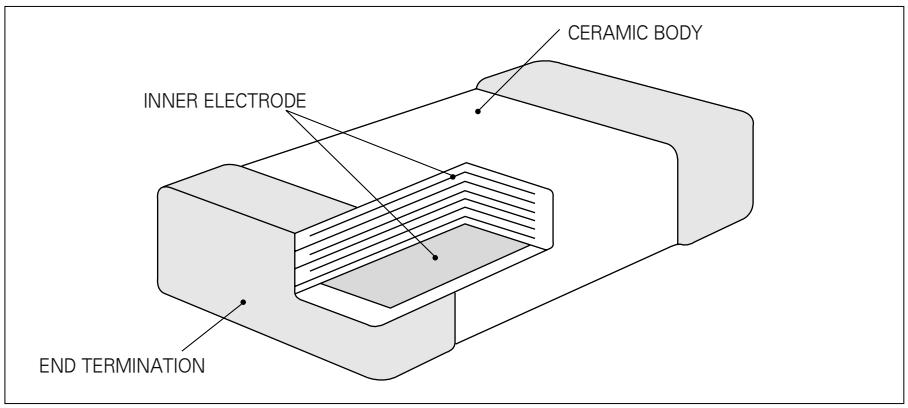
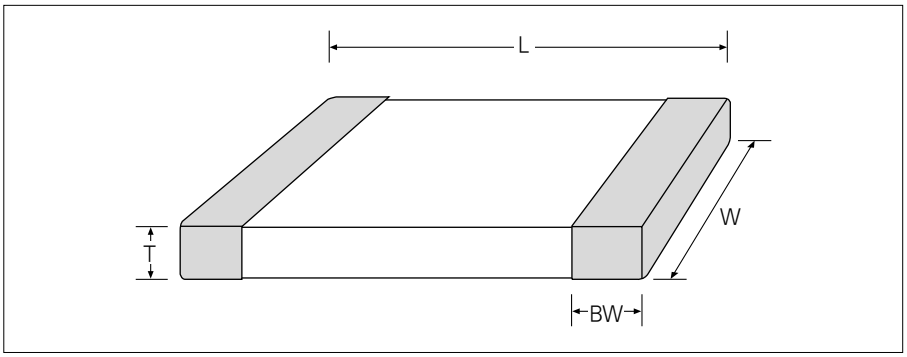
FEATURE



CONFIGURATION AND DIMENSIONS

- Miniature Size
- Wide Capacitance, Temperature Compensation and Voltage Range
- Highly Reliable Performance
- Industry Standard Size
- Tape & Reel for Surface Mount Assembly



Code	EIA Code	DIMENSION(mm)			
		L	W	T(MAX)	BW
05	0402	1.0±0.05	0.5±0.05	0.5±0.05	0.2+0.15/-0.1
10	0603	1.6±0.1	0.8±0.1	0.8±0.1	0.3±0.2
21	0805	2.0±0.1	1.25±0.1	1.25±0.1	0.5+0.2/-0.3
31	1206	3.2±0.2	1.6±0.2	1.6±0.2	0.5+0.2/-0.3
32	1210	3.2±0.3	2.5±0.2	2.5±0.2	0.6±0.3
43	1812	4.5±0.4	3.2±0.3	2.5±0.2	0.8±0.3
55	2220	5.7±0.4	5.0±0.3	2.5±0.3	1.0±0.3

PART NUMBER CODE

CL	10	C	101	J	B	N	C
1	2	3	4	5	6	7	8

(1) SAMSUNG Multilayer Ceramic Chip Capacitor
(2) Type(Size)
(3) Capacitance Temperature Characteristics
(4) Nominal Capacitance
(5) Capacitance Tolerance
(6) Rated Voltage
(7) Option
(8) Packaging Type

CAPACITANCE TEMPERATURE CHARACTERISTICS

• CLASS Ⅰ(Temperature Compensation)

