APPROVAL SHEET

MULTILAYER CERAMIC CAPACITORS

Microwave Series (RF)

01005 to 1111 Sizes (6.3V to 1500V)

NP0 & X8G Dielectrics

Halogen Free & RoHS Compliance

*Contents in this sheet are subject to change without prior notice.

1. INTRODUCTION

MLCC consists of a conducting material and electrodes. To manufacture a chip-type SMT and achieve miniaturization, high density and high efficiency, ceramic condensers are used.

WTC RF series MLCC is used at high frequencies generally have a small temperature coefficient of capacitance, typical within the ±30ppm/℃ required for NP0 (C0G) & X8G classification and have excellent conductivity internal electrode. Thus, WTC RF series MLCC will be with the feature of low ESR and high Q characteristics.

2. FEATURES

a. High Q and low ESR performance at high frequency.
b. Ultra low capacitance to 0.1pF.
c. Can offer high precision tolerance to ±0.05pF.
d. Quality improvement of telephone calls for low power loss and better performance.

3. APPLICATIONS

a. Telecommunication products & equipments: Mobile phone, WLAN, Base station.
b. RF module: Power amplifier, VCO.
c. Tuners.

4. HOW TO ORDER

RF	15	N	100	J	500	C	T
Series	**Size**	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
RF=Ultra High Q & Low ESR	**02**=01005(0402) **03**=0201 (0603) **15**=0402 (1005) **18**=0603 (1608) **11**=0505 (1414) **21**=0805 (2012) **22**=1111 (2828)	**N**=NP0 **G**=X8G	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 0R5=0.5pF 1R0=1.0pF 100=10x10^0 =10pF	**A**=±0.05pF **B**=±0.1pF **C**=±0.25pF **D**=±0.5pF **F**=±1% **G**=±2% **J**=±5%	Two significant digits followed by no. of zeros. And R is in place of decimal point. **6R3**=6.3 VDC **100**=10 VDC **250**=25 VDC **500**=50 VDC **101**=100 VDC **201**=200 VDC **251**=250 VDC **501**=500 VDC **152**=1500 VDC	**C**=Cu/Ni/Sn	**T**=7" reeled **G**= 13" reeled

5. EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol		Remark	M_B (mm)
01005 (0402)	0.40±0.02	0.20±0.02	0.20±0.02	V	#	0.10±0.03
0201 (0603)	0.60±0.03	0.30±0.03	0.30±0.03	L	#	0.15±0.05
0402 (1005)	1.00±0.05	0.50±0.05	0.50±0.05	N	#	0.25+0.05/-0.10
0603 (1608)	1.60±0.10	0.80±0.10	0.80±0.07	S		0.40±0.15
	1.60 +0.15/-0.10	0.80 +0.15/-0.10	0.50±0.10	H		
0805 (2012)	2.00±0.15	1.25±0.10	0.60±0.10	A		0.50±0.20
	2.00±0.20	1.25±0.20	0.85±0.10	T		
0505 (1414)	1.40 +0.38/-0.25	1.40±0.38	1.15±0.15	J	#	0.25+0.25/-0.13
1111 (2828)	2.79 +0.51/-0.25	2.79±0.38	≤ 1.78	G	#	0.38±0.25

Reflow soldering only is recommended.

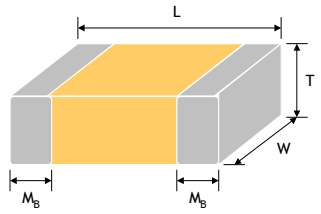

Fig. 1 The outline of MLCC

6. GENERAL ELECTRICAL DATA

Dielectric	NP0	X8G
Size	01005, 0201, 0402, 0505, 0603, 0805, 1111	0805
Capacitance*	0.1pF to 1000pF	0.2pF~82pF
Capacitance tolerance	Cap≤5pF: A (±0.05pF), B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: B (±0.1pF), C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%)	
Rated voltage (WVDC)	6.3V, 10V, 25V, 50V, 100V, 200V, 250V, 500V, 1500V	250V, 500V
Q*	01005, 0201, 0402/25V~50V: Cap<30pF:Q≥400+20C; Cap≥30pF:Q≥1000 0402/100V~200V, 0603, 0805, 0505, 1111: Cap<30pF:Q≥800+20C; Cap≥30pF:Q≥1400	
Insulation resistance at Ur	≥10GΩ or RxC≥100Ω-F whichever is smaller.	
Operating temperature	-55 to +125℃	-55 to +150℃
Capacitance change	±30ppm/℃	
Termination	Ni/Sn (lead-free termination)	

* Measured at the conditions of 25℃ ambient temper ature and 30~70% related humidity.
Apply 1.0±0.2Vrms, 1.0MHz±10% for Cap≤1000pF and 1.0±0.2Vrms, 1.0kHz±10% for Cap>1000pF.

7. PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape	
			7" reel	13" reel
01005 (0402)	0.20±0.02	V	20,000	-
0201 (0603)	0.30±0.03	L	15,000	70,000
0402 (1005)	0.50±0.05	N	10,000	50,000
0603 (1608)	0.80±0.07	S	4,000	15,000
	0.50±0.10	H	4,000	-
0805 (2012)	0.60±0.10	A	4,000	15,000
	0.85±0.10	T	4,000	15,000
Size	**Thickness (mm)/Symbol**		**Plastic tape**	
			7" reel	**13" reel**
0505 (1414)	1.15±0.15	J	3,000	-
1111 (2828)	≤ 1.78	G	2,000	-

Unit: pieces

8. CAPACITANCE RANGE (NP0)

DIELECTRIC		NP0		
SIZE		01005		Tolerance
RATED VOLTAGE (VDC)		16	25	
Capacitance	0.2pF (0R2)	V	V	A, B
	0.3pF (0R3)	V	V	A, B
	0.4pF (0R4)	V	V	A, B
	0.5pF (0R5)	V	V	A, B, C
	0.6pF (0R6)	V	V	A, B, C
	0.7pF (0R7)	V	V	A, B, C
	0.75pF (R75)	V	V	A, B, C
	0.8pF (0R8)	V	V	A, B, C
	0.9pF (0R9)	V	V	A, B, C
	1.0pF (1R0)	V	V	A, B, C
	1.1pF (1R1)	V	V	A, B, C
	1.2pF (1R2)	V	V	A, B, C
	1.3pF (1R3)	V	V	A, B, C
	1.5pF (1R5)	V	V	A, B, C
	1.6pF (1R6)	V	V	A, B, C
	1.8pF (1R8)	V	V	A, B, C
	2.0pF (2R0)	V	V	A, B, C
	2.2pF (2R2)	V	V	A, B, C
	2.4pF (2R4)	V	V	A, B, C
	2.7pF (2R7)	V	V	A, B, C
	3.0pF (3R0)	V	V	A, B, C
	3.3pF (3R3)	V	V	A, B, C
	3.6pF (3R6)	V	V	A, B, C
	3.9pF (3R9)	V	V	A, B, C
	4.0pF (4R0)	V	V	A, B, C
	4.3pF (4R3)	V	V	A, B, C
	4.7pF (4R7)	V	V	A, B, C
	5.0pF (5R0)	V	V	A, B, C
	5.1pF (5R1)	V	V	B, C, D
	5.6pF (5R6)	V	V	B, C, D
	6.0pF (6R0)	V	V	B, C, D
	6.2pF (6R2)	V		B, C, D
	6.7pF (6R7)	V		B, C, D
	6.8pF (6R8)	V		B, C, D
	7.0pF (7R0)	V		B, C, D
	7.5pF (7R5)	V		B, C, D
	8.0pF (8R0)	V		B, C, D
	8.2pF (8R2)	V		B, C, D
	9.0pF (9R0)	V		B, C, D
	9.1pF (9R1)	V		B, C, D
	10pF (100)	V	V	C ,D, G
	12pF (120)	V	V	J
	15pF (150)	V	V	J
	20pF (200)	V	V	J
	22pF (220)	V	V	J

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact WTC local representative.

