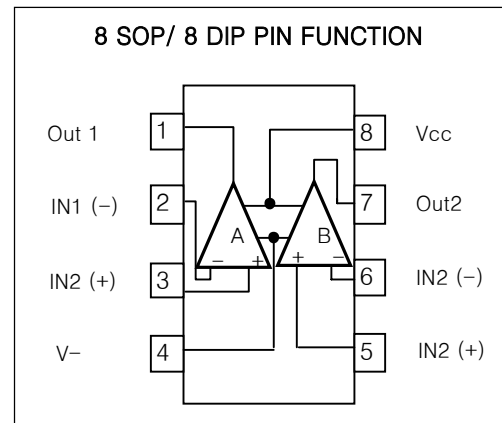


FEATURES

- 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 $V_{CC}-1.5V$ DC
- Power drain suitable for battery operation



ORDERING INFORMATION

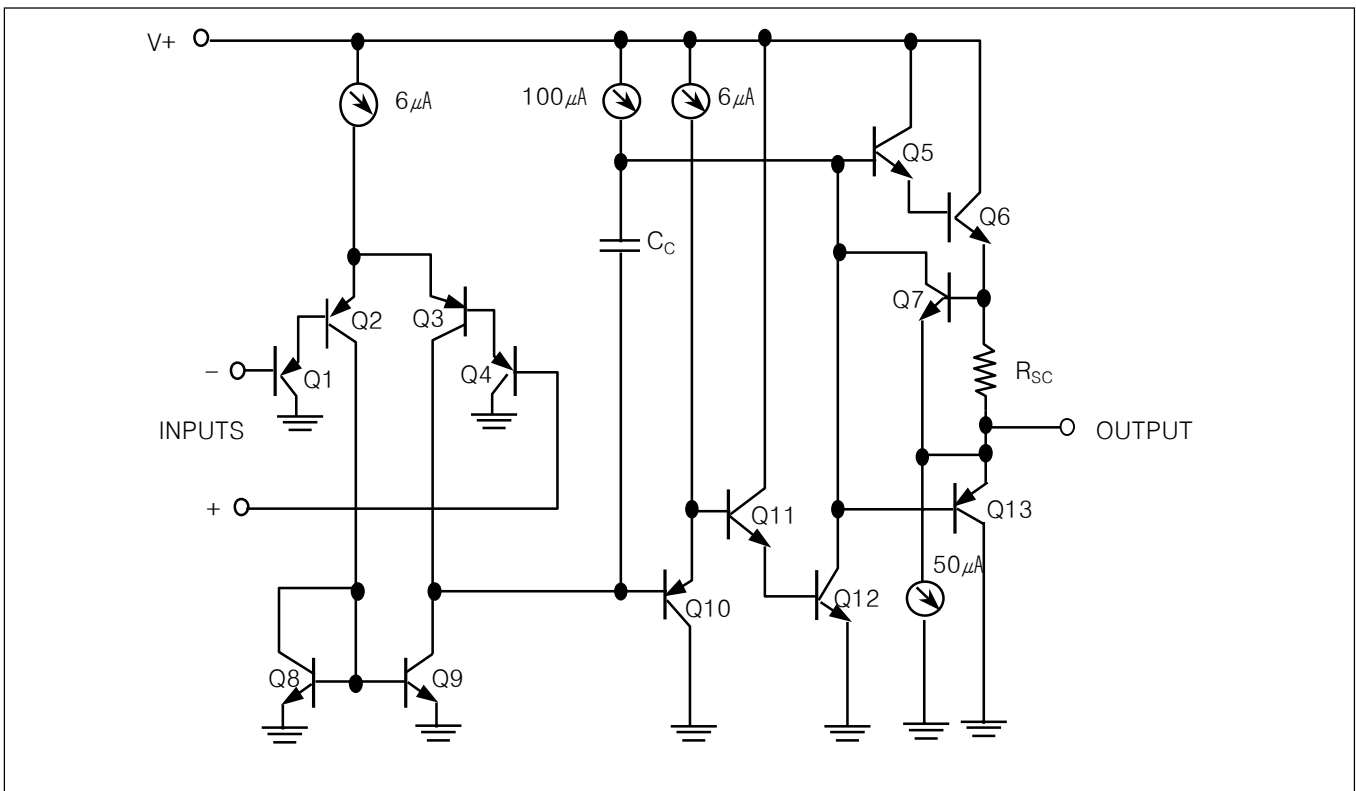
Device	Package
LM358D	8 SOP
LM358N	8 DIP

DUAL OPERATIONAL AMPLIFIERS

LM358 consists of four independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltage. 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 amplifier, DC gain blocks and all the conventional OP amp circuits which now can be easily implemented in single power supply systems.

