NE/SU536-H

DESCRIPTION

The 536 is a special purpose high performance operational amplifier utilizing an FET input stage for extremely high input impedance and low input current.

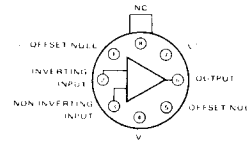
The device features internal compensation, standard pinout, wide differential and common mode input voltage range, high slew rate and high output drive capability.

FEATURES

- **5pA input bias current**
- **Input and output protection**
- **Offset null capability**
- **Internally compensated**
- **6V/μsec slew rate**
- **Standard pinout**
- **1MHz unity gain bandwidth**

PIN CONFIGURATION

H PACKAGE



ORDER PART NO.
SU536H
NE536H

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Supply voltage	±22	V
Differential input voltage range	±30	V
Common mode input voltage range	$\pm V_S$	
Power dissipation[1]	500	mW
Operating temperature range		
SU536T	-55 to +85	°C
NE536T	0 to +70	°C
Storage temperature range	-65 to +150	°C
Lead temperature (solder, 60sec)	300	°C
Output short circuit duration[2]	indefinite	

NOTES

1. Rating applies for case temperature to +25°C; derate linearly at 6.5mW/°C for ambient temperatures above 75°C.
2. Short circuit may be to ground or either supply. Rating applies to +125°C case temperature or +75°C ambient temperature.

DC ELECTRICAL CHARACTERISTICS $T_A = 25°C$, $V_S = \pm 15V$ unless otherwise specified.[1]

PARAMETER		TEST CONDITIONS	NE536			UNIT
			Min	Typ	Max	
V_{OS}	Offset voltage	$R_S \leq 10k\Omega$		30	90	mV
		Over temp., $R_S \leq 10k\Omega$		30		mV
V_{OS}	Drift	$R_S = 0\Omega$, over temp.		30		μV/°C
I_{OS}	Offset current			5		pA
I_{BIAS}	Input current[2]			30	100	pA
V_{CM}	Common mode voltage range		±10	±11		V
CMRR	Common mode rejection ratio	$R_S \leq 10k\Omega$, $V_{IN} = \pm 10V$	64	80		dB
R_{IN}	Input resistance			10^{14}		Ω
V_{OUT}	Output voltage swing	$R_L \geq 2k\Omega$, over temp.	±10	±11		V
		R_L 10kΩ, over temp.	±12	±13		V
I_{CC}	Supply current	$V_{OUT} = OV$		6.0	8.0	mA
P_{SRR}	Supply voltage rejection ratio	$R_S \leq 10k\Omega$, $\pm 6 \leq V_S \pm 15$		100	300	μV/V
A_{VOL}	Large signal voltage gain	$V_O = \pm 10V$, R_L 2kΩ	50			V/mV
		$V_O = \pm 10V$, $R_L \geq 2k\Omega$, over temp.	25			V/mV
P_S	Power supply range		±6	±18		V

NOTES

1. Operating temperature range: NE536 is 0°C to 70°C.
2. Input current typically doubles every 10°C.

DC ELECTRICAL CHARACTERISTICS $T_A = 25°C$, $\pm6V \leq V_S \leq \pm 20V$ unless otherwise specified.[2]

PARAMETER	TEST CONDITIONS	SU536			UNIT
		Min	Typ	Max	
V_{OS} Offset voltage	$R_S \leq 10k\Omega$ $R_S \leq 10k\Omega$, over temp.		7.5 7.5	20 30	mV mV
V_{OS} Drift	$R_S \leq 10k\Omega$		20		$\mu V/°C$
I_{OS} Offset current			5		pA
I_{BIAS} Input current[1]	 Over temp.		5 250	30 3000	pA pA
V_{CM} Common mode voltage range CMRR Common mode rejection ratio	$V_S = \pm15V$ $R_S \leq 10k\Omega$, $V_{IN} = \pm10V$	±10 70	±11 80		V dB
R_{IN} Input resistance			10^{14}		Ω
V_{OUT} Output voltage swing	$R_L \geq 2k\Omega$, $V_S = \pm15V$, over temp. $R_L \geq 10k\Omega$, $V_S = \pm15V$, over temp.	±10 ±12	±12 ±13		V V
I_{CC} Supply current	$V_{OUT} = OV$, $V_S = \pm20V$		6.0	8.0	mA
P_{SRR} Supply voltage rejection ratio	$R_S \leq 10k\Omega$		50	150	$\mu V/V$
A_{VOL} Large signal voltage gain	Over temp., $V_S = \pm15V$, $V_O = \pm10V$, $R_L \geq 2k\Omega$	50			V/mV
P_S Power supply range		±6		±20	V

