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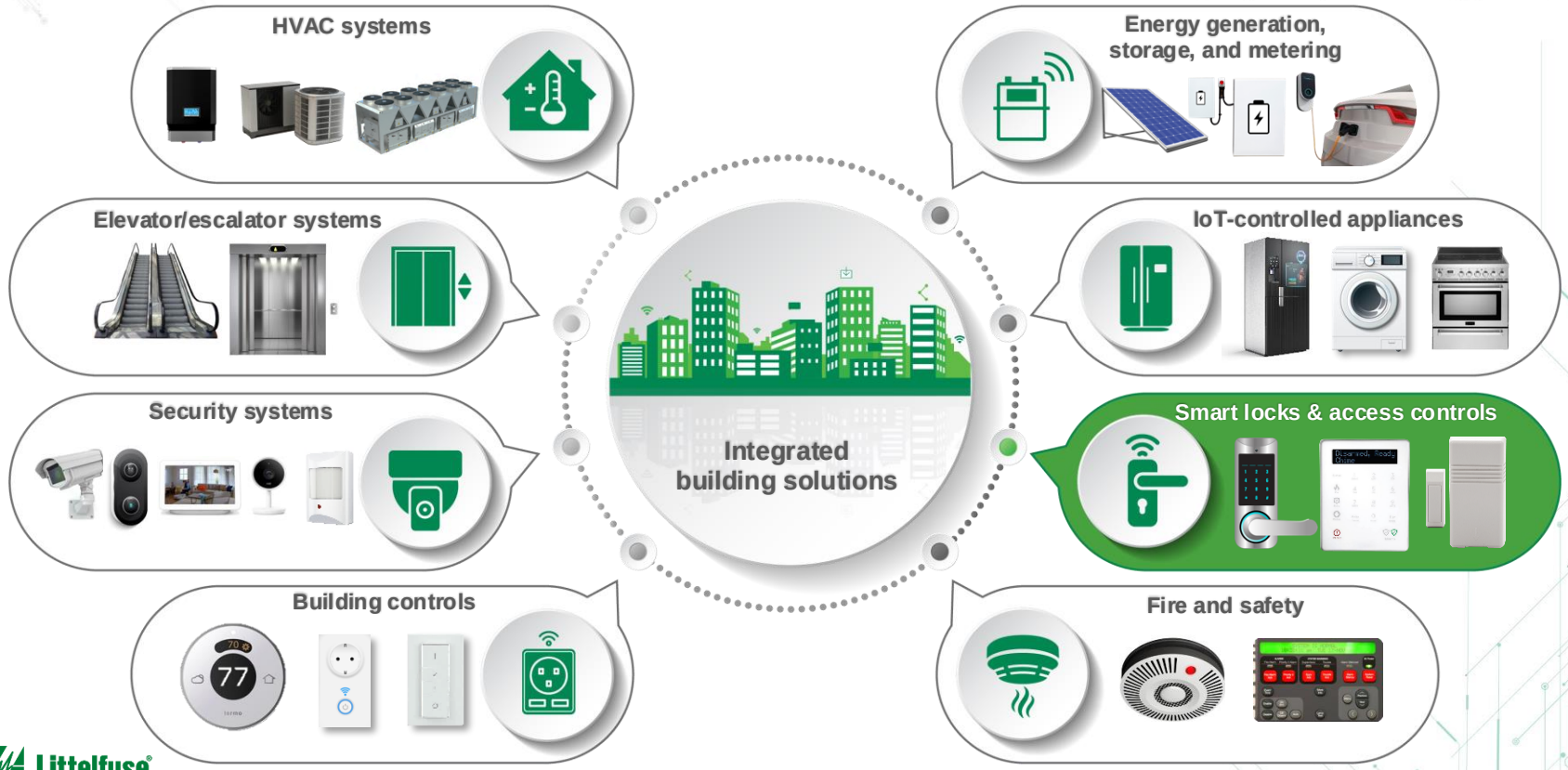
Smart Locks and Access Control

Building Solutions

REV0723

Smart buildings and homes are equipped with intelligent technologies that make lives more convenient and energy efficient



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Smart lock shipments poised for strong growth

