Features

- Low Offset Voltage: 1uV
- Lowest auto-zero amplifier noise
- Input offset drift: 0.002 μV/°C
- 5 V single-supply operation
- High gain, CMRR, and PSRR: 130 dB
- low input bias current: 100 pA maximum
- Low supply current: 1.0 mA
- Overload recovery time: 50 μs
- Rail-to-rail input and output swing

Application

- Automotive sensors
- Pressure and position sensors
- Medical instrumentation
- Photodiode amplifiers
- Thermocouple amplifiers
- Precision current sensing

Description

This amplifier has ultra low offset, drift, and bias current. The CBM8628/CBM8629 are wide bandwidth auto-zero amplifiers featuring rail-to-rail input and output swing and low noise. Operation is fully specified from 2.7 V to 5 V single supply(±1.35 V to ±2.5 V dual supply).

The CBM8628,CBM8629,CBM8630 provide benefits previously found only in expensive auto-zeroing or chopper-stabilized amplifiers, these zero-drift amplifiers combine low cost with high accuracy and low noise. No external capacitor is required. In addition, the CBM8628,CBM8629,CBM8630 greatly reduce the digital switching noise found in most chopper-stabilized amplifiers. With an offset voltage of only 1 μV, drift of less than 0.005 μV/°C,and noise of only 0.5 μV p-p (0.1 Hz to 10 Hz), the CBM8628,CBM8629,CBM8630 are suited for applications where error sources cannot be tolerated. Position and pressure sensors,medical equipment, and strain gage amplifiers benefit greatly from nearly zero drift over their operating temperature range.Many systems can take advantage of the rail-to-rail input and output swings provided by the CBM8628,CBM8629,CBM8630 to reduce input biasing complexity and maximize SNR.

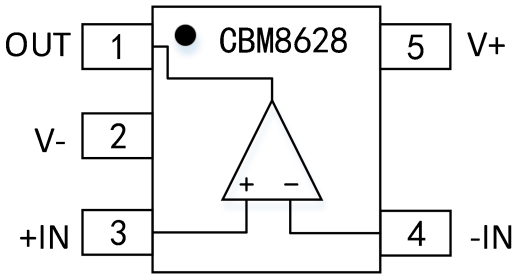
The CBM8628,CBM8629,CBM8630 are specified for the extended industrial temperature range(−40°C to +125°C). The CBM8628 is available in 5-lead SOT-23.The CBM8629 is available in the standard 8-lead narrow SOP and MSOP plastic packages. CBM8630 quad amplifier is available in 14-lead narrow SOP and 14-lead TSSOP plastic packages.

Catalog

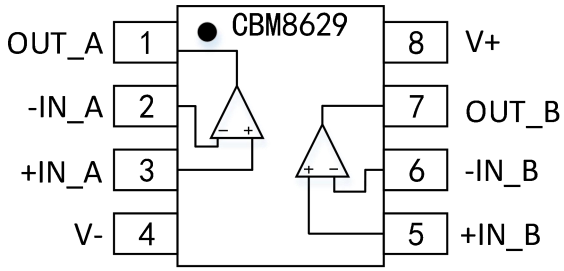
Revision Log

Version	Revision date	Change content	Reason for Change	Modified by	Reviewed By	Note
V1.0	2024.12.13	Added TSOT23-5 package size and outline drawing, and modified the TSSOP14 package outline drawing.	Regular update	WW	LYL	
V1.1	2025.7.16	Update MSOP8 package Mark information	Error update	WW	LYL	

