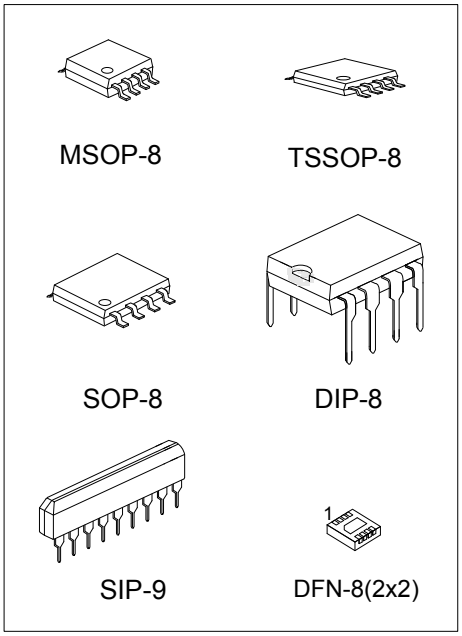
DUAL OPERATIONAL AMPLIFIER



■ DESCRIPTION

The UTC **LM358** consists of two independent high gain, internally frequency compensated operational amplifier. It can be operated from a single power supply and also split power supplies.

■ FEATURES

*Internally frequency compensated for unity gain.
*Wide power supply range 3V - 32V.
*Input common-mode voltage range include ground.
*Large DC voltage gain.

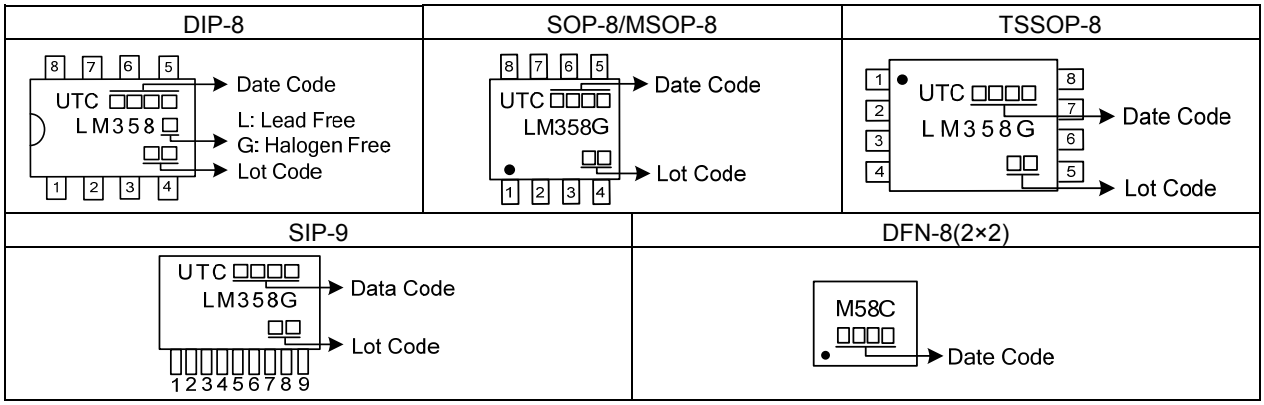
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen-Free		
LM358L-D08-T	LM358G-D08-T	DIP-8	Tube
-	LM358G-G09-T	SIP-9	Tube
-	LM358G-P08-R	TSSOP-8	Tape Reel
-	LM358G-S08-R	SOP-8	Tape Reel
-	LM358G-SM1-R	MSOP-8	Tape Reel
-	LM393G-K08-2020-R	DFN-8(2×2)	Tape Reel

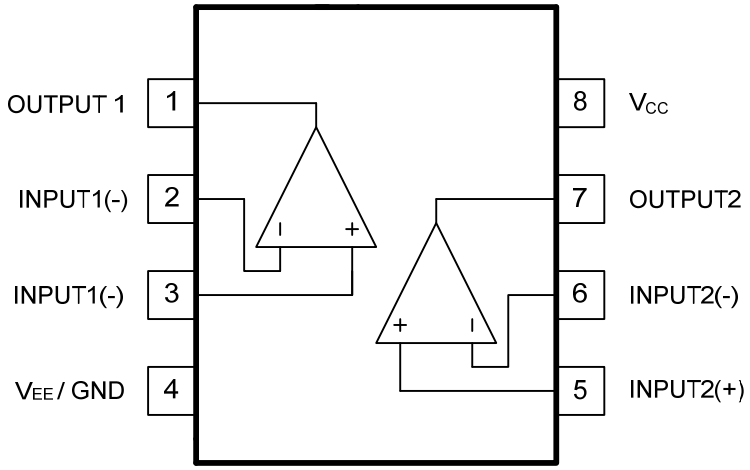
LM358L-D08-T
(1) Packing Type
(2) Package Type
(3) Green Package

