

## ■ 特長／Features

- 定電流制御機能（周波数固定、他励式）
- 2 相入力（1-2 相励磁は ENA を併用）
- 電流減衰モード切替機能（マイクロステップ駆動対応）
- ノイズキャンセル機能
- 貫通電流防止機能
- 過熱アラーム機能
- 逆起電力吸収ダイオード内蔵
- Constant Current Control Function (Fixed Frequency PWM Control)
- 2-Phase Input (Half Step Drive Uses ENA Together)
- Current Decay Mode (Fast Decay or Slow Decay)
- Noise Cancellation Function
- Cross Conduction Protection
- Overheating Alarm Function
- Built-in Flywheel and Flyback Diodes

## ■ 絶対最大定格／Absolute Maximum Ratings

特に指定なき場合はTa=25℃／Ta=25℃ unless otherwise specified

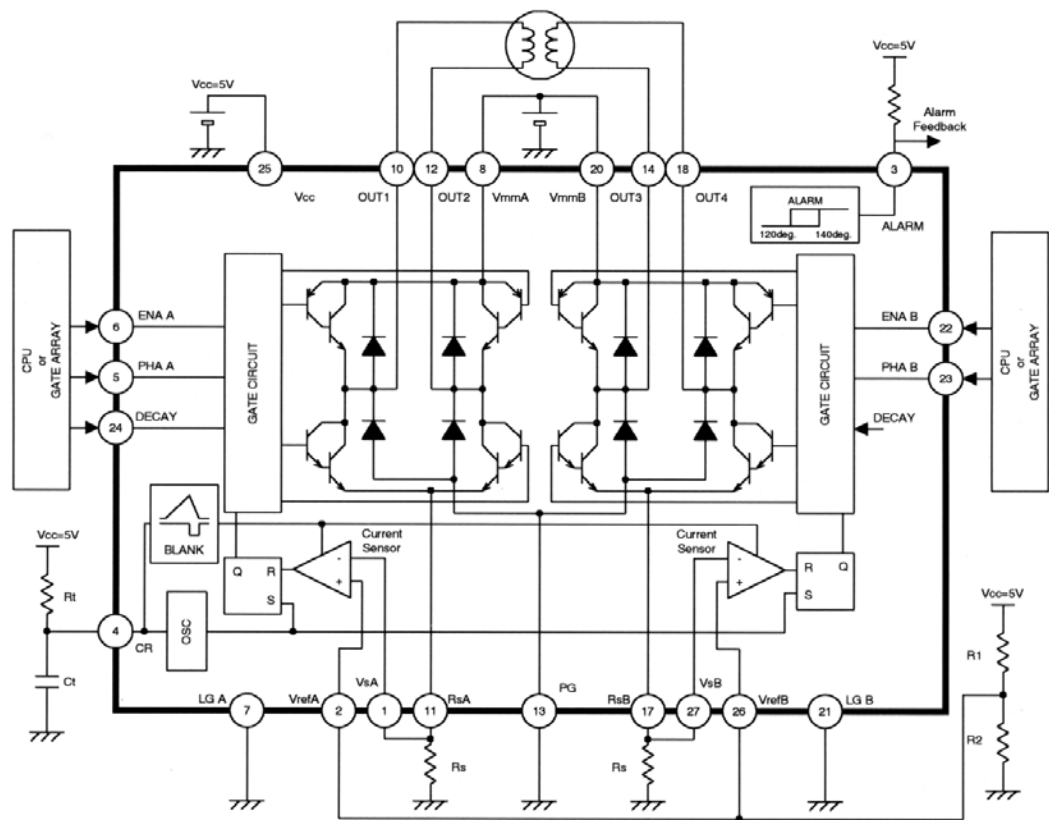
| 項 目                                      | Parameter | 記号 Symbol          | 定格値 Rating          | 単位 Unit |
|------------------------------------------|-----------|--------------------|---------------------|---------|
| ロジック電源電圧<br>Logic Supply Voltage         |           | V <sub>CC</sub>    | 0 ～ 6               | V       |
| ロジック入力電圧<br>Logic Input Voltage          |           | V <sub>Logic</sub> | 0 ～ V <sub>CC</sub> | V       |
| モータ電源電圧<br>Load Supply Voltage           |           | V <sub>mm</sub>    | 60                  | V       |
| 出力電流<br>Output Current                   |           | I <sub>C</sub>     | 1.3                 | A       |
| フライホイールダイオード電流<br>Flywheel Diode Current |           | I <sub>f</sub>     | 1.3                 | A       |
| 許容損失<br>Power Dissipation                |           | P <sub>D</sub>     | 5                   | W       |
| 保存温度<br>Storage Temperature              |           | T <sub>stg</sub>   | -40 ～ 150           | ℃       |
| 接合部温度<br>Junction Temperature            |           | T <sub>j</sub>     | 150                 | ℃       |

