# AS662 Dual Operational Transconductance Amplifiers (OTA) with buffer

### Features

- $g_m$ adjustable over 6 decades
- excellent gm linearity
- excellent matching between amplifiers
- controlled buffer
- high output SNR
- LM13700 functional replacement

### Applications

- current-controlled amplifiers
- stereo audio amplifiers
- current-controlled impedances
- current-controlled filters
- current-controlled oscillators
- multiplexers
- VCA
- S&H circuits

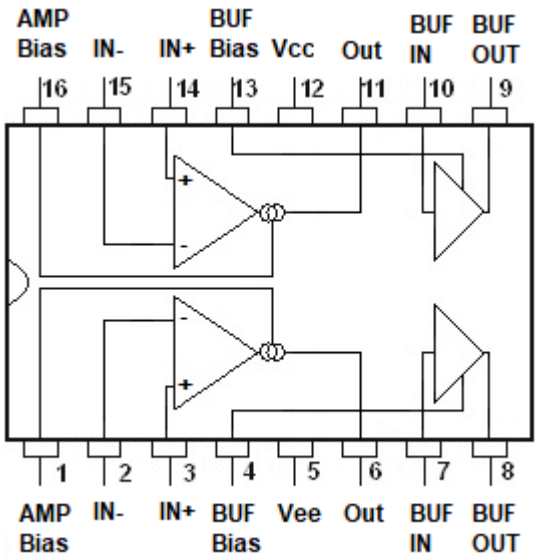
### AS662 D


SOIC 16 , 150mil, 1.27 mm

## General Description

The AS662D consists of two current-controlled transconductance amplifiers OTA, each with differential inputs and a push-pull output. Both amplifiers share common supplies, but operate independently. Two buffers allows external control and gives flexibility in application.

## Connection Diagram




## Pin Functions

| Pin | | Description |
|---|---|---|
| Name | Number | |
| Amp bias 1,2 | 1, 16 | Current bias input |
| IN+ 1,2 | 3, 14 | Positive input |
| IN- 1,2 | 2, 15 | Negative input |
| OUT 1,2 | 6, 11 | Output |
| BUF IN | 7, 10 | Buffer input |
| BUF OUT | 8, 9 | Buffer output |
| BUF BIAS | 4, 13 | Buffer bias |
| Vcc | 12 | Positive power supply |
| Vee | 5 | Negative power supply |

**Absolute Maximum Ratings**

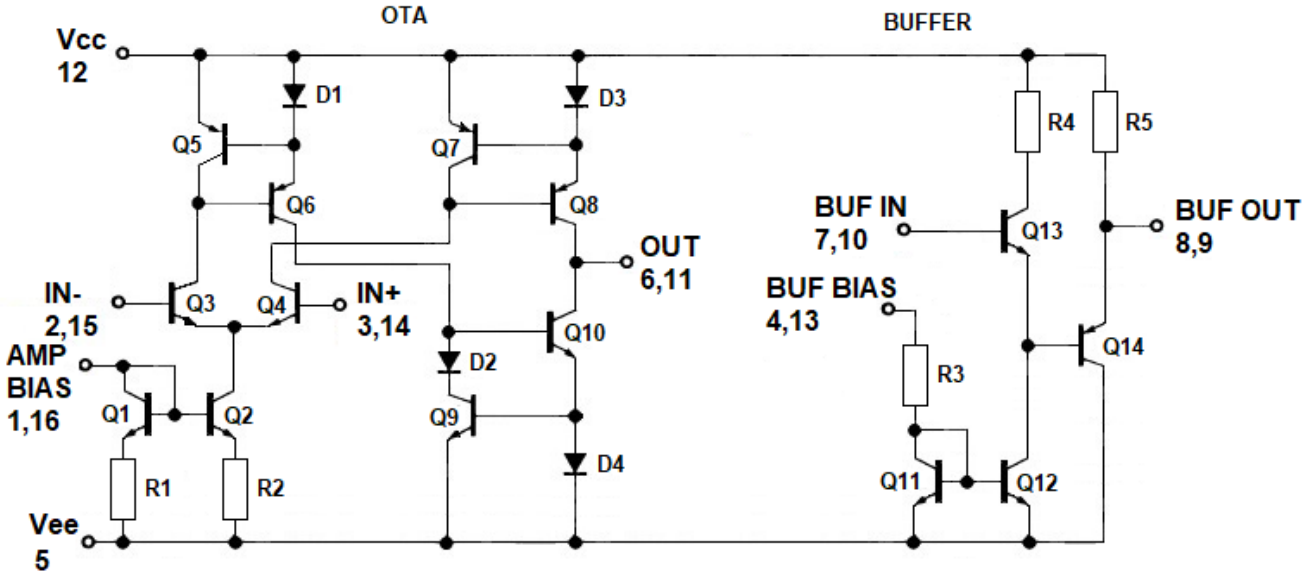
| | |
|---|---|
| Supply voltage | 36 $V_{DC}$ or ±18 V |
| Differential input voltage | ± 5 V |
| Amplifier bias current ($I_{ABC}$) | 2 mA |