DIELECTRIC		NP0									
SIZE		0201					0402				Tolerance
RATED VOLTAGE (VDC)		6.3	10	25	50	100	25	50	100	200	
Capacitance	0.1pF (0R1)	L	L	L	L	L	N	N	N*	N*	A, B
	0.2pF (0R2)	L	L	L	L	L	N	N	N	N	A, B
	0.3pF (0R3)	L	L	L	L	L	N	N	N	N	A, B
	0.4pF (0R4)	L	L	L	L	L	N	N	N	N	A, B
	0.5pF (0R5)	L	L	L	L	L	N	N	N	N	A, B, C
	0.6pF (0R6)	L	L	L	L	L	N	N	N	N	A, B, C
	0.7pF (0R7)	L	L	L	L	L	N	N	N	N	A, B, C
	0.75pF (R75)	L	L	L	L	L	N	N	N	N	A, B, C
	0.8pF (0R8)	L	L	L	L	L	N	N	N	N	A, B, C
	0.9pF (0R9)	L	L	L	L	L	N	N	N	N	A, B, C
	1.0pF (1R0)	L	L	L	L	L	N	N	N	N	A, B, C
	1.1pF (1R1)	L	L	L	L	L	N	N	N	N	A, B, C
	1.2pF (1R2)	L	L	L	L	L	N	N	N	N	A, B, C
	1.3pF (1R3)	L	L	L	L	L	N	N	N	N	A, B, C
	1.4pF (1R4)	L	L	L	L	L	N	N	N	N	A, B, C
	1.5pF (1R5)	L	L	L	L	L	N	N	N	N	A, B, C
	1.6pF (1R6)	L	L	L	L	L	N	N	N	N	A, B, C
	1.7pF (1R7)	L	L	L	L	L	N	N	N	N	A, B, C
	1.8pF (1R8)	L	L	L	L	L	N	N	N	N	A, B, C
	1.9pF (1R9)	L	L	L	L	L	N	N	N	N	A, B, C
	2.0pF (2R0)	L	L	L	L	L	N	N	N	N	A, B, C
	2.1pF (2R1)	L	L	L	L	L	N	N	N	N	A, B, C
	2.2pF (2R2)	L	L	L	L	L	N	N	N	N	A, B, C
	2.3pF (2R3)	L	L	L	L	L	N	N	N	N	A, B, C
	2.4pF (2R4)	L	L	L	L	L	N	N	N	N	A, B, C
	2.5pF (2R5)	L	L	L	L	L	N	N	N	N	A, B, C
	2.6pF (2R6)	L	L	L	L	L	N	N	N	N	A, B, C
	2.7pF (2R7)	L	L	L	L	L	N	N	N	N	A, B, C
	2.8pF (2R8)	L	L	L	L	L	N	N	N	N	A, B, C
	2.9pF (2R9)	L	L	L	L	L	N	N	N	N	A, B, C
	3.0pF (3R0)	L	L	L	L	L	N	N	N	N	A, B, C
	3.1pF (3R1)	L	L	L	L	L	N	N	N	N	A, B, C
	3.2pF (3R2)	L	L	L	L	L	N	N	N	N	A, B, C
	3.3pF (3R3)	L	L	L	L	L	N	N	N	N	A, B, C
	3.4pF (3R4)	L	L	L	L	L	N	N	N	N	A, B, C
	3.5pF (3R5)	L	L	L	L	L	N	N	N	N	A, B, C
	3.6pF (3R6)	L	L	L	L	L	N	N	N	N	A, B, C
	3.7pF (3R7)	L	L	L	L	L	N	N	N	N	A, B, C
	3.8pF (3R8)	L	L	L	L	L	N	N	N	N	A, B, C
	3.9pF (3R9)	L	L	L	L	L	N	N	N	N	A, B, C
	4.0pF (4R0)	L	L	L	L	L	N	N	N	N	A, B, C
	4.1pF (4R1)	L	L	L	L	L	N	N	N	N	A, B, C
	4.2pF (4R2)	L	L	L	L	L	N	N	N	N	A, B, C
	4.3pF (4R3)	L	L	L	L	L	N	N	N	N	A, B, C
	4.4pF (4R4)	L	L	L	L	L	N	N	N	N	A, B, C
	4.5pF (4R5)	L	L	L	L	L	N	N	N	N	A, B, C
	4.6pF (4R6)	L	L	L	L	L	N	N	N	N	A, B, C
	4.7pF (4R7)	L	L	L	L	L	N	N	N	N	A, B, C
	4.8pF (4R8)	L	L	L	L	L	N	N	N	N	A, B, C
	4.9pF (4R9)	L	L	L	L	L	N	N	N	N	A, B, C
	5.0pF (5R0)	L	L	L	L	L	N	N	N	N	A, B, C
	5.1pF (5R1)	L	L	L	L	L	N	N	N	N	B, C, D
	5.2pF (5R2)	L	L	L	L	L	N	N	N	N	B, C, D
	5.3pF (5R3)	L	L	L	L	L	N	N	N	N	B, C, D
	5.4pF (5R4)	L	L	L	L	L	N	N	N	N	B, C, D
	5.5pF (5R5)	L	L	L	L	L	N	N	N	N	B, C, D
	5.6pF (5R6)	L	L	L	L	L	N	N	N	N	B, C, D
	5.7pF (5R7)	L	L	L	L	L	N	N	N	N	B, C, D
	5.8pF (5R8)	L	L	L	L	L	N	N	N	N	B, C, D
	5.9pF (5R9)	L	L	L	L	L	N	N	N	N	B, C, D
	6.0pF (6R0)	L	L	L	L	L	N	N	N	N	B, C, D

*. The letter in cell with " * " mark is expressed the capacitance tolerance "B tolerance(±0.1pF)" only.

1. The letter in cell is expressed the symbol of product thickness.

2. For more information about products with special capacitance or other data, please contact WTC local representative.

DIELECTRIC		NP0									
SIZE		0201					0402				Tolerance
RATED VOLTAGE (VDC)		6.3	10	25	50	100	25	50	100	200	
Capacitance	6.1pF (6R1)	L	L	L	L	L	N	N	N	N	B, C, D
	6.2pF (6R2)	L	L	L	L	L	N	N	N	N	B, C, D
	6.3pF (6R3)	L	L	L	L	L	N	N	N	N	B, C, D
	6.4pF (6R4)	L	L	L	L	L	N	N	N	N	B, C, D
	6.5pF (6R5)	L	L	L	L	L	N	N	N	N	B, C, D
	6.6pF (6R6)	L	L	L	L	L	N	N	N	N	B, C, D
	6.7pF (6R7)	L	L	L	L	L	N	N	N	N	B, C, D
	6.8pF (6R8)	L	L	L	L	L	N	N	N	N	B, C, D
	6.9pF (6R9)	L	L	L	L	L	N	N	N	N	B, C, D
	7.0pF (7R0)	L	L	L	L	L	N	N	N	N	B, C, D
	7.1pF (7R1)	L	L	L	L	L	N	N	N	N	B, C, D
	7.2pF (7R2)	L	L	L	L	L	N	N	N	N	B, C, D
	7.3pF (7R3)	L	L	L	L	L	N	N	N	N	B, C, D
	7.4pF (7R4)	L	L	L	L	L	N	N	N	N	B, C, D
	7.5pF (7R5)	L	L	L	L	L	N	N	N	N	B, C, D
	7.6pF (7R6)	L	L	L	L	L	N	N	N	N	B, C, D
	7.7pF (7R7)	L	L	L	L	L	N	N	N	N	B, C, D
	7.8pF (7R8)	L	L	L	L	L	N	N	N	N	B, C, D
	7.9pF (7R9)	L	L	L	L	L	N	N	N	N	B, C, D
	8.0pF (8R0)	L	L	L	L	L	N	N	N	N	B, C, D
	8.1pF (8R1)	L	L	L	L	L	N	N	N	N	B, C, D
	8.2pF (8R2)	L	L	L	L	L	N	N	N	N	B, C, D
	8.3pF (8R3)	L	L	L	L	L	N	N	N	N	B, C, D
	8.4pF (8R4)	L	L	L	L	L	N	N	N	N	B, C, D
	8.5pF (8R5)	L	L	L	L	L	N	N	N	N	B, C, D
	8.6pF (8R6)	L	L	L	L	L	N	N	N	N	B, C, D
	8.7pF (8R7)	L	L	L	L	L	N	N	N	N	B, C, D
	8.8pF (8R8)	L	L	L	L	L	N	N	N	N	B, C, D
	8.9pF (8R9)	L	L	L	L	L	N	N	N	N	B, C, D
	9.0pF (9R0)	L	L	L	L	L	N	N	N	N	B, C, D
	9.1pF (9R1)	L	L	L	L	L	N	N	N	N	B, C, D
	9.2pF (9R2)	L	L	L	L	L	N	N	N	N	B, C, D
	9.3pF (9R3)	L	L	L	L	L	N	N	N	N	B, C, D
	9.4pF (9R4)	L	L	L	L	L	N	N	N	N	B, C, D
	9.5pF (9R5)	L	L	L	L	L	N	N	N	N	B, C, D
	9.6pF (9R6)	L	L	L	L	L	N	N	N	N	B, C, D
	9.7pF (9R7)	L	L	L	L	L	N	N	N	N	B, C, D
	9.8pF (9R8)	L	L	L	L	L	N	N	N	N	B, C, D
	9.9pF (9R9)	L	L	L	L	L	N	N	N	N	B, C, D
	10pF (100)	L	L	L	L	L	N	N	N	N	F, G, J
	11pF (110)	L	L	L	L		N	N	N	N	F, G, J
	12pF (120)	L	L	L	L		N	N	N	N	F, G, J
	13pF (130)	L	L	L	L		N	N	N	N	F, G, J
	15pF (150)	L	L	L	L		N	N	N	N	F, G, J
	16pF (160)	L	L	L	L		N	N	N	N	F, G, J
	18pF (180)	L	L	L	L		N	N	N	N	F, G, J
	20pF (200)	L	L	L	L		N	N	N	N	F, G, J
	22pF (220)	L	L	L			N	N	N	N	F, G, J
	24pF (240)	L	L	L			N	N	N	N	F, G, J
	27pF (270)	L	L	L			N	N	N	N	F, G, J
	30pF (300)	L	L	L			N	N	N	N	F, G, J
	33pF (330)	L	L	L			N	N	N	N	F, G, J
	36pF (360)						N	N	N		F, G, J
	39pF (390)						N	N	N		F, G, J
	43pF (430)						N	N	N		F, G, J
	47pF (470)						N	N	N		F, G, J
	56pF (560)						N	N	N		F, G, J
	68pF (680)						N	N			F, G, J
	82pF (820)						N	N			F, G, J
	100pF (101)						N	N			F, G, J

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact WTC local representative.

