

PRODUKTINFORMATION



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— Vi reserverar oss mot fel samt förbehåller oss rätten till ändringar utan föregående meddelande —

ELFA artikelnr.

73-118-06 TL081CP/CA081E/771TC

73-118-22 TL082CP dubbel JFET op

73-118-55 TL084CN/TDB0084DP/XR084CP

Antal sidor: 22

TL081, TL081A, TL081B, TL082, TL082A, TL082B TL082Y, TL084, TL084A, TL084B, TL084Y JFET-INPUT OPERATIONAL AMPLIFIERS

SLOS081D – FEBRUARY 1977 – REVISED FEBRUARY 1997

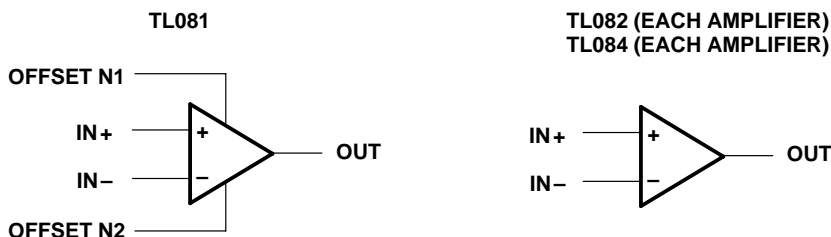
- Low Power Consumption
- Wide Common-Mode and Differential Voltage Ranges
- Low Input Bias and Offset Currents
- Output Short-Circuit Protection
- Low Total Harmonic Distortion . . . 0.003% Typ
- High Input Impedance . . . JFET-Input Stage
- Latch-Up-Free Operation
- High Slew Rate . . . 13 V/ μ s Typ
- Common-Mode Input Voltage Range Includes V_{CC+}

description

The TL08x JFET-input operational amplifier family is designed to offer a wider selection than any previously developed operational amplifier family. Each of these JFET-input operational amplifiers incorporates well-matched, high-voltage JFET and bipolar transistors in a monolithic integrated circuit. The devices feature high slew rates, low input bias and offset currents, and low offset voltage temperature coefficient. Offset adjustment and external compensation options are available within the TL08x family.

The C-suffix devices are characterized for operation from 0°C to 70°C. The I-suffix devices are characterized for operation from –40°C to 85°C. The M-suffix devices are characterized for operation over the full military temperature range of –55°C to 125°C.

symbols



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
INSTRUMENTS**

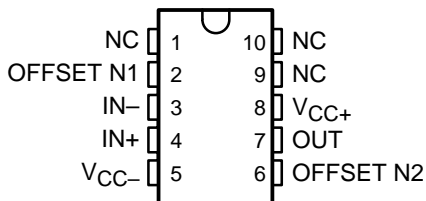
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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

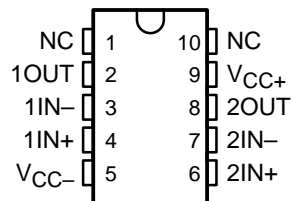
TL081, TL081A, TL081B, TL082, TL082A, TL082B TL082Y, TL084, TL084A, TL084B, TL084Y JFET-INPUT OPERATIONAL AMPLIFIERS

SLOS081D – FEBRUARY 1977 – REVISED FEBRUARY 1997

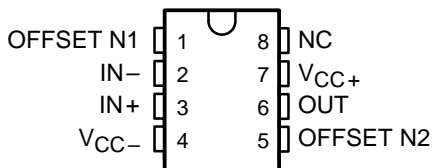
**TL081M
U PACKAGE
(TOP VIEW)**



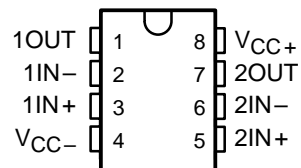
**TL082M
U PACKAGE
(TOP VIEW)**



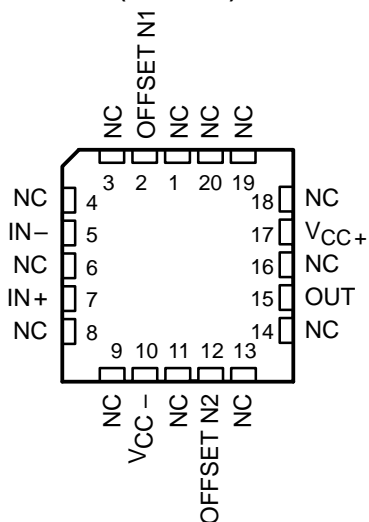
**TL081, TL081A, TL081B
D, JG, P, OR PW PACKAGE
(TOP VIEW)**



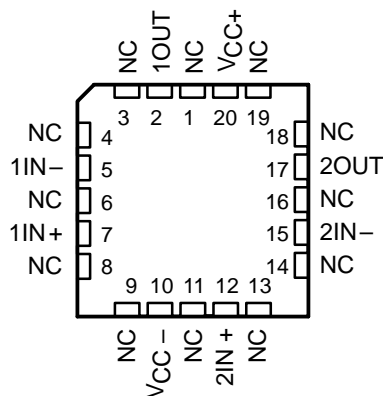
**TL082, TL082A, TL082B
D, JG, P, OR PW PACKAGE
(TOP VIEW)**



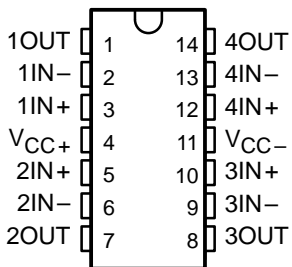
**TL081M . . . FK PACKAGE
(TOP VIEW)**



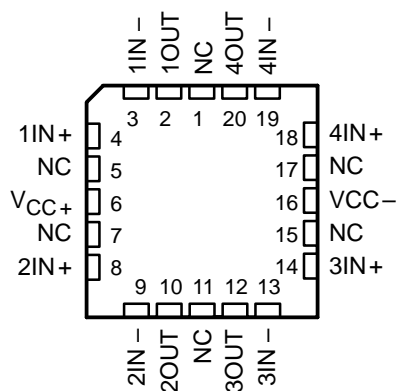
**TL082M . . . FK PACKAGE
(TOP VIEW)**



**TL084, TL084A, TL084B
D, J, N, PW, OR W PACKAGE
(TOP VIEW)**



**TL084M . . . FK PACKAGE
(TOP VIEW)**



NC – No internal connection

AVAILABLE OPTIONS

| T _A | V _{IOMAX} AT 25°C | PACKAGED DEVICES | | | | | | | | | | CHIP FORM (Y) | |
|----------------------|-------------------------------|---------------------------------|---------------------------------|----------------------------------|-----------------------|------------------------|-----------------------|---------------------------------|---------------------------------|---------------------|---------------------|---------------------|--------|
| | | SMALL OUTLINE (D008) | SMALL OUTLINE (D014) | CHIP CARRIER (FK) | CERAMIC DIP (J) | CERAMIC DIP (JG) | PLASTIC DIP (N) | PLASTIC DIP (P) | TSSOP (PW) | FLAT PACK (U) | FLAT PACK (W) | | |
| 0°C to 70°C | 15 mV 6 mV 3 mV | TL081CD TL081ACD TL081BCD | — | — | — | — | — | — | TL081CP TL081ACP TL081BCP | TL081CPW | — | — | — |
| | 15 mV 6 mV 3 mV | TL082CD TL082ACD TL082BCD | — | — | — | — | — | — | TL082CP TL082ACP TL082BCP | TL082CPW | — | — | TL082Y |
| | 15 mV 6 mV 3 mV | — | TL084CD TL084ACD TL084BCD | — | — | — | — | TL084CN TL084ACN TL084BCN | — | TL084CPW | — | — | TL084Y |
| −40°C to 85°C | 6 mV 6 mV 6 mV | TL081ID TL082ID TL084ID | — | — | — | — | — | TL081IP TL082IP TL084IN | — | — | — | — | — |
| −55°C to 125°C | 6 mV 6 mV 9 mV | — | — | TL081MFK TL082MFK TL084MFK | — | TL081MJG TL082MJG | — | — | — | — | TL081MU TL082MU | — | — |
| | | | | | TL084MJ | | | | | | TL084MW | | |

The D package is available taped and reeled. Add R suffix to the device type (e.g., TL081CDR).

