



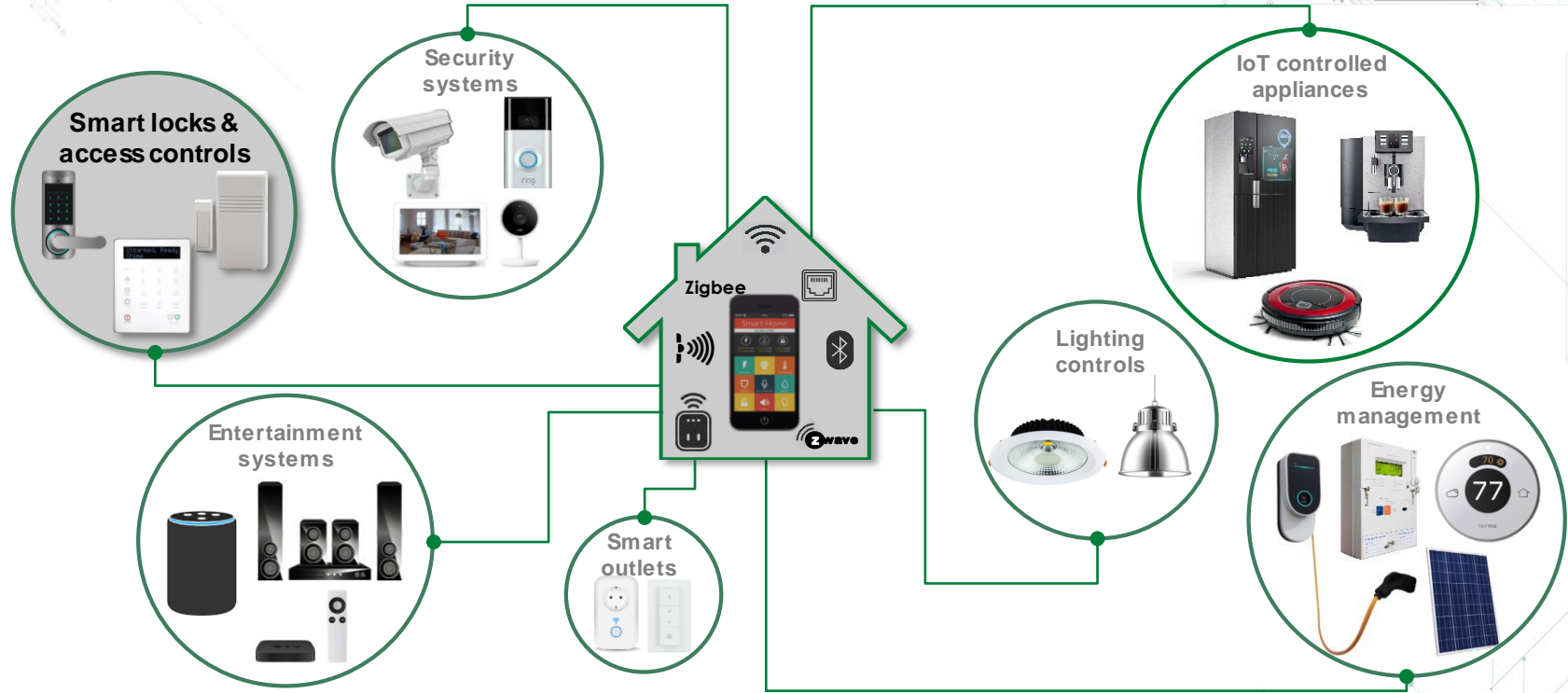
Expertise Applied | Answers Delivered

IoT smart locks and access control



Building automation

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

IoT smart lock shipments poised for strong growth

Market Trends and Drivers

Global smart lock unit shipments are expected to increase from ~7M in 2019 to ~23M units in 2024 at a CAGR of 25%*