Symbol	EIA Code	Temperature Coefficient (PPM/℃)	※Temperature Characteristies	Operation Temperature Range
C	C0G(CH)	0±60	C△	-55 ~ +125℃
P	P2H	-150±60	P△	
R	R2H	-220±60	R△	
S	S2H	-330±60	S△	
T	T2H	-470±60	T△	
U	U2J	-750±120	U△	
L	S2L	+350 ~ -1000	SL	

※ Temperature Characteristies

Temperature Characteristies	below 2.0pF	2.2 ~3.9pF	above 4.0pF	above 10pF
C△	CK	CJ	CH	CG/CH
P△	PK	PJ	PH	PH
R△	RK	RJ	RH	RH
S△	SK	SJ	SH	SH
T△	TK	TJ	TH	TH
U△	UK	UJ	UJ	UJ

K:±250 PPM/℃
J:±120 PPM/℃
H:±60 PPM/℃
G:±30 PPM/℃

• CLASS Ⅱ(High Dielectric Constant)

Symbol	EIA Code	Capacitance Change (ΔC:%)	Operation Temperature Range
B	X7R	±15	-55 ~ +125℃
F	Y5V	+22 ~ -82	-30 ~ +85℃

NOMINAL CAPACITANCE

• The nominal capacitance value is expressed in pico-Farad(pF) and identified by a three-digit number, first two digits represent significant figures and last digit specifies the number of zeros to follow. For values below 1pF, the letter "R" is used as the decimal point and the last digit becomes significant.

example)
$100 = 10 \times 10^{0} = 10\,pF$
$102 = 10 \times 10^{2} = 1000\,pF$
$020 = 2 \times 10^{0} = 2\,pF$
$1R5 = 1.5\,pF$

CAPACITANCE TOLERANCE

Temperature Characteristics	Symbol	Tolerance	Applicable Capacitance & Range
C0G(NPO) or T.C Series	B	±0.1pF	0.5~3pF
	C	±0.25pF	0.5~10pF
	D	±0.5pF	
	F	±1%	6~10pF
	*G	±2%	E-24 Series for over 10pF
	J	±5%	
	K	±10%	
B(X7R)	J	±5%	E-12 Series
	K	±10%	
	M	±20%	
F(Y5V)	Z	-20~+80%	E-6 Series

※ Please Consult us for special tolerances.
* Option

RATED VOLTAGE

Symbol	Rated Voltage(Vdc)	Symbol	Rated Voltage(Vdc)
Q	6.3V	D	200V
P	10V	G	500V
O	16V	I	1000V
A	25V	J	2000V
B	50V	K	3000V
C	100V		

THICKNESS OPTION

Symbol	Description of the Code
N	Standard thickness(please refer to standard thickness table on next page)
A	Thinner than standard thickness
B	Thicker than standard thickness
C	Standard Thickness High Q(Low 'D.F')
D	Reserved for future use
E	Reserved for future use

* Please consult us for other termination type.

PACKAGING TYPE

Symbol	Packaging	Symbol	Packaging
B	Bulk	F	Embossed tape, 13″ Reel
P	Cassette	L	Paper 13″ Reel
C	Paper tape, 7″ Reel	O	Paper 10″ Reel
D	Paper tape, 13″ Reel	S	Embossed tape, 10″ Reel
E	Embossed tape, 7″ Reel		

STANDARD CAPACITANCE STEP

Series	Capacitance Step											
E-3	1.0				2.2				4.7			
E-6	1.0		1.5		2.2		3.3		4.7		6.8	
E-12	1.0	1.2	1.5	1.8	2.2	2.7	3.3	3.9	4.7	5.6	6.8	8.2
E-24	1.0	1.2	1.5	1.8	2.2	2.7	3.3	3.9	4.7	5.6	6.8	8.2
	1.1	1.3	1.6	2.0	2.4	3.0	3.6	4.3	5.1	6.2	7.5	9.1

* Standard Capacitance is "Each step$\times 10^{n}$"

