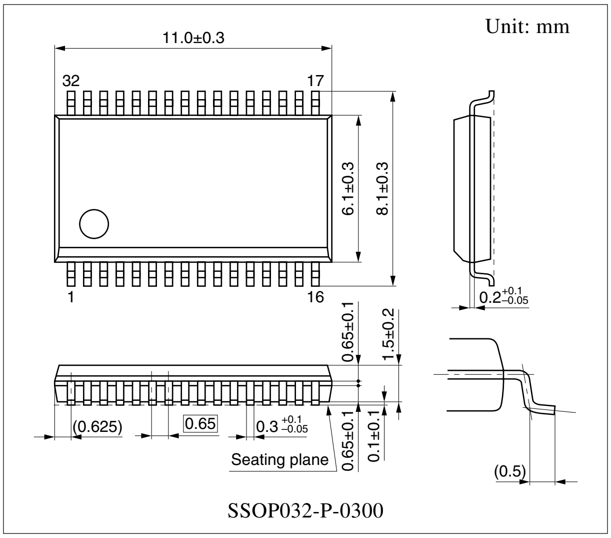
AN8497SA

3-channel linear input PWM driver IC

■ Overview

The AN8497SA is a PWM output 3-channel driver IC supporting linear inputs, and best suited for an actuator and a motor drive for CD-ROM and DVD-ROM. Due to its linear input, a conventional system can be used only by replacing a driver. And, due to an adoption of PWM output, you can reduce considerably power consumption compared with a conventional driver. Further a space saving surface mount package is adopted thanks to its low thermal generation.



Note) The package of this product will be changed to lead-free type (SSOP032-P-0300B). See the new package dimensions section later of this datasheet.

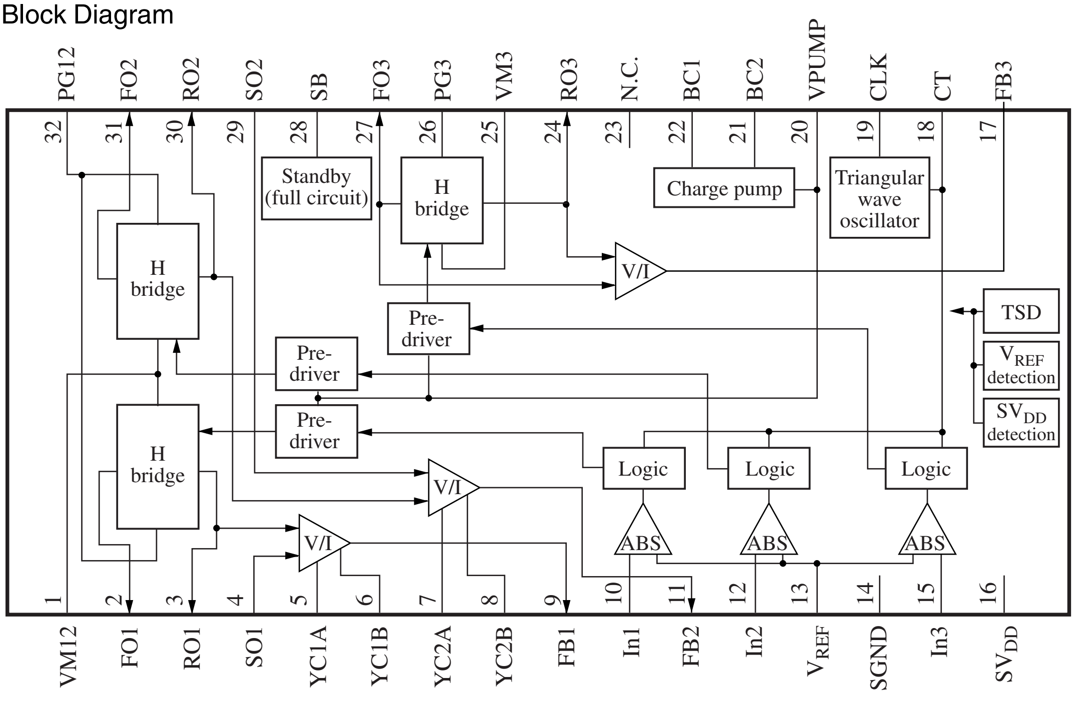
■ Features

- Maximum 64% reduction of power consumption compared with a conventional linear 3-channel driver IC
- Free gain setting by an external resistor due to voltage feedback
- Standby function available (standby current < 20 µA)
- Only for supply voltage 5 V
- Phase compensation function

