

BOURNS®

PRODUCT PROFILE



Automotive Solutions
Circuit Protection
Discrete Semiconductors

Custom & Standard Magnetics
Sensors & Controls
Resistive Products

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Custom Automotive Sensors

Types Available:

- Powertrain speed & position
- Wheel speed
- Chassis level
- Fuel level
- Brake wear
- Pedal position
- Steering torque & angle
- Throttle position
- Motor position & phase current sensors

Features:

- Contacting: resistive
- Non-contacting: VR, hall effect, xMR, inductive
- Interfaces: analog, PWM, SENT, SPI, CAN, PSi5
- Extensive simulation tools
- Global engineering, testing, manufacturing, and sales support
- All sites are IATF 16949 and ISO 26262 compliant
- Innovative & cost-effective solutions



Applications

- ABS wheel speed
- Accelerator pedal
- Electric Power Steering
- Brake pedal module
- Brake wear
- Chassis Level
- Electric park brake
- Fuel tank level
- Steer by wire
- Throttle position
- Transmission position
- Transmission speed
- Transfer case position
- Motor position
- Disconnect unit position

Custom Commercial Vehicle Sensors

Types Available:

- Powertrain speed & position
- Brake wear
- Chassis level
- Ride height
- Steering torque & angle
- Fuel level
- Pedal position

Features:

- Contacting: resistive
- Non-contacting: VR, hall effect, xMR, inductive
- Interfaces: analog, PWM, SENT, SPI, CAN, PSI5
- Extensive simulation tools
- Global engineering, testing, manufacturing, and sales support
- All sites are IATF 16949 and ISO 26262 compliant
- Innovative & cost-effective solutions



Applications

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- Brake pedal module
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- Throttle position
- Transmission position
- Transmission speed
- Transfer case position
- Motor position
- Disconnect unit position

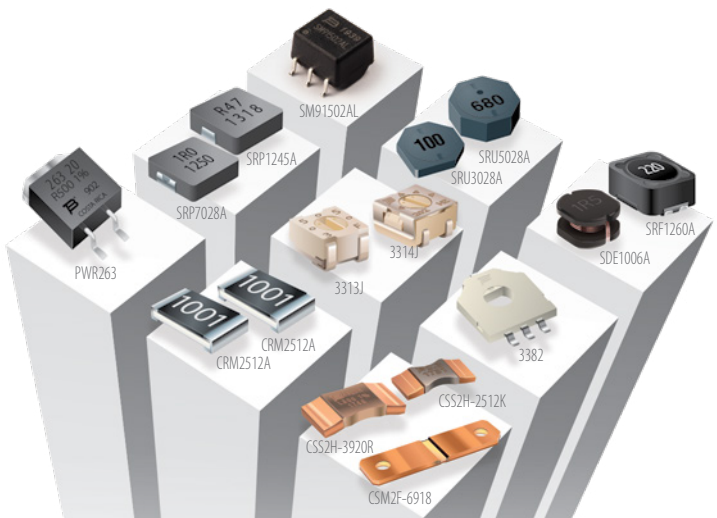
Automotive Grade Passive Components

Types Available:

- Inductors
- Transformers
- Power resistors
- Chip Resistor
- Power Resistors
- Current Sense Resistors
- EB-Welded Shunts
- Current sense resistors
- Trimpot® trimming potentiometers

Features:

- AEC-Q200 compliant
- TS 16949 factory produced
- Automotive temperature capable
- High quality and reputation



Applications

- Battery management
- Cameras
- DC/DC & AC/DC power supplies
- Diagnostic tools
- Electronic Control Modules (ECU)
- Infotainment, telematics, navigation, connected cars
- Instrument clusters
- Lighting
- Networking
- OBCs (On Board Chargers)
- Start-stop

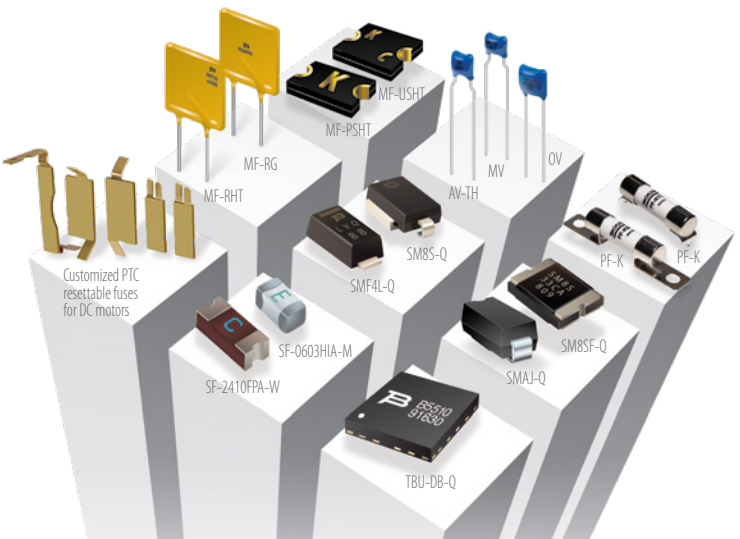
Automotive Grade Circuit Protection

Types Available:

- Multifuse® PPTC resettable fuses
- SinglFuse™ SMD fuses
- POWrFuse™ high-power fuses
- TBU® high-speed protectors
- Metal Oxide Varistors (MOVs)
- ChipGuard® MLVs
- Diodes
- LED shunt protectors

Features:

- Overcurrent protection for automotive and other applications
- IATF 16949 quality system
- Resettable PTCs suitable for application temperatures up to 125 °C
- SinglFuse™ SMD fuses suitable for application temperatures up to 150 °C
- AEC-Q101 compliant diodes
- AEC-Q200 compliant fuses
- Wide range of current ratings
- Dedicated automotive CP team
- Transient protection



Applications

- BMS (Battery Management Systems)
- Car alarm systems
- Cooling & HVAC systems
- Electronic Control Unit (ECU) input/output protection
- GPS shark fin antennas
- Infotainment, telematics and navigation input/output protection
- Load dump and other transient voltage protection
- Other DC motor applications
- Powerbus (mode protection) applications
- Power steering motors
- Seat adjustment motors
- Sunroof activation motors
- Window regulators

Mini-Breaker Thermal Cutoff Devices (TCOs)

Types Available:

- Low current series (LC, NRC)
- High current series (AA, AC, AD, HC, NRA, NX, CBA)
- Surface mount series (SAS, SD, SCA)

Features:

- Overtemperature and overcurrent protection in a single device
- Resettable protection
- Wide range of temperature options: 55 °C ~ 150 °C
- Low resistance
- Small & thin size for compact package design
- High corrosion resistance properties
- Surface mount & weldable axial leads
- AEC-Q200 tested
- RoHS compliant*



Applications

Battery cell protection for:

- Notebook PC battery cells
- Tablet & smartphone battery cells
- Wearable & VR/AR battery cells
- USB Type C cables
- Heaters (including automotive)
- TWS wireless charging coils

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

**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.

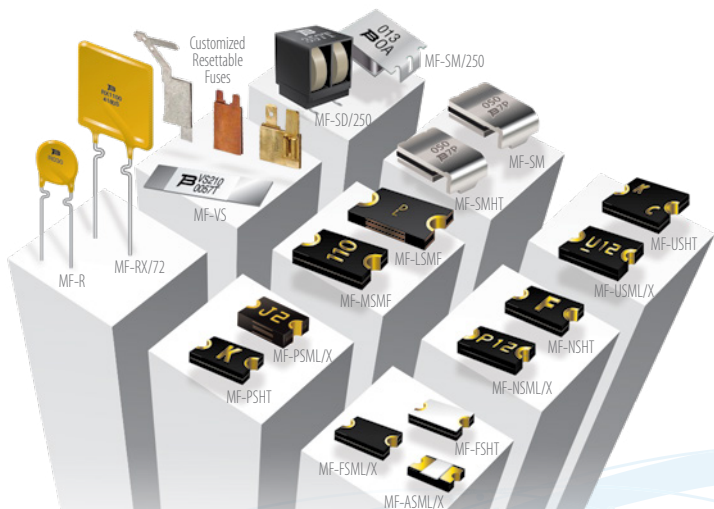
MultiFuse® PPTC Resettable Fuses

Types Available:

- Radial leaded through-hole
- Surface mount
(0402, 0603, 0805, 1206, 1210, 1812, 2018, 2920 & 3425)
- Axial leaded battery strap
- Unencapsulated chip/disc
- Customized solutions for DC motors

Features:

- 6 to 72 V operating voltages
- Hold currents from 50 mA to 13 A
- Agency recognition - UL, CSA & TÜV
- Interrupt voltages of 250 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
- AEC-Q200 compliant models available
- RoHS compliant* & halogen free**



