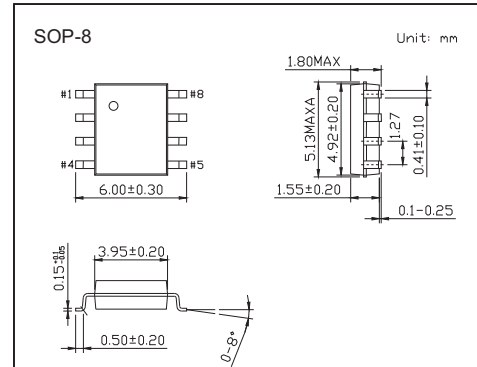
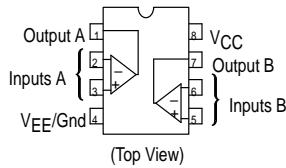


Features

- Short Circuit Protected Outputs
- Common Mode Range Extends to Negative Supply
- Single Supply Operation: 3.0 V to 32 V
- Single and Split Supply Operation
- True Differential Input Stage
- Low Input Bias Currents
- Internally Compensated



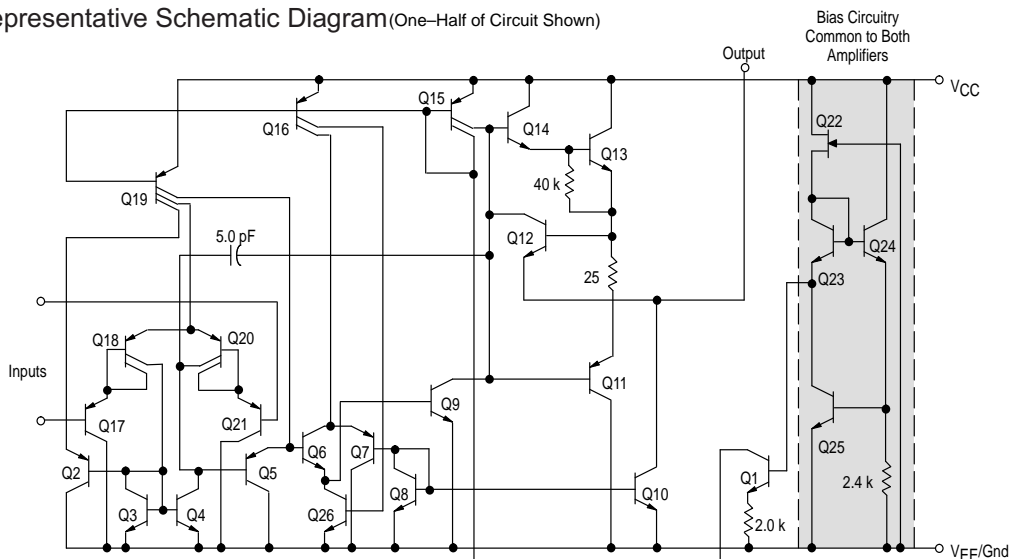
Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Rating | Unit |
|-------------------------------------|------------------|-------------|--------------------|
| Power Supply Voltages | | | |
| Single Supply | V_{CC} | 32 | Vdc |
| Split Supplies | V_{CC}, V_{EE} | ± 16 | |
| Input Differential Voltage Range *1 | V_{IDR} | ± 32 | Vdc |
| Input Common Mode Voltage Range *2 | V_{ICR} | -0.3 to 32 | Vdc |
| Output Short Circuit Duration | tsc | Continuous | |
| Junction Temperature | T_J | 150 | $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Air | $R_{\theta JA}$ | 238 | $^\circ\text{C/W}$ |
| Storage Temperature Range | T_{stg} | -55 to +125 | $^\circ\text{C}$ |
| Operating Ambient Temperature Range | T_A | 0 to +70 | $^\circ\text{C}$ |

*1 Split Power Supplies.

*2 For supply voltages less than 32 V the absolute maximum input voltage is equal to the supply voltage.

