# DARF N MLCC

#### CONTENT (MLCC)

E STANDARD NUMBER	
STRUCTURE	4
ORDERING CODE	
HIGH Q & LOW ESR TYPE (Q SERIES)	5
Test Spec.	10
PACKAGE	12
OTHERS	14

#### **E Standard Number**

E3				1.0					2.2						4.7									
E6		1.	.0			1	.5			2	.2			3	.3			4	.7			6	.8	
E12	1.	.0	1.	2	1.	.5	1.	.8	2	.2	2	.7	3.	.3	3	.9	4	.7	5.	.6	6	.8	8	.2
E24	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1

MLCC

Rev. 202204

DADEON			
DARF⊙N			
Structure			
(4)Nickel Inner Electrode (Ni) (5)Ceramic (Ceramic powder) Class I: CaZrO3 Class II: BaTiO3		(3)Termination ( (2)Termination ( (1)Termination (	Middle Layer (Ni)
Ordering Code	<u>C</u> 100	<u>05 NP0 1</u>	
PRODUCT CODE			
C = MLCC			
SIZE in mm (EIA CODE, in inch)			
0402(01005) 0603(0201) 1005 (0402) 1608 (0603) 3216 (1206) 3225(1210) 4520 (1808) 4532 (1812)		5)	
T. C. NP0: 0 ± 30ppm/℃ -55℃ to +125℃ X7R: ±15% -55℃ to +125℃ X6S: ±22% X5R: ±15% -55℃ to +85℃ Y5V: +22%/-82% CAPACITANCE CODE	-55℃ to + -30℃ to +		
Expressed in pico-farads and identified by a three-digit number.	Code	Cap (pF)	
First two digits represent significant figures.	478	0.47	
Last digit specifies the number of zeros. (Use 9 for 1.0 through 9.9pF; Use 8 for 0.20 through 0.99pF)	229	2.2	
	101	100	
	102	1000	
A: ± 0.05pF B: ± 0.1pF C: ± 0.25pF D: ± 0.5pF J: ±5% K: ±10% M: ±20% Z: +80/-20%	F: ±1%	G: ±2%	
VOLTAGE CODE           B: 4V         C: 6.3V         D: 10V         E: 16V         F: 25V         N: 35V           J: 200V         K: 250V         L: 500V         M: 630V         P: 1KV         Q: 2KV		H: 100V S: 4KV	
PACKAGING CODE			
N: Paper tape reel Ø250mm (10") D: Embosse	d tape reel Ø180 d tape reel Ø250 d tape reel Ø330	0mm (10")	
Application Code			
S: Standard Q: High Q/Low ESR F: Microwave A: Auto	omotive Infotain	ment with AE	C-Q200

### High Q & Low ESR Type (Q Series)

Filtering
 Timing

1.

Application

LC and RC tuned circuit

#### Feature

- 1. Ultra-stable
- 2. Tight tolerance available
- $3. \quad Low \ ESR \ (Frequency is within \ 2.4GHz)$
- 4. Good frequency performance
- 5. No aging of capacitance
- 6. RoHS compliant
- 7. Halogen Free

Standard External Dimensions

# 

TYPE	Dimension (mm)										
(EIA Size)	L (Length)	W (Width)	T (Max.)	g (Min)	A (Min/Max)						
C0603 (0201)	0.6±0.03	0.3±0.03	0.33	0.15	0.10/0.20						
C1005 (0402)	1.0 ± 0.05	0.5 ± 0.05	0.55	0.30	0.15/0.35						
C1608 (0603)	1.6 ± 0.10	0.8 ± 0.10	0.90	0.50	0.25/0.65						

#### Part Number & Characteristic

### • C0603NP0\_Q Series (EIA0201)

RV	DARFON P/N	Measuring	Capaci	tance	Aveilable Televence	Thick.	Toleran	ce(mm)	ESR(1GHz)	Q(1GHz)	Standard
RV	DARFON P/N	Condition	Value	Unit	Available Tolerance	(mm)	L/W	Thick.	mΩ (max.)	(min.)	Packing
	C0603NP0108CGTQ	1V, 1MHz	0.1	pF	±0.25pF	0.30	±0.03	±0.03	4547	350	
	C0603NP0208□GTQ	1V, 1MHz	0.2	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	2274	350	
	C0603NP0308 GTQ	1V, 1MHz	0.3	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	1516	350	
	C0603NP0408□GTQ	1V, 1MHz	0.4	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	1137	350	
	C0603NP0508 GTQ	1V, 1MHz	0.5	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	909	350	
	C0603NP0608 GTQ	1V, 1MHz	0.6	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	758	350	
	C0603NP0708 GTQ	1V, 1MHz	0.7	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	650	350	
	C0603NP0758□GTQ	1V, 1MHz	0.75	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	606	350	
	C0603NP0808□GTQ	1V, 1MHz	0.8	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	568	350	
	C0603NP0908 GTQ	1V, 1MHz	0.9	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	505	350	
	C0603NP0109□GTQ	1V, 1MHz	1.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	455	350	
	C0603NP0119□GTQ	1V, 1MHz	1.1	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	482	300	
	C0603NP0129□GTQ	1V, 1MHz	1.2	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	442	300	
	C0603NP0139□GTQ	1V, 1MHz	1.3	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	408	300	
	C0603NP0149□GTQ	1V, 1MHz	1.4	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	379	300	
50V	C0603NP0159□GTQ	1V, 1MHz	1.5	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	354	300	Paper, 15Kpcs
	C0603NP0169□GTQ	1V, 1MHz	1.6	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	332	300	
	C0603NP0179□GTQ	1V, 1MHz	1.7	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	312	300	
	C0603NP0189□GTQ	1V, 1MHz	1.8	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	295	300	
	C0603NP0209□GTQ	1V, 1MHz	2.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	318	250	
	C0603NP0229□GTQ	1V, 1MHz	2.2	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	289	250	
	C0603NP0249□GTQ	1V, 1MHz	2.4	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	265	250	
	C0603NP0259□GTQ	1V, 1MHz	2.5	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	255	250	
	C0603NP0279□GTQ	1V, 1MHz	2.7	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	236	250	
	C0603NP0309□GTQ	1V, 1MHz	3.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	265	200	
	C0603NP0339□GTQ	1V, 1MHz	3.3	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	241	200	
	C0603NP0369□GTQ	1V, 1MHz	3.6	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	221	200	
	C0603NP0399□GTQ	1V, 1MHz	3.9	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	204	200	
	C0603NP0409CGTQ	1V, 1MHz	4.0	pF	±0.25pF	0.30	±0.03	±0.03	199	200	
	C0603NP0439□GTQ	1V, 1MHz	4.3	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	185	200	
	C0603NP0479□GTQ	1V, 1MHz	4.7	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	169	200	

		Measuring	Capaci	tance		Thick.	Toleran	ce(mm)	ESR(1GHz)	Q(1GHz)	Standard		
RV	DARFON P/N	Condition	Value	Unit	Available Tolerance	(mm)	L/W	Thick.	mΩ (max.)	(min.)	Packing		
	C0603NP0509□GTQ	1V, 1MHz	5.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	177	180			
	C0603NP0519□GTQ	1V, 1MHz	5.1	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	173	180			
	C0603NP0569□GTQ	1V, 1MHz	5.6	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	158	180			
	C0603NP0609 GTQ C0603NP0629 GTQ	1V, 1MHz 1V, 1MHz	6.0 6.2	pF pF	±0.5pF, ±0.25pF, ±0.1pF ±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03 ±0.03	±0.03 ±0.03	147 143	180 180			
	C0603NP0689 GTQ	1V, 1MHz	6.8	pr	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	143	180			
	C0603NP0709□GTQ	1V, 1MHz	7.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	189	120			
	C0603NP0759□GTQ	1V, 1MHz	7.5	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	177	120			
	C0603NP0829□GTQ	1V, 1MHz	8.2	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	162	120			
50V	C0603NP0909□GTQ	1V, 1MHz	9.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	147	120	Paper, 15Kpcs		
	C0603NP0919□GTQ	1V, 1MHz	9.1	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	146	120	·		
	C0603NP0100 GTQ C0603NP0110 GTQ	1V, 1MHz 1V, 1MHz	10 11	pF pF	±5%, ±2% ±5%, ±2%	0.30	±0.03 ±0.03	±0.03 ±0.03	133 138	120 105			
	C0603NP0120 GTQ	1V, 1MHz	12	pr	±5%, ±2%	0.30	±0.03	±0.03	130	90			
	C0603NP0130 GTQ	1V, 1MHz	13	pF	±5%, ±2%	0.30	±0.00	±0.03	153	80			
	C0603NP0150 GTQ	1V, 1MHz	15	pF	±5%, ±2%	0.30	±0.03	±0.03	152	70			
	C0603NP0160□GTQ	1V, 1MHz	16	pF	±5%, ±2%	0.30	±0.03	±0.03	166	60			
	C0603NP0180□GTQ	1V, 1MHz	18	pF	±5%, ±2%	0.30	±0.03	±0.03	147	60			
	C0603NP0200□GTQ	1V, 1MHz	20	pF	±5%, ±2%	0.30	±0.03	±0.03	199	40			
	C0603NP0220 GTQ C0603NP0208 FTQ	1V, 1MHz 1V, 1MHz	22 0.2	pF pF	±5%,±2%,±1% ±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03 ±0.03	±0.03 ±0.03	207 2274	35 350			
	C0603NP0308 TTQ	1V, IMHZ	0.2	pF pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	1516	350			
	C0603NP0408 TTQ	1V, 1MHz	0.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.00 ±0.03	±0.00	1137	350			
	C0603NP0508 TTQ	1V, 1MHz	0.5	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	909	350			
	C0603NP0608□FTQ	1V, 1MHz	0.6	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	758	350			
	C0603NP0708□FTQ	1V, 1MHz	0.7	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	650	350			
	C0603NP0758 FTQ	1V, 1MHz	0.75	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	606	350			
		1V, 1MHz	0.8 0.9	pF pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03 ±0.03	±0.03 ±0.03	568 505	350 350			
	C0603NP0908□FTQ C0603NP0109□FTQ	1V, 1MHz 1V, 1MHz	0.9 1.0	ρ⊢ pF	±0.25pF, ±0.1pF, ±0.05pF ±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	455	350			
	C0603NP0119 TR	1V, 1MHz	1.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.00 ±0.03	±0.00	482	300			
	C0603NP0129□FTQ	1V, 1MHz	1.2	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	442	300			
	C0603NP0139□FTQ	1V, 1MHz	1.3	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	408	300			
	C0603NP0149□FTQ	1V, 1MHz	1.4	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	379	300			
	C0603NP0159DFTQ	1V, 1MHz	1.5	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	354	300			
		1V, 1MHz 1V, 1MHz	1.6 1.8	рF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03 ±0.03	±0.03	332 295	300 300			
	C0603NP0189□FTQ C0603NP0209□FTQ	1V, 1MHz 1V, 1MHz	2.0	pF pF	±0.25pF, ±0.1pF, ±0.05pF ±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03 ±0.03	295 318	250			
	C0603NP0229 TTQ	1V, 1MHz	2.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	289	250			
	C0603NP0249□FTQ	1V, 1MHz	2.4	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	265	250			
	C0603NP0259□FTQ	1V, 1MHz	2.5	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	255	250			
	C0603NP0279□FTQ	1V, 1MHz	2.7	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	236	250			
	C0603NP0309□FTQ	1V, 1MHz	3.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	265	200			
25V	C0603NP0339□FTQ C0603NP0369□FTQ	1V, 1MHz	3.3	pF	±0.25pF, ±0.1pF, ±0.05pF ±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03 ±0.03	±0.03 ±0.03	241 221	200 200	Bapar 15Knaa		
250	C0603NP0399□FTQ	1V, 1MHz 1V, 1MHz	3.6 3.9	pF pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	221	200	Paper, 15Kpcs		
	C0603NP0439□FTQ	1V, 1MHz	4.3	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.00 ±0.03	±0.00	185	200			
	C0603NP0479 FTQ	1V, 1MHz	4.7	pF	±0.25pF, ±0.1pF, ±0.05pF	0.30	±0.03	±0.03	169	200			
	C0603NP0509□FTQ	1V, 1MHz	5.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	177	180			
	C0603NP0519□FTQ	1V, 1MHz	5.1	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	173	180			
	C0603NP0569□FTQ	1V, 1MHz	5.6	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	158	180			
		1V, 1MHz	6.0	рF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	147	180			
	C0603NP0629□FTQ C0603NP0689□FTQ	1V, 1MHz 1V, 1MHz	6.2 6.8	pF pF	±0.5pF, ±0.25pF, ±0.1pF ±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03 ±0.03	±0.03 ±0.03	143 130	180 180			
	C0603NP0709□FTQ	1V, 1MHz	7.0	pr	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	189	120			
	C0603NP0759□FTQ	1V, 1MHz	7.5	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	177	120			
	C0603NP0829□FTQ	1V, 1MHz	8.2	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	162	120			
	C0603NP0909□FTQ	1V, 1MHz	9.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	147	120			
	C0603NP0919 FTQ	1V, 1MHz	9.1	pF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	146	120			
	C0603NP0959 FTQ	1V, 1MHz	9.5	рF	±0.5pF, ±0.25pF, ±0.1pF	0.30	±0.03	±0.03	140	120			
	C0603NP0100□FTQ C0603NP0110□FTQ	1V, 1MHz 1V, 1MHz	10 11	pF pF	±5%, ±2% ±5%, ±2%	0.30	±0.03 ±0.03	±0.03 ±0.03	133 138	120 105			
	C0603NP0120 TTQ	1V, 1MHz 1V, 1MHz	11	рг pF	±5%, ±2%	0.30	±0.03	±0.03	130	90			
	C0603NP0130 TTQ	1V, 1MHz	13	pF	±5%, ±2%	0.30	±0.03	±0.03	153	80	+		
	C0603NP0150□FTQ	1V, 1MHz	15	pF	±5%, ±2%	0.30	±0.03	±0.03	152	70			
	C0603NP0160□FTQ	1V, 1MHz	16	pF	±5%, ±2%	0.30	±0.03	±0.03	166	60			
	C0603NP0180□FTQ	1V, 1MHz	18	pF	±5%, ±2%	0.30	±0.03	±0.03	147	60			
	C0603NP0200□FTQ	1V, 1MHz	20	pF	±5%, ±2%	0.30	±0.03	±0.03	199	40			
	C0603NP0220□FTQ	1V, 1MHz	22	рF	±5%,±2%,±1%	0.30	±0.03	±0.03	207	35			

