AMC DOC. #: AMC358_A
November 2001

ADD MICROTECH CORP.

AMC358

DUAL OPERATIONAL AMPLIFIERS

DESCRIPTION

The AMC358 series is designed containing two independent, high gain operational amplifiers. It can operate from a single power supply over a wide range from 5V to 30V.

Not only it can be used in all conventional operation amplifiers circuits in single power supply systems, the AMC358 series is also ideal for transducer amplifiers, DC gain blocks and etc. In addition, without the need of ±15V dual power supply voltages, the AMC358 series can be directly operated from the 5V power supply voltage which is also used for digital systems.

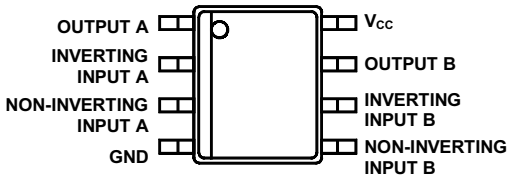
FEATURES

- **Large DC voltage gain (typical 100 dB)**
- **Wide bandwidth (typical 1MHz)**
- **Operated by either single supply or dual supplies**
- **High accuracy output voltage**
- **Low input offset voltage (typical 2mV)**
- Large output voltage swing: 0V to VCC – 1.5V
- Low dropout voltage
- Input common-mode voltage range includes ground
- Low supply current drain
- Pin assignment identical to earlier LM358 series.

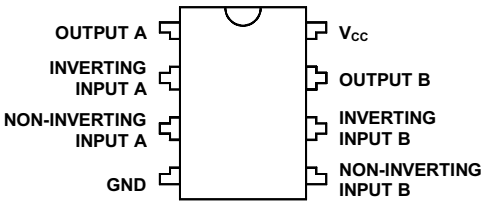
APPLICATIONS

- General Purpose Amplifiers
- Pulse Generator
- Square Wave Oscillator
- Low Drift Peak Detector
- Voltage Controlled Oscillator (VCO)
- Filters

PACKAGE PIN OUT



8-Pin Plastic S.O.I.C.
(Top View)



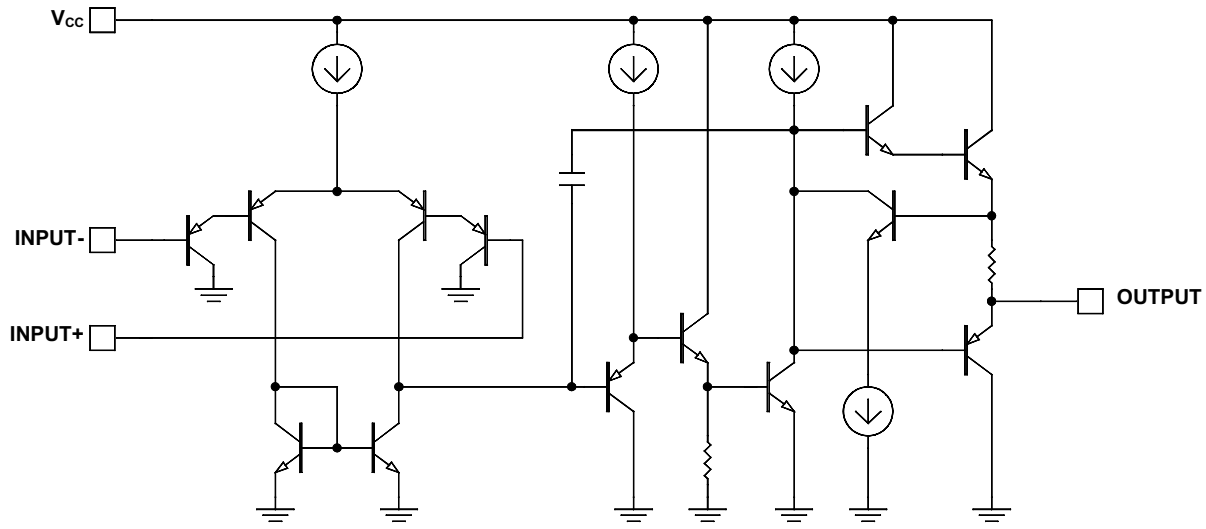
8-Pin Plastic DIP
(Top View)

ORDER INFORMATION

T_A (°C)	**M** Plastic DIP 8-pin	**DM** Plastic SOIC 8-pin
0 to 70	**AMC358M**	**AMC358DM**

Note: All surface-mount packages are available in Tape & Reel. Append the letter "T" to part number (i.e. AMC358DMT).

