AT4558

Dual Operational Amplifier for Audio

Features

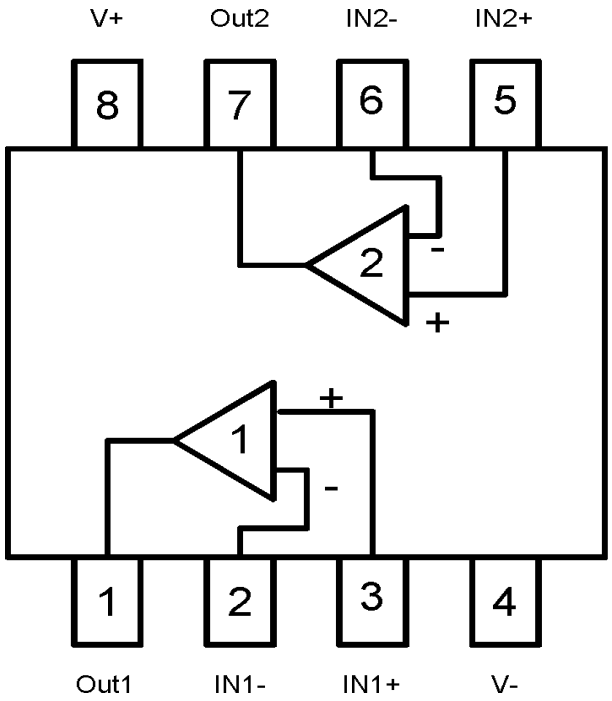
- Operating Voltage : ±1.5~±8V or 3~16V
- Large DC Voltage Gain: 100 dB
- High input Resistance :0.8MΩ
- Low Input Offset Voltage:0.7mV
- Bandwidth(unity gain):3MHz
- Bipolar Technology

Description

The AT4558 consists of two independent, high gain, internally compensated amplifiers which were designed specifically to operate from a single or split power supply.

Application areas include transducer amplifier, DC gain blocks and all the conventional operational amplifier circuits. The AT4558 can be directly operated +5V power supply, which is normally used in digital systems.

Block Diagram



2F, No.10, Prosperity RD. II, Science-Based Industrial Park, Hsinchu 300,Taiwan, R.O.C.
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Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	unit
Power supply voltage	V+/V-	±8	V
Diffeential Input Voltage	V_{ID}	±14	V
Input Voltage Range	V_{IN}	±7	V
Power Dissipation	P_D	500	mW
Operating temperature	T_{opr}	0~+85	°C
Storage temperature	T_{stg}	-55~+150	°C

*Stresses beyond those listed under " absolute maximum ratings" may cause permanent damage to the device. Exposure to absolute-maximum-rated conditions for extended peeriods may affect device reliability.

Recommended Operating Condition

Parameter	Symbol	Limits	unit
Power supply voltage	V+/V-	±1.5~±8(3~16)	V

Electrical characteristics (unless otherwise noted, Ta = 25°C, V+ = 6V, V- =-6V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input Offset Voltage	V_{IO}	-	0.7	6	mV	R_S≤10KΩ
Input Offset Current	I_{IO}	-	5	200	nA	
Input Bias Current	I_B	-	70	500	nA	
Input Resistance	R_{IN}	0.5	0.8	-	MΩ	
Input Voltage Range	Vin	-	-	±5	V	
Large Signal Voltage Gain	Av	86	100	-	dB	
Gain Bandwidth	GBW	-	3	-	MHz	
Phase Margin	θm	-	60	-	deg.	
Output Voltage Swing	Vsw	-	±5	-	V	R_L=10KΩ
DC common mode Rejection ratio	CMRR	-	98	-	dB	
Power supply rejection Ratio	PSRR	-	95	-	dB	R_S≤10KΩ, f_{in}=100Hz Vp-p=100mV
Slew rate	SR	0.9	1.0	-	V/μS	R_L=2KΩ CL=100pF
Input Noise Voltage	Vnoise	-	1.94	-	uVrms	RIAA, Rs=1KΩ, 30kHz, LPF
Output Resistance	Ro	-	75	-	Ω	
Output Short-Circuit Current	Ios	-	100	-	mA	*
Channel separation	α	-	100	-	dB	f=1KHz~20KHz
Rise Time	Tr	-	55	-	ns	
Operating Current	Icc	-	5.5	10	mA	

*1 Due to power disspation issue, it is not allowed for both channels to operate at this condition at the same moment.

