Dual general-purpose operational amplifier | NE/SA/SE4558

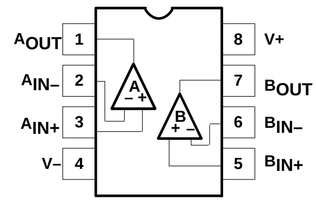
DESCRIPTION

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

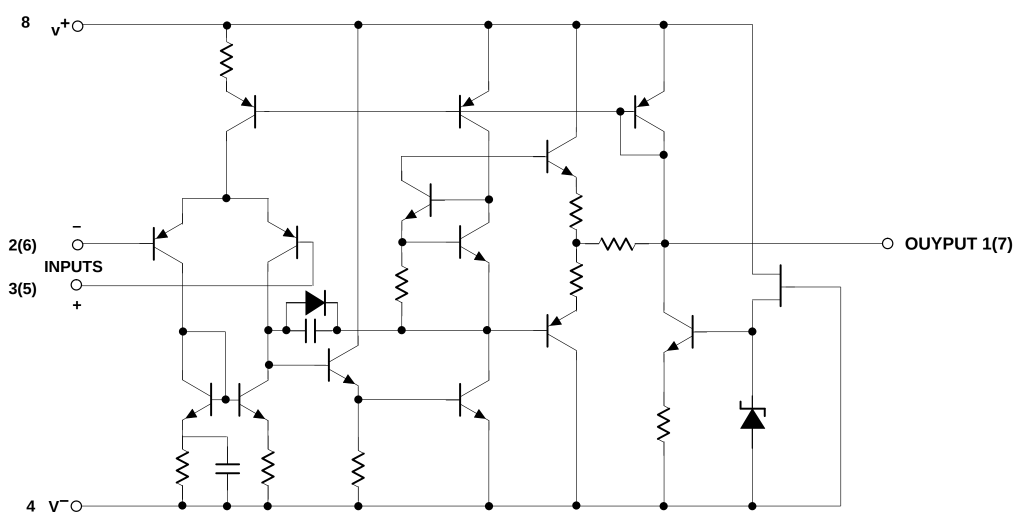
PIN CONFIGURATIONS



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
8-Pin Plastic Small Outline (SO) Package	0 to +70°C	NE4558D	0174C
8-Pin Plastic Dual In-Line Package (DIP)	0 to +70°C	NE4558N	0404B
8-Pin Plastic Dual In-Line Package (DIP)	-40 to +85°C	SA4558N	0404B
8-Pin Plastic Dual In-Line Package (DIP)	-40 to +85°C	SA4558D	0404B
8-Pin Plastic Dual In-Line Package (DIP)	-55 to +125°C	SE4558N	0404B

EQUIVALENT SCHEMATIC



ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage		
	SE4558	±22	V
	NE4558, SA4558	±18	V
$P_{D\ MAX}$	Maximum power dissipation,		
	T_A=25°C (Still air)[1]		
	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:
   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 ELECTRICAL CHARACTERISTICS

V_{CC}=±15V, TA= 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≤10kΩ		1.0	5.0		2.0	6.0	mV
	$\Delta V_{OS}/\Delta T$	Over temp.		4			4		µV/°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≥2kΩ V_{OUT}=±10V	50,000	300,000		20,000	300,000		V/V
	Output voltage swing	R_L≥10kΩ R_L≥2kΩ	±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≤10kΩ	70	100		70	100		dB
PSRR	Power supply rejection ratio	R_S≤10kΩ		10	150		10	150	µV/V
I_{SC}	Short-circuit current		5	25	60	5	25	60	mA
	Power consumption (all amplifiers)	R_L=∞		120	170		120	170	mW

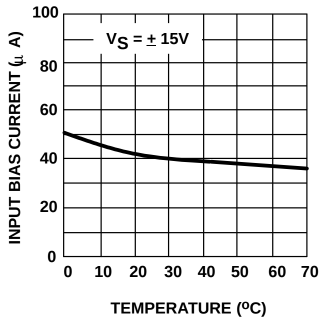
DC ELECTRICAL CHARACTERISTICS (Continued)

