

## Low Noise, Bipolar Input Dual Audio Operational amplifier

### DESCRIPTION

NJM8068 is a low noise bipolar input dual audio operational amplifier has  $3.5\text{nV}/\sqrt{\text{Hz}}$  at 1kHz.

The NJM8068 features Low distortion, high slew rate, wide bandwidth and high open-loop gain. In addition, unity-gain stable allows voltage-follower operation. These features make NJM8068 ideal for audio pre amplifier, microphone amplifier, line amplifier and other audio applications. NJM8068 operate over a wide temperature range of  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ , making this IC ideal for use in industrial measurement instruments.

The NJM8068 is available in the 8-pin SOP8 and MSOP8 (TVSP8) packages.

### FEATURES

- Designed for High-Quality Sound
- Low Noise  $3.5\text{nV}/\sqrt{\text{Hz}}$  at 1kHz
- Low Distortion 0.001%
- Slew Rate  $6.8\text{V}/\mu\text{s}$
- Gain Bandwidth Product 19MHz
- Open-Loop Voltage Gain 120dB
- Unity-Gain stable
- Bipolar Input
- Supply Voltage  $\pm 4\text{V}$  to  $\pm 18\text{V}$
- Operating Temperature  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Supply Current (All Amplifier) 5mA typ.
- Package SOP8

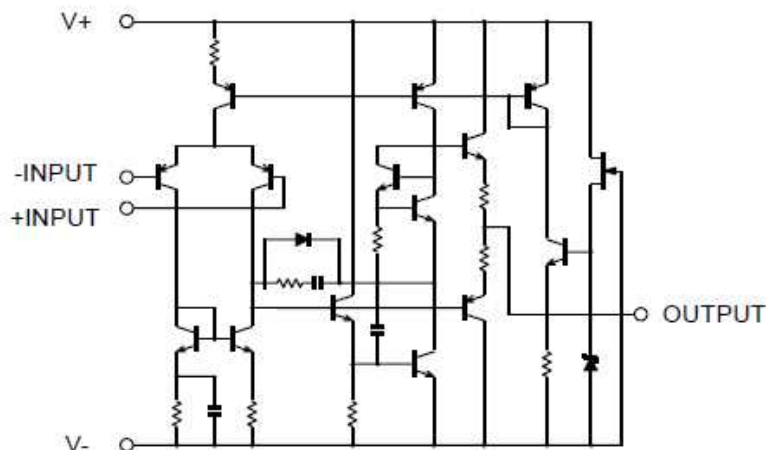
MSOP8(TVSP8)\*

\*MEET JEDEC MO-187-DA / THIN TYPE

### APPLICATIONS

- Professional Audio sets
- Audio pre/microphone amplifiers
- Analog/Digital mixer
- AV Receiver
- Car Audio
- Industrial Measurement Instruments

### BLOCK DIAGRAM (1 amplifier)



### PACKAGE OUTLINE

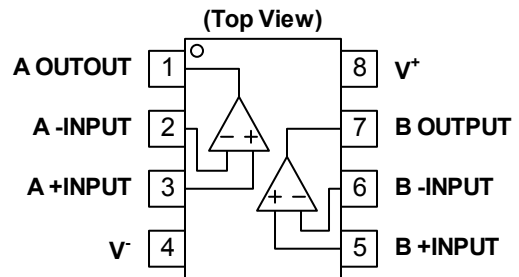


NJM8068G  
(SOP8)



NJM8068RB1  
(MSOP8(TVSP8))

### PIN CONFIGURATION



Package	Product Name
SOP8	NJM8068G
TVSP8	NJM8068RB1

### Related Products

Features	Product
$5\text{nV}/\sqrt{\text{Hz}}$ , 0.0005%, $5\text{V}/\mu\text{s}$ , 15MHz (Low Noise, Low distortion Audio OP-AMP)	NJM8080

