



NEW PRODUCT UPDATE SEPTEMBER 2019

ULP series

EDC/ EDS series

Introduction

- **Purpose**
 - To describe the features and capabilities of the new ULP Ultra Low-Profile Series electrolytic capacitors from CDE.
- **Objectives**
 - Explain the differences between the ULP Series and conventional capacitors
 - Provide product details, including key features and specifications, and options.
 - Discuss ideal applications that can benefit from the low profile and high performance of the ULP Series capacitors

Traditional methods of low-profile bulk storage consume valuable PCB space!

- A single ULP has the same bulk storage capacitance as dozens of solid tantalum chip caps, depending on values!
- About 70% less board space than ULP alternatives!
- Eliminates wasted space between components in bulk arrays

HIGHER BULK STORAGE.
WITHOUT THE BULK.

Ultra-low profile
2mm and 3mm thin

Near hermetic and
No dry-out

Replaces banks of
solid tantalum capacitors

3,000 Hr. life at 85 °C
without voltage derating

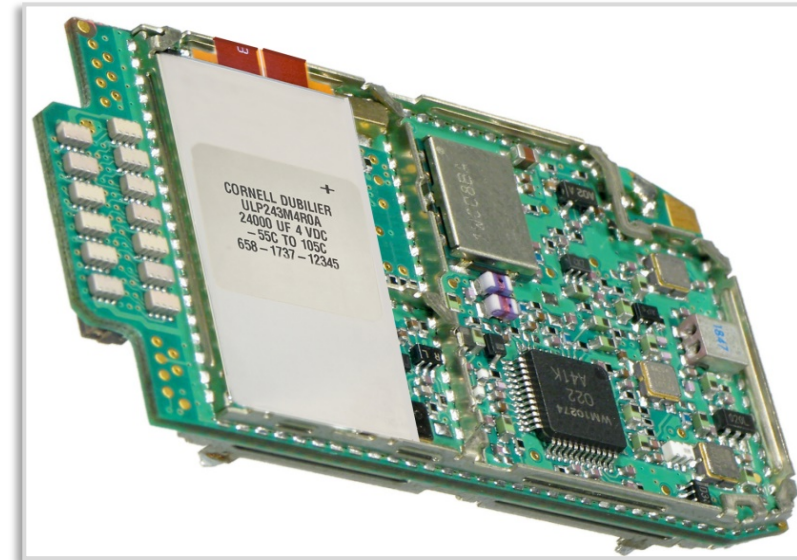
INTRODUCING THE LATEST IN
ULTRA-LOW PROFILE CAPACITANCE.

What do you get when you take the energy density of an aluminum electrolytic and engineer it to fit a rectangular case that is 2mm or 3mm thick? The ULP. A capacitor that takes up to 70% less board space when compared to solid tantalum capacitors. For hold-up applications the size and cost savings are extraordinary. For technical information and samples visit cde.com/ULP

CDE CORNELL
DUBILIER

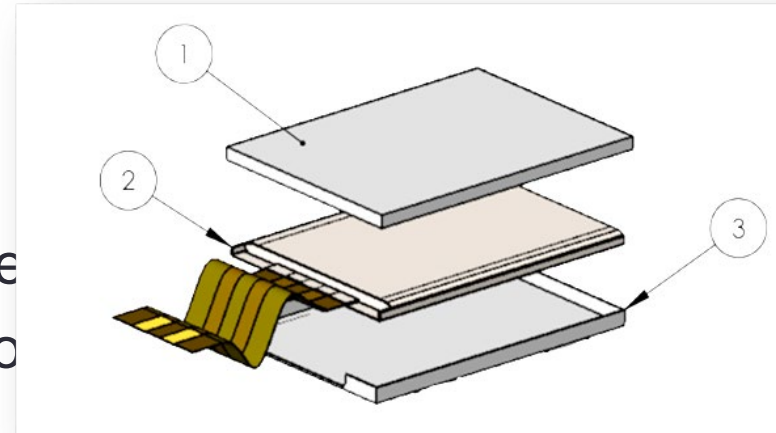
Smaller, more reliable circuits are possible with ULP, Ultra Low-Profile Capacitors

- Lower in height than V-Chip SMT aluminum electrolytics and comparable height profile to solid tantalums with much greater bulk storage capability per unit area
- Overall size and weight of finished board is reduced
- Reduces component count, increases reliability