(1) T: Tube, R: Tape Reel
(2) D08: DIP-8, G09: SIP-9, S08: SOP-8, P08: TSSOP-8, SM1: MSOP-8, K08-2020: DFN-8(2×2)
(3) L: Lead Free, G: Halogen Free and Lead Free

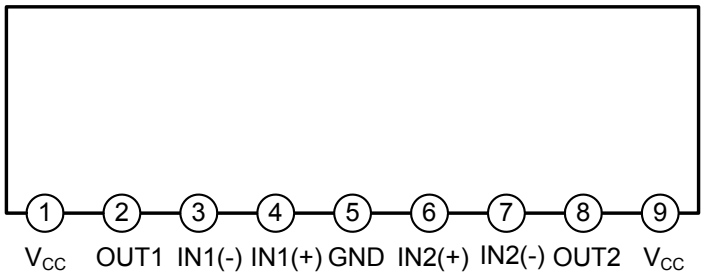
■ MARKING



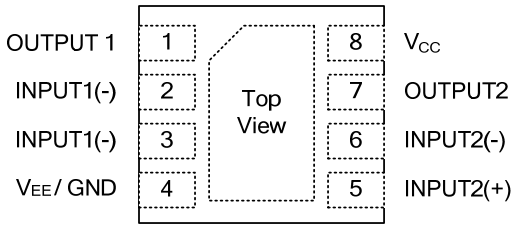
■ PIN DESCRIPTION



SOP-8/DIP-8/MSOP-8/TSSOP-8

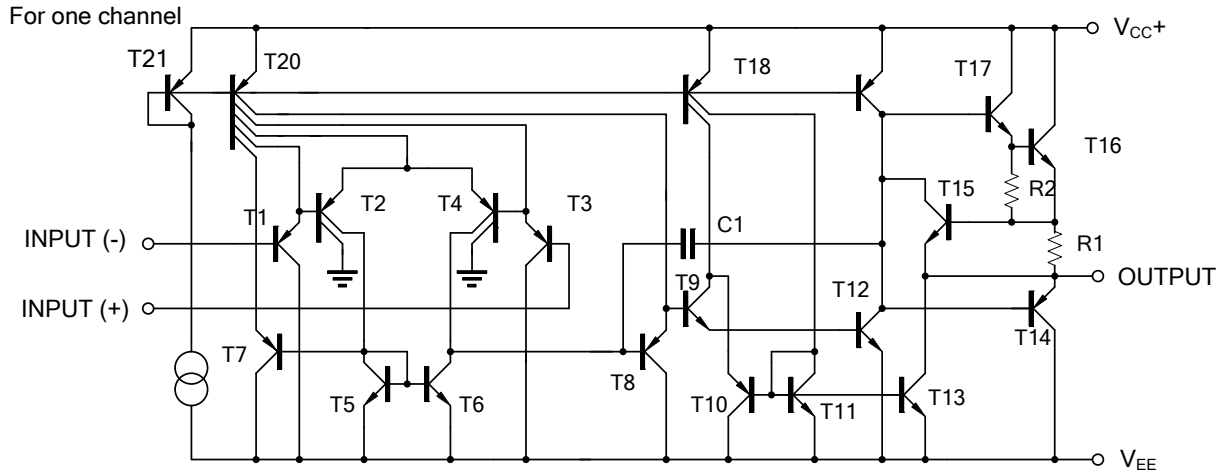


SIP-9



DFN-8(2×2)

