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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



To Our Customers

Continuing its rich tradition of partnering with high quality Japanese semiconductor suppliers, CEL is now partnering with THine from May of 2015 onwards.

THC63LVDF84B(5S)

LVDS 24Bit COLOR HOST-LCD PANEL INTERFACE RECEIVER(Falling Edge Clock)

General Description

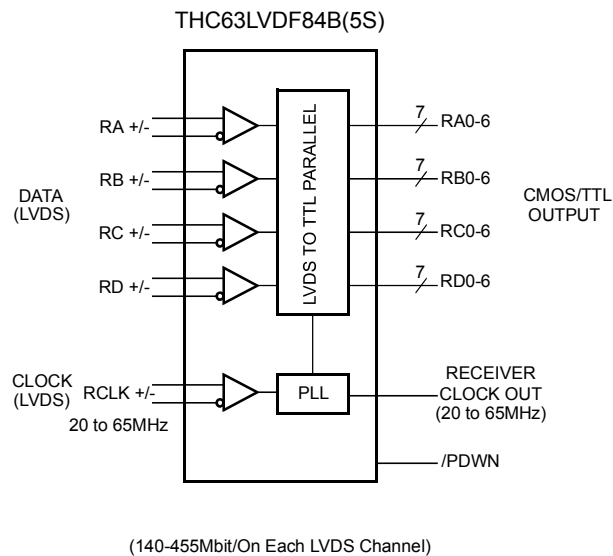
The THC63LVDF84B(5S) receiver convert the four LVDS(Low Voltage Differential Signaling) data streams back into 28bits of CMOS/TTL data with falling edge clock.

At a transmit clock frequency of 65MHz, 24bits of RGB data and 4bits of LCD timing and control data (HSYNC, VSYNC, CNTL1, CNTL2) are transmitted at a rate of 1.8Gbps.

Features

- Wide dot clock range: 20-65MHz suited for VGA, SVGA and XGA
- PLL requires No external components
- Low power consumption
- Power-Down Mode
- Low profile 56 Lead TSSOP Package
- Pin compatible with THC63LVDF84A

Block Diagram



Pin Out

THC63LVDF84B(5S)

RC3	1	56	VCC
RD6	2	55	RC2
RC4	3	54	RC1
GND	4	53	RC0
RC5	5	52	GND
RC6	6	51	RB6
RD0	7	50	RD5
LVDSGND	8	49	RD4
RA-	9	48	VCC
RA+	10	47	RB5
RB-	11	46	RB4
RB+	12	45	RB3
LVDSVCC	13	44	GND
LVDSGND	14	43	RB2
RC-	15	42	RD3
RC+	16	41	RD2
RCLK-	17	40	VCC
RCLK+	18	39	RB1
RD-	19	38	RB0
RD+	20	37	RA6
LVDSGND	21	36	GND
PLLGND	22	35	RA5
PLLVCC	23	34	RD1
PLLGND	24	33	RA4
/PDWN	25	32	RA3
CLKOUT	26	31	VCC
RA0	27	30	RA2
GND	28	29	RA1

Pin Description

Pin Name	Pin #	Type	Description
RA+, RA-	10, 9	LVDS IN	LVDS Data Inputs
RB+, RB-	12, 11	LVDS IN	
RC+, RC-	16, 15	LVDS IN	
RD+, RD-	20, 19	LVDS IN	
RCLK+, RCLK-	18, 17	LVDS IN	LVDS Clock Inputs
RA0~RA6	27,29,30,32,33,35,37	OUT	Pixel Data Outputs
RB0~RB6	38,39,43,45,46,47,51	OUT	
RC0~RC6	53,54,55,1,3,5,6	OUT	
RD0~RD6	7,34,41,42,49,50,2	OUT	
CLKOUT	26	OUT	Pixel Clock Output
/PDWN	25	IN	H: Normal operation L: Power down (all outputs are pulled to ground)
VCC	31,40,48,56	Power	Power Supply Pins for TTL outputs and digital circuitry
GND	4,28,36,44,52	Ground	Ground Pins for TTL outputs and digital circuitry
LVDSVCC	13	Power	Power Supply Pin for LVDS inputs
LVDSGND	8,14,21	Ground	Ground Pins for LVDS inputs
PLLVCC	23	Power	Power Supply Pin for PLL circuitry
PLLGND	22,24	Ground	Ground Pins for PLL circuitry