Applications

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

***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 www.bourns.com/docs/legal/disclaimer.pdf

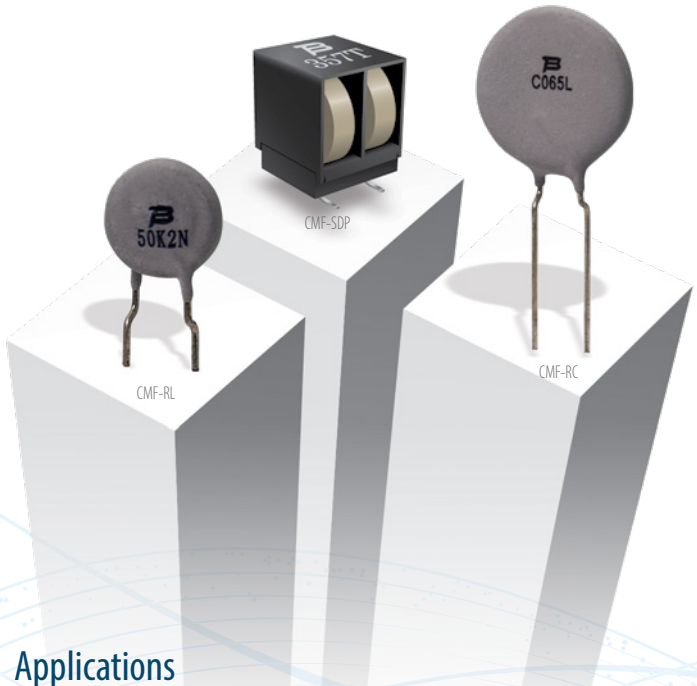
Ceramic PTC Protectors

Types Available:

- Radial leaded through-hole
- Surface mount
- Dual-packaged surface mount
- Unencapsulated disk or chip

Features:

- Aids compliance with:
 - ITU-T K.20/21/45
 - Telcordia GR-1089-CORE
 - UL 60950, 3rd Edition
- UL recognized
- Matching available with narrow resistance tolerance
- Alternative tolerances and resistances on request
- Overload inrush-current limiting
- RoHS compliant*



Applications

Overcurrent protection

for telecom applications:

- Access equipment (POTS)

- Central Office (CO)
- Customer Premises Equipment (CPE)
- PABX protection

- Set-top boxes
- VOIP protection
- xDSL and integrated linecards

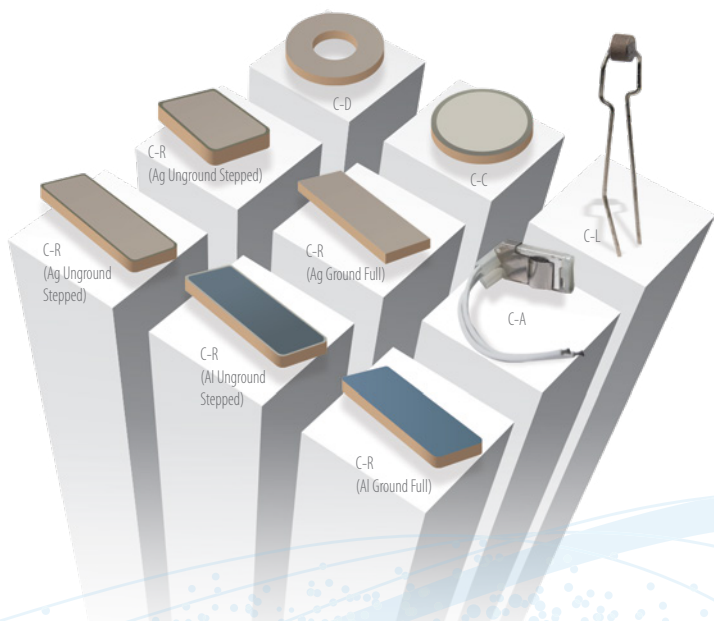
Ceramic PTC Heaters

Types Available:

- Radial leaded through-hole
- Customized rectangular and circular designs
- Custom assemblies with housing & wiring

Features:

- Self-regulated heating
- Simple circuit design
- Suitable for clamp-contact
- Long life stability
- Silver (Ag) and aluminum (Al) electrode coating
- Stepped and full electrodes
- Ground and unground edges
- Variety of surface temperature, Curie temperature, R_{min} , and operating voltage ratings available
- AEC-Q200 compliant models available



Applications

- Home appliances
- HVAC systems

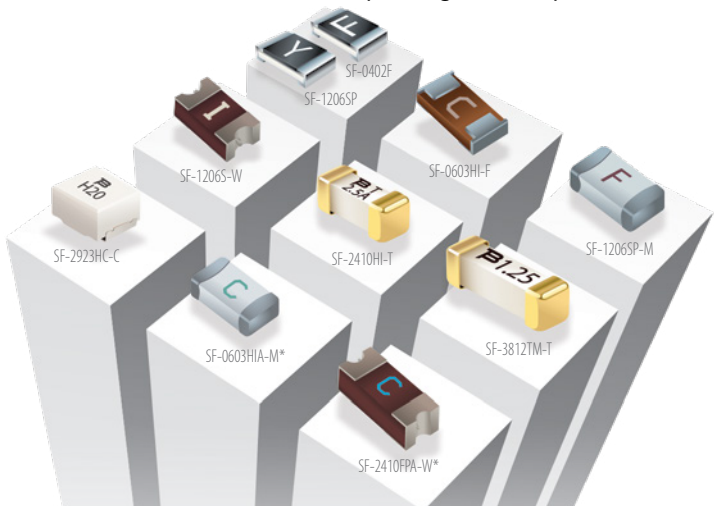
SinglFuse™ SMD Fuses

Types Available:

- Fast-acting
- Slow blow/time lag
- High inrush
- 7 available footprints:
0402 (1005 metric)
0603 (1508 metric)
1206 (3216 metric)
1210 (3225 metric)
2410 (6125 metric)
2923 (7358 metric)
3812 (10030 metric)

Features:

- Single blow fuse for overcurrent protection
- UL recognized & IEC compliant
- AEC-Q200 compliant models available*
- Surface mount packaging for automated assembly
- Thin film, multilayer, wire-in-air, ceramic tube/cube constructions
- Surge capability for specific models
- RoHS compliant** and halogen free***
- Wide range of fusing speeds, current ratings, voltage ratings, interrupt ratings and footprint sizes



Applications

- Automotive*
- Battery chargers
- Battery Management Systems (BMS)
- Wireless headsets
- Cellphones
- Digital cameras
- Disk drives
- DVD players
- LCD monitors
- Industrial controllers
- Portable memory
- PDAs
- Rechargeable battery packs
- Set-top boxes
- Telecommunication requiring surge protection

*Meets Bourns internal AEC-Q200 equivalence test plan.

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

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POWrFuse™ High-Power Fuses

Types Available:

- Electric Vehicle
- Industrial
- Photovoltaic
- Semiconductor
- Telecom

Features:

- UL 248 & IEC 60269 standards compliance
- ISO 8820 automotive grade*
- Wide range of current, voltage, and interrupting ratings and fusing characteristics
- Voltage rating up to 1000 VDC
- Current rating up to 400 A
- Interrupting rating up to 150 kA
- Three mounting options:
Ferrule, bolt and PCB mounting
- Fusing speeds comply with specific UL 248, IEC 60269-6 & ISO 8820-8 definitions
- RoHS compliant** and halogen free***



Applications

- Electric Vehicle
- Industrial
- Photovoltaic
- Semiconductor
- Telecom

*Meets Bourns internal AEC-Q200 equivalence test plan.

