



# Ultralow Offset Voltage Operational Amplifier

## OP07

### FEATURES

- Low  $V_{OS}$  ..... **25 $\mu$ V Max**
- Low  $V_{OS}$  Drift ..... **0.6 $\mu$ V/ $^{\circ}$ C Max**
- Ultra-Stable vs Time ..... **1.0 $\mu$ V/Month Max**
- Low Noise ..... **0.6 $\mu$ V<sub>p-p</sub> Max**
- Wide Input Voltage Range .....  **$\pm$ 14V**
- Wide Supply Voltage Range .....  **$\pm$ 3V to  $\pm$ 18V**
- Fits 725, 108A/308A, 741, AD510 Sockets
- 125 $^{\circ}$ C Temperature-Tested Dice

### ORDERING INFORMATION <sup>†</sup>

$T_A = +25^{\circ}\text{C}$ $V_{OS}$ MAX ( $\mu\text{V}$ )	PACKAGE				OPERATING TEMPERATURE RANGE
	TO-99	CERDIP 8-PIN	PLASTIC 8-PIN	LCC 20-CONTACT	
25	OP07AJ*	OP07AZ*	—	—	MIL
75	OP07EJ	OP07EZ	OP07EP	—	COM
75	OP07J*	OP07Z*	—	OP07RC/883	MIL
150	OP07CJ	OP07CZ	OP07CP	—	XIND
150	—	—	OP07CS <sup>††</sup>	—	XIND
150	OP07DJ	—	OP07DP	—	XIND

\* For devices processed in total compliance to MIL-STD-883, add /883 after part number. Consult factory for 883 data sheet.

<sup>†</sup> Burn-in is available on commercial and industrial temperature range parts in CerDIP, plastic DIP, and TO-can packages.

<sup>††</sup> For availability and burn-in information on SO and PLCC packages, contact your local sales office.

### GENERAL DESCRIPTION

The OP-07 has very low input offset voltage (25 $\mu$ V max for OP-07A) which is obtained by trimming at the wafer stage. These low offset voltages generally eliminate any need for external nulling. The OP-07 also features low input bias current ( $\pm$ 2nA for OP-07A) and high open-loop gain (300V/mV for OP-07A). The low offsets and high open-loop gain make the OP-07 particularly useful for high-gain instrumentation applications.

The wide input voltage range of  $\pm$ 13V minimum combined with high CMRR of 110dB (OP-07A) and high input impedance provides high accuracy in the noninverting circuit configuration. Excellent linearity and gain accuracy can be maintained

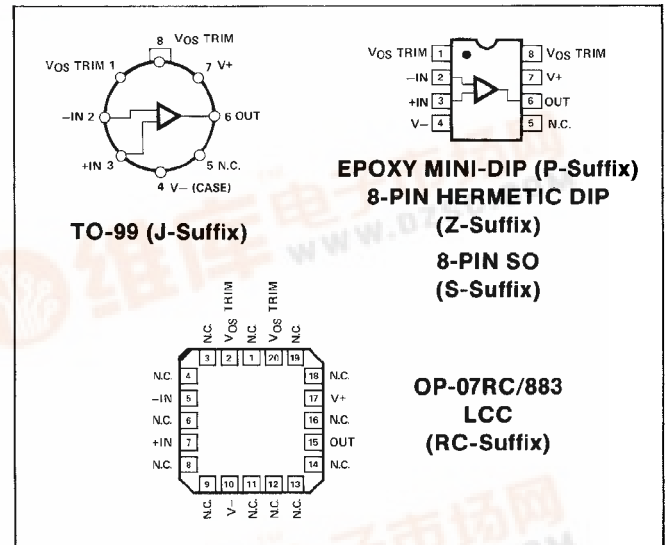
even at high closed-loop gains.

Stability of offsets and gain with time or variations in temperature is excellent. The accuracy and stability of the OP-07, even at high gain, combined with the freedom from external nulling have made the OP-07 a new industry standard for instrumentation and military applications.

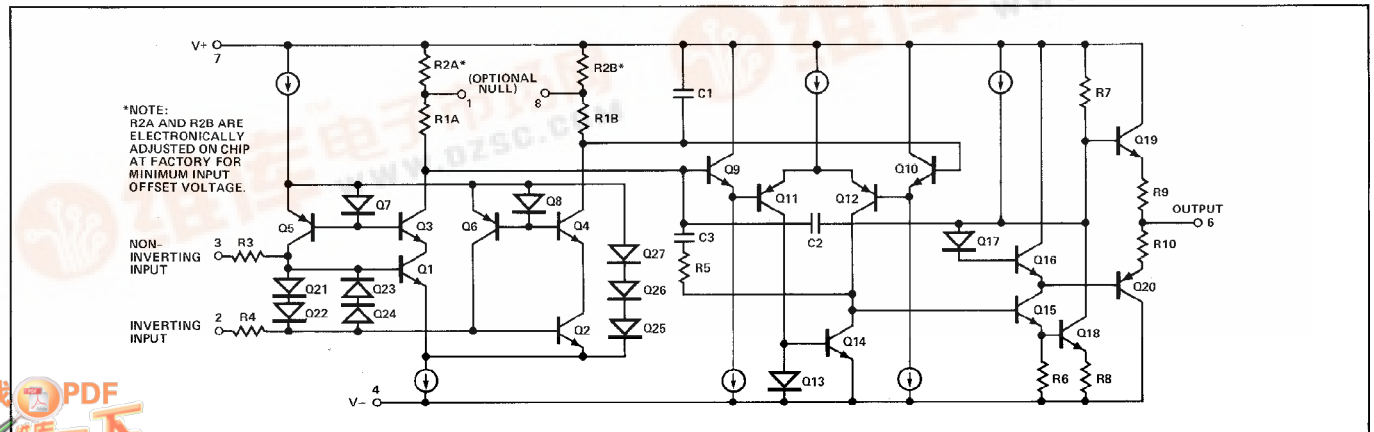
The OP-07 is available in five standard performance grades. The OP-07A and the OP-07 are specified for operation over the full military range of  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ; the OP-07E is specified for operation over the  $0^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  range, and OP-07C and D over the  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  temperature range.

The OP-07 is available in hermetically-sealed TO-99 metal can or ceramic 8-pin Mini-DIP, and in epoxy 8-pin Mini-DIP. It is a direct replacement for 725, 108A, and OP-05 amplifiers; 741-types may be directly replaced by removing the 741's nulling potentiometer. The OP-207, a dual OP-07, is available for applications requiring close matching of two OP-07 amplifiers. For improved specifications, see the OP-77/OP-177.

