

GS358

Dual Operational Amplifiers

JAN. 2010

Product Description

The GS358 consists of two independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages.

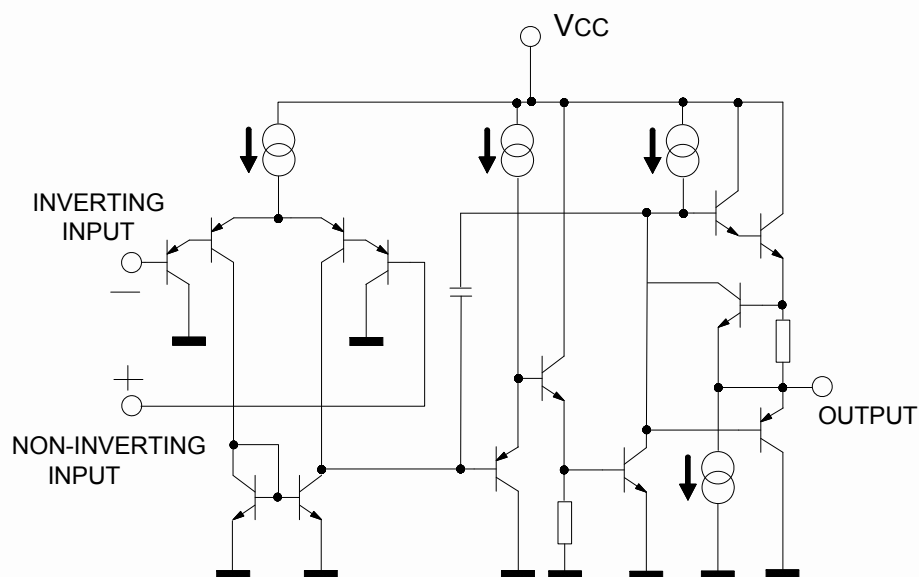
Operation from split power supplies is also possible and the low power supply current drains in independent of the magnitude of the power supply voltage.

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 GS358 can be directly operated off 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 $\pm 15V$ power supplies.

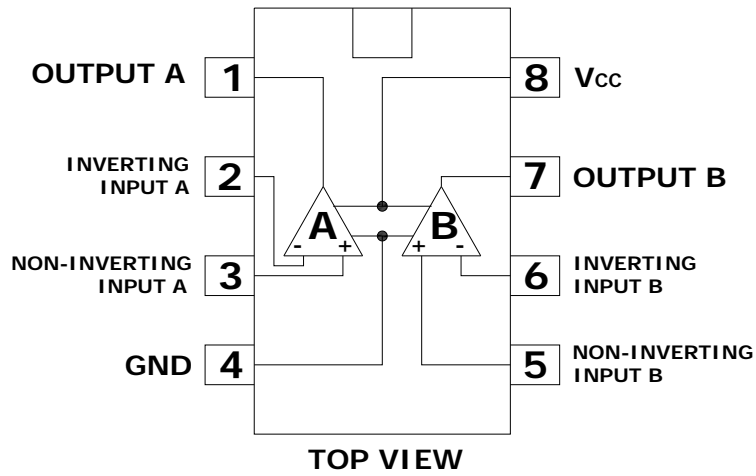
Features

- Wide range of supply voltages 3V to 36V
- Low supply current drain independent of supply voltage 0.7mA (TYP.)
- Low input biasing current
- Low input offset voltage and offset current
- Input common-mode voltage range includes ground
- Differential input voltage range equal to the power supply voltage
- DC voltage gain: 100V/mV TYP.
- Internally frequency compensation
- RoHS Compliant, 100%Pb & Halogen Free

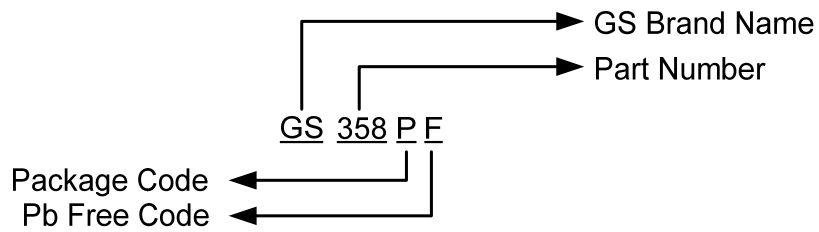
Block Diagram



Pin Assignments

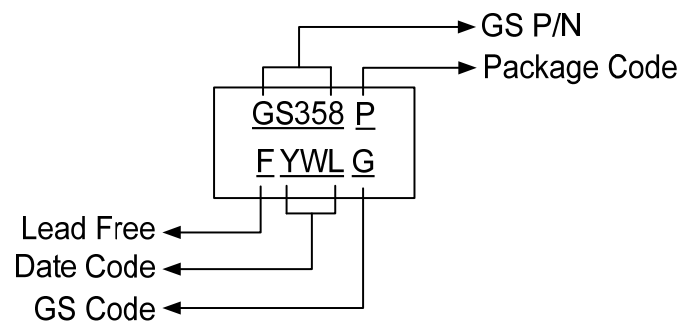


Ordering Information



| Device | Package |
|---------|---------|
| GS358PF | DIP-8 |
| GS358SF | SOP-8 |

Marking Information



Absolute Maximum Ratings

| Symbol | Parameter | Value | | Unit |
|-----------------------------------|--|-------------|-----|------|
| V _{CC} | Single Supply | 40 | | V |
| V _{CC} , V _{EE} | Split Supply | ±20 | | V |
| V _{IDR} | Input Differential Voltage Range | ±40 | | V |
| I _{OS} | Output Short-circuit to GND | Continuous | | |
| T _J | Junction Temperature | 150 | | °C |
| T _{STG} | Storage Temperature Range | -65 to +150 | | °C |
| T _A | Operating Ambient Temperature Range | -40 to 85 | | °C |
| θ _{JA} | Thermal Resistance (Junction to Ambient) | DIP-8 | 125 | °C/W |
| | | SOP-8 | 160 | |
| θ _{JC} | Thermal Resistance (Junction to Case) | DIP-8 | 42 | °C/W |
| | | SOP-8 | 22 | |
| ESD | ESD Rating (HBM) | 2 | | KV |

Electrical Characteristics

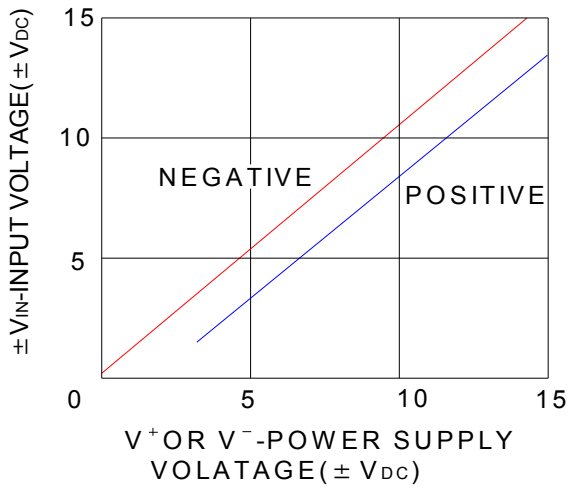
at specified free-air temperature, $V_{CC}=5V$ (Unless Otherwise Noted)

| Symbol | Parameter | Test Conditions* | Min | Typ | Max | Unit | |
|-----------------|--|--|------------|-------------------|----------|----------|------------------|
| V_{IO} | Input offset voltage | $V_{CC}=5V$ to Max. $V_{IC}=V_{ICR}$ min, $V_o = 1.4V$ | 25°C | | 3 | 7 | mV |
| | | | Full range | | | 9 | |
| αV_{IO} | Average temperature coefficient of input offset voltage | | Full range | | 7 | | $\mu V/^\circ C$ |
| I_{IO} | Input offset current | $V_o = 1.4V$ | 25°C | | 2 | 50 | nA |
| | | | Full range | | | 150 | |
| αI_{IO} | Average temperature coefficient of input offset current | | Full range | | 10 | | $\mu A/^\circ C$ |
| I_{IB} | Input bias current | $V_o = 1.4V$ | 25°C | | 20 | 250 | nA |
| | | | Full range | | | 500 | |
| V_{ICR} | Common-mode input voltage range | $V_{CC} = 5V$ to MAX | 25°C | 0 to $V_{CC}-1.5$ | | | V |
| | | | Full range | 0 to $V_{CC}-2$ | | | |
| V_{OH} | High-level output voltage | $R_L = 2k\Omega$ | 25°C | $V_{CC}-1.5$ | | | V |
| | | $V_{CC} = MAX,$ $R_L = 2k\Omega$ | Full range | 26 | | | |
| | | $V_{CC} = MAX,$ $R_L = 10k\Omega$ | Full range | 27 | 28 | | |
| V_{OL} | Low-level output voltage | $R_L = 10k\Omega$ | Full range | | 5 | 20 | mV |
| A_{VD} | Large-signal differential voltage amplification | $V_{CC} = 15V$ $V_o=1V$ to $11V$ $R_L=2k\Omega$ | 25°C | 25 | 100 | | V/mV |
| | | | Full range | 15 | | | |
| CMRR | Common-mode rejection ratio | $V_{CC} = 5V$ to MAX $V_{IC} = V_{ICR}$ min | 25°C | 65 | 80 | | dB |
| K_{SVR} | Supply voltage rejection ratio ($\Delta V_{CC}/\Delta V_{IO}$) | $V_{CC} = 5V$ to MAX | 25°C | 65 | 100 | | dB |
| V_{O1}/V_{O2} | Crosstalk attenuation | $f = 1k$ to $20k$ (Hz) | 25°C | | 120 | | dB |
| I_o | Output current | $V_{CC} = 15V,$ $V_{ID} = 1V,$ $V_o = 0V$ | 25°C | -20 | -30 | | mA |
| | | | Full range | -10 | | | |
| | | $V_{CC} = 15V$ $V_{ID} = -1V,$ $V_o = 15V$ | 25°C | 10 | 20 | | mA |
| | | | Full range | 5 | | | |
| | | $V_{ID} = -1V,$ $V_o = 200mV$ | 25°C | 12 | 30 | | μA |
| I_{OS} | Short-circuit output current | V_{CC} at $5V,$ GND at $-5V,$ $V_o = 0V$ | 25°C | | ± 40 | ± 60 | mA |
| I_{CC} | Supply current (two amplifiers) | $V_o = 2.5V,$ No load | Full range | | 0.7 | 1.2 | mA |
| | | $V_{CC} = MAX,$ $V_o = 0.5V_{CC},$ No load | Full range | | 1 | 2 | |

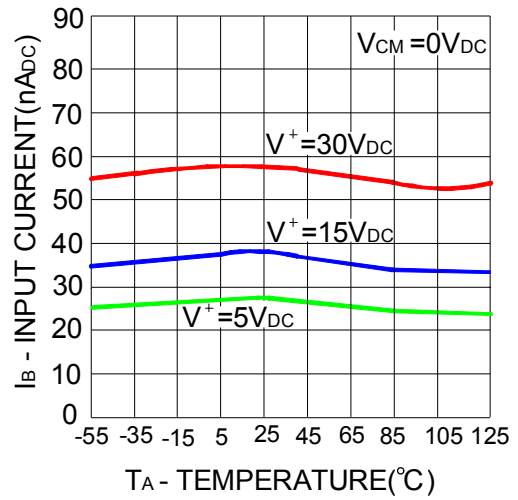
*All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified. "MAX" V_{CC} for testing Purposes is 30V. Full range is $-40^\circ C$ to $85^\circ C$

Typical Performance Characteristics

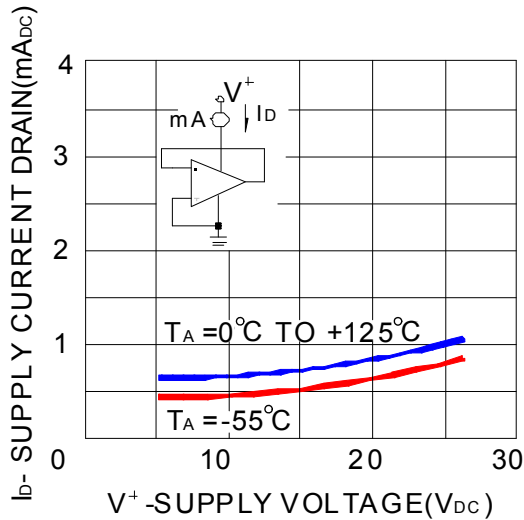
Input Voltage Range



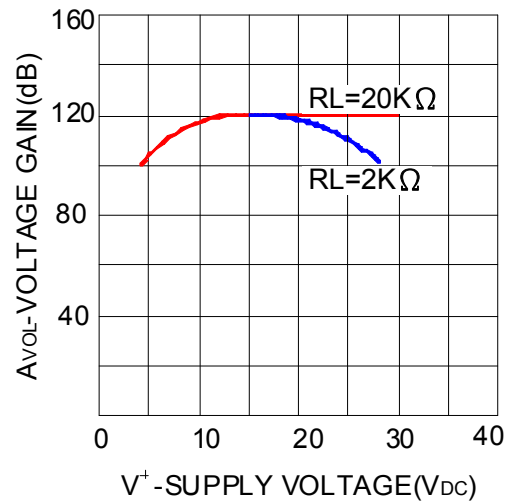
Input Current



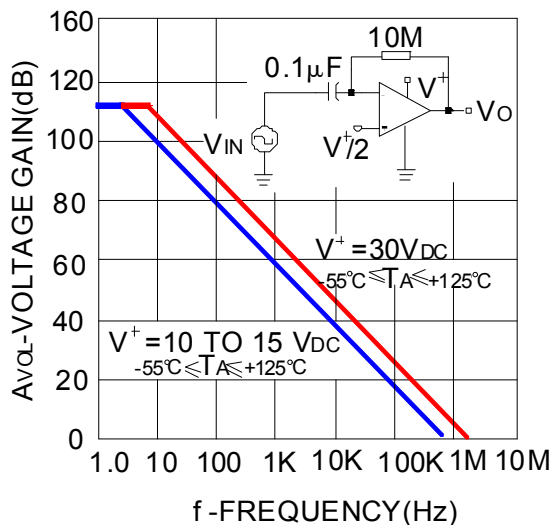
Supply Current



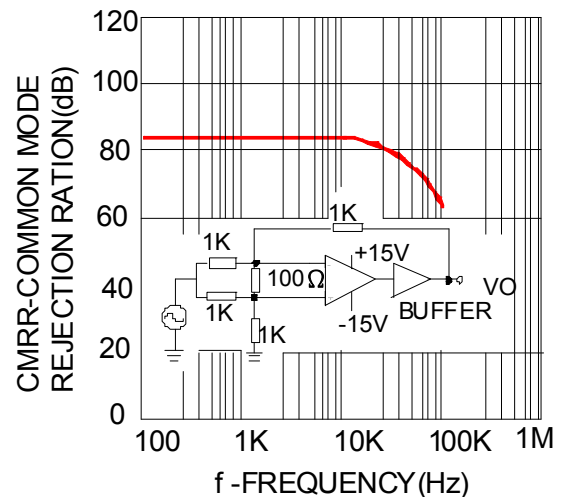
Voltage Gain



Open Loop Frequency Response

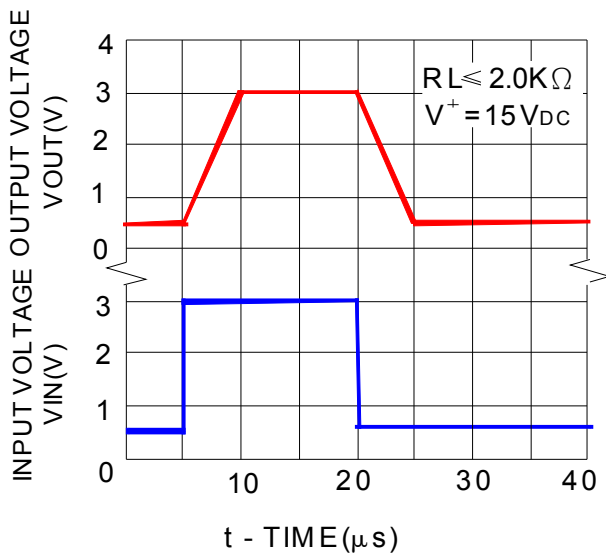


Common Mode Rejection Ratio

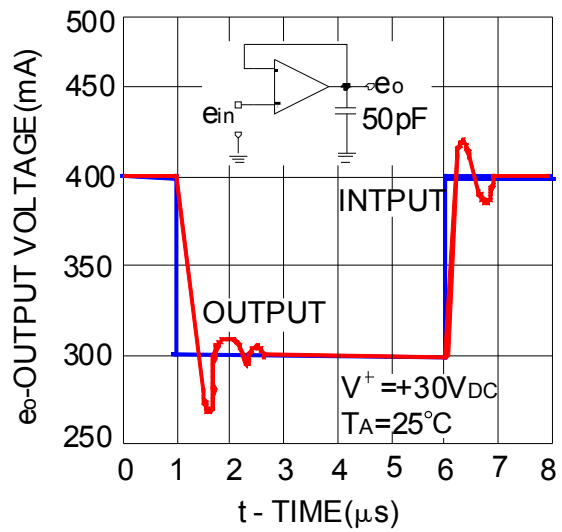


Typical Performance Characteristics (Continue)

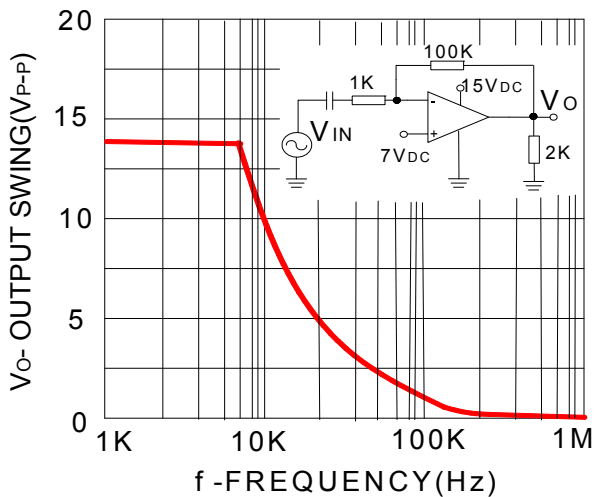
Voltage Follower Pulse Response



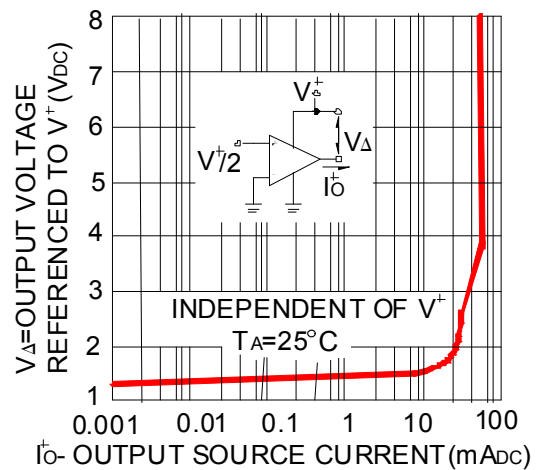
Voltage Follower Pulse Response (Small Signal)



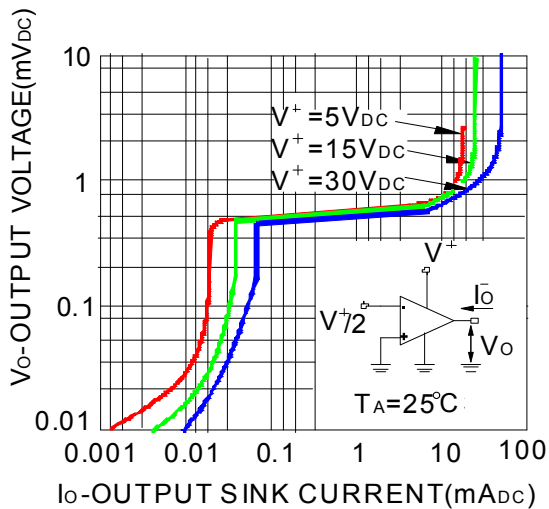
Large Signal Frequency Response



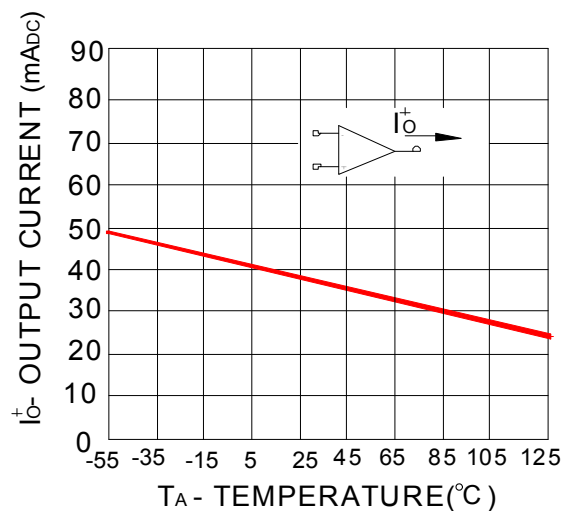
Output Characteristics Current Sourcing



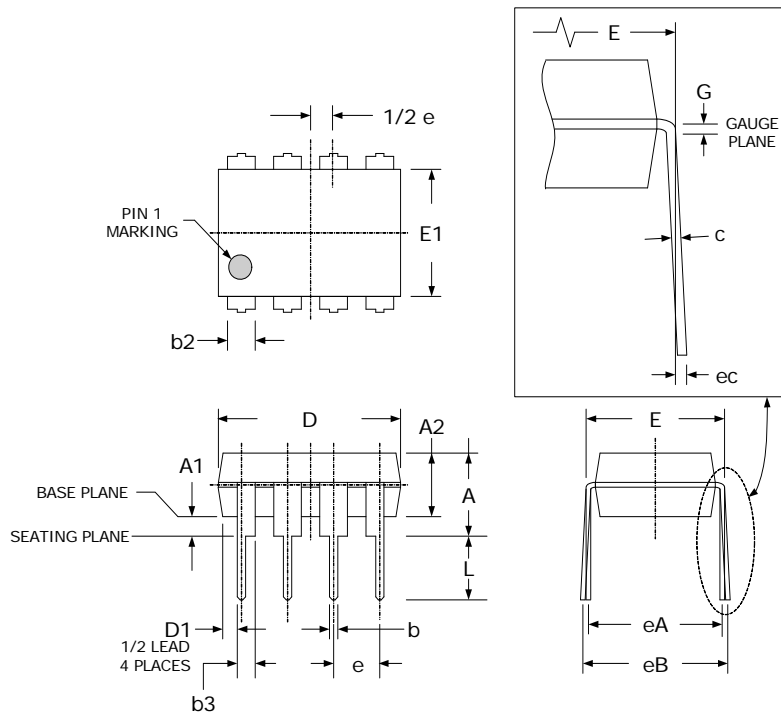
Output Characteristics Current Sinking



Current Limiting



DIP-8 PLASTIC PACKAGE



| Dimensions | | | | |
|------------|-------------|-------|------------|------|
| SYMBOL | Millimeters | | Inches | |
| | MIN | MAX | MIN | MAX |
| A | - | 5.33 | - | .210 |
| A1 | 0.38 | - | .015 | - |
| A2 | 2.92 | 4.95 | .115 | .195 |
| b | 0.36 | 0.56 | .014 | .022 |
| b2 | 1.14 | 1.78 | .045 | .070 |
| b3 | 0.76 | 1.14 | .030 | .045 |
| c | 0.20 | 0.36 | .008 | .014 |
| D | 9.02 | 10.16 | .355 | .400 |
| D1 | 0.13 | - | .005 | - |
| E | 7.62 | 8.26 | .300 | .325 |
| E1 | 6.10 | 7.11 | .240 | .280 |
| e | 2.54 (TYP) | | .100 (TYP) | |
| eA | 7.62 (TYP) | | .300 (TYP) | |
| eB | - | 10.92 | - | .430 |
| eC | 0.00 | 1.52 | .000 | .060 |
| L | 2.92 | 3.81 | .115 | .150 |
| G | 0.38 (TYP) | | .015 (TYP) | |

Additional Information :

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