

READ2304G

High Drivability & High Slew Rate, Input Output Full Range, CMOS Dual Operational Amplifier

R03DS0159EJ0100

Rev.1.00

$V_{IO} \leq \pm 6mV$, $SR = 8V/\mu s$, $GBW=6MHz$

2020.08.20

Description

The READ2304G is input and output full range dual CMOS Operational Amplifier realizing high drivability and high slew rate. This IC can be used in minimum operating supply voltage from 2.5V, and in wide ambient temperature range from -40°C to +105°C.

Available in ultra-small 8 pins TSSOP and MSOP packages.

Features

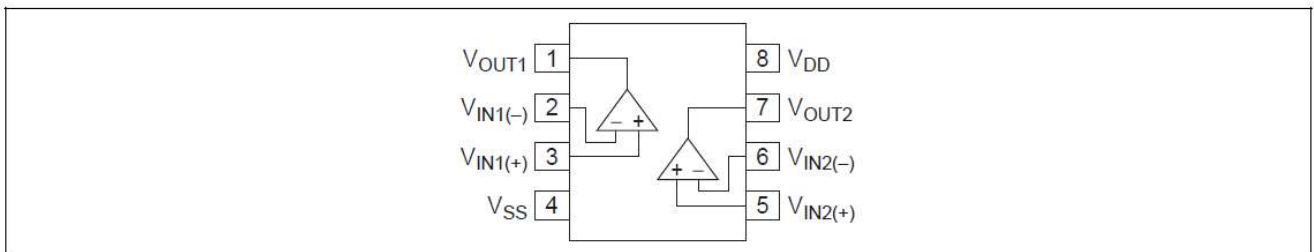
- Low voltage single supply operation $V_{DD} = 2.5V$ to $5.5V$
- Low input offset voltage $V_{IO} \leq \pm 6.0mV$
- Low input bias current $I_B \leq (1pA)$.
- Wide output voltage range $V_{OUT} : V_{SS}+0.1V$ to $V_{DD}-0.1V(@I_o=5mA)$
- Supply current (per channel) $I_{DD} = 0.75mA$ Typ.
- High slew rate $SR = 8V/\mu s$ Typ.

() reference value of design

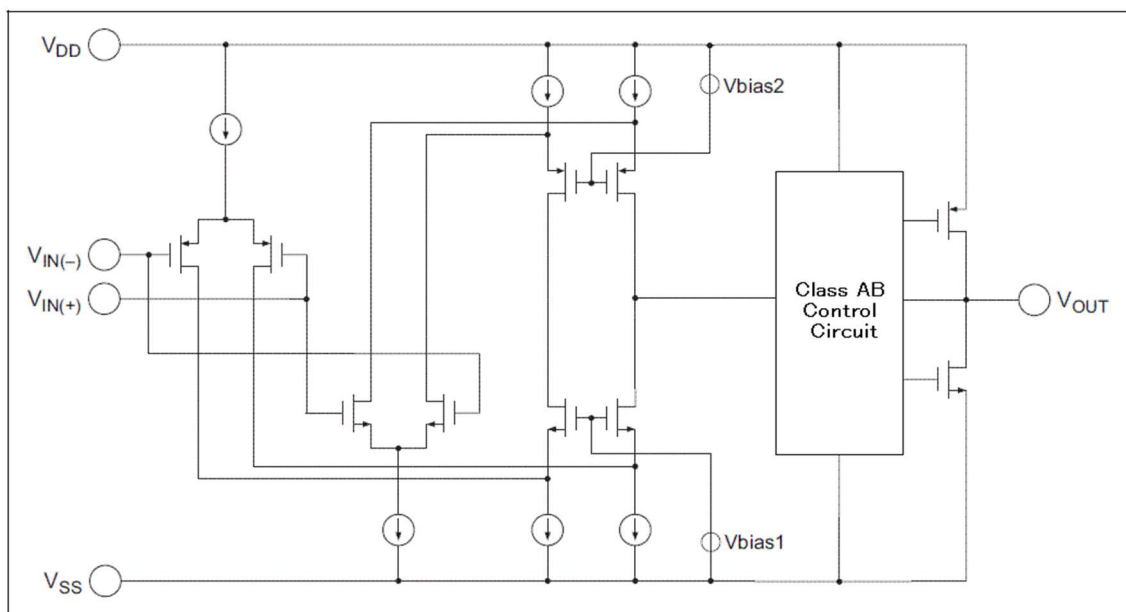
Product Line-up

Type name	Product type quality level	Package
READ2304GSP	High slew rate with Normal quality level	8 pins plastic TSSOP
READ2304GSN	High slew rate with Normal quality level	8 pins plastic MSOP

Pin Arrangement



Equivalent Circuit (per one channel)



Absolute Maximum Ratings

<TA=25°C>

Items	Symbol	Ratings	Unit
Supply voltage ^{Note.1}	V _{DD}	-0.3 to +6.5	V
Differential input voltage	V _{ID}	-V _{DD} to +V _{DD}	V
Input voltage ^{Note.2}	V _I	-0.3 to V _{DD} +0.3	V
Maximum output current	I _O	20	mA
Power dissipation ^{Note.3}	P _T	440	mW
Junction temperature	T _J	+150	°C
Operating temp. range	T _A	-40 to +105	°C
Storage temp. range	T _{stg}	-55 to +150	°C

Note 1. Please take note that reverse connection of a power supply may cause destruction.

