

FAN8026G3

5-CH Motor Driver

Features

- 5-CH Balanced transformerless (BTL) driver
- Operating supply voltage : 4.5 V ~ 13.2V
- Built-in thermal shut down circuit (TSD)
- Built-in channel mute circuit
- Built-in 1-OP AMP

Description

The FAN8026G3 is a monolithic integrated circuit suitable for a 5-CH motor driver which drives a tracking actuator, a focus actuator, a sled motor, a spindle motor, and a tray motor of the CDP/CAR-CD/DVDP systems.

28-SSOPH-375SG3



Typical application

- Compact disk player
- Video compact disk player
- Car compact disk player
- Digital video disk player

Ordering information

| Device | Package | Operating temp |
|-------------------------------|------------------|----------------|
| FAN8026G3 | 28-SSOPH-375-SG2 | -35°C ~ +85°C |
| FAN8026G3X ^{note1} | 28-SSOPH-375-SG2 | -35°C ~ +85°C |
| FAN8026G3_NL ^{note2} | 28-SSOPH-375-SG2 | -35°C ~ +85°C |
| FAN8026G3X_NL | 28-SSOPH-375-SG2 | -35°C ~ +85°C |

Notes:

1. X : Tape&Reel
2. NL : Lead free

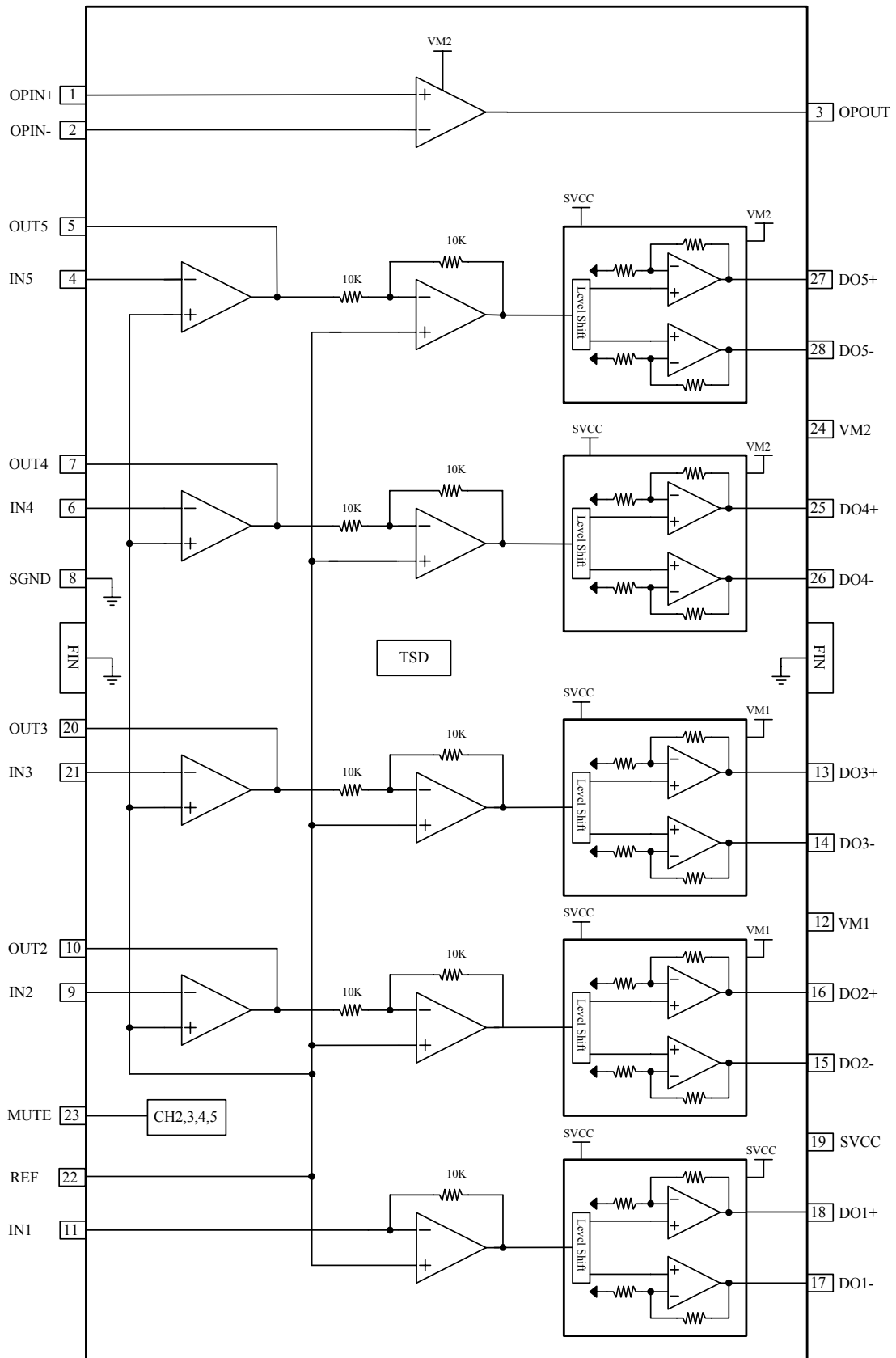
Pin Assignments



Pin Definitions

| Pin Number | Pin Name | I/O | Pin Function Description |
|------------|----------|-----|---|
| 1 | OPIN+ | I | OP-AMP Input(+) |
| 2 | OPIN- | I | OP-AMP Input(-) |