DIELECTRIC		NP0									
SIZE		0505			0603			0805				Tolerance
RATED VOLTAGE (VDC)		50	100	250	50	100	250	50	100	250	500	
Capacitance	0.1pF (0R1)				H	H	H					A, B
	0.2pF (0R2)				H	H	H	A	A	A	A	A, B
	0.3pF (0R3)				S	S	S	T	T	T	T	A, B
	0.4pF (0R4)	J	J	J	S	S	S	T	T	T	T	A, B
	0.5pF (0R5)	J	J	J	S	S	S	T	T	T	T	A, B, C
	0.6pF (0R6)	J	J	J	S	S	S	T	T	T	T	A, B, C
	0.7pF (0R7)	J	J	J	S	S	S	T	T	T	T	A, B, C
	0.8pF (0R8)	J	J	J	S	S	S	T	T	T	T	A, B, C
	0.9pF (0R9)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.0pF (1R0)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.1pF (1R1)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.2pF (1R2)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.3pF (1R3)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.4pF (1R4)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.5pF (1R5)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.6pF (1R6)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.7pF (1R7)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.8pF (1R8)	J	J	J	S	S	S	T	T	T	T	A, B, C
	1.9pF (1R9)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.0pF (2R0)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.1pF (2R1)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.2pF (2R2)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.3pF (2R3)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.4pF (2R4)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.5pF (2R5)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.6pF (2R6)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.7pF (2R7)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.8pF (2R8)	J	J	J	S	S	S	T	T	T	T	A, B, C
	2.9pF (2R9)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.0pF (3R0)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.1pF (3R1)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.2pF (3R2)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.3pF (3R3)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.4pF (3R4)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.5pF (3R5)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.6pF (3R6)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.7pF (3R7)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.8pF (3R8)	J	J	J	S	S	S	T	T	T	T	A, B, C
	3.9pF (3R9)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.0pF (4R0)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.1pF (4R1)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.2pF (4R2)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.3pF (4R3)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.4pF (4R4)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.5pF (4R5)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.6pF (4R6)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.7pF (4R7)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.8pF (4R8)	J	J	J	S	S	S	T	T	T	T	A, B, C
	4.9pF (4R9)	J	J	J	S	S	S	T	T	T	T	A, B, C
	5.0pF (5R0)	J	J	J	S	S	S	T	T	T	T	A, B, C
	5.1pF (5R1)	J	J	J	S	S	S	T	T	T	T	B, C, D
	5.2pF (5R2)	J	J	J	S	S	S	T	T	T	T	B, C, D
	5.3pF (5R3)	J	J	J	S	S	S	T	T	T	T	B, C, D
	5.4pF (5R4)	J	J	J	S	S	S	T	T	T	T	B, C, D
	5.5pF (5R5)	J	J	J	S	S	S	T	T	T	T	B, C, D
	5.6pF (5R6)	J	J	J	S	S	S	T	T	T	T	B, C, D
	5.7pF (5R7)	J	J	J	S	S	S	T	T	T	T	B, C, D
	5.8pF (5R8)	J	J	J	S	S	S	T	T	T	T	B, C, D
	5.9pF (5R9)	J	J	J	S	S	S	T	T	T	T	B, C, D
	6.0pF (6R0)	J	J	J	S	S	S	T	T	T	T	B, C, D

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact WTC local representative.

DIELECTRIC		NP0										
SIZE		0505			0603			0805				Tolerance
RATED VOLTAGE (VDC)		50	100	250	50	100	250	50	100	250	500	
Capacitance	6.1pF (6R1)	J	J	J	S	S	S	T	T	T	T	B, C, D
	6.2pF (6R2)	J	J	J	S	S	S	T	T	T	T	B, C, D
	6.3pF (6R3)	J	J	J	S	S	S	T	T	T	T	B, C, D
	6.4pF (6R4)	J	J	J	S	S	S	T	T	T	T	B, C, D
	6.5pF (6R5)	J	J	J	S	S	S	T	T	T	T	B, C, D
	6.6pF (6R6)	J	J	J	S	S	S	T	T	T	T	B, C, D
	6.7pF (6R7)	J	J	J	S	S	S	T	T	T	T	B, C, D
	6.8pF (6R8)	J	J	J	S	S	S	T	T	T	T	B, C, D
	6.9pF (6R9)	J	J	J	S	S	S	T	T	T	T	B, C, D
	7.0pF (7R0)	J	J	J	S	S	S	T	T	T	T	B, C, D
	7.1pF (7R1)	J	J	J	S	S	S	T	T	T	T	B, C, D
	7.2pF (7R2)	J	J	J	S	S	S	T	T	T	T	B, C, D
	7.3pF (7R3)	J	J	J	S	S	S	T	T	T	T	B, C, D
	7.4pF (7R4)	J	J	J	S	S	S	T	T	T	T	B, C, D
	7.5pF (7R5)	J	J	J	S	S	S	T	T	T	T	B, C, D
	7.6pF (7R6)	J	J	J	S	S	S	T	T	T	T	B, C, D
	7.7pF (7R7)	J	J	J	S	S	S	T	T	T	T	B, C, D
	7.8pF (7R8)	J	J	J	S	S	S	T	T	T	T	B, C, D
	7.9pF (7R9)	J	J	J	S	S	S	T	T	T	T	B, C, D
	8.0pF (8R0)	J	J	J	S	S	S	T	T	T	T	B, C, D
	8.1pF (8R1)	J	J	J	S	S	S	T	T	T	T	B, C, D
	8.2pF (8R2)	J	J	J	S	S	S	T	T	T	T	B, C, D
	8.3pF (8R3)	J	J	J	S	S	S	T	T	T	T	B, C, D
	8.4pF (8R4)	J	J	J	S	S	S	T	T	T	T	B, C, D
	8.5pF (8R5)	J	J	J	S	S	S	T	T	T	T	B, C, D
	8.6pF (8R6)	J	J	J	S	S	S	T	T	T	T	B, C, D
	8.7pF (8R7)	J	J	J	S	S	S	T	T	T	T	B, C, D
	8.8pF (8R8)	J	J	J	S	S	S	T	T	T	T	B, C, D
	8.9pF (8R9)	J	J	J	S	S	S	T	T	T	T	B, C, D
	9.0pF (9R0)	J	J	J	S	S	S	T	T	T	T	B, C, D
	9.1pF (9R1)	J	J	J	S	S	S	T	T	T	T	B, C, D
	9.2pF (9R2)	J	J	J	S	S	S	T	T	T	T	B, C, D
	9.3pF (9R3)	J	J	J	S	S	S	T	T	T	T	B, C, D
	9.4pF (9R4)	J	J	J	S	S	S	T	T	T	T	B, C, D
	9.5pF (9R5)	J	J	J	S	S	S	T	T	T	T	B, C, D
	9.6pF (9R6)	J	J	J	S	S	S	T	T	T	T	B, C, D
	9.7pF (9R7)	J	J	J	S	S	S	T	T	T	T	B, C, D
	9.8pF (9R8)	J	J	J	S	S	S	T	T	T	T	B, C, D
	9.9pF (9R9)	J	J	J	S	S	S	T	T	T	T	B, C, D
	10pF (100)	J	J	J	S	S	S	T	T	T	T	F, G, J
	11pF (110)	J	J	J	S	S	S	T	T	T	T	F, G, J
	12pF (120)	J	J	J	S	S	S	T	T	T	T	F, G, J
	13pF (130)	J	J	J	S	S	S	T	T	T	T	F, G, J
	15pF (150)	J	J	J	S	S	S	T	T	T	T	F, G, J
	16pF (160)	J	J	J	S	S	S	T	T	T	T	F, G, J
	18pF (180)	J	J	J	S	S	S	T	T	T	T	F, G, J
	20pF (200)	J	J	J	S	S	S	T	T	T	T	F, G, J
	22pF (220)	J	J	J	S	S	S	T	T	T	T	F, G, J
	24pF (240)	J	J	J	S	S	S	T	T	T	T	F, G, J
	27pF (270)	J	J	J	S	S	S	T	T	T	T	F, G, J
	30pF (300)	J	J	J	S	S	S	T	T	T	T	F, G, J
	33pF (330)	J	J	J	S	S	S	T	T	T	T	F, G, J
	36pF (360)	J	J	J	S	S	S	T	T	T	T	F, G, J
	39pF (390)	J	J	J	S	S	S	T	T	T	T	F, G, J
	43pF (430)	J	J	J	S	S	S	T	T	T	T	F, G, J
	47pF (470)	J	J	J	S	S	S	T	T	T	T	F, G, J
	56pF (560)	J	J	J	S	S	S	T	T	T	T	F, G, J
	68pF (680)	J	J	J	S	S	S	T	T	T	T	F, G, J
	82pF (820)	J	J	J	S	S	S	T	T	T		F, G, J
	100pF (101)	J	J	J	S	S	S	T	T	T		F, G, J
	120pF (121)				S			T	T	T		F, G, J
	150pF (151)				S			T	T	T		F, G, J
	180pF (181)				S			T	T	T		F, G, J
	220pF (221)				S			T	T	T		F, G, J

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2. For more information about products with special capacitance or other data, please contact WTC local representative.