### PIN CONNECTIONS



### SIMPLIFIED SCHEMATIC



# OP07

## ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage .....	±22V
Differential Input Voltage .....	±30V
Input Voltage (Note 2) .....	±22V
Output Short-Circuit Duration .....	Indefinite
Storage Temperature Range	
J, RC and Z Packages .....	−65°C to +150°C
P Package .....	−65°C to +125°C
Operating Temperature Range	
OP-07A, OP-07, OP-07RC .....	−55°C to +125°C
OP-07E .....	0°C to +70°C
OP-07C, OP-07D .....	−40°C to +85°C
Lead Temperature (Soldering, 60 sec) .....	+300°C
Junction Temperature (T <sub>J</sub> ) .....	+150°C

PACKAGE TYPE	θ <sub>JA</sub> (Note 3)	θ <sub>JC</sub>	UNITS
TO-99 (J)	150	18	°C/W
8-Pin Hermetic DIP (Z)	148	16	°C/W
8-Pin Plastic DIP (P)	103	43	°C/W
20-Contact LCC	98	38	°C/W
8-Pin SO (S)	158	43	°C/W

### NOTES:

1. Absolute maximum ratings apply to both DICE and packaged parts, unless otherwise noted.
2. For supply voltages less than ±22V, the absolute maximum input voltage is equal to the supply voltage.
3. θ<sub>JA</sub> is specified for worst case mounting conditions, i.e., θ<sub>JA</sub> is specified for device in socket for TO, CerDIP, P-DIP, and LCC packages; θ<sub>JA</sub> is specified for device soldered to printed circuit board for SO package.

## ELECTRICAL CHARACTERISTICS at V<sub>S</sub> = ±15V, T<sub>A</sub> = 25°C, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	OP-07A			OP-07			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	V <sub>OS</sub>	(Note 1)	—	10	25	—	30	75	μV
Long-Term Input Offset Voltage Stability	ΔV <sub>OS</sub> /Time	(Note 2)	—	0.2	1.0	—	0.2	1.0	μV/Mo
Input Offset Current	I <sub>OS</sub>		—	0.3	2.0	—	0.4	2.8	nA
Input Bias Current	I <sub>B</sub>		—	±0.7	±2.0	—	±1.0	±3.0	nA
Input Noise Voltage	e <sub>np-p</sub>	0.1Hz to 10Hz (Note 3)	—	0.35	0.6	—	0.35	0.6	μV <sub>p-p</sub>
Input Noise Voltage Density	e <sub>n</sub>	f <sub>O</sub> = 10Hz (Note 3)	—	10.3	18.0	—	10.3	18.0	nV/√Hz
		f <sub>O</sub> = 100Hz (Note 3)	—	10.0	13.0	—	10.0	13.0	
		f <sub>O</sub> = 1000Hz (Note 3)	—	9.6	11.0	—	9.6	11.0	
Input Noise Current	i <sub>np-p</sub>	0.1Hz to 10Hz (Note 3)	—	14	30	—	14	30	pA <sub>p-p</sub>
Input Noise Current Density	i <sub>n</sub>	f <sub>O</sub> = 10Hz (Note 3)	—	0.32	0.80	—	0.32	0.80	pA/√Hz
		f <sub>O</sub> = 100Hz (Note 3)	—	0.14	0.23	—	0.14	0.23	
		f <sub>O</sub> = 1000Hz (Note 3)	—	0.12	0.17	—	0.12	0.17	
Input Resistance — Differential-Mode	R <sub>IN</sub>	(Note 4)	30	80	—	20	60	—	MΩ
Input Resistance — Common-Mode	R <sub>INCM</sub>		—	200	—	—	200	—	GΩ
Input Voltage Range	IVR		±13	±14	—	±13	±14	—	V
Common-Mode Rejection Ratio	CMRR	V <sub>CM</sub> = ±13V	110	126	—	110	126	—	dB
Power Supply Rejection Ratio	PSRR	V <sub>S</sub> = ±3V to ±18V	—	4	10	—	4	10	μV/V
Large-Signal Voltage Gain	A <sub>VO</sub>	R <sub>L</sub> ≥ 2kΩ, V <sub>O</sub> = ±10V	300	500	—	200	500	—	V/mV
		R <sub>L</sub> ≥ 500Ω, V <sub>O</sub> = ±0.5V, V <sub>S</sub> = ±3V (Note 4)	150	400	—	150	400	—	
Output Voltage Swing	V <sub>O</sub>	R <sub>L</sub> ≥ 10kΩ	±12.5	±13.0	—	±12.5	±13.0	—	V
		R <sub>L</sub> ≥ 2kΩ	±12.0	±12.8	—	±12.0	±12.8	—	
		R <sub>L</sub> ≥ 1kΩ	±10.5	±12.0	—	±10.5	±12.0	—	
Slew Rate	SR	R <sub>L</sub> ≥ 2kΩ (Note 3)	0.1	0.3	—	0.1	0.3	—	V/μs
Closed-Loop Bandwidth	BW	A <sub>VCL</sub> = +1 (Note 3)	0.4	0.6	—	0.4	0.6	—	MHz
Open-Loop Output Resistance	R <sub>O</sub>	V <sub>O</sub> = 0, I <sub>O</sub> = 0	—	60	—	—	60	—	Ω
Power Consumption	P <sub>d</sub>	V <sub>S</sub> = ±15V, No Load	—	75	120	—	75	120	mW
		V <sub>S</sub> = ±3V, No Load	—	4	6	—	4	6	
Offset Adjustment Range		R <sub>P</sub> = 20kΩ	—	±4	—	—	±4	—	mV

### NOTES:

1. OP-07A grade V<sub>OS</sub> is measured approximately one minute after application of power. For all other grades V<sub>OS</sub> is measured approximately 0.5 seconds after application of power.
2. Long-Term Input Offset Voltage Stability refers to the averaged trend line of V<sub>OS</sub> vs. Time over extended periods after the first 30 days of operation.

Excluding the initial hour of operation, changes in V<sub>OS</sub> during the first 30 operating days are typically 2.5μV — refer to typical performance curves. Parameter is sample tested.