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Varistor Products

Types Available:

High Energy:

- ZOV Series
- ZOVR Series
- ZOVS Series
- ZOVA Series
- ZOVH Series

Medium Voltage

- DV Series
- PV Series
- CV Series
- CVQ Series
- SV Series
- ZV Series

Low Voltage:

- ZV/ZVHT Series
- ZVE Series
- ZVX Series

Automotive Grade:

- AV/AVHT Series
- MV Dual Function Series
- OV Dual Function Series

Features:

- Metal oxide & multilayer designs
- Varistor sizes 5 mm - 60 mm
- Wide range of voltage ratings
- Wide range of current ratings
- UL recognized
- Temperature ratings up to +125 °C
- Wide range of customizable options
- AEC-Q200 compliant models available (AV, AVHT, MV, OV)
- RoHS compliant*



Applications

AC line protection:

- Surge protective devices
- LED lighting
- Solar inverters
- Power supplies
- Industrial electronics
- High value consumer goods

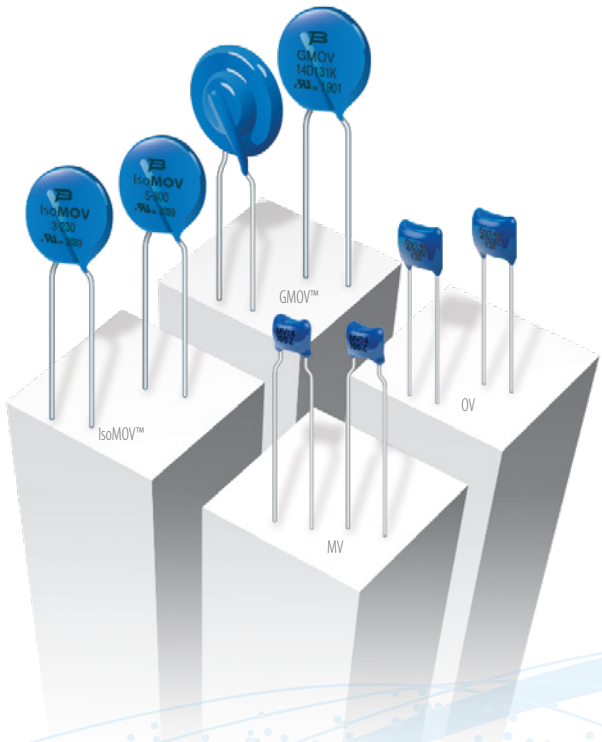
Hybrid Protection Components

Types Available:

- 14 mm through-hole
- 20 mm through-hole

Features:

- Hybrid designs using Bourns' patented FLAT® technology
- Standard 14 mm & 20 mm sizes
- Matched GDT-MOV pairings
- Low leakage
- Bidirectional protection
- Low capacitance
- UL 1449 4th Edition Type 5 Recognized
- RoHS compliant*



Applications

AC Line Protection:

- White goods
- Power line communications

- Smoke alarm systems
- High value consumer goods

DC Line Protection:

- Solar inverters
- Power supplies
- Distribution systems

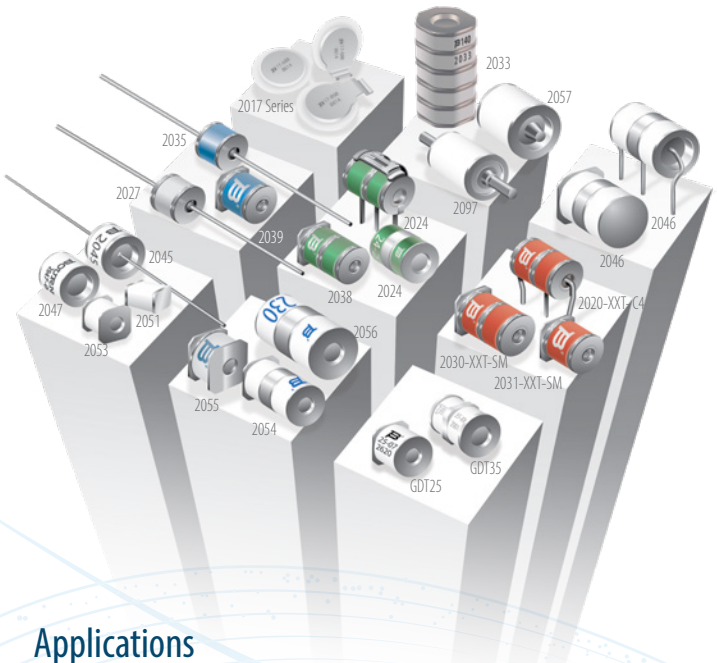
Gas Discharge Tube (GDT) Surge Arrestors

Types Available:

- Light duty
- Medium duty
- Heavy duty
- High voltage
- High current
- FLAT® technology
- Hybrid
- Powerline

Features:

- 75 - 7200 V operating voltages
- 8/20 μ s surge current ratings of 2 kA - 100 kA
- Low capacitance
- Through-hole & surface mount packages available
- Switch Grade Fail-Short options
- Fast GDT versions available
- Low overshoot hybrid designs
- UL, Telcordia, REA, IEEE, ITU-T and IEC recognition
- RoHS compliant*



Applications

- Appliances
- CATV/broadband
- Consumer electronics
- Data communications
- Industrial power ports
- Industrial and process controls
- Telecommunications
- Transportation signaling

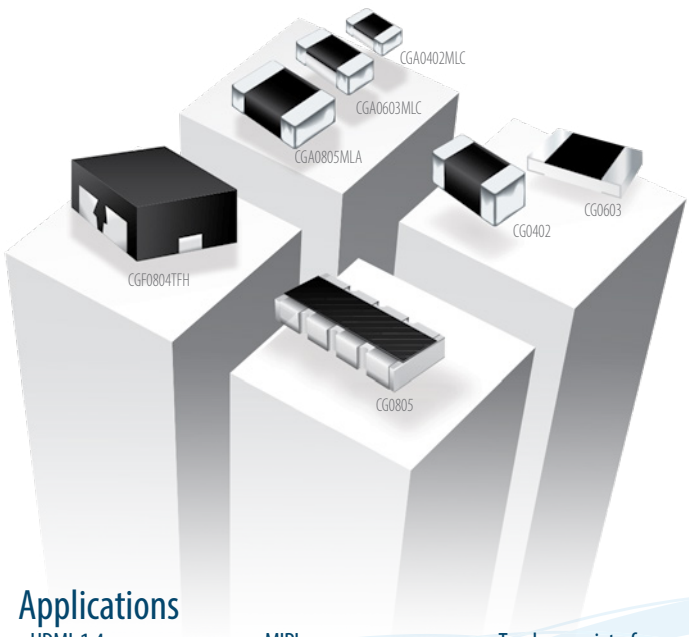
ChipGuard® ESD Suppressors

Types Available:

- Multilayer varistor
- Polymer technologies
- Air-gap technologies

Features:

- ESD protection to industry specification IEC 61000-4-2
- Minimum 8 kV contact and 15 kV air discharge ESD withstand
- SMD packages (0201, 0402, 0603, 0805, 1206)
- AEC-Q200 compliant models available
- RoHS compliant*



Applications

- HDMI 1.4
- CANbus
- Ethernet
- Digital Visual Interface (DVI)
- USB 3.0 / USB OT
- MIPI
- MHL
- Memory protection
- SIM card ports
- Camera links
- Sensors
- Touchscreen interfaces
- GPS
- Antennas
- High-speed communication buses
- Circuits sensitive to ESD

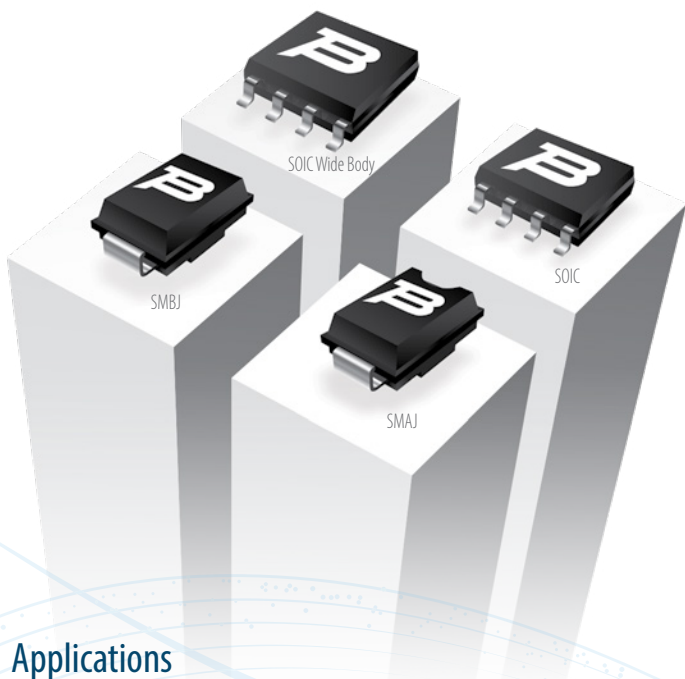
TISP[®] Thyristor Surge Protectors

Types Available:

- Unidirectional
- Bidirectional
- Programmable
- ACTP - AC Transient Protectors

Features:

- Protection voltages from 15 V - 700 V
- Dedicated SLIC protection
- Telephone port protection
- xDSL (including G.fast) protection
- UL recognized
- Assists with Telcordia GR-1089, UL 60950, FCC (TIA), ITU-T, IEC & YD/T compliance
- Offline AC power supply protection
- Specified in chipset reference designs for 15 years
- RoHS compliant*



Applications

- Central office, access network and customer premises equipment
- FTTx equipment
- ISDN and NT protection
- Modems, gateways and set-top boxes
- Offline Switch Mode Power Supplies (SMPS)
- POTS protection
- VoIP protection
- xDSL protection