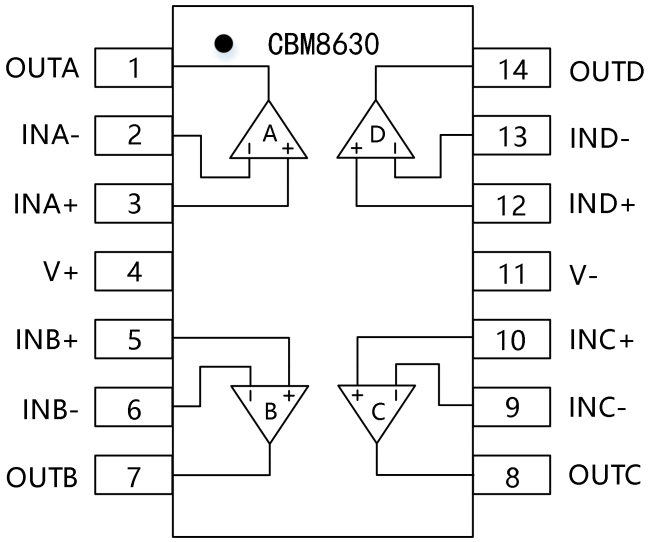
Pin Configurations



SOT23/TSOT23 Pin Configuration



MSOP/SOP Pin Configuration



TSSOP/SOP Pin Configuration

Pin Description

PIN N°	SYMBOL(CBM8628)	NAME AND FUNCTION
1	OUT	Output
2	V-	Negative power supply
3	+IN	None inverting input
4	-IN	inverting input
5	V+	Positive power supply

PIN N°	SYMBOL(CBM8629)	NAME AND FUNCTION
1	OUT_A	Output A
2	-IN_A	inverting input A
3	+IN_A	None inverting input A
4	V-	inverting input/V-
5	+IN_B	V+/None inverting input B
6	-IN_B	inverting input B
7	OUT_B	Output B
8	V+	Positive power supply

PIN N°	SYMBOL (CBM8630)	NAME AND FUNCTION
1	OUT_A	Output A
2	-IN_A	inverting input A
3	+IN_A	None inverting input A
4	V+	Positive power supply
5	+IN_B	None inverting input B
6	-IN_B	inverting input B
7	OUT_B	Output B
8	OUT_C	Output C
9	-IN_C	inverting input C
10	+IN_C	None inverting input C
11	V-	Negative power supply
12	+IN_D	None inverting input D
13	-IN_D	inverting input D
14	OUT_D	Output D

Absolute Maximum Ratings (1)

- Supply Voltage: 6V
- Input Voltage:GND – 0.3 V to VS + 0.3 V
- Differential Input Voltage:±5 V
- Storage Temperature Range All Packages: −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
- SOT23-5:230℃/W（θJ_A）/146℃/W（θJ_C）
- MSOP-8:190℃/W（θJ_A）/44℃/W（θJ_C）
- SOP-8:105℃/W（θJ_A）/43℃/W（θJ_C）
- Lead Temperature (Soldering, 60s):300℃
- ESD（CBM8628）：5kV（HBM）
- ESD（CBM8629）：5kV（HBM）

Electrical Characteristics

(V_S = 5 V, V_{CM} = V_S/2, T_A = 25°C, unless otherwise noted.)

Table1.

PARAMETER	CONDITION	CBM8628,CBM8629,CBM8630			
		MIN	TYP	MAX	UNIT
INPUT CHARACTERISTICS					
Input Offset Voltage (V_{OS})			1	5	μV
Offset Voltage Drift（ΔVos/ΔT）	−40°C ≤ TA ≤ +125°C		0.002	0.02	μV/℃
Input Bias Current（I_B）			30	100	pA
Input Offset Current（I_{os}）			50	200	pA
Input Voltage Range		0		5	V
Common-Mode Rejection Ratio（CMRR）	VCM =0V to 2.7V	115	130		dB
Open-Loop Voltage Gain（A_{OL}）	R_L=10kΩ,V_O=0.3V to4.7V	110	140		dB
INPUT CAPACITANCE					
Differential（C_{DIFF}）			1.5		pF
Common-Mode（C_{COM}）			8.0		pF
OUTPUT CHARACTERISTICS					
Output Voltage High（V_{OH}）	R_L=100kΩ至地	4.99	4.996		V
	R_L=10kΩ至地	4.95	4.98		V
Output Voltage Low（V_{OL}）	R_L=100kΩ至 V+		1	5	mV
	R_L=10kΩ至 V+		10	20	mV
Short-Circuit Limit（I_{SC}）		±25	±50		mA
Output Current (I_{OUT})			±30		mA
POWER SUPPLY					
Power Supply Rejection Ratio（PSRR）	V_s = 2.7V 至 5.5V	115	130		dB
Supply Current/Amplifier (I_{SY})	V_O=V_S/2		0.75	1	mA
NOISE PERFORMANCE					
Voltage Noise(e_n p-p)	0.1Hz 至 10Hz		0.5		μVp – p
	0.1Hz 至 1.0Hz		0.16		μVp – p
Voltage Noise Density (e_n)	f=1KHz		22		$nV/\sqrt{Hz}$
Current Noise Density (i_n)	f=10Hz		5		$fA/\sqrt{Hz}$