**■ ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	$V^+ / V^-$	$\pm 18$	V
Differential Input Voltage <sup>(1)</sup>	$V_{ID}$	$\pm 36$	V
Input Voltage <sup>(2)</sup>	$V_{IN}$	$V^- - 0.3$ to $V^+ + 36$	V
Output Terminal Input Voltage	$V_O$	$V^- - 0.3$ to $V^+ + 0.3$	V
Power Dissipation <sup>(3)</sup>		(2-layer / 4-Layer)	
SOP8	$P_D$	690 / 1000	mW
MSOP8(TVSP8)		510 / 680	
Operating Temperature Range	$T_{opr}$	-40 to +125	°C
Storage Temperature Range	$T_{stg}$	-65 to +150	°C

(1) Differential voltage is the voltage difference between +INPUT and -INPUT.

(2) Input voltage is the voltage should be allowed to apply to the input terminal independent of the magnitude of  $V^+$ .  
The normal operation will establish when any input is within the Common Mode Input Voltage Range of electrical characteristics.

(3) Power dissipation is the power that can be consumed by the IC at  $T_a=25^\circ\text{C}$ , and is the typical measured value based on JEDEC condition. When using the IC over  $T_a=25^\circ\text{C}$  subtract the value  $[\text{mW}/^\circ\text{C}] = P_D / (T_{stg}(\text{MAX}) - 25)$  per temperature.

2-layer: EIA/JEDEC STANDARD Test board (76.2x114.3x 1.6mm, 2layers, FR-4) mounting

4-layer: EIA/JEDEC STANDARD Test board (76.2x114.3x 1.6mm, 4layers, FR-4) mounting

