Details are subject to change without notice

# 4+1-CHANNEL BUFFER FOR TFT LCD

## FEATURES

- 4+1-Channel:
  4 Channels with an Output Current of ±30mA (MAX); 1 $V_{com}$ with an Output Current of ±100mA (MAX)
- Unity Gain Buffer Capable of Driving Large Capacitive Loads
- Input Range Matched to LCD Reference Requirements
- $V_{DD}$ Specified for 6.5V to 16V
- TSSOP14 Package

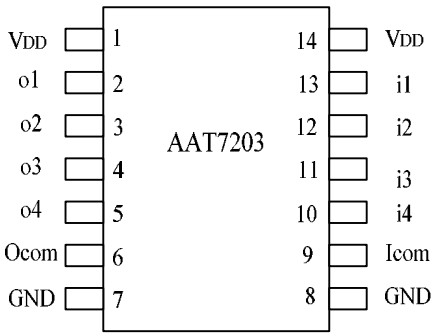
## GENERAL DESCRIPTION

The AAT7203 is a 4+1-channel buffer designed for thin film transistor liquid crystal display (TFT LCD). This device consists of a $V_{com}$ buffer circuit, two rail-to-rail buffer amplifier circuits, and 2 buffer amplifier circuits. Each buffer is capable of driving heavy capacitive loads and providing fast load current ($V_{com}$: 100mA, and the others: 30mA).

AAT7203 comes in a compact TSSOP14 package, which makes it an ideal component for space-sensitive designs of LCD monitors and LCD TVs.

## PIN CONFIGURATION

**TOP VIEW**




**TSSOP14**

## PIN DESCRIPTION

| PIN NO. | NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 1 | $V_{DD}$ | I | Power Supply |
| 2 | o1 | O | Buffer Channel 1 Output |
| 3 | o2 | O | Buffer Channel 2 Output |
| 4 | o3 | O | Buffer Channel 3 Output |
| 5 | o4 | O | Buffer Channel 4 Output |
| 6 | $O_{com}$ | O | Com Buffer Output |
| 7 | GND | I | Ground |
| 8 | GND | I | Ground |
| 9 | $I_{com}$ | I | Com Buffer Input |
| 10 | i4 | I | Buffer Channel 4 Input |
| 11 | i3 | I | Buffer Channel 3 Input |
| 12 | i2 | I | Buffer Channel 2 Input |
| 13 | i1 | I | Buffer Channel 1 Input |
| 14 | $V_{DD}$ | I | Power Supply |

## ABSOLUTE MAXIMUM RATINGS

| CHARACTERISTICS | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| Supply Voltage | $V_{DD}$ | +18 | V |
| Input Voltage | $V_I$ | $-0.5$ to $V_{DD}+0.5$ | V |
| Output Voltage | $V_O$ | $-0.5$ to $V_{DD}+0.5$ | V |
| Output Loading Current for Gamma, Rail-to-Rail Buffer | $I_L$ | $\pm 30$ | mA |
| Output Loading Current for Com Buffer | | $\pm 100$ | mA |
| Maximum Junction Temperature | $T_J$ | +125 | $^oC$ |
| Operating Temperature | $T_C$ | $-20$ to +85 | $^oC$ |
| Storage Temperature | $T_{storage}$ | $-45$ to +125 | $^oC$ |
| Lead Temperature (Soldering for 10 Seconds) | --- | 260 | $^oC$ |

Note: Values beyond absolute maximum ratings may cause permanent damage to the device.

## ELECTRICAL CHARACTTERISTICS ($V_{DD}$=10V, $T_C$=25°C UNLESS OTHERWISE SPECIFIED)

### POWER SUPPLY PERFORMANCE

| PARAMETER | | TEST CONDITIONS | MN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| Power Supply Rejection Ratio | PSRR | $V_{DD}$ varies from 6.5V to 16.0V | - | 80 | - | dB |
| Supply Current | $I_S$ | | - | 6.3 | - | mA |

### INPUT CHARACTERISTICS

| PARAMETER | | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| Input Offset Voltage | $V_{OS}$ | $V_I = V_{DD}/2$, $V_O = V_{DD}/2$ | - | 2 | 12 | mV |
| Input Bias Current | $I_B$ | $V_I = V_{DD}/2$, $V_O = V_{DD}/2$ | - | 2 | 50 | nA |

Note 2: Slew rate is measured on rising and falling edges.

