



Bourns® Product Profile

- Circuit Protection Solutions
- Variable & Fixed Resistors
- Sensors & Controls
- Magnetics
- Diodes
- Components
- Customized Packaging
- Automotive
- Outside Plant Products

Bourns® Product Profile

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TBU® HSP Products

Applications

POTS linecards

VoIP equipment

ONUs and ONTs

Gateways and modems

10/100 & Gigabit

Ethernet

VDSL interfaces

Remote metering &
surveillance

Avionics (DO160)

Rail and mass transit

Industrial automation

Test equipment

RS232, RS422, RS485,
CANbus and LVDS

Sensors

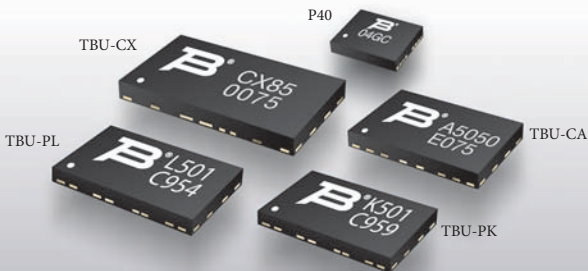
Introduction:

TBU® HSP products are circuit protection devices designed to protect against faults caused by short circuits, AC power cross, induction and lightning surges.

The TBU® High-Speed Protector blocks surges, providing a barrier to sensitive electronics and eliminating exposure to large voltages or currents during surge events.

Features:

- Extremely high-speed performance
- Blocks high voltages & currents
- Exceptionally low let-through energy
- Very high bandwidth, GHz compatible
- UL recognized components
- Programmable



Multifuse® Polymer PTC freeXpansion™ Products

Applications

USB 2.0, USB 3.0 & HDMI
port protection

PC motherboards -
plug & play protection

Mobile phones -
battery & port protection

PDAs / digital cameras

Industrial controllers

Portable medical devices
(excluding critical life support)

Portable memory

Game consoles

GPS navigation systems

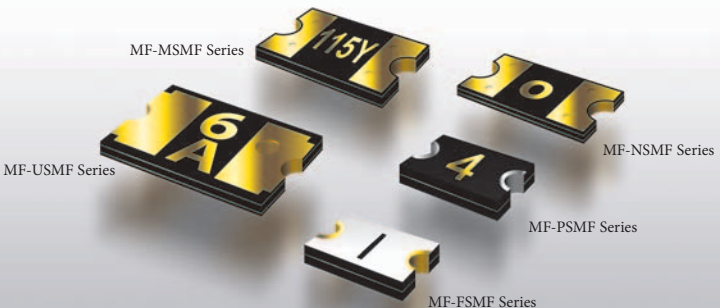
Types Available:

- MF-FSMF Series
(0603 / 1608 metric)
- MF-PSMF Series
(0805 / 2010 metric)
- MF-LSMF Series
(2920 / 7555 metric)
- MF-MSMF Series
(1812 / 4532 metric)
- MF-USMF Series
(1210 / 3225 metric)
- MF-NSMF Series
(1206 / 3216 metric)
- MF-SMDF Series
(2018 / 5050 metric)
- Easily customizable

Features:

Unique freeXpansion™ design
provides:

- Greater resistance stability
- Smallest PTCs
- Highest voltage withstand
- Highest hold current (I_{hold})
- Extended product life



Multifuse® Polymer PTC Resettable Fuses

Applications

Computers

Batteries

Automotive

Charging ports

Telecommunications

Industrial controls

Portable electronics

Medical products
(excluding critical life support)

Point of Sale

Game consoles and toys

Security systems

DC motors

Types Available:

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

Features:

- 6 to 90 V operating voltages
- Hold currents from 50 mA to 11.0 A
- Agency approval - 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°C and $+125^{\circ}\text{C}$
- Custom designs available upon request
- Bulk, embossed tape and ammo pack packaging
- RoHS compliant* standard & halogen free** upon request
- Some models AEC-200 compliant

MF-R/600 Series



MF-R Series



MF-NSMF Series



MF-MSMF Series



MF-PSMF Series



MF-SM



Customized Resettable Fuses



MF-VS Series



MF-LL Series



*RoHS Directive 2002/95/EC Jan. 27, 2003 including Annex.

**The Bourns definition of "halogen-free" is: Bromine (Br) content: ≤ 900 ppm; Chlorine (Cl) content: ≤ 900 ppm; Total Br + Cl content: ≤ 1500 ppm.

