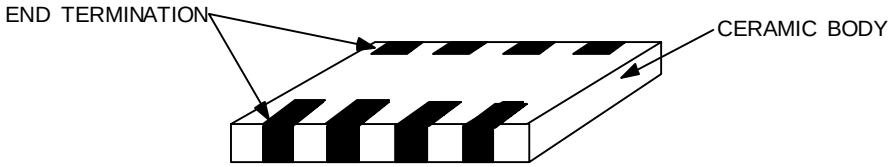
FEATURE



- Reduction in required real estate(more than 50%)
- Reduction cost, Space and time for placement on PCB
- Reduction in number of solder joints
- Easier PCB design
- Reduced waste from tape and reel packaging process
- Protect EMI bypassing digital signal line noise

PART NUMBER CODE

CL	A	4	C	101	K	B	N	E
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

(1) Samsung Multilayer Ceramic Chip Capacitor

(2) Capacitor Array

(3) Array Type

(4) Capacitance Temperature Characteristics

(5) Nominal Capacitance

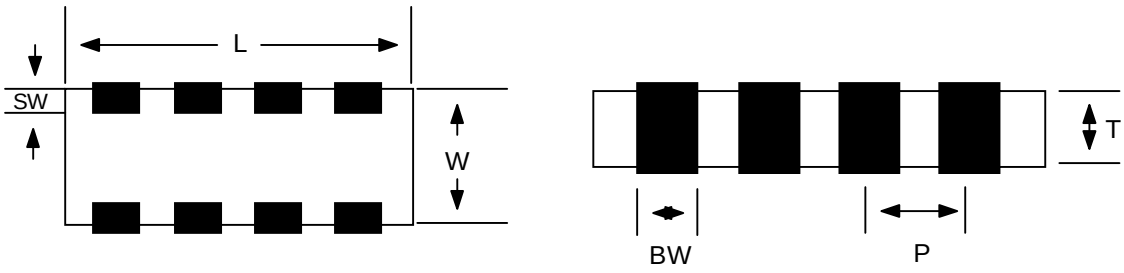
(6) Capacitance Tolerance(NPO:"K" only, X7R:"M" only)

(7) Rated Voltage

(8) Thickness Option

(9) Packaging Type("E" only)

CONFIGURATION AND DIMENSIONS



unit:mm

Type	Size(inch)	Element	L	W	T	BW	SW	P
4	0612	4	3.2+/-0.2	1.6+/-0.2	1.35 max	0.4+/-0.2	0.1 min	0.8+/-0.2

ARRAY TYPE(SIZE)

CODE	NUMBER OF CAPS	SIZE	
		UNIT(mm)	UNIT(inch)
4	4	3.2 x 1.6	06 x 12

CAPACITANCE TEMPERATURE CHARACTERISTIC

CODE	TEMP. CHARACTERISTIC		TEMP. RANGE
# C	COG	0+/-30 (PPM/C)	-55 ~ +125 C
B	X7R	+/-15%	-55 ~ +125 C
F	Y5V	+22~ -82%	-30 ~ + 85 C

*** Temperature Characteristics**

Temperature Characteristics	below 2.0pF	2.2 ~ 3.9pF	above 4.0pF	above 10pF
#C	CK	CJ	CH	CG/CH

K : +/- PPM/c J : +/-120 PPM/c H : +/-60 PPM/c G : +/-30 PPM/c

NOMINAL CAPACITANCE

The value of nominal capacitance is expressed in pico-Farad(pF) with a three-digit number.
The first two digits denote significant figures and the last digit denotes the multiple of 10 in pF.
For values below 1pF, the letter "R" is used as the decimal point and the last digit becomes significant.

example 100 = 10 x 10^0 = 10pF 222 = 22 x 10^2 = 2200pF
020 = 2 x 10^0 = 2pF 1R5 = 1.5pF

CAPACITANCE TOLERANCE

CHAR.	TOLERANCE		NOMINAL CAPACITANCE
C	* J (+/- 5 %)	MORE THAN 10pF	E-12 SERIES
	K (+/-10 %)		
B	* J (+/-5%), * K (+/-10%), M (+/-20%)		E-6 SERIES
F	Z (+80 ~ -20%)		E-6 SERIES

Please Consult us for special tolerances. * : Option

RATED VOLTAGE

Symble	Rated Voltage(Vdc)
O	16V
A	25V
B	50V
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

