4-channel H-bridge type BTL driver for CD players

BA6892FP

The BA6892FP is a 4-channel H-bridge BTL driver for CD players. Independent power supplies for each predriver and power driver assure efficient operation at low voltages. Each channel is independently mutable.

●Applications

CD players, CD-ROM drives and other optical disc devices

●Features

1) 4-channel BTL driver in a HSOP 28-pin package, ideal for application miniaturization.
2) Wide dynamic range.
3) Driver gain is adjustable with an attached resistor.
4) Independent power supply for each preamplifier and power amplifier, for drives that operate efficiently on low voltages.
5) Power amplifier current drops to an extremely low level when the preamplifier power supply is lowered, allowing for a standby mode.

●Absolute maximum ratings (Ta = 25°C)

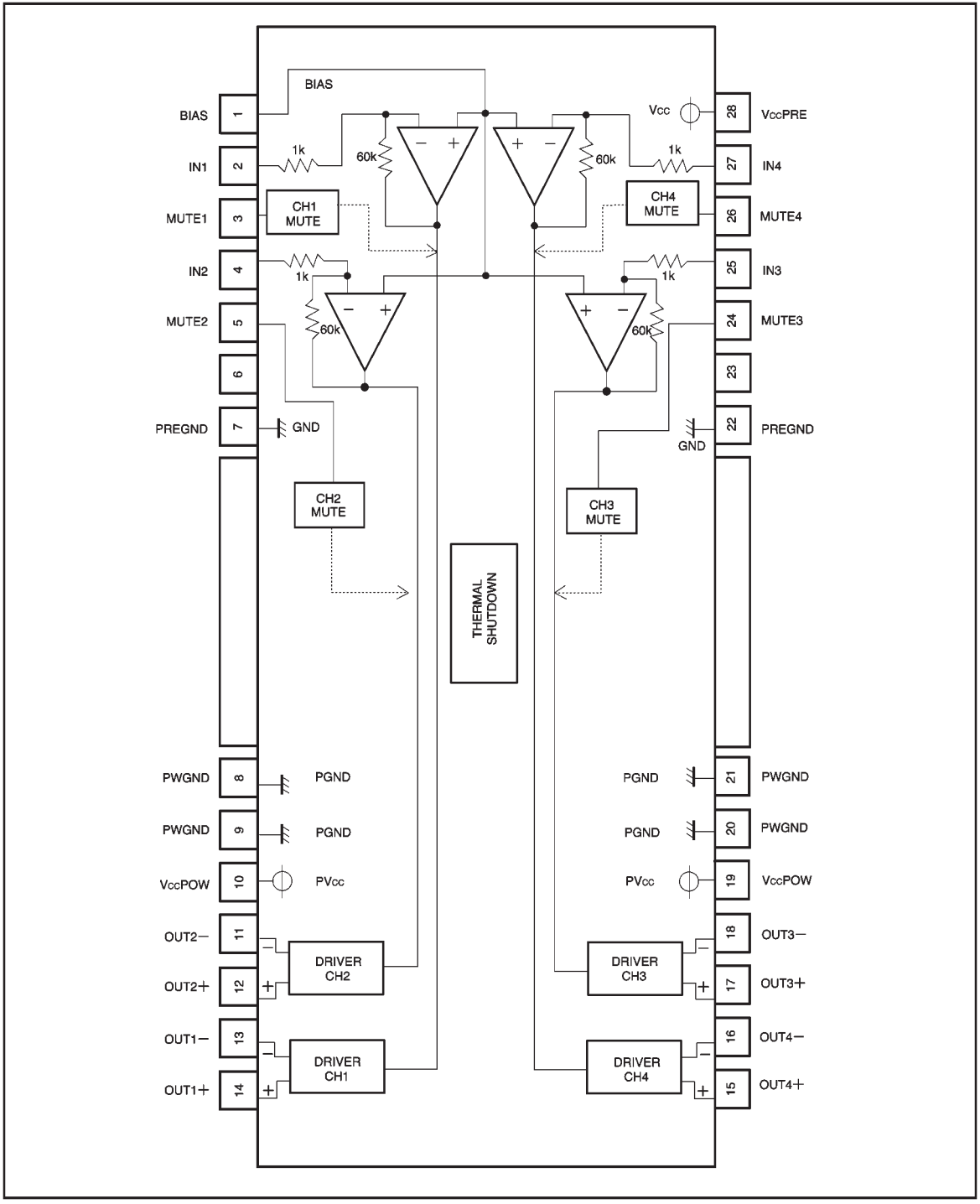
Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	18	V
Power dissipation	Pd	1800*	mW
Operating temperature	Topr	−30～+85	℃
Storage temperature	Tstg	−55～+150	℃

