CEL California Eastern Laboratories | THine THine Electronics, Inc.
World's Leading Company in Mixed Signal Technologies

To Our Customers

Continuing it's 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)

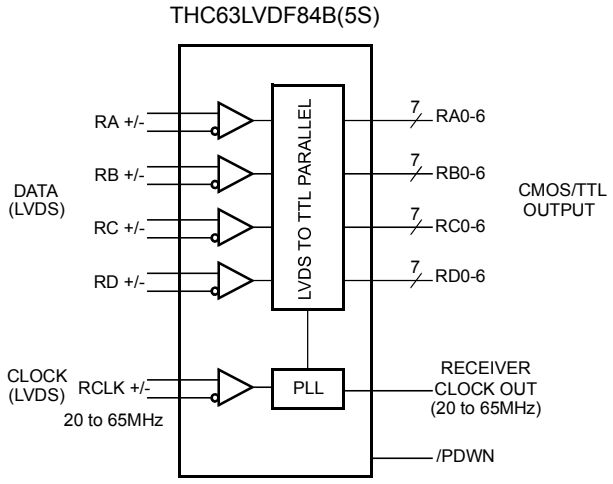
General Description

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

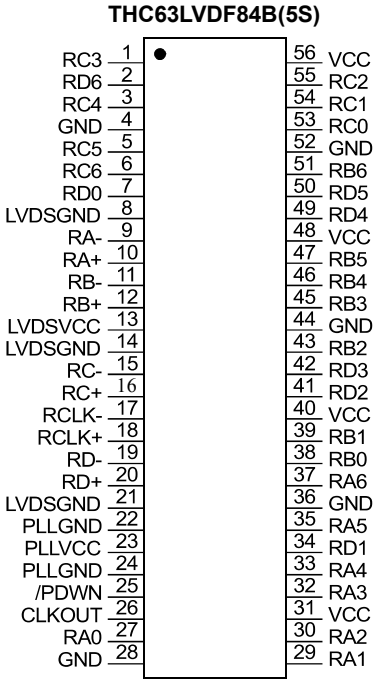
- Wide dot clock range: 20-65MHz suited for VGA, SVGA and XGA
- PLL requires No external components
- Low power consumption
- Power-Down Mode
- Low profile 56 Lead TSSOP Package
- Pin compatible with THC63LVDF84A

Block Diagram



(140-455Mbit/On Each LVDS Channel)

Pin Out



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} = VCC = PLL VCC = LVDS VCC

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 ≤ VIN ≤ VCC			±10	uA

LVDS RECEIVER DC SPECIFICATIONS

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{TH}	Differential Input High Threshold	VOC = +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	uA

Absolute Maximum Ratings[1]

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

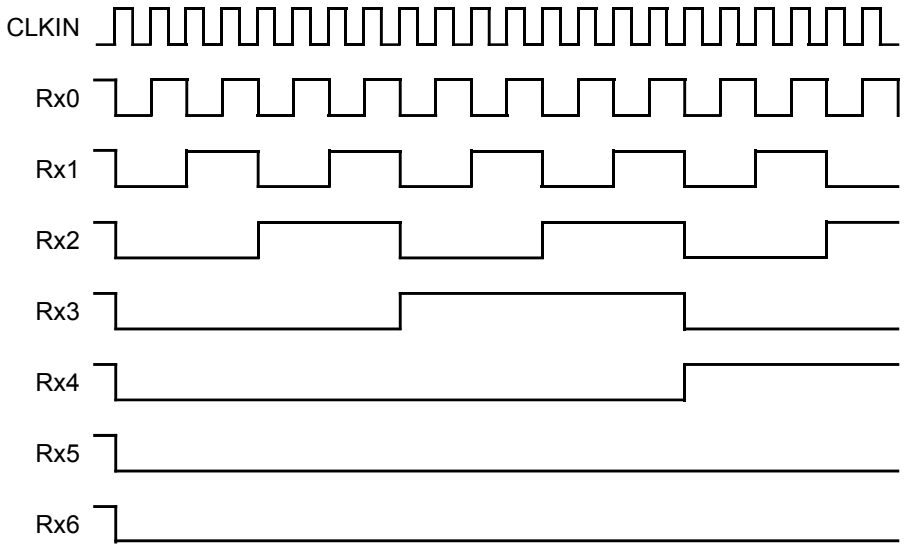
1. "Absolute Maximum Ratings" are those valued beyond which the safety of the device can not be guaranteed. They are not meant to imply that the device should be operated at these limits. The tables of "Electrical Characteristics" specify conditions for device operation.