■ Applications

- Optical disk drive

■ Block Diagram



■ Pin Descriptions

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	VM12	Channel 1, 2 power supply	17	FB3	Channel 3 feedback signal output pin
2	FO1	Channel 1 forward output pin	18	CT	Triangular wave output pin
3	RO1	Channel 1 reverse output pin	19	CLK	CLK synchronous pulse input pin
4	SO1	Channel 1 feedback signal input pin	20	VPUMP	Charge pump step-up voltage output
5	YC1A	Channel 1 feedback gain adjustment pin A	21	BC2	Charge pump capacitor connection pin 2
6	YC1B	Channel 1 feedback gain adjustment pin B	22	BC1	Charge pump capacitor connection pin 1
7	YC2A	Channel 2 feedback gain adjustment pin A	23	N.C.	N.C.
8	YC2B	Channel 2 feedback gain adjustment pin B	24	RO3	Channel 3 reverse output pin
9	FB1	Channel 1 feedback signal output pin	25	VM3	Channel 3 power supply
10	In1	Channel 1 driver input pin	26	PG3	Channel 3 power ground
11	FB2	Channel 2 feedback signal output pin	27	FO3	Channel 3 forward output pin
12	In2	Channel 2 driver input pin	28	SB	All shut off input pin
13	V_{REF}	Reference voltage input pin	29	SO2	Channel 2 feedback signal input pin
14	SGND	Control circuit ground	30	RO2	Channel 2 reverse output pin
15	In3	Channel 3 driver input pin	31	FO2	Channel 2 forward output pin
16	SV_{DD}	Control circuit power supply	32	PG12	Channel 1, 2 power supply

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage [*2]	SV_{DD}	6.0	V
	V_{M12} , V_{M3}		
Supply voltage application range	SV_{DD}	− 0.3 to +6.0	V
	V_{M12} , V_{M3}		
Drive output voltage [*7]	$V_{(m)}$	7.0	V
Control signal input voltage [*8]	$V_{(n)}$	SGND to SV_{DD}	V
Supply current [*3]	I_{SVDD}	200	mA
	I_{VM12}	2 000	
	I_{VM3}	1 200	
Drive output current channel 1, 2 [*5]	$I_{(o)}$	±1 000	mA
Drive output current channel 3 [*6]	$I_{(p)}$	±1 200	mA
Power dissipation [*4]	P_D	400	mW
Operating ambient temperature [*1]	T_{opr}	−30 to +75	°C
Storage temperature [*1]	T_{stg}	−55 to +150	°C

Note) Do not apply external currents or voltages to any pins not specifically mentioned expect for the power supply and GND pins.
For circuit currents, '+' denotes current flowing into the IC, and '−' denotes current flowing out of the IC.
*1: Except for the operating ambient temperature and storage temperature, all ratings are for T_a = 25°C.
*2: The voltage in a step-up voltage circuit exceeds a supply voltage. Refer to "■ Electrical Characteristics" for an allowable value of a step-up voltage.
*3: Use within 1 000 mA in each channel 1 and channel 2.

■ Absolute Maximum Ratings (continued)

Note) ∗4: Use within the range of not exceeding P_D = 400 mW without heat sink and at T_a = 75°C in accordance with an allowable power dissipation characteristic curve of "■ Application Note".
∗5: o = 2, 3, 30, 31
∗6: p = 24, 27
∗7: m = 2, 3, 4, 24, 27, 29, 30, 31
∗8: n = 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 ,15, 17, 18, 19, 22, 28

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	SV_{DD}	4.5 to 5.0 to 5.5	V
	V_{M12} , V_{M3}	3.5 to 5.0 to 5.5	

