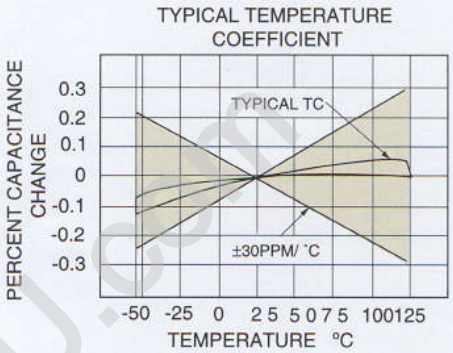
Typical Performance Characteristics

COG

APPLICATION - Suited for percision circuits, Requiring stable dielectric characteristics :
- Negligible dependence of capacitance and dissipation factor on time, voltage, and frequency.

DIELECTRIC CHARACTERISTICS

Temperature Coefficient	0±30 ppm/℃
Temperature Range	-55℃ to 125℃
Dissipation Factor	〈 0.001(0.1%) @ 1MHz, 25℃ (1KHz, above 1000pF)
Quality Factor	〉1000 (1KHz, above 1000pF)
Insulation Resistance	〉1000ΩF or 1000GΩ, whichever is less, @25℃, VDCW. @125℃, IR is 1% of 25℃ requirement
Dielectric Strength	〉2.5×VDCW. 50mA Max
Test Parameters	1MHz±50KHz, 1.0±0.2 VRMS, below 1000pF, 25℃ 1KHz±50Hz, 1.0±0.2 VRMS, above 1000pF, 25℃

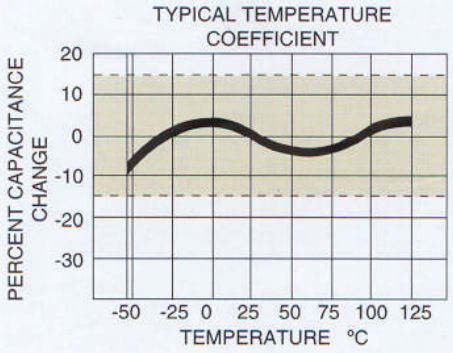


X7R

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

Capacitance Change	△C 0±15%
Temperature Range	-55℃ to 125℃
Dissipation Factor	〈 0.025(2.5%) @ 1KHz, 25℃
Insulation Resistance	〉1000ΩF or 100GΩ, whichever is less, @25℃, VDCW. @125℃, IR is 10% Of 25℃ requirement
Dielectric Strength	〉2.5×VDCW. 50mA Max
Aging	〈 2.5% / decade hour
Test Parameters	1KHz±50Hz, 1.0±0.2 VRMS, 25℃

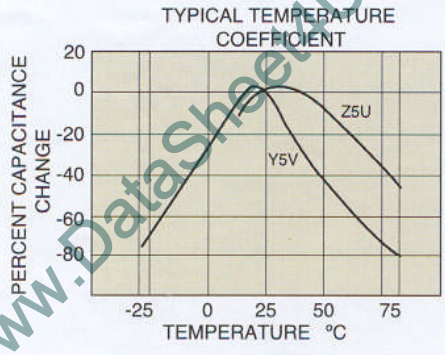


Z5U / Y5V

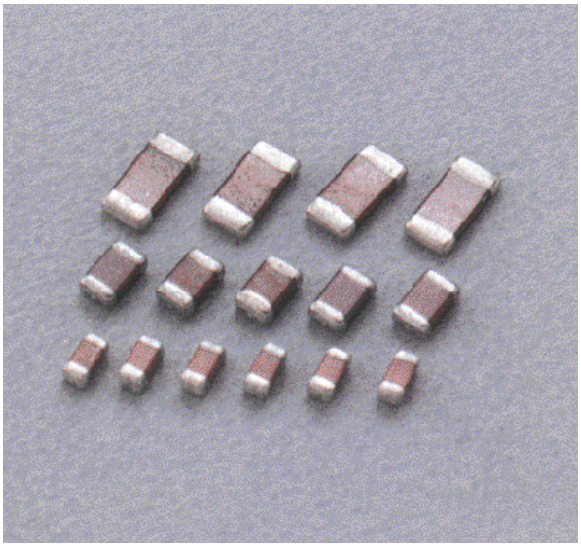
APPLICATION - The Hi-K(Z5U. Y5V) dielectrics deliver high capacitance density and are ideally suited for applications where space is at a premium, or as replacement for tantalum capacitors, Typical applications include use as by-pass or decoupling elements.
Best performance is obtained at or near room tempereture, with low D.C. bias

