

#### DUAL BUS BUFFER

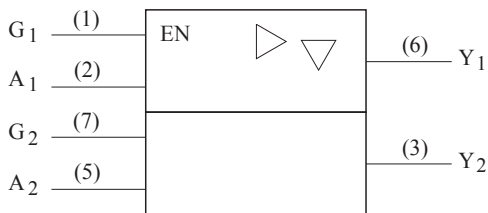
#### FEATURES

- Super High Speed :  $t_{PD}=2.6ns$ (Typ.) into 50pF at  $V_{CC}=5V$ .
- High Output Driver :  $\pm 24mA$  at  $V_{CC}=3V$ .
- Power Down High Impedance inputs/outputs.
- Outputs are Overvoltage Tolerant in 3-STATE mode.
- Wide Operating Voltage Range :  $V_{CC(oper)}=1.65\sim 5.5V$ .

#### MAXIMUM RATINGS (Ta=25°C)

| CHARACTERISTIC              | SYMBOL    | RATING    | UNIT |
|-----------------------------|-----------|-----------|------|
| Power Supply Voltage        | $V_{CC}$  | -0.5~7    | V    |
| DC Input Voltage            | $V_{IN}$  | -0.5~7    | V    |
| DC Output Voltage           | $V_{OUT}$ | -0.5~7    | V    |
| Input Diode Current         | $I_{IK}$  | -50       | mA   |
| Output Diode Current        | $I_{OK}$  | -50       | mA   |
| DC Output Current           | $I_{OUT}$ | $\pm 50$  | mA   |
| DC $V_{CC}$ /ground Current | $I_{CC}$  | $\pm 100$ | mA   |
| Power Dissipation           | $P_D$     | 200       | mW   |
| Storage Temperature Range   | $T_{stg}$ | -65 ~ 150 | °C   |
| Lead Temperature (10s)      | $T_L$     | 260       | °C   |

#### Logic Diagram

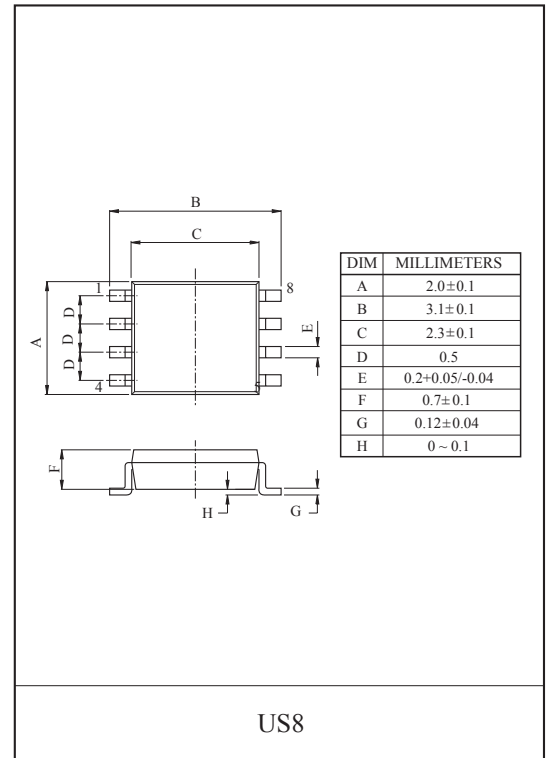


#### Truth Table

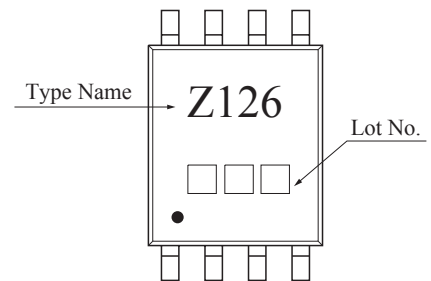
| INPUTS    |   | OUTPUTS |
|-----------|---|---------|
| $\bar{G}$ | A | Y       |
| L         | X | Z       |
| H         | L | L       |
| H         | H | H       |

