**Table of Contents**

**AUTOMOTIVE SOLUTIONS**

**AUTOMOTIVE SENSORS**
- Custom Automotive Sensors ..........................................................2
- Custom Commercial Vehicle Sensors .........................................3

**AUTOMOTIVE COMPONENTS**
- Automotive Grade Passive Components .......................................4
- Automotive Grade Circuit Protection ...........................................5

**CIRCUIT PROTECTION**

**OVERTEMPERATURE PROTECTION**
- Miniature Thermal Cutoff Devices (TCOs) ....................................6

**OVERCURRENT PROTECTION**
- Multifuse® Polymer PTC Resettable Fuses ..................................7
- Ceramic PTC Protectors ...............................................................8
- Ceramic PTC Heaters .................................................................9
- SinglFuse™ SMD Fuses ..............................................................10
- POWrFuse™ High-Power Fuses ..................................................11

**OVERVOLTAGE PROTECTION**
- Varistor Products .........................................................................12
- Hybrid Protection Components ......................................................13
- Gas Discharge Tubes (GDTs) .......................................................14
- ChipGuard® ESD Suppressors .....................................................15
- TISP® Thyristor Surge Protectors ...............................................16
- Open LED Shunt Protectors (LSPs) .............................................17

**SEMICONDUCTORS**
- Insulated Gate Bipolar Transistors (IGBTs) .....................................18
- TBU® & TCS™ High-Speed Protectors .........................................19
- Power TVS Diodes ......................................................................20
- Diodes & Arrays ..........................................................................21

**INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT)**
- Surge Protective Devices (SPDs) ..................................................22
- Central Office and Outside Plant Products ....................................23
Table of Contents

MAGNETIC PRODUCTS
CUSTOM MAGNETICS
Kaschke Components - Custom Magnetics ............................................. 24
Custom Magnetics .................................................................................. 25

MAGNETIC COMPONENTS
Inductors & Common Mode Chokes ....................................................... 26
Transformers .......................................................................................... 27

SENSORS & RESISTORS
SENSORS & CONTROLS
Sensors .................................................................................................. 28
Pro Audio & Lighting .............................................................................. 29
Commercial Panel Controls .................................................................. 30
Industrial Panel Controls ....................................................................... 31
Non-Contacting Position Sensors & Rotary Controls ......................... 32
Rotary Encoders ..................................................................................... 33

PRECISION VARIABLE RESISTORS
Trimpot® Trimming Potentiometers ....................................................... 34

RESISTORS
Current Sense Resistors ......................................................................... 35
Power Resistors ...................................................................................... 36
Chip Resistors & Arrays ......................................................................... 37
Resistor Networks .................................................................................. 38

CONNECTORS
Modular Contacts ................................................................................ 39

SWITCHES
Switches ............................................................................................... 40

CUSTOMIZED PACKAGING
SEMS: Specialty Engineering & Manufacturing Services ................... 41
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
- 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

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
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 SOLUTIONS

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
CIRCUIT PROTECTION

Mini-Breaker Thermal Cutoff Devices (TCOs)

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*

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

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

**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 °C and +125 °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*

Types Available:
- CMF-RL
- CMF-SLP
- CMF-SDP
- CMF-RC

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, $R_{\text{min}}$, 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

---

*Meet Bourns internal AEC-Q200 equivalence test plan.
***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.
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.
***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.
**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

DC Line Protection:
- Solar inverters
- Power supplies
- Distribution systems

CIRCUIT PROTECTION

Gas Discharge Tube (GDT) Surge Arrestors

Features:
- 75 - 7200 V operating voltages
- 8/20 µs 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*

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

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

CIRCUIT PROTECTION

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

Features:
- Extremely high-speed performance (<1 µs)
- 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*

Types Available:
- Single bidirectional
- Dual unidirectional
- Dual bidirectional

Applications

Telecom
- AISG V2.0
- xDSL interfaces
- Smart grid
- ONU & ONT
- 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

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*

Types Available:
- Transient Voltage Suppressor (TVS) diodes
- Transient Voltage Suppressor (TVS) diode arrays
- Steering diode arrays

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

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

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

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

**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

**Types Available:**
- AC filter chokes
- Current transformers
- High power inductor modules
- PFC inductors
- Planar transformers
- Power transformers