Ceramic PTC Products

Applications

Overcurrent protection for telecom applications:

Customer premises equipment (CPE)

Central office (CO)

Access equipment POTS

xDSL and integrated linecards

PABX protection

VOIP protection

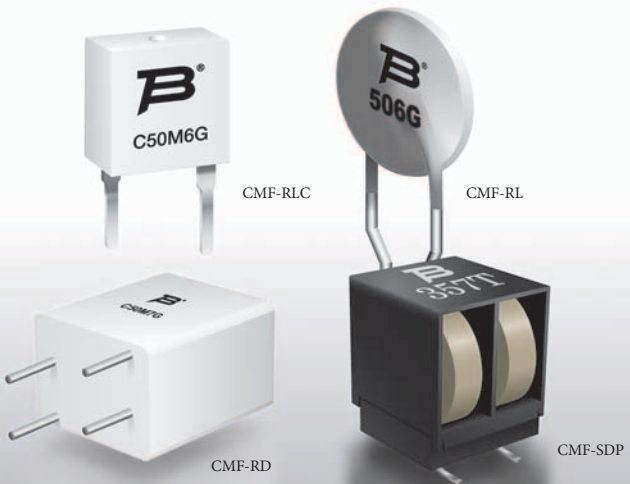
Set top boxes

Types Available:

- Radial leaded through-hole
- Surface mount
- Dual packaged surface mount
- Dual packaged radial leaded through-hole
- 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
- RoHS compliant*



*RoHS Directive 2002/95/EC
Jan. 27, 2003 including Annex.

Telefuse™ Telecom Fuses

Applications

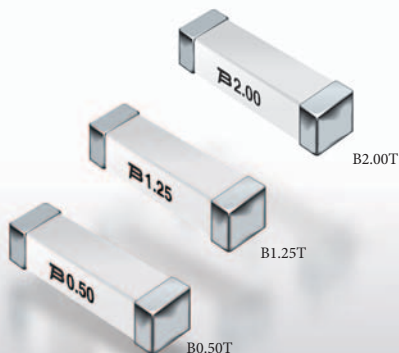
Telecom circuit protection

Types Available:

- Surface mount

Features:

- Telecom overcurrent protection
- Withstands lightning surge and AC power cross
- Assists in meeting Telcordia GR-1089 and UL 60950 specifications
- Operates safely under fault conditions
- RoHS compliant*



Line Protection Modules

Applications

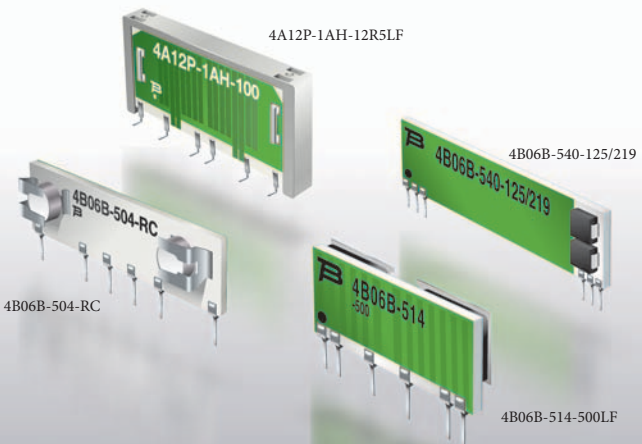
Telecom circuit protection

Types Available:

- Through-hole
- Surface mount
- Multifunction modules

Features:

- Precision tolerance overcurrent protection
- Resistance values from 5.6 ohms to 100 ohms
- Withstands lightning surge and AC power cross
- Assists in meeting Telcordia GR-1089 and ITU-T K.20/K.21/K.45 specifications
- Operates safely under fault conditions
- Nonflammable
- UL 497A recognized
- One shot fuse options
- Resettable fuse options
- 1, 2 and 4 port options
- Custom designs available



SinglFuse™ Thin Film Chip Fuses

Applications

Portable memory

LCD monitors

Disk drives

PDA's

Digital cameras

DVD players

Cell phones

Bluetooth headsets

Rechargeable
battery packs

Battery chargers

Set top boxes

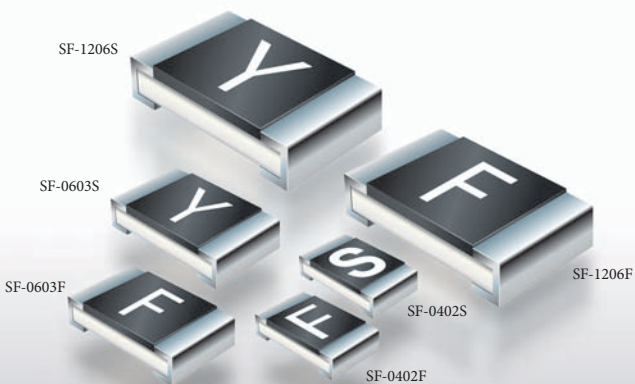
Industrial controllers

Types Available:

- Fast acting fuse
- Slow blow fuse
- Surface mount
- 3 available footprints:
 - 0402 (1005 Metric)
 - 0603 (1508 Metric)
 - 1206 (3216 Metric)

Features:

- Single blow fuse for overcurrent protection
- UL certified
- Surface mount packaging for automated assembly
- Thin film chip fuse
- RoHS compliant* and halogen free**
- Wide range of both fast & slow blow fuses in three product sizes



*RoHS Directive 2002/95/EC Jan. 27, 2003 including Annex.

