

Features

- Supply operation: 8V ($\pm 4V$)~36V ($\pm 18V$)
- Low noise: 90 nV p-p (0.1 Hz 至 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
CBM27A . . . 3.9 nV/ \sqrt{Hz} @ 1 kHz Max
CBM27G . . . 5.0 nV/ \sqrt{Hz} @ 1 kHz Max
- Low input offset voltage
CBM27A . . . 26 μV Max
CBM27G . . . 100 μV Max
- Low input offset voltage drift
CBM27A . . . 0.2 $\mu V/^\circ C$
CBM27G . . . 0.4 $\mu V/^\circ C$

Application

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

Description

Cbm27 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, CBM27 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 CBM27 an excellent choice for professional audio applications. Power supply rejection ratio (PSRR) and common mode rejection ratio (CMRR)

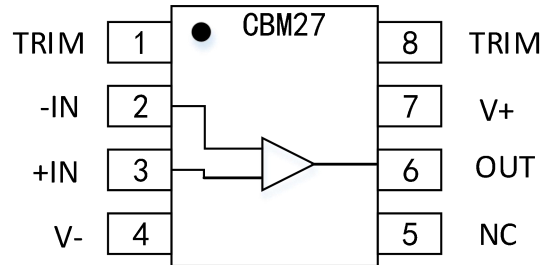
both exceed 120dB. With these features and 0.2 μ V long term drift per month, the circuit design can easily reach the high performance level.

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

Catalog

Features.....	1
Application.....	1
Description.....	1
Catalog.....	3
Pin Configurations.....	4
Absolute Maximum Ratings ⁽¹⁾	5
Electrical Characteristics.....	6
Typical Characteristics.....	8
Package Outline Dimensions.....	9
SOP-8.....	9
Package/Ordering Information.....	10

Pin Configurations



SOP8 Pin Configuration

Pin Description

PIN_N	SYMBOL(CBM27A/CBM27G)	NAME AND FUNCTION
1	TRIM	Corrected offset voltage
2	-IN	Inverting input
3	+IN	None inverting input
4	V-	Negative power supply
5	NC	Not connected
6	OUT	Output
7	V+	Positive power supply
8	TRIM	Corrected offset voltage

Absolute Maximum Ratings ⁽¹⁾

- Supply Voltage: 8V-44V($\pm 4V$ - $\pm 22V$)
- Input Voltage : V- to V+
- Storage Temperature Range : -65°C to $+150^{\circ}\text{C}$
- Operating Temperature Range :
CBM27A : -55°C to $+125^{\circ}\text{C}$
CBM27G : -40°C to $+85^{\circ}\text{C}$
- Junction Temperature Range : -65°C to $+150^{\circ}\text{C}$
- Package thermal resistance value
(product ambient temperature = $+ 25^{\circ}\text{C}$)
SOP8(θ_{JC}): $43^{\circ}\text{C}/\text{W}$
SOP-8(θ_{JA}) : $158^{\circ}\text{C}/\text{W}$
- Lead Temperature (Soldering, 60s) : 300°C

Electrical Characteristics

(Electrical parameters of CBM27A, $V_S = \pm 15\text{ V}$, $V_{CM} = V_S/2$, $T_A = 25^\circ\text{C}$, unless otherwise noted.)

Table1.

PARAMETER	CONDITION	CBM27A			
		MIN	TYP	MAX	UNIT
INPUT CHARACTERISTICS					
Input Offset Voltage (V_{OS})			10	26	μV
Offset Voltage Drift ($\Delta V_{OS}/\Delta T$)			0.2	0.8	$\mu\text{V}/^\circ\text{C}$
Input Bias Current (I_B)			± 10	± 40	nA
Input Offset Current (I_{OS})			7	37	nA
Adjustable range of input offset voltage	$R_P=10\text{k}\Omega$		± 4.0		mV
Input Voltage range(IVR)		± 11.0	± 12.2		V
Common-Mode Rejection Ratio (CMRR)	$V_{CM} = \pm 11.0\text{V}$	115	130		dB
Open-Loop Voltage Gain (A_{OL})	$R_L \geq 2\text{k}\Omega, V_O = \pm 10\text{V}$	950	1800		V/mV
	$R_L \geq 600\Omega, V_O = \pm 11\text{V}$	800	1500		V/mV
OUTPUT CHARACTERISTICS					
Output Voltage range(OVR)	$R_L \geq 2\text{k}\Omega$	± 12.0	± 13.5		V
	$R_L \geq 600\Omega$	± 10.0	± 12.0		V
NOISE PERFORMANCE					
Input noise voltage(en p-p)	$f = 0.1\text{ Hz to } 10\text{ Hz}$		0.09	0.2	$\mu\text{Vp-p}$
Input Voltage Noise Density (e_n)	$f_o = 10\text{Hz}$		3.5	5.2	$\text{nV}/\sqrt{\text{Hz}}$
	$f_o = 30\text{Hz}$		3.1	4.5	$\text{nV}/\sqrt{\text{Hz}}$
	$f_o = 1000\text{Hz}$		3.0	3.9	$\text{nV}/\sqrt{\text{Hz}}$
Current Noise Density (i_n)	$f_o = 10\text{Hz}$		1.8	4.0	$\text{pA}/\sqrt{\text{Hz}}$
	$f_o = 30\text{Hz}$		1.0	2.4	$\text{pA}/\sqrt{\text{Hz}}$
	$f_o = 1000\text{Hz}$		0.4	0.7	$\text{pA}/\sqrt{\text{Hz}}$
DYNAMIC PERFORMANCE					
Slew Rate (SR)	$R_L \geq 2\text{ k}\Omega$	1.7	2.8		$\text{V}/\mu\text{s}$
Gain-Bandwidth Product (GBW)		5	8		MHz
POWER SUPPLY					
Power supply voltage rejection ratio (PSRR)	$V_S = \pm 4\text{V} \sim \pm 18\text{V}$	100	125		dB

