MULTILAYER CERAMIC CHIP CAPACITORS

Trimming type CKE series

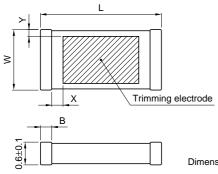
FEATURES

- Because the capacitance adjustment can be accomplished without dependence on mechanical structures, trimmed values are not prone to fluctuation as a result of shock or other external factors.
- Highly linear trimming area characteristics make precise adjustment possible using a laser trimming machine.
- High Q values can be attained at high frequencies.
- Enables the design of highly space-efficient high-packing-density circuits.

APPLICATIONS

Portable telephones, car telephones, TVs, VCR remote controls, digital high frequency products, or other high frequency products.

SHAPES AND DIMENSIONS



Dimensions in mm

PRODUCT IDENTIFICATION

$$\frac{\mathsf{CKE30}}{(1)} \ \frac{\mathsf{C0H}}{(2)} \ \frac{\mathsf{1H}}{(3)} \ \frac{\mathsf{210}}{(4)} \ \frac{\mathsf{Y}}{(5)} \ \frac{\mathsf{X}}{(6)}$$

- (1)Series name
- (2)Capacitance temperature characteristics

Temperature	Temperature	Temperature	
characteristics	coefficient	range	
C0H	0±60ppm/°C	-25 to +85°C	

(3) Rated voltage Edc

	111	507
(4)	Nominal capacitar	nce
	2R5	2.5pF
	6R5	6.5pF
	020	2.0pF
	210	21pF

(5) Capacitance tolerance

0.15+0.2, -0.05

′	•		
Y		0 to +30%	

(6) Packaging style

	_	_	•	
Т				Taping (reel)
В				Bulk



Tuno	L	W	В	Trimming range	
Туре	+0.3, -0.1	+0.3, -0.1	Ь	X	Υ
CKE20	2	1.25	0.2±0.05	0.1min.	0.1min.
CKE30	3.2	1.6	0.3±0.15	0.3±0.2 =0.05	0.15±0.2 =0.05

0.3±0.15

CAPACITANCE RANGES/CLASS1(TEMPERATURE COMPENSATION) TEMPERATURE CHARACTERISTICS: CH (0±60ppm/°C)

RATED VOLTAGE Edc: 50V

CKE40

Capacitance	Talaranaa	Trimming range	Q min.		Thickness	Part No.
(pF)	Tolerance	(pF)	200MHz	900MHz	(mm)max.	Part No.
6.5	0 to +30%	1.2 to 6.5	200	25	0.7	CKE20C0H1H6R5Y
2	0 to +30%	0.5 to 2	600	100	0.7	CKE30C0H1H020Y
6.5	0 to +30%	1.2 to 6.5	300	40	0.7	CKE30C0H1H6R5Y
2.5	0 to +30%	0.5 to 2.5	600	125	0.7	CKE40C0H1H2R5Y
4.5	0 to +30%	1 to 4.5	400	75	0.7	CKE40C0H1H4R5Y
12	0 to +30%	2.5 to 12	200	25	0.7	CKE40C0H1H120Y
21	0 to +30%	3 to 21	90		0.7	CKE40C0H1H210Y

0.3+0.2, -0.05



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TYPICAL ELECTRICAL CHARACTERISTICS

LASER TRIMMING CONDITIONS

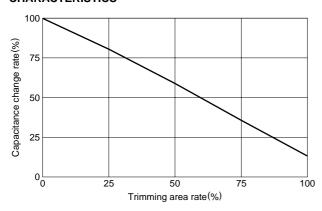
Output: 0.5W, oscillation frequency: 3kHz, scan speed: 30mm/s, laser beam spot diameter: 50µm

SAMPLE: CKE30C0H1H6R5Y

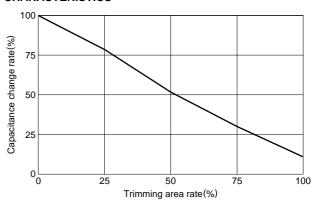
Characteristics curve	Trimming area rate	Capacitance
1	0%	8.4pF
2	25%	6.8pF
3	50%	5pF
4	75%	3.1pF
5	100%	1.2pF

SAMPLE: CKE40C0H1H210Y					
Characteristics curve	Trimming area rate	Capacitance			
1	0%	23pF			
2	25%	18pF			
3	50%	11.7pF			
4	75%	6.9pF			
5	100%	2.5pF			

