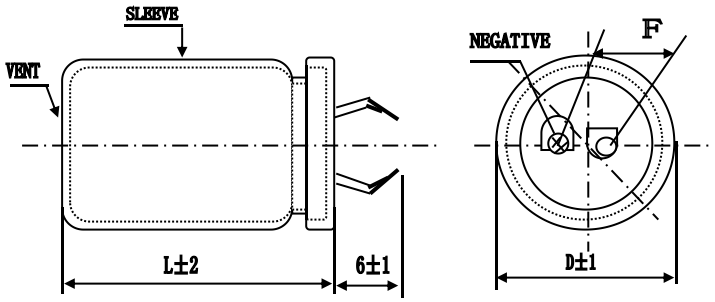
AHAPE AND DIMENSONS

Snap-in（CD293）



D：25.4mm　　L：45mm　　F=10mm

Rated voltage (v)	Surge Voltage（V）	Cap（μF)	（size）	(Terminal type)	(Temperature)	5℃）(Nominal capacitance tolerance)	（20±5℃）Dissipation factor	（μA）（20±5℃）Leakage current	（A）Rated ripple curret	Enduran ce（hours）at 105 ± 2℃120HZ
400	450	220	25.4×45	Snap-in	-25~+105℃	±20%	≤0.15	≤889	1.14	2000

1. SCOPE

This specification covers CD293 “LX” series Snap-in and Lug type aluminum electrolytic capacitors.

2. APPLICABLE SPECIFICATION

Japanese Industrial Standard GB/T2963-2001、Characteristics and IEC60384-1-1999 except as specified in this specification.

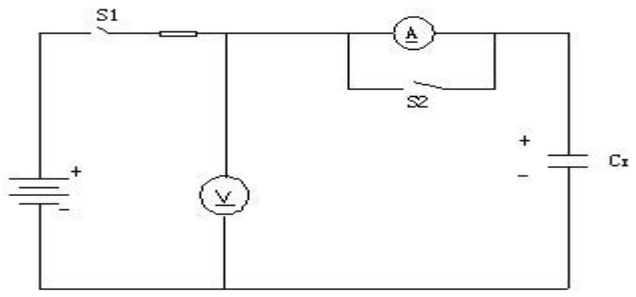
3. OPERAT ING TEMPERATURE RANGE

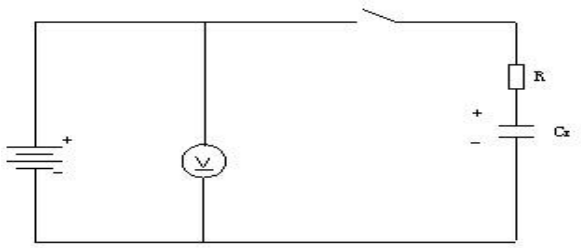
-Operating temperature range is the range of ambient temperature at which the capacitor can be
operated continuously at rated voltage.
-25～+105℃

4. CHARACTERISTICS

Unless otherwise specified，the standard range of atmospheric conditions for making Measurements and tests are as follows.
Ambient temperature:15 to35℃
Relative humidity:45 to 75%
Air pressure:86kpa to 106kpa
If there may be doubt on the results，measurements shall be made within the following limits.
Ambient temperature:25±2℃
Relative humidity:60 to 70%
Air pressure:86kpa to 106kpa

4.1 ELECTRICAL CHARACTERISICS

NO	Item	Test method	Performancs
4.1.1	Rated voltage		DC ： 400V
4.1.2	Capacitance	Measuring frequency:120Hz±20% Measuring circuit: Series equivalent circuit Measuring voltage: 0.5Vrms or less +1.5 to 2.0VDC	220μF Capacitance tolerance: ±20% C:Capacitance(μF)
4.1.3	Dissipation Factor	Testing condition are the same as 4.1.2 for capacitance	tgδ≤0.15
4.1.4	Leakage current	The rated voltage shall be applied across the capacitor and its protective resistor which shall then be measured after an electrification period of 5 min. Measurement circuit  Rs:Protective resistor(1000±100Ω) DC ammeter DC voltmeter S1:Switch S2:Protective switch for an ammeter	Voltage 400V After 5 minutes Ic≤889 Ic:Leakage current(μA) V:Rated voltage(V)

