

Electronics products and applications

# Electronics Solutions

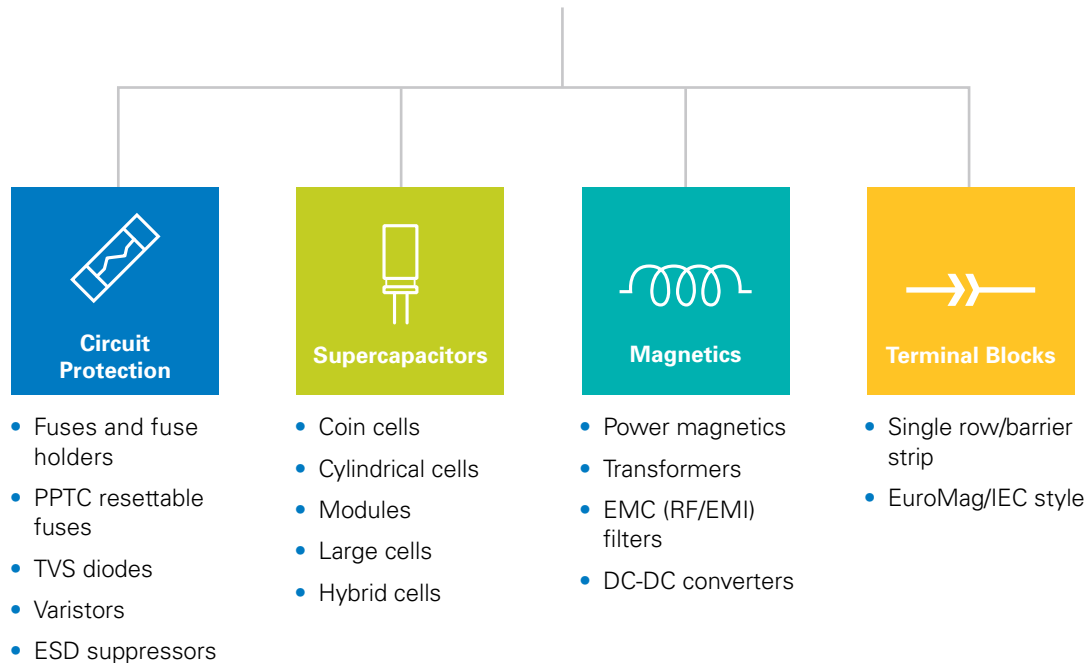
Circuit Protection, Magnetics, Supercapacitors and Terminal Blocks



*Powering Business Worldwide*

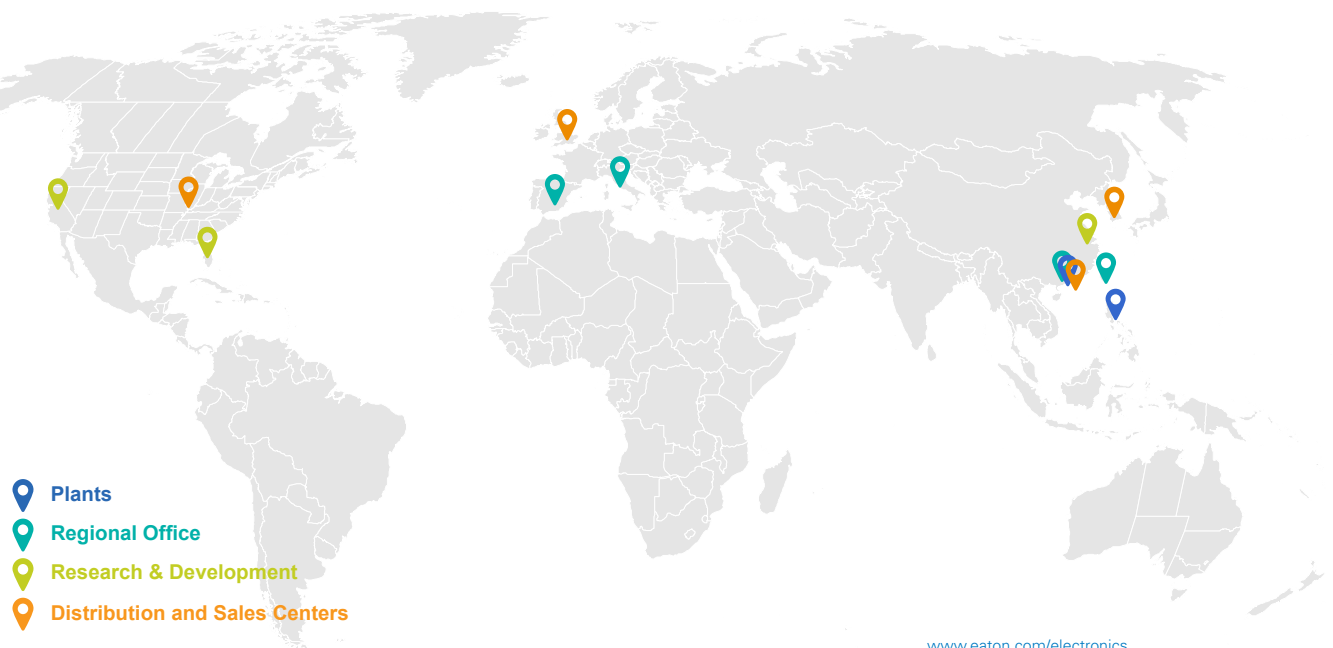
Eaton offers a range of electronics components that include power and EMC magnetics solutions, circuit protection, supercapacitors and terminal blocks products. These products serve customers in computing, consumer, energy, industrial, medical and transportation markets.