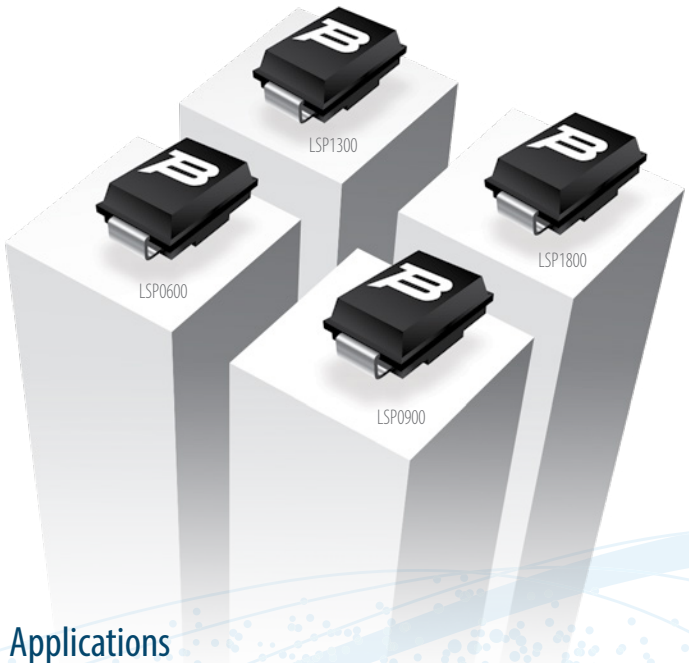
LED Shunt Protectors (LSPs)

Types Available:

- SMB package
- SMA package

Features:

- Fast switching
- Industry standard, small footprint
- Suitable for industrial lighting environments
- Improved uptime of the end application by shunting/bypassing open-circuit LEDs in a series string
- Can assist with ENERGY STAR® compliance
- RoHS compliant*



Applications

- Vehicle lighting
- High-bay industrial lighting
- Intrinsically safe lighting
- LED streetlights
- Low maintenance lighting

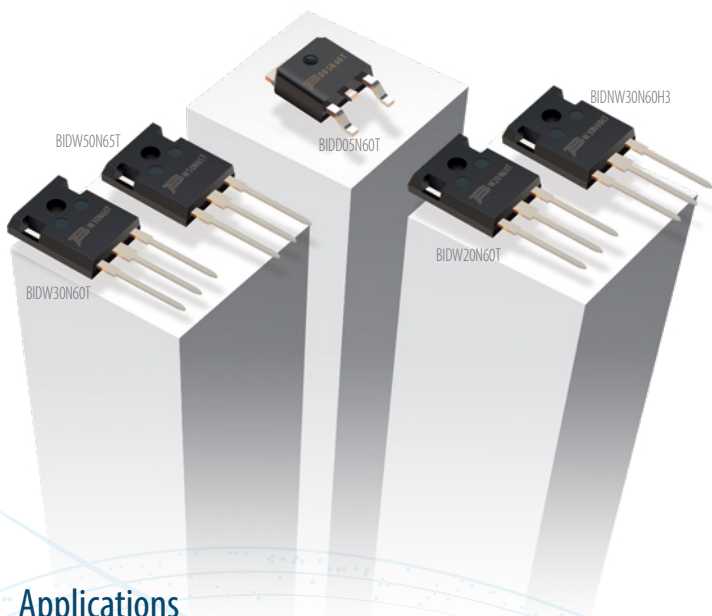
Insulated Gate Bipolar Transistors (IGBTs)

Types Available:

- Surface mount
- Through-hole packages

Features:

- Discrete IGBT co-packed with Fast Recovery Diode (FRD)
- Advanced Trench-Gate Field-Stop (TGFS) technology
- Low saturation voltage drop ($V_{CE(sat)}$)
- Low switching loss
- TO-252, TO-247 and TO-247N packages
- Qualified according to JEDEC standard for power switching products
- RoHS compliant*



Applications

- Home appliances
- UPS
- SMPS
- PFC
- Solar inverters
- Industrial motor drives
- Welding

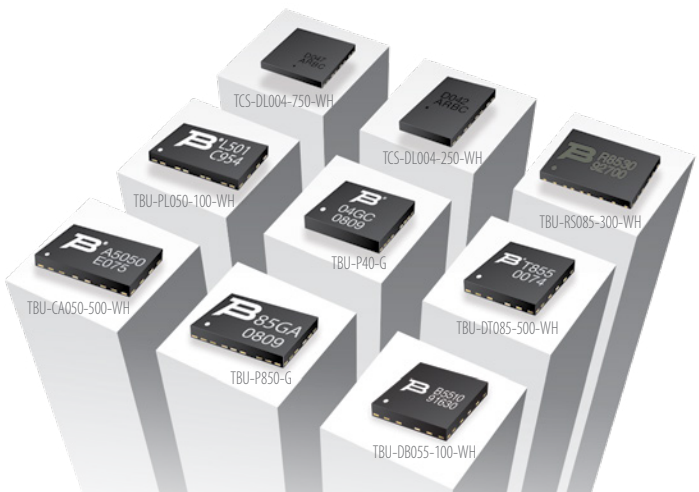
TBU[®] & TCS[™] High-Speed Protectors (HSPs)

Types Available:

- Single bidirectional
- Dual unidirectional
- Dual bidirectional

Features:

- Extremely high-speed performance (<1 μ s)
- Blocks high voltages & currents up to rated limits
- Exceptionally low let-through energy
- Very high bandwidth, GHz compatible
- AEC-Q101 compliant models available
- UL recognized components
- Low insertion loss up to frequencies beyond GHz
- No capacitance to ground
- Programmable model available
- Compact DFN package
- RoHS compliant*



Applications

Telecom

- AISG V2.0
- xDSL interfaces
- Smart grid
- ONUs & ONTs
- Gateways & modems
- VoIP equipment
- 10/100 & Gigabit
- POTS linecards
- SLIC

Industrial

- RS232, RS422, RS485, CANbus and LVDS
- Remote metering & surveillance
- Industrial automation
- Test equipment
- Avionics
- Rail and mass transit

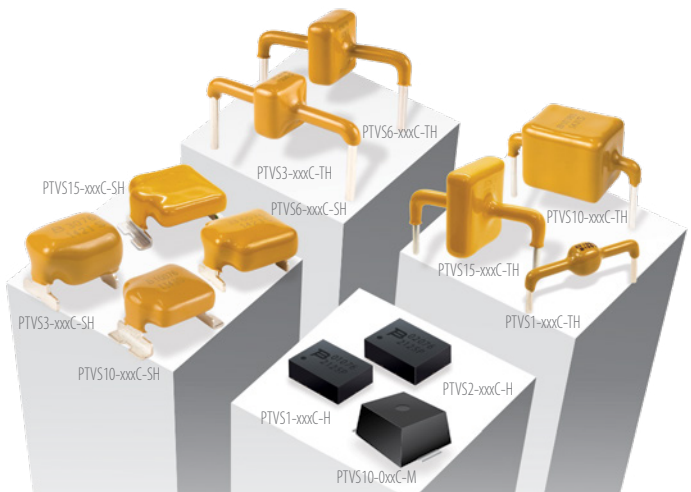
Power TVS Products (PTVS)

Types Available:

- Surface Mount
- Over-molded
 - DFN
- Axial Lead
- Through-hole
 - Gull-wing

Features:

- Robust lightning protection
- 1, 2, 3, 6, 10, 15 & 20 kA peak current rating
- Rigid voltage clamp
- Voltages from 15 V to 430 V
- Simple design
- Axial lead and surface mount packages
- Common PCB footprint for all axial leaded devices
- UL recognized components
- RoHS compliant*



Applications

- AC and DC input power line protection in certain harsh environments
- High power DC bus protection
- High reliability applications requiring high energy surge protection and a rigid voltage clamp
- Industrial equipment
- Street lighting
- Solar inverters
- Telecom base station equipment

Diodes & Arrays

Types Available:

- Transient Voltage Suppressor (TVS) diodes
- Transient Voltage Suppressor (TVS) diode arrays
- Steering diode arrays

Features:

- Excellent high frequency response
- SMD packages (0201, DFN2, DFN6, DFN10, SOD323, SC70-6, SOT23, SOT23-6, SOT143A, NSOIC 8L, NSOIC 16L, SOD-123F, SMA, SMB, SMC, DO-218)
- AEC-Q101 compliant models available
- RoHS compliant*



Applications

- Appliances
- Consumer electronics
- HMI, touch interfaces
- High-speed communication ports such as USB 3.0, IEEE1394, HDMI, Gb Ethernet
- Fast communication ports such as USB 1.1, 10/100b Ethernet ports
- RS232, RS422 & RS485 type applications