## ELECTRICAL CHARACTTERISTICS ($V_{DD}$=10V, $T_C$=25°C UNLESS OTHERWISE SPECIFIED)

### OUTPUT CHARACTERISTICS

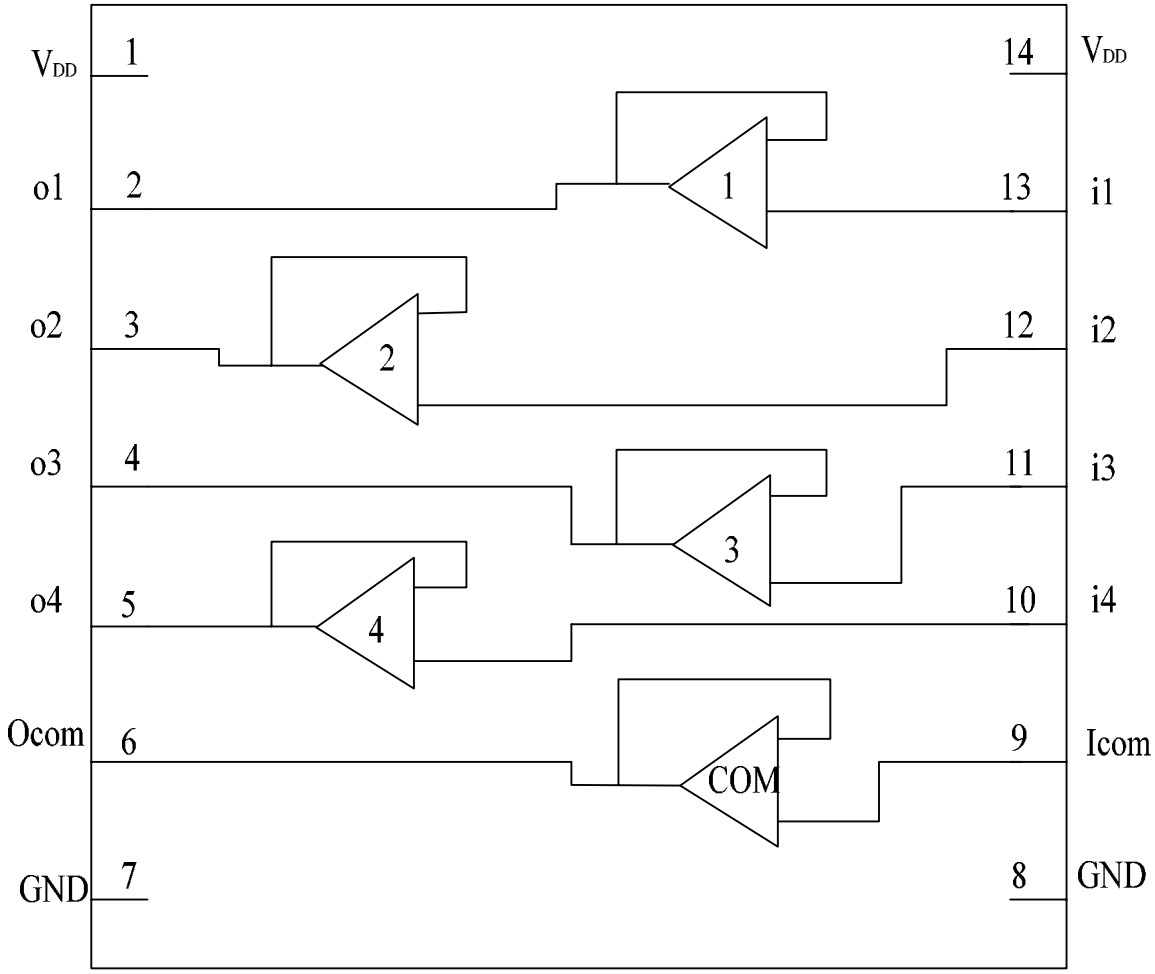
| PARAMETER | | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| Output Swing Low | $V_{OL}$ | $I_L$ =5mA (Buffer 1, 4)<br>$V_I$ =0V | - | 0.08 | 0.15 | V |
| | | $I_L$ =10mA (Buffer 2, 3)<br>$V_I$ =1V | - | 1.02 | 1.05 | V |
| Output Swing High | $V_{OH}$ | $I_L$ = – 5 mA (Buffer 1, 4)<br>$V_I$ =10V | 9.85 | 9.92 | - | V |
| | | $I_L$ = – 10 mA (Buffer 2, 3)<br>$V_I$ =9V | 8.95 | 8.98 | - | V |
| Output Swing (Buffer 2,3) | $V_{OL}$ | $I_L$ =10mA, $V_I$ =5V | - | 5.02 | 5.04 | V |
| | $V_{OH}$ | $I_L$ = – 10 mA, $V_I$ =5V | 4.96 | 4.98 | - | V |
| Output Swing (COM) | $V_{OL}$ | $I_L$ =50mA, $V_I$ =5V | - | 5.03 | 5.05 | V |
| | $V_{OH}$ | $I_L$ = – 50 mA, $V_I$ =5V | 4.95 | 4.97 | - | V |
| Short Circuit Current | $I_{SC}$ | (Buffer 2,3 ) | - | ± 70 | - | mA |
| | | (Com Buffer, Buffer 1, 4) | - | ±180 | - | mA |

