

APPLICATION NOTE (Summary)

TC90207FG

1. Overview

TC90207FG is LVDS-Rx Bridge IC for picture IF.
 Input signal is LVDS (4ch Data/1ch Clock: max 40MHz), output signal is LVTTTL (28bit Data, Clock).

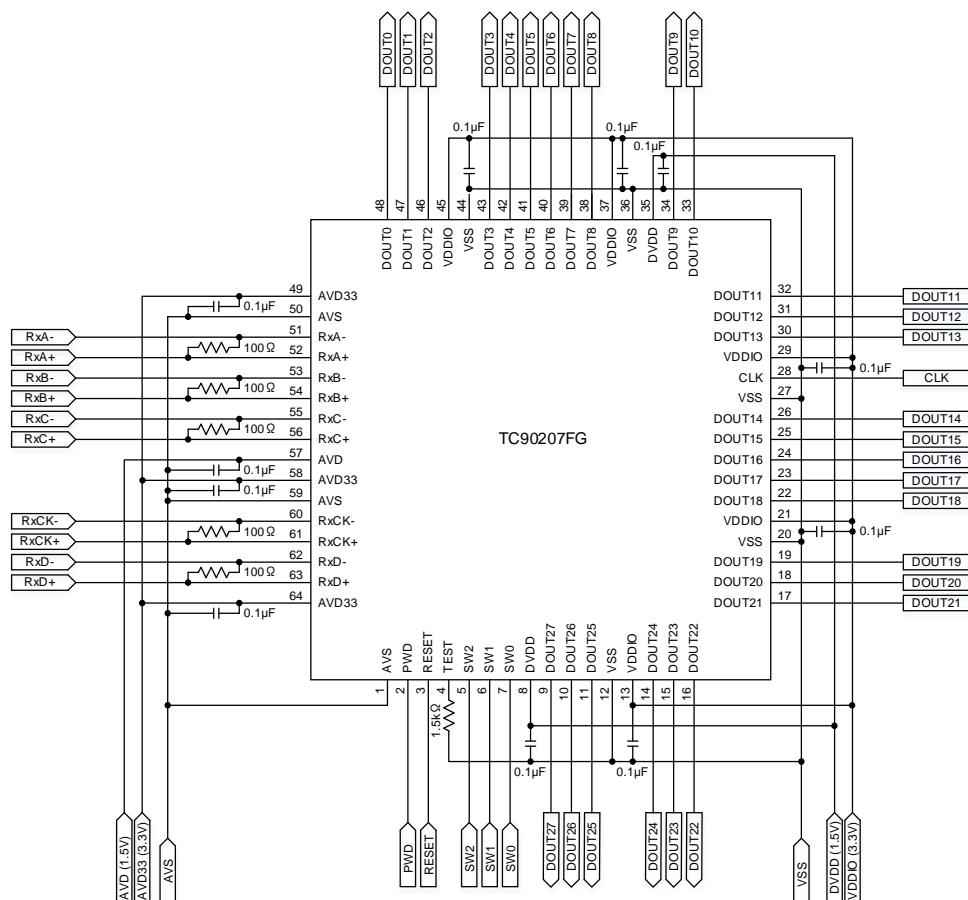
2. Features

- IC operation is capable only terminal control.
 (Output data swapping is set by H/L of terminal SW0 –SW2.)
- Power Down mode (This case, output pin is Low)
- Power Supply : 3.3V, 1.5V
- Package : LQFP 64pin 10 x 10 mm (LQFP64-P-1010-0.50E)

3. Application Circuit

Figure3-1 is an example of Application circuit.
 Operating frequency is from 25MHz to 40MHz, therefore the resolution of connectable panel is WVGA (800x480) as a standard.

