

LVDS RX/TX LIBRARY CELL

UMC LG180 GENERIC PROCESS

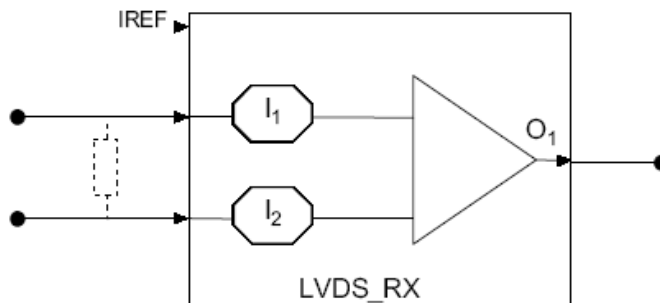
LVDS_RX

Description

The LVDS_RX

- is a differential line receiver designed for applications requiring high data rates
- provides CMOS output levels
- requires an external resistor of 100 Ohms \pm 1% connected to differential inputs
- requires the cell BG_I170_I200_V12 for biasing
- is designed as IO-pad cell with ESD protection
- is designed to be used with junction temperature from -40°C to $+125^{\circ}\text{C}$ and supply voltage of $3.3\text{V} \pm 10\%$ and $1.8\text{V} \pm 10\%$
- area 0.01754 mm^2 (size $X=125.24 \text{ um}$, $Y=140.12\text{um}$)
- working frequency is 40MHz (80Mbps transmission speed)

Symbol



Pins list

Pin	Description	Input capacitance (pF)	Type
IREF	Current Bias Input	-	Analog
I2	Positive LVDS Input	3.860	Analog
I1	Negative LVDS Input	3.857	Analog
O1	Output	-	Digital

Truth Table

INPUTS		OUTPUT
I1	I2	O1
0	0	1
0	1	1
1	0	0
1	1	1

DC CHARACTERISTICS

Symbol	Parameter	Min	Typ	Max	Units
VI	Input Voltage Range	0		2000*	mV
WIDTH	Input differential threshold	-100		+100	mV
VHYS	Input differential hysteresis	25			mV
VOH	Output Voltage High		V _{CCK}		V
VOL	Output Voltage Low		GNDK		V

*In typical and fast corners, the max voltage range is 2.4V according to standard. In slow corner, this requirement is achieved only for a power supply at least 3.22V.

AC CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{PLHD}	Differential Propagation Delay Low to High*	$C_{load}=1.5$ pF Slope=1.7n	3.234	3.515	4.204	ns
t_{PHLD}	Differential Propagation Delay High to Low*	$C_{load}=1.5$ pF Slope=1.7n	3.027	3.605	4.752	ns
t_{TLH}	Output Rise Time**	$C_{load}=1.5$ pF Slope=1.7n	1.101	1.221	1.867	ns
t_{THL}	Output Fall Time**	$C_{load}=1.5$ pF Slope=1.7n	0.666	0.766	1.206	ns
C_{load}	Load Capacitance				1.5	pF
f_{MAX}	Maximum Operating Frequency				40	MHz
TXS	Transmission Rate				80	Mb/s

* measured between 50% - 50%

** measured between 10% - 90 %

POWER CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
IVCC3IO	Peak Current from VCC3IO	Static (V_{i1} and V_{i2} at 0.05V)	621	642	666	uA
IVCC	Peak Current from VCC	Static (V_{i1} and V_{i2} at 0.05V)	1.52	2.49	3.5	mA
IVCC3IO	Current Consumption from VCC3IO	Static (no input transition)	561	583	608	uA
IVCC	Current Consumption from VCC	Static (no input transition)	418	587	805	uA

