

NE/SA/SE4558 Dual General-Purpose Operational Amplifier

Product Specification

Linear Products

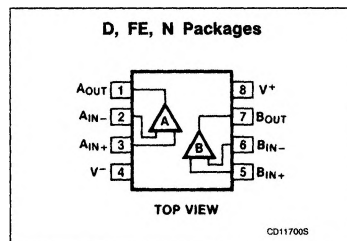
DESCRIPTION

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 $\pm 22V$ for SE4558 and $\pm 18V$ for NE4558
- Short-circuit protection
- No frequency compensation required
- No latch-up
- Large common-mode and differential voltage ranges
- Low power consumption

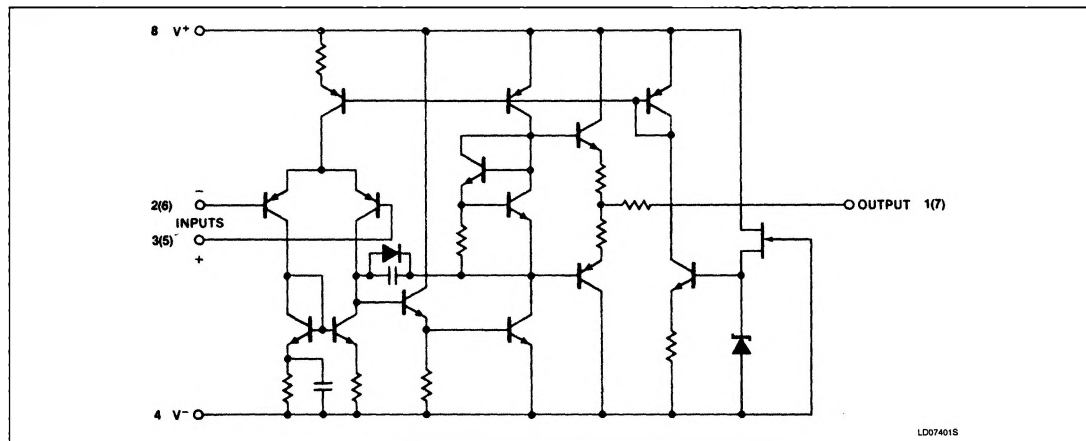
PIN CONFIGURATIONS



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



Dual General-Purpose Operational Amplifier

NE/SA/SE4558

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V _{CC}	Supply voltage	± 22	V
	SE4558 NE4558, SA4558	± 18	V
P _D MAX	Maximum power dissipation, T _A = 25°C (Still air) ¹		
	FE package	780	mW
	N package	1160	mW
	D package	780	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	-55 to +125	°C
	SA4558	-40 to +85	°C
	NE4558	0 to +70	°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.

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DC AND AC ELECTRICAL CHARACTERISTICS $V_{CC} = \pm 15V$, $T_A = 25^\circ C$, 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		$\mu V/^\circ C$
I_{OS}	Input offset current			50	200		30	200	nA
	$\Delta I_{OS}/\Delta T$	Over temp.		20			20		$pA/^\circ C$
I_{BIAS}	Input bias current			40	500		200	500	nA
	$\Delta I_B/\Delta T$	Over temp.		40			40		$pA/^\circ C$
R_{IN}	Input resistance		0.3	1.0		0.3	1.0		M Ω
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)	$V_{IN} = 20mV$ $R_L = 2k\Omega$ $C_L \leq 100pF$							
	Rise time			100			100		ns
	Overshoot			15.0			15.0		%
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	$f = 1k\Omega$		25			25		$nV/\sqrt{Hz}$
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	$T_A = HIGH$		105	150		115	150	mW
		$T_A = LOW$		125	200		120	200	mW

NOTE:

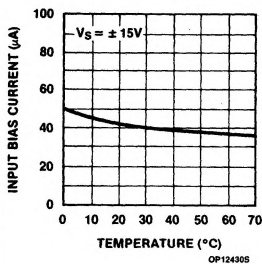
1. SA4558 only.

