

## General Description

The SDP358 consists of two independent, high gain and Internally frequency compensated operational amplifiers, it is specifically designed to operate from a single power supply. Operation from split power supply is also possible and the low power supply current drain is independent of the magnitude of the power supply voltages.

## Features

- Internally frequency compensation
- High voltage gain:100dB(Typical)
- Low input bias current:20nA(Typical)
- Low input offset voltage:2mV(Typical)
- Large output voltage swing:  $0V \sim (V_{CC}-1.5V)$
- Wide power supply voltage range:  
Single supply: 3V to 18V  
Dual supplies:  $\pm 1.5V$  to  $\pm 9V$
- Low supply current drain:0.25mA(Typical)

## Applications

- Battery Charger
- Cordless Telephone
- Switching Power Supply



Figure 1. Package Type

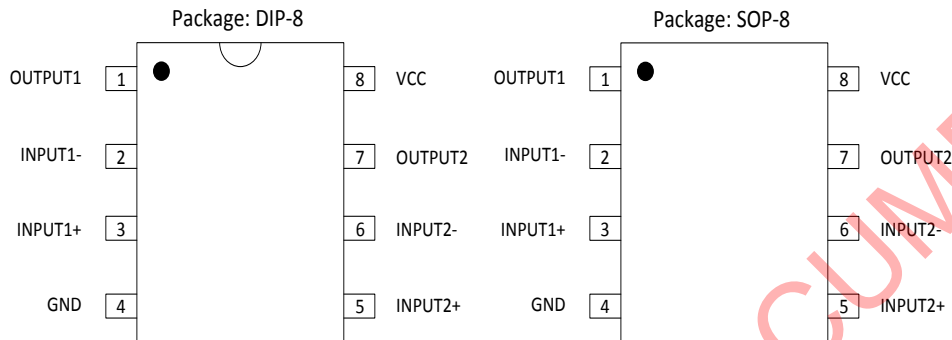
**Pin Configuration**


Figure 1. Pin Configuration

Pin Number	Pin Name	Function
1, 7	OUTPUT	Output of Amplifier
2, 6	INPUT-	Input- of Amplifier
3, 5	INPUT+	Input+ of Amplifier
4	GND	GND of Amplifier
8	VCC	VCC of Amplifier

Table1. Pin Description

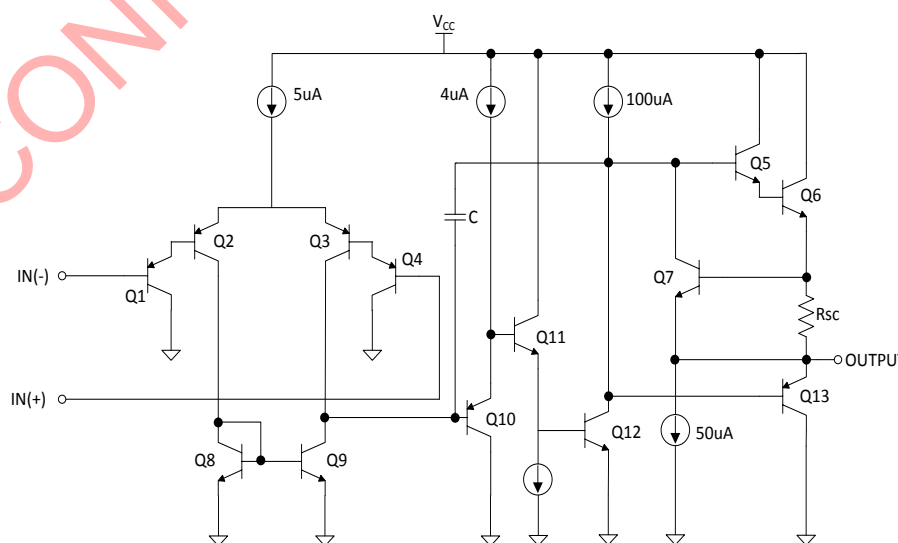
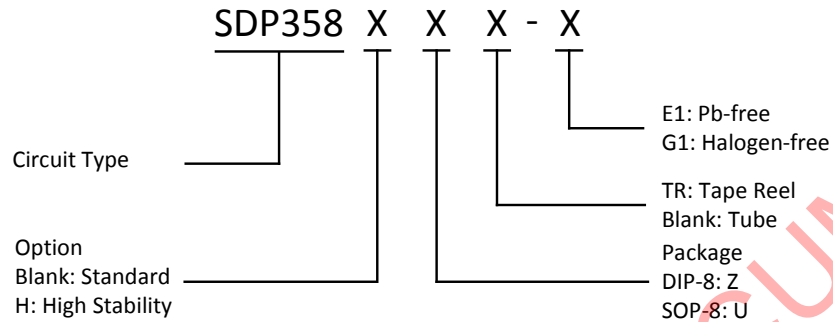
**Functional Block Diagram**


