■ 特長／ Features

- 2 モータ駆動用
- 定電流制御機能（オフ時間固定）
- 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
- 過熱保護機能
- 逆起電力吸収ダイオード内蔵

- Dual Stepper Motor Driver
- Constant Current Control Function (Fixed Off Time)
- Current Decay Mode (Fast Decay or Slow Decay)
- Noise Cancellation Function
- Cross Conduction Protection
- Thermal Shutdown 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

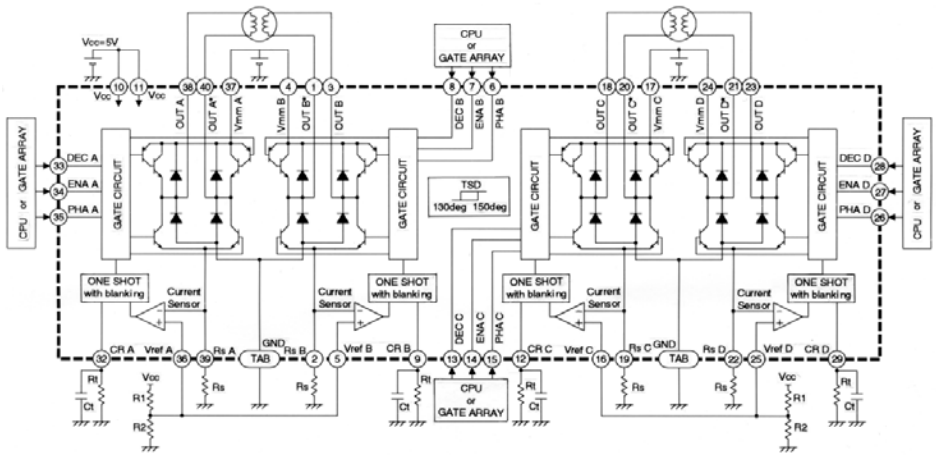
項　目　Parameter	記号　Symbol	定格値　Rating	単位　Unit
ロジック電源電圧 Logic Supply Voltage	V_{CC}	0 ～ 6	V
ロジック入力電圧 Logic Input Voltage	V_{LOGIC}	0 ～ V_{CC}	V
モータ電源電圧 Load Supply Voltage	V_{mm}	35	V
出力電流 Output Current	I_{OUT}	1.2	A
フライホイールダイオード電流 Flywheel Diode Current	I_f	1.2	A
許容損失 Power Dissipation	P_D	2.9	W
保存温度 Storage Temperature	T_{stg}	-40 ～ 150	℃
接合部温度 Junction Temperature	T_j	150	℃

