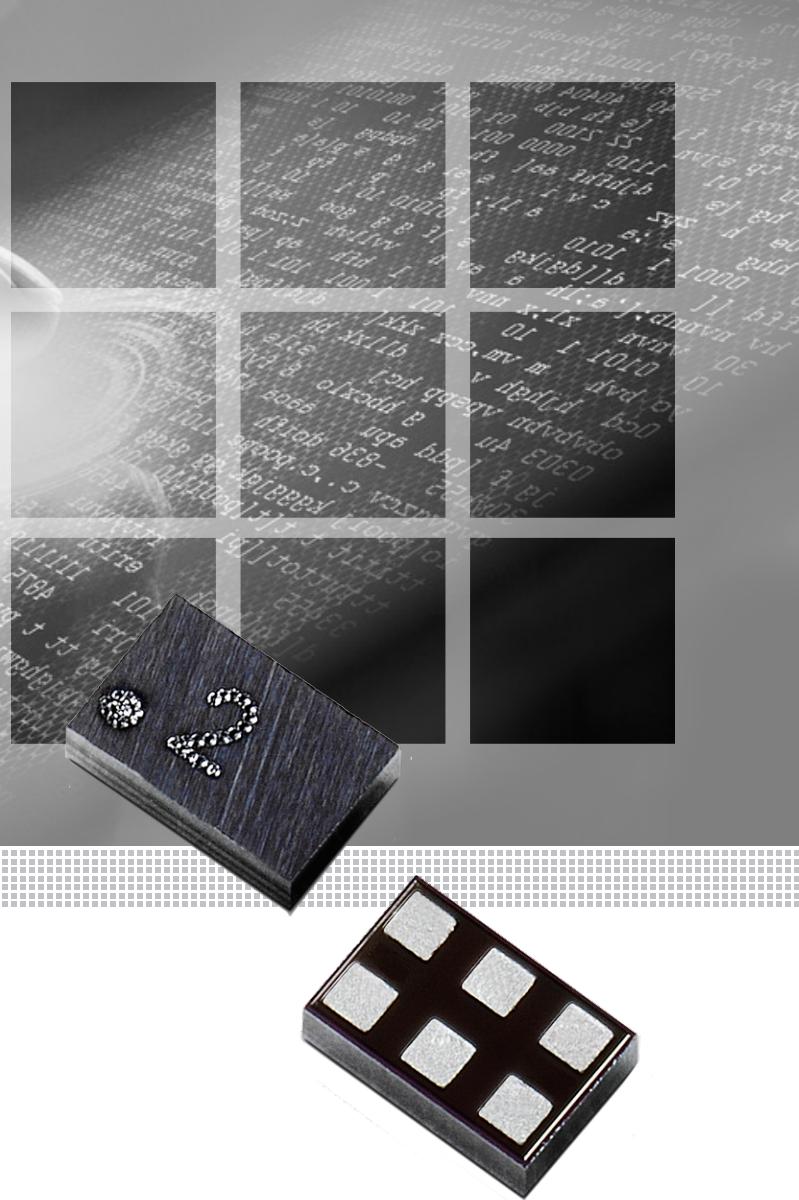


# 5X ESD DIODES IN A 0402-SIZED FOOTPRINT



Same High  
Performance ESD  
Circuit Protection in  
33% of the Footprint

Extremely small outline, densely  
packaged device to protect the data  
and interface lines of user interfaces,  
specifically touch screen displays

The SP1012-05WTG is a five-line, bidirectional, low capacitance device ideally suited to protect the lines on SIM cards and touch screens against ESD damage. The SP1012 provides five lines of ESD protection in the same size footprint as an 0402 style chip.

Although it was initially designed to protect the baseband and subscriber identity processors against ESD damage, it's also ideal for use in other ESD protection applications. The SP1012 is particularly well suited for protecting the I<sup>2</sup>C lines on capacitive touch screen displays against ESD.

