Signetics

NE/SA/SE4558
Dual General-Purpose Operational Amplifier

Product Specification

Linear Products

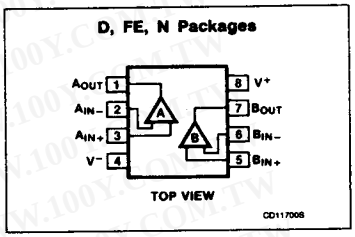
DESCRIPTION

The 4558 is a dual operational amplifier that is internally compensated. Excellent channel separation allows the use of a dual device in a single amp application, providing the highest packaging density. The NE/SA/SE4558 is a pin-for-pin replacement for the RC/RM/RV4558.

FEATURES

- **2MHz unity gain bandwidth guaranteed**
- **Supply voltage ± 22V for SE4558 and ± 18V for NE4558**
- **Short-circuit protection**
- **No frequency compensation required**
- **No latch-up**
- **Large common-mode and differential voltage ranges**
- **Low power consumption**

PIN CONFIGURATIONS



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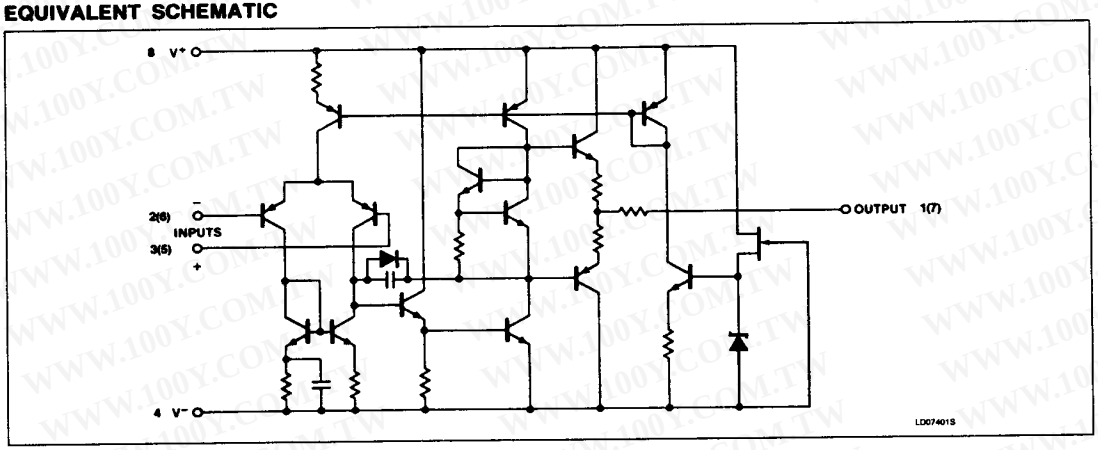
ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
8-Pin Plastic SO	0 to +70°C	NE4558D
8-Pin Ceramic DIP	0 to +70°C	NE4558FE
8-Pin Plastic DIP	0 to +70°C	NE4558N
8-Pin Plastic DIP	−40°C to +85°C	SA4558N
8-Pin Ceramic DIP	−40°C to +85°C	SA4558FE
8-Pin Plastic DIP	−55°C to +125°C	SE4558N
8-Pin Ceramic DIP	−55°C to +125°C	SE4558FE

EQUIVALENT SCHEMATIC



ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage SE4558 NE4558, SA4558	 ±22 ±18	 V V
$P_{D\ MAX}$	Maximum power dissipation, T_A = 25°C (Still air)[1] FE package N package D package	 780 1160 780	 mW mW mW
	Differential input voltage	±30	V
V_{IN}	Input voltage[2]	±15	V
T_{STG}	Storage temperature range	−65 to +150	°C
T_A	Operating ambient temperature range SE4558 SA4558 NE4558	 −55 to +125 −40 to +85 0 to +70	 °C °C °C
T_{SOLD}	Lead soldering temperature (10sec max)	300	°C
	Output short-circuit duration[3]	Indefinite	

NOTES:
1. Derate above 25°C, at the following rates:
   FE package at 6.2mW/°C
   N package at 9.3mW/°C
   D package at 6.2mW/°C
2. For supply voltages less than ± 15V, the absolute maximum input voltage is equal to the supply voltage.
3. Short-circuit may be to ground on one amp only. Rating applies to +125°C case temperature or +75°C ambient temperature for NE4558 and to +85°C ambient temperature for SA4558.

