

TOSHIBA CMOS Linear Integrated Circuit Silicon Monolithic

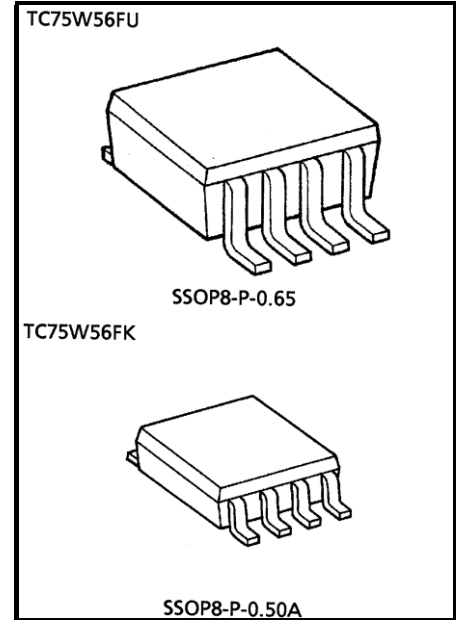
# TC75W56FU, TC75W56FK

## Dual Comparator

TC75W56 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.

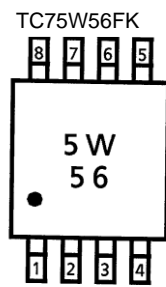
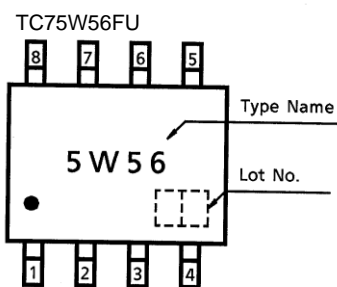
### Features

- Low supply current:  $I_{DD} = 20\mu A$  (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

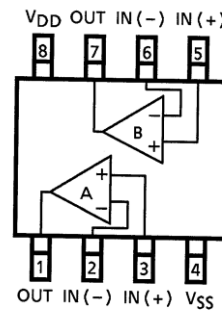


Weight  
 SSOP8-P-0.65 : 0.021g (typ.)  
 SSOP8-P-0.50A : 0.01g (typ.)

### 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>(TC75W56FU)                 | mW |
|                            |                                   | 200<br>(TC75W56FK)                 |    |
| 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.

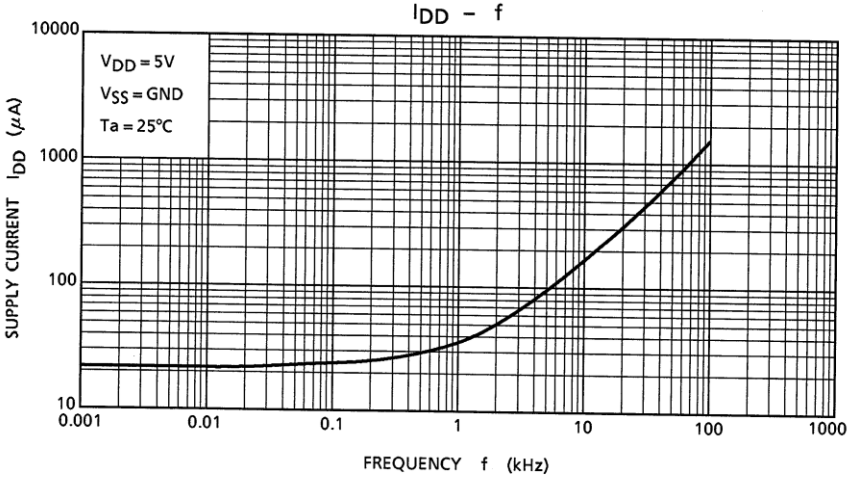
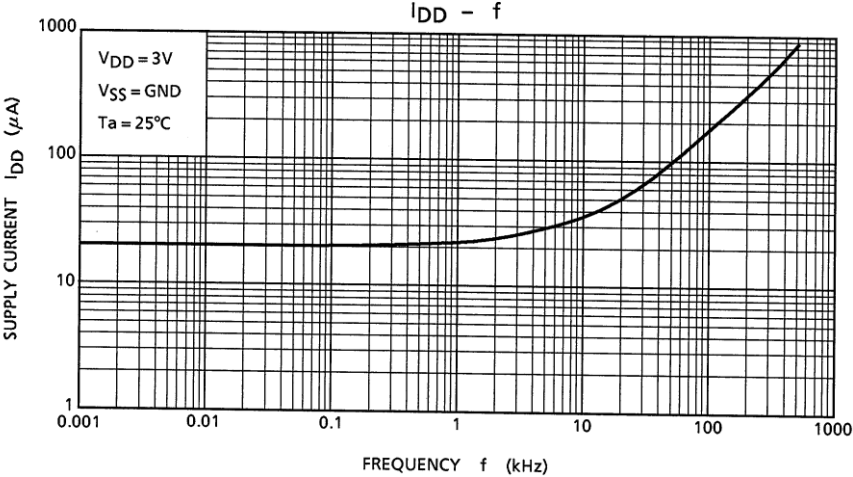
## Electrical Characteristics (VDD = 5V, VSS = GND, Ta = 25°C)