2. Stresses above these ratings may cause permanent damage such as characteristics degradation or destruction. Please do not exceed voltage below of GND-0.3V as it is bottom limit. In addition, operation amplifier is operated as normal when input voltage for electrical characteristics is in common mode input voltage range.

3. The value is measured under mounted on a glass epoxy base board (size 100mm x 100mm, 1mm thickness, copper foiled surface base board area with 15% solid pattern).

Note that restrictions will be made to the following conditions for each product, and the derating ratio depending on the operating ambient temperature.

READ2304GSP: Derate at -5.5 mW/°C when T_A > 69 °C

(Junction – ambient thermal resistance R_{th(J-A)} = 183 °C/W)

READ2304GSN: Derate at -4.8 mW/°C when T_A > 58 °C

(Junction – ambient thermal resistance R_{th(J-A)} = 208 °C/W)

Electrical Characteristics<V_{DD}=5V, T_A= +25°C>

Items	Symbol	MIN.	TYP.	MAX.	Unit	Test Condition
Supply voltage	V _{DD} - V _{SS}	2.5		5.5	V	
Input offset voltage	V _{IO}			±6.0	mV	
Input offset current	I _{IO}			(1)	pA	
Input bias current	I _B			(1)	pA	
Output high voltage	V _{OH}	V _{DD} -0.2			V	I _L = 10mA
Output low voltage	V _{OL}			V _{SS} +0.2	V	I _L = 10mA
Voltage gain	A _v	60	90		dB	R _L ≥100kΩ
Channel supply current	I _{DD} /ch		0.75	1.5	mA	R _L =∞, I _o =0
Common mode rejection ratio	CMRR	60	80		dB	
Supply voltage rejection ratio	SVRR	60	80		dB	
Common mode input voltage range	V _{ICM}	V _{SS}		V _{DD}	V	
Gain bandwidth product	GBW		6		MHz	C _L =20pF
Slew rate	SR		8		V/us	C _L =20pF