Surge Protective Devices

Types Available:

- 1, 2, 3 & 4 pole
DIN rail mountable
- N-type connector
- F-type connector
- Residential enclosure
- Commercial enclosure

Features:

AC Surge Protective Devices

- Pluggable
- DIN rail type
- 50 kA - 100 kA rated

DC Surge Protective Devices

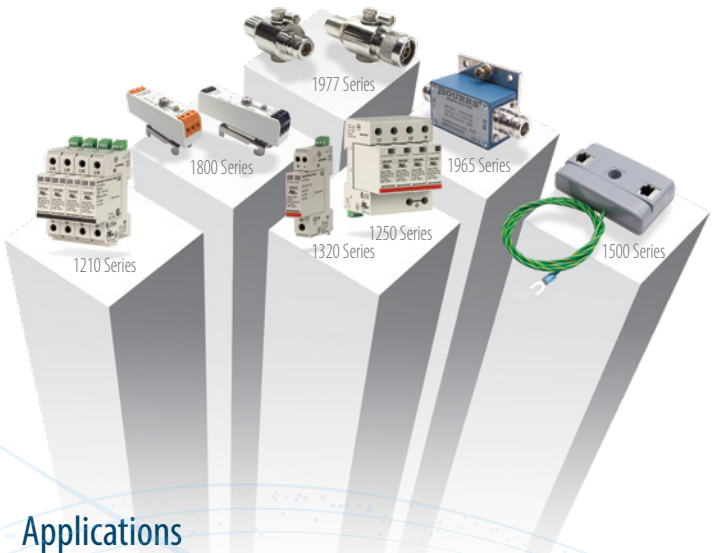
- 12 V, 24 V, 48 V, 75 V or 110 V
DC power

Signal & Data Line Protective Devices

- Gigabit Ethernet
- T1/E1 applications
- RS-232, RS-422, RS-423, RS-485,
20 mA and 50 mA instrument loops

Coaxial Surge Protective Devices

- RF applications from
DC-1 GHz, 50 ohms



Applications

- 2-way base stations
- Antennas
- Broadband
- CATV
- Cellular
- Commercial enclosures
- Ethernet
- GPS
- Microwave
- Residential enclosures
- Satellite video
- Transceivers
- UHF, VHF transmitters

Central Office & Outside Plant Products

Types Available:

- Protection - 5-pin modules:
 - 3-type overvoltage only
 - 4-type overvoltage and sneak current
- Station protection
- Digital Subscriber Line (DSL) products
- Protection connector blocks
- Terminal blocks

Features:

- Surge protection
- Modular units
- UL listed
- RUS and Telcordia compliant



Applications

- Building entrances
- Central office
- Customer premises
- Industrial process control
- Outside plant
- Military premises
- Telecommunications
- Telephony
- Transportation
- Voice, data, network lines

Kaschke Components - Custom Magnetics

Types Available:

- AC filter chokes
- Current transformers
- High power inductor modules
- PFC inductors
- Planar transformers
- Power transformers

Features:

- High volume ferrites with high flux density and limited losses up to 100 kHz
- Ring cores up to R102 with very good insertion losses and high Q-factor
- Rod cores for transmitter/receiver coils in the 20 kHz – 40 MHz range
- Pot cores for proximity switchers with high Q-factor
- Impeder cores for inductive welding
- Customized core shapes
- Medium and small lot sizes, and single item production on request
- Complex core shapes using optimized grinding technology
- Large core shapes using joining and bonding technology



Applications

- Industrial electronics
- Propulsion technology
- Alternative energies
- Sensor technology
- Medical engineering (low/medium risk)*
- Consumer goods

Custom Magnetics

Types Available:

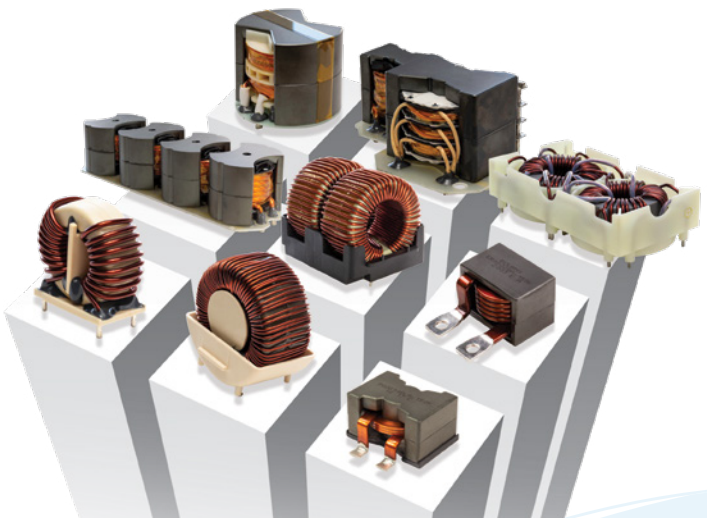
- Transformers for high power
- Planar transformers for medium power
- Push-pull transformers for low power
- Flyback transformers
- Flat wire inductors
- CMC and DMC chokes
- PFC chokes

Features:

- Standard and custom designs
- Designed to comply with, but not restricted to: Insulation Class: B, F H
- Industry Standards: UL 508, EN-61558-1, EN 60950, EN 62368-1

Quality:

- VDA 6.3, Factory IATF 16949 certified
- High volume, high automation production capabilities
- High frequency power topologies: buck, boost, SEPIC, CUK, half and full bridge LLC, push-pull, forward, flyback



Applications

- High-frequency switching power supplies
- AC-DC, DC-DC & DC-AC converters
- OBC (On Board Chargers)
- Charging stations
- Battery management
- Renewable energy
- Consumer electronics
- Communications
- Instrumentation
- Industrial
- Medical (low/medium risk)*

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Inductors & Common Mode Chokes

Types Available:

Power Inductors

- Non-shielded
- Semi-shielded
- Shielded
- High current shielded
- High current toroids
- Dual chokes
- Flat wirewound
- Ferrite core
- Metal alloy powder core

Common Mode Chokes

- Toroid
- High current
- High impedance
- Sector-wound
- Bifilar-wound

Chip Inductors

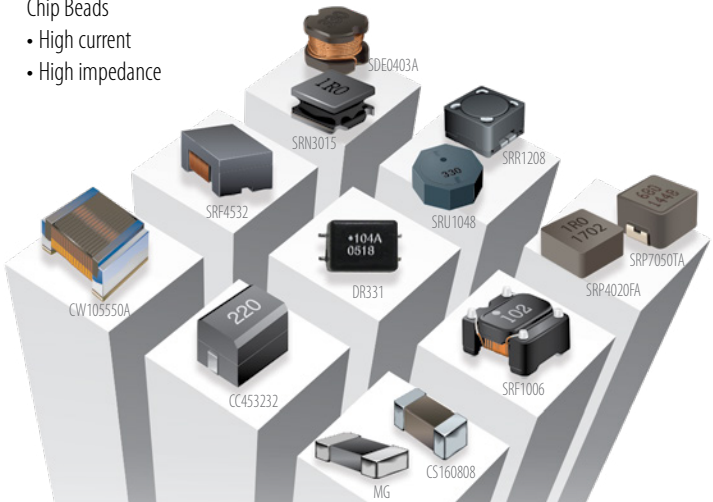
- Encapsulated
- Wirewound
- Multilayer ceramic
- Multilayer ferrite
- Open wirewound

Chip Beads

- High current
- High impedance

Features:

- Standard inductance values from 1.0 nH to 100 mH
- More than 170 surface mount power inductor models
- More than 50 through-hole power inductor models
- Available in a wide range of sizes
- Operating temperature as high as +200 °C
- Saturation current up to 118 A
- AEC-Q200 compliant models available



Applications

- Battery chargers
- BMS
- CD players
- Data communication
- DC-DC converters
- Global positioning systems
- Internet equipment
- LED drivers
- Local area networks
- Monitoring equipment
- PMIC
- Portable radios
- Portable tools
- SSDs (Solid State Drives)
- Switch mode power supplies
- Solar power conversion
- Test equipment
- Televisions
- Video conferencing equipment
- Telecommunications
- Wearables

