Fact Sheet

Military Semiconductor Products

TLC4502M / 5962-9753701QxA, TLC4502AM / 5962-9753702QxA

SGYV041 -August 1997

TLC4502 Advanced LinEPIC™ SELF-CALIBRATING (Self-Cal™) PRECISION DUAL OPERATIONAL AMPLIFIER

HIGHLIGHTS

The TLC4502 self-calibrating operational amplifier utilizes the recent availability of on-chip digital and analog signal processing to automatically null the input offset voltage at power-up. This self-calibrating feature requires typically 300 ms to complete and is repeatable to within ±3 μV on successive calibrations. The technique involves the extraction and digital storage of the key offset-nulling information. This information is retained without degradation as long as the circuit is powered. This eliminates the need for continuous chopping of the input signal to refresh the offset information. Once the process is complete, the bulk of the calibration circuitry drops out of the signal path and shuts down. This minimizes or eliminates any effect the calibration circuitry might have on the desired signal path. It also allows the TLC4502 to be used exactly like any other operational amplifier after the calibration cycle is complete.

The TLC4502 also features a rail-to-rail output structure capable of driving loads to 1 kΩ and 1 nF. Unlike existing commercially available low-offset high-precision amplifiers, the TLC4502 needs only a single 5-V supply, requires no trimming, and uses no bipolar transistors or JFETs.

KEY FEATURES/BENEFITS

- Power On Calibration of Input Offset Voltage
- Low Input Offset Voltage ...< 50 μV Max (TLC4502A)
- Low Input Offset Voltage Drift ...< 1 μV/°C
- Low Input Bias Current
- High Output Drive Capability
    - C_L < 1 nF and R_L > 1 kΩ
- High Open Loop Gain ...> 120 dB
- Rail-To-Rail Output Voltage Swing
- Low Distortion ...< 0.01% at 10 kHz
- Low Noise ...12 nV/√Hz at 1 kHz
- High Slew Rate ...2.5 V/μs
- Low Power Consumption < 1.5 mA (Typical) Per Amplifier
- Short Calibration Time . . . 300 ms Typ

SUPPORT

For additional information on this and other Mixed Signal/Analog Products visit our Mixed Signal home page at:

http://www.ti.com/sc/docs/military/product/mix_sig/mixsig_1.htm

Additional information regarding this product is available by calling the Texas Instruments U.S. Product Information Center (PIC) at (972) 644-5580 during normal business hours (CST/CDT). For European PIC information visit http://www.ti.com/sc/docs/pic/home.htm

DIE SIZE

The current die has a size of: 80 mils x 93 mils.

TECHNOLOGY

- 1 µm LinEPIC™ Process
- ESD level: 2 kV

PACKAGING

Package Option: 8-pin Ceramic Dual in Line Package (JG)
10-pin Ceramic Flat Package (U)
20-pin Leadless Ceramic Chip Carrier (FK)

POWER DISSIPATION

The table below shows modeled data. This data can be used for approximating system thermal characteristics:

Package Thermal Data

Package	$R_{\theta}JA$	$R_{\theta}JC$
8 Pin DIP	180º C/W	28º C/W
10 Pin Flat Pack	180º C/W	22º C/W
20 Pin LCC	65º C/W	20º C/W

Note: much better thermal impedances can be achieved by using air flow, or with increasing metal backplane thickness or trace area in the Printed Circuit Board (PCB) that is used.

PROCESS/PERFORMANCE OPTIONS

The TLC4502M is processed to the military temperature range at the SN-level, or at the SNJ-level for programs requiring devices processed to MIL-PRF-38535. The DSCC Standard Microcircuit Drawing (SMD) for this device is given below.

DSCC SMD

TI Parent	DSCC SMD
TLC4502MFKB / UB / JGB	5962-9753701Q2A / HA / PA
TLC4502AMFKB / UB / JGB	5962-9753702Q2A / HA / PA

SUPPORT LITERATURE

You can access data sheets via TI's home page on the internet (http://www.ti.com) or reference the literature number SLOS161B when contacting the PIC.

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