Figure 3. Functional Block Diagram

**Ordering Information**


Package	Temperature Range	Part Number		Marking ID		Packing Type
		Pb-free	Halogen-free	Pb-free	Halogen-free	
DIP-8	-40°C~85°C	SDP358Z-E1	SDP358Z-G1	SDP358	SDP358G	Tube
DIP-8		SDP358HZ-E1	SDP358HZ-G1	SDP358	SDP358G	Tube
SOP-8		SDP358HUTR-E1	SDP358HUTR-G1	SDP358	SDP358G	Tape Reel

**Absolute Maximum Ratings** (Note: Stresses greater than those listed under absolute maximum ratings may cause permanent damage to the device.)

Parameter	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	20	V
Differential Input Voltage	$V_{ID}$	20	V
Input Voltage	$V_{IN}$	-0.3 to 20	V
Input Current	$I_{IN}$	50	mA
Output Short Circuit to Ground	-	Continuous	
Power Dissipation (TA=25°C)	DIP-8	830	mW
	SOP-8	550	
Operating Junction Temperature	$T_J$	150	°C
Storage Temperature Range	$T_{STG}$	-65 to 150	°C
Latch-up test per JEDEC 78	-	200	mA

Table 2. Absolute Maximum Ratings

**Recommended Operating Conditions**

Parameter	Symbol	Min	Max	Unit
Power supply	$V_{CC}$	3	18	V
Operation temperature	$T_a$	-40	85	°C

Table 3 Recommended Operating Conditions

**Electrical Characteristics** ( $T_a=25^\circ\text{C}$ ,  $V_{CC}=5\text{V}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input Offset Voltage	$V_{IO}$	$V_O: 1.4\text{V}$ , $R_S: 0\Omega$		2	5	mV
Input Offset Current	$I_{IO}$	IIN+ or IIN-, $V_{CM}=0\text{V}$		5	50	nA
Input Bias Current	$I_B$	IIN+ or IIN-, $V_{CM}=0\text{V}$		20	200	nA
Large Signal Voltage Gain	$A_{vd}$	$R_L=2\text{k}\Omega$ , $V_{CC+}=15\text{V}$ , $V_O=1.4\text{V}\sim 11.4\text{V}$	85	100		dB
Power Supply Rejection Ration	PSRR	$V_{CC}=5\text{V}$ to $15\text{V}$	70	100		dB
Supply Current	$I_{CC1}$	$V_{CC}=5\text{V}$		0.25	0.5	mA
	$I_{CC2}$	$V_{CC}=15\text{V}$		0.3	0.6	mA
Input Common Mode Voltage Range	$V_{icm}$	$V_{CC}=15\text{V}$	0		$V_{CC}-1.5$	V
Common Mode Rejection Ratio	CMRR		70	90		dB
Output Source Current	$I_{source}$	$V_{id-}=1\text{V}$ , $V_{CC}=15\text{V}$ , $V_O=2\text{V}$	20	45		mA
Short Circuit to Ground	$I_{SC}$	$V_{CC}=15\text{V}$		45	60	mA
Output Sink Current	$I_{sink1}$	$V_{id+}=0\text{V}$ , $V_{id-}=1\text{V}$ , $V_{CC}=15\text{V}$ , $V_O=2\text{V}$	10	20		mA
	$I_{sink2}$	$V_{id+}=0\text{V}$ , $V_{id-}=1\text{V}$ , $V_{CC}=15\text{V}$ , $V_O=0.2\text{V}$	12	70		$\mu\text{A}$
Output High Voltage Swing	$V_{OH1}$	$V_{CC}=15\text{V}$ , $R_L=2\text{k}$	12			V
	$V_{OH2}$	$V_{CC}=15\text{V}$ , $R_L=10\text{k}$	12.5	13.5		V
Output Low Voltage Swing	$V_{OL}$	$V_{CC}=5\text{V}$ , $R_L=10\text{k}$		5	20	mV
Offset Voltage Temperature Coefficient	$DV_{io}$			7	30	$\mu\text{V}/^\circ\text{C}$
Channel Separation	CS	$f=1\text{kHz}$ to $20\text{kHz}$		-120		dB