Supply Current

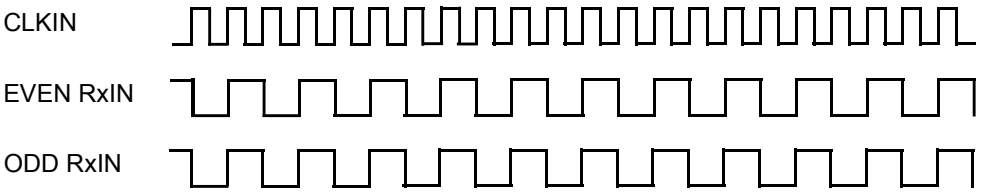
V_{CC} = VCC = PLL VCC = LVDS VCC

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

16 Gray Scale Pattern



Worst Case Pattern



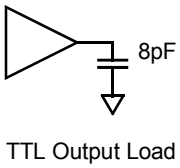
Switching Characteristics

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

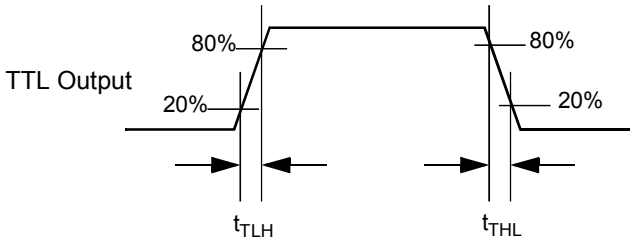
Symbol	Parameter	Min.	Typ.	Max.	Units
t_{RCP}	CLK OUT Period	15.4	T	50.0	ns
t_{RCH}	CLK OUT High Time		4T/7		ns
t_{RCL}	CLK OUT Low Time		3T/7		ns
t_{RCD}	RCLK +/- to CLK OUT Delay		5T/7		ns
t_{RS}	TTL Data Setup to CLK OUT	0.35T-0.3			ns
t_{RH}	TTL Data Hold from CKL OUT	0.45T-1.6			ns
t_{TLH}	TTL Low 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

