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SPECIFICATION

Part Description: Type DA (Safety standard Recognized Ceramic Capacitor)

Customer Part No	DONG IL Part No
DGL0105	DA2GYE152MTS0L3

	DONG IL		CUSTOMER			
WRITTEN by	CHECKED by	APPROVED by	WRITTEN by	CHECKED by	APPROVED by	
pule						
S.H.PARK		W.C.JUNG				
11/13		11/13	/	/	/	

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

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		■ Record of Revision	1	Γ		
Date	Rev.No Description Issued by Checked					emark
2011.02.03	rev.01	Production specification review	J.HOHM	B. S MIN		
2011.07.14	rev.02	Production specification review Lead Type (04(3.20mm) > CO3 (2.80mm)	S.H PARK	H.S CHI		
2012. 04.03	rev.03	specification review - Cover → HFi - Contents → I page - Standard Marking formal → 7 page - Capacitor structure & Material → 13 page - Packing specification → 14 page	w.c Jung.	J.H. Par	k	
2012.09.10	Rev.04	Production specification review [Type Dosignation (part Number)] rev.	W.C.JUNG	Y.H.LIM		
2016.11.09	Rev.05	5. Standard Marking Format> Marking Configuration Changes	W.C.JUNG	Y.H.LIM		
2019.04.10	Rev.06	Lead spacing Change standardization 10.0 ± 1.0mm -> 10.0 ± 0.5mm	S.H.KANG	W.C.JUNG	i	
2021.07.14 Rev.07		1.3. temperature and humidity conditions> Add	S.H.PARK	W.C JUNG	3	

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1. SCOPE

This specification relates high dielectric disc type fixed AC (Alternating Current) ceramic capacitor, intended for use in equipment for telecommunication and electronic devices.

1-1. Features

- 1. We design capacitors in much more compact size than current Type DA, having reduced the diameter by 20% max.
- 2. Operating temperature range guaranteed up to 125 degrees.
- 3. Dielectric strength: AC4000V
- 4. Class X1,Y1 capacitors which are recognized by cULus, KC, CQC, ENEC.
 - * ENEC mark has replaced all the following European National marks (FIMKO, DEMKO, NEMKO, SEMKO, SEV, VDE)
- 5. Possible to use with a component in appliance requiring reinforced insulation and double insulation, based on UL 1492, IEC 60065 and IEC 60950.
- 6. Coated with flame-retardant epoxy resin. (conforming to UL94V-0 standard)

1-2. Applications and Standard Recognition

- 1. Ideal for use as X, Y capacitors for AC line filter and primary-secondary coupling on switching power supplies and AC adaptes.
- 2. This specification is applied to following safety standard reconized ceramic capacitor.

Safety standard and recognized number

Safety standard	Standard number	Recognized No.	R.V (ac)	Temp. Char
cULus	UL 60384-14	FOWX2.E128646(US)	400V	SL. B. E
COLUS	OL 00304-14	FOWX8.E128646(CSA)	400V	SL. B. E
ENEC	EN 60384-14:2013	ENEC16/FI/22/01031/M1	400V	SL. B. E
KC	K60384-14	SJ03001-2001A	400V	SL. B. E
CQC	GB/T6346.14-2015	CQC14001110431	400V	SL. B. E

1-3. TEMPERTURE AND HUMIDITY CONDITIONS

1. Characteristic specification : $-25 \,^{\circ}\text{C} \sim + 85 \,^{\circ}\text{C}$

2. Operating Temperature Range : -45° C ~ $+125^{\circ}$ C.

3. Humidity do not exceed -10 to 40 degrees centigrade and 15 to 85%.

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2. Type Designation (Part Number)

DA	2G	ΥE	152	M	Т	S	0	L3
2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8	2-9

2-1. Type

Туре	AC Testing Voltage
DA	AC 4000V

2-2. Rating Voltage

400V AC

2-3. Capacitance temperature characteristic

T.C	Temp. Range	Change Rate
SL	+20 ~ +85 °C	- 1000 ~ + 350ppm / ℃
В	-25 ~ +85°C	+10 ~ -10%
Ь	-25 ~ +105℃	+10 ~ -15%
E	-25 ~ +85 ℃	+22 ~ -56%

2-4. Nominal Capacitance

The nominal capacitance value in pF is expressed by three digit number.