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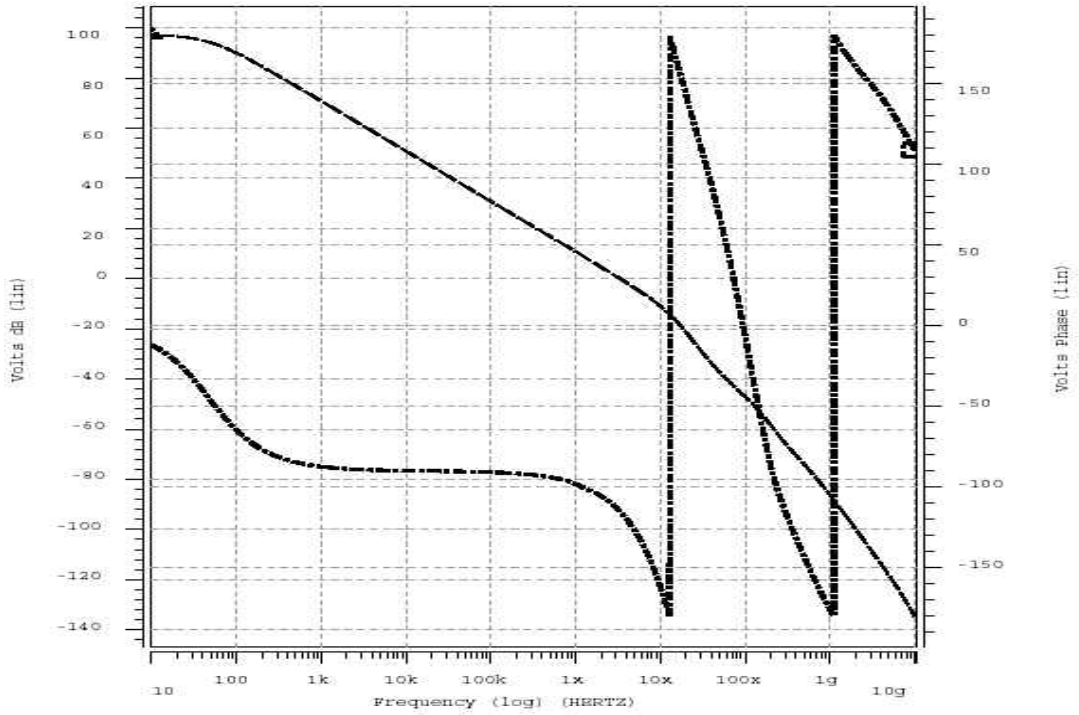
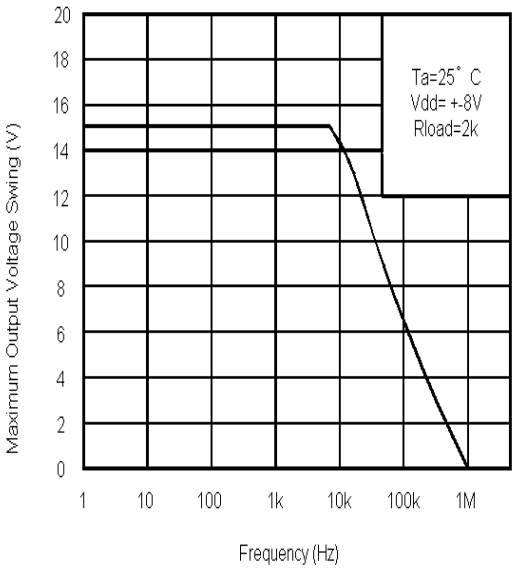
Typical Curve