Representative Schematic Diagram (One-Half of Circuit Shown)



■ Electrical Characteristics $T_A = 25^\circ\text{C}$ ($V_{CC} = 5.0\text{ V}$, $V_{EE} = \text{Gnd}$, $T_A = 25^\circ\text{C}$, unless otherwise noted.)

| Parameter | Symbol | Testconditions | Min | Typ | Max | Unit |
|---|--------------------------|---|-----|------|----------|------------------------------|
| Input Offset Voltage | V_{IO} | $V_{CC} = 5.0\text{ V to } 30\text{ V}$, $V_{IC} = 0\text{ V to } V_{CC} - 1.7\text{ V}$ $V_O \approx 1.4\text{ V}$, $R_S = 0\Omega$ $T_A = 25^\circ\text{C}$ | | 2.0 | 7.0 | mV |
| | | $T_A = T_{High} *5$ | | | 9.0 | |
| | | $T_A = T_{Low} *5$ | | | 9.0 | |
| | | | | | | |
| Average Temperature Coefficient of Input Offset Voltage | $\Delta V_{IO}/\Delta T$ | $T_A = T_{High} \text{ to } T_{Low} *5$ | | 7.0 | | $\mu\text{V}/^\circ\text{C}$ |
| Input Offset Current | I_{IO} | $T_A = T_{High} \text{ to } T_{Low} *5$ | | 5.0 | 50 | nA |
| | | | | | 150 | |
| Input Bias Current | I_{IB} | $T_A = T_{High} \text{ to } T_{Low} *5$ | | -45 | -250 | |
| | | | | -50 | -500 | |
| Average Temperature Coefficient of Input Offset Current | $\Delta I_{IO}/\Delta T$ | $T_A = T_{High} \text{ to } T_{Low} *5$ | | 10 | | $\text{pA}/^\circ\text{C}$ |
| Input Common Mode Voltage Range *6 | V_{ICR} | $V_{CC} = 30\text{ V}$ | 0 | | 28.3 | V |
| | | $V_{CC} = 30\text{ V}$, $T_A = T_{High} \text{ to } T_{Low}$ | 0 | | 28 | |
| Differential Input Voltage Range | V_{IDR} | | | | V_{CC} | V |
| Large Signal Open Loop Voltage Gain | A_{VOL} | $R_L = 2.0\text{ k}\Omega$ $V_{CC} = 15\text{ V}$, For Large V_O Swing, $T_A = T_{High} \text{ to } T_{Low}$ | 25 | 100 | | V/mV |
| | | | 15 | | | |
| Channel Separation | C_S | $1.0\text{ kHz} \leq f \leq 20\text{ kHz}$, Input Referenced | | -120 | | dB |
| Common Mode Rejection | CMR | $R_S \leq 10\text{ K}\Omega$ | 65 | 70 | | dB |
| Power Supply Rejection | PSR | | 65 | 100 | | dB |
| Output Voltage-High Limit | V_{OH} | $T_A = T_{High} \text{ to } T_{Low} *5$ $V_{CC} = 5.0\text{ V}$, $R_L = 2.0\text{ K}\Omega$ $T_A = 25^\circ\text{C}$ $V_{CC} = 30\text{ V}$, $R_L = 2.0\text{ K}\Omega$ $V_{CC} = 30\text{ V}$, $R_L = 10\text{ K}\Omega$ | 3.3 | 3.5 | | V |
| | | | 26 | | | |
| | | | 27 | 28 | | |
| Output Voltage-Low Limit | V_{OL} | $V_{CC} = 5.0\text{ V}$, $R_L = 10\text{ K}\Omega$ $T_A = T_{High} \text{ to } T_{Low} *5$ | | 5 | 20 | mV |
| Output Source Current | I_{O+} | $V_{ID} = +1.0\text{ V}$, $V_{CC} = 15\text{ V}$ | 20 | 40 | | mA |
| Output Sink Current | I_{O-} | $V_{ID} = -1.0\text{ V}$, $V_{CC} = 15\text{ V}$ | 10 | 20 | | mA |
| | | $V_{ID} = -1.0\text{ V}$, $V_O = 200\text{ mV}$ | 12 | 50 | | μA |
| Output Short Circuit to Ground *7 | I_{SC} | | | 40 | 60 | mA |
| Power Supply Current (Total Device) | I_{CC} | $T_A = T_{High} \text{ to } T_{Low} *5$ $V_{CC} = 30\text{ V}$, $V_O = 0\text{ V}$, $R_L = \infty$ $V_{CC} = 5\text{ V}$, $V_O = 0\text{ V}$, $R_L = \infty$ | | 1.5 | 3.0 | mA |
| | | | | 0.7 | 1.2 | |

*5 $T_{Low} = 0^\circ\text{C}$, $T_{High} = +70^\circ\text{C}$

*6 The input common mode voltage or either input signal voltage should not be allowed to go negative by more than 0.3 V.

The upper end of the common mode voltage range is $V_{CC} - 1.7\text{ V}$.

*7 Short circuits from the output to V_{CC} can cause excessive heating and eventual destruction.

Destructive dissipation can result from simultaneous shorts on all amplifiers.

■ Marking

| | |
|---------|-------|
| Marking | LM358 |
|---------|-------|