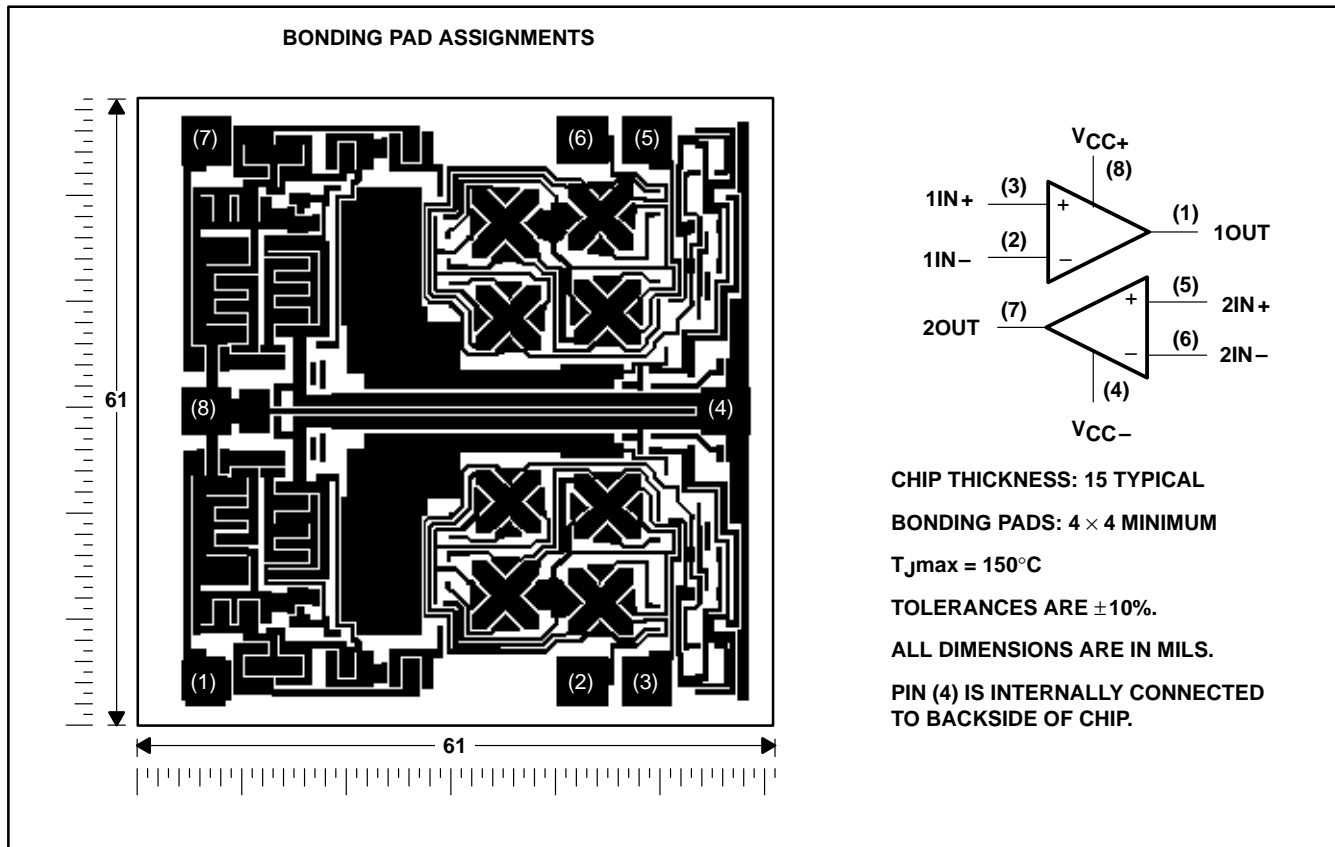
TL081, TL081A, TL081B, TL082, TL082A, TL082B
 TL082Y, TL084, TL084A, TL084B, TL084Y
JFET-INPUT OPERATIONAL AMPLIFIERS
 SLOS081D – FEBRUARY 1977 – REVISED FEBRUARY 1997

TL081, TL081A, TL081B, TL082, TL082A, TL082B
 TL082Y, TL084, TL084A, TL084B, TL084Y
 JFET-INPUT OPERATIONAL AMPLIFIERS

SLOS081D – FEBRUARY 1977 – REVISED FEBRUARY 1997

TL082Y chip information

These chips, when properly assembled, display characteristics similar to the TL082. Thermal compression or ultrasonic bonding may be used on the doped-aluminum bonding pads. Chips may be mounted with conductive epoxy or a gold-silicon preform.

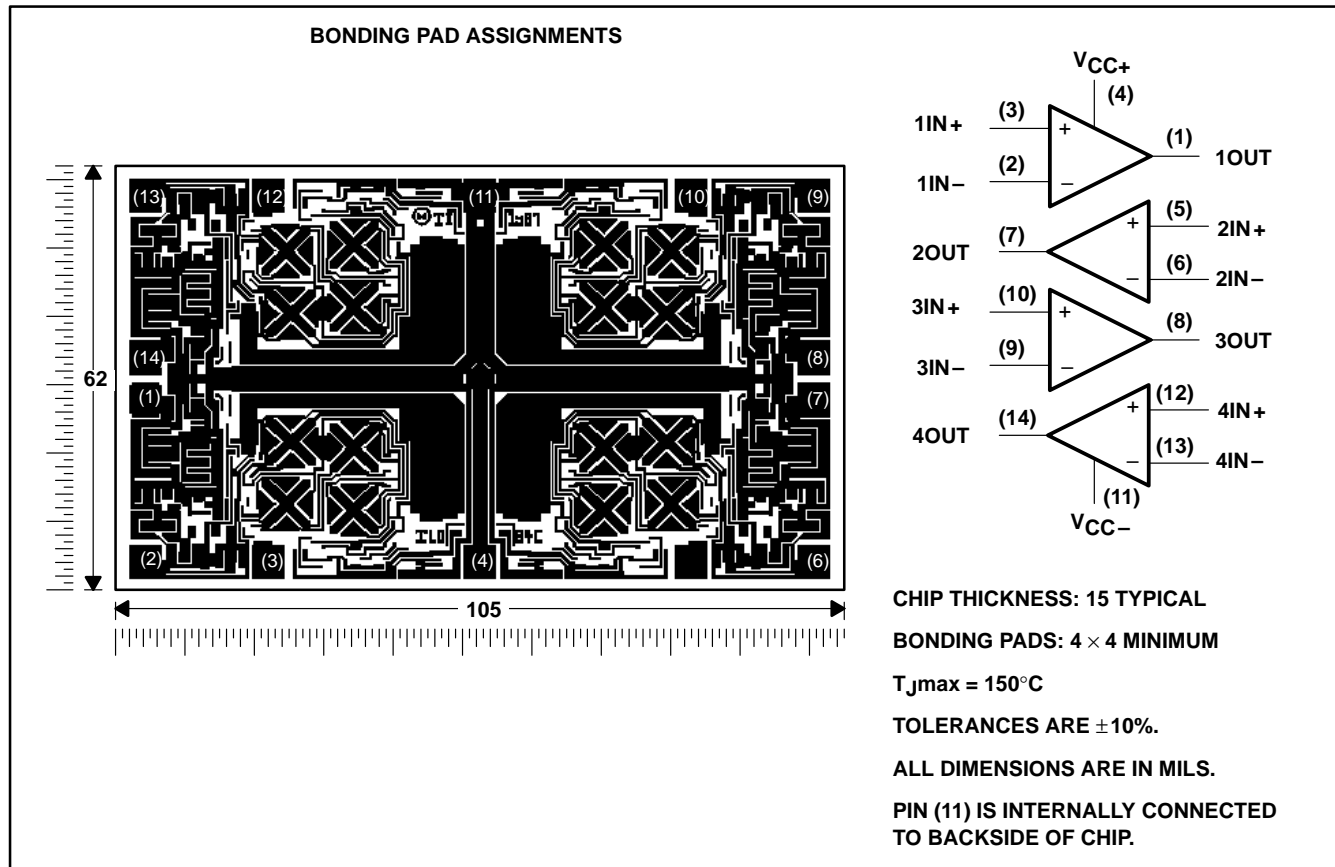


**TL081, TL081A, TL081B, TL082, TL082A, TL082B
 TL082Y, TL084, TL084A, TL084B, TL084Y
 JFET-INPUT OPERATIONAL AMPLIFIERS**

SLOS081D – FEBRUARY 1977 – REVISED FEBRUARY 1997

TL084Y chip information

These chips, when properly assembled, display characteristics similar to the TL084. Thermal compression or ultrasonic bonding may be used on the doped-aluminum bonding pads. Chips may be mounted with conductive epoxy or a gold-silicon preform.



**TL081, TL081A, TL081B, TL082, TL082A, TL082B
TL082Y, TL084, TL084A, TL084B, TL084Y
JFET-INPUT OPERATIONAL AMPLIFIERS**

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absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

| | TL08_C TL08_AC TL08_BC | TL08_I | TL08_M | UNIT |
|--|------------------------------|------------|------------|------|
| Supply voltage, V_{CC+} (see Note 1) | 18 | 18 | 18 | V |
| Supply voltage V_{CC-} (see Note 1) | -18 | -18 | -18 | V |
| Differential input voltage, V_{ID} (see Note 2) | ± 30 | ± 30 | ± 30 | V |
| Input voltage, V_I (see Notes 1 and 3) | ± 15 | ± 15 | ± 15 | V |
| Duration of output short circuit (see Note 4) | unlimited | unlimited | unlimited | |
| Continuous total power dissipation | See Dissipation Rating Table | | | |
| Operating free-air temperature range, T_A | 0 to 70 | -40 to 85 | -55 to 125 | °C |
| Storage temperature range, T_{stg} | -65 to 150 | -65 to 150 | -65 to 150 | °C |
| Case temperature for 60 seconds, T_C | FK package | | | 260 |
| Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds | J or JG package | | | 300 |
| Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds | D, N, P, or PW package | | | 260 |

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- NOTES:
1. All voltage values, except differential voltages, are with respect to the midpoint between V_{CC+} and V_{CC-} .
 2. Differential voltages are at $IN+$ with respect to $IN-$.
 3. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 V, whichever is less.
 4. The output may be shorted to ground or to either supply. Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.