CAPACITANCE Vs CHIP THICKNESS STANDARD

Size			1005 Type (0402)	1608 Type (0603)	2012 Type (0805)			3216 Type (1206)		
DIMEN-SION (mm)		L	1.0 ± 0.05	1.6 ± 0.1	2.0 ± 0.1			3.2 ± 0.2		
		W	0.5 ± 0.05	0.8 ± 0.1	1.25 ± 0.1			1.6 ± 0.2		
		T	0.5 ± 0.05	0.8 ± 0.1	0.65 - +0.05/-0.1	0.85 - +0.05/-0.1	1.25 ± 0.1	0.85 ± 0.15	1.25 ± 0.2	1.6 ± 0.2
CAPACITANCE RANGE(pF)	SL	50V	240	1000	1000	1500	2700	2700	5600	8200
		100V	-	680	560	910	1000	1500	3300	3900
	C,TC (Except SL)	25V	150	1000	-	-	-	3600	6800	10000
		50V	150	1000	560	1000	2200	2200	4700	-
		100V	-	300	430	680	1200	2200	3600	5100
		200V	-	-	-	300	560	820	1600	2400
		500V	-	-	-	-	-	-	560	820
		1000V	-	-	-	-	-	-	-	-
		2000V	-	-	-	-	-	-	-	-
		3000V	-	-	-	-	-	-	-	-
	B (X7R)	6.3V	-	1000000	-	-	4700000	-	-	10000000
		10V	100000	470000	270000	470000	1000000	1000000	3300000	4700000
		16V	68000	220000	200000	330000	1000000	910000	1500000	3300000
		25V	10000	47000	68000	130000	330000	390000	620000	1000000
		50V	4700	27000	39000	56000	100000	150000	240000	470000
		100V	-	4700	12000	20000	33000	62000	100000	150000
		200V	-	-	-	12000	20000	30000	56000	75000
		500V	-	-	-	-	-	-	24000	36000
		1000V	-	-	-	-	-	-	-	-
		2000V	-	-	-	-	-	-	-	-
		3000V	-	-	-	-	-	-	-	-
	F (Y5V)	10V	220000	1000000	-	-	4700000	-	-	1000000
		16V	220000	470000	680000	1000000	2200000	2200000	4700000	-
		25V	33000	330000	220000	470000	1000000	1000000	2200000	3300000
		50V	10000	100000	68000	150000	470000	470000	680000	-

3225 Type (1210)				4532 Type (1812)				5750 Type (2220)
3.2 ± 0.3				4.5 ± 0.4				5.7 ± 0.4
2.5 ± 0.2				3.2 ± 0.3				5.0 ± 0.3
1.25 ± 0.2	1.6 ± 0.2	2.0 ± 0.2	2.5 ± 0.2	1.25 ± 0.2	1.6 ± 0.2	2.0 ± 0.2	2.5 ± 0.2	2.5 ± 0.3
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
10000	22000	47000	-	13000	22000	47000	68000	-
7500	10000	13000	18000	15000	20000	24000	36000	-
3600	5100	6200	8200	6800	10000	12000	16000	6800
1200	1800	2000	2700	2400	3600	3900	5100	4700
-	-	-	820	-	-	-	2400	3300
-	-	-	560	-	-	-	1600	2200
-	-	-	390	-	-	-	1100	1500
-	-	-	22000000	-	-	-	-	-
2200000	3300000	10000000	-	-	-	-	22000000	-
2400000	-	-	10000000	-	-	-	-	-
1000000	-	-	-	-	-	-	-	-
470000	-	-	-	1500000	2200000	2700000	3300000	-
180000	270000	330000	430000	360000	510000	560000	820000	-
120000	160000	200000	270000	220000	300000	330000	430000	430000
33000	51000	62000	82000	62000	100000	120000	160000	240000
-	-	-	20000	-	-	-	10000	130000
-	-	-	12000	-	-	-	6200	75000
-	-	-	6800	-	-	-	3600	43000
-	-	-	22000000	-	-	-	-	-
6800000	10000000	-	-	-	-	-	-	-
3300000	-	-	-	-	-	-	-	-
1000000	-	-	-	-	-	-	-	-

