



CD27A_CD27G

Low Noise, Precision Operational Amplifier

Version: Rev 1.0.0 Date: 2025-5-26

Features ■■

- Supply operation: 8V ($\pm 4V$)~36V ($\pm 18V$)
- Low noise: 90 nV p-p (0.1 Hz to 10 Hz)
- High open-loop gain: 1800 V/mV
- Low drift: 0.2 $\mu V/^{\circ}C$
- High speed: 2.8 V/ μs slew rate, 8 MHz gain bandwidth
- CMRR: 130 dB at VCM of $\pm 11 V$
- Maximum noise spectral density
 - CD27A . . . 3.9 nV/ $\sqrt{Hz}$ @ 1 kHz Max
 - CD27G . . . 5.0 nV/ $\sqrt{Hz}$ @ 1 kHz Max
- Low input offset voltage
 - CD27A . . . 26 μV Max
 - CD27G . . . 100 μV Max
- Low input offset voltage drift
 - CD27A . . . 0.2 $\mu V/^{\circ}C$
 - CD27G . . . 0.4 $\mu V/^{\circ}C$

Application ■■

- High precision data acquisition system
- Automated test equipment (ATE)
- Audio preamplifier
- Instruments
- Power acquisition application system

Description ■■

CD27 provides low-level signal, excellent low noise and high-precision amplification performance. The products are widely used in stable integrators, precision summation amplifiers, precision voltage threshold detectors, comparators and professional audio circuits, such as magnetic heads and microphone preamplifiers.

Offset voltage as low as 26 μV . Drift is 0.2 $\mu V/^{\circ}C$, so the device is an ideal choice for precision instrument applications. Low noise ($e_n=3.5nV/\sqrt{Hz}$ at 10Hz), 1/f noise turning frequency (2.7Hz) and high gain (1800V/MV) can accurately amplify the low-level signal with high gain. 8MHz gain bandwidth product and 2.8 V/ μs slew rate can achieve excellent dynamic accuracy in high-speed data acquisition system. Using the bias current elimination circuit, CD27 can achieve a low input bias current of $\pm 10na$. The output stage has good load driving ability. $\pm 10 V$ guaranteed swing (600 Ω load) and low output distortion make the CD27 an excellent choice for professional audio applications. Power supply rejection ratio (PSRR) and common mode rejection ratio (CMRR) both

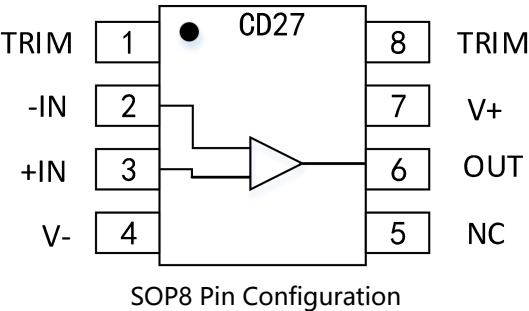
exceed 120dB. With these features and 0.2 μ V long term drift per month,the circuit design can easily reach the high performance level.

The product provides more design flexibility in a wide range of temperature environments from - 40 $^{\circ}$ C to + 125 $^{\circ}$ C and all power supply modes supported by the product.

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Pin Configurations



Pin Description

Pin_N	Symbol (CD27A/CD27G)	Input/Output	Function
1	TRIM	--	Corrected offset voltage
2	-IN	Input	Inverting input
3	+IN	Input	None inverting input
4	V-	--	Negative power supply
5	NC	--	Not connected
6	OUT	Output	Output
7	V+	--	Positive power supply
8	TRIM	--	Corrected offset voltage

Absolute Maximum Ratings

Parameter	Range
Supply Voltage	8V-44V(±4V-±22V)
Input Voltage	V- to V+
Storage Temperature Range	-65°C to +150°C
Operating Temperature Range All Packages	-40°C to +125°C
Junction Temperature Range All Packages	-65°C to +150°C
Package thermal resistance value	SOP8(θ _{JC}): 43°C/W
(product ambient temperature = + 25 °C)	SOP-8(θ _{JA}): 158°C/W
Lead Temperature (Soldering, 60s)	300°C

Electrical characteristics

(Electrical parameters of CD27A, $V_S = \pm 15\text{ V}$, $V_{CM} = V_S/2$, $T_A = 25^\circ\text{C}$, unless otherwise noted.)