DISSIPATION RATING TABLE

| PACKAGE | $T_A \leq 25^\circ\text{C}$ POWER RATING | DERATING FACTOR | DERATE ABOVE T_A | $T_A = 70^\circ\text{C}$ POWER RATING | $T_A = 85^\circ\text{C}$ POWER RATING | $T_A = 125^\circ\text{C}$ POWER RATING |
|-------------|---|--------------------|-----------------------|--|--|---|
| D (8 pin) | 680 mW | 5.8 mW/°C | 32°C | 460 mW | 373 mW | N/A |
| D (14 pin) | 680 mW | 7.6 mW/°C | 60°C | 604 mW | 490 mW | N/A |
| FK | 680 mW | 11.0 mW/°C | 88°C | 680 mW | 680 mW | 273 mW |
| J | 680 mW | 11.0 mW/°C | 88°C | 680 mW | 680 mW | 273 mW |
| JG | 680 mW | 8.4 mW/°C | 69°C | 672 mW | 546 mW | 210 mW |
| N | 680 mW | 9.2 mW/°C | 76°C | 680 mW | 597 mW | N/A |
| P | 680 mW | 8.0 mW/°C | 65°C | 640 mW | 520 mW | N/A |
| PW (8 pin) | 525 mW | 4.2 mW/°C | 25°C | 336 mW | N/A | N/A |
| PW (14 pin) | 700 mW | 5.6 mW/°C | 25°C | 448 mW | N/A | N/A |
| U | 675 mW | 5.4 mW/°C | 25°C | 432 mW | 351 mW | 135 mW |
| W | 680 mW | 8.0 mW/°C | 65°C | 640 mW | 520 mW | 200 mW |



electrical characteristics, $V_{CC\pm} = \pm 15\text{ V}$ (unless otherwise noted)

| PARAMETER | TEST CONDITIONS | T_A † | TL081C TL082C TL084C | | | TL081AC TL082AC TL084AC | | | TL081BC TL082BC TL084BC | | | TL081I TL082I TL084I | | | UNIT |
|---|---|------------|----------------------------|------------|-----|-------------------------------|------------|-----|-------------------------------|------------|-----|----------------------------|------------|------------------------------|------|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | |
| V_{IO} Input offset voltage | $V_O = 0$ $R_S = 50\ \Omega$ | 25°C | 3 | 15 | | 3 | 6 | | 2 | 3 | | 3 | 6 | mV | |
| | | Full range | | 20 | | | 7.5 | | | 5 | | | 9 | | |
| α_{VIO} Temperature coefficient of input offset voltage | $V_O = 0$ $R_S = 50\ \Omega$ | Full range | | 18 | | | 18 | | | 18 | | | 18 | $\mu\text{V}/^\circ\text{C}$ | |
| I_{IO} Input offset current‡ | $V_O = 0$ | 25°C | 5 | 200 | | 5 | 100 | | 5 | 100 | | 5 | 100 | pA | |
| | | Full range | | 2 | | | 2 | | | 2 | | | 10 | nA | |
| I_{IB} Input bias current‡ | $V_O = 0$ | 25°C | 30 | 400 | | 30 | 200 | | 30 | 200 | | 30 | 200 | pA | |
| | | Full range | | 10 | | | 7 | | | 7 | | | 20 | nA | |
| V_{ICR} Common-mode input voltage range | | 25°C | ± 11 | -12 to 15 | | ± 11 | -12 to 15 | | ± 11 | -12 to 15 | | ± 11 | -12 to 15 | V | |
| V_{OM} Maximum peak output voltage swing | $R_L = 10\ \text{k}\Omega$ | 25°C | ± 12 | ± 13.5 | | ± 12 | ± 13.5 | | ± 12 | ± 13.5 | | ± 12 | ± 13.5 | V | |
| | $R_L \geq 10\ \text{k}\Omega$ | Full range | ± 12 | | | ± 12 | | | ± 12 | | | ± 12 | | | |
| | $R_L \geq 2\ \text{k}\Omega$ | | ± 10 | ± 12 | | ± 10 | ± 12 | | ± 10 | ± 12 | | ± 10 | ± 12 | | |
| A_{VD} Large-signal differential voltage amplification | $V_O = \pm 10\ \text{V}$, $R_L \geq 2\ \text{k}\Omega$ | 25°C | 25 | 200 | | 50 | 200 | | 50 | 200 | | 50 | 200 | V/mV | |
| | $V_O = \pm 10\ \text{V}$, $R_L \geq 2\ \text{k}\Omega$ | Full range | 15 | | | 25 | | | 25 | | | 25 | | | |
| B_1 Unity-gain bandwidth | | 25°C | | 3 | | | 3 | | | 3 | | | 3 | MHz | |
| r_i Input resistance | | 25°C | | 10^{12} | | | 10^{12} | | | 10^{12} | | | 10^{12} | Ω | |
| CMRR Common-mode rejection ratio | $V_{IC} = V_{ICRmin}$, $V_O = 0$, $R_S = 50\ \Omega$ | 25°C | 70 | 86 | | 75 | 86 | | 75 | 86 | | 75 | 86 | dB | |
| k_{SVR} Supply voltage rejection ratio ($\Delta V_{CC\pm} / \Delta V_{IO}$) | $V_{CC} = \pm 15\ \text{V}$ to $\pm 9\ \text{V}$, $V_O = 0$, $R_S = 50\ \Omega$ | 25°C | 70 | 86 | | 80 | 86 | | 80 | 86 | | 80 | 86 | dB | |
| I_{CC} Supply current (per amplifier) | $V_O = 0$, No load | 25°C | | 1.4 | 2.8 | | 1.4 | 2.8 | | 1.4 | 2.8 | | 1.4 | 2.8 | mA |
| V_{O1}/V_{O2} Crosstalk attenuation | $A_{VD} = 100$ | 25°C | | 120 | | | 120 | | | 120 | | | 120 | dB | |

† All characteristics are measured under open-loop conditions with zero common-mode voltage unless otherwise specified. Full range for T_A is 0°C to 70°C for TL08_C, TL08_AC, TL08_BC and -40°C to 85°C for TL08_I.

‡ Input bias currents of a FET-input operational amplifier are normal junction reverse currents, which are temperature sensitive as shown in Figure 17. Pulse techniques must be used that maintain the junction temperature as close to the ambient temperature as possible.

**TL081, TL081A, TL081B, TL082, TL082A, TL082B
TL082Y, TL084, TL084A, TL084B, TL084Y
JFET-INPUT OPERATIONAL AMPLIFIERS**

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electrical characteristics, $V_{CC\pm} = \pm 15\text{ V}$ (unless otherwise noted)

| PARAMETER | TEST CONDITION [†] | T_A | TL081M, TL082M | | | TL084M | | | UNIT |
|---|--|----------------|----------------|----------------------|-----|----------|----------------------|-----|------------------------------|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| V_{IO} Input offset voltage | $V_O = 0, R_S = 50\ \Omega$ | 25°C | | 3 | 6 | | 3 | 9 | mV |
| | | -55°C to 125°C | | | 9 | | | 15 | |
| α_{VIO} Temperature coefficient of input offset voltage | $V_O = 0, R_S = 50\ \Omega$ | -55°C to 125°C | | 18 | | | 18 | | $\mu\text{V}/^\circ\text{C}$ |
| I_{IO} Input offset current [‡] | $V_O = 0$ | 25°C | | 5 | 100 | | 5 | 100 | pA |
| | | 125°C | | | 20 | | | 20 | nA |
| I_{IB} Input bias current [‡] | $V_O = 0$ | 25°C | | 30 | 200 | | 30 | 200 | pA |
| | | 125°C | | | 50 | | | 50 | nA |
| V_{ICR} Common-mode input voltage range | | 25°C | ± 11 | ± 12 to ± 15 | | ± 11 | ± 12 to ± 15 | | V |
| V_{OM} Maximum peak output voltage swing | $R_L = 10\ \text{k}\Omega$ | 25°C | ± 12 | ± 13.5 | | ± 12 | ± 13.5 | | V |
| | $R_L \geq 10\ \text{k}\Omega$ | -55°C to 125°C | ± 12 | | | ± 12 | | | |
| | $R_L \geq 2\ \text{k}\Omega$ | | ± 10 | ± 12 | | ± 10 | ± 12 | | |
| A_{VD} Large-signal differential voltage amplification | $V_O = \pm 10\ \text{V}, R_L \geq 2\ \text{k}\Omega$ | 25°C | 25 | 200 | | 25 | 200 | | V/mV |
| | $V_O = \pm 10\ \text{V}, R_L \geq 2\ \text{k}\Omega$ | -55°C to 125°C | 15 | | | 15 | | | |
| B_1 Unity-gain bandwidth | | 25°C | | 3 | | | 3 | | MHz |
| r_i Input resistance | | 25°C | | 10^{12} | | | 10^{12} | | Ω |
| CMRR Common-mode rejection ratio | $V_{IC} = V_{ICR\text{min}}, V_O = 0, R_S = 50\ \Omega$ | 25°C | 80 | 86 | | 80 | 86 | | dB |
| k_{SVR} Supply voltage rejection ratio ($\Delta V_{CC\pm}/\Delta V_{IO}$) | $V_{CC} = \pm 15\ \text{V to } \pm 9\ \text{V}, V_O = 0, R_S = 50\ \Omega$ | 25°C | 80 | 86 | | 80 | 86 | | dB |
| I_{CC} Supply current (per amplifier) | $V_O = 0, \text{ No load}$ | 25°C | | 1.4 | 2.8 | | 1.4 | 2.8 | mA |
| V_{O1}/V_{O2} Crosstalk attenuation | $A_{VD} = 100$ | 25°C | | 120 | | | 120 | | dB |

[†] All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified.

