TECHNICAL DATA

DN8500A

Designers' Data Sheet

ULTRA LOW INPUT CURRENT OPERATIONAL AMPLIFIER

The DN8500A is an ultra low input bias current operational amplifier. This amplifier will replace the discontinued Intersil ICH8500A in most applications. It is ideally suited for analog and electrometer applications where high input resistance and low input current are of prime importance.

This amplifier is unconditionally stable and the input offset voltage can be adjusted to zero with a 5kΩ potentiometer. The input current of the DN8500A is 10 fA maxium over a temperature range of -25° C to +85° C.

Pin 8 is connected to the case. This permits the designer to operate the case at any desired potential. This is the key to achieving the ultra low input current associated with this amplifier. Forcing the case to the same potential as the input eliminates current flow between the case and any of the other Pins.

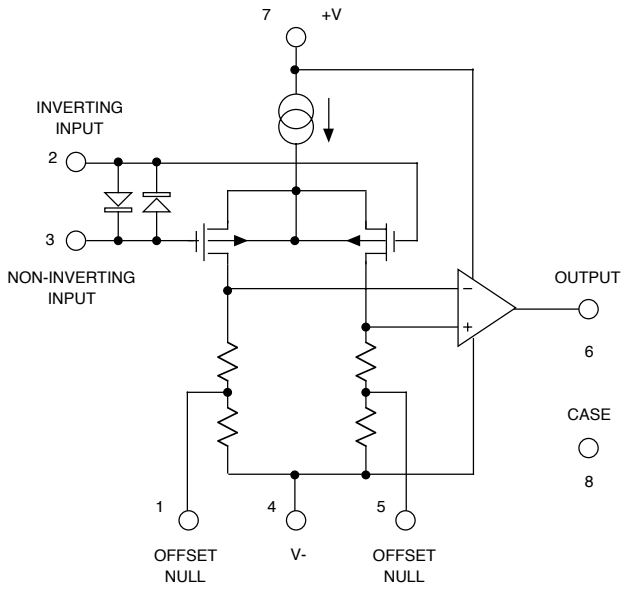
FEATURES

- **Input Bias current Less Than 10 fA at All Operating Temperatures**
- **No Frequency Compensation Required**
- **Offset Voltage Null Capabillity**
- **Short Circuit Protection**
- **Low Power Consumption**

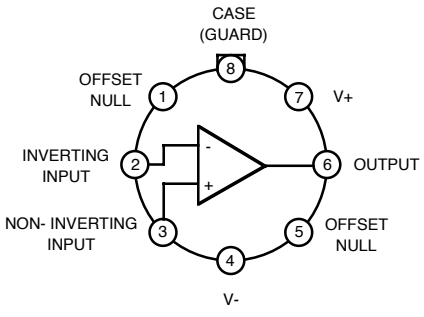
APPLICATIONS

- **Femto Ampmeters**
- **Electrometers**
- **Long Tme Integrators**
- **pH Meters**
- **Proximity Detectors**
- **Sample and Hold Circuits**
- **Photometers**
- **Ion Chamber Amplifiers**

FUNCTIONAL SCHEMATIC DIAGRAM



PIN CONFIGURATION



TO-99 Metal Can

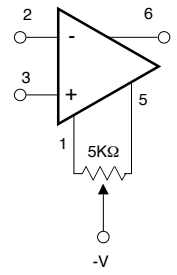
ABSOLUTE MAXIMUM RATINGS

Supply Voltage.....±18V
Internal Power Dissipation.....500mW
Differential Voltage.....±10V
Storage Temperature.....-65°C to +150°C
Operating Temperature.....-25°C to +85°C
Lead Temperature (Soldering, 10sec).....300°C
Output Short Circuit Duration.....Indefinite

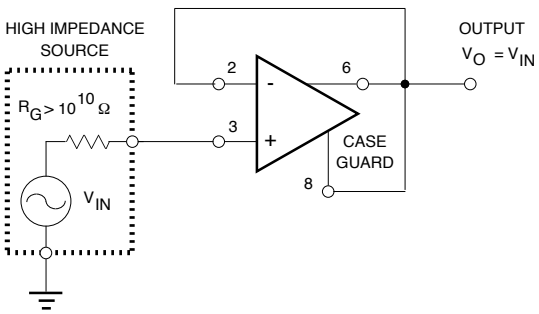
ELECTRICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE SPECIFIED, V_{SUPPLY} = ±15V)