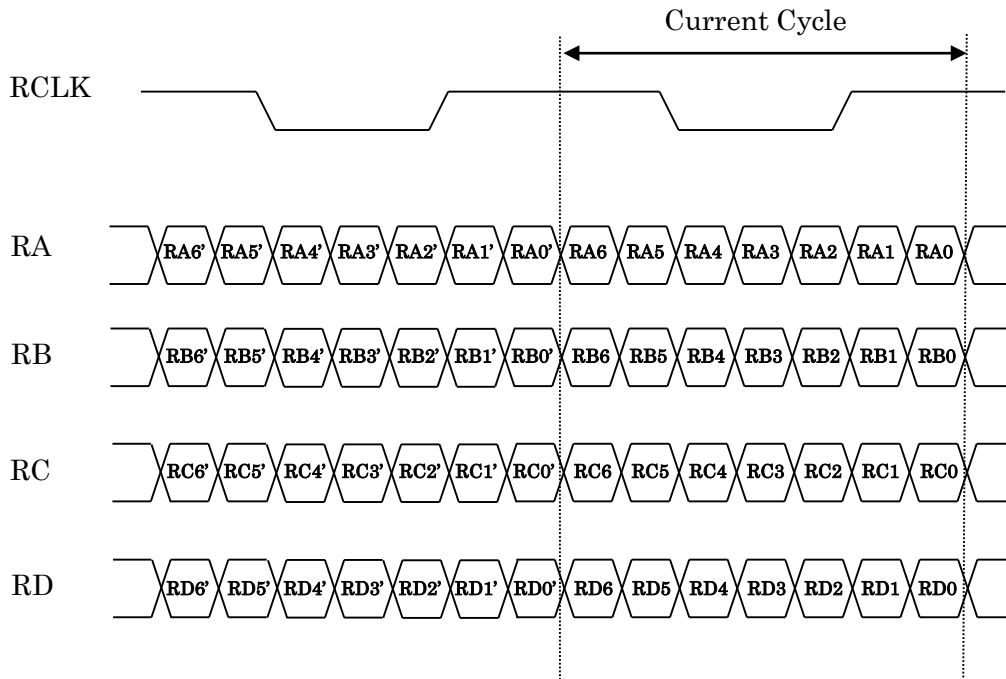
Figure 3-1 Example of Application Circuit



4. LVDS Signal input

Figure 4-1 is LVDS data arrangement inputted each lanes.

Figure 4-1 LVDS Data arrangement



5. LVTTL Output

It can swap output data like the table 5.1 by the L/H state of each control pin of SW0 (7pin), SW1 (6pin), SW2 (5pin).