3. Sample tested.
4. Guaranteed by design.

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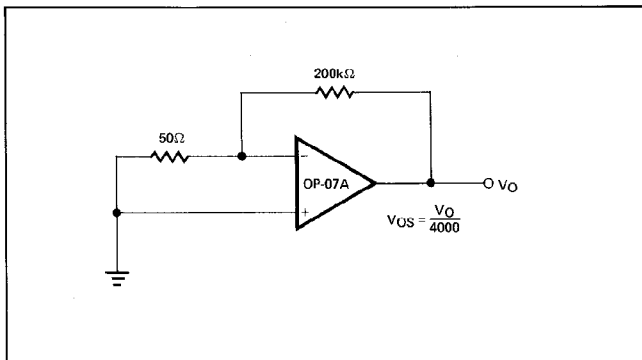
## ELECTRICAL CHARACTERISTICS at $V_S = \pm 15V$ , $-55^\circ C \leq T_A \leq +125^\circ C$ , unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	OP-07A			OP-07			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	$V_{OS}$	(Note 1)	—	25	60	—	60	200	$\mu V$
Average Input Offset Voltage Drift Without External Trim	$TCV_{OS}$	(Note 2)	—	0.2	0.6	—	0.3	1.3	$\mu V/^\circ C$
With External Trim	$TCV_{OSn}$	$R_P = 20k\Omega$ (Note 3)	—	0.2	0.6	—	0.3	1.3	$\mu V/^\circ C$
Input Offset Current	$I_{OS}$		—	0.8	4	—	1.2	5.6	nA
Average Input Offset Current Drift	$TCI_{OS}$	(Note 2)	—	5	25	—	8	50	$\mu A/^\circ C$
Input Bias Current	$I_B$		—	$\pm 1$	$\pm 4$	—	$\pm 2$	$\pm 6$	nA
Average Input Bias Current Drift	$TCI_B$	(Note 2)	—	8	25	—	13	50	$\mu A/^\circ C$
Input Voltage Range	IVR		$\pm 13$	$\pm 13.5$	—	$\pm 13$	$\pm 13.5$	—	V
Common-Mode Rejection Ratio	CMRR	$V_{CM} = \pm 13V$	106	123	—	106	123	—	dB
Power Supply Rejection Ratio	PSRR	$V_S = \pm 3V$ to $\pm 18V$	—	5	20	—	5	20	$\mu V/V$
Large-Signal Voltage Gain	$A_{VO}$	$R_L \geq 2k\Omega$ , $V_O = \pm 10V$	200	400	—	150	400	—	V/mV
Output Voltage Swing	$V_O$	$R_L \geq 2k\Omega$	$\pm 12$	$\pm 12.6$	—	$\pm 12$	$\pm 12.6$	—	V

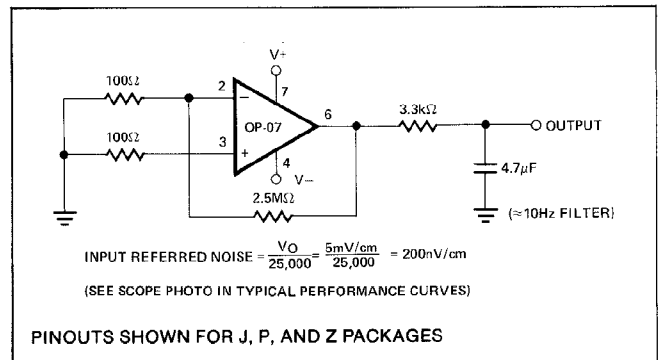
### NOTES:

- OP-07A grade  $V_{OS}$  is measured approximately one minute after application of power. For all other grades  $V_{OS}$  is measured approximately 0.5 seconds after application of power.
- Sample tested.
- Guaranteed by design.

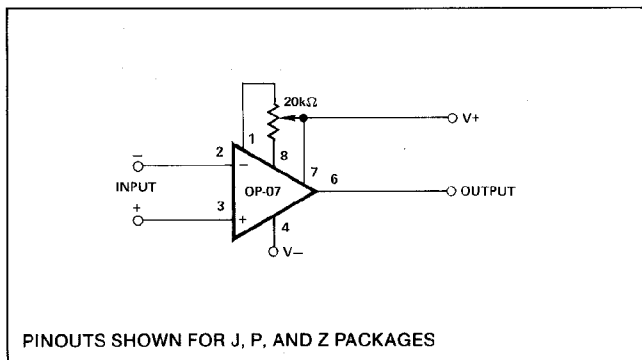
### TYPICAL OFFSET VOLTAGE TEST CIRCUIT



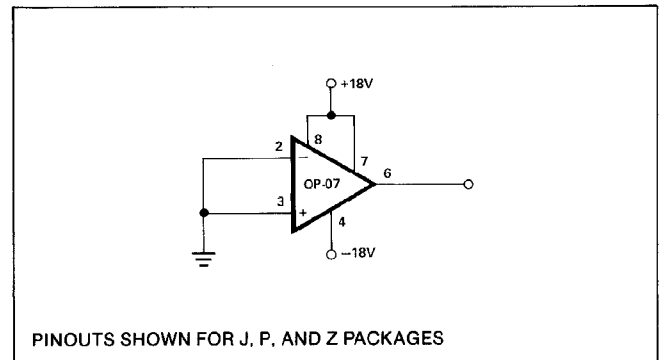
### TYPICAL LOW-FREQUENCY NOISE TEST CIRCUIT



