

TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

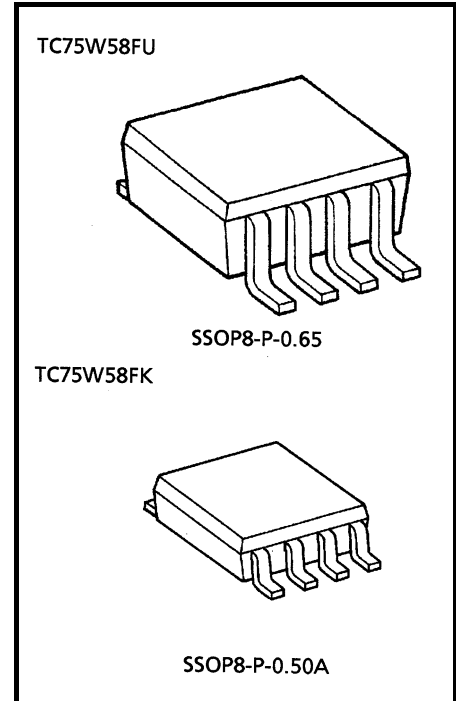
# TC75W58FU, TC75W58FK

## Dual Comparator

TC75W58 is a CMOS type general-purpose dual comparator capable of single power supply operation and using lower supply currents than the conventional bipolar comparators. Its open drain output forms wired OR with other open drain outputs.

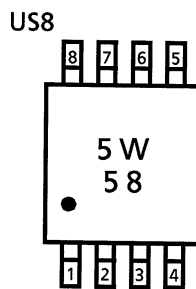
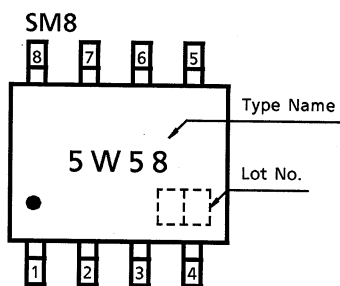
### Features

- Low supply current:  $I_{DD} = 20\mu A$  (typ.)
- Single power supply operation
- Wide common mode input voltage range:  $V_{SS} \sim V_{DD} - 0.9V$
- Open drain output circuit
- Low input bias current
- Small package

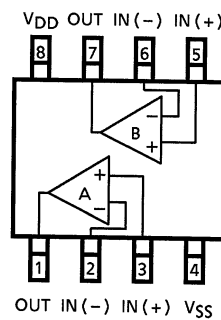


Weight  
 SSOP8-P-0.65: 0.021g (typ.)  
 SSOP8-P-0.50A: 0.01g (typ.)

### Marking (Top View)



### Pin Connection (Top View)



## Absolute Maximum Ratings (Ta = 25°C)

| Characteristic             | Symbol                            | Rating                           | N  |
|----------------------------|-----------------------------------|----------------------------------|----|
| Supply voltage             | V <sub>DD</sub> , V <sub>SS</sub> | ±3.5 or 7                        | V  |
| Differential input voltage | DV <sub>IN</sub>                  | ±7                               | V  |
| Input voltage              | V <sub>IN</sub>                   | V <sub>SS</sub> ~V <sub>DD</sub> | V  |
| Output current             | I <sub>O</sub>                    | ±35                              | mA |
| Power dissipation          | P <sub>D</sub>                    | 250<br>(TC75W58FU)               | mW |
|                            |                                   | 200<br>(TC75W58FK)               |    |
| Operating temperature      | T <sub>opr</sub>                  | -40~85                           | °C |
| Storage temperature        | T <sub>stg</sub>                  | -55~125                          | °C |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note: Since this product sometimes brings about latchup, which is peculiar to CMOS devices, note the following points:

- Don't raise the voltage level of I/O pins beyond V<sub>DD</sub>, nor lower it below V<sub>SS</sub>. Consider the timing for power supply, too.
- Don't let any abnormal noise enter the device.

## Electrical Characteristics ( $V_{DD} = 5V$ , $V_{SS} = GND$ , $T_a = 25^{\circ}C$ )

| Characteristic                    | Symbol          | Test Circuit | Test Condition     | Min | Typ.    | Max     | Unit    |
|-----------------------------------|-----------------|--------------|--------------------|-----|---------|---------|---------|
| Input offset voltage              | $V_{IO}$        | —            | —                  | —   | $\pm 1$ | $\pm 7$ | mV      |
| Input offset current              | $I_{IO}$        | —            | —                  | —   | 1       | —       | pA      |
| Input bias current                | $I_I$           | —            | —                  | —   | 1       | —       | pA      |
| Common mode input voltage         | $CMV_{IN}$      | —            | —                  | 0   | —       | 4.1     | V       |
| Supply current                    | $I_{DD}$ (Note) | —            | —                  | —   | 22      | 44      | $\mu A$ |
| Voltage gain                      | $G_V$           | —            | —                  | —   | 94      | —       | dB      |
| Sink current                      | $I_{sink}$      | —            | $V_{OL} = 0.5V$    | 13  | 25      | —       | mA      |
| Output leak current               | $I_{LEAK}$      | —            | $V_O = 5V$         | —   | 5       | —       | nA      |
| Output voltage                    | $V_{OL}$        | —            | $I_{sink} = 5.0mA$ | —   | 0.1     | 0.3     | V       |
| Operating supply voltage          | $V_{DD}$        | —            | —                  | 1.8 | —       | 7.0     | V       |
| Propagation delay time (turn on)  | $t_{PLH}$ (1)   | —            | Over drive = 100mV | —   | 800     | —       | ns      |
|                                   | $t_{PLH}$ (2)   | —            | TTL step input     | —   | 620     | —       |         |
| Propagation delay time (turn off) | $t_{PHL}$ (1)   | —            | Over drive = 100mV | —   | 230     | —       | ns      |
|                                   | $t_{PHL}$ (2)   | —            | TTL step input     | —   | 350     | —       |         |
| Response time                     | $t_{TLH}$       | —            | Over drive = 100mV | —   | 190     | —       | ns      |
|                                   | $t_{THL}$       | —            | Over drive = 100mV | —   | 6       | —       |         |