**Electrical Characteristics**

( Vs = ±15 V, $T_A$ = 25°C, amplifier bias current ~~(~~$I_{AMP\ BIAS}$~~)~~ = 500 µA, amplifier output load - 27 kΩ, buffer load – 47 kΩ. )

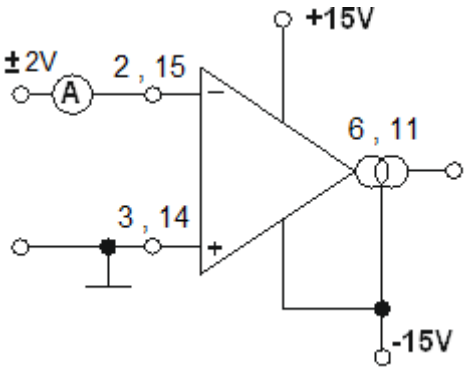
| PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **OTA** | | | | | |
| Input offset voltage ($V_{OS}$)<br>AS662D<br>AS662D* | $I_{AMP\ BIAS}$ = 5 µA | | | <br>250<br>700 | µV |
| Input offset change ($Vos_{CH}$) | 5 µA ≤ $I_{AMP\ BIAS}$ ≤ 500 µA | | 0 | 1 | mV |
| Input offset current ($I_{OI}$) | | | 0 | 0,2 | µA |
| Input bias current ($I_I$) | | | 0,9 | 1,5 | µA |
| | Over specified temperature range | | 1 | 8 | |
| Forward transconductance ($g_m$) | $I_{AMP\ BIAS}$ = 500 µA | 7700 | 8500 | 9100 | µS |
| | Over specified temperature range | 5400 | | | |
| $g_m$ tracking | | | 0,3 | | dB |
| Peak output current | $R_L$ = 0, $I_{AMP\ BIAS}$ = 5 µA | | 4,7 | | µA |
| | $R_L$ = 0, $I_{AMP\ BIAS}$ = 500 µA | 400 | 450 | 510 | |
| | $R_L$ = 0, over specified temp range | 300 | | | |
| Supply current, V+ | $I_{AMP\ BIAS}$ = 500 µA, both channels | | 6,5 | 7,5 | mA |
| Supply current, V- | $I_{AMP\ BIAS}$ = 500 µA, both channels | -9.5 | -8 | | mA |
| CMRR | | 80 | 100 | | dB |
| Common-mode range | | ±12 | ±13 | | V |
| Crosstalk | Referred to input,<br>f = 1 kHz, Vi = 5 mVrms | 70 | 100 | | dB |
| Differential input current ($I_{DIC}$) | $I_{AMP\ BIAS}$ = 0 (refer to test circuit) | | 5.4 | 16 | nA |
| Leakage current ($I_{LC}$) | $I_{AMP\ BIAS}$ = 0 (refer to test circuit) | | 0.2 | | nA |
| Input resistance | | 10 | 26 | | kΩ |
| Open-loop bandwidth | | | 2 | | MHz |
| Slew rate | Unity gain compensated | | 50 | | V/µs |
| Peak output voltage | | | | | |
| Positive | $R_L$ = 27kΩ | 11 | 12,5 | | V |
| Negative | $R_L$ = 27kΩ | | -12,5 | -11 | V |
| $V_{OS}$ sensitivity | | | | | |
| Positive | $\Delta V_{OS}/\Delta V^+$ | | 20 | 150 | µV/V |
| Negative | $\Delta V_{OS}/\Delta V^-$ | | 20 | 150 | µV/V |
| Distortion | Icontrol = 200 µA, Vi = 5 mVrms | | 0,25 | 1 | % |
| Residual noise 1 | Icontrol = 0 µ A,<br>BPF (30~20 kHz, 3 dB, 6 dB / Oct) | | -100 | -90 | dBm |
| Residual noise 2 | Icontrol = 200 µ A,<br>BPF (30~20 kHz, 3 dB, 6 dB / Oct) | | -85 | -66 | dBm |
| Leakage level | Icontrol = 0 µ A,<br>Vin = -30 dBm fin = 20 kHz | | -100 | -75 | dBm |
| **Buffer** | | | | | |
| Buffer offset | $U_{BUF\ BIAS}$ = 0 V, $U_{BUF\ IN}$ = 0V | | -0,01 | -0,1 | V |
| Buffer input bias current | $U_{BUF\ BIAS}$ = 0 V, $U_{BUF\ IN}$ = 0V | | 1,2 | 2 | µA |
| Peak output voltage | | | | | |
| Positive | $R_L$ = 47kΩ | 11 | 12,5 | | V |
| Negative | $R_L$ = 47kΩ | | -12,5 | -11 | V |