			DN8500A			
SYMBOL	**CHARACTERISTIC**	**TEST CONDITIONS**	**MIN**	**TYP**	**MAX**	**UNIT**
I_L	Input Leakage Current (Inverting and Non-Inverting)	Case at the same potential as the inputs			±10	fA
V_{OS}	Input Offset Voltage				±25	mV
$\Delta V_{OS}/\Delta T$	Change in Input Offset Voltage Over Temperature	+25 to +85°C to -25 to +25°C		±10		mV
ΔV_{OS}	Offset Voltage Adjustment Range	5 kΩ Potentiometer		±30		mV
$\Delta V_{OS}/\Delta T$	Long Term Input Offset Voltage Stability	At 25°C		±1.0		mV
CMRR	Common Mode Rejection Ratio	± 5 volts common mode voltage		75		dB
ΔV_O	Output Voltage Swing	$R_L \geq 10k\Omega$	±11			V
V_{CM}	Common Mode Voltage Range		±10			V
A_{VOL}	Large Signal Voltage Gain		20,000	10^5		
C_{fb}	Feedback Capacitance	Case guarded		0.1		pF
SR	Slew Rate	$R_L \geq 2k\Omega$		0.5		V/us
C_{IN}	Input Capacitance	Case guarded		0.7		pF
C_{IN}	Input Capacitance	Case grounded		1.5		pF