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TISP[®] Thyristor Surge Protectors

Applications

Central office POTS
Access equipment POTS
Fiber to the home
xDSL and integrated linecards
PABX protection
VOIP protection
xDSL modem protection
ISDN linecards and NT equipment
V.92 modems
Cordless DECT and analog phones
Set top boxes

Types Available:

- Unidirectional
- Bidirectional
- Programmable

Features:

- Protection voltages from 15 V to 700 V
- Dedicated SLIC protection
- Telephone port protection
- VDSL protection
- UL recognized
- Enables Telcordia GR-1089, UL 60950, FCC (TIA), ITU-T, IEC & YD/T compliance
- 25 years experience in telephone protection
- Specified in chipset reference designs for 15 years

SMB



SOIC Wide Body



SMAJ



SOIC



Gas Discharge Tubes

Applications

Appliances

Telecommunications

Data communications

CATV/broadband

Industrial power ports

Industrial and process controls

Transportation signaling

Consumer electronics

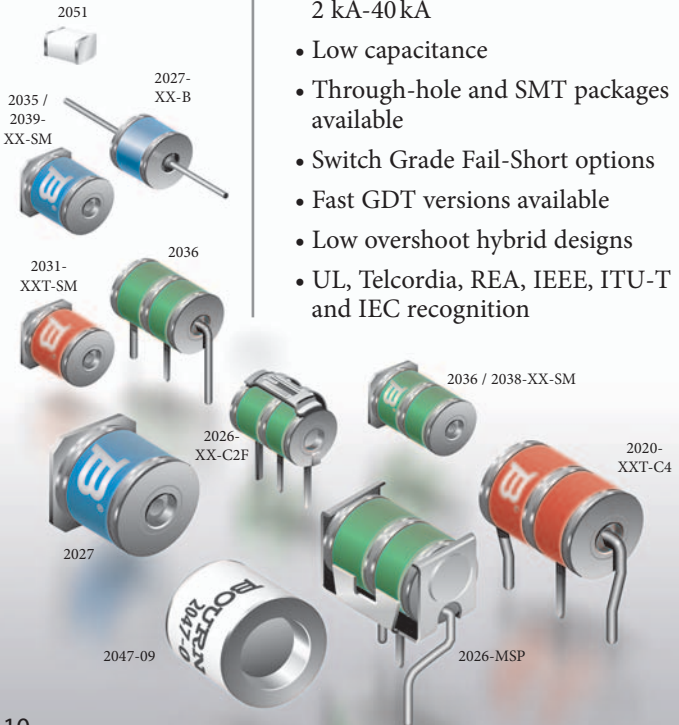
Types Available:

3-Electrode GDTs

- TRIGARD® GDT
 - Mini TRIGARD™ GDT
 - MSP® Hybrid Protector
 - T-Series fast GDTs for TBU® HSP products
- 2-Electrode GDTs*
- High voltage
 - High current
 - T-Series fast GDTs for TBU® HSP products

Features:

- 75-1100 V operating voltages
- 8/20 μ s surge current ratings of 2 kA-40 kA
- Low capacitance
- Through-hole and SMT packages available
- Switch Grade Fail-Short options
- Fast GDT versions available
- Low overshoot hybrid designs
- UL, Telcordia, REA, IEEE, ITU-T and IEC recognition



ESD Protection Solutions

Applications

Appliances

Computers

Consumer electronics

General purpose
ESD protection

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

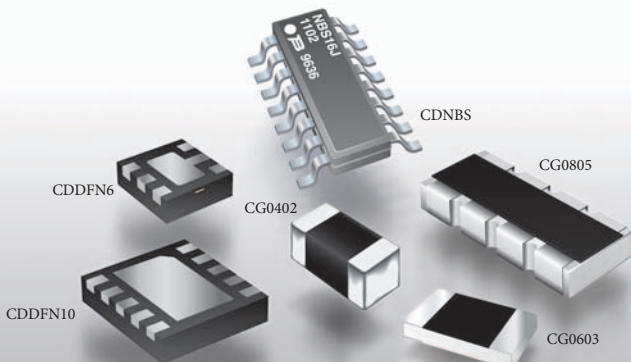
RS232, RS422 & RS485
type applications

Types Available:

- Transient voltage suppressor (TVS) diodes
- Transient voltage suppressor (TVS) diode arrays
- Steering diode arrays
- ChipGuard® ESD suppressors
 - *Multi-layer varistor, polymer and air-gap technologies*
- Schottky diode arrays

Features:

- Excellent high frequency response
- ESD protection to industry specification IEC 61000-4-2
- Minimum 8 kV contact and 15 kV air discharge ESD withstand
- SMT Packages (0402, DFN2, 0603, 0805, 1206, DFN4, DFN6, DFN10, SOD323, SOT563, SC70-6, SOT23, SOT23-6, SOT143A, NSOIC 8L, NSOIC 16L & MSOP 10L)



LSP Open LED Shunt Protectors

Applications

LED streetlights

Avionics lighting

High-bay industrial lighting

Intrinsically safe lighting

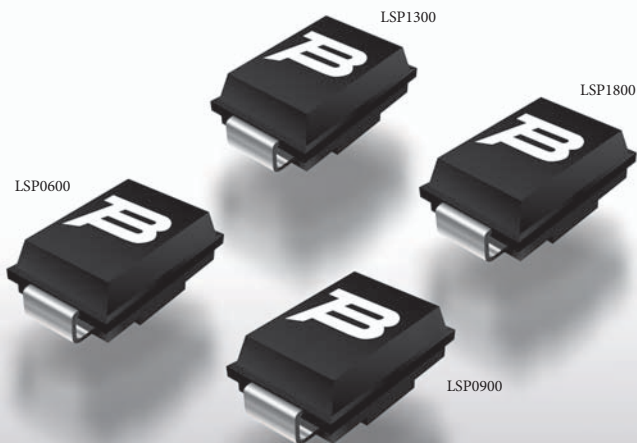
Low maintenance lighting

Types Available:

- SMB package

Features:

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



Trimpot® Trimming Potentiometers

Applications

Brightness/contrast controls

Microcontrollers

Phone headsets

Power supplies

Credit card readers

CATV decoders

Plasma televisions

LCD controllers

Lighting controls

Smoke detectors

Speakers

Process controllers

Temperature sensors

Torque sensors

Base stations

Stereo equipment

Voltage meters

Magnetic card readers

RF meters

Controller daughter boards

Printers

Two-way radios

Security systems

Disk drives

Satellite receivers

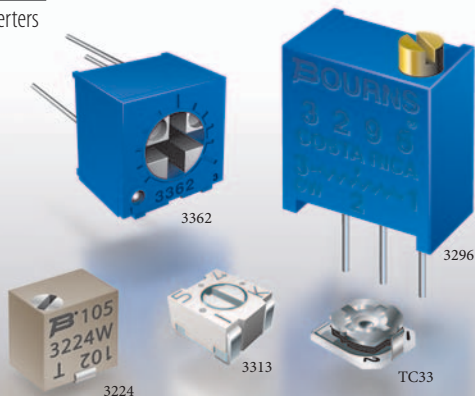
A/D converters

Types Available:

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

Features:

- Top, bottom, side, front and back adjust
- 2 mm to 12.7 mm sizes
- Tube, bulk, embossed tape, ammo pack, radial tape and reel
- Compatible with pick and place equipment



Chip Resistors & Chip Arrays

Applications

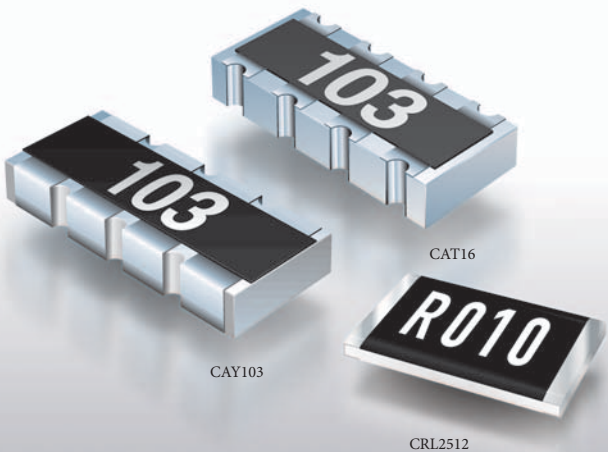
- Current sense
- Cellular and cordless phones
- Communications interface
- Flashlights
- Intercom systems
- Internet telephony
- Local area networks
- Measurement equipment
- Portable digital assistants
- Portable tools
- Remote controllers
- Telecom switching devices
- Test equipment

Types Available:

- Thick film chip arrays
- Thick film chip resistors
- Thin film chip resistors
- Metal strip chip resistors

Features:

- Standard resistance values from .001 ohms to 10 megohms
- Standard resistance tolerances .01 %, 1.0 % and 5.0 % (thin film)
- Chip resistors from 0201-size to 2512-size
- Chip arrays from 0402 x 2-size to 0603 x 8-size
- Operating temperature range of -55 °C to +170 °C (metal strip)
- Powers up to 3 W (metal strip)



Power Resistors

Applications

Battery controls

Isolators

Combiners

Surge protection

Motor controllers

AC power supplies

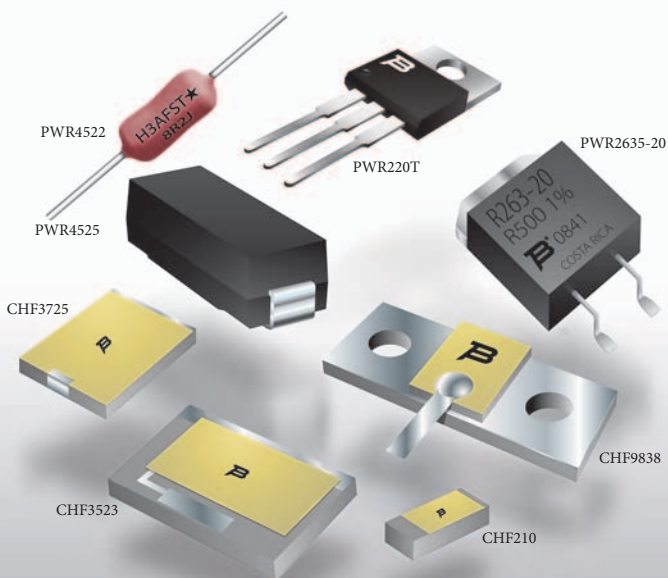
LED lighting

Types Available:

- RF high power loads and resistors
- Shunt resistors
- Fusible wirewound safety resistors
- Surface mount wirewound resistors
- Surface mount and through-hole TO-220 packaged resistors

Features:

- Through-hole and surface mount
- 0.002 Ω to 100k Ω
- 0.5 watts to >800 watts
- 0.1 % to 5 % tolerances
- Operating temperature up to 275 $^{\circ}\text{C}$
- AEC Q200 approved (TO-220 packaged resistors)
- Up to 1 KW (RF power resistors)
- Excellent surge performance



Resistor & RC Networks

Applications

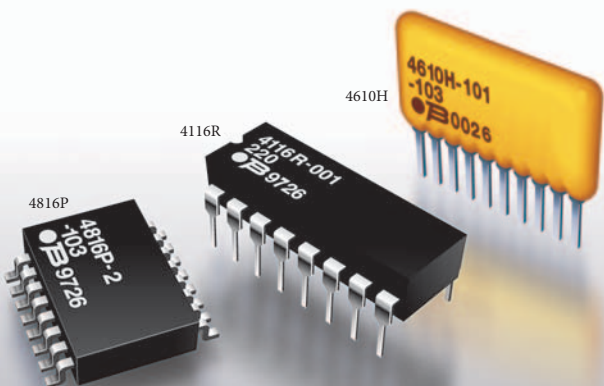
- Access equipment
- Bar code scanners
- Cable boxes
- Computer peripherals
- Consumer electronics
- Data communication
- Fax equipment
- Modems
- Monitoring equipment
- Portable power generators
- Satellite systems
- Telecom switching devices
- Test equipment

Types Available:

- Thick film resistor networks
- Thin film on ceramic resistor networks
- Resistor/capacitor (RC) networks
- Capacitor 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°C



Commercial Panel Controls & Encoders

Applications

Kitchen appliances

Communications equipment

Irrigation controls

Portable electronics

Test and measurement instrumentation

Medical equipment
(excluding critical life support)

Power tools

Types Available:

Panel Controls

- Rotary
- Motorized rotary

Encoders

- Incremental contacting

Features:

Mounting Options

- Bushing
- Bushingless
- PC mount
- Solder lug

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*

[†] available on some models



Commercial Slide Potentiometers

Applications

Audio mixing consoles

Video mixing boards

Broadcast consoles

Pro lighting boards

Medical equipment
(excluding critical life support)

Test and measurement

Types Available:

- Manual
- Motorized
- Open frame & metal housing

Features:

- Sizes (vary by model):
 - 10 mm to 100 mm
- Options
 - Dust covers (available on some models)
 - Single and dual gang
 - Various lever styles and lengths
 - Touch sense track (Model PSM)



Pro Audio Products

Applications

- Electric guitars & basses
- Instrument amplifiers
- Audio mixing consoles
- Video mixing boards
- Broadcast consoles

Types Available:

- Rotary

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)



Industrial Encoders

Applications

Audiovisual equipment

Household appliances

Communications
equipment

Industrial heavy
equipment

Medical equipment
(excluding critical life support)

Test and measurement
instrumentation

Scanners and copiers

Robotics

Forklifts and material
handling

Types Available:

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

Features:

Mounting options

- Bushing
- Snap-in
- PC board
- Servo

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[†]

[†] available on
some models



Industrial Panel Controls

Applications

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

Types Available:

- Rotary

Features:

Mounting options

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

Output

- Linear
- Custom taper
- Audio taper

Sizes (vary by model)