Keys to high performance and space savings

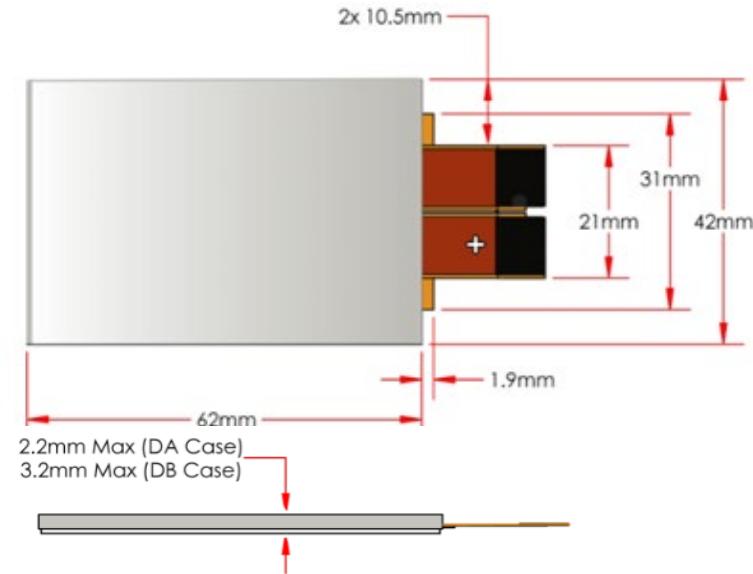
- Superior performance of an aluminum electrolytic in a low-profile package
 - 3,000 hr. life @ 85 °C
 - -40 to 85 °C at full-rated voltage
- Higher capacitance density due to unique packaging and seal system
 - Up to 0.4J/cc energy density
- Primary seal is a near-hermetic heat-sealed polymer. No rubber gaskets or grommets!
- Safer design



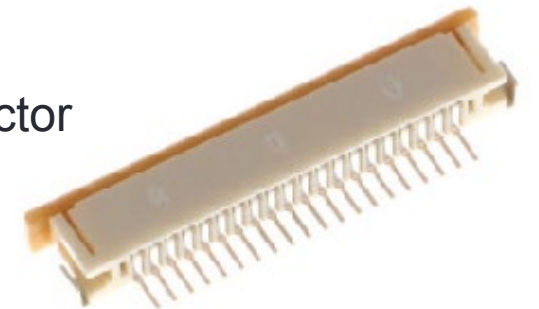
1. Case cover
2. Heat-sealed capacitor pouch
3. Bottom cover

Mechanical design characteristics.

- Available in two case thicknesses of 2.2 or 3.2 mm with a footprint of 62 x 42mm
- Flex (FPC) Lead System allows on or off-board mounting
- Mating ZIF Molex Connector
- Nickel-Silver outer case
 - Robust construction, 10g vibration rating
- Light weight
 - 2.2mm (17g)
 - 3.3mm (22g)



Mating Molex Connector
05227 12079



ULP Ultra Low-Profile series includes 16 values/voltage combinations.

Capacitance from 500 μ F to 24,000 μ F, 4 to 63 WVDC

WV (v)	ULP (2mm)	ULP (3mm)
	85 °C Cap (μ F)	85 °C Cap (μ F)
4.0	7,800	24,000
6.3	6,600	20,000
10	5,200	15,000
16	3,600	11,000
25	2,300	6,900
35	1,400	4,400
50	700	2,200
63	500	1,500

Designed for *maximum* capacitance in the *smallest* package.

ULP capacitors allows designers to “think thin,” while achieving higher end-product performance...

- Bulk capacitance storage in portable devices
- Compact power supplies
 - Consumer
 - Industrial
 - Mil/Aero
- SSD Drives



ULP Ultra Low-Profile Series Summary

- Ultra-thin package design: 2 or 3mm
- One ULP capacitor has the same bulk storage capacity as dozens of solid tantalum chips, depending on values.
 - **Not an alternative to hybrid tantalums or high ripple current types**
- Up to 0.4J/cc energy density, saves space
- Values from 500 μ F to 24,000 μ F;
4 to 63 WVDC
- Rated at 3,000 hours at 85 °C
- Reduce size, weight & cost
- Increases reliability – one device vs. many; fewer PCB connection points