Market Trends and Drivers

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

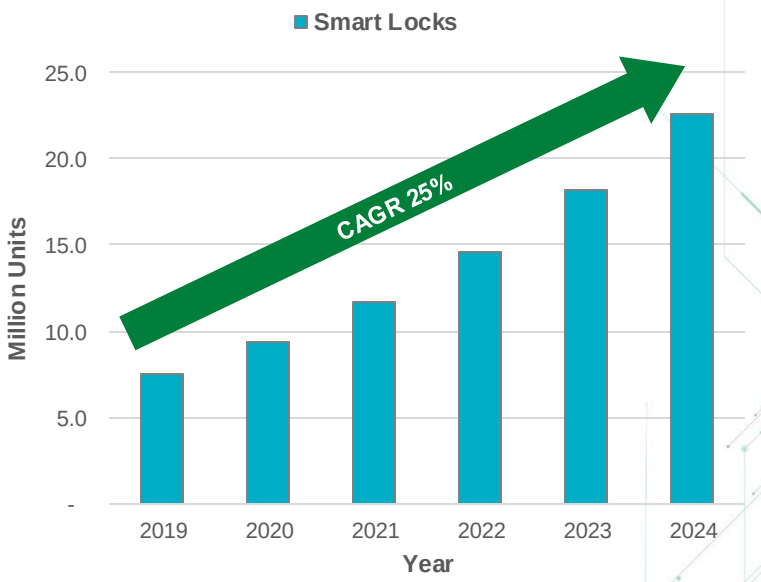
Residential, hospitality, and enterprise segments will grow as smart phones add convenience, accessibility, and an easy-to-use interface to smart locks

The US 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 is very strong at 25% CAGR



Source: 1. Smart Lock Market Size (Grandview Research, February 2020)
2. Home Automation Hubs (PC Mag, July 2019)
3. Internal marketing estimates

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Window/door sensors and control panels show strong growth

Market trends and drivers

Global window and door sensor unit shipments are expected to increase from 160 M in 2020 to ~250 M units in 2024

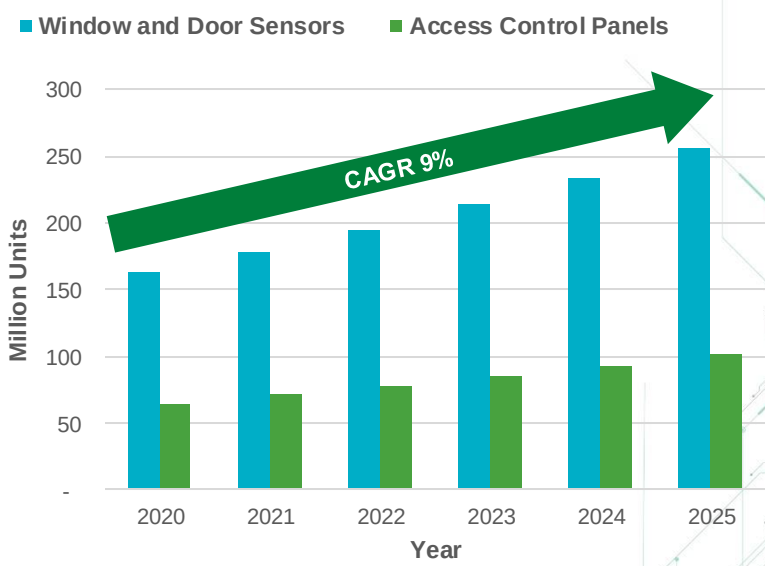
Increased awareness of personal security will drive growth globally, especially in developing economies like South America, Africa, and India

Global access control panel unit shipments are expected to increase from ~65 M to ~100 M units in 2025

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



Source: 1. Window Sensors Market Outlook (Allied Market Research, May 2019)
2. Internal marketing estimates

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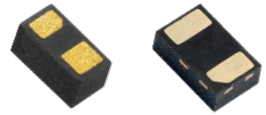
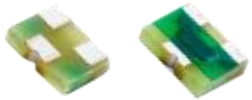
Protection and sensing solutions for smart locks