SYMBOL	PARAMETER	TEST CONDITIONS	SE4558			SA/NE4558			UNIT
			Min	Typ	Max	Min	Typ	Max	
t_R	Transient response (unity gain)	V_{IN}=20mV, R_L=2kΩ, C_L≤100pF							
	Rise time			100			100		ns
	Overshoot			15.0			15.0		%
SR	Slew rate (unity gain)	R_L≥2kΩ		1.0			1.0		V/µs
	Channel separation (gain=100)	f=10kHz, R_S=1kΩ		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≤10kΩ			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≥2kΩ, V_{OUT}=±10V	25,000			15,000			V/V
	Output voltage swing	R_L≥2kΩ	±10			±10			V
P_C	Power consumption	T_A=HIGH T_A=LOW		105 125	150 200		115 120	150 200	mW mW

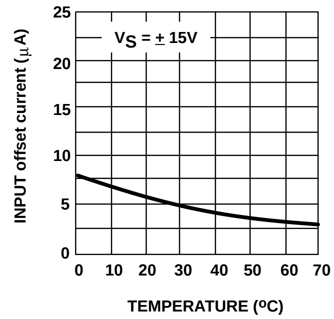
NOTES:
1. SA4558 only.

TYPICAL PERFORMANCE CURVES

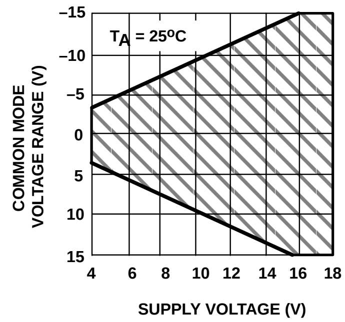
Input Bias as a Function of Ambient Temperature



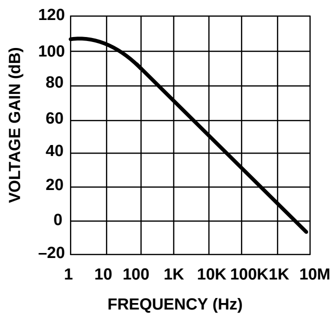
Input Offset Current as as a Function of Ambient Temperature



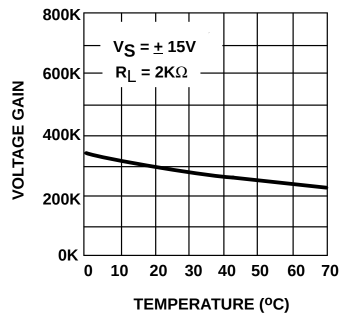
Common–Mode Range as a Function of Supply Voltage



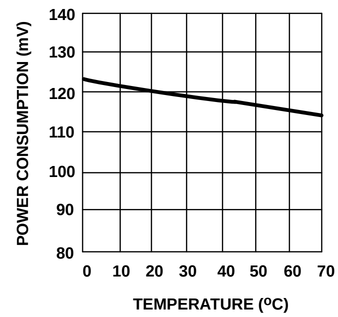
Open–Loop Voltage Gain as a Function of Frequency



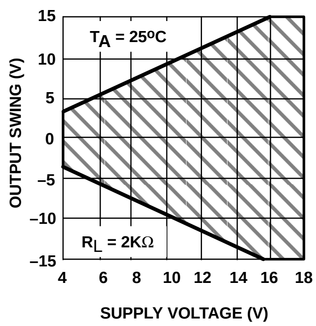
Open–Loop Gain as a Function of Temperature



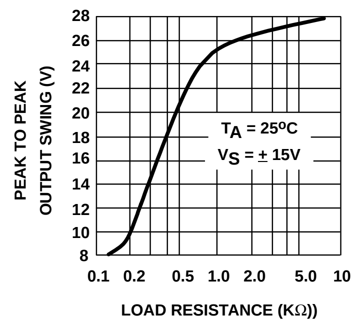
Power Consumption as a Function of Ambient Temperature