■ 電気的特性／ Electrical Characteristics

特に指定なき場合はTa=25℃, Vcc=5V／Ta=25℃, Vcc=5V unless otherwise specified

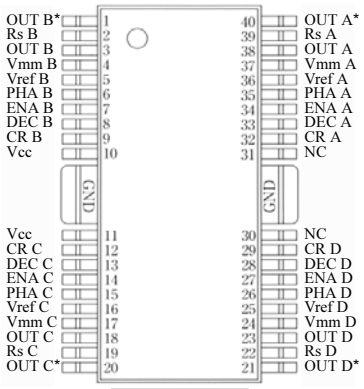
項　目　Parameter	記号　Symbol	測定条件　Condition	min.	typ.	max.	単位　Unit
Output stage						
Vmm 消費電流 1 軸（A+B or C+D） Load Supply Current 1 Axis (A+B or C+D)	$I_{mm\ (OFF)1}$	V_{mm}=24V, V_{ENA}=2.1V, No load	-	-	7	mA
Vmm 消費電流 2 軸（A+B+C+D） Load Supply Current 2 Axis (A+B+C+D)	$I_{mm\ (OFF)2}$	V_{mm}=24V, V_{ENA}=2.1V, No load	-	-	14	mA
上側出力飽和電圧 Output Saturation Voltage (Upper side)	$V_{CE\ (SAT)}H$	I_C=0.8A	-	1.2	1.5	V
下側出力飽和電圧 Output Saturation Voltage (Lower side)	$V_{CE\ (SAT)}L$	I_C=0.8A	-	0.7	1.0	V
出力リーク電流 Output Leakage Current	Ir	V_{mm}=35V	-	-	20	μA
上側ダイオード順電圧 Diode Forward Drop (Upper side)	V_FH	I_f=0.8A	-	1.3	1.6	V
下側ダイオード順電圧 Diode Forward Drop (Lower side)	V_FL	I_f=0.8A	-	1.3	1.5	V
Logic stage						
V_{CC} 消費電流（V_{CC}1+V_{CC}2） Logic Supply Current (V_{CC}1+V_{CC}2)	$I_{CC\ (ON)}$	V_{ENA}=“L”	-	95	135	mA
V_{CC} 消費電流（V_{CC}1+V_{CC}2） Logic Supply Current (V_{CC}1+V_{CC}2)	$I_{CC\ (OFF)}$	V_{ENA}=“H”	-	36	52	mA
PHA/ENA/DEC“H”入力電圧 PHA/ENA/DEC“H”Input Voltage	V_{LOGIC}H		2.1	-	V_{CC}	V
PHA/ENA/DEC“L”入力電圧 PHA/ENA/DEC“L”Input Voltage	V_{LOGIC}L		GND	-	0.8	V
PHA/ENA/DEC“H”入力電流 PHA/ENA/DEC“H”Input Current	I_{LOGIC}H	V_{LOGIC}=“H”	-	-	20	μA
PHA/ENA/DEC“L”入力電流 PHA/ENA/DEC“L”Input Current	I_{LOGIC}L	V_{LOGIC}=“L”	-	-100	-200	μA
CR 充電電流 CR Charge Current	I_{CR}	V_{CR}=2V	-	1	-	mA
Vref 入力電圧 Vref Input Current	V_{ref}		-	-	1.0	V
Vref 入力電流 Vref Input Current	I_{ref}	V_{ref}=0V	-	-1	-10	μA
ブランキングタイム Blanking Time	t_b	Rt=30kΩ, Ct=1000pF	-	2.14	-	μs
過熱保護動作温度 Thermal Shutdown Temperature	T_{TSD}		-	150	-	℃

■ 基本応用回路／ Typical Application



■ ピン配置図／Pin Assignment

Top View MTD2009J



Package
HSOP40

■ 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	30	kΩ
Ct	1000	pF
R1+R2	≦ 10	kΩ

■ 真理値表／ Truth Table

ENA A or B or C or D	PHA A or B or C or D	OUT A or B or C or D	OUT A*or B*or C* or D*
L	L	L	H
L	H	H	L
H	*	OFF	OFF

*: don't care

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

■ 出力電流，ワンショットオフ時間，ブランキングタイムの設定／ Setting of Output Current, One Shot Off Time and Blanking Time

○ 出力電流設定式／ Output Current Setting

$$Ichop = \frac{Vref}{Rs} - 0.012\ [A]$$

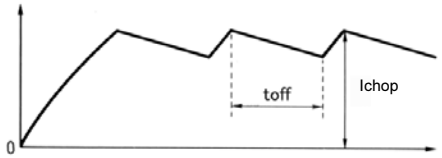
○ ワンショットオフ時間設定式／ One Shot Off Time Setting

$$toff = 1.163 \times Ct \times Rt\ [s]$$

○ ブランキングタイム設定式／ Blanking Time Setting

$$tb = Ct \times Rt \times In\left(\frac{1-\frac{Rt}{1000}}{3-\frac{Rt}{1000}}\right)\ [s]$$

Constant current waveform (Motor current)



■ 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	T_j	-25 ～ 120	℃
ロジック電源電圧 Logic Supply Voltage	V_{CC}	4.75 ～ 5.25	V
モータ電源電圧 Load Supply Voltage	V_{mm}	5 ～ 31	V

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   【特別用途】

   輸送機器（車載、船舶等）、基幹用通信機器、交通信号機器、防災/防犯機器、各種安全機器、医療機器等

   【特定用途】

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