

To : _____

ELECTRIC DOUBLE LAYER CAPACITORS DRAWING

PART NUMBER : _____

ELNA PART No. : DZ-2R5D475T
DZ-2R7D475T (Environment-friendly capacitor)

DRAWING No. : SD-0020

RECEIVED SIGNATURE		
APPROVED	DATE	_____
	TITLE/NAME	_____
	SIGNATURE	_____
	DATE	_____
	TITLE/NAME	_____
	SIGNATURE	_____

DATE : Aug. 12. 2005

DRAWN BY : *A. Oyama*

APPROVED BY : *M. Kobayashi*

ELNA CO., LTD.

YOKOHAMA OFFICE 3-8-11, SHIN-YOKOHAMA, KOUHOKU-KU,
YOKOHAMA-SHI, KANAGAWA, 222-0033 JAPAN

PHONE : +81-45-470-7254
FAX : +81-45-470-7260

The purpose for submission

We herewith would like to submit our drawing . No. SD-0020 as following reason.

Would you please give us your considerations.

1. The purpose for submission

Reasons	Main content (or Points of difference)
<input checked="" type="checkbox"/> New parts	
Specification change according to your requirement	
Modification due to our specification change	
There is a difference from your specification	
Others ()	

2. The time of effect

The delivery after specification sheet is returned.

The order after specification sheet is returned.

Automatically switch after specification sheet is returned.

Arrangement will be considered separately.

ELECTRIC DOUBLE LAYER CAPACITORS DRAWING

1. Description DYNACAP (ELECTRIC DOUBLE LAYER CAPACITOR)
Series DZ 2.5V 4.7F, 2.7V 4.7F

2. Operating Temperature Range -25 to 70

3. Max. Operating Voltage 2.5V and 2.7V

4. Electrical Performance See Table 1.

Table 1.

No.	Item	Performance	Test Method
1	Rated Capacitance	See 10. Standard Ratings	See 12. Measuring of method
2	Rated Capacitance Tolerance	-20% to +80%	_____
3	Internal Resistance at 1kHz	See 10. Standard Ratings	See 12. Measuring of method

5. Climatic performance See Table 2.

Table 2.

No.	Item	Performance requirements		Test Method											
1	Characteristics at high and low temperature	Change in Capacitance	Within $\pm 30\%$ of measured value at 20 .	<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%;">Step</td> <td style="width: 10%;">1</td> <td style="width: 10%;">2</td> <td style="width: 10%;">3</td> </tr> <tr> <td>Temperature</td> <td style="text-align: center;">20</td> <td style="text-align: center;">-25</td> <td style="text-align: center;">70</td> </tr> </table> Time at each step : Time until thermal equilibrium (temperature stability) is achieved then the each measurements shall be made.				Step	1	2	3	Temperature	20	-25	70
		Step	1					2	3						
		Temperature	20					-25	70						
Internal Resistance	Less than 5 times of measured value at 20 .														
2	Endurance	Change in Capacitance	Within $\pm 30\%$ of initial measured value.	70 \pm 2 1000 +48/0 h Applied voltage : Max. Operating Voltage Measuring temp. : Room temp.											
		Internal Resistance	Less than 4 times of initial specified value.												
3	Storage at high temperature	The same as the endurance values.		70 \pm 2 1000 +48/0 h Applied voltage : No Voltage Measuring temp. : Room temp.											
4	Damp heat, (Steady State)	The same as the endurance values.		55 \pm 2 90 ~ 95%RH, 500 +24/0 h Applied voltage : No Voltage Measuring temp. : Room temp.											
5	Rapid change of temperature	Change in Capacitance	Within $\pm 10\%$ of initial measured value.	-25 (30 \pm 3 min.)		Room temp. (Less than 3 min.)									
		Internal Resistance	Less than initial specified value.	Room temp. (Less than 3 min.) 5 cycles		70 (30 \pm 3 min.)									

6. Mechanical Performance



Table 3.