## Electrical Characteristics ( $V_{DD} = 3V$ , $V_{SS} = GND$ , $T_a = 25^{\circ}C$ )

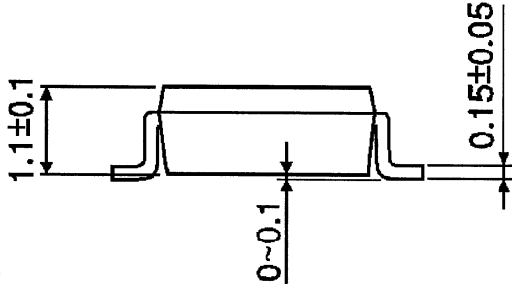
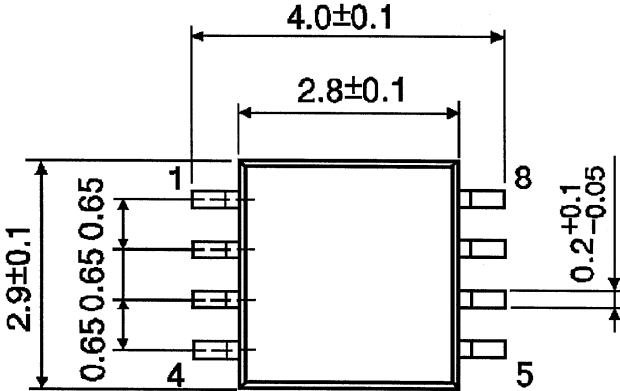
| Characteristic                    | Symbol          | Test Circuit | Test Condition     | Min | Typ.    | Max     | Unit    |
|-----------------------------------|-----------------|--------------|--------------------|-----|---------|---------|---------|
| Input offset voltage              | $V_{IO}$        | —            | —                  | —   | $\pm 1$ | $\pm 7$ | mV      |
| Input offset current              | $I_{IO}$        | —            | —                  | —   | 1       | —       | pA      |
| Input bias current                | $I_I$           | —            | —                  | —   | 1       | —       | pA      |
| Common mode input voltage         | $CMV_{IN}$      | —            | —                  | 0   | —       | 2.1     | V       |
| Supply current                    | $I_{DD}$ (Note) | —            | —                  | —   | 20      | 40      | $\mu A$ |
| Sink current                      | $I_{sink}$      | —            | $V_{OL} = 0.5V$    | 6   | 18      | —       | mA      |
| Output leak current               | $I_{LEAK}$      | —            | $V_O = 3V$         | —   | 5       | —       | nA      |
| Output voltage                    | $V_{OL}$        | —            | $I_{sink} = 5.0mA$ | —   | 0.15    | 0.35    | V       |
| Propagation delay time (turn on)  | $t_{PLH}$       | —            | Over drive = 100mV | —   | 590     | —       | ns      |
| Propagation delay time (turn off) | $t_{PHL}$       | —            | Over drive = 100mV | —   | 230     | —       | ns      |
| Response time                     | $t_{TLH}$       | —            | Over drive = 100mV | —   | 170     | —       | ns      |
|                                   | $t_{THL}$       | —            | Over drive = 100mV | —   | 5       | —       |         |

Note: Since this product causes an increase in current consumption with a rise in operational frequency, make sure that power consumption does not exceed the allowable dissipation.

**Package Dimensions**

SSOP8-P-0.65

Unit: mm

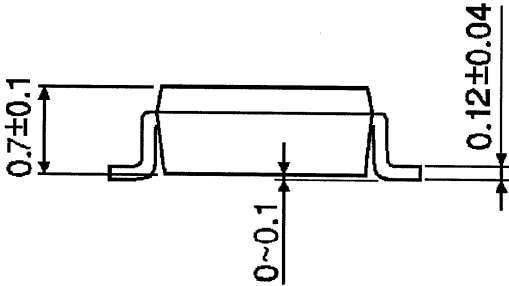
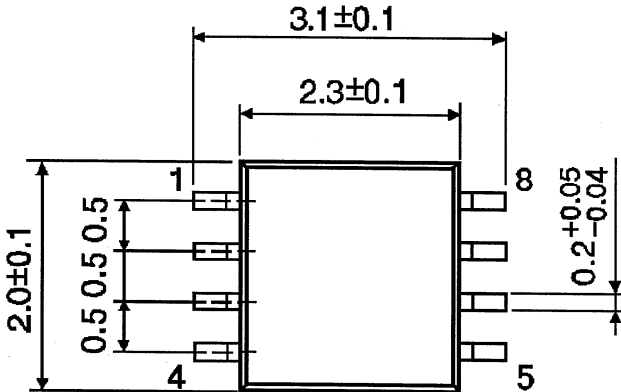


Weight: 0.021g(typ.)

**Package Dimensions**

SSOP8-P-0.50A

Unit: mm



Weight: 0.01g(typ.)

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