- 9 to 23 mm

Terminal Styles

- PC pins
- Solder lugs

Options

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

[†] available on some models



Linear Motion Potentiometers

Applications

Position sensing

Copy machine cassette
paper size selectors

Infusion pumps

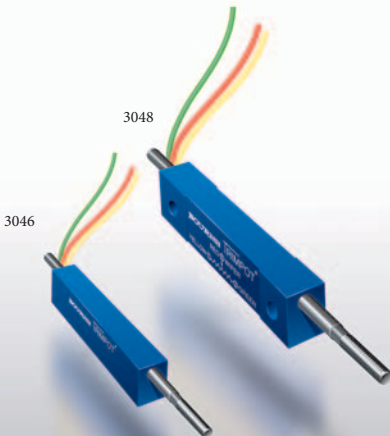
Rear view mirror
position feedback

Types Available:

- Rectangular body
- Flexible lead
- Conductive plastic element

Features:

- 0.12 to 0.25 watt power ratings
- 3.81 mm to 12.7 mm stroke lengths
- 500,000 cycles actuation life
- 1k ohm to 50k ohm standard resistance values



Precision Controls

Applications

HMI & MMI (Human-Machine & Machine-machine interface)

Communications equipment

Test and measurement instrumentation

Amplifiers

Medical instrumentation and equipment (excluding critical life support)

Industrial equipment controls

Environmental test equipment

Actuators

Avionics

Military

Types Available:

- Rotary
- Digital push-button
- Single and multiturn

Features:

Mounting options

- Bushing
- Snap-in
- PC mount
- Servo mount

Output

- Linear
- Custom taper
- Audio taper
- Reverse audio

Sizes (vary by model)

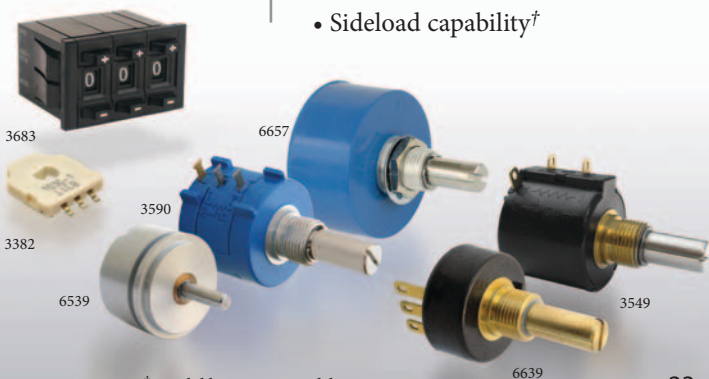
- 13 to 51 mm diameter

Terminal Styles

- PC pins
- Turret terminals
- Insulated flexible wire leads
- Solder eyelets

Options

- Clutch
- Rotary switch option[†]
- Multi-cup option[†]
- Boardwash seal option[†]
- Sideload capability[†]



[†] available on some models

Turns-Counting Dials

Applications

Power supplies

Test and measurement instrumentation

Medical instrumentation and equipment (excluding critical life support)

Industrial equipment controls

Environmental test equipment

Automation control panels

Types Available:

- Digital
- Concentric dial

Features:

Materials

- Metal (industrial)
- Plastic (commercial)

Turns

- Up to 20 turns available

Sizes (vary by model)

- 22 to 46 mm

Options

- Black face and silver face dials available
- Locking brake



Inductors & Transformers

Applications

Battery chargers

CD players

Data communication

DC/DC converters

Global positioning systems

Internet equipment

LED drivers

Local area networks

Monitoring equipment

Portable radios

Portable tools

Switch mode power supplies

Test equipment

Televisions

Video conferencing equipment

Automotive

Telecommunications

Types Available:

Power Inductors

- Non-shielded
- Semi-shielded
- Shielded
- High current toroids
- Dual chokes
- Flat wirewound

Chip Inductors

- Molded wirewound
- Multilayer ceramic
- Multilayer ferrite
- Open wirewound

Chip Beads

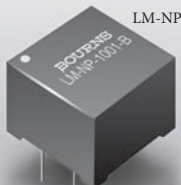
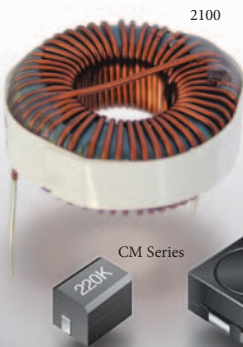
- High current
- High impedance

Transformers

- Line-matching
- Wideband
- ISDN
- xDSL
- LAN
- PoE/VoIP

Features:

- Standard inductance values from 1.0 nH to 500 mH
- 17 models of chip inductors
- More than 100 models of surface mount power inductors
- More than 50 models of through-hole power inductors
- Available in a wide range of sizes
- Low profile down to 0.9 mm
- Operating temperature as high as 200 °C
- Sealed and open construction
- Saturation current up to 80 A
- Custom universal wound, high Q