### DARF<sup>®</sup>N

### • C1005NP0\_Q Series (EIA0402)

			g Capacitance	Available Tolerance	Thick.	Toleran	ce(mm)	ESR(1GHz)	Q(1GHz)	Standard	
RV	DARFON P/N	Condition	Value	Unit	Available Tolerance	(mm)	L/W	Thick.	mΩ (max.)	(min.)	Packing
100V	C1005NP0308□HTQ	1V, 1MHz	0.3	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	1768	300	Bapar 10Kpaa
1000	C1005NP0109 HTQ	1V, 1MHz	1.0	pF	±0.25pF,±0.1pF,±0.05pF	0.50	±0.05	±0.05	531	300	Paper, 10Kpcs
	C1005NP0108BGTQ	1V, 1MHz	0.1	pF	±0.1pF	0.50	±0.05	±0.05	5305	300	
	C1005NP0208□GTQ	1V, 1MHz	0.2	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	2653	300	
	C1005NP0308□GTQ	1V, 1MHz	0.3	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	1768	300	
	C1005NP0408□GTQ	1V, 1MHz	0.4	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	1326	300	
	C1005NP0508□GTQ	1V, 1MHz	0.5	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	1061	300	
	C1005NP0568□GTQ	1V, 1MHz	0.56	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	947	300	
	C1005NP0608□GTQ	1V, 1MHz	0.6	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	884	300	
	C1005NP0708□GTQ	1V, 1MHz	0.7	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	758	300	
	C1005NP0758□GTQ	1V, 1MHz	0.75	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	707	300	
	C1005NP0808□GTQ	1V, 1MHz	0.8	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	663	300	
	C1005NP0828□GTQ	1V, 1MHz	0.82	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	647	300	
	C1005NP0908□GTQ	1V, 1MHz	0.9	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	589	300	
	C1005NP0109□GTQ	1V, 1MHz	1.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	531	300	
	C1005NP0119□GTQ	1V, 1MHz	1.1	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	482	300	
	C1005NP0129□GTQ	1V, 1MHz	1.2	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	531	250	
	C1005NP0139□GTQ	1V, 1MHz	1.3	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	490	250	
	C1005NP0159□GTQ	1V, 1MHz	1.5	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	424	250	
	C1005NP0169□GTQ	1V, 1MHz	1.6	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	398	250	
	C1005NP0189□GTQ	1V, 1MHz	1.8	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	354	250	
	C1005NP0209□GTQ	1V, 1MHz	2.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	398	200	
	C1005NP0229 GTQ	1V, 1MHz	2.2	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	362	200	
	C1005NP0249□GTQ	1V, 1MHz	2.4	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	332	200	
	C1005NP0279□GTQ	1V, 1MHz	2.7	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	295	200	
	C1005NP0299□GTQ	1V, 1MHz	2.9	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	274	200	
	C1005NP0309□GTQ	1V, 1MHz	3.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	265	200	
50V	C1005NP0339□GTQ	1V, 1MHz	3.3	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	241	200	Paper, 10Kpcs
	C1005NP0369□GTQ	1V, 1MHz	3.6	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	246	180	-p-, - p
	C1005NP0399□GTQ	1V, 1MHz	3.9	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	227	180	
	C1005NP0409□GTQ	1V, 1MHz	4.0	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	221	180	
	C1005NP0439 GTQ	1V, 1MHz	4.3	pF	±0.25pF, ±0.1pF	0.50	±0.05	±0.05	206	180	
	C1005NP0479 GTQ	1V, 1MHz	4.7	pF	±0.25pF, ±0.1pF, ±0.05pF	0.50	±0.05	±0.05	188	180	
	C1005NP0509 GTQ	1V, 1MHz	5.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	212	150	
	C1005NP0519 GTQ	1V, 1MHz	5.1	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	208	150	
	C1005NP0569 GTQ	1V, 1MHz	5.6	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	189	150	
	C1005NP0609 GTQ	1V, 1MHz	6.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	177	150	
	C1005NP0629 GTQ	1V, 1MHz	6.2	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	171	150	
	C1005NP0689□GTQ	1V, 1MHz	6.8	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	156	150	
	C1005NP0709 GTQ	1V, 1MHz	7.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	227	100	
	C1005NP0759 GTQ	1V, 1MHz	7.5	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	212	100	
	C1005NP0809 GTQ	1V, 1MHz	8.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	199	100	
	C1005NP0829 GTQ	1V, 1MHz	8.2	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05		194	100	
	C1005NP0909 GTQ	1V, 1MHz	9.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	177	100	
	C1005NP0919 GTQ	1V, 1MHz	9.1	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	175	100	
	C1005NP0959 GTQ	1V, 1MHz	9.5	pF	±0.5pF, ±0.25pF, ±0.1pF	0.50	±0.05	±0.05	186	90	
	C1005NP0100 GTQ	1V, 1MHz	10	pF	±5%, ±2%	0.50	±0.05	±0.05	199	80	
	C1005NP0110 GTQ	1V, 1MHz	11	pF	±5%, ±2%	0.50	±0.05	±0.05	207	70	
	C1005NP0120 GTQ	1V, 1MHz	12	pF	±5%, ±2%	0.50	±0.05	±0.05	221	60	
	C1005NP0150 GTQ	1V, 1MHz	15	pF	±5%, ±2%, ±1%	0.50	±0.05	±0.05	265	40	
	C1005NP0160 GTQ	1V, 1MHz	16	pF	±5%, ±2%, ±1%	0.50	±0.05	±0.05	284	35	
	C1005NP0180 GTQ	1V, 1MHz	18	pF	±5%, ±2%	0.50	±0.05	±0.05	295	30	
	C1005NP0200 GTQ	1V, 1MHz	20	pF	±5%, ±2%	0.50	±0.05	±0.05	398	20	
	C1005NP0220□GTQ	1V, 1MHz	22	pF	±5%, ±2%	0.50	±0.05	±0.05	362	20	
051	C1005NP0508BFTQ	1V, 1MHz	0.5	pF	±0.1pF	0.50	±0.05	±0.05	1061	300	<b>_</b>
25V	C1005NP0209BFTQ	1V, 1MHz	2.0	pF	±0.1pF	0.50	±0.05	±0.05	398	200	Paper, 10Kpcs
	C1005NP0479CFTQ	1V, 1MHz	4.7	pF	±0.25pF	0.50	±0.05	±0.05	188	180	
16V	C1005NP0109BETQ	1V, 1MHz	1.0	pF	±0.1pF	0.50	±0.05	±0.05	531	300	Paper, 10Kpcs

MLCC

□ Tolerance Code: A=±0.05 pF, B=±0.1pF, C=±0.25pF ,D=±0.5pF, G=±2%, J=±5%; Special tolerance on the request.