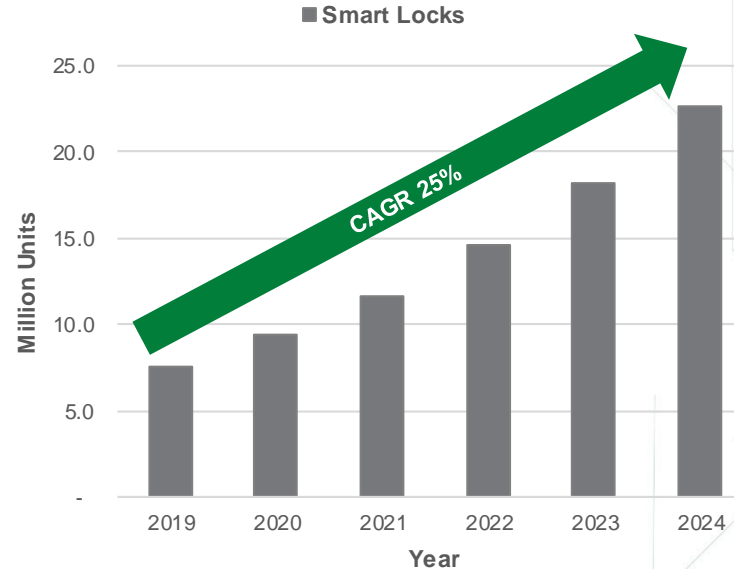
Residential, hospitality, and enterprise segments will grow as smart phones add convenience, accessibility, and an easy-to-use interface to smart locks

The U.S. growth will be driven by feature-rich products. The Asia Pacific growth will come from new residential and commercial buildings paired with smart city government initiatives

The residential segment makes up 70% of the market. New homes are now being built with smart locks, while retrofitting traditional locks has become more affordable to homeowners

The rise in popularity of Airbnb and the sharing economy has required homeowners to give remote access to their properties, accelerating the need for smart locks

Smart lock growth very strong at 25% CAGR



Source: 1. [Smart Lock Market Size](#) (Grandview Research, February 2020)
2. [Home Automation Hubs](#) (PC Mag, July 2019)

* Units shipped are calculated based on an SP of \$160 per unit and dropping 5% per year from low-cost Asian suppliers entering the market

Window/door sensors & control panels show strong growth

Market trends and drivers

Global window and door sensor unit shipments are expected to increase from ~300M in 2019 to ~465M units in 2024*

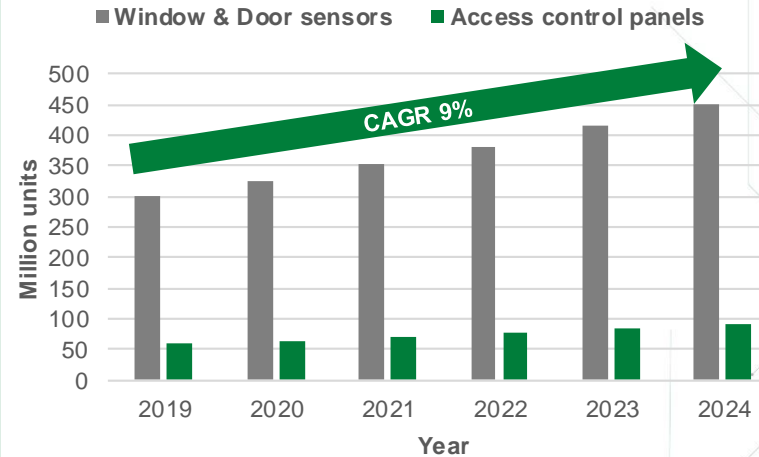
Increased awareness of personal security will drive growth globally, especially in developing economies like South America, Africa, and India

Global access control panel unit shipments are expected to increase from ~60M to ~90M units in 2024*

New homes are being built with window and door sensors pre-installed along with the control panel to monitor them. Some window manufacturers offer integrated security features

Wireless systems remove the need for professional installation, lowering the barrier to adopting security systems and the overall cost to the consumer

