# TJM4558

## WIDE BANDWIDTH DUAL BIPOLAR OPERATIONAL AMPLIFIERS

- INTERNALLY COMPENSATED
- SHORT-CIRCUIT PROTECTION
- GAIN AND PHASE MATCH BETWEEN AMPLIFIER
- LOW POWER CONSUMPTION
- PIN TO PIN COMPATIBLE WITH MC1458/LM358
- GAIN BANDWIDTH PRODUCT (at 100kHz) 5.5MHz

**N**
**DIP8**
(Plastic Package)

**D**
**SO8**
(Plastic Micropackage)

**P**
**TSSOP8**
(Thin Shrink Small Outline Package)

### DESCRIPTION

The TJM4558 is a high performance monolithic dual operational amplifier.

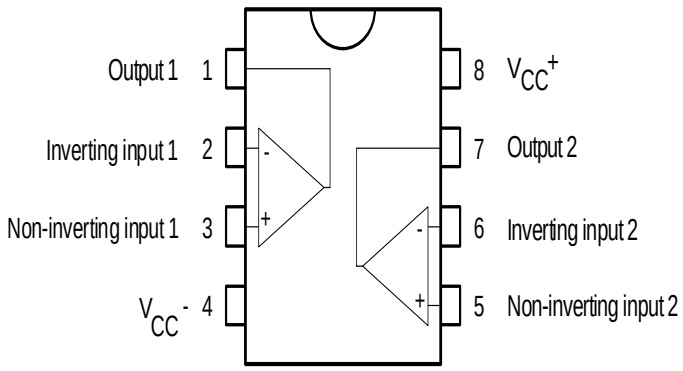
The circuit combines all the outstanding features of the MC1458 and, in addition possesses three times the unity gain bandwidth of the industry standard.

### ORDER CODE

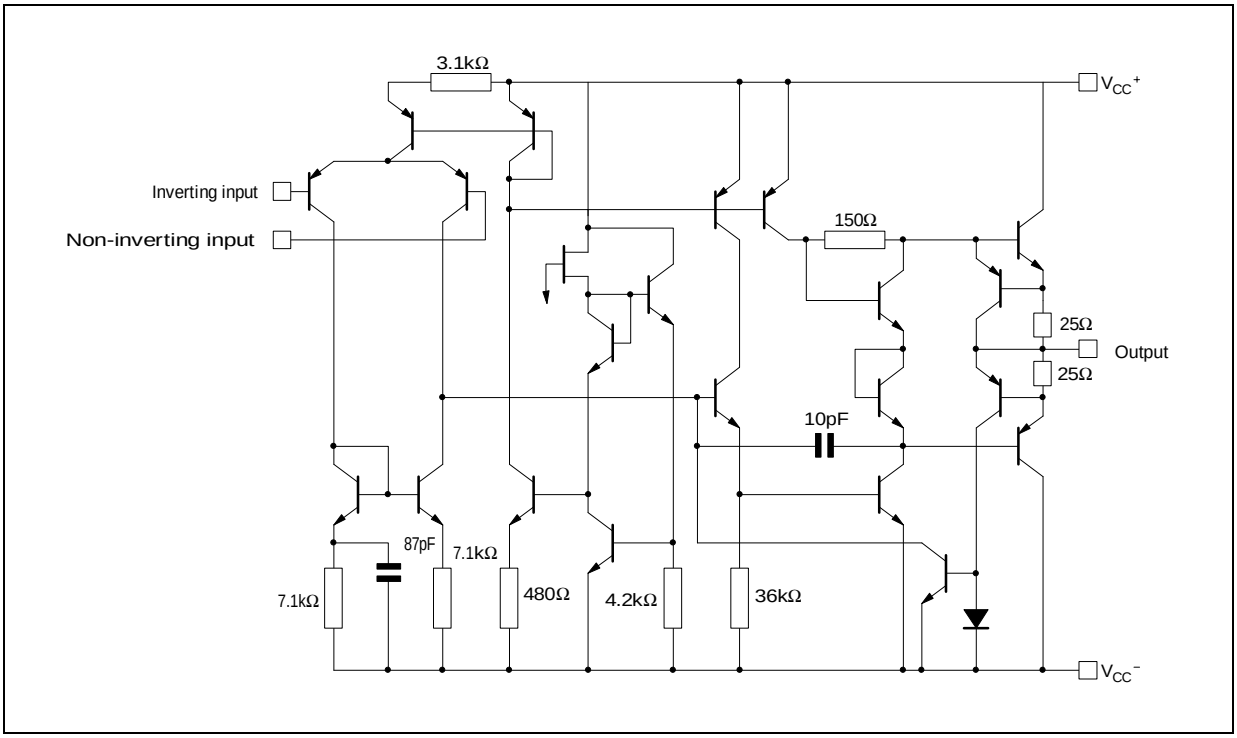
| Part Number | Temperature Range | Package | | |
|---|---|---|---|---|
| | | N | D | P |
| TJM4558C | 0°C, +70°C | • | • | • |
| TJM4558I | -40°C, +105°C | • | • | • |
| **Example :** TJM4558CN | | | | |