Electrical Characteristics

CMOS/TTL DC SPECIFICATIONS

$$V_{CC} = V_{CC} = PLL V_{CC} = LVDS V_{CC}$$

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{IH}	High Level Input Voltage		2.0		V_{CC}	V
V_{IL}	Low Level Input Voltage		GND		0.8	V
V_{OH1}	High Level Output Voltage	$I_{OH} = -4mA$	2.4			V
V_{OL1}	Low Level Output Voltage	$I_{OL} = 4mA$			0.4	V
I_{IN}	Input Current	$0V \leq V_{IN} \leq V_{CC}$			± 10	μA

LVDS RECEIVER DC SPECIFICATIONS

$$V_{CC} = V_{CC} = PLL V_{CC} = LVDS V_{CC}$$

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{TH}	Differential Input High Threshold	$V_{OC} = +1.2V$			100	mV
V_{TL}	Differential Input Low Threshold		-100			mV
I_{IN}	Input Current	$V_{IN} = +2.4V/0V$ $V_{CC} = 3.6V$			± 10	μA

Absolute Maximum Ratings¹

Supply Voltage (Vcc)	-0.3 to +4V
CMOS/TTL Input Voltage	-0.3 to (Vcc + 0.3V)
CMOS/TTL Output Voltage	-0.3V to (Vcc + 0.3V)
LVDS Receiver Input Voltage	-0.3V to (Vcc + 0.3V)
Junction Temperature	+125°C
Storage Temperature Range	-55°C to +150°C
Resistance to soldering heat	+260°C /10sec
Maximum Power Dissipation@25°C	0.5W

Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
All Supply Voltage	3.0	3.3	3.6	V
Operating Ambient Temperature	-40		85	°C
Differential CLKIN Frequency	20		65	MHz

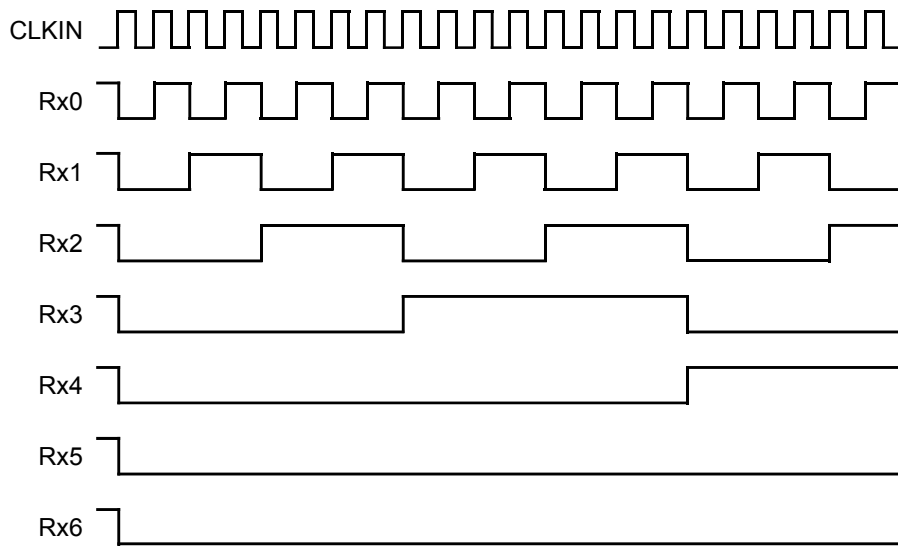
1. "Absolute Maximum Ratings" are those valued beyond which the safety of the device can not be guaranteed. They are not meant to imply that the device should be operated at these limits. The tables of "Electrical Characteristics" specify conditions for device operation.

