

# DATA SHEET

Part No.	AN41240A
Package Code No.	HSOP056-P-0300B

Maintenance/Discontinued includes following product lifecycle stage.  
planned maintenance type  
maintenance type  
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# AN41240A

## Motor drive IC for Optical Disk

### ■ Overview

The AN41240A is a single chip IC that uses single-hall-sensor drive on the input side of the spindle motor drive block and low-noise direct PWM drive of sine wave on the output side, incorporating a PWM 6-channel driver necessary for optical pickup and mechanism driving.

It is effective for reducing noise, vibration and power consumption of the optical disk drive.

### ■ Features

- 1-hall-sensor, 3 phase full-wave and less-noise Direct-PWM driving for Spindle motor driver.
- The actuator (focus, tracking, tilt) drive blocks use linear input and direct PWM drive technique.  
Moreover, the driver are low in power consumption.
- Sled (stepping) motor and loading motor drive blocks use linear input and direct PWM drive technique.  
Less external components are used as the current detection resistors are built-in.
- Independent power supply pins are provided for each of the spindle motor, actuator, sled (stepping) motor, and loading motor drive channels.
- Functions : Motor drive for optical disk /Actuator drive  
Spindle motor driver, Actuator (Focus, Tracking, Tilt) driver,  
Sled (Stepping) motor driver, Loading motor driver
- Drive voltage : 8 V ( $V_{MSP}$ ,  $V_{MST}$ ), 5 V ( $V_{DD}$ ,  $V_{MAC}$ ), 8 V / 5 V ( $V_{MLO}$ )
- Additional features : Built-in Stand-by function (Spindle and Ch.1 to Ch.6 ALL mute)  
1 time /3 times FG output frequency switch  
Spindle Torque Limit switch  
Short brake / Reverse brake / Auto brake switch  
Normal Torque / Low-Torque Mode switch  
Bias pin for Hall elements  
Thermal shutdown  
Loading power supply selectable, 8 V / 5 V.  
Sled (Stepping) gain switch

### ■ Applications

- CD-ROM, DVD-ROM, CD-R/RW,  
DVD recorder, various combination types.