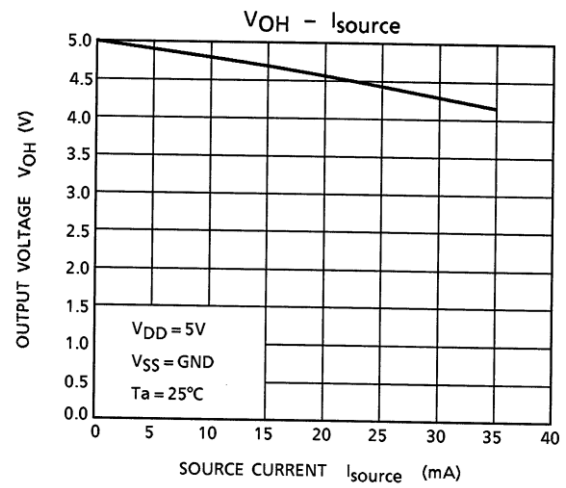
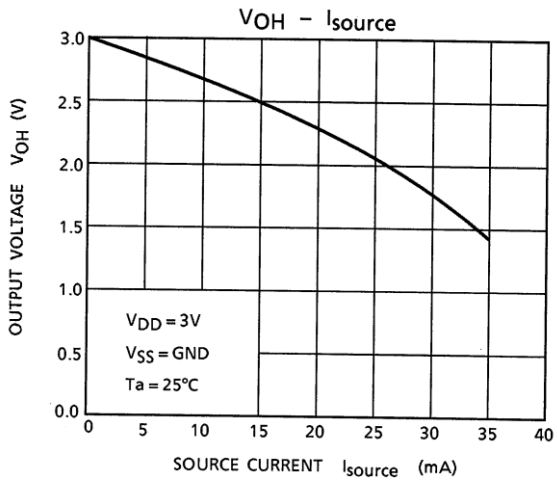
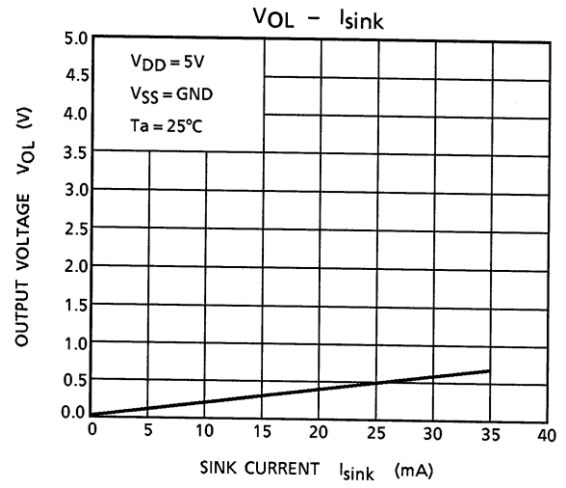
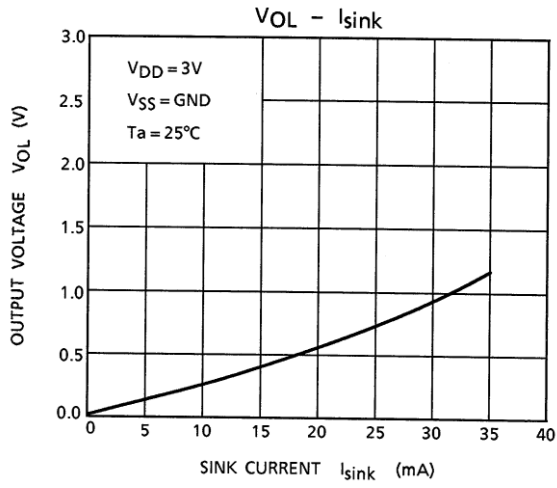
| Characteristic                    | Symbol                 | Test Circuit | Test Condition              | Min | Typ. | Max | Unit |
|-----------------------------------|------------------------|--------------|-----------------------------|-----|------|-----|------|
| Input offset voltage              | V <sub>IO</sub>        | —            | —                           | —   | ±1   | ±7  | mV   |
| Input offset current              | I <sub>IO</sub>        | —            | —                           | —   | 1    | —   | pA   |
| Input bias current                | I <sub>I</sub>         | —            | —                           | —   | 1    | —   | pA   |
| Common mode input voltage         | CMV <sub>IN</sub>      | —            | —                           | 0   | —    | 4.1 | V    |
| Supply current                    | I <sub>DD</sub> (Note) | —            | —                           | —   | 22   | 44  | μA   |
| Voltage gain                      | G <sub>V</sub>         | —            | —                           | —   | 94   | —   | dB   |
| Sink current                      | I <sub>sink</sub>      | —            | V <sub>OL</sub> = 0.5V      | 13  | 25   | —   | mA   |