PACKAGING TYPE

Symbol	Packaging
E	Embossed Tape, 7" Reel

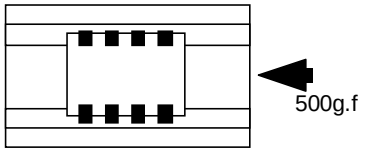
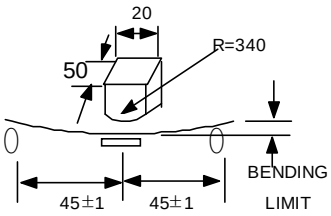
CAPACITANCE RANGE

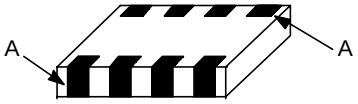
THICKNESS 0.85+/-0.1mm

Temperature Characteristics	CH	X7R			Y5V		
Rated Voltage(DC) / Capacitance(pF)	50V	16V	25V	50V	16V	25V	50V
10							
15							
22							
33							
47							
68							
100							
150							
220							
330							
470							
680							
1000							
1500							
3300							
4700							
10000							
22000							
47000							
100000							
150000							

Please contact us for special capacitance and high voltage(100V)

RELIABILITY AND TEST CONDITIONS

<table>
<tr><th>NO</th><th colspan="2">ITEM</th><th>PERFORMANCE</th><th colspan="3">TEST CONDITION</th></tr>
<tr><td>1</td><td colspan="2">APPEARANCE</td><td>NO ABNORMAL EXTERIOR APPEARANCE.</td><td colspan="3">THROUGH MICROSCOPE(x10)</td></tr>
<tr><td>2</td><td colspan="2">INSULATION RESISTANCE</td><td>10,000Mohm OR 500Mohm uF PRODUCT WHICHEVER IS SMALLER. (RATED VOLTAGE IS BELOW 16V 10,000Mohm OR 100Mohm uF)</td><td colspan="3">RATED VOLTAGE SHALL BE APPLIED. MEASUREMENT TIME IS 60 ~ 120 SEC.</td></tr>
<tr><td>3</td><td colspan="2">WITHSTANDING VOLTAGE</td><td>NO DIELECTRIC BREAKDOWN OR MECHANICAL BREAKDOWN.</td><td colspan="3">CLASS I:300% OF THE RATED VOLTAGE FOR 1~5 SEC, CLASS II:250% OF THE RATED VOLTAGE FOR 1~5 SEC IS APPLIED LESS THAN 50mA CURRENT.</td></tr>
<tr><td rowspan="4">4</td><td rowspan="4">CAPACITANCE</td><td rowspan="3">CLASS I</td><td rowspan="3">WITHIN THE SPECIFIED TOLERANCE.</td><td>CAPACITANCE</td><td>FREQUENCY</td><td>VOLTAGE</td></tr>
<tr><td>1,000pF AND BELOW</td><td>1MHz+/-10%</td><td>0.5 ~ 5 Vrms</td></tr>
<tr><td>MORE THAN 1,000pF</td><td>1KHz+/-10%</td><td>1.0+/-0.2Vrms</td></tr>
<tr><td>CLASS II</td><td>WITHIN THE SPECIFIED TOLERANCE.</td><td colspan="2">FREQUENCY</td><td>VOLTAGE</td></tr>
<tr><td colspan="3"></td><td colspan="2">1KHz+/-10%</td><td>1.0+/-0.2Vrms</td></tr>
<tr><td rowspan="3">5</td><td rowspan="3">Q</td><td rowspan="3">CLASS I</td><td rowspan="3">30pF AND OVER : Q >=1,000
LESS THAN 30pF: Q >=400 +20C
(C : CAPACITANCE)</td><td>CAPACITANCE</td><td>FREQUENCY</td><td>VOLTAGE</td></tr>
<tr><td>1,000pF AND BELOW</td><td>1MHz+/-10%</td><td>0.5 ~ 5 Vrms</td></tr>
<tr><td>MORE THAN 1,000pF</td><td>1KHz+/-10%</td><td>1.0+/-0.2Vrms</td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">Tan delta</td><td rowspan="3">CLASS II</td><td rowspan="3"><table><tr><td>CHAR.</td><td>25V and over</td><td>16V</td></tr><tr><td>B</td><td>0.025 MAX</td><td>0.035 MAX</td></tr><tr><td>F</td><td>0.05 MAX</td><td>0.07 MAX (C<1.0uF)
0.09 MAX (C>=1.0uF)</td></tr></table></td><td colspan="2">FREQUENCY</td><td>VOLTAGE</td></tr>
<tr><td colspan="2">1KHz+/-10%</td><td>1.0+/-0.2Vrms</td></tr>
<tr><td></td><td></td></tr>
<tr><td>7</td><td colspan="2">ADHESIVE STRENGTH OF TERMINATION</td><td>NO INDICATION OF PEELING SHALL OCCUR ON THE TERMINAL ELECTRODE.</td><td colspan="3">A 500g.f PULL FORCE SHALL BE APPLIED FOR 10+/-1SECOND.
 
