Description

The GM358 consists of two high gain, internally frequency compensated operational amplifiers which are designed to operated from a single power supply over a wide range of voltages. Operation from split power supplies is also available. The GM358 feature low power drain, a common mode input voltage range extending to GND/VEE. The GM358 is equivalent to one-half of the GM324.

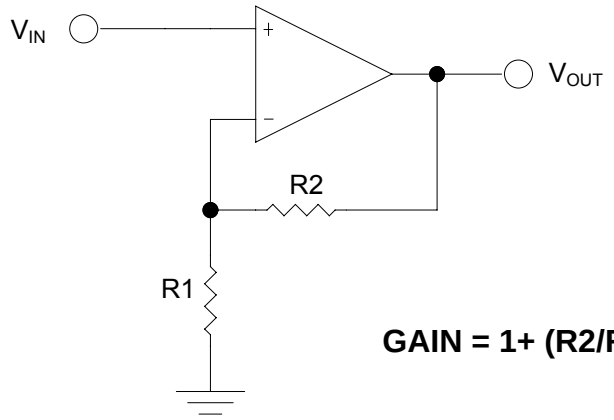
Application areas include transducer amplifiers, DC gain blocks and all the conventional op-amp circuits which now can be more easily implemented in single power supply systems. For example, the GM358 can be directly operated of the standard +5V power supply voltage which is used in digital systems and will easily provide the required interface electronics without requiring the additional ±15V power supplies.

The GM358 is available in SOP-8 and DIP-8 packages.

Features

- **True Differential Input Stage**
- **Internally Frequency Compensated for Unity Gain**
- **Single Supple Operation: 3V to 40V**
- **Wide Bandwidth (unity Gain, temperature compensated): 1 MHz**
- **Short Circuit Protected Outputs**
- **Low Input Bias Current**
- **Common Mode Range Extends to Negative Supply**
- **Single and Split Supply Operation**

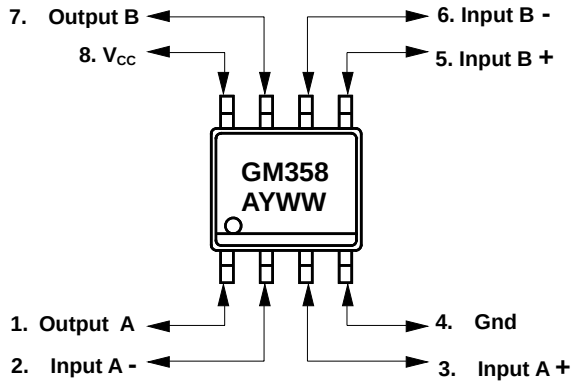
Typical Application Circuits



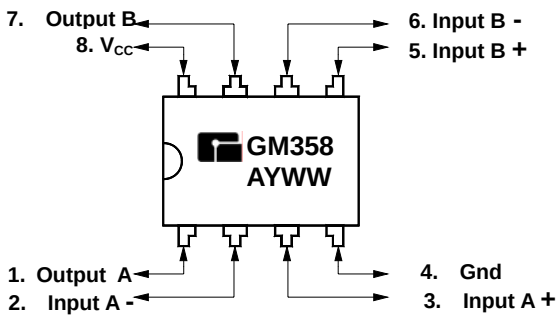
GAIN = 1+ (R2/R1)