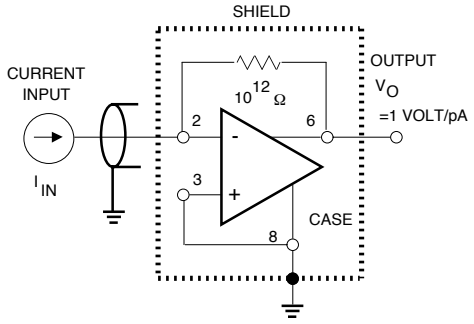
VOLTAGE OFFSET NULL CIRCUIT



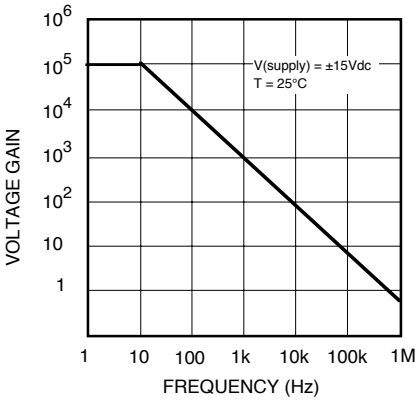
HIGH INPUT IMPEDANCE VOLTAGE FOLLOWER



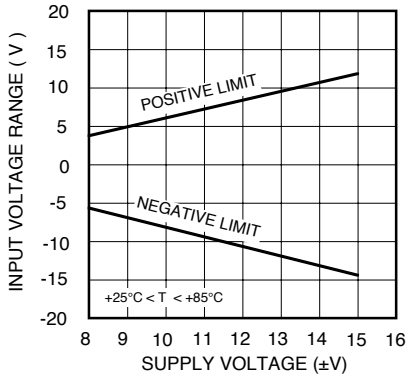
PICOAMP CURRENT MEASURING CIRCUIT



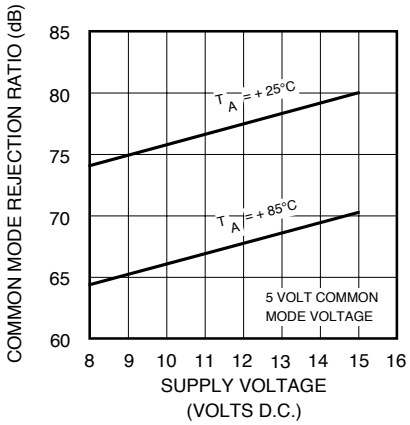
OPEN LOOP VOLTAGE GAIN vs. FREQUENCY



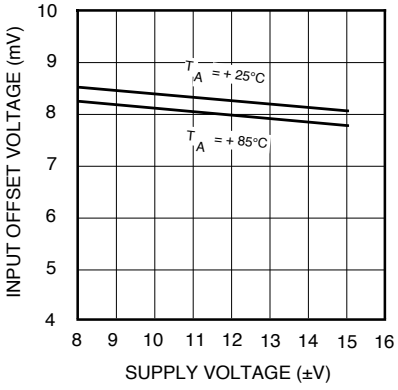
INPUT VOLTAGE RANGE vs. SUPPLY VOLTAGE



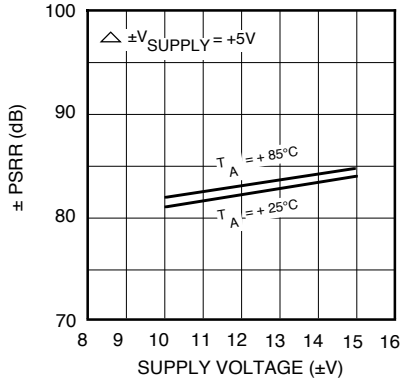
COMMON MODE REJECTION RATIO vs. SUPPLY VOLTAGE



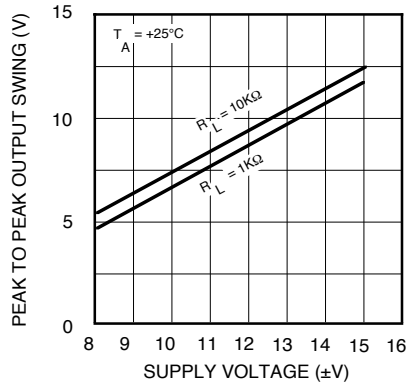
INPUT OFFSET VOLTAGE vs. SUPPLY VOLTAGE



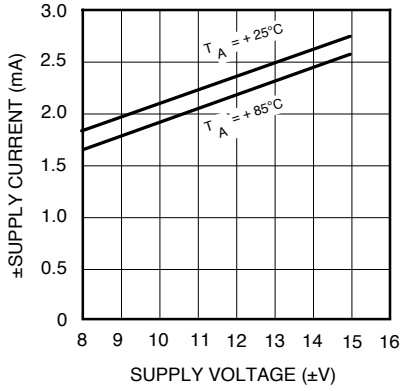
± POWER SUPPLY REJECTION RATIO vs. SUPPLY VOLTAGE



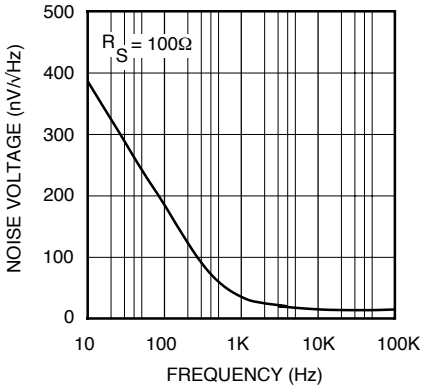
OUTPUT VOLTAGE SWING vs. SUPPLY VOLTAGE



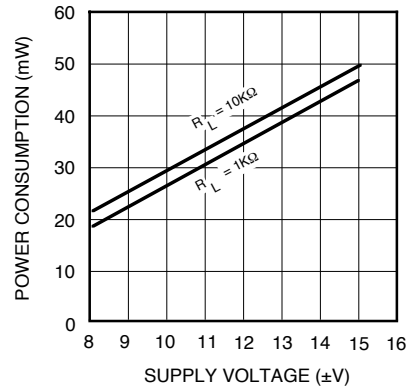
±QUIESCENT SUPPLY CURRENT vs. SUPPLY VOLTAGE