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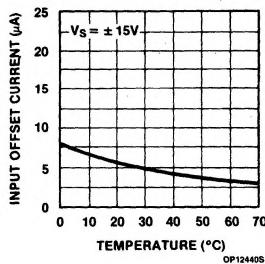
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TYPICAL PERFORMANCE CURVES

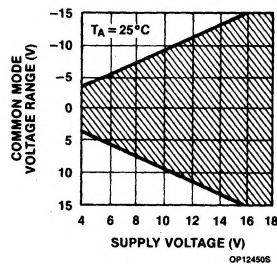
Input Bias Current as a Function of Ambient Temperature



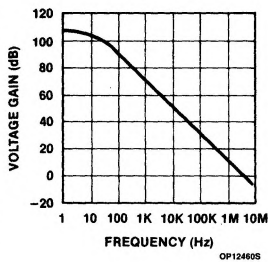
Input Offset Current as a Function of Ambient Temperature



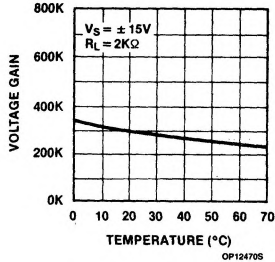
Common-Mode Range as a Function of Supply Voltage



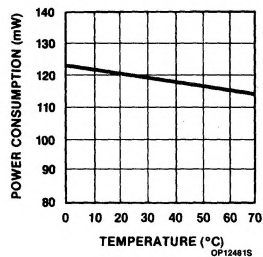
Open-Loop Voltage Gain as a Function of Frequency



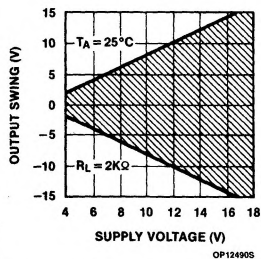
Open-Loop Gain as a Function of Temperature



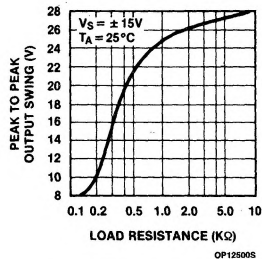
Power Consumption as a Function of Ambient Temperature



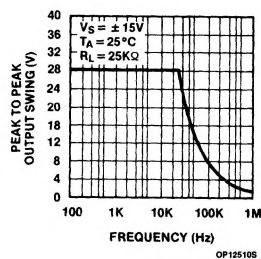
Typical Output Voltage as a Function of Supply Voltage



Output Voltage Swing as a Function of Load Resistance



Output Voltage Swing as a Function of Frequency

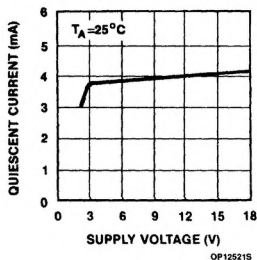


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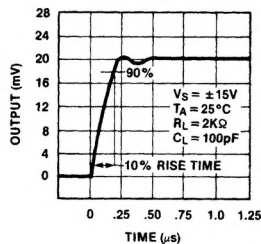
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TYPICAL PERFORMANCE CURVES (Continued)

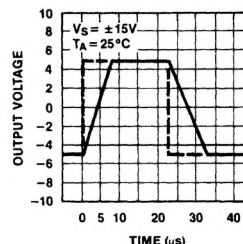
Quiescent Current as a Function of Supply Voltage



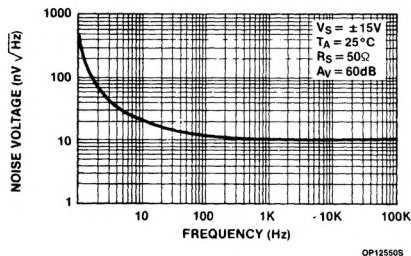
Transient Response



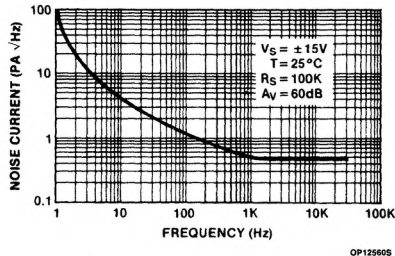
Voltage-Follower Large-Signal Pulse Response



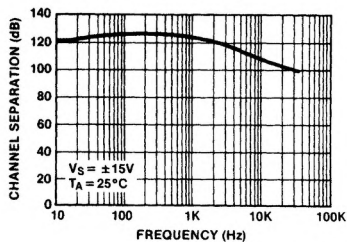
Input Noise Voltage as a Function of Frequency



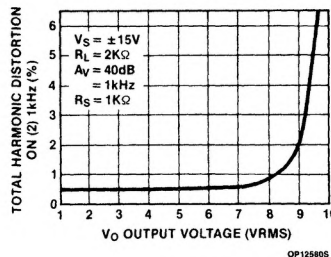
Input Noise Current as a Function of Frequency



Channel Separation



Total Harmonic Distortion vs Output Voltage

Distortion vs Frequency
 $V_O = 1\text{V}_{\text{RMS}}$ 