TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

# TA7522S,TA7522F

## Dual Voltage Comparator

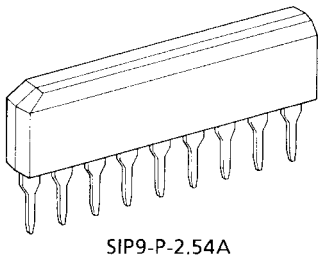
The TA7522S, TA7522F is an easy-to-use IC incorporating two voltage comparator circuits.

Since one channel has an inverted-output buffer, a CR oscillator can be easily built up. In addition, the IC has so wide an operating temperature range that it can be used in wide application fields.

### Features

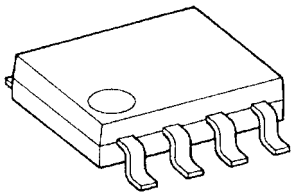
- Two-circuit package
- High gain
- Single 3V power supply for operation
- Inverted-output also available
- A 0V input causes action in the IC with a single power supply.
- Wide common-mode input range
- No latch-up
- Operating temperature range : from −40 to 85°C
- Open-collector output
- SIP-9 pin (TA7522S)
- SOP-8 pin (TA7522F)

TA7522S



SIP9-P-2.54A

TA7522F

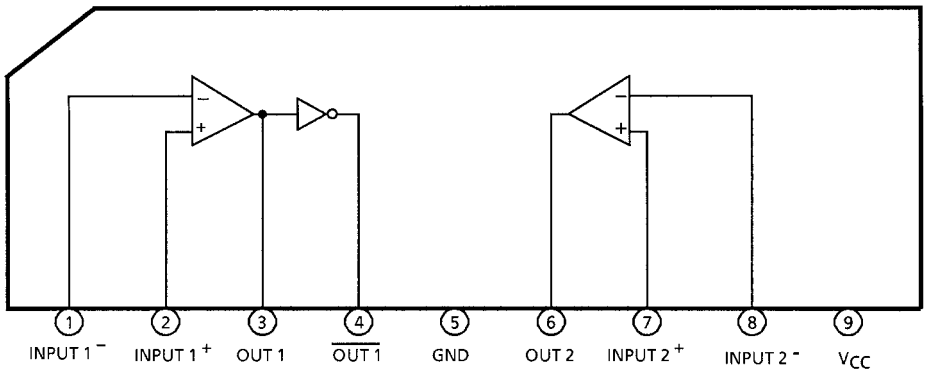


SOP8-P-225-1.27

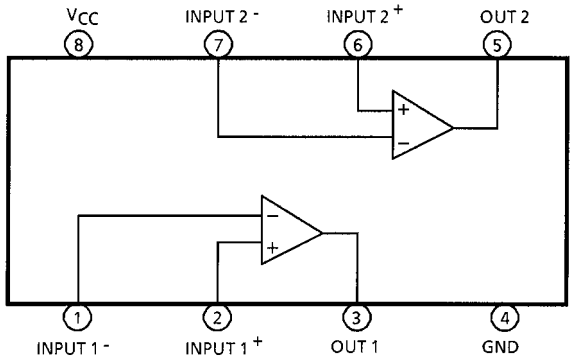
Weight
SIP9-P-2.54A : 0.92 g (typ.)
SOP8-P-225-1.27 : 0.08 g (typ.)

## Block Diagram And Pin Layout

TA7522S




TA7522F




Note : The TA7522S and TA7522F are the same chip, except that they are housed in different packages.