() reference value of design**Notes**

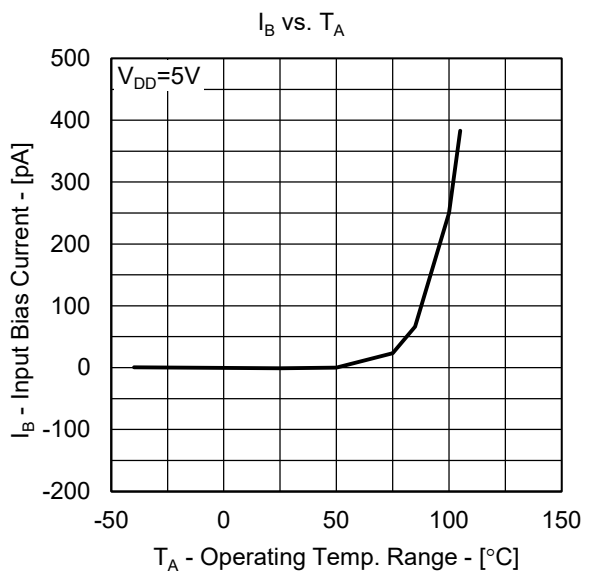
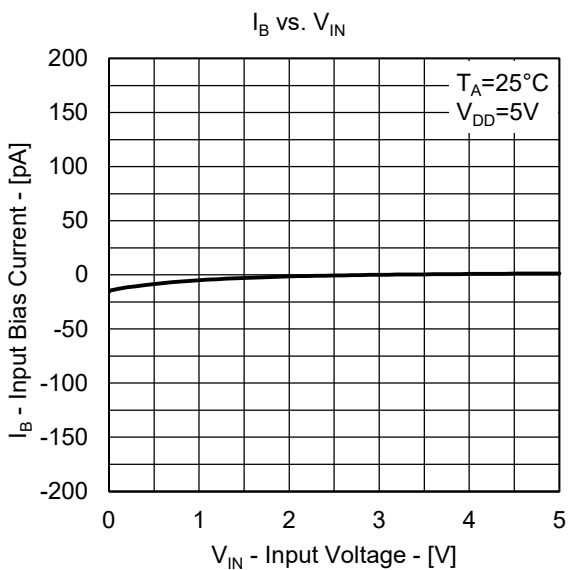
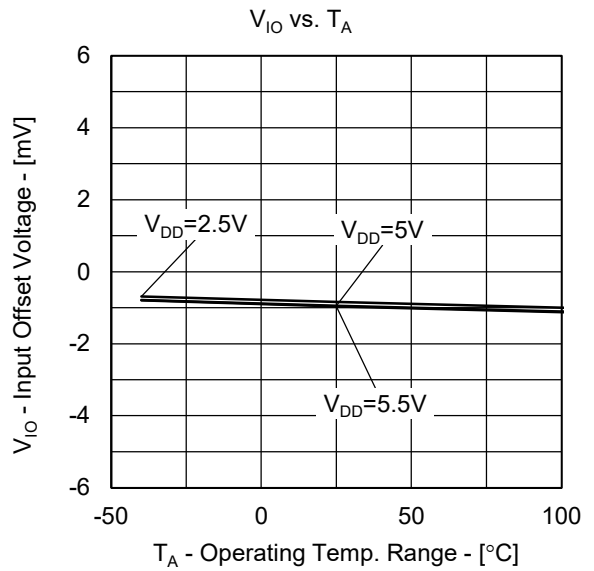
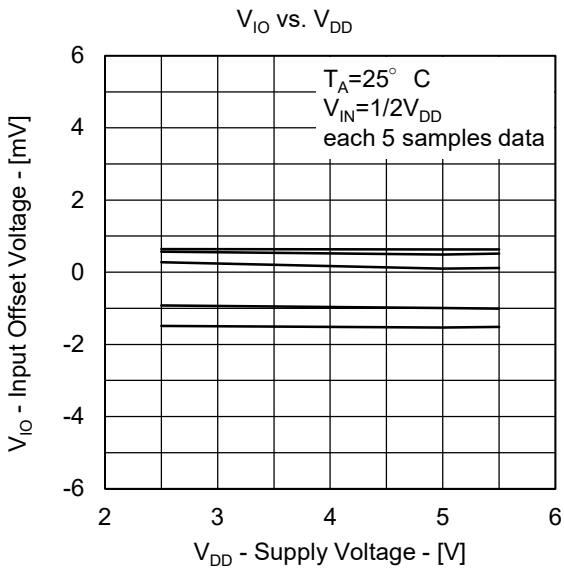
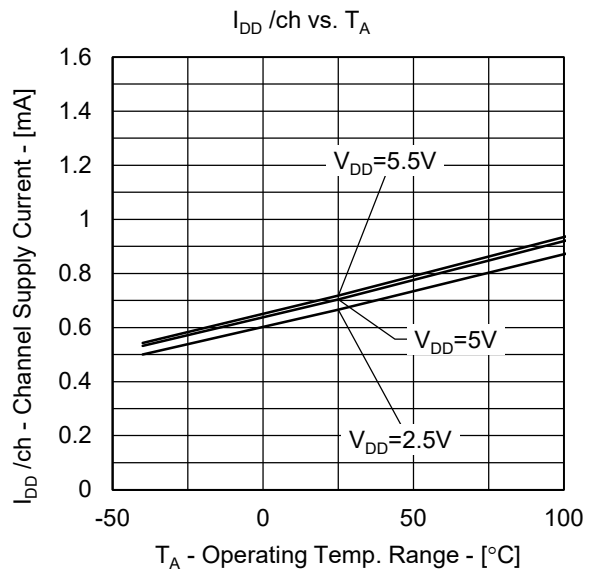
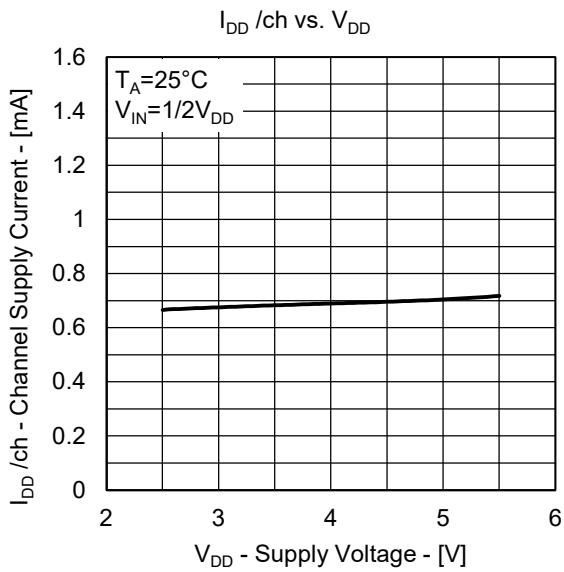
Output terminal: The over-current protection feature is not built in the output terminal of this product.

