

Five Channels BTL Power Driver AM5810FM

The AM5810FM is a 5-channel BTL driver - 2 of the channels are able to drive stepping motor, and 1 channel is for reversible driver. Package material is Pb Free for purpose of environmental protection.

● Applications

DVD, CD players

● Features

- 1) A power saving mode is enabled by power-save terminal.
- 2) Small surface mounting power package (HSOP-28)
- 3) Separating Vcc into Pre and Pow, can make better power efficiency
- 4) Thermal-shut-down circuit built in
- 5) Wide dynamic range < 4.0V (Typ.) at PreVcc=12V, PowVcc=5V >
- 6) BTL driver:
Input pins consist of (+) and (-), therefore various input types are available such as differential input.
- 7) Loading driver:
 - a. The output voltage is adjustable by output voltage control terminal. (Only “H” side voltage)
 - b. Brake circuit built in
 - c. Circuit protection diode built in

● Absolute Maximum Ratings

| Parameter | Symbol | Limits | Unit |
|-----------------------|-------------------|-------------------|------|
| Supply voltage | PREVCC, POWVCC | 13.5 | V |
| Power dissipation | Pd | 2.2 ^{*1} | W |
| Operating temperature | Topr | -40 ~ +85 | °C |
| Storage temperature | Tstg | -55 ~ +150 | °C |

* PCB (70X70X1.6mm) glass epoxy mounting.

* 1. Derating: 17.6mW/°C for operation above Ta=25°C

● Guaranteed Operating Ranges

| | |
|--------|--------------|
| PREVCC | 4.3 ~ 13.2V |
| POWVCC | 4.3 ~ PREVCC |

● **Electrical Characteristics (Unless otherwise specified, Ta = 25°C, PREVCC = 12V,**

POWVCC12/34 = 5V, BIAS = 1.65V, PS = 2V, RL = 8Ω)

| Parameter | Symbol | Conditions | Limit | | | Unit |
|------------------------|--------|------------|-------|------|-----|------|
| | | | Min | Typ | Max | |
| Quiescent Current | ICC | RL = ∞ | - | 23.5 | 34 | mA |
| Power save on current | IPS | PS = "L" | - | 1.2 | 2.8 | mA |
| Power save on voltage | VPSON | | - | - | 0.5 | V |
| Power save off voltage | VPSOFF | | 2.0 | - | - | V |

< **BTL Driver** >

| | | | | | | |
|----------------------------|--------|--------------|------|------|------|----|
| Output offset voltage | VOO | | -50 | 0 | 50 | mV |
| Max. output voltage | VOM | | 3.6 | 4.0 | - | V |
| Closed loop voltage gain | GVC | | 17.2 | 19.0 | 20.8 | dB |
| Mute on voltage | VMTON | | - | - | 0.5 | V |
| Mute off voltage | VMTOFF | | 1.5 | - | - | V |
| Input current for mute pin | IMUTE | VMUTE = 5V | - | 160 | 270 | μA |
| Input current for Bias pin | IBIAS | BVIAS = 2.5V | - | 75 | 120 | μA |

< **OP-AMP (CH3,4)** >

| | | | | | | |
|---------------------------------|-------|---------------------------|------|---|------|------|
| Common mode input voltage range | VICM | | 0.5 | - | 10.0 | V |
| Input offset voltage | VOFOP | | -6 | 0 | 6 | mV |
| Input bias current | IBOP | | - | - | 300 | nA |
| High level output voltage | VOHOP | BIAS = 6V | 11.5 | - | - | V |
| Low level output voltage | VOLOP | BIAS = 6V | - | - | 0.5 | V |
| Output sink current | ISIN | | 1 | - | - | mA |
| Output source current | ISOU | | 1 | - | - | mA |
| Slew rate | SROP | Input pulse 100KHz, 2Vp-p | - | 1 | - | V/μs |