### AC CHARACTERISTICS

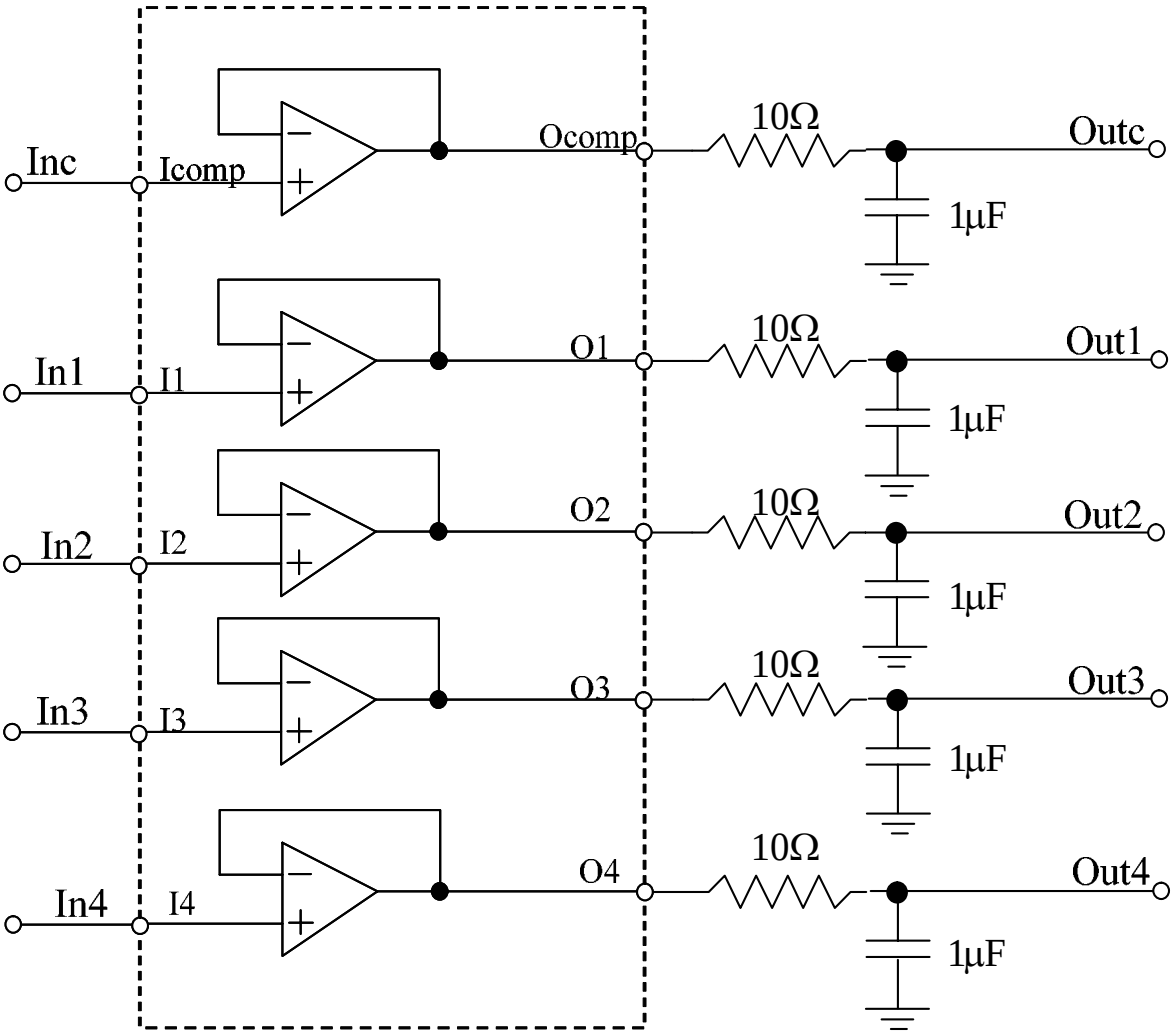
| Parameter | | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Slew Rate (Note 2) | SR | $V_I$ =2V to 8V,<br>20% to 80% | - | 1 | - | V/μs |
| Settling Time | $t_s$ | $V_I$ =4.5V to 5.5V 0.1%<br>$V_I$ =5.5V to 4.5V 0.1% | - | 5 | - | μs |