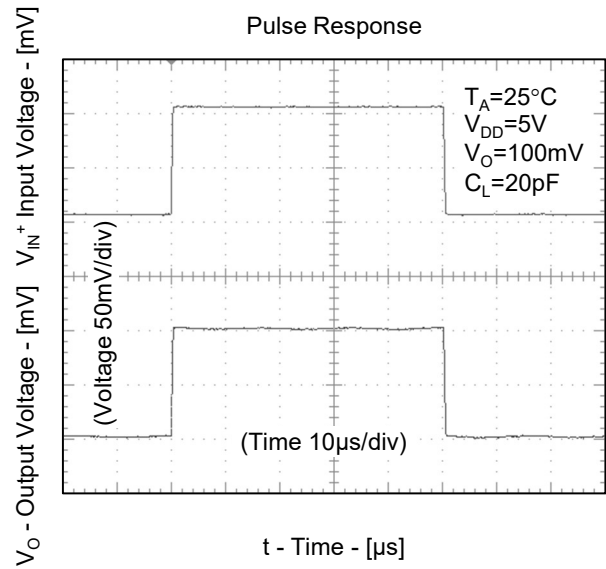
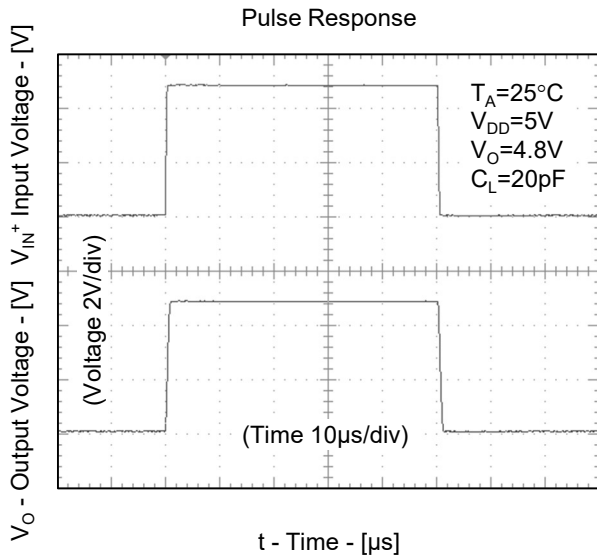
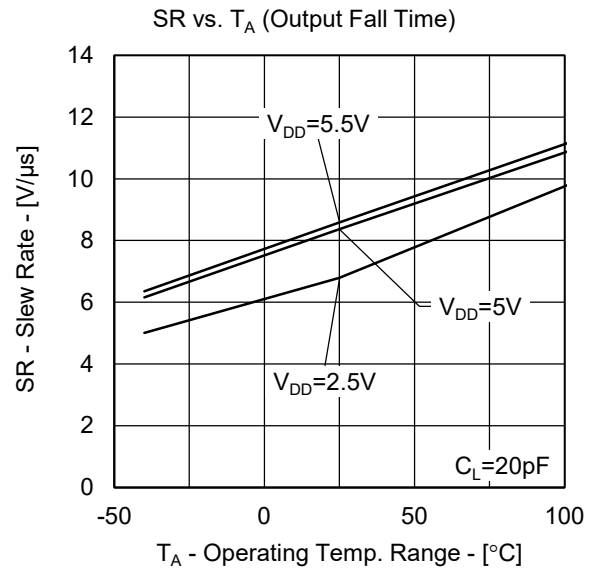
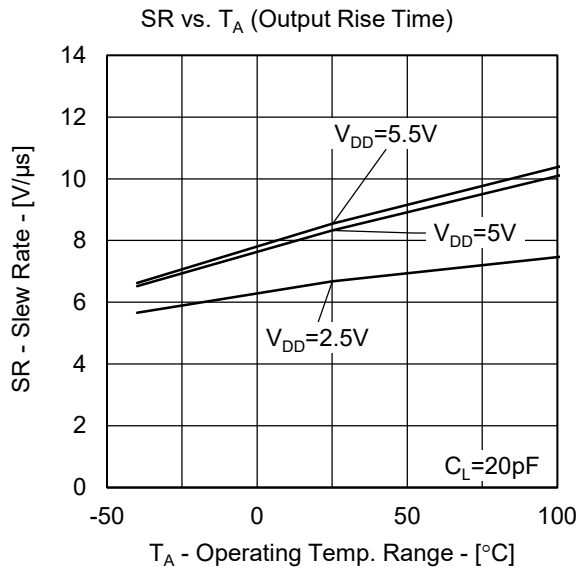
Therefore, please insert resistance to output port.