< **Loading Driver** >

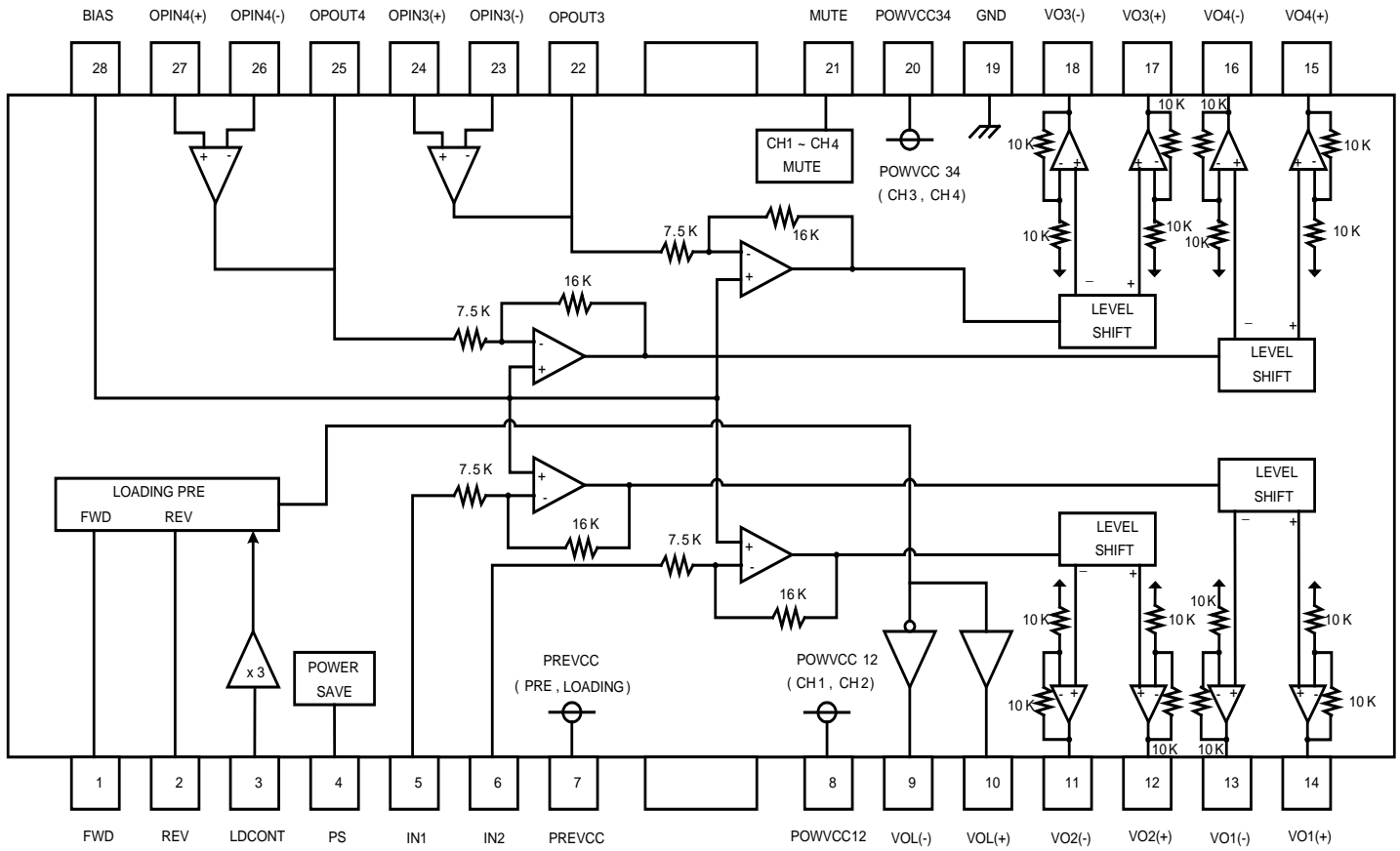
| | | | | | | |
|--|--------|---|-----|------|-----|----|
| Output saturation voltage 1 | VSAT1 | Upper + Lower saturation, IL = 200mA | 0.7 | 1.1 | 1.5 | V |
| Output saturation voltage between F&R | ΔVSAT1 | Output saturation voltage 1 between FWD and REV | - | - | 0.1 | V |
| Output saturation voltage 2 | VSAT2 | Upper + Lower saturation, IL = 500mA | 1.0 | 1.55 | 2.2 | V |
| Output adjustable gain on "H" side voltage | GVH | "H" side output for input (LDCNT) | 7.4 | 9.4 | 11 | dB |