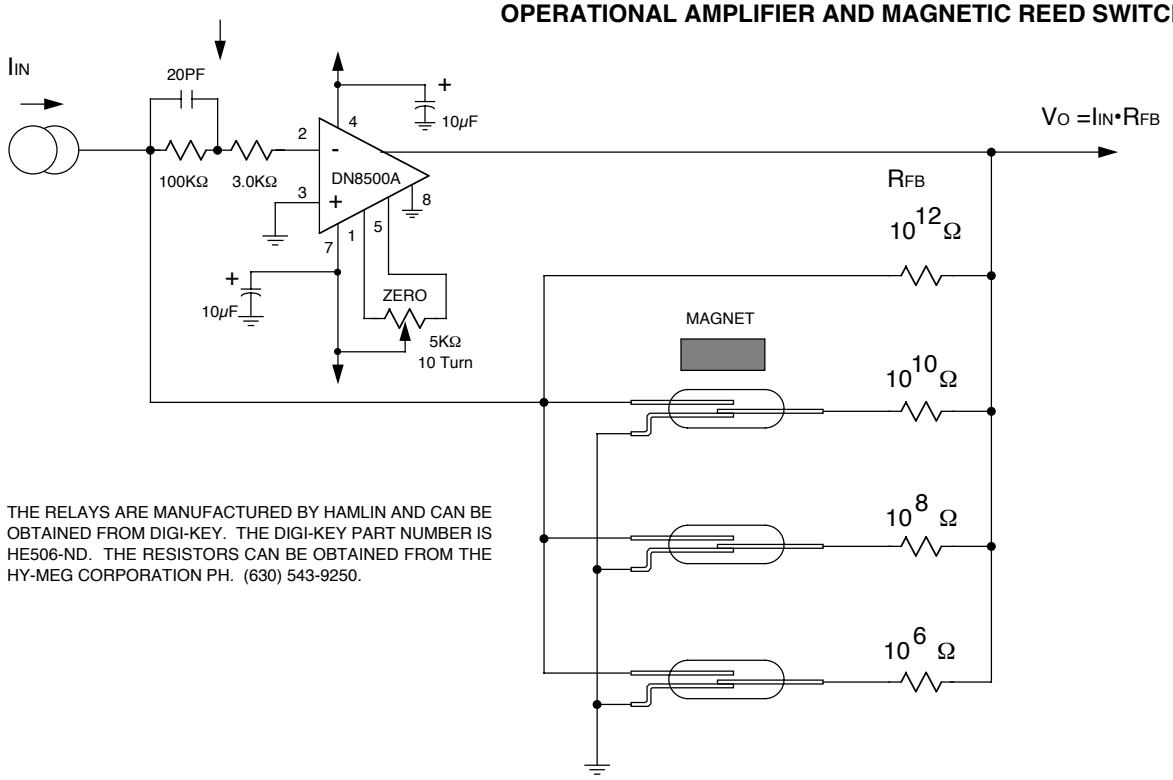
EQUIVALENT INPUT NOISE VOLTAGE



POWER CONSUMPTION vs. SUPPLY VOLTAGE

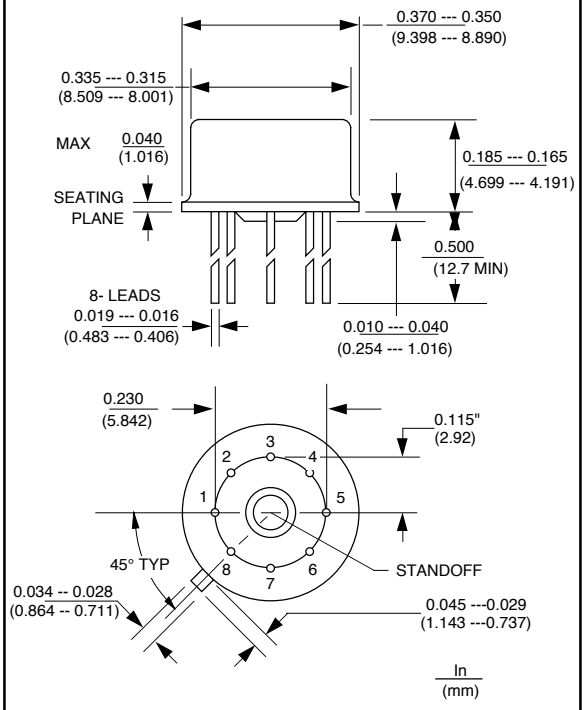


LOW LEVEL CURRENT METER USING THE DN8500A OPERATIONAL AMPLIFIER AND MAGNETIC REED SWITCHES



THE RELAYS ARE MANUFACTURED BY HAMLIN AND CAN BE OBTAINED FROM DIGI-KEY. THE DIGI-KEY PART NUMBER IS HE506-ND. THE RESISTORS CAN BE OBTAINED FROM THE HY-MEG CORPORATION PH. (630) 543-9250.

PACKAGE DEMENSIONS



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