Supply Current

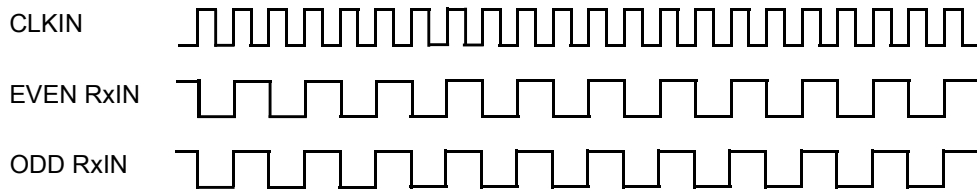
V_{CC} = VCC = PLL VCC = LVDS VCC

Symbol	Parameter	Condition(*)	Typ.	Max.	Units
I _{RCCG}	Receiver Supply Current 16Grayscale Pattern	CL=8pF, V _{CC} =3.3V	41	53	mA
I _{RCCW}	Receiver Supply Current Worst Case Pattern	f = 65MHz	72	94	mA
I _{RCCS}	Receiver Power Down Supply Current	/PDWN = L		10	mA

16 Gray Scale Pattern



Worst Case Pattern



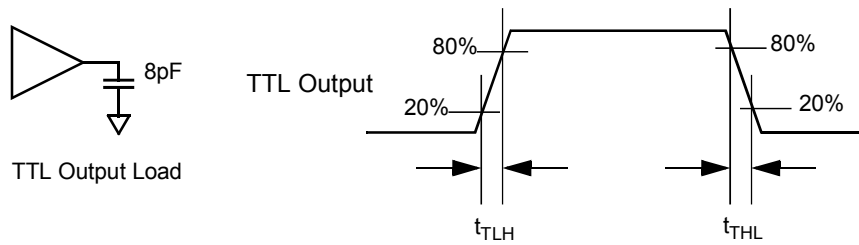
Switching Characteristics

V_{CC} = VCC = PLL VCC = LVDS VCC

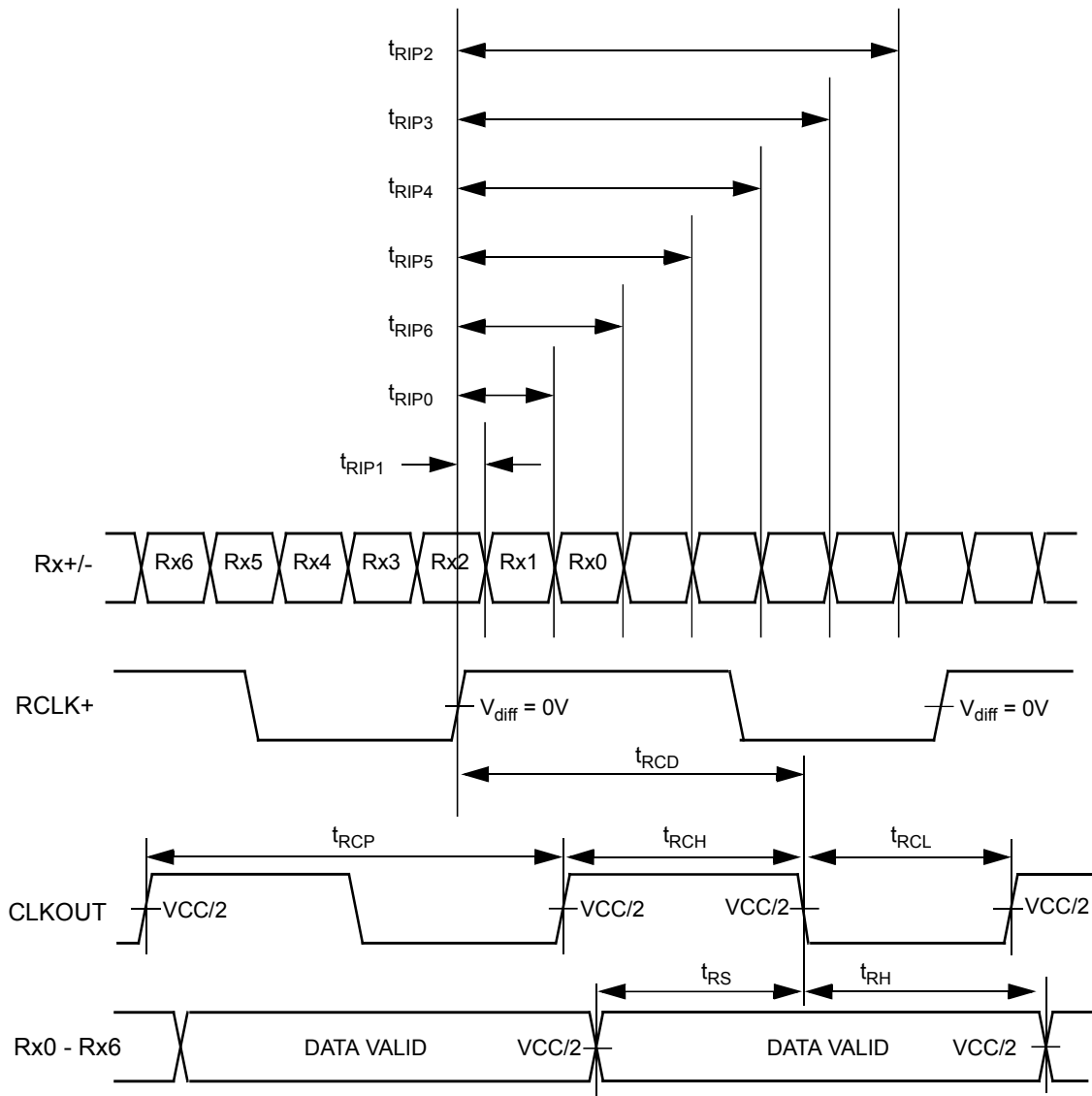
Symbol	Parameter	Min.	Typ.	Max.	Units
t _{RCP}	CLK OUT Period	15.4	T	50.0	ns
t _{RCH}	CLK OUT High Time		4T/7		ns
t _{RCL}	CLK OUT Low Time		3T/7		ns
t _{RCD}	RCLK +/- to CLK OUT Delay		5T/7		ns
t _{RS}	TTL Data Setup to CLK OUT	0.35T-0.3			ns
t _{RH}	TTL Data Hold from CKL OUT	0.45T-1.6			ns
t _{TLH}	TTL Low to High Transition Time		2.0	3.0	ns
t _{THL}	TTL High to Low Transition Time		1.8	3.0	ns
t _{RIP1}	Input Data Position0 (T = 11.76ns)	-0.4	0.0	+0.4	ns
t _{RIP0}	Input Data Position1 (T = 11.76ns)	T/7-0.4	T/7	T/7+0.4	ns
t _{RIP6}	Input Data Position2 (T = 11.76ns)	2T/7-0.4	2T/7	2T/7+0.4	ns
t _{RIP5}	Input Data Position3 (T = 11.76ns)	3T/7-0.4	3T/7	3T/7+0.4	ns
t _{RIP4}	Input Data Position4 (T = 11.76ns)	4T/7-0.4	4T/7	4T/7+0.4	ns
t _{RIP3}	Input Data Position5 (T = 11.76ns)	5T/7-0.4	5T/7	5T/7+0.4	ns
t _{RIP2}	Input Data Position6 (T = 11.76ns)	6T/7-0.4	6T/7	6T/7+0.4	ns
t _{RPLL}	Phase Lock Loop Set			10.0	ms

