Messrs: Ropla

SPECIFICATION

Part Description : "Type TC" CERAMIC CAPACITOR

Customer Part No	DONG IL Part No
-	CC Series

DONG IL				CUSTOMER	R
WRITTEN by	CHECKED by	APPROVED by	WRITTEN by	CHECKED by	APPROVED by
AR I	\times	How			
W.C.JUNG		Y.H.LIM			
06/28		06/28	/	/	/

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Please return to me by e-mail of this specification's cover with your signature

DONG IL ELECTRONICS CO., LTD.

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DIS-H-204	TE	EMPERATURE COMPENSATION CERAMIC	Ο ΟΑΡΑΟΙΤΟ	DR	02	1
		Record of Revision	1	1		
Date	Rev.No	Description	Issued by	Checked b	by Re	emark
2010.02.03	3 rev.01	Production specification review	J.H Uhm	B.S. Min		
2011.06.28	3 rev.02	2-1. Type Designation" Halogen Free "추가	S.H PARK	H.S. CHI		
	1					

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1. Sco This ce	pe s specification is ap ramic capacitor.	plied to temperature compe	nsation		
■ Feat 1-1 Coa (equiva 1-2 Tap	ures ted with flame-reta lent to UL94V-0 st ing available for au	ardant epoxy resin andard) Itomatic insertion.			
2. Part 2-1.	: Number for Sy Type Designation	/stem			
	CC 3F SL 2-1-1 2-1-2 2-1-3	470 J B S P10 2-1-4 2-1-5 2-1-6 2-1-7 2-1-8	CO4 2-1-9		
Fo	r lead type straight	short lead, lead tolerance is	only ±0.3 mm available.		
2- 2-	 1-1. Type CC : Temperature 1-2. Rating Voltag 1H : 50V, 2H : 50 	compensation ceramic capaci e(DC) 00V, 3A : 1KV, 3D : 2KV	itor(class I) /, 3F : 3KV, 3J : 6KV		
2-	1-3. Temperature	Characteristics			
	Temp. Char	Temp. Range	Change Rate		
	SL	-25 ~ +85°C	+ 350 ~ -1000ppm/°C	2	
2-	1-4. Nominal Capa The nominal capac	acitance Sitance value in pF is expresse	ed by three digit number.	ulitiplier	

of 10 in pF of zero to follow.