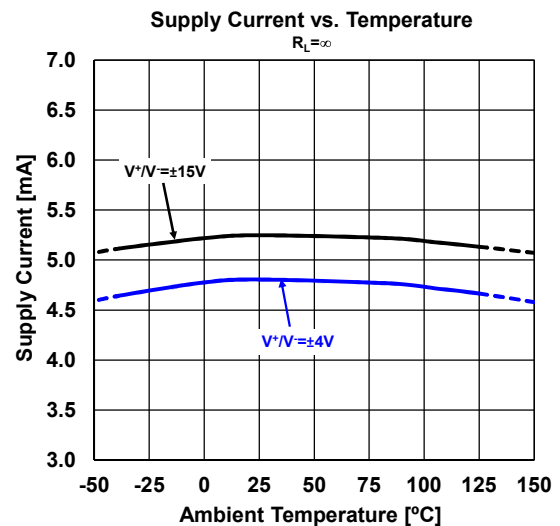
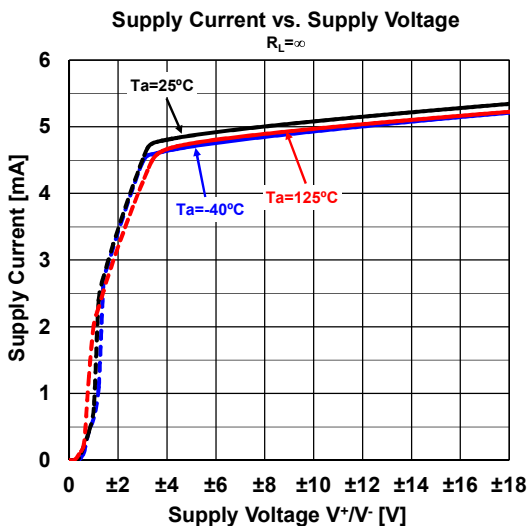
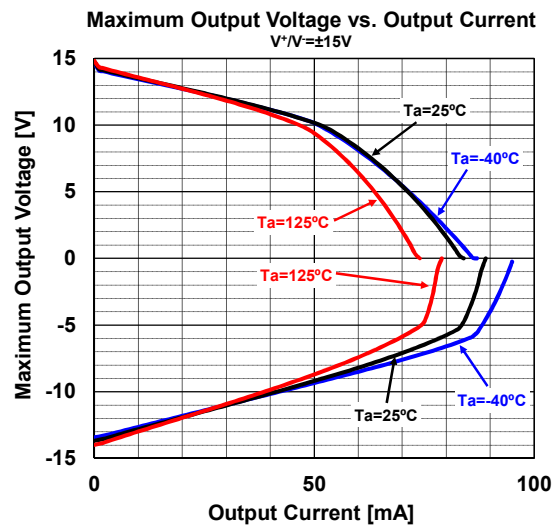
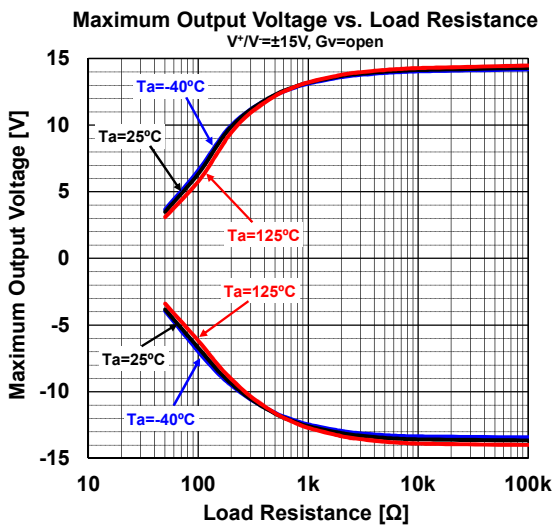
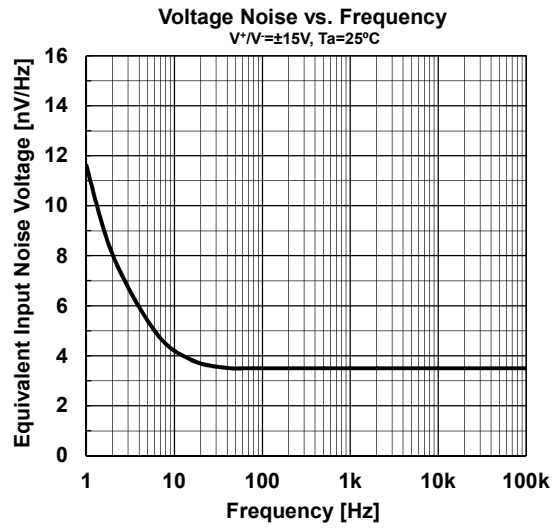
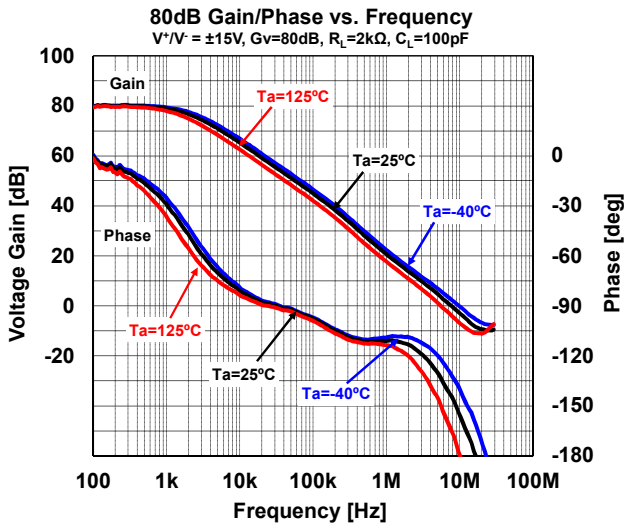
**■ RECOMMENDED OPERATING CONDITIONS ( $T_a=25^\circ\text{C}$ )**

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V^+ / V^-$		$\pm 4$	-	$\pm 18$	V