### OPTIONAL OFFSET NULLING CIRCUIT



### BURN-IN CIRCUIT



# OP07

## ELECTRICAL CHARACTERISTICS at $V_S = \pm 15V$ , $T_A = 25^\circ C$ , unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	OP-07E			OP-07C			OP-07D			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	$V_{OS}$	(Note 1)	—	30	75	—	60	150	—	60	150	$\mu V$
Long-Term $V_{OS}$ Stability	$V_{OS}/\text{Time}$	(Note 2)	—	0.3	1.5	—	0.4	2.0	—	0.5	3.0	$\mu V/\text{Mo}$
Input Offset Current	$I_{OS}$		—	0.5	3.8	—	0.8	6.0	—	0.8	6.0	nA
Input Bias Current	$I_B$		—	$\pm 1.2$	$\pm 4.0$	—	$\pm 1.8$	$\pm 7.0$	—	$\pm 2.0$	$\pm 12$	nA
Input Noise Voltage	$e_{np-p}$	0.1Hz to 10Hz (Note 3)	—	0.35	0.6	—	0.38	0.65	—	0.38	0.65	$\mu V_{p-p}$
Input Noise Voltage Density	$e_n$	$f_O = 10\text{Hz}$	—	10.3	18.0	—	10.5	20.0	—	10.5	20.0	$nV/\sqrt{\text{Hz}}$
		$f_O = 100\text{Hz}$ (Note 3)	—	10.0	13.0	—	10.2	13.5	—	10.3	13.5	
		$f_O = 1000\text{Hz}$	—	9.6	11.0	—	9.8	11.5	—	9.8	11.5	
Input Noise Current	$i_{np-p}$	0.1Hz to 10Hz (Note 3)	—	14	30	—	15	35	—	15	35	$pA_{p-p}$
Input Noise Current Density	$i_n$	$f_O = 10\text{Hz}$	—	0.32	0.80	—	0.35	0.90	—	0.35	0.90	$pA/\sqrt{\text{Hz}}$
		$f_O = 100\text{Hz}$ (Note 3)	—	0.14	0.23	—	0.15	0.27	—	0.15	0.27	
		$f_O = 1000\text{Hz}$	—	0.12	0.17	—	0.13	0.18	—	0.13	0.18	
Input Resistance — Differential-Mode	$R_{IN}$	(Note 4)	15	50	—	8	33	—	7	31	—	M $\Omega$
Input Resistance — Common-Mode	$R_{INCM}$		—	160	—	—	120	—	—	120	—	G $\Omega$
Input Voltage Range	IVR		$\pm 13$	$\pm 14$	—	$\pm 13$	$\pm 14$	—	$\pm 13$	$\pm 14$	—	V
Common-Mode Rejection Ratio	CMRR	$V_{CM} = \pm 13V$	106	123	—	100	120	—	94	110	—	dB
Power Supply Rejection Ratio	PSRR	$V_S = \pm 3V$ to $\pm 18V$	—	5	20	—	7	32	—	7	32	$\mu V/V$
Large-Signal Voltage Gain	$A_{VO}$	$R_L \geq 2k\Omega$ , $V_O = \pm 10V$ $R_L \geq 500\Omega$	200	500	—	120	400	—	120	400	—	V/mV
		$V_O = \pm 0.5V$ $V_S = \pm 3V$ (Note 4)	150	400	—	100	400	—	—	400	—	
Output Voltage Swing	$V_O$	$R_L \geq 10k\Omega$	$\pm 12.5$	$\pm 13.0$	—	$\pm 12.0$	$\pm 13.0$	—	$\pm 12.0$	$\pm 13.0$	—	V
		$R_L \geq 2k\Omega$	$\pm 12.0$	$\pm 12.8$	—	$\pm 11.5$	$\pm 12.8$	—	$\pm 11.5$	$\pm 12.8$	—	
		$R_L \geq 1k\Omega$	$\pm 10.5$	$\pm 12.0$	—	—	$\pm 12.0$	—	—	$\pm 12.0$	—	
Slew Rate	SR	$R_L \geq 2k\Omega$ (Note 3)	0.1	0.3	—	0.1	0.3	—	0.1	0.3	—	V/ $\mu s$
Closed-Loop Bandwidth	BW	$A_{VCL} = +1$ (Note 5)	0.4	0.6	—	0.4	0.6	—	0.4	0.6	—	MHz
Open-Loop Output Resistance	$R_O$	$V_O = 0, I_O = 0$	—	60	—	—	60	—	—	60	—	$\Omega$
Power Consumption	$P_d$	$V_S = \pm 15V$ , No Load	—	75	120	—	80	150	—	80	150	mW
		$V_S = \pm 3V$ , No Load	—	4	6	—	4	8	—	4	8	
Offset Adjustment Range		$R_P = 20k\Omega$	—	$\pm 4$	—	—	$\pm 4$	—	—	$\pm 4$	—	mV

### NOTES:

- Input Offset Voltage measurements are performed by automated test equipment approximately 0.5 seconds after application of power.
- Long-Term Input Offset Voltage Stability refers to the averaged trend line of  $V_{OS}$  vs. Time over extended periods after the first 30 days of operation.  
Excluding the initial hour of operation, changes in  $V_{OS}$  during the first 30 operating days are typically  $2.5\mu V$  — refer to typical performance curves. Parameter is sample tested.
- Sample tested.
- Guaranteed by design.
- Guaranteed but not tested.

# OP07

**ELECTRICAL CHARACTERISTICS** at  $V_S = \pm 15V$ ,  $0^\circ C \leq T_A \leq +70^\circ C$  for OP-07E, and  $-40^\circ C \leq T_A \leq +85^\circ C$  for OP-07C/D, unless otherwise noted.

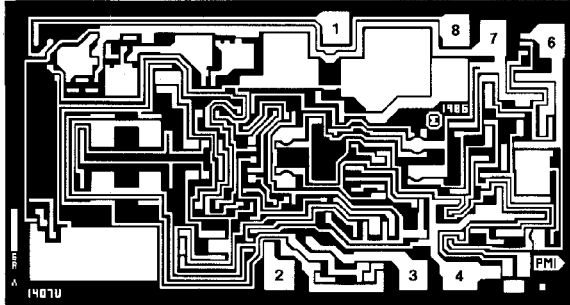
PARAMETER	SYMBOL	CONDITIONS	OP-07E			OP-07C			OP-07D			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	$V_{OS}$	(Note 1)	—	45	130	—	85	250	—	85	250	$\mu V$
Average Input Offset Voltage Drift Without External Trim	$TCV_{OS}$	(Note 3)	—	0.3	1.3	—	0.5	1.8	—	0.7	2.5	$\mu V/^\circ C$
With External Trim	$TCV_{OSn}$	$R_P = 20k\Omega$ (Note 3)	—	0.3	1.3	—	0.4	1.6	—	0.7	2.5	$\mu V/^\circ C$
Input Offset Current	$I_{OS}$		—	0.9	5.3	—	1.6	8.0	—	1.6	8.0	nA
Average Input Offset Current Drift	$TCI_{OS}$	(Note 2)	—	8	35	—	12	50	—	12	50	$pA/^\circ C$
Input Bias Current	$I_B$		—	$\pm 1.5$	$\pm 5.5$	—	$\pm 2.2$	$\pm 9.0$	—	$\pm 3.0$	$\pm 14$	nA
Average Input Bias Current Drift	$TCI_B$	(Note 2)	—	13	35	—	18	50	—	18	50	$pA/^\circ C$
Input Voltage Range	IVR		$\pm 13.0$	$\pm 13.5$	—	$\pm 13.0$	$\pm 13.5$	—	$\pm 13.0$	$\pm 13.5$	—	V
Common-Mode Rejection Ratio	CMRR	$V_{CM} = \pm 13V$	103	123	—	97	120	—	94	106	—	dB
Power Supply Rejection Ratio	PSRR	$V_S = \pm 3V$ to $\pm 18V$	—	7	32	—	10	51	—	10	51	$\mu V/V$
Large-Signal Voltage Gain	$A_{VO}$	$R_L \geq 2k\Omega$ $V_O = \pm 10V$	180	450	—	100	400	—	100	400	—	V/mV
Output Voltage Swing	$V_O$	$R_L \geq 2k\Omega$	$\pm 12$	$\pm 12.6$	—	$\pm 11$	$\pm 12.6$	—	$\pm 11$	$\pm 12.6$	—	V