| Source current                    | I <sub>source</sub>    | —            | V <sub>OH</sub> = 4.5V      | 9   | 21   | —   | mA   |
| Output voltage                    | V <sub>OL</sub>        | —            | I <sub>sink</sub> = 5.0mA   | —   | 0.1  | 0.3 | V    |
|                                   | V <sub>OH</sub>        | —            | I <sub>source</sub> = 5.0mA | 4.7 | 4.9  | —   |      |
| Operating supply voltage          | V <sub>DD</sub>        | —            | —                           | 1.8 | —    | 7.0 | V    |
| Propagation delay time (turn on)  | t <sub>PLH</sub> (1)   | —            | Over drive = 100mV          | —   | 680  | —   | ns   |
|                                   | t <sub>PLH</sub> (2)   | —            | TTL step input              | —   | 500  | —   |      |
| Propagation delay time (turn off) | t <sub>PHL</sub> (1)   | —            | Over drive = 100mV          | —   | 250  | —   | ns   |
|                                   | t <sub>PHL</sub> (2)   | —            | TTL step input              | —   | 380  | —   |      |
| Response time                     | t <sub>TLH</sub>       | —            | Over drive = 100mV          | —   | 60   | —   | ns   |
|                                   | t <sub>THL</sub>       | —            | Over drive = 100mV          | —   | 8    | —   |      |