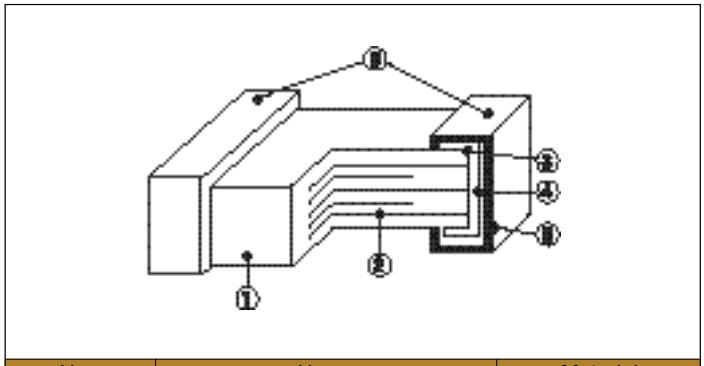
DIELECTRIC CHARACTERISTICS

Capacitance Change	Z5U/Y5V: △C%+22～-56/ △C%+22～-82
Temperature Range	Z5U/Y5V: 10℃～+85℃/ -30℃ ～+85℃
Dissipation Factor	Z5U/Y5V:〈0.04 (4%) / 〈0.05 (5%)@1KHz, 25℃
Insulation Resistance	〉1000ΩF or 100 GΩ, whichever is less, @ 25℃ VDCW
Dielectric Strength	〉2.5×VDCW, 50mA Max
Aging	〈5% / decade hour
Test Parameters	1KHz±50Hz, 0.5 VRMS, 25℃



SMD Type





No.	Name		Material
1	Ceramic dielectric		Ceramics
2	Internal electrode		Palladium Silver
3	Terminal Electrode		Silver
4	Intermediate	Electric plating	Nickel
5	External		Solder

TYPE DESIGNATION (HOW TO ORDER)

CS 2012 Z5U 104 M 500 N R

CAPACITANC CODE (picofarads)
1st two digits are significant; third digit denotes number of zeros:

331=330pF
R denotes decimal
8R2=8.2pF

See chart capacitance range

TOLERANCE CODE
¶ B = ° ±0.1 pF
¶ C = ° ±0.25 pF
¶ D = ° ±0.5 pF
F = ° ±1%
G= ° ±2%
J = ° ±5%
K = ° ±10%
M= ° ±20%
Z = +80~-20%
P = +100~-0%
¶ For capacitance values below 10 pF only.

VOLTAGE CODE
1st two digits are significant: third digit denotes number of zeros.

Standard Voltages :

