

**SANYO**

No.2663A

**LC7936A, 7936B****32-Bit PPC LED Erasing Head Driver****Features**

- High-speed, high-voltage silicon gate CMOS device
- Contains high-speed shiftable (5MHz max) 32-bit shift register, 32-bit latch, output driver on/off control circuit, 32-bit N-channel open drain output driver.
- Serial shift data is shifted on the positive transition of the clock signal (CLOCK).
- 32-bit latch data is changed on the negative transition of the LATCH pad signal and is held on the positive transition.
- The STROBE pad signal, BEO pad signal can be used to exercise on/off control of the output driver.
- All output drivers can be turned on by setting 32-bit latch regardless of shift register data. (TEST=Hi, STROBE=Lo, BEO=Hi)
- Complete separation of logic circuit GND (1 pad) and thermal driver GND (4 pads)
- Maximum ratings of driver output:  $V_O=15V$ ,  $I_{OL}=30mA$
- Logic unit operating voltage:  $V_{DD}=4.5V$  to  $5.5V$

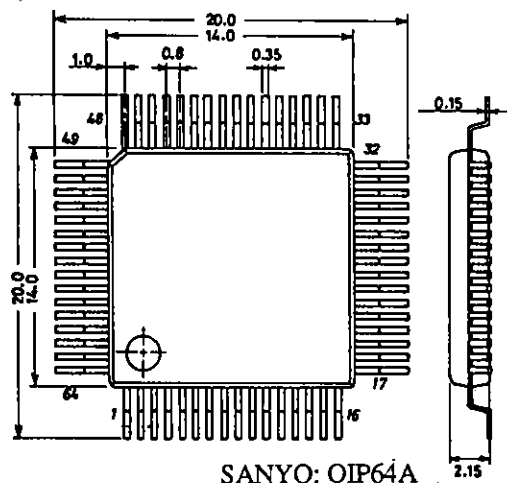
**Absolute Maximum Ratings at  $T_a=25^\circ C$** 

|                             |           |                                | unit                   |
|-----------------------------|-----------|--------------------------------|------------------------|
| Maximum Supply Voltage      | $V_{DD}$  | -0.3 to +7.0                   | V                      |
| Input Voltage               | $V_I$     | -0.3 to $V_{DD}+0.3$           | V                      |
| Output Voltage              | $V_O$ (1) | $S_{OUT}$ output               | -0.3 to $V_{DD}+0.3$ V |
|                             | $V_O$ (2) | D1 to D32 output               | 15 V                   |
| Output Circuit              | $I_O$     | Output Tr off                  |                        |
|                             |           | D1 to D32 output, per output   | 30 mA                  |
| Allowable Power Dissipation | $P_d$ max | QIP-64 package at $70^\circ C$ | 450 mW                 |
| Operating Temperature       | $T_{opr}$ | QIP-64 package                 | 0 to +70 $^\circ C$    |
| Storage Temperature         | $T_{stg}$ | QIP-64 package                 | -35 to +125 $^\circ C$ |

**Package Dimensions 3057-Q64AIC**

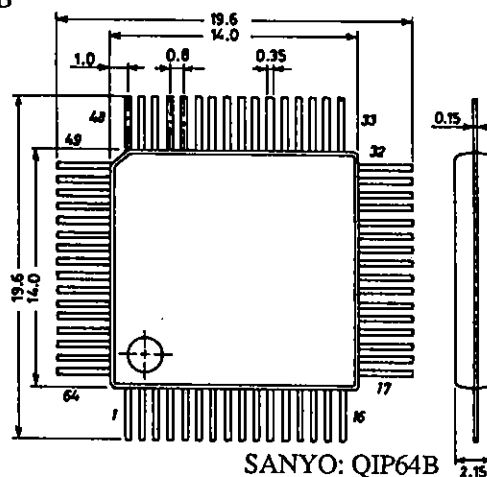
(unit: mm)

LC7936A

**Package Dimensions 3026B-Q64BIC**

(unit: mm)