■ Electrical Characteristics at $SV_{DD} = V_{M12} = V_{M3} = 5$ V, $V_{REF} = 1.65$ V, SB = 3.3 V, $R_L = 8\ \Omega$, $T_a = 25$°C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Power supply current at standby	I_{VMS}	SB = "L"	—	—	10	μA
Control supply current at standby	I_{SVS}	SB = "L", V_{REF} = 0 V	—	—	10	μA
Control supply current at no input	I_{SVA}	SB = "H"	—	5	10	mA
Charge pump						
Output voltage	V_{PMP}	I_{PMP} = 0 mA	7.0	8.4	9.8	V
Current output capability	V_{PMPL}	I_{PMP} = −1 mA	5.9	7.3	8.7	V
Triangular wave generation circuit						
Sink current	I_{CTSN}	V_{CT} = 1.6 V	133	153	173	μA
Source current	I_{CTSR}	V_{CT} = 0.1 V	37	44	51	μA
Self-running oscillation frequency	f_{TR}	C_{CT} = 100 pF	175	200	225	kHz
Driver block						
Channel 1, 2 output on resistance (upper/lower)	R_{ON1} , R_{ON2}	R_L = 8 Ω	—	1.4	2.3	Ω
Channel 3 output on resistance (upper/lower)	R_{ON3}	R_L = 8 Ω	—	0.8	1.6	Ω
Output offset voltage	V_{OS}	—	–50	—	50	mV
Voltage gain "+"	G	—	12.0	14.0	16.0	dB
"+" / "–" relative gain	G_R	—	–1.5	—	1.5	dB
Dead zone converted to input	V_{DZ}	—	0	10	30	mV
SV_{DD} reset						
Reset supply voltage	V_{RESH}	—	4.5	—	—	V
V_{REF} reset						
High-level input voltage	V_{RRH}	—	1.35	—	—	V
Low-level input voltage	V_{RRL}	—	—	—	0.7	V
Standby operation						
High-level input voltage	V_{SBH}	—	2.7	—	—	V
Low-level input voltage	V_{SBL}	—	—	—	0.8	V

■ Electrical Characteristics at $SV_{DD} = V_{M12} = V_{M3} = 5$ V, $V_{REF} = 1.65$ V, SB = 3.3 V, $R_L = 8\ \Omega$, $T_a = 25°C$ (continued)

• Design reference data

Note) The characteristics listed below are theoretical values based on the IC design and are not guaranteed.

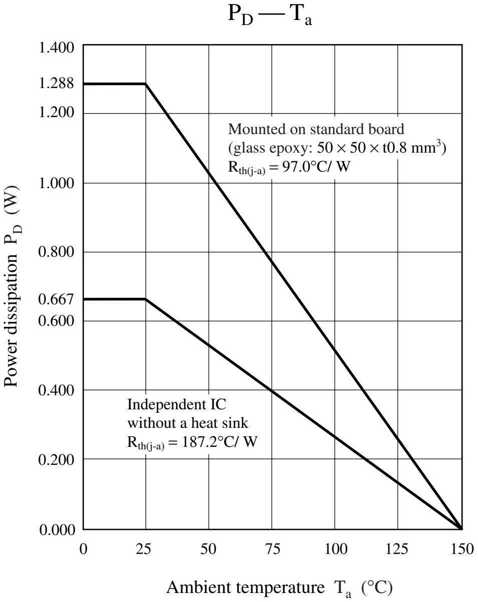
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Thermal protection						
Thermal protection operating temperature	T_{TSD}	—	—	160	—	°C
Thermal protection hysteresis width	ΔT_{TSD}	—	—	40	—	°C
SV_{DD} reset						
Hysteresis width	ΔV_{RES}	—	—	0.2	—	V