Table1.

PARAMETER	COND ITION	CD27A			
		MIN	TYP	MAX	UNIT
INPUT CHARACTERISTICS					
Input Offset Voltage (V _{OS})	--	--	10	26	μV
Offset Voltage Drift (ΔV _{OS} /ΔT)	--	--	0.2	0.8	μV/°C
Input Bias Current (I _B)	--	--	±10	±40	nA
Input Offset Current (I _{OS})	--	--	7	37	nA
Adjustable range of input offset voltage	R _p =10kΩ	--	±4.0	--	mV
Input Voltage range(IVR)		±11.0	±12.2	--	V
Common-Mode Rejection Ratio (CMRR)	V _{CM} = ±11.0V	115	130	--	dB
Open-Loop Voltage Gain (A _{OL})	R _L ≥2KΩ,V _O =±10V	950	1800	--	V/mV
	R _L ≥600Ω,V _O =±11V	800	1500	--	V/mV
OUTPUT CHARACTERISTICS					
Output Voltage range(OVR)	R _L ≥2KΩ	±12.0	±13.5	--	V
	R _L ≥600Ω	±10.0	±12.0	--	V
NOISE PERFORMANCE					
Input noise voltage(en p-p)	f = 0.1 Hz to 10 Hz	--	0.09	0.2	μVp-p
Input Voltage Noise Density (e _n)	f _o = 10Hz	--	3.5	5.2	nV/√Hz
	f _o = 30Hz	--	3.1	4.5	nV/√Hz
	f _o = 1000Hz	--	3.0	3.9	nV/√Hz
Current Noise Density (i _n)	f _o = 10Hz	--	1.8	4.0	pA/√Hz
	f _o = 30Hz	--	1.0	2.4	pA/√Hz
	f _o = 1000Hz	--	0.4	0.7	pA/√Hz
DYNAMIC PERFORMANCE					
Slew Rate (SR)	R _L ≥ 2 kΩ	1.7	2.8	--	V/μs
Gain-Bandwidth Product (GBW)		5	8	--	MHz
POWER SUPPLY					
Power supply voltage rejection ratio (PSRR)	V _s =±4V~±18V	100	125	--	dB
Power Dissipation(PD)		--	100	150	mW

Table2.

(Electrical parameters of CD27G, $V_S = \pm 15\text{ V}$, $V_{CM} = V_S/2$, $T_A = 25^\circ\text{C}$, unless otherwise noted.)

PARAMETER	CONDITION	CD27G			
		MIN	TYP	MAX	UNIT
INPUT CHARACTERISTICS					
Input Offset Voltage (V _{OS})	--	--	30	100	μV
Offset Voltage Drift (ΔV _{OS} /ΔT)	--	--	0.4	1.9	μV/°C
Input Bias Current (I _B)	--	--	±15	±80	nA
Input Offset Current (I _{OS})	--	--	10	75	nA
Adjustable range of input offset voltage	R _p =10kΩ	--	±4.0	--	mV
Input Voltage range(IVR)		±11.0	±12.2	--	V
Common-Mode Rejection Ratio (CMRR)	V _{CM} =±11.0V	110	125	--	dB
Open-Loop Voltage Gain (A _{OL})	R _L ≥2KΩ,V _O =±10V	700	1500	--	V/mV
	R _L ≥600Ω,V _O =±11V	600	1500	--	V/mV
OUTPUT CHARACTERISTICS					
Output Voltage range(OVR)	R _L ≥2KΩ	±11.0	±13.3	--	V
	R _L ≥600Ω	±10.0	±12.0	--	V
NOISE PERFORMANCE					
Input noise voltage(en p-p)	f = 0.1 Hz to 10 Hz	--	0.1	0.25	μV p-p
Input Voltage Noise Density (e _n)	fo = 10Hz	--	3.8	8.0	nV/√Hz
	fo = 30Hz	--	3.3	6.0	nV/√Hz
	fo = 1000Hz	--	3.1	5.0	nV/√Hz
Current Noise Density (i _n)	fo = 10Hz	--	1.8	4.0	pA/√Hz
	fo = 30Hz	--	1.1	2.5	pA/√Hz
	fo = 1000Hz	--	0.5	0.7	pA/√Hz
DYNAMIC PERFORMANCE					
Slew Rate (SR)	R _L ≥ 2 kΩ	1.7	2.8	--	V/μs
Gain-Bandwidth Product (GBW)		5	8	--	MHz
POWER SUPPLY					
Power supply voltage rejection ratio (PSRR)	V _S =±4V~±18V	95	120	--	dB
Power Dissipation(PD)		--	105	175	mW