* Reduced by 14.4 mW for each increase in Ta of 1℃ over 25℃.

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Predriver supply voltage	V_{CCPRE}	3.0	−	14.0	V
Powerdriver supply voltage	V_{CCPOW}	1.5	−	14.0	V

●Block diagram

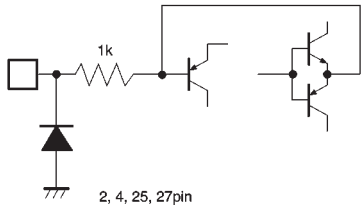


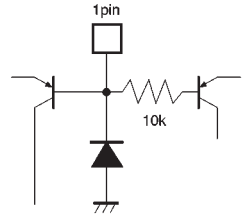
●Pin descriptions

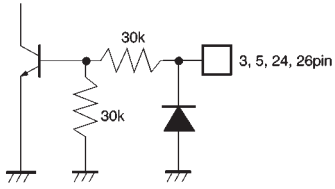
Pin No.	Pin name	Function
1	BIAS	Bias input
2	IN1	Channel 1 input
3	MUTE1	Channel 1 mute
4	IN2	Channel 2 input
5	MUTE2	Channel 2 mute
6	—	Test pin
7	PREGND	Pre-ground
8	PWGND	Power ground
9	PWGND	Power ground
10	VccPOW	Power Vcc
11	OUT2—	Channel 2 negative output
12	OUT2+	Channel 2 positive output
13	OUT1—	Channel 1 negative output
14	OUT1+	Channel 1 positive output
15	OUT4+	Channel 4 positive output
16	OUT4—	Channel 4 negative output
17	OUT3+	Channel 3 positive output
18	OUT3—	Channel 3 negative output
19	VccPOW	Power Vcc
20	PWGND	Power ground
21	PWGND	Power ground
22	PREGND	Pre-ground
23	—	N.C.
24	MUTE3	Channel 3 mute
25	IN3	Channel 3 input
26	MUTE4	Channel 4 mute
27	IN4	Channel 4 input
28	VccPRE	Pre Vcc

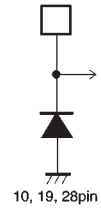
Notes: (1) Postive and negativc output of the driver is relative to the polarity of the input pins.
(For example, pin 14 is HIGH when pin 2 input is HIGH.)
(2) The radiating fin is internally shorted by pin 8 (GND).
(3) Pin 6 is the test pin and should be left unconnected.