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS

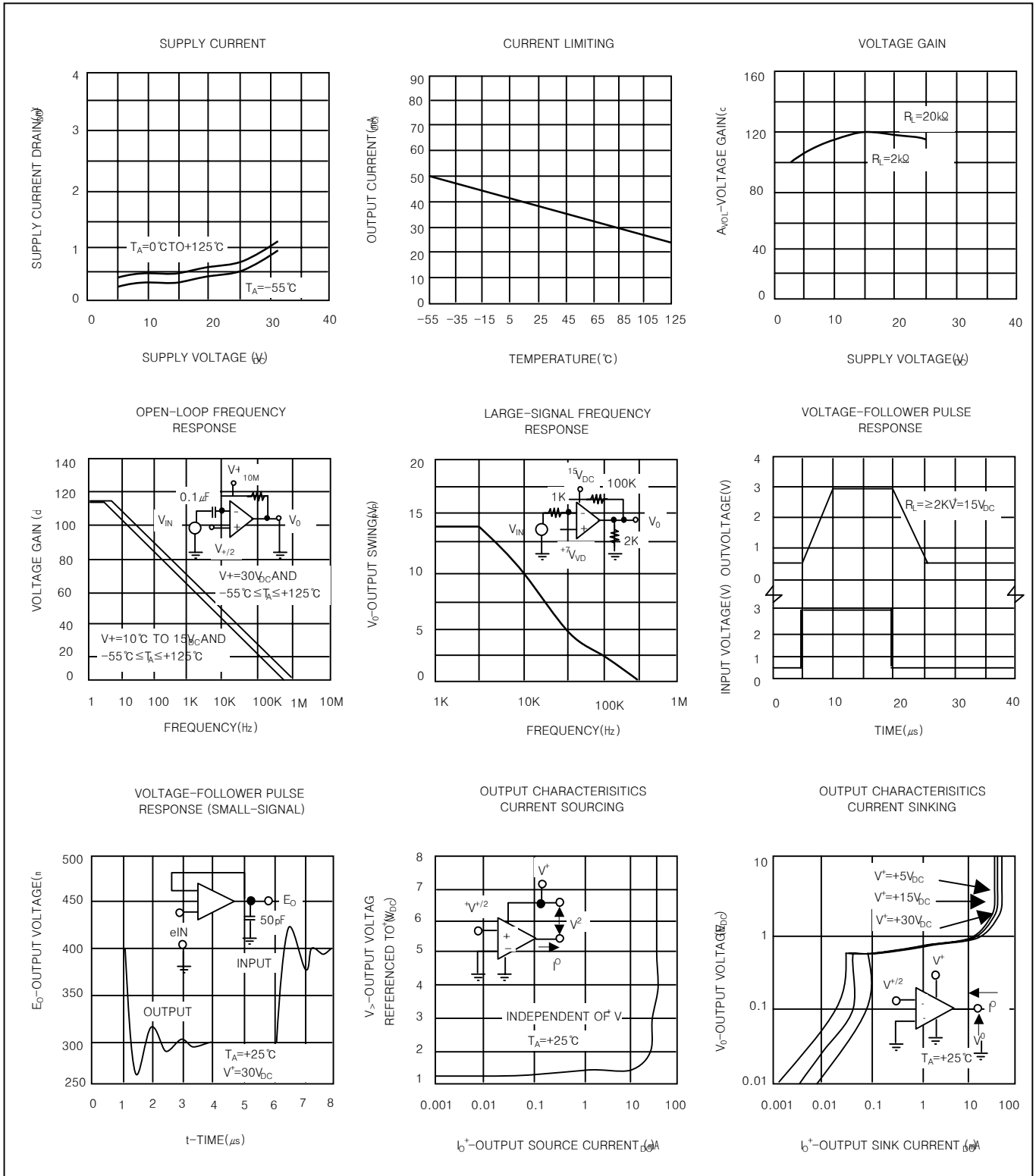
CHARACTERISTIC	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	± 16 or 32	V
Differential Input Voltage	$V_{I(DIFF)}$	± 32	V
Input Voltage	V_I	-0.3 to +32	V
Output Short Circuit to GND $V_{CC} \leq V$ $T_A = 25^\circ\text{C}$ (One Amp)		Continuous	
Operating Temperature Range	T_{OPR}	0~+70	$^\circ\text{C}$
Storage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