## Pin Description

| Pin No. | | Symbol | Description |
|---|---|---|---|
| TA7522S | TA7522F | | |
| 1 | 1 | $INPUT1^-$ | Inverted-input pin |
| 2 | 2 | $INPUT1^+$ | Non-inverted-input pin |
| 3 | 3 | OUT1 | Output pin corresponding to INPUT1 |
| 4 | — | $\overline{OUT1}$ | Output pin for inversion of OUT1 |
| 5 | 4 | GND | Grounded |
| 6 | 5 | OUT2 | Output pin corresponding to INPUT2 |
| 7 | 6 | $INPUT2^+$ | Non-inverted-input pin |
| 8 | 7 | $INPUT2^-$ | Inverted-input pin |
| 9 | 8 | $V_{CC}$ | Power supply pin |

## Maximum Ratings (Ta = 25°C)

| Characteristics | Symbol | Rating | Unit |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | −0.3 to +18 | V |
| Supply Voltage Surge | $V_{CC\ SURGE}$ | +30 (within 1 second) | V |
| Power Dissipation | $P_D$ | 500 / 440 | mW |
| Differential Input Voltage | $DV_{IN}$ | ±18 | V |
| Input Voltage | $V_{IN}$ | −0.3 to +18 | V |
| Output Current | $I_{SINK}$ | 30 | mA |
| Operating Temperature | $T_{opr}$ | −40 to +85 | °C |
| Storage Temperature | $T_{stg}$ | −55 to +150 | °C |

Note: $P_D$ : TA7522S / TA7522F

## Electrical Characteristics (Ta = - 40 to +85°C)

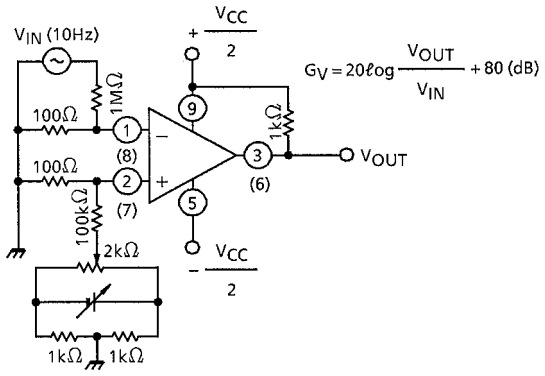
| Characteristics | Symbol | | Test CirCuit | Test Condition | Min | (Note) typ. | Max | Unit |
|---|---|---|---|---|---|---|---|---|
| Voltage Gain | $G_V$ | | 1 | $V_{CC}$ = 6V, $R_L$ = 1kΩ<br>f = 10Hz, test circuit 1 | 60 | 95 | — | dB |
| Input Offset Voltage | $V_{IO}$ | | 2 | $V_{CC}$ = 6V, $R_L$ = 1kΩ<br>$CMV_{IN}$ = 3V,<br>test circuit 2 | — | 2 | 10 | mV |
| Input Bias Current | $I_I$ | | 3 | $V_{CC}$ = 6V, $CMV_{IN}$ = 3V<br>test circuit 3 | — | −0.2 | −2 | μA |
| Input Offset Current | $I_{IO}$ | | 3 | Same as above | — | 0.02 | 0.3 | μA |
| Common-mode Input Voltage | $CMV_{IL}$ | | 4 | $V_{CC}$ = 6.5V, $R_L$ = 1kΩ<br>$V_{IO}$ = 20mV,<br>test circuit 4 | — | −0.5 | 0 | V |
| | $CMV_{IH}$ | | | Same as above | 5.0 | 5.3 | — | V |
| Zero Output Voltage | $V_{OL}$ | OUT1<br>OUT2 | 5 | $V_{CC}$ = 5.5V, $V_{IN}$ = 0.1V<br>$I_{OL}$ = 10mA,<br>test circuit 5 | — | 0.18 | 0.4 | V |
| | | $\overline{OUT1}$ | | $V_{CC}$ = 5.5V, $V_{IN}$ = 0.1V,<br>$I_{OL}$ = 15mA,<br>$V_{OL}$ (out1) ≧2V,<br>test circuit 5 | — | 0.25 | 0.4 | V |
| Output Leakage Current | $I_{LEAK}$ | OUT1<br>$\overline{OUT1}$<br>OUT2 | 6 | $V_{CC}$ = 6V, $V_{OUT}$ = 30V<br>test circuit 6 | — | — | 10 | μA |
| | | OUT1 | 6 | $V_{CC}$ = 6V, $V_{OUT}$ = 0.4V<br>test circuit 6 | — | −1.5 | −10 | μA |
| Current Consumption | $I_{CC}$ | | 7 | $V_{CC}$ = 6.5V, $R_L$ = ∞<br>test circuit 7 | — | 3 | 7 | mA |

Note : An ambient temperature of 25°C is assumed for the typical values.

