

# TC4S584F

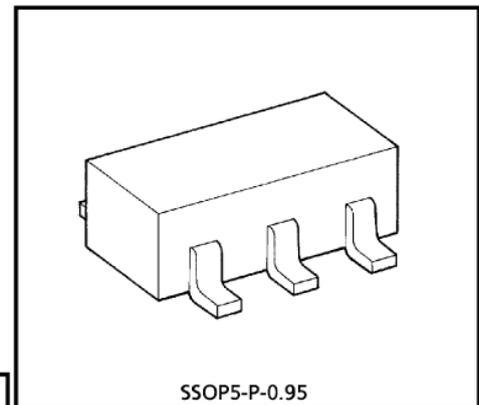
## SCHMITT TRIGGER

TC4S584F is the one circuit inverter having the schmitt trigger function at the input terminal.

That is, since the circuit threshold level voltage at the leading and trailing edges of input waveform are different ( $V_p$ ,  $V_N$ ), the TC4S584F can be used in the broad range application, including line receiver, waveform shaping circuit, astable multivibrator, etc. In addition to ordinary inverter.

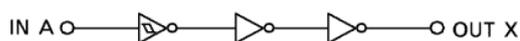
### ABSOLUTE MAXIMUM RATINGS

| CHARACTERISTIC              | SYMBOL    | RATING                           | UNIT |
|-----------------------------|-----------|----------------------------------|------|
| DC Supply Voltage           | $V_{DD}$  | $V_{SS} - 0.5 \sim V_{SS} + 20$  | V    |
| Input Voltage               | $V_{IN}$  | $V_{SS} - 0.5 \sim V_{DD} + 0.5$ | V    |
| Output Voltage              | $V_{OUT}$ | $V_{SS} - 0.5 \sim V_{DD} + 0.5$ | V    |
| DC Input Current            | $I_{IN}$  | $\pm 10$                         | mA   |
| Power Dissipation           | $P_D$     | 200                              | mW   |
| Operating Temperature Range | $T_{opr}$ | -40~85                           | °C   |
| Storage Temperature Range   | $T_{stg}$ | -65~150                          | °C   |
| Lead Temperature (10s)      | $T_L$     | 260                              | °C   |

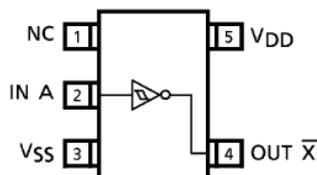


SSOP5-P-0.95  
Weight : 0.016g (Typ.)

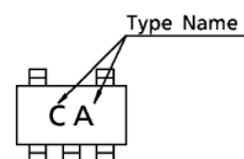
### LOGIC DIAGRAM



### PIN ASSIGNMENT (TOP VIEW)



### MARKING



Start of commercial production  
1988-05

### OPERATING RANGES ( $V_{SS} = 0V$ )

| CHARACTERISTIC    | SYMBOL   |   | MIN. | TYP. | MAX.     | UNIT |
|-------------------|----------|---|------|------|----------|------|
| DC Supply Voltage | $V_{DD}$ | — | 3    | —    | 18       | V    |
| Input Voltage     | $V_{IN}$ | — | 0    | —    | $V_{DD}$ | V    |