1 User interface
Diode Array

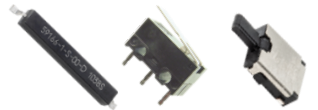


2 Wireless interface
Polymer ESD Suppressor



3 Positions
Reed Switch, TMR

4 Tamper detection
Reed Switch, Detect Switch



5 Program/reset
Tactile Switch, Slide Switch

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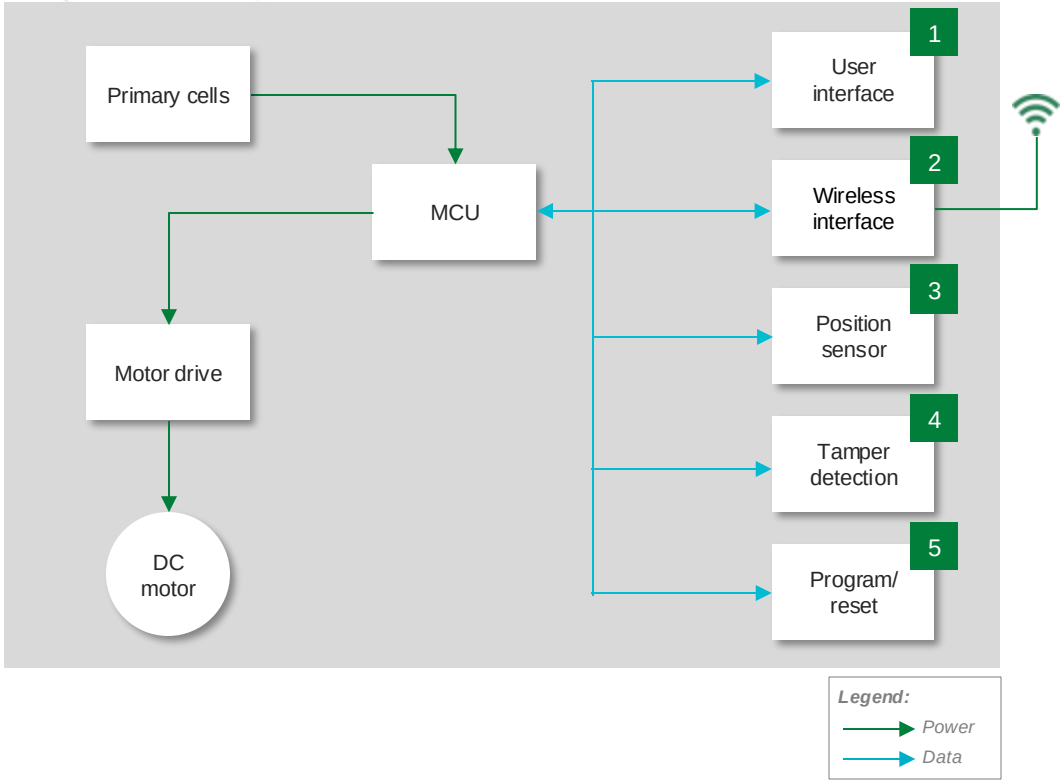
Click the product series in the table below for more info

Smart lock block diagram



	Technology	Product series
1	TVS Diode Array	SC1205-01UTG, SP1233
2*	Polymer ESD Suppressor	PGB10603, PGB10402
3	Reed Switch, Magnetic Actuator	MDSM-10, MITI-7, H-36
	TMR	LF11115TMR
4	Reed Switch	59166
	Detect Switch	ZMA, FDSD
5	Tactile or Slide Switch	KSC, PTS, KMR2, JS

Acronyms:
MCU: Microcontroller Unit
DC: Direct Current
ESD: Electrostatic Discharge
TMR: Tunneling Magnetoresistance

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

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Click the product series in the table below for more info

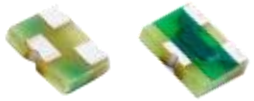
Benefits of Littelfuse components in smart locks

	Technology	Function in application	Product series	Benefits	Features
1	TVS Diode Array	Protects touchscreen ICs from user-induced ESD events	SC1205-01UTG, SP1233	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; protection in small 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	Detects door closure prior to engaging deadbolt	MDSM-10, MITI-7, H-36	Compact design; lowest power consumption for longest battery life	Ultra-miniature size (7 mm); hermetically sealed; magnetically operated contacts
	TMR	Detects position of door handle	LF11115TMR	Small footprint; latching logic; low power consumption	SOT23 package; 200 nA supply current
4	Reed Switch	Detects magnetic tampering	59166	Lowest power consumption for longest battery life	Hermetically sealed; magnetically operated contacts
	Detect Switch	Detects physical tampering of lock housing	ZMA, FDSD	Compact size; long electrical and mechanical life (up to 300,000 cycles); various mounting types	Vertical side actuation; flat or bending terminations available
5	Tactile or Slide Switch	Button input for programming and reset	KSC, PTS, KMR2, JS	Very long operating life; high reliability; supports SPDT, DPDT, and DP3T	Ultra-low current consumption; rugged sealing and resistant to corrosion