Table 5-1 LVTTL Output data arrangement

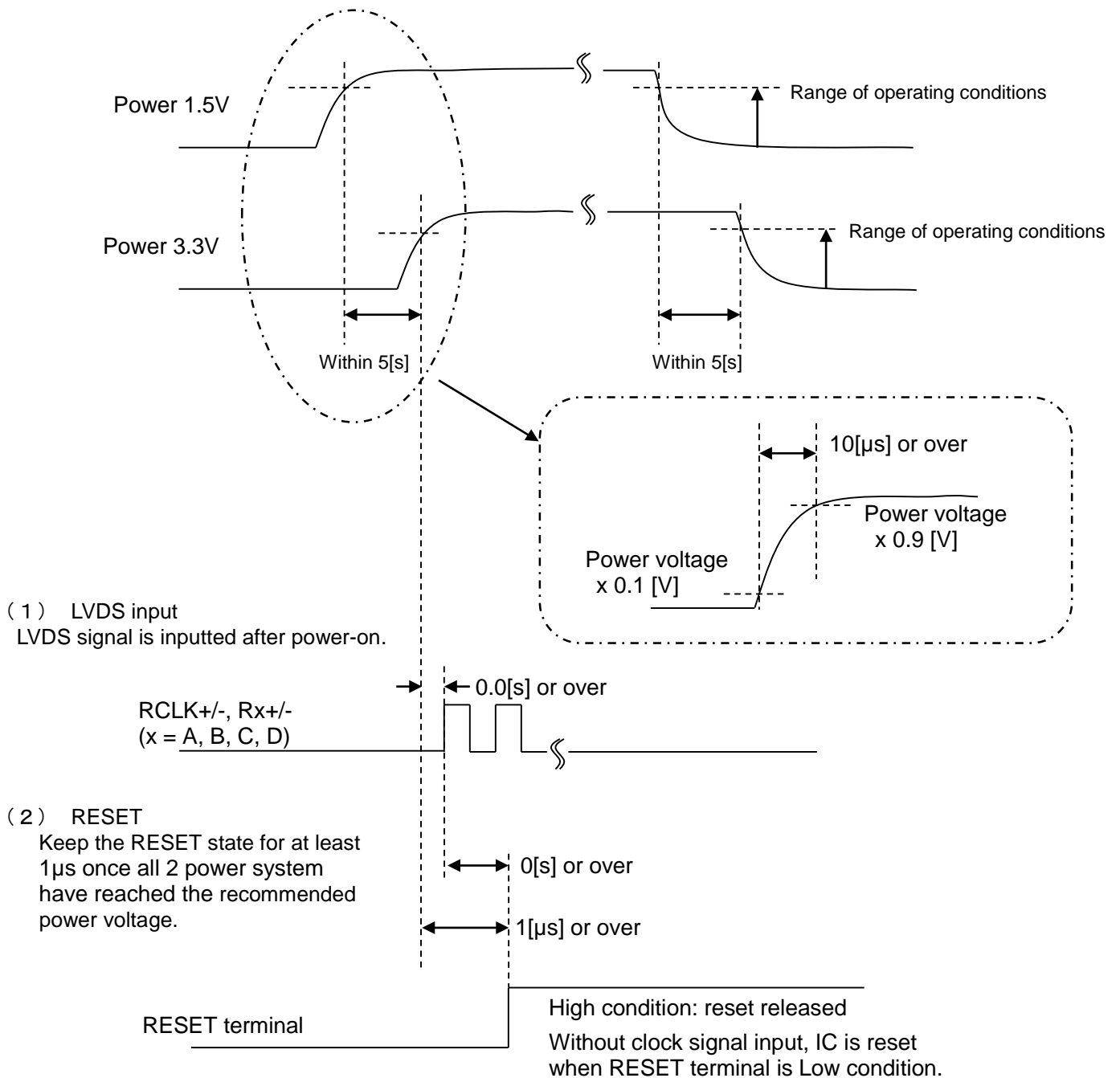
SW0	L	H	L	H	L	H	L	H
SW1	L	L	H	H	L	L	H	H
SW2	L	L	L	L	H	H	H	H
DOUT0	RA0	RD0	RD6	RA6	RC3	RB3	RD6	RA6
DOUT1	RA1	RD1	RD5	RA5	RC2	RB2	RC6	RB6
DOUT2	RA2	RD2	RD4	RA4	RC1	RB1	RC4	RB4
DOUT3	RA3	RD3	RD3	RA3	RC0	RB0	RC5	RB5
DOUT4	RA4	RD4	RD2	RA2	RB6	RC6	RD0	RA0
DOUT5	RA5	RD5	RD1	RA1	RB5	RC5	RD1	RA1
DOUT6	RA6	RD6	RD0	RA0	RD5	RA5	RA0	RD0
DOUT7	RB0	RC0	RC6	RB6	RD4	RA4	RA1	RD1
DOUT8	RB1	RC1	RC5	RB5	RB4	RC4	RA2	RD2
DOUT9	RB2	RC2	RC4	RB4	RB3	RC3	RA3	RD3
DOUT10	RB3	RC3	RC3	RB3	RB2	RC2	RA4	RD4
DOUT11	RB4	RC4	RC2	RB2	RB1	RC1	RA5	RD5
DOUT12	RB5	RC5	RC1	RB1	RB0	RC0	RD2	RA2
DOUT13	RB6	RC6	RC0	RB0	RA6	RD6	RD3	RA3
DOUT14	RC0	RB0	RB6	RC6	RD3	RA3	RA6	RD6
DOUT15	RC1	RB1	RB5	RC5	RD2	RA2	RB0	RC0
DOUT16	RC2	RB2	RB4	RC4	RA5	RD5	RB1	RC1
DOUT17	RC3	RB3	RB3	RC3	RA4	RD4	RB2	RC2
DOUT18	RC4	RB4	RB2	RC2	RA3	RD3	RB3	RC3
DOUT19	RC5	RB5	RB1	RC1	RA2	RD2	RB4	RC4
DOUT20	RC6	RB6	RB0	RC0	RA1	RD1	RD4	RA4
DOUT21	RD0	RA0	RA6	RD6	RA0	RD0	RD5	RA5
DOUT22	RD1	RA1	RA5	RD5	RD1	RA1	RB5	RC5
DOUT23	RD2	RA2	RA4	RD4	RD0	RA0	RB6	RC6
DOUT24	RD3	RA3	RA3	RD3	RC5	RB5	RC0	RB0
DOUT25	RD4	RA4	RA2	RD2	RC4	RB4	RC1	RB1
DOUT26	RD5	RA5	RA1	RD1	RC6	RB6	RC2	RB2
DOUT27	RD6	RA6	RA0	RD0	RD6	RA6	RC3	RB3
CLKOUT	CLK	CLK	CLK	CLK	CLK	CLK	CLK	CLK