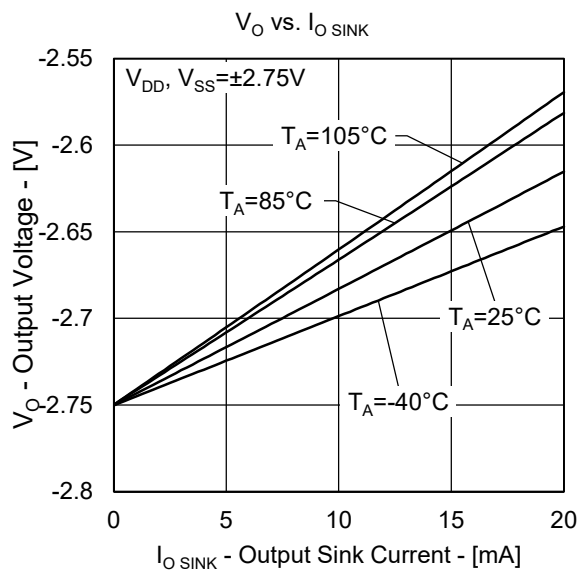
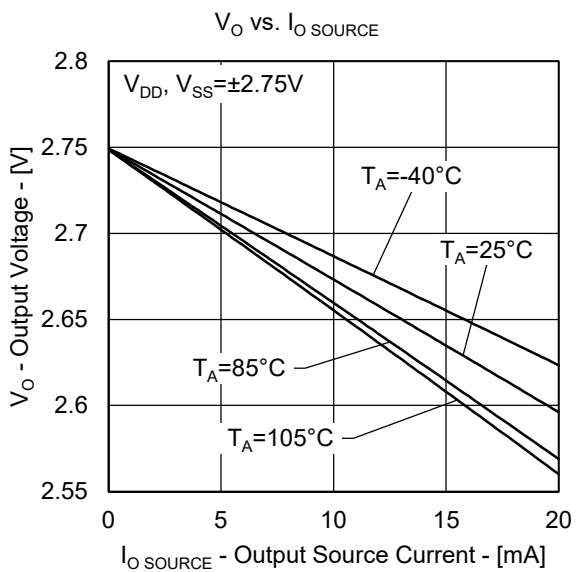
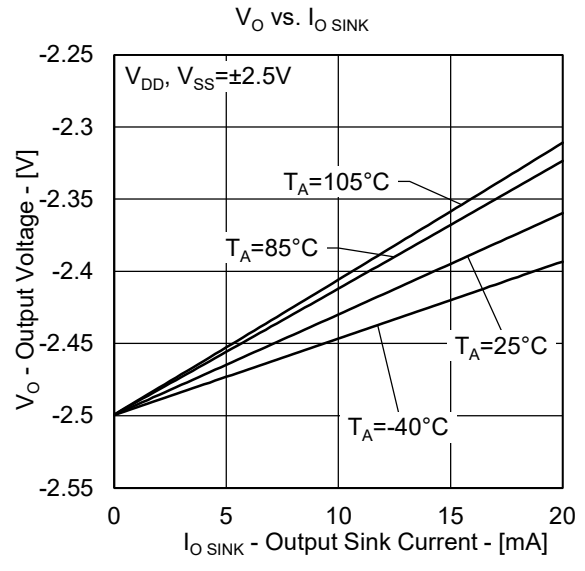
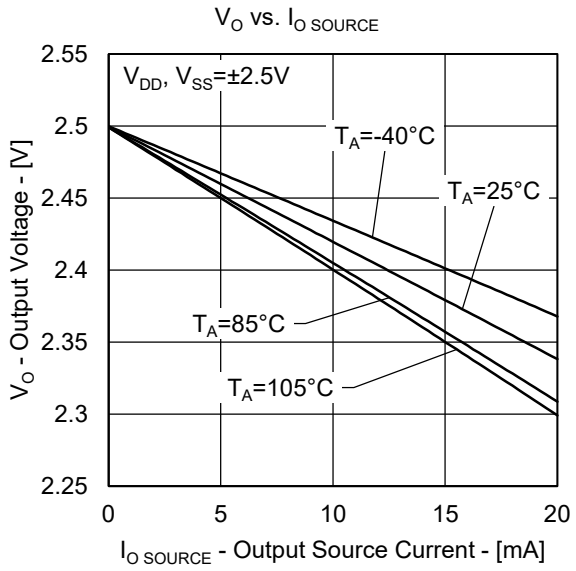
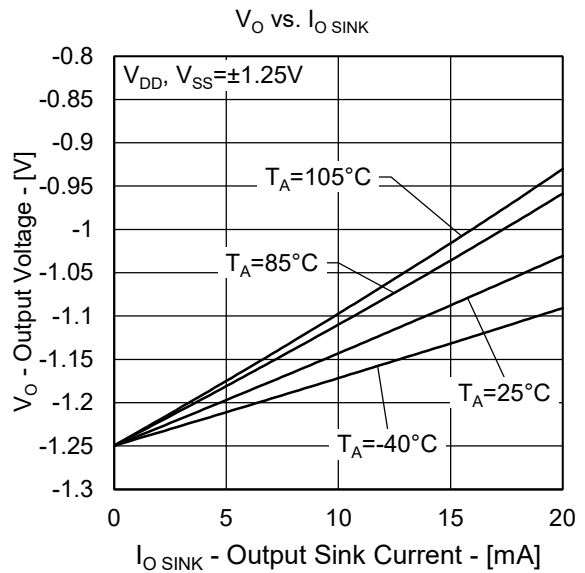
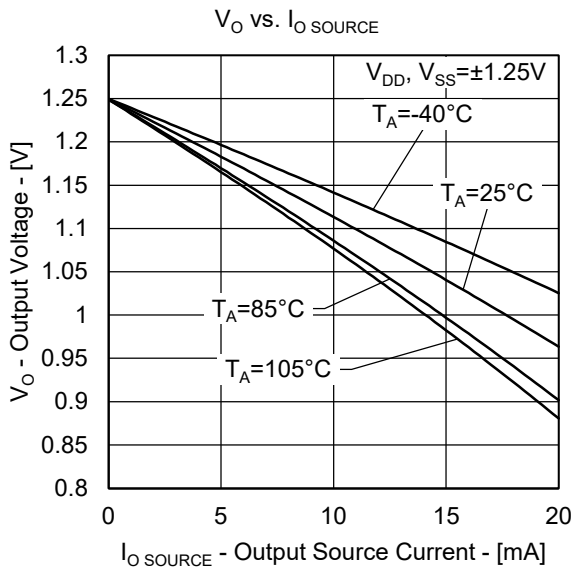
Input offset voltage : The amplifier circuit of the first block of operational amplifier.

