

MTD2038G

DMOS Microstepping PWM Motor Driver

Features

- Dual full bridge for a bipolar stepper motor driver
- Load supply voltage 40V , Output current 1.0A
- Constant current control (Fixed frequency PWM control)
- 2-bit selectable current level (Full step/Half step/Quarter step)
- Stand-by function
- Thermal shutdown with hysteresis
- Under voltage lock out function
- Surface mount package with heat sink(HSOP24)

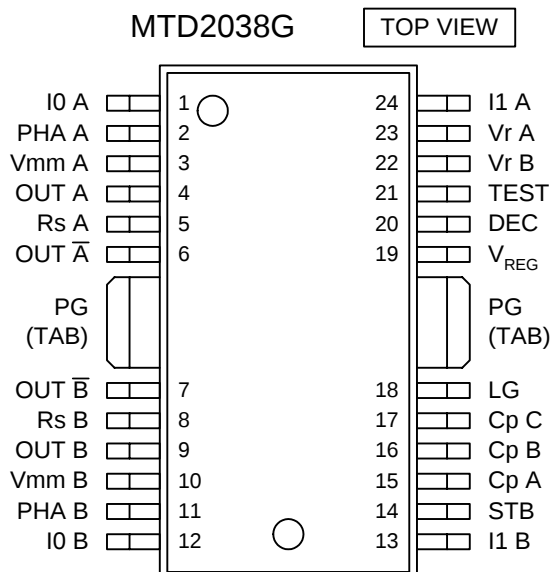


■ Absolute maximum ratings / Ta=25

Parameter	Symbol	Rating	Unit
V _{REG} Output current	I _{REG}	12	mA
Logic input	V _{LOGIC}	0 ~ 6	V
Reference input	V _r	0 ~ 7	V
Load supply	V _{mm}	40	V
Output current	I _{OUT}	1.0	A
Power dissipation	P _D *1	2.1	W
Storage temperature range	T _{stg}	-40 ~ 150	
Maximum Junction temperature	T _j	150	

*1 : 50.8 × 50.8 × 1mm³ Glass Epoxy Board(FR4),200mm² Copper Pattern

■ Pin Assignment



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■ Electrical Characteristics

Vmm=24V, Ta=25 unless otherwise specified

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
● Output stage						
Load supply current (All circuit OFF)	I _{mm} (OFF)	V _{IOA} =V _{I1A} =V _{IOB} =V _{I1B} =5V	-	13	22	mA
Load supply current (All circuit ON)	I _{mm} (ON)	V _{IOA} =V _{I1A} =V _{IOB} =V _{I1B} =0V	-	13	22	mA
Load supply current (Stand-by)	I _{mm} (STB)	V _{STB} =5V	-	-	200	μA
Upper MOSFET ON resistance	R _{ON} H	I _{out} =-0.8A	-	1.8	2.0	Ω
Lower MOSFET ON resistance	R _{ON} L	I _{out} =0.8A	-	0.8	1.0	Ω
Upper MOSFET leakage current	I _{rH}	V _{mm} =35V, V _{OUT} =0V	-	-	100	μA
Lower MOSFET leakage current	I _{rL}	V _{OUT} =35V, V _{RS} =0V	-	-	100	μA
Upper MOSFET reverse voltage	V _F H	I _F =0.8A	-	1.4	1.6	V
Lower MOSFET reverse voltage	V _F L	I _F =0.8A	-	1.1	1.3	V
VcpA under voltage lock out threshold	VcpAUVLO	-	V _{mm} +3	V _{mm} +4	V _{mm} +6	V
● Logic stage						
V _{REG} output voltage	V _{REG}	I _{REG} =500 μA	4.85	5.00	5.15	V
		I _{REG} =12mA	4.75	-	5.25	V
PHA/I0/I1/DEC "H" input voltage	V _{LOGIC} H	-	2.0	-	V _{REG}	V
PHA/I0/I1/DEC "L" input voltage	V _{LOGIC} L	-	GND	-	0.8	V
STB "H" input voltage	V _{STB} H	-	2.3	-	V _{REG}	V
STB "L" input voltage	V _{STB} L	-	GND	-	0.8	V
PHA/I0/I1 "H" input current	I _{PHA/I0/I1} H	V _{PHA/I0/I1} =5V	-	-	10	μA
PHA/I0/I1 "L" input current	I _{PHA/I0/I1} L	V _{PHA/I0/I1} =0V	-	-20	-50	μA
STB "H" input current	I _{STB} H	V _{STB} =5V	-	45	90	μA
STB "L" input current	I _{STB} L	V _{STB} =0V	-	-	-10	μA
DEC "H" input current	I _{DEC} H	V _{DEC} =5V	-	75	150	μA
DEC "L" input current	I _{DEC} L	V _{DEC} =0V	-	-	-10	μA
Vr "H" input current	I _{ref} H	Vr=4V	-	1	10	μA
Vr "L" input current	I _{ref} L	Vr=0V	-	-1	-10	μA
Comparator threshold voltage (100%)	Vs1	V _{I0(AorB)} ="L", V _{I1(AorB)} ="L"	95	100	105	%
Comparator threshold voltage (70%)	Vs2	V _{I0(AorB)} ="H", V _{I1(AorB)} ="L"	64	70	76	%
Comparator threshold voltage (40%)	Vs3	V _{I0(AorB)} ="L", V _{I1(AorB)} ="H"	36	40	44	%
Oscillator frequency	f _{OSC}	-	20	30	40	kHz
Comparator blanking time	t _b	-	-	0.65	-	μs
CpA charging time *1	T _{chg}	Cp1=0.22 μF, Cp2=0.01 μF, V _{STB} =5V → 0V	-	-	1.5	ms
Thermal shutdown temperature *2	T _{TSD}	-	150	170	190	

*1: Charge of a charge pump takes time. Therefore, please take the time more than Tchg from aftr Vcc input or Stand-by release to even before a motor drive start.