AC Timing Diagrams

TTL Output



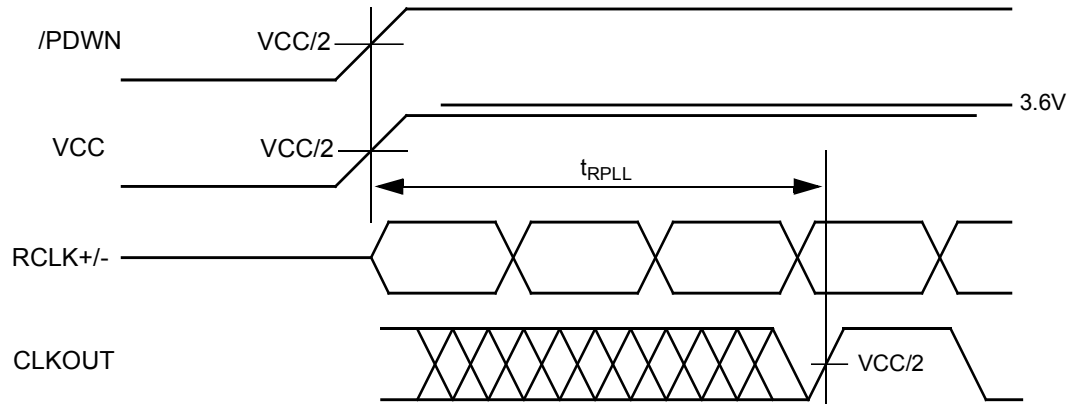
AC Timing Diagrams



Note:
 1) $V_{diff} = (RA+) - (RA-), \dots, (RCLK+) - (RCLK-)$

AC Timing Diagrams

Phase Lock Loop Set Time



Note

1)Power On Sequence

Power on LVDS-Tx after THC63LVDF84B(5S).

