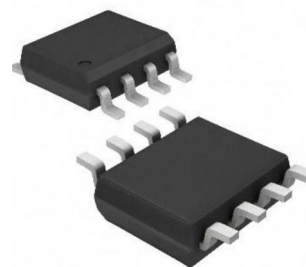


OP07CDR-HX General Purpose Amplifier

General Description

The OP07CDR-HX is an industry standard for instrumentation applications due to its excellent accuracy and stability. It offers a wide input voltage range of ± 13 V minimum, high CMRR of 106 dB, and high input impedance, ensuring high accuracy in the noninverting circuit configuration. Even at high closed-loop gains, the OP07CDR-HX maintains excellent linearity and gain accuracy. It exhibits outstanding stability of offsets and gain over time and variations in temperature. With its accuracy and stability, combined with the freedom from external nulling, the OP07CDR-HX has become widely recognized and used in the instrumentation industry.



SOP-8

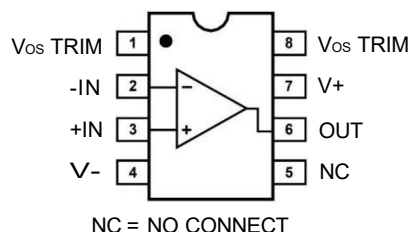
Features

- Low VOS: maximum 75 μ V
- Low VOS drift: maximum 1.3 μ V/ $^{\circ}$ C
- Low noise: maximum 0.6 μ V p-p
- Ultrastable vs. time: maximum 1.5 μ V per month
- Wide supply voltage range: ± 3 V to ± 18 V
- Wide input voltage range: typical ± 14 V
- 125 $^{\circ}$ C temperature-tested dice

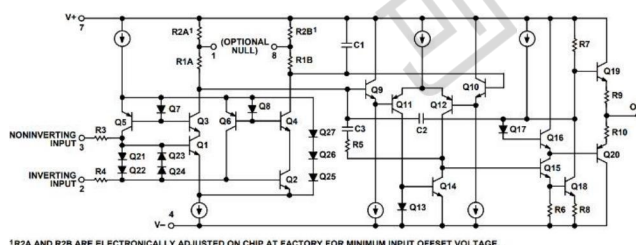
Applications

- Wireless base station control circuits
- Optical network control circuits
- Instrumentation
- Sensors and controls
- Thermocouples
- Strain bridges
- Shunt current measurements
- Resistor thermal detectors (RTDs)
- Precision filters