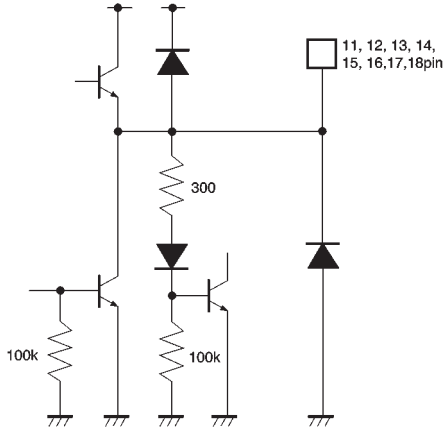
●Input / output circuits

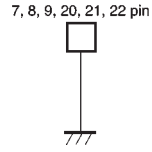












●Electrical characteristics (unless otherwise noted, Ta = 25°C, V_{CCPRE} = V_{CCPOW} = 4V, BIAS = 2V, R_L = 8Ω, RIN = 9.1kΩ)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Supply current 1 (V_{CC}PRE)	I_{Q1}	—	3.6	6.0	mA	Open input	Fig. 1
Supply current 2 (V_{CC}POW)	I_{Q2}	—	—	10	μA	Open input	Fig. 1
Standby current	I_{ST}	—	—	1	μA	V_{CC}PRE=OFF, V_{CC}POW=4V	Fig. 1
Input offset voltage	V_{OI}	−5.5	0.7	5.5	mV		Fig. 1