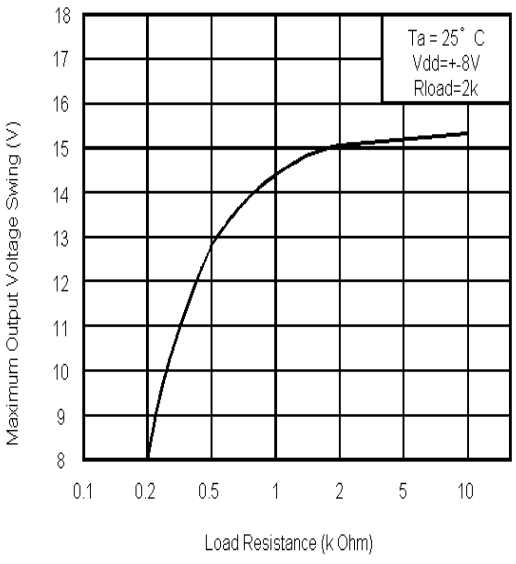
Open-Loop Gain Bandwidth and Phase Margin



Maximum Output Voltage Swing vs Frequency



Maximum Output Voltage Swing vs Load Resistance



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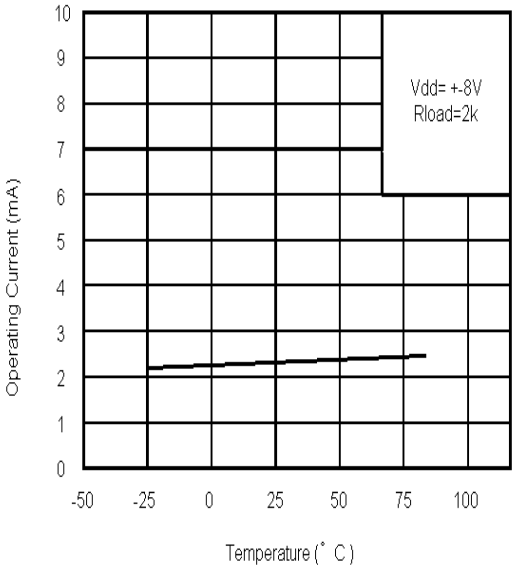
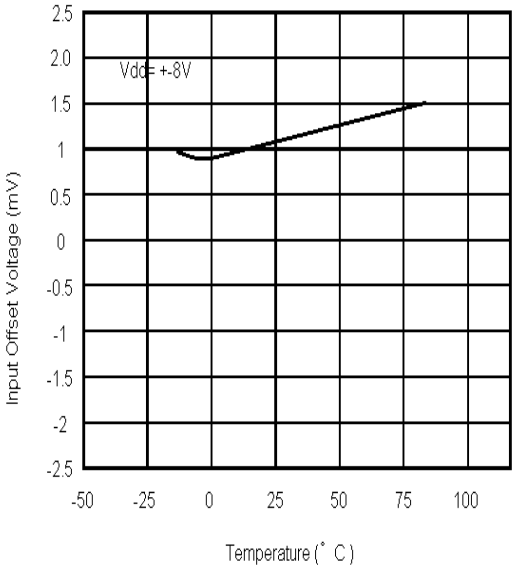
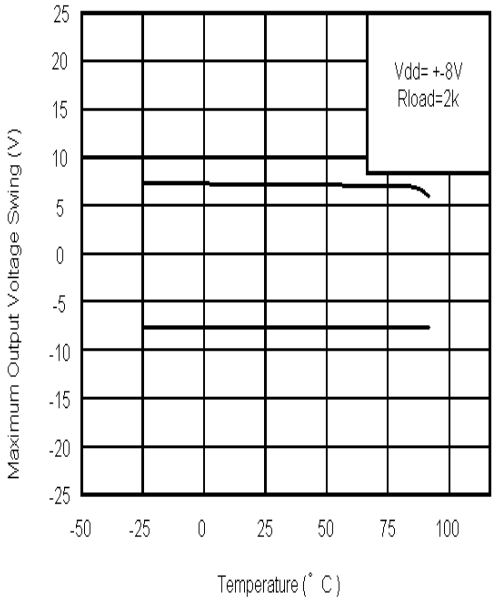
Operating Current vs Temperature



