BOURNS®

Smart LED Protection in Building Automation Systems

APPLICATION BRIEF

Situation

The adoption of Building Automated Systems (BAS) is an increasingly important trend in the development of smarter, more efficient buildings. Among the key components of a comprehensive BAS are smart automated LED lighting systems, which offer features such as motion detection, customizable lighting controls, remote access, and power management. When configured with Power over Ethernet (PoE), these systems can reduce installation costs by using a single cable for both power and data transmission. However, to ensure reliable operation, PoE systems must be protected against overvoltage and overcurrent threats. This application brief presents Bourns' protection solutions for smart LEDs integrated into PoE-based BAS. While the focus is on smart LEDs, these solutions are also applicable to a wide range of BAS devices.

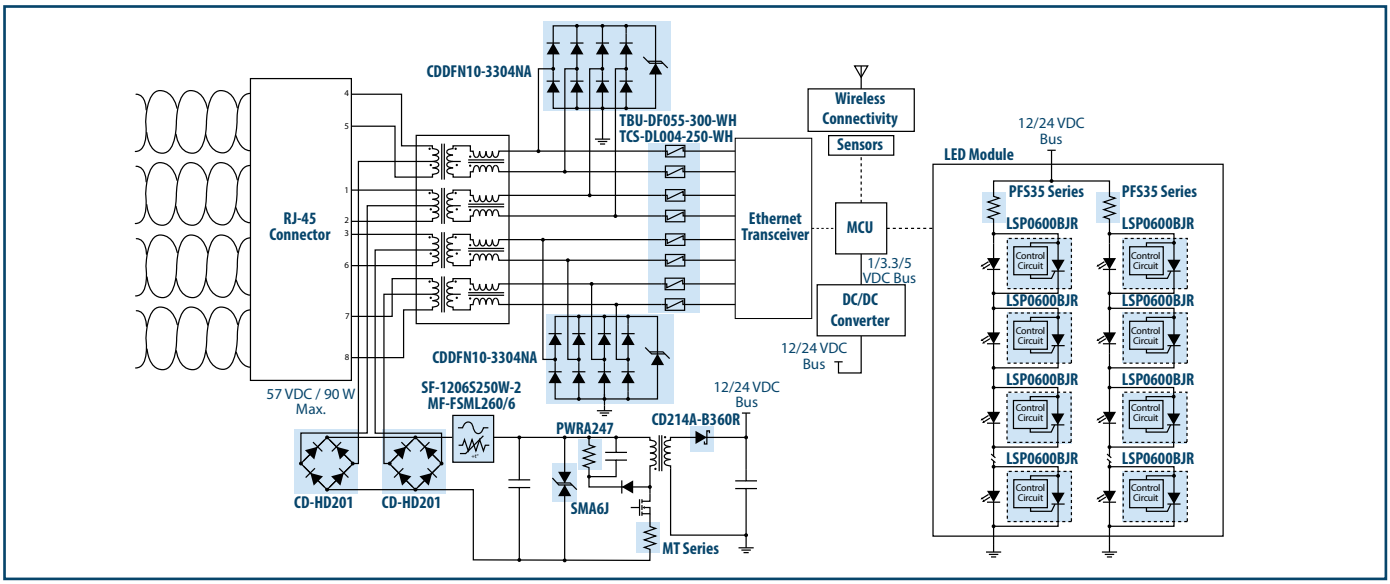
Solution

To help ensure sufficient data protection, implementing a TVS (Transient Voltage Suppression) steering diode array along with a Bourns® TBU® High-Speed Protector (HSP) is advised. Bourns® TVS steering diode arrays protect data lines at high frequencies and maintain a low capacitance, making them a highly-effective overvoltage protection solution. Bourns® TBU® HSPs are designed to protect sensitive data lines. Bourns offers both diode arrays and TBU HSPs in packaging optimized for use in both transmission and receiving circuits. Reliable power protection is essential to guard against load variations and short circuits. Bourns provides a comprehensive suite of components, including TVS diodes, PPTC (Polymer Positive Temperature Coefficient) resettable fuses, and current sensing shunts. These components function across different stages of a PoE circuit, with each stage offering increasingly precise control over voltage and current flow.