Note 2: Slew rate is measured on rising and falling edges.

## BLOCK DIAGRAM

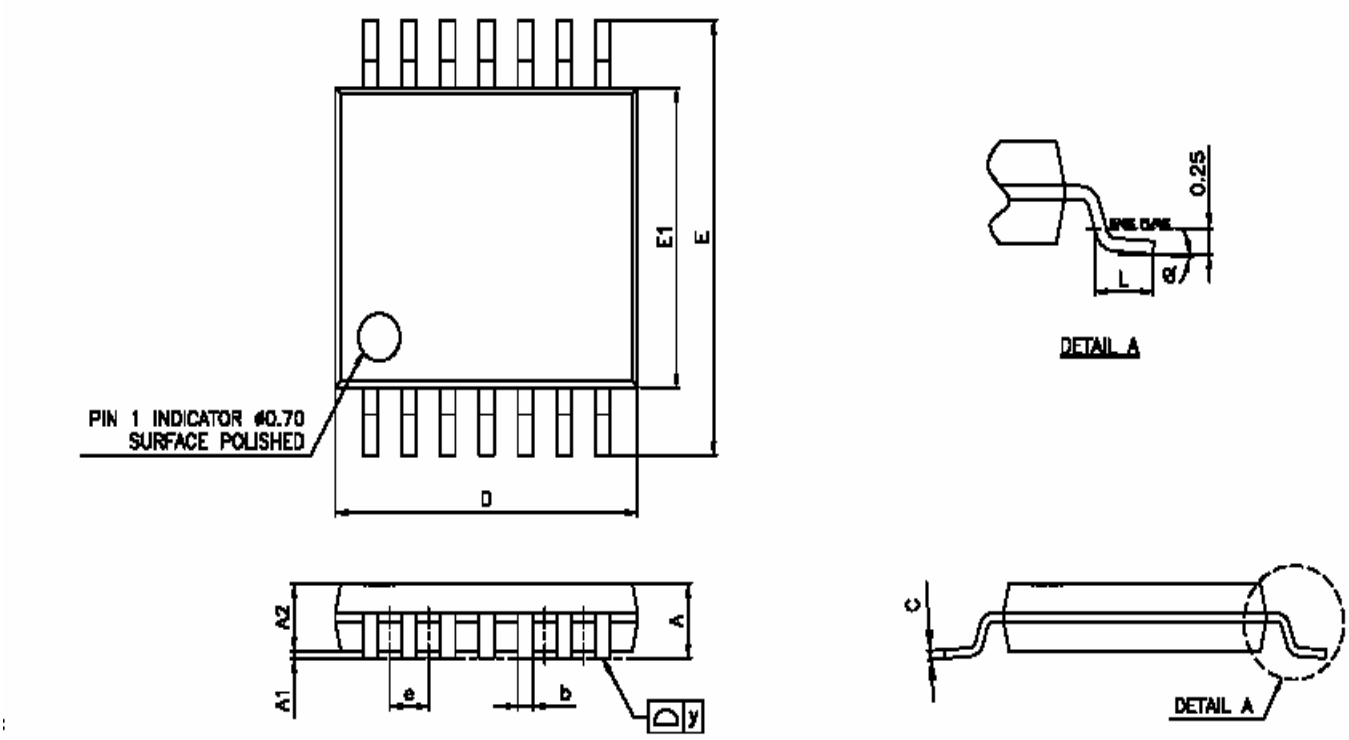


## APPLICATION CIRCUIT



## PACKAGE DIMENSION

**TSSOP14**



## PACKAGE DIMENSION (CONT.)

**TSSOP14**

| SYMBOL | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---|---|---|---|---|---|---|
| | MIN | TYP | MAX | MIN | TYP | MAX |
| A | --- | --- | 1.20 | --- | --- | 0.047 |
| A1 | 0.05 | --- | 0.15 | 0.002 | --- | 0.006 |
| A2 | 0.80 | 1.00 | 1.05 | 0.031 | 0.039 | 0.041 |
| b | 0.19 | --- | 0.30 | 0.007 | --- | 0.012 |
| C | 0.09 | --- | 0.20 | 0.0035 | --- | 0.0080 |
| D | 4.90 | 5.00 | 5.10 | 0.193 | 0.197 | 0.201 |
| E | --- | 6.40 | --- | 0.193 | 0.252 | 0.201 |
| E1 | 4.30 | 4.40 | 4.50 | 0.170 | 0.173 | 0.177 |
| e | --- | 0.65 | --- | --- | 0.026 | --- |
| L | 0.45 | 0.60 | 0.75 | 0.0177 | 0.0240 | 0.0295 |
| y | --- | --- | 0.076 | --- | --- | 0.003 |
| θ | 0° | --- | 8° | 0° | --- | 8° |

Note:

1. CONTROLLING DIMENSION: MILLIMETERS
2. LEAD FRAME MATERIAL: OLIN C7025/EFTEC 64T
3. DIMENSION “D” DOES NOT INCLUDE MOLD FLASH, TIE BAR BURRS AND GATE BURRS. MOLD FLASH, TIE BAR BURRS AND GATE BURRS SHALL NOT EXCEED 0.006” [0.15 MILLIMETERS] PER END. DIMENSION “E1” DOES NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED 0.010” [0.25 MILLIMETERS] PER SIDE.
4. DIMENSION “b” DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.003” [0.08 MILLIMETERS] TOTAL IN EXCESS OF THE “b” DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSION AND AN ADJACENT LEAD TO BE 0.0028” [0.07 MILLIMETERS]
5. TOLERANCE: ± 0.010” [0.25 MILLIMETERS] UNLESS OTHERWISE SPECIFIED.
6. OTHERWISE DIMENSION FOLLOW ACCEPTABLE SPEC.
7. REFERENCE DOCUMENT: JEDEC SPEC MO-153

## ORDERING INFORMATION

