# DATA SHEET

| Part No. | AN41206A |
|---|---|
| Package Code No. | HQFP048-P-0707A |

**Panasonic**

## Contents

# AN41206A

## Optical disk motor drive IC

### ■ Overview

AN41206A, an optical disk motor drive IC, has Direct PWM(Pulse Width Modulation)featuring low noise in a spindle motor driver and 5-channel PWM motor driver are integrated on a single chip.

It is effective for reducing noise, vibration and power consumption of laptop computers.

### ■ Features

- 3-phase full-wave and low-noise Direct PWM drive system for spindle motor driver.
- Linear input, Direct PWM driving for actuator (Focus, Tracking and Tilt coil), sled motor driver.
  Enable to reduce total power consumption.
- Individual construction of power supply pins : Individual construction of power supply pins of Spindle, Actuator and Sled Motor
- Compact package   :   Less area   9.0 mm × 9.0 mm (Pins included)
                        Slim package   1.0 mmt
                        High power dissipation : On standard board (one side) : 1.348 W (Glass-epoxy 50 mm × 50 mm × 0.8 mmt)
- Functions         :   Spindle motor driver
                        Actuator (Focus, Tracking, Tilt) driver
                        Sled Stepping Motor driver
- Drive voltage     :   5 V
- Additional features :   Short brake / Reverse brake / Auto brake switching
                        1 time / 3 times FG output
                        SP gain mode switching
                        Built-in Bias pin for Hall element
                        Output reset function at $V_{REF}$ drop
                        Thermal shutdown

### ■ Applications

- Slim Type
- CD-ROM, DVD-ROM, CD-R/RW
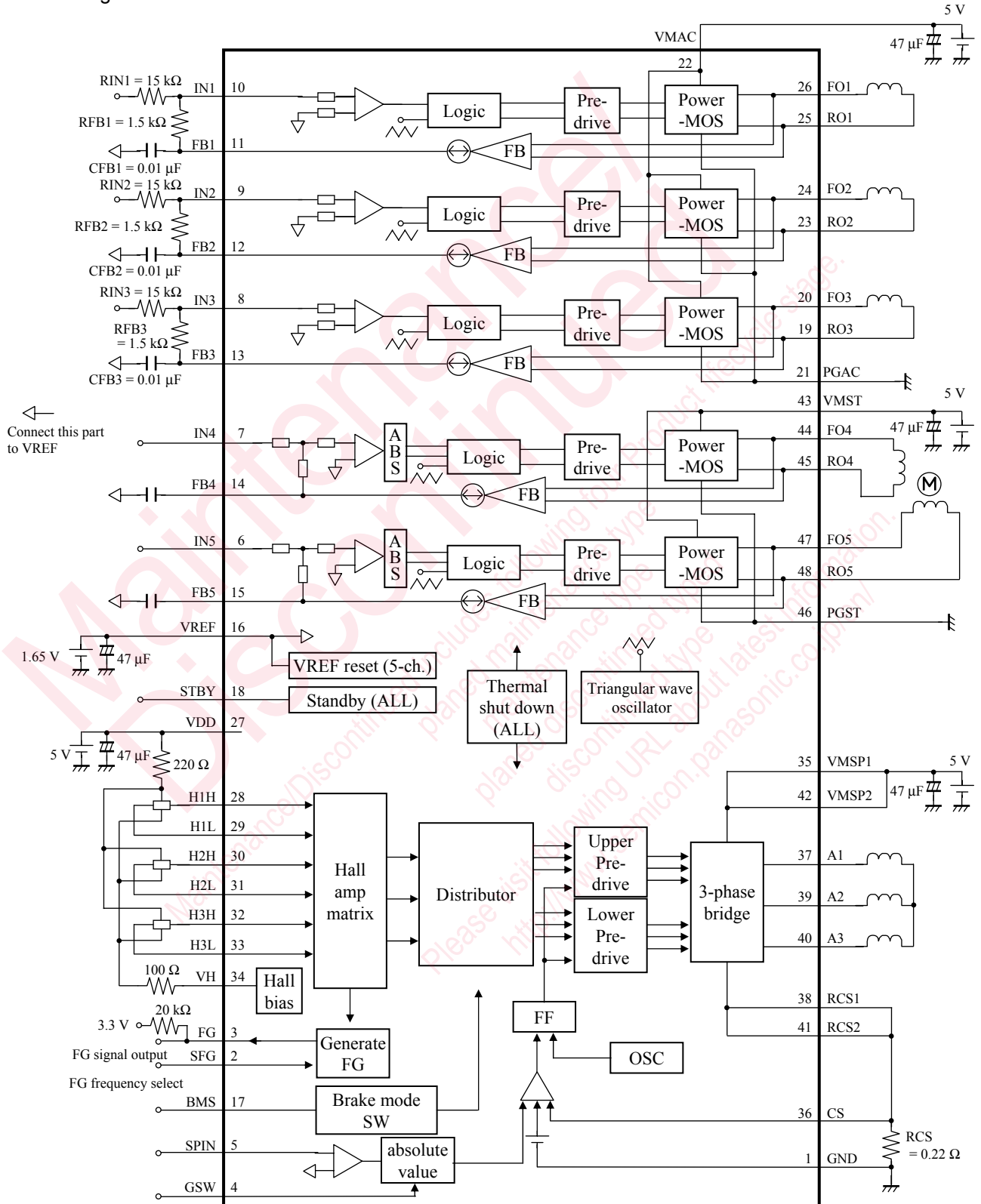- DVD recorder, Combination types
- 5 V system CD/DVD player