Table 4. Electrical Characteristics

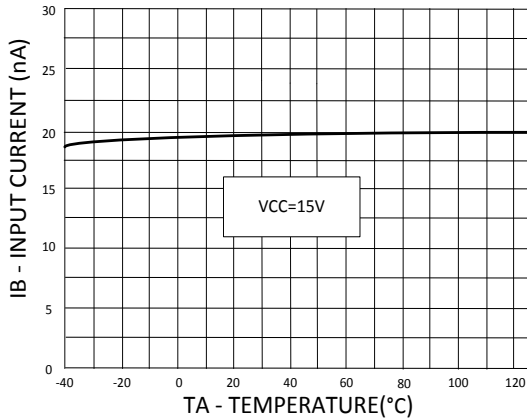
**Typical Performance Characteristics**


Figure 4. Input Current

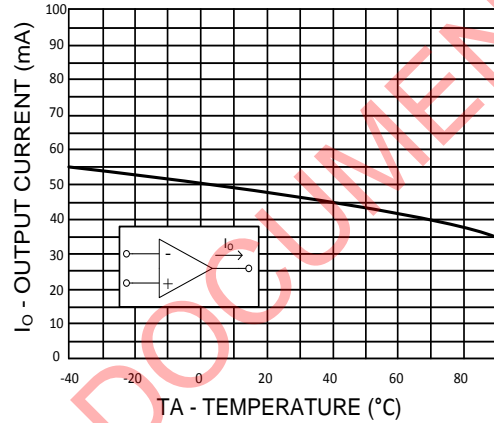


Figure 5. Current Limiting

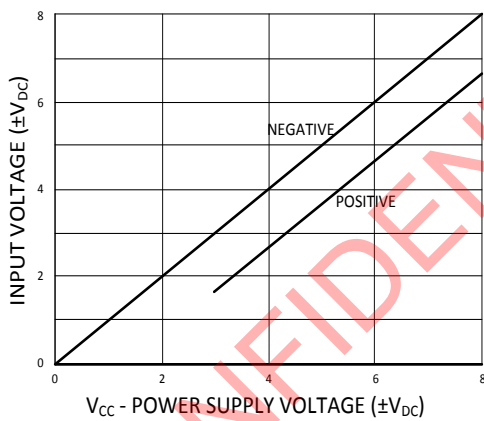


Figure 6. Input Voltage Range

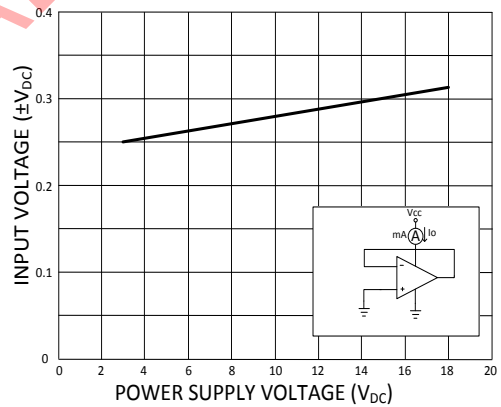


Figure 7. Supply Current

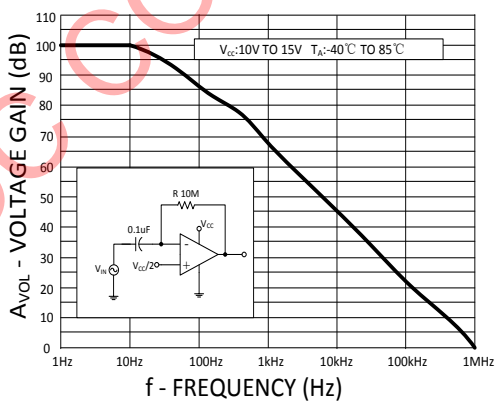


