

MAV358

DUAL LOW VOLTAGE RAIL-TO-RAIL OUTPUT OPERATIONAL AMPLIFIER



CBC Microelectronics
<http://www.cbey.net>

General Description

The MAV358 is dual low voltage (2.7-5.5V) operational amplifiers which have rail-to-rail output swing capability. The input common-mode voltage range includes ground. The chip exhibits excellent speed-power ratio, achieving 1MHz of bandwidth and 1V/ μ s of slew rate with low supply current.

The MAV358 is built with BiCMOS process. It has bipolar input and output stages for improved noise performance, low input offset voltage and higher output current drive.



MSOP-8

SOP-8

Figure 1: Package Types of MAV358

Features

(For $V_{CC}=5V$ and $V_{EE}=0V$, Typical unless Otherwise Noted)

- Guaranteed 2.7V to 5.5V Performance.
- No Crossover Distortion
- Gain-Bandwidth Product 1MHz
- Industrial Temperature Range: $-40^{\circ}C$ to $+85^{\circ}C$
- Low Supply Current: 130 μ A
- Rail-to-Rail Output Swing under 10k Ω Load:
 - V_{OH} up to $V_{CC} - 10mV$
 - V_{OL} near to $V_{EE} + 65mV$
- V_{CM} : $-0.2V$ to $V_{CC} - 0.8V$

Applications

- Active Filters
- Low Power, Low Voltage Applications
- General Purpose Portable Devices
- Cellular Phone, Cordless Phone
- Battery-Powered Systems

Pin Configuration

M/L Package
(SOP-8/MSOP-8)

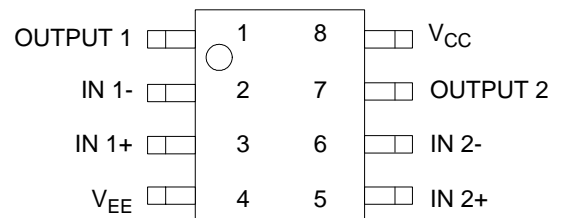
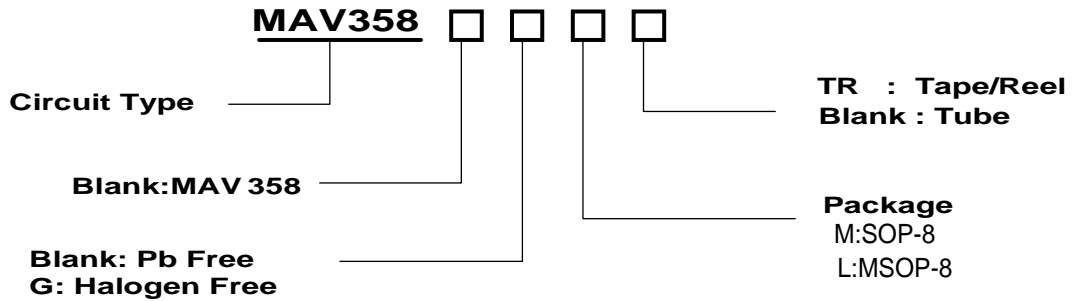


Figure 2: Pin Configuration of MAV358 (TopView)

MAV358

Ordering Information



Package	Condition	Part Number		Marking ID		Packing Type
		Pb-free	Halogen-Free	Pb-free	Halogen-Free	
SOP-8	3.0mV	MAV358M	MAV358GM	MA358M	MA358GM	Tube
	3.0mV	MAV358MTR	MAV358GMTR	MA358M	MA358GM	Tape&Reel
MSOP-8	3.0mV	MAV358L	MAV358GL	MA358L	MA358GL	Tube
	3.0mV	MAV358LTR	MAV358GLTR	MA358L	MA358GL	Tape&Reel

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	6	V
Operation Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10 Seconds)	T_{LEAD}	260	°C
ESD (Machine Model)		200	V
ESD (Human Body Model)		2000	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

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Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	2.7	5.5	V
Ambient Operating Temperature Range	T_A	-40	85	°C