### ■ Package

- 48 pin plastic quad flat package with heat slug (QFP Type)

### ■ Type

- Silicon monolithic bipolar IC

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■ Block Diagram

## ■ Block Diagram (continued)

Notes)

BMS Mode table

| H | Reverse-Brake |
|---|---|
| OPEN | S-R-S-Brake |
| L | Short-Brake |

Spindle speed control signal input

| SPIN > VREF | Acceleration |
|---|---|
| SPIN <VREF | Brake |

GSW/SFG mode table

| GSW | SFG | CH operation | FG output | SP gain |
|---|---|---|---|---|
| L | H | All CH operating | 1FG | high |
| | OPEN | All CH operating | 3FG | |
| | L | CH1 mute | 1FG | |
| H | H | All CH operating | | low |
| | OPEN | All CH operating | 1FG | |
| | L | CH1 mute | | |

■ Pin Descriptions

| Pin No. | Pin name | Type | Description |
|---------|----------|------|-------------|
| 1 | GND | Ground | Control circuit GND |
| 2 | SFG | Input | Spindle FG mode switching input |
| 3 | FG | Output | Spindle FG signal output |
| 4 | GSW | Input | Spindle Gain switching input |
| 5 | SPIN | Input | Spindle control signal input |
| 6 | IN5 | Input | Ch.5 control signal input |
| 7 | IN4 | Input | Ch.4 control signal input |
| 8 | IN3 | Input | Ch.3 control signal input |
| 9 | IN2 | Input | Ch.2 control signal input |
| 10 | IN1 | Input | Ch.1 control signal input |
| 11 | FB1 | Output | Ch.1 feedback output |
| 12 | FB2 | Output | Ch.2 feedback output |
| 13 | FB3 | Output | Ch.3 feedback output |