DYNAMIC PERFORMANCE					
Slew Rate（SR）	R_L=10kΩ		1		V/μs
Gain-Bandwidth Product（GBW）			2.5		MHz
Settling Time			0.05		ms

(V_S = 2.7V, V_{CM} = V_S/2, T_A = 25°C, unless otherwise noted.)

Table 2.

PARAMETER	CONDITION	CBM8628,CBM8629,CBM8630			
		MIN	TYP	MAX	UNIT
INPUT CHARACTERISTICS					
Input Offset Voltage (V_{OS})			1	5	μV
Offset Voltage Drift（ΔVos/ΔT）	−40°C ≤ TA ≤ +125°C		0.002	0.02	μV/℃
Input Bias Current（I_B）			30	100	pA
Input Offset Current（I_{os}）			50	200	pA
Input Voltage Range		0		2.7	V
Common-Mode Rejection Ratio（CMRR）	VCM =0V 至 2.7V	115	130		dB
Open-Loop Voltage Gain（A_{OL}）	R_L=10kΩ,V_O=0.3V 至 2.4V	110	140		dB
INPUT CAPACITANCE					
Differential（C_{DIFF}）			1.5		pF
Common-Mode（C_{COM}）			8.0		pF
OUTPUT CHARACTERISTICS					
Output Voltage High（V_{OH}）	R_L=100kΩ至地	2.68	2.695		V
	R_L=10kΩ至地	2.67	2.68		V
Output Voltage Low（V_{OL}）	R_L=100kΩ至 V+		1	5	mV
	R_L=10kΩ至 V+		10	20	mV
Short-Circuit Limit（I_{SC}）		±10	±15		mA
Output Current (I_{OUT})			±10		mA
POWER SUPPLY					
Power Supply Rejection Ratio（PSRR）	V_s = 2.7V 至 5.5V	115	130		dB
Supply Current/Amplifier (I_{SY})	V_O=V_S/2		0.75	1	mA
NOISE PERFORMANCE					
Voltage Noise(e_n p-p)	0.1Hz 至 10Hz		0.5		μVp − p
Voltage Noise Density (e_n)	f=1kHz		22		$nV/\sqrt{Hz}$

Current Noise Density (i_n)	f=10Hz		5		$fA/\sqrt{Hz}$
DYNAMIC PERFORMANCE					
Slew Rate（SR）	R_L=10kΩ		1		V/μs
Gain-Bandwidth Product（GBW）			2		MHz
Settling Time			0.05		ms