Marking Information and Pin Configurations (Top View) – Pb Free

SO8



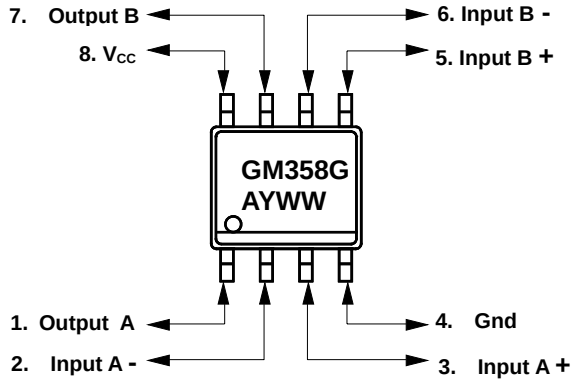
DIP8



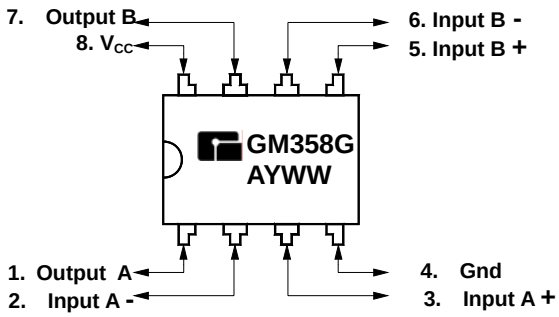
A: Assembly / Test site code
Y: Year
WW: Week

Marking Information and Pin Configurations (Top View) – Green

SO8



DIP8



G: Green Product
A: Assembly / Test site code
Y: Year
WW: Week

Ordering Information – Pb Free Product

Ordering Number	Package	Shipping
GM358D8T	DIP-8	60 Units / Tube
GM358S8T	SOP-8	100 Units / Tube
GM358S8R	SOP-8	2,500 Units / Tape & Reel

Ordering Information – Green Product

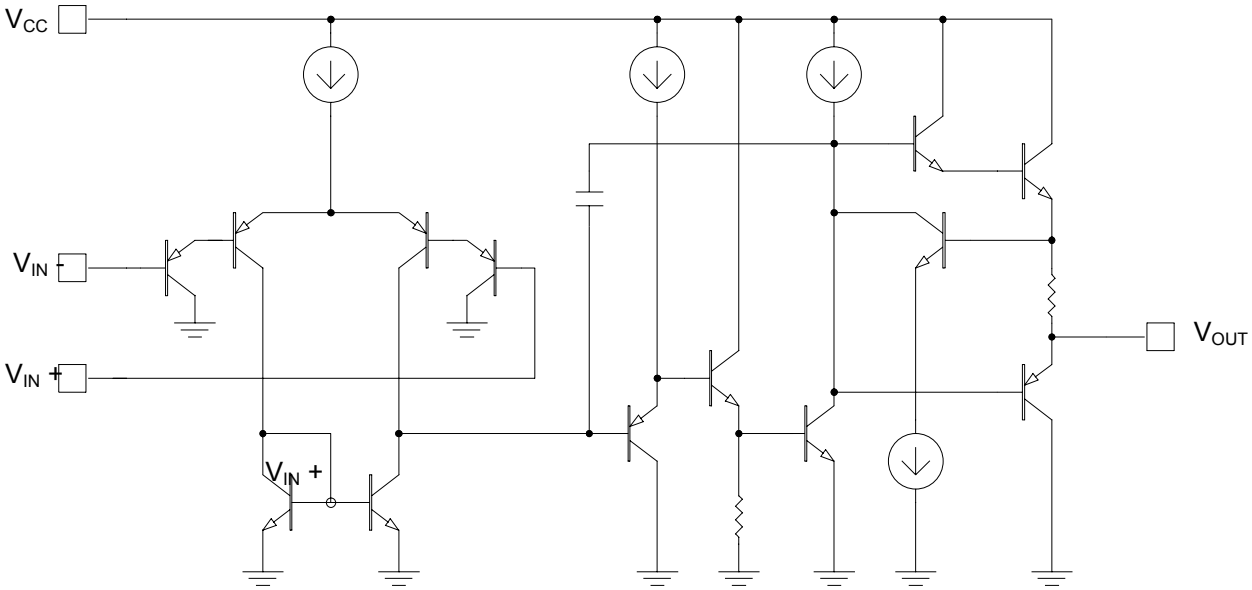
Ordering Number	Package	Shipping
GM358D8TG	DIP-8	60 Units / Tube
GM358S8TG	SOP-8	100 Units / Tube
GM358S8RG	SOP-8	2,500 Units / Tape & Reel