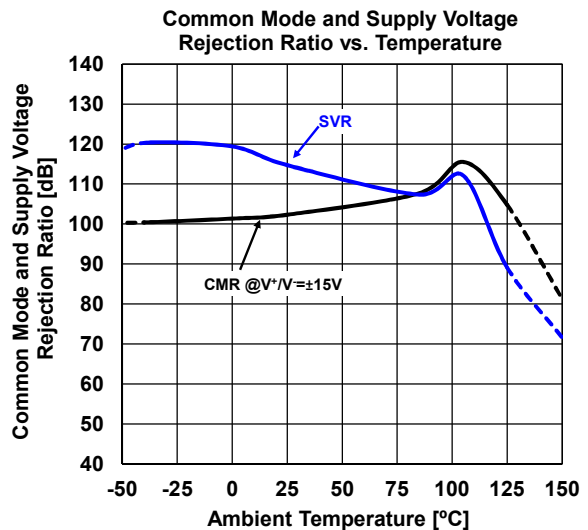
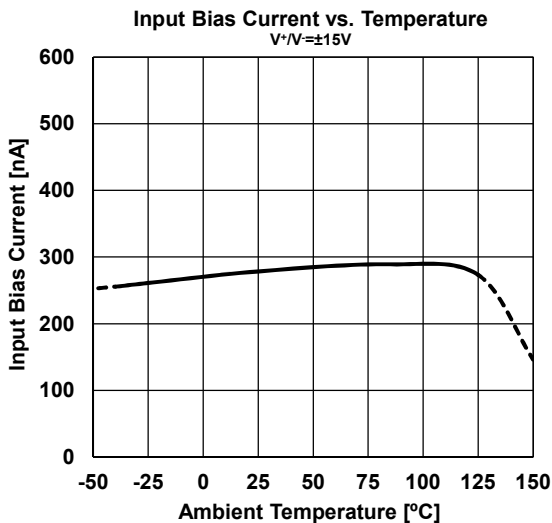
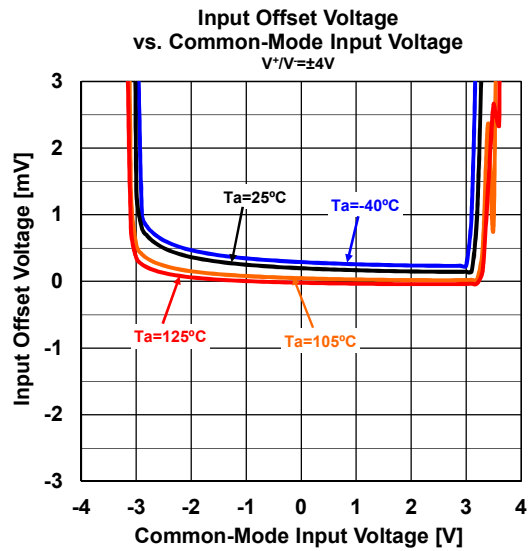
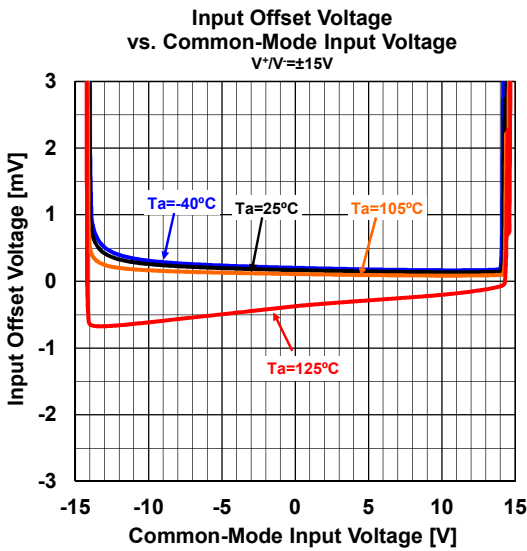
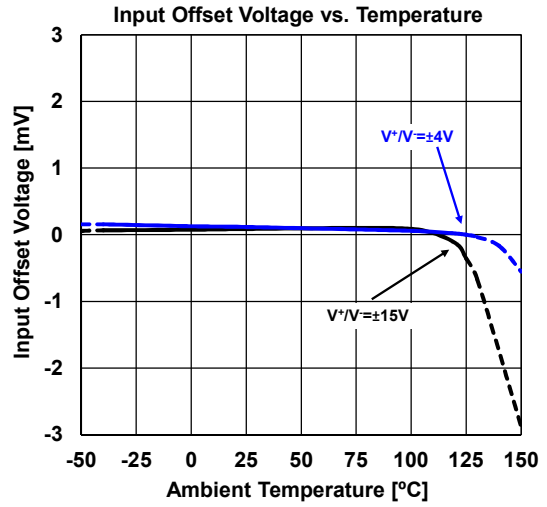
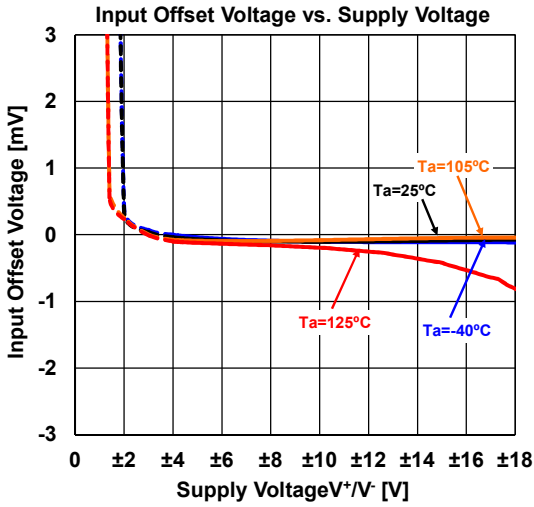
**■ ELECTRICAL CHARACTERISTICS ( $V^+ / V^- = \pm 15\text{V}$ ,  $T_a=25^\circ\text{C}$ , unless otherwise noted.)**