| 3 | OPOUT | O | OP-AMP Output |
| 4 | IN5 | I | CH5 Op-amp Input(-) |
| 5 | OUT5 | O | CH5 Op-amp Output |
| 6 | IN4 | I | CH4 Op-amp Input(-) |
| 7 | OUT4 | O | CH4 Op-amp Output |
| 8 | GND | - | Ground |
| 9 | IN2 | I | CH2 Op-amp Input(-) |
| 10 | OUT2 | O | CH2 Op-amp Output |
| 11 | IN1 | I | CH1 Input |
| 12 | VM1 | - | Power Supply Voltage(For CH2,CH3) |
| 13 | DO3+ | O | CH3 Drive Output(+) |
| 14 | DO3- | O | CH3 Drive Output(-) |
| 15 | DO2- | O | CH2 Drive Output(-) |
| 16 | DO2+ | O | CH2 Drive Output(+) |
| 17 | DO1- | O | CH1 Drive Output(-) |
| 18 | DO1+ | O | CH1 Drive Output(+) |
| 19 | SVCC | - | Power Supply Voltage(For Signal,CH1) |
| 20 | OUT3 | O | CH3 Op-amp Output |
| 21 | IN3 | I | CH3 Op-amp Input(-) |
| 22 | REF | I | CH1,2,3,4,5 Input Reference |
| 23 | MUTE | I | MUTE(CH2,3,4,5) |
| 24 | VM2 | - | Power Supply Voltage(For CH4,CH5,Normal Op-amp) |
| 25 | DO4+ | O | CH4 Drive Output(+) |
| 26 | DO4- | O | CH4 Drive Output(-) |
| 27 | DO5+ | O | CH5 Drive Output(+) |
| 28 | DO5- | O | CH5 Drive Output(-) |

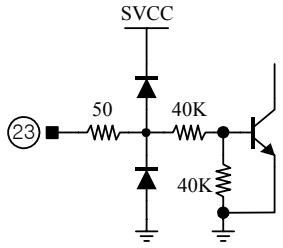
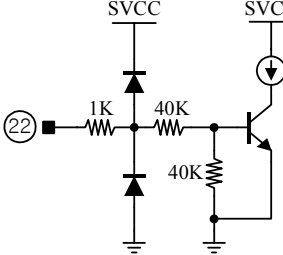
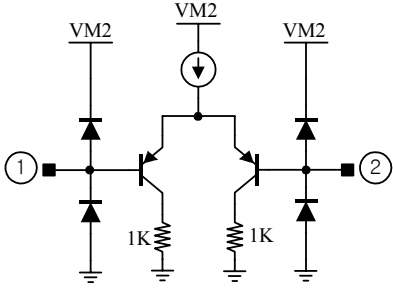
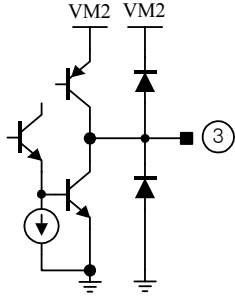
Internal Block Diagram