SCHEMATIC DIAGRAM (each amplifier)



ABSOLUTE MAXIMUM RATINGS (Note 1)	
Input Supply Voltage	32V
Input Voltage	-0.3V to 30V
Differential Input Voltage	32V
Operating Junction Temperature Range, T_J	0^oC to 150^oC
Storage Temperature Range	-65^oC to 150^oC
Lead Temperature (soldiering, 10 seconds)	260^oC
ESD	TBD

Note 1: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, these specifications apply the operating at specified free-air temperatures and V_{CC} = 5V.

Parameter	Symbol	Test Conditions		AMC358 Min	AMC358 Typ	AMC358 Max	Units
Input Offset Voltage	V_{IO}	T_A = 25 °C (Note 2)			3	7	mV
		0 °C ≤ T_A ≤ 70 °C				9	
Input Bias Current (Note 3)	I_{IB}	T_A = 25 °C			- 20	- 250	nA
		0 °C ≤ T_A ≤ 70 °C				500	
Input Offset Current	I_{IO}	V_{CM} = 0V, V_{OUT} = 1.4V	T_A = 25 °C		2	50	nA
			0 °C ≤ T_A ≤ 70 °C			150	
Input Common-mode Voltage Range (Note 4)	V_{CM}	V_{CC} = 30V	T_A = 25 °C	0		V_{CC} – 1.5	V
			0 °C ≤ T_A ≤ 70 °C	0		V_{CC} – 2.0	
Supply Current	I_{CC}	No load	0 °C ≤ T_A ≤ 70 °C		0.7	1.2	mA
		V_{CC} = 30V, No load			1.0	2.0	
High-level Output Voltage	V_{OH}	V_{CC} = 30V, 0 °C ≤ T_A ≤ 70 °C	R_L = 2 kΩ	26			V
			R_L = 10 kΩ	27	28		
Low-level Output Voltage	V_{OL}	R_L = 10 kΩ, 0 °C ≤ T_A ≤ 70 °C			5	100	mV
Large Signal Voltage	A_{VD}	V_{CC} =15V, V_{OUT} = 1V to 11V, R_L = 10 kΩ, T_A = 25 °C		25	100		V/mV
Common-mode Rejection Ratio	CMRR	V_{CC} = 5V to 30V, V_{CM} = 0V to V_{CC} – 1.5V, T_A = 25 °C		65	85		dB
Power Supply Rejection Ratio (Note 5)	KSVR	V_{CC} = 5V to 30V, T_A = 25 °C			100		dB
Cross Talk (note 5)		f = 1 kHz to 20 kHz, T_A = 25 °C			120		dB
Output Current	Source	I_O	V_{CC} =15V, V_{IN}^+ - V_{IN}^- = 1V, V_{OUT} = 2V, T_A = 25 °C	- 20	- 30		mA
	Sink		V_{CC} =15V, V_{IN}^+ - V_{IN}^- = - 1V, V_{OUT} = 2V, T_A = 25 °C	10	20		mA
			V_{CC} =15V, V_{IN}^+ - V_{IN}^- = 1V, V_{OUT} = 2mV, T_A = 25 °C	12	20		µA
Short Circuit Output Current (Note 6)	I_{OS}	V_{CC} =15V, T_A = 25 °C			± 40	± 60	mA

Note 2: $V_{OUT} \cong$ 1.4V, R_S = 0Ω, with V_{CC} from 5V to 30V; and over the full input common-mode range (0V to V_{CC} – 1.5V) at 25°C.

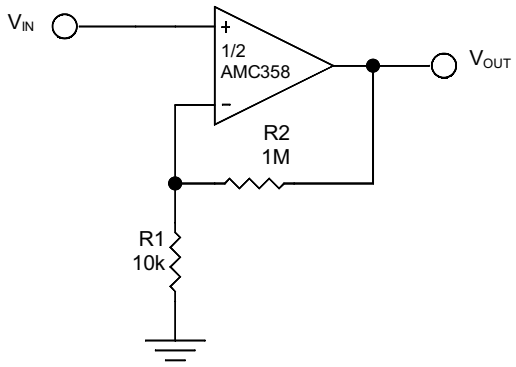
Note 3: Due to PNP input stage, the direction of the input current is out of the IC. It is essentially constant, independent of the state of the output, so no loading change exists on the input lines.

Note 4: The input common-mode voltage of either input signal voltage should not be allowed to go negative by more than 0.3V (at 25°C). The upper limit of the common-mode voltage range is V_{CC} – 1.5V (at 25°C), but either or both inputs can go to 32V without damage, independent of the magnitude of V_{CC}.