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
<b>INPUT/OUTPUT CHARACTERISTICS</b>						
Input Offset Voltage	$V_{IO}$	$R_S \leq 10\text{k}\Omega$	-	0.3	3	mV
Input Bias Current	$I_B$		-	260	1000	nA
Input Offset Current	$I_{IO}$		-	5	200	nA
Open Loop Voltage Gain	$A_V$	$R_L = 2\text{k}\Omega$ , $V_O = \pm 10\text{V}$	90	120	-	dB
Common-Mode Rejection Ratio	CMR		80	110	-	dB
Input Resistance	$R_{IN}$		50	300	-	k $\Omega$
Common-Mode Input Voltage Range	$V_{ICM}$		$\pm 12$	$\pm 13.5$	-	V
Maximum Output Voltage	$V_{OM}$	$R_L \geq 2\text{k}\Omega$	$\pm 12$	$\pm 13.5$	-	V
<b>POWER SUPPLY</b>						
Supply Current(All Amplifiers)	$I_Q$		-	5	8	mA
Supply Voltage Rejection Ratio	SVR		80	120	-	dB
<b>AC PERFORMANCE</b>						
Gain Bandwidth Product	GBW	$f=100\text{kHz}$	-	19	-	MHz
Unity Gain Frequency	$f_T$	$G_v=0\text{dB}$	-	7.5	-	MHz
Slew Rate	SR	$R_L \geq 2\text{k}\Omega$	-	6.8	-	V/ $\mu\text{s}$
<b>NOISE, DISTORTION</b>						
Equivalent Input Noise Voltage	$e_n$	$f=1\text{kHz}$	-	3.5	-	nV/ $\sqrt{\text{Hz}}$
		FLAT, $f=20\text{Hz} \sim 20\text{kHz}$	-	0.5	0.7	$\mu\text{Vrms}$
Total Harmonic Distortion	THD		-	0.001	-	%
Channel Separation	CS		-	120	-	dB