[‡] Input bias currents of a FET-input operational amplifier are normal junction reverse currents, which are temperature sensitive as shown in Figure 17. Pulse techniques must be used that maintain the junction temperatures as close to the ambient temperature as is possible.

operating characteristics, $V_{CC\pm} = \pm 15\ \text{V}, T_A = 25^\circ\text{C}$ (unless otherwise noted)

| PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------------------|--|--|--------|-----|------------------------------|
| SR Slew rate at unity gain | $V_I = 10\ \text{V}, R_L = 2\ \text{k}\Omega, C_L = 100\ \text{pF}, \text{ See Figure 1}$ | 8* | 13 | | V/ μs |
| | $V_I = 10\ \text{V}, R_L = 2\ \text{k}\Omega, C_L = 100\ \text{pF}, T_A = -55^\circ\text{C to } 125^\circ\text{C}, \text{ See Figure 1}$ | 5* | | | |
| t_r Rise time | $V_I = 20\ \text{mV}, R_L = 2\ \text{k}\Omega, C_L = 100\ \text{pF}, \text{ See Figure 1}$ | | 0.05 | | μs |
| Overshoot factor | | | 20% | | |
| V_n Equivalent input noise voltage | $R_S = 20\ \Omega$ | $f = 1\ \text{kHz}$ | 18 | | $\text{nV}/\sqrt{\text{Hz}}$ |
| | | $f = 10\ \text{Hz to } 10\ \text{kHz}$ | 4 | | μV |
| I_n Equivalent input noise current | $R_S = 20\ \Omega, f = 1\ \text{kHz}$ | | 0.01 | | $\text{pA}/\sqrt{\text{Hz}}$ |
| THD Total harmonic distortion | $V_{I\text{rms}} = 6\ \text{V}, f = 1\ \text{kHz}, A_{VD} = 1, R_S \leq 1\ \text{k}\Omega, R_L \geq 2\ \text{k}\Omega,$ | | 0.003% | | |

*On products compliant to MIL-PRF-38535, this parameter is not production tested.



**TL081, TL081A, TL081B, TL082, TL082A, TL082B
TL082Y, TL084, TL084A, TL084B, TL084Y
JFET-INPUT OPERATIONAL AMPLIFIERS**

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electrical characteristics, $V_{CC\pm} = \pm 15\text{ V}$, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

| PARAMETER | TEST CONDITIONS† | TL082Y, TL084Y | | | UNIT |
|---|--|----------------|-----------------|-----|------------------------------|
| | | MIN | TYP | MAX | |
| V_{IO} Input offset voltage | $V_O = 0$, $R_S = 50\ \Omega$ | | 3 | 15 | mV |
| αV_{IO} Temperature coefficient of input offset voltage | $V_O = 0$, $R_S = 50\ \Omega$ | | 18 | | $\mu\text{V}/^\circ\text{C}$ |
| I_{IO} Input offset current‡ | $V_O = 0$, | | 5 | 200 | pA |
| I_{IB} Input bias current‡ | $V_O = 0$, | | 30 | 400 | pA |
| V_{ICR} Common-mode input voltage range | | ± 11 | -12 to 15 | | V |
| V_{OM} Maximum peak output voltage swing | $R_L = 10\ \text{k}\Omega$, | ± 12 | ± 13.5 | | V |
| A_{VD} Large-signal differential voltage amplification | $V_O = \pm 10\ \text{V}$, $R_L \geq 2\ \text{k}\Omega$ | 25 | 200 | | V/mV |
| B_1 Unity-gain bandwidth | | | 3 | | MHz |
| r_i Input resistance | | | 10^{12} | | Ω |
| CMRR Common-mode rejection ratio | $V_{IC} = V_{ICRmin}$, $V_O = 0$, $R_S = 50\ \Omega$ | 70 70 | 86 86 | | dB |
| k_{SVR} Supply voltage rejection ratio ($\Delta V_{CC\pm} / \Delta V_{IO}$) | $V_{CC} = \pm 15\ \text{V}$ to $\pm 9\ \text{V}$, $V_O = 0$, $R_S = 50\ \Omega$ | 70 70 | 86 86 | | dB |
| I_{CC} Supply current (per amplifier) | $V_O = 0$, No load | | 1.4 | 2.8 | mA |
| V_{O1}/V_{O2} Crosstalk attenuation | $A_{VD} = 100$ | | 120 | | dB |

† All characteristics are measured under open-loop conditions with zero common-mode voltage unless otherwise specified.

‡ Input bias currents of a FET-input operational amplifier are normal junction reverse currents, which are temperature sensitive as shown in Figure 17. Pulse techniques must be used that maintain the junction temperature as close to the ambient temperature as possible.

operating characteristics, $V_{CC\pm} = \pm 15\ \text{V}$, $T_A = 25^\circ\text{C}$

| PARAMETER | TEST CONDITIONS | | | MIN | TYP | MAX | UNIT |
|--------------------------------------|--|---|---|--------|-----|-----|------------------------------|
| SR Slew rate at unity gain | $V_I = 10\ \text{V}$, | $R_L = 2\ \text{k}\Omega$, | $C_L = 100\ \text{pF}$, See Figure 1 | 8 | 13 | | V/ μs |
| t_r Rise time | $V_I = 20\ \text{mV}$, | $R_L = 2\ \text{k}\Omega$, | $C_L = 100\ \text{pF}$, See Figure 1 | 0.05 | | | μs |
| Overshoot factor | | | | 20% | | | |
| V_n Equivalent input noise voltage | $R_S = 20\ \Omega$ | $f = 1\ \text{kHz}$ | | 18 | | | $\text{nV}/\sqrt{\text{Hz}}$ |
| | | $f = 10\ \text{Hz}$ to $10\ \text{kHz}$ | | 4 | | | μV |
| I_n Equivalent input noise current | $R_S = 20\ \Omega$, | $f = 1\ \text{kHz}$ | | 0.01 | | | $\text{pA}/\sqrt{\text{Hz}}$ |
| THD Total harmonic distortion | $V_{I\text{rms}} = 6\ \text{V}$, $f = 1\ \text{kHz}$ | $A_{VD} = 1$, | $R_S \leq 1\ \text{k}\Omega$, $R_L \geq 2\ \text{k}\Omega$, | 0.003% | | | |



PARAMETER MEASUREMENT INFORMATION

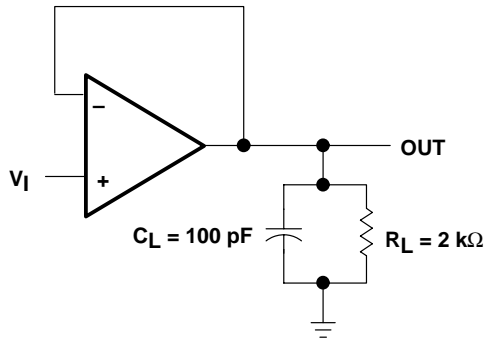


Figure 1

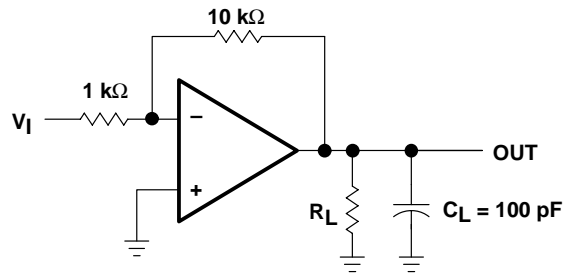


Figure 2

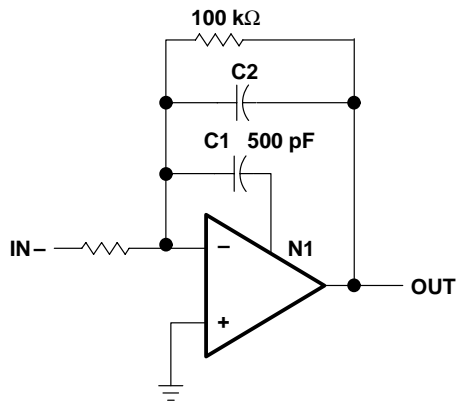


Figure 3

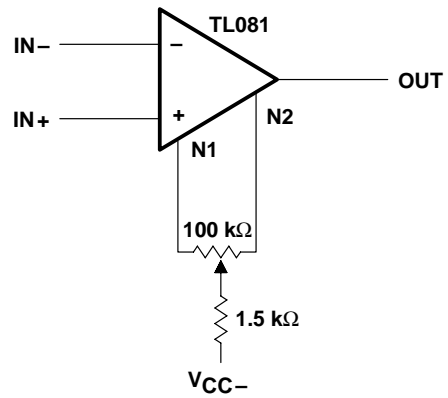


Figure 4

**TL081, TL081A, TL081B, TL082, TL082A, TL082B
TL082Y, TL084, TL084A, TL084B, TL084Y
JFET-INPUT OPERATIONAL AMPLIFIERS**

SLOS081D – FEBRUARY 1977 – REVISED FEBRUARY 1997

TYPICAL CHARACTERISTICS

Table of Graphs

| | | FIGURE |
|-----------------|---|-------------------------|
| V _{OM} | Maximum peak output voltage | vs Frequency |
| | | vs Free-air temperature |
| | | vs Load resistance |
| | | vs Supply voltage |
| A _{VD} | Large-signal differential voltage amplification | 5, 6, 7 |
| | Differential voltage amplification | 8, 9, 10 |
| P _D | Total power dissipation | 11 |
| I _{CC} | Supply current | 12 |
| I _B | Input bias current | 13 |
| | Large-signal pulse response | 14 |
| V _O | Output voltage | 15 |
| CMRR | Common-mode rejection ratio | 16 |
| V _n | Equivalent input noise voltage | 17 |
| THD | Total harmonic distortion | 18 |