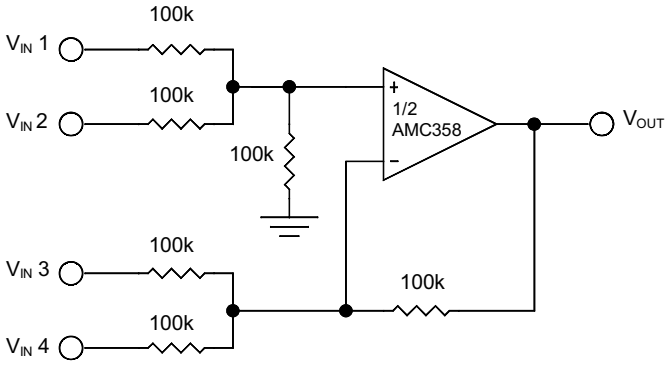
Note 5 These parameters, although guaranteed, are not tested in production.

Note 6: Short Circuits from the output to V_{CC} can cause excessive heating and eventual destruction. When considering short circuits to ground, the maximum output current is approximately 40mA independent of the magnitude of V_{CC}. At values of supply voltage in excess of 15V, continuous short-circuit can exceed the power dissipation ratings and cause destruction. Destructive dissipation can result from simultaneous shorts on all amplifiers.

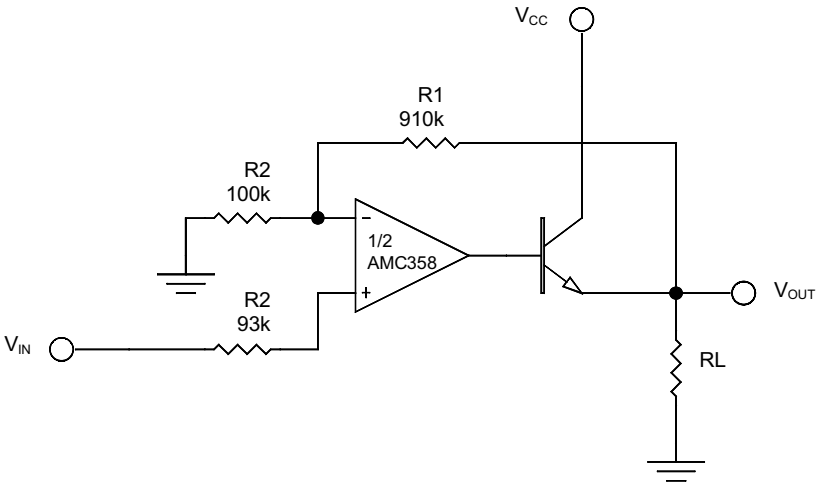
APPLICATION INFORMATION



Non-Inverting DC Gain (0V Output)
Gain = 1 + (R2/R1)

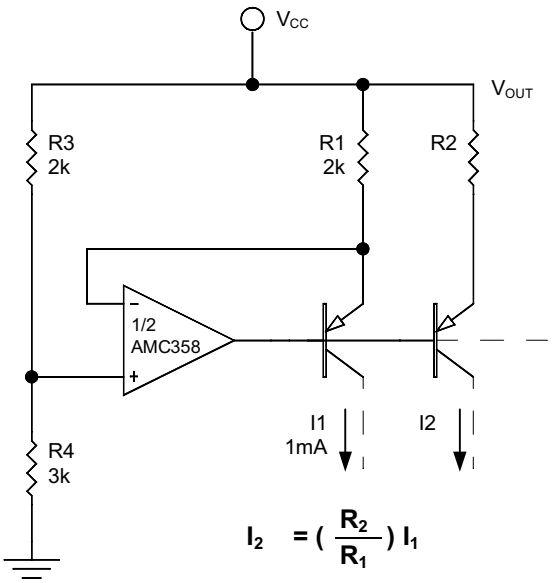


DC Summing Amplifier
(V_{IN}'S ≥ 0 V_{DC} and V_{OUT} ≥ 0 V_{DC})

