

USB Solutions



*Covering protection, filtering and switching
devices from ON Semiconductor.*



Integrated Solutions for USB Line Protection and Termination

ON Semiconductor provides a selection of integrated solutions for USB line protection and termination. Integrated IC solutions combine diodes with resistive and capacitive elements into a single package, providing:

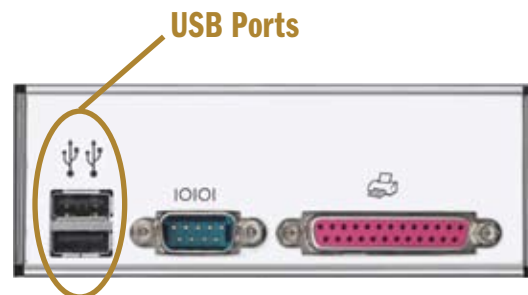
- improved parametric stability
- reduced parasitic inductance
- component count reduction
- board space reduction
- simplified supply chain
- lower overall system cost

Related Application Notes (download from www.onsemi.com)

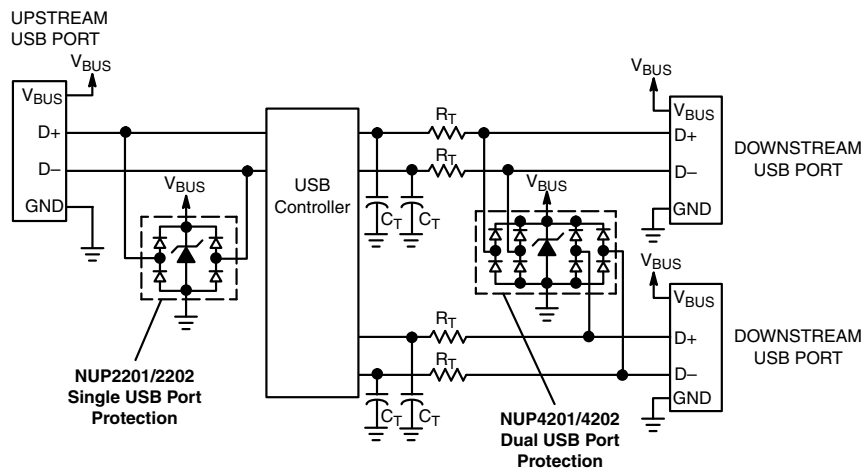
- ESD Protection for Dual USB 2.0 Port Using the Low Capacitance TVS Diode Array, NUP4201DR2 Device – download AND8082/D
- EMI Filtering, USB Upstream Line Termination and ESD Protection Using the STF202 Device – download AND8074/D
- MicroIntegration Technology Solutions for Protection in High Speed I/O Data Lines – download AND8104/D
- Design Considerations for ESD/EMI Filters: (Almost Everything You Wanted to Know About EMI Filters and Were Afraid to Ask) – download AND8200/D
- Solving EMI and ESD Problems with Integrated Passive Device Low Pass Pi Filters - download AND8026/D

Speed of Data Transport

Port	Speed
Serial Port	0.115 Mbit/s
Standard Parallel Port	0.92 Mbit/s
USB 1.1	
Low Speed	1.5 Mbit/s
High Speed	12 Mbit/s
USB 2.0	
Low Speed	1.5 Mbit/s
Full Speed	12 Mbit/s
High Speed	480 Mbit/s

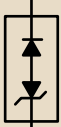
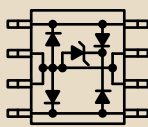
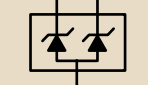
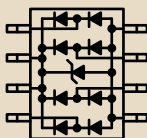
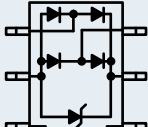
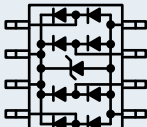
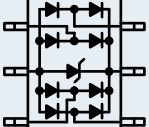
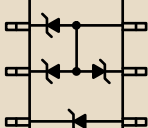
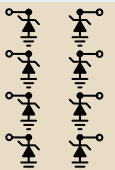
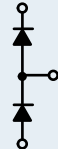
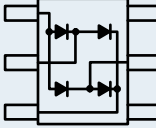
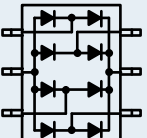