DIELECTRIC		NP0						
SIZE		1111						Tolerance
RATED VOLTAGE (VDC)		50	100	200	250	500	1500	
Capacitance	1.0pF (1R0)	G	G	G	G	G	G	A, B, C
	1.1pF (1R1)	G	G	G	G	G	G	A, B, C
	1.2pF (1R2)	G	G	G	G	G	G	A, B, C
	1.3pF (1R3)	G	G	G	G	G	G	A, B, C
	1.5pF (1R5)	G	G	G	G	G	G	A, B, C
	1.6pF (1R6)	G	G	G	G	G	G	A, B, C
	1.8pF (1R8)	G	G	G	G	G	G	A, B, C
	2.0pF (2R0)	G	G	G	G	G	G	A, B, C
	2.2pF (2R2)	G	G	G	G	G	G	A, B, C
	2.4pF (2R4)	G	G	G	G	G	G	A, B, C
	2.7pF (2R7)	G	G	G	G	G	G	A, B, C
	3.0pF (3R0)	G	G	G	G	G	G	A, B, C
	3.3pF (3R3)	G	G	G	G	G	G	A, B, C
	3.6pF (3R6)	G	G	G	G	G	G	A, B, C
	3.9pF (3R9)	G	G	G	G	G	G	A, B, C
	4.0pF (4R0)	G	G	G	G	G	G	A, B, C
	4.3pF (4R3)	G	G	G	G	G	G	A, B, C
	5.0pF (5R0)	G	G	G	G	G	G	A, B, C
	5.1pF (5R1)	G	G	G	G	G	G	B, C, D
	5.6pF (5R6)	G	G	G	G	G	G	B, C, D
	6.0pF (6R0)	G	G	G	G	G	G	B, C, D
	6.8pF (6R8)	G	G	G	G	G	G	B, C, D
	7.0pF (7R0)	G	G	G	G	G	G	B, C, D
	8.0pF (8R0)	G	G	G	G	G	G	B, C, D
	8.2pF (8R2)	G	G	G	G	G	G	B, C, D
	10pF (100)	G	G	G	G	G	G	F, G, J
	12pF (120)	G	G	G	G	G	G	F, G, J
	15pF (150)	G	G	G	G	G	G	F, G, J
	18pF (180)	G	G	G	G	G	G	F, G, J
	22pF (220)	G	G	G	G	G	G	F, G, J
	27pF (270)	G	G	G	G	G	G	F, G, J
	33pF (330)	G	G	G	G	G	G	F, G, J
	39pF (390)	G	G	G	G	G		F, G, J
	47pF (470)	G	G	G	G	G		F, G, J
	56pF (560)	G	G	G	G	G		F, G, J
	68pF (680)	G	G	G	G	G		F, G, J
	82pF (820)	G	G	G	G	G		F, G, J
	100pF (101)	G	G	G	G	G		F, G, J
	120pF (121)	G	G	G	G	G		F, G, J
	150pF (151)	G	G	G	G	G		F, G, J
	180pF (181)	G	G	G	G	G		F, G, J
	220pF (221)	G	G	G	G	G		F, G, J
	270pF (271)	G	G	G	G	G		F, G, J
	330pF (331)	G	G	G	G	G		F, G, J
	390pF (391)	G	G	G	G	G		F, G, J
	470pF (471)	G	G	G	G	G		F, G, J
	560pF (561)	G	G	G	G	G		F, G, J
	680pF (681)	G	G	G	G	G		F, G, J
	820pF (821)	G	G	G	G	G		F, G, J
	1000pF (102)	G	G	G	G	G		F, G, J

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2. For more information about products with special capacitance or other data, please contact WTC local representative.

CAPACITANCE RANGE (X8G)

DIELECTRIC		X8G		
SIZE		0805		Tolerance
RATED VOLTAGE (VDC)		250	500	
Capacitance	0.2pF (0R2)	A	A	A, B
	0.3pF (0R3)	T	T	A, B
	0.4pF (0R4)	T	T	A, B
	0.5pF (0R5)	T	T	A, B, C
	0.6pF (0R6)	T	T	A, B, C
	0.7pF (0R7)	T	T	A, B, C
	0.8pF (0R8)	T	T	A, B, C
	0.9pF (0R9)	T	T	A, B, C
	1.0pF (1R0)	T	T	A, B, C
	1.1pF (1R1)	T	T	A, B, C
	1.2pF (1R2)	T	T	A, B, C
	1.3pF (1R3)	T	T	A, B, C
	1.4pF (1R4)	T	T	A, B, C
	1.5pF (1R5)	T	T	A, B, C
	1.6pF (1R6)	T	T	A, B, C
	1.7pF (1R7)	T	T	A, B, C
	1.8pF (1R8)	T	T	A, B, C
	1.9pF (1R9)	T	T	A, B, C
	2.0pF (2R0)	T	T	A, B, C
	2.1pF (2R1)	T	T	A, B, C
	2.2pF (2R2)	T	T	A, B, C
	2.3pF (2R3)	T	T	A, B, C
	2.4pF (2R4)	T	T	A, B, C
	2.5pF (2R5)	T	T	A, B, C
	2.6pF (2R6)	T	T	A, B, C
	2.7pF (2R7)	T	T	A, B, C
	2.8pF (2R8)	T	T	A, B, C
	2.9pF (2R9)	T	T	A, B, C
	3.0pF (3R0)	T	T	A, B, C
	3.1pF (3R1)	T	T	A, B, C
	3.2pF (3R2)	T	T	A, B, C
	3.3pF (3R3)	T	T	A, B, C
	3.4pF (3R4)	T	T	A, B, C
	3.5pF (3R5)	T	T	A, B, C
	3.6pF (3R6)	T	T	A, B, C
	3.7pF (3R7)	T	T	A, B, C
	3.8pF (3R8)	T	T	A, B, C
	3.9pF (3R9)	T	T	A, B, C
	4.0pF (4R0)	T	T	A, B, C
	4.1pF (4R1)	T	T	A, B, C
	4.2pF (4R2)	T	T	A, B, C
	4.3pF (4R3)	T	T	A, B, C
	4.4pF (4R4)	T	T	A, B, C
	4.5pF (4R5)	T	T	A, B, C
	4.6pF (4R6)	T	T	A, B, C
	4.7pF (4R7)	T	T	A, B, C
	4.8pF (4R8)	T	T	A, B, C
	4.9pF (4R9)	T	T	A, B, C
	5.0pF (5R0)	T	T	A, B, C
	5.1pF (5R1)	T	T	B, C, D
	5.2pF (5R2)	T	T	B, C, D
	5.3pF (5R3)	T	T	B, C, D
	5.4pF (5R4)	T	T	B, C, D
	5.5pF (5R5)	T	T	B, C, D
	5.6pF (5R6)	T	T	B, C, D
	5.7pF (5R7)	T	T	B, C, D
	5.8pF (5R8)	T	T	B, C, D
	5.9pF (5R9)	T	T	B, C, D
	6.0pF (6R0)	T	T	B, C, D