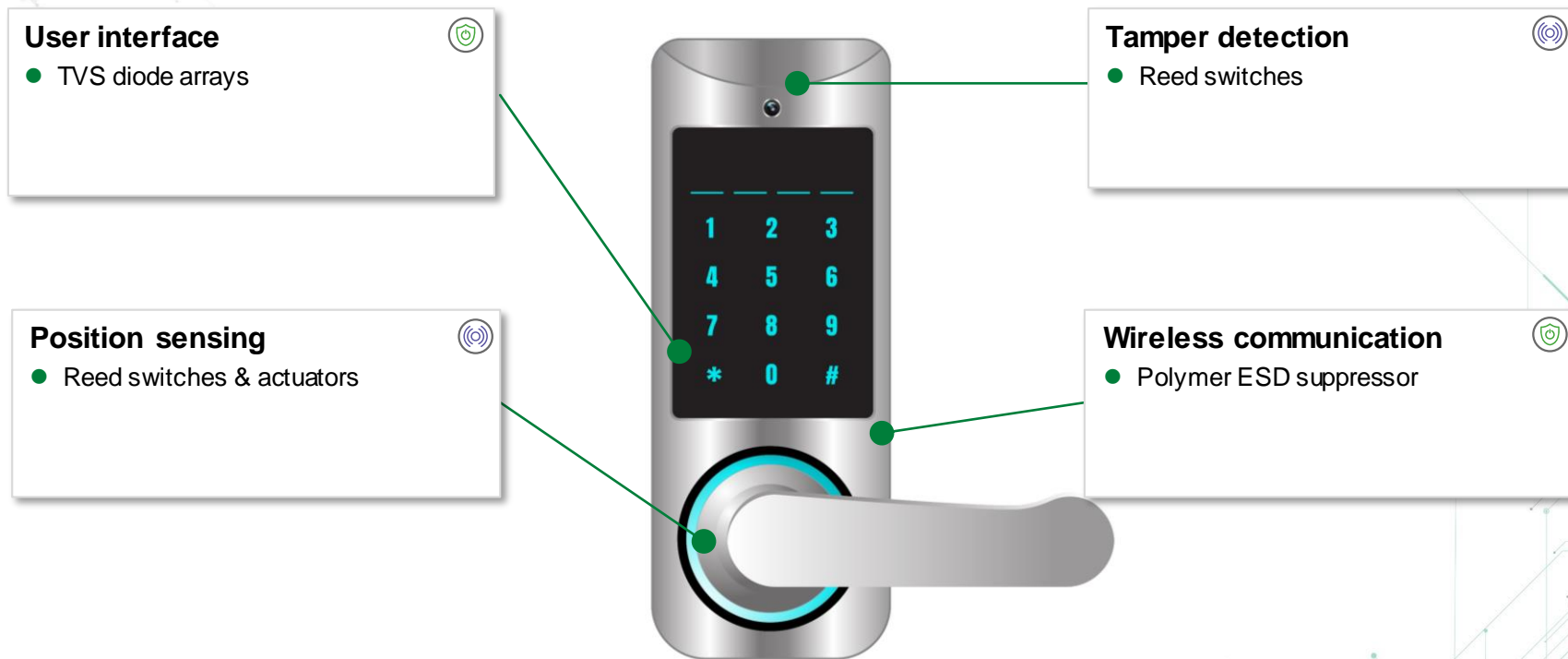
Showing strong growth at ~9% CAGR



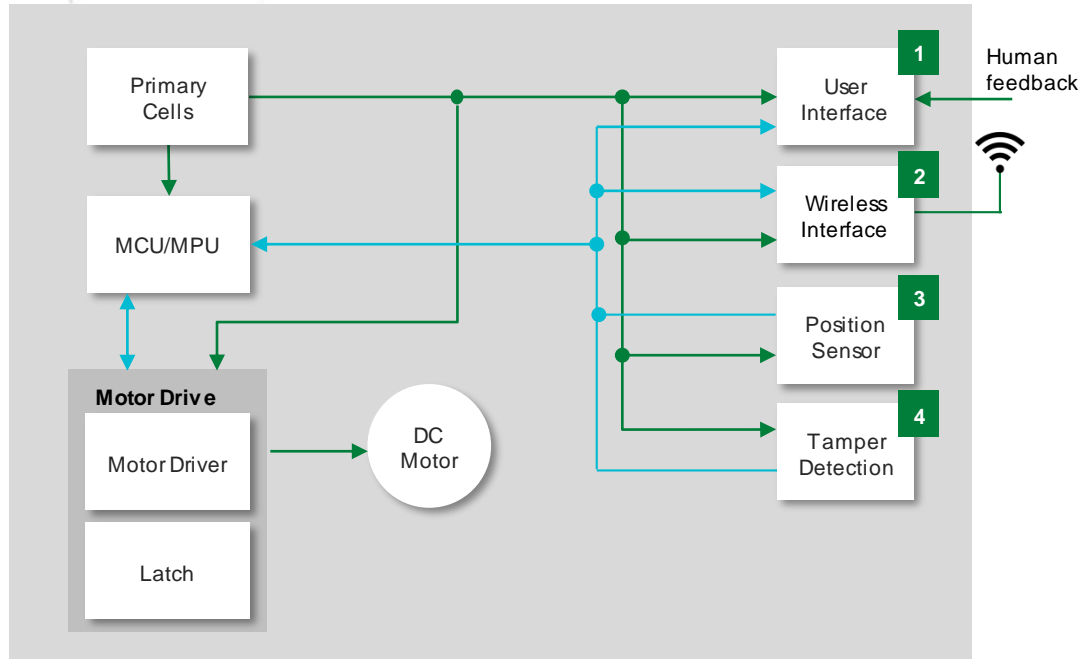
*Units shipped are calculated based on \$30/sensor and 5 sensors per panel

Source: [Window Sensors Market Outlook](#) (Allied Market Research, May 2019)

Protection and sensing solutions for smart locks



Smart lock block diagram



Legend:
 Power Line
 Signal Line

	Technology	Series
1	TVS diode array	SP1012 , SP1003
2*	Polymer ESD suppressor	PGB10603 , PGB10402
3	Reed switch Magnetic actuator	MDSM-4 , MDSR-10 H-36
4	Reed switch	59166

Acronyms:

MOV: metal oxide varistor

TVS: transient voltage suppressor

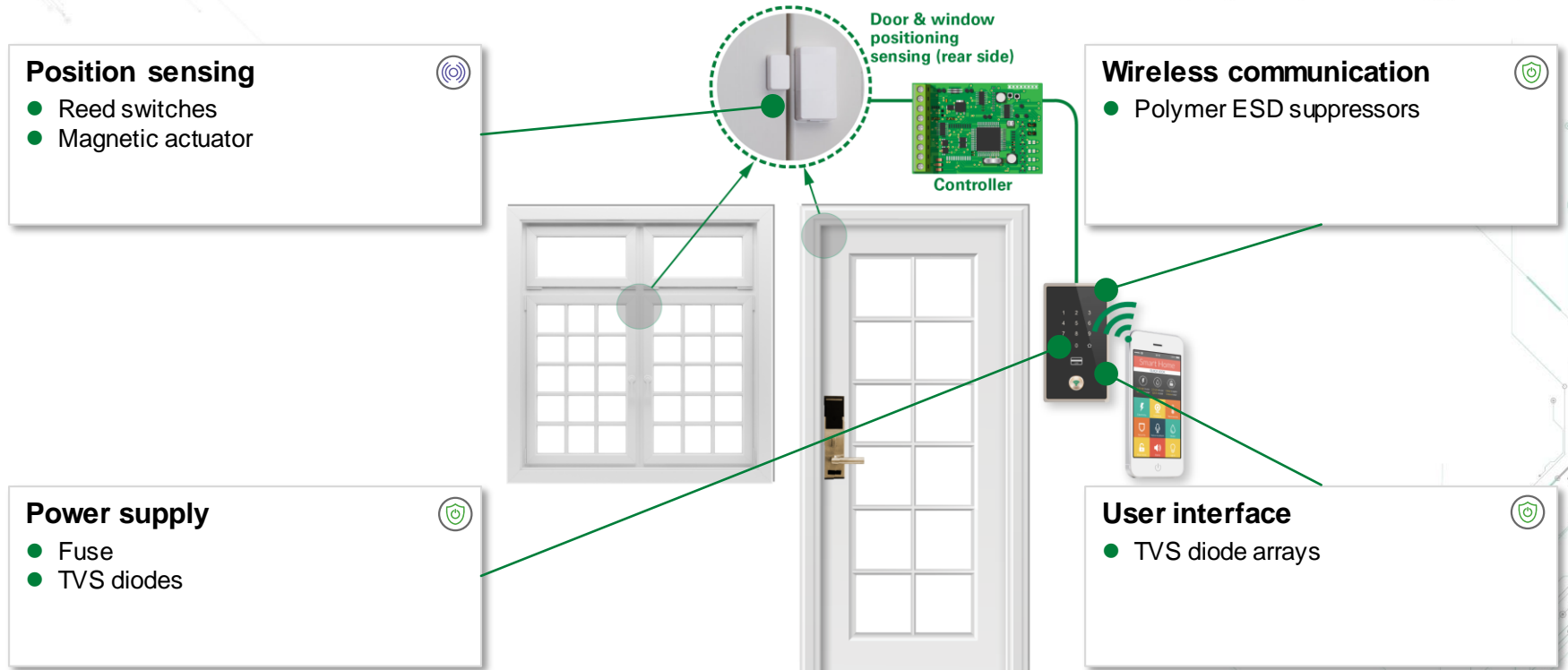
ESD: electrostatic discharge

*-Recommended for compact designs where clearance between the antenna and the casing is < 2 mm

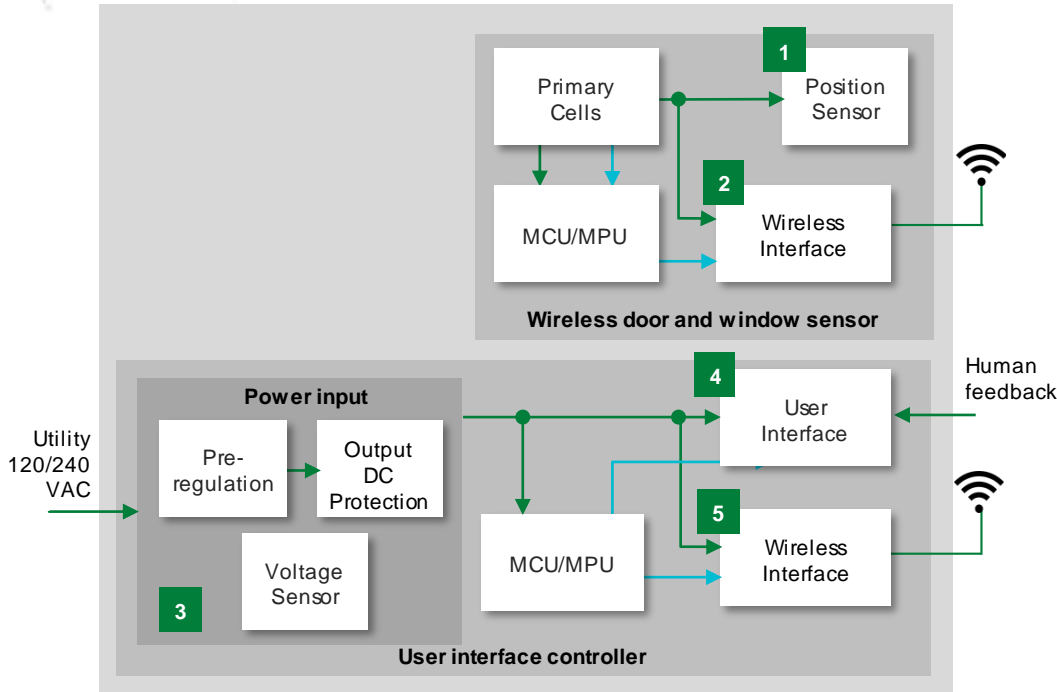
Benefits of Littelfuse components in smart locks