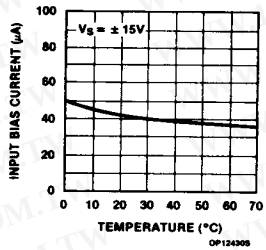
DC AND AC ELECTRICAL CHARACTERISTICS $V_{CC} = \pm 15V$, $T_A = 25°C$, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	SE4558			SA/NE4558			UNIT
			Min	Typ	Max	Min	Typ	Max	
V_{OS}	Input offset voltage	$R_S \leq 10k\Omega$		1.0	5.0		2.0	6.0	mV
	$\Delta V_{OS}/\Delta T$	Over temp.		4			4		$\mu V/°C$
I_{OS}	Input offset current			50	200		30	200	nA
	$\Delta I_{OS}/\Delta T$	Over temp.		20			20		pA/°C
I_{BIAS}	Input bias current			40	500		200	500	nA
	$\Delta I_B/\Delta T$	Over temp.		40			40		pA/°C
R_{IN}	Input resistance		0.3	1.0		0.3	1.0		MΩ
A_V	Large-signal voltage gain	$R_L \geq 2k\Omega$ $V_{OUT} = \pm 10V$	50,000	300,000		20,000	300,000		V/V
	Output voltage swing	$R_L \geq 10k\Omega$ $R_L \geq 2k\Omega$	±12 ±10	±14 ±13		±12 ±10	±14 ±13		V V
V_{IN}	Input voltage range		±12	±13		±12	±13		V
CMRR	Common-mode rejection ratio	$R_S \leq 10k\Omega$	70	100		70	100		dB
PSRR	Power supply rejection ratio	$R_S \leq 10k\Omega$		10	150		10	150	$\mu V/V$
I_{SC}	Short-circuit current		5	25	60	5	25	60	mA
	Power consumption (all amplifiers)	$R_L = \infty$		120	170		120	170	mW
t_R	Transient response (unity gain) Rise time Overshoot	$V_{IN} = 20mV$ $R_L = 2k\Omega$ $C_L \leq 100pF$		 100 15.0			 100 15.0		 ns %
SR	Slew rate (unity gain)	$R_L \geq 2k\Omega$		1.0			1.0		V/μs
	Channel separation (gain = 100)	f = 10kHz $R_S = 1k\Omega$		90			90		dB
GBW	Unity gain bandwidth (gain = 1)		2.0	3.0		2.0	3.0		MHz
θ_M	Phase margin			45			45		Degree
V_{NOISE}	Input noise voltage	f = 1kΩ		25			25		nV/√Hz
NOTE: The following specifications apply over operating temperature range.									
V_{OS}	Input offset voltage	$R_S \leq 10k\Omega$			6.0			7.5	mV
I_{OS}	Input offset current				500			300/500[1]	nA
I_{BIAS}	Input bias current				1500			800/1500[1]	nA
A_V	Large-signal voltage gain	$R_L \geq 2k\Omega$ $V_{OUT} = \pm 10V$	25,000			15,000			V/V
	Output voltage swing	$R_L \geq 2k\Omega$	±10			±10			V
P_C	Power consumption	T_A = HIGH T_A = LOW		105 125	150 200		115 120	150 200	mW mW

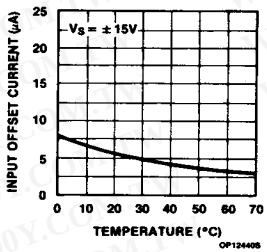
NOTE:
1. SA4558 only.