PIN CONFIGURATIONS



Simplified Schematic

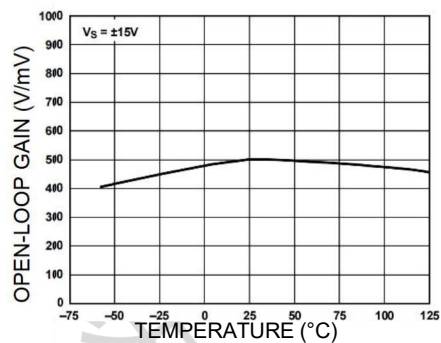


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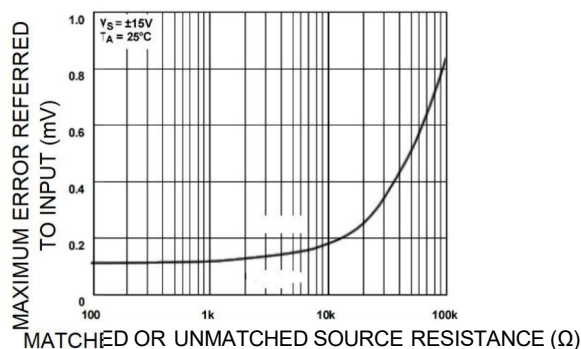
ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
TA = 25°C						
Input Offset Voltage	V _{OS}			60	150	μV
Long-Term VOS Stability	V _{OS} /Time			0.4	2.0	μV/Month
Input Offset Current	I _{OS}			0.8	6.0	nA
Input Bias Current	I _B			±1.8	±7.0	nA
Input Noise Voltage	e _n p-p	0.1 Hz to 10 Hz		0.38	0.65	μV p-p
Input Noise Voltage Density	e _n	f _o = 10 Hz		10.5	20.0	nV/√Hz
		f _o = 100 Hz ^C		0.2	13.5	
		f _o = 1 kHz		9.8	11.5	
Input Noise Current	I _n p-p			15	35	pA p-p
Input Noise Current Density	I _n	f _o = 10 Hz		0.35	0.90	pA/√Hz
		f _o = 100 Hz ^C		0.15	0.27	
		f _o = 1 kHz		0.13	0.18	
Input Resistance, Differential Mode	R _{IN}		8	33		MΩ
Input Resistance, Common Mode	R _{INCM}			120		GΩ
Input Voltage Range	IVR		±13	±14		V
Common-Mode Rejection Ratio	CMRR	V _{CM} = ±13V	100	120		dB
Power Supply Rejection Ratio	PSRR	V _S = ±3V to ±18V		7	32	μV/V
Large Signal Voltage Gain	A _{VO}	R _L ≥ 2 kΩ, V _O = ±10V	120	400		V/Mv
		R _L ≥ 500 Ω, V _O = ±0.5V, V _S = ±3V	100	400		
-40°C ≤ TA ≤ +85°C						
Input Offset Voltage	V _{OS}			85	250	μV
Voltage Drift Without External Trim	TCV _{OS}			0.5	1.8	μV/°C
Voltage Drift with External Trim	TCV _{OSN}	R _P = 20 kΩ		0.4	1.6	μV/°C
Input Offset Current	I _{OS}			1.6	8.0	nA
Input Offset Current Drift	TCI _{OS}			12	50	pA/°C
Input Bias Current	I _B			±2.2	±9.0	nA
Input Bias Current Drift	TCI _B			18	50	pA/°C
Input Voltage Range	IVR		±13	±13.5		V
Common-Mode Rejection Ratio	CMRR	V _{CM} = ±13V	97	120		dB
Power Supply Rejection Ratio	PSRR	V _S = ±3V to ±18V		10	51	μV/V
Large Signal Voltage Gain	A _{VO}	R _L ≥ 2 kΩ, V _O = ±10V	100	400		V/mV
OUTPUT CHARACTERISTICS						
TA = 25°C						
Output Voltage Swing	V _O	R _L ≥ 10 kΩ	±12.0	±13.0		V
		R _L ≥ 2 kΩ	±11.5	±12.8		
		R _L ≥ 1 kΩ		±12.0		
-40°C ≤ TA ≤ +85°C						
Output Voltage Swing	V _O	R _L ≥ 2 kΩ	±12	±12.6		V
DYNAMIC PERFORMANCE						
TA = 25°C						
Slew Rate	SR	R _L ≥ 2 kΩ	0.1	0.3		V/μs
Closed-Loop Bandwidth	BW	A _{VOL} = 1 ^E	0.4	0.6		MHz
Open-Loop Output Resistance	R _O	V _O = 0, I _O = 0		60		Ω
Power Consumption	P _d	V _S = ±15V, No load		80	150	mW
		V _S = ±3V, No load		4	8	
Offset Adjustment Range		R _P = 20 kΩ		±4		mV

