

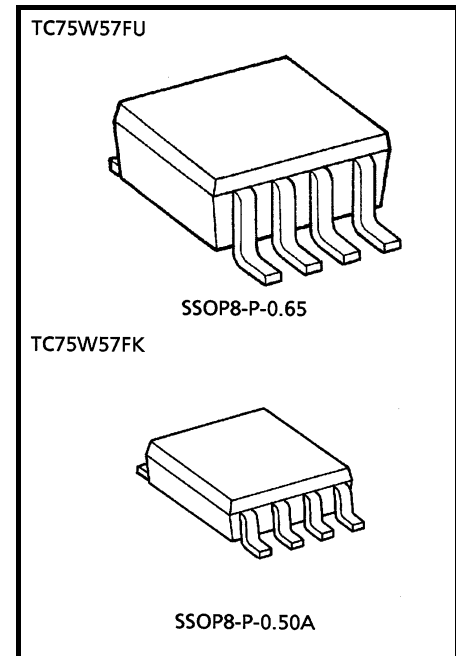
# TC75W57FU, TC75W57FK

## Dual Comparator

TC75W57 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 push-pull output can connect directly to local IC's such as TTL and CMOS circuits.

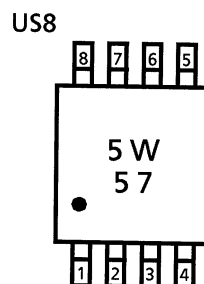
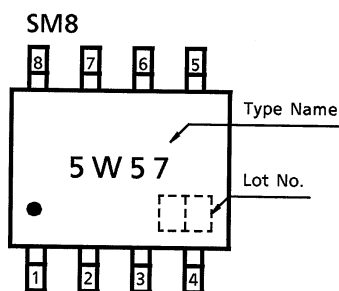
### Features

- Low supply current:  $I_{DD} = 200\mu A$  (typ.)
- Single power supply operation
- Wide common mode input voltage range:  $V_{SS}$  to  $V_{DD} - 0.9V$
- Push-pull output circuit
- Low input bias current
- Small package

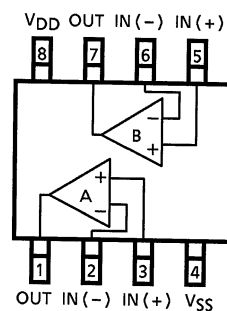


Weight  
 SSOP8-P-0.65: 0.021g (typ.)  
 SSOP8-P-0.50A: 0.01g (typ.)

### Marking (Top View)



### Pin Connection (Top View)



Start of commercial production  
 1997-05

## 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> to V <sub>DD</sub> | V  |
| Output current             | I <sub>OUT</sub>                  | ±35                                | mA |
| Power dissipation          | P <sub>D</sub>                    | 250<br>(TC75W57FU)                 | mW |
|                            |                                   | 200<br>(TC75W57FK)                 |    |
| Operating temperature      | T <sub>opr</sub>                  | −40 to 85                          | °C |
| Storage temperature        | T <sub>stg</sub>                  | −55 to 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 latchcap, 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.

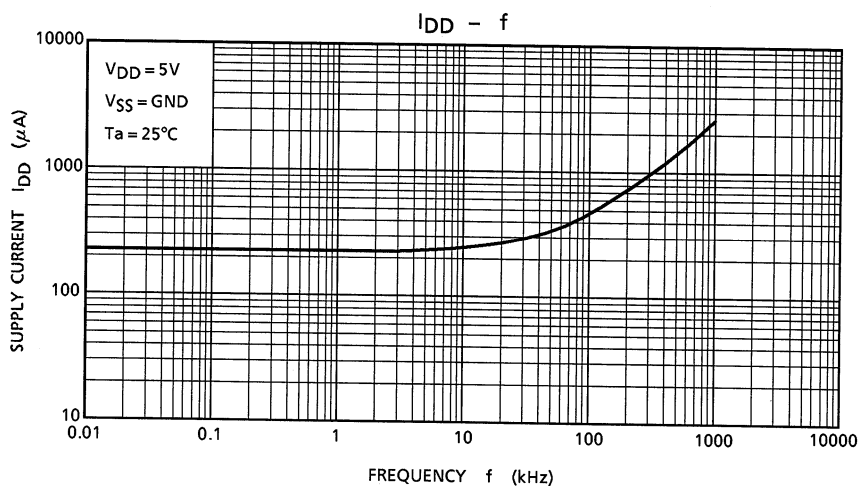
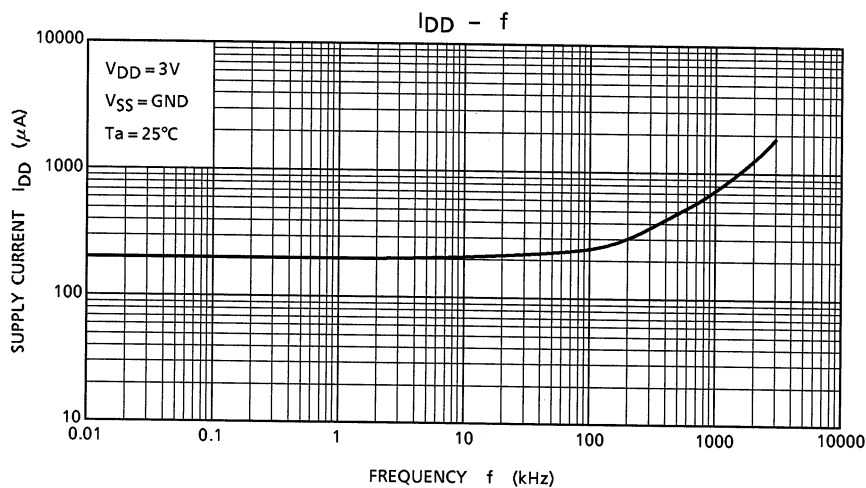
**Electrical Characteristics ( $V_{DD} = 5V$ ,  $V_{SS} = GND$ ,  $T_a = 25^\circ C$ )**

