

**FEATURES**

- Internally frequency compensated for unity gain
- Large DC voltage gain : 100dB
- Wide power supply range : 3V~32V(or±1.5V~16V)
- Input common-mode voltage range includes ground
- Large output voltage swing : 0V DC to VCC-1.5V DC
- Power drain suitable for battery operation
- Moisture Sensitivity Level 3
- LM358G is Halogen Free product

**ORDERING INFORMATION**

Device	Package
LM358D	SOP-8
LM358GD	

**DESCRIPTION**

The LM358D consists of two independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits. Which now can be easily implemented in single power supply systems.

**ABSOLUTE MAXIMUM RATING**

CHARACTERISTIC	SYMBOL	VALUE	UNIT
Supply Voltage	$V_{CC}$	±16V or 32V	V
Differential Input Voltage	$V_{I(DIF)}$	±32V	V
Input Voltage	$V_I$	-0.3V to 32V	V
Output Short Circuit to GND		Continuous	
$V_{CC} \leq V_{TA}=25^{\circ}\text{C}$ (One Amp)			
Operating Temperature Range	$T_{OPR}$	0 to 70°C	°C
Storage Temperature Range	$T_{STG}$	-65°C to 150°C	°C

## ELECTRICAL CHARACTERISTICS

Electrical characteristics at specified free-air temperature,  $V_{CC}=5V$ (unless otherwise noted)

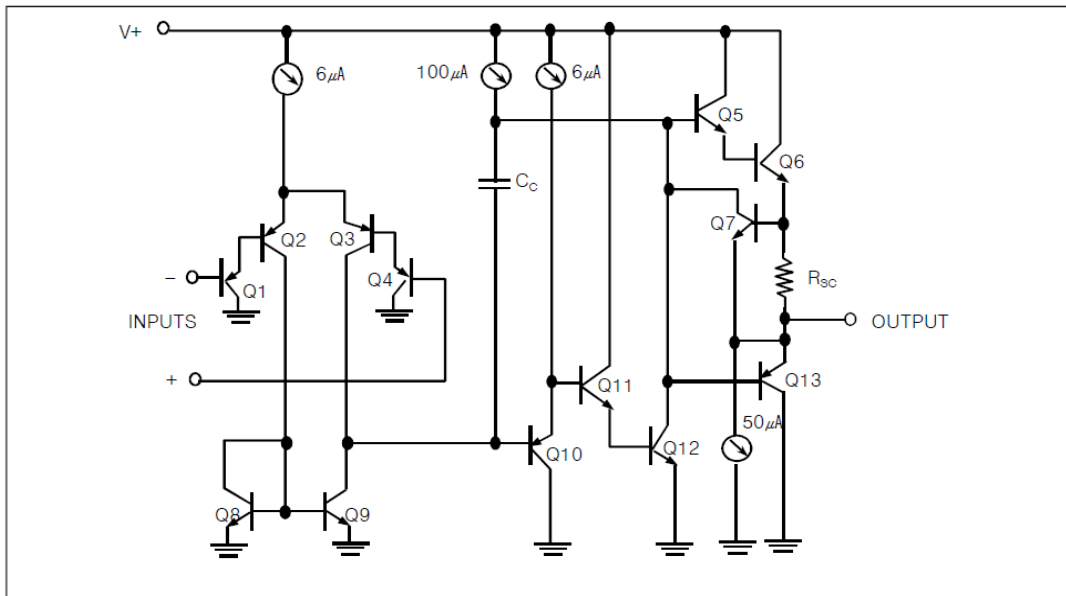
PARAMETER	TEST CONDITIONS*	MIN	TYP	MAX	UNIT	
$V_{IO}$ Input offset voltage	$V_{CC}=5V$ to MAX, $V_{IC}=V_{ICR}$ min, $V_O=1.4V$	25 °C	3	7	mV	
		Full range		9		
$\alpha V_{IO}$ Average temperature coefficient of input offset voltage		Full range	7		$\mu V/^\circ C$	
$I_{IO}$ Input offset current	$V_O=1.4V$	25 °C	2	50	nA	
		Full range		150		
$\alpha I_{IO}$ Average temperature coefficient of input offset current		Full range	10		$pA/^\circ C$	
$I_{IB}$ Input bias current	$V_O=1.4V$	25 °C	-20	-250	nA	
		Full range		-500		
$V_{ICR}$ Common-mode input voltage range	$V_{CC}=5V$ to MAX	25 °C	0 to $V_{CC}-1.5$		V	
		Full range	0 to $V_{CC}-2$			
$V_{OH}$ High-level output voltage	$R_L \geq 2k\Omega$	25 °C	$V_{CC}-1.5$		V	
	$V_{CC}=MAX$ , $R_L=2k\Omega$	Full range	26			
	$V_{CC}=MAX$ , $R_L \geq 10k\Omega$	Full range	27	28		
$V_{OL}$ Low-level output voltage	$R_L \geq 10k\Omega$	Full range		5	20	mV
$A_{VD}$ Large-signal differential voltage amplification	$V_{CC}=15V$ $V_O=1V$ to 11V $R_L \geq 2k\Omega$	25 °C	25	100	V/mV	
		Full range	15			
THD Total harmonic distortion	$F=1kHz$ , $A_V=20dB$ , $R_L=2k\Omega$ , $V_O=2V_{PP}$ , $C_L=100pF$	25 °C		0.02	%	
CMRR Common-mode rejection ratio	$V_{CC} = 5 V$ to MAX, $V_{IC} = V_{ICR}$ min	25 °C	65	80	dB	
$k_{SVR}$ Supply voltage rejection ratio ( $\Delta V_{CC}/\Delta V_{IO}$ )	$V_{CC} = 5 V$ to MAX	25 °C	65	100	dB	
$V_{O1}/V_{O2}$ Crosstalk attenuation	$f=1kHz$ to 20kHz	25 °C		120	dB	
$I_O$ Output current	$V_{CC}=15V$ , $V_{ID}=1V$ , $V_O=0V$	25 °C	-20	-30	mA	
		Full range	-10			
	$V_{CC}=15V$ , $V_{ID}= -1V$ , $V_O=15V$	25 °C	10	20		
		Full range	5			
$V_{ID}= -1 V$ , $V_O= 200mV$	25 °C	12	30	$\mu A$		
$I_{OS}$ Short-circuit output current	$V_{CC}$ at 5V, GND at -5V, $V_O=0$	25 °C		$\pm 40$	$\pm 60$	mA
$I_{CC}$ Supply current (Two amplifiers)	$V_O=2.5 V$ , No load	Full range		0.7	1.2	mA
	$V_{CC} = MAX$ , $V_O = 0.5V_{CC}$ , No load	Full range		1	2	