**Functional block diagram - one Operational Transconductance Amplifier**



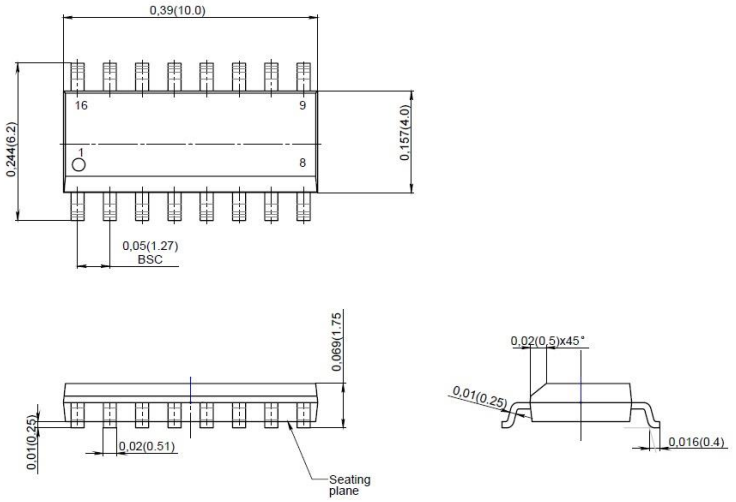

R1 ~ R2 ~ 400 Ohm ; R3 ~ 40k ; R4 ~ 500 Ohm ; R5 ~ 10k (tolerance +-20% )

**Differential Input Current Test Circuit**



| PART NUMBER | PACKAGE | BODY SIZE (NOM) | Additonal marking |
|---|---|---|---|
| AS662D | SOIC 16 | 150 mil, 1.27 mm pitch | -------- |
| AS662D * | SOIC 16 | 150 mil, 1.27 mm pitch | white dot |

**Package Dimensions in millimeters (inches)**
**SOIC-16 (150 mil)**




**Revision history**

| Date | Revision | Changes |
|---|---|---|
| 20-Dec-2021 | **1** | Preliminary version 1 |
| 13-Apr-2022 | **2** | Final version |