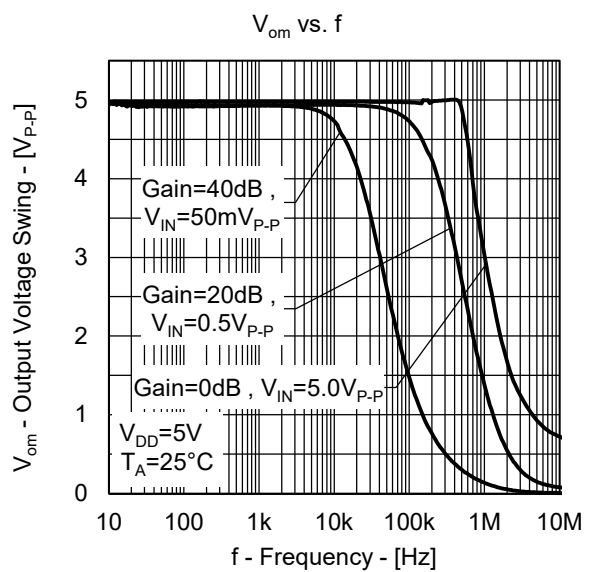
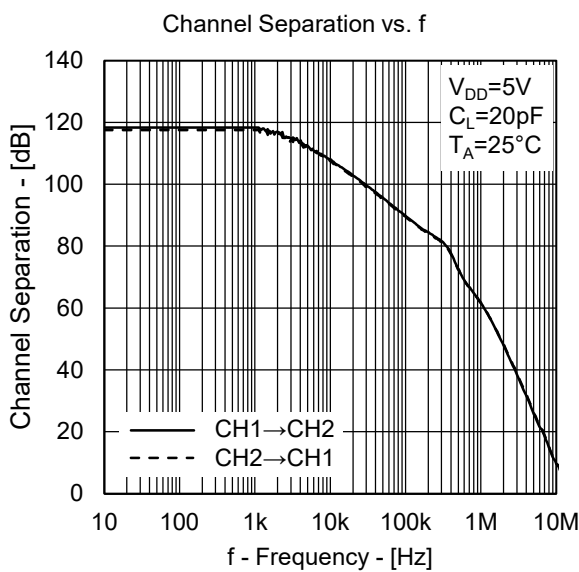
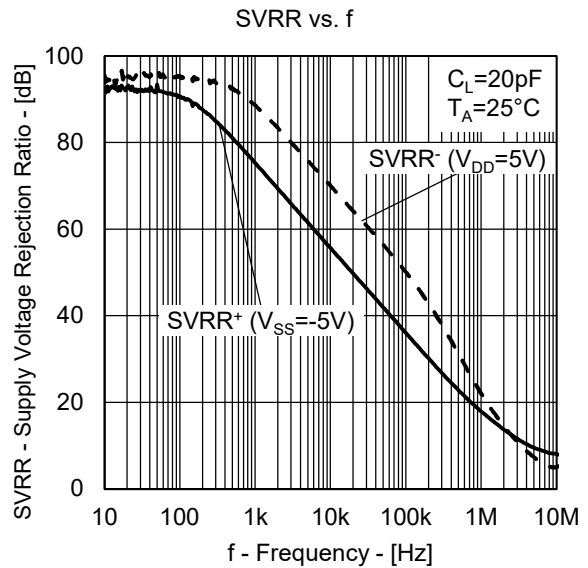
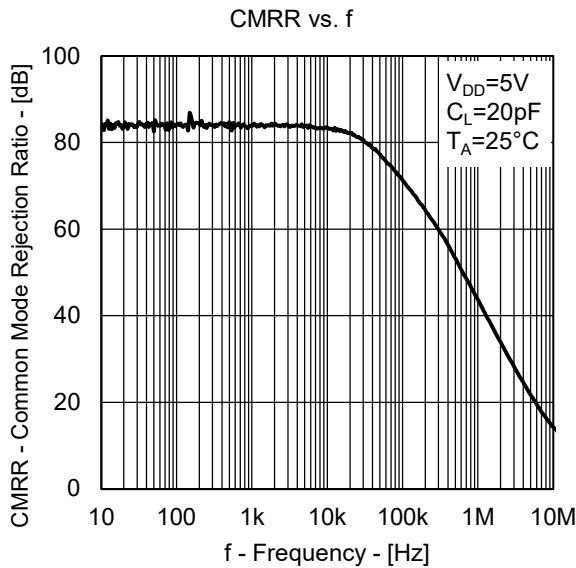
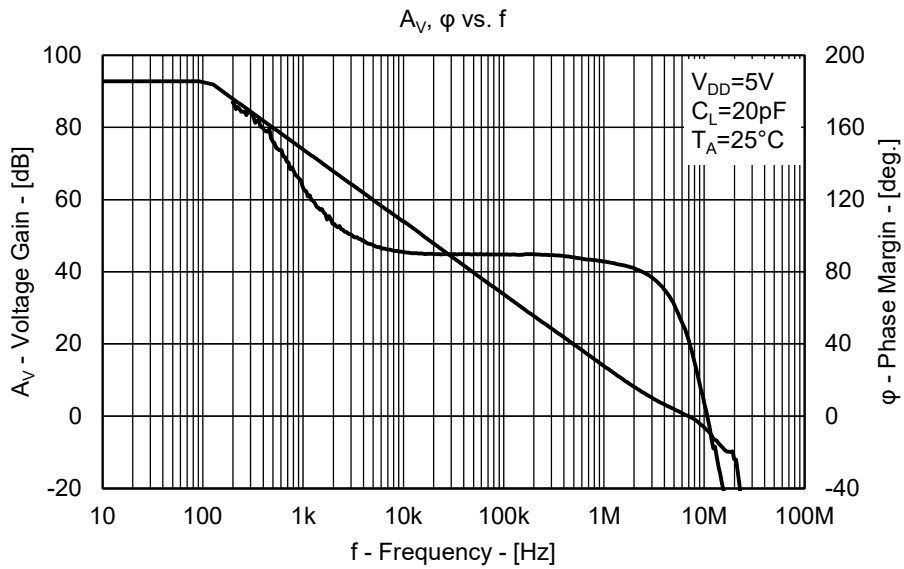
A circuit suitable for operation near GND, and a circuit suitable for operation near +power supply. In case of input voltage of overlap point output port has a minute voltage shift or distortion.

