BURR-BROWN®

3521 SERIES
3522 SERIES

NOT RECOMMENDED FOR NEW DESIGNS

Ultra-Low Drift - FET Input OPERATIONAL AMPLIFIERS

FEATURES

- ULTRA-LOW DRIFT, 1μV/°C max
- LOW INITIAL OFFSET VOLTAGE, 250μV, max
- LOW BIAS CURRENT, 1pA, max
- LOW NOISE
- HIGH COMMON-MODE REJECTION, 90dB, typ
- WIDE POWER SUPPLY RANGE, ±5VDC to ±20VDC

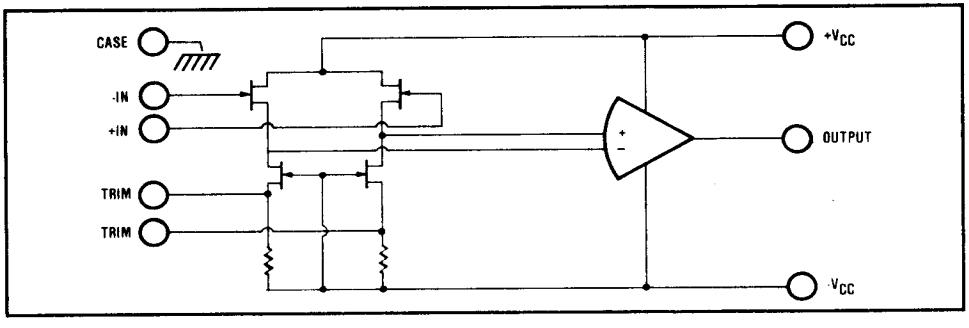
DESCRIPTION

With input offset voltage drifts as low as 1μV/°C, the Burr-Brown 3521 IC Operational Amplifier provides FET input performance combined with drift equal to the best bipolar IC's (e.g., BB3500E). The spectacular performance is achieved through truly state-of-the-art hybrid design and manufacturing, including monolithic FET pairs and active laser-trimming.

The 3521 and 3522 have an exceptionally fast thermal response. This fast warm-up is achieved without any heat-sinking.

While low drift and FET input impedance are the outstanding features of the 3521 and 3522 other specifications have not been compromised. They are internally compensated for unity-gain configuration and the initial voltage offset is guaranteed less than 250μV so for most applications the 3521 is ready to "plug-in and go." Like other low drift IC's from Burr-Brown the 3521 and 3522 have ample speed and bandwidth for most any application. (Slew rate = 0.6V/μsec). The high common-mode rejection ratio (90dB, typ.) enables them to be used as a 0.01% accurate buffer with low drift and extremely-high input impedance. The 3521/3522 also have very-low input noise to complement the low drift. The output is current limited to provide protection for continuous output shorts to common.

The 3521/3522 are pin-compatible with 741-type amplifiers, but provide FET input performance with ultra-low drift while exceeding all other specifications for general purpose operational amplifiers of the 741-type. Burr-Brown tests and guarantees all units to meet all max/min specifications.



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SPECIFICATIONS

ELECTRICAL

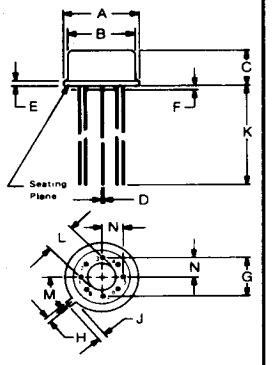
Typical at +25°C and ±15VDC power supply unless otherwise noted.

MODELS	3521H	3521J	3521K	3521L	3521R
OPEN-LOOP GAIN, DC					
Rated Load, min	94dB	•	•	•	•
RATED OUTPUT					
Voltage, min	+10V	•	•	•	•
Current, min	±10mA	•	•	•	•
Output Impedance	100Ω	•	•	•	•
FREQUENCY RESPONSE					
Unity Gain, Open-Loop	1.5MHz	•	•	•	•
Full Power Response, min	10kHz	•	•	•	•
Slew Rate, min	0.6V/μsec	•	•	•	•
INPUT OFFSET VOLTAGE					
Initial Offset, 25°C, max	±500μV	250μV	250μV	250μV	250μV
vs Temp (0°C to +70°C), **max	±10μV/°C	±5μV/°C	2μV/°C	±1μV/°C	±5μV/°C
vs Temp (-25°C to +85°C)	±15μV/°C	±8μV/°C	±4μV/°C	±2μV/°C	±2μV/°C
vs Supply Voltage	±25μV/V	•	•	•	•
vs Time	5μV/mo	•	•	•	•
INPUT BIAS CURRENT					
Initial Bias, 25°C, max (doubles every +10°C)	-20pA	•	-15pA	-10pA	•
vs Supply Voltage	1pA/V	•	•	•	•
INPUT DIFFERENCE CURRENT					
Initial difference, 25°C	±2pA	•	•	•	•
INPUT IMPEDANCE					
Differential	$10^{11}\Omega$	•	•	•	•
Common-mode	$10^{12}\Omega$	•	•	•	•
INPUT NOISE					
Voltage, 0.01Hz - 10Hz, p-p	4μV	•	•	•	•
Voltage, 10Hz - 1kHz, rms	2μV	•	•	•	•
Current, 0.01Hz - 10Hz, p-p	0.3pA	•	•	•	•
Current, 10Hz - 1kHz, rms	0.6pA	•	•	•	•
INPUT VOLTAGE RANGE					
Common-mode Voltage	±10V	•	•	•	•
Common-mode Rejection	90dB	•	•	•	•
Max. Safe Input Voltage	±Supply	•	•	•	•
POWER SUPPLY					
Rated Voltage	±15VDC	•	•	•	•
Voltage Range, derated	±5 to ±20VDC	•	•	•	•
Current, quiescent	±4mA	•	•	•	•
TEMPERATURE RANGE					
Specification	0°C to +70°C	•	•	•	-55°C to +125°C
Operating	-25°C to +85°C	•	•	•	-55°C to +125°C
Storage	-65°C to +150°C	•	•	•	•