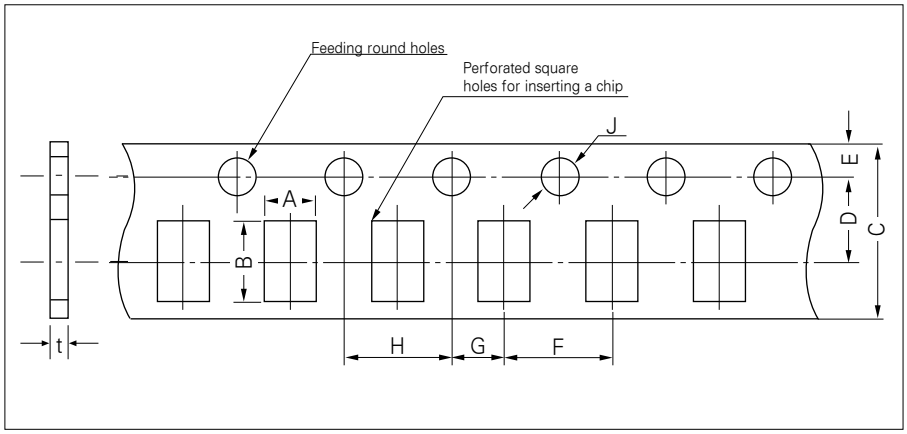
CAPACITANCE RANGE

Temperature Characteristics		Size	Voltage	Capacitance Range(pF)
CLASS I	SL,UJ	05 (0402)	50 V	10 ~ 240
		10 (0603)	50 V	10 ~ 1000
			100 V	10 ~ 680
		21 (0805)	50 V	10 ~ 2700
			100 V	10 ~ 1000
		31 (1206)	50 V	10 ~ 8200
			100 V	10 ~ 3900
	C(C0G) & TC Series	05 (0402)	25 V	10 ~ 150
			50 V	10 ~ 150
		10 (0603)	25 V	10 ~ 1000
			50 V	10 ~ 1000
			100 V	10 ~ 300
		21 (0805)	50 V	10 ~ 2200
			100 V	10 ~ 1200
			200 V	10 ~ 560
		31 (1206)	25 V	1500 ~ 10000
			50 V	10 ~ 4700
			100 V	10 ~ 5100
			200 V	10 ~ 2400
			500 V	10 ~ 820
		32 (1210)	50 V	560 ~ 47000
			100 V	2200 ~ 18000
			200 V	470 ~ 8200
			500 V	330 ~ 2700
			1000 V	10 ~ 820
			2000 V	10 ~ 560
			3000 V	10 ~ 390
		43 (1812)	50 V	1000 ~ 68000
			100 V	1000 ~ 36000
			200 V	1000 ~ 16000
			500 V	1000 ~ 5100
			1000 V	10 ~ 2400
			2000 V	10 ~ 1600
			3000 V	10 ~ 1100
		55 (2220)	200 V	10 ~ 6800
			500 V	10 ~ 4700
			1000 V	10 ~ 3300
			2000 V	10 ~ 2200
			3000 V	10 ~ 1500
	B(X7R)	05 (0402)	10 V	100 ~ 100000
			16 V	100 ~ 68000
			25 V	100 ~ 10000
			50 V	100 ~ 4700
		10 (0603)	6.3 V	100000 ~ 1000000
			10 V	100 ~ 470000
			16 V	100 ~ 220000
			25 V	100 ~ 47000
			50 V	100 ~ 27000
			100 V	100 ~ 4700
		21 (0805)	6.3 V	2200000 ~ 4700000
			10 V	100 ~ 1000000
			16 V	100 ~ 1000000
			25 V	100 ~ 330000
			50 V	100 ~ 100000
			100 V	100 ~ 33000
			200 V	100 ~ 20000

