

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

SLOS081G – FEBRUARY 1977 – REVISED SEPTEMBER 2004

- 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/ordering information

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

ORDERING INFORMATION

T_J	V_{IOmax} AT 25°C	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	15 mV	PDIP (P)	Tube of 50	TL081CP	TL081CP
			Tube of 50	TL082CP	TL082CP
		PDIP (N)	Tube of 25	TL084CN	TL084CN
		SOIC (D)	Tube of 75	TL081CD	TL081C
			Reel of 2500	TL081CDR	
			Tube of 75	TL082CD	TL082C
			Reel of 2500	TL082CDR	
			Tube of 50	TL084CD	TL084C
			Reel of 2500	TL084CDR	
		SOP (PS)	Reel of 2000	TL081CPSR	T081
			Reel of 2000	TL082CPSR	T082
		SOP (NS)	Reel of 2000	TL084CNSR	TL084
		TSSOP (PW)	Tube of 150	TL082CPW	T082
			Reel of 2000	TL082CPWR	
			Tube of 90	TL084CPW	T084
			Reel of 2000	TL084CPWR	

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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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.



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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.

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TL084, TL084A, TL084B
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description/ordering information (continued)

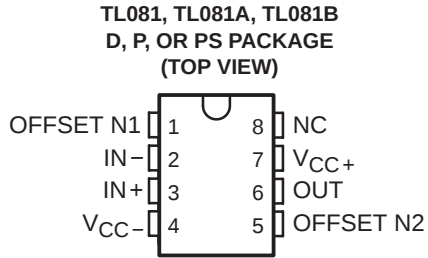
ORDERING INFORMATION

T_J	V_{IOmax} AT 25°C	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	6 mV	PDIP (P)	Tube of 50	TL081ACP	TL081ACP
			Tube of 50	TL082ACP	TL082ACP
		PDIP (N)	Tube of 25	TL084ACN	TL084ACN
		SOIC (D)	Tube of 75	TL081ACD	081AC
			Reel of 2500	TL081ACDR	
			Tube of 75	TL082ACD	082AC
			Reel of 2500	TL082ACDR	
			Tube of 50	TL084ACD	TL084AC
			Reel of 2500	TL084ACDR	
		SOP (PS)	Reel of 2000	TL082ACPSR	T082A
		SOP (NS)	Reel of 2000	TL084ACNSR	TL084A
	3 mV	PDIP (P)	Tube of 50	TL081BCP	TL081BCP
			Tube of 50	TL082BCP	TL082BCP
		PDIP (N)	Tube of 25	TL084BCN	TL084BCN
		SOIC (D)	Tube of 75	TL081BCD	081BC
			Reel of 2500	TL081BCDR	
			Tube of 75	TL082BCD	082BC
			Reel of 2500	TL082BCDR	
			Tube of 50	TL084BCD	TL084BC
			Reel of 2500	TL084BCDR	
–40°C to 85°C	6 mV	PDIP (P)	Tube of 50	TL081IP	TL081IP
			Tube of 50	TL082IP	TL082IP
		PDIP (N)	Tube of 25	TL084IN	TL081IN
		SOIC (D)	Tube of 75	TL081ID	TL081I
			Reel of 2500	TL081IDR	
			Tube of 75	TL082ID	TL082I
			Reel of 2500	TL082IDR	
			Tube of 50	TL084ID	TL084I
			Reel of 2500	TL084IDR	
		TSSOP (PW)	Reel of 2000	TL082IPWR	Z082
–40°C to 125°C	9 mV	SOIC (D)	Tube of 50	TL084QD	TL084QD
			Reel of 2500	TL084QDR	
–55°C to 125°C	9 mV	CDIP (J)	Tube of 25	TL084MJ	TL084MJ
		LCCC (FK)	Reel of 55	TL084FK	TL084FK
	6 mV	CDIP (JG)	Tube of 50	TL082MJG	TL082MJG
		LCCC (FK)	Tube of 55	TL082MFK	TL082MFK

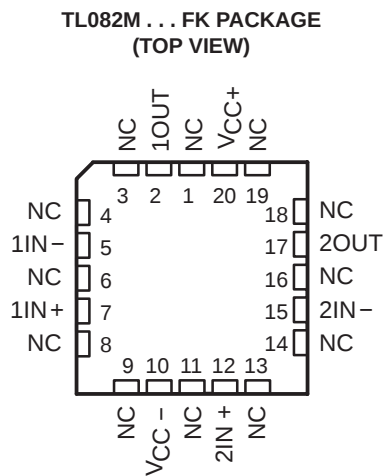
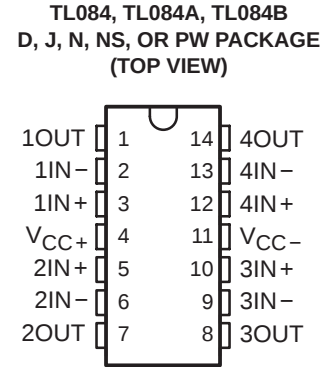
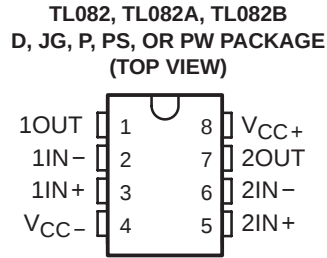
† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

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

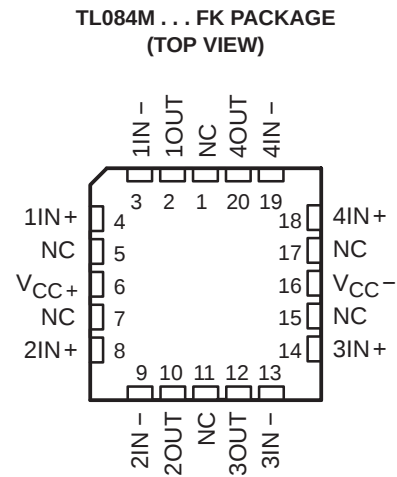
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NC – No internal connection

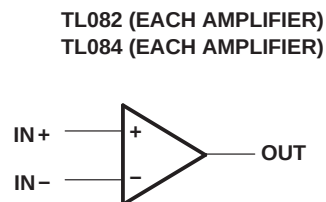
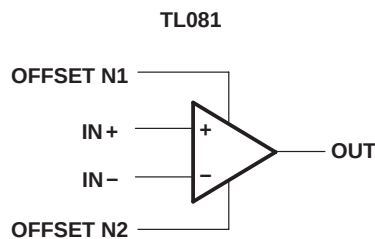