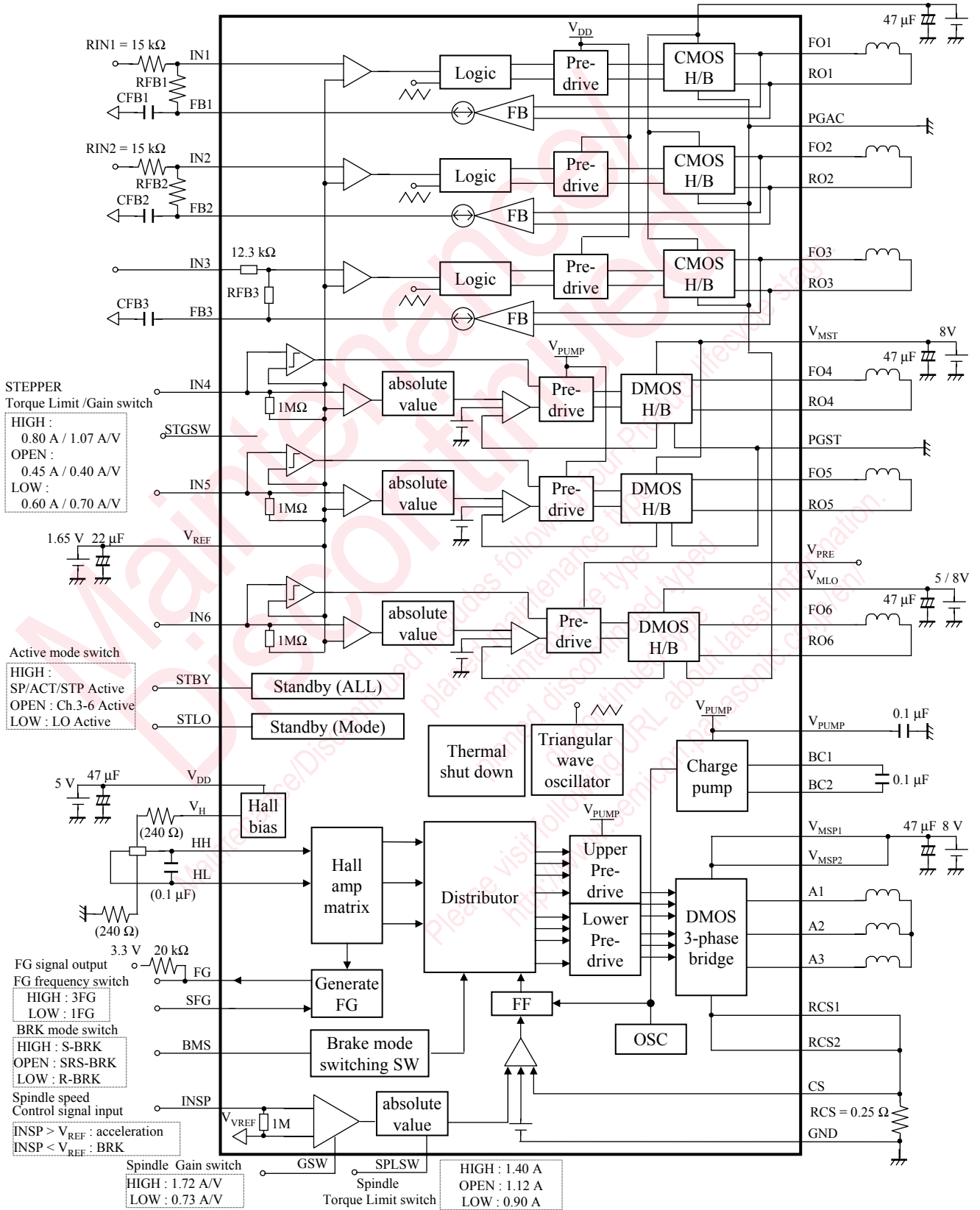
### ■ Package

- 56 pin plastic small outline package with heat sink (SOP Type)

### ■ Type

- Bi-CDMOS IC.

■ Block Diagram



### ■ Pin Descriptions

Pin No.	Pin name	Type	Description
1	V <sub>MSP2</sub>	Power supply	Spindle motor drive power supply 2
2	FO4	Output	Ch.4 non-inverting output
3	RO4	Output	Ch.4 inverting output
4	PGST	Ground	Ch.4, Ch.5 drive GND
5	FO5	Output	Ch.5 non-inverting output
6	RO5	Output	Ch.5 inverting output
7	V <sub>MST</sub>	Power supply	Ch.4, Ch.5 motor drive power supply
8	BC1	Output	Charge pump setup capacitor 1
9	BC2	Output	Charge pump setup capacitor 2
10	V <sub>PUMP</sub>	Output	Charge pump output
11	GND	Ground	Control circuit GND
12	IN4	Input	Ch.4 control signal input
13	IN5	Input	Ch.5 control signal input
14	V <sub>REF</sub>	Input	Reference voltage input
15	N.C.	—	N.C.
16	INSP	Input	Spindle motor drive control signal input
17	IN6	Input	Ch.6 control signal input
18	IN2	Input	Ch.2 control signal input
19	FB2	Output	Ch.2 feedback output
20	V <sub>PRE</sub>	Input	Ch.6 Pre-Drive power supply
21	FB1	Output	Ch.1 feedback output
22	IN1	Input	Ch.1 control signal input
23	IN3	Input	Ch.3 control signal input
24	FB3	Output	Ch.3 feedback output
25	RO6	Output	Ch.6 inverting output
26	V <sub>MLO</sub>	Power supply	Ch.6 motor drive power supply
27	FO6	Output	Ch.6 non-inverting output
28	PGAC2	Ground	Ch.1, Ch.2, Ch.3, Ch.6 drive GND2
29	RO3	Output	Ch.3 inverting output
30	FO3	Output	Ch.3 non-inverting output
31	RO2	Output	Ch.2 inverting output
32	FO2	Output	Ch.2 non-inverting output
33	PGAC1	Ground	Ch.1, Ch.2, Ch.3, Ch.6 drive GND1
34	V <sub>MAC</sub>	Power supply	Ch.1, Ch.2, Ch.3 coil drive power supply
35	RO1	Output	Ch.1 inverting output

■ Pin Descriptions (continued)