Typical USB Line Protection Application



USB Line Protection Devices

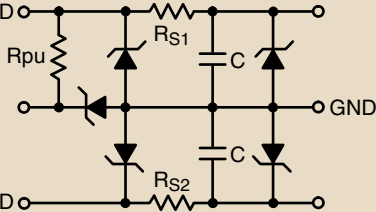
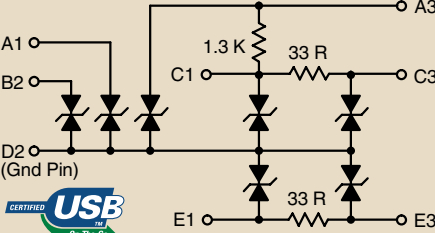
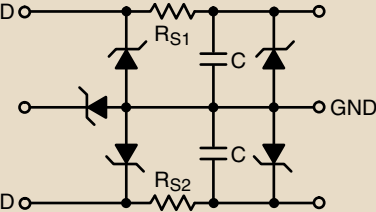
Integrated protection devices for USB from ON Semiconductor can replace up to 9 discrete devices, minimize board space and simplify board layouts. Our portfolio includes Low-, Full- and High-Speed USB solutions. All of our devices are IEC61000-4-2 compliant.

	1-Line (1/2 Port)	2-Lines (1 Port)	4-Lines (2 Ports)
Low & Full Speed I/O Lines + VBUS	  SL05T1G    ESD9A5.0ST5G 	  LC03-6R2   ESD7A5.0DT5G* 	  SRDA05-4R2
Low, Full & High Speed I/O Lines + VBUS	—	  NUP2201MR6T1G   NUP2202W1T2G 	  NUP4201DR2   NUP4201MR6T1G   NUP4202W1T2G 
Low, Full & High Speed I/O Lines	—	  NUP4060AXV6T1G 	  NUP8010MNT1G 
Low, Full & High Speed I/O Lines	  NUP1301ML3T1G 	  NUP2301MW6T1G 	  NUP4301MR6T1G  NUP4304MR6T1G 

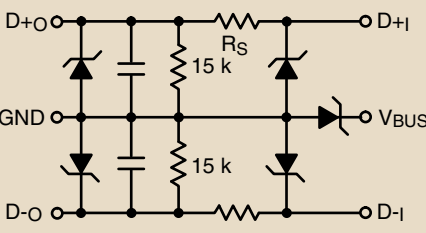
 = Symbol denotes 2nd level interconnect Pb-Free (lead) content.
 * = Coming soon.

USB Filter Devices

Integrated protection and termination devices for USB from ON Semiconductor can replace up to 11 devices by combining TVS diodes with resistive and capacitive elements. They are suitable for Low- and Full-Speed USB solutions. All of our devices are IEC61000-4-2 Level 4 compliant.

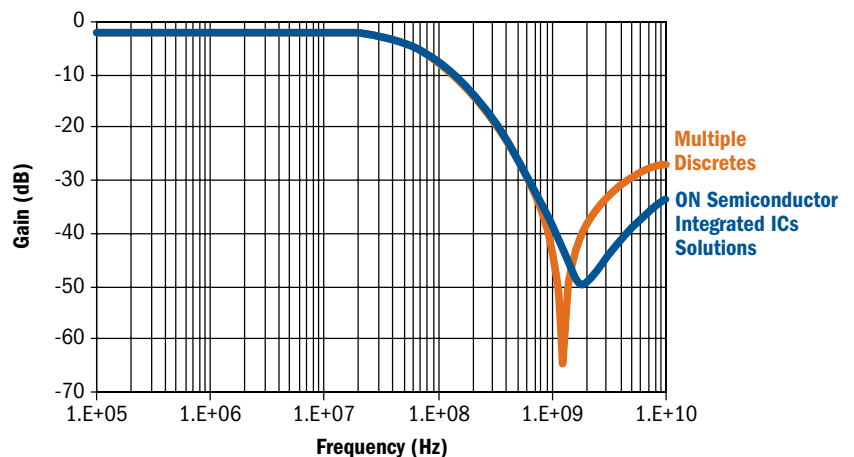
Upstream Filters	OTG (On-The-Go)	Upstream/Downstream Filters
		
