

## HIGH-POWER & LOW-VOLTAGE AUDIO POWER AMPLIFIER

### ■ GENERAL DESCRIPTION

The **NJU7084** is an audio power amplifier designed for telephone applications. No external coupling capacitors are required because of the differential outputs. The closed loop gain is adjusted by two external resistors, and a SD pin permit power down with muting the input signal.

The **NJU7084** improves high output power compared with other amplifier.

### ■ APPLICATION

- Cell Phone, PHS
- Portable Telephone, Wireless Telephone
- White Goods
- Security Alarm
- Monitor

### ■ FEATURES

- Operating Voltage
- Operating Current
- Supply Current in Shutdown Mode
- Output Power
- Thermal Shutdown Circuit
- C-MOS Technology
- Package Outline

$V^+ = 2.8$  to  $5.5V$

$I_{DD1} = 2.5mA$  typ. ( $V^+ = 5V, R_L = \infty$ , no signal)

$I_{DD1} = 2mA$  typ. ( $V^+ = 3V, R_L = \infty$ , no signal)

$I_{DD2} = 2\mu A$  max.

$P_0 = 1W$  typ. ( $V^+ = 5V, R_L = 8\Omega, THD = 2\%$ )

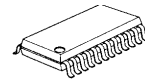
$P_0 = 400mW$  typ. ( $V^+ = 3V, R_L = 4\Omega, THD = 2\%$ )

VSP8, DMP24

### ■ PACKAGE OUTLINE

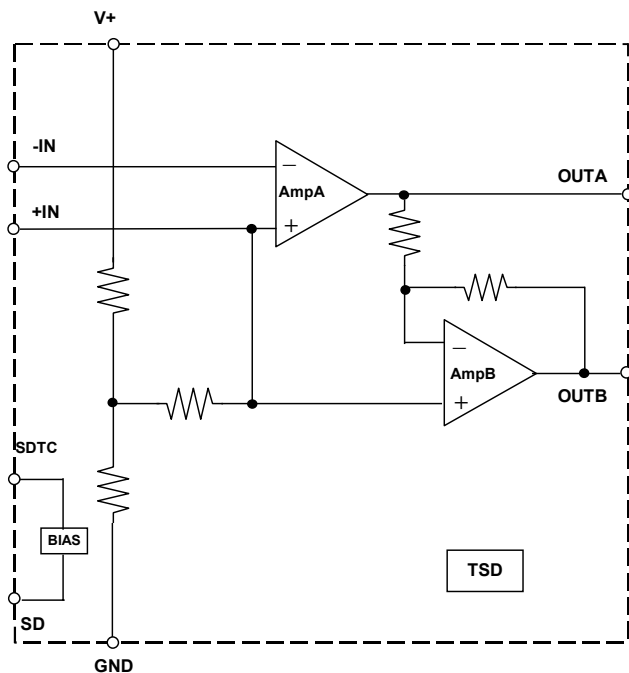


**NJU7084R**



**NJU7084M**

### ■ PIN CONFIGURATION & BLOCK DIAGRAM



(VSP8)

1. SD
2. SDTC
3. +IN
4. -IN
5. OUTA
6.  $V^+$
7. GND
8. OUTB

(DMP24)

- |         |        |           |
|---------|--------|-----------|
| 1. NC   | 9. NC  | 17. OUTA  |
| 2. NC   | 10. NC | 18. $V^+$ |
| 3. NC   | 11. NC | 19. GND   |
| 4. NC   | 12. NC | 20. OUTB  |
| 5. SD   | 13. NC | 21. NC    |
| 6. SDTC | 14. NC | 22. NC    |
| 7. +IN  | 15. NC | 23. NC    |
| 8. -IN  | 16. NC | 24. NC    |

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## ■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	+7	V
Power Dissipation	P <sub>D</sub>	960 <sup>*1)</sup> (VSP8) 1350 <sup>*2)</sup> (DMP24)	mW
Output Peak Current	I <sub>op</sub>	500	mA
Input Voltage Range	V <sub>IN</sub>	-0.3 to V <sup>+</sup> +0.3 <sup>*3)</sup>	V
Operating Temperature Range	T <sub>opr</sub>	-40 to +85	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +150	°C

<sup>\*1)</sup> EIA/JEDEC STANDARD Test board (76.2 x 114.3 x 1.6mm, 4layers, FR-4) mounting

<sup>\*2)</sup> EIA/JEDEC STANDARD Test board (76.2 x 114.3 x 1.6mm, 2layers, FR-4) mounting

<sup>\*3)</sup> SD, SDTC, IN+, IN-, OUTA, OUTB terminals.

## ■ RECOMMENDED OPERATING VOLTAGE RANGE (Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage Range	V <sup>+</sup>	-	2.8	3.0	5.5	V

## ■ ELECTRICAL CHARACTERISTICS

### ● Amplifier (Ta=25°C, V<sup>+</sup>=5V, G<sub>v</sub>=6dB, f=1kHz, R<sub>L</sub>=8Ω, Active)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current 1	I <sub>DD1</sub>	No signal, R <sub>L</sub> =∞, Active	-	2.5	6	mA
Operating Current 2	I <sub>DD2</sub>	No signal, R <sub>L</sub> =∞, V <sub>SD</sub> =0.25V	-	-	2	μA
Output Power	P <sub>O1</sub>	THD≤2%	0.8	1	-	W
Total Harmonic Distortion (THD+N)	THD	P <sub>O</sub> =400mW	-	0.1	-	%
Supply Voltage Rejection Ratio	PSRR	C1=1μF, C2=2.2μF V <sub>ripple</sub> =100mVrms	45	55	-	dB
Mute Attenuation	MAT	Shutdown	-	70	-	dB
Input Resistance	R <sub>SD</sub>	SD Terminal	105	150	195	kΩ
Output Offset Voltage	V <sub>OD</sub>	V <sub>IN</sub> =0V	-50	-	50	mV

### (Ta=25°C, V<sup>+</sup>=3V, G<sub>v</sub>=6dB, f=1kHz, R<sub>L</sub>=4Ω, Active)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current 1	I <sub>DD1</sub>	No signal, R <sub>L</sub> =∞, Active	-	2.0	4	mA
Operating Current 2	I <sub>DD2</sub>	No signal, R <sub>L</sub> =∞, V <sub>SD</sub> =0.25V	-	-	2	μA
Output Power	P <sub>O1</sub>	THD≤2%	320	400	-	mW
Total Harmonic Distortion (THD+N)	THD	P <sub>O</sub> =200mW	-	0.1	-	%
Supply Voltage Rejection Ratio	PSRR	C1=1μF, C2=2.2μF V <sub>ripple</sub> =100mVrms	-	55	-	dB
Mute Attenuation	MAT	Shutdown	-	70	-	dB
Output Offset Voltage	V <sub>OD</sub>	V <sub>IN</sub> =0V	-50	-	50	mV

