

BOURNS®



BATTERY MANAGEMENT &
PROTECTION PRODUCT PROFILE

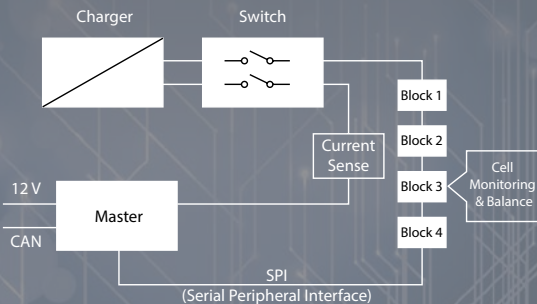
Introduction



The rechargeable battery industry is experiencing significant growth which is projected to continue to expand into the future. This growth is driven by an increase in portable battery powered devices, electric vehicles, energy storage and industrial applications.

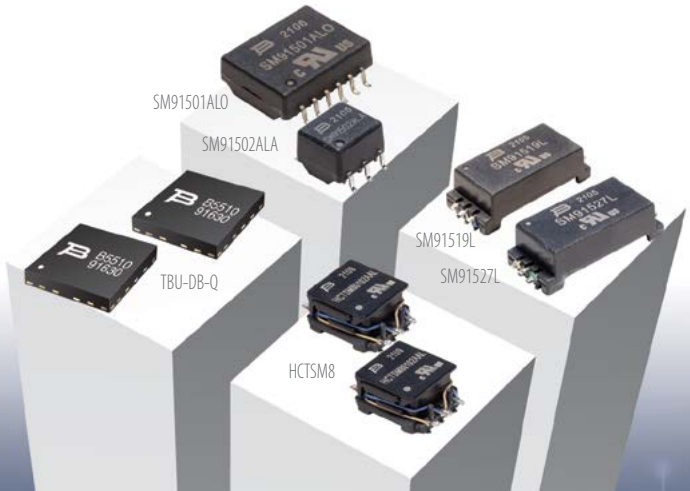
These applications use various battery chemistries including nickel cadmium, nickel-metal-hydride, lithium-ion, and other chemistries currently in development.

Block Diagram of High Voltage Battery System



Battery Monitoring

Battery pack voltages can range from a couple of volts in portable electronics to higher voltages such as 48 V and 60 V in power tools or in hybrid electric vehicles. For fully electric vehicles, battery stacks can be 400 V or higher, requiring fully isolated communications and power at high working voltages.



Push/Pull Isolation Transformer

Model	HI-POT Pri/sec	Rated Current	Working Voltage	Clearance/ Creepage Distance	AEC-Q200 Compliant	IATF 16949 Certified Factory
HCTSM80xx	5K Vdc/60 sec.	350 mA	800 V _{rms} (higher on request)	8 mm min. (longer on request)	Yes	Yes

BMS Signal Isolation Transformer

Model	Description	Inductance Values	Working Voltage
SM91501ALO	Dual Channel AEC-Q200 Compliant BMS Transformer + CMC	370 μ H max.	Functional 1600 VDC
SM91502ALA	Single Channel AEC-Q200 Compliant BMS Transformer + CMC	370 μ H	Functional 1000 VDC

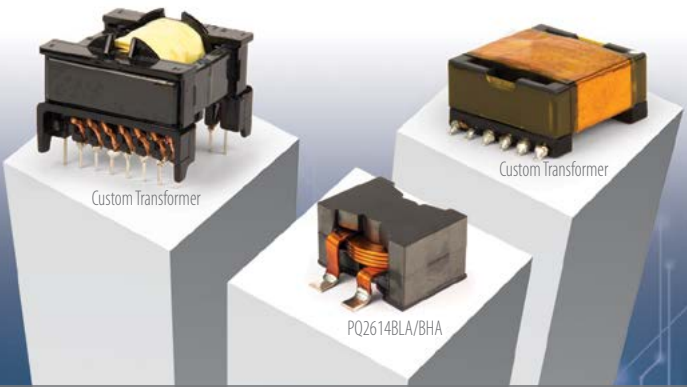
Cell Monitoring IC A/D Input Surge Protection

Model	Description	Trip Current	Working Voltage	Trip Time
TBU-DB-Q	Two Channel High-Speed Protector	200 mA	550 V	1 μ s

High Power Magnetics for Chargers



The Bourns Factory in Dongguan, China produces standard high power inductors for chargers and customized transformers for high frequency and high AC currents in topologies used in high power converters such as full bridge resonant LLCs.