## Test Circuit

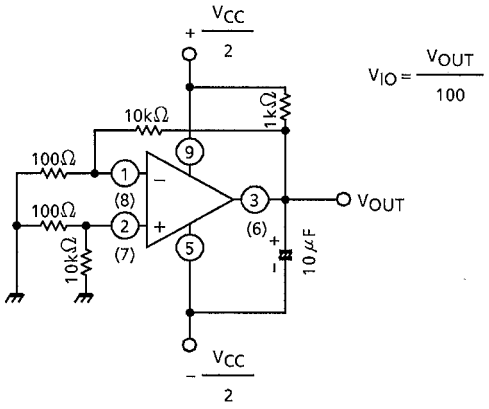
**(Shown below is an example for the TA7522S. For the TA7522F, note that the pin numbers are different.)**

### 1. $G_V$



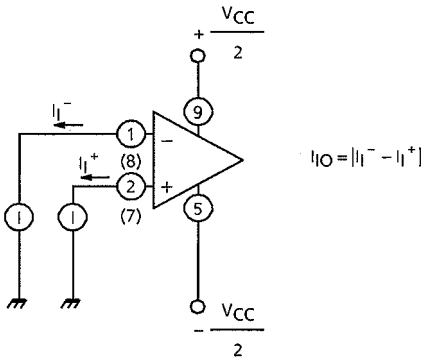

$$G_V = 20\log\frac{V_{OUT}}{V_{IN}} + 80\ (dB)$$

### 2. $V_{IO}$



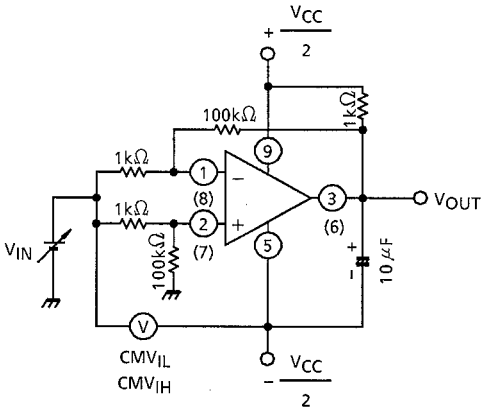

$$V_{IO} = \frac{V_{OUT}}{100}$$

### 3. $I_I$,$I_{IO}$




$$I_{IO} = |I_I^- - I_I^+|$$

### 4. $CMV_{IL}$,$CMV_{IH}$

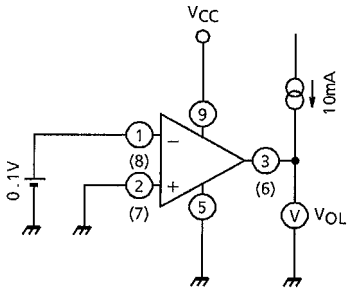



$CMV_{IL}$ : Input voltage relative to pin 5 as it is obtained when $V_{IN}$ is decreased until output $V_{OUT}$ becomes ±2V.

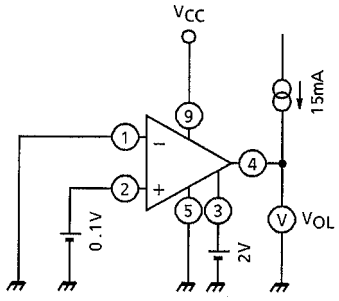
$CMV_{IH}$ : Input voltage relative to pin 5 as it is obtained when $V_{IN}$ is increased until output $V_{OUT}$ becomes ±2V.