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	±16 or 32	V
Differential Input Voltage		$V_{I(DIFF)}$	±32	V
Input Voltage		V_I	-0.3 ~ +32	V
Output Short to Ground			Continuous	
Power Dissipation	SIP-9	P_D	750	mW
	DIP-8		625	
	SOP-8		440	
	TSSOP-8		360	
	MSOP-8		300	
	DFN-8(2×2)		830	
Junction Temperature		T_J	+125	°C
Operating Temperature		T_{OPR}	-40 ~ +85	°C
Storage Temperature		T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS (V_{CC}=5.0V, V_{EE}=GND, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	$V_{I(OFF)}$	V_{CM}=0V toV_{CC}-1.5V $V_{O(P)}$=1.4V, R_S=0Ω		2.0	5.0	mV
Input Common Mode Voltage	$V_{I(CM)}$	V_{CC}=30V	0		V_{CC}-1.5	V
Differential Input Voltage	$V_{I(DIFF)}$				V_{CC}	V
Output Voltage Swing	V_{OH}	V_{CC}=30V, R_L=2KΩ	26			V
		V_{CC}=30V, R_L=10KΩ	27	28		V
	V_{OL}	V_{CC}=5V, R_L≧10KΩ		5	20	mV
Large Signal Voltage Gain	G_V	V_{CC}=15V, R_L≧2KΩ $V_{O(P)}$=1V ~ 11V	25	100		V/mV
Power Supply Current	I_{CC}	R_L=∝, V_{CC}=30V		0.8	2.0	mA
		R_L=∝, Full Temperature Range		0.5	1.2	mA
Input Offset Current	$I_{I(OFF)}$			5	50	nA
Input Bias Current	$I_{I(BIAS)}$			45	250	nA
Short Circuit Current to Ground	I_{SC}			40	70	mA
Output Current	I_{SOURCE}	V_I(+)=1V, V_I(-)=0V V_{CC}=15V, $V_{O(P)}$=2V	10	30		mA
	I_{SINK}	V_I(+)=0V, V_I(-)=1V V_{CC}=15V, $V_{O(P)}$=2V	10	15		mA
		V_I(+)=0V, V_I(-)=1V V_{CC}=15V, $V_{O(P)}$=200mV	12	100		μA
Common Mode Rejection Ratio	CMRR		65	80		dB
Power Supply Rejection Ratio	PSRR		65	100		dB
Channel Separation	CS	f=1KHZ ~ 20KHZ		120		dB