### Eaton's Electronics Components



### Worldwide Presence

Every day Eaton develops and delivers innovative new technologies and solutions that touch people at home, work and play. Technology makes it possible for all of us to accomplish things we once thought impossible. By engaging thought leaders in science, technology, innovation and engineering, we passionately pursue ideas and products that are changing how we live. For Eaton, innovation is more than just a process, it is the creative realization of the impact we can have on the lives of people around the world.



## COMPUTING

## CONSUMER

## ENERGY

## INDUSTRIAL

## MEDICAL

## TRANSPORTATION

	CIRCUIT PROTECTION							TERMINAL BLOCKS		MAGNETICS								SUPERCAPACITORS						
	Cartridge fuses and holders	Radial fuses	SMD fuses	PPTC resettable fuses	TVS diodes	Multilayer varistors	Metal oxide varistors	PolySurg <sup>™</sup> ESD suppressors	EuroMag blocks & plugs	Single row terminal blocks	Automotive	Multi-phase & V-Core	High current ferrite & molded inductors	Shielded drum	Semi-shielded	Common mode inductors	Transformers	Chip inductors & ferrite beads	Thru-hole inductors	Coin cells	Small cylindrical cells	Large cells	Modules	Hybrid cells
Servers	●		●	●	●	●	●		●	●		●	●	●	●	●		●	●	●			●	
Storage					●		●						●	●	●			●		●	●		●	●
Wired communication	●		●		●	●	●		●	●				●	●			●						
Wireless communication	●													●	●			●		●	●			
Personal computing/peripherals	●	●	●	●	●		●	●				●	●	●	●	●	●	●	●					
Personal communications		●		●	●		●	●						●	●			●						
Wearable electronics					●		●	●						●	●			●						
Set-top boxes	●	●	●	●	●	●	●	●					●	●	●	●	●	●	●	●	●			
TV/monitor/display	●	●	●		●	●	●	●				●	●	●	●	●	●	●						
Toys	●	●	●		●	●	●	●						●	●			●						
Appliances	●		●	●	●	●	●		●				●	●	●	●	●	●	●	●	●			
Generation	●		●			●			●	●			●							●	●	●	●	
Distribution	●		●			●			●	●			●				●					●	●	
Metering	●		●			●			●				●	●	●			●	●	●	●	●		●
Manufacturing automation	●	●	●	●	●	●	●		●	●			●	●	●	●		●		●	●	●	●	●
Test & measurement	●	●	●	●	●	●	●		●	●			●	●	●	●	●	●		●	●			
Building & home control	●		●	●	●	●	●	●	●	●			●				●	●		●	●			●
Lighting & security	●		●	●	●	●	●		●	●			●	●	●	●	●	●		●	●	●		●
Mission critical power	●		●	●	●	●				●				●	●							●	●	
IoT		●	●	●	●	●	●	●										●		●	●			●
Personal	●	●	●	●	●	●	●	●					●	●	●		●	●			●			●
Consumable							●						●					●						
Equipment	●		●	●	●	●	●		●	●			●					●		●	●	●	●	●
Hospital systems	●		●	●		●	●															●	●	
Under-the-hood					●					●	●	●										●		
Safety systems					●						●		●					●			●	●		
Lighting					●						●		●	●	●	●	●							
Infotainment					●		●				●		●	●	●			●						
Interior					●		●				●		●	●	●			●						
Drive/traction											●		●				●					●	●	

Eaton features a broad variety of Bussmann™ series circuit protection products spanning overcurrent protection (including one-time fuses, accompanying fuse accessories and PPTC resettable devices) and overvoltage protection components (ESD suppressors, varistors and TVS diodes). With over 100 years of circuit protection expertise, Eaton is committed to designing and manufacturing the most innovative portfolio of circuit protection products for numerous applications including industrial, automotive, energy management, computing, medical and consumer products.