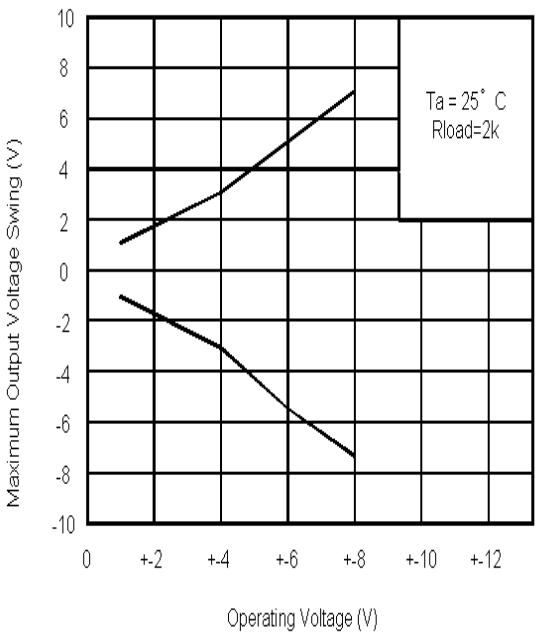
Input Offset Voltage vs Temperature



Maximum Output Voltage Swing vs Temperature



Maximum Output Voltage Swing vs Operating Voltage



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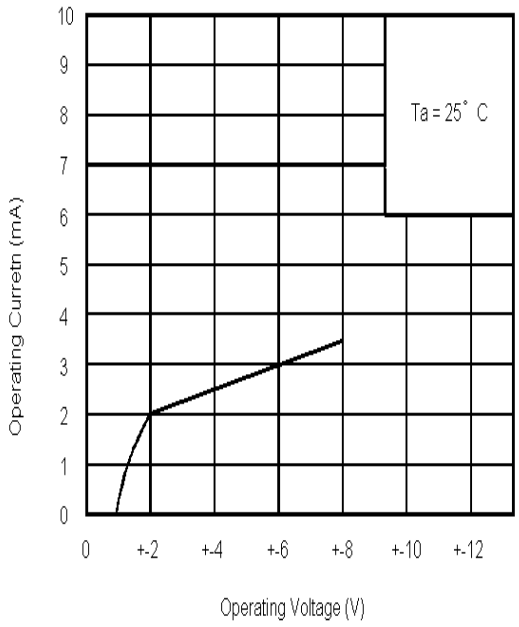
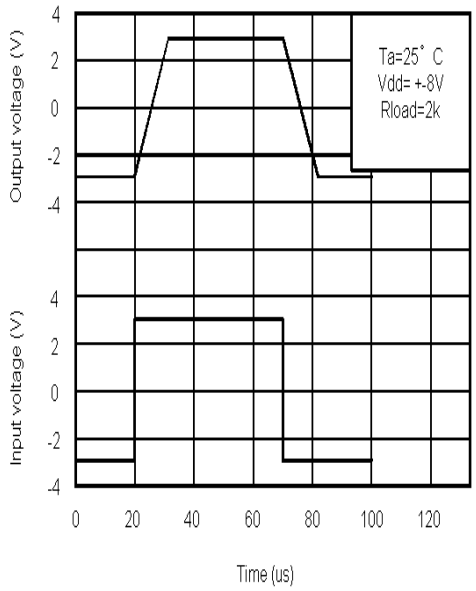
Operating Current vs Operating Voltage