**NOTES:**

1. Input offset voltage measurements are performed by automated test equipment approximately 0.5 seconds after application of power.
2. Sample tested.
3. Guaranteed by design.

# OP07

## DICE CHARACTERISTICS (125°C TESTED DICE AVAILABLE)



- 1. BALANCE
- 2. INVERTING INPUT
- 3. NONINVERTING INPUT
- 4. V-
- 6. OUTPUT
- 7. V+
- 8. BALANCE

DIE SIZE 0.100 × 0.055 inch, 5500 sq. mils  
(2.54 × 1.40 mm, 3.56 sq. mm)

**WAFER TEST LIMITS** at  $V_S = \pm 15V$ ,  $T_A = 25^\circ C$  for OP-07N, OP-07G and OP-07GR devices;  $T_A = 125^\circ C$  for OP-07NT and OP-07GT devices, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	OP-07NT LIMIT	OP-07N LIMIT	OP-07GT LIMIT	OP-07G LIMIT	OP-07GR LIMIT	UNITS
Input Offset Voltage	$V_{OS}$		140	40	210	80	150	$\mu V$ MAX
Input Offset Current	$I_{OS}$		4.0	2.0	5.6	2.8	6.0	nA MAX
Input Bias Current	$I_B$		$\pm 4$	$\pm 2$	$\pm 6$	$\pm 3$	$\pm 7$	nA MAX
Input Resistance Differential-Mode	$R_{IN}$	(Note 2)	—	20	—	20	8	M $\Omega$ MIN
Input Voltage Range	IVR		$\pm 13$	$\pm 13$	$\pm 13$	$\pm 13$	$\pm 13$	V MIN
Common-Mode Rejection Ratio	CMRR	$V_{CM} = \pm 13V$	100	110	100	110	100	dB MIN
Power Supply Rejection Ratio	PSRR	$V_S = \pm 3V$ to $\pm 18V$	20	10	20	10	30	$\mu V/V$ MAX
Output Voltage Swing	$V_O$	$R_L = 10k\Omega$	—	$\pm 12.5$	—	$\pm 12.0$	$\pm 12.0$	V MIN
		$R_L = 2k\Omega$	$\pm 12.0$	$\pm 12.0$	$\pm 12.0$	$\pm 11.5$	$\pm 11.5$	
		$R_L = 1k\Omega$	—	$\pm 10.5$	—	$\pm 10.5$	—	
Large-Signal Voltage Gain	$A_{VO}$	$R_L = 2k\Omega$ $V_O = \pm 10V$	200	200	150	120	120	V/mV MIN
Differential Input Voltage			$\pm 30$	$\pm 30$	$\pm 30$	$\pm 30$	$\pm 30$	V MAX
Power Consumption	$P_d$	$V_{OUT} = 0V$	—	120	—	120	150	mW MAX

**NOTES:**

- For 25°C characteristics of OP-07NT and OP-07GT, see OP-07N and OP-07G characteristics, respectively.
- Guaranteed by design.

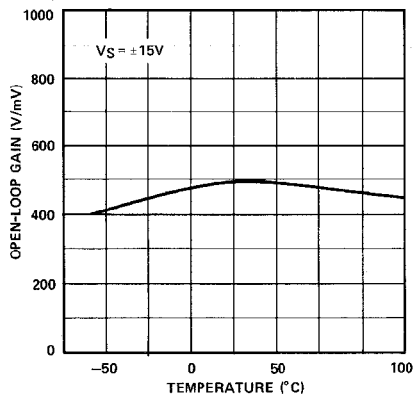
Electrical tests are performed at wafer probe to the limits shown. Due to variations in assembly methods and normal yield loss, yield after packaging is not guaranteed for standard product dice. Consult factory to negotiate specifications based on dice lot qualification through sample lot assembly and testing.

**TYPICAL ELECTRICAL CHARACTERISTICS** at  $V_S = \pm 15V$ ,  $T_A = +25^\circ C$ , unless otherwise noted.

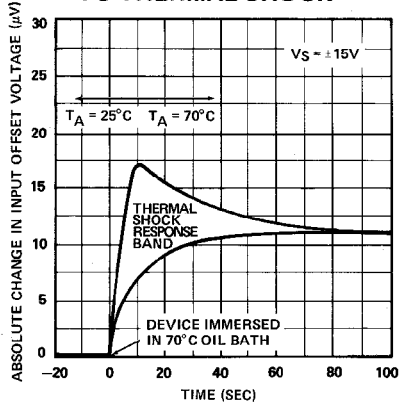
PARAMETER	SYMBOL	CONDITIONS	OP-07NT TYPICAL	OP-07N TYPICAL	OP-07GT TYPICAL	OP-07G TYPICAL	OP-07GR TYPICAL	UNITS
Average Input Offset Voltage Drift	$TCV_{OS}$	$R_S = 50\Omega$	0.2	0.2	0.3	0.3	0.7	$\mu V/^\circ C$
Nullified Input Offset Voltage Drift	$TCV_{OSn}$	$R_S = 50\Omega$ , $R_P = 20k\Omega$	0.2	0.2	0.3	0.3	0.7	$\mu V/^\circ C$
Average Input Offset Current Drift	$TCI_{OS}$		5	5	8	8	12	pA/°C
Slew Rate	SR	$R_L \geq 2k\Omega$	0.3	0.3	0.3	0.3	0.3	V/ $\mu s$
Closed-Loop Bandwidth	BW	$A_{VCL} = +1$	0.6	0.6	0.6	0.6	0.6	MHz