Ex) In case of 470 : 47 x $10^0 = 47$ pF

TEMPERATURE COMPENSATION CERAMIC CAPACITOR 2-1-5. Capacitance Tolerance. $C : \pm 0.25 pF$ $D : \pm 0.5 pF$ $J : \pm 5.0\%$ $K : \pm 10\%$ 2-1-6. Packing Style B Bulk Type F Taping Type "Flat Pack" 2-1-7. Lead Variation K Kink Type or Vertical Type S Straight Type 2-1-8. Lead Spacing (F) Not mentioned $5.0 (-02/+0.8)$ P07 7.5 ± 1.0 P10 10.0 ± 1.0 2-1-9. Lead Cutting Length Lead Type Code Length (L)	204		SPECIFI	CATION		Rev. No.	Page
2-1-5. Capacitance Tolerance.		TEMPI	ERATURE COMPENSA	TION CERAMIC CA	APACITOR	02	
C: $\pm 0.25 pF$ D: $\pm 0.5 pF$ J: $\pm 5.0\%$ K: $\pm 10\%$ 2-1-6. Packing StyleBBulk TypeFTaping Type "Flat Pack"2-1-7. Lead VariationKKink Type or Vertical TypeSStraight Type2-1-8. Lead Spacing (F)Not mentionedNot mentioned $5.0 (-02/+0.8)$ P07 7.5 ± 1.0 P10 10.0 ± 1.0 2-1-9. Lead Cutting LengthLead TypeCodeLead TypeCode	2	-1-5. Capacitan	ce Tolerance.				
2-1-6. Packing Style B Bulk Type F Taping Type "Flat Pack" 2-1-7. Lead Variation K Kink Type or Vertical Type S Straight Type 2-1-8. Lead Spacing (F) Not mentioned 5.0 (-02/+0.8) P07 7.5 ± 1.0 P10 10.0 ±1.0 2-1-9. Lead Cutting Length Lead Type Code Length (L)		C:±0.25pF	D:±0.5pF J:±	5.0% K:±10	%		
B Bulk Type F Taping Type "Flat Pack" 2-1-7. Lead Variation Kink Type or Vertical Type S Straight Type S Straight Type Por 7.5 ± 1.0 P10 10.0 ±1.0 2-1-9. Lead Cutting Length Lead Type Code Length (L)	2.	-1-6. Packing S	tyle				
F Taping Type "Flat Pack" 2-1-7. Lead Variation K Kink Type or Vertical Type S Straight Type 2-1-8. Lead Spacing (F) Not mentioned 5.0 (-02/+0.8) P07 7.5 ± 1.0 P10 10.0 ±1.0 2-1-9. Lead Cutting Length Lead Type Code Length (L)		B	Bulk Type				
K Kink Type or Vertical Type S Straight Type 2-1-8. Lead Spacing (F) Not mentioned 5.0 (-02/+0.8) P07 7.5 ± 1.0 P10 10.0 ±1.0 2-1-9. Lead Cutting Length Lead Type Code		F	Taping Type "Flat	Pack"			
K Kink Type or Vertical Type S Straight Type 2-1-8. Lead Spacing (F) Not mentioned 5.0 (-02/+0.8) P07 7.5 ± 1.0 P10 10.0 ± 1.0 2-1-9. Lead Cutting Length Lead Type Code Length (L)	2	-1-7. Lead Varia	ation				
S Straight Type 2-1-8. Lead Spacing (F) Not mentioned 5.0 (-02/+0.8) P07 7.5 ± 1.0 P10 10.0 ± 1.0 2-1-9. Lead Cutting Length Lead Type Code Length (L)		К	Kink Type or Vertic	al Type			
2-1-8. Lead Spacing (F) Not mentioned 5.0 (-02/+0.8) P07 7.5 ± 1.0 P10 10.0 ±1.0 2-1-9. Lead Cutting Length Lead Type Code Length (L)		S	Straight Typ	e			
P10 1.5 ± 1.0 P10 10.0 ± 1.0 2-1-9. Lead Cutting Length Length (L)	2-	-1-8. Lead Space	cing (F)	<u></u>			
P10 10.0 ±1.0 2-1-9. Lead Cutting Length Length (L)	2-	1-8. Lead Spac Not mentioned	5.0 (-02/+0.8)			
2-1-9. Lead Cutting Length Lead Type Code Length (L)	2-	1-8. Lead Spac Not mentioned P07	5.0 (-02/+0.8 7.5 ± 1.0)			
Lead Type Code Length (L)	2-	1-8. Lead Spac Not mentioned P07 P10	5.0 (-02/+0.8 7.5 ± 1.0 10.0 ±1.0)			
	2·	1-8. Lead Spac Not mentioned P07 P10 ·1-9. Lead Cutti	cing (F) 5.0 (-02/+0.8 7.5 ± 1.0 10.0 ±1.0)			
C03 2.8 ± 0.3	2·	1-8. Lead Spac Not mentioned P07 P10 -1-9. Lead Cutti Lead Type	cing (F) 5.0 (-02/+0.8 7.5 ± 1.0 10.0 ±1.0 ng Length Code) Length	n (L)		
straight $C04$ 3.2 ± 0.3	2·	1-8. Lead Spac Not mentioned P07 P10 1-9. Lead Cutti Lead Type	5.0 (-02/+0.8 7.5 ± 1.0 10.0 ±1.0 ng Length Code C03) Lengtł 2.8 ±	n (L) 0.3		
vertical $C07$ 6.3 ± 0.5	2·	•1-8. Lead Space Not mentioned P07 P10 •1-9. Lead Cuttin Lead Type straight	5.0 (-02/+0.8 7.5 ± 1.0 10.0 ±1.0 ng Length Code C03 C04) Length 2.8 ± 3.2 ±	n (L) 0.3 0.3		
C10 10.0 ± 0.3	2·	•1-8. Lead Space Not mentioned P07 P10 •1-9. Lead Cuttin Lead Type straight out kink vertical) Length 2.8 ± 3.2 ± 6.3 ±	n (L) 0.3 0.3 0.5		
	2·	•1-8. Lead Space Not mentioned P07 P10 •1-9. Lead Cuttin Lead Type straight out kink vertical	$5.0 (-02/+0.8)$ 7.5 ± 1.0 10.0 ± 1.0 ng Length Code C03 C04 C07 C10) Length 2.8 ± 3.2 ± 6.3 ± 10.0 ±	n (L) 0.3 0.3 0.5 0.3		