Temperature Characteristics		Size	Voltage	Capacitance Range(pF) 0.5 10 100 1000 10000 100000 1000000 10000000 100000000
CLASS Ⅱ	B(X7R)	31 (1206)	6.3 V	6800000 10000000
			10 V	1000 4700000
			16 V	1000 3300000
			25 V	1000 1000000
			50 V	1000 470000
			100 V	1000 150000
			200 V	1000 75000
			500 V	1000 36000
		32 (1210)	6.3 V	10000000 22000000
			10 V	1000 10000000
			16 V	1000 10000000
			25 V	1000 1000000
			50 V	1000 470000
			100 V	1000 430000
			200 V	1000 270000
			500 V	1000 82000
			1000 V	820 20000
			2000 V	560 12000
			3000 V	390 6800
		43 (1812)	10 V	10000000 22000000
			16 V	
			25 V	
			50 V	10000 3300000
			100 V	10000 820000
			200 V	10000 430000
			500 V	10000 160000
			1000V	2400 10000
			2000V	1600 6200
			3000V	1100 3600
		55 (2220)	200 V	6800 430000
			500 V	4700 240000
			1000V	3300 130000
			2000V	2200 75000
			3000V	1500 43000
	F(Y5V)	05 (0402)	10 V	2200 220000
			16 V	2200 220000
			25 V	2200 33000
			50 V	2200 10000
		10 (0603)	10 V	2200 1000000
			16 V	2200 470000
			25 V	2200 330000
			50 V	2200 100000
		21 (0805)	10 V	1000000 4700000
			16 V	10000 2200000
			25 V	10000 1000000
			50 V	10000 470000
		31 (1206)	10 V	100000 10000000
			16 V	10000 4700000
			25 V	10000 3300000
			50 V	10000 680000
		32 (1210)	10 V	10000000 22000000
			16 V	100000 10000000
			25 V	100000 3300000
			50 V	100000 1000000

PACKAGING SPECIFICATIONS

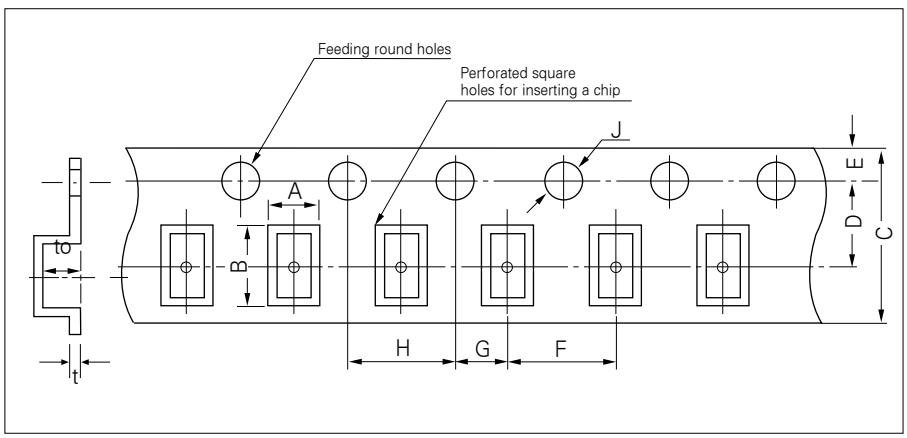
• Cardboard Paper Tape



Unit: mm

Symbol / Type		A	B	C	D	E	F	G	H	J	t
Dimension	05	0.65 ±0.1	1.10 ±0.1	8.0 ±0.3	3.5 ±0.05	1.75 ±0.1	2.0 ±0.05	1.0 ±0.05	4.0 ±0.1	ø 1.5 +0.1 −0	1.1 max
	10	1.10 ±0.2	1.90 ±0.2				4.0 ±0.1	2.0 ±0.05			
	21	1.16 ±0.2	2.4 ±0.2								
	31	2.0 ±0.2	3.6 ±0.2								