*Specification same as for 3521H.
**-55°C to +125°C for 3521R.

MECHANICAL

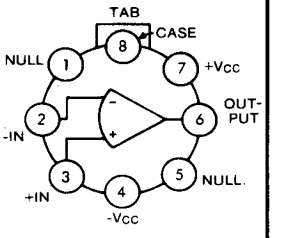
(TO-99 PACKAGE)



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.335	.370	8.51	9.40
B	.305	.335	7.75	8.51
C	.165	.185	4.19	4.70
D	.016	.021	0.41	0.53*
E	.010	.040	0.25	1.02
F	.010	.040	0.25	1.02
G	.200 BASIC		5.08 BASIC	
H	.028	.034	0.71	0.86
J	.029	.045	0.74	1.14
K	.500	–	12.7	–
L	.110	.160	2.79	4.06
M	45° BASIC		45° BASIC	
N	.095	.105	2.41	2.67

CONNECTION DIAGRAM

(TOP VIEW)



ELECTRICAL (CONT)

Typical at +25°C and ±15VDC power supply unless otherwise noted.

MODELS	3522J	3522K	3522L	3522S
OPEN-LOOP GAIN, DC				
Rated Load, min	94dB	•	•	•
RATED OUTPUT				
Voltage, min	±10V	•	•	•
Current, min	±10mA	•	•	•
Output Impedance	100Ω	•	•	•
FREQUENCY RESPONSE				
Unity Gain, Open-loop	1MHz	•	•	•
Full Power Response, min	10kHz	•	•	•
Slew Rate, min	0.6V/μsec	•	•	•
INPUT OFFSET VOLTAGE				
Initial Offset, 25°C, max	±1mV	±500μV	±500μV	±500μV
vs Temp (0°C to +70°C), max	±50μV/°C	±10μV/°C	±10μV/°C	
(-55°C to +125°C), max				±25μV/°C
vs Supply Voltage	±25μV/mo	•	•	•
vs Time	±10μV/mo	•	•	•
INPUT BIAS CURRENT**				
Input Bias, 25°C, max	-10pA	-5pA	-1pA	-5pA
(doubles every +10°C)				
vs Supply Voltage	±0.1pA/V	•	•	•
INPUT DIFFERENCE CURRENT				
Initial Difference, +25°C	±2pA	±1pA	±0.5pA	±1pA
INPUT IMPEDANCE				
Differential	$10^{11}\Omega$	•	•	•
Common-mode	$10^{12}\Omega$	•	•	•
INPUT NOISE				
Voltage, 0.01Hz to 10Hz, p-p	4μV	•	•	•
Voltage, 10Hz to 1kHz, rms	2μV	•	•	•
Current, 0.01Hz to 10Hz, p-p	0.3pA	•	•	•
Current, 10Hz to 1kHz, rms	0.6pA	•	•	•
INPUT VOLTAGE RANGE				
Common-mode Voltage	±10V	•	•	•
Common-mode Rejection	90dB	•	•	•
Max. Safe Input Voltage	±Supply	•	•	•
POWER SUPPLY				
Rated Voltage	±15VDC	•	•	•
Voltage Range, derated	±5VDC to ±20VDC	•	•	•
Current, quiescent	±4mA	•	•	•
TEMPERATURE RANGE				
Specification	0°C to +70°C	•	•	-55°C to +125°C
Operating	-25°C to +85°C	•	•	-55°C to +125°C
Storage	-65°C to +150°C	•	•	•

*Specification same as for 3522J.
**After Warm-Up.