



ESD Solutions for USB 3.0

RClamp® 3346P

KEY FEATURES

- 3.3V working voltage
- Protects six lines
- $\pm 17\text{kV}$ Contact/ $\pm 20\text{kV}$ Air
- Dynamic resistance: 0.15Ω
- Low capacitance: 0.65pF I/O to I/O
- Flow-through package ($2.7\text{x}0.8\text{x}0.50\text{mm}$)



Alternative Solutions

RClamp® 3324P

KEY FEATURES

- 3.3V working voltage
- Protects four lines
- $\pm 17\text{kV}$ Contact/ $\pm 20\text{kV}$ Air
- Dynamic resistance: 0.15Ω
- Low capacitance: 0.65pF I/O to I/O
- Flow-through package ($2.5\text{x}1.0\text{x}0.60\text{mm}$)

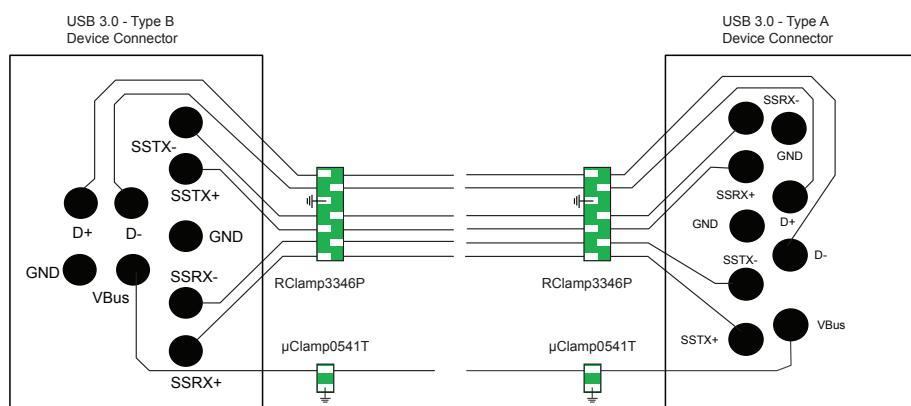
RClamp® 3552T

KEY FEATURES

- 3.5V working voltage
- Protects two lines
- $\pm 17\text{kV}$ Contact/ $\pm 20\text{kV}$ Air
- Dynamic resistance: 0.3Ω
- Low capacitance: 0.4pF I/O to I/O
- Flow-through package ($1.0\text{x}0.6\text{x}0.50\text{mm}$)

ESD Protection To Safeguard High-Speed USB 3.0 Data Lines

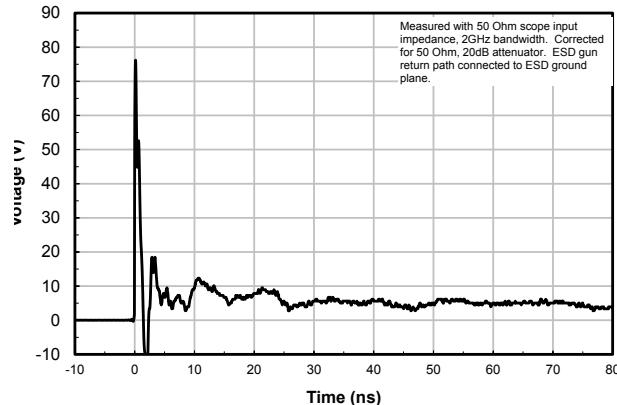
High-speed USB 3.0 data-line transceivers are vulnerable to frequent threats from ESD, EFT and Cable Discharge events. USB 3.0 ICs require state of the art transient voltage suppression (TVS) protection solutions that can both arrest dangerous fast rise-time transient threats while also presenting sufficiently low junction capacitance to not adversely impact signal integrity. Semtech has pioneered and led the way in transient protection for high speed data lines, offering industry leading TVS technology to safeguard the most sensitive USB 3.0 data lines.



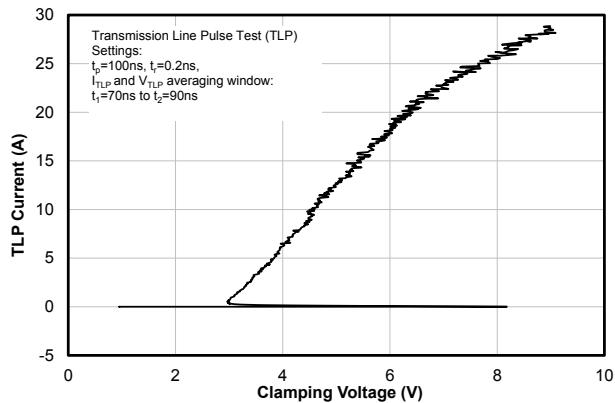
USB 3.0 Protection with RClamp® 3346P

ESD & TLP Clamping Response RClamp® 3346P

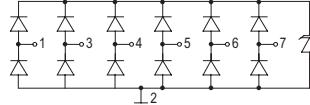
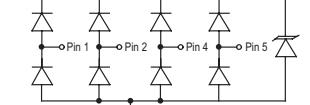
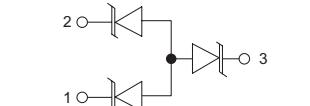
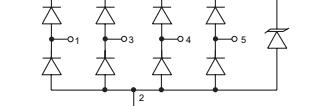
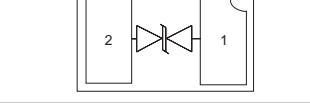
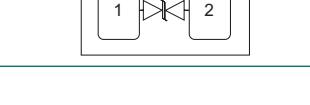
ESD Clamping (+8kV Contact per IEC 61000-4-2)
Between any I/O and Ground



TLP Characteristic (Positive)



Device Parameter Summary (USB 3.0 Protection)

Part Number	V_{rvm}	Lines	ESD Rating		Cap (I/O - I/O)	I _{pp} @ 8/20 μ s	Package size (mm)	Schematic Reference
			Air	Contact				
RClamp3346P	3.3	6	$\pm 20\text{kV}$	$\pm 17\text{kV}$	0.6pF	5A	2.7x0.8x0.5	
RClamp3324P	3.3	4	$\pm 20\text{kV}$	$\pm 17\text{kV}$	0.6pF	4.5A	2.5x1.0x0.6	
RClamp3552T	3.5	2	$\pm 20\text{kV}$	$\pm 17\text{kV}$	0.3pF	4A	1.0x0.6x0.4	
RClamp7524T	5	4	$\pm 30\text{kV}$	$\pm 25\text{kV}$	0.5pF	5A	1.3x0.8x0.4	
RClamp3521P	3.5	1	$\pm 17\text{kV}$	$\pm 12\text{kV}$	0.33pF	4A	1.0x0.6x0.5	
RClamp3331ZA	3.3	1	$\pm 18\text{kV}$	$\pm 18\text{kV}$	0.35pF	4A	0.6x0.3x0.25	



200 Flynn Road, Camarillo, California 93012 • phone: (805) 498-2111 • fax: (805) 498-3804

Semtech and the Semtech logo are registered marks of Semtech Corporation. All other trademarks and trade names mentioned may be marks and names of their respective companies. Semtech reserves the right to make changes to, or discontinue any products described in this document without further notice. Semtech makes no warranty, representation or guarantee, express or implied, regarding the suitability of its products for any particular purpose. ©2017 Semtech Corporation. All rights reserved. USB3-PB