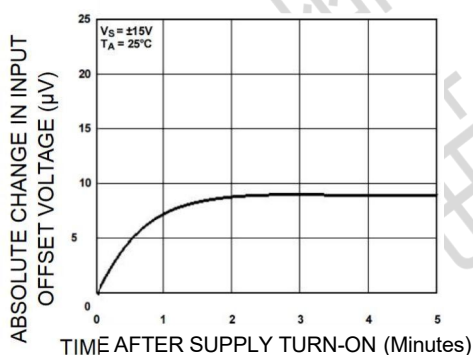
TYPICAL PERFORMANCE CHARACTERISTICS



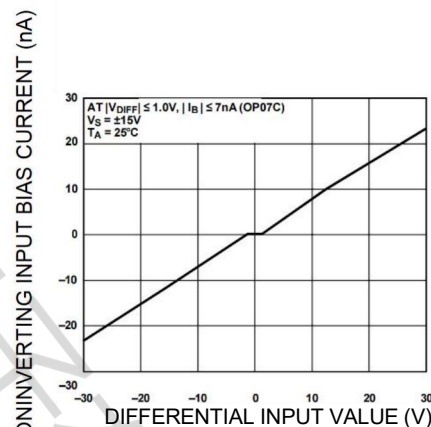
Open-Loop Gain vs. Temperature



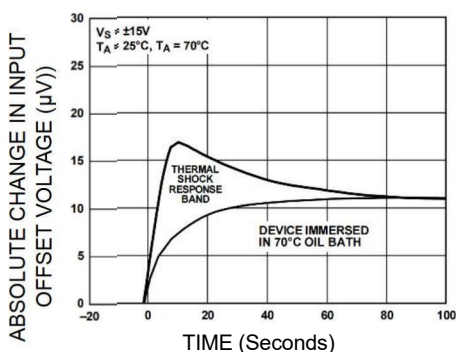
Maximum Error vs. Source Resistance



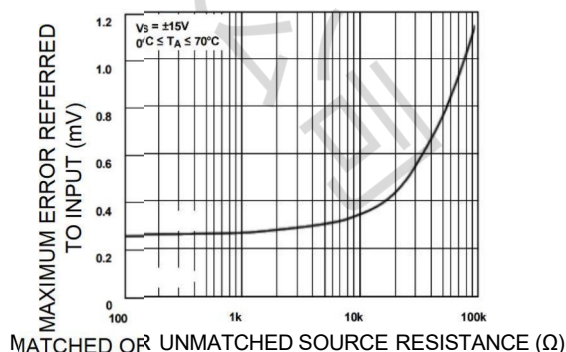
Warm-Up Drift



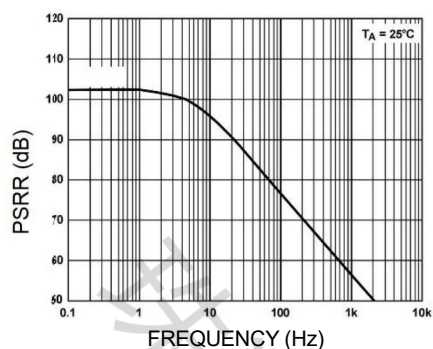
Input Bias Current vs. Differential Input Voltage



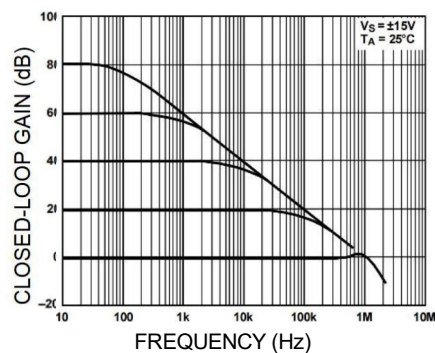
Offset Voltage Change due to Thermal



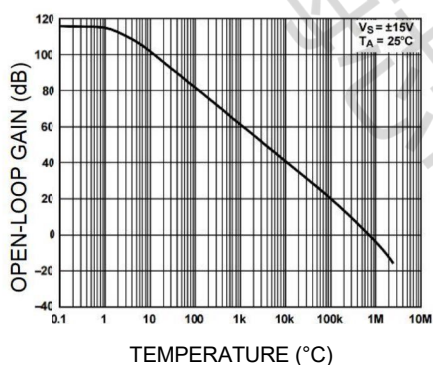
Maximum Error vs. Source Resistance



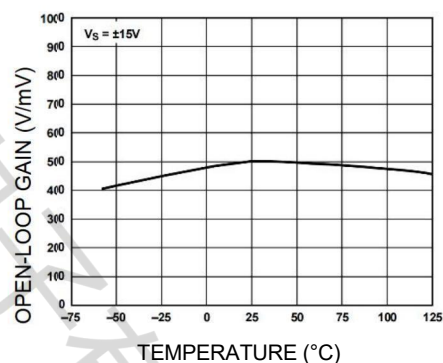
PSRR vs. Frequency



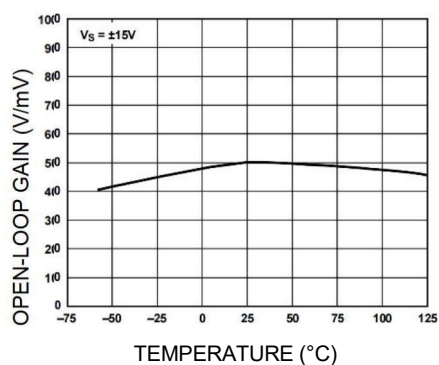
Closed-Loop Frequency Response for Various Gain