 STF202-22T1G  TSOP-6	 NUF222FCT1G  Flip-Chip	 NUF2030XV6T1G  30 pF (typ) @ 2.5 V
 NUF2221W1T2G 		 NUF2042XV6T1G  42 pF (typ) @ 2.5 V
 NUF2015W1T2G  SC-88 SOT-363		 NUF2240W1T1G  17 pF (typ) @ 2.5 V SC-88 SOT-363

 = Symbol denotes 2nd level interconnect Pb-Free (lead) content.

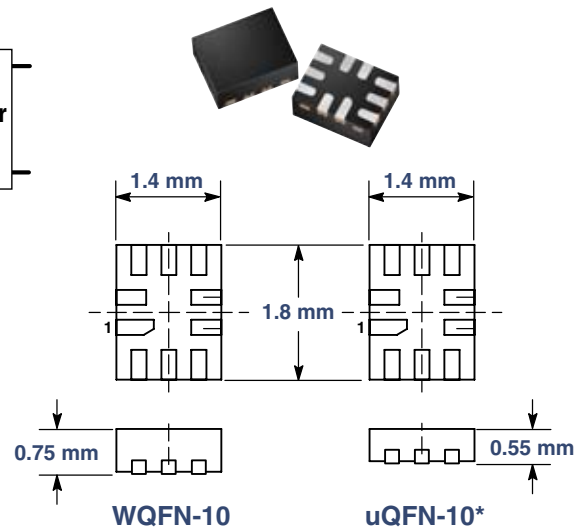
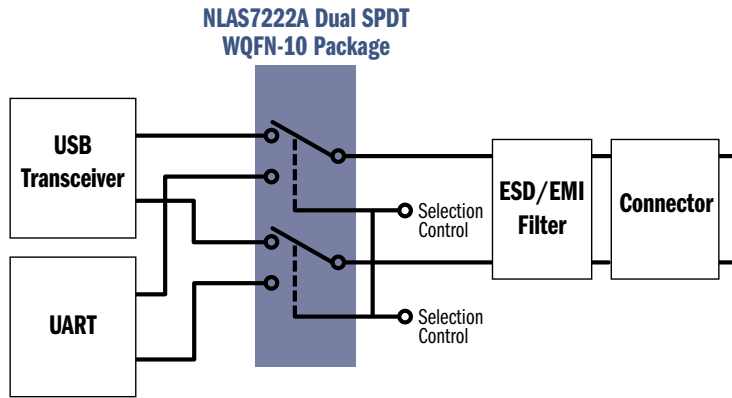
Downstream Filter

 NUF2101MT1G  55 pF (typ) @ 0 V TSOP-6

 = Symbol denotes 2nd level interconnect Pb-Free (lead) content.

The integrated solution from ON Semiconductor delivers improved insertion losses since there are lower parasitics compared to discrete solutions which use multiple packages.



NLAS7222A Dual SPDT Switch <7 pF On Switch Capacitance



Key Performance Characteristics

- Passes USB 2.0 High Speed Signals
- 6.5 Ω Typical R_{DSon} @ 3.0 V
- 500 MHz Bandwidth
- Low Crosstalk: -45 dB @ 250 MHz
- Smallest Package in the Industry

Device	Configuration	R_{ON} Max (Ω)	C Typ (pF)	Package
NLAS7222A	Dual SPDT	9	6.5	WQFN-10, uDFN-10*
NLAS4717EP	Dual SPDT	4.5	38	Flip-Chip 10

* Coming Soon



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