</td></tr>
<tr><td>8</td><td>BENDING STRENGTH</td><td>APPEARANCE</td><td>NO MECHANICAL DAMAGE SHALL OCCUR.</td><td colspan="3">BENDING SHALL BE APPLIED TO THE LIMIT(1mm) WITH 0.3mm/SEC.
 
</td></tr>
</table>

<table>
<tr><th>NO</th><th colspan="3">ITEM</th><th colspan="3">PERFORMANCE</th><th>TEST CONDITION</th></tr>
<tr><td>9</td><td colspan="2">SOLDERABILITY</td><td></td><td colspan="3">MORE THAN 75% OF THE TERMINAL SURFACE IS TO BE SOLDERED NEWLY, SO METAL PART(A) DOES NOT COME OUT OR DISSOLVE.
 
</td><td>SOLDER TEMPERATURE : 230+/-5C
SOLDER : H63A
FLUX : ROSIN
PRE-HEATING : AT 80~120C
FOR 10~30SEC.</td></tr>
<tr><td rowspan="8">10</td><td rowspan="8">RESISTANCE TO SOLDERING HEAT</td><td>APPEARANCE</td><td colspan="3">NO MECHANICAL DAMAGE SHALL OCCUR.</td><td rowspan="8">DIP : SOLDER TEMPERATURE OF 270+/-5C
DIP TIME :10+/-1SEC.
EACH TERMINATION SHALL BE FULLY IMMERSED AND PREHEATED AS FOLLOWING:
<table><tr><th>STEP</th><th>TEMP.(C)</th><th>TIME (SEC.)</th></tr><tr><td>1</td><td>80~100</td><td>60</td></tr><tr><td>2</td><td>150~180</td><td>60</td></tr></table>
MEASURE AT ROOM TEMP. AFTER COOLING FOR
CLASS I : 24 +/- 2 HOURS
CLASS II : 48 +/- 4 HOURS</td></tr>
<tr><td rowspan="3">CAPACITANCE</td><td>CHARACTERISTIC</td><td colspan="2">CAP. CHANGE</td></tr>
<tr><td>CLASS I</td><td colspan="2">WITHIN +/-2.5% OR +/-0.25uF WHICHEVER IS LARGER</td></tr>
<tr><td rowspan="2">CLASS II</td><td>B</td><td>WITHIN +/-7.5%</td></tr>
<tr><td>F</td><td>WITHIN +/-20%</td></tr>
<tr><td>Q
CLASS I</td><td colspan="3">30pF AND OVER : Q>= 1000
LESS THAN 30pF : Q>= 400+20C</td></tr>
<tr><td>Tan delta
CLASS II</td><td colspan="3">TO SATISFY THE SPECIFIED INITIAL VALUE.</td></tr>
<tr><td>INSULATION RESISTANCE</td><td colspan="3">TO SATISFY THE SPECIFIED INITIAL VALUE.</td></tr>
<tr><td>WITHSTANDING VOLTAGE</td><td colspan="3">TO SATISFY THE SPECIFIED INITIAL VALUE.</td></tr>
<tr><td rowspan="8">11</td><td rowspan="8">VIBRATION TEST</td><td>APPEARANCE</td><td colspan="3">NO MECHANICAL DAMAGE SHALL OCCUR.</td><td rowspan="8">THE CAPACITOR SHALL BE SUBJECTED TO A HARMONIC MOTION HAVING A TOTAL AMPLITUDE OF 1.5mm.

THE ENTIRE FREQUENCY RANGE, FROM 10 TO 55Hz AND RETURN TO 10Hz, SHALL BE TRAVERSED IN 1 MINUTE.