X : Don't Care

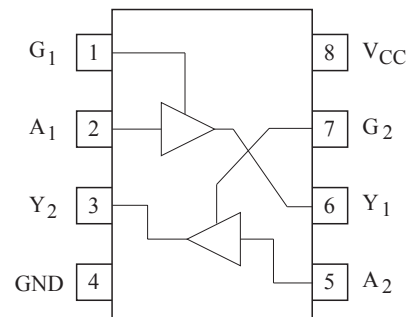
Z : High Impedance



#### MARKING



#### PIN CONNECTION(TOP VIEW)



# KIC7WZ126FK

## Recommended Operating Conditions

| CHARACTERISTIC           | SYMBOL     | RATING   | UNIT |
|--------------------------|------------|--|------|
| Supply Voltage           | $V_{CC}$   | 1.65~5.5   | V    |
|                          |            | 1.5~5.5 (Note1)  |      |
| Input Voltage            | $V_{IN}$   | 0~ $V_{CC}$  | V    |
| Output Voltage           | $V_{OUT}$  | 0~ $V_{CC}$ (Note2)  | V    |
|                          |            | 0~5.5 (Note3)  |      |
| Operating Temperature    | $T_{opr}$  | -40~85   | °C   |
| Input Rise and Fall Time | $t_r, t_f$ | 0~20 ( $V_{CC}=1.8\pm 0.15V, 2.5\pm 0.2V$ )<br>0~10 ( $V_{CC}=3.8V\pm 0.3V$ )<br>0~5 ( $V_{CC}=5.0V\pm 0.5V$ ) | ns/V |