## ■ 電気的特性／Electrical Characteristics

特に指定なき場合はTa=25°C, V<sub>CC</sub>=5V／Ta=25°C, V<sub>CC</sub>=5V unless otherwise specified

| 項目                                                                        | Parameter | 記号                       | Symbol | 測定条件                                         | Condition | min. | typ. | max.            | 単位  | Unit |
|---------------------------------------------------------------------------|-----------|--------------------------|--------|----------------------------------------------|-----------|------|------|-----------------|-----|------|
| Output stage                                                              |           |                          |        |                                              |           |      |      |                 |     |      |
| 上側出力飽和電圧<br>Output Saturation Voltage (Upper side)                        |           | V <sub>CE(SAT)</sub>     | H      | I <sub>C</sub> =0.8A                         |           | -    | 1.0  | 1.4             | V   |      |
| 下側出力飽和電圧<br>Output Saturation Voltage (Lower side)                        |           | V <sub>CE(SAT)</sub>     | L      | I <sub>C</sub> =0.8A                         |           | -    | 1.0  | 1.4             | V   |      |
| 上側出力リーク電流<br>Output Leakage Current (Upper side)                          |           | I <sub>rH</sub>          |        | V <sub>mm</sub> =60V, V <sub>OUT</sub> =0V   |           | -    | -    | 10              | μA  |      |
| 下側出力リーク電流<br>Output Leakage Current (Lower side)                          |           | I <sub>rL</sub>          |        | V <sub>OUT</sub> =60V, V <sub>Rs</sub> =0V   |           | -    | -    | 10              | μA  |      |
| 上側ダイオード順電圧<br>Diode Forward Drop (Upper side)                             |           | V <sub>FH</sub>          |        | I <sub>r</sub> =0.8A                         |           | -    | 1.3  | 1.6             | V   |      |
| 下側ダイオード順電圧<br>Diode Forward Drop (Lower side)                             |           | V <sub>FL</sub>          |        | I <sub>r</sub> =0.8A                         |           | -    | 1.3  | 1.5             | V   |      |
| Logic stage                                                               |           |                          |        |                                              |           |      |      |                 |     |      |
| V <sub>CC</sub> 消費電流 (2 回路 ON 時)<br>Logic Supply Current (2 Circuit ON)   |           | I <sub>CC</sub>          | (ON)   | V <sub>ENA</sub> =0A                         |           | -    | 25   | 33              | mA  |      |
| V <sub>CC</sub> 消費電流 (2 回路 OFF 時)<br>Logic Supply Current (2 Circuit OFF) |           | I <sub>CC</sub>          | (OFF)  | V <sub>ENA</sub> =5V                         |           | -    | 19   | 26              | mA  |      |
| Phase/Enable/Decay “H” 入力電圧<br>Phase/Enable/Decay “H” Input Voltage       |           | V <sub>PHA/ENA/DEC</sub> | H      |                                              |           | 2.3  | -    | V <sub>CC</sub> | V   |      |
| Phase/Enable/Decay “L” 入力電圧<br>Phase/Enable/Decay “L” Input Voltage       |           | V <sub>PHA/ENA/DEC</sub> | L      |                                              |           | GND  | -    | 0.8             | V   |      |
| Phase/Enable/Decay “H” 入力電流<br>Phase/Enable/Decay “H” Input Current       |           | I <sub>PHA/ENA/DEC</sub> | H      | V <sub>PHA/ENA/DEC</sub> =5V                 |           | -    | -    | 10              | μA  |      |
| Phase/Enable “L” 入力電流<br>Phase/Enable “L” Input Current                   |           | I <sub>PHA/ENA</sub>     | L      | V <sub>PHA/ENA</sub> =0V                     |           | -    | -100 | -150            | μA  |      |
| Decay “L” 入力電流<br>Decay “L” Input Current                                 |           | I <sub>DEC</sub>         | L      | V <sub>DEC</sub> =0V                         |           | -    | -200 | -300            | μA  |      |
| V <sub>ref</sub> 入力電流<br>V <sub>ref</sub> Input Current                   |           | I <sub>ref</sub>         |        | V <sub>ref</sub> =0V                         |           | -    | -1   | -10             | μA  |      |
| V <sub>s</sub> 入力電流<br>V <sub>s</sub> Input Current                       |           | I <sub>s</sub>           |        | V <sub>s</sub> =0V                           |           | -    | -1   | -10             | μA  |      |
| チョッピング周波数<br>Chopping Frequency                                           |           | f <sub>chop</sub>        |        | C <sub>t</sub> =4700pF, R <sub>t</sub> =13kΩ |           | -    | 22   | -               | kHz |      |
| ブランキングタイム<br>Blanking Time                                                |           | t <sub>b</sub>           |        | C <sub>t</sub> =4700pF                       |           | -    | 2.2  | -               | μs  |      |
| V <sub>s</sub> 最大電圧<br>V <sub>s</sub> Maximum Voltage                     |           | V <sub>s</sub>           | (max)  |                                              |           | -    | -    | 1.0             | V   |      |
| 過熱アラーム端子漏れ電流<br>Thermal Alarm Leakage Current                             |           | I <sub>r</sub>           | (alm)  | V <sub>alm</sub> =5V                         |           | -    | -    | 10              | μA  |      |
| 過熱アラーム動作端子電流<br>Thermal Alarm Output Current                              |           | I <sub>alm</sub>         |        | V <sub>alm</sub> =0.5V                       |           | -    | -    | 2               | mA  |      |
| 過熱アラーム動作温度<br>Thermal Alarm Operating Temperature                         |           | T <sub>alm</sub>         |        |                                              |           | -    | 140  | -               | °C  |      |