### 5. $V_{OL}$

#### 5.1 OUT1,OUT2

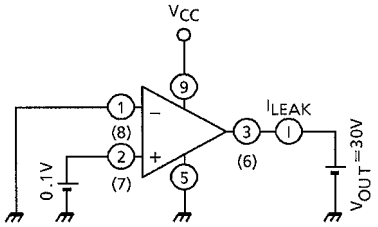



#### 5.2 $\overline{OUT1}$

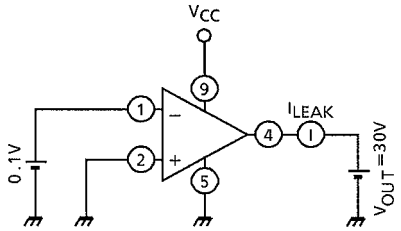


**6. $I_{LEAK}$**

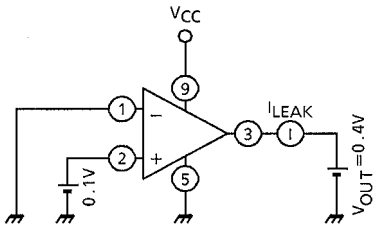
**6.1 OUT1,OUT2**



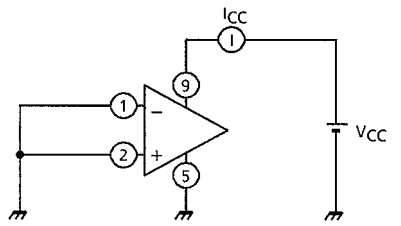

**6.2 $\overline{OUT1}$**




**6.3 OUT1**



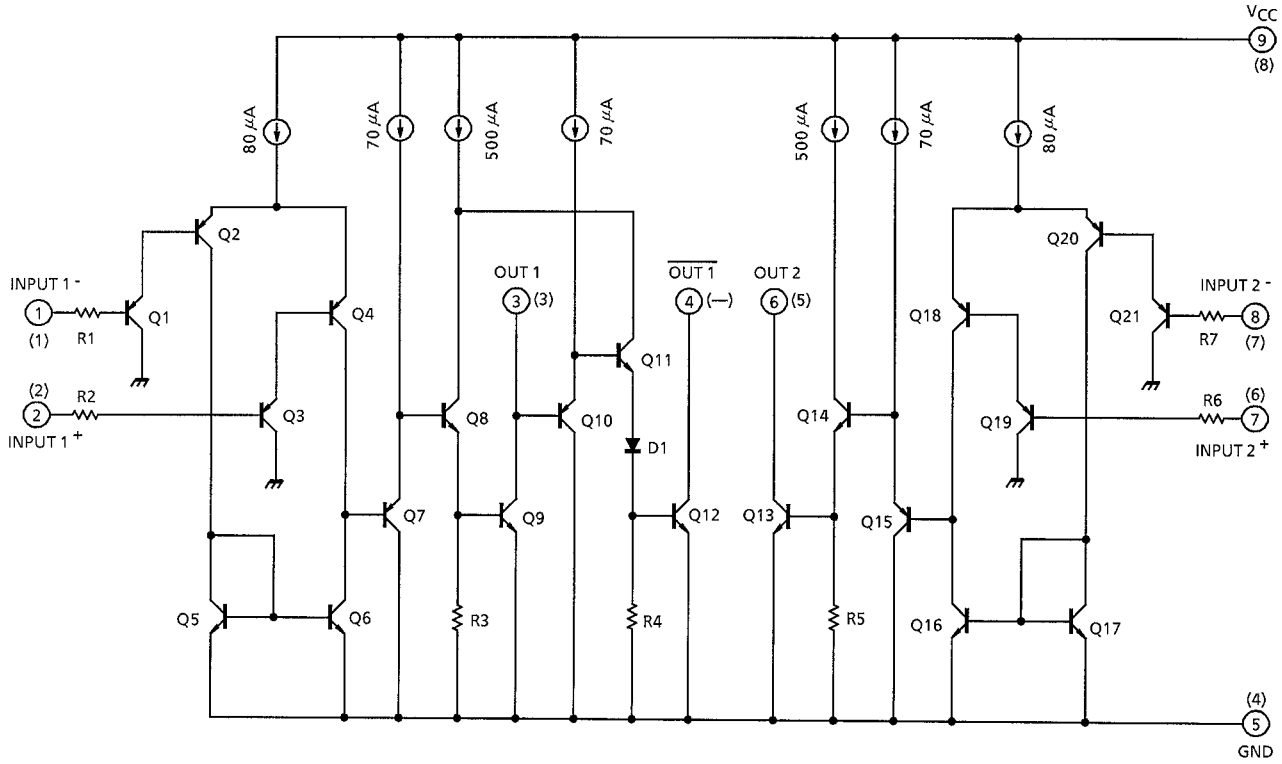

**7. $I_{CC}$ $\overline{OUT1}$**




All inputs are grounded.