Typical Characteristics

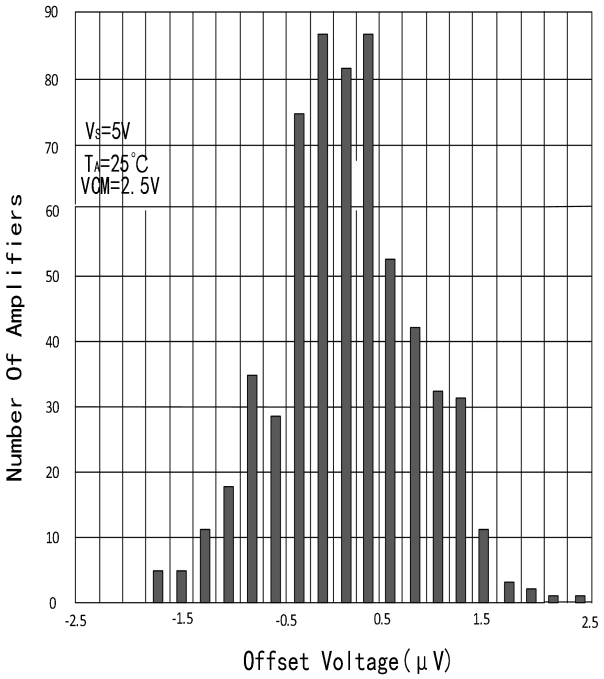


Figure1.Input Offset Voltage Distribution

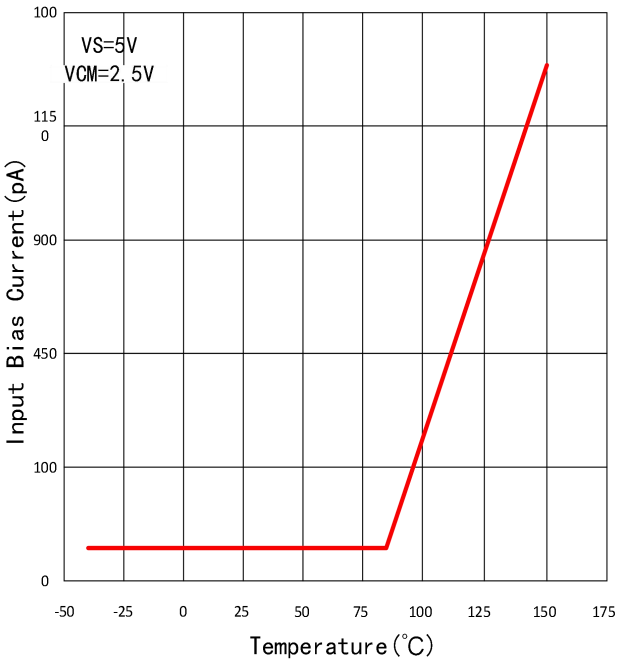


Figure2.Input Bias Current vs. Temperature

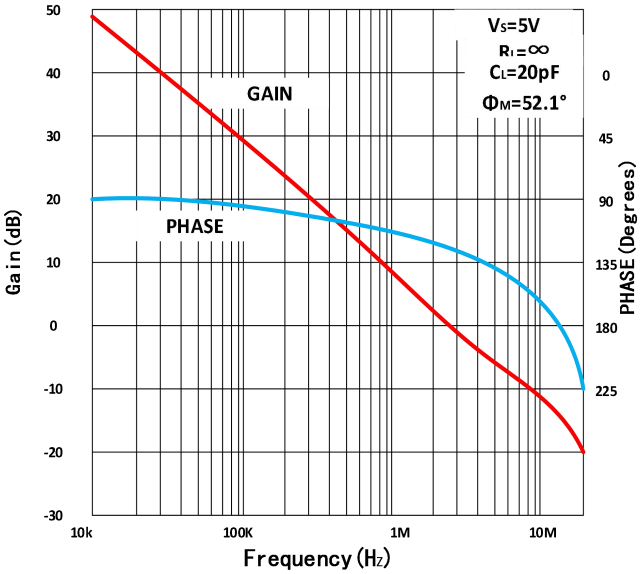


Figure3.Open-Loop Gain and Phase vs. Frequency

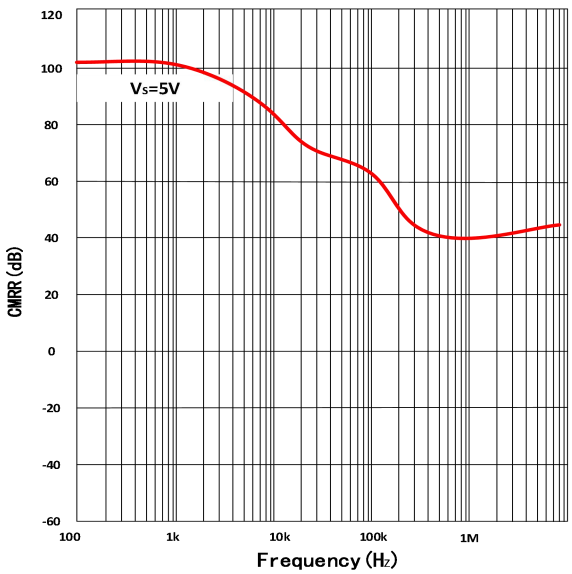