Diodes

Applications

Appliances

Portable electronics

Desktop PCs & notebooks

Digital cameras

MP3 players

Base stations

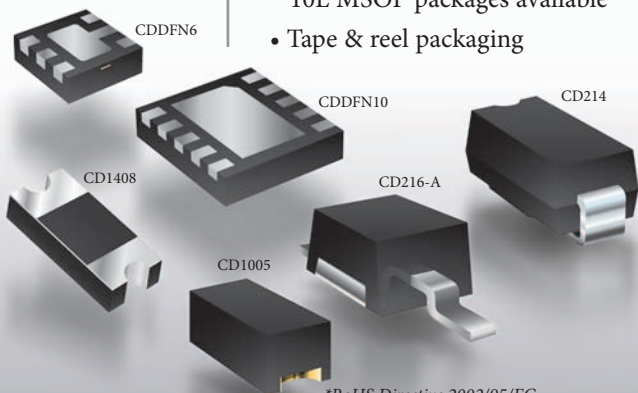
Port protection
(USB 1.0, 1.1, 2.0,
3.0, RS-485, Ethernet,
RS-232, RS-422, etc.)

Types Available:

- Transient voltage suppressor (TVS) diodes
- Transient voltage suppressor (TVS) diode arrays
- Switching diodes
- Schottky barrier diodes
- Zener diodes
- Schottky rectifier diodes
- Fast response rectifier diodes
- High voltage rectifier diodes
- Steering diode arrays
- Bridge rectifier diodes

Features:

- RoHS compliant*
- Surface mount devices
- Leadless - DFN2, DFN4, DFN6, DFN10, 0603, 1005, 1206, 1408, 1607, 2010 & 2320 packages available
- SMA, SMB, SMC, SOT563, SC70-6, SOT23 & SOT23-6 packages available
- 8L & 16L NSOIC, 16L WSOIC & 10L MSOP packages available
- Tape & reel packaging



*RoHS Directive 2002/95/EC
Jan. 27, 2003 including Annex.

Modular Contacts

Applications

Cellular phones

Docking stations

PDA's

Laptop computers

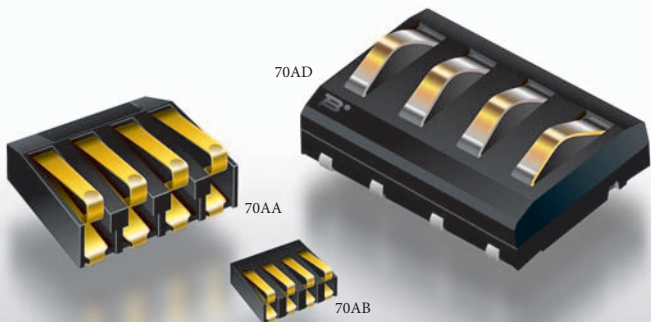
Rechargeable battery
packs

Types Available:

- Male
- Female

Features:

- Precious metal
- 2-6 contacts
- 1.27 mm, 2.54 mm, 4.0 mm pitch and height
- Through-hole and surface mount
- Normal force:
 - 70AB - 40 grams minimum
 - 70AA - 80 grams minimum
 - 70AD - 100 grams minimum
- Contact resistance – < 0.030 ohms
- Tube, embossed tape, 13" reel packaging



Switches

Applications

Instrumentation

Industrial controls

Communications
equipment

Computers

Security systems

Appliances

Automotive

Audiovisual

Types Available:

- Rotary
- Tactile

Features:

- Surface mount and through-hole mounting
- PC pins, gull wing, and J-hook terminal styles
- Sealed and boardwashable types
- 3, 4, and 6 mm sizes
- Tube and embossed tape carrier packaging



7914



7829



7813



7814

Microelectronic Modules

SEMS: Specialty Engineering & Manufacturing Services

Applications

Telecommunications

Optic assemblies

Instrumentation

Industrial sensors & controls

Medical equipment
(excluding critical life support)

RF/Wireless

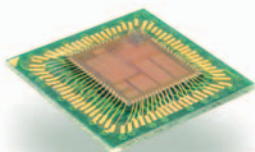
Automotive

Types Available:

- Single in line
- Dual in line
- SMT
- Ball Grid Array (BGA)
- Custom

Features:

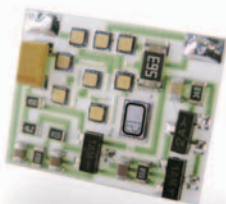
- High density thick film
- Fine pitch SMT
- Chip & wire
- Flip chip
- Stud bump bonding
- RF packaging



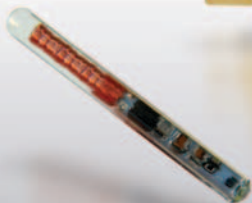
Chip Scale Packaging



Fiber Optic



Thick Film Modules



Medical



GPS/Wi-Fi/Bluetooth

Solutions in Sensor Technology

Applications

ABS wheel speed

Accelerator pedal

Active steering

Brake pedal module

Chassis level

Electric park brake

EPAS

Exhaust gas recirculation

Fuel tank level

Gear position

Steer-by-wire

Steering torque

Throttle position

Transmission speed

Types Available:

- Customer specific
- Position, speed and torque sensors

Features:

- Contacting and non-contacting solutions
- Engineering support capabilities
- All manufacturing sites are TS 16949 certified
- In-house design, tool making, screen printing, cermet firing & injection molding capabilities
- Development of proprietary resistive ink
- Innovative and cost-effective solutions



Automotive Circuit Protection

Applications

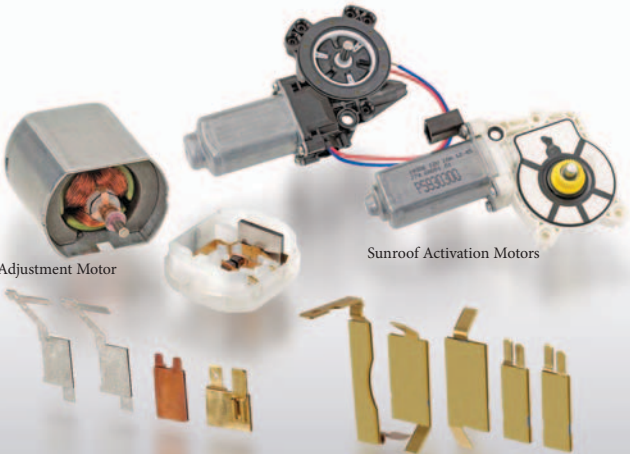
- Window regulators
- Seat adjustment motors
- Sunroof activation motors
- Powerbus (mode protection) applications
- Other DC motor applications
- Car alarm systems
- Power steering motors
- GPS shark fin antennae
- Cooling & HVAC systems
- Electronic control unit (ECU) input/output protection
- Load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

Types Available:

- TVS diodes
- Multifuse® PTC resettable fuses
- Metal alloy shunts
- ChipGuard® MLVs

Features:

- Overcurrent and overvoltage protection for automotive applications
- TS 16949 quality system
- Resettable PTCs suitable for application temperatures up to 125 °C
- Majority certified to AEC-Q200-Rev C
- Wide range of current ratings 0.05 - 20 A
- Dedicated automotive CP team



Seat Adjustment Motor

Sunroof Activation Motors

Multifuse® PTC Resettable Fuses

Fuel Cards

Applications

Fuel level sensing in fuel delivery systems:

Scooters/motorcycles

Passenger cars

Light duty trucks

SUVs

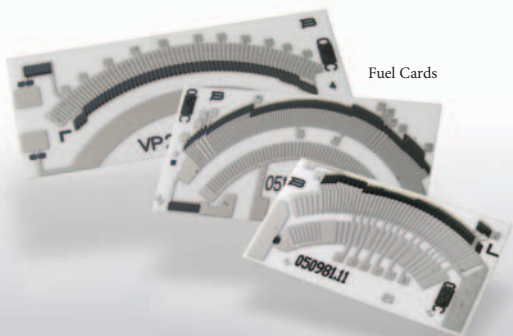
Off-road equipment

Types Available:

- Rectangular ceramic substrates
- Various ink systems:
 - Resistor
 - Terminations/wiper tracks
 - Protective glazes/polymers
- Wires attached
- Tinned solder pads
- Single or double side printing

Features:

- Customer specific patterns
- Up to 100 discrete resistance steps
- Typical resistance ranges from 95 ohms to 1.7k ohms
- Rated current 100 mA
- In line, 100% dynamic electrical test
- Life cycles:
 - Up to 1 million dry
 - Up to 3 million wet



Fuel Cards

Central Office and Outside Plant Products

Applications

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

Types Available:

- Protection - 5-pin modules:
 - 3-type overvoltage only
 - 4-type overvoltage and sneak current
- Protection - station
- Network interface devices
- Digital subscriber line (DSL) products
- Protection connector blocks
- Terminal blocks

Features:

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

7032-25-ECO



CG-391



130 Block

7004-01-WIS-P1-I

2470-41-G-MSP

2377-45-HS-IDC

BBT

2430-41-G-MSP



2377-45-HS

2420-31-G



2378-35-HS



2410-39-G-MSP



2377-45-BC-TBU



3610A2



2377-35-G-IDC



3617-01



3670-01

www.bourns.com

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France:	+33 (0)2 5473 5151	+33 (0)2 5473 5156
Germany:	+41 (0)41 768 5555	+41 (0)41 768 5510
Italy:	+41 (0)41 768 5555	+41 (0)41 768 5510
Japan:	+81 49 269 3204	+81 49 269 3297
Singapore:	+65 6348 7227	+65 6348 1272
Switzerland:	+41 (0)41 768 5555	+41 (0)41 768 5510
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