Model	Description	Inductance Values	Saturation Current Range
PQ2614BLA/BHA	AEC-Q200 Compliant Inductor	1-33 μ H	2.6 A to 100 A

CANbus



TVS Diodes

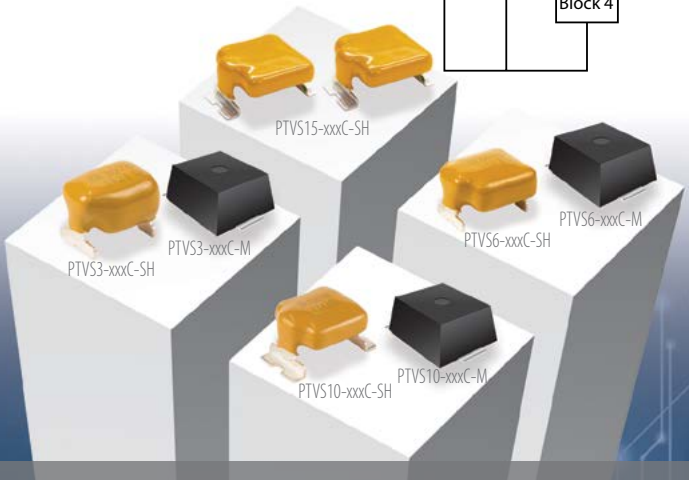
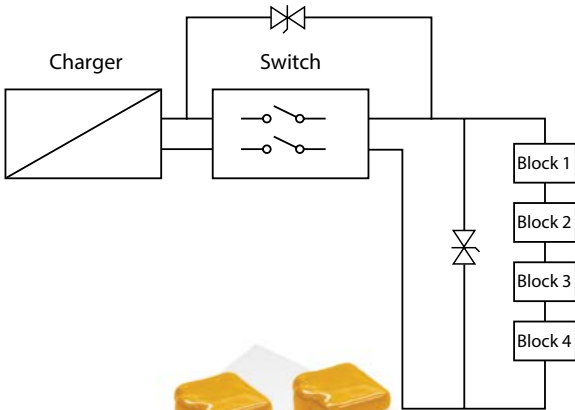
Model	Description	Working Voltage	ESD Level
CDSOT23-T24CAN-Q	ESD and Surge Protection of CANbus	24 V	30 kV Contact

CANbus Common Mode Chokes

Series	Description	Impedance Range	Current Range
SRF4530A	Auto Grade CMC for Standard CANbus	600 - 7500 ohms	0.2 - 0.36 A
SRF3225TAC	Auto Grade CMC for CANbus FD Class II up to 2 Mbps	550 - 5100 ohms	0.15 - 0.3 A
SRF322TAFD	Auto Grade CMC for CANbus FD Class III up to 5 Mbps	5100 ohms	0.15 A

Relay Protection

Bourns® high power TVS diodes can prevent flyback surges from damaging MOSFET or relay contact switches which can occur during disconnection of a short circuit.



Power TVS Diodes

Model	Description	Peak Current	Repetitive Standoff Voltage
PTVS3-xxC-M	Axial Leaded/Surface Mount Power TVS Diode	3 kA	66 - 76 V _{wm}
PTVS6-xxC-M	Axial Leaded /Surface Mount Power TVS Diode	6 kA	66 - 76 V _{wm}
PTVS10-xxC-M	Axial Leaded Surface Mount Power TVS Diode	10 kA	66 - 76 V _{wm}

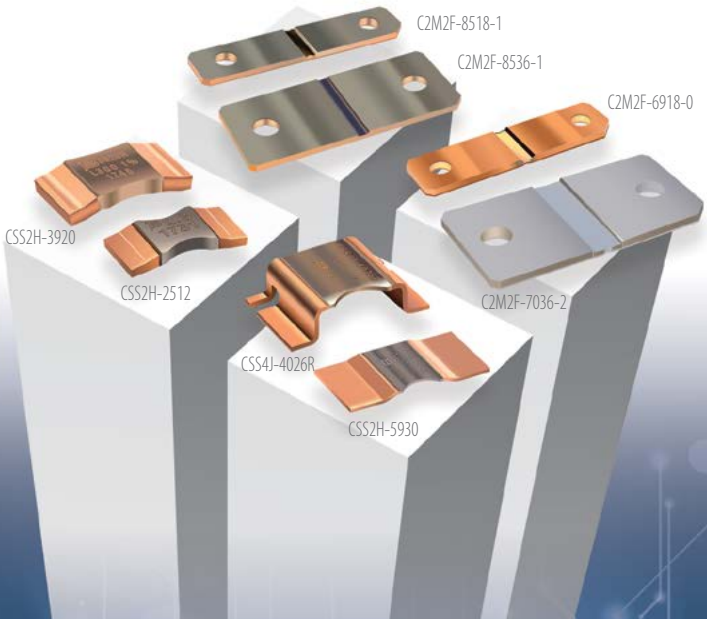
Current Sense Resistors

Types Available:

- Surface mount
- Bus bar mount
- Custom

Features:

- Low TCR resistive material
- Resistances as low as 25 $\mu\Omega$
- Rated power up to 50 W
- Customization capability
- 4-Terminal Kelvin connections in some models
- AEC-Q200 compliant



Applications

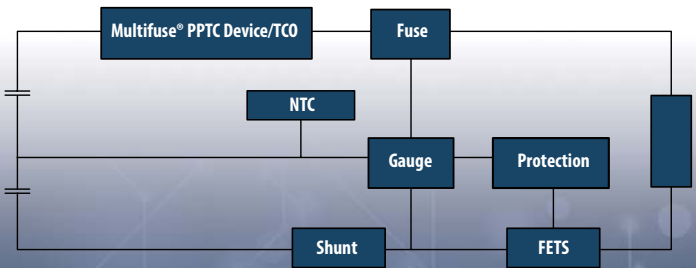
- Power supplies
- Motor drives
- White goods
- Navigation equipment
- Battery management systems
- Frequency converters
- On-board chargers
- Medical (low/medium risk*)
(excluding life support)
- DC-DC converters
- Automation equipment

**Bourns® products have not been designed for and are not intended for use in "lifesaving," "life-critical" or "life-sustaining" applications nor any other applications where failure or malfunction of the Bourns® product may result in personal injury or death. See Legal Disclaimer Notice.*

Lithium-Ion Battery Pack Protection

Charging and discharging of smartphone and tablet Lithium-ion battery packs is controlled by the gas gauge IC, along with low resistance MOSFETs and current sense resistors.

For safety reasons, IC independent overcurrent and overtemperature protection may also be added to the pack. Bourns offers two technologies for pack designers; namely Multifuse® Polymer PTC technology and Mini-breaker Thermal Cutoff Device bi-metal technology.



Multifuse® PPTC Resettable Fuses			
Model	Size	Hold Current	Voltage
MF-USML	1210	8 A max.	6 V, 12 V
MF-NSML	1208	7 A max.	6 V, 12 V
MF-PSML	0805	4.5 A max.	6 V, 12 V
MF-FSML	0603	3 A max.	6 V, 12 V
MF-ASML	0402	0.5 A max.	6 V

Mini-Breakers

(Miniature Resettable Thermal Cutoff Devices)

Types Available:

- Low current series (LC, NRC)
- High current series (HC, NRA, AC, SA)
- Surface Mount Series (SA, SC)

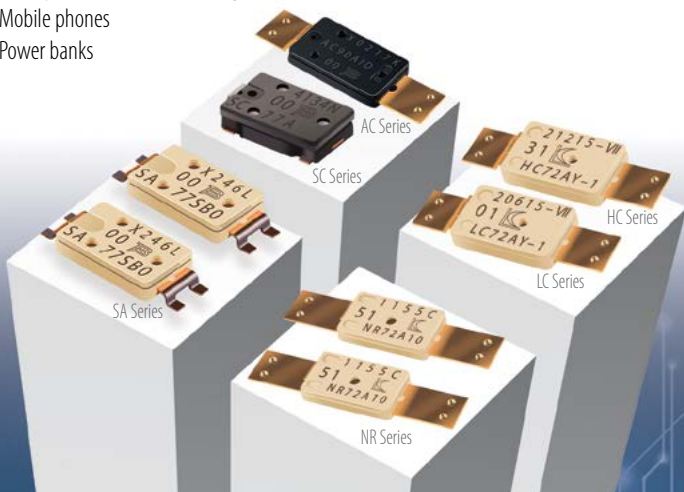
Applications:

Battery cell protection for:

- Notebook PCs
- Tablet PCs
- Smartphones
- Mobile phones
- Power banks

Features:

- Overtemperature and overcurrent protection in a single device
- Resettable activation
- Wide range of temperature options: 72 °C, 77 °C, 82 °C, 85 °C and 90 °C
- Low resistance
- Small & thin size for compact package design
- Optimal corrosion resistant properties
- RoHS compliant*



