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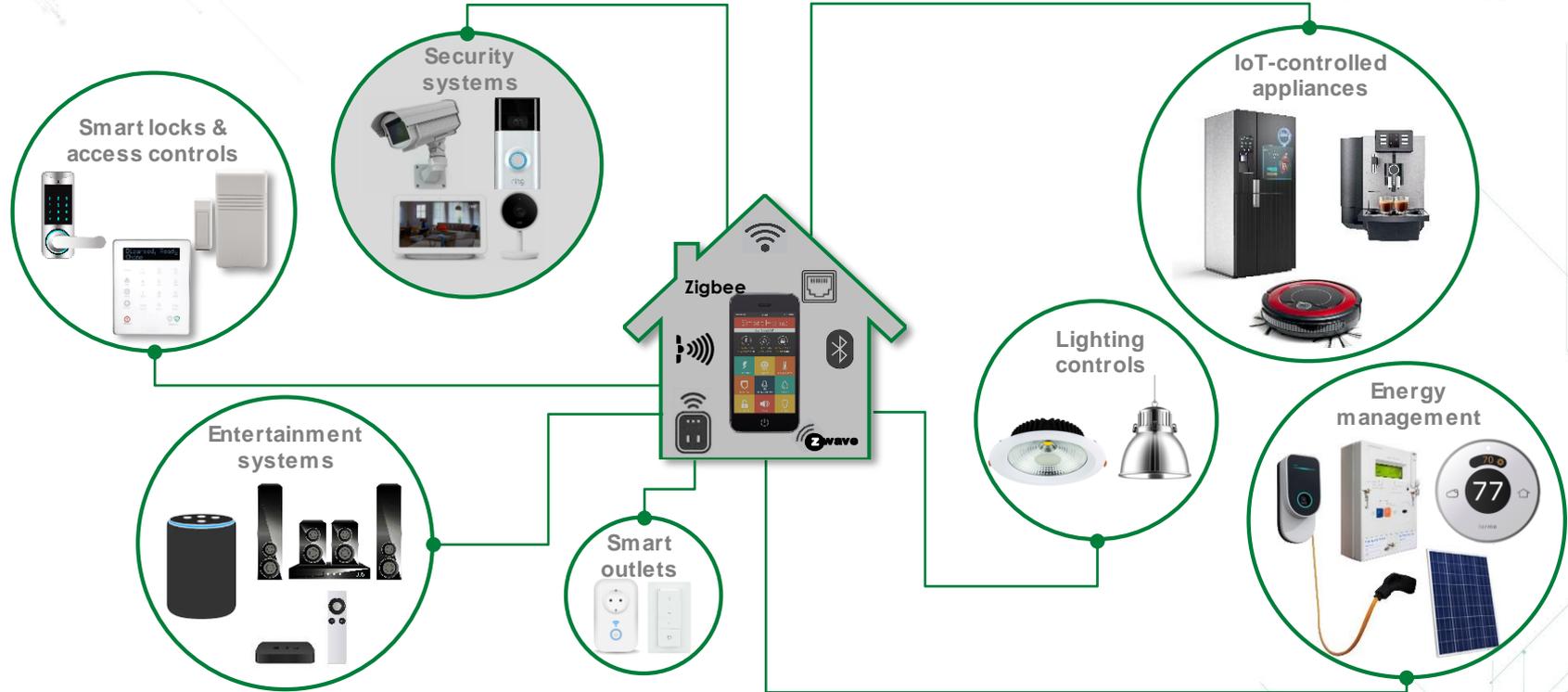
Security Camera and Video Doorbells



Building Automation

Users must independently evaluate the suitability of and test each product selected for their own specific applications. It is the User's sole responsibility to determine fitness for a particular system or use based on their own performance criteria, conditions, specific application, compatibility with other parts, and environmental conditions. Users must independently provide appropriate design and operating safeguards to minimize any risks associated with their applications and products. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [littelfuse.com/disclaimer-electronics](https://www.littelfuse.com/disclaimer-electronics).