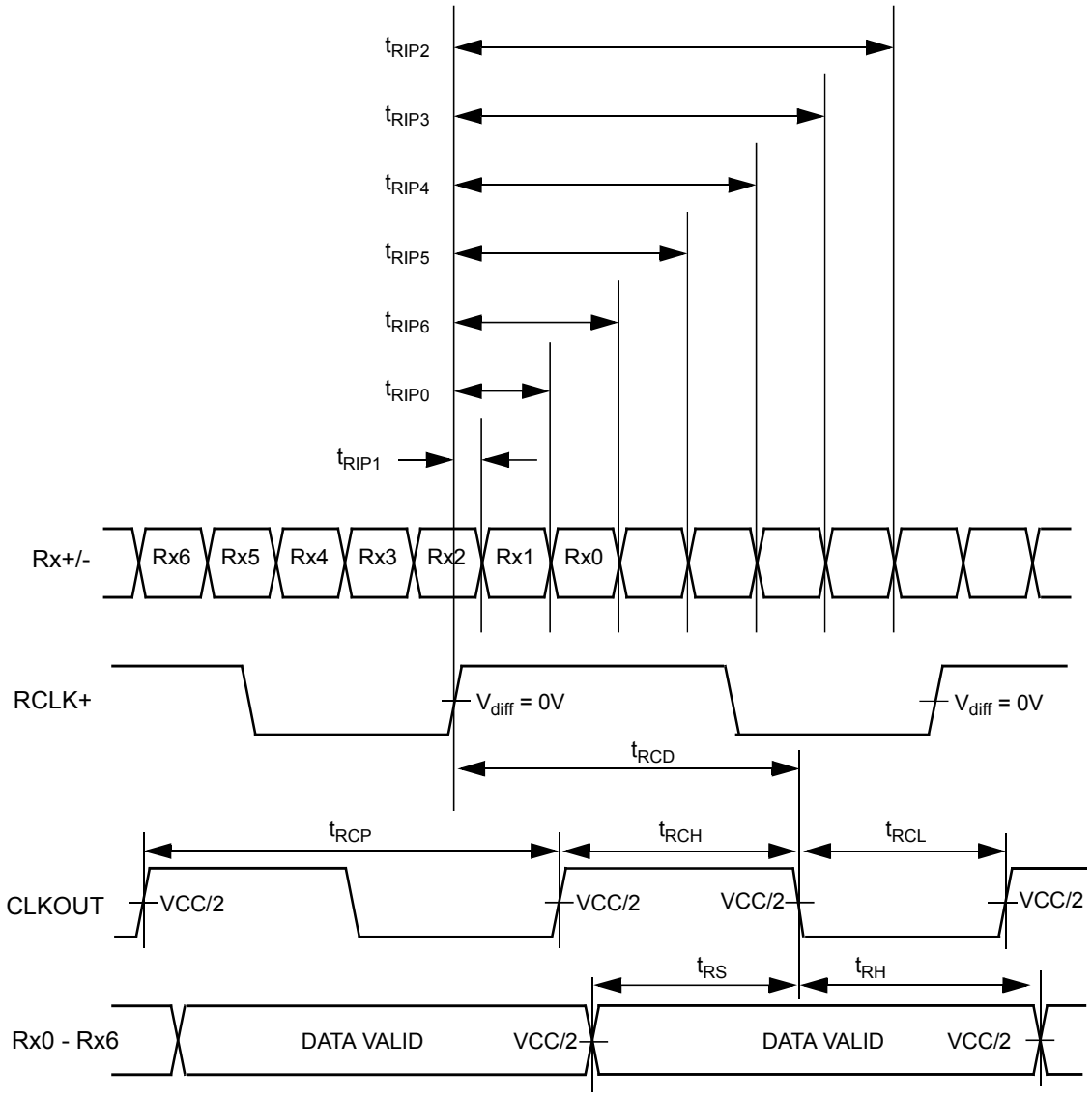
TTL Output



TTL Output Load



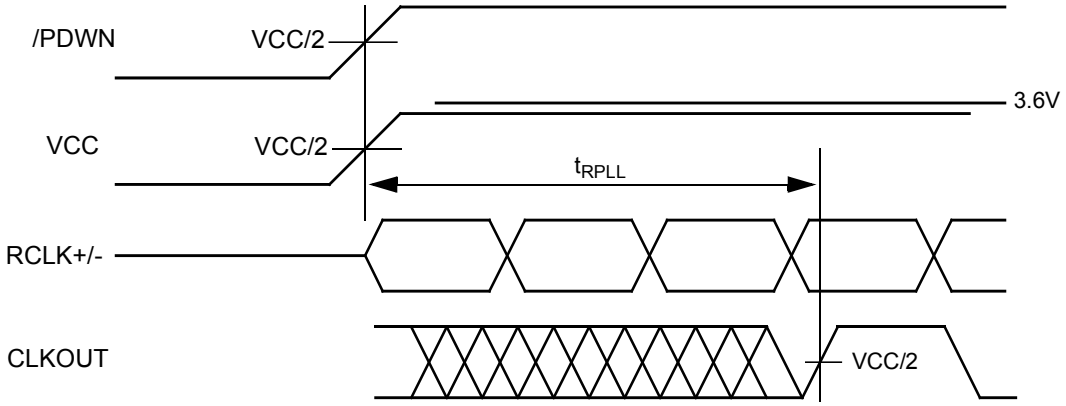
AC Timing Diagrams



Note:
1) Vdiff = (RA+) - (RA-), ... (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

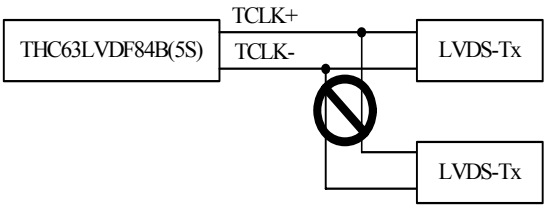
Don't connect and disconnect the LVDS cable, when the power is supplied to the system.

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.

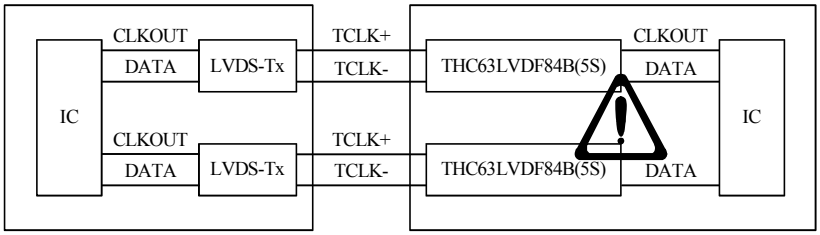
4)Multi Drop Connection

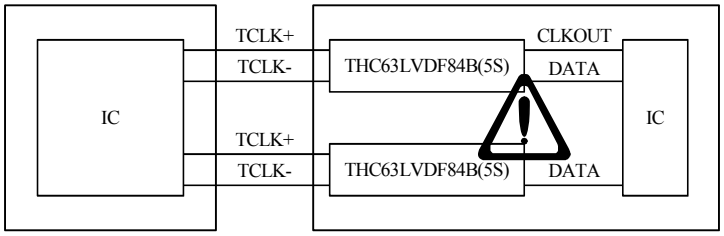
Multi drop connection is not recommended.