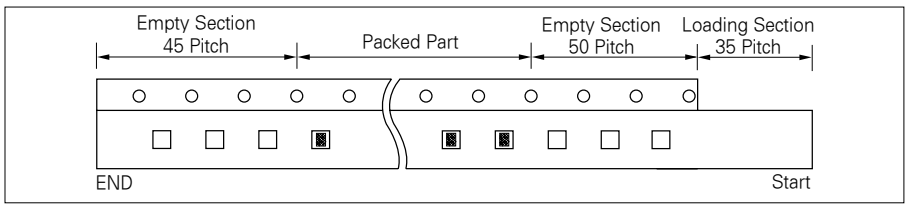
• Embossed Plastic Tape



Unit: mm

Symbol / Type		A	B	C	D	E	F	G	H	J	to	t
Dimension	21	1.45 ±0.2	2.3 ±0.2	8.0 ±0.3	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	ø 1.5 +0.1 −0	2.5 max	0.6 BEL-OW
	31	2.0 ±0.2	3.6 ±0.2									
	32	2.9 ±0.2	3.6 ±0.2									
	43	3.6 ±0.2	4.9 ±0.2	12.0 ±0.3	5.6 ±0.05		8.0 ±0.1				3.8 max	

• **Taping Size**

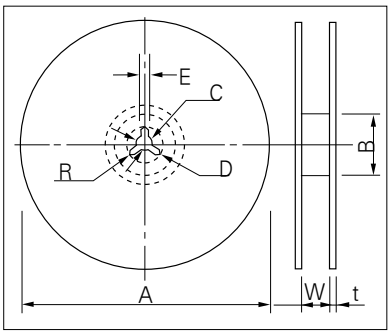


Unit: pcs

Symbol	Cardboard Paper Tape	Embossed Plastic Tape
7″ Reel	4,000	2,000
13″ Reel	15,000	-

• **Reel Dimensions**

Unit: mm

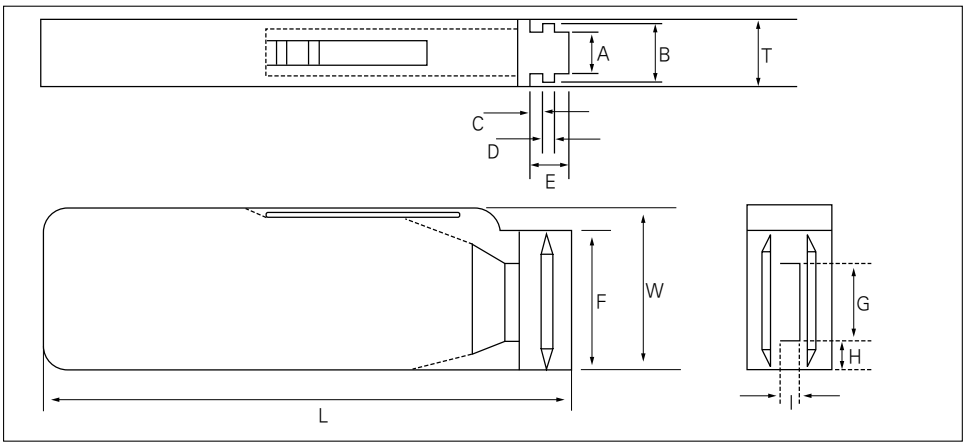


Symbol	A	B	C	D
7″ Reel	ø178 ±2.0	min. ø50	ø13 ±0.5	21 ±0.8
13″ Reel	ø330 ±2.0	min. ø70		

Symbol	E	W	t	R
7″ Reel	2.0 ±0.5	10 ±1.5	0.8 ±0.2	1.0
13″ Reel				

BULK CASE PACKAGING

• Bulk case packaging can reduce the stock space and transportation costs.
• The bulk feeding system can increase the productivity.
• It can eliminate the components loss.



Unit: mm

Symbol	A	B	T	C	D	E
Dimension	6.8±0.1	8.8±0.1	12±0.1	1.5 +0.1, -0	2 +0, -0.1	4.7±0.1

Symbol	F	W	G	H	L	I
Dimension	31.5 +0.2, -0	36 +0, -0.2	19±0.35	7±0.35	110±0.7	5±0.35

• **Quantity**

Unit: pcs

Size	05(0402)	10(0603)	21(0805)	
			T≤0.85㎜	T≥1.0㎜
Quantity	80,000	15,000	10,000	5,000