Typical Characteristics

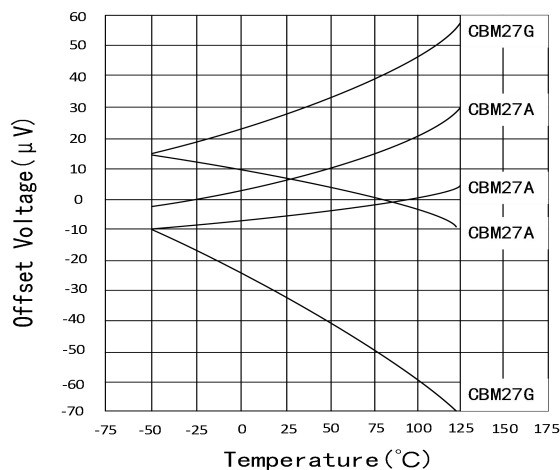


Figure 1. Offset Voltage Drift of Five Representative Units vs. Temperature

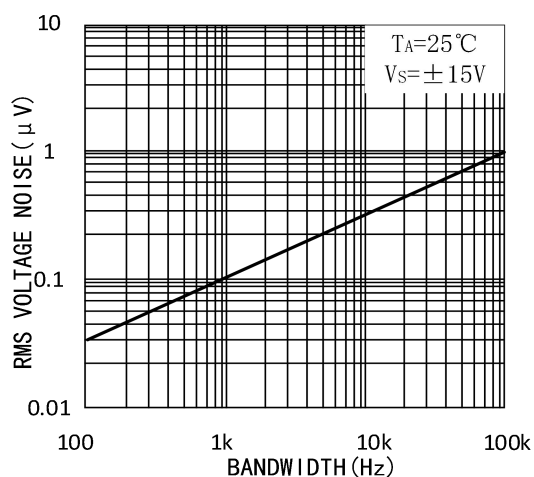


Figure 3. Input Wideband Voltage Noise vs. Bandwidth (0.1 Hz to Frequency Indicated)