Absolute Maximum Ratings

PARAMETER	Symbol	RATINGS	UNITS
Supply Voltage	V_{CC}	32	V
	V_{CC}, V_{EE}	±16	
Input Differential Voltage Range (Note 1)	V_{IDR}	32	V
Input Common Mode Voltage Range (Note 2)	V_{ICR}	=0.3 to 32	V
Output Short Circuit Duration	t_{SC}	Continuous	-
Junction Temperature	T_J	150	°C
Operating Ambient Temperature Range	T_A	0 to 70	°C
Storage Temperature		- 65 to 150	°C
Lead Temperature (soldering 10 sec.)		260	°C
ESD Tolerance – Human Body Mode		2,000	V

Note 1: Split Power Supplies
Note 2: For Supply less 40V, the absolute maximum input range is equal to the supply voltage

Block Diagram



Electrical Characteristics (V_{CC} = 5V, at specified free-air temperature, unless otherwise specified)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Input offset Voltage	V_{IO}	V_{CC} = 5V to Max V_{IC} = V_{ICR} min V_O = 1.4V	T_A = 25°C		3	7	mV
			Full Range			9	
Average Temperature Coefficient of Input offset Voltage	αV_{IO}		Full Range		7		µV/°C
Input Offest Current	I_{IO}		T_A = 25°C		2	50	nA
			Full Range			150	
Average Temperature Coefficient of Input offset Current	αI_O		Full Range		10		pA/°C
Input Bias Current	I_{IB}	V_O =1.4V	T_A = 25°C		-20	-250	nA
			Full Range			-500	
Common-Mode Input Voltage Range	V_{ICR}	V_{CC} = 5V to Max	T_A = 25°C	0 to V_{CC}-1.5V			V
			Full Range	0 to V_{CC}-2.0V			
High-Level output Voltage	V_{OH}	R_L = 2K	T_A = 25°C	V_{CC}-1.5V	-	-	V
		V_{CC} = MAX, R_L = 2K	Full Range	26			
		V_{CC} = MAX, R_L = 10K	Full Range	27	28		
High-Level output Voltage	V_{OL}	R_L = 10K	Full Range		5	20	mV
Large-Signal Differential Voltage Amplification	A_{VD}	V_{CC} = 15V, V_O = 1V to 11V $R_L \geq$ 2K	T_A = 25°C	25	100		V/mV
			Full Range	15			
Common Mode Rejection Ratio	CMRR	V_{CC} = 5V to Max V_{IC} = V_{ICR} min	T_A = 25°C	65	80		dB
Supply Voltage Rejection Ratio	K_{SVR}	V_{CC} = 5V to Max	T_A = 25°C	65	100		dB
Crosstalk Attenuation	V_{O1}/V_{O2}	f = 1KHz to 20KHz	T_A = 25°C		120		dB
Output Current	I_O	V_{CC} = 15V, V_{ID} = 1V, V_O = 0V	T_A = 25°C	-20	-30		mA
			Full Range	-10			
		V_{CC} = 15V, V_{ID} = -1V, V_O = 15V	T_A = 25°C	10	20		
			Full Range	5			
		V_{ID} = -1V, V_O = 200mV	Full Range	12	30		µA
Short-Circuit output Current	I_{OS}	V_{CC} at 5V, Gnd at -5V, V_O = 0V	T_A = 25°C		±40	±60	mA
Supply Current (two amplifiers)	I_{CC}	V_O = 2.5V, No Load	Full Range		0.7	1.2	mA
		V_{CC} = Max, V_O = 0.5V_{CC}, No Load	Full Range		1	2	

* All characteristics are measured under open loop conditions with zero common-mode input voltage unless otherwise specified. "MAX" V_{CC} for testing purposes is 30V.

