ANALOG DEVICES

# Picoampere Input Current Bipolar Op Amp

## AD705



### 1.1 Scope.

This specification covers the detail requirements for a precision, low input current, low offset voltage, monolithic bipolar amplifier.

### 1.2 Part Number.

The complete part number per Table 1 of this specification is as follows:

| Device | Part Number |
|---|---|
| −1 | AD705T/883B |

### 1.2.3 Case Outline.

See Appendix 1 of General Specification ADI-M-1000: package outline:

| (X) | Package | Description |
|---|---|---|
| Q | Q-8 | 8-Pin Cerdip Package |

### 1.3 Absolute Maximum Ratings. ($T_A$ = +25°C unless otherwise noted)

Supply Voltage . . . . . ±18 V
Internal Power Dissipation[1] . . . . . 650 mW
Input Voltage . . . . . $\pm V_S$
Differential Input Voltage[2] . . . . . ±0.7 V
Output Short Circuit Duration . . . . . Indefinite
Storage Temperature Range . . . . . −65°C to+150°C
Operating Temperature Range . . . . . −55°C to +125°C
Lead Temperature Range (Soldering 60 sec) . . . . . +300°C

NOTES

[1]Maximum package power dissipation vs. ambient temperature.

| Package Type | MAXIMUM AMBIENT Temperature for Rating | DERATE ABOVE MAXIMUM Ambient Temperature |
|---|---|---|
| Q-8 | 75°C | 6.7 mW/°C |

[2]The Input pins of this amplifier are protected by back-to-back diodes. If the differential voltage exceeds ±0.7 V, external series protection resistors should be added to limit the input current to less than 25 mA.

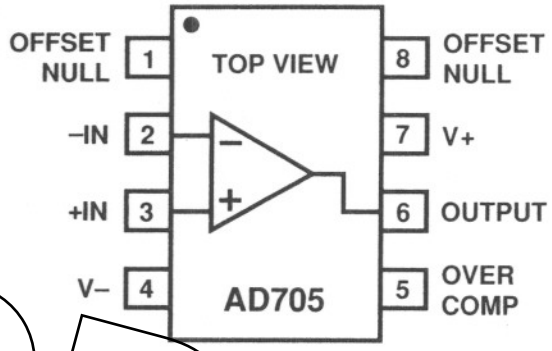
# AD705 – SPECIFICATIONS

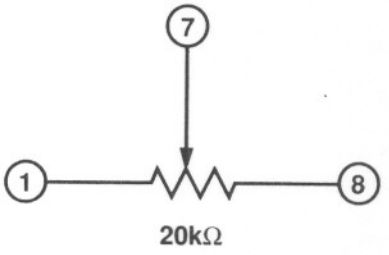
| Test | Symbol | Device | Design Limit @ +25°C | Sub Group 1 | Sub Group 2, 3 | Sub Group 4 | Test Condition[1] | Units |
|---|---|---|---|---|---|---|---|---|
| Input Offset Voltage[2] | $V_{OS}$ | −1 | 25 | 90 | 60 | 25 | | ±μV |
| Input Offset Voltage Drift | $TCV_{OS}$ | −1 | 0.6 | | 0.6 | | | ±μV/°C |
| Power Supply Rejection Ratio | PSRR | −1 | 114 | 114 | <br>108 | | ±2 V≤$V_S$≤±18 V<br>±2.5 V≤$V_S$≤±18 V | ±dB |
| Input Bias Current[3] | $I_B$ | −1 | 100<br>150 | 150<br>200 | 250<br>450 | 100<br>150 | Either Input, $V_{CM}$ = 0 V<br>Either Input, $V_{CM}$ = ±13.5 V | ±pA |
| Input Offset Current | $I_{OS}$ | −1 | 100<br>150 | 150<br>200 | 250<br>450 | 100<br>150 | $V_{CM}$ = 0 V<br>$V_{CM}$ = ±13.5 V | ±pA |
| Unity Gain Crossover Frequency | $F_U$ | −1 | 0.4 | | | | | MHz |
| Slew Rate | $I_{SR}$ | −1 | 0.1 | | | | | V/μs |
| Common Mode Rejection Ratio | CMRR | −1 | 114 | 114 | 108 | | $V_{CM}$ = ±13.5 V | dB |
| Open Loop Gain | $A_{OL}$ | −1 | 400<br>300 | 400<br>300 | 300<br>200 | | $V_O$=±12 V, $R_L$ = 10 kΩ<br>$V_O$=±10 V, $R_L$ = 2 kΩ | V/mV |
| Output Voltage Swing | $V_{OUT}$ | −1 | ±13 | ±13 | ±13 | | $R_L$ = 10 kΩ | V |
| Power Supply Quiescent Current | $I_Q$ | −1 | 600 | 600 | 800 | | | μA |
| Input Noise Voltage | $e_N$ | −1 | 1 | | | | 0.1 to 10 Hz, p-p max | μV |

NOTES
[1]$V_S$ = ±15 V unless otherwise noted.
[2]Input offset voltage specifications are guaranteed with $V_{OS}$ unnulled at $T_A$ = +25°C.
[3]Bias current specifications guaranteed maximum at either input.

### 3.2.1 Functional Block Diagram and Terminal Assignments.

**8-Pin Cerdip (Q-8) Package**




$V_{OS}$ TRIM



### 3.2.4 Microcircuit Technology Group.

This microcircuit is covered by technology group (49).

### 4.2.1 Life Test/Burn-In Circuit.

Steady state life test is per MIL-STD-883 Method 1005. Burn-in is per MIL-STD-883 Method 1015 test condition (B).