TYPICAL PERFORMANCE CHARACTERISTICS

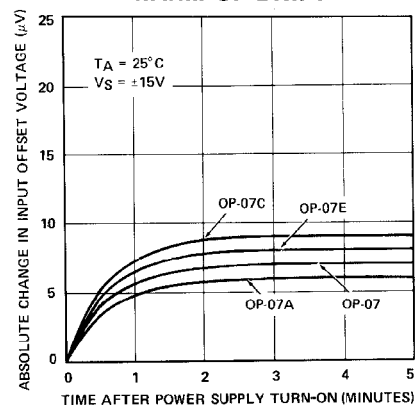
OPEN-LOOP GAIN vs TEMPERATURE



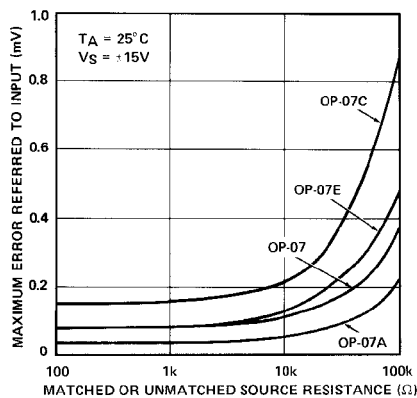
OFFSET VOLTAGE CHANGE DUE TO THERMAL SHOCK



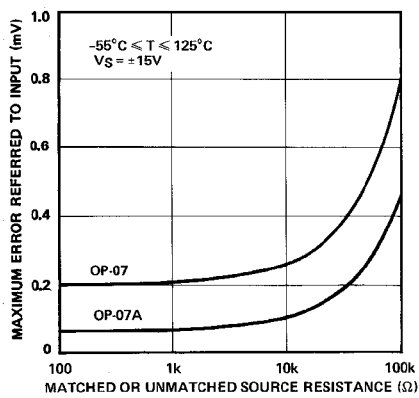
WARM-UP DRIFT



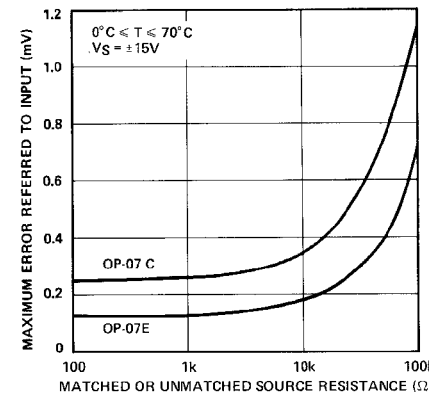
MAXIMUM ERROR vs SOURCE RESISTANCE



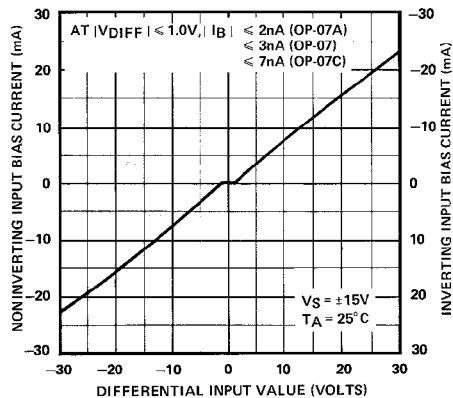
MAXIMUM ERROR vs SOURCE RESISTANCE



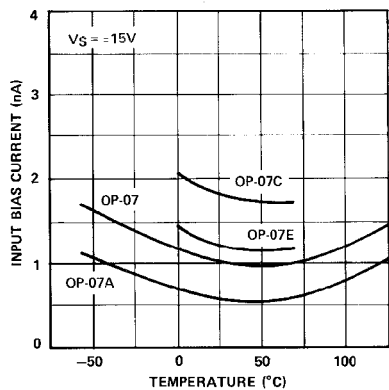
MAXIMUM ERROR vs SOURCE RESISTANCE



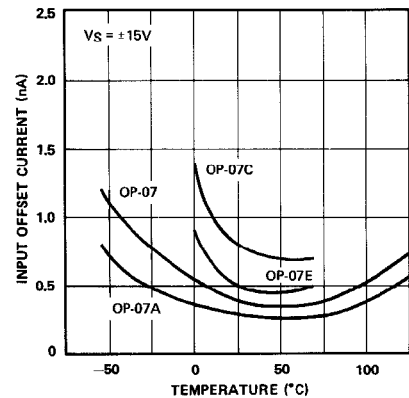
INPUT BIAS CURRENT vs DIFFERENTIAL INPUT VOLTAGE



INPUT BIAS CURRENT vs TEMPERATURE



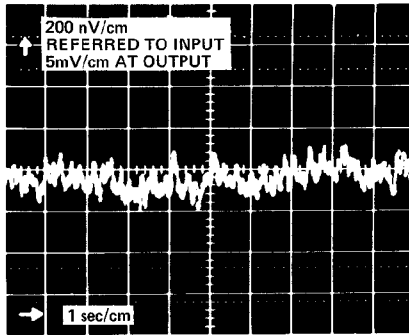
INPUT OFFSET CURRENT vs TEMPERATURE



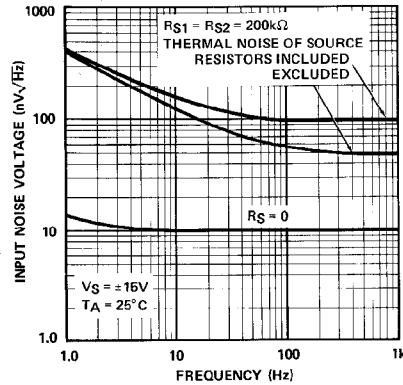
# OP07

## TYPICAL PERFORMANCE CHARACTERISTICS

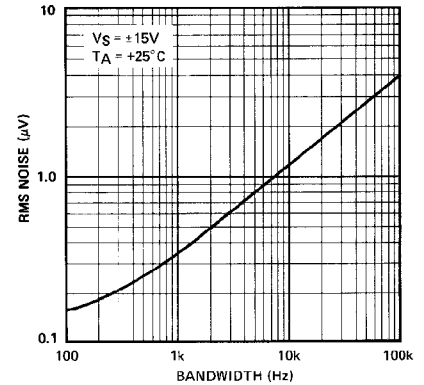
**OP-07 LOW FREQUENCY NOISE**



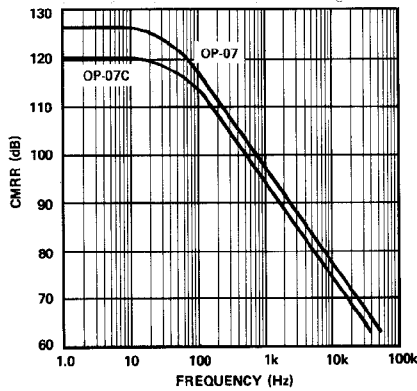
**TOTAL INPUT NOISE VOLTAGE vs FREQUENCY**