Smart homes are equipped with intelligent technologies for convenient and energy-efficient living



IoT devices protect, control, and sense to improve safety, reliability, convenience, and energy efficiency of buildings

Security cameras are a fast-growing market

Market Trends and Drivers

An estimated 120 million units of **non-residential security cameras** are installed each year globally, and this is expected to increase at a CAGR of 11%

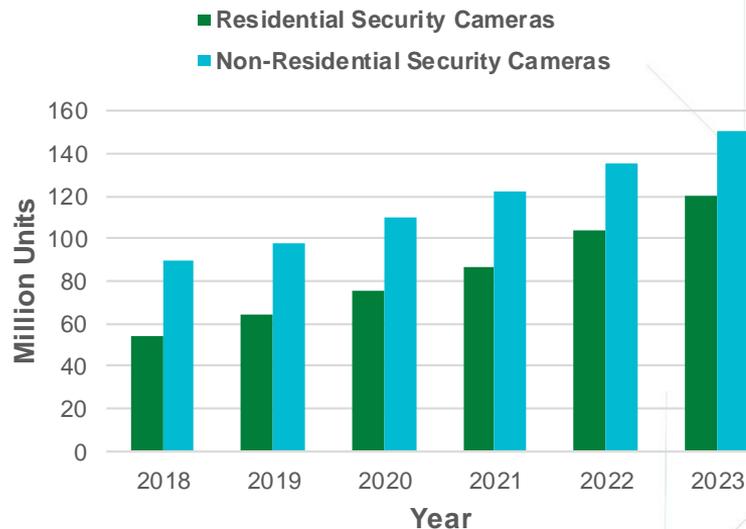
Growth in Asia is driven by government initiatives to improve public safety and security. **Growth in the Americas** is driven by retail and commercial use

Global **residential security camera** unit shipments are expected to grow from 54 million units in 2018 to 120 million units in 2023 at a CAGR of 17%

Wired and wireless cameras are expected to maintain the majority of the shipment volume. The **video doorbell** segment is expected to show the largest growth over the next three years

Cameras with thermal imaging functionality to detect body temperature will show significant growth driven by the COVID-19 pandemic

Projected increase in security camera installation from 2018 to 2023



Sources: 1. [Global Video Surveillance Market](#) (Markets and Markets, Apr 2020)
2. [Security Cameras Market](#) (Transparency Market Research, 2016)