The first two digits denote significant figure; the last digit denotes the mulitiplier of 10 in pF of zero to follow. Ex) In case of $152 : 15 \times 10^2 = 1500 \text{pF}$

2-5. Capacitance Tolerance

2-6. Packing Style

В	Bulk Type
Т	Taping Type "Flat Pack"

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2-7. Lead Variation

V	V (Vertical-climp)
K	Out-Kink Type
S	Straight Type

2-8. Lead Cutting Length

= 0: = 0 a a c a a a a	or Load Catting Longin								
Lead Type	Code	Length (L)							
	0	Taping							
	2	$2.2 \pm 0.3 \text{ mm}$							
	3	$2.8 \pm 0.3 \text{ mm}$							
Straight Out kink	4	$3.2 \pm 0.3 \text{ mm}$							
Vertical	5	$5.0 \pm 0.3 \text{ mm}$							
, vortioai	7	6.3 ± 0.5 mm							
	X	10.0 ± 0.3 mm							
	L	Long							

^{*} Straight Long Type : 20 ± 1.0 mm

2-9. Lead Pitch-Spacing(F)

_ 00	- 0: _0aa : ::0:: opao:::9(:)							
L1	12.7 - F5.0 mm							
L2	15.0 - F7.5 mm							
L3	15.0 - F10.0 mm							
L4	25.4 - F7.5 mm							
L5	25.4 - F10.0 mm							
L6	25.4 - F12.5 mm							

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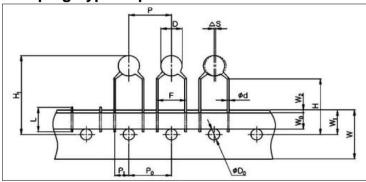
3. Part Numbering

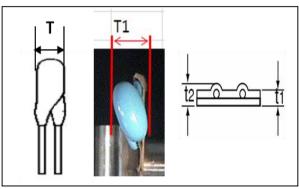
	Temp	Capacitance	Tolerance	Di	mensions(m	m)
Part Number	Char	(pF)	(%)	D (max)	T (max)	Lead Spacing(F)
DA2GYE152M****	E	1500	±20	9.0	6.0	10±0.5

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

4. Capacitors Type

Taping Type Capacitors





ITEM	CODE	Dimensions(mm)
Body Diameter	D	Max 9.0
Dady Thickness	Т	Max 6.0
Body Thickness	T1	Max 6.5
Lead Diameter	ød	0.6±0.05
Pitch of Sprocket Hole	P0	15.0±1.0
Pitch of Component	Р	15.0±1.0
Lead length from Hole Center to Lead	P1	10.0±1.0
Lead length from Hole Center to component Center	P2	-
Lead Spacing(Center to center of Lead)	F	10.0±0.5
Deviation along Tape, Left, or Right	△S	0±2.0
Deviation across Tape	△h	0±2.0
Carrier tape width	W	18.0 + 0.8 - 0.2
Hold down tape Width	W0	7.0 Min
Position of Sproket hole	W1	9.0±0.5
Hold Down Tape Position	W2	3.0 Max
Height of Component From Hole Center	Н	20.0±1.0
Lead-Wire Clinch Height	H0	16.0±0.5
Cpmponent Height	H1	32.25 Max
Portion to Cut in case of Defect	L	11.0 Max
Lead Protrusion	Lx	1.0 Max
Diameter of Sprocket Hole	øD0	4.0±0.2
Total Tape Thickness	t1	0.7±0.2
Total Thickness, Tape and Lead Wire	t2	1.5 Max

^{*} Taping pattern in the Package is all "FLAT PACK".