Power Dissipation(PD)			100	150	mW
-----------------------	--	--	-----	-----	----

Table2.

 (Electrical parameters of CBM27G, $V_S = \pm 15\text{ V}$, $V_{CM} = V_S/2$, $T_A = 25^\circ\text{C}$, unless otherwise noted.)

PARAMETER	CONDITION	CBM27G			
		MIN	TYP	MAX	UNIT
INPUT CHARACTERISTICS					
Input Offset Voltage (V_{OS})			30	100	μV
Offset Voltage Drift ($\Delta V_{OS}/\Delta T$)			0.4	1.9	$\mu\text{V}/^\circ\text{C}$
Input Bias Current (I_B)			± 15	± 80	nA
Input Offset Current (I_{OS})			10	75	nA
Adjustable range of input offset voltage	$R_P = 10\text{k}\Omega$		± 4.0		mV
Input Voltage range(IVR)		± 11.0	± 12.2		V
Common-Mode Rejection Ratio (CMRR)	$V_{CM} = \pm 11.0\text{V}$	110	125		dB
Open-Loop Voltage Gain (A_{OL})	$R_L \geq 2\text{k}\Omega, V_O = \pm 10\text{V}$	700	1500		V/mV
	$R_L \geq 600\Omega, V_O = \pm 11\text{V}$	600	1500		V/mV
OUTPUT CHARACTERISTICS					
Output Voltage range(OVR)	$R_L \geq 2\text{k}\Omega$	± 11.0	± 13.3		V
	$R_L \geq 600\Omega$	± 10.0	± 12.0		V
NOISE PERFORMANCE					
Input noise voltage(en p-p)	$f = 0.1\text{ Hz to } 10\text{ Hz}$		0.1	0.25	$\mu\text{V p-p}$
Input Voltage Noise Density (e_n)	$f_o = 10\text{Hz}$		3.8	8.0	$\text{nV}/\sqrt{\text{Hz}}$
	$f_o = 30\text{Hz}$		3.3	6.0	$\text{nV}/\sqrt{\text{Hz}}$
	$f_o = 1000\text{Hz}$		3.1	5.0	$\text{nV}/\sqrt{\text{Hz}}$
Current Noise Density (i_n)	$f_o = 10\text{Hz}$		1.8	4.0	$\text{pA}/\sqrt{\text{Hz}}$
	$f_o = 30\text{Hz}$		1.1	2.5	$\text{pA}/\sqrt{\text{Hz}}$
	$f_o = 1000\text{Hz}$		0.5	0.7	$\text{pA}/\sqrt{\text{Hz}}$
DYNAMIC PERFORMANCE					
Slew Rate (SR)	$R_L \geq 2\text{ k}\Omega$	1.7	2.8		V/ μs
Gain-Bandwidth Product (GBW)		5	8		MHz
POWER SUPPLY					
Power supply voltage rejection ratio (PSRR)	$V_S = \pm 4\text{V} \sim \pm 18\text{V}$	95	120		dB
Power Dissipation(PD)			105	175	mW

