

Ultra-low clamping voltage 0201 ESD diodes



This new ultra-low clamping 0201 Z-series completes the existing and large range of ST single ESD protection devices

To protect microcontrollers and ICs against ESD strikes, ST's 0201 single-line protection ICs with snapback effect drastically reduce the clamping voltage down to 7 V for an 8 kV ESD discharge.

As circuits become denser in compliance with Moore's law, technologies become more vulnerable to ESD events. ST satisfies customers' needs for tiny, efficient and robust protection devices.

KEY FEATURES

- Efficiency and robustness
- Ultra-low clamping voltage: 7 V after 30 ns (IEC 61000-4-2 ESD contact discharge)
- 0201 flexible and standard package (0.6 x 0.3 mm)
- Very low capacitance down to 6 pF
- Very low leakage current below 100 nA
- Up to 18 kV IEC 61000-4-2 ESD contact discharge
- Up to 7 A 8/20 μ s peak pulse current

KEY BENEFITS

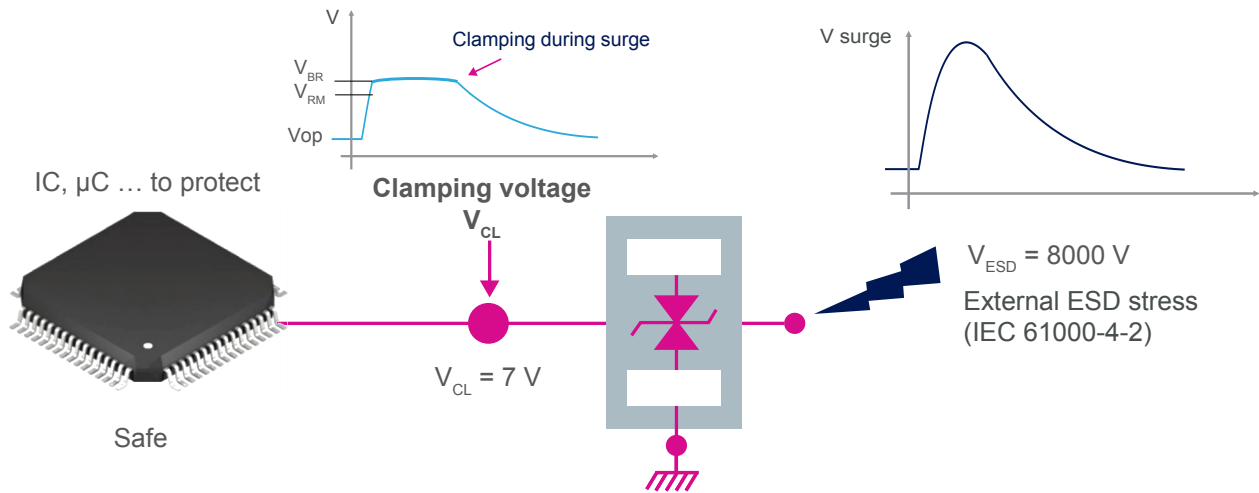
- Easy design and PCB layout
- System immunity against ESD
- Smaller form factor with more functionalities

KEY APPLICATIONS

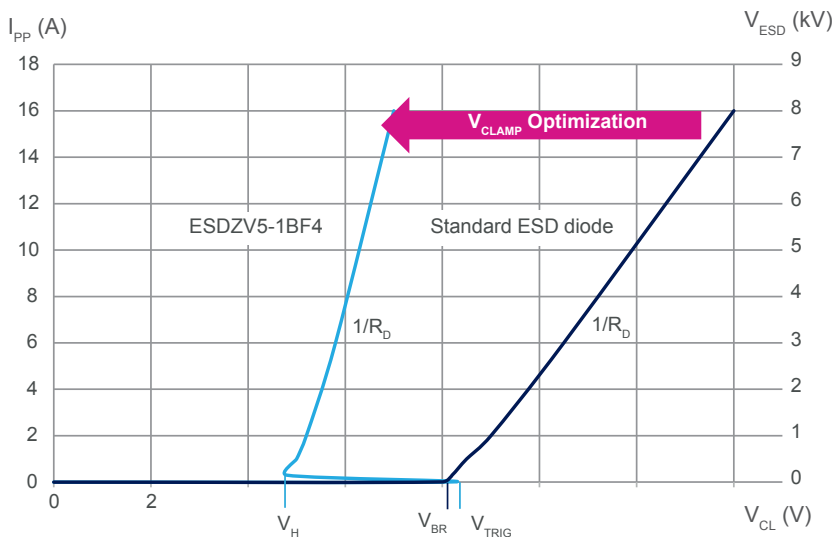
- Smart watches
- Fitness devices
- Wireless speakers
- Access control devices
- Point-of-sale terminals
- Active cables and connectors
- Healthcare devices
- Industrial sensors
- Wearables
- Smartphones and portable devices
- Laptops and peripherals

GET RID OF ESD HAZARDS

ESD surges of 8 kV are clamped down to 8 V protecting IC or microcontroller from external ESD hazards



Clamping voltage is divided by 2



ULTRA-LOW CLAMPING VOLTAGE

Snapback effect

The 0201 Z-series behaves differently from standard ESD diodes, which start to clamp from the breakdown voltage V_{BR} value (corresponding to the avalanche voltage of the diode) following a slope linked to the dynamic resistance R_D of the diode.

The clamping voltage is given by $V_{\text{CL}} = V_{\text{BR}} + R_D \cdot I_{\text{PP}}$, where I_{PP} is the peak pulse current.

The 0201 Z-series ESD diodes offer a Snapback effect that will not turn on until reaching their trigger voltage (V_{TRIG}). Once V_{TRIG} reached, then the voltage will suddenly decrease down the holding voltage (V_H).

In this case, $V_{\text{CL}} = V_H + R_D \cdot I_{\text{PP}}$.

This new protection technology also offers lower dynamic resistance (R_D) than standard ESD diodes.

The Snapback effect combined with improved dynamic resistance leads to a drastic reduction of the clamping voltage.

PRODUCT TABLE

Part number	Directionality	V_{TRIG} min.	V_H min.	V_{CL} (30 ns after IEC 61000-4-2 8 kV contact)	Maximum peak pulse voltage	Typical line capacitance
ESDZV5-1BF4	Bi-directional	5.8 V	4 V	7 V	18 kV	6 pF
ESDZL5-1F4	Uni-directional	5.8 V	4 V	9.5 V	15 kV	7.5 pF