Littelfuse solutions for wired security cameras

Memory

- TVS diode



DC power input

- Fuse, PPTC
- TVS diode



Motor drive

- Solid state relay



Power over ethernet

- Fuse, PPTC
- Diode array

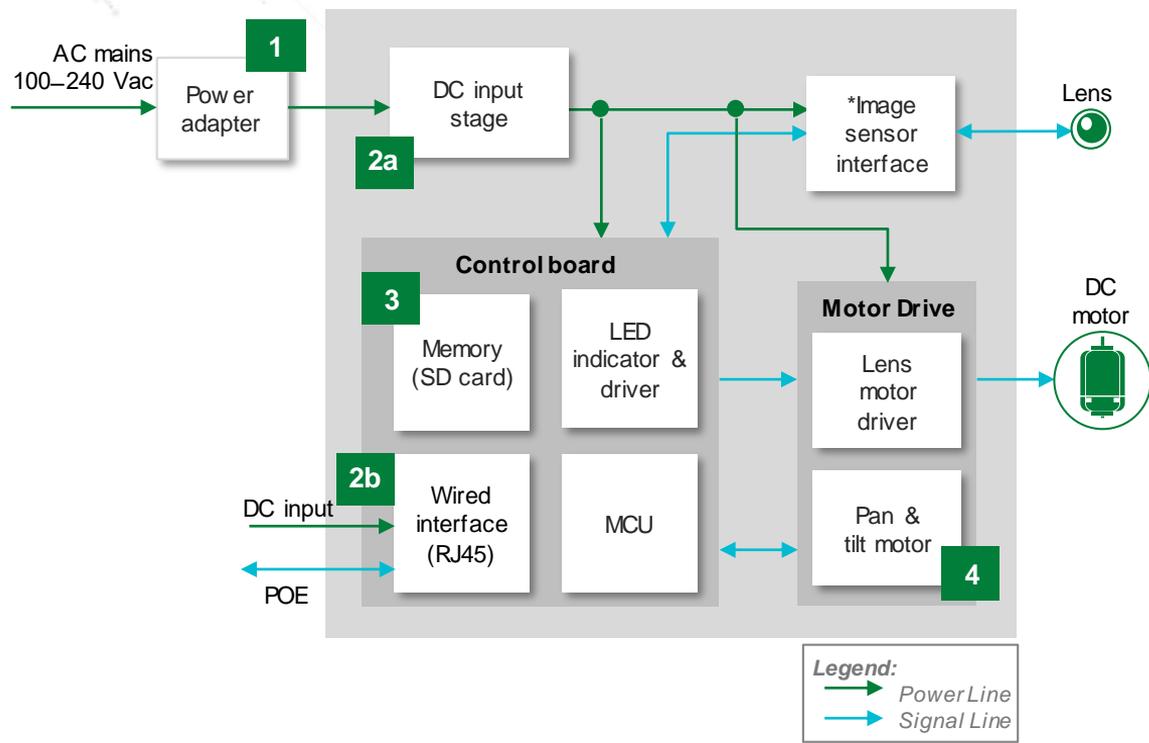


Power adapter

- Fuse
- MOV
- TVS diode



Wired security camera functional block diagram



	Technology	Series
1	Fuse	875, 807, 373
	MOV	TMOV* , LA , UltraMOV
	TVS diode	P6KE , P6SMB
2a	Fuse, PPTC	461, 449, picoSMD
	TVS diode	5.0SMDJ
2b	Fuse, PPTC	461, 449, picoSMD
	Diode array	SRV05-4HTG , SP0504SHTG
3	Diode array	SP1006
4	Solid state relay	CPC1560

* TMOV is the recommended solution to comply with the new IEC 62368-1 standard



Click on the product series in the table below for more info

Benefits of Littelfuse products for wired cameras

	Technology	Function in application	Product series	Benefits	Features
1	Fuse	Protects power stage from overcurrent events	875 , 807 , 373	Reduces customer qualification time by complying with third-party safety standards such as UL/IEC	Third-party compliance (UL/IEC); low internal resistance; shock safe; vibration resistant
	MOV	Protects power unit from voltage transients and lightning	TMOV* , LA , UltraMOV	Reduces customer qualification time by complying with third-party safety standards such as UL/IEC	High energy absorption capability: 40–530 J (2 ms)
	TVS diode	Protects power unit from voltage transients	P6KE , P6SMB	Improves system reliability by protecting downstream parts from transients on power lines	600 W peak pulse capability; glass passivated chip junction; compatible with lead-free solder reflow temperature profile
2a	Fuse	Protects the power stage from overcurrent events	461 , 449 , picoSMD	Reduces customer qualification time by complying with UL/IEC; compact design	Surface mountable; resettable option; compatible with the lead-free solder process per IEC standards
	TVS Diode	Protects sensitive electronic parts in power stage from voltage transients	5.0SMDJ	Improves system reliability by clamping the voltage at safe levels during transients	5000 W peak pulse capability; compatible with high temperature soldering; fast response time (< 1.0 ps)
2b	Fuse, PPTC	Protects the power stage from overcurrent events	461 , 449 , picoSMD	Reduces customer qualification time by complying with UL/IEC; compact design	Surface mountable; resettable option; compatible with the lead-free solder process per IEC standards
	Diode array	Protects sensitive electronic parts from voltage transients	SRV05-4HTG , SP0504SHTG	Compact package with multi-rail protection; retains high-speed signal reliability	Multiple rail-to-rail protections; low leakage current; low capacitance of 1 pF (TYP) per I/O
3	Diode array	Protects memory card from user-induced ESD event	SP1006	Enables compact design; low power loss	Industry's smallest footprint available (0201); low leakage current
4	Solid state relay	Optically-isolated switch to drive motor	CPC1560	Robust operation with integrated protection in case of motor stalling	Integrated current limit, thermal shutdown; bounce-free switching; fast turn-on

