

USB 1.1 (FULL SPEED) PHYSICAL INTERFACE

Name		Description	
CCUSB1P1N40A		USB 1.1 (Full Speed) physical interface integrated within IO PAD	
Category		Type	Status
Interfaces		USB	GDS
Foundry	Technology	Process Node	Year
TSMC	CMOS	40 nm	2024
Deliverables (preferable IP merge model)			
<ul style="list-style-type: none"> ◆ Datasheet ◆ Characterization report ◆ Encrypted Flat Extracted netlist with parasitic ◆ Behavioral models 		<ul style="list-style-type: none"> ◆ Abstract View ◆ Timing View ◆ DRC, LVS and antenna report ◆ Integration guidelines and support 	

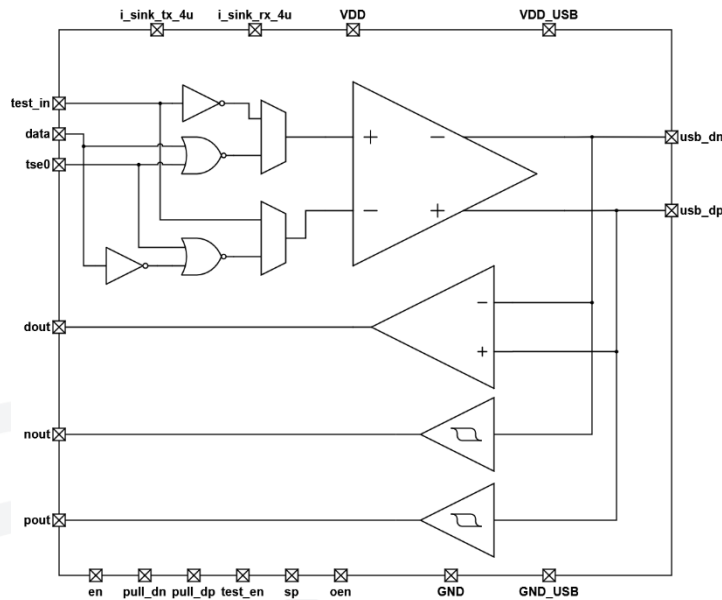


Figure 1. Simplified block diagram.

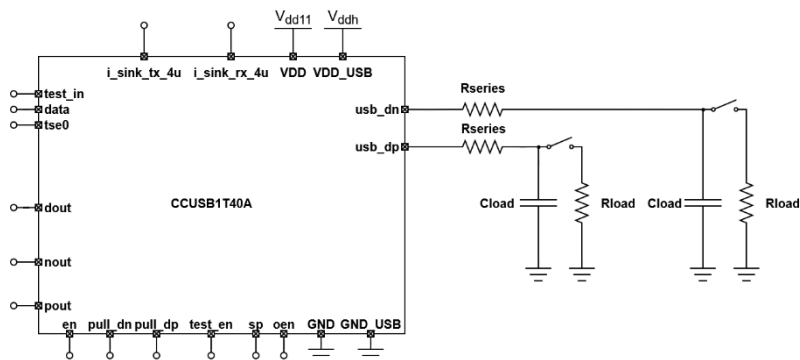


Figure 2. Typical use case.

Table 1. Pin description.

Pin name	Direction	Type	Active	Description
VDD_USB	I/O	Power		High supply voltage
VDD	I/O	Power		Digital supply voltage
GND_USB	I/O	Power		Ground for high supply voltage
GND	I/O	Power		Ground for digital supply voltage
data	I	Digital		Input signal
usb_dn	I/O	Analog		Positive differential input/output signal
usb_dp	I/O	Analog		Negative differential input/output signal
dout	O	Digital		Single ended data output signal
nout	O	Digital		Negative differential output signal
pout	O	Digital		Positive differential output signal
i_sink_tx_4u	I/O	Analog		Reference current sink supplied from PMOS transistor
i_sink_rx_4u	I/O	Analog		Reference current sink supplied from PMOS transistor
sp	I	Digital		Speed select signal
oen	I	Digital		Output enable signal
en	I	Digital	High	Enable signal
test_en	I	Digital		Test enable signal
pull_dn	I	Analog		D- node pull up
pull_dp	I	Analog		D+ node pull up
test_in	I	Digital		Test signal input to driver
tse0	I	Digital		Commands both outputs to a logic zero

Table 2. Specification.

Parameter	Description	Min.	Typ.	Max.	Unit
T_j	Operating junction temperature	-40	27	125	°C
Full speed 12MHz					
$I_{VDD_USB_avg}$	Average current consumption on VDD_USB supply	5.47	7.7	9.08	mA
I_{VDD_avg}	Average current consumption on VDD supply	6.32	6.34	6.54	μA
R_{out_high}	Output resistance for driving high	29.29	31.34	34.45	Ω
R_{out_low}	Output resistance for driving low	29.31	32.41	37.56	Ω
t_{PHZ}	Driver enable delay	9.06	10.87	13.33	ns
t_{PLZ}					
t_{rise}	Rise time	5.81	6.91	8.26	ns
t_{fall}	Fall time	4.83	5.99	7.93	ns
VCSR	Output signal crossover voltage	1.56	1.66	1.84	V
Slow speed 1.5MHz Cloud-50pF					
$I_{VDD_USB_avg}$	Average current consumption on VDD_USB supply	915.8	947.1	977.4	μA
t_{PHZ}	Driver enable delay	66.75	88.48	119.8	ns
t_{PLZ}					
t_{rise}	Rise time	71.67	96.71	137.6	ns
t_{fall}	Fall time	69.43	97.37	142.7	ns
VCSR	Output signal crossover voltage	1.66	1.81	1.93	V
Slow speed 1.5MHz Cloud-150pF					
t_{PHZ}	Driver enable delay	115.0	152.8	196.7	ns
t_{PLZ}					
t_{rise}	Rise time	137.3	181.2	277.5	ns
t_{fall}	Fall time	128.0	177.3	285.4	ns
VCSR	Output signal crossover voltage	1.748	1.765	1.766	V