**MAXIMUM PEAK OUTPUT VOLTAGE
vs
FREQUENCY**

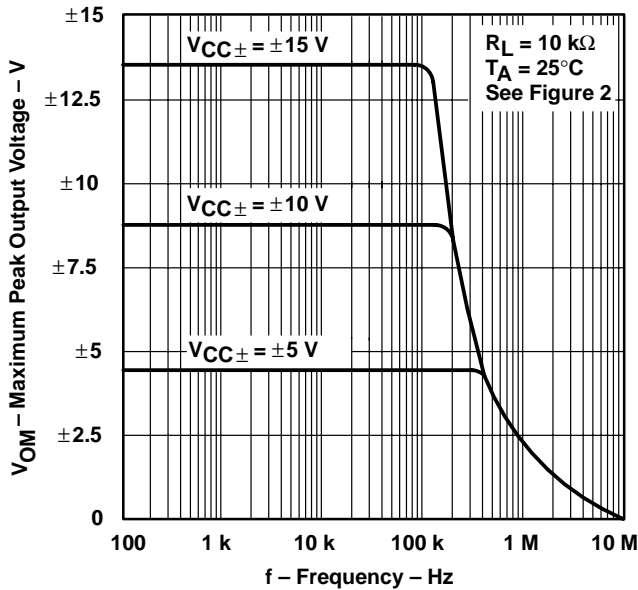


Figure 5

**MAXIMUM PEAK OUTPUT VOLTAGE
vs
FREQUENCY**

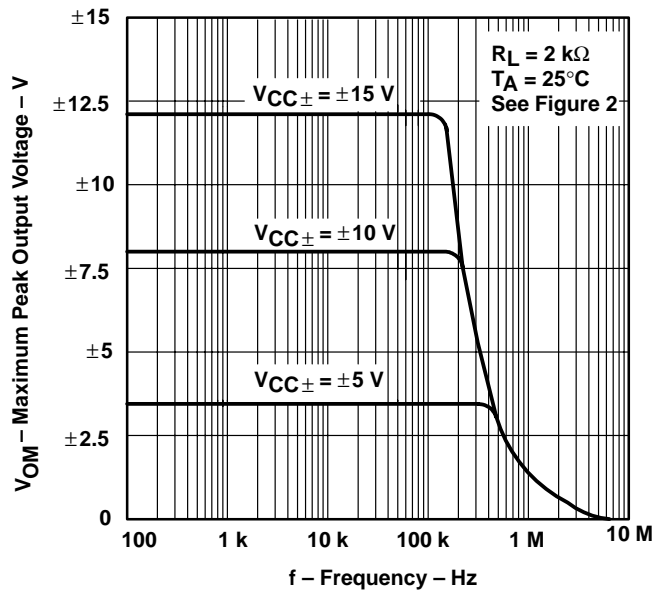
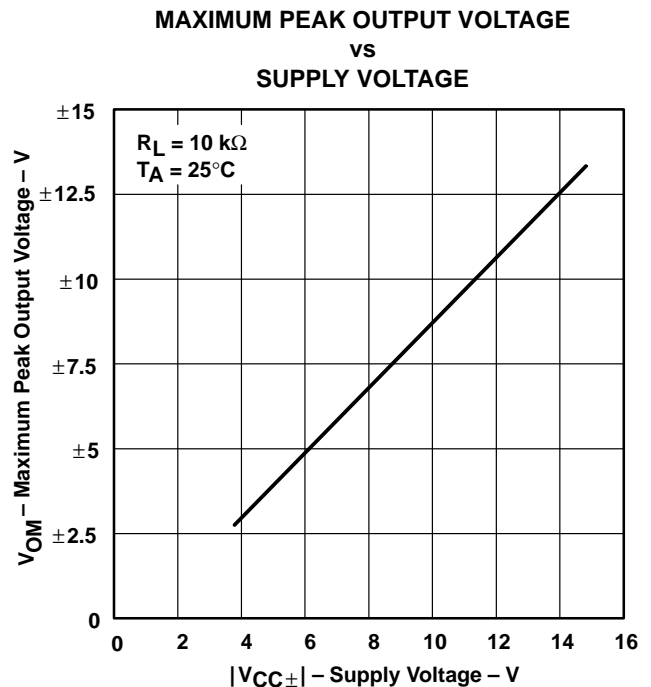
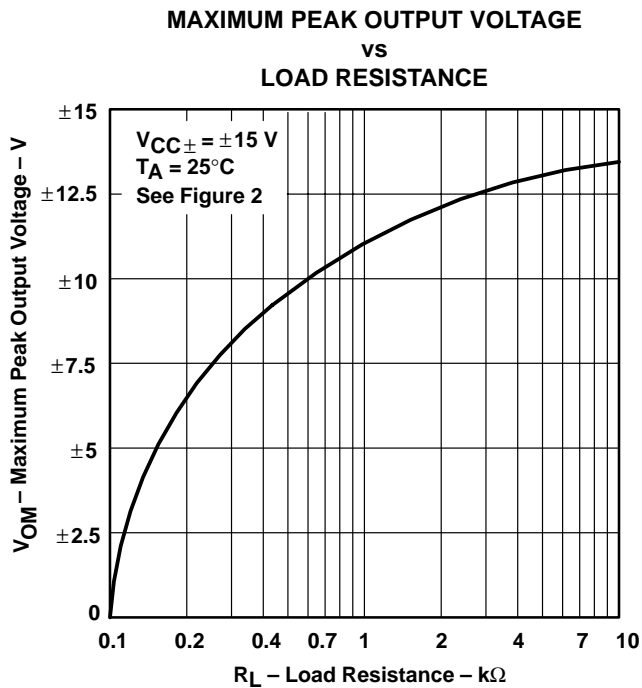
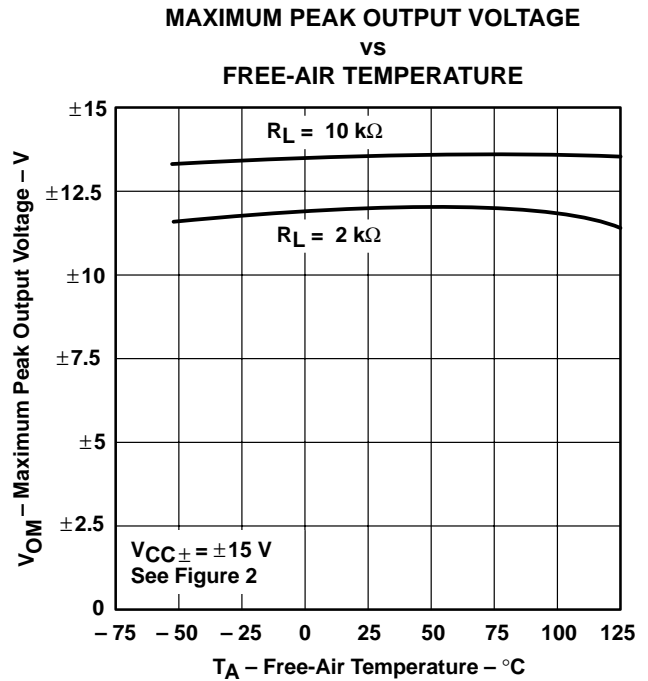
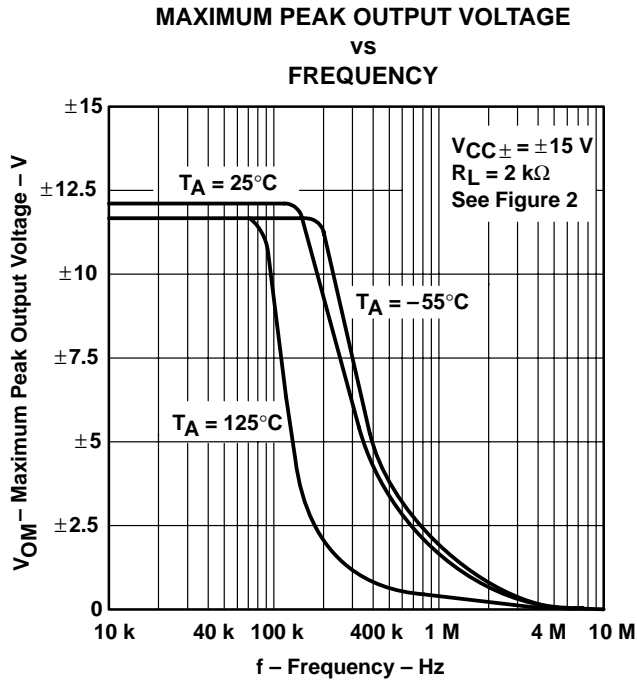