Note1 : Data retention only. Note2 : Active State. Note3 : 3-STATE

## ELECTRICAL CHARACTERISTICS (DC Characteristics)

| CHARACTERISTIC            |            | SYMBOL  | TEST CONDITION              |                    | Ta=25°C              |           |                      | Ta=-40~85°C          |                      | UNIT |   |
|---------------------------|------------|---|-----------------------------|--------------------|----------------------|-----------|----------------------|----------------------|----------------------|------|---|
|                           |            |   |                             | $V_{CC}(V)$        | MIN.                 | TYP.      | MAX.                 | MIN.                 | MAX.                 |      |   |
| Input Voltage             | High Level | $V_{IH}$  | -                           | 1.65~1.95          | $0.75 \times V_{CC}$ | -         | -                    | $0.75 \times V_{CC}$ | -                    | V    |   |
|                           |            |   |                             | 2.3~5.5            | $0.7 \times V_{CC}$  | -         | -                    | $0.7 \times V_{CC}$  | -                    |      |   |
|                           | Low Level  | $V_{IL}$  | -                           | 1.65~1.95          | -                    | -         | $0.25 \times V_{CC}$ | -                    | $0.25 \times V_{CC}$ |      |   |
|                           |            |   |                             | 2.3~5.5            | -                    | -         | $0.3 \times V_{CC}$  | -                    | $0.3 \times V_{CC}$  |      |   |
| Output Voltage            | High Level | $V_{OH}$  | $V_{IN}=V_{IH}$ or $V_{IL}$ | $I_{OH}=-100\mu A$ | 1.65                 | 1.55      | 1.65                 | -                    | 1.55                 | -    | V |
|                           |            |   |                             |                    | 2.3                  | 2.2       | 2.3                  | -                    | 2.2                  | -    |   |
|                           |            |   |                             |                    | 3.0                  | 2.9       | 3.0                  | -                    | 2.9                  | -    |   |
|                           |            |   |                             |                    | 4.5                  | 4.4       | 4.5                  | -                    | 4.4                  | -    |   |
|                           |            |   |                             | $I_{OH}=-4mA$      | 1.65                 | 1.29      | 1.52                 | -                    | 1.29                 | -    |   |
|                           |            |   |                             | $I_{OH}=-8mA$      | 2.3                  | 1.9       | 2.15                 | -                    | 1.9                  | -    |   |
|                           |            |   |                             | $I_{OH}=-16mA$     | 3.0                  | 2.4       | 2.80                 | -                    | 2.4                  | -    |   |
|                           |            |   |                             | $I_{OH}=-24mA$     | 3.0                  | 2.3       | 3.68                 | -                    | 2.3                  | -    |   |
|                           | Low Level  | $V_{OL}$  | $V_{IN}=V_{IH}$ or $V_{IL}$ | $I_{OL}=100\mu A$  | 1.65                 | -         | 0                    | 0.1                  | -                    | 0.1  | V |
|                           |            |   |                             |                    | 2.3                  | -         | 0                    | 0.1                  | -                    | 0.1  |   |
|                           |            |   |                             |                    | 3.0                  | -         | 0                    | 0.1                  | -                    | 0.1  |   |
|                           |            |   |                             |                    | 4.5                  | -         | 0                    | 0.1                  | -                    | 0.1  |   |
|                           |            |   |                             | $I_{OL}=4mA$       | 1.65                 | -         | 0.08                 | 0.24                 | -                    | 0.24 |   |
|                           |            |   |                             | $I_{OL}=8mA$       | 2.3                  | -         | 0.10                 | 0.30                 | -                    | 0.30 |   |
|                           |            |   |                             | $I_{OL}=16mA$      | 3.0                  | -         | 0.15                 | 0.40                 | -                    | 0.40 |   |
|                           |            |   |                             | $I_{OL}=24mA$      | 3.0                  | -         | 0.22                 | 0.55                 | -                    | 0.55 |   |
| $I_{OL}=32mA$             | 4.5        | -   | 0.22                        | 0.55               | -                    | 0.55      |                      |                      |                      |      |   |
| Input Leakage Current     | $I_{IN}$   | $V_{IN}=5.5V$ or GND                                      | 0~5.5                       | -                  | -                    | $\pm 0.1$ | -                    | $\pm 1$              | $\mu A$              |      |   |
| 3-STATE Output Leakage    | $I_{OZ}$   | $V_{IN}=V_{IH}$ or $V_{IL}$<br>$0 \leq V_{OUT} \leq 5.5V$ | 1.65~5.5                    | -                  | -                    | $\pm 0.5$ | -                    | $\pm 5$              | $\mu A$              |      |   |
| Power Off Leakage Current | $I_{OFF}$  | $V_{IN}$ or $V_{OUT}=5.5V$                                | 0.0                         | -                  | -                    | 1         | -                    | 10                   | $\mu A$              |      |   |
| Quiescent Supply Current  | $I_{CC}$   | $V_{IN}=5.5V$ or GND                                      | 1.65~5.5                    | -                  | -                    | 1         | -                    | 10                   | $\mu A$              |      |   |

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## Noise Characteristics

| CHARACTERISTIC                               | SYMBOL                    | TEST CONDITION       |                     | Ta=-25°C |      | UNIT |
|--|---------------------------|----------------------|---------------------|----------|------|------|
|  |                           |                      | V <sub>CC</sub> (V) | TYP.     | MAX. |      |
| Quiet Output Maximum Dynamic V <sub>OL</sub> | V <sub>OLP</sub> (Note 1) | C <sub>L</sub> =50pF | 5.0                 | -        | 1.0  | V    |
| Quiet Output Minimum Dynamic V <sub>OL</sub> | V <sub>OLV</sub> (Note 1) | C <sub>L</sub> =50pF | 5.0                 | -        | 1.0  | V    |
| Quiet Output Minimum Dynamic V <sub>OH</sub> | V <sub>OHV</sub> (Note 1) | C <sub>L</sub> =50pF | 5.0                 | -        | 4.0  | V    |
| Minimum HIGH Level Dynamic Input Voltage     | V <sub>IHD</sub> (Note 1) | C <sub>L</sub> =50pF | 5.0                 | -        | 3.5  | V    |
| Maximum LOW Level Dynamic Input Voltage      | V <sub>ILD</sub> (Note 1) | C <sub>L</sub> =50pF | 5.0                 | -        | 1.5  | V    |

Note 1 : Characteristic guaranteed by design.