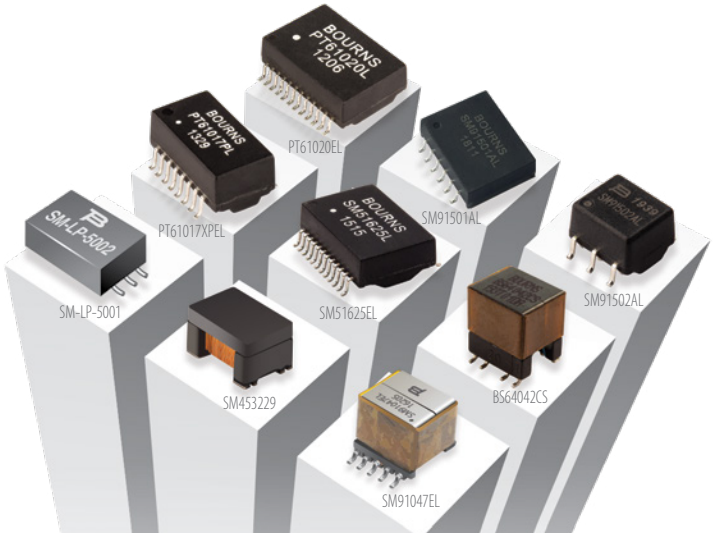
Transformers

Types Available:

- Line-matching
- LAN
- Chip LAN
- PoE/VoIP
- BMS
- High voltage isolation
- Power

Features:

- 10/100/1000 Base -T
- Operating temperature up to +125 °C
- High working and isolation voltage
- PoE+
- Compliant with IEEE 802.3
- Compliant with IEC 60950
- AEC-Q200 compliant models available
- RoHS compliant*



Applications

- Battery management
- LAN
- Ethernet
- xDSL
- Power over Ethernet
- PoE+
- Modems
- Laptop computers
- Telecommunications
- Instrumentation
- AC/DC power supplies
- Home metering
- Home automation
- Appliances
- White goods
- LED drivers

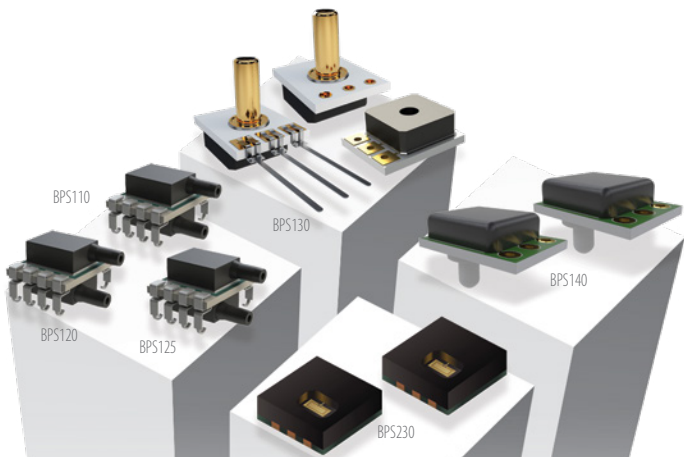
Sensors

Types Available:

- Pressure sensors
- Humidity sensors

Features:

- Ultra-low sensing: 250 Pa to 1.0 PSI
- High pressure sensing: 15 PSI to 500 PSI
- Extreme sensitivity and stability
- Certain harsh media compatibility: (air, liquid, gas)
- Analog and digital output options
- Differential and gauge options
- Active temperature compensation
- Highly accurate humidity sensing with digital output
- RoHS and REACH compliant*



Applications

Medical Devices

(low/medium risk)**

- Portable oxygen generators
- Nebulizers
- CPAP equipment
- Diagnostic spirometers

Industrial

- HVAC
- Process control
- Food processing
- Packaging automation
- Pneumatic control
- Gas flow instrumentation

Consumer

- Home appliances
- White goods
- Office automation

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

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Pro Audio & Lighting

Types Available:

Rotary Potentiometers

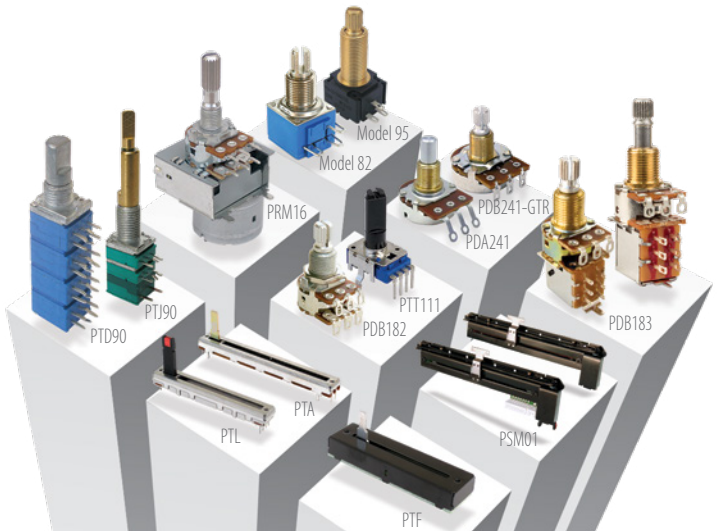
- Rotary

Slide Potentiometers

- Manual
- Motorized
- Open frame & metal housing

Features:

- Flatted, knurled or plain shafts
- Metal and plastic shafts
- Splash seal
(available on some models)
- Various standard resistance codes
- Various standard tapers
- PC pin and solder lug options
(available on some models)
- Dual concentric shafts (Model PTJ90)



Applications

- Audio mixing consoles
- Bass guitars
- Broadcast consoles
- Electric guitars
- Instrument amplifiers
- Video mixing boards

Commercial Panel Controls

Types Available:

Panel Controls

- Rotary
- Motorized rotary

Encoders

- Incremental contacting

Mounting Options

- Bushing • Bushingless
- PC mount • Solder lug

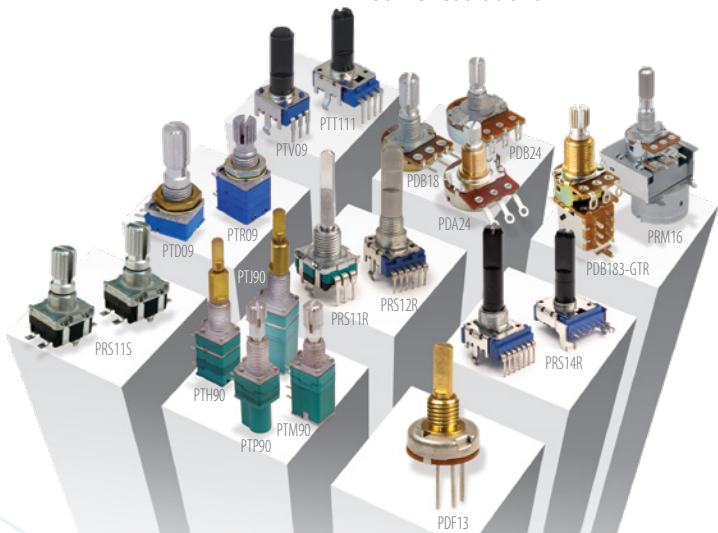
Features:

Sizes (vary by model)

- 9 to 24 mm (rotary panel controls)
- 12 and 16 mm square (encoders)

Options

- Panel controls:
 - Several taper options
 - Rotary switch option[†]
 - Multi-cup option[†]
 - Push/pull switch option[†]
- Encoders:
 - Momentary push switch
 - Detents available on some resolutions



Applications

- Communications equipment
- Kitchen appliances
- Irrigation controls
- Medical equipment*
(excluding critical life support)
- Portable electronics
- Power tools
- Test and measurement instrumentation

[†] available on some models

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Industrial Panel Controls

Types Available:

- Rotary

Mounting options

- Bushing
- PC mount
- Snap-in
- Reverse audio

Terminal Styles

- PC pins
- Solder lugs

Features:

Output

- Linear taper
 - Audio taper
 - Custom taper
- Sizes (vary by model)

- 9 to 23 mm

Options

- Flexible lead-wires
- Rotary switch option[†]
- Multi-cup option[†]
- Boardwash seal option[†]



Applications

- Avionics and aerospace
- Environmental test equipment
- HMI (Human-Machine Interface)
- Irrigation controls
- Industrial equipment controls
- Medical instrumentation and equipment*
(excluding critical life support)
- Military grade equipment
- Test and measurement instrumentation
- Video conferencing equipment

[†] available on some models

Non-Contacting Position Sensors & Rotary Controls

Types Available:

- Rotary
- Mounting options
- Bushing
 - Servo mount

Terminal Styles

- PC pins
- Solder lugs
- Solder eyelets
- Insulated flexible wire leads*

Features:

- Non-contacting "Hall Effect" technology
 - Single & multiturn models available
 - Seal option available on some models
- Output
- Analog
 - Pulse-Width Modulation (PWM)*
 - Serial Peripheral Interface (SPI)*
 - Synchronous Serial Interface (SSI)*
 - Sizes (vary by model)
 - 20 mm and 22 mm diameter