<table>
<tr><td rowspan="2">4.1.5</td><td rowspan="2">Surge Test</td><td>Voltage application:
1000 times of charging for 30±5sec, with a period of 5.5±0.5min.
Test temperature: 15℃-35℃
And the capacitor shall be stored under standard atmospheric conditions to obtain thermal stability, after which measurements shall be made.</td><td>Capacitance:Not less than 80% of value before test.
Dissipation factor:
Not more 200% of the specified value in Table-1.
Leakage current:
To satisfy No.4.1.4</td></tr>
<tr><td colspan="2">Test circuit
 

Note:This requirement is applicable only to instantaneous over voltage which may be applied to terminals of capacitor,therefore,not applicable to such Over voltages as often applied.</td></tr>
</table>

4.2 MECHANICAL PERFORMANCE

NO	Item	Test method	Performancs
4.2.1	TERMINAL STRENGTH	Terminal tensile strength: 1. Firstly measure riveting thicknes of the cover plate with a cursor caliper. Then put the cover into the mold and add to 200N with a sputtering pull gauge. And then take out the cover and measure the thickness again. 2. Put the cover into the test mold, add to 350N. Observe if the welding needle will fall off.	1. If the thickness of the two rivets does not change, the result is qualified. If the second one is thicker than the first one , the test is failed. 2. The welding needle should n ot fall off during the test. Other wise the test is failed.
4.2.1	Resistance to Vibration	To comply with JIS C 5102 8.2and JIS C5025 Direction and duration of vibration: 3 orthogonal directions mutually each for 2h,Total 6h.	When the capacitance is measured there shall be no intermittent contacts,or open or short circuiting There shall be no such mechanical damage.
4.2.3	Solder ability	To comply with IEC60068-2-2 Temperature or solder:230±5℃ Dipping time:2±0.5sec. This specification shall be met after the capacitors are stored under standard atmospheric conditions for 6 months.	At least 3/4f circumferential surface of the dipping portion of termination shall be covered with new solder.

4.3 ENDURANCE PERFORMANCE

NO	Item	Test method	Performancs
4.3.1	Resistance to soldering heat	Solder bath method Solder temperature:260±5℃ Immersion time : 10±1sec. Printed wiring board:1.6mm	Variation of capacitance: Within ±10% of the value before test. Dissipation factor: To satisfy Table 1. Leakage current: To satisfy No 4.1.4 Appearance: No remarkable abnormality.
4.3.2	Resistance to damp heat(steady state)	To comply with JIS C 5023 Test Temperature: 40±2℃ Test time: 240±8h. Relative humidity: 90～95% After completion of test,the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours,after which measurements shall be made.	Variation of capacitance: Within ±15% of the value before test. Dissipation factor: To satisfy Table 1. Leakage current: To satisfy No 4.1.4 Appearance: No remarkable abnormality.
4.3.3	Load life	Aftet applying rated voltage with maximum ripple current for 2000h at 105℃ and then resumed for 24 hours.	Variation of capacitance: Within ±20% of the value before test. Dissipation factor: Not more than 200% of the specified value in Table 1. Leakage current : To satisfy No 4.1.4 Appearance: No remarkable abnormality.

NO	Item	Test method	Performance
4.3.4	SHELF LIFE TEST	The capacitors are then stored with no voltage applied at a temperature of 105 ±2℃for 1000_{-0}^{+48}h and then resumed 16 hours.	Variation of capacitance:Within ±20% of the value before test. Dissipation factor: Not more than 200% of the specified value in Table 1. Leakage current: Not more than 200% of the satisfy No.4.1.4 Appearance: No remarkable abnormality.
4.3.5	SAFETY VENT	Applied voltage:AC voltage not exceeding 0.7 times of the rated direct voltage or 250 V AC whichever is the low Frequency：50 Hz or 60 Hz. Series resistor:refer to the table below.	The vent device is actuated under the test conditions,thereby preventing terminals,metal pieces,etc,of the capacitor from scattering due to burst,the case from separating from the seal packing,or the capacitor from producing flame.