基本応用回路／ Typical Application



推奨回路定数／ Recommended External Components Value

| 記号    | Symbol | 推奨値  | Recommendation | 単位 | Unit |
|-------|--------|------|----------------|----|------|
| Rs    |        | 0.68 |                | Ω  |      |
| Rt    |        | 13   |                | kΩ |      |
| Ct    |        | 4700 |                | pF |      |
| R1+R2 |        | ≤ 10 |                | kΩ |      |

推奨動作条件／ Recommended Operating Conditions

特に指定なき場合はTa=25℃／Ta=25℃ unless otherwise specified

| 項目       | Parameter            | 記号  | Symbol | 推奨値         | Recommendation | 単位 | Unit |
|----------|----------------------|-----|--------|-------------|----------------|----|------|
| 接合部温度    | Junction Temperature | Tj  |        | -25 ~ 120   |                | ℃  |      |
| ロジック電源電圧 | Logic Supply Voltage | Vcc |        | 4.75 ~ 5.25 |                | V  |      |
| モータ電源電圧  | Load Supply Voltage  | Vmm |        | 5 ~ 54      |                | V  |      |

出力電流，チョッピング周波数の設定／ Setting of Output Current and Chopping Frequency

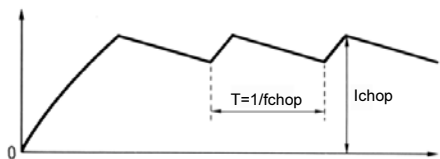
- 出力電流設定式／ Output Current Setting

$I_{chop} = \frac{V_{ref}}{R_s} [A]$

- チョッピング周波数設定式／ Chopping Frequency Setting

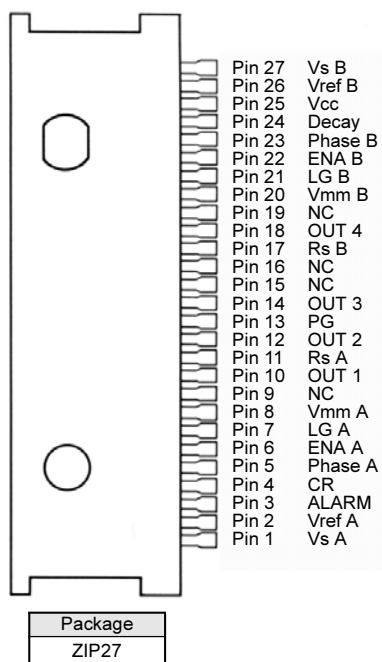
$f_{chop} = \frac{1}{0.72 \times C_t \times R_t} [Hz]$

Constant current waveform (Motor current)



## ■ ピン配置図／ Pin Assignment

MARKING SIDE VIEW MTD2005



## ■ 真理値表／ Truth Table

| ENA A or B | PHA A or B | OUT 1 or 4 | OUT 2 or 3 |
|------------|------------|------------|------------|
| L          | L          | L          | H          |
| L          | H          | H          | L          |
| H          | x          | OFF        | OFF        |

x: don't care

| DECAY | Decay Mode | Switching Transistor            |
|-------|------------|---------------------------------|
| L     | Fast       | Both source and sink transistor |
| H     | Slow       | Only source transistor          |