NC – No internal connection



NC – No internal connection

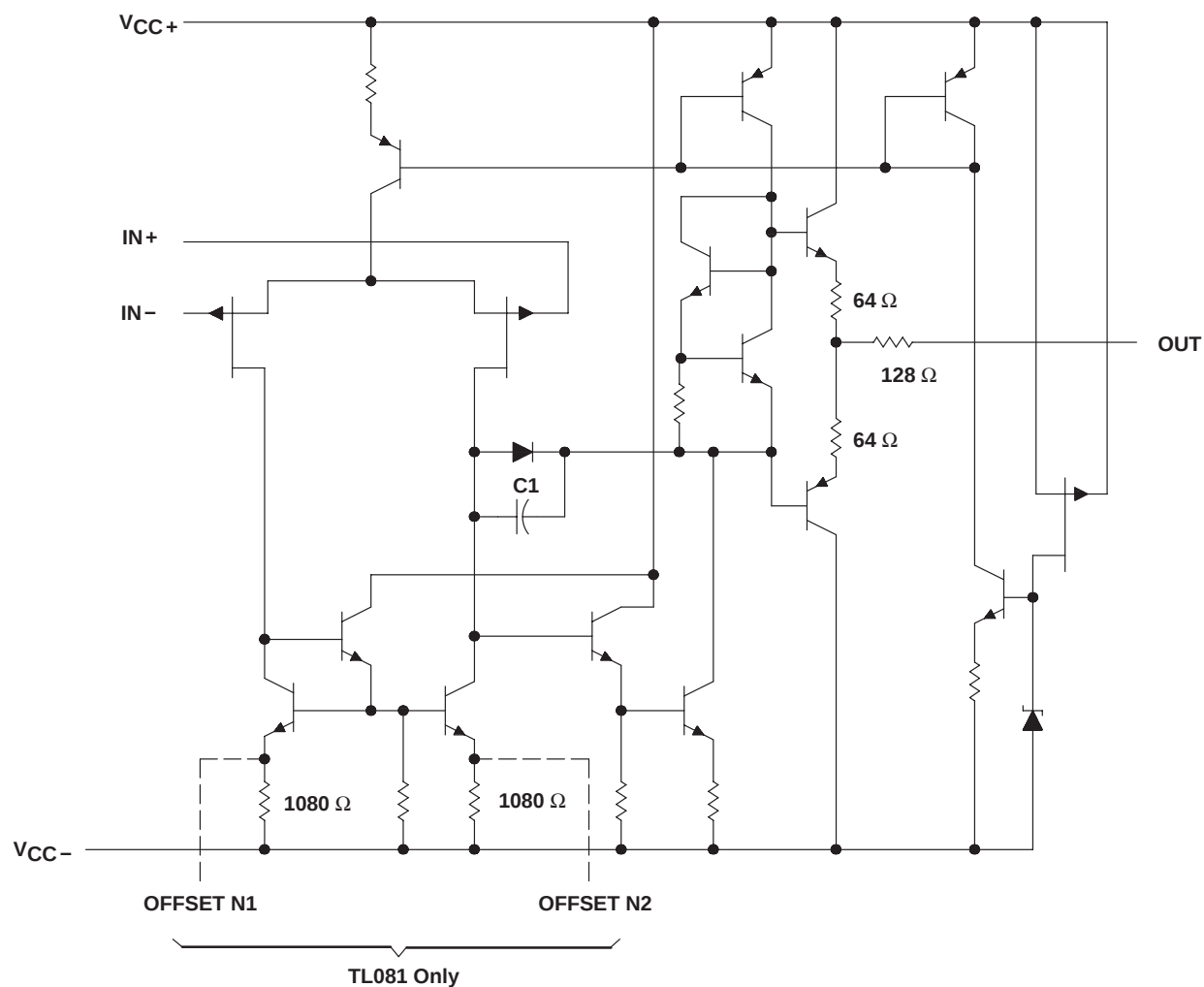
symbols



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

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schematic (each amplifier)



Component values shown are nominal.

**TL081, TL081A, TL081B, TL082, TL082A, TL082B
TL084, TL084A, TL084B
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	TL084Q	TL08_M	UNIT
Supply voltage, V_{CC+} (see Note 1)		18	18	18	18	V
Supply voltage V_{CC-} (see Note 1)		–18	–18	–18	–18	V
Differential input voltage, V_{ID} (see Note 2)		± 30	± 30	± 30	± 30	V
Input voltage, V_I (see Notes 1 and 3)		± 15	± 15	± 15	± 15	V
Duration of output short circuit (see Note 4)		Unlimited	Unlimited	Unlimited	Unlimited	
Continuous total power dissipation		See Dissipation Rating Table				
Operating free-air temperature range, T_A		0 to 70	–40 to 85	–40 to 125	–55 to 125	°C
Package thermal impedance, θ_{JA} (see Notes 5 and 6)	D package (8-pin)	97	97			°C/W
	D package (14-pin)	86	86			
	N package (14-pin)	76	76			
	NS package (14-pin)	80				
	P package (8-pin)	85	85			
	PS package (8-pin)	95	95			
	PW package (8-pin)	149				
	PW package (14-pin)	113	113			
Operating virtual junction temperature		150	150	150	150	°C
Case temperature for 60 seconds, T_C	FK package				260	°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds	J or JG package				300	°C
Storage temperature range, T_{stg}		–65 to 150	–65 to 150	–65 to 150	–65 to 150	°C

[†] 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.

5. Maximum power dissipation is a function of $T_J(\max)$, θ_{JA} , and T_A . The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(\max) - T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can affect reliability.

6. The package thermal impedance is calculated in accordance with JESD 51-7.

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 (14 pin)	680 mW	7.6 mW/°C	60°C	604 mW	490 mW	186 mW
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



TL081, TL081A, TL081B, TL082, TL082A, TL082B
TL084, TL084A, TL084B
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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 Ω	25°C Full range	3	15	20	3	3	6	2	2	3	3	3	6	mV
α _{VIO}	Temperature coefficient of input offset voltage V _O = 0 R _S = 50 Ω	Full range		18			18			18			18		μV/°C
I _{IO}	Input offset current [‡] V _O = 0	25°C Full range	5	200		5	5	100	5	5	100	5	5	100	pA
I _{IB}	Input bias current [‡] V _O = 0	25°C Full range	30	400	10	30	30	200	30	30	200	30	30	200	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 kΩ	25°C	±12	±13.5		±12	±13.5		±12	±13.5		±12	±13.5		V
	R _L ≥ 10 kΩ	Full range	±12	±12		±12	±12		±12	±12		±12	±12		
	R _L ≥ 2 kΩ		±10	±12		±10	±12		±10	±12		±10	±12		
A _{VD}	Large-signal differential voltage amplification V _O = ±10 V, R _L ≥ 2 kΩ	25°C	25	200		50	200		50	200		50	200		V/mV
	V _O = ±10 V, R _L ≥ 2 kΩ	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 Ω	25°C	70	86		75	86		75	86		75	86		dB
KSVR	Supply-voltage rejection ratio (ΔV _{CC±} /ΔV _{IO}) V _{CC} = ±15 V to ±9 V, V _O = 0, R _S = 50 Ω	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 an 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
TL084, TL084A, TL084B
JFET-INPUT OPERATIONAL AMPLIFIERS