■ TYPICAL CHARACTERISTICS

Fig.1 Input Voltage Range

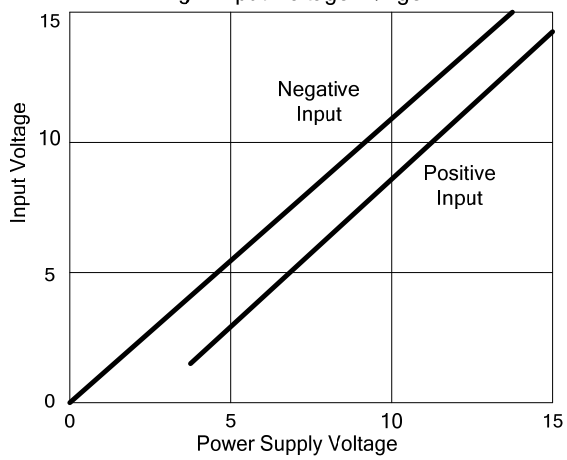


Fig.2 Input Current vs Temperature

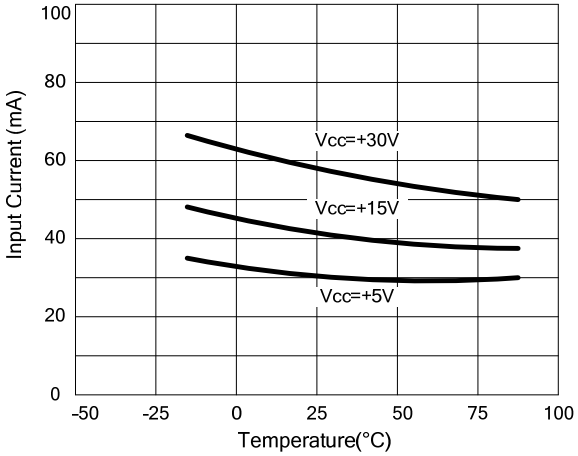


Fig.3 Supply Current vs Supply Voltage

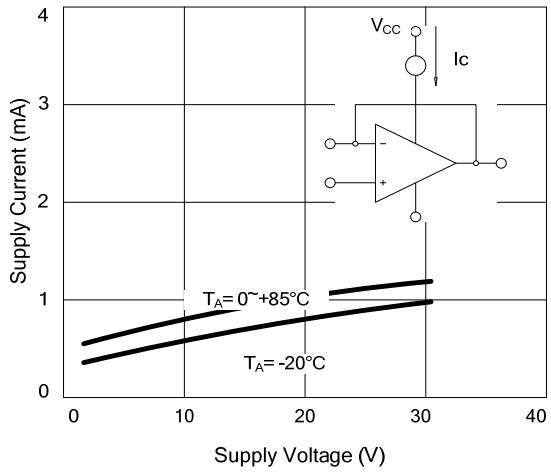


Fig. 4 Voltage Gain vs Supply Voltage

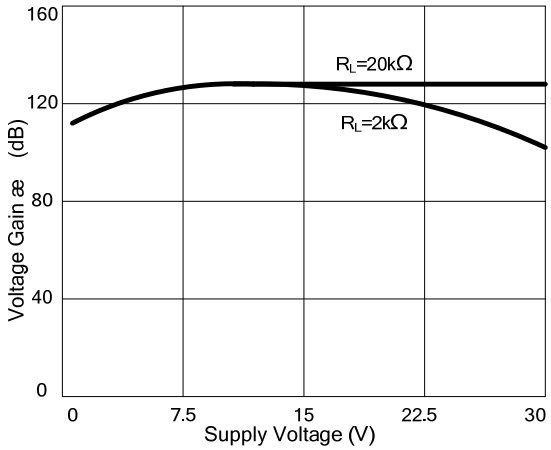


Fig. 5 Open Loop Gain vs Frequency

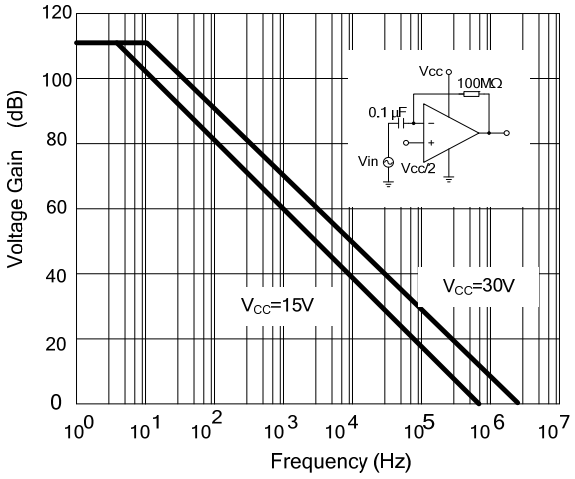
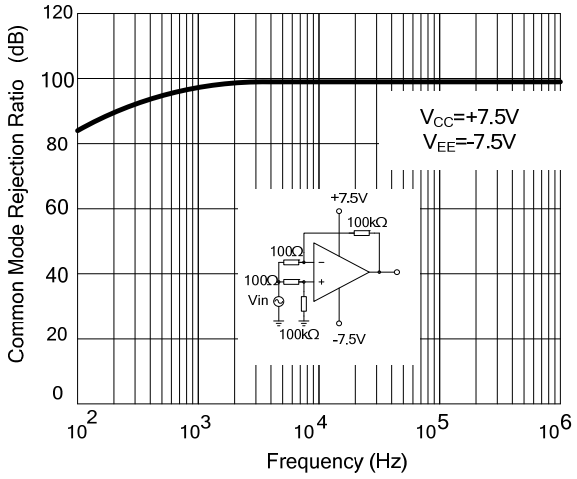


Fig. 6 Common Mode Rejection Ratio vs Frequency



■ TYPICAL CHARACTERISTICS(Cont.)