Typical Characteristics

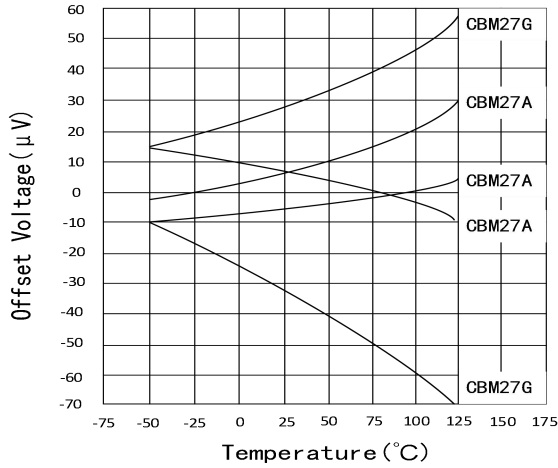


Figure 1. Offset Voltage Drift of Five Representative Units vs. Temperature

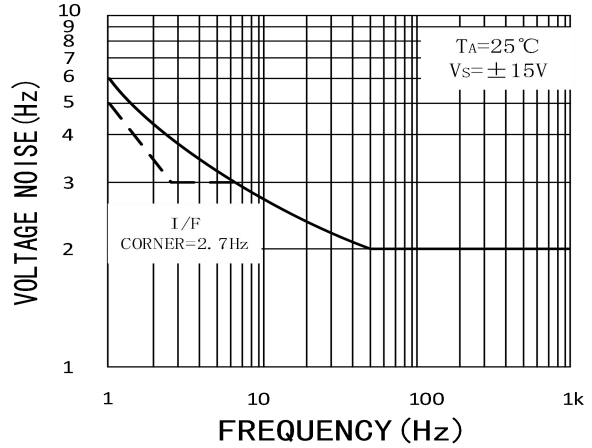


Figure 2. Voltage Noise Density vs. Frequency

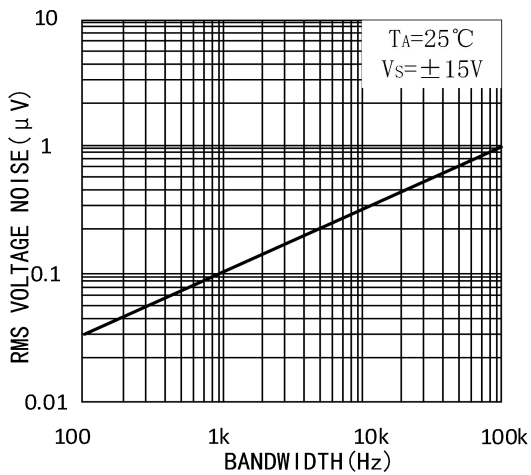


Figure 3. Input Wideband Voltage Noise vs. Bandwidth (0.1 Hz to Frequency Indicated)

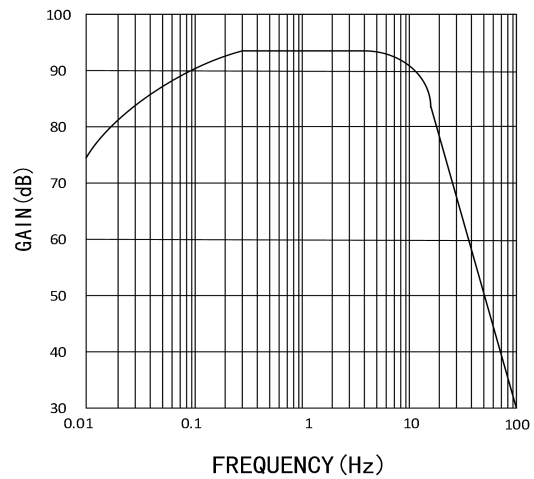
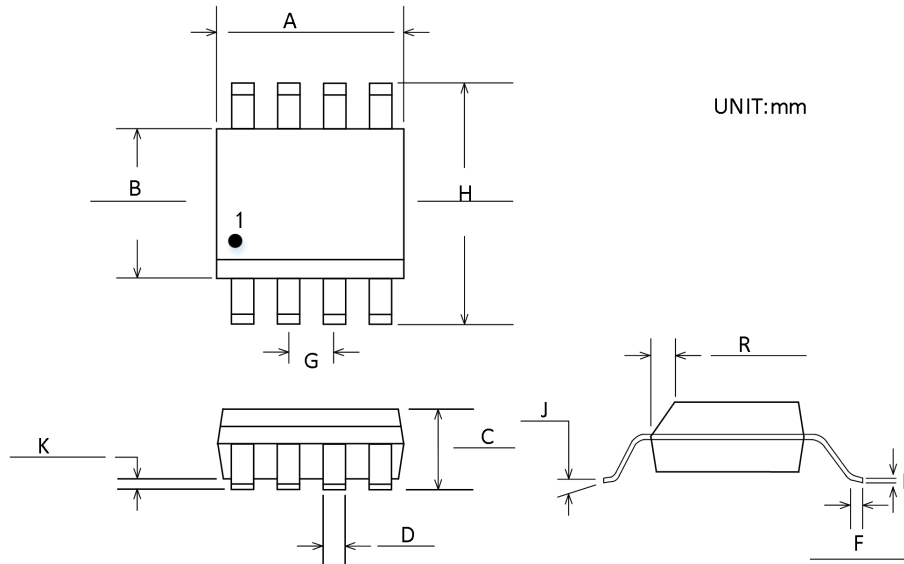


Figure 4 0.1 Hz to 10 Hz p-p Noise Tester Frequency Response

Package Outline Dimensions

SOP-8



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

PRODUCT TYPE	OPERATING TEMPERATURE	PACKAGE	PACKAGE MARKING	NUMBER OF PACKAGES
CBM27AS8	-40°C~125°C	SOP-8	CBM27A	Tape and Reel, 2500
CBM27AS8-RL	-40°C~125°C	SOP-8	CBM27A	Tape and Reel, 3000
CBM27AS8-REEL	-40°C~125°C	SOP-8	CBM27A	Tape and Reel, 4000
CBM27GS8	-40°C~125°C	SOP-8	CBM27G	Tape and Reel, 2500
CBM27GS8-RL	-40°C~125°C	SOP-8	CBM27G	Tape and Reel, 3000
CBM27GS8-REEL	-40°C~125°C	SOP-8	CBM27G	Tape and Reel, 4000