6. Sequence of power ON and OFF

This section is critical to the reliability assurance of the IC.
Read it carefully before setting power-on/off control accordingly.

●Power ON/OFF

The order of power-on and power-off of 2-system VDD is good with random order.
However, please complete power-on and power-off of 2-system VDD within 5 second.
Normally, recommendation of each power supply of power-on and power-off are same timing.
It needs 10µs or over for the period of power rising slope. (Period of 10% to 90% of voltage)



RESTRICTIONS ON PRODUCT USE

- Toshiba Corporation, and its subsidiaries and affiliates (collectively "TOSHIBA"), reserve the right to make changes to the information in this document, and related hardware, software and systems (collectively "Product") without notice.
- This document and any information herein may not be reproduced without prior written permission from TOSHIBA. Even with TOSHIBA's written permission, reproduction is permissible only if reproduction is without alteration/omission.
- Though TOSHIBA works continually to improve Product's quality and reliability, Product can malfunction or fail. Customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Before customers use the Product, create designs including the Product, or incorporate the Product into their own applications, customers must also refer to and comply with (a) the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and (b) the instructions for the application with which the Product will be used with or for. Customers are solely responsible for all aspects of their own product design or applications, including but not limited to (a) determining the appropriateness of the use of this Product in such design or applications; (b) evaluating and determining the applicability of any information contained in this document, or in charts, diagrams, programs, algorithms, sample application circuits, or any other referenced documents; and (c) validating all operating parameters for such designs and applications. **TOSHIBA ASSUMES NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.**
- **PRODUCT IS NEITHER INTENDED NOR WARRANTED FOR USE IN EQUIPMENTS OR SYSTEMS THAT REQUIRE EXTRAORDINARILY HIGH LEVELS OF QUALITY AND/OR RELIABILITY, AND/OR A MALFUNCTION OR FAILURE OF WHICH MAY CAUSE LOSS OF HUMAN LIFE, BODILY INJURY, SERIOUS PROPERTY DAMAGE AND/OR SERIOUS PUBLIC IMPACT ("UNINTENDED USE").** Except for specific applications as expressly stated in this document, Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, medical equipment, equipment used for automobiles, trains, ships and other transportation, traffic signaling equipment, equipment used to control combustions or explosions, safety devices, elevators and escalators, devices related to electric power, and equipment used in finance-related fields. **IF YOU USE PRODUCT FOR UNINTENDED USE, TOSHIBA ASSUMES NO LIABILITY FOR PRODUCT.** For details, please contact your TOSHIBA sales representative.
- Do not disassemble, analyze, reverse-engineer, alter, modify, translate or copy Product, whether in whole or in part.
- Product shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.
- The information contained herein is presented only as guidance for Product use. No responsibility is assumed by TOSHIBA for any infringement of patents or any other intellectual property rights of third parties that may result from the use of Product. No license to any intellectual property right is granted by this document, whether express or implied, by estoppel or otherwise.
- **ABSENT A WRITTEN SIGNED AGREEMENT, EXCEPT AS PROVIDED IN THE RELEVANT TERMS AND CONDITIONS OF SALE FOR PRODUCT, AND TO THE MAXIMUM EXTENT ALLOWABLE BY LAW, TOSHIBA (1) ASSUMES NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (2) DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO SALE, USE OF PRODUCT, OR INFORMATION, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.**
- Do not use or otherwise make available Product or related software or technology for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). Product and related software and technology may be controlled under the applicable export laws and regulations including, without limitation, the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of Product or related software or technology are strictly prohibited except in compliance with all applicable export laws and regulations.
- Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. Please use Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. **TOSHIBA ASSUMES NO LIABILITY FOR DAMAGES OR LOSSES OCCURRING AS A RESULT OF NONCOMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.**