Littelfuse solutions for wired doorbell cameras

Memory

- TVS diode



Wireless interface

- Polymer ESD suppression



User interface

- Diode array



Power supply unit

- Fuse
- TVS diode
- Solid state relay



Door bell chime

- Solid state relay

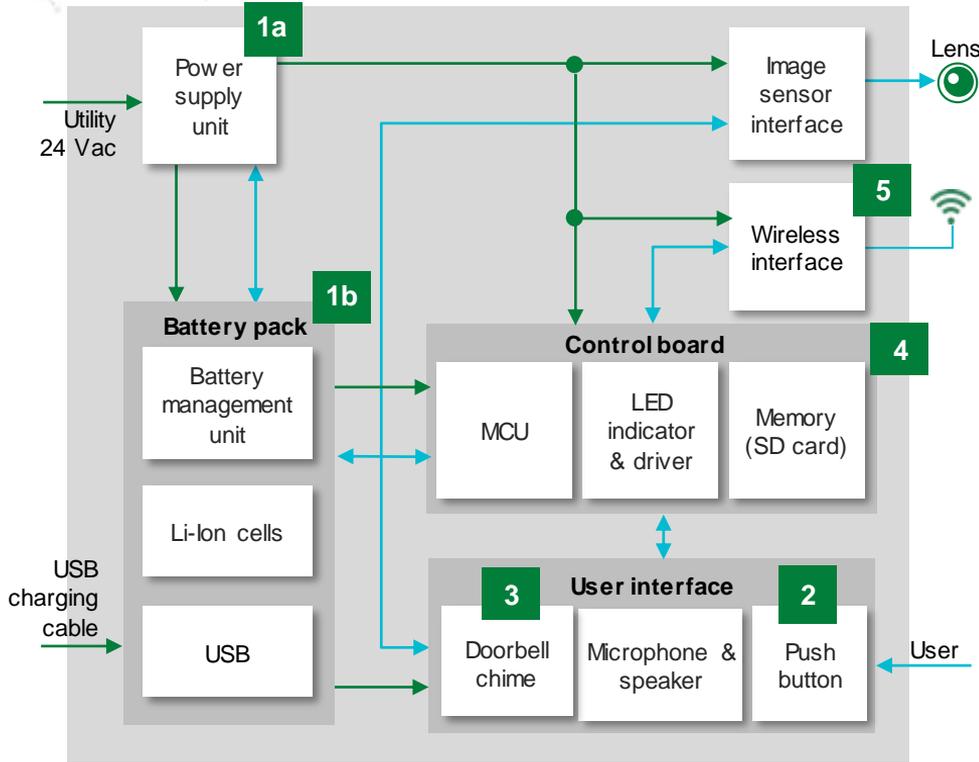


Charging port

- Fuse
- TVS diode
- Diode array



Wired doorbell camera functional block diagram



	Technology	Series
1a	Fuse	443, 449
	Solid state relay	PLB190
	TVS diode	4.0SMDJ24A
1b*	Fuse	469, 449
	TVS diode	SMBJ
	MLV	MLA
2	TVS diode array	SP1006
3**	Solid state relay	LCB710
4	Diode array	SP1006
5***	Polymer ESD suppressor	PGB10603, PGB10402

* In some applications, micro-USB port is provided for charging removable Li-Ion batteries. The rechargeable battery is built in and gets power from the main power stage

** This is found in European markets where SSR is used to cut off vampire power and as an energy harvester switch to transfer power to the image sensor only a few times an hour, as per privacy regulations