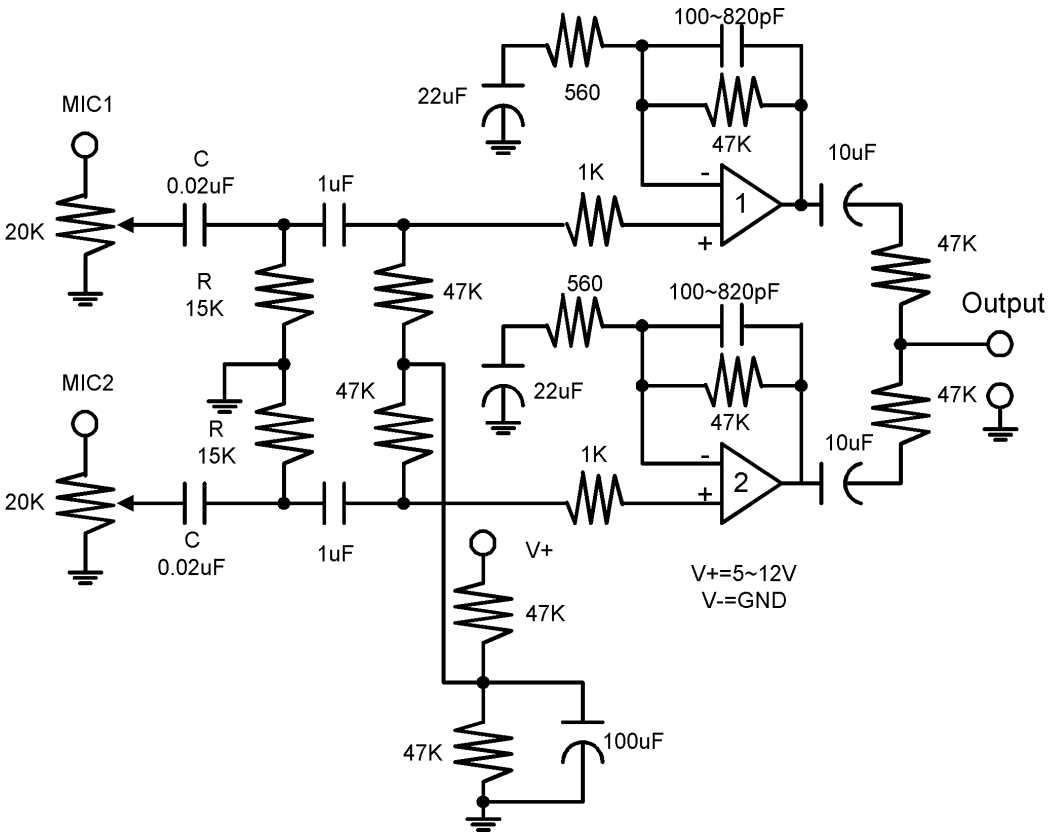


Voltage Follower pulse response

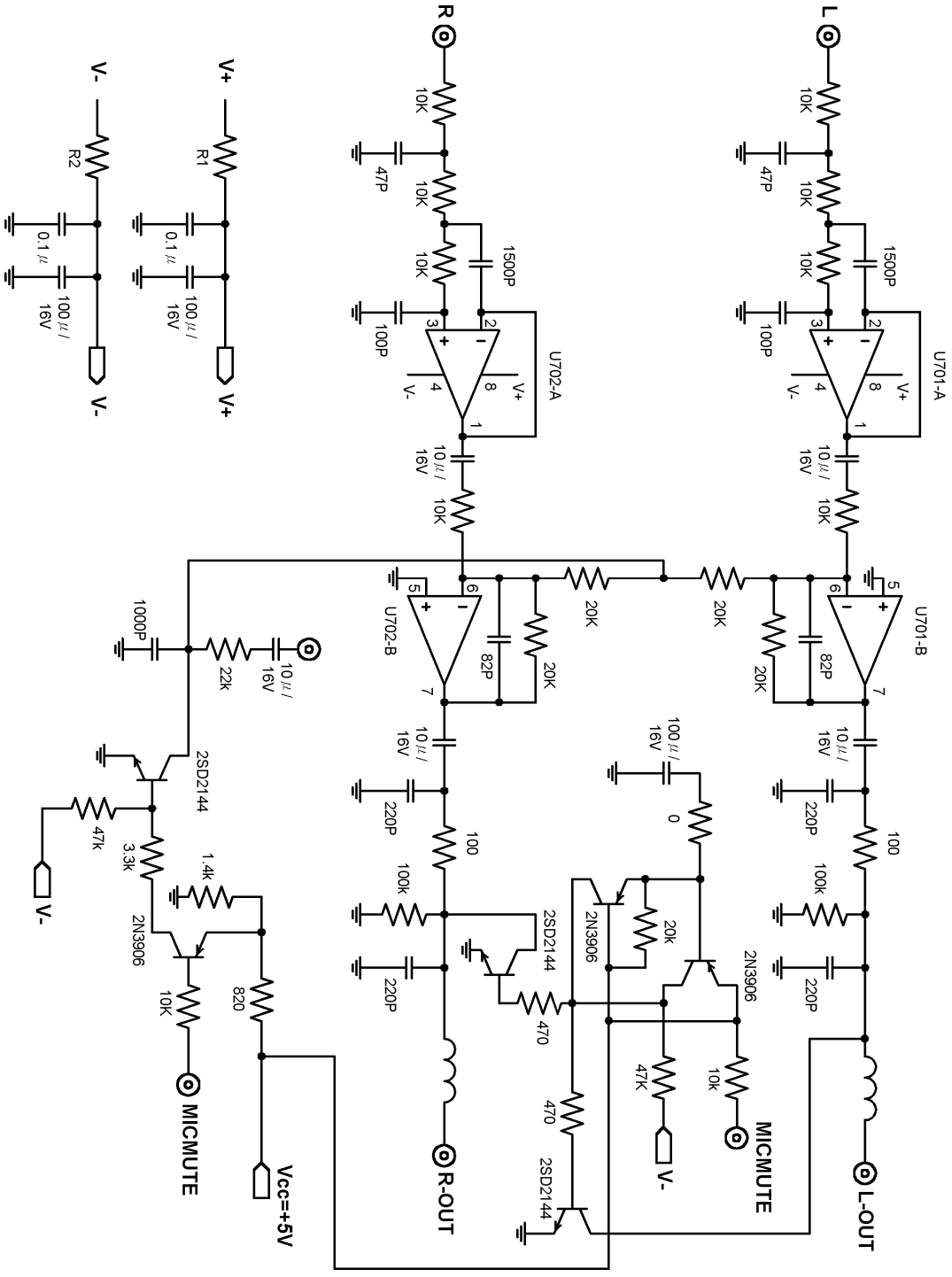