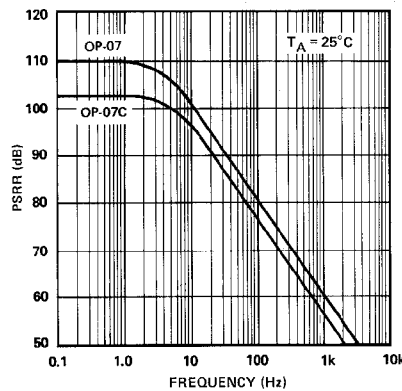
**INPUT WIDEBAND NOISE vs BANDWIDTH (0.1Hz TO FREQUENCY INDICATED)**



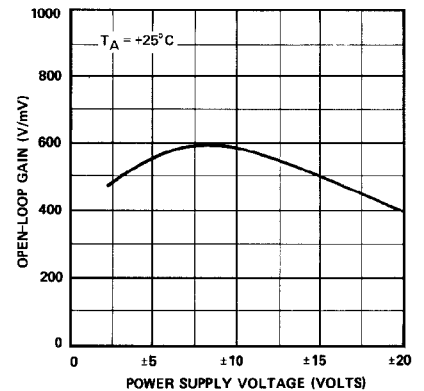
**CMRR vs FREQUENCY**



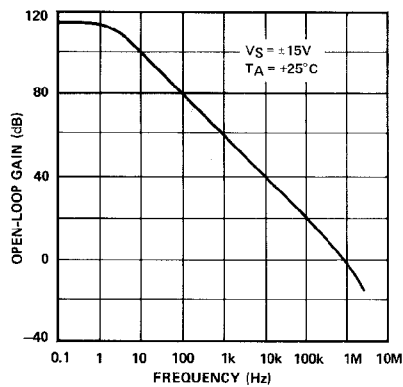
**PSRR vs FREQUENCY**



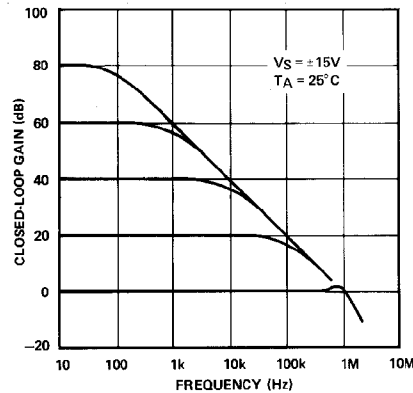
**OPEN-LOOP GAIN vs POWER SUPPLY VOLTAGE**



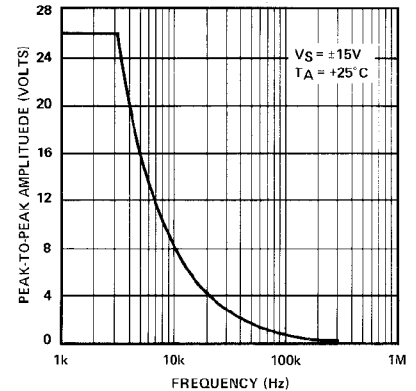
**OPEN-LOOP FREQUENCY RESPONSE**



**CLOSED-LOOP RESPONSE FOR VARIOUS GAIN CONFIGURATIONS**



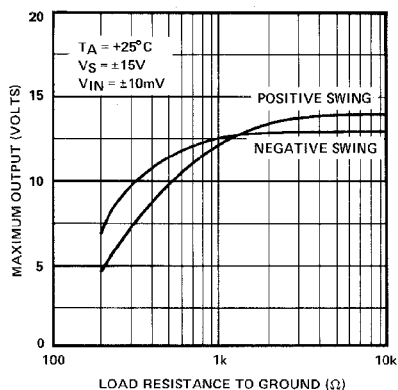
**MAXIMUM OUTPUT SWING vs FREQUENCY**



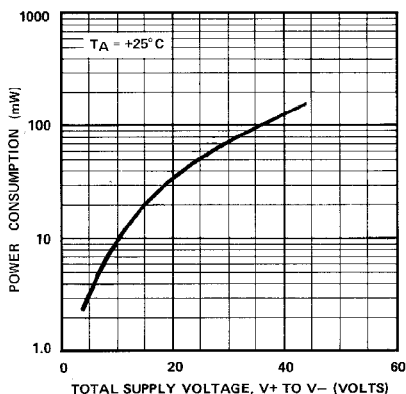


## TYPICAL PERFORMANCE CHARACTERISTICS

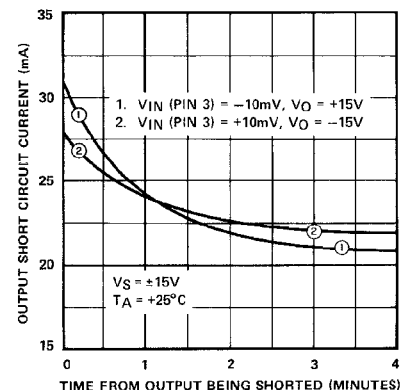
### MAXIMUM OUTPUT VOLTAGE vs LOAD RESISTANCE



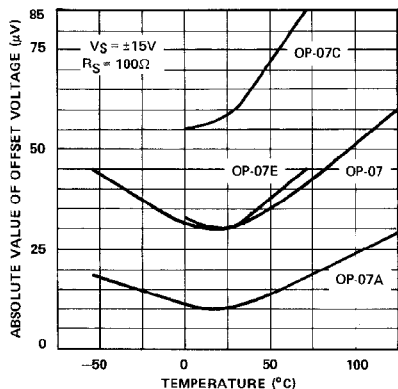
### POWER CONSUMPTION vs POWER SUPPLY



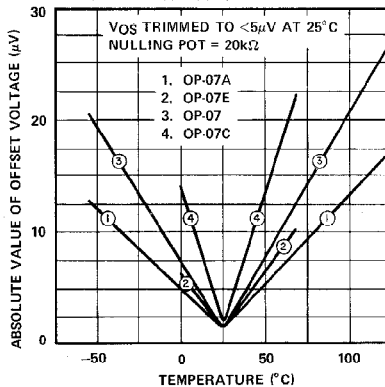
### OUTPUT SHORT-CIRCUIT CURRENT vs TIME