LC7936B



**Allowable Operating Conditions at Ta=0 to +70°C**

|                         |                                 | Pin Name   | min                 | typ | max                | unit |
|-------------------------|---------------------------------|--|---------------------|-----|--------------------|------|
| Supply Voltage          | V <sub>DD</sub>                 | V <sub>DD</sub>  | 4.5                 |     | 5.5                | V    |
| "H"-Level Input Voltage | V <sub>IH</sub>                 | S <sub>IN</sub> , CLOCK, LATCH<br>BEO, STROBE, LED-check (TEST)  | 0.8V <sub>DD</sub>  |     | V <sub>DD</sub>    | V    |
| "L"-Level Input Voltage | V <sub>IL</sub>                 | S <sub>IN</sub> , CLOCK, LATCH,<br>BEO, STROBE, LED-check (TEST) | V <sub>SS</sub> (L) |     | 0.2V <sub>DD</sub> | V    |
| Clock Frequency         | f <sub>CLK</sub>                | CLOCK Duty: 50%  |                     |     | 5.0                | MHz  |
| Clock Pulse Width       | t <sub>w</sub>                  | CLOCK  | 75                  |     |                    | ns   |
| Clock Rise/Fall Time    | t <sub>r</sub> , t <sub>f</sub> | CLOCK  |                     |     | 200                | ns   |
| Data Setup Time         | t <sub>DS</sub>                 | S <sub>IN</sub> , CLOCK  | 100                 |     |                    | ns   |
| Data Hold Time          | t <sub>DH</sub>                 | S <sub>IN</sub> , CLOCK  | 50                  |     |                    | ns   |
| Latch Pulse Width       | t <sub>wL</sub>                 | LATCH  | 100                 |     |                    | ns   |

**Electrical Characteristics at Ta=25°C**

|                                  |                     | Pin Name                         | min   | typ | max                  | unit |
|----------------------------------|---------------------|----------------------------------|---|-----|----------------------|------|
| "H"-Level Input Current          | I <sub>IH</sub> (1) | S <sub>IN</sub> , CLOCK<br>LATCH |   |     | 10                   | μA   |
| "H"-Level Input Current          | I <sub>IH</sub> (2) | BEO, LED-check (TEST)            | 12  |     | 72                   | μA   |
| "L"-Level Input Current          | I <sub>IL</sub> (1) | S <sub>IN</sub> , CLOCK<br>LATCH | -10   |     |                      | μA   |
| "L"-Level Input Current          | I <sub>IL</sub> (2) | STROBE                           | -72   |     | -12                  | μA   |
| "H"-Level Output Voltage         | V <sub>OH</sub>     | S <sub>OUT</sub>                 | V <sub>DD</sub> =5V,<br>I <sub>OH</sub> =-0.5mA                         |     | V <sub>DD</sub> -0.5 | V    |
| "L"-Level Output Voltage         | V <sub>OL</sub> (1) | S <sub>OUT</sub>                 | V <sub>DD</sub> =5V,<br>I <sub>OL</sub> =0.5mA                          |     | 0.5                  | V    |
| "L"-Level Output Voltage         | V <sub>OL</sub> (2) | D1 to D32                        | V <sub>DD</sub> =5V,<br>I <sub>OL</sub> =30 mA                          |     | 0.5                  | V    |
| Output Off-State Leakage Current | I <sub>OFF</sub>    | D1 to D32                        | V <sub>O</sub> =15V   |     | 20                   | μA   |
| Input Capacitance                | C <sub>IN</sub>     | CLOCK                            |   | 5.0 |                      | pF   |
| Operating Current Dissipation    | I <sub>DD</sub>     | V <sub>DD</sub>                  | V <sub>DD</sub> =5V,<br>f <sub>CLK</sub> =5MHz,<br>all outputs: no load |     | 5                    | mA   |