Pin No.	Pin name	Type	Description
36	FO1	Output	Ch.1 non-inverting output
37	V <sub>H</sub>	Output	Spindle motor drive hall bias output
38	HL	Input	Spindle motor drive hall element negative input
39	HH	Input	Spindle motor drive hall element positive input
40	V <sub>DD</sub>	Power supply	Control circuit power supply
41	FG	Output	Spindle motor drive FG signal output
42	N.C.	—	N.C.
43	SPLSW	Input	Spindle motor Torque Limit switching input
44	STGSW	Input	Ch.4, Ch.5 motor drive input/output Gain switching input
45	BMS	Input	Spindle motor drive brake mode switching input
46	GSW	Input	Spindle motor drive input/output Gain switching input
47	SFG	Input	Spindle motor drive FG mode switching input
48	STLO	Input	LO shutdown input
49	STBY	Input	Total shutdown input
50	V <sub>MSP1</sub>	Power supply	Spindle motor drive power supply 1
51	A1	Output	Spindle motor drive output 1
52	CS	Input	Spindle motor drive output current detection
53	RCS1	Output	Spindle motor drive common source output 1
54	A2	Output	Spindle motor drive output 2
55	A3	Output	Spindle motor drive output 3
56	RCS2	Output	Spindle motor drive common source output 2

### ■ Absolute Maximum Ratings

A No.	Parameter	Symbol	Rating	Unit	Pin	Notes
1	Supply voltage	$V_{DD}, V_{MAC}$	6.0	V	—	*1
		$V_{MSP}, V_{MST}, V_{MLO}$	10.0			
2	Supply current	$I_{DD}$	100	mA	—	—
		$I_{MSP}$	1 500			
		$I_{MAC}$	2 500			
		$I_{MST}$	2 000			
		$I_{MLO}$	1 000			
3	Power dissipation	$P_D$	448	mW	—	*2
4	Operating ambient temperature	$T_{opr}$	-40 to +85	°C	—	*3
5	Storage temperature	$T_{stg}$	-55 to +150	°C	—	*3
6	Drive power supply / output instantaneous current spindle	$I_{(p)}$	±3 500	mA	p = 1, 50, 51, 53, 54, 55, 56	*4, *5
7	Drive output current Ch.1, Ch.2, Ch.3	$I_{(q)}$	±1 000	mA	q = 29, 30, 31, 32, 35, 36	*5
8	Drive output current Ch.4, Ch.5, Ch.6	$I_{(r)}$	±1 000	mA	r = 2, 3, 5, 6, 25, 27	*5
9	Drive output voltage	$V_{(m)}$	10.7	V	m = 2, 3, 5, 6, 25, 27, 51, 54, 55	*5
10	Drive output voltage	$V_{(l)}$	6.7	V	l = 29, 30, 31, 32, 35, 36	*5
11	Control signal input voltage	$V_{(n)}$	GND to $V_{DD}$	V	n = 12, 13, 14, 16, 17, 18, 22, 23 38, 39, 43, 44, 45, 46 47, 48, 49	*5
12	Hall bias current	$I_{HB(x)}$	30	mA	x = 37	*5

- Notes) \*1: The values under the condition not exceeding the above absolute maximum ratings and the power dissipation.  
The charge pump output circuit voltage will exceed the supply voltage. The limit of the charge pump output circuit voltage is shown in "Operating Supply Voltage / Current Range" on Page8.
- \*2: The power dissipation shown is the value at  $T_a = 85^\circ\text{C}$  for the independent (unmounted) IC package.  
When using this IC, refer to the  $P_D$ - $T_a$  diagram of the package standard and use under the condition not exceeding the allowable value.
- \*3: Except for the power dissipation, operating ambient temperature, and storage temperature, all ratings are for  $T_a = 25^\circ\text{C}$ .
- \*4: Each output current of  $\pm 3\,500\text{ mA}$ ,  $\pm 2\,000\text{ mA}$  is only permissible for a period within 1 ms and 50 ms respectively.
- \*5: Do not apply current or voltage from outside to any pin not listed other than the power supply and ground pins.  
For the circuit currents, '+' denotes current flowing into the IC, and '-' denotes current flowing out of the IC.

### ■ Operating supply voltage range

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Supply voltage range	$V_{DD}$	4.5	5.0	5.5	V	—
	$V_{MAC}$	4.5	5.0	5.5		
	$V_{MSP}, V_{MST}$	7.2	8.0	8.8		*
	$V_{MLO} (5\text{ V})$	4.5	5.0	5.5		
	$V_{MLO} (8\text{ V})$	7.2	8.0	8.8		

Note) \*: The values under the condition not exceeding the above absolute maximum ratings and the power dissipation.

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