	Technology	Function in application	Product series	Benefits	Features
1	TVS diode array	Protects touchscreen ICs from user-induced ESD events	SP1012 , SP1003	Helps comply with IEC standards (61000-4-2: ±15 kV contact, ±30 kV air; 61000-4-4: 40 A (5/50 nS); enables a compact design; retains high signal integrity	Low dynamic resistance; five-channel protection in a small 0402 footprint; maintains high signal integrity
2	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
3	Reed switch Magnetic actuator	Proximity detection of the door to verify full closure before engaging deadbolt	MDSM-4 , MDSR-10 H-36	Lowest power consumption for longest battery life	Hermetically sealed, magnetically operated contacts
4	Reed switch	Alerts user if someone is tampering with the lock	59166	Lowest power consumption for longest battery life	Hermetically sealed, magnetically operated contacts

Wireless door/window sensors with control panel



Wireless door/window sensors with control panel block diagram



	Technology	Series
1	Reed switch Magnetic actuator	MDSM-4 , MDSR-10 H-36
2*	Polymer ESD suppressor	PGB10603 , PGB10402
3**	Fuse	215 , 875 , 877
	MOV	LA , C-III
	TVS diode	SMCJ
4	TVS diode array	SP1012 , SP1003
5*	Polymer ESD suppressor	PGB10603 , PGB10402

Acronyms:

MOV: metal oxide varistor
 TVS: transient voltage suppressor

*: Recommended for compact designs where clearance between the antenna and the casing is < 2 mm

**-. For commercial installations, the power input from AC mains is provided

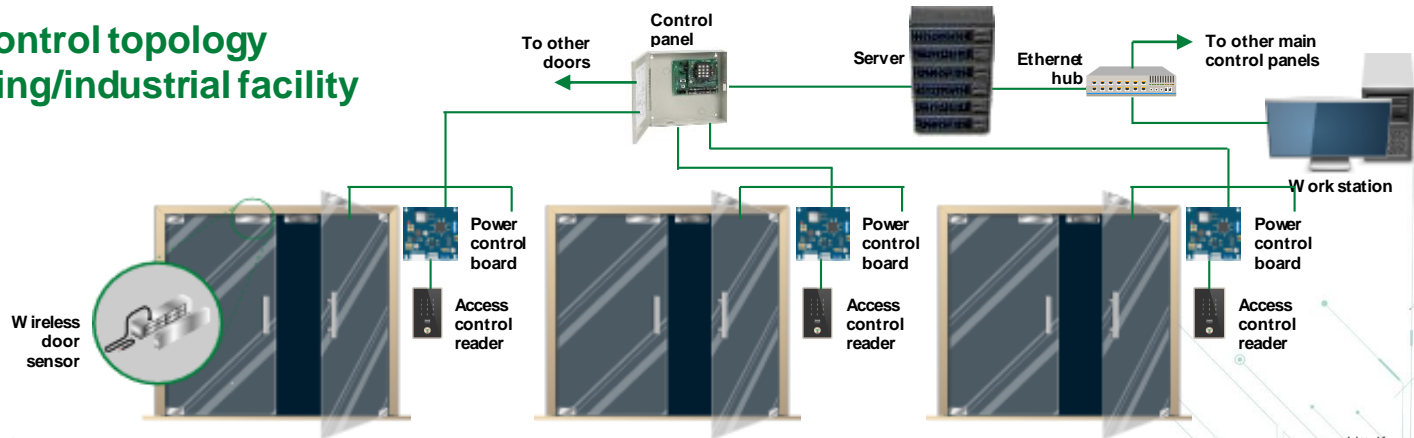
Benefits of Littelfuse products for access control