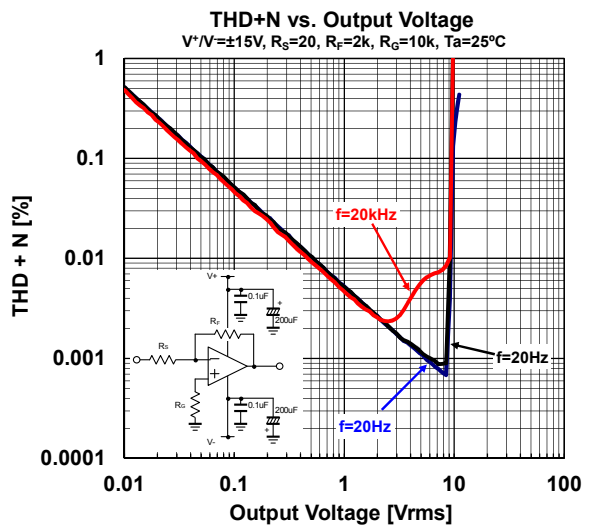
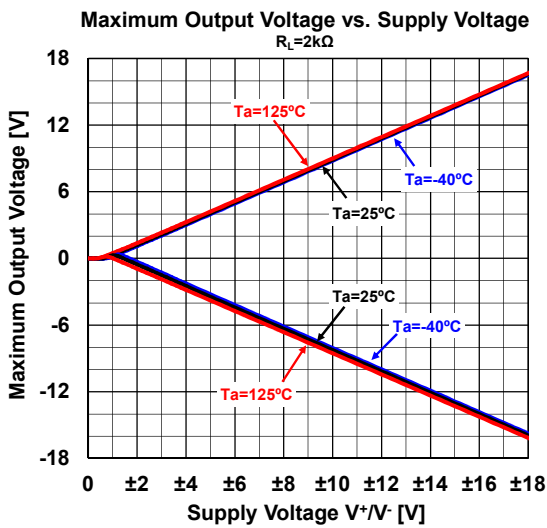
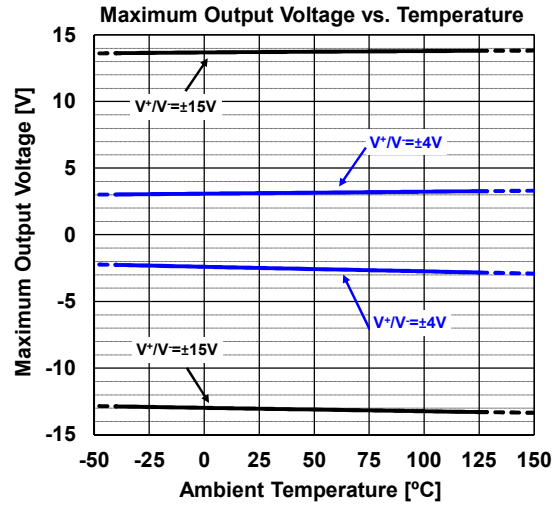
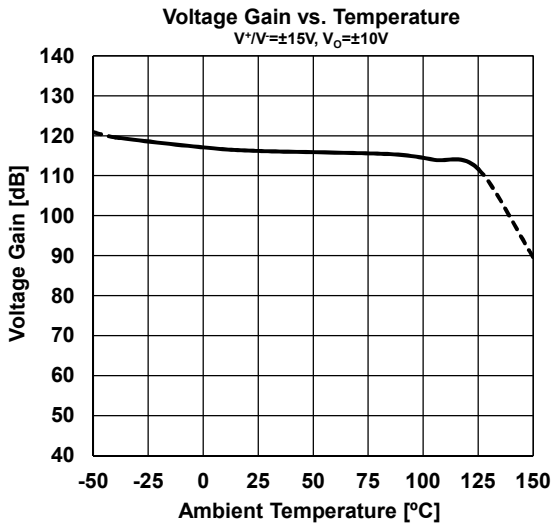
■ TYPICAL CHARACTERISTICS