2.7V Electrical Characteristics

All limits are guaranteed for $T_A=25^{\circ}\text{C}$, $V_{CC}=2.7\text{V}$, $V_{EE}=0\text{V}$, $V_{CM}=1.0\text{V}$, $V_O=V_{CC}/2$ and $R_L>1\text{M}\Omega$, limits in **bold types** are guaranteed for $T_A=-40$ to 85°C , unless otherwise specified. (Note 2)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}			1.7	7	mV
					9	
Input Bias Current	I_B			11	250	nA
					500	
Input Offset Current	I_{IO}			5	50	nA
					150	
Input Common Mode Voltage Range	V_{CM}	for $\text{CMRR} \geq 50\text{dB}$	-0.2		1.9	V
Supply Current	I_{CC}	$V_O=V_{CC}/2$, $A_{VCL}=1$, no load		80	170	μA
					270	
Common Mode Rejection Ratio	CMRR	$0 \leq V_{CM} \leq 1.7\text{V}$	50	65		dB
Power Supply Rejection Ratio	PSRR	$2.7\text{V} \leq V_{CC} \leq 5\text{V}$, $V_O=1\text{V}$,	50	60		dB
Output Short Circuit Current	I_{SOURCE}	$V_O=0\text{V}$	5	20		mA
	I_{SINK}	$V_O=2.7\text{V}$	10	30		mA
Output Voltage Swing	V_{OH}	$R_L=10\text{k}\Omega$ to 1.35V	2.60	2.69		V
	V_{OL}			60	180	mV
Gain Bandwidth Product	GBWP	$C_L=200\text{pF}$		1		MHz
Phase Margin	ϕ_M			60		Deg
Gain Margin	G_M			10		dB

Note 2: Limits over the full temperature are guaranteed by design, but not tested in production.

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5V Electrical Characteristics

All limits are guaranteed for $T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}$, $V_{EE}=0\text{V}$, $V_{CM}=2.0\text{V}$, $V_O=V_{CC}/2$ and $R_L>1\text{M}\Omega$, limits in **bold types** are guaranteed for $T_A=-40$ to 85°C , unless otherwise specified. (Note 2)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}			1.7	7	mV
					9	
Input Bias Current	I_B			11	250	nA
					500	
Input Offset Current	I_{IO}			5	50	nA
					150	
Input Common Mode Voltage Range	V_{CM}	for $\text{CMRR}\geq 50\text{dB}$	-0.2		4.2	V
Supply Current	I_{CC}	$V_O=V_{CC}/2$, $A_{VCL}=1$, no load		130	250	μA
					350	
Large Signal Voltage Gain	G_V	$R_L=2\text{k}\Omega$	84	100		dB
			80			
Common Mode Rejection Ratio	CMRR	$0\leq V_{CM}\leq 4\text{V}$	50	65		dB
Power Supply Rejection Ratio	PSRR	$2.7\text{V}\leq V_{CC}\leq 5\text{V}$, $V_O=1\text{V}$, $V_{CM}=1\text{V}$	50	60		dB
Output Short Circuit Current	I_{SOURCE}	$V_O=0\text{V}$	5	60		mA
	I_{SINK}	$V_O=5\text{V}$	10	160		mA
Output Voltage Swing	V_{OH}	$R_L=2\text{k}\Omega$ to 2.5V	4.7	4.96		V
			4.6			
		$R_L=10\text{k}\Omega$ to 2.5V	4.9	4.99		
			4.8			
	V_{OL}	$R_L=2\text{k}\Omega$ to 2.5V		120	300	mV
					400	
$R_L=10\text{k}\Omega$ to 2.5V			65	180		
				280		
Slew Rate	SR		1		V/ μS	
Gain Bandwidth Product	GBWP	$C_L=200\text{pF}$		1		MHz
Phase Margin	ϕ_M			60		Deg
Gain Margin	G_M			10		dB

Note 2: Limits over the full temperature are guaranteed by design, but not tested in production.