Output offset voltage	V_{OO}	−35	0	35	mV		Fig. 1
Dead zone width	V_{DB}	1	4	10	mV	Total for positive and negative	Fig. 1
Maximum output amplitude	V_{OM}	2.0	2.5	—	V	V_{IN}=±0.7V	Fig. 1
Voltage gain	G_{VC}	11	14	17	dB	V_{IN}=±0.3V	Fig. 1
Voltage gain differential (positive and negative)	ΔG_{VC}	−1.9	0	1.0	dB		Fig. 1
MUTE-ON voltage	V_{MON}	2.0	—	—	V		Fig. 1
MUTE-OFF voltage	V_{MOFF}	—	—	0.5	V		Fig. 1

●Measurement circuit

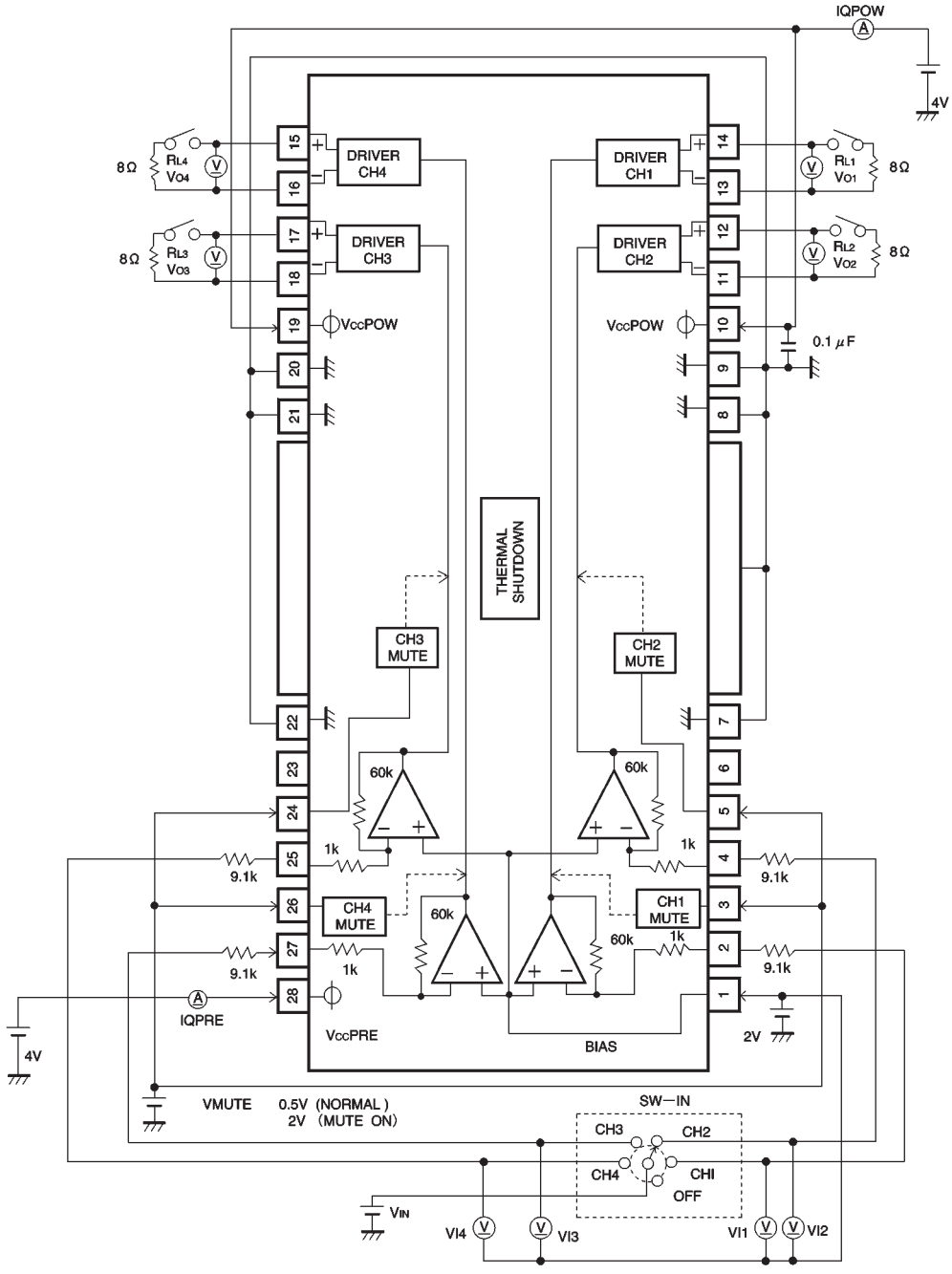
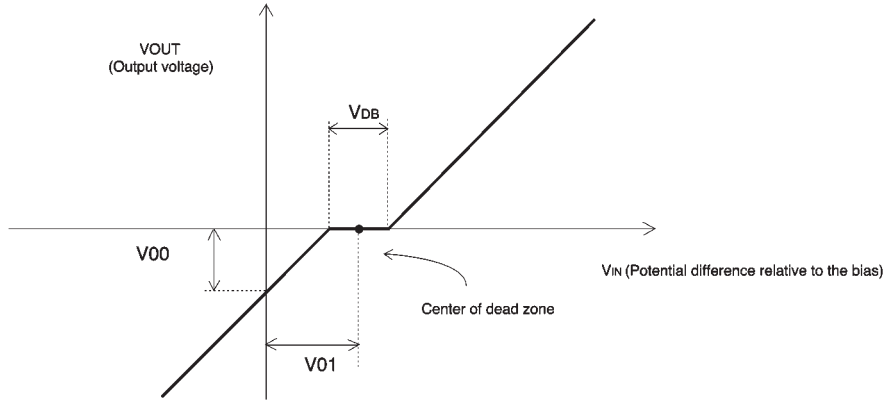