Figure 8. Open Loop Frequency Response

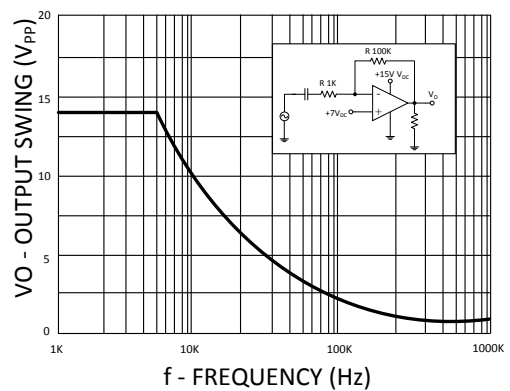


Figure 9. Large Signal Frequency Response

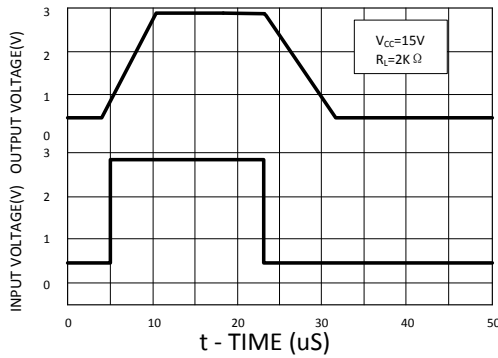


Figure 10. Voltage Follower Pulse Response

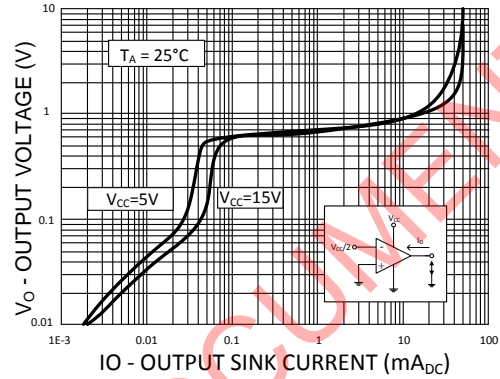


Figure 11. Output Characteristics Current Sinking

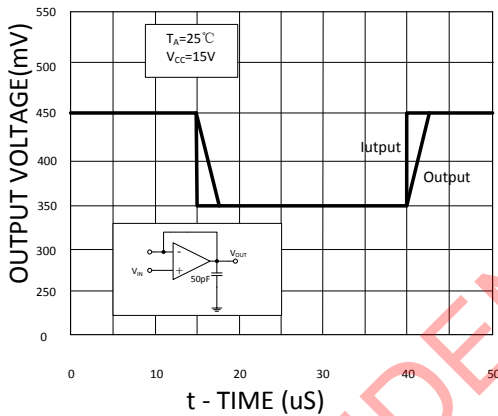


Figure 12. Voltage Follower Pulse Response (Small Signal)