	Technology	Function in application	Product series	Benefits	Features
1	Reed switch and magnetic actuator	Open/closed proximity detection of the window or door	MDSM-4 , MDSR-10 H-36	Lowest power consumption for longest battery life	Hermetically sealed, magnetically operated contacts
2	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
3	Fuse	Protects equipment and personnel from overcurrent faults	215 , 875 , 877	Reduces customer qualification time by complying with regulatory safety standards such as UL/IEC	Compliant with UL/IEC standards, low internal resistance, shock safe, vibration resistant
	MOV	Protects the power unit from lightning and other voltage transients on the AC line	LA , C-III	Reduces customer qualification time by complying with regulatory safety standards such as UL/IEC	Can meet wide-set surge withstand specifications: 40 J – 530 J (2 mS)
	TVS diode	Protects sensitive electronic components from voltage transients	SMCJ	Helps comply with IEC standards (61000-4-2: ±15 kV contact, ±30 kV air; 61000-4-4: 40 A (5/50 nS); enables a compact design; retains high signal integrity	1500 W peak pulse capability; low dynamic resistance; five-channel protection in a small 0402 footprint; maintains high signal integrity
4	TVS diode array	Protects touchscreen ICs from user-induced ESD events	SP1012 , SP1003	Helps comply with IEC standards (61000-4-2: ±15 kV contact, ±30 kV air; 61000-4-4: 40 A (5/50 nS); enables a compact design; retains high signal integrity	Low dynamic resistance; five-channel protection in a small 0402 footprint; maintains high signal integrity
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

Standards for smart locks and access control

Standard	Title	General scope	Littelfuse Technology	Market
UL 1034	Standard for burglary-resistant electric locking mechanism	These requirements apply to the construction, performance, and operation of burglary-resistant electric locking mechanisms and their related devices, such as control units, control switches, and power supplies, and the like used to secure and release doors	Fuse, MOV	North America
GA 374	Burglary-resistant electronic locks	This standard is applicable to the design, manufacture, inspection, and acceptance of burglary-resistant electronic locks	Fuse, MOV	China
GA 701 - 2007	General specifications for burglary resistant fingerprint locks	This standard applies to fingerprints as an input signal to identify and address relevant information to electrically control the mechanical locking mechanism's opening and closing of certain anti-destructive power locks	Fuse	China

Access control topology in a building/industrial facility



Additional information can be found on littelfuse.com

Circuit Protection Selection Guide



Sensor Selection Guide



ESD Suppression Selection Guide



Click on each image to open the catalog

Red switch selection guide

LITTELFUSE REED SWITCH SELECTION GUIDE
A quick reference guide to selecting reed switches for electronic applications

Series	Material	Dimensions	Operating Voltage	Operating Current	Operating Power	Response Time	Temperature Range	Notes
A	Aluminum	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
	Steel	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
	Aluminum	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
	Steel	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
B	Aluminum	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
	Steel	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
	Aluminum	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
	Steel	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
C	Aluminum	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
	Steel	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
	Aluminum	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1
	Steel	12.7 x 12.7 x 2.5	10-200 VAC	100 mA	20 W	100 μs	-55 to 150 °C	1

Notes: 1. Operating Voltage: Maximum AC and DC voltage. 2. Operating Current: Maximum AC and DC current. 3. Operating Power: Maximum AC and DC power. 4. Response Time: Typical value. 5. Temperature Range: Storage and operating temperature range. 6. Dimensions: All dimensions in millimeters unless otherwise specified. 7. Material: Material of the reed switch housing. 8. Notes: Additional notes and specifications are available in the full catalog.