250 = 25 VDCW
500 = 50 VDCW

DIELECTRIC CODE

C0G
X7R
Z5U
Y5V

TERMINAL CODE

P = Palladium Silver
S = Silver
N = Nickel

SIZE CODE
See chart

PACKING CODE
B = BULK PACK
R = REEL PACK

TYPE CODE

SMD Type

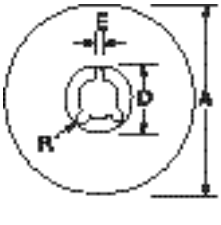
CAPACITANCE RANGE AND DIMENSIONS BY TYPE

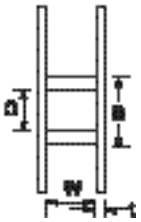
SIZE CODE		1608				2012				3216				3225			
SIZE(mm)	L	1.60° 0.1				2.00° 0.20				3.20° 0.25				3.20° 0.25			
	W	0.80° 0.1				1.25° 0.15				1.60° 0.20				2.50° 0.25			
	T	0.80° 0.1				1.20 MAX				1.20 MAX				1.30 MAX			
CAPACITANCE VALUE		C0G	X7R	Z5U	Y5V	C0G	X7R	Z5U	Y5V	C0G	X7R	Z5U	Y5V	C0G	X7R	Z5U	Y5V
0.5pF	0R5	0R5				0R5				0R5							
1	010																
2	020																
3	030																
4	040																
5	050																
6	060																
7	070																
8	080																
9	090																
10	100																
12	120																
15	150																
16	160																
18	180																
20	200																
22	220													220			
24	240																
27	270																
30	300																
33	330																
36	360																
39	390		390														
43	430																
47	470																
51	510																
56	560																
62	620																
68	680																
75	750			750													
82	820																
91	910																
100	101						101				101						
120	121																
150	151																
180	181																
220	221																
270	271																
330	331				331												
390	391																
470	471	471															
560	561																
680	681																
820	821																
1000	102					102		102							102		
1200	122																
1500	152																
1800	182																
2200	222																
2700	272									272							
3300	332																
3900	392																
4700	472													472			
5600	562																
6800	682																
8200	822																
10nF	103								103			103	103			103	103
15	153		153														
22	223			223													
33	333																
47	473																
68	683																
100	104				104		104	104			104						
150	154														154		
220	224																
330	334																
470	474											474				474	
680	684																
1000	105								105				105				105

SMD Type

REEL PACKING DIMENSIONS

REEL DIMENSIONS





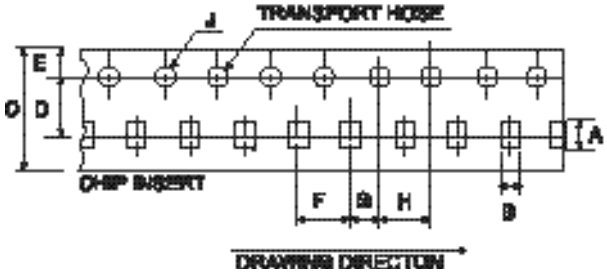
(Unit : mm)

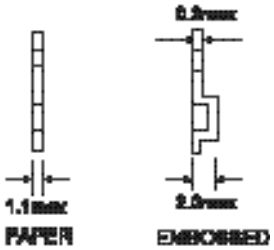
A	ϐ178A° 2e	E	2.0° 0.5
B	ϐ50Min	W	10.0° 0.5
C	ϐ13.0° 0.5	t	2.0° 0.5
D	ϐ21.0° 0.8	R	1.0