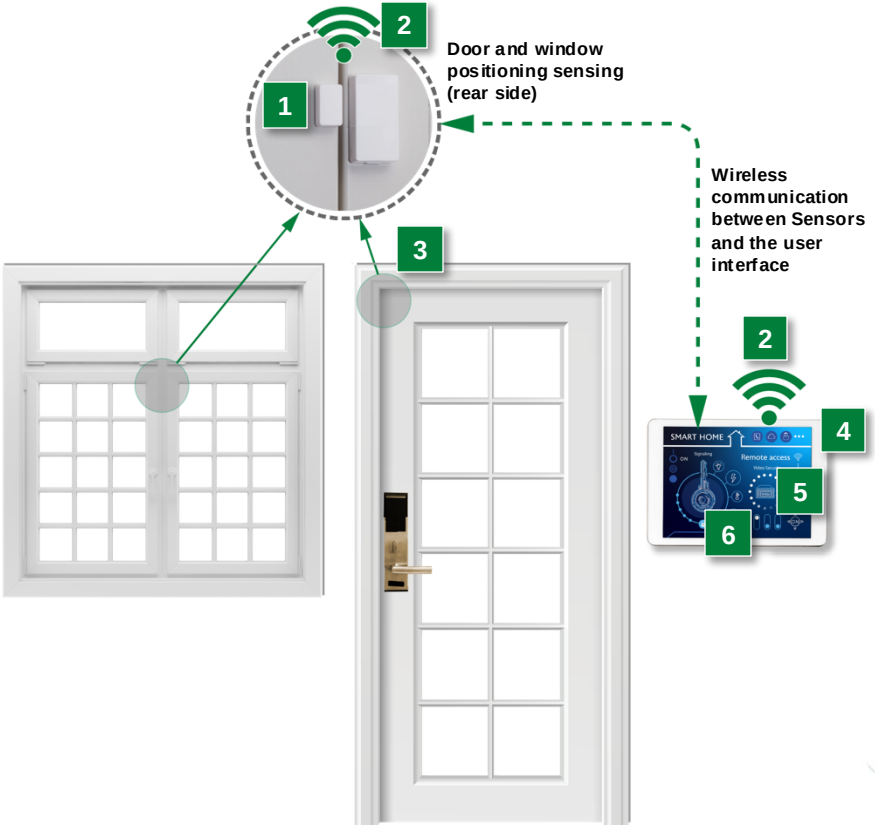
Wireless door/window sensors with control panel