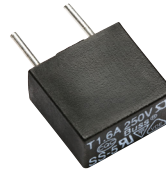
### Overcurrent

#### Cartridge fuses



- Available in ¼ inch, 5 mm and 3 mm
- Vast product offerings in UL and IEC designs
- Available with axial leads
- Fast-acting and time-delay performance options
- High voltage, 600 Vac/dc, ratings with high interrupting rating capability

#### Radial fuses



- Rectangular and cylindrical body styles that offer industry standard landing patterns
- Protects in primary and secondary circuits
- Both UL and IEC performance characteristics both body styles
- Voltage ratings up to 350 Vac and 450 Vdc
- Broad range of global agency certifications

#### Fuse holders, clips, blocks



- Printed Circuit Board (PCB) fuseclips
- In-line fuseholders
- Panel-mount fuseholders
- Fuse blocks for both ¼ inch & 5 mm
- High voltage options, up to 600 V
- Ingress Protection options up to IP67

#### PTC resettable fuses



- Radial and surface mount product types
- Device “resets” after fault is cleared to offer protection against multiple overcurrent events
- High temperature capability offered (+125 °C)
- Low resistance technology improves energy efficiency
- AEC-Q200 qualified families available

#### Surface mount (SMD) fuses

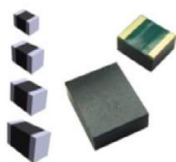


- Footprints from 1.6 mm x 0.8 mm to 13 mm x 5 mm
- High voltage options available up to 350 Vac / 600 Vdc
- Nominal current ratings up to 100 A
- Provides excellent cycling performance
- Both time delay and fast acting performance
- AEC-Q200 qualified families available



## Overvoltage

### Surface mount (SMD) varistors - MLV & MOV



- Multiple footprints from 0402 to 4032 EIA
- Provides protection from ESD up to induced lightning
- Working voltages from 5.5 Vdc to 670 Vdc and 4 Vac to 510 Vac
- Peak surge current ratings up to 1200 A
- AEC-Q200 qualified MLVs available

### TVS diodes



- Operating voltage ratings up to 450 Vdc
- Industry common radial and SMD footprints
- Uni-direction and bi-directional options
- High power options available (up to 10 kA surge current protection)
- AEC-Q101 qualified families available with up to ISO 16750 5a & 5b load dump ratings

### Through-hole varistors - MOV



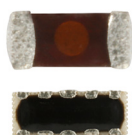
- Radial devices offer combined thermal element and MOV for integrated protection
- Broad operating voltage range
- Provides up to 10 kA I<sub>max</sub> surge current rating
- Indication offered in both disc sizes
- UL 1449 certifications

### TVS diodes - ESD suppressors



- Discrete and multi-signal packages
- Ultra compact package sizes down to DFN0603 and 0201 EIA
- Ultra low capacitance, down to 0.15 pF
- Uni-directional and bi-directional protection
- Array configurations offered that are ideally suited for common I/O interfaces

### Polysurg™ ESD suppressors



- Ultra-low capacitance (0.05 pF) ideal for latest high-speed data circuits
- Very fast response time, within 1 ns
- Single-line and array options
- Inherent bi-directional performance
- AEC-Q200 qualified families available

Eaton offers a wide range of power magnetics and EMC filtering components for a broad array of applications. Automotive solutions allow for a wide operating temperature range and are built for rugged environments. Eaton's inductor and transformer families are offered in a wide variety of sizes, have high current capabilities and high power densities.

## Magnetics

### Toroid



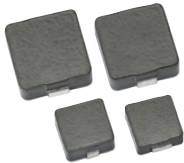
- Wide variety of sizes
- Closed magnetic path, very good EMI shielding
- High inductance/current rating
- Dual winding options can be used in multiple configurations
- Multiple core materials available

### Shielded drum



- Compact size
- Wide variety of shapes, sizes, inductance values, and current options
- Magnetically shielded - good EMI shielding
- Dual winding options can be used in multiple configurations
- Ferrite core (high efficiency)

### High current



- High power density
- High operating temperature
- Ferrite, powder, and composite core options
- Pressed and two-piece construction options
- Magnetically shielded options
- Good EMI shielding