ULP Ultra Low-Profile Series Resources

- <https://youtu.be/GabWPttQxKc>
- Great video to share
- <http://cde.com/new-product/ulp>
- Datasheets, powerpoint, fun facts about ULP



Shop CDE
online at:
shoppui.com

Electric Double Layer Capacitors (Coin Cell Supercapacitors)

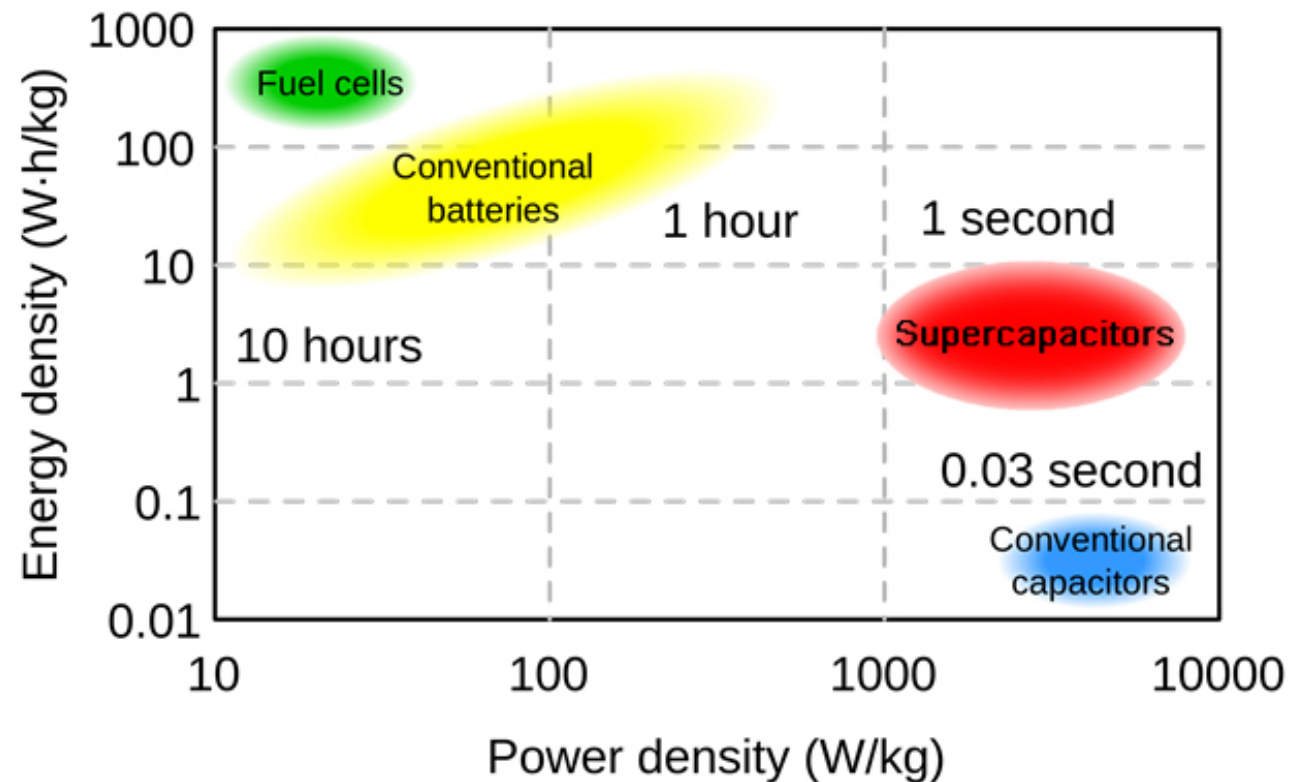


Introduction

- **Purpose**
 - To describe the features and capabilities of two new coin cell supercapacitor series from CDE.
- **Objectives**
 - Explain advantages of supercapacitors over rechargeable batteries and aluminum electrolytic capacitors
 - Explain the differences between the EDC/EDS coin cell supercapacitors and conventional electrolytic capacitors
 - Provide product details, including key features and specifications, and options.
 - Discuss common applications that can benefit from the higher performance of EDC/EDS coin cell supercapacitors