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5. Standard Marking Format



Marking Form

Type Designation : DA	Approved Monogram					
Nominal Capacitance : 152						
Capacitance Tolerance : M	/ 7 //40					
Company Name : DIC	CQC C SUs					
Sub-Class: X1, Y1	ENEC	CQC	UL	KC		
Rating Voltage: X1 400~, Y1 250~	* Safety certi	fications can	be printed on e	ither the		
Production Date : L11 (2023.01.01)	capacitor body or packing label.					

Production Date Table

Yea	ar		Month								Da	ite					
Year	Code	Month	Code	Month	Code	Date	Code										
2020	I	1	1	7	7	1	1	7	7	13	D	19	J	25	Р	31	٧
2021	J	2	2	8	8	2	2	8	8	14	Е	20	K	26	Q		•
2022	K	3	3	9	9	3	3	9	9	15	F	21	L	27	R		
2023	L	4	4	10	0	4	4	10	Α	16	G	22	M	28	S		
2024	М	5	5	11	N	5	5	11	В	17	Н	23	N	29	Т		
2025	N	6	6	12	D	6	6	12	С	18	I	24	0	30	U		

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6. Specification and Reliability test method

6-1. Capacitance

Capacitance shall be within the specified tolerance when measured at $20\pm2^{\circ}C$, 1 ± 0.1 KHz, at 1Vrms (SL: 1 ± 0.1 MHz)

6-2. Dissipation Factor (tanδ or Q)

Measured at 1±0.1KHz, 1Vrms and 20±2 $^{\circ}$ C (SL: 1±0.1MHz)

	,		
Char.	Quality or Dissipation Factor (Tanδ)		
CI	$Q \ge 400 + (20xC^*) (C < 30pF)$		
SL	$Q \ge 1000 \qquad \qquad (C \ge 30 pF)$		
B,E	Tanδ 2.5% max		

C*: Capacitance (pF)

6-3. Insulation Resistance

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

6-4. Withstanding Voltage (Between terminals)

DA: 4,000V AC for 60sec, frequency 60Hz. (Charge & Discharge current: 50mA Max)

6-5. Withstanding Voltage (Between terminal and body)

Capacitors shall not be damaged when Rated Voltage as below condition applied both connected leads and body. DA: 4,000V AC for 60sec, frequency 60Hz.

6-6. Temperature Characteristics

Capacitance measurement should be made with the following 5 consecutive steps.

Steps	1	2	3	4	5
Temperature	+20℃	-25 ℃	+20℃	+85℃	+20℃
Temperature	+20℃	-25 ℃	+20℃	+105℃	+20℃

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Capacitance change rate during 5 steps is calculated and standardized with the C value of the 3rd

T.C Temp. Range		Change Rate
SL +20 ~ +85 °C - 1000 ~ + 350ppm / °C		- 1000 ~ + 350ppm / ℃
D	-25 ~ +85℃	+10 ~ -10%
Ь	-25 ~ +105℃	+10 ~ -15%
E	-25 ~ +85 ℃	+22 ~ -56%

6-7. Reliability Test

6-7-1. Humidity Resistance Test

Capacitor shall be subjected to 40±3 °C temperature, 90 to 95% relative humidity for 500±12hrs. After placing in room condition for 1 to 2 hr, the following measurement satisfies table I.

Table I.

Annogrange	No remarkable damage		
Appearance	Hi-k	T.C	
Cap. Changes	B: ±10% Max	SL: ±5.0% Max	
	E: ±20% Max	SL. ±5.0% Wax	
D E (tanā)	B: ±5% Max	$Q \ge 100 + (10/3 \times C^*) (C < 30pF)$	
D.F (tanδ)	E: ±5% Max	$Q \ge 200 \qquad \qquad (C \ge 30 pF)$	
Insulation Resistance	3000 MΩ Min		

C*: Capacitance (pF)

6-7-2. Humidity Resistance Load Test

Temperature : $40\pm3^{\circ}$ °C , Humidity : $90 \sim 95\%$

Applied Voltage: Rating Voltage

Testing time: 500±12 hr

Rated value is the same table I

6-7-3. High Temperature Load Test

Capacitors are to placed in a circulating air oven for 1000±48.-0 hrs the air oven be maintained at a is be maintained at a temperature of 85±3°C throughout the test, each capacitor is to be to a 800Vrms alternating potential having a frequency of 50-60Hz, except that once each hour the potential is to be increased to 1600rms for 1/10 sec. After this test, capacitors shall satisfy Table I.

