ENYCAP™ Instruction Manual (UL 810A Chapter 21)

For EDLC series:

- 220 EDLC ENYCAP
- 225 EDLC-R ENYCAP
- 230 EDLC-HV ENYCAP
- 235 EDLC-HVR ENYCAP

21.1 OPERATING INSTRUCTIONS

OPERATING VOLTAGE AND CURRENT RANGES (220 EDLC ENYCAP / 225 EDLC-R ENYCAP Series)

MODEL NUMBER	MAXIMUM RATED VOLTAGE, V_{DC}	MAXIMUM CHARGING CURRENT, A	END OF DISCHARGE VOLTAGE, V_{DC}	MAXIMUM DISCHARGING CURRENT, A
220 EDLC 5F 2V7 1020 U, 225 EDLC 5F 2V7 1020 U	2.7	1.8	1.5	1.8
220 EDLC 7F 2V7 1025 U, 225 EDLC 7F 2V7 1025 U	2.7	2.1	1.5	2.1
220 EDLC 8F 2V7 1220 U, 225 EDLC 8F 2V7 1220 U	2.7	2.1	1.5	2.1
220 EDLC 10F 2V7 1030 U, 225 EDLC 10F 2V7 1030 U	2.7	2.9	1.5	2.9
220 EDLC 12F 2V7 1225 U, 225 EDLC 12F 2V7 1225 U	2.7	2.4	1.5	2.4
220 EDLC 15F 2V7 1230 U, 225 EDLC 15F 2V7 1230 U	2.7	2.9	1.5	2.9
220 EDLC 20F 2V7 1620 U, 225 EDLC 20F 2V7 1620 U	2.7	2.8	1.5	2.8
220 EDLC 22F 2V7 1240 U, 225 EDLC 22F 2V7 1240 U	2.7	3.8	1.5	3.8
220 EDLC 25F 2V7 1625 U, 225 EDLC 25F 2V7 1625 U	2.7	3.0	1.5	3.0
220 EDLC 25F 2V7 1820 U, 225 EDLC 25F 2V7 1820 U	2.7	3.2	1.5	3.2
220 EDLC 30F 2V7 1825 U, 225 EDLC 30F 2V7 1825 U	2.7	3.5	1.5	3.5
220 EDLC 35F 2V7 1631 U, 225 EDLC 35F 2V7 1631 U	2.7	3.5	1.5	3.5
220 EDLC 40F 2V7 1831 U, 225 EDLC 40F 2V7 1831 U	2.7	3.9	1.5	3.9
220 EDLC 50F 2V7 1835 U, 225 EDLC 50F 2V7 1835 U	2.7	4.4	1.5	4.4
220 EDLC 60F 2V7 1840 U, 225 EDLC 60F 2V7 1840 U	2.7	5.0	1.5	5.0
220 EDLC 100F 2V7 2040 U, 225 EDLC 100F 2V7 2040 U	2.7	5.0	1.5	5.0

OPERATING VOLTAGE AND CURRENT RANGES (230 EDLC-HV ENYCAP / 235 EDLC-HVR ENYCAP Series)				
MODEL NUMBER	**MAXIMUM RATED VOLTAGE, V_{DC}**	**MAXIMUM CHARGING CURRENT, A**	**END OF DISCHARGE VOLTAGE, V_{DC}**	**MAXIMUM DISCHARGING CURRENT, A**
230 EDLC 5F 3V 1020 U, 235 EDLC 5F 3V 1020 U	3.0	1.8	1.5	1,8
230 EDLC 7F 3V 1025 U, 235 EDLC 7F 3V 1025 U	3.0	2.1	1.5	2.1
230 EDLC 8F 3V 1220 U, 235 EDLC 8F 3V 1220 U	3.0	2.1	1.5	2.1
230 EDLC 10F 3V 1030 U, 235 EDLC 10F 3V 1030 U	3.0	2.9	1.5	2.9
230 EDLC 12F 3V 1225 U, 235 EDLC 12F 3V 1225 U	3.0	2.4	1.5	2.4
230 EDLC 15F 3V 1230 U, 235 EDLC 15F 3V 1230 U	3.0	2.9	1.5	2.9
230 EDLC 20F 3V 1620 U, 235 EDLC 20F 3V 1620 U	3.0	2.8	1.5	2.8
230 EDLC 22F 3V 1240 U, 235 EDLC 22F 3V 1240 U	3.0	3.8	1.5	3.8
230 EDLC 25F 3V 1625 U, 235 EDLC 25F 3V 1625 U	3.0	3.0	1.5	3.0
230 EDLC 25F 3V 1820U, 235 EDLC 25F 3V 1820U	3.0	3.2	1.5	3.2
230 EDLC 30F 3V 1825 U, 235 EDLC 30F 3V 1825 U	3.0	3.5	1.5	3.5
230 EDLC 35F 3V 1631 U, 235 EDLC 35F 3V 1631 U	3.0	3.5	1.5	3.5
230 EDLC 40F 3V 1831 U, 235 EDLC 40F 3V 1831 U	3.0	3.9	1.5	3.9
230 EDLC 50F 3V 1835 U, 235 EDLC 50F 3V 1835 U	3.0	4.4	1.5	4.4
230 EDLC 60F 3V 1840 U, 235 EDLC 60F 3V 1840 U	3.0	5.0	1.5	5.0
230 EDLC 100F 3V 2040 U, 235 EDLC 100F 3V 2040 U	3.0	5.0	1.5	5.0

21.2 INSTRUCTIONS FOR SAFE INSTALLATIONS

Appropriate Connections

Capacitor terminals can be clamped or soldered.