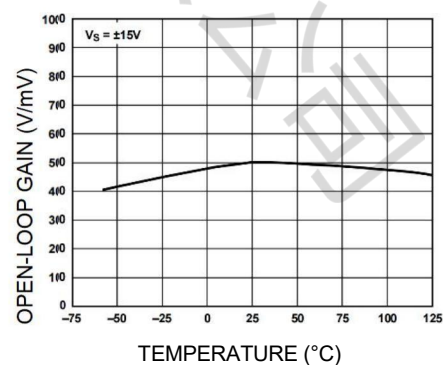
Open-Loop Gain vs. Temperature



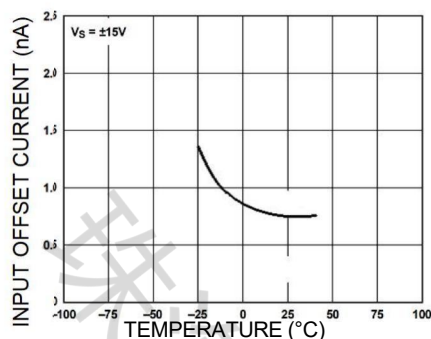
Open-Loop Gain vs. Temperature



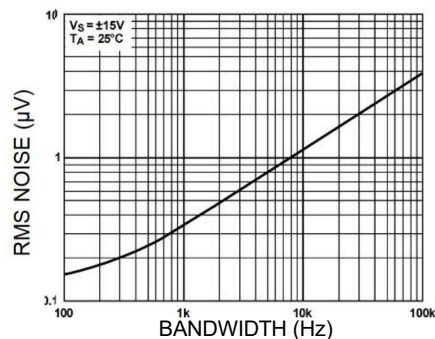
Open-Loop Gain vs. Temperature



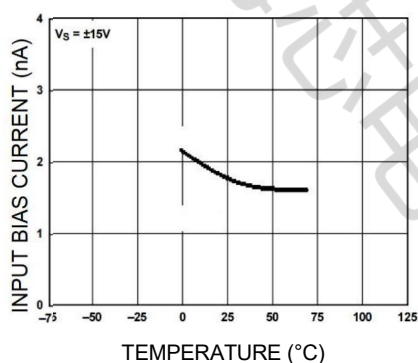
Open-Loop Gain vs. Temperature



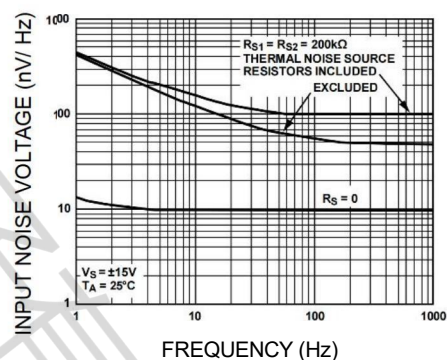
Input Offset Current vs. Temperature



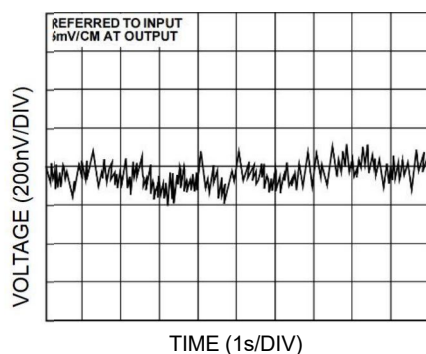
Input Wideband Noise vs. Bandwidth, 0.1 Hz to Frequency Indicated



