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

- Smart locks & access controls
- Security systems
- Entertainment systems
- IoT controlled appliances
- Lighting controls
- Energy management
- Smart outlets
- Zigbee
- Z-Wave
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.

* 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.

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)
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

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

Showing strong growth at ~9% CAGR

Protection and sensing solutions for smart locks

User interface
- TVS diode arrays

Position sensing
- Reed switches & actuators

Tamper detection
- Reed switches

Wireless communication
- Polymer ESD suppressor
Smart lock block diagram

**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

**Legend:**
- **Power Line**
- **Signal Line**

**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

<table>
<thead>
<tr>
<th>Technology</th>
<th>Function in application</th>
<th>Product series</th>
<th>Benefits</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 TVS diode array</td>
<td>Protects touchscreen ICs from user-induced ESD events</td>
<td>SP1012, SP1003</td>
<td>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</td>
<td>Low dynamic resistance; five-channel protection in a small 0402 footprint; maintains high signal integrity</td>
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<td>2 Polymer ESD suppressor</td>
<td>Protects the Wi-Fi chipset from user-induced ESD events</td>
<td>PGB10603, PGB10402</td>
<td>Enables compact design and low clearance between antenna and casing, retains RF signal integrity, improves system reliability</td>
<td>Ultra-low capacitance; compact form factor; low leakage current; fast response time</td>
</tr>
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<td>3 Reed switch</td>
<td>Proximity detection of the door to verify full closure before engaging deadbolt</td>
<td>MDSM-4, MDSR-10 H-36</td>
<td>Lowest power consumption for longest battery life</td>
<td>Hermetically sealed, magnetically operated contacts</td>
</tr>
<tr>
<td>4 Reed switch</td>
<td>Alerts user if someone is tampering with the lock</td>
<td>59166</td>
<td>Lowest power consumption for longest battery life</td>
<td>Hermetically sealed, magnetically operated contacts</td>
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Wireless door/window sensors with control panel

**Position sensing**
- Reed switches
- Magnetic actuator

**Power supply**
- Fuse
- TVS diodes

**Wireless communication**
- Polymer ESD suppressors

**User interface**
- TVS diode arrays
Wireless door/window sensors with control panel block diagram

Legend:
- Power Line
- Signal Line

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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

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<tr>
<td>Reed switch and magnetic actuator</td>
<td>Open/closed proximity detection of the window or door</td>
<td>MDSM-4, MDSR-10 H-36</td>
<td>Lowest power consumption for longest battery life</td>
<td>Hermetically sealed, magnetically operated contacts</td>
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<td>Polymer ESD suppressor</td>
<td>Protects the Wi-Fi chipset from user-induced ESD events</td>
<td>PGB10603, PGB10402</td>
<td>Enables compact design and low clearance between antenna and casing, retains RF signal integrity; improves system reliability</td>
<td>Ultra-low capacitance; compact form factor; low leakage current; fast response time</td>
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<td>Fuse</td>
<td>Protects equipment and personnel from overcurrent faults</td>
<td>215, 875, 877</td>
<td>Reduces customer qualification time by complying with regulatory safety standards such as UL/IEC</td>
<td>Compliant with UL/IEC standards, low internal resistance, shock safe, vibration resistant</td>
</tr>
<tr>
<td>MOV</td>
<td>Protects the power unit from lightning and other voltage transients on the AC line</td>
<td>LA, C-III</td>
<td>Reduces customer qualification time by complying with regulatory safety standards such as UL/IEC</td>
<td>Can meet wide-set surge withstand specifications: 40 J – 530 J (2 mS)</td>
</tr>
<tr>
<td>TVS diode</td>
<td>Protects sensitive electronic components from voltage transients</td>
<td>SMCJ</td>
<td>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</td>
<td>1500 W peak pulse capability; low dynamic resistance; five-channel protection in a small 0402 footprint; maintains high signal integrity</td>
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<td>TVS diode array</td>
<td>Protects touchscreen ICs from user-induced ESD events</td>
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Standards for smart locks and access control

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<tr>
<th>Standard</th>
<th>Title</th>
<th>General scope</th>
<th>Littelfuse Technology</th>
<th>Market</th>
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<tr>
<td>UL 1034</td>
<td>Standard for burglary-resistant electric locking mechanism</td>
<td>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</td>
<td>Fuse, MOV</td>
<td>North America</td>
</tr>
<tr>
<td>GA 374</td>
<td>Burglary-resistant electronic locks</td>
<td>This standard is applicable to the design, manufacture, inspection, and acceptance of burglary-resistant electronic locks</td>
<td>Fuse, MOV</td>
<td>China</td>
</tr>
<tr>
<td>GA 701 - 2007</td>
<td>General specifications for burglary resistant fingerprint locks</td>
<td>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</td>
<td>Fuse</td>
<td>China</td>
</tr>
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Access control topology in a building/industrial facility

[Diagram of access control topology]
Additional information can be found on littelfuse.com

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

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Greener
Local resources supporting our global customers