Why supercapacitors

- Bridge the gap between batteries and standard electrolytic capacitors



Comparison to Batteries and Capacitors

- **Rechargeable Batteries**

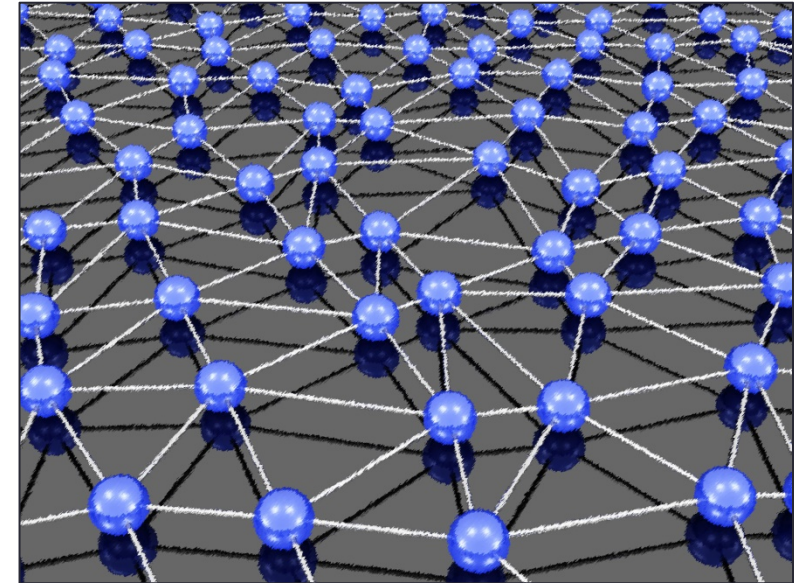
- Highest stored energy
- Long discharge time (1 – 3 hours)
- Cycles (<10,000)

- **Supercaps**

- High power density
- Short charge/discharge time (seconds)
- Cycles (>1,000,000)

- **Capacitors (Aluminum Electrolytic)**

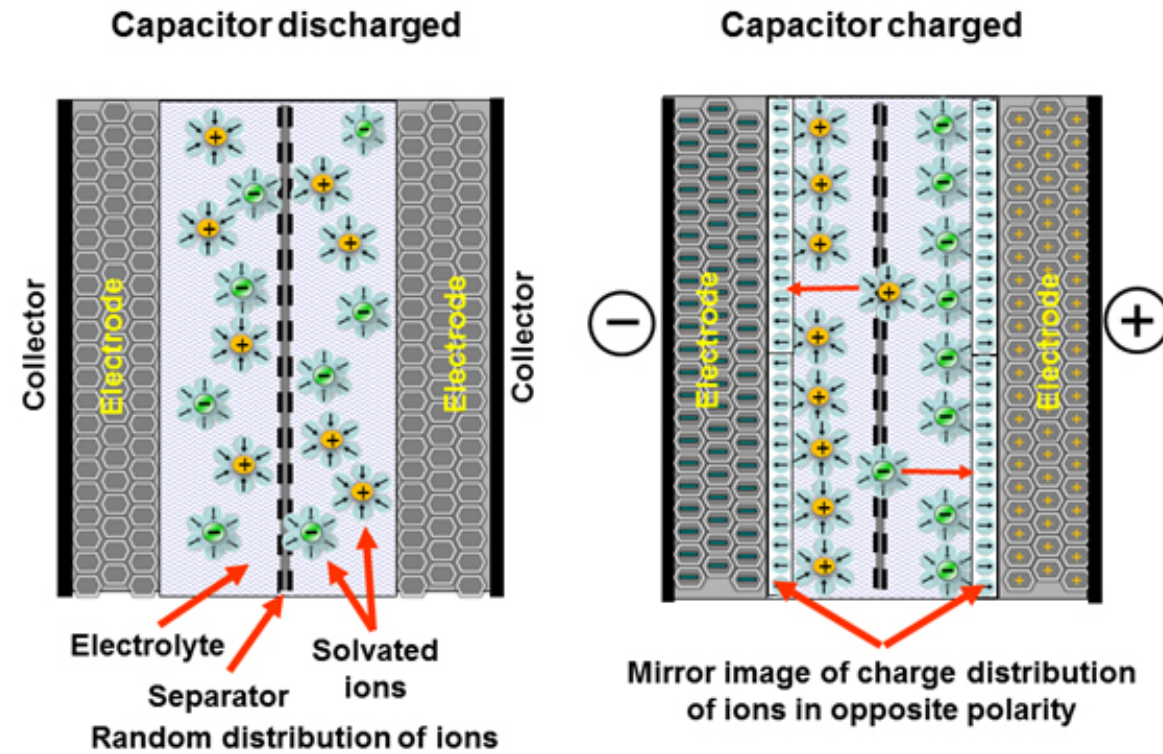
- High Power
- Highest temperature Range
- Lowest Stored Energy
- Limited cycling



EDC/EDS Coin Cell Supercapacitors offer unique advantages

The EDC/EDS coin cells are very compact, high-capacitance devices. Compared to traditional electrolytics or rechargeable batteries, the EDC/EDS coin cells are...