Equivalent Circuits

| | |
|---|--|
| <p style="text-align: center;">BTL CH1 Input</p> | <p style="text-align: center;">BTL CH2,3,4,5 Op-amp Input</p> |
| <p style="text-align: center;">BTL CH2,3,4,5 Op-amp Output</p> | <p style="text-align: center;">BTL CH1 Driver Output</p> |
| <p style="text-align: center;">BTL CH2,3 Driver Output</p> | <p style="text-align: center;">BTL CH4,5 Driver Output</p> |

Equivalent Circuits (Continued)

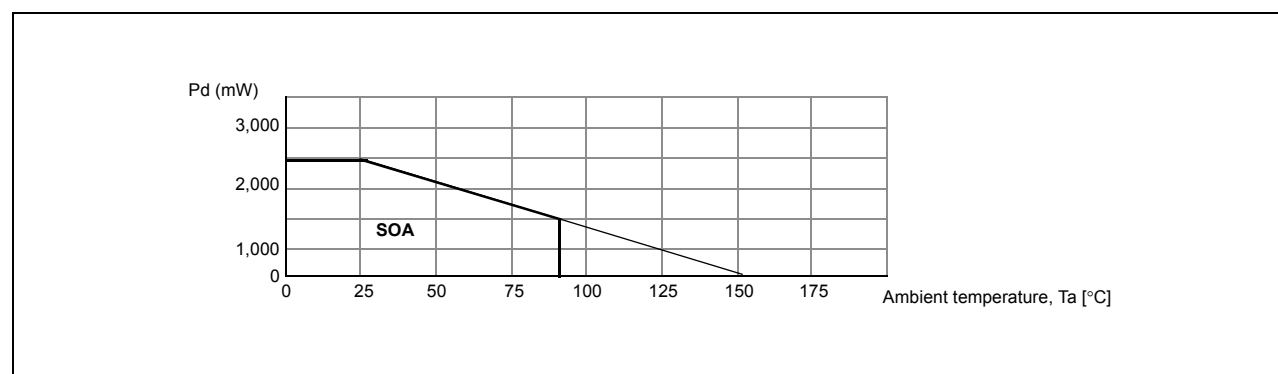
| Mute | REF |
|--|--|
|  |  |
| Op-amp Input | Op-amp Output |
|  |  |

Absolute Maximum Ratings (Ta=25°C)

| Parameter | Symbol | Value | Unit |
|------------------------|------------------|--------------------------|------|
| Maximum supply voltage | SVCC | 15 | V |
| | VM1 | 15 | V |
| | VM2 | 15 | V |
| Power dissipation | P _D | 2.5 ^{note1,2,3} | W |
| Operating temperature | T _{OPR} | -35 ~ +85 | °C |
| Storage temperature | T _{STG} | -55 ~ +150 | °C |

Notes:

- When mounted on glass epoxy PCB (76 × 114 × 1.6mm)
- Power dissipation is reduced at the rate of -20mW/°C for TA≥25°C.
- Do not exceed Pd and SOA(Safe Operating Area).



Recommended Operating Conditions (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|-----------------|--------|------|------|------|------|
| Supply voltage1 | SVCC | 4.5 | - | 13.2 | V |
| Supply voltage2 | VM1 | 4.5 | - | SVCC | V |
| Supply voltage3 | VM2 | 4.5 | - | SVCC | V |