Figure 6



TYPICAL CHARACTERISTICS†



† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

**TL081, TL081A, TL081B, TL082, TL082A, TL082B
 TL082Y, TL084, TL084A, TL084B, TL084Y
 JFET-INPUT OPERATIONAL AMPLIFIERS**

SLOS081D – FEBRUARY 1977 – REVISED FEBRUARY 1997

TYPICAL CHARACTERISTICS†

**LARGE-SIGNAL
 DIFFERENTIAL VOLTAGE AMPLIFICATION
 vs
 FREE-AIR TEMPERATURE**

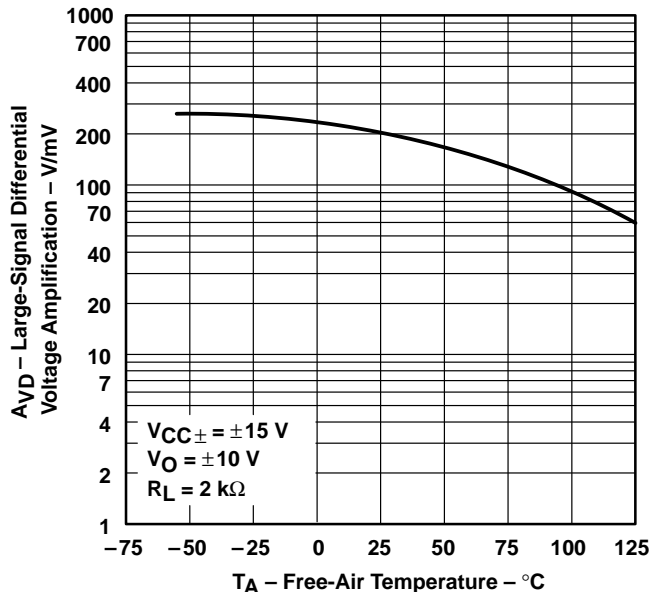


Figure 11

**LARGE-SIGNAL
 DIFFERENTIAL VOLTAGE AMPLIFICATION
 vs
 FREQUENCY**

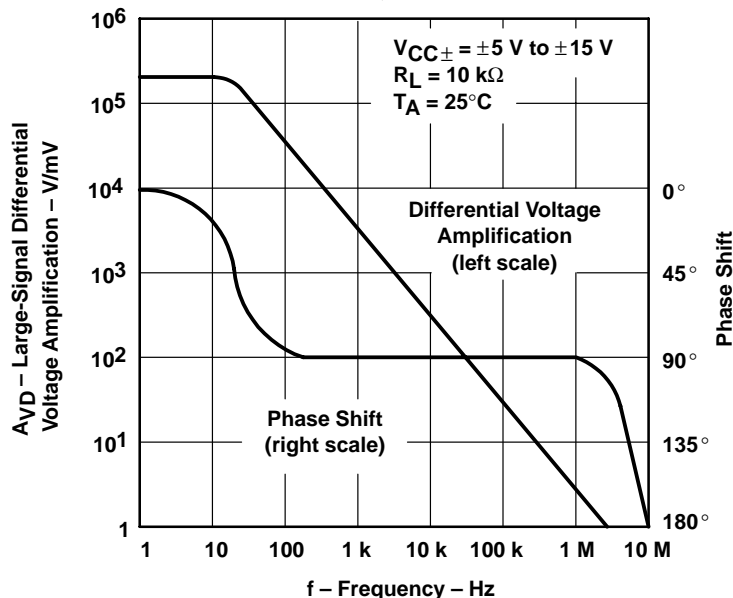


Figure 12

† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.