THIS CYCLE SHALL BE PERFORMED 2 HOURS IN EACH THERE MUTUALLY PERPENDICULAR DIRECTION, FOR TOTAL PERIOD OF 6 HOURS.</td></tr>
<tr><td rowspan="3">CAPACITANCE</td><td>CHARACTERISTIC</td><td colspan="2">CAP. CHANGE</td></tr>
<tr><td>CLASS I</td><td colspan="2">WITHIN +/-2.5% OR +/-0.25pF WHICHEVER IS LARGER</td></tr>
<tr><td rowspan="2">CLASS II</td><td>B</td><td>WITHIN +/-5%</td></tr>
<tr><td>F</td><td>WITHIN +/-20%</td></tr>
<tr><td>Q
CLASS I</td><td colspan="3">30pF AND OVER: Q>= 1000
LESS THAN 30pF : Q>= 400+20C</td></tr>
<tr><td>Tan delta
CLASS II</td><td colspan="3">TO SATISFY THE SPECIFIED INITIAL VALUE.</td></tr>
<tr><td>INSULATION RESISTANCE</td><td colspan="3">TO SATISFY THE SPECIFIED INITIAL VALUE.</td></tr>
</table>

* THE INITIAL VALUE OF CLASS II MLCC SHALL BE MEASURED AFTER THE HEAT TREATMENT OF 150 +0/-10C ,1Hr AND SITTING OF 48+/-4hr AT ROOM TEMPERATURE & ROOM HUMIDITY.

<table>
<tr><th>NO</th><th colspan="2">ITEM</th><th colspan="3">PERFORMANCE</th><th>TEST CONDITION</th></tr>
<tr><td rowspan="6">12</td><td rowspan="6">HUMIDITY
(STEADY
STATE)</td><td>APPEARANCE</td><td colspan="3">NO MECHANICAL DAMAGE SHALL OCCUR.</td><td rowspan="6">TEMPERATURE : 40+/-2 C
RELATIVE HUMIDITY:90~95 %RH
TEST TIME : 500 +12/-0 Hr.

MEASURE AT ROOM TEMPERATURE
AFTER COOLING FOR
CLASS I : 24+/-2 Hr.
CLASS II : 48+/-4 Hr.</td></tr>
<tr><td rowspan="4">CAPACITANCE</td><td colspan="2">CHARACTERISTIC</td><td>CAPACITANCE CHANGE</td></tr>
<tr><td colspan="2">CLASS I</td><td>WITHIN +/-5% OR +/-0.5uF WHICHEVER IS LARGER</td></tr>
<tr><td rowspan="2">CLASS II</td><td>B</td><td>WITHIN +/-12.5%</td></tr>
<tr><td>F</td><td>WITHIN +/-30%</td></tr>
<tr><td>Q
CLASS I</td><td colspan="3">30pF AND OVER : Q>= 350
10 ~30pF : Q>= 275 + 2.5C
LESS THAN 10pF : Q>= 200 + 10C</td></tr>
<tr><td>Tan delta
CLASS II</td><td colspan="3"><table><tr><td>CHAR.</td><td>25V and over</td><td>16V</td></tr><tr><td>B</td><td>0.05 MAX</td><td>0.05 MAX</td></tr><tr><td>F</td><td>0.075 MAX</td><td>0.1 MAX (C<1.0uF)
0.125 MAX (C>=1.0uF)</td></tr></table></td></tr>
<tr><td>INSULATION RESISTANCE</td><td colspan="3">MINIMUM INSULATION RESISTANCE:
1,000 Mohm OR 50Mohm uF PRODUCT WHICHEVER IS SMALLER.</td></tr>
<tr><td rowspan="6">13</td><td rowspan="6">MOISTURE
RESISTANCE</td><td>APPEARENCE</td><td colspan="3">NO MECHANICAL DAMAGE SHALL OCCUR.</td><td rowspan="6">APPLIED VOLTAGE :
RATED VOLTAGE
TEMPERATURE : 40+/-2 C
RELATIVE HUMIDITY:90~95%RH
TEST TIME : 500 +12/-0 Hr.CURRENT
APPLIED : 50mA MAX.

MEASUREING AT ROOM
TEMPERATURE
AFTER COOLING FOR
CLASS I : 24+/-2 Hr.
CLASS II : 48+/-4 Hr.</td></tr>
<tr><td rowspan="4">CAPACITANCE</td><td colspan="2">CHARACTERISTIC</td><td>CAPACITANCE CHANGE</td></tr>
<tr><td colspan="2">CLASS I</td><td>WITHIN +/-7.5% OR +/-0.75uF WHICHEVER IS LARGER</td></tr>
<tr><td rowspan="2">CLASS II</td><td>B</td><td>WITHIN +/-12.5%</td></tr>
<tr><td>F</td><td>WITHIN +/-30%</td></tr>
<tr><td>Q
CLASS I</td><td colspan="3">30pF AND OVER : Q>= 200
30pF AND BELOW : Q>= 100 + 10/3C</td></tr>
<tr><td>Tan delta
CLASS II</td><td colspan="3"><table><tr><td>CHAR.</td><td>25V and over</td><td>16V</td></tr><tr><td>B</td><td>0.05 MAX</td><td>0.05 MAX</td></tr><tr><td>F</td><td>0.075 MAX</td><td>0.1 MAX (C<1.0uF)
0.125 MAX (C>=1.0uF)</td></tr></table></td></tr>
<tr><td>INSULATION RESISTANCE</td><td colspan="3">MINIMUM INSULATION RESISTANCE:
500 Mohm OR 25Mohm uF PRODUCT, WHICHEVER IS SMALLER.</td></tr>
</table>