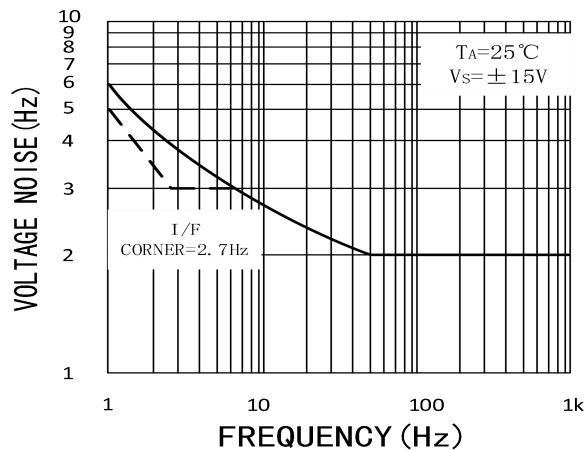


Figure 2. Voltage Noise Density vs. Frequency

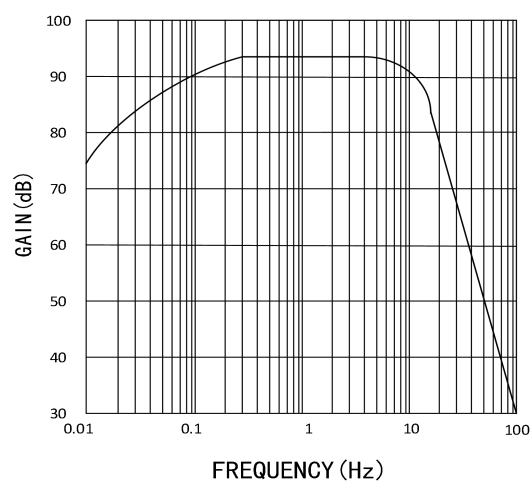
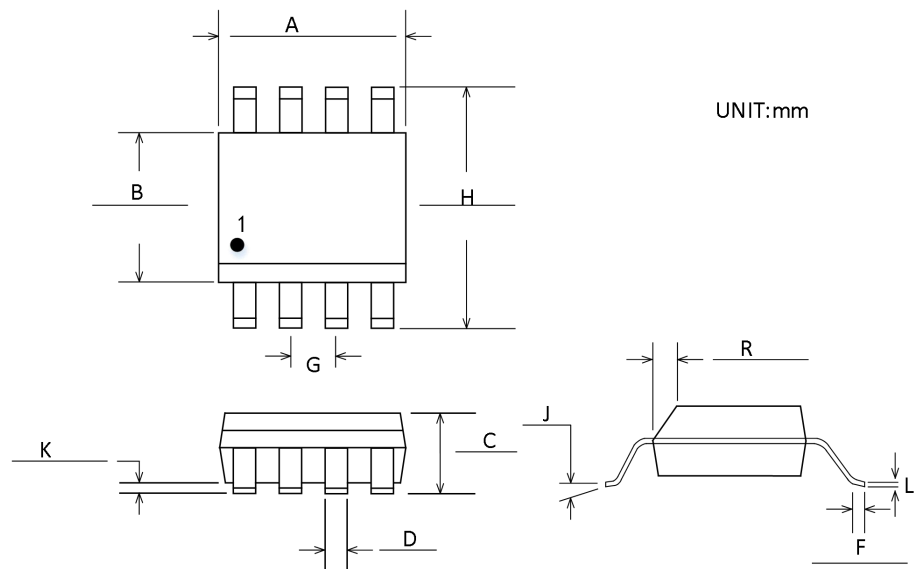


Figure 4 0.1 Hz to 10 Hz p-p Noise Tester Frequency Response

Package Outline Dimensions

SOP8



Symbol	Dimensions In Millimeters	
	Min	Max
A	4.80	5.00
B	3.80	4.00
C	1.35	1.75
D	0.31	0.51
F	0.40	1.27
G	1.27BSC	
H	5.80	6.20
J	0°	8°
K	0.10	0.25
L	0.17	0.25
R	0.25	0.50

Package/Ordering Information

MODEL	TEMPERATURE	PACKAGE DESCRIPTION	PACKAGE OPTION
CD27AS8	-40°C~125°C	SOP-8	Tape and Reel, 2500
CD27AS8-RL	-40°C~125°C	SOP-8	Tape and Reel, 3000
CD27AS8-REEL	-40°C~125°C	SOP-8	Tape and Reel, 4000
CD27GS8	-40°C~125°C	SOP-8	Tape and Reel, 2500
CD27GS8-RL	-40°C~125°C	SOP-8	Tape and Reel, 3000
CD27GS8-REEL	-40°C~125°C	SOP-8	Tape and Reel, 4000

Revision Log

Version	Revision date	Change content	Reason for Change	Modified by	Reviewed By	Note
V1.0	2025.5.26	Initial version	Regular update	WW	LYL	