No.	Item	Performance requirements		Test Method								
1	Robustness of terminals	When the capacitance is measured, there shall be no intermittent contacts, or open or short circuiting. There shall be no such mechanical damage as lead wire damage etc.		<p>Tensile strength of lead wire:</p> <p>A static load of the following shall be applied to the lead wire in the axial direction and acting in a direction away from the body for 10±1 sec.</p> <table border="1" data-bbox="1042 421 1489 539"> <thead> <tr> <th>Lead diameter (mm)</th> <th>Loading force (N)</th> </tr> </thead> <tbody> <tr> <td>0.6</td> <td>10</td> </tr> </tbody> </table> <p>Bending of lead wire:</p> <p>The capacitor shall be held by its body in such a manner that axis of the lead wire is vertical : A mass applying a following force shall then be suspended from the end of the lead. The body of the capacitor shall then be inclined through an angle of 90 degrees in the vertical plane and then returned to its initial position over a period of 2 to 3 sec; this operation constitutes 1 bend. The lead shall be subjected to 1 bent in each direction to give a total of 2 bends.</p> <table border="1" data-bbox="1042 869 1489 987"> <thead> <tr> <th>Lead diameter (mm)</th> <th>Loading force (N)</th> </tr> </thead> <tbody> <tr> <td>0.6</td> <td>5</td> </tr> </tbody> </table>	Lead diameter (mm)	Loading force (N)	0.6	10	Lead diameter (mm)	Loading force (N)	0.6	5
Lead diameter (mm)	Loading force (N)											
0.6	10											
Lead diameter (mm)	Loading force (N)											
0.6	5											
2	Vibration	Change in Capacitance	Within ±10% of initial measured value.	<p>Direction and duration of vibration : 3 orthogonal directions mutually each for 2h. Total 6h. Frequency : 10 to 55 Hz reciprocation for 1 min Total amplitude : 1.5 mm</p> <p>A nominal size is D 12.5mm or L 25mm, needs to fix to a print circuit board.</p>								
		Internal Resistance	Less than initial specified value.									
		Visual examination	No notable change to be found.									
3	Solderability	At least 3/4 of circumferential surface of the dipped portion of termination shall be covered with new solder.		<p>Temperature of solder : 245 ± 5</p> <p>Dipped time : 3±0.5 sec</p> <p>Composition of Solder : Sn-3Ag-0.5Cu</p>								
4	Resistance to soldering heat	Change in Capacitance	Within ±10% of initial measured value.	<p>Temperature of solder : 260±3</p> <p>Dipped time : 5±0.5 sec</p> <p>Solder : H60A or H63A</p> <p>Immersion depth : from a root 2 to 2.5 mm</p>								
		Internal Resistance	Less than initial specified value.									
		Visual examination	No notable change to be found.									

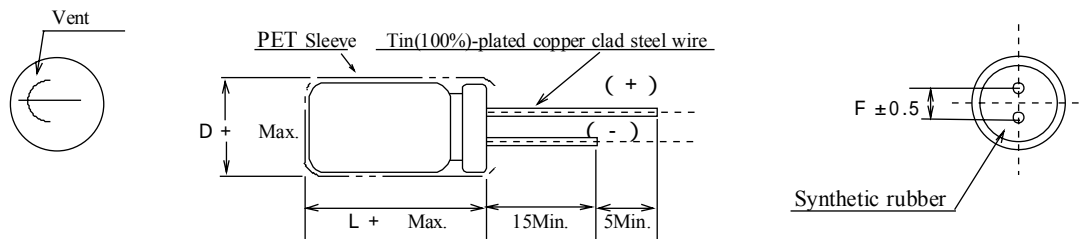
7. Marking

The capacitor shall be marked with Product name, Series name, Max. Operating voltage, Rated capacitance, Polarity, Manufacture's mark, Date code and Factory mark.
And the capacitor shall be marked in white ink on black sleeve.

[Marking]

Mark	Item
DYNACAP DZ 2.5V 4.7F	Product name Series name Max. Operating voltage and Rated capacitance
	Negative Polarity
ELNA 0522 	Manufacture's mark Date code Factory mark

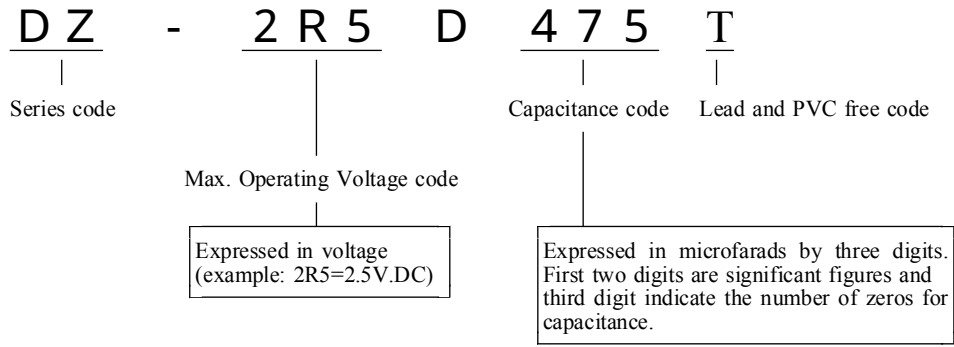
8. Outline drawing



Unit : mm

D	12.5
L	31.5
F	5.0
d	0.6
	0.5
	2.0

9. Part Number System



10. Standard Ratings

ELNA Part No.	Max. operating voltage (V.DC)	Capacitance (F)	Internal Resistance (mΩ)	Case size (mm)	
				D	L
DZ-2R5D475T	2.5	4.7	200 or less	12.5	31.5
DZ-2R7D475T	2.7	4.7	200 or less	12.5	31.5

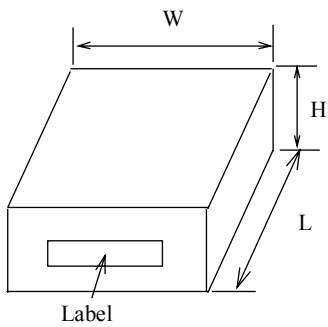
11. Packaging Procedures

(1) Numbers of products in packages (pcs.)