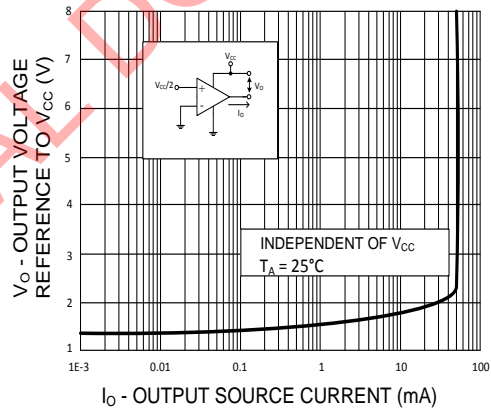


Figure 13. Output Characteristics Current Sourcing

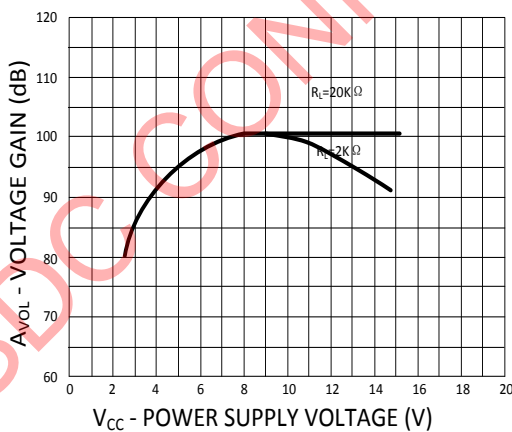


Figure 14. Output Characteristics Current Sourcing

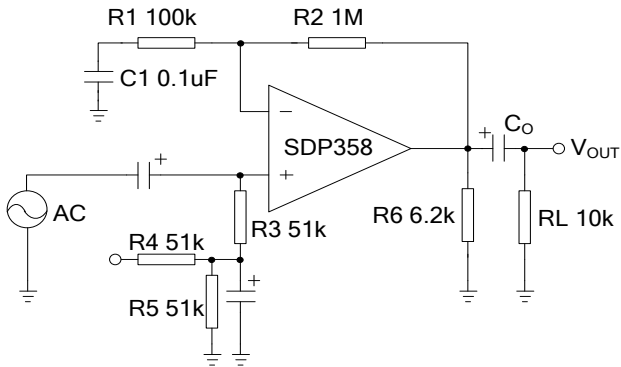
**Typical Applications**


Figure 15. AC Coupled Non-Inverting Amplifier

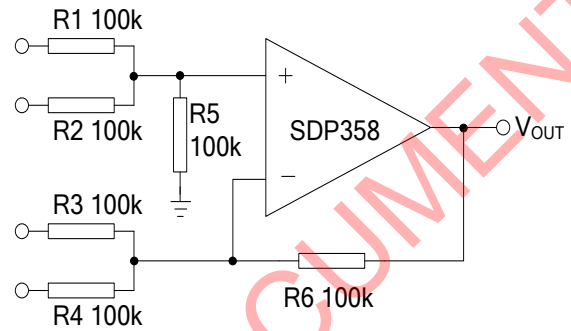


Figure 16. DC Summing Amplifier

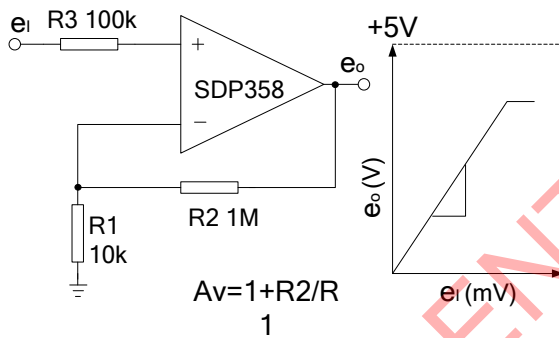


Figure 17. Synthetic DC Amplifier

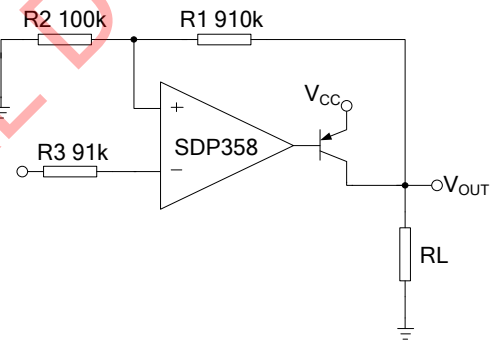


Figure 18. Power Amplifier

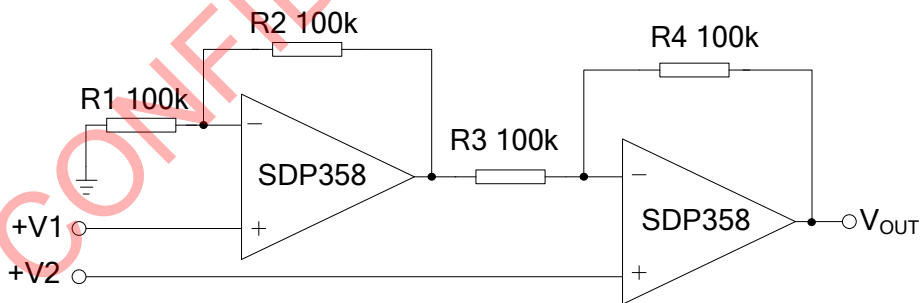
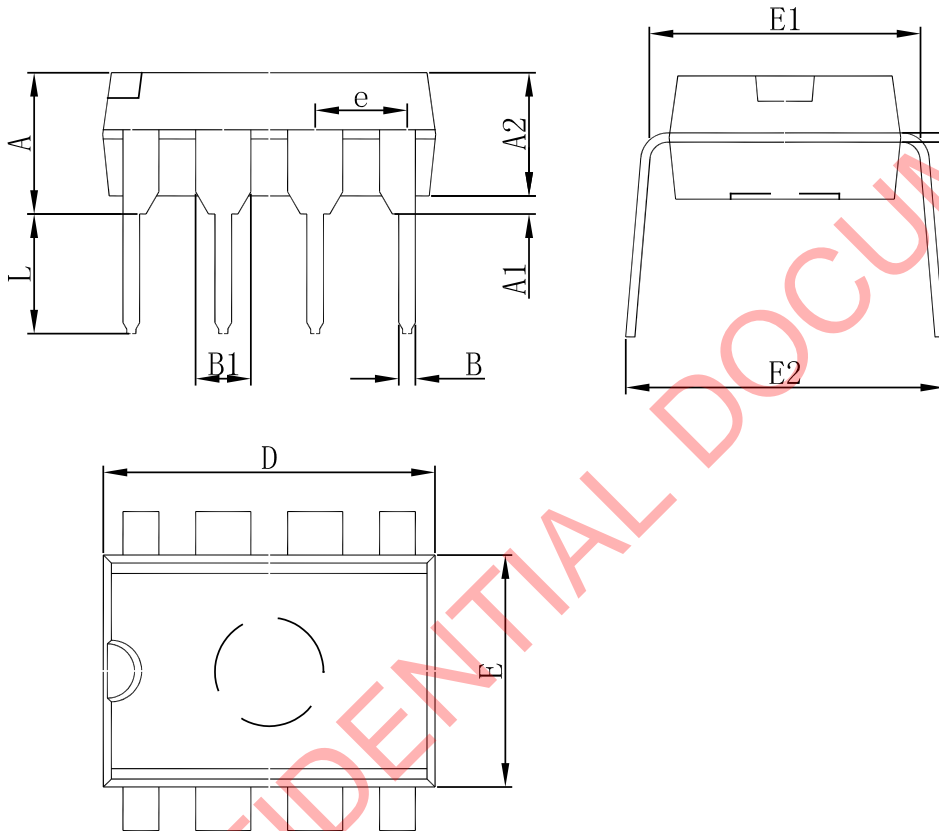