Capacitance(C)	Series resistor
C≤1 μF	1000Ω
1 μF ＜C≤10 μF	100Ω
10 μF ＜C≤100 μF	10Ω
100 μF ＜C≤1000 μF	1Ω
1000 μF ＜C≤10000 μF	0.1Ω
10000 μF ＜C	*

		*Resistance is equivalent to a half impedance by test frequency. **DC test** Where case size： D≤22.4mm：1A d.c.max D>22.4mm：10A d.c.max Note:1.This requirement applies to capacitors with diameter of 6mm or more. 2.When the pressure relief divice does not oveven 30minutes after commencement of to the test may be ended.	

Frequency correction fator for ripple current

Freq(Hz) / U_R(V)	50	120	500	1K	10～50K
10～100	0.90	1.0	1.05	1.10	1.15
160～250	0.80	1.0	1.10	1.13	1.18
315～450	0.80	1.0	1.05	1.10	1.15

Temperature coefficient

(℃)	≤65	85	105
coefficient	2.1	1.7	1.0

5. MARKING

5.1 The following items shall be marked indelibly on the capacitor.

(1) DM trade mark.

(2) Rated voltage

(3) Type and specification

(4) Polarity of the terminals

(5) Pacted temperature

5.2 Sleeve color: black

Marking color: white

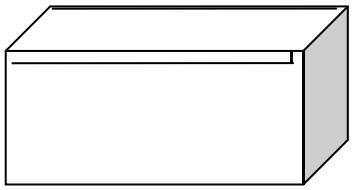
6. PACKING

6.1 PACKING LABEL

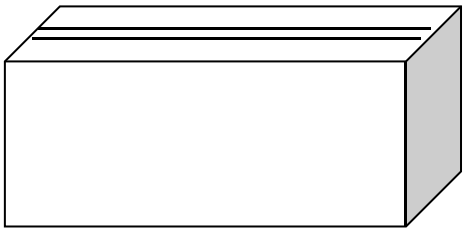
DM

CD293	±20%
400V220μF	25.4×45
648只	

6.2 Bulk packing capacitors are packed into PVC bags,inner BOX and cartons



inner box



carton

Φ25.4：

Φ25.4×45	550×275×255	648	265×265×47/8*8	81	8

Package

8.

8.1 IMPORTANT INFORMATION ON THE APPLICATION OF ALUMINUM ELECTROLYTIC CAPACITORS

When reverse voltage is applied on DC electrolytic capacitor,the capacitor will becomes short circuited please use non polarized capacitors in the circuit be damage due to abnormal current flows through the capacitors since thw circuit where the positive voltage may be applied to the cathode terminal.

（2）Use capacitor within rated voltage

When capacitor is used at higher voltage than the rated voltage,leakage current increases,characteristics drastically deteriorste and damage in a short period may occur as a result.Please take extra caution that the peak voltage should not exceed the rated voltage.

（3）Charge and discharge application.

When aluminum electrolytic capacitorsfor general purpose are employed in rapid charge and discharge application,its life expectancy may be shortened by capacitance decrease,heat rise,etc.

（4） Store the capacitor

I creased leakage current is common in aluminum capacitors which have been stored for long period of time.The Higher the storage temperature,the higher the leakage current increase,therefore please take precautions concerning the storage location.The leakage current

decrease gradually as voltage is applied to the capacitor.In cases where increased leakage current causes problems in the circuit,apply voltage(aging)before using.

（5）Ripple current applied to capacitor should not exceed the rated value.

Excessive heat will reduce capacitance and result in shortened life of capacitorif ripple currents exceeding the specified rated value are applied.The peak value of the ripple voltage should be less than the rated voltage.

（6）Lead stress

When a strong force is applied to the lead wires or terminals,stress is put on the internal connections.This may result in short circuit,open circuit or increased leakage current.It is not advisable to bend or handle a capacitor after it has been soldered to the PC board.

（7）Heat resistance at the soldering process

In the dip soldering process of PC board with aluminum electrolytic capacitors mounted,secondary shrinkage or crack of PVC sleeve may be observed when solder temperature is too high or dipping time is too long.

（8）Hole pitch and position of PC board.

A PC board must be designed so its hole pitch coincides with the lead pitch(lesd spacing) of the capacitor specified by the catalog or specifications.when a capacitor is forcibly inserted into an unmatached hole pitch,a stress is put on the leads.This could result in a short circuit or increased leakage current.

8.2 This product is lead free and environmental friendly