### • C1608NP0\_Q Series (EIA0603)

CriedBMP0389(TK) IV, Vin Hink 0, 0, P         ft 20 2g1 - 20 1p7 + 20 0g7 - 20 007         LW         Thack         Mul (max),         Packa           CriedBMP0389(TK) IV, Vin Hink 0, 0, P         ft 20 2g1 - 20 1p7 + 20 0g7 - 20 0g7         0.00         0.00         0.00         1.01         1.272         280           CriedBMP0389(TK) IV, Vin Hink 0, 0, P         ft 20 2g1 - 20 1p7 + 20 0g7         0.00         0.00         1.01         1.272         280           CriedBMP0389(TK) IV, Vin Hink 1, 0         ft 20 2g1 - 20 1p7 + 20 0g7         0.00         1.01         0.03         280           CriedBMP039(TK) IV, Vin Hink 1, 20         ft 20 2g1 - 20 1p7 + 20 0g7         0.00         1.01         0.01         421         280           CriedBMP039(TK) IV, Vin Hink 1, 20         ft 10 2g1 - 20 p1 + 0 0g7         0.00         1.01 <t< th=""><th colspan="2"></th><th>Measuring</th><th>Capaci</th><th>tance</th><th>And the balls of the second</th><th>Thick.</th><th>Toleran</th><th>ce(mm)</th><th>ESR(1GHz)</th><th>Q(1GHz)</th><th>Standard</th></t<>			Measuring	Capaci	tance	And the balls of the second	Thick.	Toleran	ce(mm)	ESR(1GHz)	Q(1GHz)	Standard
C1698M-0008/CT0         VI. MML         0.5 <i>p</i> F         40.266/4.016/2.40.066/1         0.00         40.10	RV	DARFON P/N	Condition	Value	Unit	Available Tolerance	(mm)	L/W	Thick.	mΩ (max.)	(min.)	Packing
CHECOMPORTING         1V, HMHE         0.75         pr         10.25pf         10.7pf         10.00         840         10.10         10.10         850         2000           CHEGOMPORED_CTIC         1V, HMHE         10.0         pf         10.25pf         10.17         10.10         10.10         10.10         10.10         60.00         40.10 <td></td> <td>C1608NP0308  KTQ</td> <td>1V, 1MHz</td> <td>0.3</td> <td>рF</td> <td>±0.25pF,±0.1pF, ±0.05pF</td> <td>0.80</td> <td>±0.10</td> <td>±0.10</td> <td>2122</td> <td>250</td> <td></td>		C1608NP0308  KTQ	1V, 1MHz	0.3	рF	±0.25pF,±0.1pF, ±0.05pF	0.80	±0.10	±0.10	2122	250	
CHR08HP080g1TC0         1V, HMHz         0.8         pf         10.25pf         0.05pf         0.050         10.0         10.0         60.0         820           CHR08HP010g1TC0         1V, HMHz         1.2         pf         10.25pf         0.05pf         0.00         10.01         10.01         60.0         830         20.01		C1608NP0508  KTQ	1V, 1MHz	0.5	pF	±0.25pF,±0.1pF, ±0.05pF	0.80	±0.10	±0.10	1273	250	
C1808MP0100_INTO         IV. HM#L         10         pF         40.25pT         0.01pF         0.00pT         0.000p         0.001         0.010 <td></td> <td>C1608NP0758  KTQ</td> <td>1V, 1MHz</td> <td>0.75</td> <td>pF</td> <td>±0.25pF,±0.1pF, ±0.05pF</td> <td>0.80</td> <td>±0.10</td> <td>±0.10</td> <td>849</td> <td>250</td> <td></td>		C1608NP0758  KTQ	1V, 1MHz	0.75	pF	±0.25pF,±0.1pF, ±0.05pF	0.80	±0.10	±0.10	849	250	
C1808MP0120_TCD         TV, MHz         1.2         pf         1.256/F 3.056/F         0.80         1.01         0.01         6.01 <th< td=""><td></td><td>C1608NP0808□KTQ</td><td>1V, 1MHz</td><td>0.8</td><td>pF</td><td>±0.25pF,±0.1pF, ±0.05pF</td><td>0.80</td><td>±0.10</td><td>±0.10</td><td>796</td><td>250</td><td></td></th<>		C1608NP0808□KTQ	1V, 1MHz	0.8	pF	±0.25pF,±0.1pF, ±0.05pF	0.80	±0.10	±0.10	796	250	
C1808MP0159_CTC         11, MiHz         15.         pf         1252pf         201pf         200pf         203         40.01         6.01         40.01		C1608NP0109 KTQ	1V, 1MHz	1.0	pF	±0.25pF,±0.1pF, ±0.05pF	0.80	±0.10	±0.10	637	250	
C1608NP0169_RTVD         VV. 1MHz         18         pF         02567_40.1pF, 0.0567         0.88         40.10         40.10         43.12         200           C1608NP02260PUTO         VV. 1MHZ         2.2         pF         02567_40.1pF, 0.0567         0.88         40.10         40.10         43.21         150           C1608NP02260PUTO         VV. 1MHZ         2.4         pF         02567_40.1pF, 1.00567         0.88         40.10         43.01         43.21         150           C1608NP02260PUTO         VV. 1MHZ         3.3         pF         02567_40.1pF, 1.00567         0.88         40.10         43.01         43.81         100           C1608NP0350PUTO         VV. 1MHZ         3.7         pF         02567_40.1pF, 1.00567         0.88         40.10         40.10         43.01         43.81         100           C1608NP0350PUTO         VV. 1MHZ         5.6         pF         40.2567_40.1pF, 10.0567         0.80         40.10         40.10         33.81         100           C1608NP0369PUTO         VV. 1MHZ         5.6         pF         40.567_40.2567_40.1pF         0.80         40.10         40.10         23.77         70           C1608NP0369PUTO         VV. 1MHZ         6.8         pF         40.567_4		C1608NP0129 KTQ	1V, 1MHz	1.2	pF	±0.25pF,±0.1pF, ±0.05pF	0.80	±0.10	±0.10	663	200	
C1608MP0202FINTO         V1. MHE         2.0         pF         10.26 pf         10.05 pf <th< td=""><td></td><td>C1608NP0159□KTQ</td><td>1V, 1MHz</td><td>1.5</td><td>pF</td><td>±0.25pF,±0.1pF, ±0.05pF</td><td>0.80</td><td>±0.10</td><td>±0.10</td><td>531</td><td>200</td><td></td></th<>		C1608NP0159□KTQ	1V, 1MHz	1.5	pF	±0.25pF,±0.1pF, ±0.05pF	0.80	±0.10	±0.10	531	200	
CH668MP922gHXT0         V1. TMH2         22         pF         42.25pF         20.5pF         0.60         40.10         43.20         150           CH668MP922gHXT0         V1. TMH2         2.7         pF         42.25pF         20.5pF         0.60         40.10         40.10         44.22         150           CH668MP922gHXT0         V1. TMH2         3.3         pF         42.25pF         20.5pF         0.60         40.10         40.10         44.22         150           CH668MP032gHXT0         V1. TMH2         3.3         pF         42.25pF         20.5pF         0.60         40.10         40.10         44.22         1500           CH668MP037gHXT0         V1. TMH2         5.6         pF         42.5pF         20.5pF         0.60         80.10         10.10         337         1500           CH668MP065FLXT0         V1. TMH2         6.8         pF         42.5pF         0.25pF         0.60         80.10         10.10         327         70           CH668MP065FLXT0         V1. TMH2         6.8         pF         42.5pF         0.25pF         0.10         80.10         10.10         327         70           CH668MP065FLXT0         V1. TMH4         1.6         pF		C1608NP0189□KTQ	1V, 1MHz	1.8	pF		0.80	±0.10	±0.10	442	200	
CH08MP024201KT0         V1         MH2         24         PF         30.256/24.0156.0056         0.80         40.10         40.10         30.3         15.0           250W         CH08MP03930KT0         V1         MH2         30         pF         40.256/24.0156.10.056/F         0.80         40.10         40		C1608NP0209□KTQ	1V, 1MHz	2.0	pF	±0.25pF,±0.1pF, ±0.05pF	0.80	±0.10	±0.10	531	150	
CH008NP0220000         CH000NP0220000         CH000NP02200000         CH000NP02200000         CH000NP02200000         CH000NP02200000         CH000NP02200000         CH000NP022000000         CH000NP022000000         CH000NP0220000000         CH000NP0220000000000000000         CH000NP0220000000000000000000000000000000		C1608NP0229  KTQ	1V, 1MHz		pF	±0.25pF,±0.1pF, ±0.05pF	0.80	±0.10	±0.10			
C1608NP00301ChT0         1V         NHz         3.0         pF         40.25pF         10.05pF         40.05pF         40.01         40.10			1V, 1MHz		pF	±0.25pF,±0.1pF, ±0.05pF						
250V         CT608NP039G1ChT         1V. 1MHz         3.3         pF         4025pF,401pF,4005pF         0.00         40.0												
C1608NP039EURD         1V         1MHz         3.9         oF         40.256F.40.15F.10.056F         0.00         4.00         4.00         4.00           C1608NP037EURD         1V         1MHz         5.1         oF         40.256F.40.15F.10.055F         0.00         4.00         3.47         900           C1608NP0850EURD         1V         1MHz         6.0         oF         40.256F.40.256F.40.16F         0.00         40.10         4.01         3.32         800           C1608NP0850EURD         1V         1MHz         6.8         oF         40.256F.40.256F.40.16F         0.80         40.10         40.10         2.27         70           C1608NP0810EURD         1V         1MHz         8.2         oF         40.56F.40.256F.40.16F         0.80         40.10         40.10         2.27         70           C1608NP0810EURD         1V         1MHz         12         oF         ±5%.42%         0.80         40.10         40.10         3.02         3.03           C1608NP0100EURCD         1V         1MHz         12         oF         ±5%.42%         0.80         40.10         4.01         3.02         4.01           C1608NP0150EURCD         1V         1MHz         12         oF												
C1608NP047gp(RT0         1V, 1MHz         1.47         1.0F         40.25pF 40 1pF         40.05pF         0.80         40.01         40.10         3.39         100           C1608NP0591gp(RT0         1V, 1MHz         5.6         6.7         40.5pF, 40.25pF,40 1pF         0.80         40.01         40.10         355         80           C1608NP0503gp(RT0         1V, 1MHz         6.6         6.7         40.5pF, 40.25pF,40 1pF         0.80         40.01         40.10         233         400           C1608NP0503gp(RT0         1V, 1MHz         2.6         67         40.5pF, 40.25pF,40 1pF         0.80         40.01         40.10         233         40           C1608NP032gp(RT0         1V, 1MHz         10         pF         40.5pF, 40.25pF,40 1pF         0.80         40.01         40.10         333         40           C1608NP032gp(RT0         1V, 1MHz         18         pF         40.5pF, 40.25pF,40 1pF         0.80         40.01         40.10         333         30           C1608NP032gp(RT0         1V, 1MHz         18         pF         40.5pF         0.80         40.01         40.10         40.33         35           C1608NP032gp(RT0         1V, 1MHz         18         pF         40.1pF         0.80<	250V		,							-		Paper, 4Kpcs
C1608NP0510CHT0         IV. 1MHz         61         DF         40.25pF.40.1pF         40.00         40.10         40.10         34.7         90           C1608NP0580CHT0         IV. 1MHz         6.8         pF         40.5pF.40.25pF.40.1pF         0.80         40.10         40.10         332         80           C1608NP0832CHT0         IV. 1MHz         6.8         pF         40.5pF.40.25pF.40.1pF         0.80         40.10         40.10         2277         70           C1608NP0832CHT0         IV. 1MHz         6.1         pF         40.5pF.40.25pF.40.1pF         0.80         40.10         40.10         2277         70           C1608NP0100CHT0         IV. 1MHz         10         pF         45%r.2%         0.80         40.10         40.10         2277         70           C1608NP0130CHT0         IV. 1MHz         12         pF         45%r.2%         0.80         40.10         40.10         323         35           C1608NP0120BUT0         IV. 1MHz         12         pF         40.1pF         0.80         40.10         40.10         422         30           C1608NP023BUT0         IV. 1MHz         15         pF         40.1pF         0.80         40.10         40.10         422												
C100NP0500CHT0         IV. 1MHz         6.0         pF         ±0.56p; ±0.25p; ±0.10p;         0.80         ±0.10         <												
C1608.NPC000[KT0]         IV. 1MHz         6.8         pF         40.5pF         40.10         20.10         70           C1608NP0100[CTC1         VV. 1MHz         10         pF         40.5pF         40.5pF         40.01         40.10 </td <td></td> <td></td> <td>,</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>			,									
C1608.NP0680_CKT0         IV. 1MHz         6.8         pF         40.5pF         40.10         40.10         40.10         20.10         20.33         80           C1608.NP0820_CKT0         IV. 1MHz         0.1         pF         40.5pF         40.5pF         40.10         40.10         40.10         20.10         220         70           C1608.NP0100_CKT0         IV. 1MHz         10         pF         40.5pF         40.80         40.10         40.10         220         70           C1608.NP0120_CKT0         IV. 1MHz         15         pF         45%, 22%         0.80         40.10         40.10         220         25           C1608.NP0120B_UTC0         IV. 1MHz         12         pF         45%, 22%         0.80         40.10         40.10         280         25           C1608.NP0120B_UTC0         IV. 1MHz         12         pF         40.1p         0.80         40.10 <td< td=""><td></td><td></td><td>,</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>			,									
C1608MP082gTKT0         1V. 1MHz         8.2         pF         40.5pF, 40.2pF, 40.1pF         0.80         40.10         40.10         2277         70           C1608MP0100[]KT0         1V. 1MHz         10         pF         45.5pF, 40.25pF, 40.1pF, 40.5pF         0.80         40.10         40.10         2250         70           C1608MP0100[]KT0         1V. 1MHz         12         pF         ±5%, ±2%         0.80         40.10         40.10         332         40           C1608MP0120[]KT0         1V. 1MHz         12         pF         ±5%, ±2%         0.80         40.10         10.10         288         30           C1608MP01228JT0         1V. 1MHz         12         pF         ±0.1pF         0.80         40.10         10.10         663         200           C1608MP0128BJT0         1V. 1MHz         1.5         pF         ±0.1pF         0.80         ±0.10         10.10         442         150           C1608MP0129BJT0         1V. 1MHz         1.5         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         150           C1608MP0239BJT0         1V. 1MHz         2.4         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         <												
C1608NP030EJKTO         1V. 1MHz         9.1         pF         40.50 £9.00 250;         0.80         40.10         40.10         2207         70           C1608NP0102KTO         1V. 1MHz         12         pF         ±5%, ±2%         0.80         ±0.10         40.10         332         40           C1608NP0150LKTO         1V. 1MHz         18         pF         ±5%, ±2%         0.80         ±0.10         ±0.10         286         30           C1608NP0150LTO         1V. 1MHz         12         pF         ±5%, ±2%         0.80         ±0.10         ±0.10         286         30           C1608NP0150BLTO         1V. 1MHz         12         pF         ±0.1pF         0.80         ±0.10         ±0.10         683         200           C1608NP0120BLTO         1V. 1MHz         12.7         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         150           C1608NP0239BLTO         1V. 1MHz         2.7         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         150           C1608NP0239BLTO         1V. 1MHz         2.7         pF         ±0.1pF         0.80         ±0.10         ±0.10         ±33         150         150			,									
C1608HP010Q_KTC         1V. 1MHz         10         pF         ±5%, ±2%         0.80         ±0.10         10.10         227         70           C1608HP015Q_KTQ         1V. 1MHz         12         pF         ±5%, ±2%         0.80         ±0.10         ±0.10         332         40           C1608HP015Q_KTQ         1V. 1MHz         15         pF         ±5%, ±2%         0.80         ±0.10         ±0.10         288         33           C1608HP012Q_KTQ         1V. 1MHz         12         pF         ±5%, ±2%         0.80         ±0.10         ±0.10         288         33           C1608HP0129BLTQ         1V. 1MHz         15         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         200           C1608HP0129BLTQ         1V. 1MHz         12         27         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         150           C1608HP0129BLTQ         1V. 1MHz         18         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         150           C1608HP0129BLTQ         1V. 1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         ±0.10         ±0.10         ±0.10         <		_	,	-								
C1608NP012QUETQ         IV.         IMHz         12         pF         ±5%         0.80         40.01         40.10         33.2         40           C1608NP0150CHTQ         IV.         IMHz         15         pF         ±5%,±2%         0.80         40.10         40.10         303         35           C1608NP0128DLTQ         IV.         IMHz         12         pF         ±5%,±2%         0.80         40.10         40.10         299         25           C1608NP0128DLTQ         IV.         IMHz         1.2         pF         ±0.1pF         0.80         40.10         40.10         633         200           C1608NP0128DLTQ         IV.         IMHz         1.8         pF         ±0.1pF         0.80         40.10         40.10         442         200           C1608NP028DLTQ         IV.         IMHz         2.4         pF         ±0.1pF         0.80         ±0.10         40.10         442         150           C1608NP028DLTQ         IV.         IMHz         2.4         pF         ±0.1pF         0.80         40.10         40.10         40.10         40.10         40.10         40.10         40.10         40.10         40.10         40.10         40.10			,									