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

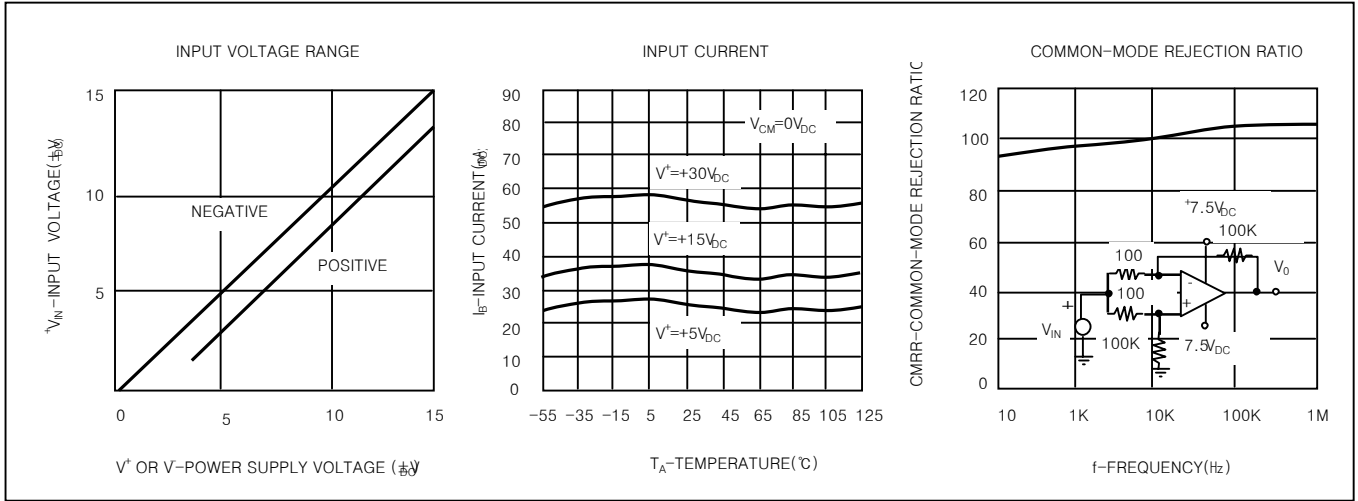
PARAMETER	TEST CONDITIONS*	LM358			UNIT	
		MIN	TYP	MAX		
V_{IO} Input Offset Voltage	$V_{CC} = 5\text{V to MAX,}$ $V_{IC} = V_{ICR\text{MIN,}}$ $V_O = 1.4\text{V}$	25 $^\circ\text{C}$	3	7	mV	
		Full Range		9		
αV_{IO} Average Temperature Coefficient of Input Offset Voltage		Full Range	7		$\mu\text{V}/^\circ\text{C}$	
I_{IO} Input Offset Current	$V_O = 1.4\text{V}$	25 $^\circ\text{C}$	2	50	nA	
		Full Range		150		
αI_{IO} Average Temperature Coefficient of Input Offset Current		Full Range	10		$\text{pA}/^\circ\text{C}$	
I_{IB} Input Bias Current	$V_O = 1.4\text{V}$	25 $^\circ\text{C}$	-20	-250	nA	
		Full Range		-500		
V_{ICR} Common-Mode Input Voltage Range	$V_{CC} = 5\text{V to MAX}$	25 $^\circ\text{C}$	0 to $V_{CC} - 1.5$		V	
		Full Range	0 to $V_{CC} - 2$			
V_{OH} High-Level Output Voltage	$R_L \geq 2\text{k}\Omega$	25 $^\circ\text{C}$	$V_{CC} - 1.5$		V	
	$V_{CC} = \text{MAX, } R_L = 2\text{k}\Omega$	Full Range	26			
	$V_{CC} = \text{MAX,}$ $R_L \geq 10\text{k}\Omega$	Full Range	27	28		
V_{OL} Low-Level Output Voltage	$R_L \geq 10\text{k}\Omega$	Full Range		5	20	mV
A_{VD} Large-Signal Differential Voltage Amplification	$V_{CC} = 15\text{V,}$ $V_O = 1\text{V to } 11\text{V,}$ $R_L \geq 2\text{k}\Omega$	25 $^\circ\text{C}$	25	100	V/mV	
		Full Range	15			
CMRR Common-Mode Rejection Ratio	$V_{CC} = 5\text{V to MAX,}$ $V_{IC} = V_{ICR\text{MIN}}$	25 $^\circ\text{C}$	65	80	dB	
K_{SVR} Supply Voltage Rejection Ratio ($\Delta V_{CC}/\Delta V_{IO}$)	$V_{CC} = 5\text{V to MAX}$	25 $^\circ\text{C}$	65	100	dB	
V_{O1}/V_{O2} Crosstalk Attenuation	$f = 1\text{ kHz to } 20\text{kHz}$	25 $^\circ\text{C}$		120	dB	
I_O Output Current	$V_{CC} = 15\text{V,}$ $V_{ID} = 1\text{V, } V_O = 0$	25 $^\circ\text{C}$	-20	-30	mA	
		Full Range	-10			
	$V_{CC} = 15\text{V,}$ $V_{ID} = -1\text{V, } V_O = 15\text{V}$	25 $^\circ\text{C}$	10	20		
		Full Range	5			
I_{OS} Short-Circuit Output Current	V_{CC} at 5V, GND at -5V, $V_O = 0$	25 $^\circ\text{C}$	± 40	± 60	mA	
I_{CC} Supply Current (Two Amplifiers)	$V_O = 2.5\text{V, No Load}$	Full Range		0.7	1.2	mA
	$V_{CC} = \text{MAX,}$ $V_O = 0.5V_{CC, No Load}$	Full Range		1	2	

* All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified <<MAX>> V_{CC} for testing purpose is 30V. Full range is 0 $^\circ\text{C}$ to 70 $^\circ\text{C}$.

TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)



TYPICAL APPLICATIONS