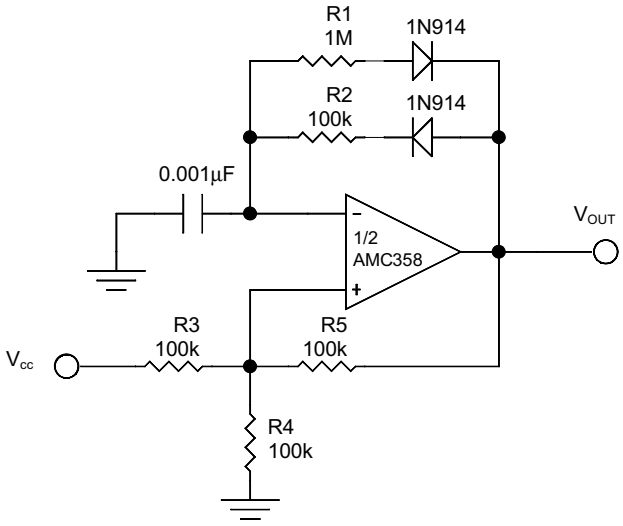


Power Amplifier

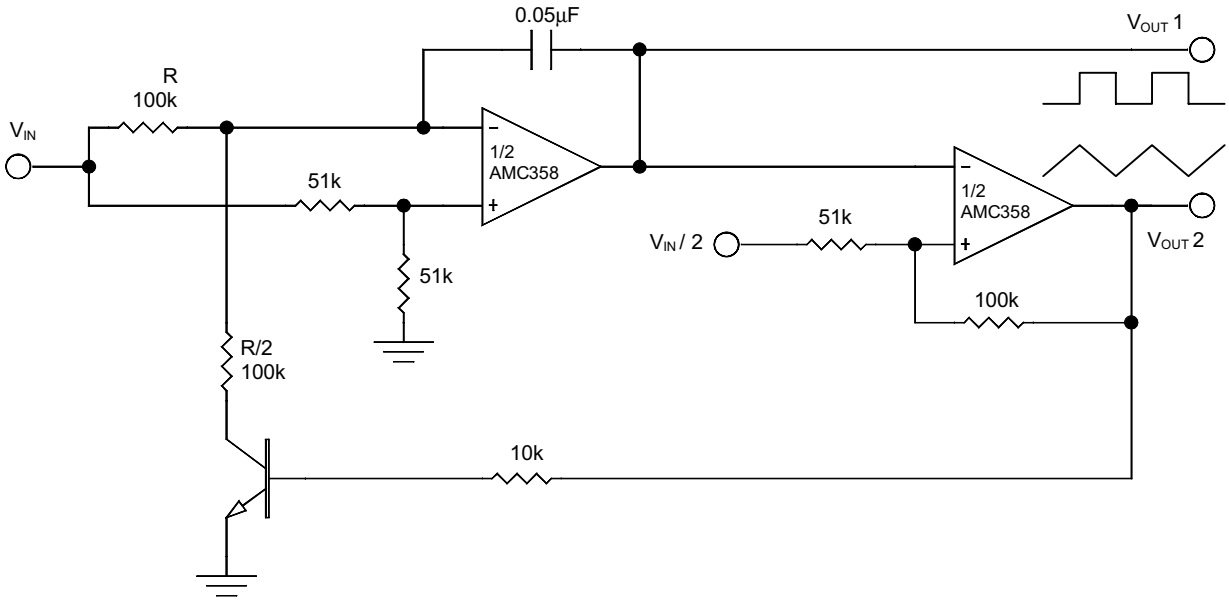
APPLICATION INFORMATION (continued)