V<sub>SD</sub>: SD Terminal Voltage

### ● Mode Control (Ta=25°C)

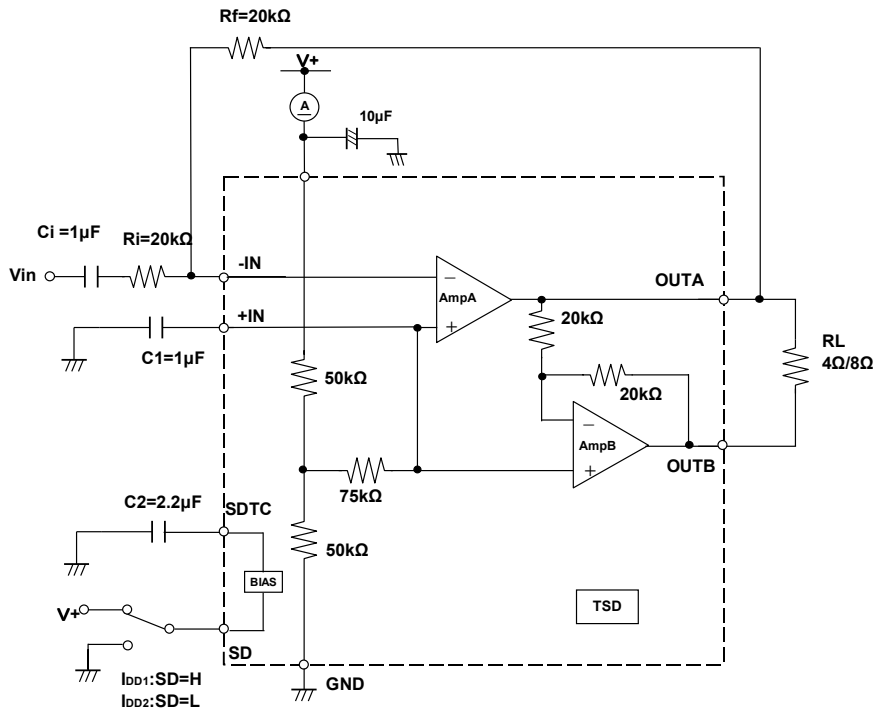
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
High Level Input Voltage	V <sub>IH</sub>	-	0.7V <sup>+</sup>	-	V <sup>+</sup>	V
Low Level Input Voltage	V <sub>IL</sub>	-	0	-	0.25	

## ■ CONTROL TERMINAL EXPLANATION

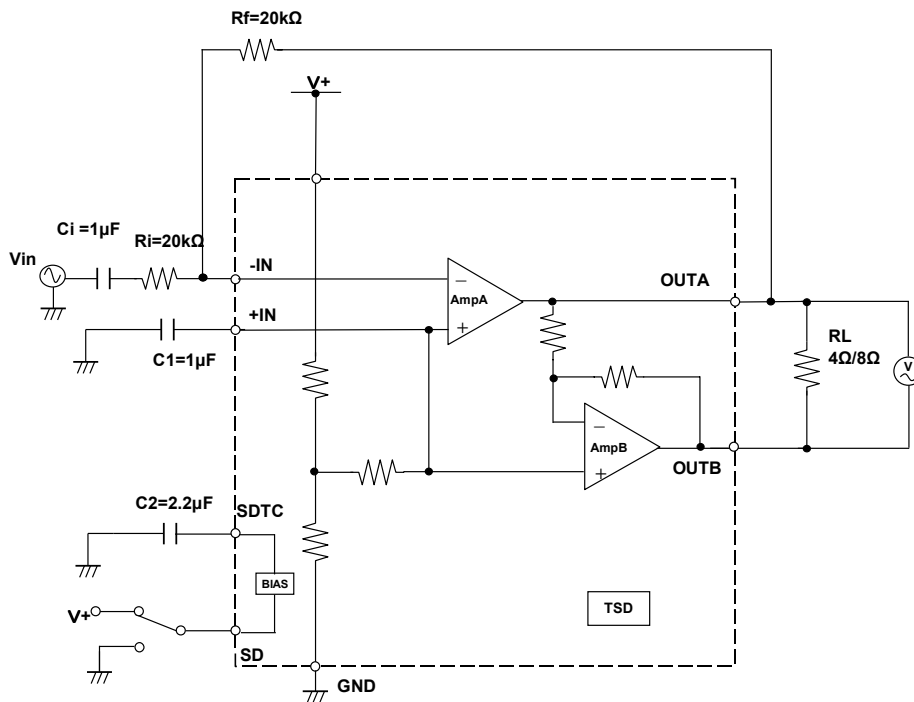
MODE	CONTROL SIGNAL (SD Terminal)	STATUS
Shutdown	L(=V <sub>IL</sub> )	IC is standby.
Active	H(=V <sub>IH</sub> )	IC is active.

## TEST CIRCUIT

TEST CIRCUIT1 (Operating Current  $I_{DD1}$ ,  $I_{DD2}$ )