TYPICAL CHARACTERISTICS†

**DIFFERENTIAL VOLTAGE AMPLIFICATION
 vs
 FREQUENCY WITH FEED-FORWARD COMPENSATION**

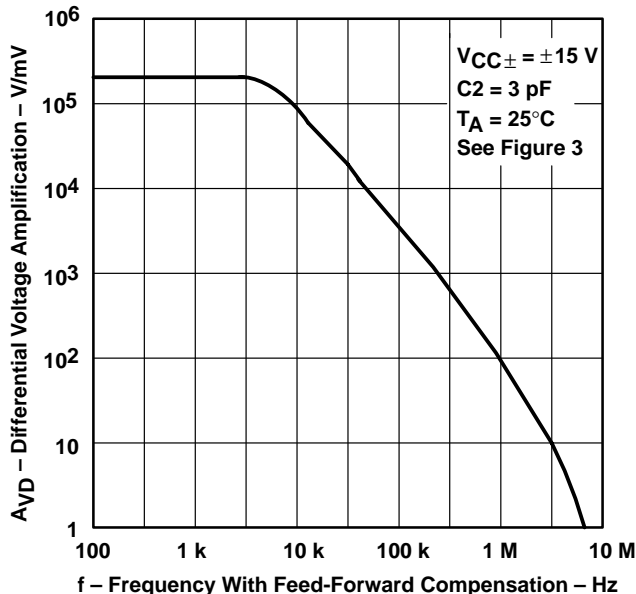


Figure 13

**TOTAL POWER DISSIPATION
 vs
 FREE-AIR TEMPERATURE**

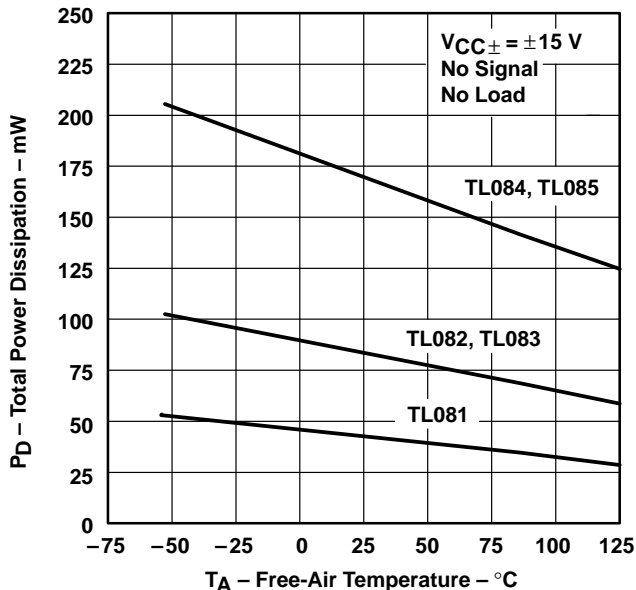


Figure 14

**SUPPLY CURRENT PER AMPLIFIER
 vs
 FREE-AIR TEMPERATURE**

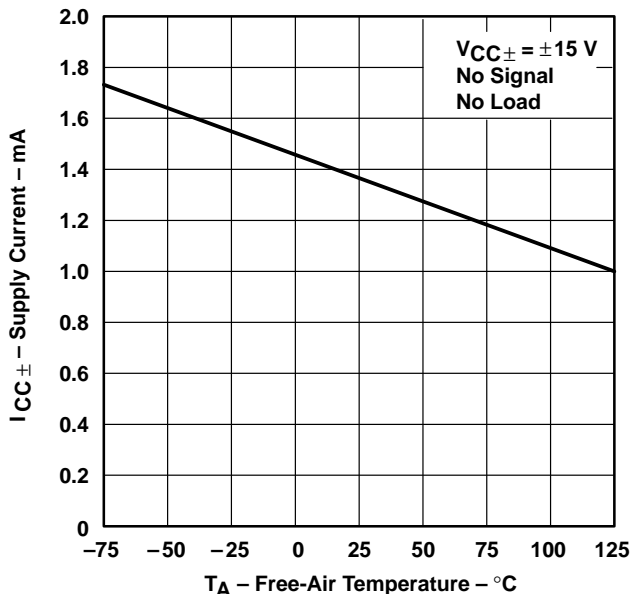


Figure 15

**SUPPLY CURRENT
 vs
 SUPPLY VOLTAGE**

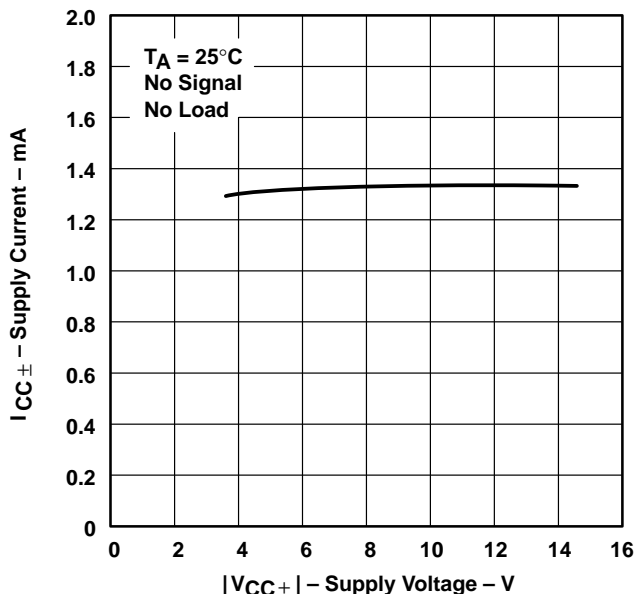


Figure 16

† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

TYPICAL CHARACTERISTICS†

**INPUT BIAS CURRENT
 vs
 FREE-AIR TEMPERATURE**

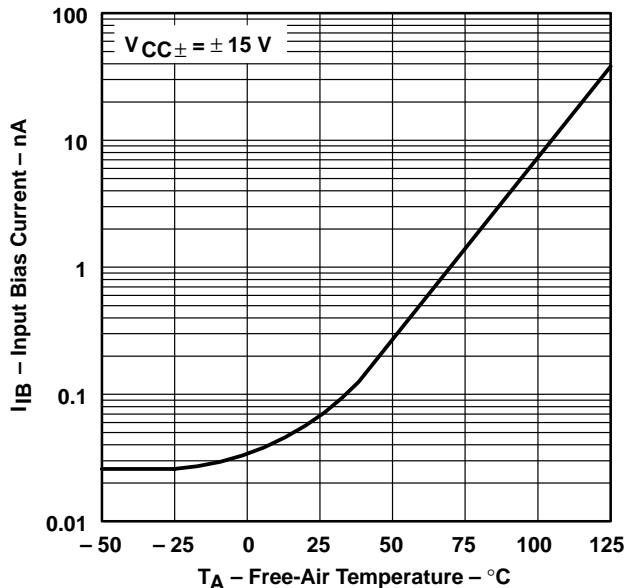


Figure 17

**VOLTAGE-FOLLOWER
 LARGE-SIGNAL PULSE RESPONSE**

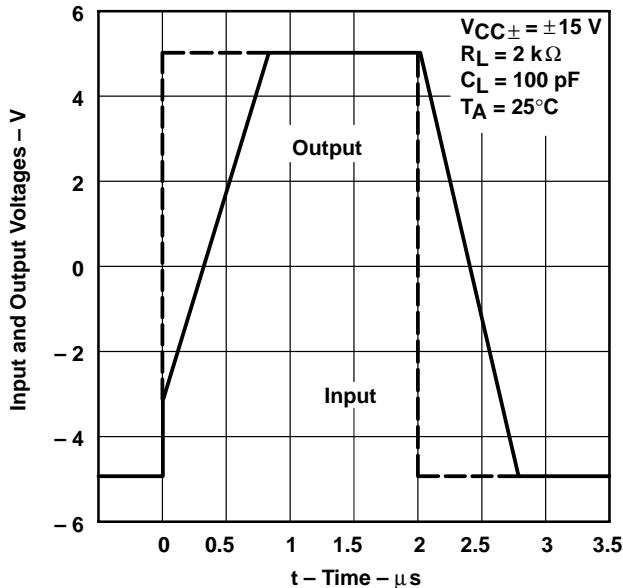


Figure 18

**OUTPUT VOLTAGE
 vs
 ELAPSED TIME**

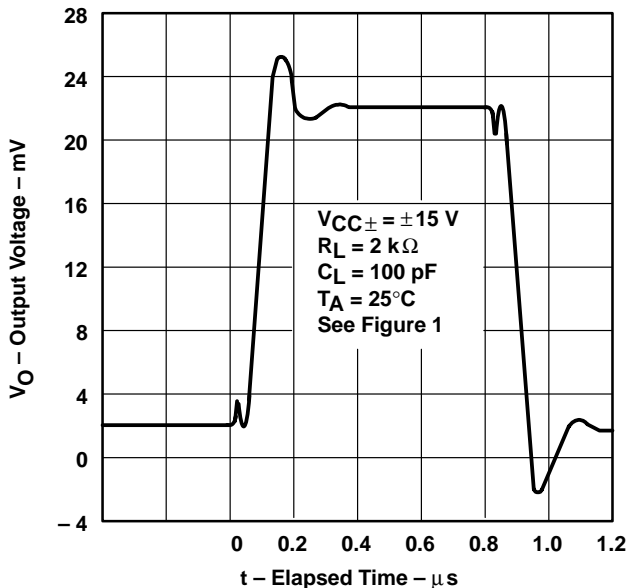


Figure 19

**COMMON-MODE REJECTION RATIO
 vs
 FREE-AIR TEMPERATURE**

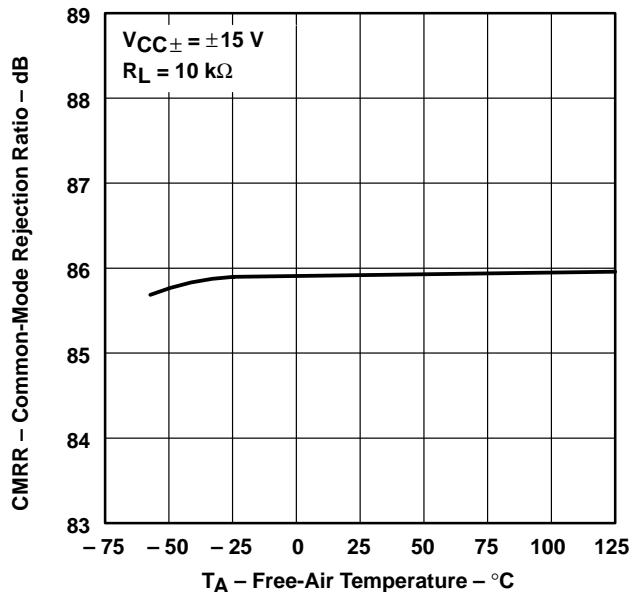
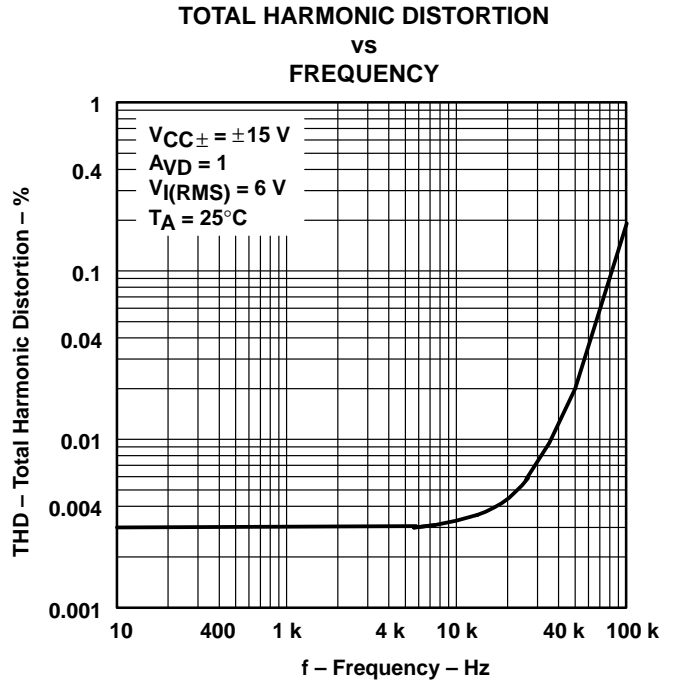
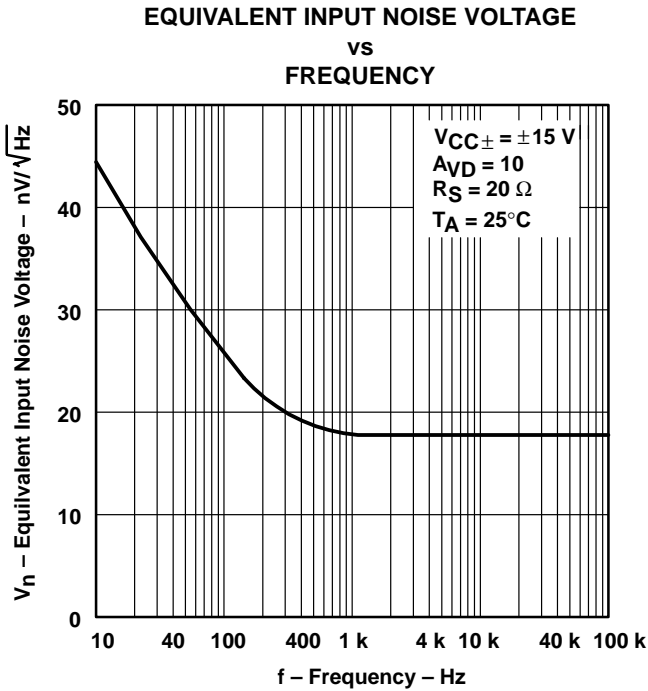