Fixed Current Source

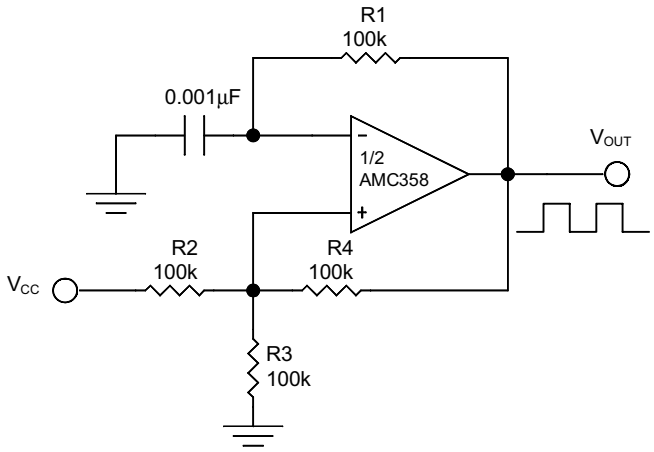


Pulse Generator

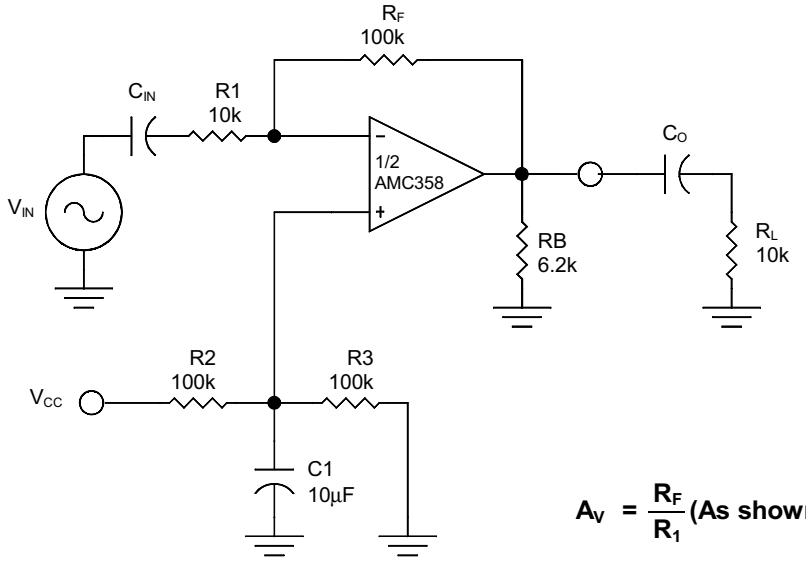


Voltage Controlled Oscillator (VCO)

APPLICATION INFORMATION (continued)



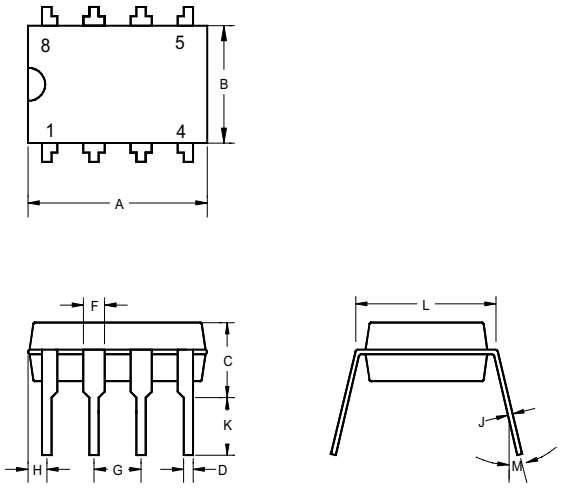
Square Wave Oscillator



$$A_V = \frac{R_F}{R_1} \text{(As shown, } A_V = 10\text{)}$$

AC Coupled Amplifier

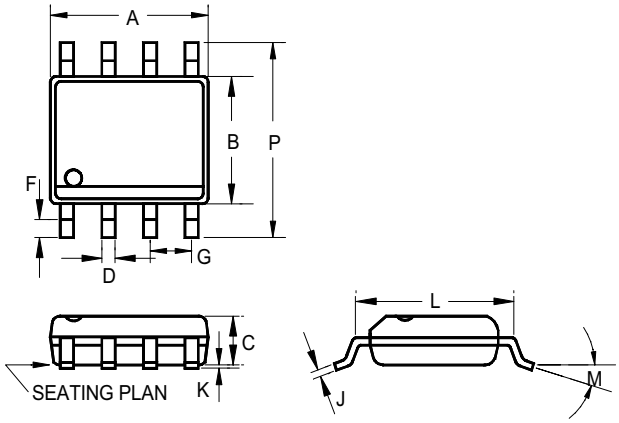
8-Pin Plastic DIP



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.355	0.365	0.400	9.02	9.27	10.16
B	0.240	0.250	0.280	6.10	6.35	7.11
C	-	-	0.210	-	-	5.33
D	-	0.018	-	-	0.46	-
F	-	0.060	-	-	1.52	-
G	-	0.100	-	-	2.54	-
H	0.050	-	0.090	1.27	-	2.29
J	0.008	-	0.015	0.20	-	0.38
K	0.115	0.130	0.150	2.92	3.30	3.81
L	0.300 BSC.			7.62 BSC.		
M	-	7º	15º	-	7º	15º

Note: For 8-pin Plastic package, 60 units per tube

8-Pin Plastic S.O.I.C.



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.183	-	0.202	4.65	-	5.13
B	0.144	-	0.163	3.66	-	4.14
C	0.068	-	0.074	1.73	-	1.88
D	0.010	-	0.020	0.25	-	0.51
F	0.015	-	0.035	0.38	-	0.89
G	0.050 BSC			1.27 BSC		
J	0.007	-	0.010	0.19	-	0.25
K	0.005	-	0.010	0.13	-	0.25
L	0.189	-	0.205	4.80	-	5.21
M	-	-	8º	-	-	8º
P	0.228	-	0.244	5.79	-	6.20

Note: for 8 pin S.O.I.C., 100 units per tube

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