Electrical Characteristics

(Unless otherwise specified, Ta=25°C, SVCC=8V, VM1=5V, VM2=5V, Vref=1.65V)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--|------------|---------------------|------|------|------|------|
| Quiescent current 1*note1 | ICC1 | MUTE Off | - | 21 | - | mA |
| Quiescent current 2*note1 | ICC2 | MUTE On | - | 12 | - | mA |
| MUTE on voltage | Vmon | Pin23=Variation | 2.0 | - | - | V |
| MUTE off voltage | Vmoff | Pin23=Variation | - | - | 0.5 | V |
| Reference MUTE on voltage | Vrmon | Pin22=Variation | - | - | 0.4 | V |
| Reference MUTE off voltage | Vrmoff | Pin22=Variation | 1.0 | - | - | V |
| REF Input voltage range | Vrefin1 | - | 1.0 | - | 3.3 | V |
| CH1 LOADING DRIVER CIRCUIT (RL=12Ω) | | | | | | |
| Output offset voltage1 | VOF1 | VIN=1.65V | -50 | - | +50 | mV |
| Maximum output voltage1 | Vom1 | - | 6 | 6.5 | - | V |
| Close-loop voltage gain1 | Gvf1 | VIN=100mVpp, f=1kHz | 10 | 12 | 14 | dB |
| CH2,3 BTL DRIVER CIRCUIT (RL=8Ω) | | | | | | |
| Output offset voltage2,3,4,5 | VOF2,3,4,5 | VIN=1.65V | -50 | - | +50 | mV |
| Maximum output voltage2,3,4,5 | Vom2,3,4,5 | - | 3.6 | 4.0 | - | V |
| Close-loop voltage gain2,3,5 | Gvf2,3,5 | VIN=100mVpp, f=1kHz | 10.5 | 12.5 | 14.5 | dB |
| Close-loop voltage gain4 | Gvf4 | VIN=100mVpp, f=1kHz | 11.5 | 13.5 | 15.5 | dB |
| INPUT OP-AMP CIRCUIT | | | | | | |
| Input offset voltage1 | VOF1 | - | -10 | - | +10 | mV |
| Input bias current1 | IB1 | - | - | - | 300 | nA |
| High level output voltage1 | VOH1 | SVCC=8V | 7 | - | - | V |
| Low level output voltage1 | VOL1 | - | - | - | 0.5 | V |
| Output sink current1 | ISINK1 | - | 1 | - | - | mA |
| Output source current1 | ISOU1 | - | 0.5 | - | - | mA |
| Common mode input range1*note1 | Vicm1 | - | -0.3 | - | 7.0 | V |
| Open loop voltage gain1*note1 | GVO1 | f=1kHz, VIN= -75dB | - | 75 | - | dB |
| Ripple rejection ratio1*note1 | RR1 | f=120Hz, VIN= -20dB | - | 65 | - | dB |
| Slew rate1*note1 | SR1 | f=120Hz, 2Vp-p | - | 1 | - | V/us |

Note:

1. Guaranteed field. (No EDS/ Final test .)

Electrical characteristics (Continued)

(Unless otherwise specified, Ta=25°C, SVCC=8V, VM1=5V, VM2=5V, Vref=1.65V)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--|--------|---------------------|------|------|------|------|
| NORMAL OP-AMP CIRCUIT | | | | | | |
| Input offset voltage | VOF2 | - | -10 | - | +10 | mV |
| Input bias current | IB2 | - | - | - | 300 | nA |
| High level output voltage | VOH2 | VM2=5V | 4.5 | - | - | V |
| Low level output voltage | VOL2 | - | - | - | 0.5 | V |
| Output sink current | ISINK2 | - | 1 | - | - | mA |
| Output source current | ISOU2 | - | 0.5 | - | - | mA |
| Common mode input range ^{1*note1} | Vicm1 | - | -0.3 | - | 4.0 | V |
| Open loop voltage gain ^{*note1} | GVO2 | f=1kHz, VIN= -75dB | - | 75 | - | dB |
| Ripple rejection ratio ^{*note1} | RR2 | f=120Hz, VIN= -20dB | - | 65 | - | dB |
| Slew rate ^{*note1} | SR2 | f=120Hz, 2Vp-p | - | 1 | - | V/us |

Note:

1.Guaranteed field. (No EDS/ Final test .)

Application information

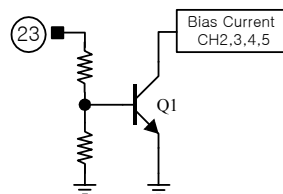
1. MUTE Function

When the mute pin is low(GND), the TR Q1 is turned on and the bias circuit is enabled. On the other hand, when the mute pin is high, the TR Q1 is turned off and the bias circuit is disabled.

It will make all the circuit blocks except CH1 off, so low power quiescent state can be established.