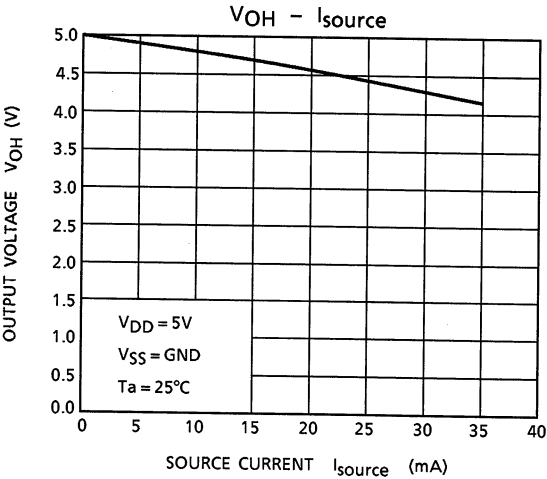
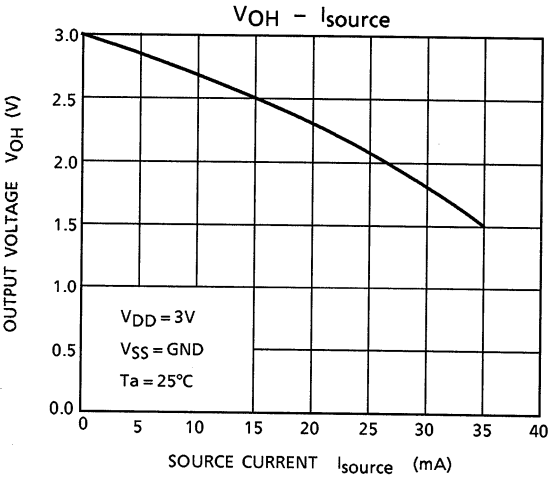
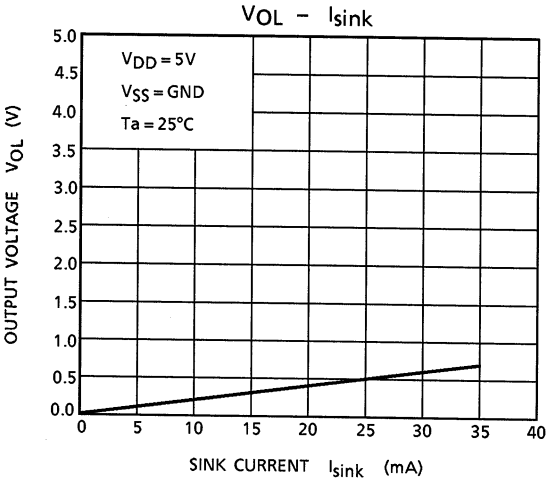
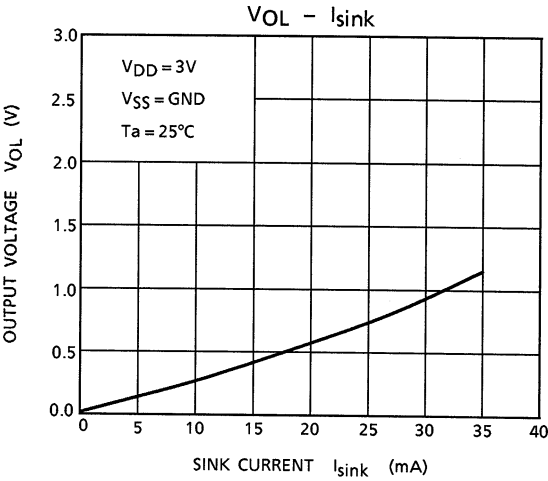
| Characteristic                    | Symbol          | Test Circuit | Test Condition       | Min | Typ.    | Max     | Unit    |
|-----------------------------------|-----------------|--------------|----------------------|-----|---------|---------|---------|
| Input offset voltage              | $V_{IO}$        | —            | —                    | —   | $\pm 1$ | $\pm 7$ | 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) | —            | —                    | —   | 220     | 440     | $\mu A$ |
| Voltage gain                      | $G_V$           | —            | —                    | —   | 94      | —       | dB      |
| Sink current                      | $I_{sink}$      | —            | $V_{OL} = 0.5V$      | 13  | 25      | —       | mA      |
| Source current                    | $I_{source}$    | —            | $V_{OH} = 4.5V$      | 9   | 21      | —       | mA      |
| Output voltage                    | $V_{OL}$        | —            | $I_{sink} = 5.0mA$   | —   | 0.1     | 0.3     | V       |
|                                   | $V_{OH}$        | —            | $I_{source} = 5.0mA$ | 4.7 | 4.9     | —       |         |
| Operating supply voltage          | $V_{DD}$        | —            | —                    | 1.8 | —       | 7.0     | V       |
| Propagation delay time (turn on)  | $t_{PLH}$ (1)   | —            | Over drive = 100mV   | —   | 140     | —       | ns      |
|                                   | $t_{PLH}$ (2)   | —            | TTL step input       | —   | 90      | —       |         |
| Propagation delay time (turn off) | $t_{PHL}$ (1)   | —            | Over drive = 100mV   | —   | 90      | —       | ns      |
|                                   | $t_{PHL}$ (2)   | —            | TTL step input       | —   | 70      | —       |         |
| Response time                     | $t_{TLH}$       | —            | Over drive = 100mV   | —   | 11      | —       | ns      |
|                                   | $t_{THL}$       | —            | Over drive = 100mV   | —   | 7       | —       |         |