**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)*

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

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*

Types Available:
• Pressure sensors
• Humidity sensors

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

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

*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 http://www.bourns.com/docs/legal/disclaimer.pdf.
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
**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 http://www.bourns.com/docs/legal/disclaimer.pdf.
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†

**Types Available:**
- Incremental contacting
- Incremental magnetic
- Absolute contacting
- Absolute/PWM magnetic
- Incremental optical
- Absolute contact
- Incremental magnetic
- Absolute/PWM magnetic
- Incremental optical

**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

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

† available on some models
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 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

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

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

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 °C

Types Available:
• Thick film resistor networks
• Tin lead plating available on some models

Applications
• Access equipment
• Bar code scanners
• Cable boxes
• Computer peripherals
• Consumer electronics
• Data communication
• Fax equipment
• Modems
• Monitoring equipment
• Portable power generators
• Power supplies: DC-DC; AC-DC; DC-AC
• Satellite systems
• Telecom switching devices
• Test equipment
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**

Types Available:

- Male
- Female
- SMT
- Through-hole

Applications

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

---


**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

40
SEMS: Specialty Engineering & Manufacturing Services

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

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

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

*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 http://www.bourns.com/docs/legal/disclaimer.pdf.
### Country/Region

<table>
<thead>
<tr>
<th>Region</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>+1-951-781-5500</td>
<td><a href="mailto:americus@bourns.com">americus@bourns.com</a></td>
</tr>
<tr>
<td>Brazil</td>
<td>+55 11 5505 0601</td>
<td><a href="mailto:americus@bourns.com">americus@bourns.com</a></td>
</tr>
<tr>
<td>China</td>
<td>+86 21 64821250</td>
<td><a href="mailto:asiacus@bourns.com">asiacus@bourns.com</a></td>
</tr>
<tr>
<td>EMEA</td>
<td>+36 88 885 877</td>
<td><a href="mailto:eurocus@bourns.com">eurocus@bourns.com</a></td>
</tr>
<tr>
<td>Japan</td>
<td>+81 49 269 3204</td>
<td><a href="mailto:asiacus@bourns.com">asiacus@bourns.com</a></td>
</tr>
<tr>
<td>Korea</td>
<td>+82 70 4036 7730</td>
<td><a href="mailto:asiacus@bourns.com">asiacus@bourns.com</a></td>
</tr>
<tr>
<td>Singapore</td>
<td>+65 6348 7227</td>
<td><a href="mailto:asiacus@bourns.com">asiacus@bourns.com</a></td>
</tr>
<tr>
<td>Taiwan</td>
<td>+886 2 25624117</td>
<td><a href="mailto:asiacus@bourns.com">asiacus@bourns.com</a></td>
</tr>
<tr>
<td>Other Asia-Pacific Countries:</td>
<td>+886 2 25624117</td>
<td><a href="mailto:asiacus@bourns.com">asiacus@bourns.com</a></td>
</tr>
</tbody>
</table>

### Technical Assistance

<table>
<thead>
<tr>
<th>Region</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>+1-951-781-5500</td>
<td><a href="mailto:techweb@bourns.com">techweb@bourns.com</a></td>
</tr>
<tr>
<td>Asia-Pacific</td>
<td>+886 2 25624117</td>
<td><a href="mailto:techweb@bourns.com">techweb@bourns.com</a></td>
</tr>
<tr>
<td>EMEA</td>
<td>+36 88 885 877</td>
<td><a href="mailto:eurotech@bourns.com">eurotech@bourns.com</a></td>
</tr>
</tbody>
</table>

### Thermal & Precision

<table>
<thead>
<tr>
<th>Region</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>+81 6 4790 8211</td>
<td><a href="mailto:techweb@bourns.com">techweb@bourns.com</a></td>
</tr>
</tbody>
</table>

*“ENERGY STAR” is a registered trademark of the U.S. Government.
“freeXpansion, “ICS” and “SingiFuse” are trademarks of Bourns, Inc.
“POWIFuse”, “TBU”, “Trimpot” and “FLAT” are registered trademarks
of Bourns, Inc. in the United States and other countries. “TISP” is a
registered trademark of Bourns Ltd., a Bourns Company, in the United
States and other countries, except that “TISP” is a registered trademark
of Bourns, Inc. in China.*

Copyright © 2022, Bourns, Inc. • Litho in USA • MIMEO • 10/22 • e/K2246