< **Loading driver input logic** >

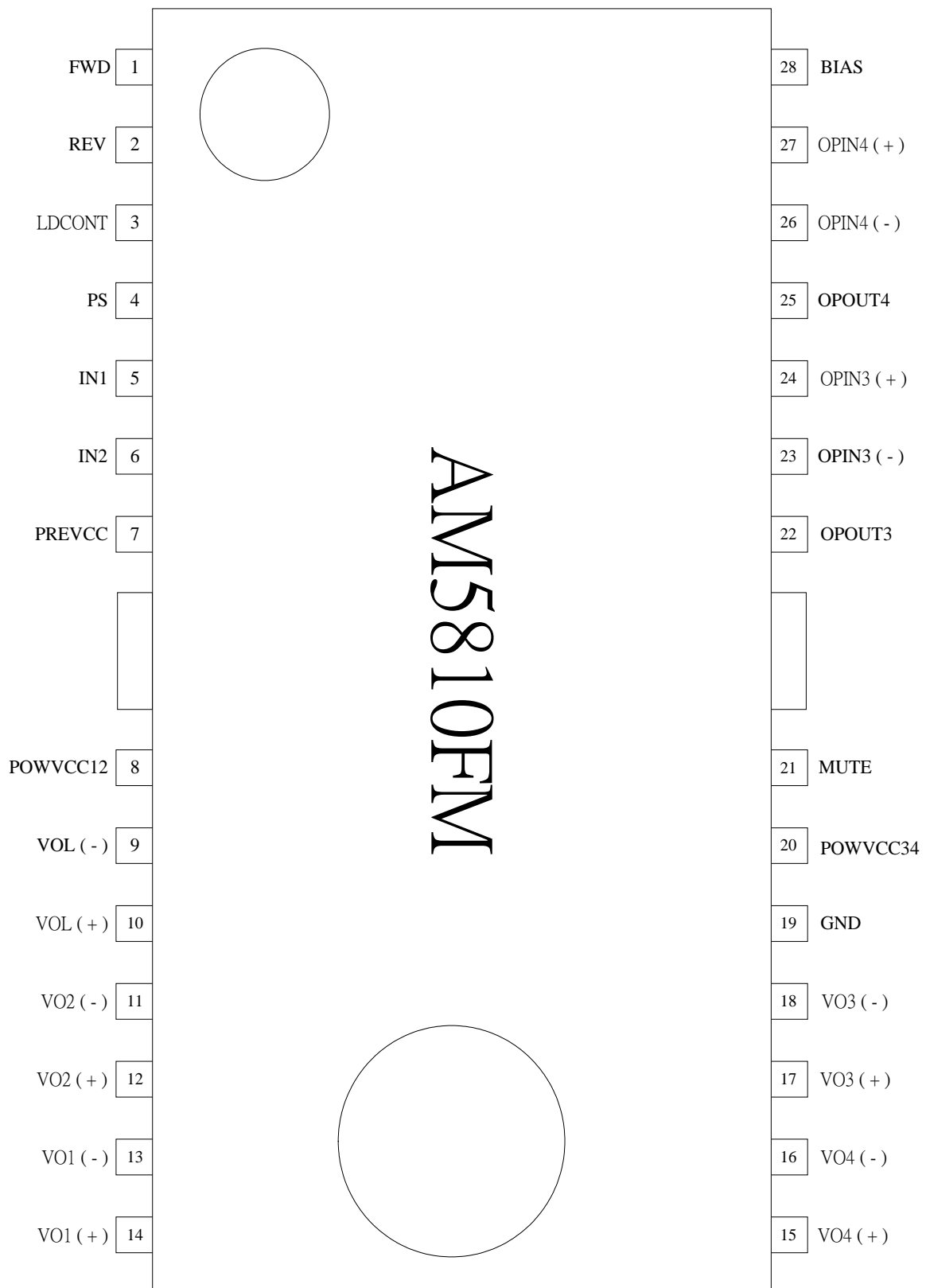
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|--------------------------|-------|------------------|------|-----|-----|----|
| Input high level voltage | VIHLD | | 1.5 | - | VCC | V |
| Input low level voltage | VILLD | | -0.3 | - | 0.5 | V |
| Input high level current | IIHLD | VFWD = VREV = 5V | - | 190 | 270 | μA |