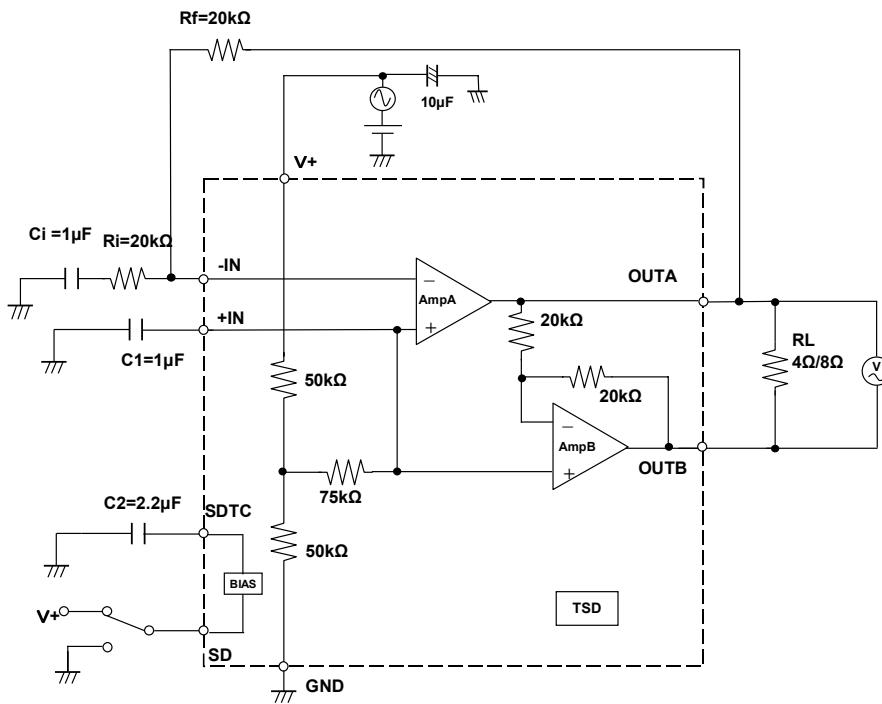


TEST CIRCUIT2 (Output Power  $P_O$ , Total Harmonic Distortion THD)

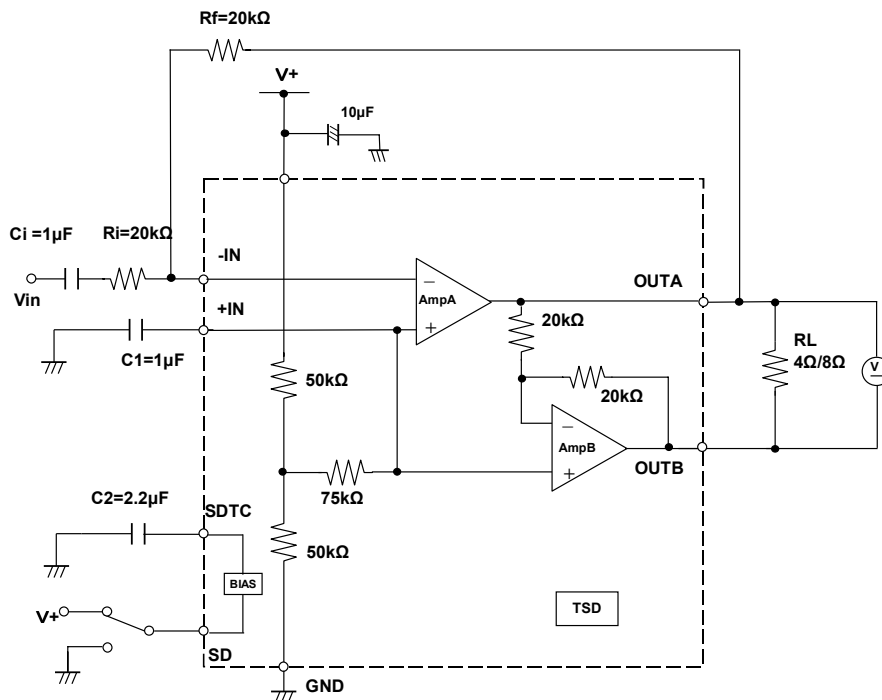


## TEST CIRCUIT

TEST CIRCUIT3 (Supply Voltage Rejection Ratio PSRR)



TEST CIRCUIT4 (Output Offset Voltage  $V_{OD}$ )



## ■ EQUIVALENT CIRCUIT

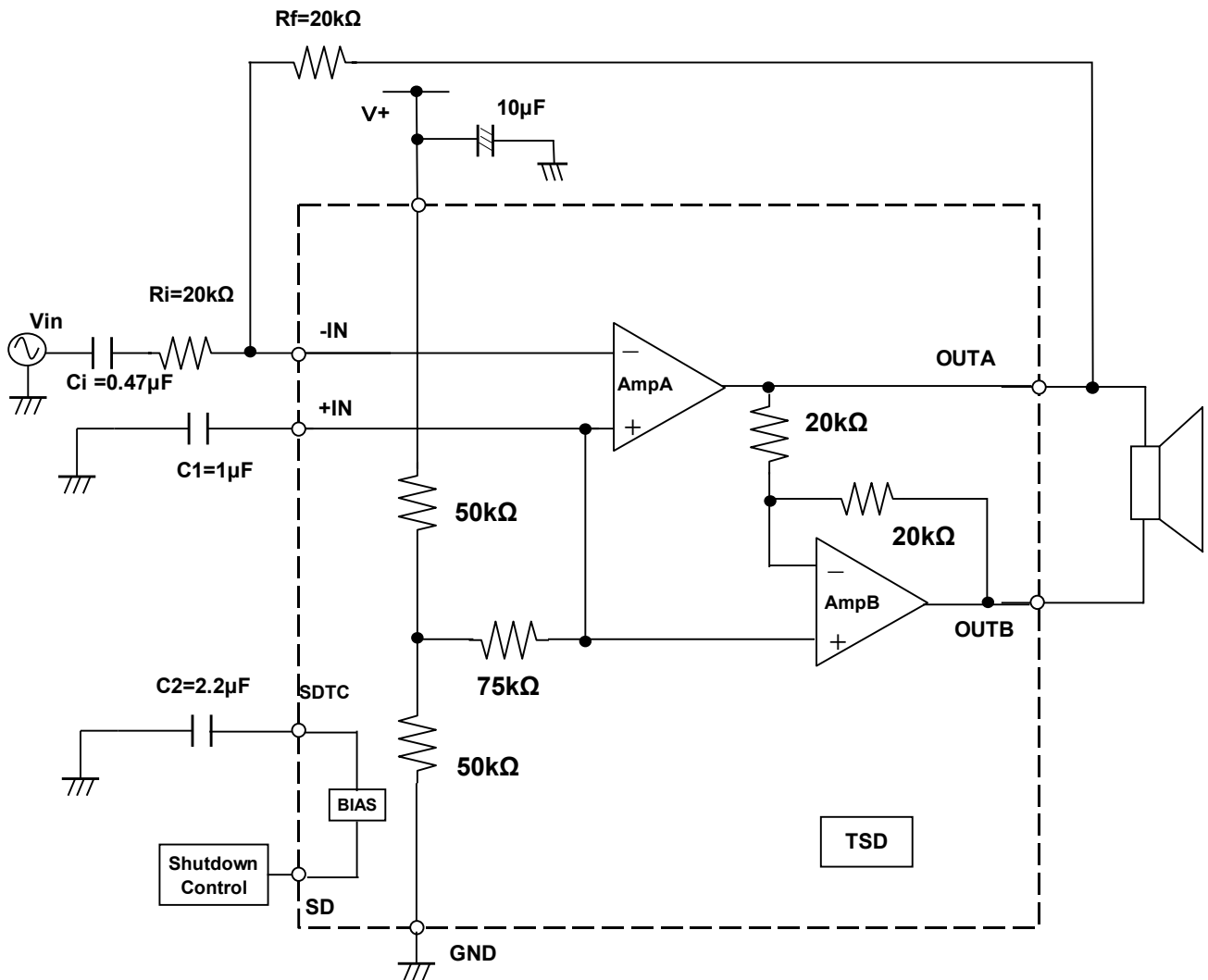
PIN No.		SYMBOL	EQUIVALENT CIRCUIT	TERMINAL VOLTAGE	Note
DMP 24	VSP 8				
5	1	SD		-	
6	2	SDTC		$2*V^+/3$	
7	3	+IN		$V^+/2$	
8	4	-IN		$V^+/2$	