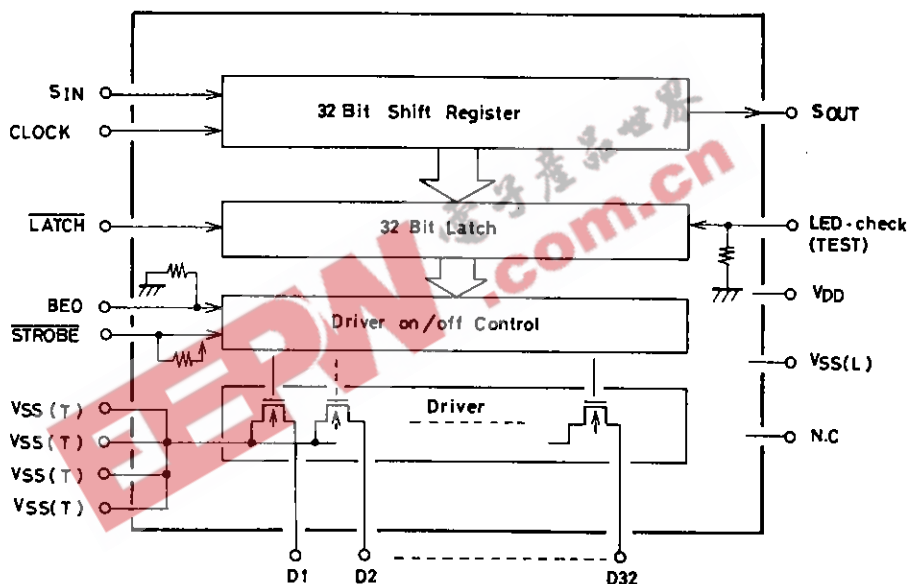
**Switching Characteristics at Ta=25°C**

|   |                      | Pin Name                 | min   | typ | max | unit |
|---|----------------------|--------------------------|---|-----|-----|------|
| Clock Latch Delay Width                 | t <sub>CL</sub>      | CLOCK, LATCH             | V <sub>DD</sub> =5V   | 100 |     | ns   |
| Latch Clock Delay Width                 | t <sub>LC</sub>      | CLOCK, LATCH             | V <sub>DD</sub> =5V   | 0   |     | ns   |
| "H"-Level Output Propagation Delay Time | t <sub>PLH</sub> (1) | LATCH,<br>D1 to D32      | V <sub>DD</sub> =5V,<br>Dn: R <sub>L</sub> =1.0kΩ<br>CL=15pF              |     | 400 | ns   |
|   | t <sub>PLH</sub> (2) | BEO, STROBE              | V <sub>DD</sub> =5V,<br>Dn: R <sub>L</sub> =1.0kΩ<br>CL=15pF              |     | 300 | ns   |
|   | t <sub>PLH</sub> (3) | CLOCK, S <sub>OUT</sub>  | V <sub>DD</sub> =5V,<br>S <sub>OUT</sub> : C <sub>L</sub> =15pF           |     | 200 | ns   |
| "L"-Level Output Propagation Delay Time | t <sub>PHL</sub> (1) | LATCH,<br>D1 to D32      | V <sub>DD</sub> =5V,<br>Dn: R <sub>L</sub> =1.0kΩ<br>C <sub>L</sub> =15pF |     | 200 | ns   |
|   | t <sub>PHL</sub> (2) | BEO, STROBE<br>D1 to D32 | V <sub>DD</sub> =5V,<br>Dn: R <sub>L</sub> =1.0kΩ<br>C <sub>L</sub> =15pF |     | 100 | ns   |
|   | t <sub>PHL</sub> (3) | CLOCK, S <sub>OUT</sub>  | V <sub>DD</sub> =5V,<br>S <sub>OUT</sub> : C <sub>L</sub> =15pF           |     | 200 | ns   |