Fig. 7 Voltage Follower Pulse Response

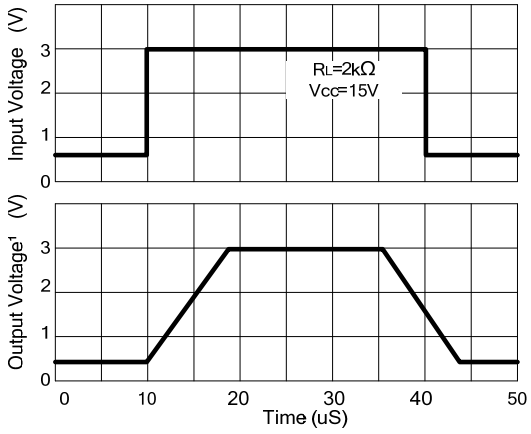


Fig. 8 Voltage Follower Response (Small Signal)

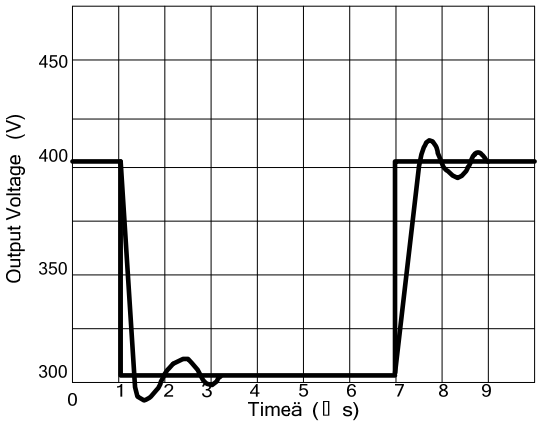


Fig. 9 Gain vs Large Signal Frequency

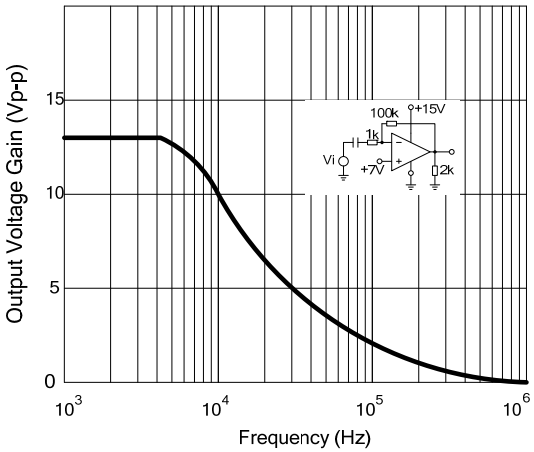


Fig. 10 Output Source Current vs Output Voltage

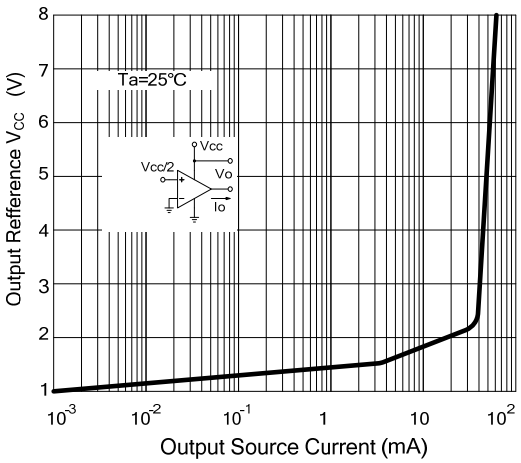


Fig. 11 Output Sink Current vs Output Voltage

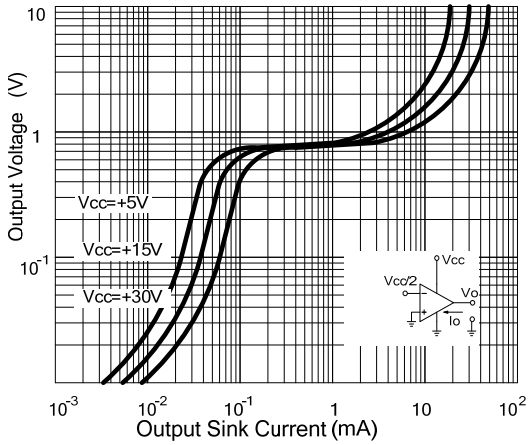


Fig.12 Current Limiting vs Temperature