DESCRIPTION

The 532/358 consists of two independent, high gain, internally frequency compensated operational amplifiers designed specifically to operate from a single power supply over a wide range of voltages. Operation from dual power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

FEATURES

- Internally frequency compensated for unity gain
- Large dc voltage gain-(100dB)
- Wide bandwidth (unity gain)—1MHz (temperature compensated)
- Wide power supply range single supply—(3Vdc to 30Vdc) or dual supplies—(±1.5Vdc to ±15Vdc)
- Very low supply current drain (400μA) essentially independent of supply voltage (1mW/op amp at +5Vdc)
- Low input biasing current—(45nA dc temperature compensated)
- Low input offset voltage—(2mVdc) and offset current—(5nA dc)

- Differential input voltage range equal to the power supply voltage
- Large output voltage—(0Vdc to V+— 1.5Vdc swing)
- SE532 MIL-STD-883A,B,C available

UNIQUE FEATURES

In the linear mode the input common-mode voltage range includes ground and the output voltage can also swing to ground, even though operated from only a single power supply voltage. The unity gain cross frequency is temperature compensated. The input bias current is also temperature compensated.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Supply voltage, V+	32 or ±16	Vdc
Differential input voltage	32	Vdc
Input voltage	-0.3 to +32	Vdc
Power dissipation ¹		Vuc
FE package	900	mW
Hpackage	680	mW
N package	500	mW
Output short-circuit to GND ⁵		
$V+ < 15$ Vdc and $T_A = 25^{\circ}C$	Continuous	1
Operating temperature range		
NE532/LM358	0 to +70	°C
LM258	-25 to +85	°C
SA532N	-40 to +85	°C
SE532/LM158	-55 to +125	°C
Storage temperature range	-65 to +150	°C
Lead temperature	300	°C
(soldering, 10sec)	1	

EQUIVALENT CIRCUIT



PIN CONFIGURATIONS



DC ELECTRICAL CHARACTERISTICS $T_A = 25$ °C, V + = + 5V unless otherwise specified.

040446750			SE532, LM158/258			NE/SA532/LM358				
	PARAMETER	TEST CONDITIONS	Min	Тур	Max	Min	Тур	Max	UNIF	
V _{os}	Offset voltage ¹	$R_{S} \le 0\Omega$ $R_{S} \le 0\Omega$, over temp.		±2	±5 ±7		±2	±7 ±9	mV mV	
Vos	Drift	$R_{S} = 0\Omega$, over temp.		7			7		μV/°C	
los	Offset current UN(+)-IN(-) Over temp.			±3	± 30 ± 100		± 5	± 50 ± 150	nA nA	
los	Drift	Over temp.		10			10		pA/°C	
I _{BIAS}	Input current ²	l _{IN} (+) or l _{IN} (−) Over temp., l _{IN} (+) or l _{IN} (−)		45 40	150 300		45 40	250 500	nA nA	
I _B	Drift	Over temp		50			50		pA/°C	
V _{см}	Common mode voltage range ³	V + = 30V Over temp., V + = 30V	0 0		V+-1.5 V+-2.0	0 0		V+-1.5 V+-2.0	V V	
C _{MRR}	Common mode rejection ratio	V + = 30V	70	85		65	70		dB	
V _{OUT} V _{OUT}	Output voltage swing (V _{OH}) Output voltage swing (V _{OL})	$ \begin{split} R_L &\geq 2k\Omega, \ V + = 30V, \ \text{over temp.} \\ R_L &\geq 10k\Omega, \ V + = 30V, \ \text{over temp.} \\ R_L &\leq 10k\Omega, \ \text{over temp.} \end{split} $	26 27	28 5	20	26 27	28 5	20	∨ ∨ mV	
lcc	Supply current	$R_L = \infty, V + = 30V$ $R_L = \infty$ on all amplifiers,		1.0	2.0		1.0	2.0	mA mA	
		over temp.		0.5	1.2		0.5	1.2		
A _{VOL}	Large signal voltage gain	$R_L \ge 2k\Omega$, $V_{OUT} \pm 10V$, $V + = 15V$ (for large V_0 swing) over temp.	50 25	100		25 15	100		V/mV V/mV	
PSRR	Supply voltage rejection ratio	R _S ≤ 0Ω	65	100		65	100		dB	
	Amplifier-to-amplifier coupling ⁴	f = 1kHz to 20kHz (input referred)	0	- 120			- 120		dB	
	Output current Source	$V_{IN+} = + 1Vdc, V_{IN-} = 0Vdc, V_{+} = 15Vdc$	20	40		20	40		mA	
		$V_{IN+} = + 1Vdc, V_{IN-} = 0Vdc,$ V+ = 15Vdc, over temp.	10	20		10	20		mA	
	Sink	$V_{IN-} = + 1Vdc, V_{IN+} = 0Vdc, V + = 15Vdc$	10	20		10	20		mA	
		$V_{IN-} = + 1Vdc, V_{IN+} = 0Vdc,$ V + = 15Vdc, over temp.	5	8		5	8		mA	
		$V_{1N+} = 0V, V_{1N-} = + 1Vdc, V_0 = 200mV$	12	50		12	50		μΑ	
Isc	Short circuit current ⁵			40	60		40	60	mA	
	Differential input voltage6				V+			V+	V	
GBW	Unity gain bandwidth	T _A = 25°C		1			1		MHz	
S.R.	Slew rate	T _A = 25°C		0.3	L		0.3		V/μs	
Noise	Input Noise Voltage	$T_A = 25 ^{\circ}C, f = 1 \text{kHz}$		40			40		nV/√Hz	