NUMBER OF PACKAGES

TYPE	EIA CODE	Qt / REEL
CS1608	CC0603	4.000pcs
CS2012	CC0805	4.000
CS3216	CC1206	3.000 4.000
CS3225	CC1210	3.000

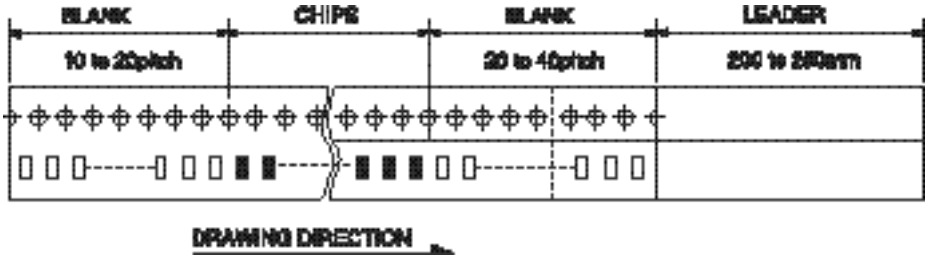
TAPE DIMENSIONS





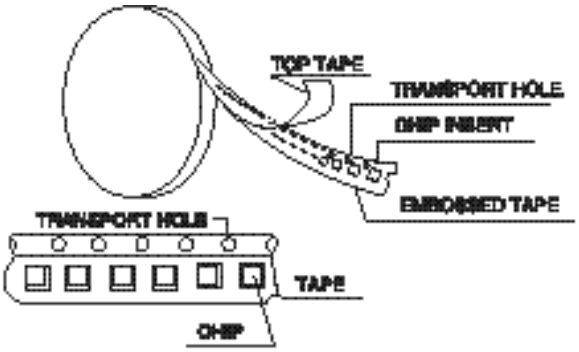
(Unit : mm)

TYPE	EIA CODE	A	B	C	D	E	F	G	H	J
CS1608	CC0603	2.0° 0.2	1.20° 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	1.5° 0.1 ° 0
CS2012	CC0805	2.4° 0.2	1.65° 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	1.5° 0.1 ° 0
CS3216	CC1206	3.6° 0.2	2.00° 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	1.5° 0.1 ° 0
CS3225	CC1210	3.6° 0.2	2.90° 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	1.5° 0.1 ° 0

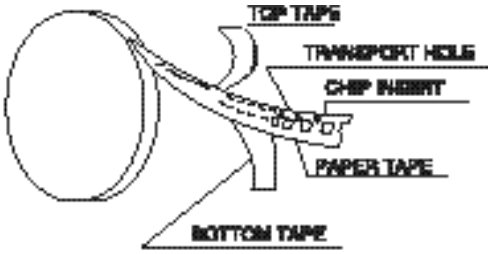


TAPING (FIGURE)

(1) EMBOSSED TAPE



(2) PAPER TAPE



Radial & Axial

TYPE DESIGNATION (HOW TO ORDER)

(HOW TO ORDER)

CR	051B	X7R	104	M	500	B
CA	2644	Z5U	104	M	500	R

CAPACITANCE CODE
THIS IS EXPRESSED IN PICOFARADS THE FIRST DIGITS ARE SIGNIFICANT FIGURES. THE THIRD IS THE NUMBER OF ZEROS.

TOLERANCE CODE

¶ B = ° 0.1 pF
¶ C = ° 0.25 pF
¶ D = ° 0.5 pF
F = ° 1%
G= ° 2%
J = ° 5%
K = ° 10%
M= ° 220%
Z = + 80° 20%
P = +100° 0%
¶ For capacitance values Below 10 pF only.

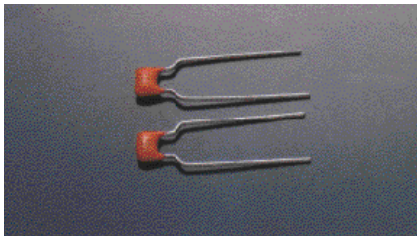
EIA TEMPERATURE CHARACTERISTICS

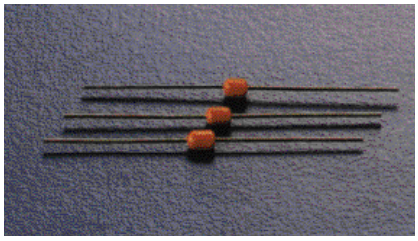
EIA Characteristic	Temperature Range	Maximum Capacitance Change Over Temperature Range
Z5U	+10° to + 85°	-56% + 22%
X7R	- 55° to + 125°	° 15%
COG(NPO)	- 55° to + 125°	0° 30ppm/°
Y5V	- 30° to + 85°	-82%+22%

VOLTAGE RATING.
THE D.C WORKING VOLTAGE RATING AT MAXIMUM OPERATING TEMPERATURE THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS

TYPE CODE
SEE DIMENSIONS.