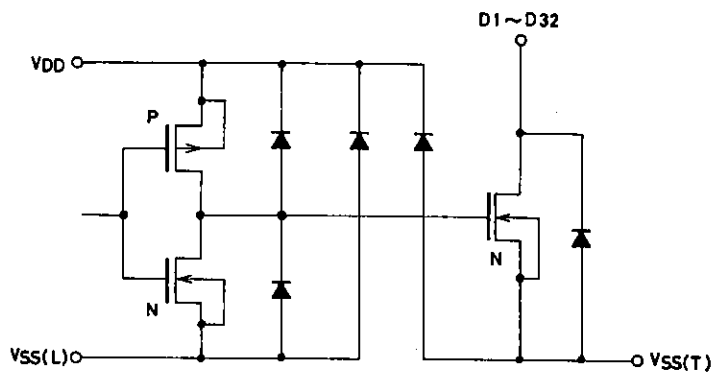
LED Driver On/Off Truth Table

| Latch Data (Q) | BEO | $\overline{\text{STROBE}}$ | LED Driver |
|----------------|-----|----------------------------|------------|
| 0              | 0   | 0                          | OFF        |
| 1              | 0   | 0                          | OFF        |
| 0              | 1   | 0                          | OFF        |
| 1              | 1   | 0                          | ON LED on  |
| 0              | 0   | 1                          | OFF        |
| 1              | 0   | 1                          | OFF        |
| 0              | 1   | 1                          | OFF        |
| 1              | 1   | 1                          | OFF        |