NOTES

1. $V_0 \equiv 1.4V$, $R_S = 0\Omega$ with V + from 5V to 30V; and over the full input common-mode range (0V to V + -1.5V).

2. The direction of the input current is out of the IC due to the pnp input stage. This current is essentially constant, independent of the state of the output so no loading change exists on the input lines.

3. The input common-mode voltage or either input signal voltage should not be allowed to go negative by more than 0.3V. The upper end of the common-mode voltage range is V + - 1.5V, but either or both inputs can go to + 32V without damage.

4. Duo to proximity of external components, insure that coupling is not originating via stray capacitance between these external parts. This typically can be detected as this type of capacitance coupling increases at higher frequencies.

5. Short circuits from the output to V + can cause excessive heating and eventual destruction. The maximum output current is approximately 40mA independent of the magnitude of V +. At values of supply voltage in excess of + 15Vdc, continuous short-circuits can exceed the power dissipation ratings and cause eventual destruction.

6. The input common-mode voltage or either input signal voltage should not be allowed to go negative by more than 0.3V. The upper end of the common-mode voltage range is V+ - 1.5V, buteither or both inputs can go to + 32Vdc without damage.

7. For operating at high temperatures, all devices must be derated based on a + 125 °C maximum junction temperature and a thermal resistance of 175 °C/W which applies for the device soldered in a printed circuit board, operating in a still air ambient.

TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)



TYPICAL APPLICATIONS



MC/SA1458/MC1558

DESCRIPTION

The MC1458 is a high performance operational amplifier with high open loop gain, internal compensation, high common mode range and exceptional temperature stability. The MC1458 is short-circuit protected and allows for nulling of offset voltage.

The MC1458/SA1458/MC1558 consists of a pair of 741 operational amplifiers on a single chip.

FEATURES

- Internal frequency compensation
- Short circuit protection
- Excellent temperature stability
- High input voltage range
- No latch-up
- 1558/1458 are 2 "op amps" in space of one 741 package
- MC1558 MIL-STD-883A,B,C available

D,N, PACKAGE OUTPUT A 8 INVERTING NON-INVERTING 5 NON-INVERTING V - 4 TOP VIEW ORDER NUMBERS MC1458N MC1558N SA1458N **H PACKAGE*** 3 OUTPUT OUTPUT B INVERTING INVERTING INPUT A INPUT B NON-INVERTING NON-INVERTING INPLIT A INPUT B ORDER NUMBERS MC1458H MC1558H *Metal cans (H) not recommended for new designs

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Supply voltage		
MC1458	±18	v
SA1458	±18	v
MC1558	±22	v
Internal power dissipation	()	
N package	500	mW
H package1	800	mW
F,FE package	1000	mW
Differential input voltage	±30	v
Input voltage ²	±15	v
Output short-circuit duration	Continuous	
Operating temperature range	, j	
MC1458	0 to +70	°C
SA1458	-40 to +85	°C
MC1558	-55 to +125	°C
Storage temperature range	-65 to +150	°C
Lead temperature (soldering 60sec)	300	°C

NOTES

 Ratings based on thermal resistances, junction to ambient, of 240°C/W, 150°C/W, 110°C/W for N, H, F and FE packages respectively, and a maximum

junction temperature of 150° C. 2. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