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## ■ EQUIVALENT CIRCUIT

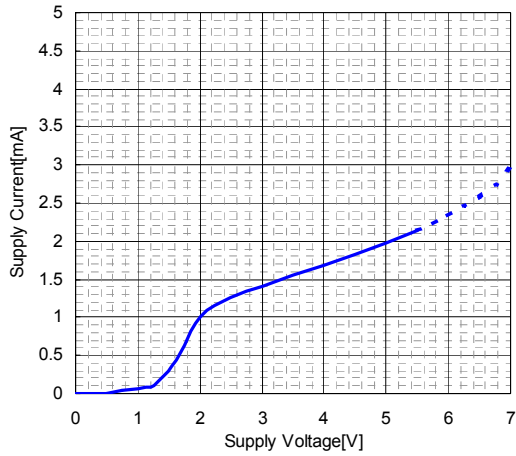
PIN No.		SYMBOL	EQUIVALENT CIRCUIT	TERMINAL VOLTAGE	Note
DMP 24	VSP 8				
17 20	5 8	OUTA OUTB		$V^+/2$	
18 19	6 7	$V^+$ GND		-	

## APPLICATION CIRCUIT

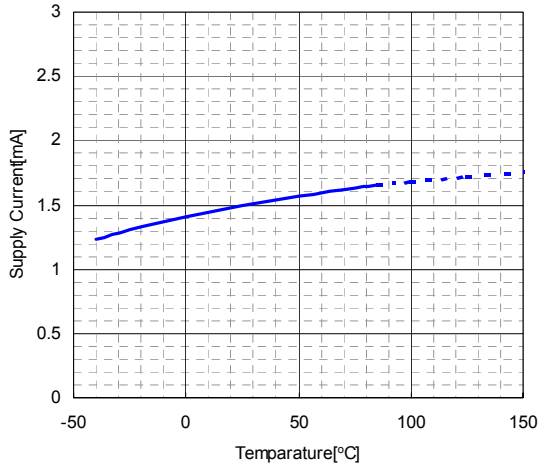


## TYPICAL CHARACTERISTICS

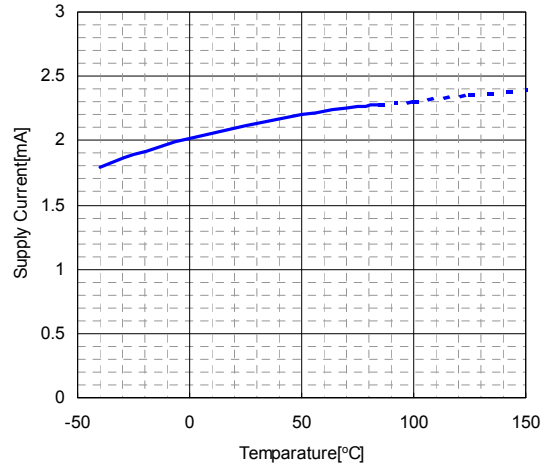
Supply Current vs Supply Voltage  
RL=OPEN, Ta=25°C



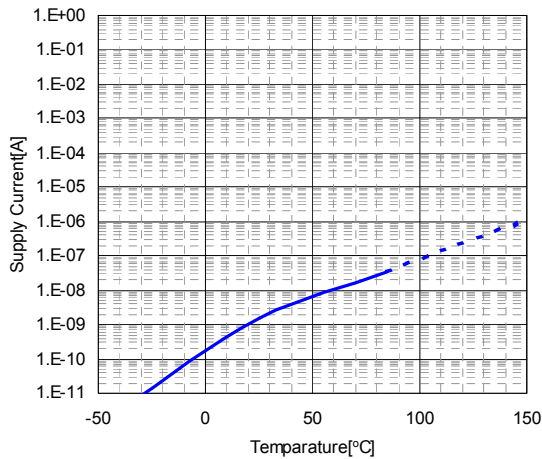
Supply Current vs Temperature  
V+=3V, Gv=6dB, RL=OPEN



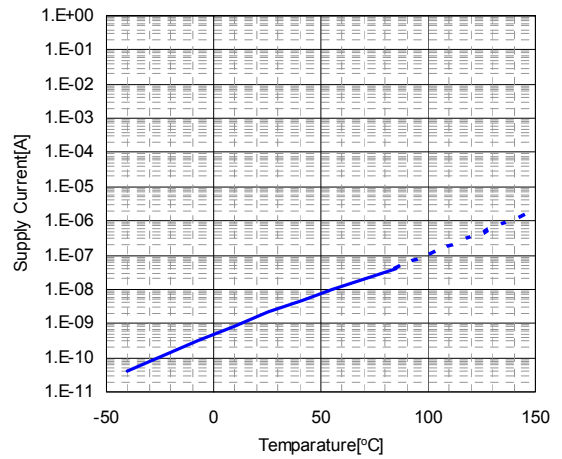
Supply Current vs Temperature  
V+=5V, Gv=6dB, RL=OPEN