PACKING CODE
B° BULK PACK
R° REEL PACK
F° FLAT PACK

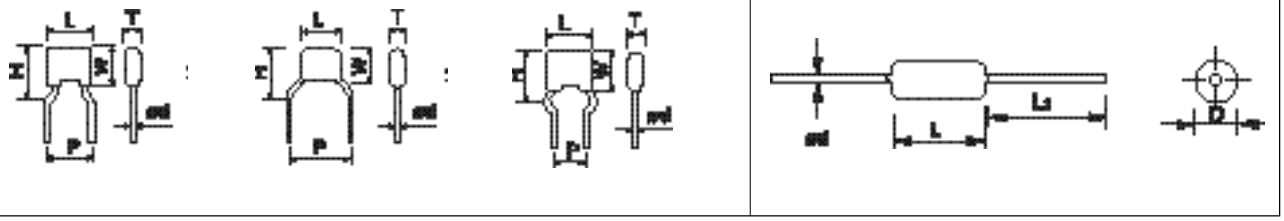




DIMENSIONS BY TYPE

(Unit : mm)

RADIAL							AXIAL				
TYPE	P	H (max)	L (max)	W (max)	ßd	T (max)	TYPE	H (max)	L (max)	W (max)	ßdj
CR051A	2.5	6.4	5.1	5.1	0.5	3.2	CA2633	3.3	2.6	25	0.5
CR051B	5.0						CA2644	4.4			
CR051D	7.6						CA2666	6.6			
CR077B	5.0	9.2	7.7	7.6							
CR077D	7.6	10.2									



Radial & Axial

CAPACITANCE RANGE TYPE

CAPACITANCE VALUE		RADIAL								AXIAL							
	TYPE	CR051				CR077				CA2644				CA2666			
		C0G	X7R	Z5U	Y5V	C0G	X7R	Z5U	Y5V	C0G	X7R	Z5U	Y5V	C0G	X7R	Z5U	Y5V
1pF	010	010								010							
2	020																
3	030																
4	040																
5	050																
6	060																
7	070																
8	080																
9	090																
10	100																
12	120																
15	150																
16	160																
18	180																
20	200																
22	220					220								220			
24	240																
27	270																
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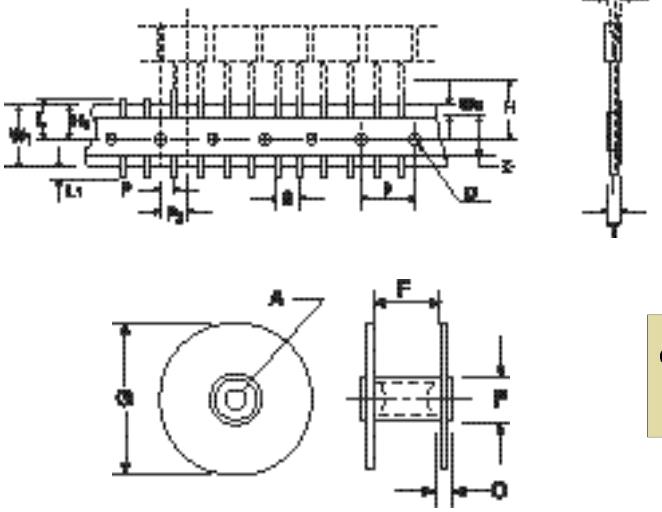
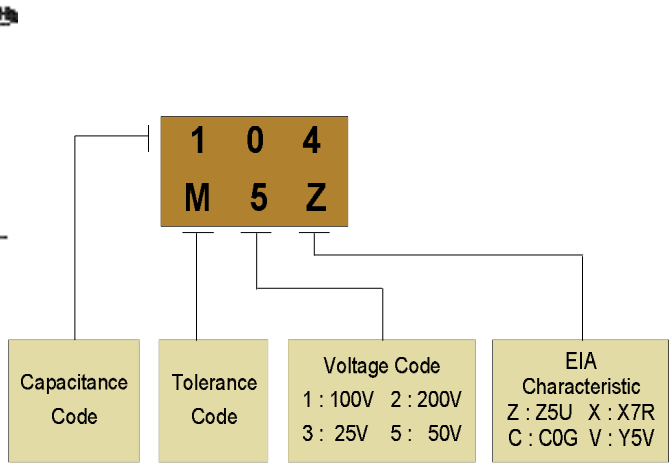
33	330																
36	360																
39	390																
43	430																
47	470																
51	510																
56	560																
62	620																
68	680																
75	750																
82	820																
91	910																
100	101		101								101						
120	121																
150	151																
180	181																
220	221																
270	271																
330	331																
390	391																
470	471																
560	561																
680	681																
820	821																
1000	102			102			102					102			102	102	
1200	122									122							
1500	152																
1800	182																
2200	222													222			
2700	272																
3300	332	332															
3900	392																
4700	472																
5600	562																
6800	682																
8200	822																
10nF	103				103	103							103				
15	153							153									
22	223																
33	333																
47	473										473						
68	683																
100	104								104			104	104		104		104
150	154		154														
220	224						224										
330	334															334	334
470	474			474	474			474									
680	684																
1000	105								105								