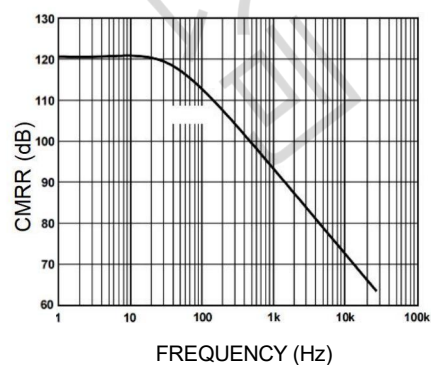
Input Bias Current vs. Temperature



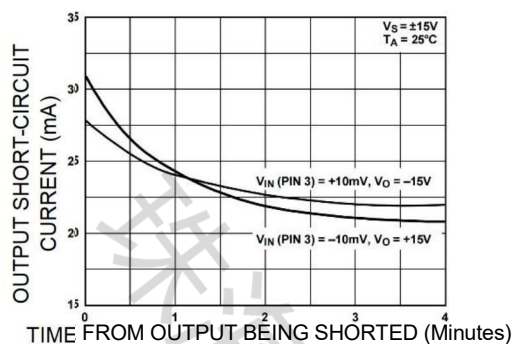
Total Input Noise Voltage vs. Frequency



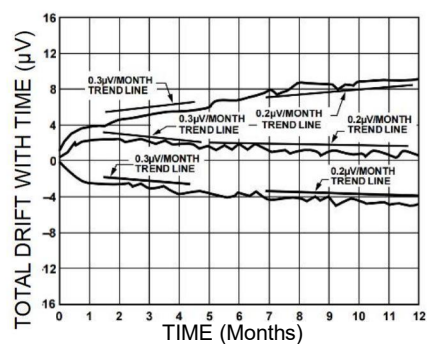
Low Frequency Noise



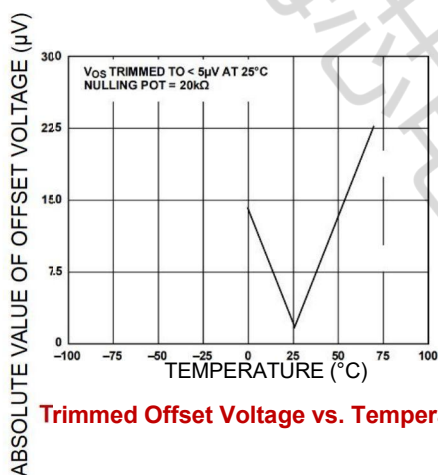
CMRR vs. Frequency



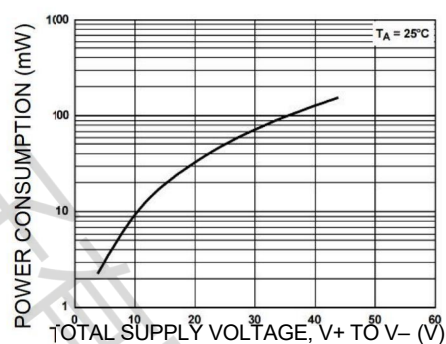
Output Short-Circuit Current vs. Time



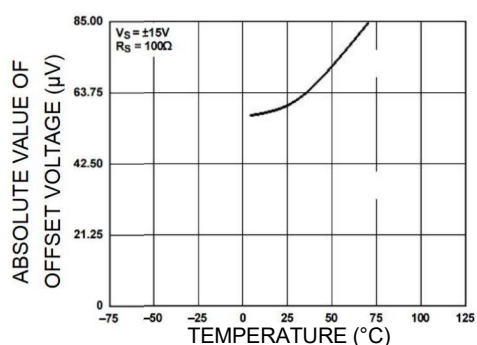
Offset Voltage Drift vs. Time



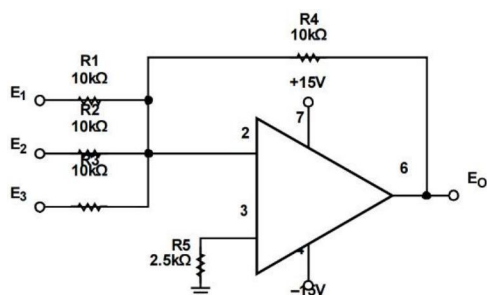
Trimmed Offset Voltage vs. Temperature



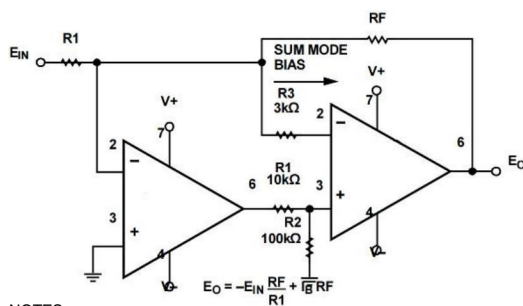
Power Consumption vs. Power Supply



Untrimmed Offset Voltage vs. Temperature



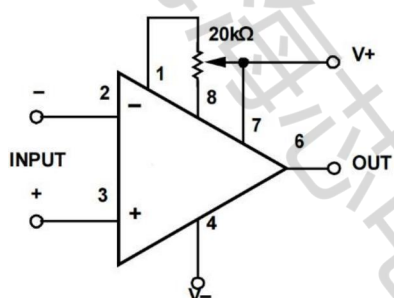
Typical Low Frequency Noise Circuit