### STATIC ELECTRICAL CHARACTERISTICS ( $V_{SS} = 0V$ )

| CHARACTERISTIC                      | SYM-BOL  | TEST CONDITION   | $V_{DD}$<br>(V) | -40°C |      | 25°C  |       |            | 85°C  |      | UNIT    |         |
|-------------------------------------|----------|--|-----------------|-------|------|-------|-------|------------|-------|------|---------|---------|
|                                     |          |  |                 | MIN.  | MAX. | MIN.  | TYP.  | MAX.       | MIN.  | MAX. |         |         |
| High-Level Output Voltage           | $V_{OH}$ | $ I_{OUT}  < 1\mu A$<br>$V_{IN} = V_{SS}, V_{DD}$  | 5               | 4.95  | —    | 4.95  | 5.00  | —          | 4.95  | —    | V       |         |
|                                     |          |  | 10              | 9.95  | —    | 9.95  | 10.00 | —          | 9.95  | —    |         |         |
|                                     |          |  | 15              | 14.95 | —    | 14.95 | 15.00 | —          | 14.95 | —    |         |         |
| Low-Level Output Voltage            | $V_{OL}$ | $ I_{OUT}  < 1\mu A$<br>$V_{IN} = V_{SS}, V_{DD}$  | 5               | —     | 0.05 | —     | 0.00  | 0.05       | —     | 0.05 | V       |         |
|                                     |          |  | 10              | —     | 0.05 | —     | 0.00  | 0.05       | —     | 0.05 |         |         |
|                                     |          |  | 15              | —     | 0.05 | —     | 0.00  | 0.05       | —     | 0.05 |         |         |
| Output High Current                 | $I_{OH}$ | $V_{OH} = 4.6V$<br>$V_{OH} = 2.5V$<br>$V_{OH} = 9.5V$<br>$V_{OH} = 13.5V$<br>$V_{IN} = V_{SS}, V_{DD}$ | 5               | -0.61 | —    | -0.51 | -1.0  | —          | -0.42 | —    | mA      |         |
|                                     |          |  | 5               | -2.5  | —    | -2.1  | -4.0  | —          | -1.7  | —    |         |         |
|                                     |          |  | 10              | -1.5  | —    | -1.3  | -2.2  | —          | -1.1  | —    |         |         |
|                                     |          |  | 15              | -4.0  | —    | -3.4  | -9.0  | —          | -2.8  | —    |         |         |
| Output Low Current                  | $I_{OL}$ | $V_{OL} = 0.4V$<br>$V_{OL} = 0.5V$<br>$V_{OL} = 1.5V$<br>$V_{IN} = V_{SS}, V_{DD}$                     | 5               | 0.61  | —    | 0.51  | 1.5   | —          | 0.42  | —    | mA      |         |
|                                     |          |  | 10              | 1.5   | —    | 1.3   | 3.8   | —          | 1.1   | —    |         |         |
|                                     |          |  | 15              | 4.0   | —    | 3.4   | 15.0  | —          | 2.8   | —    |         |         |
|                                     |          |  |                 |       |      |       |       |            |       |      |         |         |
| Positive Trigger Threshold Voltage* | $V_P$    | $V_{OUT} = 0.5V$<br>$V_{OUT} = 1.0V$<br>$V_{OUT} = 1.5V$   | 5               | 1.95  | 3.65 | 2.05  | 2.9   | 3.35       | 2.05  | 3.75 | V       |         |
|                                     |          |  | 10              | 4.3   | 7.1  | 4.5   | 5.9   | 7.1        | 4.7   | 7.2  |         |         |
|                                     |          |  | 15              | 6.9   | 10.7 | 7.1   | 9.0   | 10.6       | 7.1   | 10.8 |         |         |
| Negative Trigger Threshold Voltage* | $V_N$    | $V_{OUT} = 4.5V$<br>$V_{OUT} = 9.0V$<br>$V_{OUT} = 13.5V$  | 5               | 1.05  | 2.75 | 1.1   | 2.1   | 2.6        | 0.95  | 2.65 | V       |         |
|                                     |          |  | 10              | 2.1   | 4.9  | 2.2   | 3.5   | 4.7        | 2.0   | 4.8  |         |         |
|                                     |          |  | 15              | 3.2   | 7.0  | 3.3   | 5.0   | 6.8        | 3.1   | 6.9  |         |         |
| Hysteresis Voltage*                 | $V_H$    | —  | 5               | 0.1   | 1.35 | 0.4   | 0.75  | 1.3        | 0.4   | 1.50 | V       |         |
|                                     |          |  | 10              | 1.7   | 3.2  | 1.8   | 2.4   | 3.2        | 1.7   | 3.4  |         |         |
|                                     |          |  | 15              | 3.1   | 4.8  | 3.2   | 4.0   | 4.8        | 3.2   | 4.9  |         |         |
| Input Current                       | H Level  | $I_{IH}$   | $V_{IH} = 18V$  | 18    | —    | 0.1   | —     | $10^{-5}$  | 0.1   | —    | 1.0     | $\mu A$ |
|                                     | L Level  | $I_{IL}$   | $V_{IL} = 0V$   | 18    | —    | -0.1  | —     | $-10^{-5}$ | -0.1  | —    | -1.0    |         |
| Quiescent Device Current            | $I_{DD}$ | $V_{IN} = V_{SS}, V_{DD}$  | 5               | —     | 1    | —     | 0.001 | 1          | —     | 7.5  | $\mu A$ |         |
|                                     |          |  | 10              | —     | 2    | —     | 0.002 | 2          | —     | 15   |         |         |
|                                     |          |  | 15              | —     | 4    | —     | 0.004 | 4          | —     | 30   |         |         |

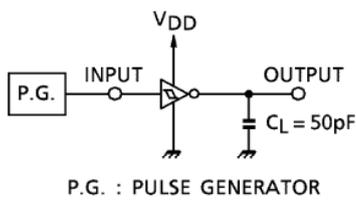
(Note) Values are different to TC4584BP, TC4584BF marked\* ( $V_P, V_N, V_H$ ).