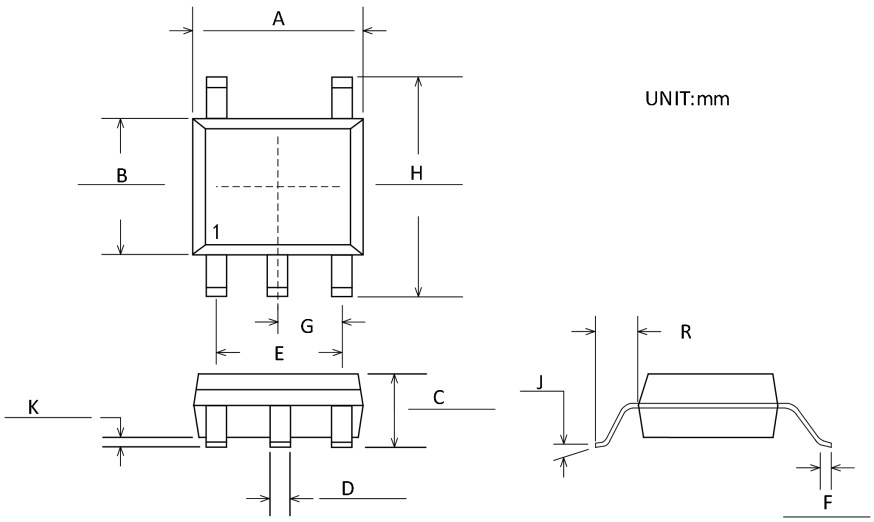


Figure4.Common-Mode Rejection Ratio (CMRR) vs. Frequency

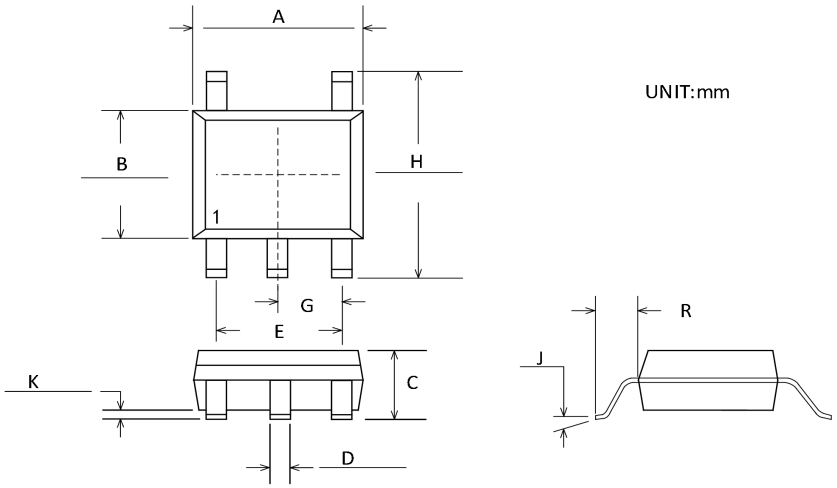
Package Outline Dimensions

SOT23-5



Symbol	Dimensions In Millimeters	
	Min	Max
A	2.80	3.00
B	1.50	1.70
C	0.95	1.45
D	0.35	0.50
E	1.90BSC	
F	0.35	0.55
G	0.95BSC	
H	2.60	3.00
J	0°	10°
K	0.05	0.15
R	0.20BSC	