Electrical Characteristics







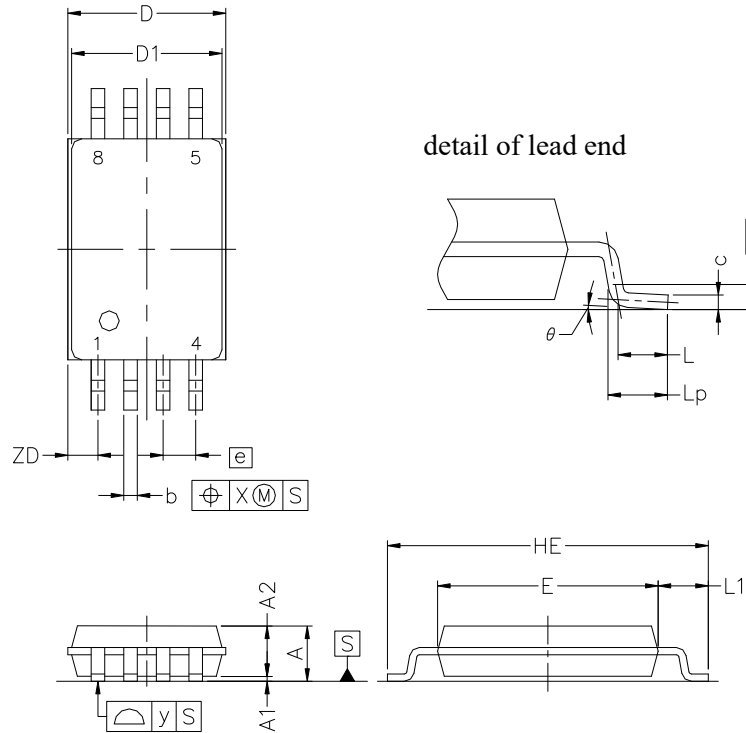


Package Dimensions

8-PIN PLASTIC TSSOP

JEITA Package code	RENESAS code	Previous code	MASS(TYP.)[g]
P-TSSOP8-0225-0.65	PTSP0008JD-A	P8GR-65-9LG	—