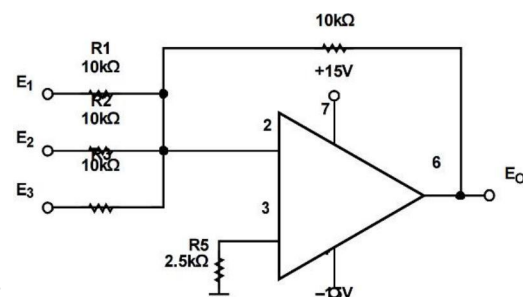
NOTES

1. PINOUT SHOWN FOR P PACKAGE

High Speed, Low VOS Composite Amplifier



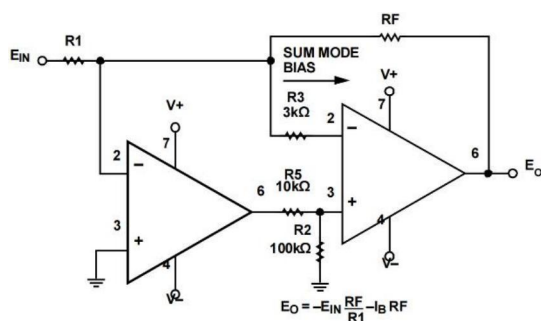
Optional Offset Nulling Circuit



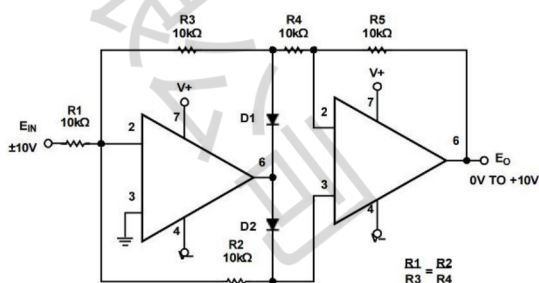
NOTES

1. PINOUT SHOWN FOR P PACKAGE

TEN Test Circuit and Voltage Waveforms



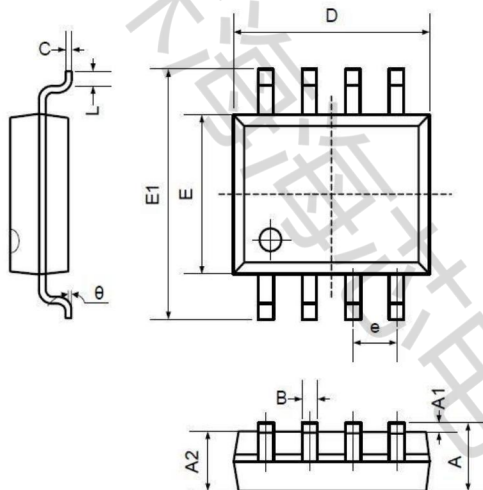
Typical Offset Voltage Test Circuit



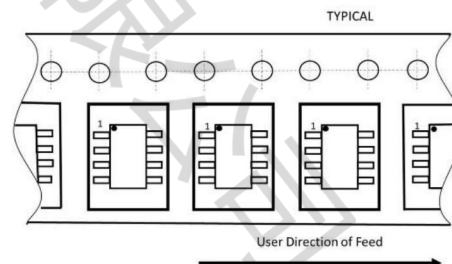
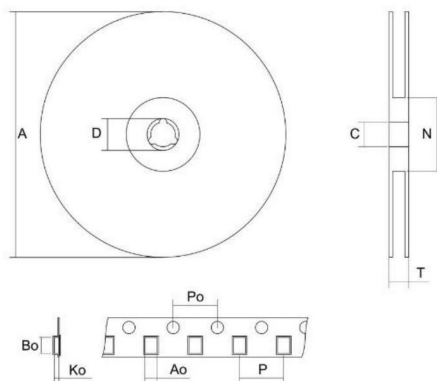
Absolute Value Circuit

DIMENSIONAL DRAWINGS

SOP-8 (Package Outline Dimensions)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Package Type	package	quantity
SOP-8	Taping	2500

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