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

PARAMETER	TEST CONDITIONS [†]	T_A	TL081M, TL082M			TL084Q, 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
		Full range			9			15	
α_{VIO} Temperature coefficient of input offset voltage	$V_O = 0, R_S = 50\ \Omega$	Full range		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
	$R_L \geq 10\text{ k}\Omega$	Full range	± 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
	$V_O = \pm 10\text{ V}, R_L \geq 2\text{ k}\Omega$	Full range	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	$V_{IC} = V_{ICRmin}, V_O = 0, R_S = 50\ \Omega$	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 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 V,	R _L = 2 kΩ,	C _L = 100 pF,	See Figure 1	8*	13		V/μs
		V _I = 10 V, T _A = − 55°C to 125°C,	R _L = 2 kΩ,	C _L = 100 pF,	See Figure 1	5*			
t _r	Rise time	V _I = 20 mV, R _L = 2 kΩ, C _L = 100 pF, See Figure 1				0.05			μs
	Overshoot factor					20			%
V _n	Equivalent input noise voltage	R _S = 20 Ω	f = 1 kHz			18			nV/√Hz
			f = 10 Hz to 10 kHz			4			μV
I _n	Equivalent input noise current	R _S = 20 Ω,	f = 1 kHz			0.01			pA/√Hz
THD	Total harmonic distortion	V _{Irms} = 6 V, f = 1 kHz	A _{VD} = 1,	R _S ≤ 1 kΩ,	R _L ≥ 2 kΩ,	0.003			%

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



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 TL084, TL084A, TL084B
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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/ μ s	
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			μ s	
	Overshoot factor					20			%	
V_n	Equivalent input noise voltage	$R_S = 20\text{ }\Omega$	$f = 1\text{ kHz}$			18			nV/ $\sqrt{\text{Hz}}$	
			$f = 10\text{ Hz to }10\text{ kHz}$			4			μ V	
I_n	Equivalent input noise current	$R_S = 20\text{ }\Omega$,	$f = 1\text{ kHz}$				0.01			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

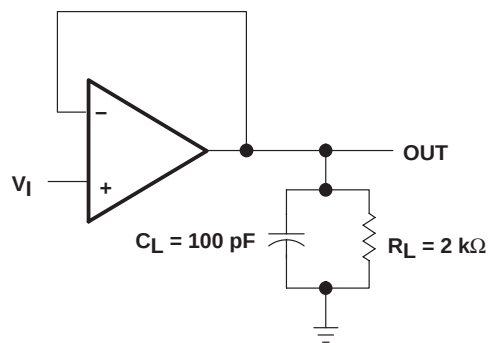


Figure 1

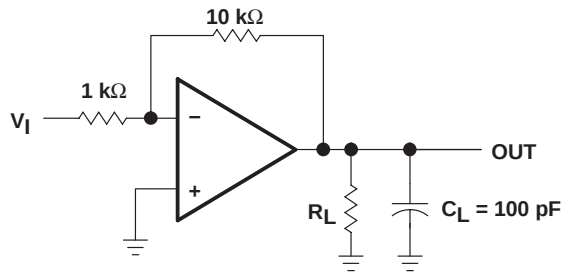


Figure 2

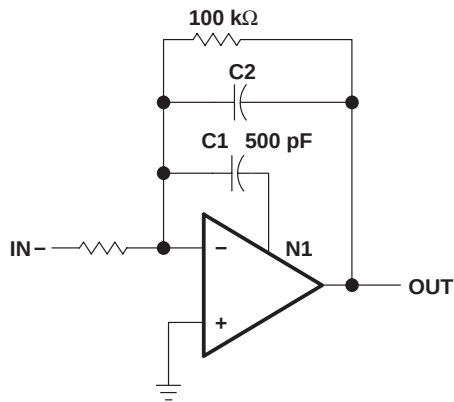


Figure 3

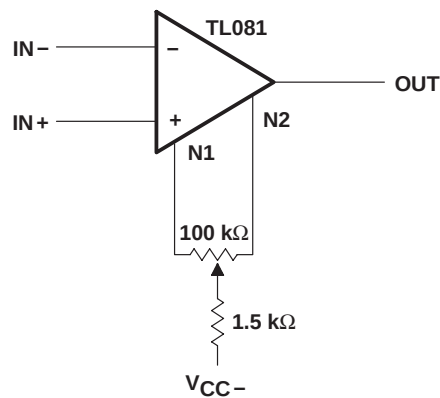


Figure 4

TYPICAL CHARACTERISTICS

Table of Graphs

		FIGURE
V_{OM}	Maximum peak output voltage	5, 6, 7
	vs Frequency	8
	vs Load resistance	9
	vs Supply voltage	10
A_{VD}	Large-signal differential voltage amplification	11
	vs Frequency	12
	Differential voltage amplification	13
P_D	Total power dissipation	14
I_{CC}	Supply current	15
	vs Supply voltage	16
I_{IB}	Input bias current	17
	Large-signal pulse response	18
V_O	Output voltage	19
CMRR	Common-mode rejection ratio	20
V_n	Equivalent input noise voltage	21
THD	Total harmonic distortion	22