DIELECTRIC		X8G		
SIZE		0805		Tolerance
RATED VOLTAGE (VDC)		250	500	
Capacitance	6.1pF (6R1)	T	T	B, C, D
	6.2pF (6R2)	T	T	B, C, D
	6.3pF (6R3)	T	T	B, C, D
	6.4pF (6R4)	T	T	B, C, D
	6.5pF (6R5)	T	T	B, C, D
	6.6pF (6R6)	T	T	B, C, D
	6.7pF (6R7)	T	T	B, C, D
	6.8pF (6R8)	T	T	B, C, D
	6.9pF (6R9)	T	T	B, C, D
	7.0pF (7R0)	T	T	B, C, D
	7.1pF (7R1)	T	T	B, C, D
	7.2pF (7R2)	T	T	B, C, D
	7.3pF (7R3)	T	T	B, C, D
	7.4pF (7R4)	T	T	B, C, D
	7.5pF (7R5)	T	T	B, C, D
	7.6pF (7R6)	T	T	B, C, D
	7.7pF (7R7)	T	T	B, C, D
	7.8pF (7R8)	T	T	B, C, D
	7.9pF (7R9)	T	T	B, C, D
	8.0pF (8R0)	T	T	B, C, D
	8.1pF (8R1)	T	T	B, C, D
	8.2pF (8R2)	T	T	B, C, D
	8.3pF (8R3)	T	T	B, C, D
	8.4pF (8R4)	T	T	B, C, D
	8.5pF (8R5)	T	T	B, C, D
	8.6pF (8R6)	T	T	B, C, D
	8.7pF (8R7)	T	T	B, C, D
	8.8pF (8R8)	T	T	B, C, D
	8.9pF (8R9)	T	T	B, C, D
	9.0pF (9R0)	T	T	B, C, D
	9.1pF (9R1)	T	T	B, C, D
	9.2pF (9R2)	T	T	B, C, D
	9.3pF (9R3)	T	T	B, C, D
	9.4pF (9R4)	T	T	B, C, D
	9.5pF (9R5)	T	T	B, C, D
	9.6pF (9R6)	T	T	B, C, D
	9.7pF (9R7)	T	T	B, C, D
	9.8pF (9R8)	T	T	B, C, D
	9.9pF (9R9)	T	T	B, C, D
	10pF (100)	T	T	F, G, J
	11pF (110)	T	T	F, G, J
	12pF (120)	T	T	F, G, J
	13pF (130)	T	T	F, G, J
	15pF (150)	T	T	F, G, J
	16pF (160)	T	T	F, G, J
	18pF (180)	T	T	F, G, J
	20pF (200)	T	T	F, G, J
	22pF (220)	T	T	F, G, J
	24pF (240)	T		F, G, J
	27pF (270)	T		F, G, J
	30pF (300)	T		F, G, J
	33pF (330)	T		F, G, J
	36pF (360)	T		F, G, J
	39pF (390)	T		F, G, J
	43pF (430)	T		F, G, J
	47pF (470)	T		F, G, J
	56pF (560)	T		F, G, J
	68pF (680)	T		F, G, J
	82pF (820)	T		F, G, J

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact WTC local representative.

9. ELECTRICAL CHARACTERISTICS

Please refer ECD on website (by items) for detail ELECTRICAL CHARACTERISTICS:
http://www.passivecomponent.com/product-search/mlcc/

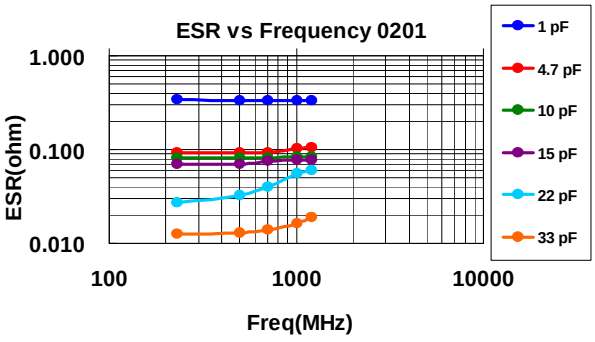


Fig. 2 ESR vs. Frequency (0201 size)

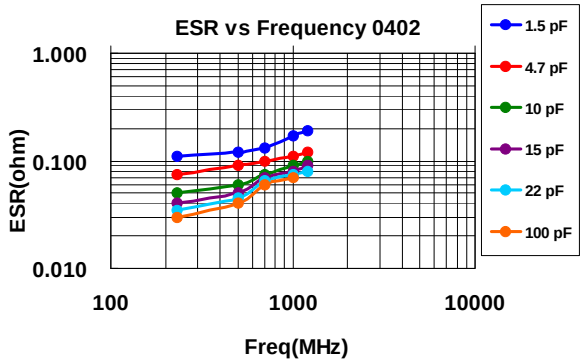


Fig. 3 ESR vs. Frequency (0402 size)

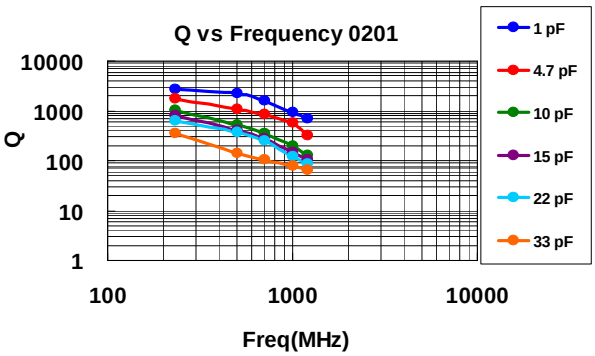


Fig. 4 Q vs. Frequency (0201 size)

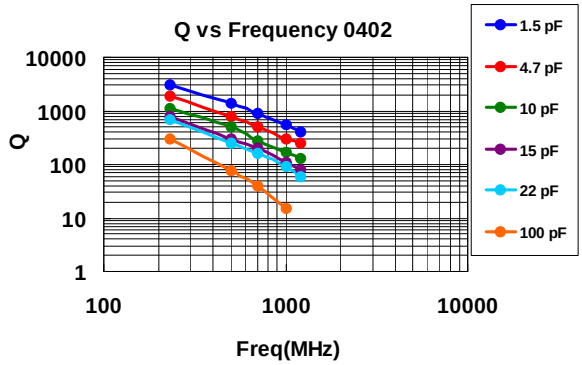


Fig. 5 Q vs. Frequency (0402 size)

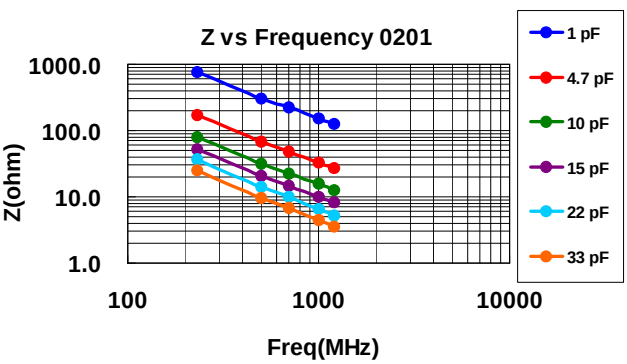


Fig. 6 Impedance vs. Frequency. (0201 size)

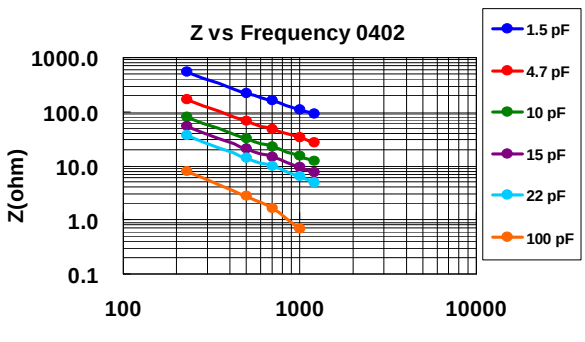


Fig. 7 Impedance vs. Frequency (0402 size)

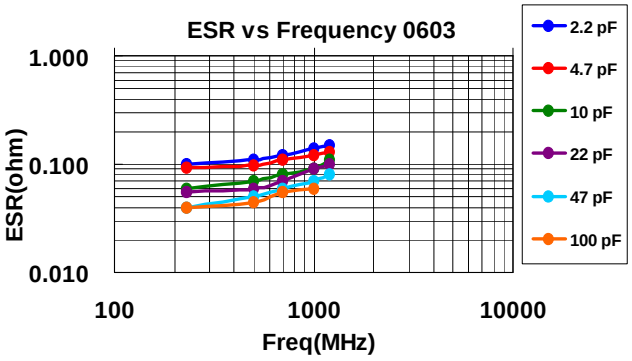


Fig. 8 ESR vs. Frequency (0603 size)

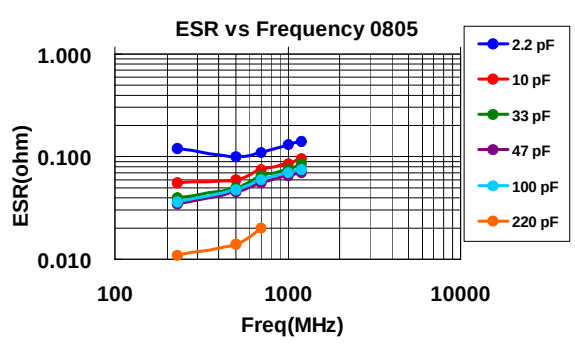


Fig. 9 ESR vs. Frequency (0805 size)