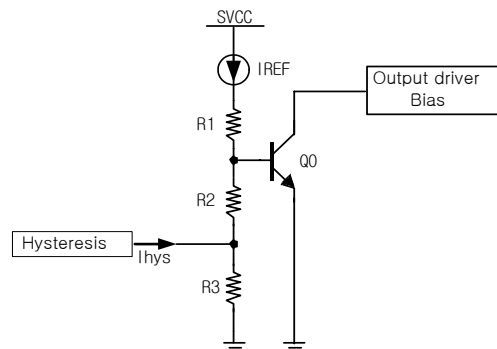
- Truth table is as follows

| Pin 23 | FAN8026 |
|--------|----------|
| High | Mute-On |
| Low | Mute-Off |



2. TSD Function

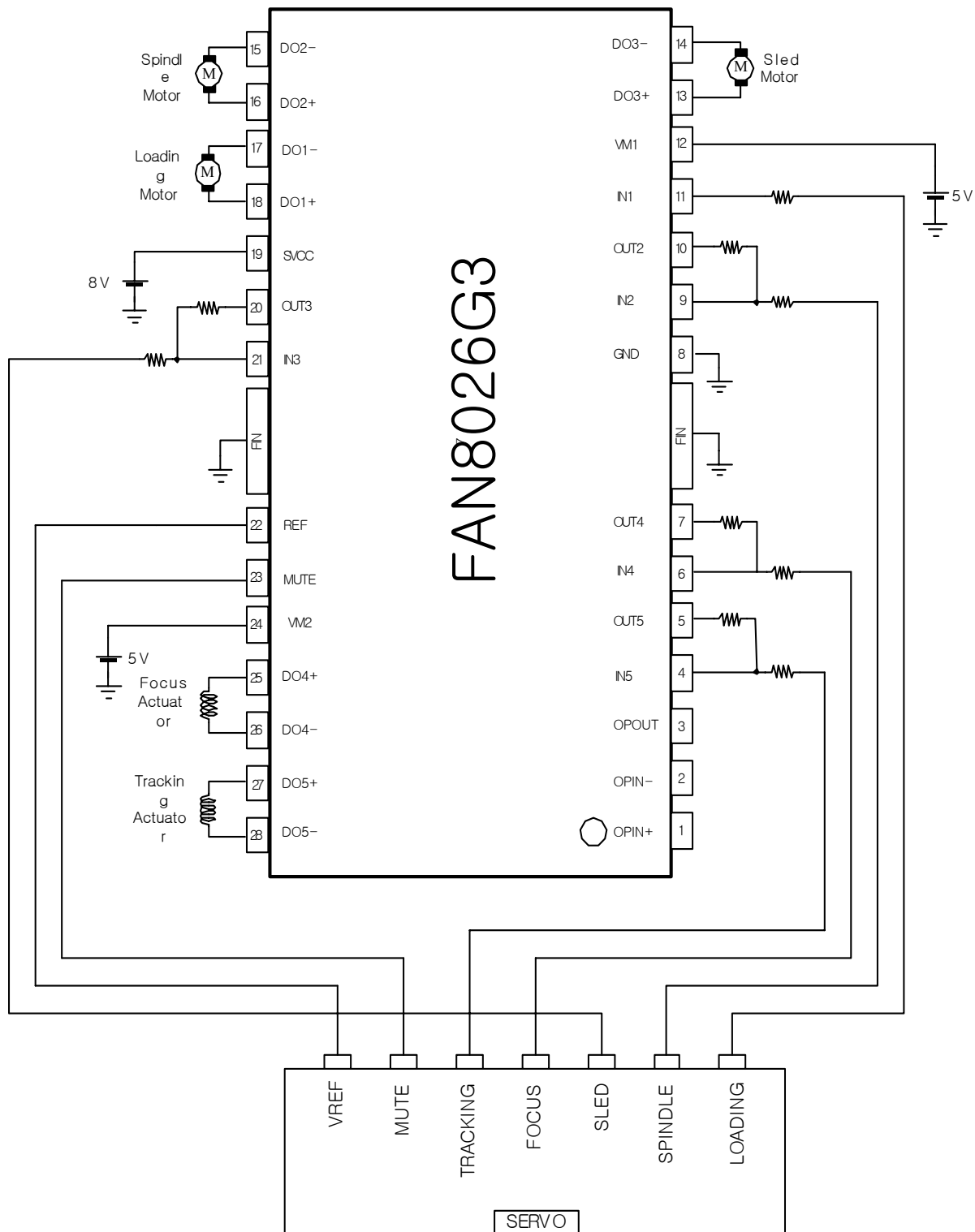
- When the chip temperature reaches to 175°C by abnormal condition, the TSD circuit is activated
- This makes the bias current of the output drivers shut down, and all the output drivers are on cut-off state. Therefore the chip temperature begins to decrease.
- When the chip temperature falls to 155°C, the TSD circuit is deactivated and the output drivers start to operate normally.