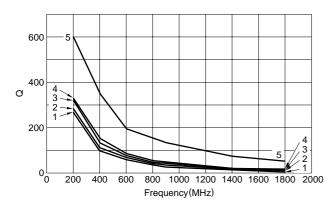
CAPACITANCE CHANGE vs.TRIMMING AREA CHARACTERISTICS



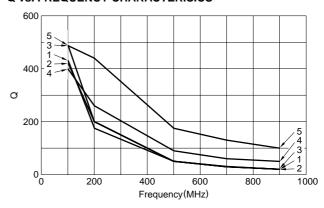
CAPACITANCE CHANGE vs.TRIMMING AREA CHARACTERISTICS



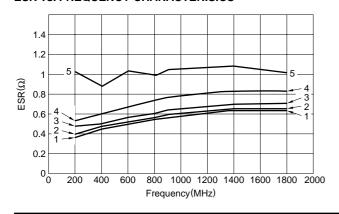
Q vs. FREQUENCY CHARACTERISICS



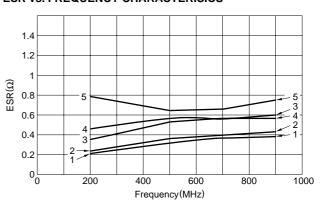
Q vs. FREQUENCY CHARACTERISICS



ESR vs. FREQUENCY CHARACTERISICS



ESR vs. FREQUENCY CHARACTERISICS

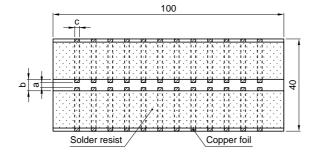




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temperature of 215°C. Solder: synthetic composition of Sn 63%, Pb 35%, Ag 2%, ar Temperature cycle* Exterior No mechanical defect. Capacitance Characteristics Variance from previous test value COH More than 10pF ±3% min. 10pF or less: ±0.3pF min. Insulation resistance Withstand voltage damages. High temperature resistance* Exterior No mechanical damage Characteristics Variance from previous test value to the special previous test value and humic 24±2h. Step Temperature(°C) Time(min) 1 -25±3 30±3 2 Room temperature 2 to 5 3 85±2 30±3 4 Room temperature 2 to 5 Solder sample to test board as shown below. Temperature: 85±2°C Impressed voltage: Rated DC voltage Impressed voltage: Rated DC voltage Time: 1000+4.8, 0h Charge and discharge current: 50mA max. Measure after leaving sample at room temperature and humic 24±2h.	Item	Reliability			Test methods and test conditions	
Voltage applied time: 60s Measurement voltage 300% of rated DC voltage Voltage applied time: 10 s5 Charge and discharge current: 50mA max.	Exterior			•	Micrometer (×3)	
Withis specified tolerance. Within specified tolerance. Capacitance Capacitan	Insulation		•	•	Measurement voltage: DC. 50V	
Voltage applied time: 1 to 5s Charge and discharge current: 50mA max.	resistance*				Voltage applied time: 60s	
Capacitance	Withstand voltage*	No dielectric n	or mechanical dam	nages.	Measurement voltage: 300% of rated DC voltage	
Within specified tolerance. Capacitance Capacitance Capacitance Capacitance Capacitance After trimming 2pF		· · · · · · · · · · · · · · · · · · ·			Voltage applied time: 1 to 5s	
Capacitance Capacitance Capacitance After trimming 2.5pF +30, -0.79 max. 0.5pF min. 4.5pF +30, -0.79 max. 1.2pF min. 12pF +30, -0.79 max. 1.2pF min. 12pF +30, -0.79 max. 1.2pF min. 12pF +30, -0.79 max. 2.5pF min. 2.5pF min. 2.5pF 6.00 1.00 2.5pF 6.00 1.00 2.5pF 6.00 1.25 4.5pF 400 7.5 6.5pF 2.00 2.5 12pF 2.00 2.5 1.2pF 2.00 2.5 2.2pF 2.00 2.5 2.2pF 2.00 2.5 2.2pF 2.00 2.5 2.2pF 2.00					Charge and discharge current: 50mA max.	
2pF	Capacitance*	Within specifie	ed tolerance.		Measurement frequency: 1MHz±10%	
2.5pF		Capacitance	Capacitance		Measurement voltage Erms: 0.5 to 5V	
4.5pF			+30, -0% max.	0.5pF min.	_	
6.5pF			+30, -0% max.	0.5pF min.		
12pF		4.5pF		1pF min.		
Capacitance		6.5pF	+30, -0% max.	1.2pF min.		
Capacitance			+30, -0% max.	2.5pF min.		
Capacitance 200MHz 900MHz 900MHz 900MHz 2pF 600 100 125 4.5pF 400 75 6.5pF 200 25 12pF 200 25 12pF 30 Solder fillet must be formed without any abnormality. Solderability Solder fillet must be formed without any abnormality. Check exterior by entering sample into reflow furnace with pet temperature of 21f°C. Solder: synthetic composition of Sn 63%, Pb 35%, Ag 2%, ar Temperature cycle* Exterior No mechanical defect. Capacitance Characteristics Variance from previous test value COH More than 10pF ±3% min. 10pF or less: ±0.3pF min. 1000+4.8, 0h Charge and discharge current: 50mA max. Measurement voltage Erms: 0.5 to 5V Measure are all to 5V Measure are all to 5V Measure are all to 6V Measure all to 5V Measure all to 6V Measure		21pF	+30, -0% max.	3pF min.		
