



## Product Brief

# New generation ESD protection diodes

## Chip scale package TVS for wireless, computing & consumer applications

Infineon offers a comprehensive portfolio of diodes designed for ESD (Electrostatic Discharge) protection of wireless, computing and consumer applications.

### Superior protection performance

Infineon TVS diodes in CSP withstand thousands of ESD strikes exceeding the toughest level of IEC61000-4-2 standard. Superior system's protection is ensured thanks to low clamping voltages and ultra-low dynamic resistance down to  $0.09 \Omega$  (see table on next page). Diodes with ultra-low capacitance are preferred solution for optimal signal integrity in high speed and RF interface applications.

### World's smallest TVS diodes

Available in 01005 and 0201 EIA-equivalent packages, these TVS diodes in chip scale package measure just  $0.43 \times 0.23 \text{ mm}$  for WLL-2-2 (thin super-small leadless package) and  $0.58 \times 0.28 \text{ mm}$  for WLL-2-1 and WLL-2-3 (thin small leadless package). With their small size underneath electrode pad design these devices boast true space savings in highly populated PCB boards.

Package's height is a key element in the design of modern electronic equipment. With only  $0.15 \text{ mm}$  thickness these WLL packages are the solution of preference for many major manufacturers of slim electronics.

WLL-2 diode packages are RoHS and halogen-free complaint. They are suitable to all most used variations of pick-and-place assembly.

### Longer battery's duration

To limit power consumption and extend battery duration, electronic hardware designers are looking to reduce leakage current drained by small components in routing operation mode. Infineon TVS diodes in CSP with leakage currents down to less than  $1 \text{ nA}$  (see table on next page) represent a significant benefit for battery-powered electronics.

### Application examples

- > Smartphones
- > Wearable devices & accessories
- > Tablet & laptop computers
- > Modules & embedded

### Key features

- > ESD absorption capability of up to  $\pm 30 \text{ kV}$  (exceeds IEC 61000-4-2 standard)
- > Surge absorption capability of up to  $\pm 12 \text{ A}$  (IEC 61000-4-5 standard)
- > Ultra-low dynamic resistance
- > Safe and stable clamping voltage
- > Fast response times below  $1 \text{ ns}$
- > For signal voltage levels of  $\pm 3.3 \text{ V}$ ,  $\pm 5.5 \text{ V}$ ,  $\pm 8 \text{ V}$ ,  $\pm 18 \text{ V}$ ,  $\pm 22 \text{ V}$
- > Low capacitance series for optimal high speed signal integrity
- > Ultra-low leakage current for longer battery duration
- > Small package size down to  $0.43 \times 0.23 \text{ mm}$  for optimal space saving on the PCB
- > Ultra-low profile of up to  $0.15 \text{ mm}$  height for both 01005 and 0201 packages