C1008NP0180_HT0         IV: 1MHz         16         pF         ±5%,±2%         0.80         40.10         ±0.10         20.10						,						
C1608NP0180_hT0         IV, 1MHz         18         pF         ±5%,±2%         0.80         9.01         4.01         2.05         30           C1608NP012BLTG         IV, 1MHz         1.2         pF         ±0.1pF         0.80         ±0.10         ±0.10         2.00         2.5           C1608NP012BLTG         IV, 1MHz         1.5         pF         ±0.1pF         0.80         ±0.10         ±0.10         5.31         200           C1608NP022BLTG         IV, 1MHz         1.8         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         200           C1608NP022BLTG         IV, 1MHz         2.7         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         150           C1608NP0239BLTG         IV, 1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         ±0.10         40.10         433         150           200V         C1608NP039BLTG         IV, 1MHz         3.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         433         100           C1608NP0479BLTG         IV, 1MHz         3.3         pF         ±0.1pF         ±0.05pF         0.80         ±0.10         ±0.10			,								-	
C1668NP022QT_KTO         1V.         1MHz         12         pF         ±5%,±2%         0.80         ±0.10         ±0.10         663         200           C1608NP0129BJTQ         1V.         1MHz         1.5         pF         ±0.1pF         0.80         ±0.10         ±0.10         6331         200           C1608NP0139BJTQ         1V.         1MHz         1.8         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         200           C1608NP0289LTQ         1V.         1MHz         2.2         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         150           C1608NP0239BJTQ         1V.         1MHz         2.7         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         150           C1608NP039BJTQ         1V.         1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         ±0.10         440         100           C1608NP039BJTQ         1V.         1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10			,									
C1608NP0139BJTQ         1V.         1MHz         1.2         pF         ±0.1pF         0.80         ±0.10         ±0.10         631         200           C1608NP0139BJTQ         1V,         1MHz         1.8         pF         ±0.1pF         0.80         ±0.10         ±0.10         44.10         631         200           C1608NP0232BJTQ         1V,         1MHz         2.4         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         150           C1608NP0239BJTQ         1V,         1MHz         2.4         pF         ±0.25pF.40.1pF, ±0.05pF         0.80         ±0.10         ±0.10         43.10         100         C1608NP0309BJTQ         1V,         1MHz         3.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         40.10         40.10         2.00         C1608NP0309BJTQ         1V,         1MHz         3.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         40.10         40.8         100         C1608NP0439BJTQ         1V,         1MHz         4.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         40.10         2.07         70         100         C1608NP047DJTV         1V,         1MHz <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>												
C1608NP0159BJTQ         1V, 1MHz         1.5         pF         ±0.1pF         0.80         ±0.10         ±0.10         531         200           C1608NP0139BJTQ         1V, 1MHz         1.8         pF         ±0.1pF         0.80         ±0.10         40.10         40.10         442         150           C1608NP023BJTQ         1V, 1MHz         2.2         pF         ±0.1pF         0.80         ±0.10         40.10         442         150           C1608NP039BJTQ         1V, 1MHz         2.4         pF         ±0.1pF         0.80         ±0.10         40.10         4303         150           C1608NP039BJTQ         1V, 1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         40.10												
C1608NP0189BJTD         TV, 1MHz         1.8         pF         40.1pF         0.80         40.10         44.22         200           C1608NP0229BJTO         TV, 1MHz         2.2         pF         ±0.1pF         0.00         ±0.10         40.10         442         150           C1608NP0249LTO         TV, 1MHz         2.7         pF         ±0.1pF         0.80         ±0.10         40.10         442         150           C1608NP039BJTO         TV, 1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         40.10         482         100           C1608NP039BJTO         TV, 1MHz         3.3         pF         ±0.1pF         0.80         ±0.10         40.10			,									
C1608MP0229B_UTC         1V, 1MHz         2.2         pF         ±0.1pF         0.80         ±0.10         ±0.10         482         150           C1600MP0279B_UTC         1V, 1MHz         2.4         pF         ±0.1pF         0.80         ±0.10         ±0.10         442         150           C1600MP0279B_UTO         1V, 1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         40.10         442         150           C1600MP039BJTO         1V, 1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         40.10         442         100           C1600MP0439BJTO         1V, 1MHz         3.9         pF         ±0.1pF         0.80         ±0.10         40.10         40.80         100           C1600MP0439BJTO         1V, 1MHz         4.7         pF         ±0.2pF, ±0.1pF, ±0.0spF         0.80         ±0.10         40.10         377         100           C1600MP0439BJTO         1V, 1MHz         4.7         pF         ±0.2pF, ±0.1pF, ±0.0spF         0.80         ±0.10         40.10         347         90           C1600MP0439BJTO         1V, 1MHz         5.1         pF         ±0.2pF, ±0.1pF, ±0.0spF         0.80         ±0.10         10.10         1010 </td <td></td>												
C1608NP0249[_JTQ         1V, 1MHz         2.4         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         150           200V         C1608NP0239BJTQ         1V, 1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         ±0.10         383         150           C1608NP039BJTQ         1V, 1MHz         3.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         482         100           C1608NP039BJTQ         1V, 1MHz         3.9         pF         ±0.1pF         0.80         ±0.10         ±0.10         333         100           C1608NP0479[_JTQ         1V, 1MHz         4.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         333         100           C1608NP068BJTQ         1V, 1MHz         6.8         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2233         80           C1608NP068BJTQ         1V, 1MHz         6.8         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2232         2250           C1608NP078B_UTQ         1V, 1MHz         0.5         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.1												
C1608NP0279BJTQ         1V. 1MHz         2.7         pF         ±0.1pF         0.80         ±0.10         ±0.10         333         150           C1608NP0309BJTQ         1V. 1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         ±0.10         531         100           C1608NP039BJTQ         1V. 1MHz         3.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         482         100           C1608NP039BJTQ         1V. 1MHz         4.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         339         100           C1608NP0479DJTQ         1V. 1MHz         4.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         339         100           C1608NP0519DJTQ         1V. 1MHz         6.1         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         233         80           C1608NP0519DJTQ         1V. 1MHz         8.2         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         233         80           C1608NP0192DTQ         1V. 1MHz         8.2         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         ±			,									
200V         C1608NP0309BJTQ         1V. 1MHz         3.0         pF         ±0.1pF         0.80         ±0.10         ±0.10         531         100           C1608NP039BJTQ         1V. 1MHz         3.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         4482         100           C1608NP039BJTQ         1V. 1MHz         4.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         40.00         40.00           C1608NP0439BJTQ         1V. 1MHz         4.7         pF         ±0.25pF.40.1pF, ±0.05pF         0.80         ±0.10         ±0.10         337         100           C1608NP0649BJTQ         1V. 1MHz         6.8         pF         ±0.25pF.40.1pF, ±0.05pF         0.80         ±0.10         ±0.10         237         70           C1608NP0649BJTQ         1V. 1MHz         8.2         pF         ±0.25pF.40.1pF, ±0.05pF         0.80         ±0.10         ±0.10         217         70           C1608NP0639B_ITQ         1V. 1MHz         8.2         pF         ±0.25pF.40.1pF, ±0.05pF         0.80         ±0.10         ±0.10         250           C1608NP0639B_ITQ         1V. 1MHz         1.5         pF         ±0.25pF.40.1pF, ±0.05pF         0.80         ±0.10												
2000         C1608NP0339BJTQ         1V. 1MHz         3.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         482         100           C1608NP039BJTQ         1V. 1MHz         3.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         4006         100           C1608NP049BJTQ         1V. 1MHz         4.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         339         100           C1608NP049BJTQ         1V. 1MHz         6.1         pF         ±0.25pF, ±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         339         100           C1608NP068BJTQ         1V. 1MHz         6.1         pF         ±0.25pF, ±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         237         70           C1608NP068BJTQ         1V. 1MHz         0.3         pF         ±0.25pF, ±0.1pF, ±0.05pF         0.80         ±0.10         101         2122         250           C1608NP0768DHTG         1V. 1MHz         0.3         pF         ±0.25pF, ±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         849         250           C1608NP078DHTG         1V. 1MHz         1.0         pF         ±0.25pF, ±0.1pF, ±0.05pF         0.80         ±												
C1608NP0399BJTQ         1V, 1MHz         3.9         pF         ±0.1pF         0.80         ±0.10	200V											Paper, 4Kpcs
C1608NP0439BJTQ         1V.         1MHz         4.3         pF         ±0.1pF         0.80         ±0.10         ±0.10         370         100           C1608NP0479_DTC         1V,         1MHz         4.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         339         100           C1608NP0689BJTQ         1V,         1MHz         5.1         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         223         80           C1608NP0689BJTQ         1V,         1MHz         8.2         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2277         70           C1608NP0680B_HTQ         1V,         1MHz         0.5         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2277         70           C1608NP0758D_HTQ         1V,         1MHz         0.5         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10						1				-		
C1608NP0479□JTQ         1V. 1MHz         4.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         339         100           C1608NP0519□JTQ         1V. 1MHz         5.1         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         347         90           C1608NP0689BJTQ         1V. 1MHz         6.8         pF         ±0.1pF         0.80         ±0.10         ±0.10         20.10         237         70           C1608NP0682SCJTQ         1V. 1MHz         0.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2122         250           C1608NP0508_HTQ         1V. 1MHz         0.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2122         250           C1608NP059B_HTQ         1V. 1MHz         0.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         243         250           C1608NP019B_HTQ         1V. 1MHz         1.5         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         531         200           C1608NP0129B_HTQ         1V. 1MHz         1.8         pF         ±0.25pF,±0.1pF,±0.05pF												
C1608NP0619□JTQ         1V, 1MHz         5.1         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         ±0.10         20.10 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>												
C1608NP0689BJTQ         1V, 1MHz         6.8         pF         ±0.1pF         0.80         ±0.10         ±0.10         210         293         80           C1608NP0308_DHTQ         1V, 1MHz         0.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2122         250           C1608NP0508_DHTQ         1V, 1MHz         0.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2122         250           C1608NP0508_DHTQ         1V, 1MHz         0.5         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         849         250           C1608NP0192DHTQ         1V, 1MHz         1.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         637         250           C1608NP0189_DHTQ         1V, 1MHz         1.5         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         531         200           C1608NP029D_HTQ         1V, 1MHz         1.8         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         200           C1608NP029D_HTQ         1V, 1MHz         2.0         pF         ±0.25pF,±0.1pF,±0.05pF			,									
C1608NP0829CJTQ         IV, 1MHz         8.2         pF         ±0.25pF         0.80         ±0.10         ±0.10         277         70           C1608NP0308_HTQ         IV, 1MHz         0.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2122         250           C1608NP0508_HTQ         IV, 1MHz         0.5         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2123         250           C1608NP0785_HTQ         IV, 1MHz         0.75         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         849         250           C1608NP0785_HTQ         IV, 1MHz         1.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         663         200           C1608NP0189_HTQ         IV, 1MHz         1.8         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         200           C1608NP029_HTQ         IV, 1MHz         2.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0249_HTQ         IV, 1MHz         2.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80												
C1608NP0308_HTQ         1V, 1MHz         0.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         2122         250           C1608NP0508_HTQ         1V, 1MHz         0.5         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         1273         250           C1608NP0758_HTQ         1V, 1MHz         0.75         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         849         250           C1608NP0109_HTQ         1V, 1MHz         1.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         637         250           C1608NP0189_HTQ         1V, 1MHz         1.2         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         200           C1608NP0209_HTQ         1V, 1MHz         1.8         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         200           C1608NP0249_HTQ         1V, 1MHz         2.4         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         432         150           C1608NP0239_HTQ         1V, 1MHz         2.7         pF         ±0.25pF,±0.1pF,±0.05pF         <												
C1608NP0508_HTQ         IV, 1MHz         0.5         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10 <t< td=""><td></td><td></td><td>,</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td></t<>			,								-	
C1608NP0758_HTQ         1V, 1MHz         0.75         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         849         250           C1608NP0109_HTQ         1V, 1MHz         1.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         637         250           C1608NP0129_HTQ         1V, 1MHz         1.2         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         633         200           C1608NP0139_HTQ         1V, 1MHz         1.5         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         531         200           C1608NP0199_HTQ         1V, 1MHz         1.8         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         200           C1608NP029_HTQ         1V, 1MHz         2.2         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP029_HTQ         1V, 1MHz         2.4         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP039_HTQ         1V, 1MHz         3.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.				0.5	<u> </u>		0.00	10.40		4070	050	
