GF40: LVDS Pad Set

Libraries

Name	Process	CUP	Form Factor
RGO_GF40_25V25_LP_UC_LVDS	LP	yes	staggered

Summary

The LVDS I/O is a three-module design (input, output and reference block). The LDP_OU_675_25V_T is a 2GBit/s LVDS Driver, LDP_IN_675_25V_DN is a 2GBit/s LVDS Receiver and the LDP_RE_000_25V is the voltage reference for up to 16 drivers. The LDP_OU_675_25V_T is designed to drive either 50Ω or 100Ω differential termination. This cell has been designed to meet a set of the standard LVDS specifications (IEEE Std 1596.3-1996, Low Voltage Differential Signaling).

Using this LVDS Pad Set, the system can achieve very high data rates per pin with simple termination requirements and low EMI. Both driver and receiver have been optimized for speed/power and can be ported to various pure digital CMOS processes from 0.18µm down to 28nm technologies. The LDP_OU_675_25V_T has been optimized for 2GBit/s operations. The receiver has been designed with no hysteresis in order to optimize sensitivity and skew.

The driver design has all the necessary components for transmit of LVDS data and a temperature stable internal reference for setting of the LVDS signaling voltage and common mode level. This provides user flexibility in deploying multiple LVDS transmitters. The reference block is required for the LVDS drivers to provide a stable common mode voltage as well as an accurate current reference for the driver source / sink current. Maximum operating frequency is 1GHz.

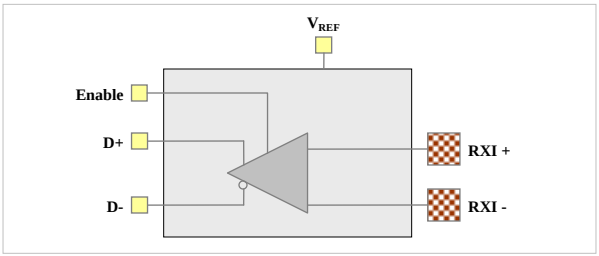
Absolute maximum ratings

Symbol	Description	Value	Units
V_{VDD}	Core supply voltage range	-0.5 to 1.38	V
V_{DVDD}	I/O supply voltage range	-0.5 to 2.95	V
V_{PAD}	Voltage range at PAD	-0.5 to (V_{DVDD} + 0.5)	V
T_J	Junction operating temperature range	-55 to 150	°C

Recommended operating conditions

Symbol	Description	Min	Nom	Max	Units
V_{VDD}	Core supply voltage	0.9	1.1 to 1.2	1.26	V
V_{DVDD}	I/O supply voltage	2.25	2.5	2.75	V
V_{VREF}	Reference voltage				V
T_A	Ambient operating temperature	0	25	100	°C
T_J	Junction temperature	-40	25	125	°C
V_{PAD}	Voltage at PAD	-0.3V		V_{DVDD}+0.3V	V

LDP_IN_675_25V_DN: 1GHz LVDS Input



Key features:

- Powered from 2.5V ±10% and 1.1V to 1.2V (±10%) core power supplies
- Operates up to 1GHz (2Gbps)
- Input receive sensitivity of 75mV peak differential (without hysteresis)
- Common mode range from 0V to 2.4V (limited by Power Supply)
- Power-up sequence independent
- Power consumption is 5 mW typical and 7.5 mW maximum at 1GHz

AC Characteristics

Parameter	Typ	Max	Units	Conditions
Propagation delay	0.5	0.85	ns	The slew rate for propagation delays, duty cycle distortion and maximum operating frequency are 1V/ns
Maximum operating frequency	1		GHz	All noise, jitter, and tdcd measured at 1GHz
Maximum data rate	2		Gb/s	

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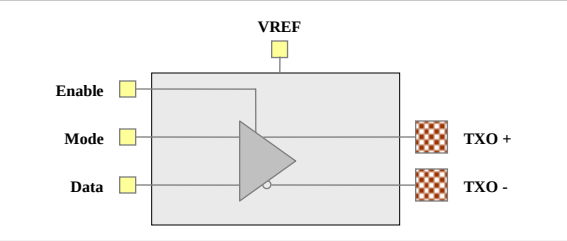
LDP_OU_675_25V_T: 1GHz LVDS Output Pad



Key features:

- Powered from 2.5V ±10% and 1.1V to 1.2V (±10%) core power supplies
- Operates up to 1GHz (2Gbps) with external 1 pF load
- Common mode output range 1.25 Volts ±50mV
- Power-up Sequence Independent
- Differential Skew between TXO_P and TXO_N 40ps
- Mode control for output drive control to drive either 100Ω or 50 Ω termination
  - 0 = 3.25 mA (for 100Ω termination)
  - 1 = 6.50 mA (for 50Ω termination)
- Power consumption at 1 GHz is 18.7 mW typical and 25.5 mW maximum

AC Characteristics

Symbol	Description	Condition	Min	Typ	Max	Units
t_{PHL}	Differential high to low propagation delay	R_L = 100 Ω C_L = 1 pF		500	730	ps
t_{PLH}	Differential low to high propagation delay	R_L = 100 Ω C_L = 1 pF		500	730	ps
t_{rise}	V_{OD} differential rise time	20% to 80%	120	190	250	ps
t_{fall}	V_{OD} differential fall time	20% to 80%	120	190	250	ps

Characterization Corners

Nominal VDD	Model	VDD	DVDD = 2.5V	Temperature
	FF	+5%	+10%	-40°C
	FF	+5%	+10%	125°C
1.2	TT	nominal	nominal	25°C
	SS	-10%	-10%	-40°C
	SS	-10%	-10%	125°C
	FF	+10%	+10%	-40°C
	FF	+10%	+10%	125°C
1.1	TT	nominal	nominal	25°C
	SS	-10%	-10%	-40°C
	SS	-10%	-10%	125°C

Cell summary

Name	Description
LDP_IN_675_25V_DN	1GHz LVDS input cell
LDP_OU_675_25V_T	1GHz LVDS output cell
LDP_RE_000_25V	V_{REF} pad
PVP_VD_RCD_12V	Core power pad with VREF
PVP_VS_RCD_12V	Power pad for VSS with VREF bus
PVP_VD_PDO_25V	Driver power pad with POC control
PVP_VD_RDO_25V	Driver power pad
PVP_VS_RDO_25V	I/O ground supply with VREF bus
SVP_SP_001_25V	0.1 µm spacer
SVP_SP_001_25V	1 µm spacer
SVP_SP_005_25V	5 µm spacer
SVP_SP_010_25V	10 µm spacer
SPP_RS_005_25V	DVDD, DVSS, POC, BIAS and VREF rail splitter
SPC_SPC_AD_UN	Core limited library adapter pad

Physical sizes

Pad name	Width	Height[*]	Units
LDP_RE_000_18V	37	180	µm
LDP_IN_675_25V_DN	55	180	µm
LDP_OU_675_25V_T	55	180	µm
PVP_VD_RCD_12V	20	180	µm
PVP_VS_RCD_12V	20	180	µm
PVP_VD_PDO_25V	20	180	µm
PVP_VD_RDO_25V	20	180	µm
PVP_VS_RDO_25V	20	180	µm
SVP_SP_000_25V	0.1	180	µm
SVP_SP_001_25V	1	180	µm
SVP_SP_005_25V	5	180	µm
SVP_SP_010_25V	10	180	µm
SPP_RS_005_25V	5	180	µm
SPP_SPC_AD_UN	25	180	µm

[*] Includes CUP bond opening.

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