# Dual Operational Amplifiers

# LM358D

\* All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified <<MAX>> VCC for testing purpose is 30V. Full range is 0°C to 70°C.

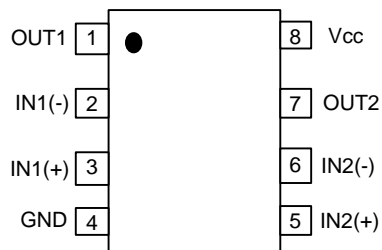
## EQUIVALENT CIRCUIT



## ORDERING INFORMATION

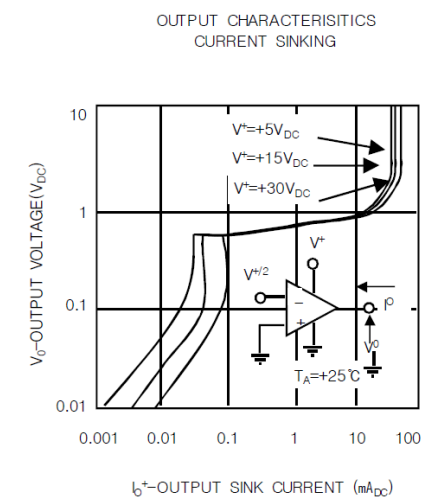
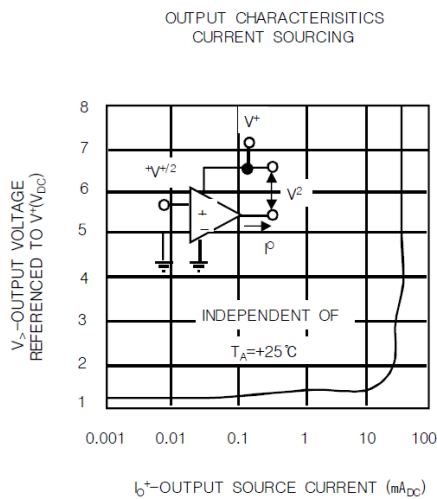
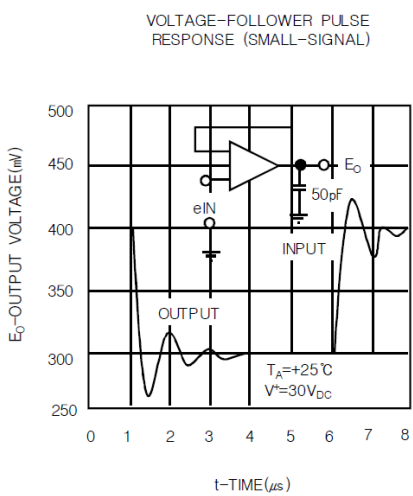