Case size	Packing quantity
12.5 × 31.5	800

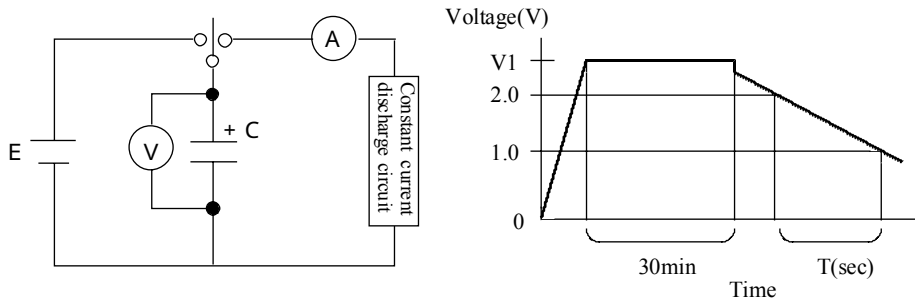
(2) Packing case dimensions (mm)

Case size	L Max.	W Max.	H Max.
12.5 × 31.5	300	230	150



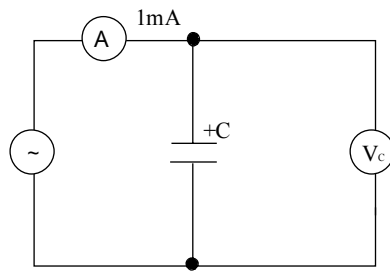
12. Measuring of method

- (1) Capacitance Charge is Max. operating voltage (V1). Discharge current is 47mA. It shall be calculated by the time to 1.0V from 2.0V.



$$\text{Capacitance} = \frac{47(\text{mA}) \times 10^{-3} \times T(\text{sec})}{2.0 - 1.0} \quad (\text{F})$$

- (2) Internal Resistance (at 1 kHz)



$$\text{Internal Resistance} = V_c / 1\text{mA} \quad (\text{m}\Omega)$$

Cautions for Using DYNACAP(Electric Double Layer Capacitor)

Usage

1. Since DYNACAP is polarized, do not apply a reversed voltage.
DYNACAP is polarized. If a reversed voltage is applied for a long time, the leakage current will increase abruptly, which may cause a decrease in the capacity, an increase in the internal resistance, and causing leakage or damage to the product in some cases.
2. Do not apply any voltage higher than the operating maximum voltage (this means the surge voltage in the case of short-time charge).
If an over voltage is applied to the product, the leakage current will increase abruptly and the product will become overheated, which may cause a decrease in the capacity, an increase in the internal resistance, and causing leakage or damage to the product in some cases.
3. Do not use smoothing a power supply (for absorbing its ripple).
Since the internal resistance of DYNACAP is high, the product will be overheated if it is used for smoothing a power supply (for absorbing its ripple), which may cause a decrease in the capacity, an increase in the internal resistance, and causing leakage or damage to the product in some cases.
4. Do not use in a circuit where quick charge and discharge are repeated very often.
In a circuit where quick charge and discharge are repeated very often, the product will become overheated, which may cause a decrease in the capacity, an increase in the internal resistance, and causing leakage or damage to the product in some cases. Reduce the charge and discharge currents while selecting a product with low internal resistance, and make sure that the product surface temperature does not rise.
5. DYNACAP life depends heavily on the ambient temperature.
The lifetime of DYNACAP is seriously affected by change in ambient temperature. If the temperature is lowered by 10 °C, the lifetime will be approximately doubled. Therefore, the product should be used at a temperature lower than the guaranteed maximum value for maximum life.
If the capacitor is used at a temperature exceeding its maximum guaranteed temperature, not only is its life shortened, but increased vapor pressure of electrolyte or electrochemical reactions may increase the internal pressure, and causing leakage or damage to the product in some cases.
6. Note that a voltage drop in DYNACAP occurs during backup.
In a case where discharge current is large, or a large current flows instantaneously, an electric double layer capacitor (DYNACAP) may not operate at the start of discharge because of a large voltage drop (IR drop) caused by the product with the DC internal resistance.
7. Do not use the product in an ambient atmosphere containing water droplets of toxic gases.
Although DYNACAP is sealed, water droplets or toxic gases may corrode the lead wires and the case, which may cause a breaking of the wires.
8. Contact us before connecting the products in series.
A series connection will cause an imbalance in the voltage, charged to the capacitors and an overvoltage may be charged to one or more them. This may cause a decrease in the capacity, an increase in the internal resistance and causing leakage or damage to the product in some cases. When using series connection for several capacitors, please derate the applied voltage from the max. operating voltage or use balancing circuits (bleeder resistor, etc.) to compensate for the imbalance in the applied voltage for each capacitor.
Moreover, please ensure the arrangement does not cause temperature fluctuation between capacitors.
9. About vibration.
A terminal blank, a terminal bend, and a crease may occur by adding too much vibration to a capacitor. Moreover, depending on the case, a DYNACAP may do degradation of the characteristic, breakage, and a leakage. When you become too much vibration, please contact our company.
10. When used on a double sided printed circuit board, do not overlap the wiring patterns on the mounted part.
A short circuit may be created by certain wiring conditions. Should the electrolyte leaks, the circuit pattern may cause a short circuit, resulting in tracking or migration.