## Electrical Characteristics (VDD = 3V, VSS = GND, Ta = 25°C)

| Characteristic                    | Symbol                 | Test Circuit | Test Condition              | Min  | Typ. | Max  | Unit |
|-----------------------------------|------------------------|--------------|-----------------------------|------|------|------|------|
| Input offset voltage              | V <sub>IO</sub>        | —            | —                           | —    | ±1   | ±7   | mV   |
| Input offset current              | I <sub>IO</sub>        | —            | —                           | —    | 1    | —    | pA   |
| Input bias current                | I <sub>I</sub>         | —            | —                           | —    | 1    | —    | pA   |
| Common mode input voltage         | CMV <sub>IN</sub>      | —            | —                           | 0    | —    | 2.1  | V    |
| Supply current                    | I <sub>DD</sub> (Note) | —            | —                           | —    | 20   | 40   | μA   |
| Sink current                      | I <sub>sink</sub>      | —            | V <sub>OL</sub> = 0.5V      | 6    | 18   | —    | mA   |
| Source current                    | I <sub>source</sub>    | —            | V <sub>OH</sub> = 2.5V      | 3    | 15   | —    | mA   |
| Output voltage                    | V <sub>OL</sub>        | —            | I <sub>sink</sub> = 5.0mA   | —    | 0.15 | 0.35 | V    |
|                                   | V <sub>OH</sub>        | —            | I <sub>source</sub> = 5.0mA | 2.65 | 2.85 | —    |      |
| Propagation delay time (turn on)  | t <sub>PLH</sub>       | —            | Over drive = 100mV          | —    | 550  | —    | ns   |
| Propagation delay time (turn off) | t <sub>PHL</sub>       | —            | Over drive = 100mV          | —    | 250  | —    | ns   |
| Response time                     | t <sub>TLH</sub>       | —            | Over drive = 100mV          | —    | 30   | —    | ns   |
|                                   | t <sub>THL</sub>       | —            | 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.

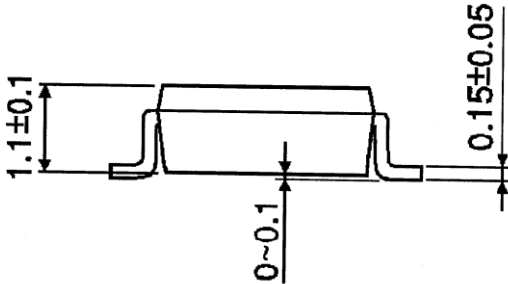
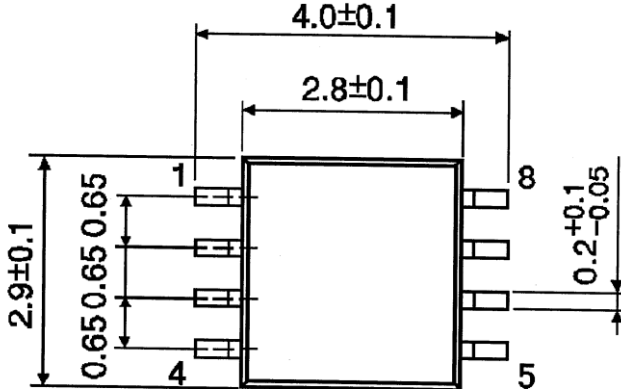




**Package Dimensions**

SSOP8-P-0.65

Unit: mm

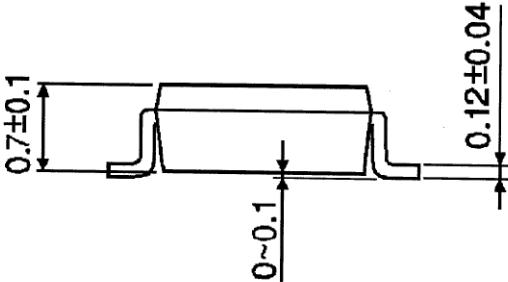
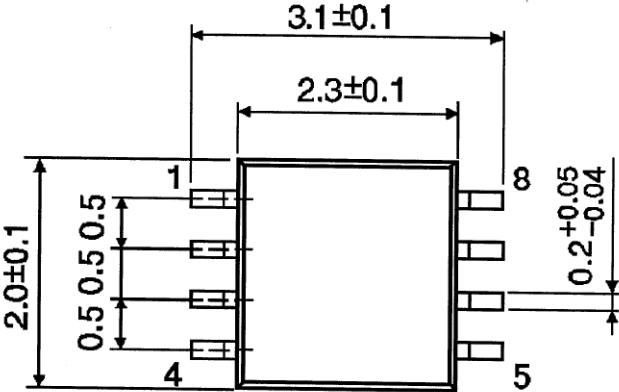


Weight: 0.021g(typ.)

**Package Dimensions**

SSOP8-P-0.50A

Unit: mm



Weight: 0.01g(typ.)

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