### Semi-shielded inductors



- Commercial and automotive grade
- High current carrying capacity
- Magnetic resin shielding technology
- Low loss magnetic material
- Inductance range from 0.33  $\mu$ H to 1 mH
- Standard footprints from 2 mm to 8 mm

### Multi-phase & Vcore



- High current
- Coupled and non-coupled
- Low tight tolerance DCR
- High efficiency
- Magnetically shielded for low EMI

### Unshielded drum



- High current capability vs. size
- Desirable for high ripple current applications
- Wide range of inductance options available

### Automotive-grade magnetics



- AEC-Q200 qualified
- Wide operating temperature
- Variety of shapes and sizes
- Power and RF/RMI filtering
- Robust construction up to 30 G (DRAP)
- Single and couple winding solutions
- Good EMI shielding
- High efficiency

### Transformers



#### Power over Ethernet (PoE)

- Input Voltage up to 60 V
- Power Ratings up to 26 W
- 1500 V isolation

#### Configurable

- 500 V isolation
- 500 Inductor and transformer configurations
- Wide range inductance and current ratings
- Power ratings up to 70 W

## Common mode chokes



- THT and SMT Configurations
- Industry footprints from 7 to 29 mm
- Operating temperature (-40 to +125 °C)
- Current ratings up to 15 A
- Impedances up 3,000  $\Omega$
- Wide inductance range
- High voltage isolation up to 1500 Vac

## DC-DC converters



- Switching regulator, non-isolated
- 3-pin SIP package (LM78x regulator compatible)
- Input voltages: up to 32 Vdc
- Output voltages: up to 15 V @ 1 A
- High efficiency

## Chip inductors and ferrite beads

### Chip inductors



- Commercial and automotive grade
- Multilayer and wirewound
- Standard sizes: 0201 to 1210 package
- High Q performance
- Tight tolerance inductance - up to 470  $\mu$ H
- Operating temperature : -40 °C to +125 °C



- DOSA SMT package
- Short circuit protection
- Remote ON/OFF function
- Programmable output from 0.9 - 5.5 Vdc @ 1A
- Input voltage: up to 14 Vdc
- Output voltage: up to 5.5 V, 1 A to 12 A

### Ferrite beads



- Multilayer monolithic construction
- Standard sizes: 0402 to 1206 package
- High impedance - up to 2,000  $\Omega$
- Current ratings up to 6 A
- Operating temperature: -40 °C to +125 °C

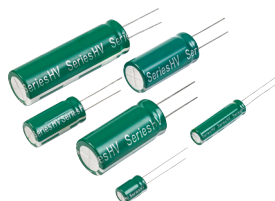
Eaton supercapacitors are unique, ultra-high capacitance devices utilizing electrochemical double layer capacitor (EDLC) construction combined with new, high performance materials. This combination of advanced technologies allows Eaton to offer a wide variety of capacitor solutions tailored to specific applications that range from a few microamps for several days to hundreds of amps for seconds.

## Coin cells



- 0.1 F to 1.5 F with operation up to 5.5 V
- Industrial temperature range up to 85 °C
- Ideal for Real Time Clock backup and battery swap ride-through
- Available in horizontal, vertical and cylindrical mounting configurations
- REACH, RoHS, SVHC compliant

## Small cylindrical



- 0.22 F to 110 F and operating voltages up to 3.0 V designed for mounting on PCBs
- Industrial temperature range -40 °C to +85 °C with voltage derating
- Product families are optimized for low DC resistance (HV, TV) and high temperature life time (HB)
- Operating life up to 20 years (depending upon voltage and temperature)
- REACH, RoHS, SVHC compliant, UL registered

## Large cells



- 275 F to 3400 F and operating voltages up to 3.0 V
- Industrial temperature range -40 °C to +85 °C with voltage derating
- Ultra low DC ESR for highest efficiency and power
- Optimized integration into modules for a wide variety of applications
- REACH, RoHS, SVHC compliant, UL registered.

## Modules



- Multi-cell modules for easy integration into large high voltage and high energy systems.
- Meet application requirements for rack mounting or harsh environments.
- 16 V to 69 V operating voltages with integrated cell balancing, temperature monitoring, and monitoring.
- REACH, RoHS, SVHC compliant, UL registered, and UN ECE certified.