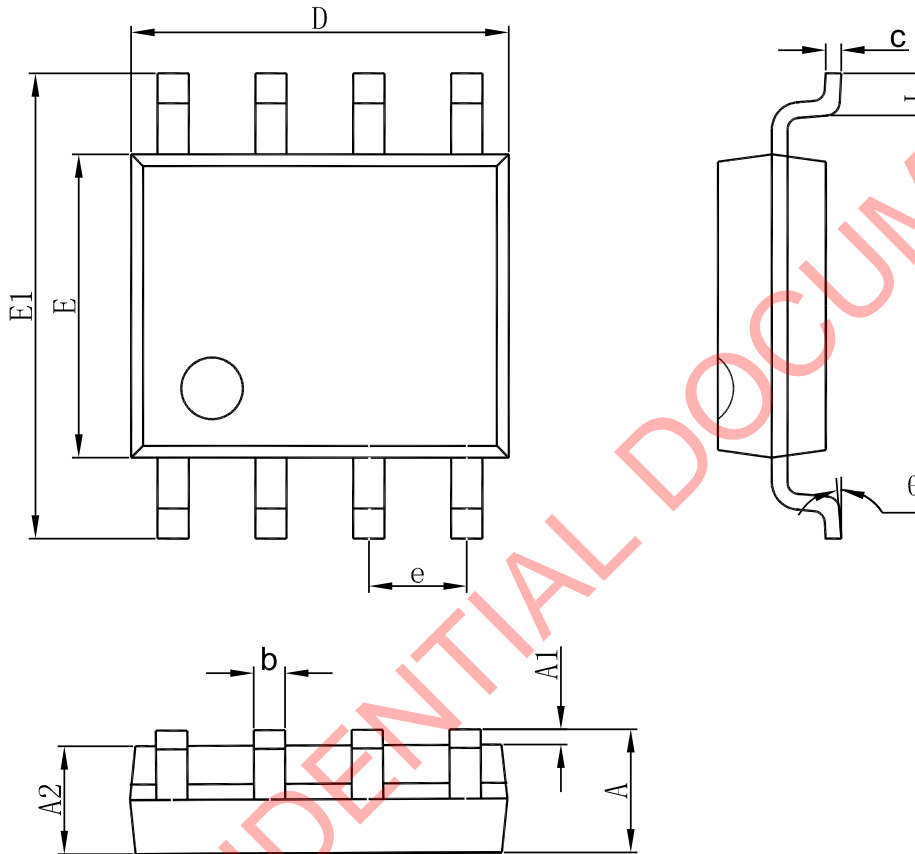


Figure 19. DC Differential Amplifier



**Mechanical Dimensions**
**DIP-8**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510	-	0.020	-
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524 (BSC)		0.060 (BSC)	
C	0.204	0.360	0.008	0.014
D	9.000	9.400	0.354	0.370
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540 (BSC)		0.100 (BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.000	0.331	0.354

**SOP-8**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



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