*** This is recommended for compact designs where clearance between the antenna and the casing is < 2 mm





Click on the product series in the table below for more info

Benefits of Littelfuse products for doorbell cameras

	Technology	Function in application	Product series	Benefits	Features
1a	Fuse	Protects the power stage from overcurrent events	443, 449	Reduces customer qualification time by complying with UL/IEC; compact design; avoids nuisance trips	Surface mountable; compatible with the lead-free solder process; wide range of current ratings; time lag
	Solid state relay	Optically-isolated switch	PLB190	Improves system reliability; enables compact design	5000 Vrms input/output isolation; no EMI/RFI generation; arc-free with no snubbing circuits
	TVS diode	Protects sensitive electronic parts from voltage transients	4.0SMDJ24A	Improves system reliability by clamping the voltage at safe levels during transients	4000 W peak pulse capability; lead-free solder reflow temperature profile compatible
1b	Fuse	Protects from high discharge currents due to external shorts	469, 449	Reduces customer qualification time by complying with UL/IEC; compact design	Surface mountable; wide range of current ratings available; compatible with the lead-free solder process, per IEC standards
	TVS diode	Protects sensitive electronic parts from voltage transients	SMBJ	Enables compact design; improves system reliability by protecting downstream parts through clamping the voltage at safe levels during transients on power lines	600 W peak pulse power capability; excellent clamping capability; fast response time: typically less than 1.0 ps
	MLV	ESD protection for data lines	MLA	Fast clamping response; rigid performance under high temperatures	Bidirectional clamping; low form factor; wide operational temperature range
2	Diode array	Protects memory card from user-induced ESD events	SP1006	Enables compact design; low power loss	Industry's smallest footprint available (0201); low leakage current
3	Solid state relay	Optically-isolated switch functions as an dual purpose switch between chime and camera	LCB710	Enables OEMs to meet European privacy regulation; enables compact design; low power loss and potential energy harvesting	Normally closed switch; no EMI/RFI generation; arc-free with no snubbing circuits
4	Diode array	Protects memory card from user-induced ESD events	SP1006	Enables compact design; low power loss	Industry's smallest footprint available (0201); low leakage current
5	Polymer ESD suppressor	Protects the Wi-Fi chipset from user-induced ESD events	PGB10603, PGB10402	Enables compact design and low clearance between antenna and casing; retains RF signal integrity; improves system reliability	Ultra-low capacitance; compact form factor; low leakage current; fast response time