For overvoltage protection, Bourns offers both unidirectional and bidirectional TVS and Schottky diodes. To address overcurrent events, Multifuse® Polymer Positive Temperature Coefficient (PPTC) Resettable Fuses provide robust and cost-effective protection that reduces short circuits events, especially in demanding applications that operate within high ambient temperature environments. Additionally, high-power shunts enable precise current sensing, allowing BAS systems to monitor individual devices effectively. Bourns' components are available in a wide range of voltages and customizable parameters, making them suitable for protecting not only LED systems but also other BAS devices.

Benefits

- Enhanced Safety: Protects BAS infrastructure from overcurrent and overvoltage risks, improving user safety and minimizing system downtime.
- Data and Power Protection: Bourns offers a multitude of protection devices aimed at both high power and high-speed applications with features that support precision accuracy.
- Precision Monitoring: Bourns® Trimpot® Trimming Potentiometers and high-power shunts are manufactured with tight tolerances to ensure accurate power measurement.
- Increased System Reliability: Protection components extend the lifespan of connected devices and help reduce maintenance needs.
- Versatile Application: Bourns PoE protection solutions are adaptable to various BAS configurations, thereby safeguarding against system-wide surge threats.



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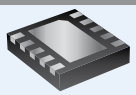
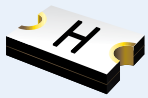
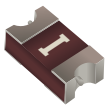
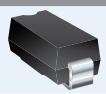
APPLICATION BRIEF

Protection

Product Image	Recommended Products	Specifications & Features
	CDDFN10-3304NA Diode Array	• Working Peak Reverse Voltage: 2.2 - 70 V • Typical Capacitance: 0.02 - 500 pF
	SMA6J58CA TVS Diode	• Working Peak Reverse Voltage: 2 - 495 V • Power Rating: 400 - 15,000 W
	LSP0600BJR LED Shunt Protector	• Rep. Peak Off-state Voltage: 6 - 18 V • Min. Holding Current: 5 mA • Max. On-state Voltage: 1.2 V
	TBU-DF055-300-WH TCS-DL004-250-WH	• Max. Impulse Voltage: 40 - 850 V • Max. RMS Voltage: 28 - 425 V • Trigger Current: 50 - 500 mA
	MF-FSML260/6 Multifuse® PPTC Reseettable Fuse	• Maximum Voltage: 6 - 72 VDC • Hold Current: 0.05 - 13 A • Operating Temperature: -40 to +125 °C
	SF-1206S250W-2 Singlfuse™ SMD Fuse	• Rated Voltage: 24 - 250 VDC; AC Rated Available • Rated Current: 62 mA to 50 A

Power

Product Image	Recommended Products	Specifications & Features
	CD214C-S3M Rectifier Diode CD214A-B360R Rectifier Diode	• Peak Power Reverse Voltage: 20 - 1600 V • Forward Current: 0.2 - 4 A • Peak Surge Current: 2 - 150 A
	CD-HD201 Bridge Diode	• Peak Reverse Voltage: 40 - 1000 V • Forward Current: 1 - 4 A • Peak Surge Current: 30 - 150 A
	PWRA247 Wirewound Power Resistor	• Power: 0.5 - 500 W • Tolerances: 0.5 % - 10 % • Temp. Coefficients: 20 - 300 ppm/ °C
	PFS35 Power Resistor	• Power: 20 - 35 W • Tolerances: 1 % - 5 % • Temp. Coefficients: 50 - 600 ppm/ °C

Precision

Product Image	Recommended Products	Specifications & Features
	MT Through-hole Metal Film Resistor	• Power: 1 - 10 W • Tolerance: 0.1 % - 5 % • Temp. Coefficient: 20 ppm/ °C