MAXIMUM PEAK OUTPUT VOLTAGE
 vs
 FREQUENCY

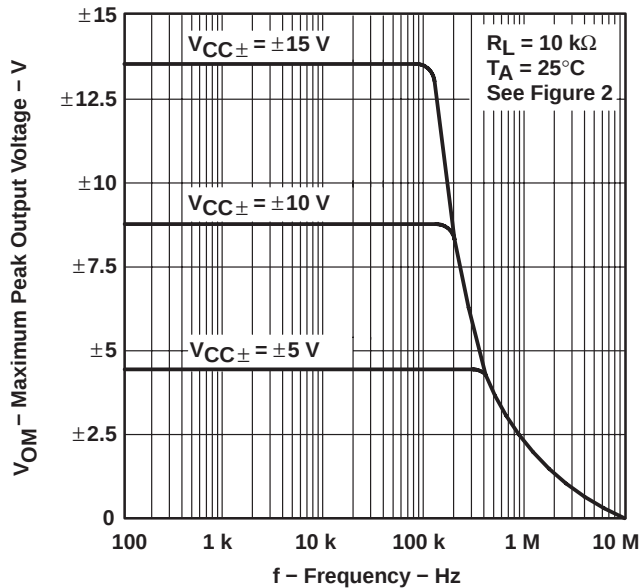


Figure 5

MAXIMUM PEAK OUTPUT VOLTAGE
 vs
 FREQUENCY

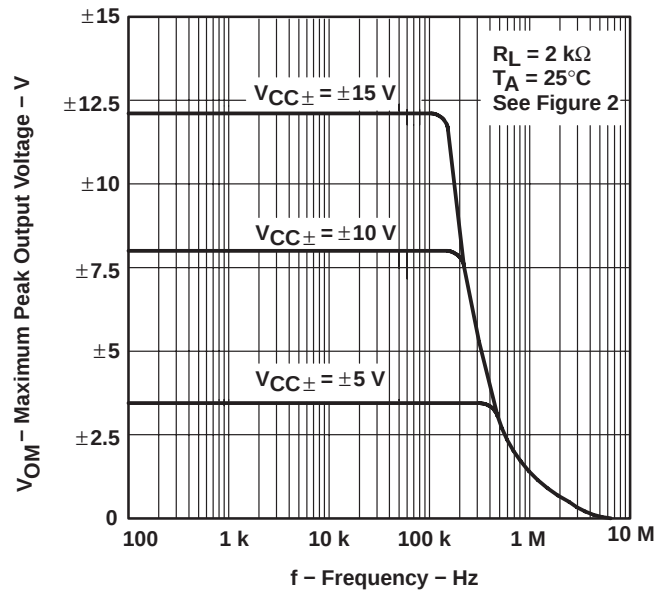


Figure 6

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

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TYPICAL CHARACTERISTICS†

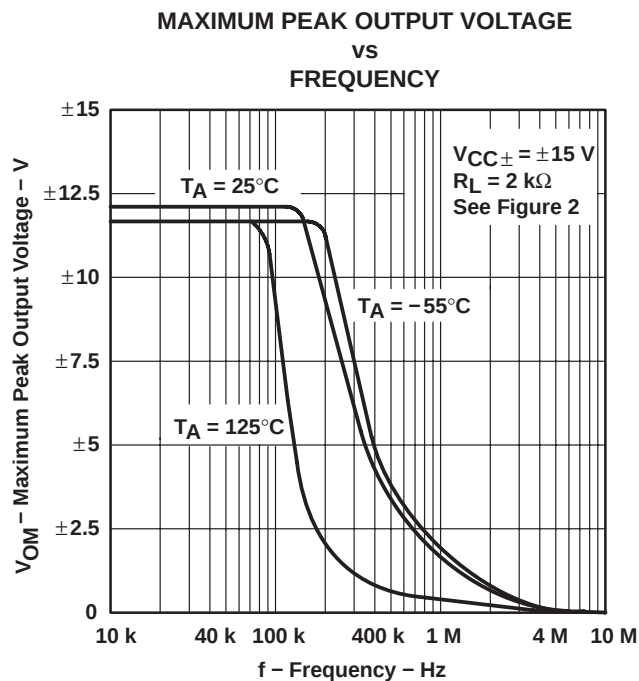


Figure 7

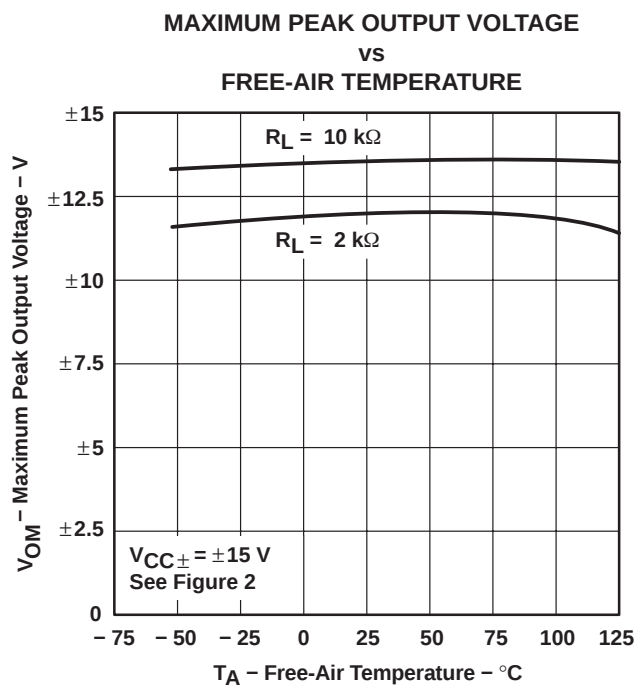


Figure 8

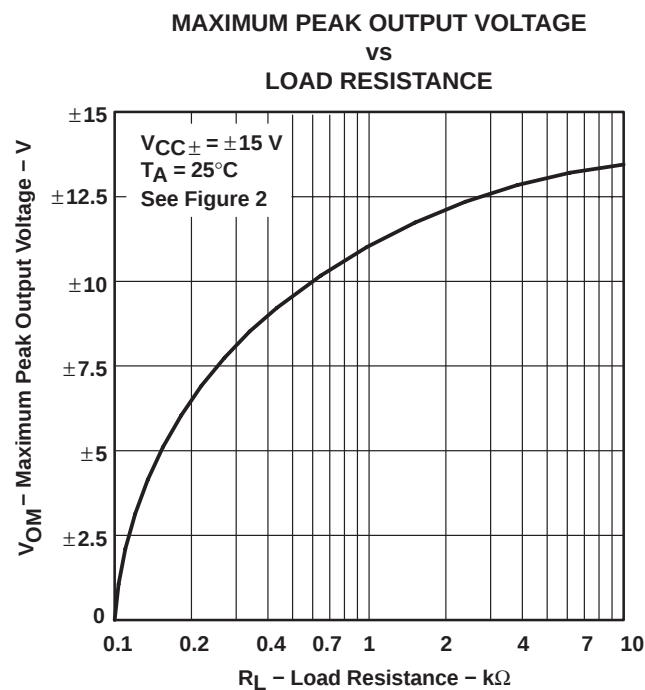


Figure 9

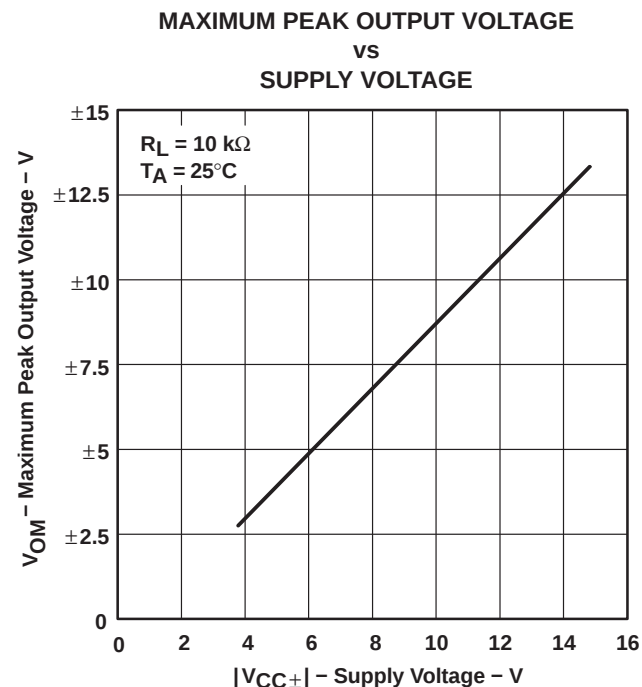


Figure 10

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

TYPICAL CHARACTERISTICS†

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

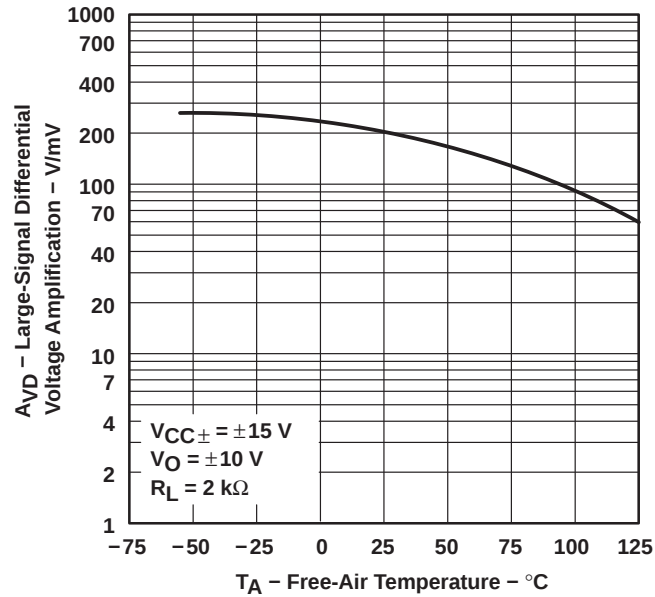


Figure 11

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

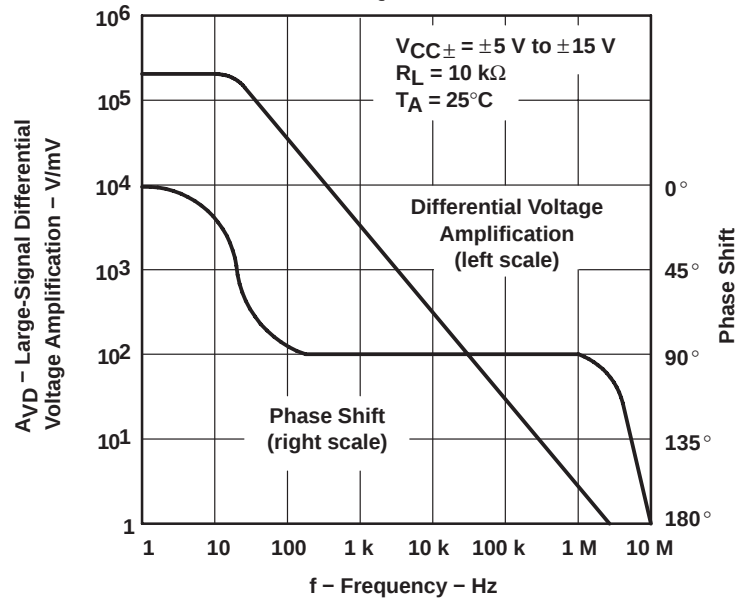


Figure 12

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