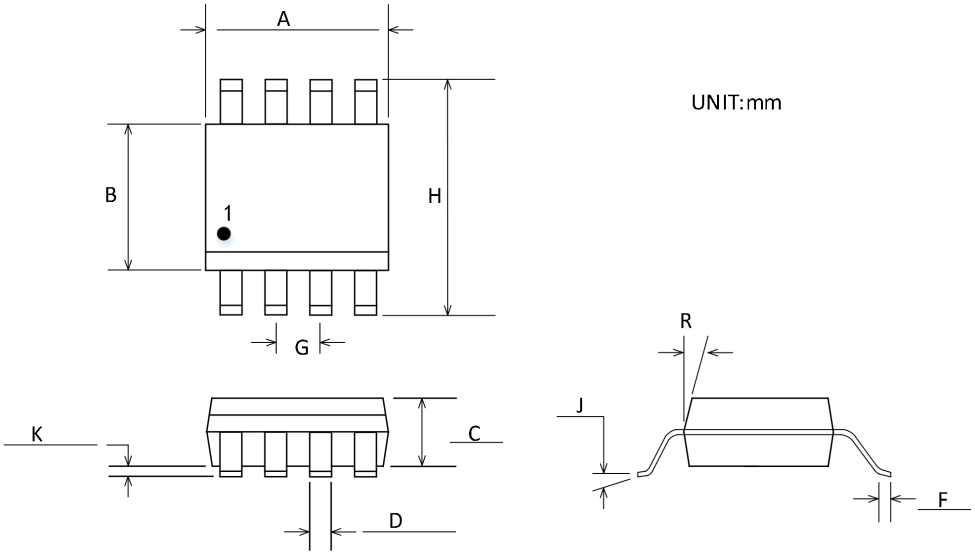
TSOT23-5



UNIT:mm

符号	尺寸（毫米）	
	最小值	最大值
A	2.80	3.00
B	1.60	1.70
C	--	0.90
D	0.35	0.50
E	1.90BSC	
G	0.95BSC	
H	2.65	2.95
J	0°	8°
K	0.02	0.09
R	0.30	0.60

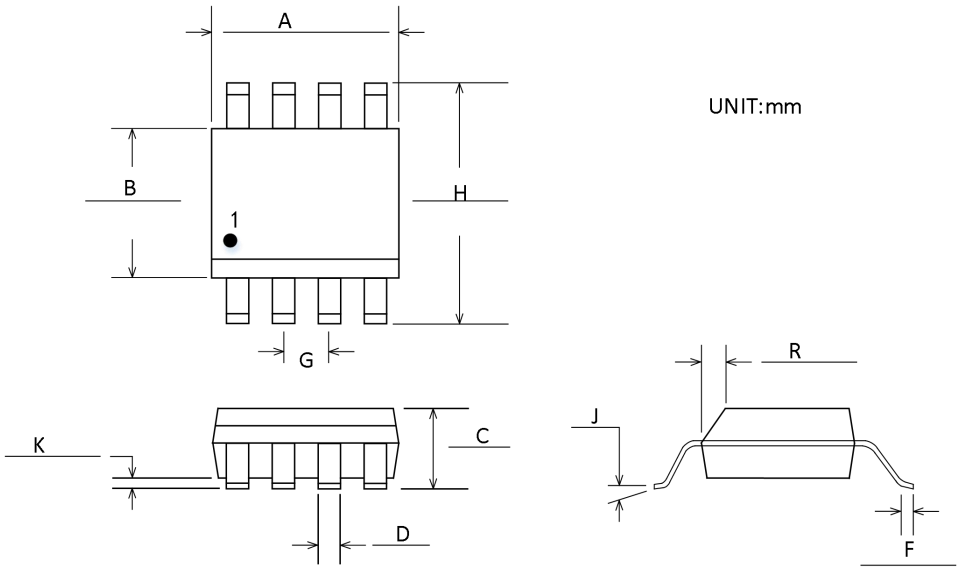
MSOP-8



UNIT:mm

Symbol	Dimensions In Millimeters	
	Min	Max
A	2.80	3.20
B	2.80	3.20
C	1.10MAX	
D	0.25	0.40
F	0.40	0.80
G	0.65BSC	
H	4.65	5.15
J	0°	6°
K	0.05	0.15
R	15°MAX	