Supply Current vs Temperature(STANBY)  
V+=3V, RL=OPEN, VSD=0.25V

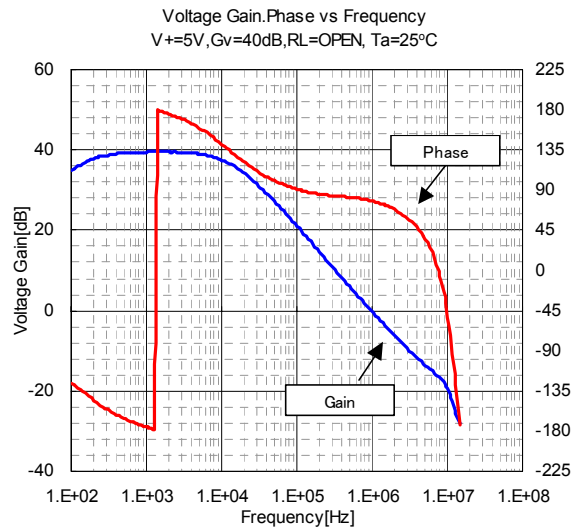
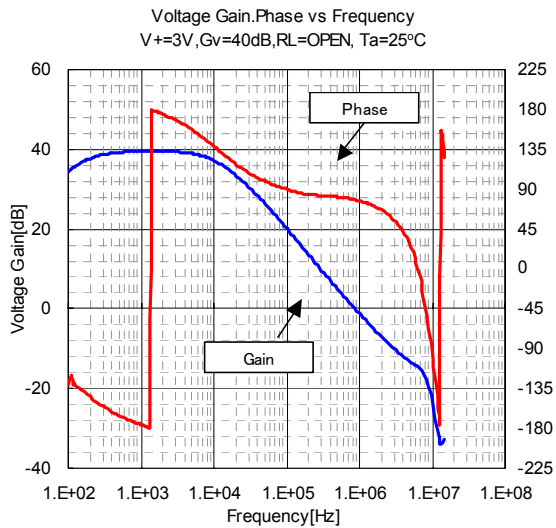
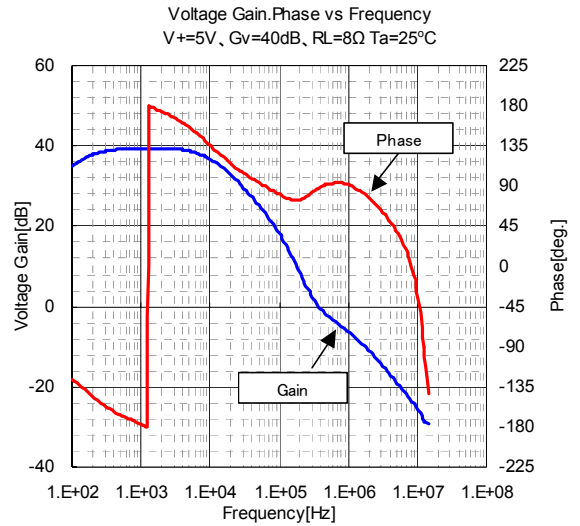
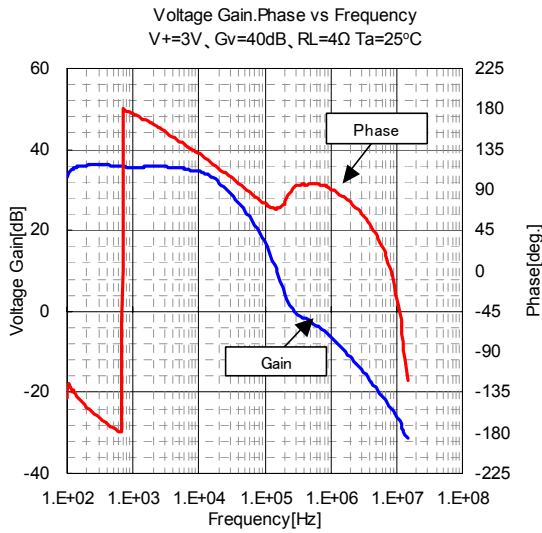
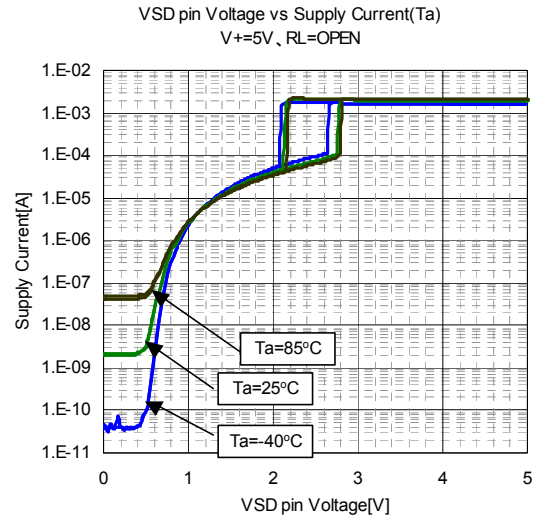
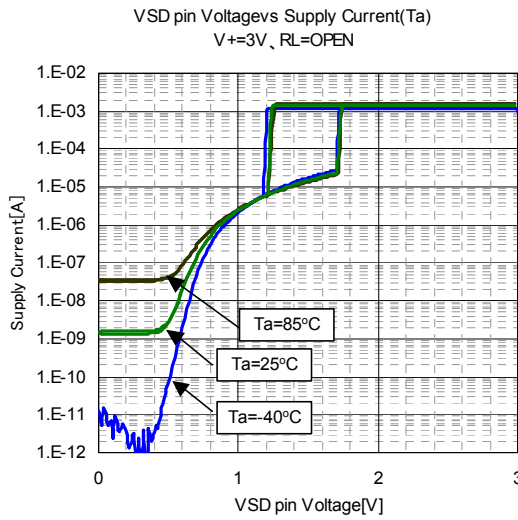