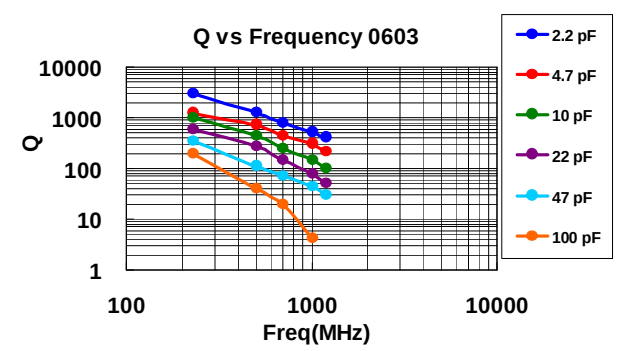


Fig. 10 Q vs. Frequency (0603 size)

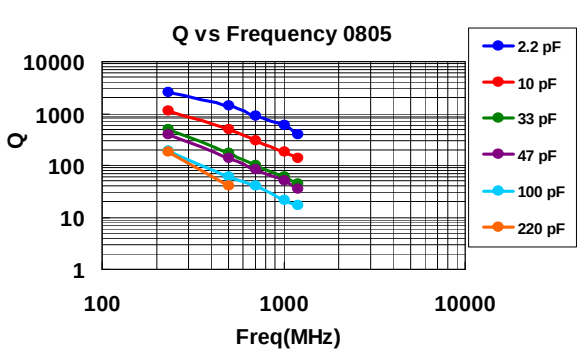


Fig. 11 Q vs. Frequency (0805 size)

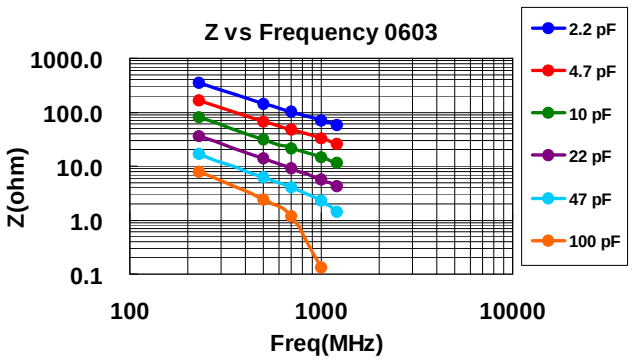


Fig.12 Impedance vs. Frequency. (0603 size)

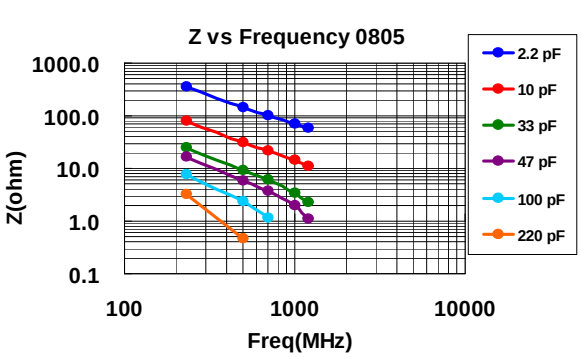


Fig.13 Impedance vs. Frequency (0805 size)

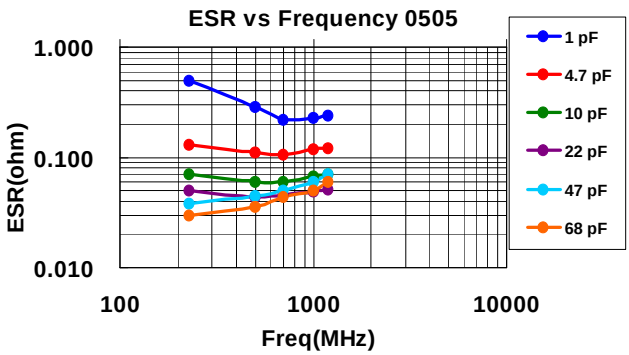


Fig. 14 ESR vs. Frequency (0505 size)

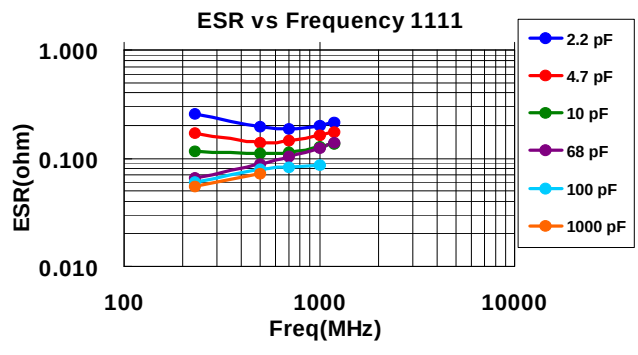


Fig. 15 ESR vs. Frequency (1111 size)

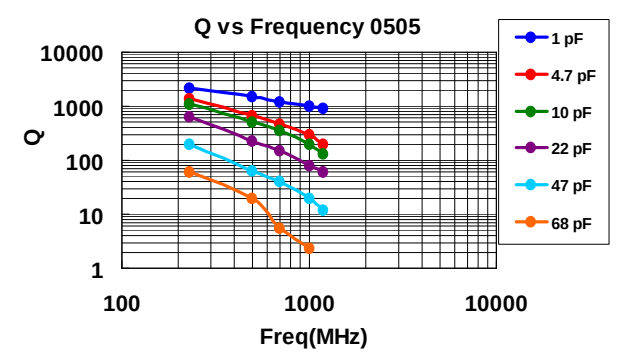


Fig. 16 Q vs. Frequency (0505 size)

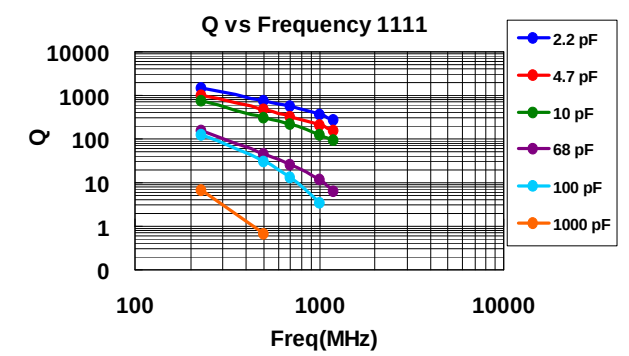


Fig. 17 Q vs. Frequency (1111 size)

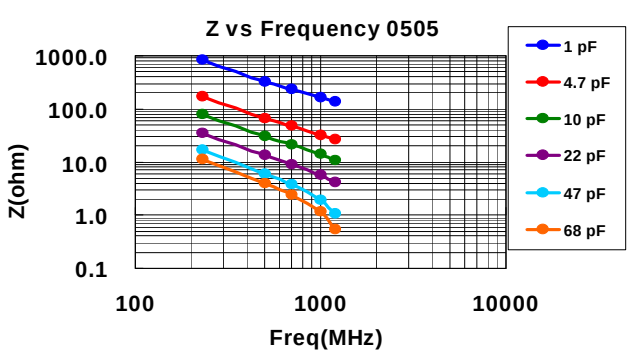


Fig.18 Impedance vs. Frequency. (0505 size)

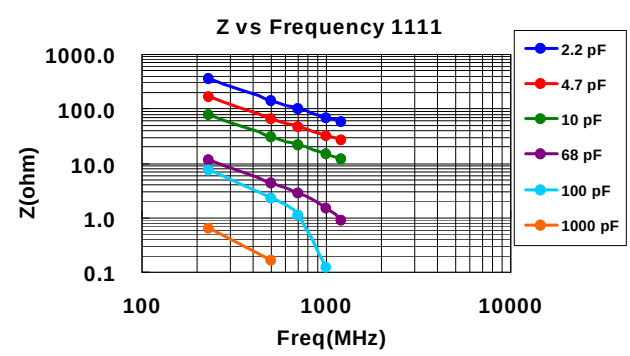


Fig.19 Impedance vs. Frequency. (1111 size)