Application Circuit

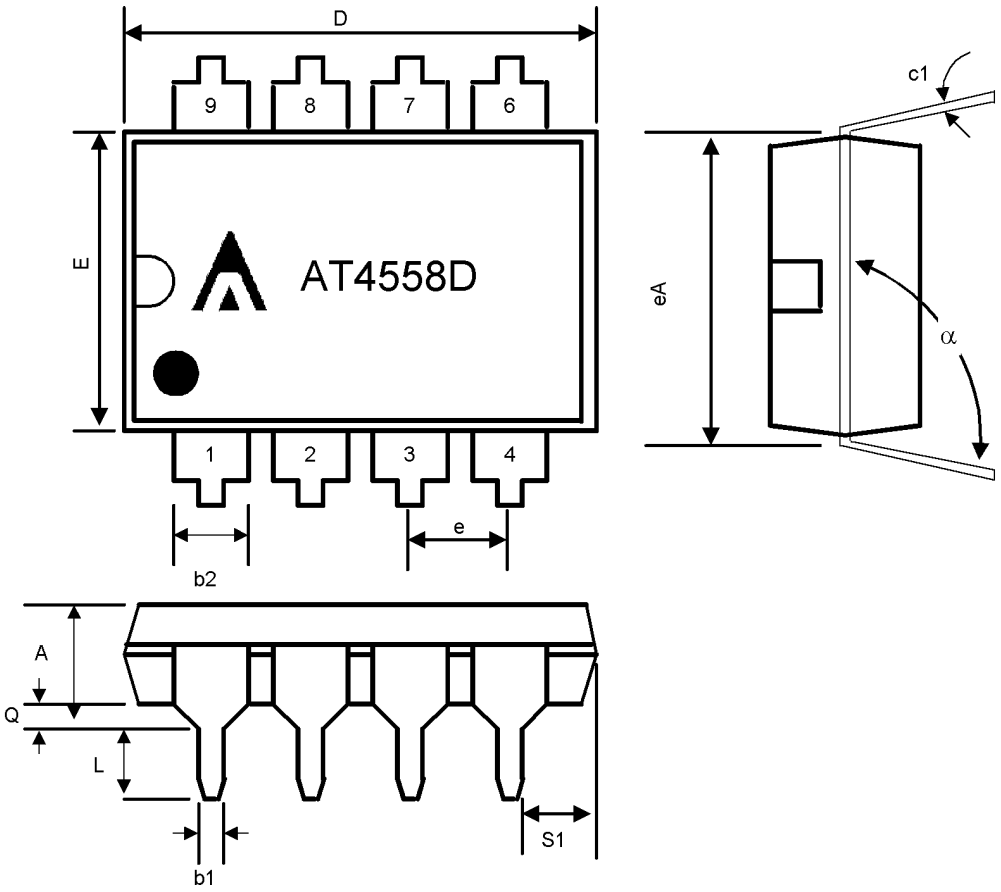
MIC Pre-Amp circuit for ECHO Application