Supply Current vs Temperature(STANBY)  
V+=5V, RL=OPEN, VSD=0.25V

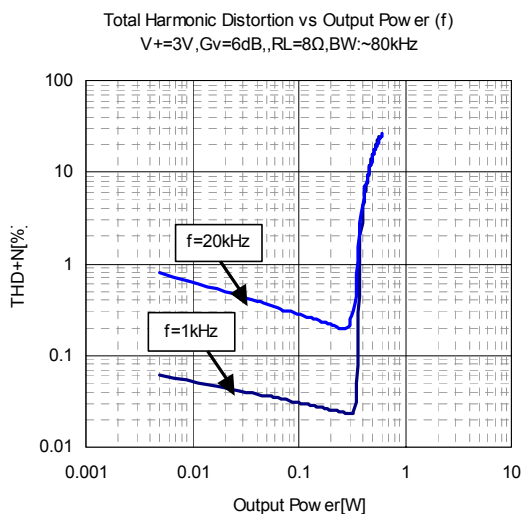
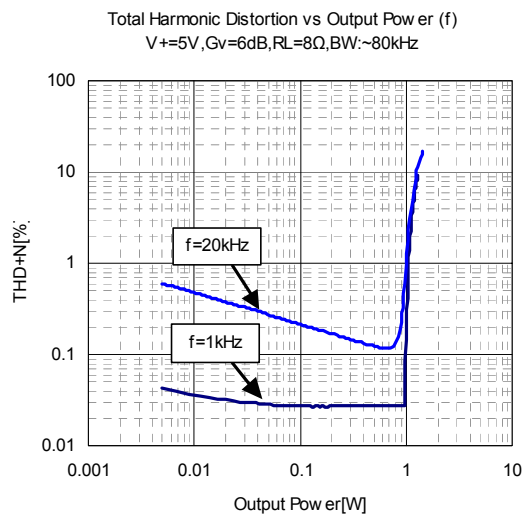
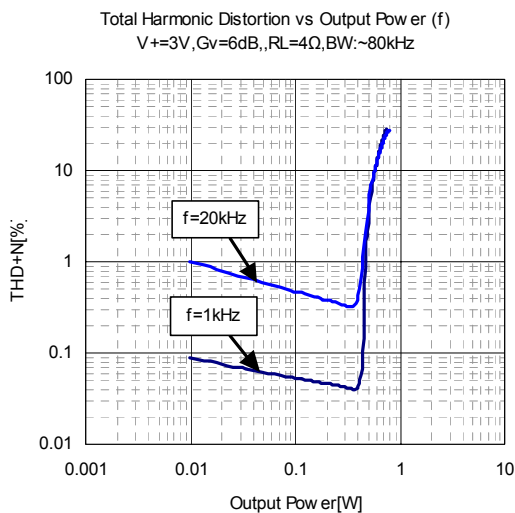
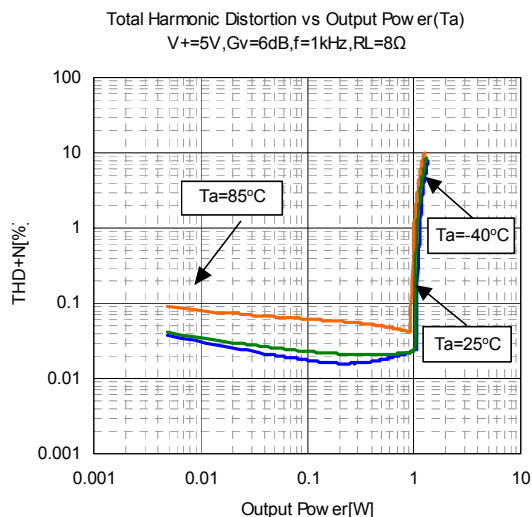
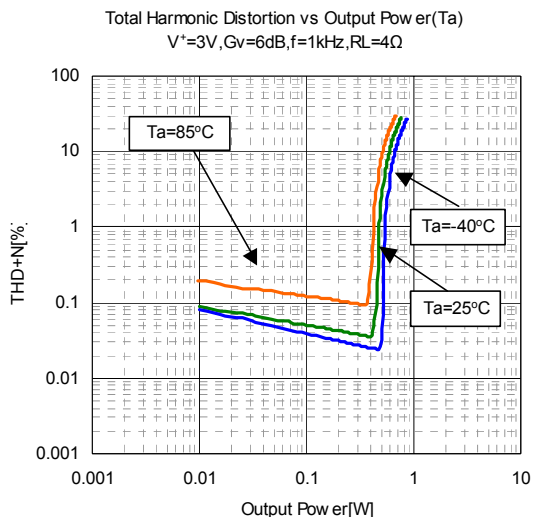




## TYPICAL CHARACTERISTICS

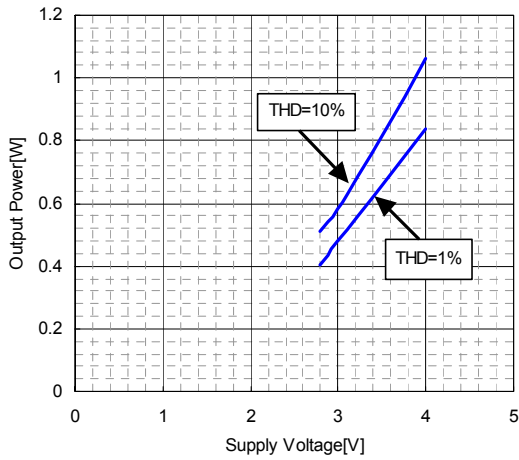


## TYPICAL CHARACTERISTICS

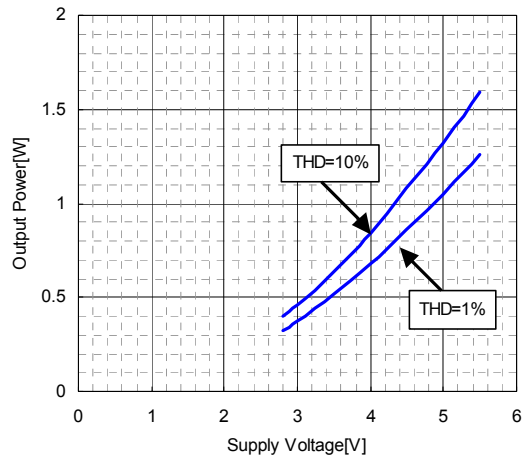


## TYPICAL CHARACTERISTICS

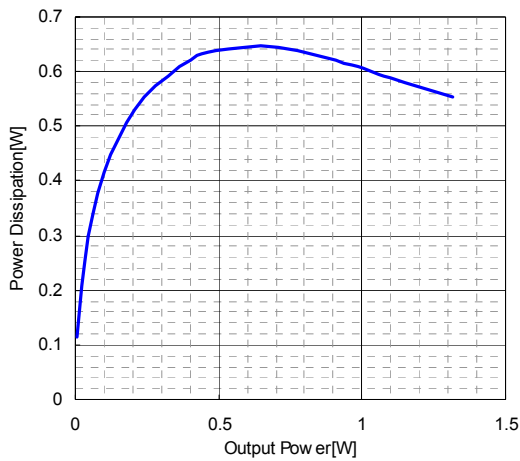
Output Voltage vs Supply Voltage (THD)  
RL=4Ω, Ta=25°C