Equivalent Circuit Block Diagram

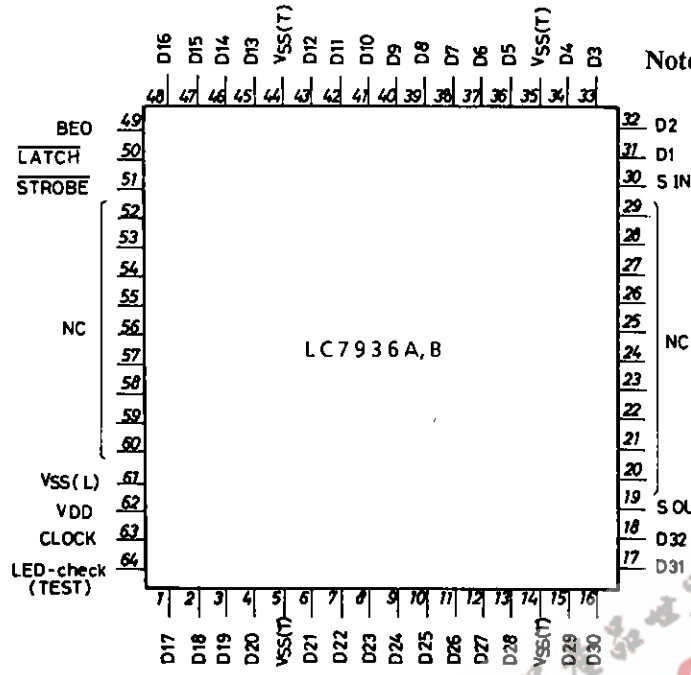


Output Driver Section Equivalent Circuit



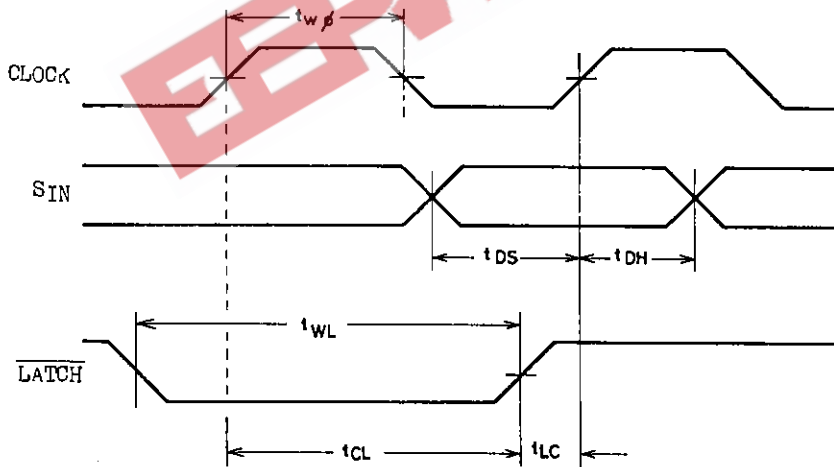
# LC7936A,7936B

## Pin Assignment

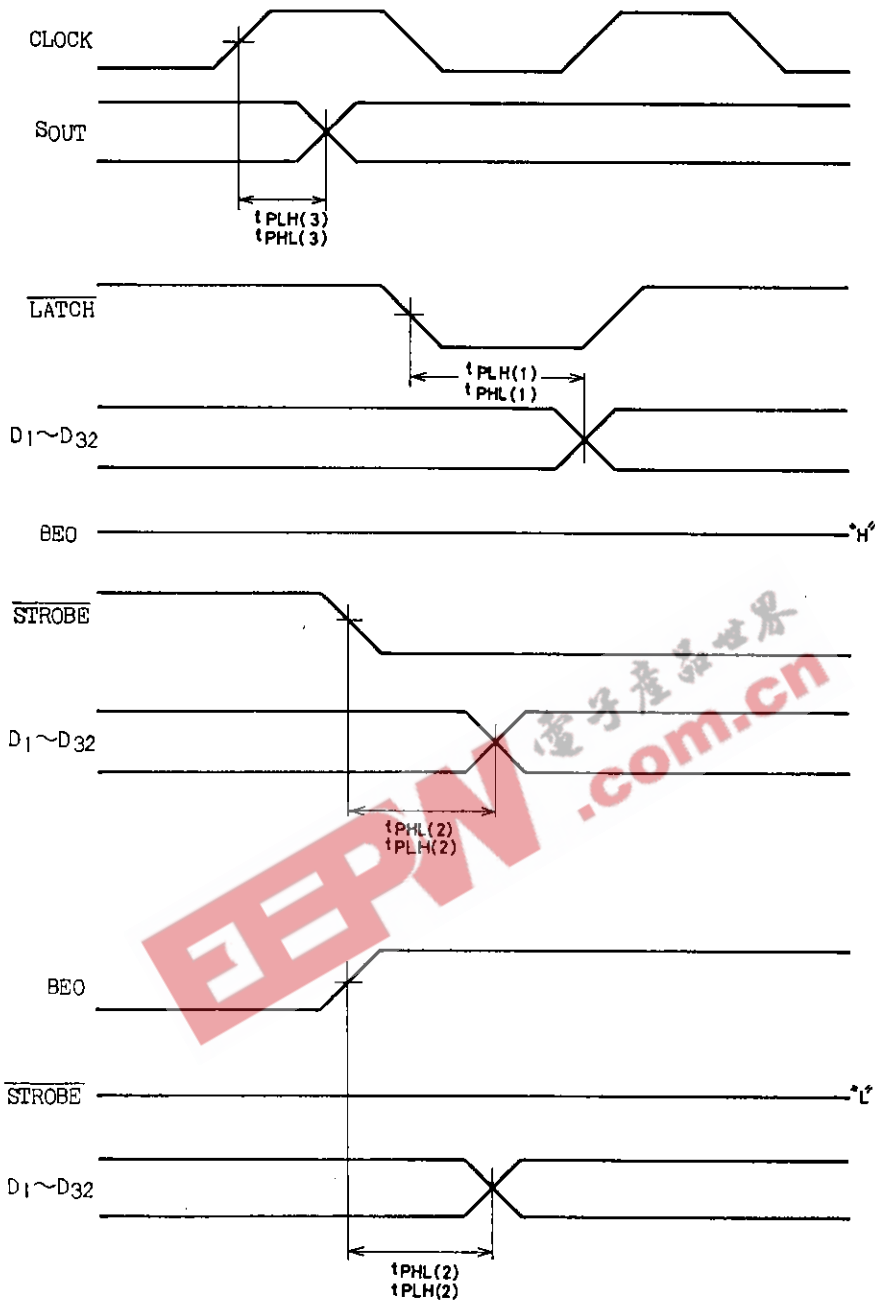


Note: Pins 24, 25 of NC pins are connected to the substrate ( $=V_{DD}$ ) and must be kept open. Other NC pins must be also kept open. When the LED-check (TEST) pin is not in use, it must not be kept open, but must be connected to GND.

## Input Data Timing Chart



Output Data Timing Chart



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