DUAL COMPARATOR

This device consists of two independent voltage comparators that are designed to operate from a single power supply over a wide range of voltage. Normal operation from dual supplies is also guaranteed on voltage range from 2 V to 36 V. $V_{CC}$ is necessary at least more 1.5 V than the input common mode voltage. The output can be connected to other open collector outputs to achieve Wired-OR relationship.

FEATURES

- Be possible to operate at the wide range single or two supply voltage.
  - 2~36 V or ±1~18 V
- Low supply current : 0.8 mA (Typ.)
- Low input offset voltage : ±2 mV (Typ.)
- Wide common mode input voltage : 0~$V_{CC}$ - 1.5 V
- Output is compatible with TTL, DTL, MOS and C-MOS.
- Output is open collector and wired-OR possible.

Weight

- DIP8-P-300-2.54A : 0.5 g (Typ.)
- DIP8-P-300-2.54C : 0.6 g (Typ.)
- SIP9-P-2.54A : 0.9 g (Typ.)
- SOP8-P-225-1.27 : 0.1 g (Typ.)
- SOP8-P-225-1.27B : 0.1 g (Typ.)
PIN CONNECTION (TOP VIEW)

TA75393F

VCC  OUT B  -IN B  +IN B  VEE
7    6     5

OUT A  -IN A  +IN A
3     2     1

TA75393FB

VCC  OUT B  -IN B  +IN B  VEE
7    6     5

OUT A  -IN A  +IN A
3     2     1

TA75393P, TA75393PA

VCC  OUT B  -IN B  +IN B  VEE
7    6     5

OUT A  -IN A  +IN A
3     2     1

TA75393S

VCC  OUT A  -IN A  +IN A  VEE  +IN B  -IN B  OUT B  VCC
7    4     3  2  6  5  1

OUT A  -IN A  +IN A
3     2     1
EQUIVALENT CIRCUIT
### MAXIMUM RATINGS (Ta = 25°C)

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>SYMBOL</th>
<th>TA75393P</th>
<th>TA75393PA</th>
<th>TA75393S</th>
<th>TA75393F</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>$V_{CC}$</td>
<td>± 18 OR 36</td>
<td>± 18 OR 36</td>
<td>± 18 OR 36</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Differential Input Voltage</td>
<td>$D_{VIN}$</td>
<td>± 36</td>
<td>± 36</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common Mode Input Voltage</td>
<td>$CMV_{IN}$</td>
<td>-0.3~$V_{CC}$</td>
<td>-0.3~$V_{CC}$</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>$P_{D}$</td>
<td>500</td>
<td>240</td>
<td>mW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>$T_{op}$</td>
<td>-40~85</td>
<td>-40~85</td>
<td>°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{stg}$</td>
<td>-55~125</td>
<td>-55~125</td>
<td>°C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ELECTRICAL CHARACTERISTICS ($V_{CC} = 5$ V, Ta = 25°C)

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>SYMBOL</th>
<th>TEST CIRCUIT</th>
<th>TEST CONDITION</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Offset Voltage</td>
<td>$V_{IO}$</td>
<td>4</td>
<td>—</td>
<td>—</td>
<td>2</td>
<td>5</td>
<td>mV</td>
</tr>
<tr>
<td>Input Bias Current</td>
<td>$I_{I}$</td>
<td>2</td>
<td>—</td>
<td>—</td>
<td>25</td>
<td>250</td>
<td>nA</td>
</tr>
<tr>
<td>Input Offset Current</td>
<td>$I_{IO}$</td>
<td>2</td>
<td>—</td>
<td>—</td>
<td>5</td>
<td>50</td>
<td>nA</td>
</tr>
<tr>
<td>Common Mode Input Voltage</td>
<td>$CMV_{IN}$</td>
<td>4</td>
<td>—</td>
<td>0</td>
<td>—</td>
<td>$V_{CC}$ - 1.5</td>
<td>V</td>
</tr>
<tr>
<td>Voltage Gain</td>
<td>$G_{V}$</td>
<td>—</td>
<td>$R_L = 15,k\Omega$</td>
<td>200</td>
<td>—</td>
<td>—</td>
<td>V/mV</td>
</tr>
<tr>
<td>Supply Current</td>
<td>$I_{CC}$</td>
<td>1</td>
<td>No load</td>
<td>—</td>
<td>0.8</td>
<td>2</td>
<td>mA</td>
</tr>
<tr>
<td>Sink Current</td>
<td>$I_{SINK}$</td>
<td>5</td>
<td>$IN,(+) = 0,V$, $IN,(-) = 1,V$</td>
<td>6</td>
<td>16</td>
<td>—</td>
<td>mA</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>$V_{OL}$</td>
<td>5</td>
<td>$IN,(+) = 0,V$, $IN,(-) = 1,V$</td>
<td>—</td>
<td>0.2</td>
<td>0.4</td>
<td>V</td>
</tr>
<tr>
<td>Output Leak Current</td>
<td>$I_{LEAK}$</td>
<td>3</td>
<td>$IN,(+) = 1,V$, $IN,(-) = 0,V$</td>
<td>—</td>
<td>0.1</td>
<td>—</td>
<td>nA</td>
</tr>
<tr>
<td>Response Time</td>
<td>$t_{resp}$</td>
<td>6</td>
<td>$R_L = 5.1,k\Omega$, $C_L = 15,pF$</td>
<td>—</td>
<td>1.3</td>
<td>—</td>
<td>$\mu$s</td>
</tr>
</tbody>
</table>
TEST CIRCUIT

(1) $I_{CC}$

(2) $I_I$, $I_O$

$I_O = I_I^+ - I_I^-$

(3) $I_{LEAK}$

(4) $V_{IO}$, CMV\_IN

(5) $I_{SINK}$, $V_{OL}$

(6) $t_{RSP}$
PACKAGE DIMENSIONS
DIP8-P-300-2.54A

Unit: mm

Weight: 0.5 g (Typ.)
PACKAGE DIMENSIONS
DIP8-P-300-2.54C

Unit: mm

Weight: 0.6 g (Typ.)
PACKAGE DIMENSIONS
SIP9-P-2.54A

Unit: mm

Weight: 0.9 g (Typ.)
PACKAGE DIMENSIONS
SOP8-P-225-1.27

Unit: mm

Weight: 0.1 g (Typ.)
PACKAGE DIMENSIONS
SOP8-P-225-1.27B

Unit : mm

Weight : 0.1 g (Typ.)
RESTRICTIONS ON PRODUCT USE

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc..

- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer’s own risk.

- The products described in this document are subject to the foreign exchange and foreign trade laws.

- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.

- The information contained herein is subject to change without notice.