※This product is not designed for protection against radioactive rays.

● Block Diagram



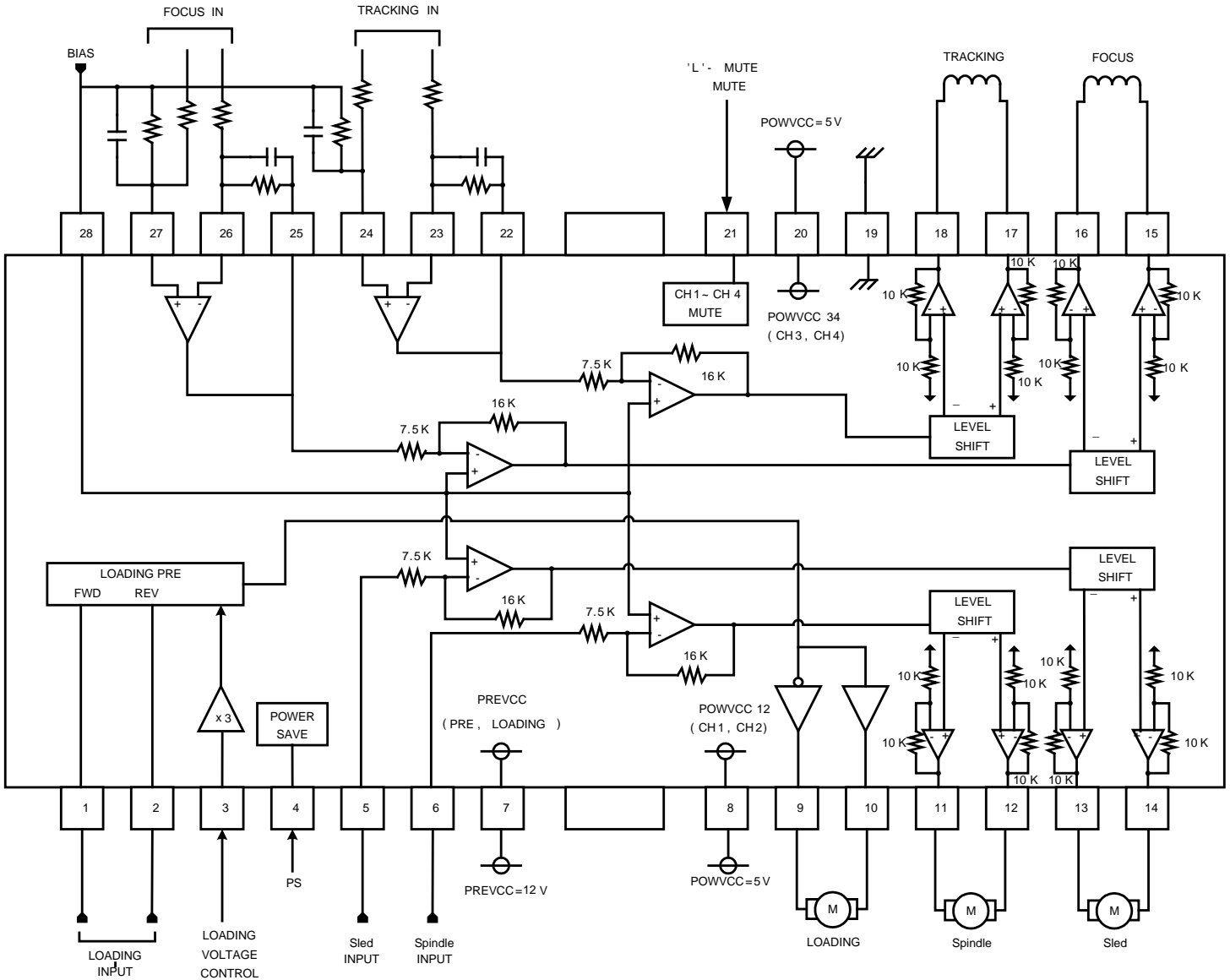
● Pin configuration



● Pin Description

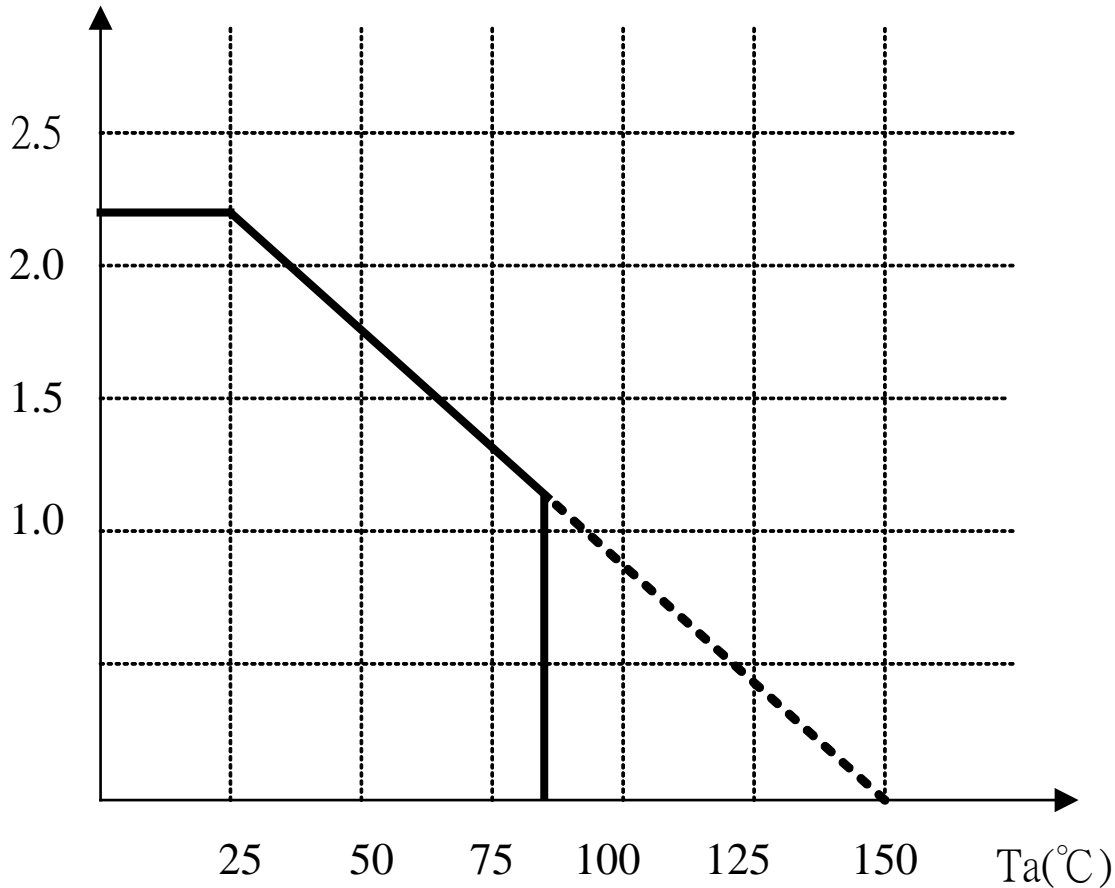
| PIN No | Pin Name | Description |
|--------|-----------|---|
| 1 | FWD | Input for loading forward |
| 2 | REV | Input for loading reverse |
| 3 | LDCONT | Output control terminal for loading |
| 4 | PS | Control terminal for power saving mode |
| 5 | IN1 | Input 1 of CH1 |
| 6 | IN2 | Input 2 of CH2 |
| 7 | PREVCC | Pre and loading unit power supply input terminal |
| 8 | POWVCC12 | Power unit power supply input terminal (CH1, CH2) |
| 9 | VOL (-) | Inverted output of loading |
| 10 | VOL (+) | Not inverted output of loading |
| 11 | VO2 (-) | Inverted output of CH2 |
| 12 | VO2 (+) | Not inverted output of CH2 |
| 13 | VO1 (-) | Inverted output of CH1 |
| 14 | VO1 (+) | Not inverted output of CH1 |
| 15 | VO4 (+) | Not inverted output of CH4 |
| 16 | VO4 (-) | Inverted output of CH4 |
| 17 | VO3 (+) | Not inverted output of CH3 |
| 18 | VO3 (-) | Inverted output of CH3 |
| 19 | GND | Substrate ground |
| 20 | POWVCC34 | Power unit power supply input terminal (CH3, CH4) |
| 21 | MUTE | Input for mute control |
| 22 | OPOUT3 | Output of CH3 OP-AMP |
| 23 | OPIN3 (-) | Inverting input of CH3 OP-AMP |
| 24 | OPIN3 (+) | Not inverting input of CH3 OP-AMP |
| 25 | OPOUT4 | Output of CH4 OP-AMP |
| 26 | OPIN4 (-) | Inverting input of CH4 OP-AMP |
| 27 | OPIN4 (+) | Not inverting input of CH4 OP-AMP |
| 28 | BIAS | Input for reference voltage |