EQUIVALENT SCHEMATIC



PIN CONFIGURATIONS

	PARAMETER TEST CONDITIONS		Min	Тур	Max	UNIT
V _{os}	Offset voltage	$R_{S} = 10k\Omega$ $R_{S} = 10k\Omega$, over temperature		1.0	5.0 6.0	mV mV
∆Vos	Offset voltage	Over temperature		10		μV/°C
los	Offset current			20	200	nA nA
∆l _{os}	Offset current	Over temperature		0.10	500	nA/°C
IBIAS	Input bias current	Over temperature		80	500 1500	nA nA
ΔIB	Bias current	Over temperature		1.0		nA/°C
V _{OUT}	Output voltage swing	$R_L = 10k\Omega$, over temperature $R_L = 2k\Omega$, over temperature	± 12 ± 10	± 14 ± 13		v v
A _{VOL}	Large signal voltage gain	$\begin{aligned} R_L &= 2k\Omega, \ V_O = \pm 10V \\ R_L &= 2k\Omega, \ V_O = \pm 10V, \ \text{over temperature} \end{aligned}$	50 20	100		V/mV V/mV
	Offset voltage adjustment range			± 30		mV
PSRR	Supply voltage rejection ratio	R _S ≤ 10kΩ		30	150	μV/V
CMRR	Common mode rejection ratio		70	90		dB
lcc	Supply current			2.3	5.0	mA
V _{IN}	Input voltage range		± 12	± 13		V
Pd	Power consumption			70	150	mW
R _{OUT} Isc	Channel separation Output resistance Output short-circuit current		10	120 75 26	60	dΒ Ω mA

DC ELECTRICAL CHARACTERISTICS $T_A = 25 \text{ °C}$, $V_S = \pm 15V$, unless otherwise specified.

DC ELECTRICAL CHARACTERISTICS (Cont'd) $T_A = 25 \,^{\circ}\text{C}$, $V_{CC} = \pm 15V$, unless otherwise specified.¹

DADAMETED		TEST CONDITIONS		MC1458		SA1458			UNIT
	PARAMETER	TEST CONDITIONS	Min	Тур	Max	Min	Тур	Max	UNIT
Vos	Offset voltage	$R_s = 10k\Omega$ $R_s = 10k\Omega$, over temp.		2.0	6.0 7.5		2.0	6.0 7.5	mV mV
∆V _{os}	Offset voltage	Over temperature		12		ł	12		μV/°C
los	Offset current	Over temperature		20	200 300		20	200 500	nA nA
Δlos	Offset current	Over temperature		0.10			0.10		nA/°C
IBIAS	Input bias current	Over temperature		80	500 800		80	500 1500	nA nA
Δl _B	Bias current	Over temperature		1.0			1.0		nA/°C
V _{OUT}	Output voltage swing	$R_L = 10k\Omega$ $R_L = 2k\Omega$, over temp.	± 12 ± 10	± 14 ± 13		± 12 ± 10	± 14 ± 13		< <
A _{VOL}	Large signal voltage gain		25 15	200		20 15	200		V/mV V/mV
	Offset voltage adjustment range			± 30			± 30		mV
PSRR	Supply voltage rejection ratio	$R_{S} \leq 10k\Omega$		30	150	ľ	30	150	μV/V
CMRR	Common mode rejection ratio		70	90		70	90		dB
I _c c	Supply current			2.3	5.6		2.3	5.6	mA
V _{IN} R _{IN}	Input voltage range Input resistance		± 12	± 13		± 12	± 13		ν ΜΩ
Pd	Power consumption			70	170		70	170	mW
Isc	Channel separation Output short-circuit current			120 25			120 25		dB mA

AC ELECTRICAL CHARACTERISTICS $T_A = 25 \text{ °C}$, $V_S = \pm 15V$, unless otherwise specified
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DADAMETED	TEST CONDITIONS	MC1458			
PARAMETER	TEST CONDITIONS	Min	Тур	Max	
Parallel input resistance	Open loop, f = 20Hz	0.3			MΩ
Common mode input impedance	f = 20Hz		200		MΩ
Equivalent input noise voltage	$A_V = 100, R_S = 10k\Omega, B_W = 1.0kHz, f = 1.0kHz$		30		nV √Hz
Power bandwidth	$A_V = 1$, $R_L = 2.0 k\Omega$, THD \leq 5%, $V_{OUT} = 20 V p \cdot p$		14		kHz
Phase margin			65		degrees
Gain margin			11		dB
Unity gain crossover frequency	Open loop		1.0		MHz
Transient response unity gain Rise time Overshoot Slew rate	$V_{IN} = 20mV$, $R_L = 2k\Omega$, $C_L \le 100pF$ $C \le 100pF$, $R_I \ge 2k$, $V_{IN} = \pm 10V$		0.3 5.0 0.8		μS % V/μS

TYPICAL PERFORMANCE CHARACTERISTICS



Signetics

MC/SA1458/MC1558

TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)



MC/SA1458/MC1558

TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