- Electric double-layer capacitors (EDLC), with very large storage capabilities
- Designed around an activated carbon anode and cathode, with an organic electrolyte
- Especially well suited for charge/discharge cycle, promoting long life energy storage



General Uses for Supercapacitors

- Due to their much faster charge/discharge times and number of cycles permitted, supercaps are being used in place of batteries to provide frequent short bursts of energy.
- When supercapacitors are placed in parallel with batteries they reduce the stress on the battery by providing quick bursts of energy to the load. This greatly extends battery life and can lower the overall size and cost of the battery. In some applications, supercapacitors may even replace battery.
- Provide sustained memory backup during power outages without use of batteries.

EDC/EDS Coin Cell Supercapacitors offer High Capacitance and Compact Size



- Product lines include values from 0.047 to 1.5 Farads
- 3.6, 5.5, 6.3 WVDC Max
- Operating temperature ranges from:
 - (EDS Series) -25 °C to +85 °C
 - (EDC Series) -25 °C to +70 °C
- Long life--rated at over 500,000 charge/discharge cycles
- Performance does not degrade with each cycle
- Very compact size
- Direct replacement for recently discontinued devices of similar values from other manufacturers



EDC/EDS Series Key Specifications



Operating Temperature Range	-25 °C to +70 °C (EDC) - -25 °C to +85 °C (EDS)
Rated Voltage Range	5.5 Vdc to 6.3 Vdc (EDC) 3.6 Vdc to 5.5 Vdc (EDS)
Capacitance Range	0.047 F to 1.5 F
Life, Moisture and Temperature Characteristics	After the following procedures have been performed, measure the capacitance and ESR at +20 °C.
Life Test:	Apply the max. operating voltage for 1000 h at +70 °C
Capacitance Change	±30% of the initial measured value
ESR	≤ 4 times the initial specified value
Shelf Life:	Subject the capacitor to 1000 hours without voltage at +70 °C.
Capacitance Change	±30% of the initial measured value
ESR	≤ 4 times the initial specified value
Moisture Resistance:	Subject the capacitor to 240 hours at +40 °C at 90 to 95% RH without voltage.
Capacitance Change	±30% of the initial measured value
ESR	≤ 3 times the initial specified value



Choose from many different SKUs... 0.047 to 1.5 Farads, at 3.6, 5.5 or 6.3VDC



85 °C

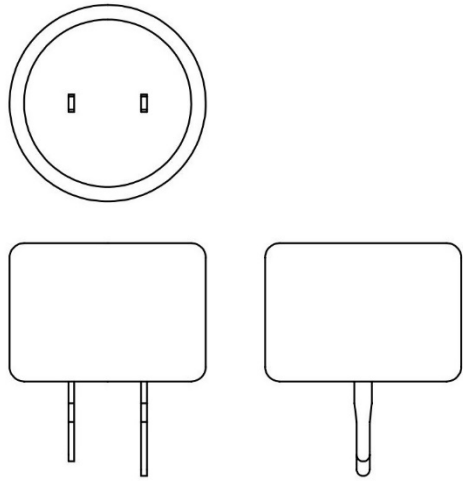
70 °C

3.6 VDC			5.5 VDC		
CDE Part Number	Cap F	ESR 1 kHz Ω	CDE Part Number	Cap F	ESR 1 kHz Ω
EDS473Z3R6*	0.047	120	EDC473Z5R5*	0.047	120
EDS104Z3R6*	0.1	75	EDC104Z5R5*	0.1	75
EDS224Z3R6*	0.22	75	EDC224Z5R5*	0.22	75
EDS334Z3R6*	0.33	75	EDC334Z5R5*	0.33	75
EDS474Z3R6*	0.47	50	EDC474Z5R5*	0.47	50
EDS105Z3R6*	1	30	EDC105Z5R5*	1	30
EDS155Z3R6*	1.5	30	EDC155Z5R5*	1.5	30