NOTES

1. Input current typically doubles every 10°C.
2. Operating temperature range for SU536 is -55°C to +85°C.

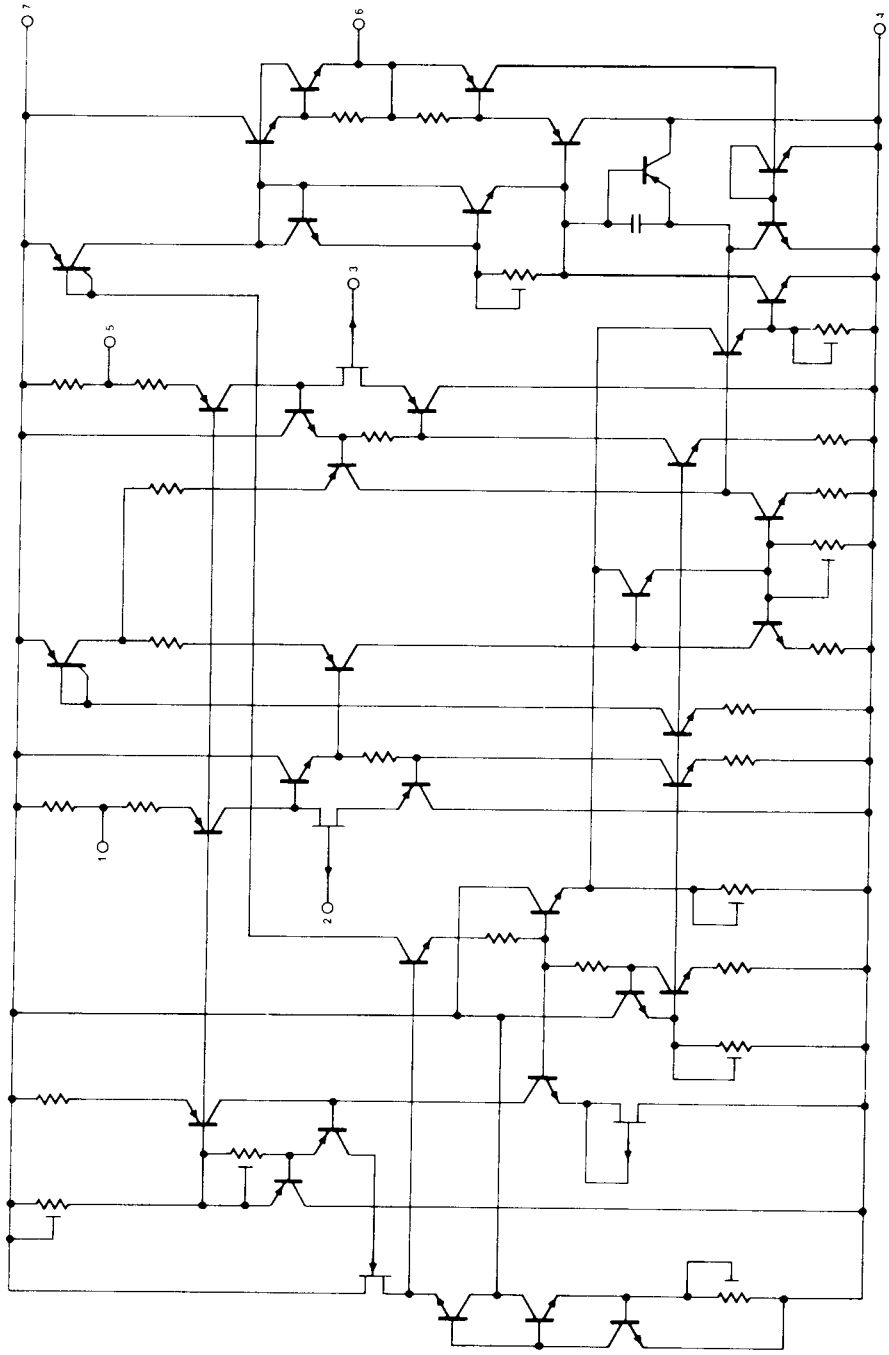
AC ELECTRICAL CHARACTERISTICS $T_A = 25°C$ unless otherwise specified.[1,2]

PARAMETER	TEST CONDITIONS	NE536			SU536			UNIT
		Min	Typ	Max	Min	Typ	Max	
Differential capacitance			6			6		pF
Input noise voltage	0.1Hz — 100kHz		20			20		μVrms
Output impedance			100			100		
Unity gain frequency Full power bandwidth	$V_S = \pm15V$ $V_S = \pm15V$		1 100			1 100		MHz KHz
Slew rate, inverter Slew rate, follower	$V_S = \pm15V$, A = -1V $V_S = \pm15V$, A = +1V		6 6			6 6		V/μs V/μs

NOTES

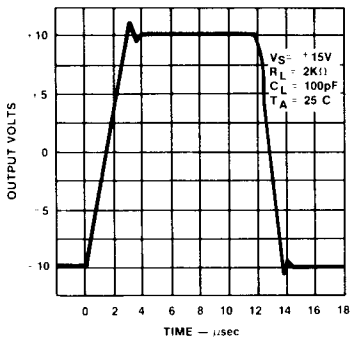
1. Temperature range for SU536 is $-55 \leq T_A \leq 85°C$
   Temperature range for NE536 is $0°C \leq T_A \leq 70°C$
2. SU536 — $\pm6V \leq T_A \pm 20V$
   NE536 — $\pm15V$