C1608NP0109_HTQ         IV, 1MHz         1.0         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         637         250           C1608NP0129_HTQ         IV, 1MHz         1.2         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         663         200           C1608NP0129_HTQ         IV, 1MHz         1.5         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         633         200           C1608NP0209_HTQ         IV, 1MHz         1.8         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         200           C1608NP0229_HTQ         IV, 1MHz         2.2         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0249_HTQ         IV, 1MHz         2.4         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP039_HTQ         IV, 1MHz         3.0         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         433         100           C1608NP0399_HTQ         IV, 1MHz         3.0         pF         ±0.25pF,±0.1pF, ±0.05pF												
C1608NP0129_HTQ         IV, 1MHz         1.2         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         663         200           C1608NP0159_HTQ         IV, 1MHz         1.5         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         531         200           C1608NP0189_HTQ         IV, 1MHz         1.8         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         200           C1608NP029_HTQ         IV, 1MHz         2.0         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0249_HTQ         IV, 1MHz         2.2         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0279_HTQ         IV, 1MHz         2.7         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP039_HTQ         IV, 1MHz         3.0         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10												
C1608NP0159_HTQ         1V, 1MHz         1.5         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         531         200           C1608NP0189_HTQ         1V, 1MHz         1.8         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         200           C1608NP0290_HTQ         1V, 1MHz         2.0         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         200           C1608NP0290_HTQ         1V, 1MHz         2.2         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0290_HTQ         1V, 1MHz         2.4         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0290_HTQ         1V, 1MHz         2.7         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         403         100           C1608NP0390_HTQ         1V, 1MHz         3.0         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         408         100           C1608NP0390_HTQ         1V, 1MHz         3.0         pF         ±0.25pF,±0.1pF, ±0.05pF												
C1608NP0189_HTQ         1V, 1MHz         1.8         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         200           C1608NP0209_HTQ         1V, 1MHz         2.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         531         150           C1608NP0229_HTQ         1V, 1MHz         2.2         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0249_HTQ         1V, 1MHz         2.4         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP029_HTQ         1V, 1MHz         2.4         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0309_HTQ         1V, 1MHz         3.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0309_HTQ         1V, 1MHz         3.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0309_HTQ         1V, 1MHz         3.3         pF         ±0.25pF,±0.1pF,±0.05pF         0												
C1608NP0209_HTQ         IV, 1MHz         2.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         531         150           C1608NP0229_HTQ         IV, 1MHz         2.2         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         150           C1608NP0249_HTQ         IV, 1MHz         2.4         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0279_HTQ         IV, 1MHz         2.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         393         150           C1608NP0399_HTQ         IV, 1MHz         3.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         150           100V         C1608NP0399_HTQ         IV, 1MHz         3.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         100           100V         C1608NP0399_HTQ         IV, 1MHz         3.3         pF         ±0.25pF,±0.1pF         0.80         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.10         ±0.1					· ·							
C1608NP0229_HTQ         IV, 1MHz         2.2         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         482         150           C1608NP0249_HTQ         IV, 1MHz         2.4         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0279_HTQ         IV, 1MHz         2.7         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         393         150           C1608NP0399_HTQ         IV, 1MHz         3.0         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         531         100           C1608NP0399_HTQ         IV, 1MHz         3.3         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0399_HTQ         IV, 1MHz         3.3         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0399_HTQ         IV, 1MHz         3.9         pF         ±0.25pF,±0.1pF, ±0.05pF         0.80         ±0.10         ±0.10         339         100           C1608NP0699_HTQ         IV, 1MHz         6.0         pF         ±0.5pF,±0.25pF,±0.1pF												
C1608NP0249_HTQ         IV, 1MHz         2.4         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         150           C1608NP0279_HTQ         IV, 1MHz         2.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         393         150           C1608NP0309_HTQ         IV, 1MHz         3.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         442         100           C1608NP0309_HTQ         IV, 1MHz         3.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0399_HTQ         IV, 1MHz         3.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0399_HTQ         IV, 1MHz         3.9         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         339         100           C1608NP0479_HTQ         IV, 1MHz         4.7         pF         ±0.25pF,±0.1pF,±0.25pF,±0.1pF         0.80         ±0.10         ±0.10         332         80           C1608NP0699_HTQ         IV, 1MHz         6.0         pF         ±0.5pF,±0.25pF,±0.1pF												
C1608NP0279_HTQ         1V, 1MHz         2.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         393         150           100V         C1608NP0309_HTQ         1V, 1MHz         3.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         531         100           C1608NP0399_HTQ         1V, 1MHz         3.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0399_HTQ         1V, 1MHz         3.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0399_HTQ         1V, 1MHz         3.9         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0479_HTQ         1V, 1MHz         4.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         333         100           C1608NP0699_HTQ         1V, 1MHz         5.6         pF         ±0.5pF,±0.25pF,±0.1pF         0.80         ±0.10         ±0.10         332         80           C1608NP0699_HTQ         1V, 1MHz         6.0         pF         ±0.5pF,±0.25pF,±0.1p										-		
C1608NP0309_HTQ         1V, 1MHz         3.0         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         531         100           100V         C1608NP0339_HTQ         1V, 1MHz         3.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0399_HTQ         1V, 1MHz         3.3         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         482         100           C1608NP0399_HTQ         1V, 1MHz         3.9         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         408         100           C1608NP0479_HTQ         1V, 1MHz         4.7         pF         ±0.25pF,±0.1pF,±0.05pF         0.80         ±0.10         ±0.10         339         100           C1608NP0699_HTQ         1V, 1MHz         5.6         pF         ±0.5pF,±0.25pF,±0.1pF         0.80         ±0.10         ±0.10         332         80           C1608NP0699_HTQ         1V, 1MHz         6.0         pF         ±0.5pF,±0.25pF,±0.1pF         0.80         ±0.10         ±0.10         293         80           C1608NP0689_HTQ         1V, 1MHz         6.8         pF         ±0.5pF,±0.25pF,±0.1pF<												
100V       C1608NP0339_HTQ       1V, 1MHz       3.3       pF       ±0.25pF,±0.1pF,±0.05pF       0.80       ±0.10       ±0.10       482       100         C1608NP0399_HTQ       1V, 1MHz       3.9       pF       ±0.25pF,±0.1pF,±0.05pF       0.80       ±0.10       ±0.10       482       100         C1608NP0399_HTQ       1V, 1MHz       3.9       pF       ±0.25pF,±0.1pF,±0.05pF       0.80       ±0.10       ±0.10       408       100         C1608NP0479_HTQ       1V, 1MHz       4.7       pF       ±0.25pF,±0.1pF,±0.05pF       0.80       ±0.10       ±0.10       339       100         C1608NP0569_HTQ       1V, 1MHz       5.6       pF       ±0.5pF,±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       332       80         C1608NP0609_HTQ       1V, 1MHz       6.0       pF       ±0.5pF,±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       332       80         C1608NP0689_HTQ       1V, 1MHz       6.8       pF       ±0.5pF,±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0829_HTQ       1V, 1MHz       8.2       pF       ±0.5pF,±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       250       70         C1608NP0190												
C1608NP0399_HTQ       1V, 1MHz       3.9       pF       ±0.25pF,±0.1pF,±0.05pF       0.80       ±0.10       ±0.10       408       100         C1608NP0479_HTQ       1V, 1MHz       4.7       pF       ±0.25pF,±0.1pF,±0.05pF       0.80       ±0.10       ±0.10       339       100         C1608NP0569_HTQ       1V, 1MHz       5.6       pF       ±0.5pF,±0.1pF,±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       339       100         C1608NP0609_HTQ       1V, 1MHz       6.0       pF       ±0.5pF,±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       332       80         C1608NP0689_HTQ       1V, 1MHz       6.8       pF       ±0.5pF,±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0829_HTQ       1V, 1MHz       8.2       pF       ±0.5pF,±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0829_HTQ       1V, 1MHz       8.2       pF       ±0.5pF,±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       277       70         C1608NP0190JHTQ       1V, 1MHz       9.1       pF       ±0.5pF,±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       227       70         C1608NP0100JHTQ	1001/				· ·							Paper, 4Kpcs
C1608NP0479_HTQ       1V, 1MHz       4.7       pF       ±0.25pF,±0.1pF, ±0.05pF       0.80       ±0.10       ±0.10       339       100         C1608NP0569_HTQ       1V, 1MHz       5.6       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       335       80         C1608NP0609_HTQ       1V, 1MHz       6.0       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       332       80         C1608NP0609_HTQ       1V, 1MHz       6.8       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0829_HTQ       1V, 1MHz       6.8       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0829_HTQ       1V, 1MHz       8.2       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       277       70         C1608NP0190JHTQ       1V, 1MHz       9.1       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       227       70         C1608NP010JHTQ       1V, 1MHz       10       pF       ±5%       0.80       ±0.10       ±0.10       332       40         C1608NP0120JHTQ       1V, 1MHz	100 0											
C1608NP0569_HTQ       1V, 1MHz       5.6       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       355       80         C1608NP0609_HTQ       1V, 1MHz       6.0       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       332       80         C1608NP0609_HTQ       1V, 1MHz       6.8       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       332       80         C1608NP0689_HTQ       1V, 1MHz       6.8       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0829_HTQ       1V, 1MHz       8.2       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0199_HTQ       1V, 1MHz       8.2       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       277       70         C1608NP0190JHTQ       1V, 1MHz       9.1       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       227       70         C1608NP0100JHTQ       1V, 1MHz       10       pF       ±5%       0.80       ±0.10       ±0.10       332       40         C1608NP0150JHTQ       1V, 1MHz			,									
C1608NP0609_HTQ       1V, 1MHz       6.0       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       332       80         C1608NP0689_HTQ       1V, 1MHz       6.8       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0829_HTQ       1V, 1MHz       8.2       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0829_HTQ       1V, 1MHz       8.2       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       277       70         C1608NP019_HTQ       1V, 1MHz       9.1       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       250       70         C1608NP010JHTQ       1V, 1MHz       10       pF       ±5%       0.80       ±0.10       ±0.10       227       70         C1608NP0120JHTQ       1V, 1MHz       12       pF       ±5%       0.80       ±0.10       ±0.10       332       40         C1608NP0150JHTQ       1V, 1MHz       15       pF       ±5%       0.80       ±0.10       ±0.10       303       35         C1608NP0180JHTQ       1V, 1MHz       18       pF       ±5												
C1608NP0689_HTQ       1V, 1MHz       6.8       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0829_HTQ       1V, 1MHz       8.2       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       293       80         C1608NP0829_HTQ       1V, 1MHz       8.2       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       277       70         C1608NP019_HTQ       1V, 1MHz       9.1       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       250       70         C1608NP0100JHTQ       1V, 1MHz       10       pF       ±5%       0.80       ±0.10       ±0.10       227       70         C1608NP0120JHTQ       1V, 1MHz       12       pF       ±5%       0.80       ±0.10       ±0.10       332       40         C1608NP0150JHTQ       1V, 1MHz       15       pF       ±5%       0.80       ±0.10       ±0.10       303       35         C1608NP0180JHTQ       1V, 1MHz       18       pF       ±5%       0.80       ±0.10       ±0.10       295       30												
C1608NP0829_HTQ       1V, 1MHz       8.2       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       277       70         C1608NP0919_HTQ       1V, 1MHz       9.1       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       250       70         C1608NP010JHTQ       1V, 1MHz       10       pF       ±5%       0.80       ±0.10       ±0.10       227       70         C1608NP0120JHTQ       1V, 1MHz       12       pF       ±5%       0.80       ±0.10       ±0.10       332       40         C1608NP0150JHTQ       1V, 1MHz       15       pF       ±5%       0.80       ±0.10       ±0.10       303       35         C1608NP0180JHTQ       1V, 1MHz       18       pF       ±5%       0.80       ±0.10       ±0.10       295       30												
C1608NP0919□HTQ       1V, 1MHz       9.1       pF       ±0.5pF, ±0.25pF,±0.1pF       0.80       ±0.10       ±0.10       250       70         C1608NP0100JHTQ       1V, 1MHz       10       pF       ±5%       0.80       ±0.10       ±0.10       227       70         C1608NP0120JHTQ       1V, 1MHz       12       pF       ±5%       0.80       ±0.10       ±0.10       332       40         C1608NP0150JHTQ       1V, 1MHz       15       pF       ±5%       0.80       ±0.10       ±0.10       303       35         C1608NP0180JHTQ       1V, 1MHz       18       pF       ±5%       0.80       ±0.10       ±0.10       295       30												
C1608NP0100JHTQ         1V, 1MHz         10         pF         ±5%         0.80         ±0.10         ±0.10         227         70           C1608NP0120JHTQ         1V, 1MHz         12         pF         ±5%         0.80         ±0.10         ±0.10         332         40           C1608NP0150JHTQ         1V, 1MHz         15         pF         ±5%         0.80         ±0.10         ±0.10         303         35           C1608NP0180JHTQ         1V, 1MHz         18         pF         ±5%         0.80         ±0.10         ±0.10         295         30												
C1608NP0120JHTQ         1V, 1MHz         12         pF         ±5%         0.80         ±0.10         ±0.10         332         40           C1608NP0150JHTQ         1V, 1MHz         15         pF         ±5%         0.80         ±0.10         ±0.10         303         35           C1608NP0180JHTQ         1V, 1MHz         18         pF         ±5%         0.80         ±0.10         ±0.10         295         30												
C1608NP0150JHTQ         1V, 1MHz         15         pF         ±5%         0.80         ±0.10         ±0.10         303         35           C1608NP0180JHTQ         1V, 1MHz         18         pF         ±5%         0.80         ±0.10         ±0.10         295         30												
C1608NP0180JHTQ 1V, 1MHz 18 pF ±5% 0.80 ±0.10 ±0.10 295 30												
C1608NP0220JHTQ 1V, 1MHz 22 pF ±5% 0.80 ±0.10 ±0.10 289 25						±5% ±5%						