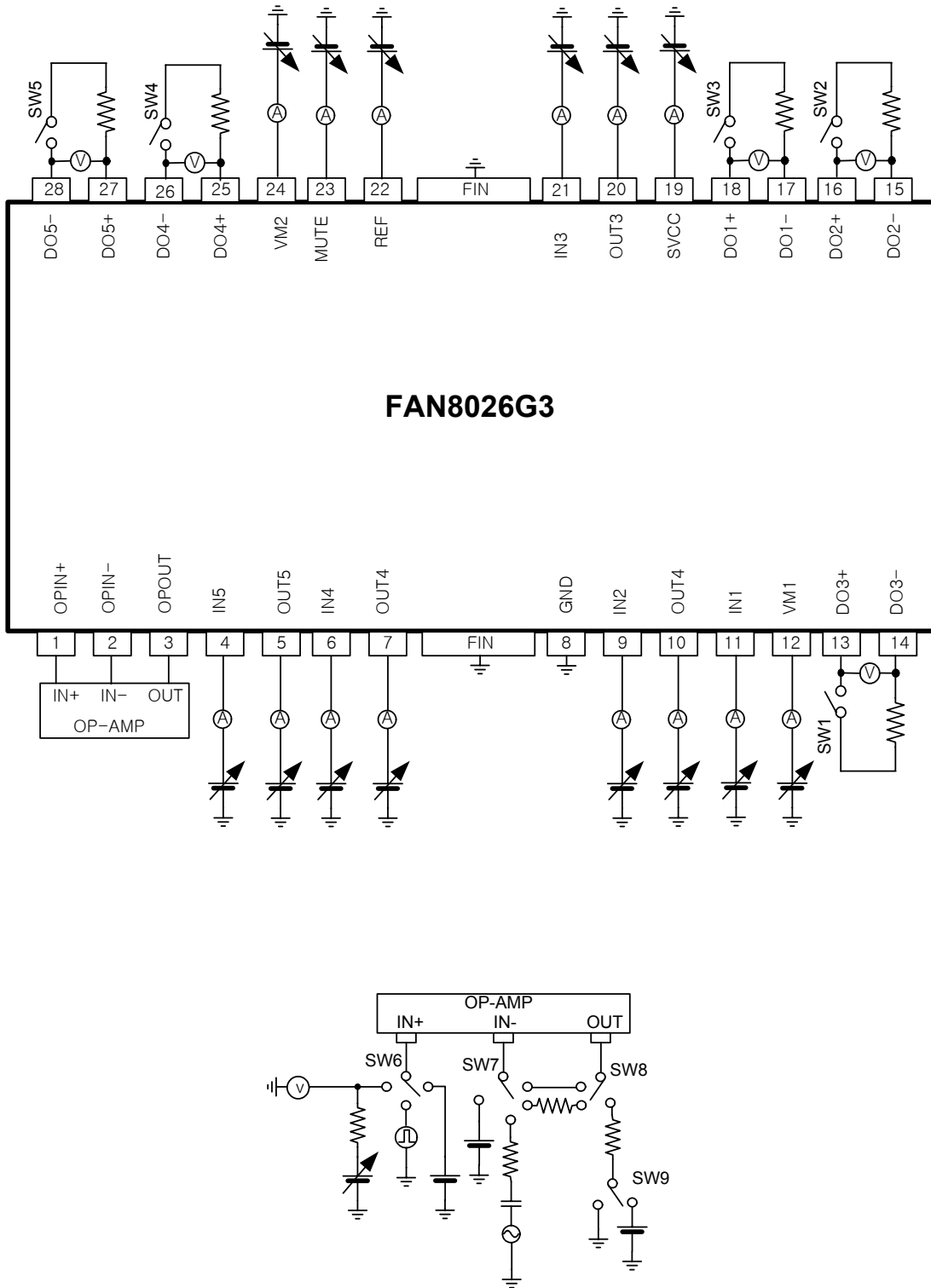
3. Notice

- If REF(pin23) is lower than 0.7V, BTL output is off.
- Under voltage protection function. (If SVcc is lower than 3.8V, Chip is disable. Hysteresis is 0.2V)
- Mute on BTL output voltage is as followed:
 - Mute on BTL output(CH2,3,4,5) = $V_M / 2$
 - Mute on BTL output CH1 = $((PV_{cc2} - 0.6) / 2)$
- Each output to output and output to GND short should be kept away.