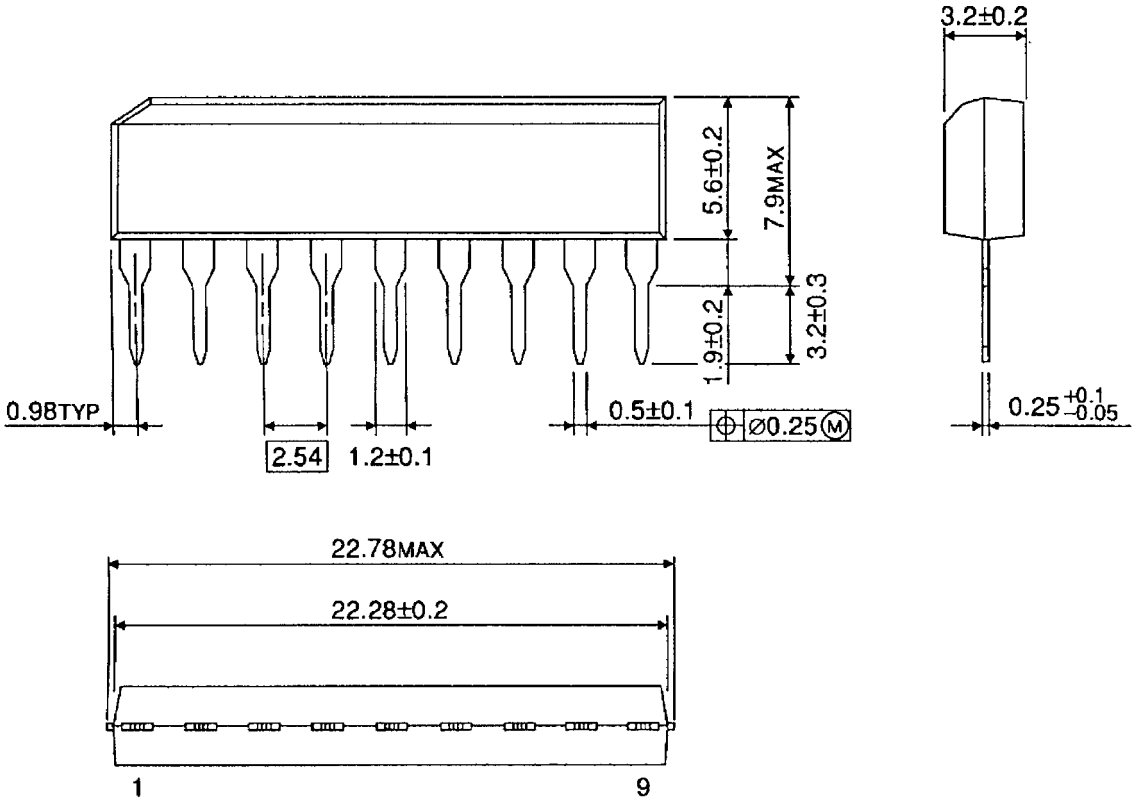
## Equivalent Circuit

**(The pin numbers are explained in order of the TA7522S and the TA7522F.)**



## Package Dimensions

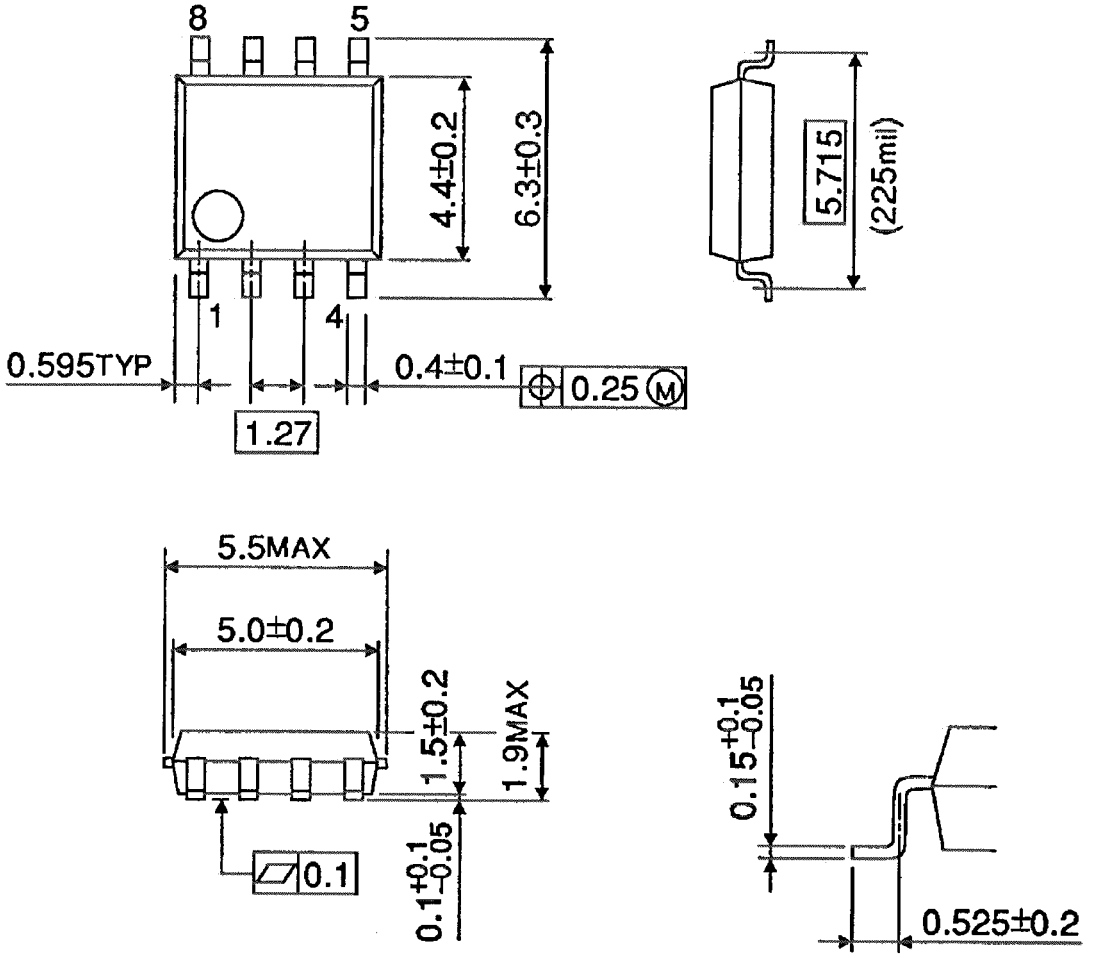
SIP9-P-2.54A Unit : mm




Weight: 0.92 g (typ.)

**Package Dimensions**

SOP8-P-225-1.27 Unit : mm




Weight: 0.08 g (typ.)

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