Radial & Axial

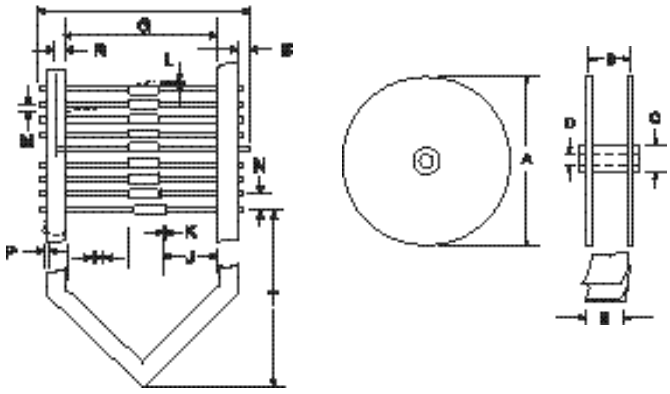
MARKING (PRINT ON THE ONE SIDE)





(Unit : mm)

CODE	DIMENSIONS	TOLERANCE	CODE	DIMENSIONS	TOLERANCE	CODE	DIMENSIONS	TOLERANCE
D	3.98	° 0.30	P1	3.86	° 0.71	C æ	9.50	min
H	16.00	° 0.50	P2	6.35	° 1.29	E æ	29.97-50.04	within range
H1	8.99	° 0.76-0.50	T	0.89	max	F æ	34.89-102.00	within range
H2	0.00	° 2.00	W1	18.00	+0.99-0.50	G æ	76.20-358.14	within range
L	11.00	max	W2	0.00	6.00 max	S	5.00	° 0.78
L1	1.52	max	A	13.79-38.10	Within range	°	No adhesive may be exposed	
P	12.70	° 0.30	B	28.57-86.00	Within range	æ		



(Unit : mm)

CODE	F		G	
PACKING TYPE	52	26	52	26
DIMENSION	64.8	38.8	52	26
TOLERANCE	+2.0 -0		° 1.25	

(Unit : mm)

CODE	DIMENSIONS	TOLERANCE	CODE	DIMENSIONS	TOLERANCE	CODE	DIMENSIONS	TOLERANCE
A	356.00	max	H	=J	° 1.20	N	5.00	° 0.40
B	F+3.17~F+6.35	Within range	J	=H	° 1.20	P	0.80	max
C	35.70		K	0.80	max	R	3.20	min
D	15.90		L	1.20	max	S	1.60	max
E	63.50		M	1.20	max	T	610.00	min