# New generation ESD protection diodes

Chip scale package TVS for wireless, computing & consumer applications

## Applications & parameters<sup>1)</sup>

Application examples	Infinion part name	Package size	Protected lines	$V_{RWM}$ [V]	$V_{Clamp}^{2)}$ [V]	$R_{Dyn}$ [Ω]	$C_L^{3)}$ [pF]	ESD IEC 61000-4-2 contact [kV]	$I_{surge}$ [A]	$I_{R,max}^{4)}$ [nA]
Audio/speaker headset lines keypad display buttons ESD protection	ESD202-B1-CSP01005	01005	1	±5.5	13.0	0.20	6.50	±15	3.0	100
	ESD230-B1-W0201	0201	1	±5.5	13.0	0.22	7.00	±16	3.0	100
	ESD231-B1-W0201	0201	1	±5.5	12.0	0.30	3.50	±30	12.0	20
	ESD233-B1-W0201	0201	1	±5.5	13.0	0.20	33.00	±16	5.0	100
	ESD237-B1-W0201	0201	1	±8.0	13.0	0.25	7.00	±15	2.5	50
	ESD239-B1-W0201	0201	1	±22.0	27.0	0.27	3.20	±16	3.5	100
	ESD241-B1-W0201	0201	1	±3.3	6.0	0.09	6.50	±15	4.0	30
	ESD242-B1-W01005	01005	1	±3.3	6.0	0.09	6.00	±15	4.0	30
	ESD245-B1-W0201	0201	1	±5.5	7.5	0.10	5.80	±15	5.0	30
	ESD246-B1-W01005	01005	1	±3.3	7.5	0.09	5.50	±15	5.0	30
ESD249-B1-W0201	0201	1	±18.0	23.0	0.30	4.20	±16	3.5	100	
USB 2.0/3.0 HDMI1.3/1.4 DisplayPort DVI NFC GPS FM radio ESD protection	ESD119-B1-W01005	01005	1	±5.5	20.0	0.80	0.20	±25	2.5	50
	ESD128-B1-W0201	0201	1	±18.0	32.0	0.85	0.30	±15	2.0	30
	ESD129-B1-W01005	01005	1	±18.0	28.0	0.80	0.30	±15	2.0	30
	ESD130-B1-W0201	0201	1	±5.5	20.0	0.80	0.30	±15	2.5	50
	ESD131-B1-W0201	0201	1	±5.5	13.0	0.60	0.25	±20	3.0	100
	ESD133-B1-W01005	01005	1	±5.5	13.0	0.60	0.23	±25	3.0	100
	ESD144-B1-W0201	0201	1	±18.0	20.0	0.60	0.25	±15	3.0	30

1) For further information please refer to datasheets: [www.infineon.com/esdprotection](http://www.infineon.com/esdprotection)

Typical values are given unless other indicated

2) Measured at  $I_{TLF} = 16\text{ A}$ ,  $t_p = 100\text{ ns}$

3) Measured at  $V_a = 0\text{ V}$

4)  $f = 1\text{ MHz}$ , measured at  $V_R$

## Orderable part No.

- › ESD202B1CSP01005XTSA1
- › ESD230B1W0201E6327XTSA1
- › ESD231B1W0201E6327XTSA1
- › ESD233B1W0201E6327XTSA1
- › ESD237B1W0201E6327XTSA1
- › ESD239B1W0201E6327XTSA1
- › ESD241B1W0201E6327XTSA1
- › ESD242B1W01005E6327XTSA1
- › ESD245B1W0201E6327XTSA1
- › ESD246B1W01005E6327XTSA1
- › ESD249B1W0201E6327XTSA1
- › ESD119B1W01005E6327XTSA1
- › ESD128B1W0201E6327XTSA1
- › ESD129B1W01005E6327XTSA1
- › ESD130B1W0201E6327XTSA1
- › ESD131B1W0201E6327XTSA1
- › ESD133B1W01005E6327XTSA1 (coming soon)
- › ESD144B1W0201E6327XTSA1
- › ESD145B1W01005E6327XTSA1 (coming soon)

Published by  
Infineon Technologies AG  
81726 Munich, Germany

© 2017 Infineon Technologies AG.  
All Rights Reserved.

### Please note!

THIS DOCUMENT IS FOR INFORMATION PURPOSES ONLY AND ANY INFORMATION GIVEN HEREIN SHALL IN NO EVENT BE REGARDED AS A WARRANTY, GUARANTEE OR DESCRIPTION OF ANY FUNCTIONALITY, CONDITIONS AND/OR QUALITY OF OUR PRODUCTS OR ANY SUITABILITY FOR A PARTICULAR PURPOSE. WITH REGARD TO THE TECHNICAL SPECIFICATIONS OF OUR PRODUCTS, WE KINDLY ASK YOU TO REFER TO THE RELEVANT PRODUCT DATA SHEETS PROVIDED BY US. OUR CUSTOMERS AND THEIR TECHNICAL DEPARTMENTS ARE REQUIRED TO EVALUATE THE SUITABILITY OF OUR PRODUCTS FOR THE INTENDED APPLICATION.

WE RESERVE THE RIGHT TO CHANGE THIS DOCUMENT AND/OR THE INFORMATION GIVEN HEREIN AT ANY TIME.

### Additional information

For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices, please contact your nearest Infineon Technologies office ([www.infineon.com](http://www.infineon.com)).

### Warnings

Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life-endangering applications, including but not limited to medical, nuclear, military, life-critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.