1 Position sensing
Reed Switch, Magnetic Actuator, TMR

2 Wireless communication
Polymer ESD Suppressor

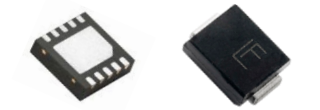


3 Tamper detection
Detect Switch

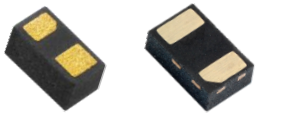


4 Button input
Tactile Switch

5 Input protection
Protection IC (eFuse), TVS Diode



6 User interface
Diode Array



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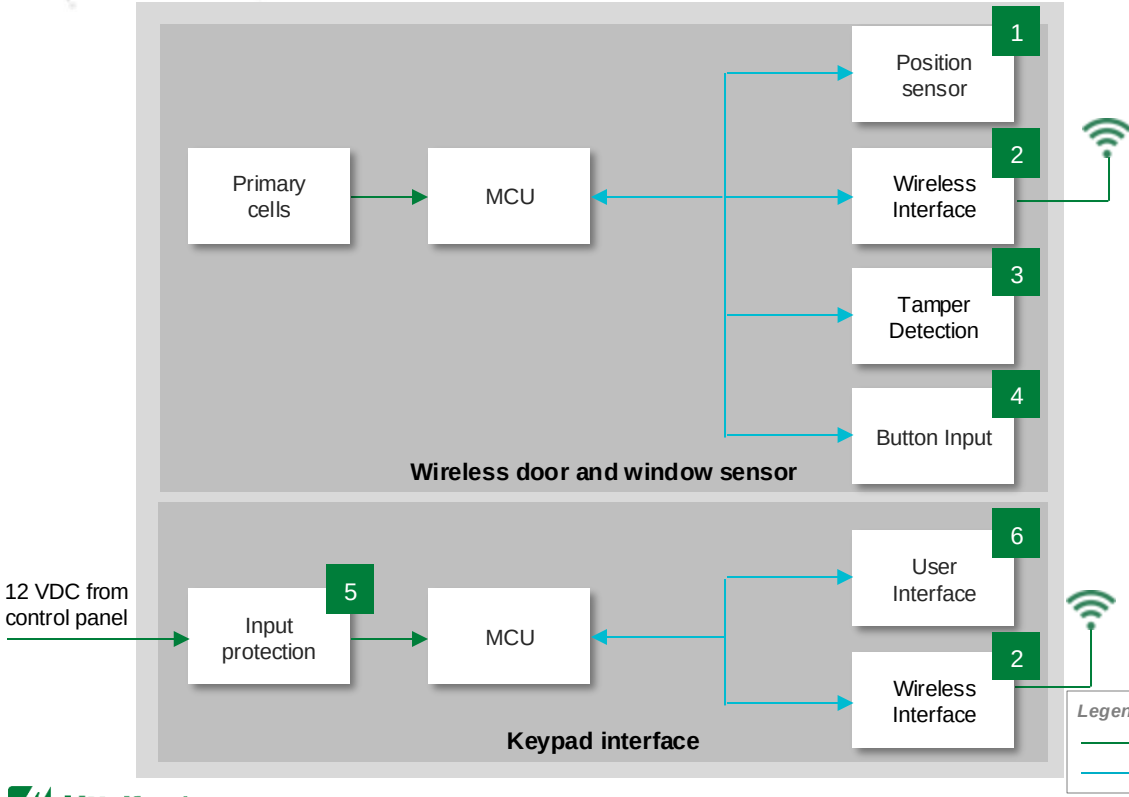
Click the product series in the table below for more info

Wireless door/window sensors with keypad



	Technology	Product series
1	Reed Switch Magnetic Actuator	MDSM-10, MITI-7, 59177 59170, H-36
	TMR	LF21215TMR
2*	Polymer ESD Suppressor	PGB10603, PGB10402
3	Detect Switch	ATS, FDSD
4	Tactile Switch	KSC, PTS
5	Protection IC (eFuse)	LS1205EVD33
	TVS Diode	SMDJ
6	TVS Diode Array	SC1205-01UTG, SP1233

Acronyms:
IC: Integrated Circuit
TVS: Transient Voltage Suppressor

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

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Click the product series in the table below for more info

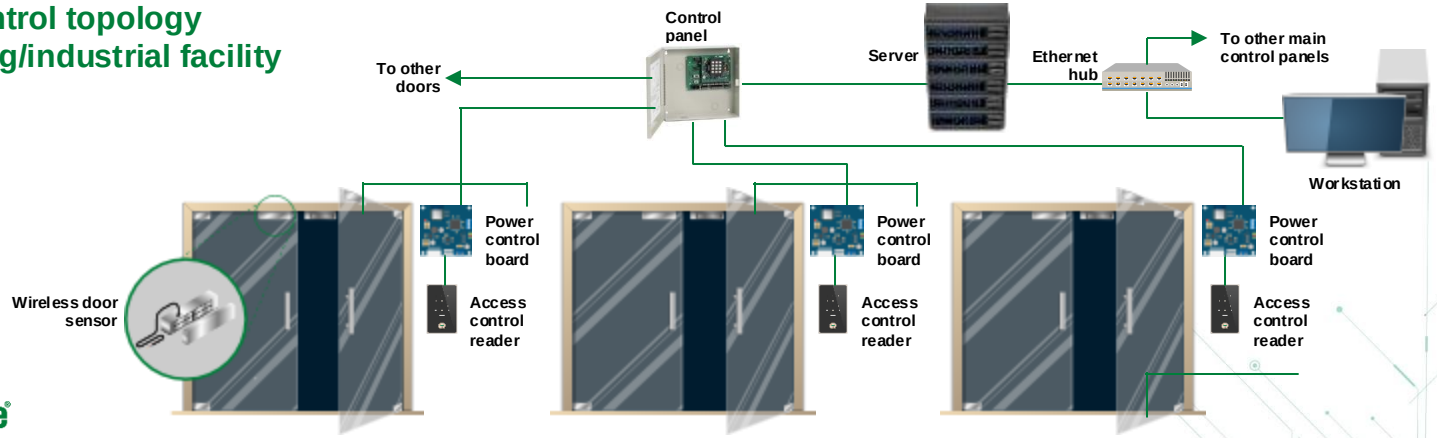
Benefits of Littelfuse products for access control