Mini-Breakers (Miniature Resettable Thermal Cutoff Devices)

Series	Trip Temperature (°C)	Trip Current @ 60 °C	Voltage
HC	72, 77, 82, 85, 90	7, 8.5, 9.5, 11, 12 A	28V
AC	72, 77, 82, 85, 90	9, 12, 14, 16, 18 A	28V
LC	72, 77, 82, 85	2.7, 3.8, 4.5, 5 A	28V
NR	72, 77, 82, 85	6, 7.8, 9.5, 10.5 A	28V
SA	72, 77, 82, 85	6, 8.8, 10.2, 11.1 A	28V
SC	72, 77, 82, 85	6.28, 7.22, 8.37, 8.7 A	28V

*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

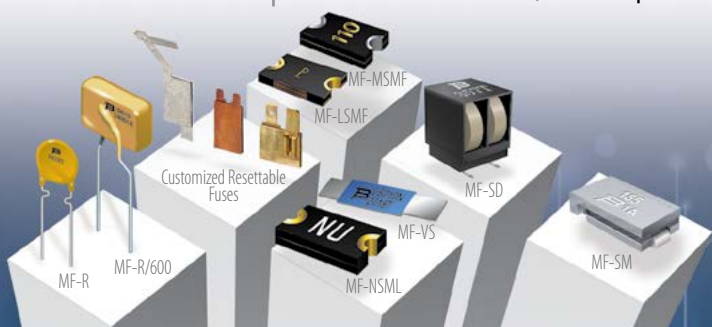
Multifuse® Polymer PTC Resettable Fuses

Types Available:

- Radial leaded through-hole
- Surface mount (0402, 0603, 0805, 1206, 1210, 1812, 2018, 2920 & 3425)
- Axial leaded battery strap
- Unencapsulated disk

Features:

- 6 to 90 V operating voltages
- Hold currents from 10 mA to 11.0 A
- Agency certifications - UL, CSA & TÜV
- Interrupt voltages of 250 V and 600 V with surge capabilities for assisting in meeting US and international telecom requirements
- High temperature polymers available with operating temperatures between $-40\text{ }^{\circ}\text{C}$ and $+125\text{ }^{\circ}\text{C}$
- Custom designs available upon request
- Bulk, embossed tape, and ammo pack packaging
- RoHS compliant* standard & halogen free** upon request
- Some models AEC-Q200 compliant



Applications

- Computers
- Batteries
- Charging ports
- Telecommunications
- Industrial controls
- Portable electronics
- Medical products***
(excluding critical life support)
- Point of Sale
- Game consoles and toys
- Security systems
- DC motors

***Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

TBU® High-Speed Protectors

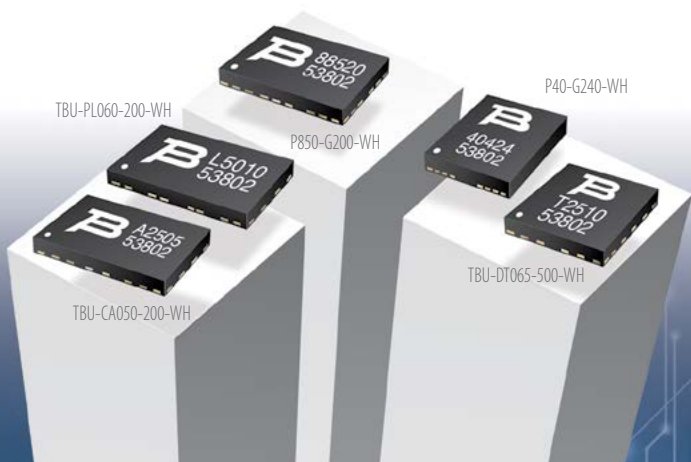
Introduction:

TBU® High-Speed Protectors (HSPs) are circuit protection devices designed to protect against faults caused by short circuits, AC power cross, induction and lightning surges.

The TBU® HSPs block surges, providing a barrier to sensitive electronics and eliminating exposure to large voltages or currents during surge events up to rated limits.

Features:

- Extremely high-speed performance
- Blocks high voltages & currents up to rated limits
- Exceptionally low let-through energy
- Very high bandwidth, GHz compatible
- UL recognized components
- Programmable models available



Applications

- POTS linecards
- VoIP equipment
- ONUs and ONTs
- Gateways and modems
- 10/100 & Gigabit Ethernet
- VDSL interfaces
- Remote metering & surveillance
- Industrial automation
- Test equipment
- RS232, RS422, RS485, CANbus and LVDS
- Sensors

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