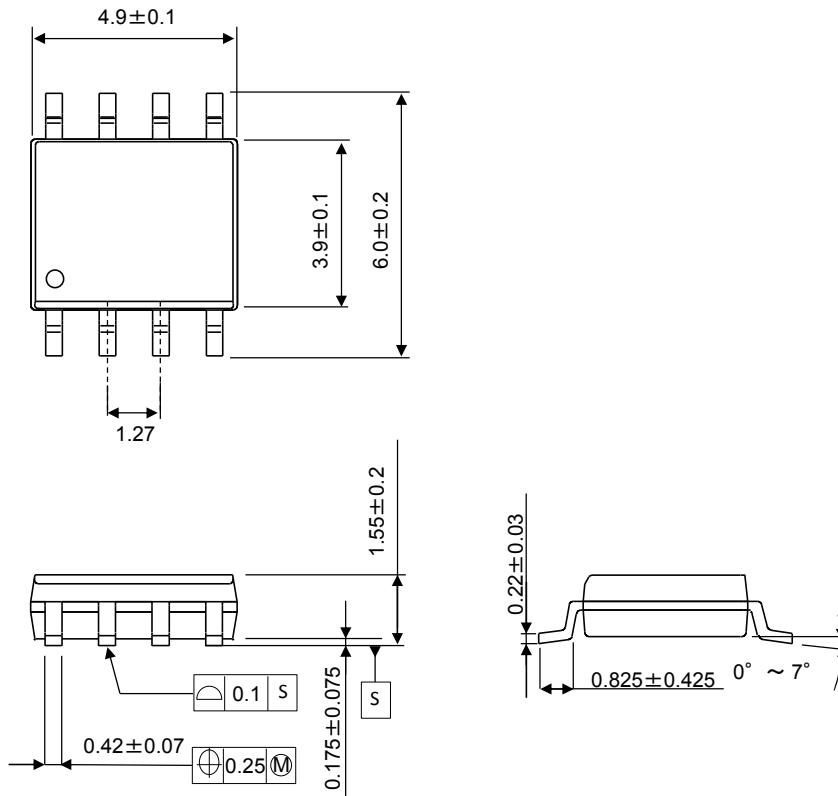
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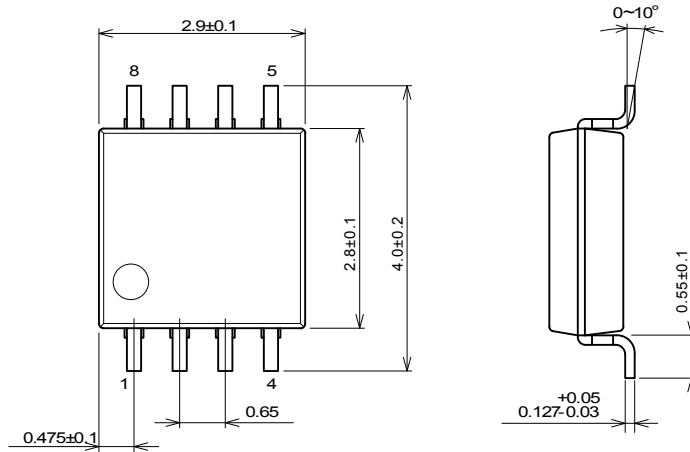


■PACKAGE DIMENSIONS

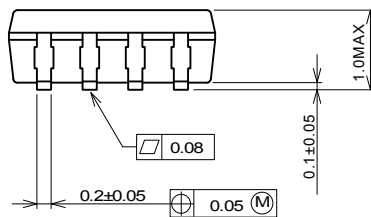


Unit: mm

SOP8 Package



Unit: mm



MSOP8(TVSP8) Package  
MEET JEDEC MO-187-DA / THIN TYPE

**[CAUTION]**  
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