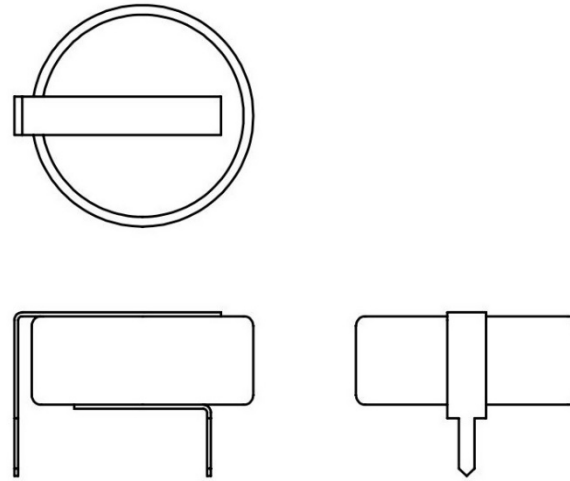
5.5 VDC			6.3 VDC		
CDE Part Number	Cap F	ESR 1 kHz Ω	CDE Part Number	Cap F	ESR 1 kHz Ω
EDS104Z5R5C	0.1	120	EDC104Z6R3C	0.1	120
EDS224Z5R5C	0.22	75	EDC224Z6R3C	0.22	75
EDS334Z5R5C	0.33	75	EDC334Z6R3C	0.33	75
EDS474Z5R5C	0.47	50	EDC474Z6R3C	0.47	50
EDS684Z5R5C	0.68	50	EDC684Z6R3C	0.68	50
EDS105Z5R5C	1	30	EDC105Z6R3C	1	30



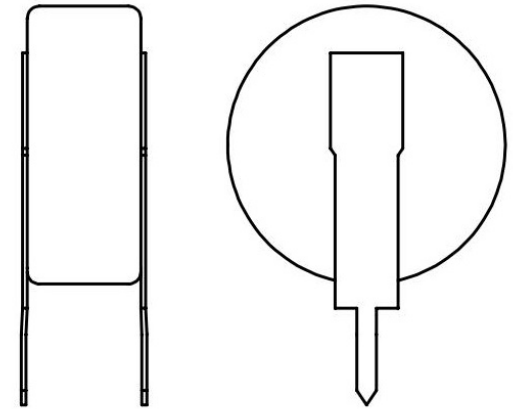
Configurations and Termination Options



RADIAL



HORIZONTAL

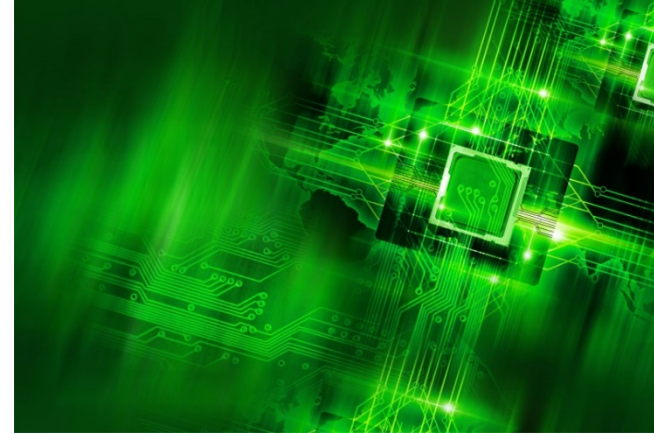


VERTICAL



Applications

- On-board CPU memory backup circuits
- RTC – Real Time Clock - Battery Backup
- Smart Utility Meters - AMR
- Solar Battery Backup and Energy Storage
- IoT - Energy harvesting/storage
- Industrial controls
- Telematics



Summary

EDC/EDS Coin Cell Supercapacitors are an economical solution to satisfying the need for on-board very high capacitance storage.

- Standard values available from 0.047 to 1.5 Farads in the range of 3.6 to 6.3 WVDC
- 10 year/500,000+ cycle operating life exceeds typical end-product life
- Unlike batteries, performance does not degrade with each charge/discharge
- Very compact size aids product design flexibility
- Provides instantaneous backup power for memory circuitry



EDC/EDS Series Resources

- <http://cde.com/new-product/edc-and-eds>



Shop CDE
online at:
shoppui.com

Locations

NORTHERN CALIFORNIA

1637 A South Main St.
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Local: 408-942-1717
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