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Functional Block Diagram

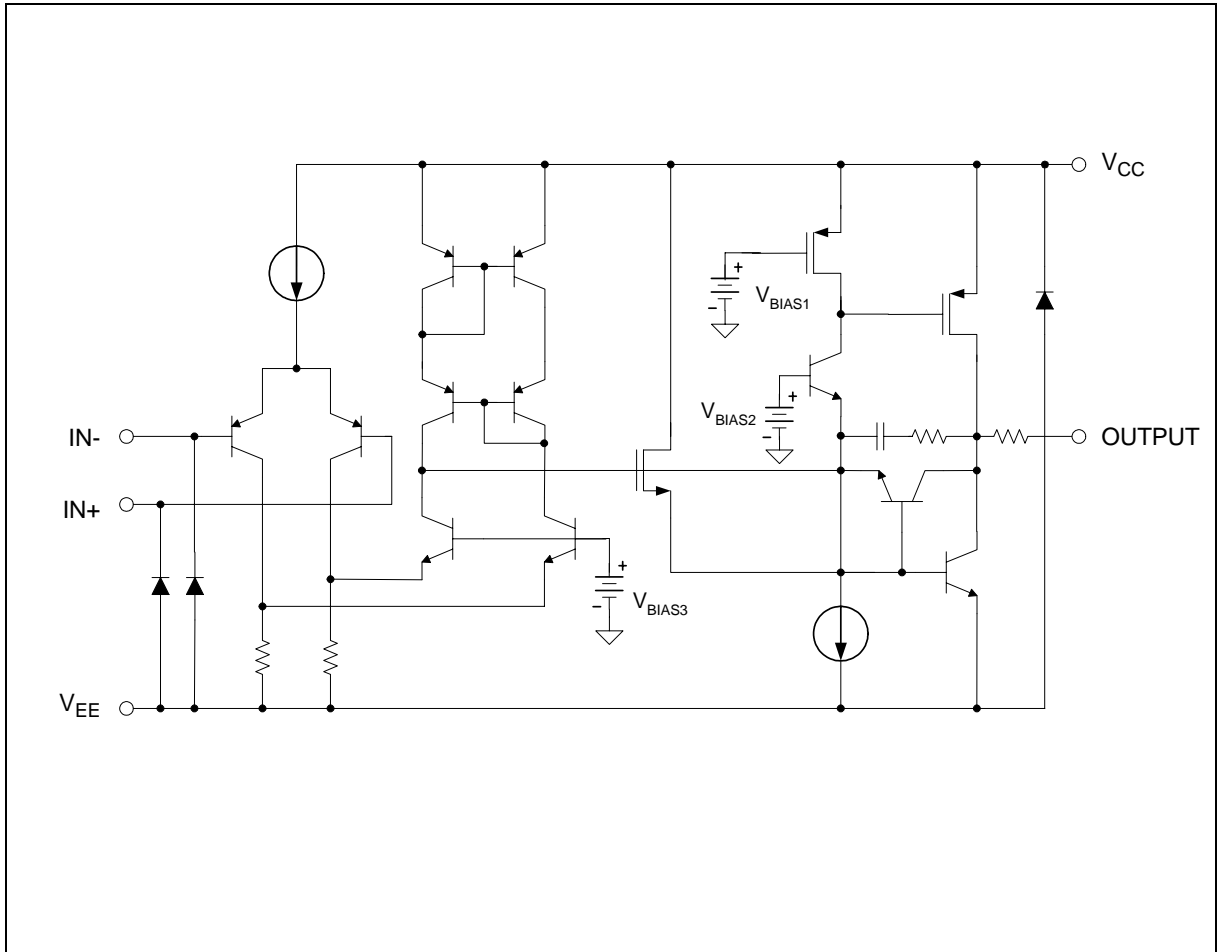


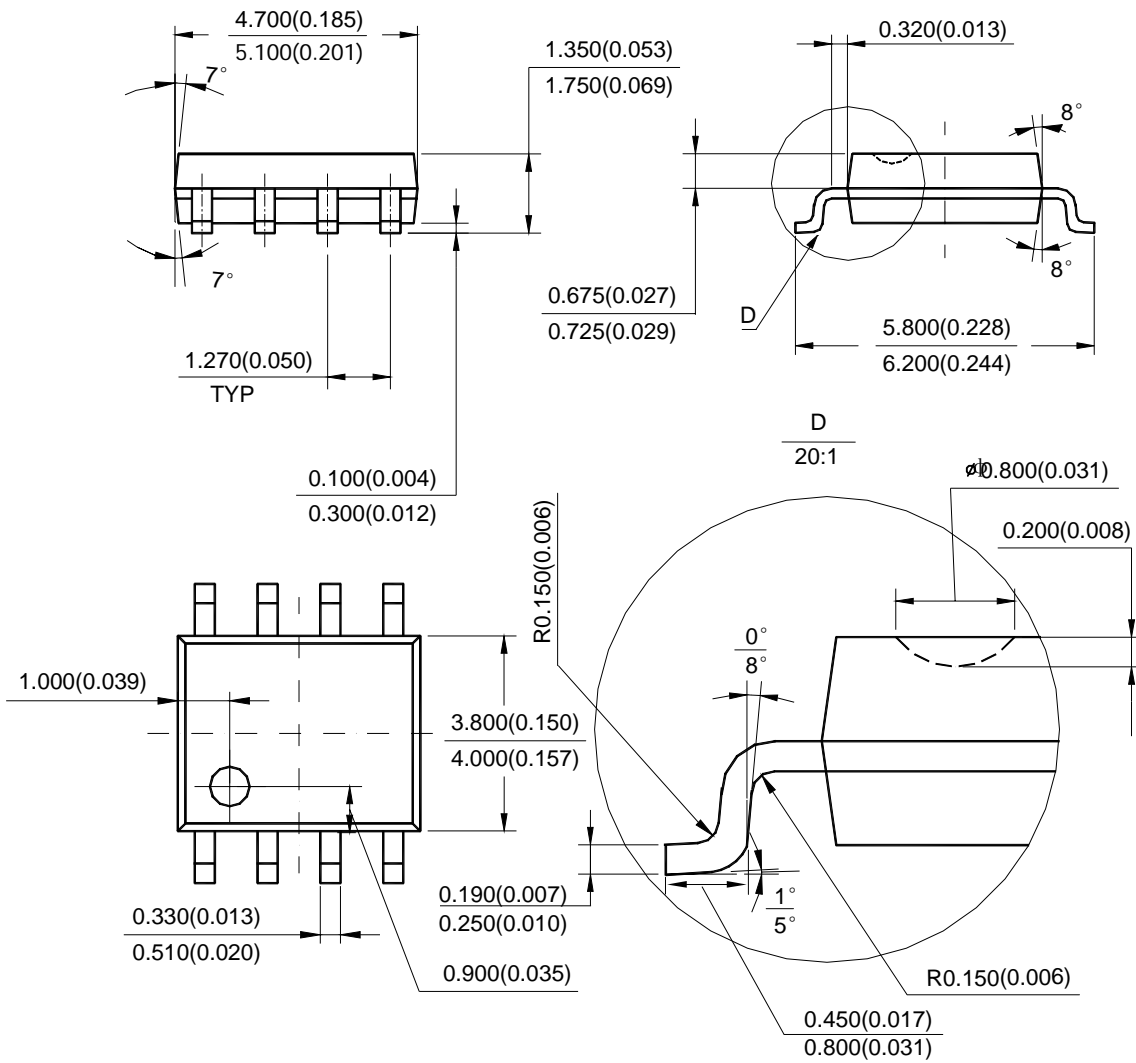
Figure 3 : Functional Block Diagram of MAV358 (Each Amplifier)