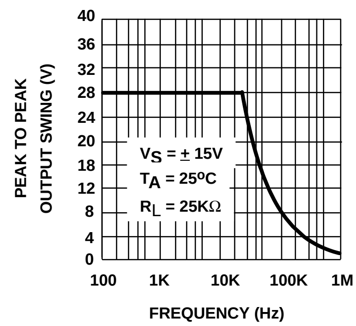
Typical Output Voltage as a Function of Supply Voltage



Output Voltage Swing as a Function of Load Resistance)

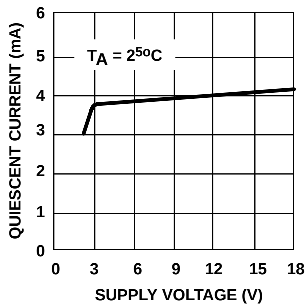


Output Voltage Swing as a Function of Frequency

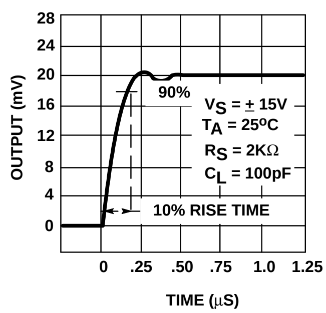


TYPICAL PERFORMANCE CURVES (Continued)

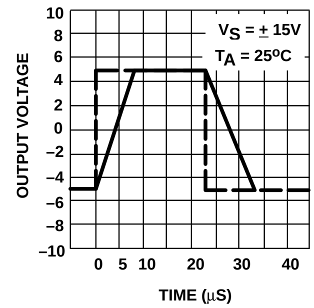
Quiescent Current as a Function of Supply Voltage



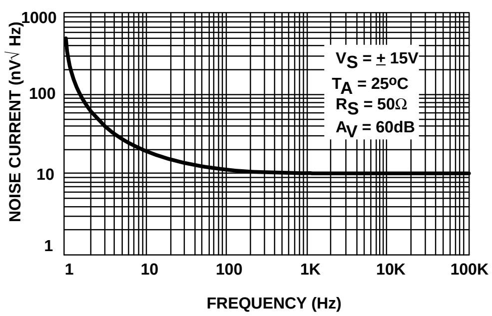
Transient Response



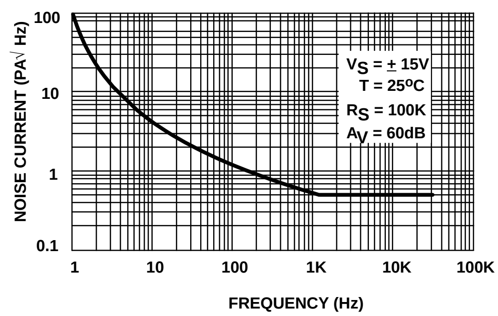
Voltage–Follower Large–Signal Pulse Response



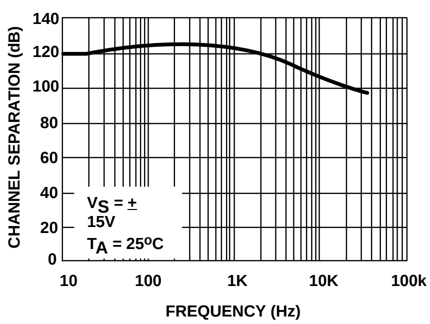
Input Noise Voltage as a Function of Frequency



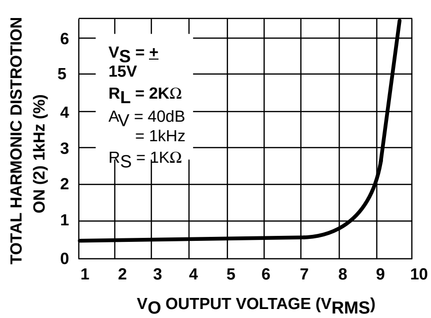
Input Noise Current as a Function of Frequency



Channel Separation



Total Harmonic Distortion vs Output Voltage



Distortion vs Frequency
$V_O = 1V_{RMS}$