Figure 20

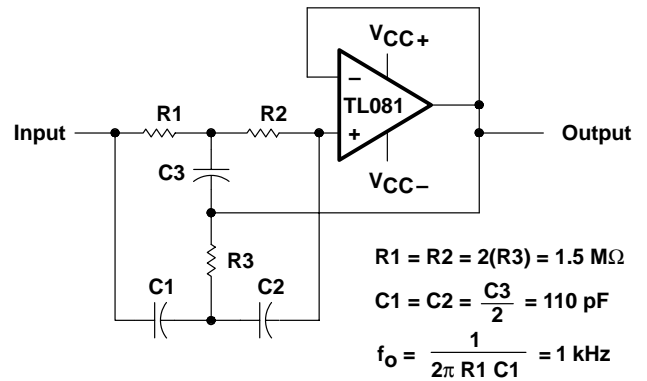
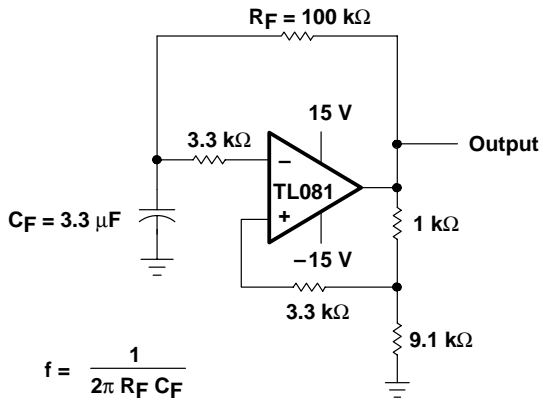
† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

TYPICAL CHARACTERISTICS†



† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

APPLICATION INFORMATION



APPLICATION INFORMATION

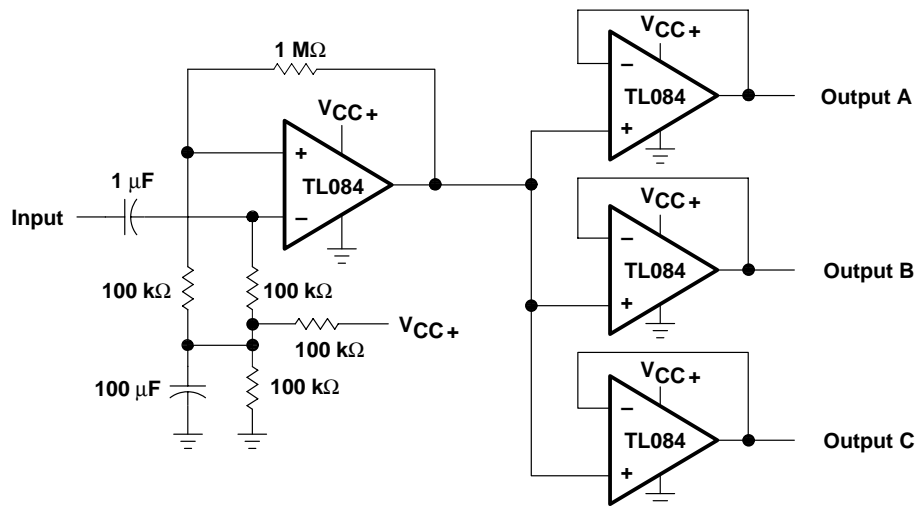
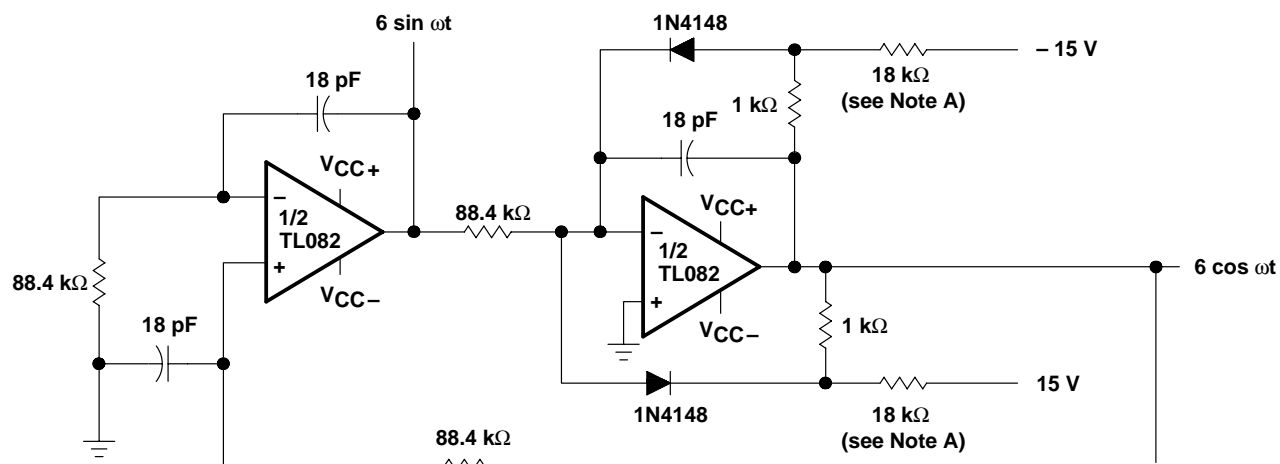


Figure 25. Audio-Distribution Amplifier



NOTE A: These resistor values may be adjusted for a symmetrical output.

Figure 26. 100-KHz Quadrature Oscillator

APPLICATION INFORMATION

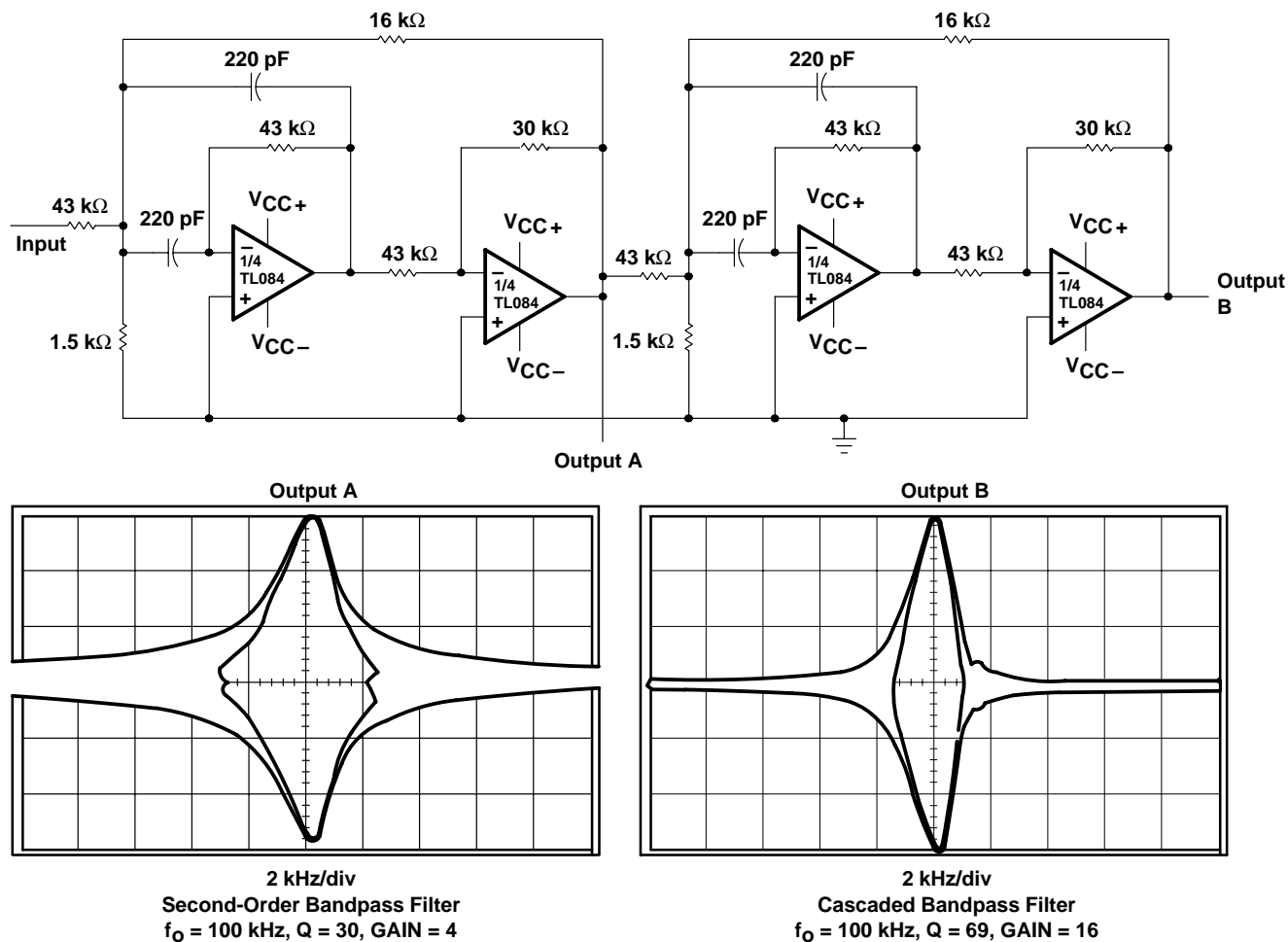


Figure 27. Positive-Feedback Bandpass Filter

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