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3. Parts Numbering

	Temp	Capacitance	Tolerance	Di	imensions(mr	m)
Part Number	Char	(pF)	(%, pF)	D (max)	T (max)	Lead Spacing(F)
CC3ASL100K****	SL	10	±10	6.0	4.0	5.0 (-02/+0.8)
CC3ASL220K****	SL	22	±10	6.0	4.0	5.0 (-02/+0.8)
CC3ASL330K****	SL	33	±10	6.0	4.0	5.0 (-02/+0.8)
CC3ASL470K****	SL	47	±10	6.0	4.0	5.0 (-02/+0.8)
CC3ASL680K****	SL	68	±10	6.0	4.0	5.0 (-02/+0.8)
CC3DSL470K****	SL	47	±10	7.0	4.0	5.0 (-02/+0.8)
CC3DSL680K****	SL	68	±10	8.0	4.0	5.0 (-02/+0.8)
CC3DSL820K****	SL	82	±10	8.0	4.0	7.5±1
CC3FSL050D****	SL	5	±0.5	6.0	4.0	5.0 (-02/+0.8)
CC3FSL100K****	SL	10	±10	7.0	4.0	5.0 (-02/+0.8)
CC3FSL220K****	SL	22	±10	7.0	4.0	5.0±1
CC3FSL470K****	SL	47	±10	8.0	4.0	5.0±1
CC3FSL101K****	SL	100	±10	9.0	6.0	7.5±1
CC3FSL221K****	SL	220	±10	14.0	6.0	7.5±1
CC3JSL080D****	SL	8	±0.5	7.0	4.5	10.0±1
CC3JSL330K****	SL	33	±10	8.0	4.5	10.0±1
CC3JSL470K****	SL	47	±10	9.0	6.0	10.0±1
CC3JSL820K****	SL	82	±10	10.0	6.0	10.0±1

* DONG IL part number might have additional code digits due to lead type and speicial settings







5. Standard Marking

MARKING ITEMS	EXAMPLE
1. Nominal capacitance	
2. Tolerance	$1 47K 2 \\ 1KV 3$
3. Rated voltage	

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			,		
6. Spe	cification and Reliability	Test Method			
610	Sanacitanca				
0-1 (Lapacitance				
Сарас	citance shall be within specified	limits when measured at a			
voltage of 1Vrms and a frequency of 1MHz at $20\pm3^{\circ}$ C.					
6-2 Quality Factor (Q)					
The d	issipation factor shall be within	limits when measured at a			
voltag	ge 1Vrms and a frequency of 1N	1Hz at 20±3℃.			
table	1) TEMP. CHA.	SL			
		Less than 30pF : 400+20×C			
	Q $30 \text{pF Over} : \ge 1000$				

6-3. Insulation Resistance

Insulation Resistance shall exceed 10,000M Ω when measured after 1 minute ±10% charge with 500V DC

6-4 Withstand Voltage (between terminals)

Capacitors shall be withstood the test voltage specified in the individual specification without damage or breakdown when measured 60Sec after application twice of rated voltage.

6-5 Withstand Voltage (between terminal and body)

Capacitors shall not be damaged when rated voltage as below condition applied both connected leads and body.

60Sec after application twice of rated voltage.