### DYNAMIC ELECTRICAL CHARACTERISTICS (Ta = 25°C, VSS = 0V, CL = 50pF)

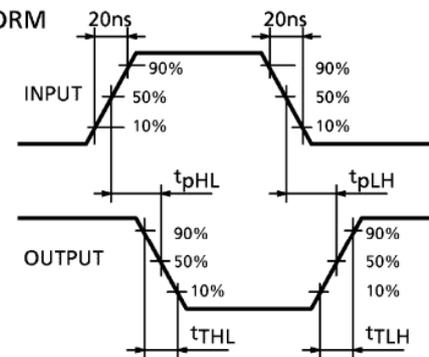
| CHARACTERISTIC                       | SYMBOL       | TEST CONDITION | VDD (V) | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|--------------|----------------|---------|------|------|------|------|
|                                      |              |                | 5       |      |      |      |      |
| Output Transition Time (Low to High) | tTLH         | —              | 5       | —    | 80   | 200  | ns   |
|                                      |              |                | 10      | —    | 50   | 100  |      |
|                                      |              |                | 15      | —    | 40   | 80   |      |
| Output Transition Time (High to Low) | tTHL         | —              | 5       | —    | 80   | 200  | ns   |
|                                      |              |                | 10      | —    | 50   | 100  |      |
|                                      |              |                | 15      | —    | 40   | 80   |      |
| Propagation Delay Time               | tpLH<br>tpHL | —              | 5       | —    | 170  | 340  | ns   |
|                                      |              |                | 10      | —    | 80   | 160  |      |
|                                      |              |                | 15      | —    | 60   | 120  |      |
| Input Capacitance                    | CIN          | —              | —       | 5    | 7.5  | pF   |      |

### CIRCUIT AND WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

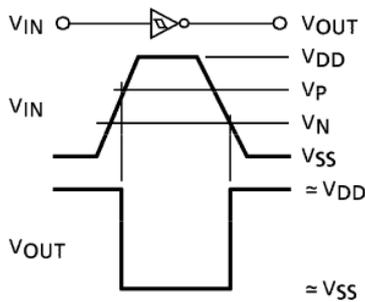
#### CIRCUIT



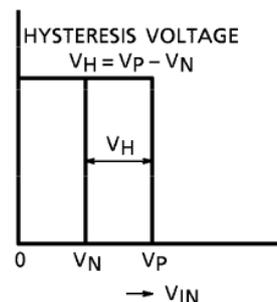
#### WAVEFORM



### INPUT-OUTPUT VOLTAGE CHARACTERISTICS



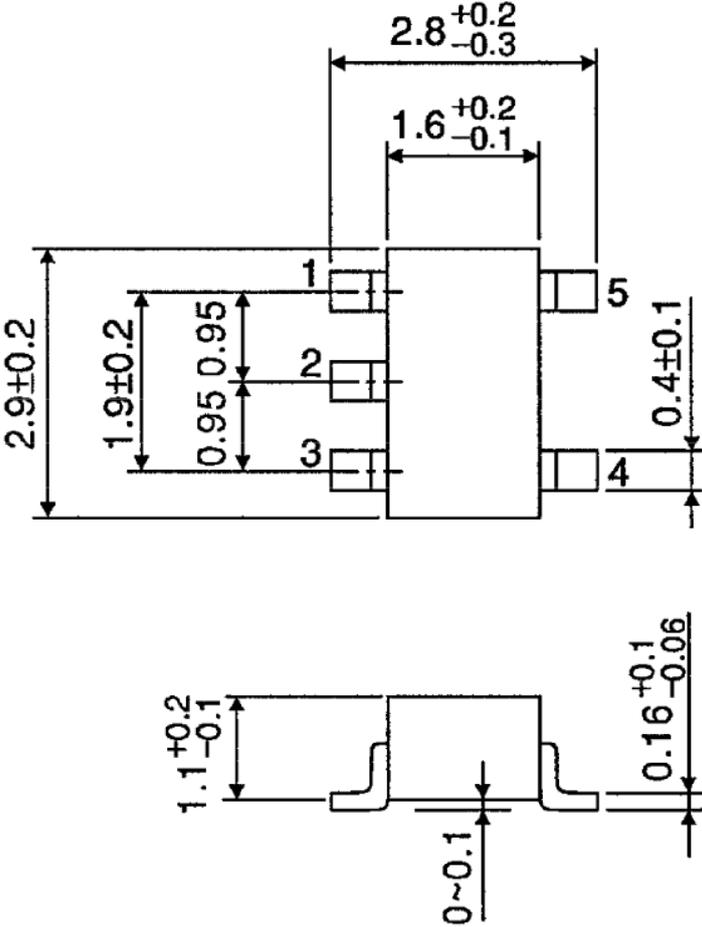
• INPUT-OUTPUT VOLTAGE WAVEFORM



• TRANSFER CHARACTERISTICS

PACKAGE DIMENSIONS  
SSOP5-P-0.95

Unit : mm



Weight : 0.016g (Typ.)

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