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Mechanical Dimensions

SOP-8

Unit: mm(inch)

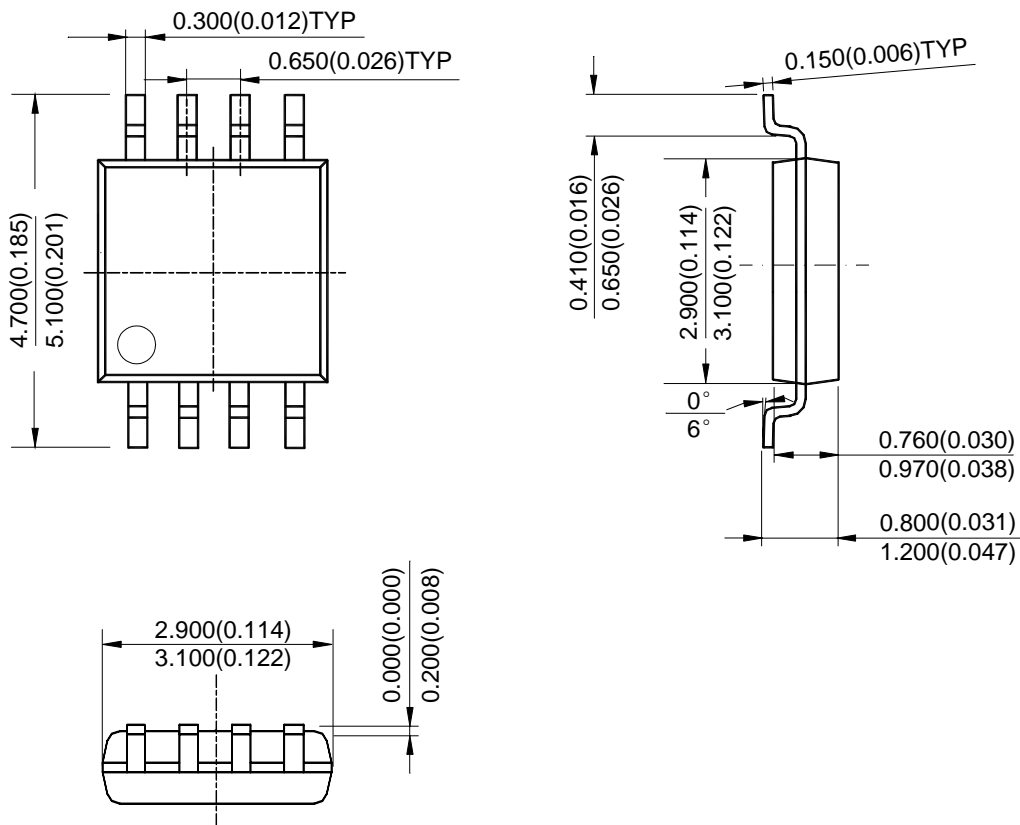


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Mechanical Dimensions (Cont'd)

MSOP-8

Unit: mm(inch)



Note: Eject hole, oriented hole and mold mark is optional.

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