## AC Characteristics

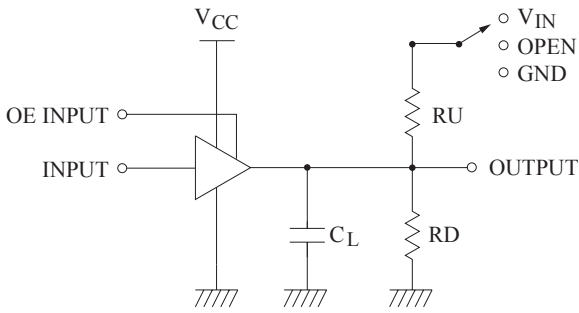
| CHARACTERISTIC   | SYMBOL                                 | TEST CONDITION   | Ta=25°C             |      |      | Ta=-40~85°C |      | UNIT |      |
|--|--|--|---------------------|------|------|-------------|------|------|------|
|  |  |  | V <sub>CC</sub> (V) | MIN. | TYP. | MAX.        | MIN. |      | MAX. |
| Propagation Delay<br>A <sub>N</sub> to Y <sub>N</sub><br>(Figures 1,3) | t <sub>PLH</sub><br>t <sub>PHL</sub>   | C <sub>L</sub> =15pF, R <sub>D</sub> =1MΩ<br>S1=Open   | 1.8±0.15            | 2.0  | -    | 12.0        | 2.0  | 13.0 | ns   |
|  |  |  | 2.5±0.2             | 1.0  | -    | 7.5         | 1.0  | 8.0  |      |
|  |  |  | 3.3±0.3             | 0.8  | -    | 5.2         | 0.8  | 5.5  |      |
|  |  |  | 5.0±0.5             | 0.5  | -    | 4.5         | 0.5  | 4.8  |      |
|  | t <sub>PLH</sub><br>t <sub>PHL</sub>   | C <sub>L</sub> =50pF, R <sub>D</sub> =500Ω<br>S1=Open  | 3.3±0.3             | 1.2  | -    | 5.7         | 1.2  | 6.0  | ns   |
|  |  |  | 5.0±0.5             | 0.8  | -    | 5.0         | 0.8  | 5.3  |      |
| Output to Output Skew<br>(Figures 1,3) (Note 2)                        | t <sub>OSLH</sub><br>t <sub>OSHL</sub> | C <sub>L</sub> =50pF, R <sub>D</sub> =500Ω<br>S1=Open  | 3.3±0.3             | -    | -    | 1.0         | -    | 1.0  | ns   |
|  |  |  | 5.0±0.5             | -    | -    | 0.8         | -    | 0.8  |      |
| Output Enable Time<br>(Figures 1,3)                                    | t <sub>PZL</sub><br>t <sub>PZH</sub>   | C <sub>L</sub> =50pF,<br>R <sub>D</sub> , R <sub>U</sub> =500Ω<br>S1=GND for t <sub>PZH</sub><br>S1=V <sub>1</sub> for t <sub>PZL</sub><br>V <sub>1</sub> =2×V <sub>CC</sub> | 1.8±0.15            | 3.0  | -    | 14.0        | 3.0  | 15.0 | ns   |
|  |  |  | 2.5±0.2             | 1.8  | -    | 8.5         | 1.8  | 9.0  |      |
|  |  |  | 3.3±0.3             | 1.2  | -    | 6.2         | 1.2  | 6.5  |      |
|  |  |  | 5.0±0.5             | 0.8  | -    | 5.5         | 0.8  | 5.8  |      |
| Output Disable Time<br>(Figures 1,3)                                   | t <sub>PLZ</sub><br>t <sub>PHZ</sub>   | C <sub>L</sub> =50pF,<br>R <sub>D</sub> , R <sub>U</sub> =500Ω<br>S1=GND for t <sub>PHZ</sub><br>S1=V <sub>1</sub> for t <sub>PLZ</sub><br>V <sub>1</sub> =2×V <sub>CC</sub> | 1.8±0.15            | 2.5  | -    | 12.0        | 2.5  | 13.0 | ns   |
|  |  |  | 2.5±0.2             | 1.5  | -    | 8.0         | 1.5  | 8.5  |      |
|  |  |  | 3.3±0.3             | 0.8  | -    | 5.7         | 0.8  | 6.0  |      |
|  |  |  | 5.0±0.5             | 0.3  | -    | 4.7         | 0.3  | 5.0  |      |
| Input Capacitance  | C <sub>IN</sub>                        |  | 0                   | -    | 2.5  | -           | -    | pF   |      |
| Output Capacitance   | C <sub>OUT</sub>                       |  | 5.0                 | -    | 4    | -           | -    | pF   |      |
| Power Dissipation<br>Capacitance (Figure 2)                            | C <sub>PD</sub>                        | (Note 3)   | 3.3                 | -    | 10   | -           | -    | -    | pF   |
|  |  |  | 5.0                 | -    | 12   | -           | -    | -    |      |