■ Usage Notes

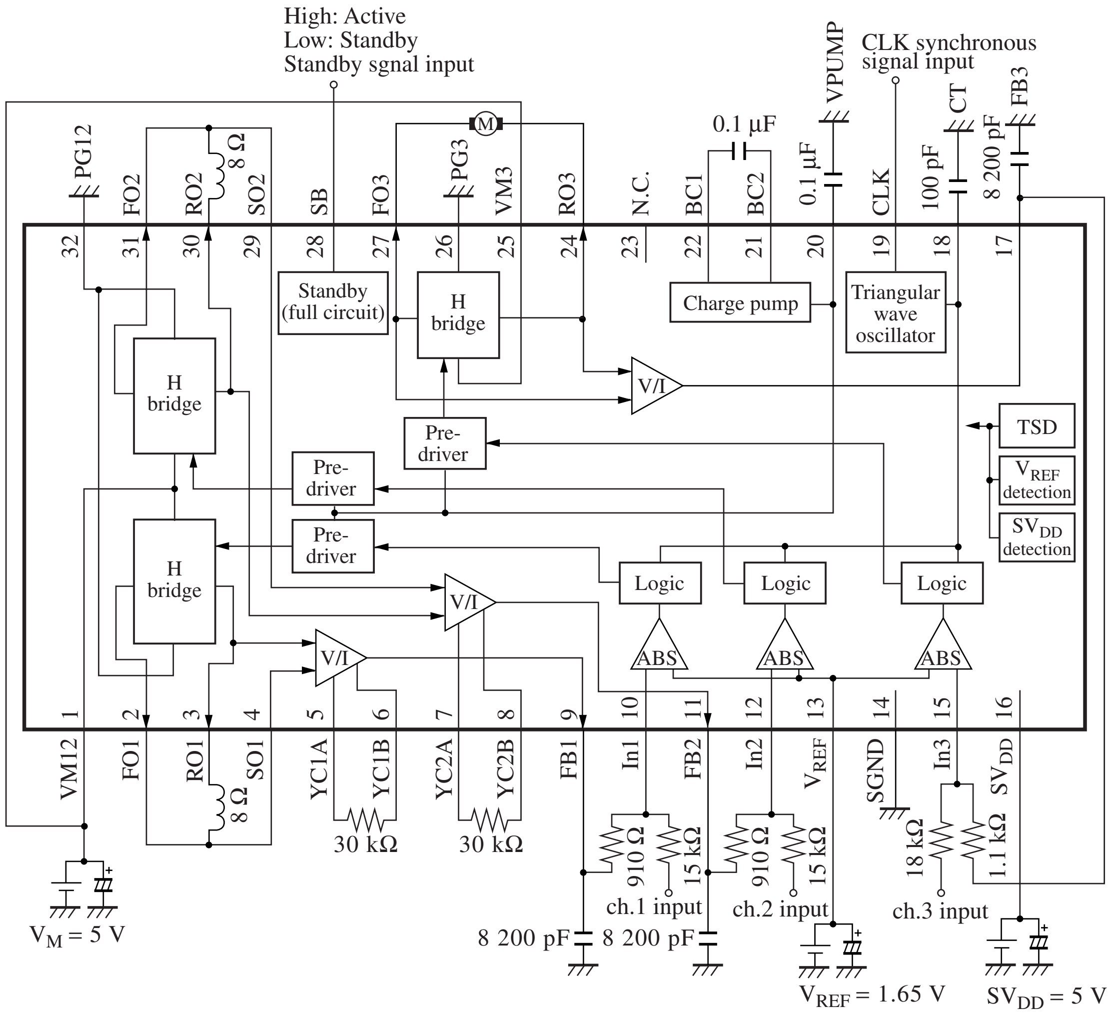
1. Be sure to use SV_{DD} in the highest potential within the IC.
2. Standby operation, reset operation
   Pin 28 is a standby switch input pin.
   You can get an active mode with high-level and standby mode with low-level. In a reset operation, all the functions of the IC stop. In a reset mode (SV_{DD} reset, V_{REF} reset and thermal protection on), only a charge pump operates.
3. Power on and off be done in a standby mode (V_{SB}: Low).
4. Do not use pin 13 (V_{REF}) in an open state.
5. Take time to check the characteristics on use.
   When changing an external circuit constant for use, consider not only static characteristics, but also transient characteristics and external parts with respect to the characteristics difference among ICs so that you can get enough margin.
6. Keep each output pin from being short-circuited to SV_{DD} or VM or GND (line-to-supply and line-to-ground fault) and also between themselves (load short-circuit). Otherwise the IC will be damaged and is likely to get fired.
7. Be cautious on a dip soldering. Prior study is required.

■ Application Note

• P_D — T_a curves of SSOP032-P-0300

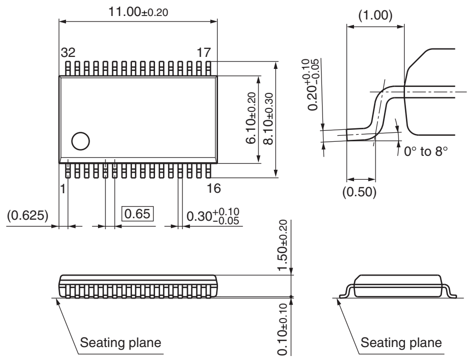


■ Application Circuit Example



■ New Package Dimensions (Unit: mm)

- SSOP032-P-0300B (Lead-free package)



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