	Technology	Function in application	Product series	Benefits	Features
1	Reed Switch Magnetic Actuator	Open/closed proximity detection of the window or door	MDSM-10, MITI-7, 59177, 59170, H-36	Compact design; lowest power consumption for longest battery life	Ultra-miniature size (7 mm); hermetically sealed; SMT 'pick & plac' overmolded option
	TMR		LF21215TMR	Small footprint; high magnetic sensitivity; low power consumption	SOT23 package; 17 G Bop; 200 nA supply current
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	Detect Switch	Detects physical tampering of sensor housing	ATS, FDSD	Long travel type; minimal board space required	IP54 sealed; vertical actuation; flat or bending terminations available
4	Tactile Switch	Button input for programming or reset	KSC, PTS	Very long operating life; high reliability	Ultra-low current consumption; rugged sealing and resistant to corrosion
5	Protection IC (eFuse)	Provides both overcurrent and overvoltage protection	LS1205EVD33	Programmable overcurrent protection, overvoltage protection, and Soft-start setting with low power dissipation	2.7~18 V operation voltage and 5 A continuous current
	TVS Diode	Protects sensitive electronic parts in power stage from voltage transients	SMDJ	Improves system reliability by clamping the voltage at safe levels during transients	3000 W peak pulse capability; compatible with high temperature soldering; fast response time (< 1.0 ps)
6	TVS Diode Array	Protects touchscreen ICs from user-induced ESD events	SC1205-01UTG, SP1233	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; protection in small footprint; maintains high signal integrity

Standards for smart locks and access control

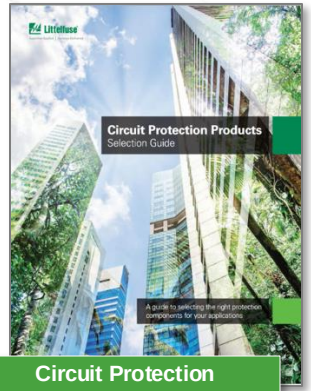
Standard	Title	General scope	Littelfuse Technology	Market
UL 1034	Standard for burglary-resistant electric locking mechanism	These requirements apply to the construction, performance, and operation of burglary-resistant electric locking mechanisms and their related devices, such as control units, control 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

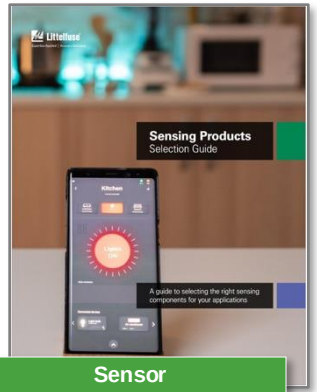


Additional information can be found on Littelfuse.com

Explore the world of Littelfuse with the electronics eCatalogs (ecatalogs.littelfuse.com)