CIRCUIT SCHEMATIC

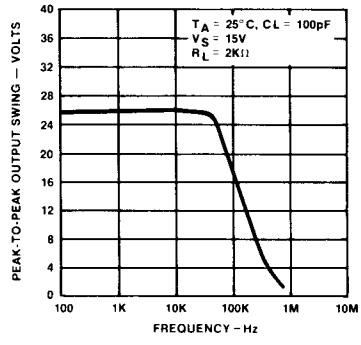


TYPICAL PERFORMANCE CHARACTERISTICS

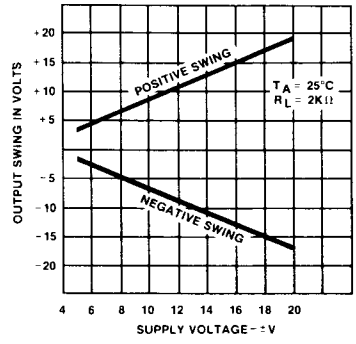
LARGE SIGNAL VOLTAGE FOLLOWER PULSE RESPONSE



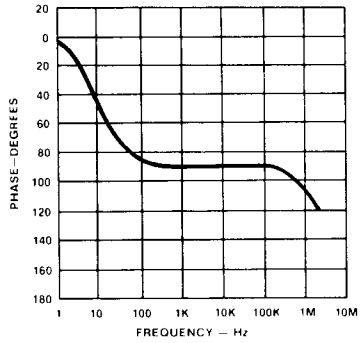
OUTPUT VOLTAGE SWING AS A FUNCTION OF FREQUENCY



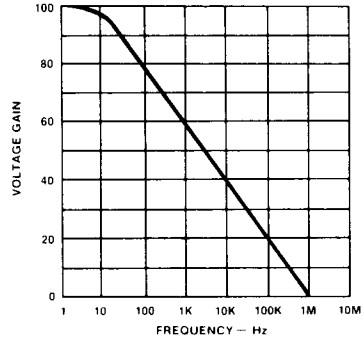
OUTPUT VOLTAGE SWING AS A FUNCTION OF SUPPLY VOLTAGE



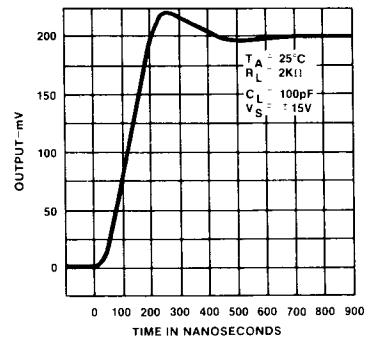
OPEN LOOP PHASE RESPONSE AS A FUNCTION OF FREQUENCY



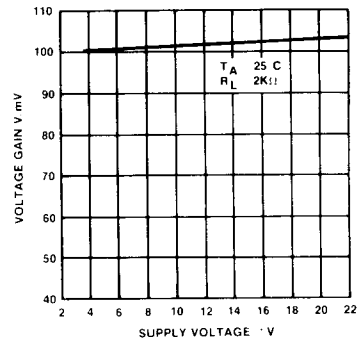
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF FREQUENCY



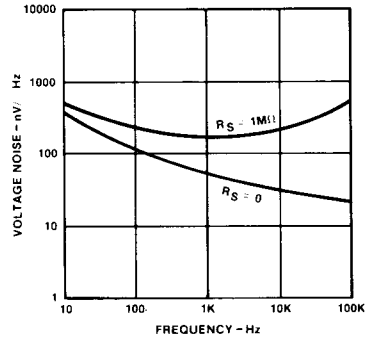
VOLTAGE FOLLOWER TRANSIENT RESPONSE



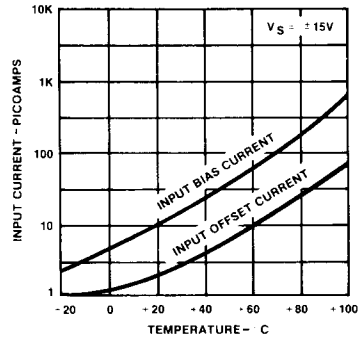
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



INPUT VOLTAGE NOISE AS A FUNCTION OF FREQUENCY

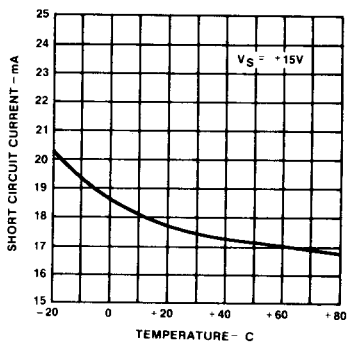


INPUT CURRENTS AS A FUNCTION OF AMBIENT TEMPERATURE



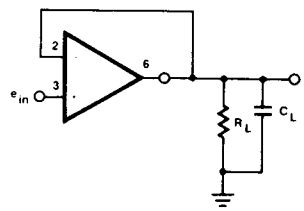
TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

OUTPUT SHORT-CIRCUIT CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



TEST CIRCUITS

VOLTAGE FOLLOWER CIRCUIT



OFFSET NULL CIRCUIT