**N =** Dual in Line Package (DIP)
**D =** Small Outline Package (SO) - also available in Tape & Reel (DT))
**P =** Thin Shrink Small Outline Package (TSSOP) - only available in Tape & Reel (PT)

### PIN CONNECTIONS (top view)



## SCHEMATIC DIAGRAM (1/2 TJM4558)




## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | TJM4558I | TJM4558C | Unit |
|---|---|---|---|---|
| $V_{CC}$ | Supply Voltage | ±22 | | V |
| $V_i$ | Input Voltage | ±15 | | V |
| $V_{id}$ | Differential Input Voltage | ±30 | | V |
| $P_{tot}$ | Power Dissipation | 680 | | mW |
| | Output Short Circuit Duration | Infinite | | |
| $T_{oper}$ | Operating Free-Air Temperature Range | -40 to +105 | 0 to +70 | °C |
| $T_{stg}$ | Storage Temperature | -65 to +150 | | °C |

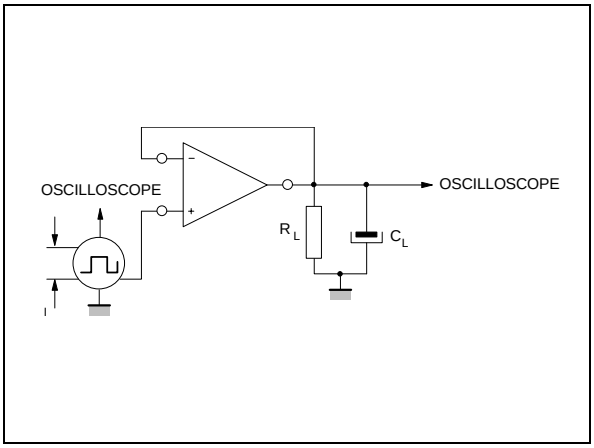
## ELECTRICAL CHARACTERISTICS

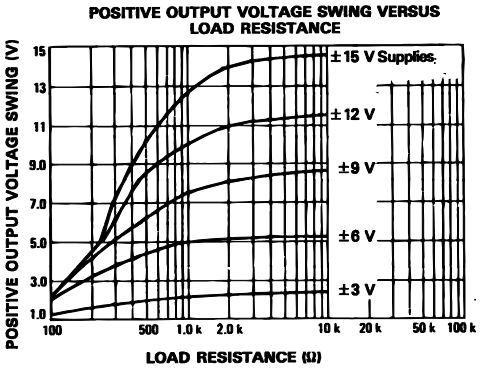
$V_{CC}$ = ±15V, $T_{amb}$ = 25°C (unless otherwise specified)