RV		Measuring	Capaci	tance	Available Tolerance		Toleran	ice(mm)	ESR(1GHz)	Q(1GHz)	Standard
RV	DARFON P/N	Condition	Value	Unit	Available Tolerance	(mm)	L/W	Thick.	mΩ (max.)	(min.)	Packing
	C1608NP0208□GTQ	1V, 1MHz	0.20	pF	±0.25pF±0.1pF, ±0.05pF	0.80	±0.10	±0.10	3183	250	
	C1608NP0228□GTQ	1V, 1MHz	0.22	pF	±0.25pF±0.1pF, ±0.05pF	0.80	±0.10	±0.10	2894	250	
	C1608NP0308□GTQ	1V, 1MHz	0.30	pF	±0.25pF±0.1pF, ±0.05pF	0.80	±0.10	±0.10	2122	250	
	C1608NP0508 GTQ	1V, 1MHz	0.50	pF	±0.25pF±0.1pF, ±0.05pF	0.80	±0.10	±0.10	1273	250	
	C1608NP0758 GTQ	1V, 1MHz	0.75	pF	±0.25pF±0.1pF, ±0.05pF	0.80	±0.10	±0.10	849	250	
	C1608NP0109□GTQ	1V, 1MHz	1.0	pF	±0.25pF±0.1pF, ±0.05pF	0.80	±0.10	±0.10	637	250	
	C1608NP0129 GTQ	1V, 1MHz	1.2	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	663	200	
	C1608NP0159 GTQ	1V, 1MHz	1.5	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	531	200	
	C1608NP0189□GTQ	1V, 1MHz	1.8	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	442	200	
	C1608NP0209□GTQ	1V, 1MHz	2.0	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	531	150	
	C1608NP0229□GTQ	1V, 1MHz	2.2	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	482	150	
	C1608NP0249□GTQ	1V, 1MHz	2.4	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	442	150	
	C1608NP0279 GTQ	1V, 1MHz	2.7	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	393	150	
50V	C1608NP0309□GTQ	1V, 1MHz	3.0	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	531	100	Depar 4Knoo
500	C1608NP0339□GTQ	1V, 1MHz	3.3	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	482	100	Paper, 4Kpcs
	C1608NP0399 GTQ	1V, 1MHz	3.9	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	408	100	
	C1608NP0479□GTQ	1V, 1MHz	4.7	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	339	100	
	C1608NP0509□GTQ	1V, 1MHz	5.0	pF	±0.25pF, ±0.1pF	0.80	±0.10	±0.10	354	90	
	C1608NP0569 GTQ	1V, 1MHz	5.6	pF	±0.5pF, ±0.25pF, ±0.1pF	0.80	±0.10	±0.10	355	80	
	C1608NP0609□GTQ	1V, 1MHz	6.0	pF	±0.5pF, ±0.25pF, ±0.1pF	0.80	±0.10	±0.10	332	80	
	C1608NP0689□GTQ	1V, 1MHz	6.8	pF	±0.5pF, ±0.25pF, ±0.1pF	0.80	±0.10	±0.10	293	80	
	C1608NP0829□GTQ	1V, 1MHz	8.2	pF	±0.5pF, ±0.25pF, ±0.1pF	0.80	±0.10	±0.10	277	70	
	C1608NP0919□GTQ	1V, 1MHz	9.1	pF	±0.5pF, ±0.25pF, ±0.1pF	0.80	±0.10	±0.10	250	70	
	C1608NP0100JGTQ	1V, 1MHz	10	pF	±5%	0.80	±0.10	±0.10	227	70	
	C1608NP0120□GTQ	1V, 1MHz	12	pF	±5%,±2%,±1%	0.80	±0.10	±0.10	332	40	
	C1608NP0150JGTQ	1V, 1MHz	15	pF	±5%	0.80	±0.10	±0.10	303	35	
	C1608NP0180JGTQ	1V, 1MHz	18	pF	±5%	0.80	±0.10	±0.10	295	30	
	C1608NP0220JGTQ	1V, 1MHz	22	pF	±5%	0.80	±0.10	±0.10	289	25	