Fig.1

	VIN	IN	VPRE	RL	Measurement point
I_{Q1}	OFF	OFF	ON	OFF	I_{QPRE}
I_{Q2}	OFF	OFF	ON	OFF	I_{QPOW}
I_{ST}	OFF	OFF	OFF	OFF	I_{QPOW}
V_{OI}	OFF	Channel1～4	ON	OFF	$V_{I1\sim4}$
V_{OO}	0V	Channel1～4	ON	ON	$V_{O1\sim4}$
V_{DB}	Sweep from −50 mW to 50 mV	Channel1～4	ON	ON	Verify range of V_{IN} where $V_{O1\sim4}$ are 0 mV
V_{OM}	±2.0V	Channel1～4	ON	ON	$V_{O1\sim4}$
G_{VC}	±0.3V	Channel1～4	ON	ON	20 log （($V_{O1\sim4}$) / V_{IN}）
ΔG_{VC}	±0.3V	Channel1～4	ON	ON	Differential between G_{VC}+G_{VC}

Note: Because the input offset is also the center of the dead zone, an output will be generated at the point where $V_{IN} = V_{BIAS}$ when the input offset is outside the dead zone width (4 mV). This is the output offset voltage.



●Application example

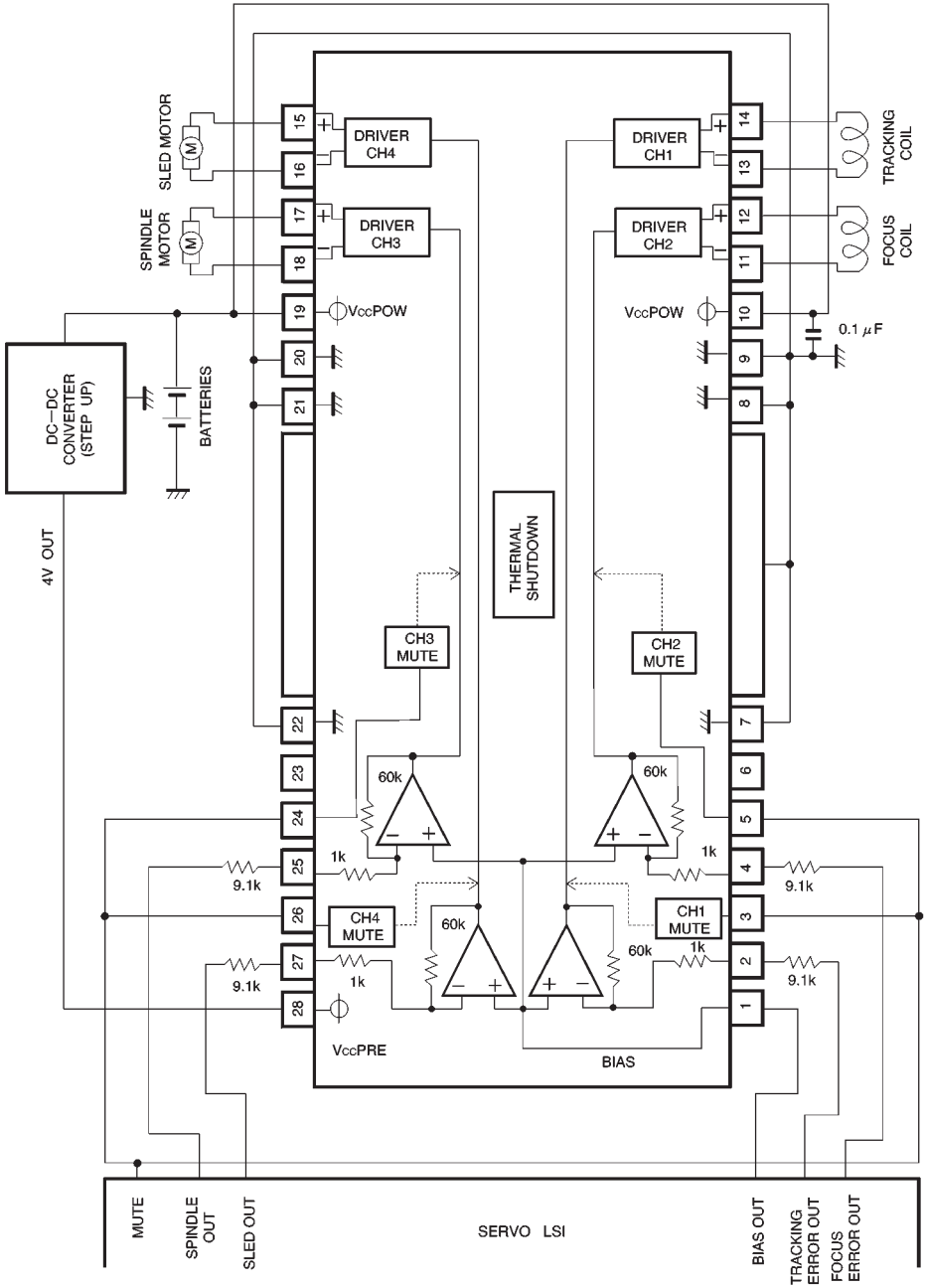


Fig. 2

●Operation notes

(1) The BA6892FP has an internal thermal shutdown circuit. Output current is muted when the chip temperature exceeds 175°C (typically) and restored when the chip temperature falls to 150°C (typically).

(2) The mute pin operates normally when open and at the LOW level (below 0.5V), but mutes the output when raised to the HIGH level (above 2V). A high impedance is output during muting. The mute pin functions independently for each channel.