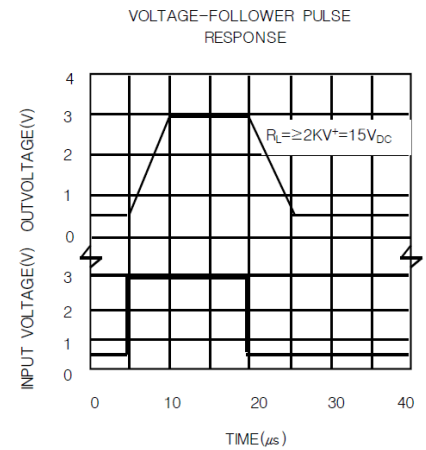
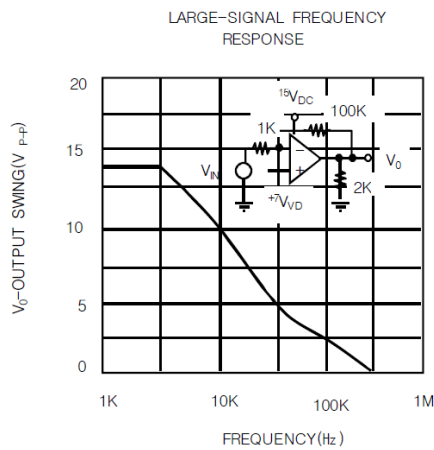
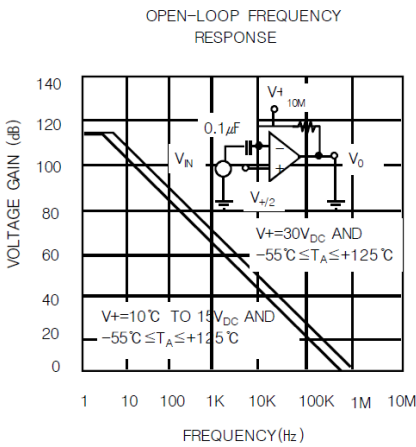
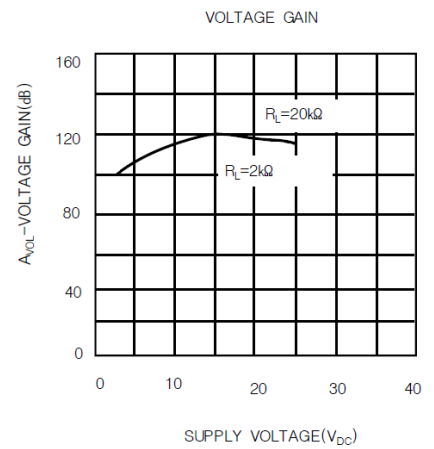
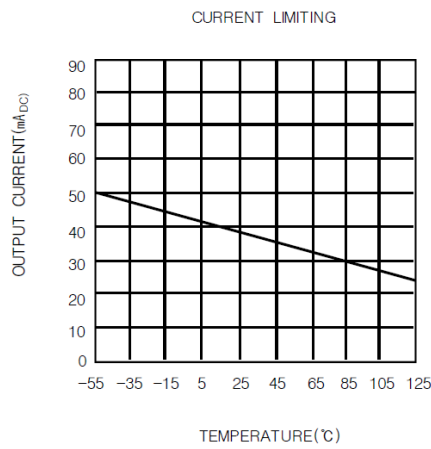
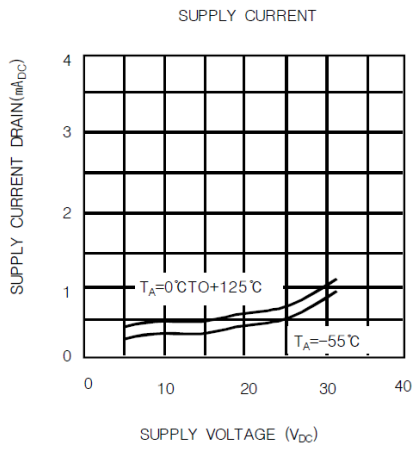
Package	Order No.	Description	Supply As	Status
SOP-8	LM358D	Dual Operational Amplifier, Pb-Free	Reel	Active
SOP-8	LM358GD	Dual Operational Amplifier, Halogen-Free	Reel	Active