Littelfuse solutions for wireless security cameras

Wireless interface



- Polymer ESD suppressor

Memory



- TVS diode

Charging port



- PPTC
- MLV

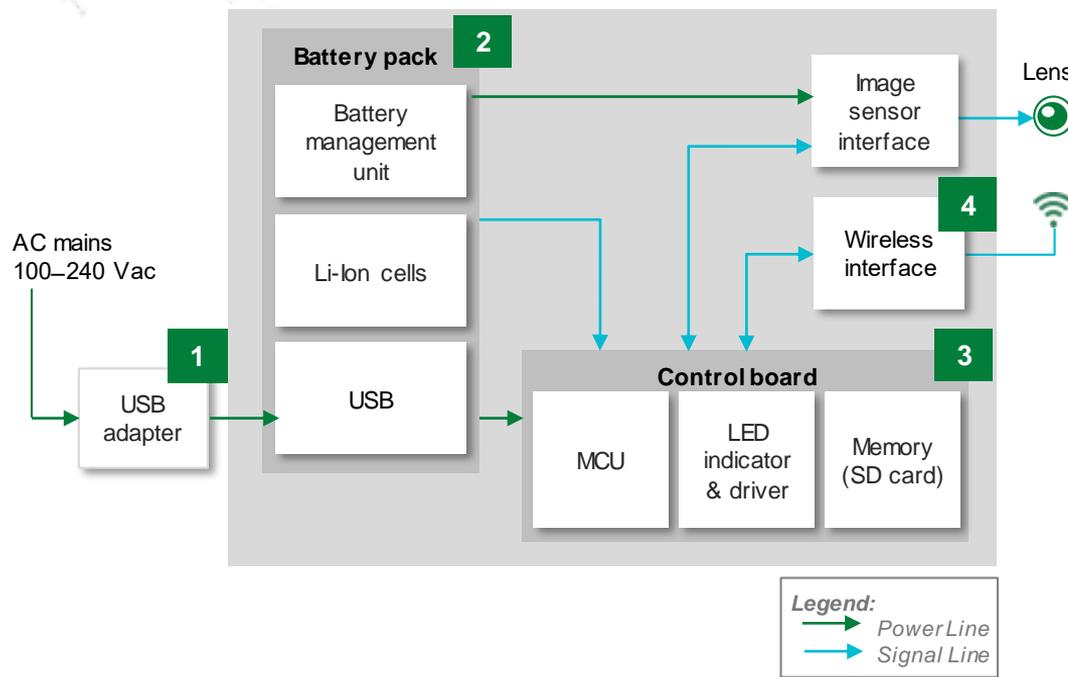
Power adapter



- Fuse
- MOV
- TVS diode



Wireless security camera functional block diagram



	Technology	Series
1	Fuse	875, 807, 373
	MOV	C-III, LA, UltraMOV
	TVS diode	P6KE, P6SMB
2	Temperature indicator**	setP™
	PPTC	0805L, nanoSMD, picoSMD
	MLV	MLA
3	Diode array	SP1006
	Polymer ESD suppressor	PGB10603, PGB10402
4*		

* This is recommended for compact designs where clearance between the antenna and the casing is < 2 mm

** The setP™ solution is recommended for USB type C port protection.



Click on the product series in the table below for more info

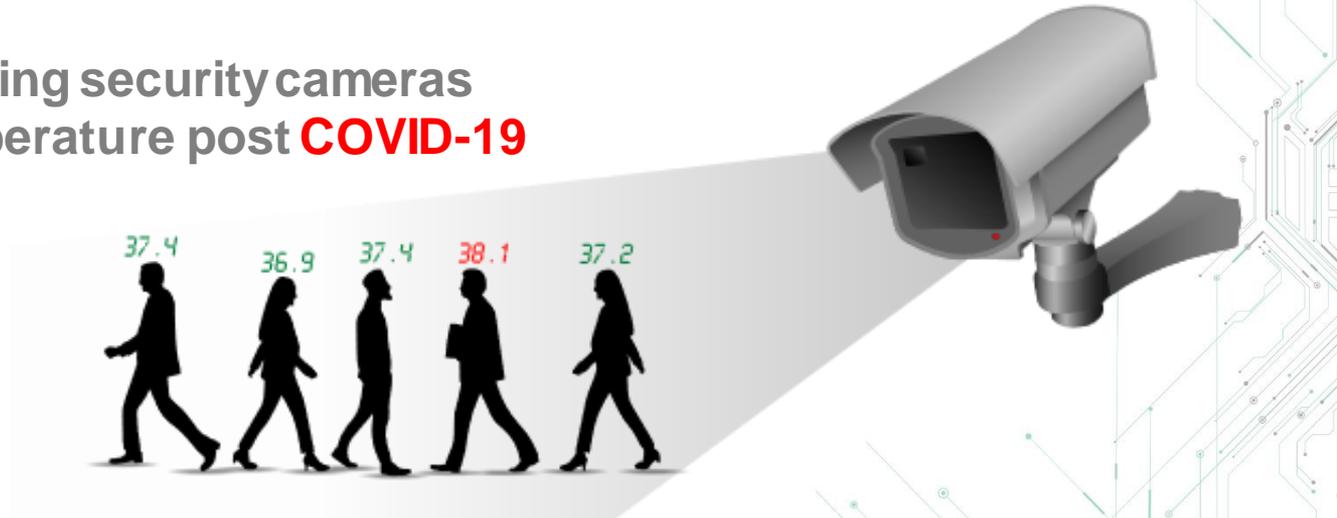
Benefits of Littelfuse products for wireless cameras