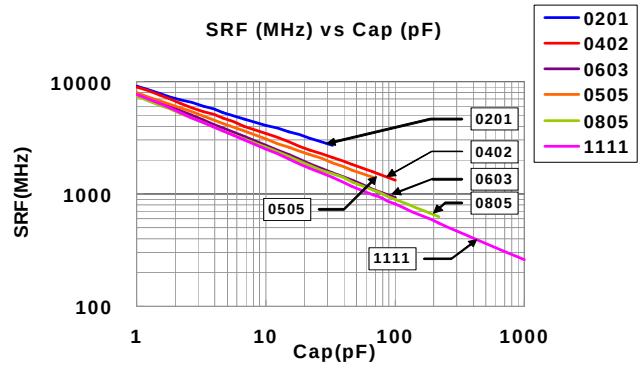


Fig.20 Self resonance frequency vs. Capacitance

10. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	Item	Test Conditions	Requirements
1.	Visual and Mechanical	---	* No remarkable defect. * Dimensions to conform to individual specification sheet.
2.	Capacitance	1.0±0.2Vrms, 1MHz±10%	* Shall not exceed the limits given in the detailed spec.
3.	Q/ D.F. (Dissipation Factor)	At 25℃ ambient temperature.	* 01005, 0201, 0402/25V~50V: Cap<30pF,Q≥400+20C;Cap≥30pF, Q≥1000 *0402/100V~200V, 0603, 0805, 0505, 1111: Cap<30pF:Q≥800+20C;Cap≥30pF:Q≥1400
4.	Dielectric Strength	*To apply voltage: ≦100V : 250% of rated voltage. 200V ~ 300V : 200% of rated voltage. 500V ~ 999V : 150% of rated voltage. 1000V ~ 3000V : 120% of rated voltage. 4000V : 110% of rated voltage. *Duration: 1 to 5 sec. *Charge & discharge current less than 50mA.	* No evidence of damage or flash over during test.
5.	Insulation Resistance	≤100V : To apply rated voltage for max. 120 sec. ≥200V :To apply rated voltage (500V max.) for 60 sec.	≥10GΩ or RxC≥100Ω-F whichever is smaller
6.	Temperature Coefficient	* With no electrical load. * Operating temperature: NP0: -55~125℃ at 25℃ X8G: -55~150℃ at 25℃	* Capacitance change: within ±30ppm/℃;
7.	Adhesive Strength of Termination	* Pressurizing force： 01005: 1N 0201: 2N 0402 to 0603: 5N >0603: 10N * Test time: 10±1 sec.	* No remarkable damage or removal of the terminations.
8.	Vibration Resistance	* Vibration frequency: 10~55 Hz/min. * Total amplitude: 1.5mm * Test time: 6 hrs. (Two hrs each in three mutually perpendicular directions.) *Cap./DF(Q) Measurement to be made after de-aging at 150℃ for 1hr then set for 24±2 hrs at room temp.	* No remarkable damage. * Cap change and Q/D.F.: To meet initial spec.
9.	Solderability	* Solder temperature: 235±5℃ * Dipping time: 2±0.5 sec.	95% min. coverage of all metalized area.
10.	Bending Test	* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 1 mm and then the pressure shall be maintained for 5±1 sec. * Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage. * Cap change: within ±5.0% or ±0.5pF whichever is larger. (This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.)
11.	Resistance to Soldering Heat	* Solder temperature: 260±5℃ * Dipping time: 10±1 sec * Preheating: 120 to 150℃ for 1 minute before imme rse the capacitor in a eutectic solder. *Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150℃ for 1hr then set for 24±2 hrs at room temp.	* No remarkable damage. * Cap change: within ±2.5% or ±0.25pF whichever is larger. * Q/D.F., I.R. and dielectric strength: To meet initial requirements. * 25% max. leaching on each edge.

<table>
<tr><th>No.</th><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>12.</td><td>Temperature Cycle</td><td>* Conduct the five cycles according to the temperatures and time.
<table>
<tr><th>Step</th><th>Temp. (℃)</th><th>Time (min.)</th></tr>
<tr><td>1</td><td>Min. operating temp. +0/-3</td><td>30±3</td></tr>
<tr><td>2</td><td>Room temp.</td><td>2~3</td></tr>
<tr><td>3</td><td>Max. operating temp. +3/-0</td><td>30±3</td></tr>
<tr><td>4</td><td>Room temp.</td><td>2~3</td></tr>
</table>
* Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150℃ for 1hr then set for 24±2 hrs at room temp.</td><td>* No remarkable damage.
* Cap change：within ±2.5% or ±0.25pF whichever is larger.
* Q/D.F., I.R. and dielectric strength: To meet initial requirements.</td></tr>
<tr><td>13.</td><td>Humidity (Damp Heat) Steady State</td><td>* Test temp.: 40±2℃
* Humidity: 90~95% RH
* Test time: 500+24/-0hrs.
* Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150℃ for 1hr then set for 24±2 hrs at room temp.</td><td>* No remarkable damage.
* Cap change: within ±5.0% or ±0.5pF whichever is larger.
* Q/D.F. value: Cap≥30pF, Q≥350;
10pF≤Cap<30pF, Q≥275+2.5C
Cap<10pF; Q≥200+10C
* I.R.: ≥1GΩ.</td></tr>
<tr><td>14.</td><td>Humidity (Damp Heat) Load</td><td>* Test temp.: 40±2℃
* Humidity: 90~95%RH
* Test time: 500+24/-0 hrs.
* To apply voltage：rated voltage (MAX. 500V)
* Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150℃ for 1hr then set for 24±2 hrs at room tem p.</td><td>* No remarkable damage.
* Cap change: within ±7.5% or ±0.75pF whichever is larger.
* Q/D.F. value: Cap≥30pF, Q≥200;
Cap<30pF, Q≥100+10/3C
* I.R.: ≥500MΩ.</td></tr>
<tr><td>15.</td><td>High Temperature Load (Endurance)</td><td>* Test temp.: NP0: 125±3℃
X8G: 150±3℃
* To apply voltage:
(1) 10V≦Ur<500V: 200% of rated voltage.
(2) ≦6.3V or 500V: 150% of rated voltage.
(3) Ur≧630V: 120% of rated voltage.
* Test time: 1000+24/-0 hrs.
* Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150℃ for 1hr then set for 24±2 hrs at room temp</td><td>* No remarkable damage.
* Cap change: within ±3.0% or ±0.3pF whichever is larger.
* Q/D.F. value: Cap≥30pF, Q≥350
10pF≤Cap<30pF, Q≥275+2.5C
Cap<10pF, Q≥200+10C
* I.R.: ≥1GΩ.</td></tr>
<tr><td>16.</td><td>ESR</td><td>The ESR should be measured at room temperature and tested at frequency 1±0.1 GHz.</td><td>
<table>
<tr><th>01005</th><th>0505</th></tr>
<tr><td>0.2pF≤Cap≤1pF:< 700mΩ/pF</td><td>0.4pF≤Cap<1.0pF: < 1500mΩ</td></tr>
<tr><td>1pF<Cap≤2pF:< 600mΩ</td><td>1.0pF≤Cap<10pF: < 250mΩ</td></tr>
<tr><td>2pF<Cap≤5pF:< 500mΩ</td><td>10pF≤Cap≤100pF: < 200mΩ</td></tr>
<tr><td>5pF<Cap≤10pF:< 300mΩ</td><td></td></tr>
<tr><td>10pF<Cap≤22pF:< 350mΩ</td><td></td></tr>
</table>
<table>
<tr><th>0201</th><th>0402</th></tr>
<tr><td>0.1pF≤Cap≤1pF:< 350mΩ/pF</td><td>0.1pF≤Cap≤1pF:< 350mΩ/pF</td></tr>
<tr><td>1pF<Cap≤5pF:< 300mΩ</td><td>1pF<Cap≤5pF:< 300mΩ</td></tr>
<tr><td>5pF<Cap≤22pF:< 250mΩ</td><td>5pF<Cap≤100pF:< 250mΩ</td></tr>
</table>
<table>
<tr><th>0603</th><th>0805</th></tr>
<tr><td>0.1pF≤Cap≤1pF:< 1500mΩ</td><td>0.3pF≤Cap≤1pF: < 1500mΩ</td></tr>
<tr><td>1pF<Cap≤10pF:< 250mΩ</td><td>1pF<Cap≤10pF: < 250mΩ</td></tr>
<tr><td>10pF<Cap≤220pF:< 200mΩ</td><td>Cap>10pF: < 200mΩ</td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td>The ESR should be measured at room temperature and tested at frequency 500±50 MHz.</td><td>0201, 22pF≤Cap≤33pF: < 300mΩ
1111, 100pF<Cap≤1000pF: < 150mΩ</td></tr>
</table>

APPENDIXES

◙ Tape & reel dimensions

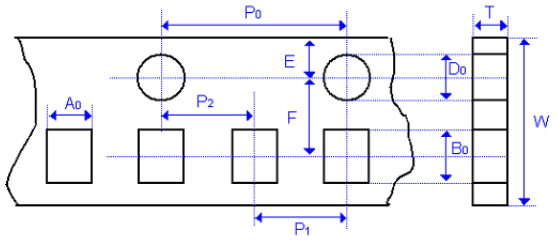


Fig. 21 The dimension of paper tape

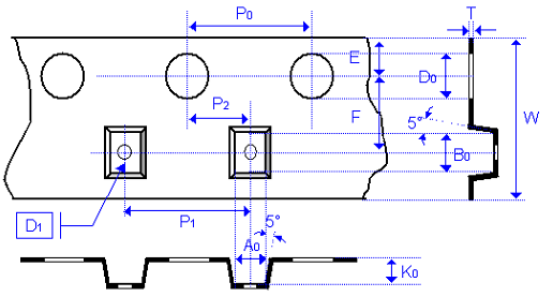


Fig. 22 The dimension of plastic tape

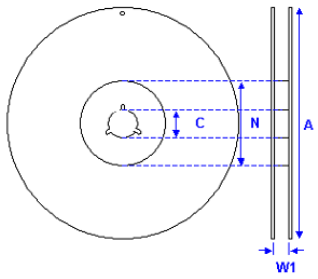
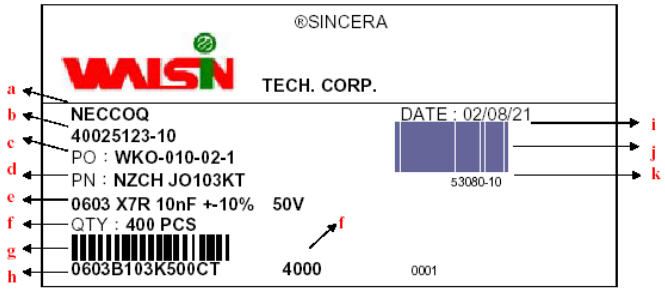