6-6 Temperature Characteristics

The rete of capacitance variation shall be satisfied table 2) when

measured the capacitance within the temperature range of table 2)

(standard temperature : 20±3°C)

table 2)

TEMP. CHAR	TEMP. RANGE	CAPACITANCE VARIATION
SL	-25℃~+85℃	WITHIN +350~-1500PPM/°C



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6-7 6	eliability Test			
0-7 F	7 1 Humidity Test			
0-	-1 Humarty Test			
sha	III be subjected to a temperature of 4	U±3°C and		
rel	ative humidity bwtween 90~95% for 5	$500(0 \sim +24)$ hours and the		
ma	intained at normal temperature and h	numidity for a period of 4~24		
ho				
tal				
	CHARACTERISTICS	SL		
	CAPACITANCE			
	VARIATION	WITHIN ±3%		
		30pF↑≥350		
	QUALITY FACTOR (Q)	30pF↓≥275+5/2C		
		10pF↓≥200+10C		
	INSULATION RESISTANCE	3000MΩ MIN		

6-7-2 Humidity Loading Test

Capacitors shall be subjected to a temperature of $40\pm3^{\circ}$ C and apply 100% of DC rated voltage, relative humidity between 90~95% after applicationd rated voltage and limiting the charging and discharging current to 50mA for 500Hours and then tested within 4~24 hours the following table 4) shall be satisfied.

table 4)

CHARACTERISTICS	SL
CAPACITANCE	
VARIATION	
	30pF↑≥200
QUALITY FACTOR (Q)	30pF↓≥100+10/3C
INSULATION RESISTANCE	3000MΩ MIN

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6-7-3 High Temperature Loading Test

Capacitors shall be subjected to a temperature of $85\pm3^{\circ}$ C and apply 200% of DC rated voltage(application twice of rated voltage) and limit the charging and discharging current to 50mA for 1000 hours and then maintained a normal temperature and humidity for a period of 4~24 hours the following table 5) shall be satisfied.

table 5)

CHARACTERISTICS	SL	
CAPACITANCE		
VARIATION	VVIIHIN ±3%	
	30pF↑≥350	
QUALITY FACTOR (Q)	30pF↓≥275+5/2C	
	10pF↓≥200+10C	
INSULATION RESISTANCE	3000MΩ MIN	

6-7-4 Dischage Test(I)

Capacitors shall comply with two folloing requirements, after with standing 50 discharges from a 1000pF capacitor. Charged to potential of 10Kv DC, with an interval of 5 seconds between successive discharge, as shown below.



visual examination No mechanical damage dielectric withstanding voltage . . . The voltage as satisfied in the individual specification

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6- Ca sta vol the suc	7-5 Discharge Test (II) pacitors shall comply with the following requirements, after with nding four discharges from a dump capacitor charged to a tage value that when discharged places a potentia of 5 Kv across e capacitor test, with an interval of 5 seconds between ccessive discharges, as shown in the circuit below. Vdc : Variable direct-current voltage L : Choke coil of approximately 3mH S : High-voltage switch Cd : Dump capacitor Ct : Capacitor under test	source and 0.03Ω	2
Th	e direct current supply is to DE adjusted to potential in		
ace	cordance with the following		

CAPACITANCE VALUE OF CT		0~0.005µF	0.0051~0.05µF
CAPACITANCE VALUE OF CD		0.005 <i>µ</i> F	0.05µF
DISSIPATION FACTOR OF CD		0.5 % max	0.5 % max
	The cheesecloth around capacitors shall not		
APPEARANCE		glow of fla	ame

- (V)

VDC =

Cd

CD : dump capacitor 0.005μ F(CT $\ge 0.05\mu$ F) OR 0.05μ F(0.005μ F < CT $\le 0.05\mu$ F)

CT : capacitance under test

7. Capacitor structure & Material

7-1 Capacitor structure



No.	Material	Substance
1	Dieletric Powder	BaTiO3, Tio2
2	Ag Plate	Ag
3	Solder (Lead Free)	Sn, Ag, Cu
4	Epoxy Resin	Pel-Powder
5	Lead Wire	СР

* Lead Wire Plating thickness : 3µm min (material: Tin)

7-2. Lead wire



No. Material			
1	Steel-wire (Fe)		
2	Copper (Cu)		
3	TIN (Sn)		

CP Lead Wire

7-3 Material Vender Imformation

NO	Material Name	Vender Name	Location	Substance
1	Dieletric Powder	CPT, and etc	Korea	BaTiO3, TiO3
2	Ag Paste	Daejoo and etc	Korea	Ag, resin and etc.
3	Solder(Lead Free)	DONG IL	Korea	Sn, Ag, Cu
4	Epoxy Resin	Pelnox and etc	Japan	Silica, Bisphenol A, etc.
5	Lead Wire	Kistron and etc	Korea	Cu-plated Steel-Wire