- **Change the value of the R and C to adjust the cutoff frequency of the high pass filter as you like.**
- **The output is connected to the input point of the echo application circuit.**



Package Outlines : DIP-8



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	-	0.200	-	5.08	-
b1	0.014	0.023	0.36	0.58	-
b2	0.045	0.065	1.14	1.65	-
c1	0.008	0.015	0.20	0.38	-
D	0.355	0.400	9.02	10.16	-
E	0.220	0.310	5.59	7.87	-
e	0.100 BSC		2.54 BSC		-
eA	0.300 BSC		7.62 BSC		
L	0.125	0.200	3.18	5.08	-
Q	0.015	0.060	0.38	1.52	-
s1	0.005	-	0.13	-	-
α	90^0	105^0	90^0	105^0	-

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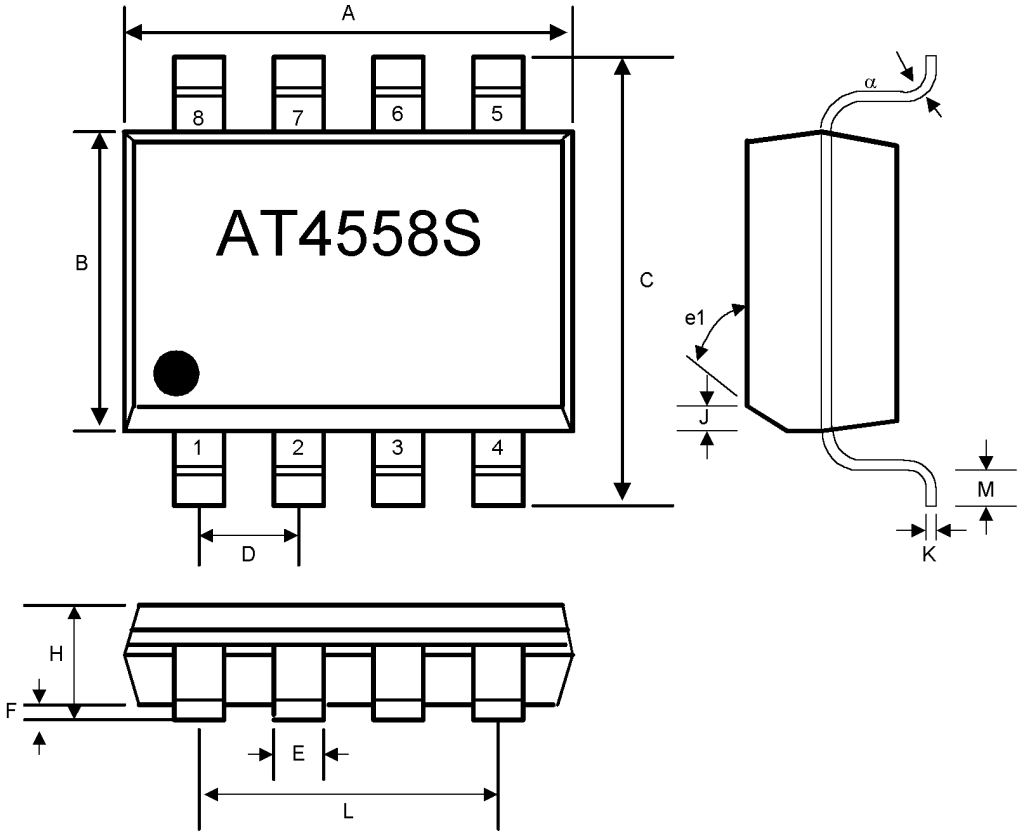
Small Outline SOP-8