The SP1012-05WTG is the world's smallest ESD protection array, well suited for critical interfaces in a range of wireless devices, including:

- Capacitive Touch Screen Interfaces
- Micro SIM Card Protection
- Micro SIM Card Protection
- Keypad Protection



Datasheet



Samples

## World's Smallest Footprint ESD Protection Array

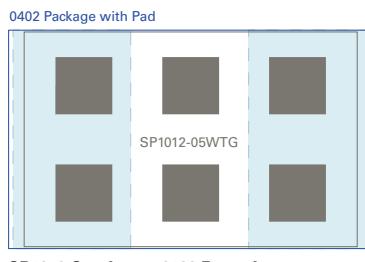
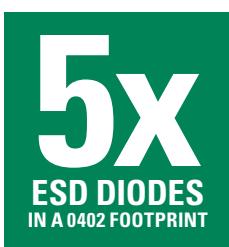


### Features

- Sets a new standard! Most ESD protection diodes per mm<sup>2</sup>
- Promotes high ESD immunity and superior protection
  - ESD: IEC61000-4-2, ±15kV
  - Lightning: IEC61000-4-5, 3A
  - EFT: IEC61000-4-4, 40A
- Very low dynamic resistance of 0.48Ω
- Flexible ground connection; any I/O pad will work
- Permits back-to-back 6V standoff

### Benefits

- Five ESD diodes in an 0402-sized footprint (0.94x0.61mm) represents a 33% space savings when compared with five discrete 0201-sized diodes, saving PCB area and cost
- ESD protection beyond the maximum rating in the IEC61000-4-2 standard gives engineers more design margin and higher end product reliability in the field
- Supports low clamping voltages needed for protecting modern electronics filled with small-geometry ICs
- Designer friendly; permits flexible routing, connect to closest available ground
- Standoff voltages enable protection of 95% of all interfaces



*SP1012 Overlay on 0402 Footprint*

**The world's most densely packaged ESD protection array is ideal for protecting consumer electronics such as wearables, smartphones, and tablets.**

The SP1012-05WTG is a five-line, bidirectional, low capacitance device that's ideally suited for protecting the lines on SIM cards and touch screens against ESD damage.

### The interaction of ESD and personal electronics

Whenever people interact with their environment, electrostatic discharges (ESDs) are created. The use of smartphones and tablet computers can exacerbate the development of these discharges. These devices are increasingly susceptible to ESD attack as a result of the use of fashionable covers, sheaths, etc. When a tablet or smartphone in a cover or sheath is inserted or removed from a pocket, purse or briefcase, it creates static electricity, which can discharge across the device's touch screen and into the device itself.

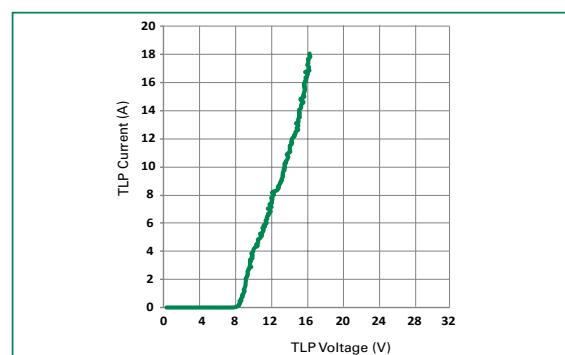
Protection of the lines that interface into the smartphone or tablet is critical to ensure the long-term reliability of the electronic device.

The capacitive touch screen display, which is the most common interface on current-generation smartphones, tablets and wearables, is particularly critical to protect because it provides, by design, a conduit to transmit wanted (control) and unwanted (electrostatic, electronic noise) signals to the most sensitive electronic elements of the device, the baseband processor.

### Capacitive touch operation

Capacitive touch sensors are either embedded into the display module or sit above the display module on a clear, flexible substrate. Micro-thin rows and columns present a known relative capacitance to the touch screen controller chip. When a person's finger or a stylus makes contact with the touch screen, this registers as a change in the relative capacitance in the microstrip rows and columns embedded in the flexible substrate. The location is established through a data bus to the baseband or applications processor.

The ultra-thin microstrips and the connecting circuitry present a path either towards ground or towards the most ESD-sensitive semiconductors on the smartphone, tablet, or wearable device.



*SP1012 Transmission Line Pulsing (TLP) Plot*