## Hybrid cells



- Ultra-high capacitance for up to 10 times energy density
- Small footprints for space-saving (8 mm x 14 mm to 16 mm x 25 mm package sizes)
- Wide range of operating temperatures (-25 °C to +70 °C)
- Low ESR and low leakage current to maximize efficiency
- Lead and halogen-free, RoHS and REACH compliant, UL recognized



## Single Row/Barrier Strips

Eaton features a family of North American style, single row terminal blocks that support a broad range of electronic and electrical OEM applications. These highly configurable terminal blocks allow users to create the right product for their application using a wide variety of terminal types, mounting options, base types, fastener options, quick connects, jumpers, markings, covers, and more.

### Features:

- Power ratings up to 50 A to 600 V
- Multiple wire and board terminations in the same footprint
- High configurability fits a majority of applications
- Can build to specific, per pole customer requirements

#### A0 & CB0



#### A1 & CB11



#### A2, LP2 & CB2



#### A3, LP3 & CB3



#### A38 & B38



#### A/B4



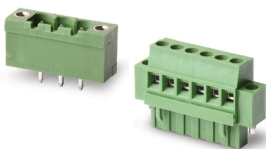
## EuroMag/IEC Style

Euromag PCB terminal blocks come in a variety of terminal options to make connections easy with different wire-entry orientations to solve wire routing issues. With straight-to-board, plug and header, screwless, 2-tiered and 3-tiered configurations, the vast majority of wire-to-board applications can be easily met with the Eaton's EuroMag terminal block product portfolio.

### Features:

- Modular and mold-to-length designs
- Pitch range from 2.54 mm to 15.00 mm
- Wire ratings from 2-24 AWG
- Accommodates applications up to 600 V

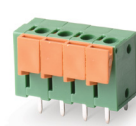
#### Headers & Plugs



#### High Current



#### Screwless



#### Cage & Screw



#### Spring & Screw



#### Tiered



## Tools

### Eaton's Electronics Product Selection Tools



#### PARAMETRIC SEARCH

Drill down into the Eaton Electronics product database to find the right part for your application.



#### IC MATCHING

Find the Eaton Electronics parts called out on IC manufacturers' demo and evaluation boards.



#### CROSS REFERENCE

Find a cross to a competitor's product or to an alternate Eaton Electronics part number.



#### SUPERCAPACITOR CALCULATOR

Determine your calculated requirements and design capability.



#### TERMINAL BLOCK SELECTOR

Find the right terminal block for any application.

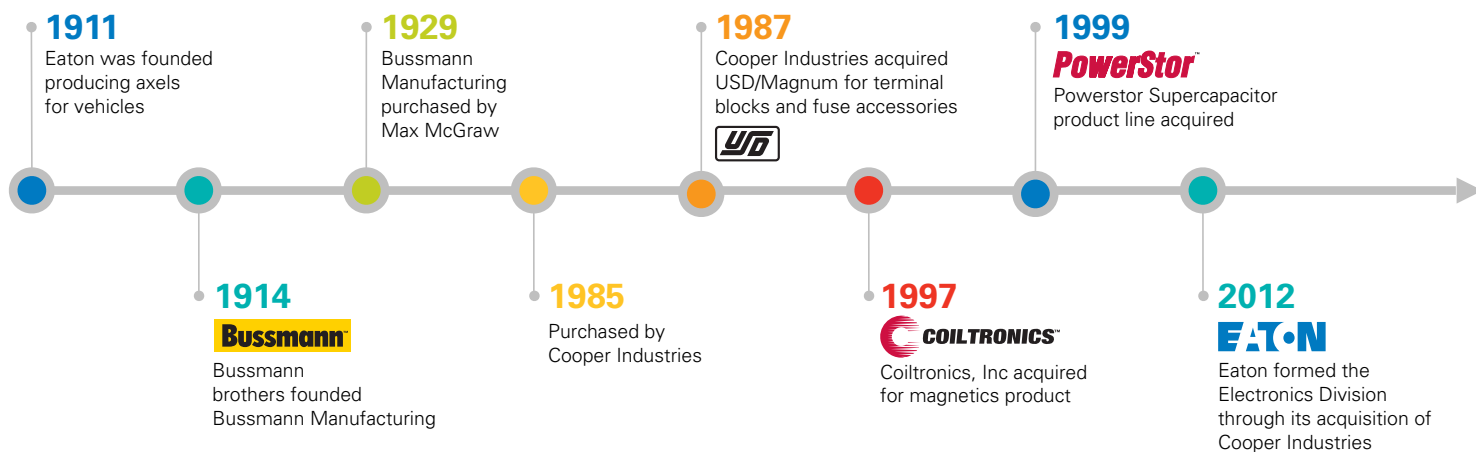


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## 100+ Years of History



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