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6-7-4. Thermal Shock Test

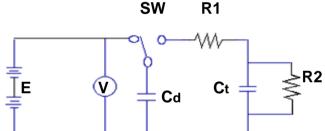
-45 $^{\circ}$ C (30min)~+125 $^{\circ}$ C (30min), It is 100 Cycle operation to → one Cycle (One hour) measure it after 12 to 24 hour, the following measurement satisfies table I.

6-7-5. Discharge Test I (Impulse test)

Table II.

Insulation Resistance	1000MΩ Min
Withstand Voltage between terminals and envelope	No failure

Capacitor shall withstand 15 times of discharges from a dump capacitor with an interval of 5 sec between successive discharges. After this test, capacitor shall satisfy table II



SW : Switch R1: $1k\Omega$

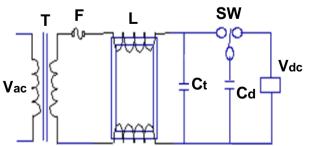
V: DC Voltmeter R2: $1000M\Omega(UL,CSA)$

Ct: Test sample $4M\Omega(VDE)$

E: 10kv DC

6-7-6. Discharge Test II (Impulse test)

Capacitor shall withstand, without causing a hazard, four discharges from a dump capacitor charged to a voltage value that when discharged places a potential of Vdc across the capacitor under test, with an interval of 5 sec between successive discharges.



Vac: 120V, 60Hz

T: Option isolation transformer of pulse blocking

F: Plug fuse 30A power supplyL: 3mH, 0.03 ohm choke coil

Ct: Test specimen

Cd: Dump Capacitor

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Ct Capacitance	Cd Capacitance	Capacitance (%)
0 to 0.005 <i>µ</i> F	0.005 <i>µ</i> F	0.5 Within
0.005 to 0.05 <i>µ</i> F	0.05 <i>µ</i> F	0.5 Within

Vdc: Variable DC power supply Vdc = 5000 (Cd + Ct) / Cd (VDC)

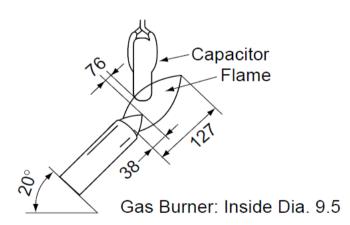
6-7-7. Flaming Test

The flame shall applied for 15 sec, and than removed for 15 sec until 5 such have been made.

applications The material to fourth cycle more than 1 minute in last cycle.

Cycle	Time (sec)
1 to 4	30 max
5	60 max

Dimensions(mm)



6-8 Mechanical Test

6-8-1. Terminal Strength (Tensile)

Capacitors shall not be damaged, when tested as follows:

Lead Diameter	Load
0.50 ~ 0.65mm	1.0kg

- The load in table shall be applied gradually to the terminal in its draw-out direction and held thus for 1 to 5 sec.

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6-8-2. Terminal Strength (Bending)

Capacitors shall not be damaged or broken, when tested as follows:

Lead Diameter	Load
0.50 ~ 0.65mm	0.5kg

- The Capacitor shall be held so that draw-out axis of the lead is kept vertical and load in left table shall be bent 90° and returned its original position in 5 sec.
- Then the body shall be bent 90°To opposite direction and returned to its original position in the same speed.

6-8-3. Solderability of Leads

The lead wire shall be soldered with uniformly coated on the axial direction over 75% of the circumferential direction

- Flux : Solution of rosin in 25%

- Solder : Sn 97.5%

- Solder temp: 260±5°C

- Immersion time: 2±0.5sec.