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■ Pin Descriptions (continued)

| Pin No. | Pin name | Type | Description |
|---------|----------|------|-------------|
| 14 | FB4 | Output | Ch.4 feedback output |
| 15 | FB5 | Output | Ch.5 feedback output |
| 16 | VREF | Input | Channel reference voltage input |
| 17 | BMS | Input | Spindle brake mode switching input |
| 18 | STBY | Input | Total shutdown input |
| 19 | RO3 | Out | Ch.3 inverting output |
| 20 | FO3 | Out | Ch.3 non-inverting output |
| 21 | PGAC | Ground | Ch.1, Ch.2, Ch.3 coil drive GND |
| 22 | VMAC | Power supply | Ch.1, Ch.2, Ch.3 coil drive power supply |
| 23 | RO2 | Output | Ch.2 inverting output |
| 24 | FO2 | Output | Ch.2 non-inverting output |
| 25 | RO1 | Output | Ch.1 inverting output |
| 26 | FO1 | Output | Ch.1 non-inverting output |
| 27 | VDD | Power supply | Control circuit power supply |
| 28 | H1H | Input | Spindle motor drive Hall element 1 positive input |
| 29 | H1L | Input | Spindle motor drive Hall element 1 negative input |
| 30 | H2H | Input | Spindle motor drive Hall element 2 positive input |
| 31 | H2L | Input | Spindle motor drive Hall element 2 negative input |
| 32 | H3H | Input | Spindle motor drive Hall element 3 positive input |
| 33 | H3L | Input | Spindle motor drive Hall element 3 negative input |
| 34 | VH | Output | Hall bias output |
| 35 | VMSP1 | Power supply | Spindle motor drive power supply |
| 36 | CS | Input | Spindle motor drive output current detection |
| 37 | A1 | Output | Spindle motor drive output 1 |
| 38 | RCS1 | Output | Spindle motor drive common source output |
| 39 | A2 | Output | Spindle motor drive output 2 |
| 40 | A3 | Output | Spindle motor drive output 3 |
| 41 | RCS2 | Output | Spindle motor drive common source output |
| 42 | VMSP2 | Power supply | Spindle motor drive power supply |
| 43 | VMST | Power supply | Ch.4, Ch.5 motor drive power supply |
| 44 | FO4 | Output | Ch.4 non-inverting output |
| 45 | RO4 | Output | Ch.4 inverting output |
| 46 | PGST | Ground | Ch.4, Ch.5 motor drive GND |
| 47 | FO5 | Output | Ch.5 non-inverting output |
| 48 | RO5 | Output | Ch.5 inverting output |

■ Absolute Maximum Ratings

| A No. | Parameter | Symbol | Rating | Unit | Pins | Notes |
|---|---|---|---|---|---|---|
| 1 | Supply voltage | $V_{MSP}$ | 6.5 | V | — | *1 |
| | | $V_{MAC}$ | 6.5 | | | |
| | | $V_{MST}$ | 6.5 | | | |
| | | $V_{DD}$ | 6.5 | | | |
| 2 | Supply current | $I_{VMSP}$ | 1 200 | mA | — | *2 |
| | | $I_{VMAC}$ | 3 000 | | | |
| | | $I_{VMST}$ | 2 000 | | | |
| | | $I_{VDD}$ | 100 | | | |
| 3 | Power dissipation | $P_D$ | 307.9 | mW | — | *3 |
| 4 | Operating ambient temperature | $T_{opr}$ | −30 to +85 | °C | — | *4 |
| 5 | Storage temperature | $T_{stg}$ | −55 to +150 | °C | — | *4 |

Notes) *1: The values under the condition not exceeding the above absolute maximum ratings and the power dissipation.

*2: Make sure not to have a current flow exceeding 1 000 mA for Ch.1 to Ch.5.

*3: The power dissipation shown is the value at $T_a$ = 85°C for the independent (unmounted) IC package without a heat sink.
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.

*4: Except for the power dissipation, operating ambient temperature, and storage temperature, all ratings are for $T_a$ = 25°C.

■ Operating Supply Voltage Range

| Parameter | Symbol | Min | Typ | Max | Unit | Notes |
|---|---|---|---|---|---|---|
| Supply voltage range | $V_{DD}$ | 4.0 | 5.0 | 5.5 | V | * |
| | $V_{MAC}$ $V_{MST}$ $V_{MSP}$ | 3.5 | 5.0 | $V_{DD}$ | | |

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

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