11. Do not keep in high temperature and high humidity atmospheres.
Avoid high temperature or high humidity or direct rays when storing capacitors.
Keep the product in a place where the temperature is 5 ~ 30 and the humidity is lower than 60%.
Avoid an abrupt temperature change, which may cause condensation or deterioration of the product or liquid leakage.
Do not store DYNACAP at a place where there is a possibility that they may get water, salt or oil spill.
Do not store DYNACAP at place where the air contains dense hazardous gas (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine ammonia, etc.).
Do not store DYNACAP at a place where it gets ultraviolet ray or radioactive ray.
12. Capacitors fitted with a relief valve
The relief valve is provided with a valve function with part of the case made thin to avoid explosion by increased internal pressure when the capacitor is under abnormal load such as over voltage or reverse voltage. After activation of the relief valve, the capacitor must be replaced as it does not restore.
For the capacitors with a case relief valve, provide a void on the top of the relief valve so as not to hamper its activation. Make a void of 2 mm or more for the product of 18 or less in diameter, and a void of 3 mm or more for the product of 20 to 35 mm in diameter on the top.

Mounting

1. When soldering the capacitor to the wiring board, do not attach the body of the capacitor to the circuit board.
If the body of the capacitor is attached directly to the circuit board, the flux or solder can blow through the through holes in the circuit board, negatively impacting the capacitor.
2. Do not overheat when soldered.
Depending on the type and size of the board, the product may be subjected to overheat, leading to loss of airtightness. This may greatly shorten the product life or cause liquid leakage. In case of a 1.6mm thick printed board, for example, keep the following soldering conditions: temperature lower than 260 , time shorter than 5 seconds. When a board thinner than 1.6 mm is used, contact us. In the case of hand soldering, the iron tip temperature is lower than 360 , time is shorter than 3 seconds.
3. Contact us when cleaning is necessary after soldering.
Certain types of solvents are not compatible and may cause damage.
4. Contact us when the product is attached by adhesive bonding.
Certain types of adhesives are not compatible.
Paste bond partially between the product and the board so that the product will not adhere completely to the board. Do not raise the temperature over the guaranteed value while the bond is hardening.
5. Heating conditions of adhesive curing oven
During heating of the adhesive curing oven, application of excessive heat may significantly shorten the product life or cause liquid leakage. Control the body temperature so as not to exceed 90 during work while setting the allowable atmospheric temperature below 110 , and allowable heating time within 60 seconds. For the heating conditions deviating from the above, consult with us providing your temperature profile conditions.
6. Be careful not to apply an excessive force to the capacitor body, terminals or lead wires.
Mount the capacitor while making sure that the terminal spacing of the capacitor and the spacing of the holes in the printed wiring board are aligned.
If the capacitor body is subjected to stress such as grabbing, falling, pushing or twisting after mounted, its terminals may come off, leading to open, short or liquid leakage.

Other cautions

1. Emergency procedures
If the DYNACAP overheats or starts to smell, immediately switch off the units main power supply to stop operation.
Keep your face and hands away from the DYNACAP, since the temperature may be high enough to cause the DYNACAP to ignite and burn.
2. Periodical inspections should be established for the DYNACAP used in industrial appliances.
The following items should be checked:
Appearance : Check if there is leakage.
Electronic performance : Check the leakage current, the electrostatic, the internal resistance and other items described in the catalog or the product specifications.
3. Disposing of DYNACAP.
Punch a hole or crush the DYNACAP(to prevent explosion) before incineration at approved facility.
If they are not to be incinerated, bring them to a professional industrial waste disposal company.
4. Other notes.
Please refer to the following literature for anything not described in the product specifications or the catalog. (Technical Report of Japan Electronics and Information Technology Industries Association #EIAJ RCR-2370A " Guideline of notabilia for fixed electric double layer capacitors ")