



## Application Brief

# ESD Protection Diodes for Mobile Phone and Consumer Applications

Infineon offers a comprehensive portfolio of diodes designed for ESD (Electrostatic Discharge) protection of applications such as (see also Table):

- SuperSpeed USB (USB 3.0)
- High-Definition Multimedia Interface (HDMI)
- Mobile High-Definition Link (MHL)
- MHL/HDMI
- Mobile Information Device Profile (MIDP)
- DisplayPort
- External Serial Advanced Technology Attachment (eSATA)
- Low Voltage Differential Signalling (LVDS) interfaces
- Audio lines, microphone, speaker, headset
- Keyboard, general purpose applications
- Power lines

### Simplified PCB Layout

Leadless and leaded packages are offered for single-line and multi-line protection.

Market standard 0201 and 0402 EIA-equivalent packages are available in all capacitance versions and measure just 0.62 x 0.32mm or 1.00 x 0.60mm respectively.

Multi-line protection of up to 4 I/O lines and additionally Vbus can be achieved simultaneously with one array solution. This is the package of preference to protect e.g. double USB ports (see Table).

Routing is a key element in modern designs. Poor package choice can force designers to do difficult routing configurations, originating impedance mismatch and signal integrity issues. The newest leadless array packages from Infineon featuring protection of up to 4 lines and flow through design with 0.5mm pitch facilitate simple PCB layout. Applications like USB 3.0 greatly benefit from this feature for the compliance with high-speed signal quality requirements.

### Superior Protection Performance

- No degradation even after thousand of ESD strikes
- REAL low clamping voltages to IEC61000-4-2
- Ultralow dynamic resistance down to 0.13Ω
- Designed for signal voltage levels from ±3.3V up to ±24V
- Ultralow capacitance values for optimal signal integrity down to 0.1pF

### Target Applications

- Mobile Phones
- Tablets
- Notebooks
- Game consoles
- External storage devices
- Printers and Scanners
- TVs and Monitors
- DVD Recorders and Players
- Digital Cameras
- HD Video Systems
- Set Top Boxes (STB)
- Voice Command Devices (VCD)

# ESD Protection Diodes for Mobile Phone and Consumer Applications

Application's Matrix for Infineon TVS Diodes

TVS Diode	Package Size	Protected Lines	V <sub>RWM</sub> [V]	C <sub>t</sub> (V <sub>C</sub> to GND) [pF]	USB 2.0	Dual USB 2.0	USB 3.0	HDMI 1.3/1.4	DisplayPort	IEEE 1394 (Firewire, DV)	e-SATA	DVI	SCSI//O Bus	Bluetooth	WLAN	S-Video	SD Card Slot	RS232	DC Input	PCMCIA Card Slot	VGA	LCD Monitor Controller (LVDS)	LCD Monitor Controller (status lines)	Keyboard, Buttons, Touchpad	Headphone Jack / Speaker	DC Input	PS/2
					ESD221-U1-02EL	TSLP-2-20	1	5.3	35																		
ESD207-B1-02EL	TSLP-2-19	1	±3.3	14												●	●			●	●	●	●	●	●	●	●
ESD207-B1-02ELS	TSSLP-2-3	1	±3.3	14												●	●			●	●	●	●	●	●	●	●
ESD206-B1-02ELS	TSSLP-2-3	1	±5.5	13												●	●			●	●	●	●	●	●	●	●
ESD206-B1-02EL	TSLP-2-19	1	±5.5	13												●	●			●	●	●	●	●	●	●	●
ESD206-B1-02V	SC79	1	±5.5	13												●	●			●	●	●	●	●	●	●	●
ESD200-B1-CSP0201	WLL-2-1	1	±5.5	6.5												●	●			●	●	●	●	●	●	●	●
ESD203-B1-02EL	TSLP-2-20	1	±12	6												●	●	●	●	●	●	●	●	●	●	●	●
ESD203-B1-02ELS	TSSLP-2-4	1	±12	6												●	●	●	●	●	●	●	●	●	●	●	●
ESD208-B1-02EL	TSLP-2-19	1	±3.3	6												●	●			●	●	●	●	●	●	●	●
ESD208-B1-02ELS	TSSLP-2-3	1	±3.3	6												●	●			●	●	●	●	●	●	●	●
ESD205-B1-02EL	TSLP-2-19	1	±5.5	4												●	●			●	●	●	●	●	●	●	●
ESD205-B1-02ELS	TSSLP-2-3	1	±5.5	4												●	●			●	●	●	●	●	●	●	●
ESD218-B1-02EL	TSLP-2-20	1	±24	2.5													●				●	●	●	●	●	●	●
ESD218-B1-02ELS	TSSLP-2-4	1	±24	2.5													●				●	●	●	●	●	●	●
ESD3V3U4ULC	TSLP-9-1	4	3.3	0.5			●	●				●															
ESD5V5U5ULC	SC74	4 + V <sub>CC</sub>	5.5	0.45	●	●						●															
ESD102-U1-02ELS	TSSLP-2-3	1	3.3	0.4	●	●	●	●	●	●	●	●															
ESD102-U2-099L	TSLP-4-10	2	3.3	0.4	●	●	●	●	●	●	●	●															
ESD102-U4-05L	TSLP-5-2	4	3.3	0.4	●	●	●	●	●	●	●	●															
ESD114-B1-02EL	TSLP-2-19	1	5.3	0.4	●	●				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
ESD114-B1-02ELS	TSSLP-2-3	1	5.3	0.4	●	●				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
ESD5V3U4RRS	SOT363	4 + V <sub>CC</sub>	5.3	0.4	●	●																					●
ESD5V3U4U-HDMI	TSLP-9-1	4	5.3	0.4				●	●	●	●	●	●	●	●					●		●					
ESD108-B1-CSP0201	WLL-2-1	1	±5.5	0.25	●	●	●	●	●	●	●	●				●	●										
ESD105-B1-02EL	TSLP-2-20	1	±5.5	0.25	●	●	●	●	●	●	●	●				●	●										
ESD105-B1-02ELS	TSSLP-2-4	1	±5.5	0.25	●	●	●	●	●	●	●	●				●	●										
ESD112-B1-02EL	TSLP-2-20	1	±5.3	0.23	●	●		●			●	●				●	●										
ESD112-B1-02ELS	TSSLP-2-4	1	±5.3	0.23	●	●		●			●	●				●	●										
ESD113-B1-02EL	TSLP-2-20	1	±3.6	0.22	●	●	●	●	●	●	●	●				●	●										
ESD101-B1-02EL	TSLP-2-20	1	±5.5	0.1												●	●										
ESD101-B1-02ELS	TSSLP-2-4	1	±5.5	0.1												●	●										
ESD103-B1-02EL	TSLP-2-20	1	±15	0.1												●	●										
ESD103-B1-02ELS	TSSLP-2-4	1	±15	0.1												●	●										

● Dedicated Solution  
● Optional Solution

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