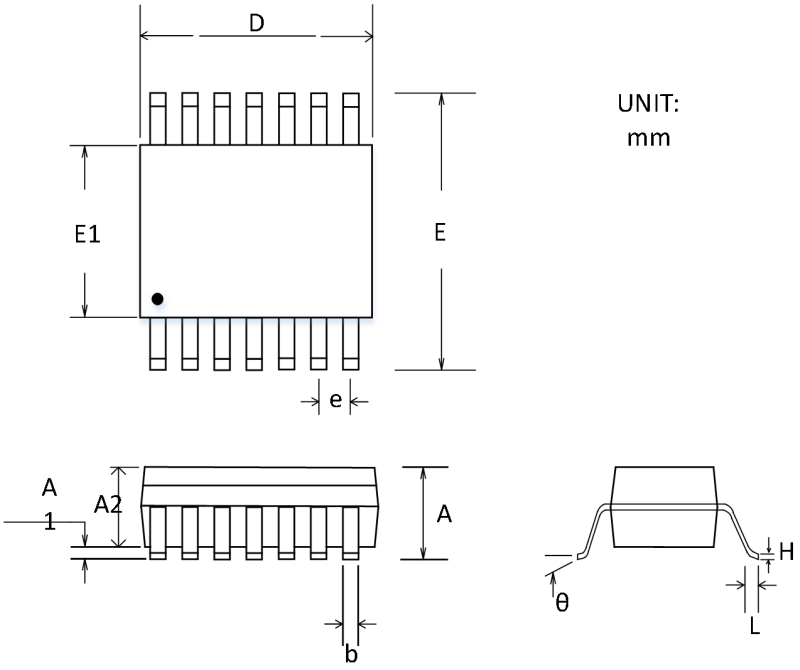
SOP-8



UNIT:mm

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
R	0.25	0.50

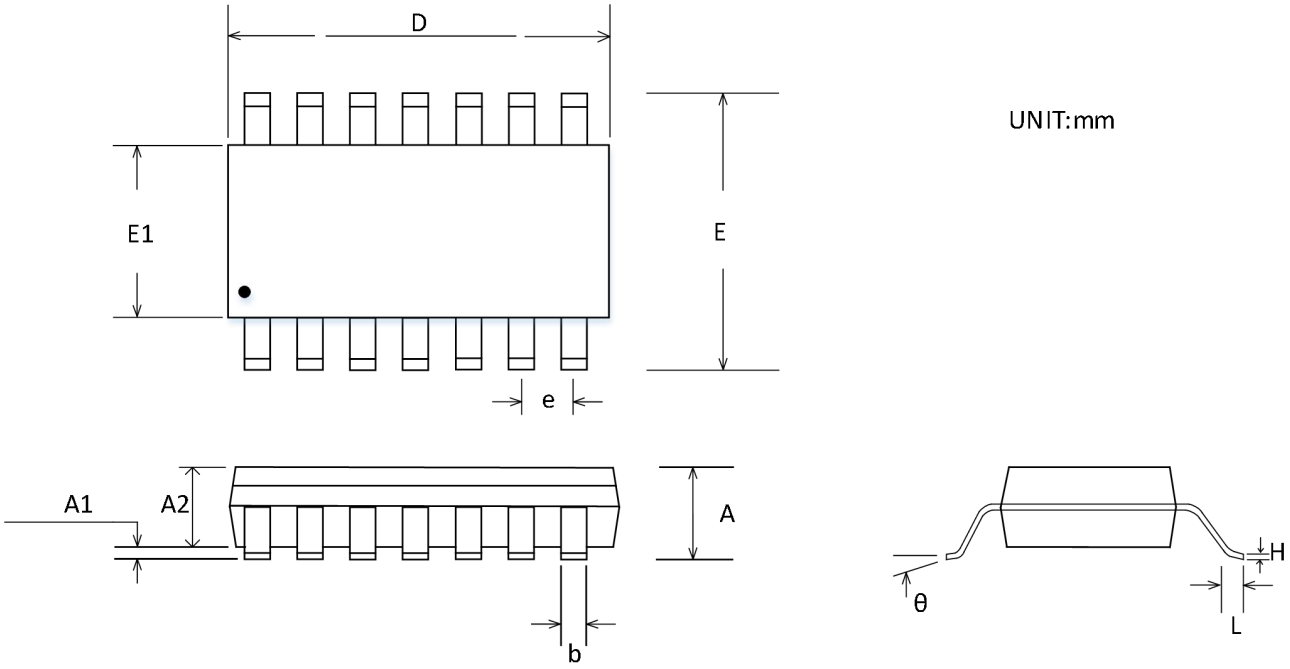
TSSOP-14



UNIT:
mm

Symbol	Dimensions In Millimeters	
	Min	Max
A	1.20MAX	
A1	0.05	0.15
A2	0.80	1.05
b	0.19	0.30
D	4.90	5.10
E	6.40BSC	
E1	4.30	4.50
e	0.65BSC	
H	0.09	0.20
L	0.45	0.75
θ	0°	8°

SOP-14



UNIT:mm

Symbol	Dimensions In Millimeters	
	Min	Max
A	1.35	1.75
A1	0.10	0.25
A2	1.25	1.50
b	0.31	0.51
D	8.55	8.75
E	5.80	6.20
E1	3.80	4.00
e	1.27BSC	
H	0.17	0.25
L	0.40	1.27
θ	0°	8°

Package/Ordering Information

PRODUCT TYPE	OPERATING TEMPERTURE	PACKAGE	PACKAGE MARKING	NUMBER OF PACKAGES
CBM8628AST5	-40℃~125℃	SOT23-5	628S	Tape and Reel, 3000
CBM8628ATT5	-40℃~125℃	TSOT-5	628T	Tape and Reel, 3000