Typical Application Circuit

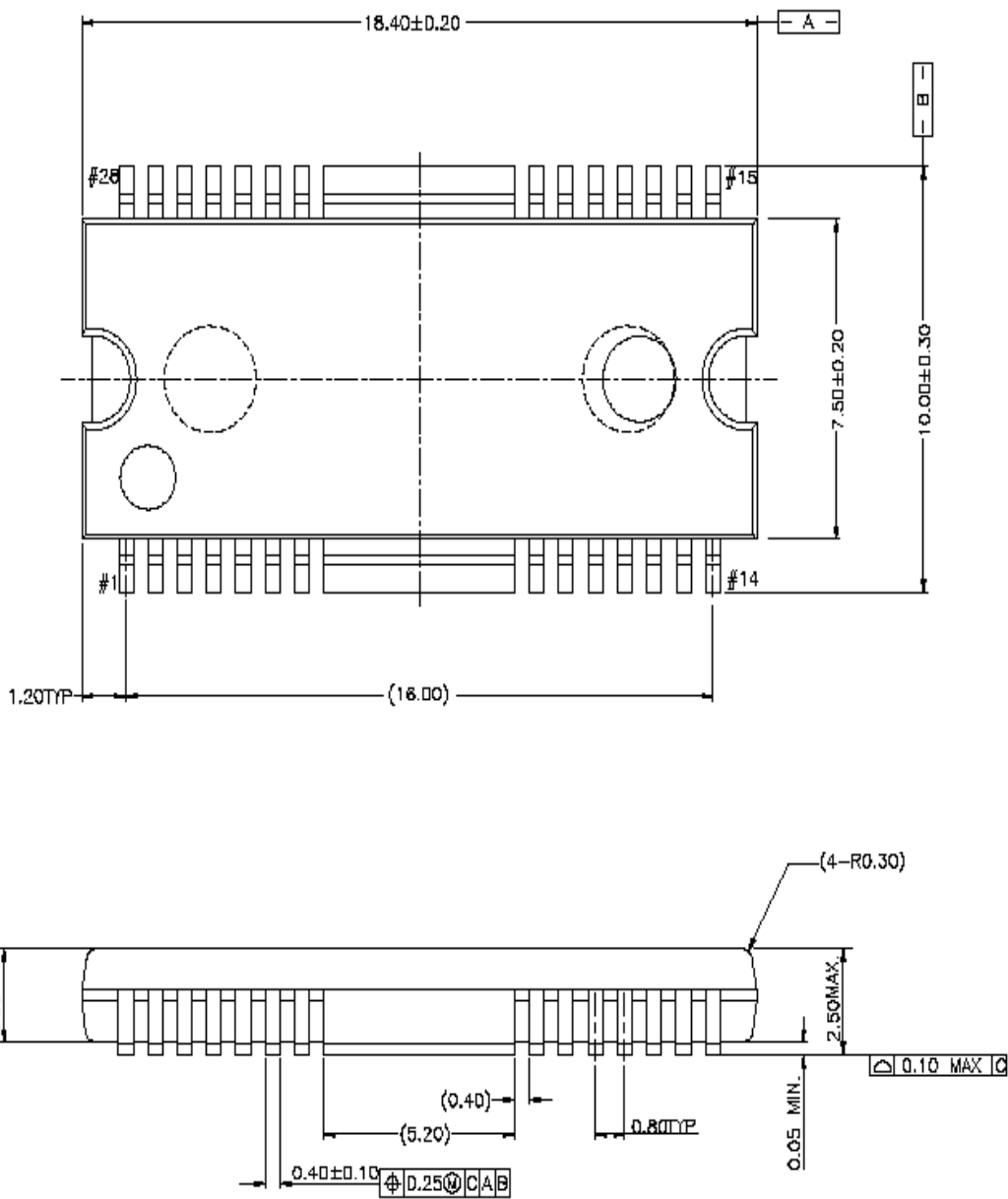


Test Circuits



Package Dimension

28-SSOPH-375-SG2



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