In case of soldering:
keep soldering temperature and time under control (manual soldering max. 350 °C for 2 s, wave soldering 235 °C for 2 s).

Capacitors are polarized,

- negative terminal on capacitor is marked with a “minus -strip” on the sleeve
- positive terminal on capacitor is marked with a “++++ -strip” on the sleeve

Mounting

Conducting tracks or lands should not be located under upright mounted capacitors; short circuits under the capacitor with danger of fire could be the result.

Keep a minimum distance of e.g. 1.5 mm between capacitor top and encasing, over life-time the capacitors show bulging.

Adhesives and Coatings

Some adhesives and coating materials affect capacitors adversely.

For varnishing, coating, lacquering, embedding, or gluing at the capacitor's sealing, ensure that the materials used are halogen-free in all their constituent parts (base material, thinners, binders, reacting agents, propellants, additives). When applying such materials, ensure that non-aluminum parts, e.g. the rubber area, are not completely sealed off.

21.3 INSTRUCTIONS FOR SAFE INSTALLATIONS

Wiring Diagram

Reverse Polarity

Capacitors are for DC applications and require polarization.

Check the polarity of each capacitor: both in circuit design and in mounting (polarity is clearly indicated on the capacitor).

Reverse voltage may result in early failures.

Placement

Avoid excessive stress to the lead wires or terminals.

Excessive stress can be caused by component processing machines if lead wires are not sufficiently fixed during bending, cutting, cropping or inserting operations. Other possible reasons are incorrect hole-distance on the printed circuit board or bending of the component after soldering.

Care should be taken when the manual bending of terminals or mounted capacitors is required.

Mechanically damaged capacitors may not be used.

21.4 PROTECTIVE COMPONENTS

Protective Devices

No special protective devices are required.

Capacitor shall be operated within an encasing.

21.5 WARNINGS

Off-Gassing During Overcharge Conditions

Excessive overcharging will generate internal gas pressure which might cause that the capacitor encasing to bulge or to separate from the rubber seal (capacitor is open / **outer case is fractured** and gas and electrolyte escapes to the environment).

21.6 METAL CASES / UNINSULATED LIFE-PARTS

Metal Cases

Insulation

The capacitor case has floating potential and is not insulated from the terminals.

Radial capacitors exhibit an indeterminate resistance between terminals and the metal case. Metal capacitor parts other than terminals should never make contact with conducting tracks or metal parts of other components.

Uninsulated Life-Parts

The capacitor case is only partly isolated. Accessible bare metal can carry voltage.

21.7 WARNINGS - TOXIC AND HAZARDOUS MATERIALS / PROTECTION

Toxic and Hazardous Materials

ENYCAP capacitors are free from PCB- or PBDE-containing substances. Dioxines or furanes are not constituent parts of energy storage capacitors.

Energy storage capacitors may contain chemicals which can be regarded as hazardous if handled incorrectly, Series 230 e.g. contain acetonitrile as solvent in the electrolyte.

Avoid Exposure During Operation

The capacitors should be operated inside an appropriate enclosure with application dependent cooling properties and ventilation.

No guarantees can be given when disinfectants are / have been used.

Disinfectants may contain halogens like chlorine, fluorine, bromine etc. and alkaline solutions. Disinfectants should not be used near or on the capacitor. Over time they can cause corrosive reactions to capacitors resulting in reduced capacitance, open circuits etc.

No guarantees can be given with regard to solvents based on halogenated hydrocarbons or ozone depleting chemicals (ODCs).

Warning: such solvents are hazardous to the environment.

Avoid Abuse

Safe handling in case of venting or rupture

Caution is necessary if the outer case is fractured; vapors or dust particles should not be inhaled (good ventilation is essential); skin, eye or clothing contact with liquids should be avoided. In case of such contact, flush thoroughly with running water as soon as possible, then wash skin or clothing with soap and water or a mild detergent.

In the event of fire, the organic parts of ENYCAP capacitors may release such constituents as carbon monoxide, nitric oxides or dust particles; take caution when breathing-in.

Disposal

Energy storage capacitors are subject to special waste regulations.

However, because of other polluting ingredients, larger quantities (in weight) of capacitors are subject to special waste regulations in accordance with the relevant national laws; please consult your local Vishay sales organization.

In general, disposal of ENYCAP capacitors must take place under controlled circumstances in a high temperature incinerator at minimum 900 °C.