□ Tolerance Code: A=±0.05 pF, B=±0.1pF, C=±0.25pF ,D=±0.5pF, G=±2%, J=±5%; Special tolerance on the request.

### • Test Spec.

	Ite		Specification	Test Method					
1	Operating Tempe	rature Range	NP0: -55 to 125 °C						
2	Rated Voltage		Shown in the table of "Part Number & Characteristic"	The rated voltage is defined as the maximum voltage, which may be applied continuously to the capacitor.					
3	Appearance		No defects or abnormalities.	Visual inspection					
4	Dimensions		Within the specified dimension.	Using calipers or Microscope.					
5	Dielectric Streng	th (Flash)	No defects or abnormalities.	No failure shall be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds. The charge and discharge current is less than 50mA.					
6	Insulation Resist	ance ( I.R.)	I.R.≧10GΩ	The insulation resistance shall be measured with a DC voltage not exceeding the rated voltage at $25^{\circ}$ C and $75$ %RH max, and within 1 minute of charging.					
7	Capacitance		Within the specified tolerance	The capacitance /Q shall be measured at $25^{\circ}$ C at					
8	Quality Factor ( C	2)	30pF min.: Q≧1000 30pF max.: Q≧400+20C C: Nominal Capacitance (pF)	the frequency and voltage shown in the tables. Frequency 1.0±0.2MHz Voltage 1.0±0.2Vrms					
9	Capacitance Tem Characteristics	perature	Capacitance change within $0\pm 30$ ppm/ $^\circ\!C$ under operating temperature range.	The capacitance value at 25°C and 85°C shall be measured and calculated from the formula given below. T.C.= $(C_{85}-C_{25})/C_{25}*\Delta T*10^{6}(PPM/^{\circ}C)$					
10	Termination Stre	ngth	No removal of the terminations or marking defect.	Apply a parallel force of 5N to a PCB mounted sample for 10±1sec. *2N for 0603 (EIA 0201).					
			No cracking or marking defects shall occur at 1mm deflection. Capacitance change: NP0: within ±5% or ± 0.5pF. (whichever is larger)	Solder the capacitor to the test jig (glass epoxy boards) shown in Fig.a using a SAC305(Sn96.5Ag3.0Cu0.5) solder. Then apply a force in the direction shown in Fig.b. The soldering shall be done with the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock.					
11	Deflection (Bend	ing Strength)	v         v         0402         0.2         0.56         0           0603         0.3         0.9         0           1005         0.4         1.5         0	2 23 3 3					
12	Solderability of T	ermination	90% of the terminations are to be soldered evenly and continuously. C0402 Series: 75% of the terminations are to be soldered evenly and continuously.	Immerse the test capacitor into a methanol solution containing rosin for 3 to 5 seconds, preheat it 150 to $180^{\circ}$ C for 2 to 3 minutes and immerse it into SAC305(Sn96.5Ag3.0Cu0.5) solder of $245 \pm 5^{\circ}$ C for 3±1seconds.					
		Appearance	No marking defects	Immerse the capacitor in a					
	Resistance to	Cap. Change	NP0 within ±2.5% or ±0.25pF ( whichever is larger )	SAC305(Sn96.5Ag3.0Cu0.5) solder solution at					
13	Soldering Heat	Q	Initial spec.	$270\pm5^{\circ}$ for 10±1 seconds. Let sit at room temperature for 24±2 hours, then measure.					
		I.R.	Initial spec.	*C0402 Series is not suitable for this testing					

	Ite	em	Specification	Test Method					
		Appearance Cap. Change	No marking defects NP0 within ±2.5% or 0.25pF ( whichever is larger )	Solder the capacitor to supporting jig (glass epoxy board) and perform the five cycles according to the					
	Temperature cycle		Initial spec.	four heat treatments listed in the following table. Let sit for 24±2hrs at room temperature, then measure.					
14	14 (Thermal shock) I.R.		Initial spec.	Step 1: Minimum operating temperature30±3minStep 2: Room temperature2~3 minStep 3: Maximum operating temperature30±3minStep 4: Room temperature2~3min					
	Appearance		No marking defects	Apply the rated voltage at $40\pm2^{\circ}$ C and 90 to 95%					
15	Humidity load Cap. Change		NP0 within $\pm 5\%$ or $\pm 0.5 pF$ ( whichever is larger )	humidity for 500±12 hours. Remove and let sit f					
15			200 min.	24±2 hours at room temperature, then measure.					
		I.R.	I.R.≧500MΩ	The charge / discharge current is less than 50mA.					
		Appearance	No marking defects						
		Cap. Change	NP0 within $\pm 5\%$ or $\pm 0.5$ pF ( whichever is larger )	Apply 200% of the rated voltage for 1000±12 hours					
16	High 6 temperature load life test Q		30pF and over : $Q \ge 350$ 10pF and over, 30pF and below : $Q \ge 275+5C/2$ 10pF and below : $Q \ge 200+10C$ C:Nominal Capacitance(pF)	at the maximum operating temperature $\pm 3^{\circ}C$ . Let sit for 24 $\pm$ 2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.					
	I.R.		$I.R. \ge 1G\Omega$						
17	ESR	& Q	Shown in the table of "Part Number & Characteristic"	Testing frequency is shown in the table of "Part Number & Characteristic"					

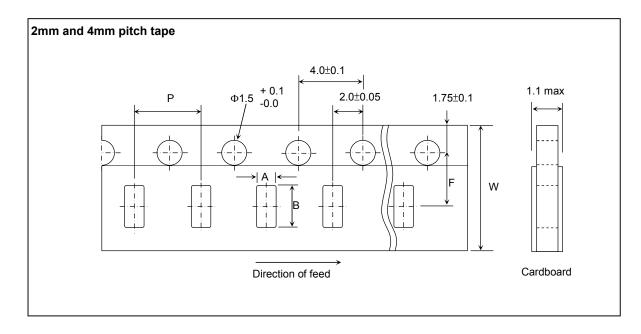
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### Package

#### • Tape and reel packaging

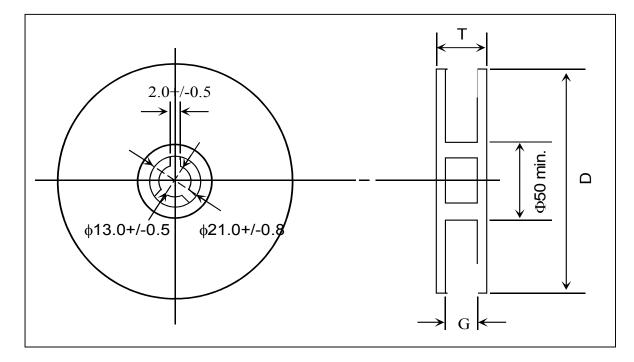
Tape and reel packaging is currently the most promising system for high-speed production. A typical 180mm (7 inch) diameter reel contains 1,500 to 15,000 capacitors, 250mm (10 inch) contains 10,000 capacitors, and 330mm (13 inch) contains 10,000 to 50,000 capacitors. Three standard sizes are available in taped and reeled package either with paper carrier tapes or embossed tapes.

### [Paper tape specifications]



		PRODUCT SIZE CODE											
SYMBOL	0603	8(0201)		<b>6(0402)</b> 05 mm)		5 <b>(0603)</b> 10 mm)	UNIT						
	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.							
А	0.38	± 0.04	0.65	± 0.10	1.0	±0.2	mm						
В	0.68	± 0.04	1.15	± 0.10	1.8	±0.2	mm						
F	3.5	± 0.05	3.5	± 0.05	3.5	±0.05	mm						
Р	2	± 0.10	2	± 0.10	4	±0.1	mm						
W	8	± 0.20	8	± 0.20	8	±0.2	mm						

### [Reel specifications]



TAPE WIDTH (mm)	G (mm)	T max. (mm)	D (mm)
4	5.0 ± 1.5	8.0	180
8	10.0 ± 1.5	14.5	180
8	10.0 ± 1.5	14.5	250
8	10.0 ± 1.5	14.5	330
12	14.0 ± 1.5	18.5	180

### [Thickness and Packing Amount]

	Thickness		Amount per reel			
THICKNESS		180 mm (7")		330 mm (13")		
Code	Spec.(mm)	Size (EIA)	Paper	Embossed	Paper	Embossed
А	0.30	0603 (0201)	15K		50K	
В	0.50	1005 (0402)	10K		50K	
D	0.80	1608 (0603)	4K		15K	

[Packing Rule]

EIA SIZE	Tape type	Reel Size	Max Reels/Box
0201	Paper	7"	10
0402	Paper	7"	10
0603	Paper/Emboss	7"	10

\*Maximum 60 reels in one carton.

### **DARF**

### Others [Storage]

- 1. The chip capacitors shall be packaged in carrier tapes or bulk cases.
- 2. Keep storage place temperatures from +5  $^\circ\mathrm{C}$  to +35  $^\circ\mathrm{C}$  , humidity from 45 to 70% RH.
- 3. The storage atmosphere must be free of gas containing sulfur and chlorine. Also, avoid exposing the product to saline moisture. If the product is exposed to such atmospheres, the terminations will oxidize and solderability will be affected.
- 4. The solderability is assured for 12 months from our final inspection date if the above storage condition is followed.

### [Circuit Design]

- 1. Once application and assembly environments have been checked, the capacitor may be used in conformance with the rating and performance, which are provided in both the catalog and the specifications. Exceeding the specifications listed may result in inferior performance. It may also cause a short, open, smoking, or flaming to occur, etc.
- 2. Please use the capacitors in conformance with the operating temperature provided in both the catalog and the specifications. Be especially cautious not to exceed the maximum temperature. In the situation the maximum temperature set forth in both the catalog and specifications is exceeded, the capacitor's insulation resistance may deteriorate, power may suddenly surge and short-circuit may occur. The loss of capacitance will occur, and may self-heat due to equivalent series resistance when alternating electric current is passed through. As this effect becomes critical in high frequency circuits, please exercise with caution. When using the capacitor in a (self-heating) circuit, please make sure the surface of the capacitor remains under the maximum temperature for usage. Also, please make certain temperature rise remain below 20°C.
- 3. Please keep voltage under the rated voltage, which is applied to the capacitor. Also, please make certain the peak voltage remains below the rated voltage when AC voltage is super-imposed to the DC voltage. In the situation where AC or pulse voltage is employed, ensure average peak voltage does not exceed the rated voltage. Exceeding the rated voltage provided in both catalog and specifications may lead to defective withstanding voltage or, in worse case situations, may cause the capacitor to burn out.
- 4. It's is a common phenomenon of high-dielectric products to have a deteriorated amount of static electricity due to the application of DC voltage.