Typical Performance Characteristics

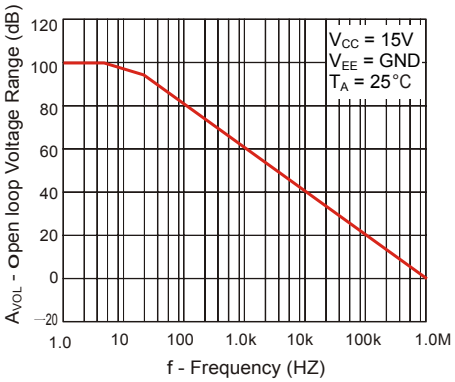


Figure 1. Large-Signal Open Loop Voltage Gain

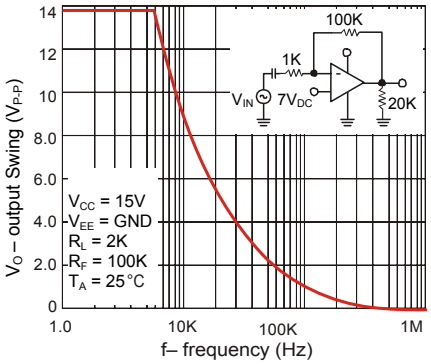


Figure 2. Large - Signal Frequency Response

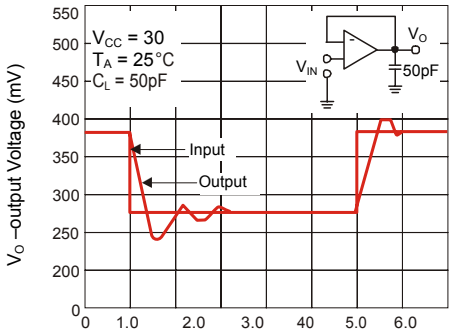


Figure 3. Small Signal Voltage Follower Pulse Response (Noninverting)

