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[®]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	_
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 <												
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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° 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° 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 ± 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° 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 ± 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"					

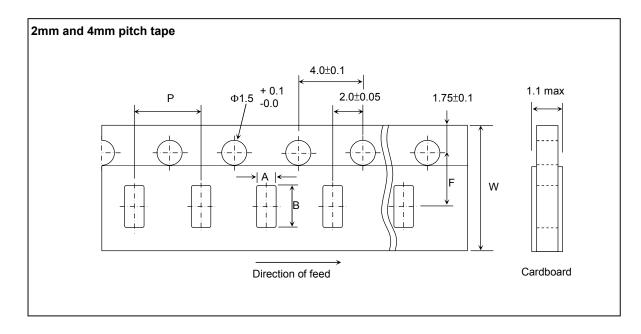
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Package

• Tape and reel packaging

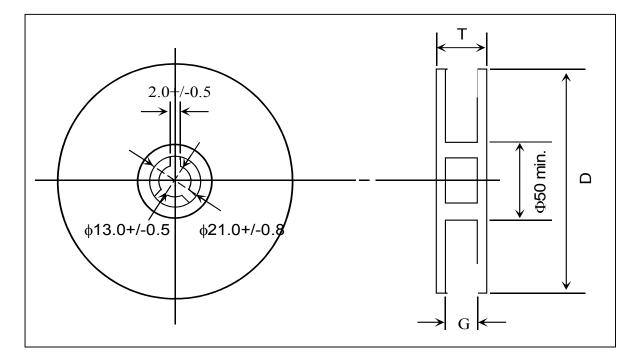
Tape and reel packaging is currently the most promising system for high-speed production. A typical 180mm (7 inch) diameter reel contains 1,500 to 15,000 capacitors, 250mm (10 inch) contains 10,000 capacitors, and 330mm (13 inch) contains 10,000 to 50,000 capacitors. Three standard sizes are available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

[Paper tape specifications]



		PRODUCT SIZE CODE											
SYMBOL	0603	8(0201)		6(0402) 05 mm)		5 (0603) 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.

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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]

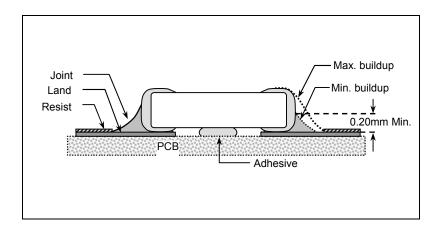
- 1. An excessive amount of flux or too rapid temperature rise can causes solvent burst, solder can generate a large quantity of gas. The gas can spreads small solder particles to cause solder balling effect or bridging problem.
- 2. Flux containing too high of a percentage of halide may cause corrosion 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]

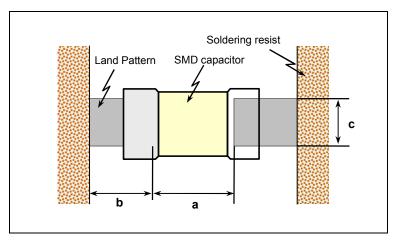
Too much solder amount may increase solder stress and cause crack risk. Insufficient solder amount may reduce adhesive Strength and cause parts falling off PCB. When soldering, confirm that the solder is placed over 0.2mm of the surface of the terminations.



[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.



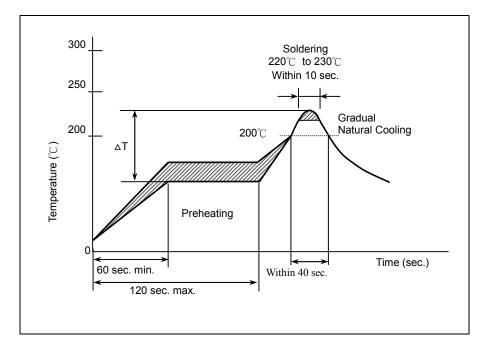
Size mm (EIA)	L x W (mm) (Dimension tolerance)	a (mm)	b (mm)	c (mm)
0602 (0201)	0.6*0.3 (within±0.03)	0.2 to 0.35	0.2 to 0.3	0.2 to 0.4
0603 (0201)	0.6*0.3 (±0.05/±0.09)	0.2 to 0.35	0.2 to 0.35	0.25 to 0.4
4005 (0402)	1.0*0.5 (within±0.10)	0.3 to 0.5	0.35 to 0.45	0.4 to 0.6
1005 (0402)	1.0*0.5 (±0.15/±0.20)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

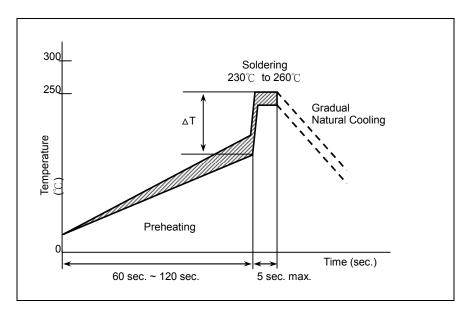
Reflow Soldering



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

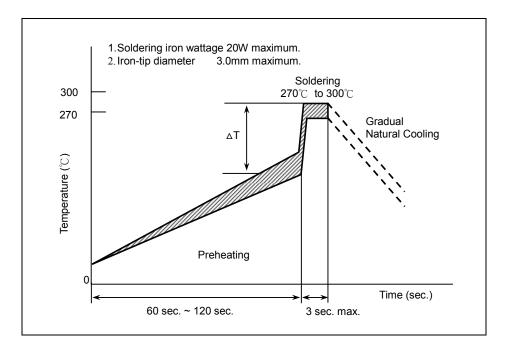
Chip Size	3216 and smaller	3225 and above
Preheating	∆T≦150°C	∆T≦130°C

Wave Soldering



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

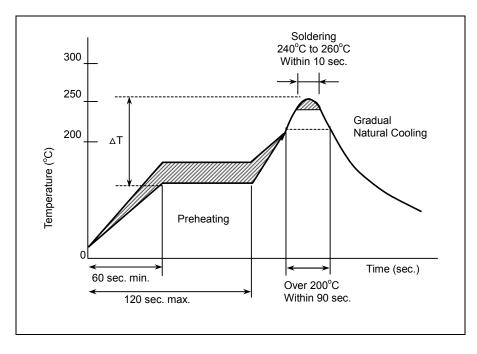
Soldering Iron



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

[Soldering]

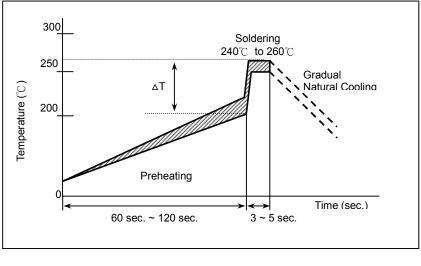
Reflow Soldering for Lead free Termination



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

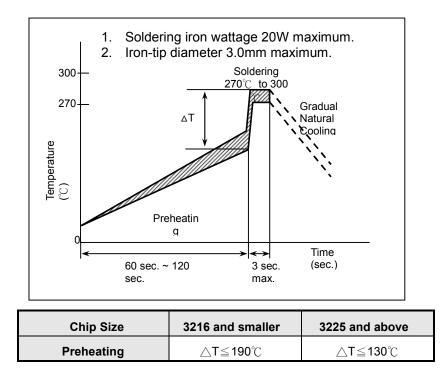
Chip Size	3216 and smaller	3225 and above
Preheating	∆T≦150°C	∆T≦130 °C

Flow Soldering for Lead free Termination



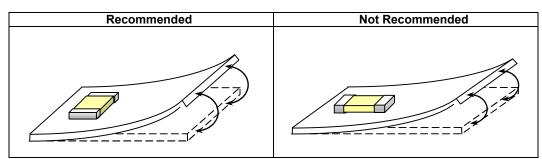
Chip Size	3216 and smaller	3225 and above
Preheating	∆T≦150°C	-

Soldering Iron

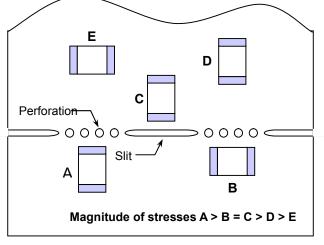


[Chip Layout and Breaking PCB]

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

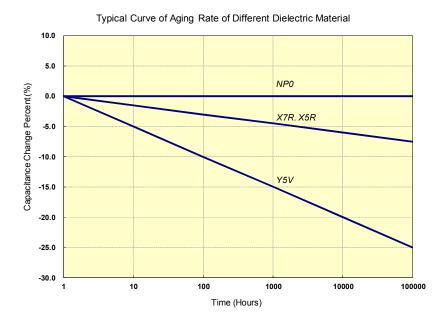


2. When breaking PCB, the layout should be noted that the mechanical stresses are depending on the position of capacitors. The following example shows recommendation for better design.



[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)

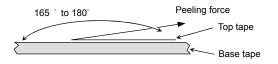
t1, t2: time in hours from start of aging. A typical curve of aging rate is shown in following figure.

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.