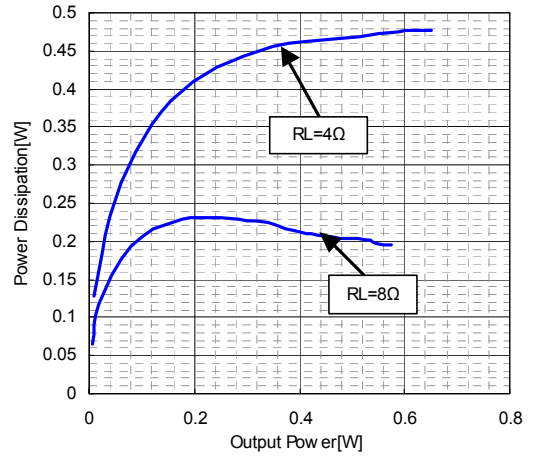
Output Voltage vs Supply Voltage (THD)  
RL=8Ω, Ta=25°C



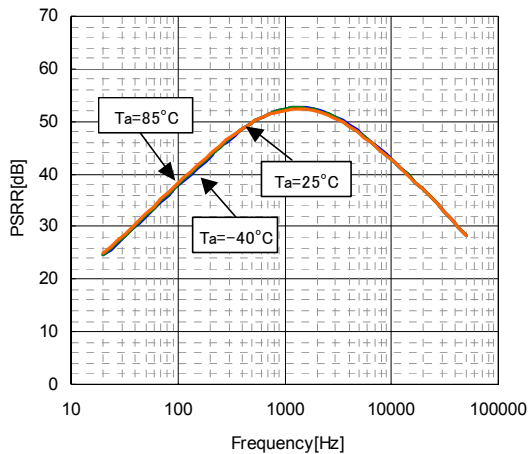
Power Dissipation vs Output Power  
V+=5V, Gv=6dB, RL=8Ω, Ta=25°C



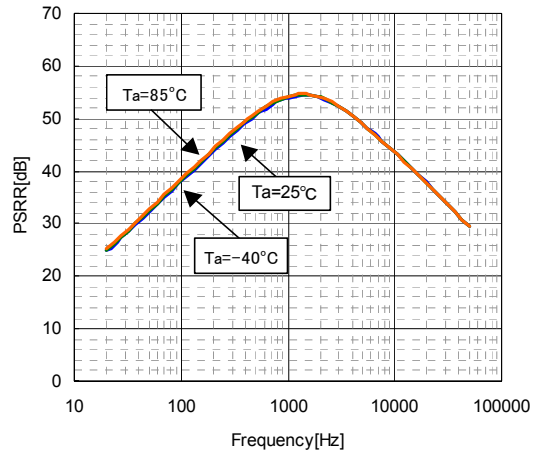
Power Dissipation vs Output Power (RL)  
V+=3V, Gv=6dB, Ta=25°C



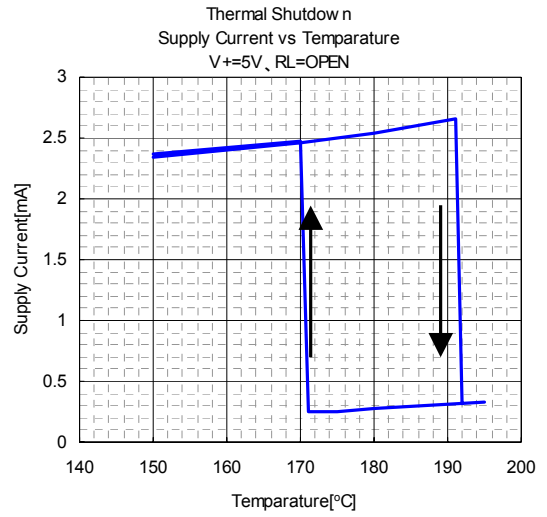
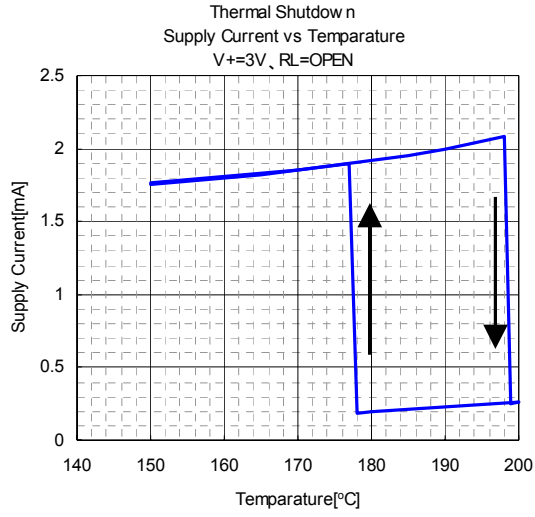
PSRR vs Frequency  
V+=3V, RL=4Ω, Ta=25°C, RIN=GND