2)Cable Connection and Disconnection

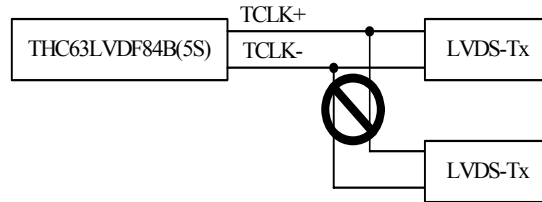
Don't connect and disconnect the LVDS cable, when the power is supplied to the system.

3)GND Connection

Connect the each GND of the PCB which LVDS-Tx and THC63LVDF84B(5S) on it. It is better for EMI reduction to place GND cable as close to LVDS cable as possible.

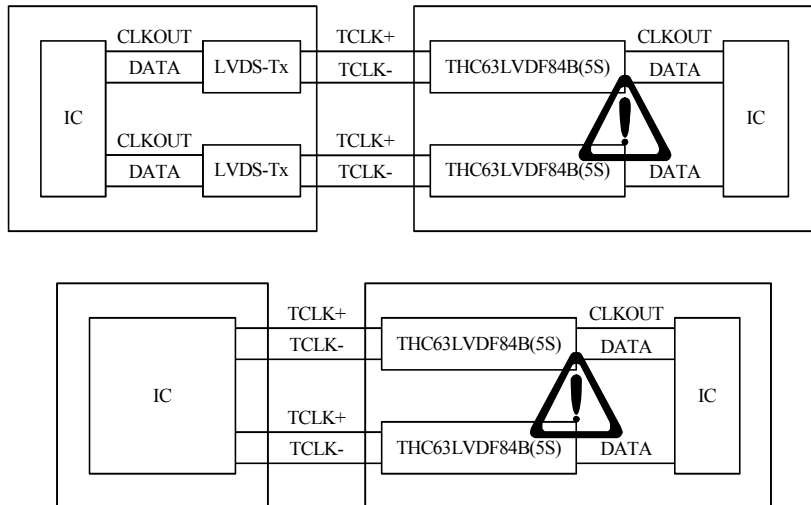
4)Multi Drop Connection

Multi drop connection is not recommended.



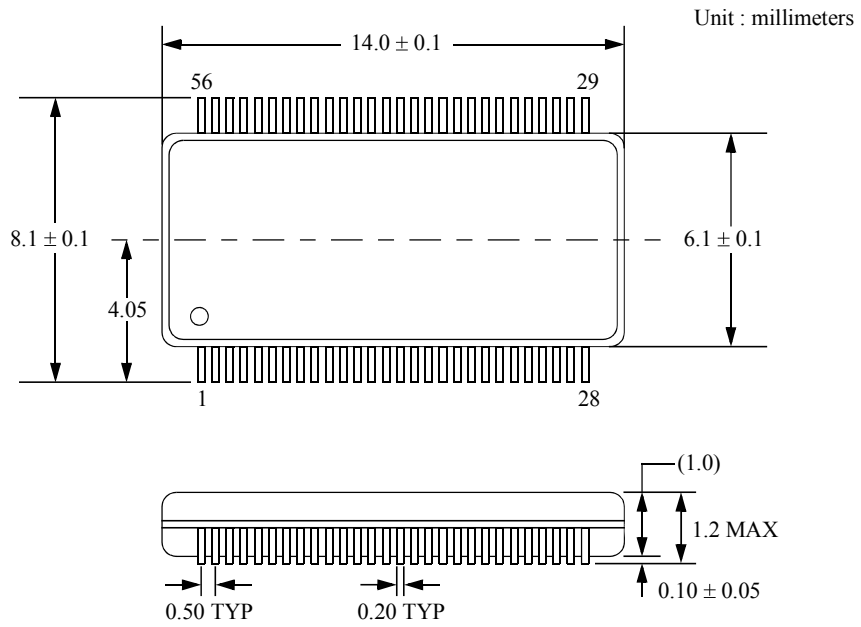
5)Asynchronous use

Asynchronous use such as following systems are not recommended.



Package

56 Lead Molded Thin Shrink Small Outline Package, JEDEC



Notices and Requests

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THine Electronics, Inc.
E-mail: sales@thine.co.jp