- Immersion depth: up to 3~4mm

6-8-4. Resistance of Soldering Heat

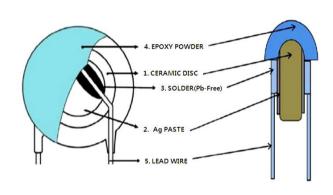
- Solder temp. : 270±5 ℃ - Immersion time : 5±0.5sec

Appearance		No visible damage	
0	SL	± 5% max	
Capacitance Change	В	± 10% max	
Onlange	Е	± 20% max	
Dielectric Strength		No. Failure	

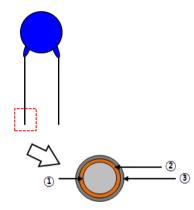
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7. Capacitor structure & Material

7-1. Capacitor structure



7-2. Lead wire



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

7-3 Material Vender Imformation

NO	Material Name	Vender Name	Location	Substance
1	Dieletric Powder	PDC, and etc	Taiwan	BaTiO3, TiO2
2	Ag Paste	Daejoo and etc	Korea	Ag, resin and etc.
3	Solder(Lead Free)	DONG IL	Korea	Sn, Ag, Cu
4	Epoxy Powder	Pelnox	Japan	Silica, Bisphenol A, etc.
4	Epoxy Fowder	Kaihua	China	Silica, disprierioi A, etc.
5	Lead Wire	Kistron and etc	Korea	Cu-plated Steel-Wire

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8. Packing Specification

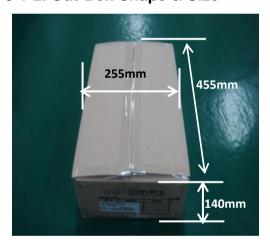
8-1. Bulk Type

Type	Diameter	Straight Long type		Forming Cutting type		
Туре	/mm	Vinyl	In box	Vinyl	In box	
	6.0 >	1,000	5,000	1,000	10,000	
	6.0 ~ 6.9	1,000	5,000	1,000	6,000	
DA	7.0 ~ 8.9	500	4,000	1,000	6,000	
	9.0 ~ 10	500	2,000	500	4,000	
	12 ~14	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>







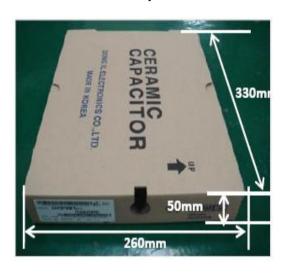


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8-2. Taping Type

IN-BOX Q'TY	,	OUT-BOX Q'T	Υ
DA, DS Type (15Pitch)	1,000 pcs	DA, DS Type (15Pitch)	6,000 pcs
DA, DS Type (30Pitch)	500 pcs	DA, DS Type (30Pitch)	3,000 pcs

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



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



8-2-3. Out-Box Mark

<RoHS, Lead Free>

RoHS (6

<Loading Capacity, Handle with Care Mark>









8-3. Packing label

Label sample	NO	Explanation
2647 JC0222TFT DA2GYE222MTKOL3 DA2GYE222MTKOL3 X1:AC400V	1	Customer Part No.
	2	Product Name
	3	Safety Certifications
DA2GYE222MTKOL3 X1:AC400V Y1:AC250V	4	Q'ty
3 c	5	Label Printer Number
DONG IL 4 Q'TY: 1,000 5 K1 6 20190104	6	Production Date
	7	Pb-Free, RoHS

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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. Soldering and Mounting (Coun')

3. Bonding, Resin Molding and Coating

For bonding, molding or coating this product, verify that these processes do not 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 adhesives and molding resins containing organic solvents (ethyl acetate, methyl ethyl ketone,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 circuit. The variation in thickness of adhesive, molding resin or coating may cause outer coating resin cracking and/or ceramic element cracking of a capacitor in a temperature cycling.

4. Treatment after Bonding, Resin Molding and Coating
When the outer coating is hot (over 100 degrees C.) after soldering, it becomes
soft and fragile. Therefore, please be careful not to give it mechanical stress.

9-3. Handling

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.