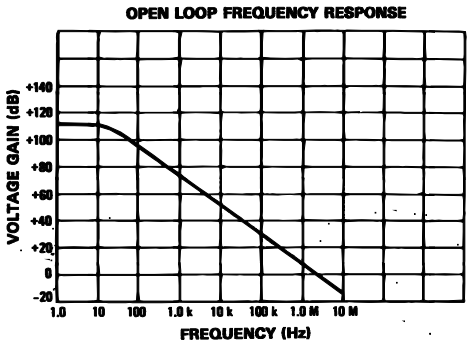
| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| $V_{io}$ | Input Offset Voltage ($R_S \leq 10k\Omega$)<br>$T_{amb}$ = +25°C<br>$T_{min.} \leq T_{amb} \leq T_{max.}$ | | 1 | 5<br>6 | mV |
| $I_{io}$ | Input Offset Current<br>$T_{amb}$ = +25°C<br>$T_{min.} \leq T_{amb} \leq T_{max.}$ | | 20<br>40 | 100 | nA |
| $I_{ib}$ | Input Bias Current<br>$T_{amb}$ = +25°C<br>$T_{min.} \leq T_{amb} \leq T_{max.}$ | | 50<br>100 | 400 | nA |
| $A_{vd}$ | Large Signal Voltage Gain ($R_L$ = 2kΩ, $V_o$ = ±10V)<br>$T_{amb}$ = +25°C<br>$T_{min.} \leq T_{amb} \leq T_{max.}$ | 50<br>25 | 200 | | V/mV |

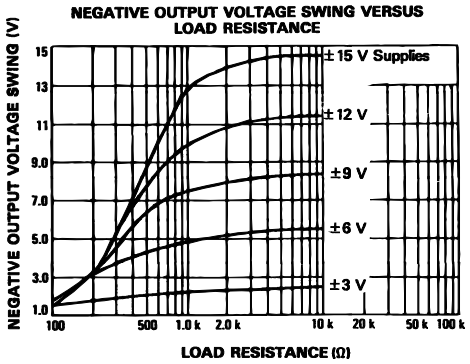
| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| SVR | Supply Voltage Rejection Ratio ($R_S \leq 10k\Omega$)<br>$T_{amb}$ = +25°C<br>$T_{min.} \leq T_{amb} \leq T_{max.}$ | | <br>90<br>77 | | dB |
| $I_{CC}$ | Supply Current, all amplifiers, no load<br>$T_{amb}$ = +25°C<br>$T_{min.} \leq T_{amb} \leq T_{max.}$ | | <br>2.3<br>4 | <br>4.5 | mA |
| $V_{icm}$ | Input Common Mode Voltage Range<br>$T_{amb}$ = +25°C<br>$T_{min.} \leq T_{amb} \leq T_{max.}$ | <br>±12<br>±12 | | | V |
| CMR | Common-mode Rejection Ratio ($R_S \leq 10k\Omega$)<br>$T_{amb}$ = +25°C<br>$T_{min.} \leq T_{amb} \leq T_{max.}$ | | <br>90<br>70 | | dB |
| $I_{os}$ | Output Short Circuit Current | 10 | 20 | | mA |
| $V_o$ | Output Voltage Swing<br>$T_{amb}$ = +25°C $R_L = 10k\Omega$<br>$R_L = 2k\Omega$<br>$T_{min.} \leq T_{amb} \leq T_{max.}$ $R_L = 10k\Omega$<br>$R_L = 2k\Omega$ | <br>±12<br>±10<br>±12<br>±10 | <br>±14<br>±13 | | V |
| SR | Slew Rate<br>($V_i$ = ±10, $R_L$ = 2kΩ, $C_L$ = 100pF, $T_{amb}$ = 25°C, unity gain) | | <br>2.2 | | V/µs |
| $t_r$ | Rise Time<br>($V_i$ = ±20mV, $R_L$ = 2kΩ, $C_L$ = 100pF, $T_{amb}$ = 25°C, unity gain) | | <br>0.3 | | µs |
| $K_{OV}$ | Overshoot<br>($V_i$ = ±20mV, $R_L$ = 2kΩ, $C_L$ = 100pF, $T_{amb}$ = 25°C, unity gain) | | <br>15 | | % |
| $R_i$ | Input Resistance | 0.3 | 2 | | MΩ |
| $C_i$ | Input Capacitance | | 1.4 | | pF |
| $R_o$ | Output Resistance | | 75 | | Ω |
| B | Unity Gain Bandwidth | | 2.8 | | MHz |
| GBP | Gain Bandwidth Product<br>($V_i$ = 10mV, $R_L$ = 2kΩ, $C_L$ = 100pF, f = 100kHz, $T_{amb}$ = 25°C) | | <br>5.5 | | MHz |
| THD | Total Harmonic Distortion<br>(f = 1kHz, $A_v$ = 20dB, $R_L$ = 2kΩ, $V_o$ = $2V_{pp}$, $C_L$ = 100pF, $T_{amb}$ = 25°C) | | <br>0.008 | | % |
| $e_n$ | Equivalent Input Noise Voltage ($R_S$ = 100Ω, f = 1kHz) | | 12 | | $\frac{nV}{\sqrt{Hz}}$ |
| $V_{O1}/V_{O2}$ | Channel Separation | | 120 | | dB |