Note 2 : Characteristic guaranteed by design. t<sub>OSLH</sub>=|t<sub>PLHmax</sub>-t<sub>PLHmin</sub>| ; t<sub>OSHL</sub>=|t<sub>PHLmax</sub>-t<sub>PHLmin</sub>|.

Note 3 : C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I<sub>CCD</sub>) at no output loading and operating at 50% duty cycle. (See Figure 2.) C<sub>PD</sub> is related to I<sub>CCD</sub> dynamic operating current by the expression : I<sub>CCD</sub>=C<sub>PD</sub> · V<sub>CC</sub> · f<sub>IN</sub>+I<sub>CC</sub>

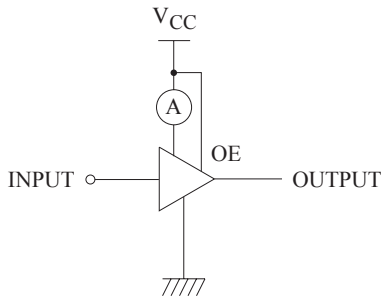
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## AC Loading and Waveforms



$C_L$  includes load and stray capacitance  
Input PRR=1.0MHz ;  $t_w=500ns$

FIGURE 1. AC Test Circuit



Input=AC Waveform ;  $t_r=t_f=1.8ns$ ;  
PRR=10MHz ; Duty Cycle=50%

FIGURE 2. I<sub>CCD</sub> Test Circuit

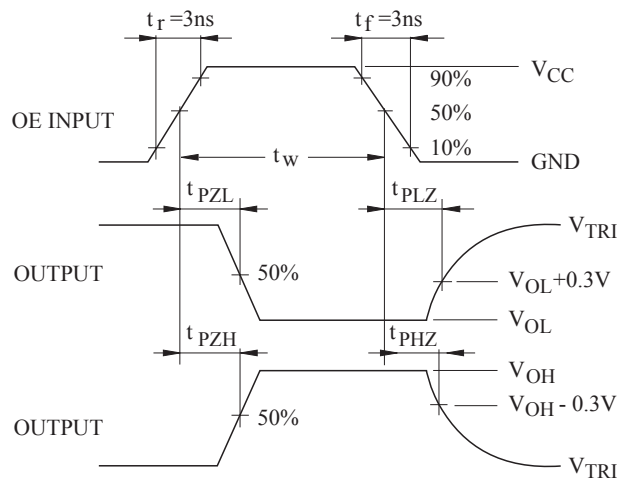
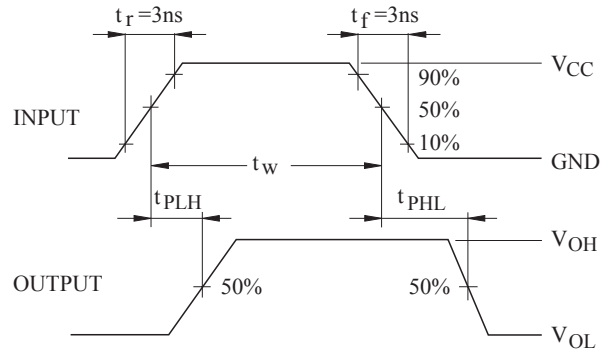


FIGURE 3. AC Waveforms