Circuit Protection Selection Guide

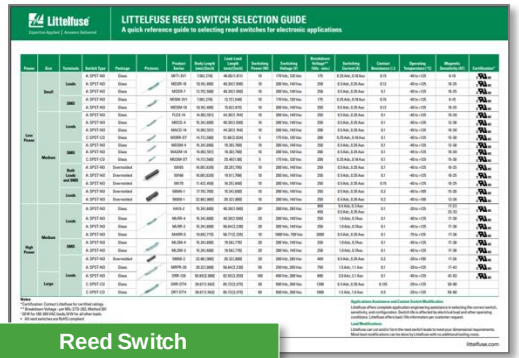


Sensor Selection Guide

ESD Suppression Selection Guide

ESD Protection Design Guide

Click images for more information



Reed Switch Selection Guide

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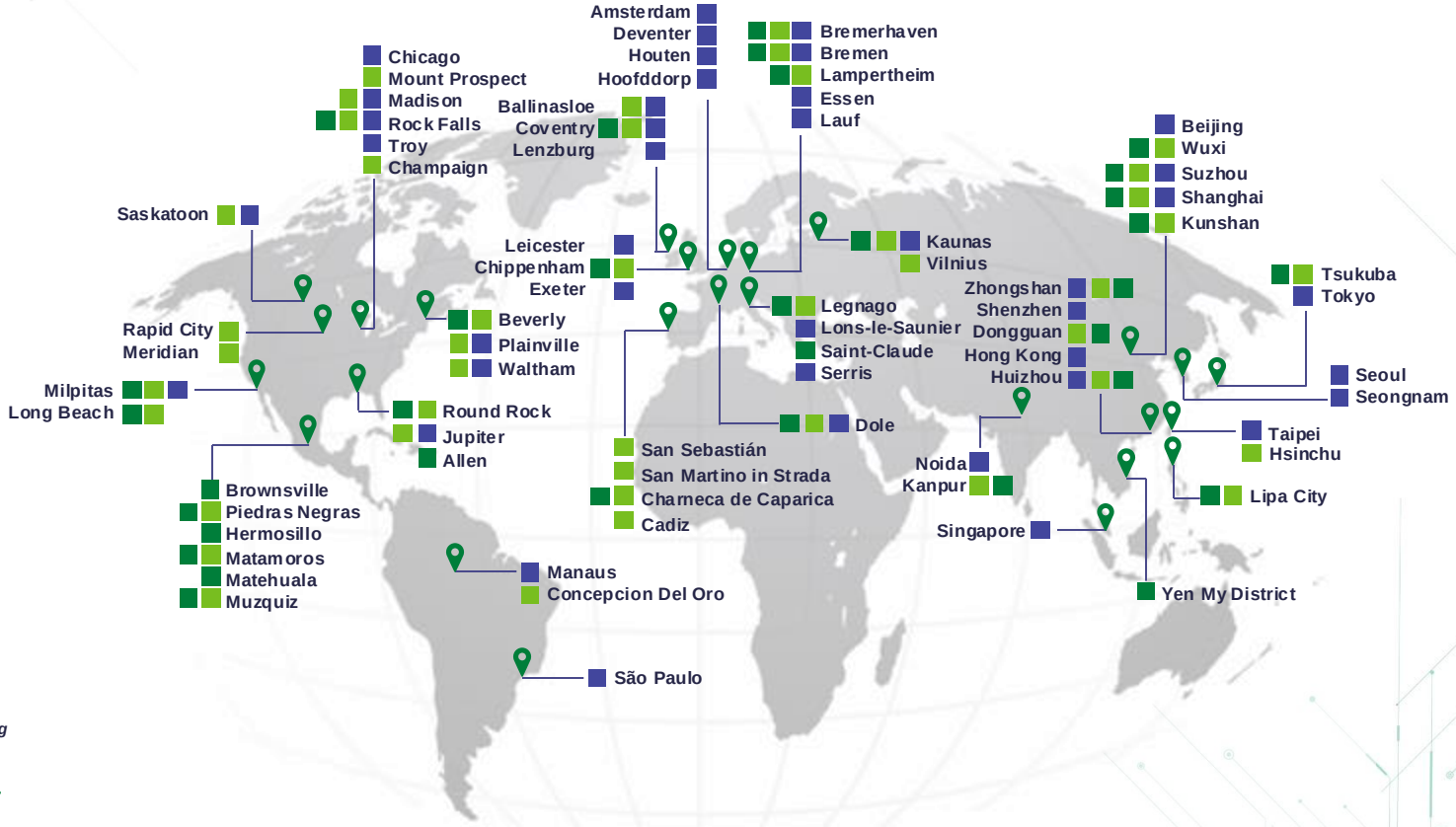
Local resources supporting our global customers



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Partner for tomorrow’s electronic systems

Broad product portfolio

We are an industrial technology manufacturing company empowering a sustainable, connected, and safer world

Application expertise

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

Global customer service

Our global customer service team will 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

We help customers get products to market faster and offer certification testing to global regulatory standards

Global manufacturing

We offer high-quality manufacturing that is committed to the highest quality standards

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