**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) | —            | —                    | —    | 200     | 400     | $\mu A$ |
| Sink current                      | $I_{sink}$      | —            | $V_{OL} = 0.5V$      | 6    | 18      | —       | mA      |
| Source current                    | $I_{source}$    | —            | $V_{OH} = 2.5V$      | 3    | 15      | —       | mA      |
| Output voltage                    | $V_{OL}$        | —            | $I_{sink} = 5.0mA$   | —    | 0.15    | 0.35    | V       |
|                                   | $V_{OH}$        | —            | $I_{source} = 5.0mA$ | 2.65 | 2.85    | —       |         |
| Propagation delay time (turn on)  | $t_{PLH}$       | —            | Over drive = 100mV   | —    | 110     | —       | ns      |
| Propagation delay time (turn off) | $t_{PHL}$       | —            | Over drive = 100mV   | —    | 90      | —       | ns      |
| Response time                     | $t_{TLH}$       | —            | Over drive = 100mV   | —    | 7       | —       | ns      |
|                                   | $t_{THL}$       | —            | Over drive = 100mV   | —    | 8       | —       |         |

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.

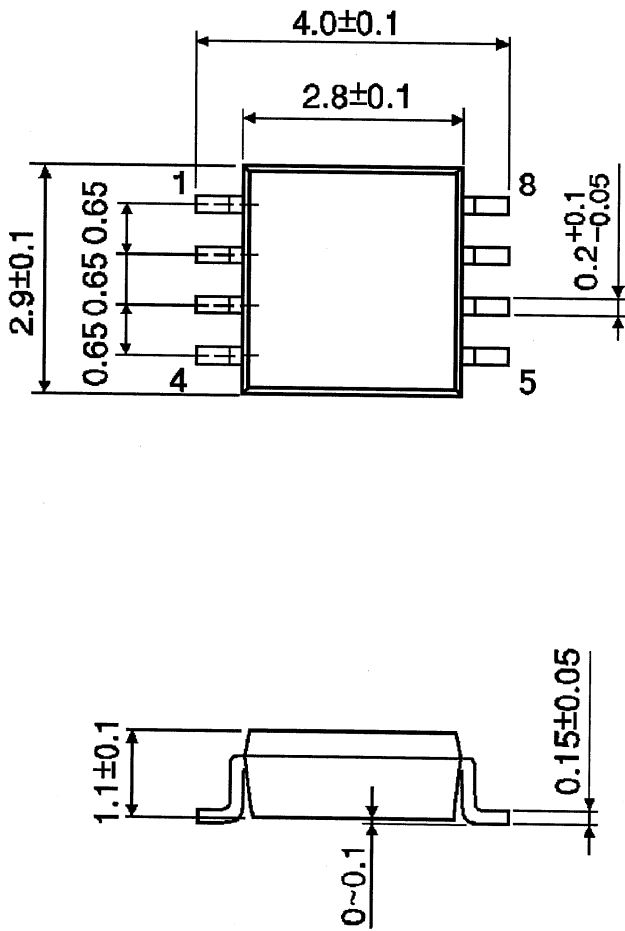




Package Dimensions

SSOP8-P-0.65

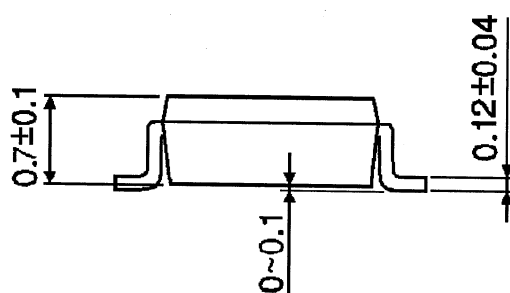
Unit: mm



Weight: 0.021g(typ.)

## SSOP8-P-0.50A

Unit: mm



Weight: 0.01g(typ.)

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105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

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