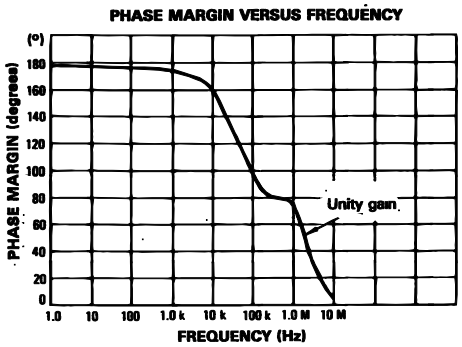
## TRANSIENT RESPONSE TEST CIRCUIT

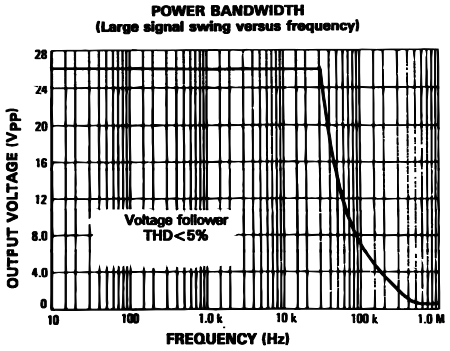


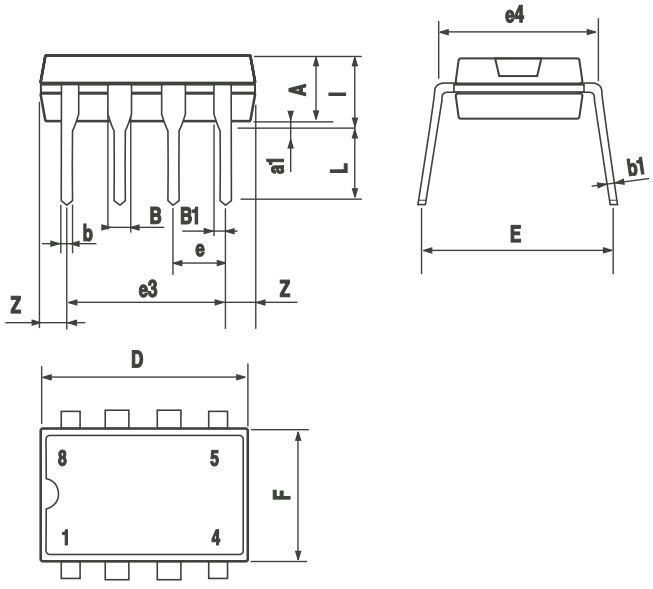



## PACKAGE MECHANICAL DATA

| Plastic DIP-8 MECHANICAL DATA | | | | | | |
|---|---|---|---|---|---|---|
| DIM. | mm. | | | inch | | |
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | | 3.3 | | | 0.130 | |
| a1 | 0.7 | | | 0.028 | | |
| B | 1.39 | | 1.65 | 0.055 | | 0.065 |
| B1 | 0.91 | | 1.04 | 0.036 | | 0.041 |
| b | | 0.5 | | | 0.020 | |
| b1 | 0.38 | | 0.5 | 0.015 | | 0.020 |
| D | | | 9.8 | | | 0.386 |
| E | | 8.8 | | | 0.346 | |
| e | | 2.54 | | | 0.100 | |
| e3 | | 7.62 | | | 0.300 | |
| e4 | | 7.62 | | | 0.300 | |
| F | | | 7.1 | | | 0.280 |
| I | | | 4.8 | | | 0.189 |
| L | | 3.3 | | | 0.130 | |
| Z | 0.44 | | 1.6 | 0.017 | | 0.063 |

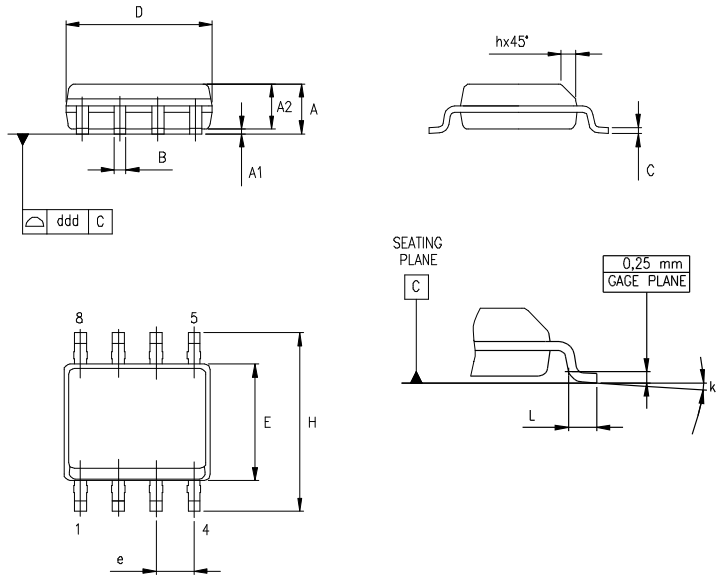



P001F

## PACKAGE MECHANICAL DATA

### SO-8 MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | 1.35 | | 1.75 | 0.053 | | 0.069 |
| A1 | 0.10 | | 0.25 | 0.04 | | 0.010 |