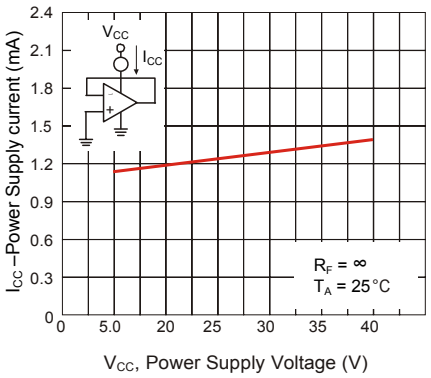


Figure 4. Power Supply Current versus Power Supply Voltage

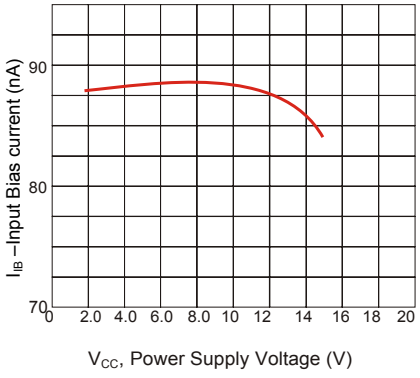


Figure 5. Input Bias Current versus Supply Voltage

Application Information

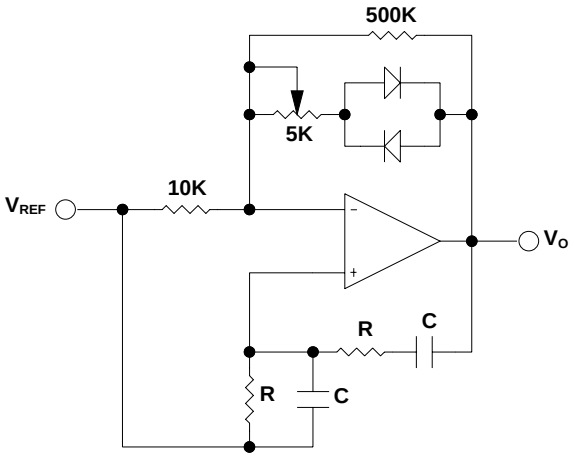


Fig.1 Wien Bridge Oscillator

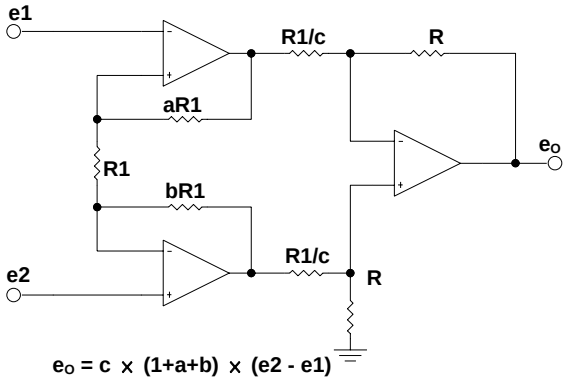


Fig. 2 High Impedance Differential Amplifier

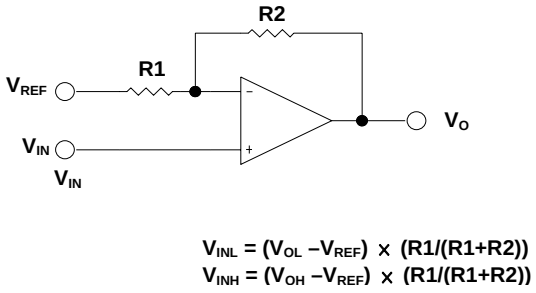


Fig. 3 Comparator with Hysteresis

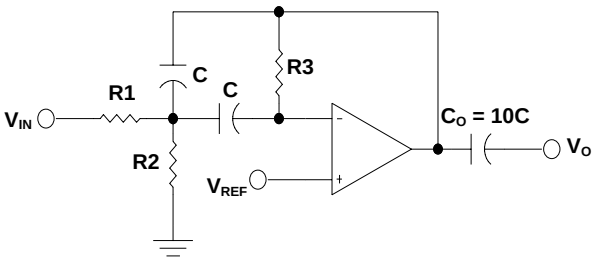


Fig. 4 Multiple Feedback Bandpass Filter

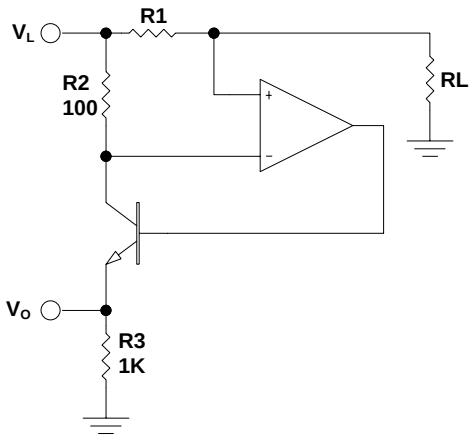


Fig. 5 Current Monitor

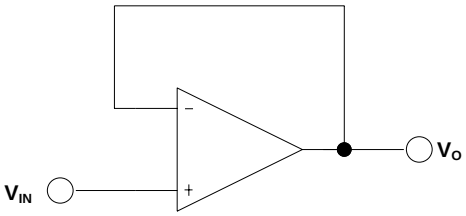