(3) Dead zone width is determined as follows:

Dead zone width = input resistance (attached resistor + internal input resistor 1kΩ) × 0.2μA

Dead zone width various according to the gain setting as defined in the preceding equation.

Example: When attached input resistor = 9.1kΩ, VDB = (9.1k+1k) ×0.2μ ≒ 2mV

Output pins output high impedance in a dead zone equal to AmV (total for positive and negative).

(4) Be sure to connect the IC to a 0.1μF bypass capacitor to the power supply, at the base of the IC.

(5) Connect the radiating fin to an external ground.

●Electrical characteristic curves

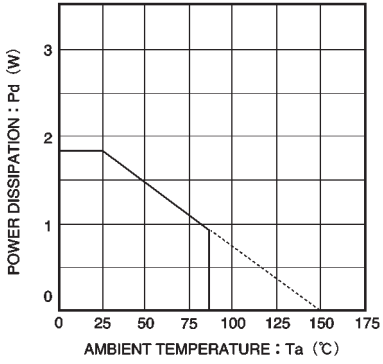


Fig. 3 Thermal derating curve

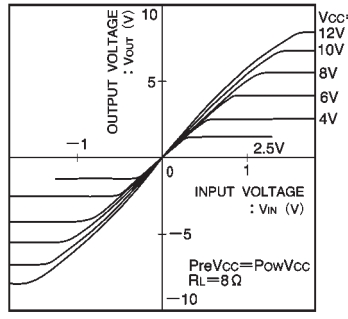


Fig. 4 I / O characteristics (Pre and power driver Vcc variation)

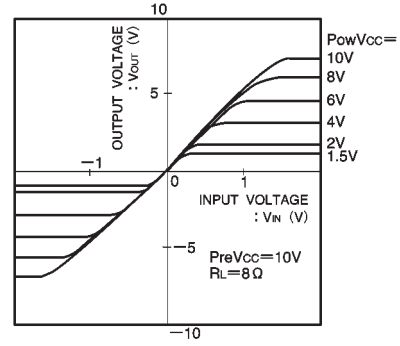


Fig. 5 I / O characteristics (powerdriver Vcc variation)

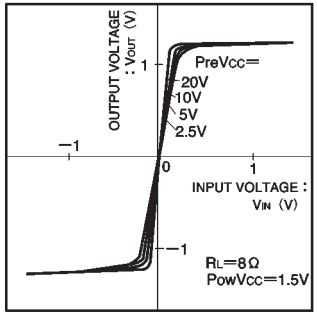


Fig. 6 I / O characteristics (predriver Vcc variation)

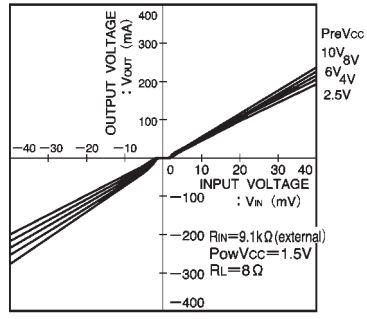
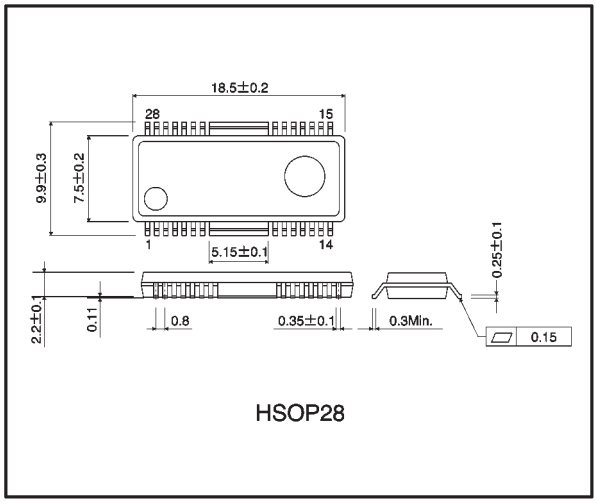


Fig. 7 Dead zone I / O characteristics (predriver Vcc variation)

●External dimensions (Units: mm)



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