| A2 | 1.10 | | 1.65 | 0.043 | | 0.065 |
| B | 0.33 | | 0.51 | 0.013 | | 0.020 |
| C | 0.19 | | 0.25 | 0.007 | | 0.010 |
| D | 4.80 | | 5.00 | 0.189 | | 0.197 |
| E | 3.80 | | 4.00 | 0.150 | | 0.157 |
| e | | 1.27 | | | 0.050 | |
| H | 5.80 | | 6.20 | 0.228 | | 0.244 |
| h | 0.25 | | 0.50 | 0.010 | | 0.020 |
| L | 0.40 | | 1.27 | 0.016 | | 0.050 |
| k | 8° (max.) | | | | | |
| ddd | | | 0.1 | | | 0.04 |



## PACKAGE MECHANICAL DATA

**TSSOP8 MECHANICAL DATA**

| DIM. | mm. | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.2 | | | 0.047 |
| A1 | 0.05 | | 0.15 | 0.002 | | 0.006 |
| A2 | 0.80 | 1.00 | 1.05 | 0.031 | 0.039 | 0.041 |
| b | 0.19 | | 0.30 | 0.007 | | 0.012 |
| c | 0.09 | | 0.20 | 0.004 | | 0.008 |
| D | 2.90 | 3.00 | 3.10 | 0.114 | 0.118 | 0.122 |
| E | 6.20 | 6.40 | 6.60 | 0.244 | 0.252 | 0.260 |
| E1 | 4.30 | 4.40 | 4.50 | 0.169 | 0.173 | 0.177 |
| e | | 0.65 | | | 0.0256 | |
| K | 0° | | 8° | 0° | | 8° |
| L | 0.45 | 0.60 | 0.75 | 0.018 | 0.024 | 0.030 |
| L1 | | 1 | | | 0.039 | |