TYPICAL PERFORMANCE CURVES

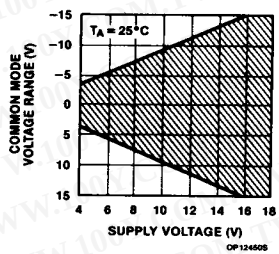
Input Bias Current as a Function of Ambient Temperature



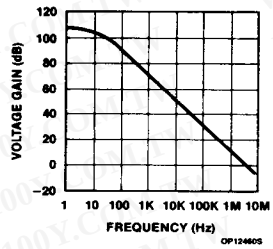
Input Offset Current as a Function of Ambient Temperature



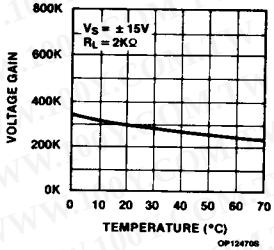
Common-Mode Range as a Function of Supply Voltage



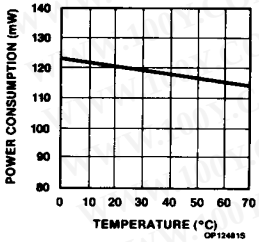
Open-Loop Voltage Gain as a Function of Frequency



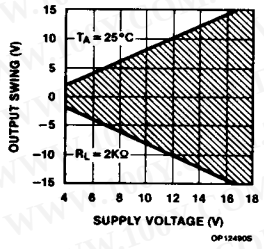
Open-Loop Gain as a Function of Temperature



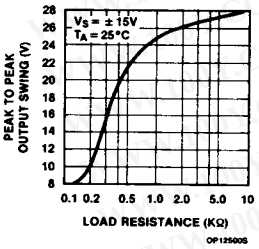
Power Consumption as a Function of Ambient Temperature



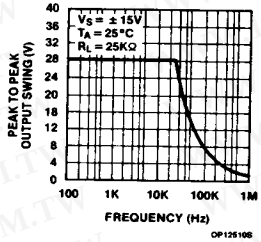
Typical Output Voltage as a Function of Supply Voltage



Output Voltage Swing as a Function of Load Resistance

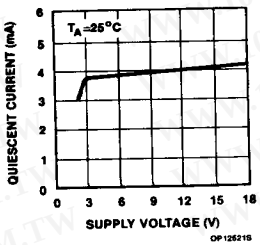


Output Voltage Swing as a Function of Frequency

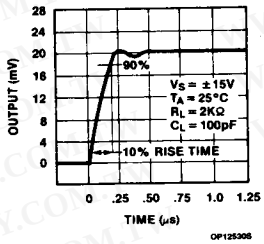


TYPICAL PERFORMANCE CURVES (Continued)

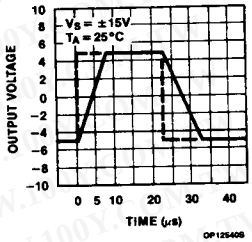
Quiescent Current as a Function of Supply Voltage



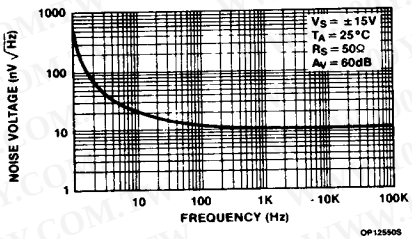
Transient Response



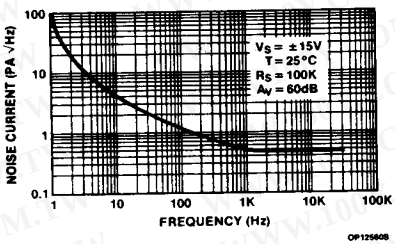
Voltage-Follower Large-Signal Pulse Response



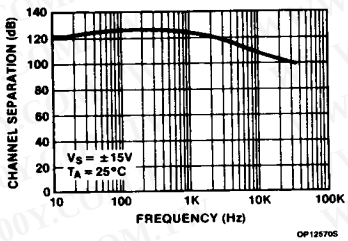
Input Noise Voltage as a Function of Frequency



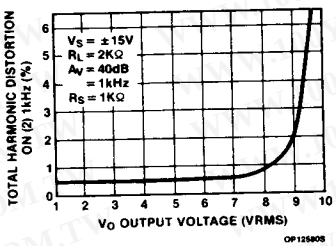
Input Noise Current as a Function of Frequency



Channel Separation



Total Harmonic Distortion vs Output Voltage



Distortion vs Frequency
V_O = 1V_{RMS}