	Technology	Function in application	Product series	Benefits	Features
1	Fuse	Protects power stage from overcurrent	875 , 807 , 373	Reduces customer qualification time by complying with third-party safety standards such as UL/IEC	Third-party compliance (UL/IEC); low internal resistance; shock safe; vibration resistant
	MOV	Protects power unit from voltage transients and lightning	C-III , LA , UltraMOV	Reduces customer qualification time by complying with third-party safety standards such as UL/IEC	High energy absorption capability: 40–530J (2ms)
	TVS diode	Protects power unit from voltage transients	P6KE , P6SMB	Improves system reliability by protecting downstream parts from transients on power lines	600 W peak pulse capability; glass passivated chip junction; compatible with lead-free solder reflow temperature profile
	Temperature indicator	Protects USB-C plugs and receptacles from overheating	setP™	Auto resets after fault is removed; allows for compact design	Resettable; low resistance; compact design
2	PPTC	Protects the power stage from overcurrent events	0805L , nanoSMD , picoSMD	Auto resets after fault is removed; allows for compact design	Resettable; low resistance; compact design
	MLV	ESD protection for data lines	MLA	Fast clamping response; rigid performance under high temperatures	Bidirectional clamping; low form factor; wide operational temperature range
	Temperature indicator	Protects USB-C plugs and receptacles from overheating	setP™	Auto resets after fault is removed; allows for compact design	Resettable; low resistance; compact design
3	Diode array	Protects memory card from user-induced ESD events	SP1006	Enables compact design; low power loss	Industry's smallest footprint available (0201); low leakage current
4	Polymer ESD suppressor	Protects the Wi-Fi chipset from user-induced ESD events	PGB10603 , PGB10402	Enables compact design and low clearance between antenna and casing; retains RF signal integrity; improves system reliability	Ultra-low capacitance; compact form factor; low leakage current; fast response time

Select safety standards for surveillance cameras

Standard	Title	General scope	Littelfuse Technology	Region
IEC 62368-1	Audio/video, information and communication technology equipment – Part 1: safety requirements	This part of IEC 62368 is a product safety standard that classifies energy sources; prescribes safeguards against those energy sources; provides guidance on the application of, and requirements for, those safeguards	Fuse, MOV	Global
IEC 62311-2	Secondary cells and batteries containing alkaline or other non-acid electrolytes	Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems	Fuse, PPTC	Global

Thermal scanning using security cameras to monitor body temperature post **COVID-19**