Applications

- Automated packaging and processing equipment
- Construction & agricultural vehicles
- Clean energy equipment
- Factory automation & assembly equipment
- HMI & MMI (Human-Machine & Machine-Machine Interface)
- Material handling equipment
- Medical diagnostic** & patient care equipment (excluding critical life support)
- Stage production & robotic lights

* available as custom option

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Rotary Encoders

Types Available:

- Incremental contacting
- Incremental magnetic
- Absolute contacting
- Absolute/PWM magnetic
- Incremental optical

Mounting options

- Bushing
- PC board
- Snap-in
- Servo

Features:

Resolution

- Contacting – 6 PPR to 36 PPR options
- Optical – 25 PPR to 256 PPR options
- Magnetic – 32 PPR to 512 PPR and 1024 PPR states options

Sizes (vary by model)

- 9, 16, 22 mm square & 16 mm x 22 mm

Options

- Detents[†]
- Momentary push switch[†]
- Shaftless versions[†]
- Sealable to IP 65 & 67[†]



Applications

- Audio/visual equipment
- Communications equipment
- Forklifts and material handling
- Household appliances
- Industrial heavy equipment
- Medical equipment*
(excluding critical life support)
- Robotics
- Scanners and copiers
- Test and measurement instrumentation

[†] available on some models

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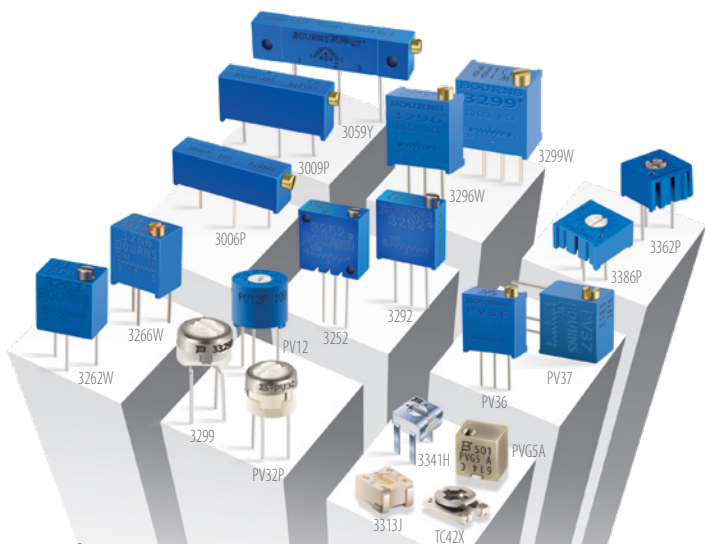
Trimpot® Trimming Potentiometers

Types Available:

- Surface mount
- Through-hole
- Single-turn
- Multiturn
- Sealed
- Open frame
- MIL-SPEC

Features:

- Top, bottom, side, front, and back adjust
- 2 mm to 12.7 mm size range
- Packaging: Tube, bulk, embossed tape, ammo pack, radial tape and reel
- Compatible with pick and place equipment
- Largest selection of sealed trimming potentiometers in the industry
- Custom designs available upon request
- Substrate, ink, rotor, epoxy and shaft development and production



Applications

- Analytical equipment
- Automated gates/doors
- Automation equipment
- Blood chemical analyzers
- Calibration equipment
- CCTV cameras
- Communication equipment
- Fire alarms
- Fluid measurements
- GPS navigation
- Industrial/graphic printers
- Laser altimeters
- Laser diode drivers
- Medical meters
(excluding critical life support)
- Metal detectors
- Military radios
- Network analyzers
- Oscilloscopes
- Portable/handheld radios
- Proximity sensors
- Radar systems
- Radiation & X-ray testers
- Relays
- RFID systems
- Satellite systems
- Scanners
- Set-top boxes
- Smoke detectors
- Temperature & respiratory monitors
(excluding critical life support)
- Transmission equipment

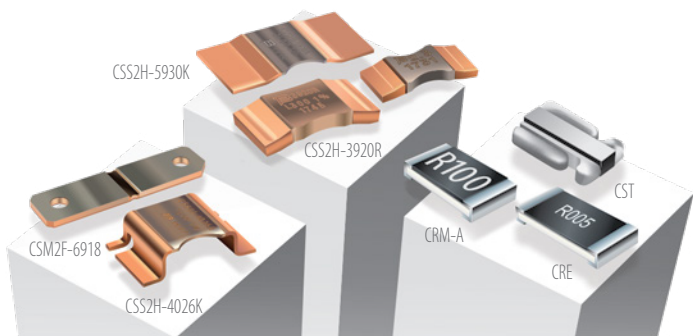
Current Sense Resistors

Types Available:

- High power thick film chip
- High power metal strip chip
- Electron beam welded metal strip

Features:

- Two and four terminal
- 25 microohms to 1 ohm
- 0.1 watts to 50 watts
- 0603 ~ 2512 sizes up to 3 watts
- Electron beam welded metal strip (2512 ~ 5930 sizes)
- High power shunts (6918, 7036, 8518 sizes)
- Very low TCR, from 50 ppm/°C
- AEC-Q200 compliant models available (Electron beam welded shunts, thick film and metal strip chip packaged resistors)



Applications

- Automation equipment
- Battery Management Systems (BMS)
- Battery packs
- DC-DC converters
- OBC (On Board Chargers)
- Charging stations
- Input amplifiers
- Navigation equipment
- Medical equipment* (excluding critical life support)
- Precision circuits
- Printers
- Power supplies
- Smart meters
- Stepper motor drives
- White goods

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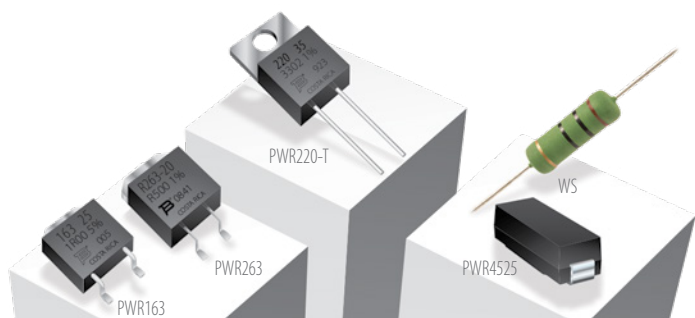
Power Resistors

Types Available:

- High surge withstand and UL1412 listed safety fusible wirewound resistors
- Surface mount wirewound resistors
- High power thick film: DPAK, D²PAK, TO220

Features:

- Through-hole and surface mount
- 0.002 ohms to 130k ohms
- 0.5 watts to 100 watts
- 0.5 % to 5 % tolerances
- AEC-Q200 compliant models available (TO220, DPAK and D²PAK packaged resistors)
- Excellent surge performance



Applications

- AC power supplies
- Audio equipment
- Base stations
- Battery controls
- Combiners
- Industrial equipment
- Isolators
- LED lighting
- Medical equipment*
(excluding critical life support)
- Motor controllers
- Renewable energy
- Smart meters
- Surge protection
- Telecommunications
- White goods
- Inrush current limiting
- Capacitor precharge/discharge
- Heaters
- Traction Inverters
- High-frequency switching power supplies
- AC-DC, DC-DC & DC-AC converters
- Battery Disconnecting Unit

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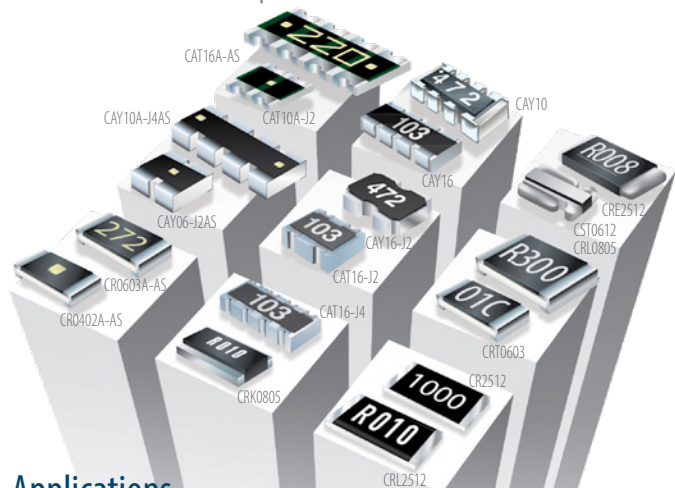
Chip Resistors & Arrays

Types Available:

- Thick film chip arrays
- Thick film chip resistors
- Thin film chip resistors
- Metal strip chip resistors
- Sulfur-resistant available
- Metal foil chip resistors
- Wide terminal chip resistors
- Four terminal chip resistors

Features:

- Standard resistance values from 0.0005 ohms to 20 megohms
- Standard resistance tolerances from 0.01 % (thin film only), 1.0 % & 5.0 %
- Chip resistors: 01005-size to 2512-size
- Chip arrays: 0201 x 2 to 0603 x 4-size
- High power up to 3 W (thick film and metal strip)
- AEC-Q200 compliant models available (thick film and metal strip)
- UL1676 listed high voltage and high surge withstand (thick film)
- Sulfur-resistant (thick and thin film)



Applications

- Navigation
- Current sense
- Cellular and cordless phones
- Communications interface
- Flashlights
- High voltage applications
- Infotainment
- Intercom systems
- Internet telephony
- Local area networks
- Measurement equipment
- Memory modules (incl. sulfur-resistant type)
- Portable digital assistants
- Portable tools
- Power supplies: DC-DC; AC-DC; DC-AC
- Pulse power applications
- Remote controllers
- Telecom switching devices
- Test equipment
- White goods

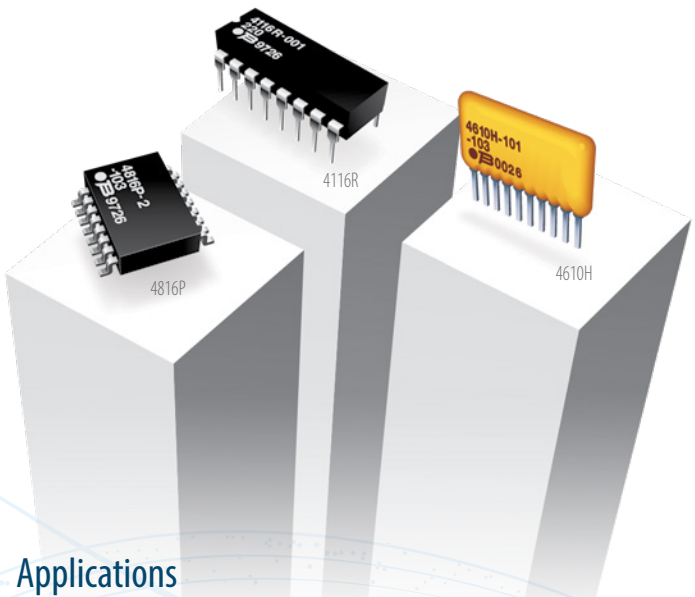
Resistor Networks

Types Available:

- Thick film resistor networks
- Tin lead plating available on some models

Features:

- Surface mount and through-hole mounting
- SIP and DIP packages
- Molded and conformal-coat packages
- Standard resistance values from 10 ohms to 10 megohms
- Custom networks for non-standard circuits and values
- SIP package height as low as 0.195 inch
- Operating temperature range of -55°C to $+125^{\circ}\text{C}$



Applications

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> • Access equipment • Bar code scanners • Cable boxes • Computer peripherals • Consumer electronics | <ul style="list-style-type: none"> • Data communication • Fax equipment • Modems • Monitoring equipment • Portable power generators | <ul style="list-style-type: none"> • Power supplies: DC-DC; AC-DC; DC-AC • Satellite systems • Telecom switching devices • Test equipment |
|--|--|---|

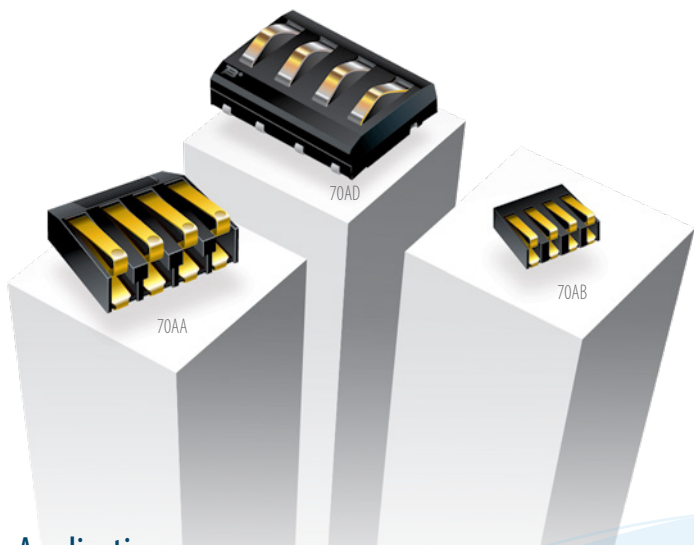
Modular Contacts

Types Available:

- Male
- Female
- SMT
- Through-hole

Features:

- Precious metal contacts
- Available in 2-6 contacts
- Available in 3 pitch sizes: 1.27 mm, 2.54 mm, 5.0 mm
- Up to 50,000 cycles
- Contact resistance < 0.030 ohms
- Packaging: tube and embossed tape (7-inch and 13-inch)
- RoHS compliant*
- Halogen free**



Applications

- Battery packs
- Wireless speakers
- Docking stations
- E-readers
- Laptop computers
- Medical devices
- PDAs
- Portable chargers
- Rechargeable smart phones
- Tablets

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

**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.

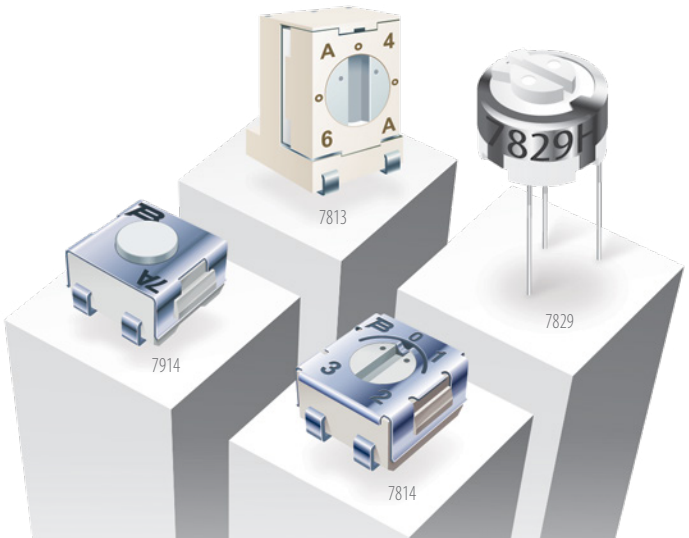
Switches

Types Available:

- Rotary
- Tactile

Features:

- Available in surface mount and through-hole configurations
- PC pins, gull wing, and J-hook terminal styles
- Sealed for PCB processing
- 3, 4, and 6 mm sizes
- Tube and embossed tape carrier packaging



Applications

- Appliances
- Audio/visual
- Computers
- Communications equipment
- GPS
- Industrial controls
- Instrumentation
- Proximity sensors
- Security systems
- Sensors
- Telecommunications
- Test equipment
- Temperature sensors

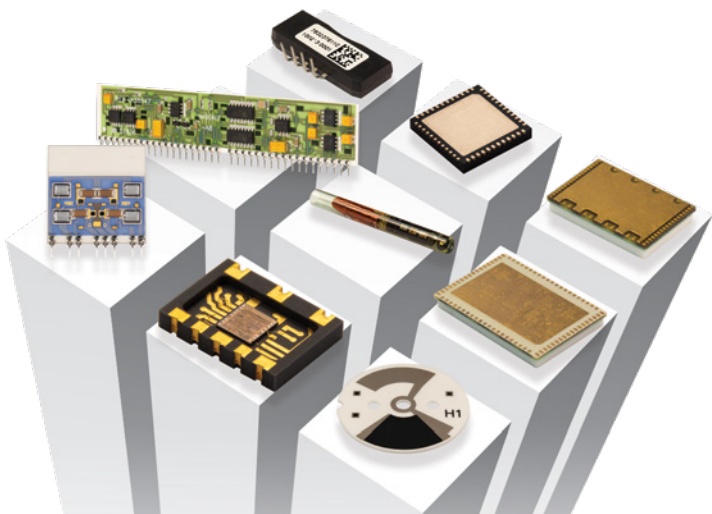
SEMS: Specialty Engineering & Manufacturing Services

Types Available:

- Single in-line
- Dual in-line
- COB (Chip-On-Board)
- Interposer
- System In Package (SIP)
- QFN
- QFP (Quad Flat Pack)
- Mini-DIL
- TO-Cans
- Butterfly
- Custom hermetic seal

Features:

- Technology Integration
- IC packaging technology
- Product launch control
- Fast time to market
- PCBA
- Thick film
- Engineering
- Customization
- Manufacturing
- High-mix low/medium volume
- Built-to-print service



Applications

- 5G
- Instrumentation
- Industrial sensors & controls
- Optic assemblies
- Medical equipment
(low/medium risk)*
- RF/wireless
- Telecommunications
- Transportation
- Internet of Things (IoT)

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