Unit:mm



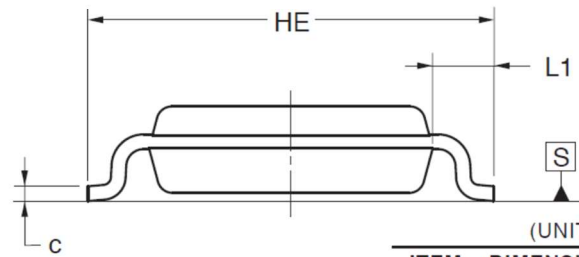
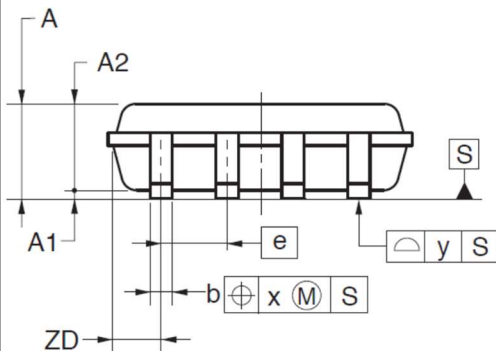
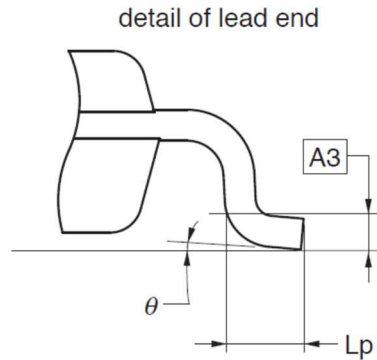
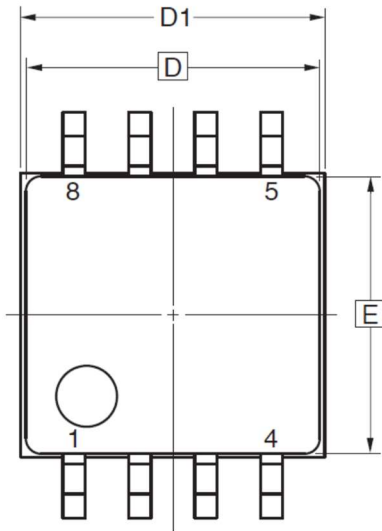
NOTE

Each lead centerline is located within 0.10 mm of its true position at maximum material condition.

ITEM	MILLIMETERS
D	3.15 ±0.15
D1	3.00 ±0.10
E	4.40 ±0.10
HE	6.40 ±0.20
A	1.20 MAX.
A1	0.10 ±0.05
A2	1.00 ±0.05
A3	0.25
b	0.24 ^{+0.06} _{-0.05}
c	0.145 ±0.055
L	0.5
Lp	0.60 ±0.15
L1	1.00 ±0.20
θ	3° ^{+5°} _{-3°}
e	0.65
x	0.10
y	0.10
ZD	0.60

8-PIN PLASTIC MSOP

JEITA Package Code	RENESAS Code	Previous Code	MASS (TYP.) [g]
P-TSSOP8-2.8x2.9-0.65	PTSP0008JF-A	P8MP-65-KAA-1	0.02



(UNIT:mm)

ITEM	DIMENSIONS
D	2.90
D1	3.00±0.20
E	2.80
HE	4.00±0.20
e	0.65
b	0.22±0.05
A	1.03 MAX.
A1	0.08±0.05
A2	0.85±0.05
A3	0.25
L1	0.60±0.20
c	0.145 ^{+0.05} _{-0.03}
Lp	0.37±0.10
x	0.10
y	0.10
theta	3° ^{+5°} _{-3°}
ZD	0.525

NOTE

Each lead centerline is located within 0.10 mm of its true position at maximum material condition.

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Renesas Electronics Corporation

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SALES OFFICES

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Renesas Electronics Corporation
TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan

Renesas Electronics America Inc.
1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.
Tel: +1-408-432-8888, Fax: +1-408-434-5351

Renesas Electronics Canada Limited
9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

Renesas Electronics Europe GmbH
Arcadisstrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
Room 101-101, Floor 1, Building 7, Yard No. 7, 8th Street, Shanghai, Haidian District, Beijing 100085, China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 301, Tower A, Central Towers, 555 Lango Road, Putuo District, Shanghai 200333, China
Tel: +86-21-2226-0695, Fax: +86-21-2226-0599

Renesas Electronics Hong Kong Limited
Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852-2886-9022

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886-2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #03-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit No 3A-1 Level 3A Tower 8 UOA Business Park, No 1 Jalan Pengaturcara U1/51A, Seksyen U1, 40150 Shah Alam, Selangor, Malaysia
Tel: +60-3-5022-1298, Fax: +60-3-5022-1290

Renesas Electronics India Pvt. Ltd.
No.777C, 100 Feet Road, HAL 2nd Stage, Indiranagar, Bangalore 560 038, India
Tel: +91-80-67208700

Renesas Electronics Korea Co., Ltd.
17F, KAMCO Yangjae Tower, 262, Gangnam-daero, Gangnam-gu, Seoul, 06265 Korea
Tel: +82-2-558-3737, Fax: +82-2-558-9338

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