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.188	0.197	4.80	5.00	-
B	0.149	0.158	3.80	4.00	-
C	0.228	0.244	5.80	6.20	-
D	0.050 BSC		1.27 BSC		-
E	0.013	0.020	0.33	0.51	-
F	0.004	0.010	0.10	0.25	-
H	0.053	0.069	1.35	1.75	-
J	0.011	0.019	0.28	0.48	
K	0.007	0.010	0.19	0.25	-
M	0.016	0.050	0.40	1.27	
L	0.150 REF		3.81 REF		-
e1	45^0		45^0		-
α	0^0	8^0	0^0	8^0	-

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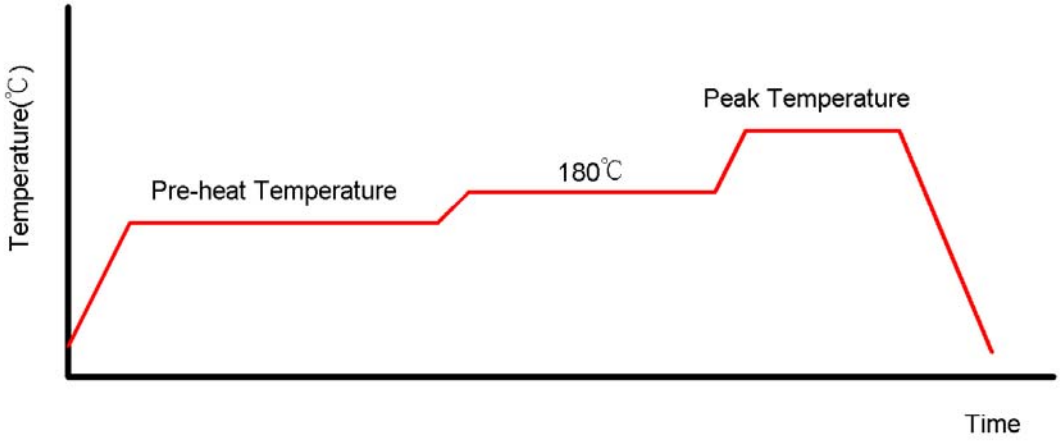
Reflow Condition (IR/Convection or VPR Reflow)

Reference JEDEC Standard J-STD-020A



Classification Reflow Profiles

	Convection or IR/Convction	VPR
Average Heating Rate(180°C to peak)	5°C/second max.	10°C/second max.
Preheat Temperature(125±20°C)	120 seconds max.	
Temperature maintained above 180°C	10~150 seconds	
Time within 5°C of actual Peak Temperature	10~20 seconds	60 seconds
Peak Temperature Range(Note 1)	219~225°C or 235~240°C	219~225°C or 235~240°C
Cooling Rate	6°C /second max.	10°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	

*1 The maximum peak temperatures for IR and VP reflow are depending on package dimensions.

Package Reflow Conditions

Pkg. Thickness ≥2.5mm and all bags	Pkg. Thickness <2.5mm and Pkg. Volume ≥350 mm^3	Pkg. Thickness <2.5mm and Pkg. Volume <350 mm^3
Convection 219~225°C		Convection 235~240°C
VPR 219~225°C		VPR 235~240°C
IR/Convection 219~225°C		IR/Convection 235~240°C