## PIN CONFIGURATION

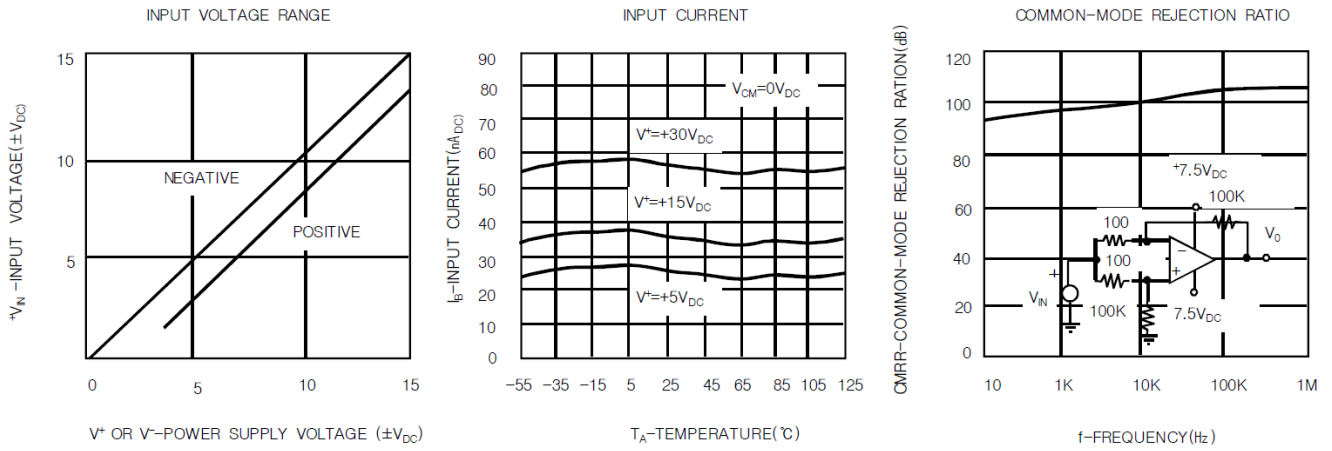


SOP-8

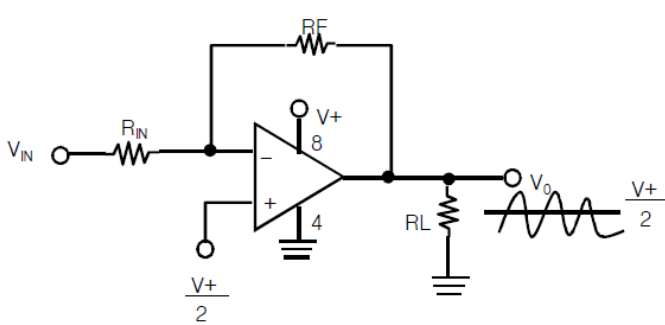
## TYPICAL PERFORMANCE CHARACTERISTICS



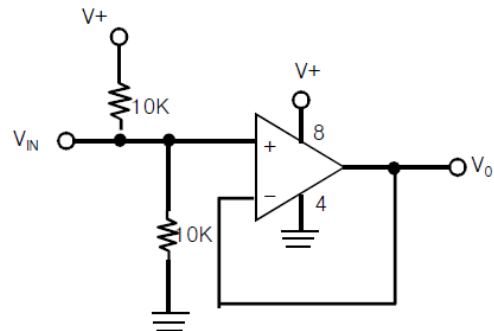
## TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)



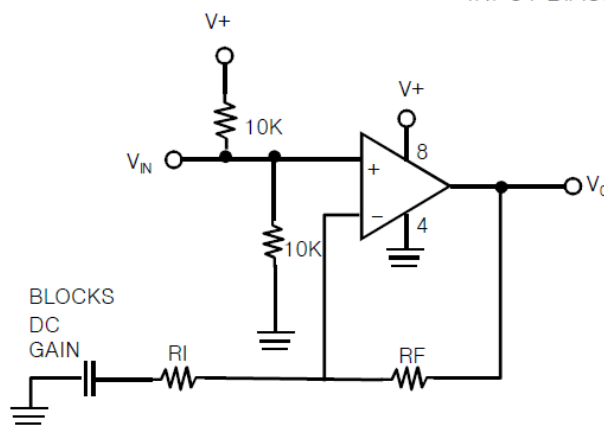
## TYPICAL APPLICATIONS



SINGLE SUPPLY INVERTING AMPLIFIER



INPUT BIASING VOLTAGE FOLLOWER



NON-INVERTING AMPLIFIER

### REVISION NOTICE

The description in this datasheet can be revised without any notice to describe its electrical characteristics properly.