Fig. 23 The dimension of reel

Size	01005	0201	0402	0505	0603	0805	1111
Thickness	V	L	N	J	S	T	G
A_0	0.25 +/-0.05	0.40 +/-0.10	0.70 +/-0.20	< 1.90	1.05 +/-0.30	1.50 +/-0.20	< 3.05
B_0	0.45 +/-0.05	0.70 +/-0.10	1.20 +/-0.20	< 1.90	1.80 +/-0.30	2.30 +/-0.20	< 3.80
T	≦0.50	≦0.55	≦0.80	0.23 +/-0.1	≦1.20	≦1.20	0.23 +/-0.1
K_0	-	-	-	< 1.50	-	-	< 2.50
W	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30
P_0	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10
$10xP_0$	40.00 +/-0.10	40.00 +/-0.10	40.00 +/-0.10	40.00 +/-0.20	40.00 +/-0.20	40.00 +/-0.20	40.00 +/-0.20
P_1	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10
P_2	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05
D_0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0
D_1	-	-	-	1.00 +/-0.10	-	-	1.00 +/-0.10
E	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10
F	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05

Size	01005, 0201, 0402, 0505, 0603, 0805, 1111	
Reel size	7”	13”
C	13.0±0.5	13.0±0.5
W_1	10.0±1.5	10.0±1.5
A	178.0±2.0	330.0±2.0
N	60.0+1.0/-0	50 min

◙ Example of customer label



*Customized label is available upon request

a. Customer name
b. WTC order series and item number
c. Customer P/O
d. Customer P/N
e. Description of product
f. Quantity
g. Bar code including quantity & WTC P/N or customer
h. WTC P/N
i. Shipping date
j. Order bar code including series and item numbers
k. Serial number of label

◙ Constructions

No.	Name		X8G, NP0
①	Ceramic material		Hi-Q dielectric ceramic
②	Inner electrode		Cu
③	Termination	Inner layer	Cu
④		Middle layer	Ni
⑤		Outer layer	Sn (Matt)

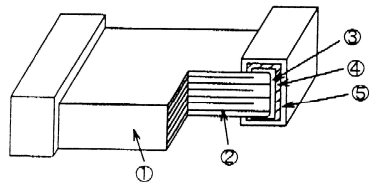


Fig. 24 The construction of MLCC

◙ Storage and handling conditions

(1) To store products at 5 to 40°C ambient temperature and 20 to 70%. related humidity conditions.

(2) The product is recommended to be used within one year after shipment. Check solderability in case of shelf life extension is needed.

Cautions:

a. The corrosive gas reacts on the terminal electrodes of capacitors, and results in the poor solderability. Do not store the capacitors in the ambience of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas etc.)

b. In corrosive atmosphere, solderability might be degraded, and silver migration might occur to cause low reliability.

c. Due to the dewing by rapid humidity change, or the photochemical change of the terminal electrode by direct sunlight,the solderability and electrical performance may deteriorate. Do not store capacitors under direct sunlight or dewing condition. To store products on the shelf and avoid exposure to moisture.

◙ Recommended soldering conditions

The lead-free termination MLCCs are not only to be used on SMT against lead-free solder paste, but also suitable against lead-containing solder paste. If the optimized solder joint is requested, increasing soldering time, temperature and concentration of N_2 within oven are recommended.

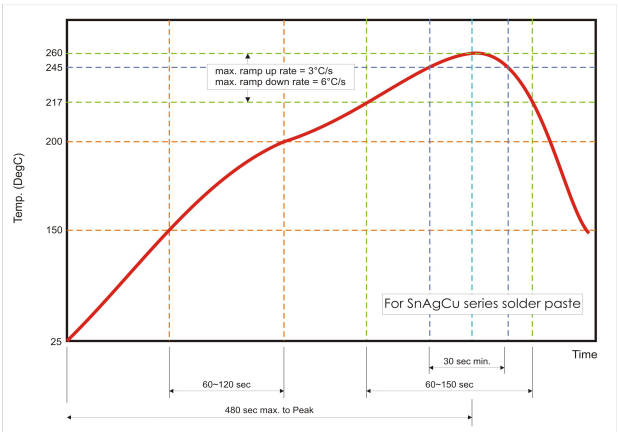


Fig. 25 Recommended reflow soldering profile for SMT process with SnAgCu series solder paste.

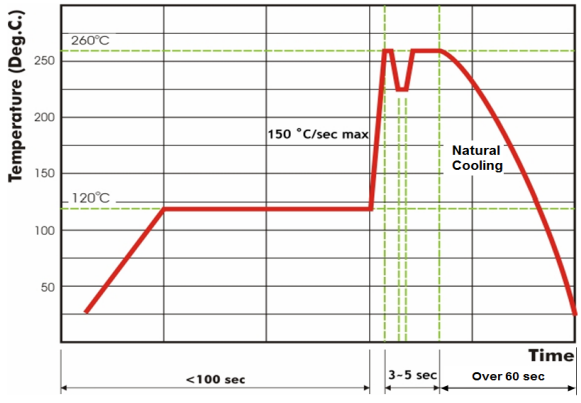


Fig. 26 Recommended wave soldering profile for SMT process with SnAgCu series solder.

Mouser Electronics

Authorized Distributor

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Walsin:

RF15N0R6B500CTNA RF15N270J500CTNA RF15N3R9B500CTNA RF15N0R1B250CTNA RF15N0R2B250CTNA RF15N0R9B250CTNA RF15N1R2C250CTNA RF15N3R3B250CTNA RF15N4R7C250CTNA RF15N4R7C500CTNA RF15N0R3B500CTNA RF15N0R7B500CTNA RF15N0R8B500CTNA RF15N101J250CTNA RF15N120J100CTNA RF15N1R5B500CTNA RF15N1R8C500CTNA RF15N220J100CTNA RF15N390J500CTNA RF15N3R6B500CTNA RF15N3R9B250CTNA RF15N5R0C500CTNA RF15N680J250CTNA RF18N0R3B250CTSA RF18N1R0B500CTSA RF15N5R0B500CTNA RF15N820J250CTNA RF18N3R0B250CTSA RF18N6R0B500CTSA RF18N7R0B500CTSA RF15N0R4B250CTNA RF15N0R8B250CTNA RF15N101J500CTNA RF15N1R0C250CTNA RF15N0R8C500CTNA RF15N1R1B250CTNA RF15N1R5B250CTNA RF15N1R8C250CTNA RF15N200J500CTNA RF15N3R6B250CTNA RF15N3R6C500CTNA RF15N5R6B500CTNA RF15N8R2C250CTNA RF18N2R0B250CTSA RF18N2R2B500CTSA RF18N4R7B500CTSA RF18N5R0C250CTSA RF15N0R4B500CTNA RF15N120J500CTNA RF15N1R5C500CTNA RF15N1R8B500CTNA RF15N2R7B500CTNA RF15N3R9C500CTNA RF15N6R0B500CTNA RF18N1R8B250CTSA RF18N1R8B500CTSA RF18N200J500CTSA RF18N4R0B250CTSA RF18N4R0B500CTSA RF18N5R0C500CTSA RF18N7R0C500CTSA RF18N8R0C250CTSA RF15N2R4C500CTNA RF15N330J500CTNA RF15N3R0C250CTNA RF15N4R0C500CTNA RF15N7R0B250CTNA RF18N3R9B250CTSA RF18N8R0B500CTSA RF18N8R0C500CTSA RF18N4R7B250CTSA RF15N0R9B500CTNA RF15N100J100CTNA RF15N1R2B250CTNA RF15N220J250CTNA RF15N220J500CTNA RF15N270J100CTNA RF15N2R0B250CTNA RF15N3R3C500CTNA RF15N4R7B500CTNA RF15N5R0C250CTNA RF15N7R5B500CTNA RF15N820J500CTNA RF18N0R9B250CTSA RF18N0R9B500CTSA RF18N390J500CTSA RF18N6R8B500CTSA RF15N2R2B500CTNA RF15N4R0B500CTNA RF15N4R3B500CTNA RF15N6R8C500CTNA RF15N7R0B500CTNA RF15N8R2B500CTNA RF18N2R0B500CTSA RF18N3R3B500CTSA RF18N5R0B500CTSA RF15N0R5B250CTNA RF15N0R5B500CTNA RF15N0R6B250CTNA RF15N150J100CTNA