● Application



● **Power dissipation curve :**

Pd (W)



*70mm×70mm×1.6mm glass epoxy board.

● **Operation notes**

- 1) The built-in thermal shutdown circuit mutes the output current when the chip temperature reaches 175°C (typ.). The hysteresis is set to 25°C (typ.), so the circuit will start up again when the chip temperature falling to 150°C (typ.).
- 2) In case mute pin voltage is under 0.5V or NC, output current is muted (except for tray motor driver). Mute pin voltage should be more than 1.5V for normal application.
- 3) Bias pin (pin 28) should be pulled up to more than 1.2V. In case the bias pin voltage is pulled down below 0.9V (typ.), the output current is muted.
- 4) Insert the bypass capacitor (~ 0.1uF) between Vcc pin and GND pin as close as possible.
- 5) Heat dissipation fins are attached to the GND on the inside of the package. Make sure to connect them to the external GND.

6) Tray driver logic input:

| FWD (pin1) | REV (pin2) | VOL+ (pin10) | VOL- (pin9) | Function |
|------------|------------|--------------|-------------|--------------|
| L | L | OPEN | OPEN | Open mode |
| L | H | L | H | Reverse mode |
| H | L | H | L | Forward mode |
| H | H | L | L | Brake mode |

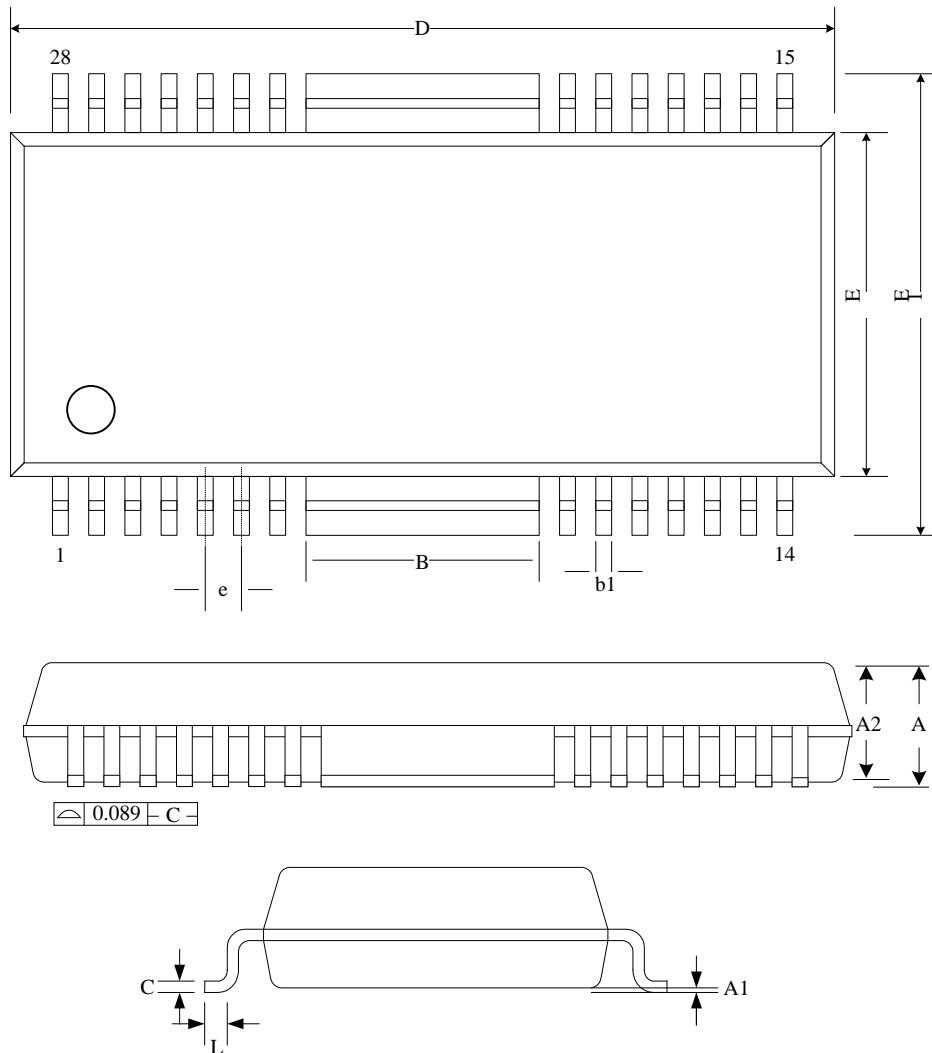
Input circuit of pin1 and pin2 is designed to avoid simultaneous activation of upper and lower output tr. ; however, in order to improve reliability, apply motor forward/reverse input once through open mode.

We recommend time period for open longer than 10msec.

“H” side Output voltage on output voltage (VOL+, VOL-) varies depending on output control terminal for tray (pin3). “H” side output voltage is set three times (9.2dB Typ.) LDCONT(pin3). And, “L” side output voltage is equal to output saturation voltage.

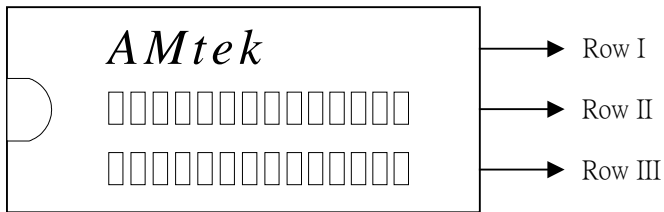
● Packaging outline

HSOP28



| SYMBOL | MILLIMETERS | | INCHES | |
|--------|-------------|-------|-------------|-------|
| | Min. | Max. | Min. | Max. |
| A | - | 2.75 | - | 0.108 |
| A1 | - | 0.3 | - | 0.012 |
| A2 | - | 2.45 | - | 0.096 |
| B | 4.95 | 5.35 | 0.195 | 0.211 |
| b1 | 0.23 | 0.47 | 0.009 | 0.019 |
| C | 0.2 | 0.36 | 0.008 | 0.014 |
| D | 17.89 | 18.8 | 0.704 | 0.740 |
| E | 7.3 | 7.9 | 0.287 | 0.311 |
| E1 | 9.6 | 10.65 | 0.378 | 0.419 |
| e | 0.8 (TYP) | | 0.031 (TYP) | |
| L | 0.3 | - | 0.012 | - |

● **Marking Identification**



Row I
AMtek

Row II
AM5810FM L/F

Row III
Lot number