5)Asynchronous use

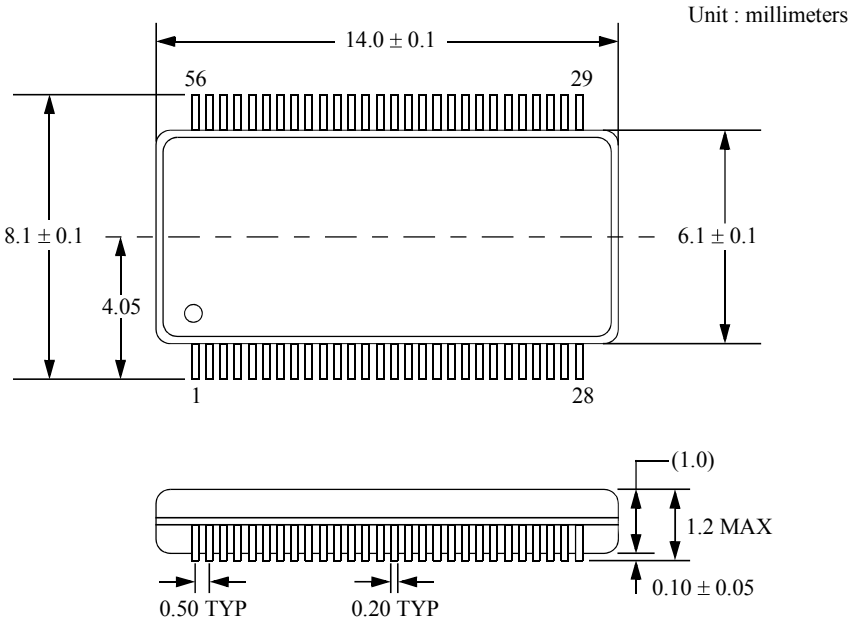
Asynchronous use such as following systems are not recommended.





Package

56 Lead Molded Thin Shrink Small Outline Package, JEDEC



Notices and Requests

1. The product specifications described in this material are subject to change without prior notice.
2. The circuit diagrams described in this material are examples of the application which may not always apply to the customer's design. We are not responsible for possible errors and omissions in this material. Please note if errors or omissions should be found in this material, we may not be able to correct them immediately.
3. This material contains our copy right, know-how or other proprietary. Copying or disclosing to third parties the contents of this material without our prior permission is prohibited.
4. Note that if infringement of any third party's industrial ownership should occur by using this product, we will be exempted from the responsibility unless it directly relates to the production process or functions of the product.
5. Product Application
   5.1 Application of this product is intended for and limited to the following applications: audio-vide deice, officce automation device, communication device, consumer electronics, smart-phone, feature phone, and amusement machinedevice. This product must not be used for applications that require extremely high-reliability/safety such as aerospace device, traffic device, transportation device, nuclear power control device, combustion chamber device, medical device related to critical care, or any kind of safety device.
   5.2 This product is not intended to be used as an automotive part, unless the product is specified as a product conforming to the demandes and specifications of ISO/TS16949 (“the specified Product”) in this data sheet. THine Electronics, Inc.(“THine”) accepts no liability what so every for any product other than the Specified Product for it not conforming to the aforementioned demands and specifications.
   5.3 THine accepts liability for demands and specifications of the Specified Product only to the extent that the user and THine have been previously and explicitly agreed to each other.
6. Despite our utmost efforts to improve the quality and reliability of the product, faults will occur with a certain small probability, which is inevitable to a semi-conductor product. Therefore, you are encouraged to have sufficiently redundant or error preventive design applied to the use of the product so as not to have our product cause any social or public damage.
7. Please note that this product is not designed to be radiation-proof.
8. Customers are asked, if required, to judge by themselves if this product falls under the category of strategic goods under the Foreign Exchange and Foreign Trade Control Law.

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