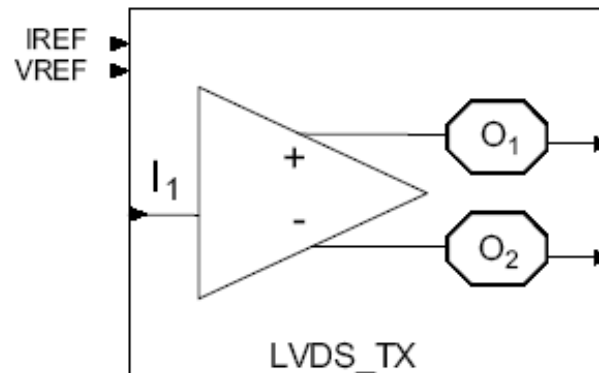
LVDS_TX

Description

The LVDS_TX

- is a differential line driver with low voltage output swing
- accepts CMOS input levels and translate them to low voltage differential outputs
- requires the cell BG_I170_I200_V12 for biasing
- is designed as IO-pad cell with ESD protection
- is designed to be used with junction temperature from -40°C to $+125^{\circ}\text{C}$ and supply voltage of $3.3\text{V}\pm 10\%$ and $1.8\text{V}\pm 10\%$
- area 0.01754 mm^2 (size $X=125.24\text{ }\mu\text{m}$, $Y=140.12\text{ }\mu\text{m}$)
- working frequency is 40MHz (80Mbps transmission speed)

Symbol



Pins list

Pin	Description	Input capacitance (fF)	Type
IREF	Current Bias Input	-	Analog
I1	Input	0.962	Digital
O1	Positive LVDS Output	-	Analog
O2	Negative LVDS Output	-	Analog
VREF	Voltage Bias Input	-	Analog

Truth Table

INPUT	OUTPUTS	
I1	O1	O2
0	0	1
1	1	0

DC CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$ V_{OD} $	Differential Output $V_{OD} = V_{O1} - V_{O2}$	$R_{load} = 100 \pm 1\%$	255.5	268.3	280.2	mV
V_{OS}	Common Mode Output Voltage $V_{OS} = (V_{O1} + V_{O2})/2$	$R_{load} = 100 \pm 1\%$	1161.8	1243.4	1248.4	mV
V_{OH}	Output Voltage High	$R_{load} = 100 \pm 1\%$	1292	1380	1394.7	mV
V_{OL}	Output Voltage Low	$R_{load} = 100 \pm 1\%$	1035	1110	1109	mV
V_{IH}	Input Voltage High			V _{CCK}		V
V_{IL}	Input Voltage Low			GNDK		V
R_O	Output Impedance Single Ended	$V_{CM} = 1\text{ V and } 1.4\text{ V}$	70		140	Ω
$?R_O$	R_O mismatch between O1 & O2	$V_{CM} = 1\text{ V and } 1.4\text{ V}$			4.8	%
$?V_{OD} $	Change in $ V_{OD} $ between '0' and '1'	$R_{load} = 100 \pm 1\%$			25	mV
$?V_{OS}$	Change in V_{OS} between '0' and '1'	$R_{load} = 100 \pm 1\%$			25	mV
I_{SO1}, I_{SO2}	Output current	Drivers shorted to ground			5.403	mA
$I_{SO1, O2}$	Output current	Drivers shorted together			2.802	mA
I_{XO1}, I_{XO2}	Power-off output leakage	Power-off			2.614*	mA

* Current measured according to IEEE P1596.3-1995 standard and with VREF and IREF pins active.

AC CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{PLHD}	Differential Propagation Delay Low to High*	$C_{load}=4pF$ Slope= 1n	1.06	1.339	1.863	ns
t_{PHLD}	Differential Propagation Delay High to Low*	$C_{load}=4pF$ Slope= 1n	1.192	1.434	1.867	ns
t_{SKD1}	Differential Pulse Skew $ t_{PLHD}-t_{PHLD} $	$C_{load}=4pF$ Slope= 1n	23.5	5.66	3.43	ps
t_{TLH}	Differential Output Rise Time**	$C_{load}=4pF$ Slope= 1n	383.1	404	412.7	ps
t_{THLD}	Differential Output Fall Time**	$C_{load}=4pF$ Slope= 1n	382.2	405	412.6	ps
C_{load}	Load Capacitance		2.75	4	5	pF
C_{in}	Input Capacitance		7.847	8.63	9.591	fF
f_{MAX}	Maximum Operating Frequency				40	MHz
TXS	Transmission Rate				80	Mbps

* measured between 50% - 50%

** measured between 20% - 80 %

POWER CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
IVCC3IO	Peak Current from VCC3IO	Static (no input transition)	9.8	11.55	13.55	mA
IVCC	Peak Current from VCCK	Static (no input transition)	319	500	716	uA
IVCC3IO	Current Consumption from VCC3IO	Static (no input transition)	6.71	6.87	7.19	mA
IVCC	Current Consumption from VCCK	Static (no input transition)	34	38.77	43.72	pA