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

SLOS081G – FEBRUARY 1977 – REVISED SEPTEMBER 2004

TYPICAL CHARACTERISTICS†

DIFFERENTIAL VOLTAGE AMPLIFICATION
vs
FREQUENCY WITH FEED-FORWARD COMPENSATION

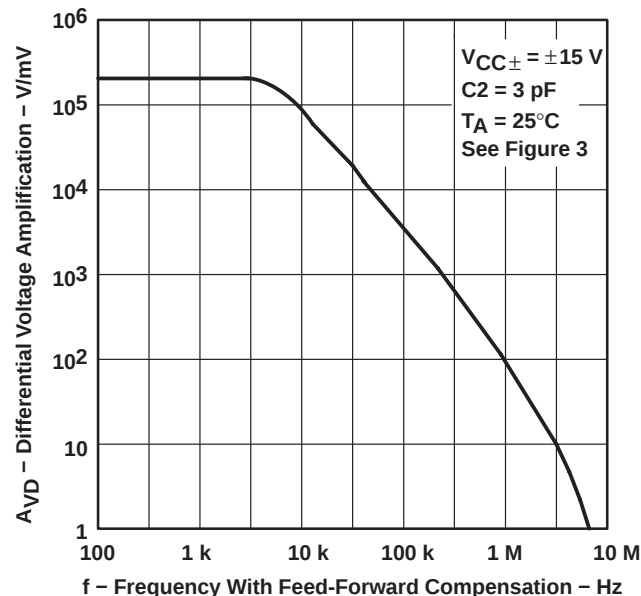


Figure 13

TOTAL POWER DISSIPATION
vs
FREE-AIR TEMPERATURE

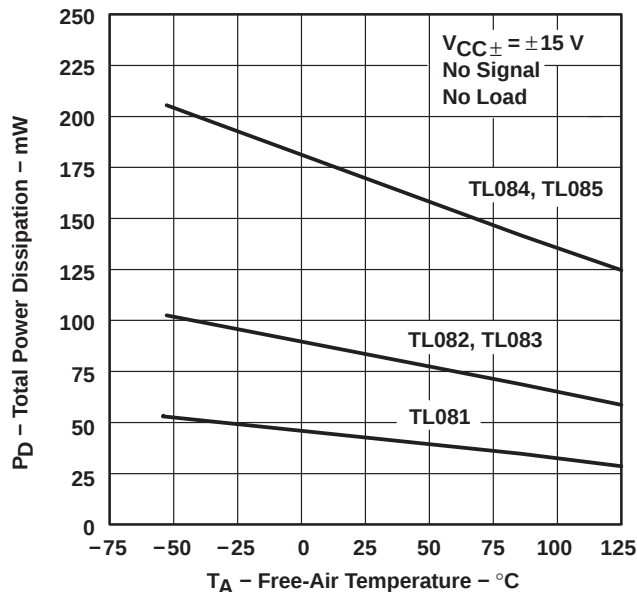


Figure 14

SUPPLY CURRENT PER AMPLIFIER
vs
FREE-AIR TEMPERATURE

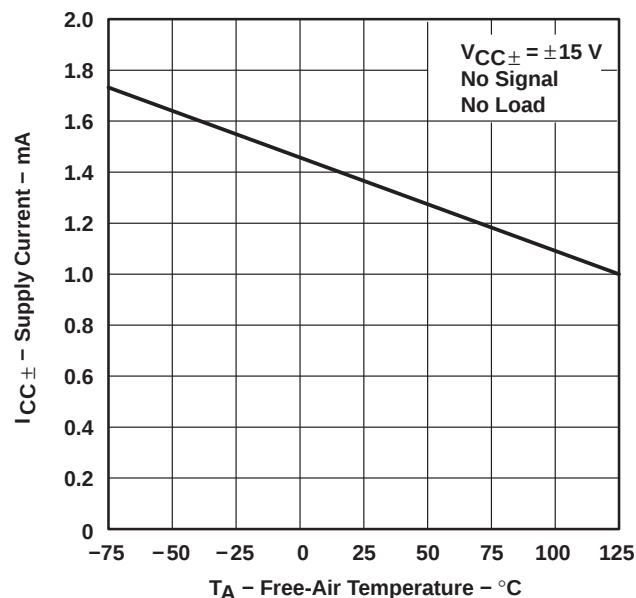


Figure 15

SUPPLY CURRENT
vs
SUPPLY VOLTAGE

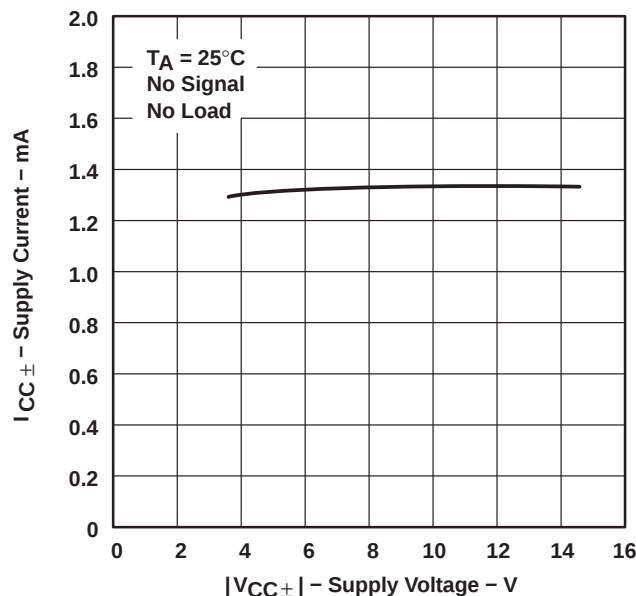


Figure 16

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

TYPICAL CHARACTERISTICS†

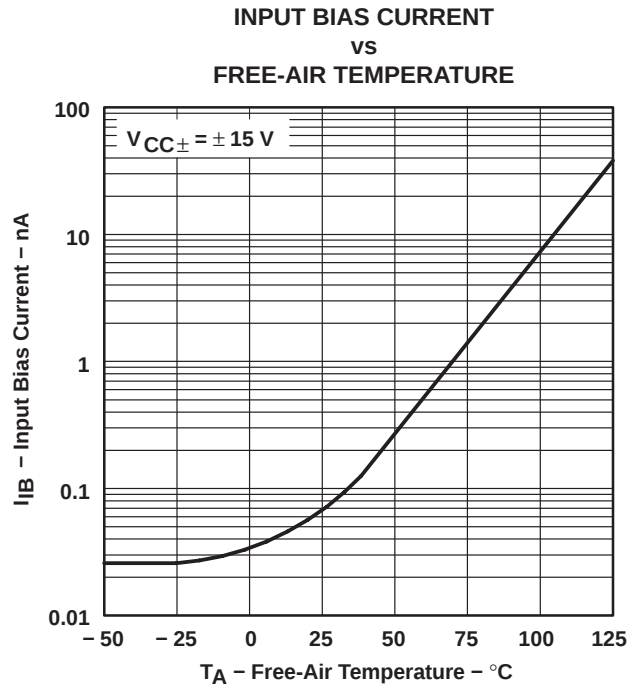


Figure 17

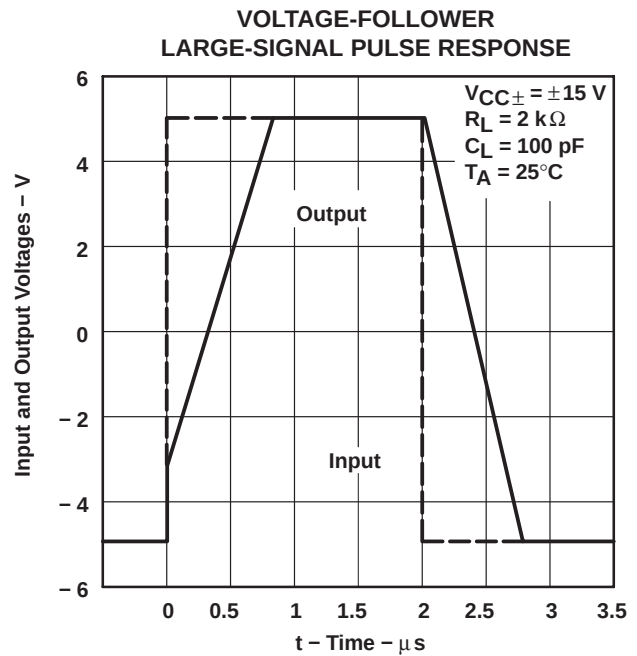


Figure 18

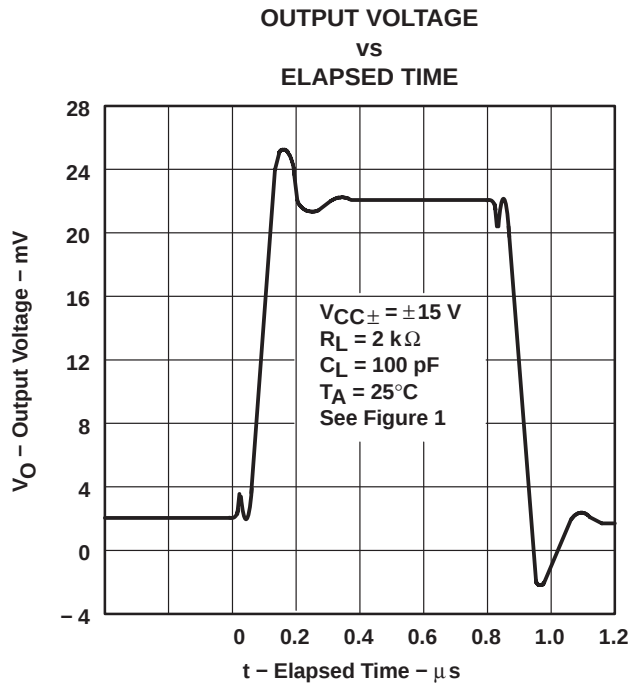


Figure 19

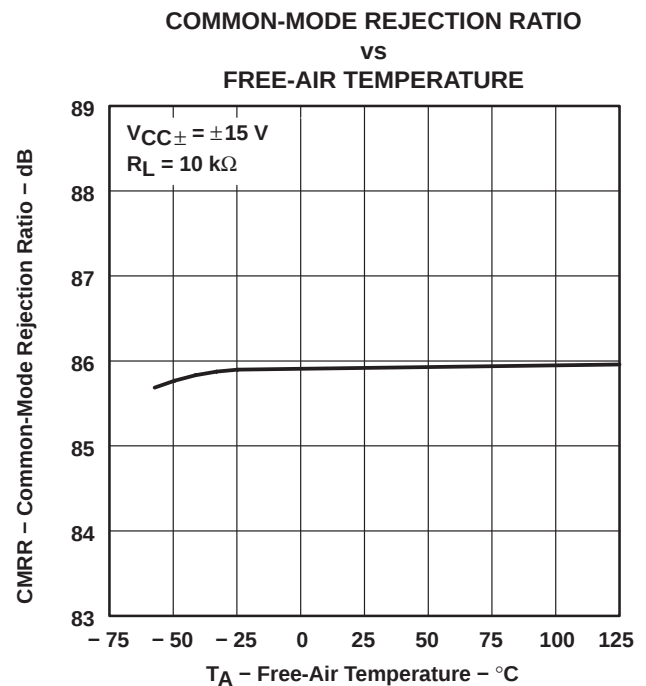


Figure 20