CBM8628AS8	-40℃~125℃	SOP-8	CBM8628A	Tape and Reel, 2500
CBM8628AS8-RL	-40℃~125℃	SOP-8	CBM8628A	Tape and Reel, 3000
CBM8628AS8-REEL	-40℃~125℃	SOP-8	CBM8628A	Tape and Reel, 4000
CBM8629AMS8	-40℃~125℃	MSOP-8	M29	Tape and Reel, 3000
CBM8629AS8	-40℃~125℃	SOP-8	CBM8629A	Tape and Reel, 2500
CBM8629AS8-RL	-40℃~125℃	SOP-8	CBM8629A	Tape and Reel, 3000
CBM8629AS8-REEL	-40℃~125℃	SOP-8	CBM8629A	Tape and Reel, 4000
CBM8630ATS14	-40℃~125℃	TSSOP-14	CBM8630AT	Tape and Reel, 2500
CBM8630ATS14-RL	-40℃~125℃	TSSOP-14	CBM8630AT	Tape and Reel, 3000
CBM8630ATS14-REEL	-40℃~125℃	TSSOP-14	CBM8630AT	Tape and Reel, 4000
CBM8630AS14	-40℃~125℃	SOP-14	CBM8630AS	Tape and Reel, 2500
CBM8630AS14-RL	-40℃~125℃	SOP-14	CBM8630AS	Tape and Reel, 3000
CBM8630AS14-REEL	-40℃~125℃	SOP-14	CBM8630AS	Tape and Reel, 4000