200MHz 900MHz 2pF 600 100 2.5pF 600 125 4.5pF 400 75 6.5pF 200 25 21pF 90 Solderability Solder fillet must be formed without any abnormality.		Canacitance	Q min.		Measurement frequency: 200MHz±10%	
2.5pF 600 125 4.5pF 400 75 6.5pF 200 25 12pF 200 25 21pF 90 Solder fillet must be formed without any abnormality.	(Loss coefficient)	•	200MHz	900MHz		
A.5pF 400 75 6.5pF 200 25 12pF 90 Solder fillet must be formed without any abnormality. Solder fillet must be formed without any abnormality.		2pF	600	100	Measurement voltage Erms: 0.5 to 5V	
6.5pF 200 25 21pF 90 25 21pF 200 25 200 25 200 25 200 25 200 25 200 25 200 25 200 25 200 25 200 25 200 25 200 25 200 25 200 25 200 25 200		2.5pF	600	125	_	
12pF 200 25 21pF 90 Solder fillet must be formed without any abnormality.		4.5pF	400	75		
Solder fillet must be formed without any abnormality. Check exterior by entering sample into reflow furnace with pe temperature of 215°C. Solder: synthetic composition of Sn 63%, Pb 35%, Ag 2%, and Solder: synthetic composition of Sn 63%, Pb 35%, Ag 2%, and Leave sample in each temperature of 1 to 4 steps for the special previous test value.		6.5pF	200	25		
Solder fillet must be formed without any abnormality. Solder fillet must be formed without any abnormality. Check exterior by entering sample into reflow furnace with petemperature of 215°C. Solder: synthetic composition of Sn 63%, Pb 35%, Ag 2%, and 2%, and 20 colder: synthetic composition of Sn 63%, Pb 35%, Ag 2%, and and the mach temperature of 1 to 4 steps for the specific in order. Repeat this operation 5 times consecutively. Measure after leaving sample at room temperature and humic temperature and humic temperature. Step Temperature(°C) Time(min) 1 -25±3 30±3 2 Room temperature 2 to 5 3 85±2 30±3 3 85±2 30±3 4 Room temperature and colder temperature and humic temperature. 2 to 5 3 85±2 30±3 4			200	25		
temperature of 215°C. Solder: synthetic composition of Sn 63%, Pb 35%, Ag 2%, ar Temperature cycle* Exterior No mechanical defect. Capacitance Characteristics Variance from previous test value COH More than 10pF ±3% min. Insulation resistance Withstand voltage damages. High temperature Exterior No mechanical damage Capacitance Form previous test value Withstand voltage Capacitance Exterior No mechanical damage Characteristics Variance from previous test value Withstand voltage damages. Exterior No mechanical damage Characteristics Variance from previous test value COH More than 10pF ±3% min. 10pF or less: ±3% min. 10pF or less: ±0.3pF min. 10pF or less: ±0.3pF min. Weasure after leaving sample at room temperature and humic 24±2h. Step Temperature(°C) Time(min) 1 -25±3 30±3 2 Room temperature 2 to 5 3 85±2 30±3 4 Room temperature 2 to 5 Solder sample to test board as shown below. Temperature: 85±2°C Impressed voltage: Rated DC voltage Time: 1000+4.8, 0h Charge and discharge current: 50mA max. Measure after leaving sample at room temperature and humic 24±2h.		21pF	90			
Capacitance Characteristics Variance from previous test value COH More than 10pF ±3% min. 10pF or less: ±0.3pF min. 1000MΩ min. resistance Exterior No mechanical damages. Capacitance Capacitance Capacitance COH More than 10pF ±3% min. 1000MΩ min. resistance Exterior No mechanical damage Characteristics Variance from previous test value COH More than 10pF ±3% min. 10pF or less: ±0.3pF min. 10pF or les	Solderability	Solder fillet mi	ust be formed witho	out any abnormality.	Solder: synthetic composition of Sn 63%, Pb 35%, Ag 2%, and flux 10%	
Previous test value	Temperature	Exterior	No mechanical d	efect.	Leave sample in each temperature of 1 to 4 steps for the specified time	
COH More than 10pF	cycle*	Capacitance	Characteristics	Variance from		