† 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 TL084, TL084A, TL084B JFET-INPUT OPERATIONAL AMPLIFIERS

SLOS081G – FEBRUARY 1977 – REVISED SEPTEMBER 2004

TYPICAL CHARACTERISTICS†

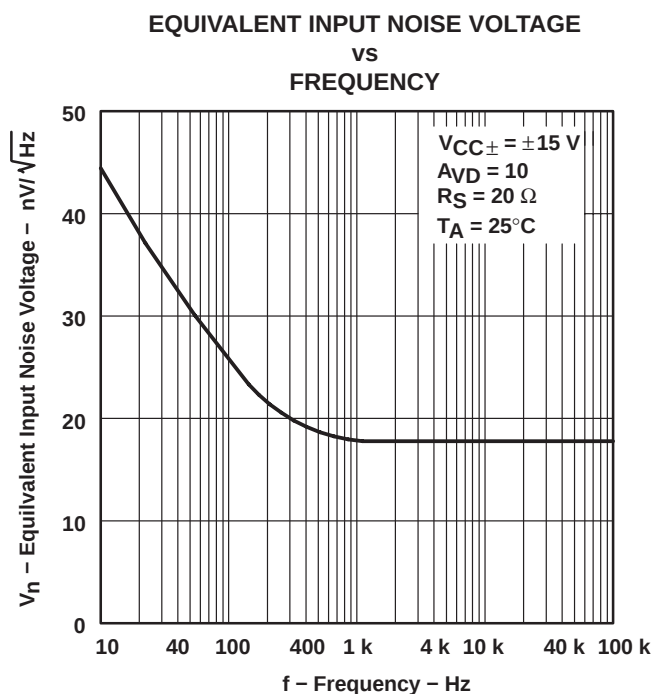


Figure 21

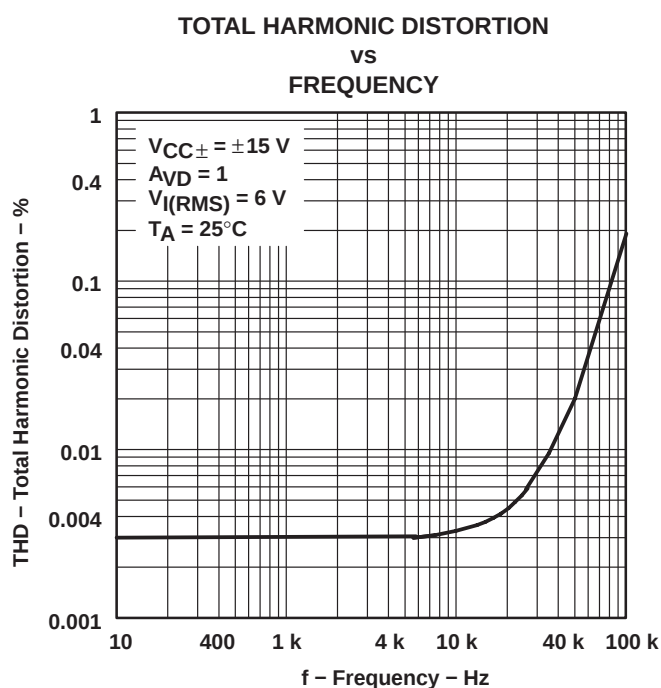


Figure 22

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

APPLICATION INFORMATION

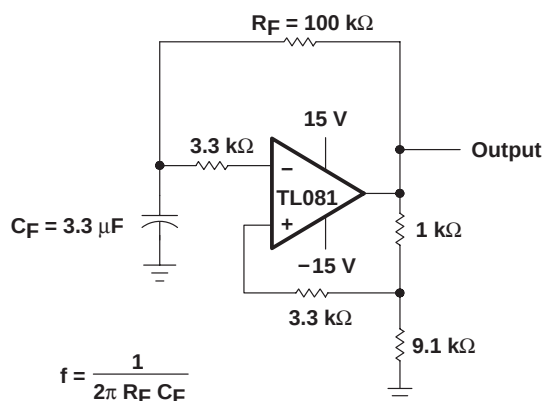


Figure 23

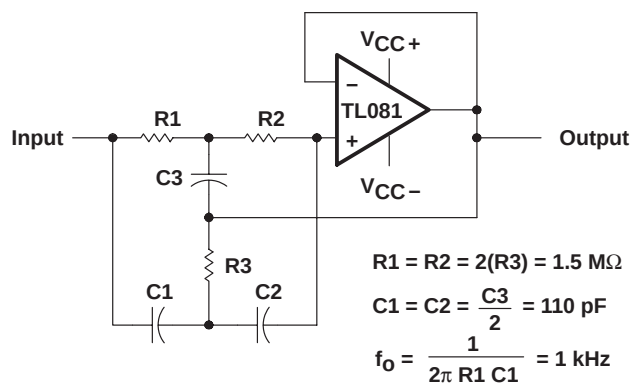


Figure 24

APPLICATION INFORMATION

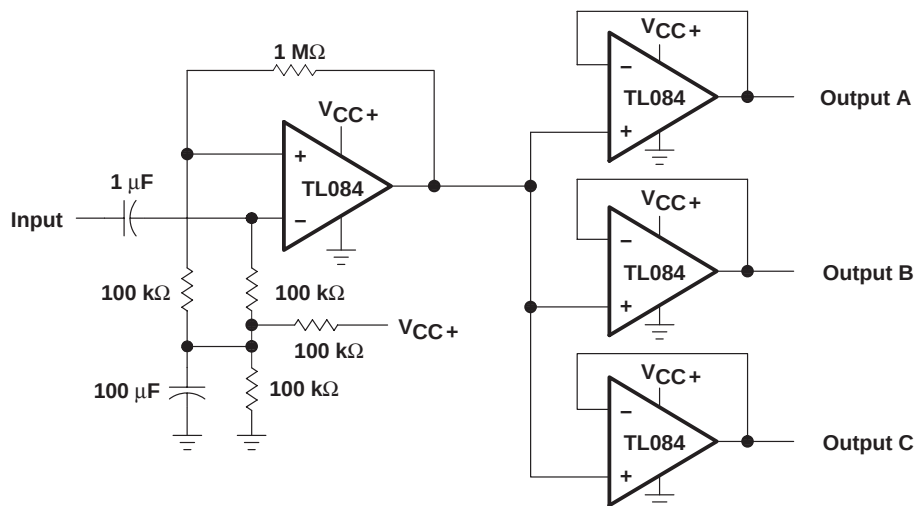
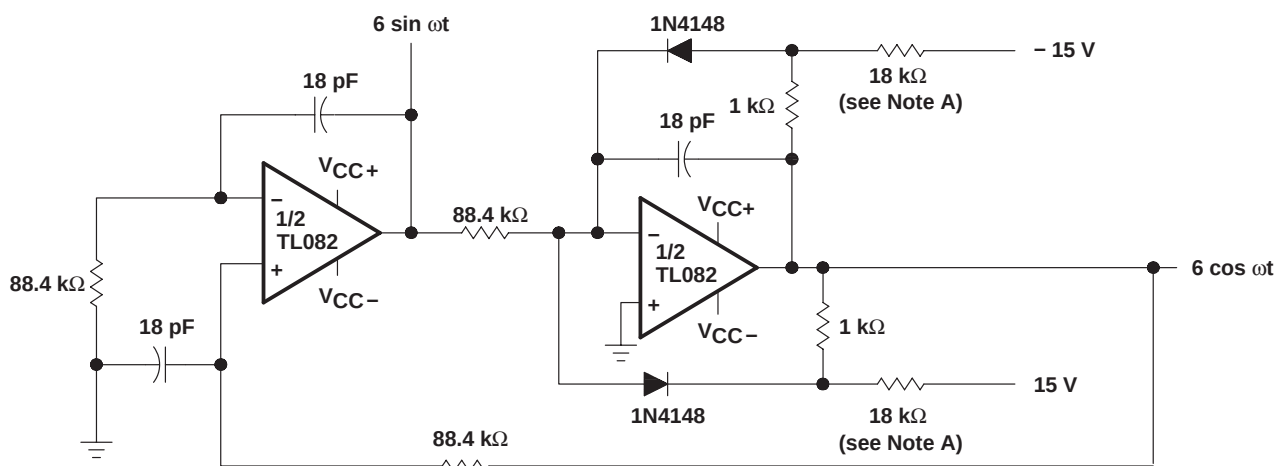


Figure 25. Audio-Distribution Amplifier



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

Figure 26. 100-KHz Quadrature Oscillator

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

SLOS081G – FEBRUARY 1977 – REVISED SEPTEMBER 2004

APPLICATION INFORMATION