PSRR vs Frequency  
V+=5V, RL=8Ω, Ta=25°C, RIN=GND

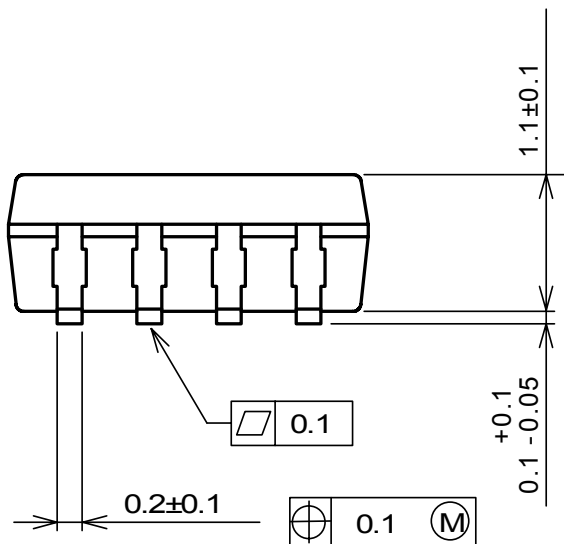
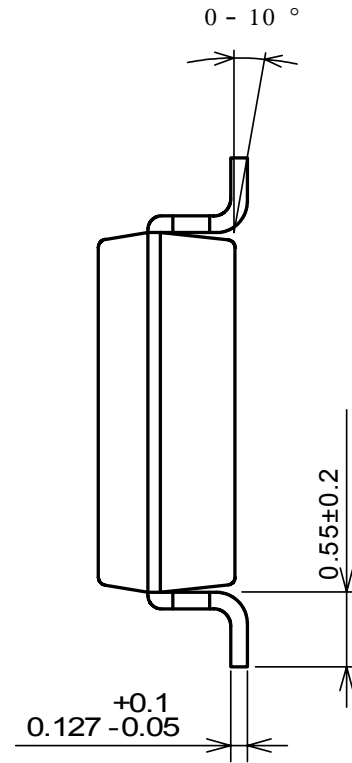
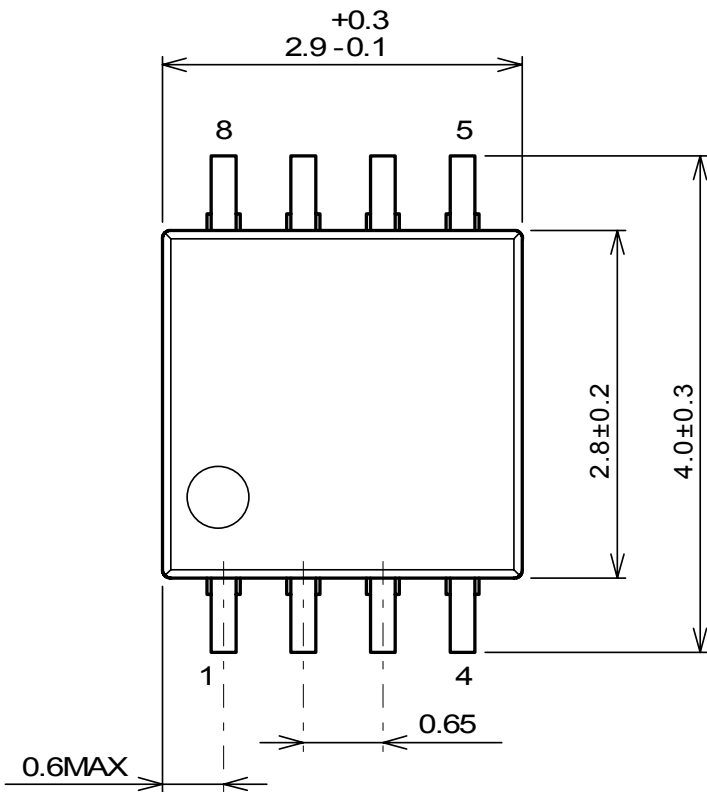


## TYPICAL CHARACTERISTICS



## PACKAGE DIMENSIONS

### VSP8

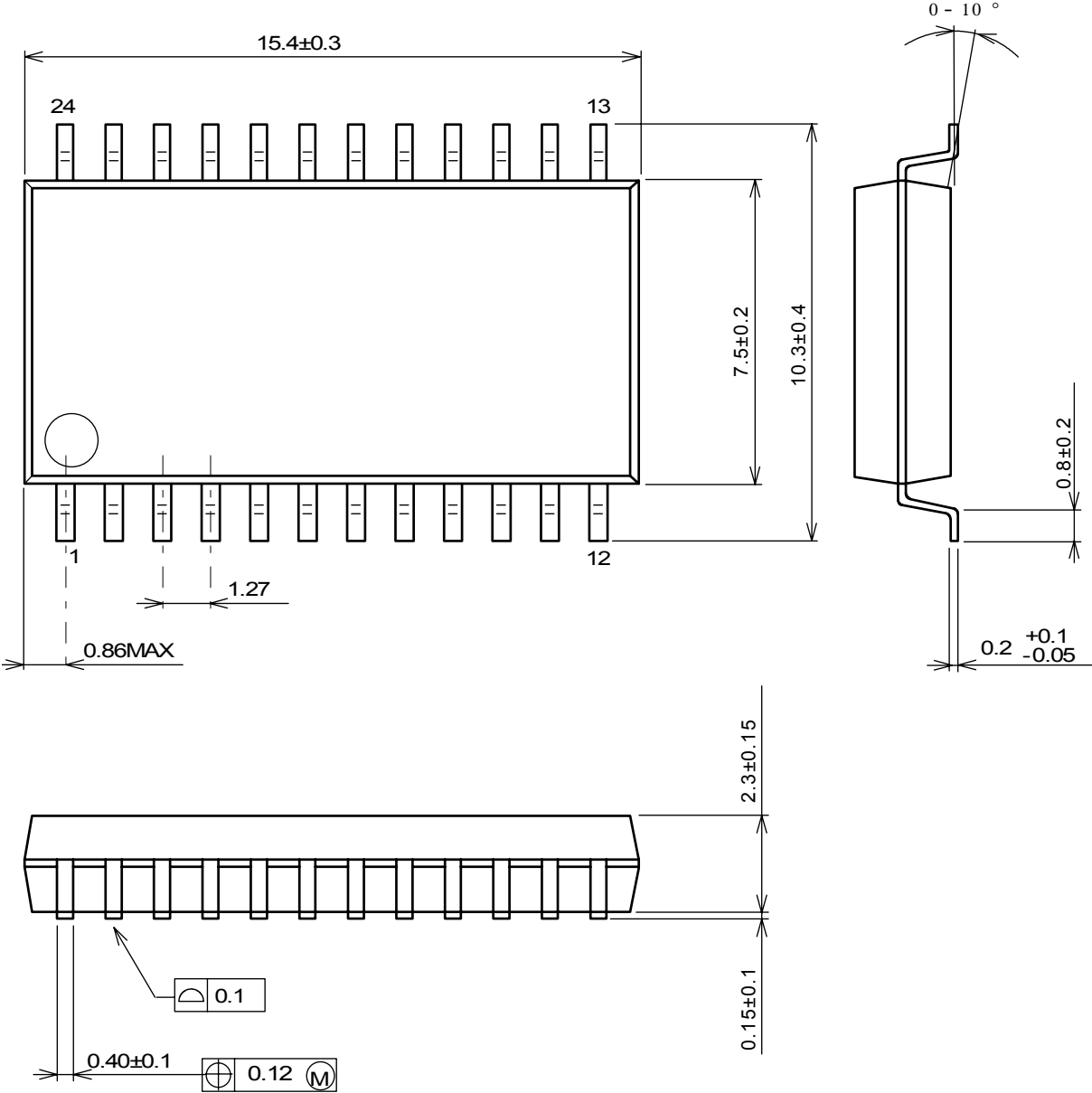


Unit:mm

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## PACKAGE DIMENSIONS

### DMP24



Unit:mm

**[CAUTION]**

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