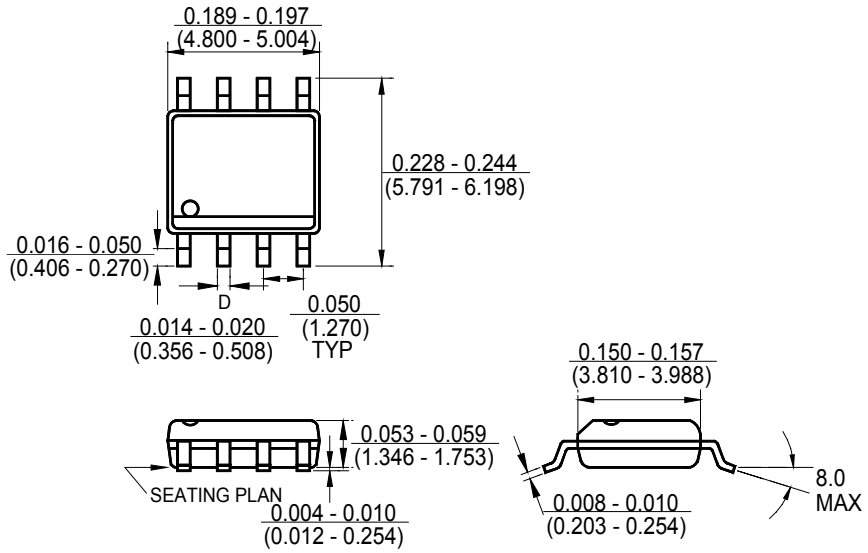
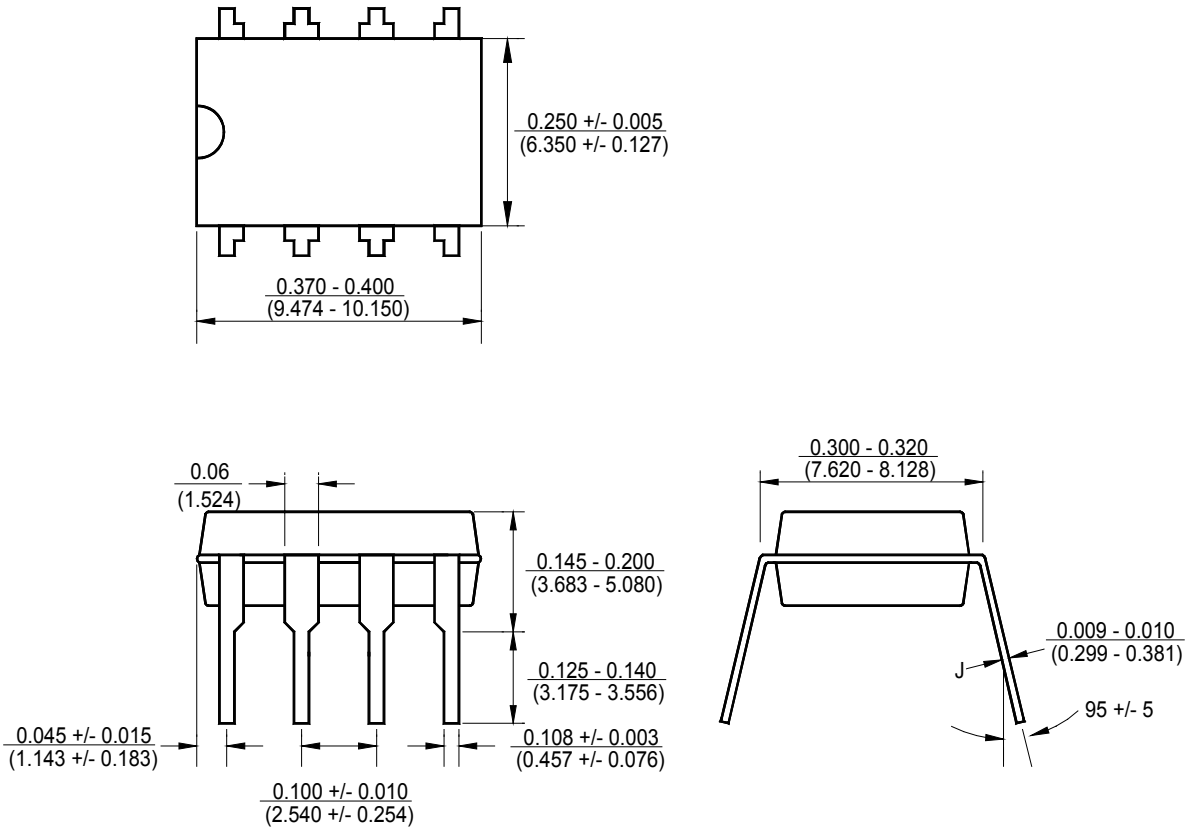


Fig. 6 Voltage Follower

Package Outline Dimensions – SO 8



Package Outline Dimensions – DIP 8



Ordering Number

GM	358	S8	R	G
APM Gamma Micro	Circuit Type	Package Type S8: SO 8 D8: DIP 8	Shipping Type R: Taping & Reel T: Tube	Blank :Pb-free G :Green

Note:

Pb-free products:

- RoHS compliant and compatible with the current require-ments of IPC/JEDEC J-STD-020.
- Suitable for use in Pb-free soldering processes with 100% matte tin (Sn) plating.

Green products:

- Lead-free (RoHS compliant)
- Halogen free(Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight)