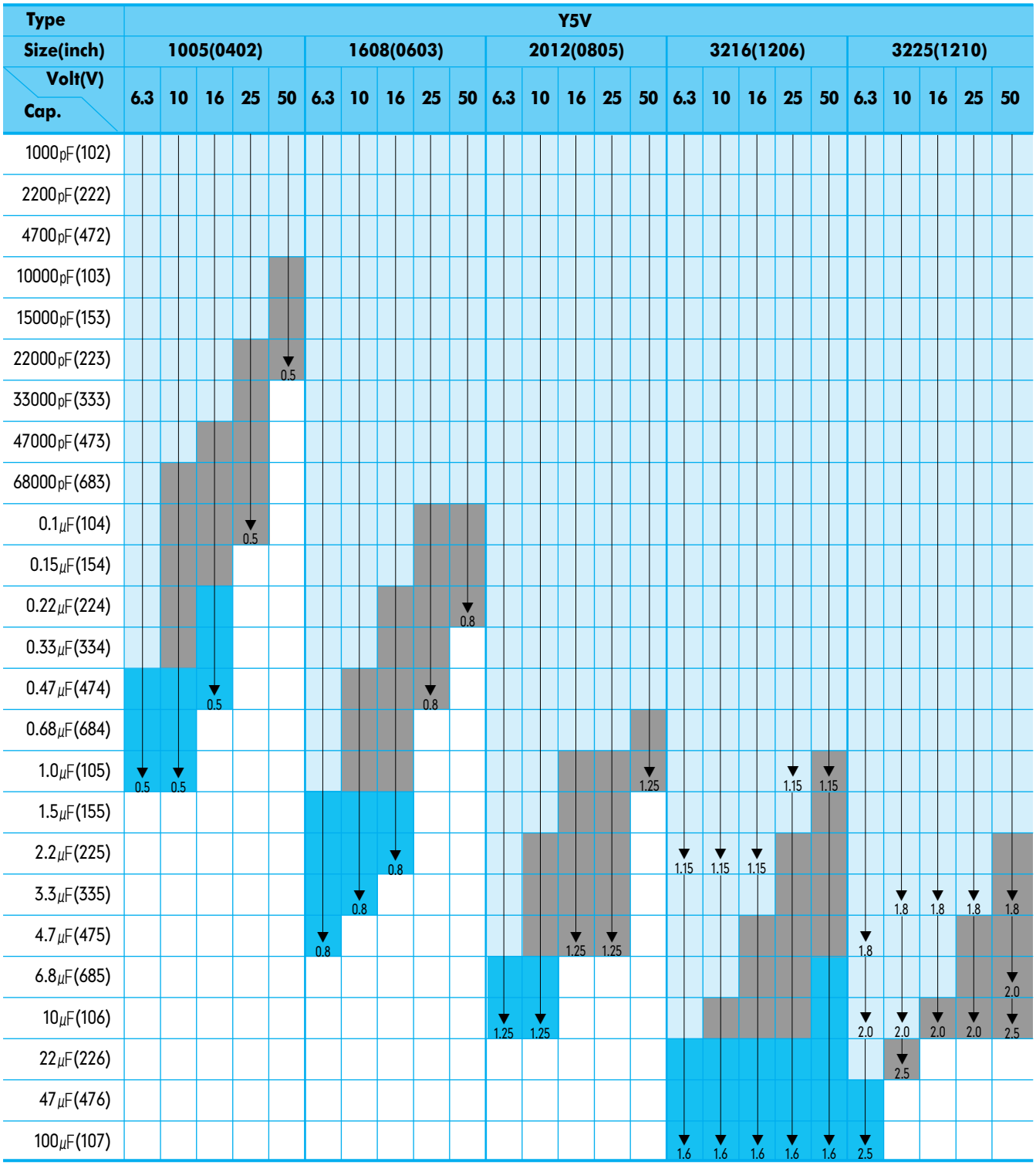


General Type : Dissipation Factor Page 22(No.5)

∗General Type : Dissipation Factor Page 22(No.5)

Thin Layer Large-Capacitance Type : Dissipation Factor Page 22(No.5)

Y5V-High Dielectric Constant Type(0603~3225) & Thin Layer Large-Capacitance Type



General Type : Dissipation Factor Page 22(No.5)

∗General Type : Dissipation Factor Page 22(No.5)

Thin Layer Large-Capacitance Type : Dissipation Factor Page 22(No.5)