<table>
<tr><th>NO</th><th colspan="2">ITEM</th><th colspan="3">PERFORMANCE</th><th>TEST CONDITION</th></tr>
<tr><td rowspan="5">14</td><td rowspan="5">HIGH TEMPERATURE RESISTANCE</td><td>APPEARANCE</td><td colspan="3">NO MECHANICAL DAMAGE SHALL OCCUR.</td><td rowspan="5">APPLIED VOLTAGE :
200% OF RATED VOLTAGE
TEST TIME : 1000 +48/-0 Hr.
CURRENT APPLIED : 50mA MAX.

CHAR. | TEMP.
CLASS I | 125 +/-3 C
CLASS II B | 125 +/-3 C
CLASS II F | 85 +/-3 C

(INITIAL VALUE MEASUREMENT)
FOR CLASS II CAPACITORS, 200 % OF RATED VOLTAGE SHALL BE APPLIED FOR 1 HOUR AT THE MAXIMUM OPERATING TEMPERATURE, THEN KEEP IT AT ROOM TEMPERATURE.
FOR 48 +/- 4 Hrs.</td></tr>
<tr><td>CAPACITANCE</td><td colspan="3">CHARACTERISTIC | CAP. CHANGE
CLASS I | WITHIN +/-3% OR +/-0.3pF,WHICHEVER IS LARGER
CLASS II B | WITHIN +/-12.5%
CLASS II F | WITHIN +/-30%</td></tr>
<tr><td>Q
CLASS I</td><td colspan="3">30pF AND OVER : Q >= 350
10 ~ 30 pF : Q >= 275 + 2.5C
LESS THAN 10pF : Q >= 200 + 10C</td></tr>
<tr><td>Tan delta
CLASS II</td><td colspan="3">CHAR. | 25V and over | 16V
B | 0.05 MAX | 0.05 MAX
F | 0.075 MAX | 0.1 MAX (C<1.0uF) 0.125 MAX (C>=1.0uF)</td></tr>
<tr><td>INSULATION RESISTANCE</td><td colspan="3">MINIMUM INSULATION RESISTANCE:
1,000 Mohm OR 50 Mohm uF PRODUCT WHICHEVER IS SMALLER.</td></tr>
<tr><td rowspan="5">15</td><td rowspan="5">TEMPERATURE CYCLE</td><td>APPEARANCE</td><td colspan="3">NO MECHANICAL DAMAGE SHALL OCCUR.</td><td rowspan="5">CAPACITORS SHALL BE SUBJECTED TO FIVE CYCLES OF THE TEMPERATURE CYCLE AS FOLLOWING

STEP | TEMP.(C) | TIME (MIN)
1 | MIN. RATED TEMP. +0/-3 | 30
2 | 25 | 2~3
3 | MAX. RATED TEMP. +3/-0 | 30
4 | 25 | 2~3

MEASURE AT ROOM TEMPERATURE AFTER COOLING FOR
CLASS I : 24+/-2 Hr.
CLASS II : 48+/-4 Hr.</td></tr>
<tr><td>CAPACITANCE</td><td colspan="3">CHARACTERISTIC | CAP. CHANGE
CLASS I | WITHIN +/-2.5% OR +/-0.25pF WHICHEVER IS LARGER
CLASS II B | WITHIN +/-7.5%
CLASS II F | WITHIN +/-20%</td></tr>
<tr><td>Q
CLASS I</td><td colspan="3">30 pF AND OVER : Q >= 1000
LESS THAN 30 pF : Q >= 400 + 20C</td></tr>
<tr><td>Tan delta
CLASS II</td><td colspan="3">TO SATISFY THE SPECIFIED INITIAL VALUE</td></tr>
<tr><td>INSULATION RESISTANCE</td><td colspan="3">MINIMUM INSULATION RESISTANCE:
1,000 Mohm OR 50Mohm uF PRODUCT WHICHEVER IS SMALLER.</td></tr>
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