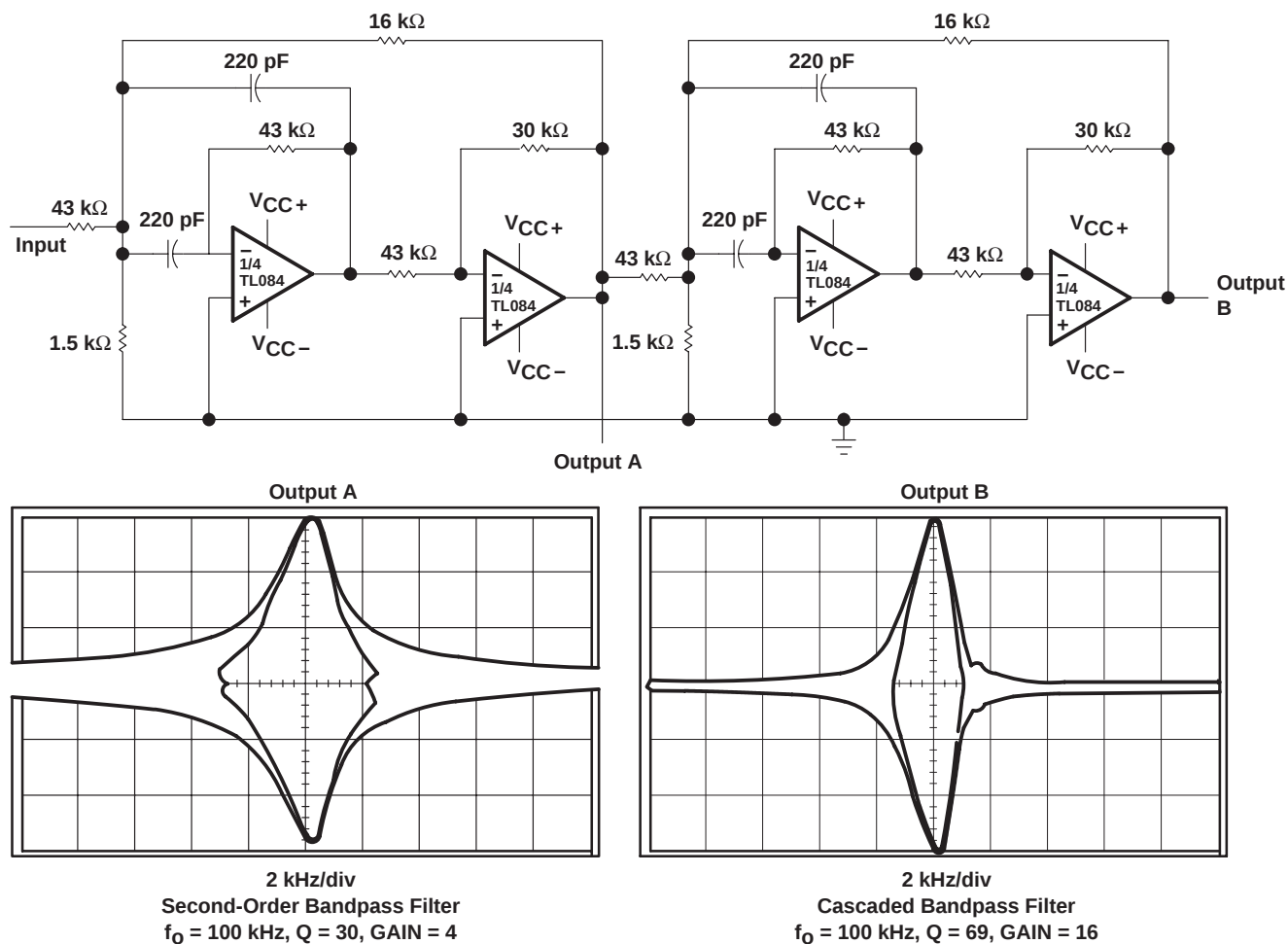


Figure 27. Positive-Feedback Bandpass Filter

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
5962-9851501Q2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
5962-9851501QPA	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	
5962-9851503Q2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
5962-9851503QCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
TL081ACD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081ACDE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081ACDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081ACDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081ACDRE4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081ACDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081ACJG	OBSOLETE	CDIP	JG	8		TBD	Call TI	Call TI	
TL081ACP	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
TL081ACPE4	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
TL081BCD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081BCDE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081BCDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081BCDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081BCDRE4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081BCDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
TL081BCP	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
TL081BCPE4	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	

continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF TL082, TL082M, TL084, TL084M :

- Catalog: [TL082](#), [TL084](#)
- Automotive: [TL082-Q1](#), [TL082-Q1](#)
- Military: [TL082M](#), [TL084M](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Military - QML certified for Military and Defense Applications