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8. Pac 8-1. I	8. Packing Specification 8-1. Bulk Type						
	Typo	Diameter	Straight Long type	Forming Cutting type			
		1 . F					

Type	Diameter)	5 71	5	5 71
туре	/mm	Vinyl	In box	Vinyl	In box
DC	6Φ	1,000	5,000	1,000	6,000
	7Φ~8Φ	1,000	4,000	1,000	6,000
	9Φ~10Φ	500	2,000	1,000	4,000
	14Φ	500	2,000	500	2,000

8-1-1. In-Box Shape & Size



8-1-2. Out-Box Shape & Size



8-1-3. Out-Box Mark <RoHS, Lead Free>

<Loading Capacity, Handle with Care Mark>





8-2. Taping Type

T	DITOU	TAPING		
туре	PIICH	IN BOX	OUT BOX	
	12.7	2,000	12,000	
DC	15	1,000	6,000	

8-2-1. In-Box Shape & Size



8-2-2. Out-Box Shape & Size



8-2-3. Out-Box Mark

<RoHS, Lead Free>



<Loading Capacity, Handle with Care Mark>



8-3. Packing label

Label sample	NO	Explanation
	1	Customer Part No.
DGL0064A1/X1608082016001000	2	Product Name
2 CC3FSL470JBS		Q'ty
CC3FSL470JBSLL1	4	Lead free / RoHS Showing
	5	Labels publisher
DONG IL 3 Q'TY : 1,000 5 K2 6 20160808	6	Production date

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9. Causion for Certified Ceramic Capacitors

FAILURE TO FOLLOW CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

9-1. Storage and Operating Condition

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. Also, avoid exposure to

moisture. Before cleaning, bonding, or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment. Store the capacitors where the temperature and relative humidity do not exceed -10 to 40 degrees centigrade and 15 to 85%. Use capacitors within 6 months after delivery. Check the solderability after 6 months or more.

9-2. Soldering and Mounting

1. Vibration and Impact

Do not expose a capacitor or its lead wires to excessive shock or vibration during use. Excessive shock or vibration may cause fatigue destruction of lead wires mounted on the circuit board.

Please take measures to hold a capacitor on the circuit boards by adhesive, molding resin or another coating.

Please confirm there is no influence of holding measures on the product with the intended equipment.

2. Soldering

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specifications of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.

Soldering the capacitor with a soldering iron should be performed in the following conditions.

- *Temperature of iron-tip: 400 degrees C. max.
- * Soldering iron wattage: 50W max.
- * Soldering time: 3.5 sec. max.

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9-2. \$ 3. F 7 7 8 7 8 7 8 7 8 7 8 7 8 8 7 8 8 8 8	Soldering and Mounting (Coun') Bonding, Resin Molding and Coating For bonding, molding or coating this product, verify that these processes de affect the quality of the capacitor by testing the performance of the bonded molded or coated product in the intended equipment. When the amount of applications, dryness/hardening conditions of adhesive molding resins containing organic solvents (ethyl acetate, methyl ethyl ectone,toluene, etc). are unsuitable, the outer coating resin of a capacitor is damaged by the organic solvents and it may result, worst case, in a short ci The variation in thickness of adhesive, molding resin or coating may cause coating resin cracking and/or ceramic element cracking of a capacitor in a emperature cycling.	o not d, es and ircuit. outer	
4. \ S	Treatment after Bonding, Resin Molding and Coating When the outer coating is hot (over 100 degrees C.) after soldering, it beco soft and fragile. Therefore, please be careful not to give it mechanical stress	mes 5.	
9-3. I Vi Do Ex th Plo int	Handling bration and Impact o not expose a capacitor or its lead wires to excessive shock or vibration du cessive shock or vibration may cause fatigue destruction of lead wires mou e circuit board. ease take measures to hold a capacitor on the circuit boards by adhesive, r sin or another coating. ease confirm there is no influence of holding measures on the product with tended equipment.	uring use inted on nolding n the	2.