ESD Protection Design Guide



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

To help customer in design process to account for requirements set by global regulatory authorities

Testing capabilities

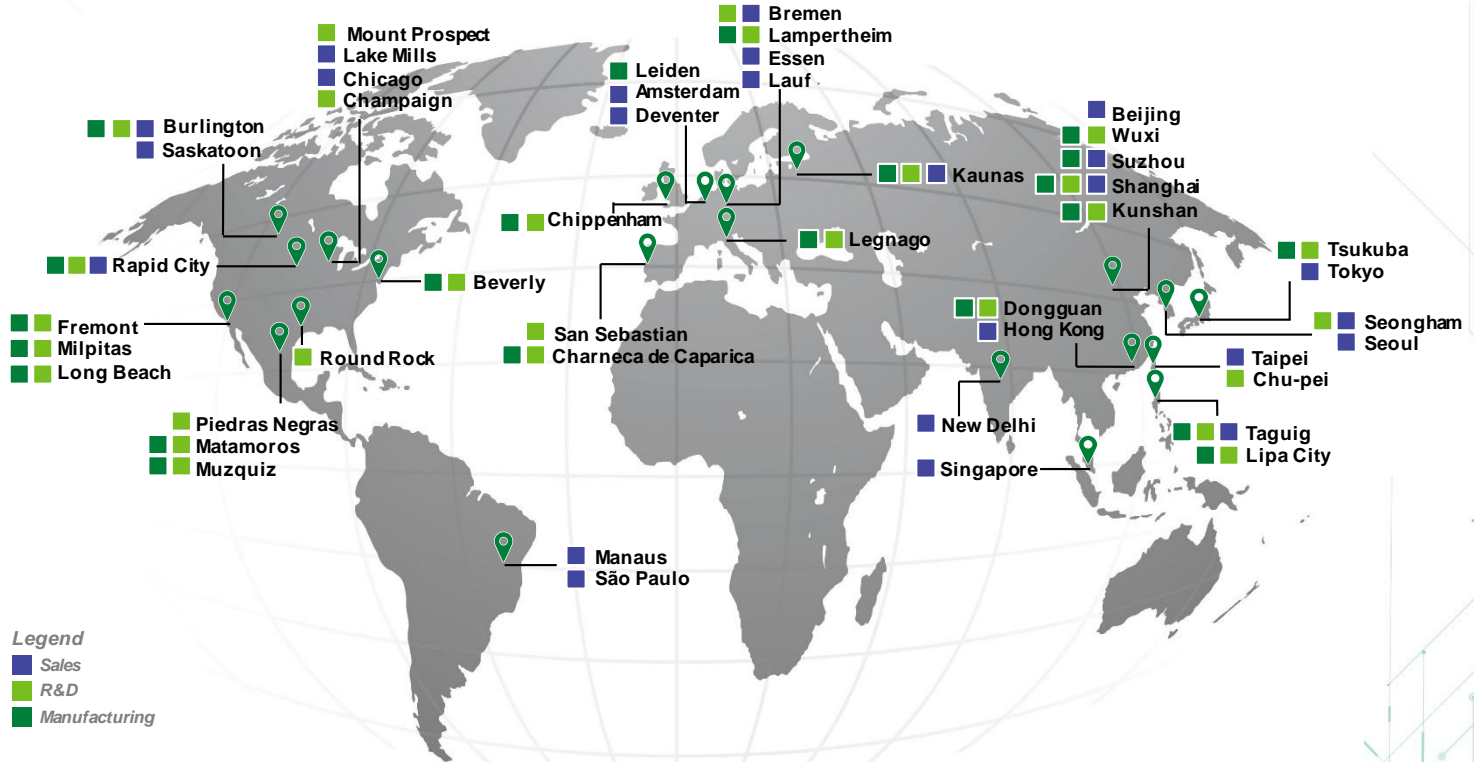
To help customers get products to market faster, we offer certification testing to global regulatory standards

Global manufacturing

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



Local resources supporting our global customers





Expertise Applied | Answers Delivered



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