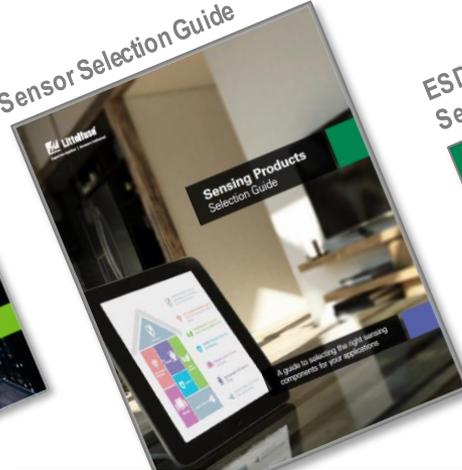


Additional information can be found on littelfuse.com

Circuit Protection
Selection Guide



Sensor Selection Guide



ESD Suppression
Selection Guide

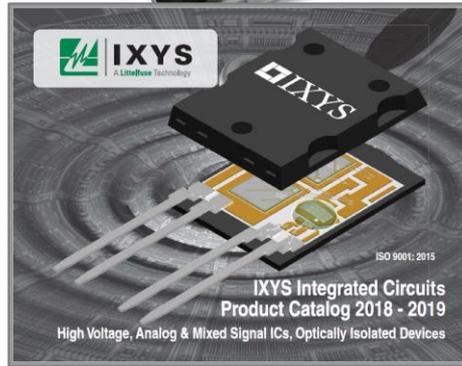


ESD Protection
Design Guide

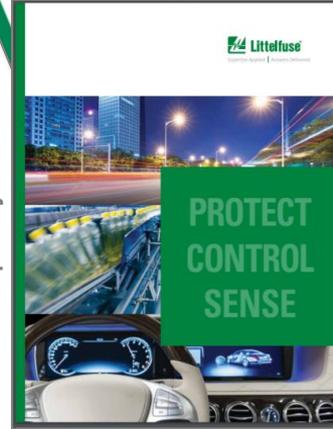


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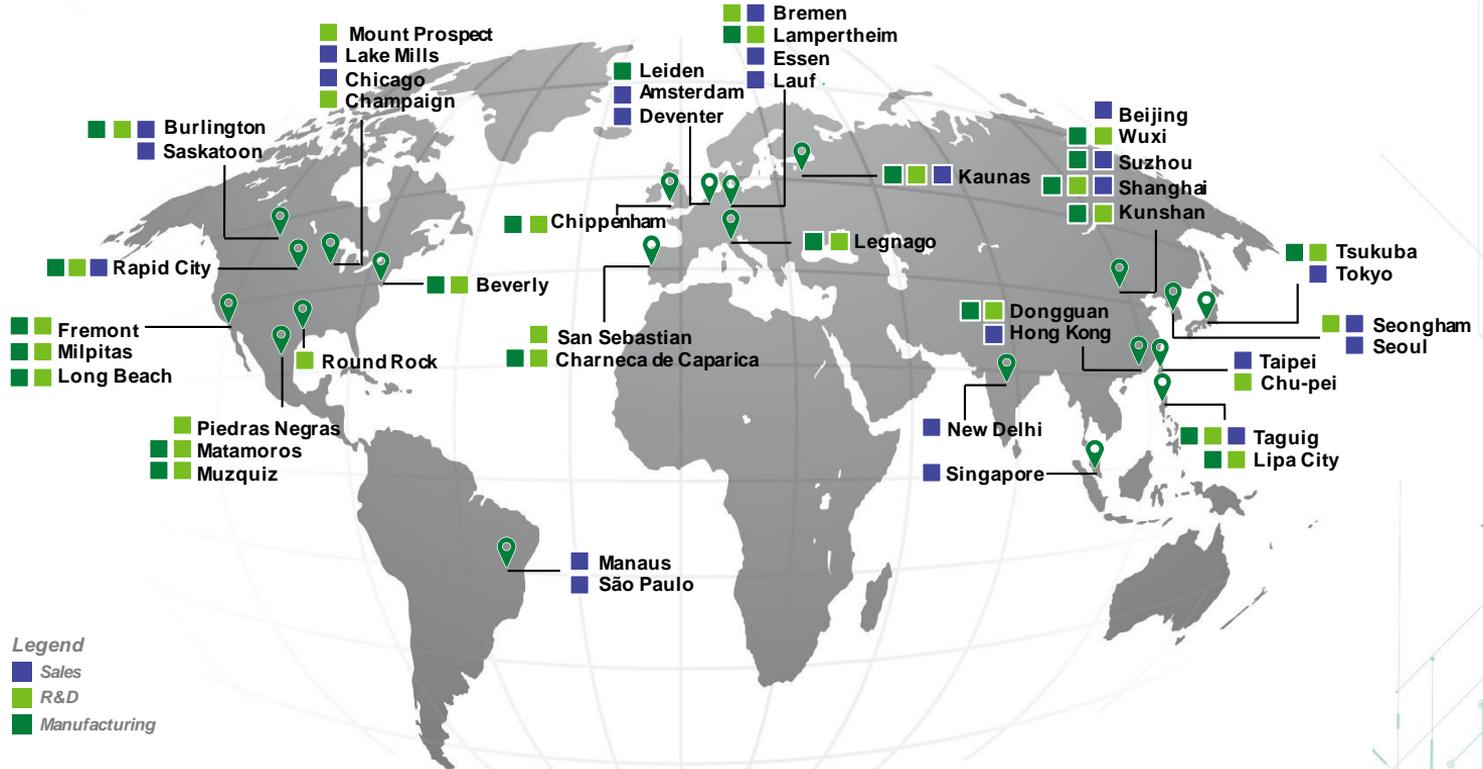
Integrated Circuits Catalog



Littelfuse Capability Brochure



Local resources supporting our global customers



Partner for tomorrow's electronic systems

Broad product portfolio

A global leader with a broad product portfolio, covering every aspect of protection, sensing, and control

Application expertise

Our engineers partner directly with customers to help speed up product design and meet their unique needs

Global customer service

Our global customer service team is with you to anticipate your needs and ensure a seamless experience

Compliance & regulatory expertise

We help customers in the design process to account for requirements set by global regulatory authorities

Testing capabilities

To help customers get products to market faster, we offer certification testing to global regulatory standards

Global manufacturing

High-volume manufacturing that is committed to the highest quality standards



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