# ±3% min. 10pF or less: ±0.3pF min. 24±2h.				previous test value	Repeat this operation 5 times consecutively.	
10pF or less: ±0.3pF min. 10pF or less: ±0.3pF min. 1			C0H	More than 10pF	Measure after leaving sample at room temperature and humidity for	
Linsulation 1000MΩ min. 2 Room temperature 2 to 5					24±2h.	
Insulation resistance Ins				•	Step Temperature(°C) Time(min)	
resistance Withstand voltage damages. High temperature resistance* Exterior No mechanical damage resistance* Capacitance Characteristics COH More than 10pF ±3% min. 10pF or less: ±0.3pF min. Provious test value to test board as shown below. Temperature: 85±2°C Impressed voltage: Rated DC voltage Time: 1000+4.8, 0h Charge and discharge current: 50mA max. Measure after leaving sample at room temperature and humic 24±2h.			1000110	±0.3pF min.	1 –25±3 30±3	
Withstand voltage damages. High temperature resistance* Exterior No mechanical damage resistance* Capacitance Characteristics Variance from previous test value COH More than 10pF ±3% min. 10pF or less: ±0.3pF min. Withstand voltage damages. Solder sample to test board as shown below. Temperature: 85±2°C Impressed voltage: Rated DC voltage Time: 1000+4.8, 0h Charge and discharge current: 50mA max. Measure after leaving sample at room temperature and humic 24±2h.			1000M Ω min.		2 Room temperature 2 to 5	
voltage damages. High temperature resistance* Exterior No mechanical damage Capacitance Characteristics Variance from previous test value COH More than 10pF ±3% min. 10pF or less: ±0.3pF min. Voltage damages. Solder sample to test board as shown below. Temperature: 85±2°C Impressed voltage: Rated DC voltage Time: 1000+4.8, 0h Charge and discharge current: 50mA max. Measure after leaving sample at room temperature and humic 24±2h.					3 85±2 30±3	
High temperature resistance* Exterior No mechanical damage resistance* Capacitance Characteristics Variance from previous test value COH More than 10pF ±3% min. 10pF or less: ±0.3pF min. Exterior No mechanical damage Solder sample to test board as shown below. Temperature: 85±2°C Impressed voltage: Rated DC voltage Time: 1000+4.8, 0h Charge and discharge current: 50mA max. Measure after leaving sample at room temperature and humic 24±2h.				mechanical	4 Room temperature 2 to 5	
resistance* Capacitance Characteristics Variance from previous test value COH More than 10pF ±3% min. 10pF or less: ±0.3pF min. Capacitance Capacitance Characteristics Variance from previous test value Impressed voltage: Rated DC voltage Time: 1000+4.8, 0h Charge and discharge current: 50mA max. Measure after leaving sample at room temperature and humic 24±2h.	I l'ale ta anno anotono				Orbitary and the test bearing as above below	
previous test value COH More than 10pF ±3% min. 10pF or less: ±0.3pF min. Impressed voltage: Rated DC voltage Time: 1000+4.8, 0h Charge and discharge current: 50mA max. Measure after leaving sample at room temperature and humic 24±2h.	• .				_	
COH More than 10pF Time: 1000+4.8, 0h	resistance	Capacitance	Characteristics		·	
±3% min. Charge and discharge current: 50mA max. 10pF or less: Measure after leaving sample at room temperature and humid 24±2h.			COLL			
10pF or less: Measure after leaving sample at room temperature and humid ±0.3pF min.			COH			
±0.3pF min. 24±2h.						
=3.001				•	•	
Insulation 1000M Ω min.			1000M Ω min.	±υ.ορг IIIII.		



		Dimensions in mm		
Туре	а	b	С	
CKE20	1.2	4	1.65	
CKE30	2.2	5	2	
CKE40	2.2	5	2.9	

Material: Glass epoxy resin

(corresponding to type GE4 specified in JIS C 6484)

Board thickness: 1.6mm

Copper foil (0.035mm thick)
Solder resist



^{*}Guaranteed when the capacitor is processed in conforming to TDK's laser process conditions.