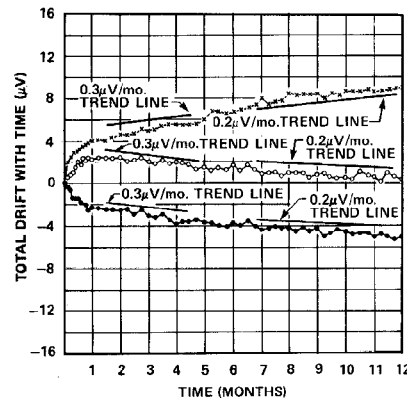
### UNTRIMMED OFFSET VOLTAGE vs TEMPERATURE



### TRIMMED OFFSET VOLTAGE vs TEMPERATURE

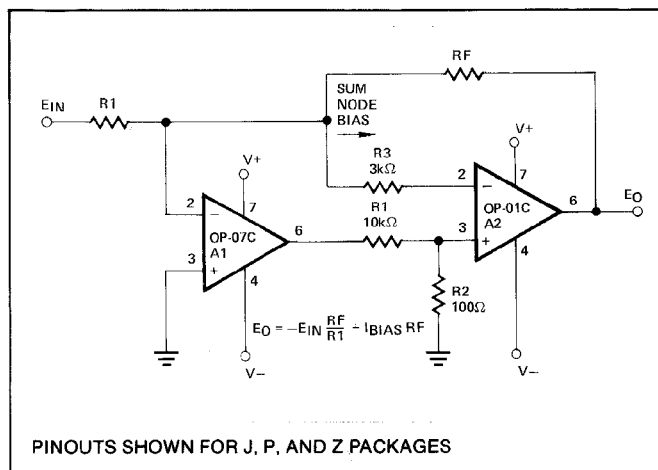


### OFFSET VOLTAGE STABILITY vs TIME

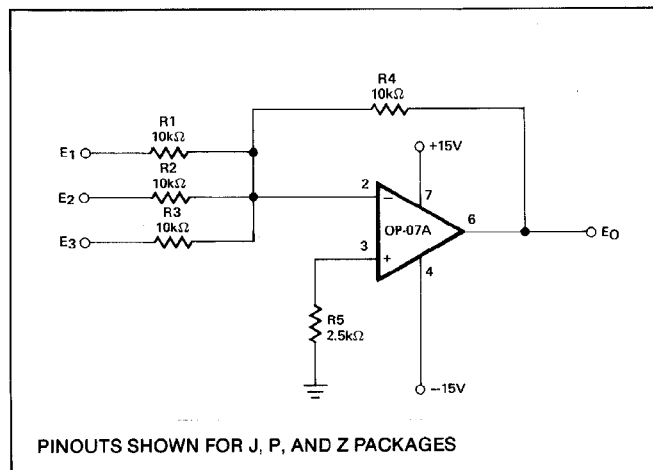


## TYPICAL APPLICATIONS

### HIGH SPEED, LOW $V_{OS}$ , COMPOSITE AMPLIFIER



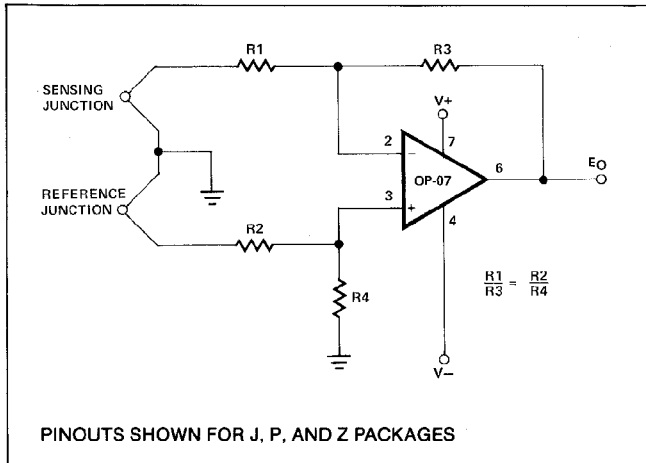
### ADJUSTMENT-FREE PRECISION SUMMING AMPLIFIER



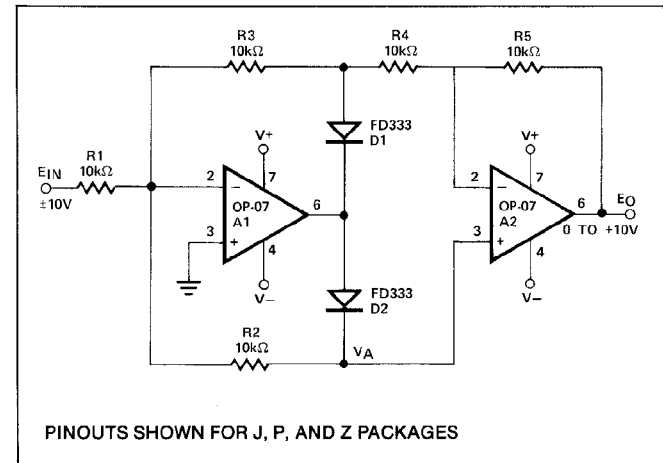
# OP07

## TYPICAL APPLICATIONS

### HIGH-STABILITY THERMOCOUPLE AMPLIFIER



### PRECISION ABSOLUTE-VALUE CIRCUIT



### APPLICATIONS INFORMATION

OP-07 series units may be substituted directly into 725, 108A/308A\* and OP-05 sockets with or without removal of external compensation or nulling components. Additionally, the OP-07 may be used in unnulling 741-type sockets. However, if conventional 741 nulling circuitry is in use, it should be modified or removed to enable proper OP-07 operation. OP-07 offset voltage may be nulled to zero through use of a potentiometer (see offset nulling circuit diagram).

\*TO-99 Package only

The OP-07 provides stable operation with load capacitance of up to 500pF and  $\pm 10V$  swings; larger capacitances should be decoupled with a 50Ω decoupling resistor.

Stray thermoelectric voltages generated by dissimilar metals at the contacts to the input terminals can degrade drift performance. Therefore, best operation will be obtained when both input contacts are maintained at the same temperature, preferably close to the package temperature.