# MLCC

### **DARF**

### [Handling]

Chip capacitors should be handled with care to avoid contamination or damage. The use of vacuum pick-up or plastic tweezers is recommended for manual placement. Tape and reeled packages are suitable for automatic pick and placement machine.

### [Flux]

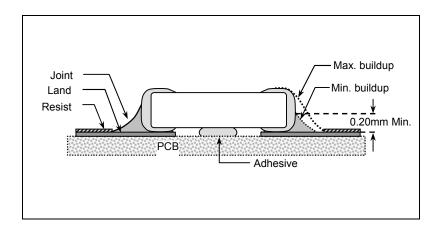
- 1. An excessive amount of flux or too rapid temperature rise can causes solvent burst, solder can generate a large quantity of gas. The gas can spreads small solder particles to cause solder balling effect or bridging problem.
- 2. Flux containing too high of a percentage of halide may cause corrosion of termination unless sufficient cleaning is applied.
- 3. Use rosin-type flux. Highly acidic flux (halide content less than 0.2wt%) is not recommended.
- 4. The water soluble flux causes deteriorated insulation resistance between outer terminations unless sufficiently cleaned.

#### [Component Spacing]

For wave soldering components, the spacing must be sufficient far apart to prevent bridging or shadowing. This is not so important for reflow process but enough space for rework should be considered. The suggested spacing for reflow soldering and wave soldering is 0.5mm and 1.0mm, respectively.

### [Solder Fillet]

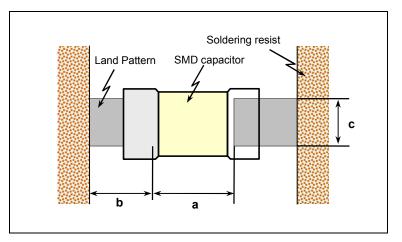
Too much solder amount may increase solder stress and cause crack risk. Insufficient solder amount may reduce adhesive Strength and cause parts falling off PCB. When soldering, confirm that the solder is placed over 0.2mm of the surface of the terminations.



#### [Recommended Land Pattern Dimensions]

When mounting the capacitor to substrate, it's important to consider that the amount of solder (size of fillet) used has a direct effect upon the capacitor once it's mounted.

- 1. The greater the amount of solder, the greater the stress to the elements, as this may cause the substrate to break or crack.
- 2. In the situation where two or more devices are mounted onto a common land, separate the device into exclusive pads by using soldering resist.
- 3. Land width equal to or less than component. It is permissible to reduce land width to 80% of component width.



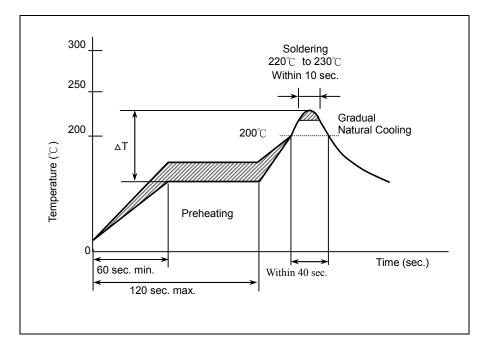
Size mm (EIA)	L x W (mm) (Dimension tolerance)	a (mm)	b (mm)	c (mm)
0602 (0201)	0.6*0.3 (within±0.03)	0.2 to 0.35	0.2 to 0.3	0.2 to 0.4
0603 (0201)	0.6*0.3 (±0.05/±0.09)	0.2 to 0.35	0.2 to 0.35	0.25 to 0.4
4005 (0402)	1.0*0.5 (within±0.10)	0.3 to 0.5	0.35 to 0.45	0.4 to 0.6
1005 (0402)	1.0*0.5 (±0.15/±0.20)	0.4 to 0.6	0.4 to 0.5	0.5 to 0.7
1608 (0603)	1.6*0.8 (within±0.10)	0.7 to 1.0	0.6 to 0.8	0.7 to 0.8
1608 (0603)	1.6*0.8 (±0.15/±0.20/±0.25)	0.8 to 1.1	0.7 to 0.8	0.8 to 1.0

### [Resin Mold]

If a large amount of resin is used for molding the chip, cracks may occur due to contraction stress during curing. To avoid such cracks, use a low shrinkage resin. The insulation resistance of the chip will degrade due to moisture absorption. Use a low moisture absorption resin. Check carefully that the resin does not generate a decomposition gas or reaction gas during the curing process or during normal storage. Such gases may crack the chip capacitor or damage the device itself.

#### [Soldering Profile for SMT Process with SnPb Solder Paste]

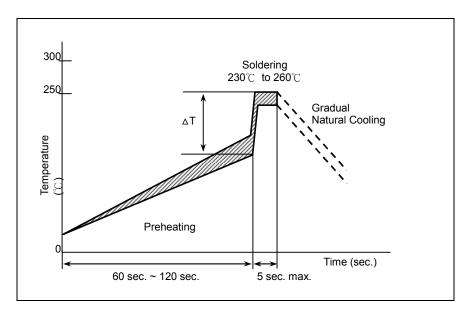
#### **Reflow Soldering**



The difference between solder and chip surface should be controlled as following table. The rate of preheat should not exceed  $4^{\circ}$ C/sec and a target of  $2^{\circ}$ C/sec is preferred.

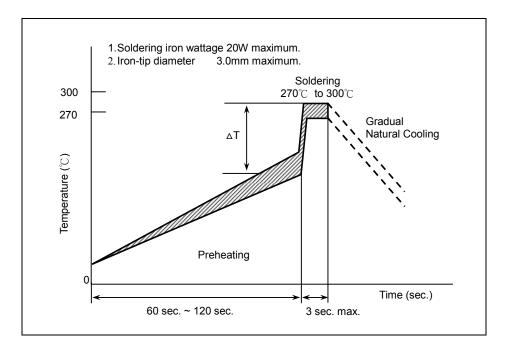
Chip Size	3216 and smaller	3225 and above
Preheating	∆T≦150°C	∆T≦130°C

### Wave Soldering



Chip Size	3216 and smaller	3225 and above
Preheating	<b>∆T≦150</b> °C	-

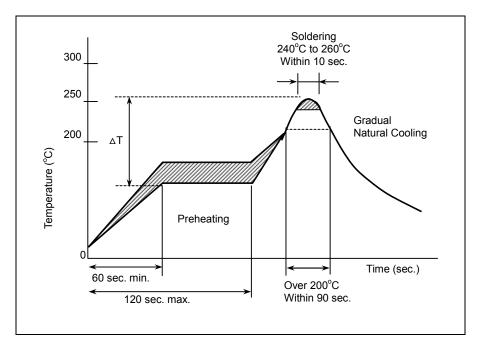
#### **Soldering Iron**



Chip Size	3216 and smaller	3225 and above
Preheating	∆T≦190°C	∆T≦130℃

### [Soldering]

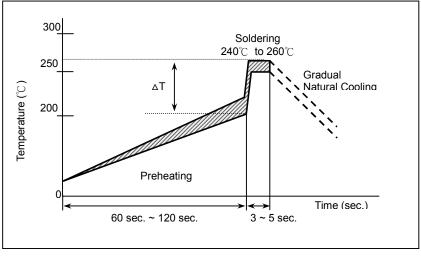
#### **Reflow Soldering for Lead free Termination**



The difference between solder and chip surface should be controlled as following table. The rate of preheat should not exceed  $4^{\circ}$ C/sec and a target of  $2^{\circ}$ C/sec is preferred.

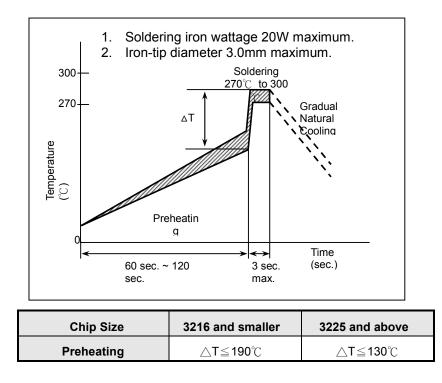
Chip Size	3216 and smaller	3225 and above
Preheating	∆T≦150°C	<b>∆T≦130</b> °C

#### Flow Soldering for Lead free Termination



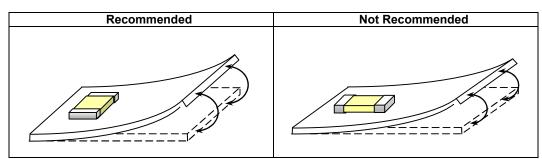
Chip Size	3216 and smaller	3225 and above
Preheating	∆T≦150°C	-

#### Soldering Iron

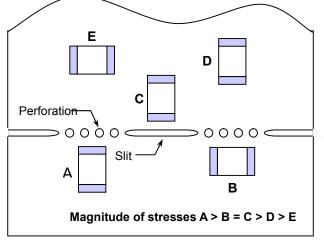


### [Chip Layout and Breaking PCB]

1. To layout the SMD capacitors for reducing bend stress from board deflection of PCB. The following are examples of Hood and bad layout.

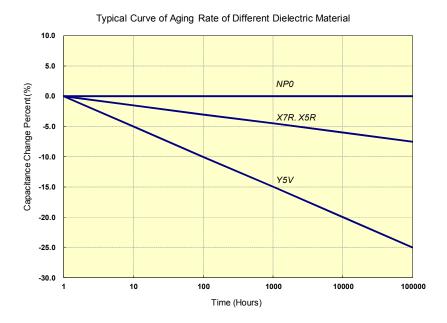


2. When breaking PCB, the layout should be noted that the mechanical stresses are depending on the position of capacitors. The following example shows recommendation for better design.



### [Aging Rate]

The capacitance and dissipation factor of class 2 capacitors decreases with time. It is known as 'aging' that follows a logarithmic low and expressed in terms of an aging constant. Aging is caused by a gradual re-alignment of the crystalline structure of the ceramic. The aging constant is defined as the percentage loss of capacitance at a 'time decade'. The law of capacitance aging is expressed as following equation:



 $C_{t2} = C_{t1} \times (1 - k \times \log_{10}(t_2/t_1))$   $C_{t1}$ : Capacitance after t1 hours of start aging.  $C_{t2}$ : Capacitance after t2 hours of start aging. k: aging constant (capacitance decrease per decade)

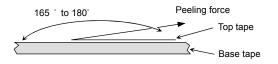
*t1, t2: time in hours from start of aging.* A typical curve of aging rate is shown in following figure.

When heating the capacitors above Curie temperature  $(130^{\circ}C \sim 150^{\circ}C)$  the capacitance can be re-new. So capacitance of class 2 capacitors will be complete de-aged by soldering process; subsequently a new aging process begins.

Because of aging, it is specified an age for measurement to meet the prescribed tolerance for class 2 capacitors. Normally, 1000 hours ( $t_2$ =1000 hrs) is defined.

### [Peeling Off Force]

Peeling off force: 0.1N to 1.0  $N^*$  in the direction shown as below. The peeling speed: 300±10 mm/min



- 1. The taped tape on reel is wound clockwise. The sprocket holes are to the right as the tape is pulled toward the user.
- 2. There are minimum 150 mm as the leader and minimum 40 mm empty tape as the tail is attached to the end of the tape.