*2: T_{TSD} is design value.

■ Thermal resistance

Symbol	Rating	Unit
θ _{ja} *3	58	/W

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■ Recommended operation conditions

Parameter	Symbol	Recommendation	Unit
Junction temperature	T _j	-25 ~ 120	
Load supply	V _{mm}	15 ~ 35	V
Reference voltage	V _r	0 ~ 6	V

■ Truth table

I0 A(B) and I1 A(B)	PHA A or B	OUT A or B	OUT $\bar{A}$ or $\bar{B}$
L	H	H	L
L	L	L	H
H	x	OFF	OFF

x : don't care

I0 A(B)	I1 A(B)	Current Level(%)
L	L	100
H	L	70
L	H	40
H	H	0

STB *1	Mode
L or OPEN	ACTIVE
H	Stand-By

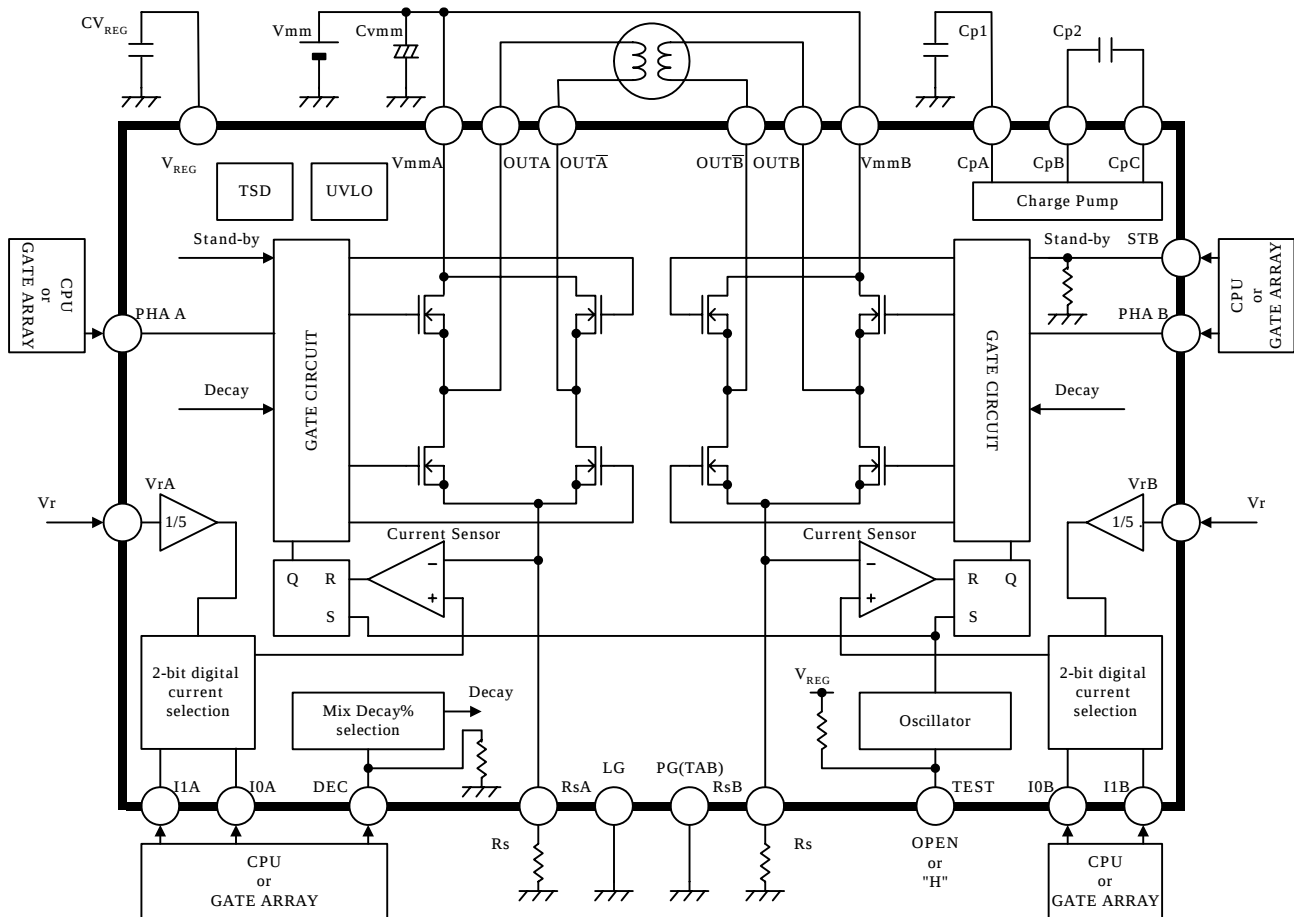
DEC *1	Current Decay Mode
L or OPEN	Slow Decay
H	Mix Decay(37.5% Fast)

*1 built-in pull-down resistance

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■ Block diagram / Typical application



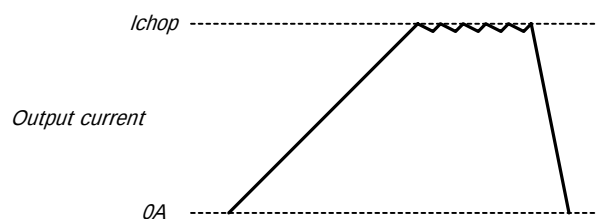
● Recommended component values

Symbol	Recommended component values	Unit
Cp1	0.22	μF
Cp2	0.01	μF
CV _{REG}	0.1	μF
R _s	0.68	Ω
Cvmm *1	47	μF

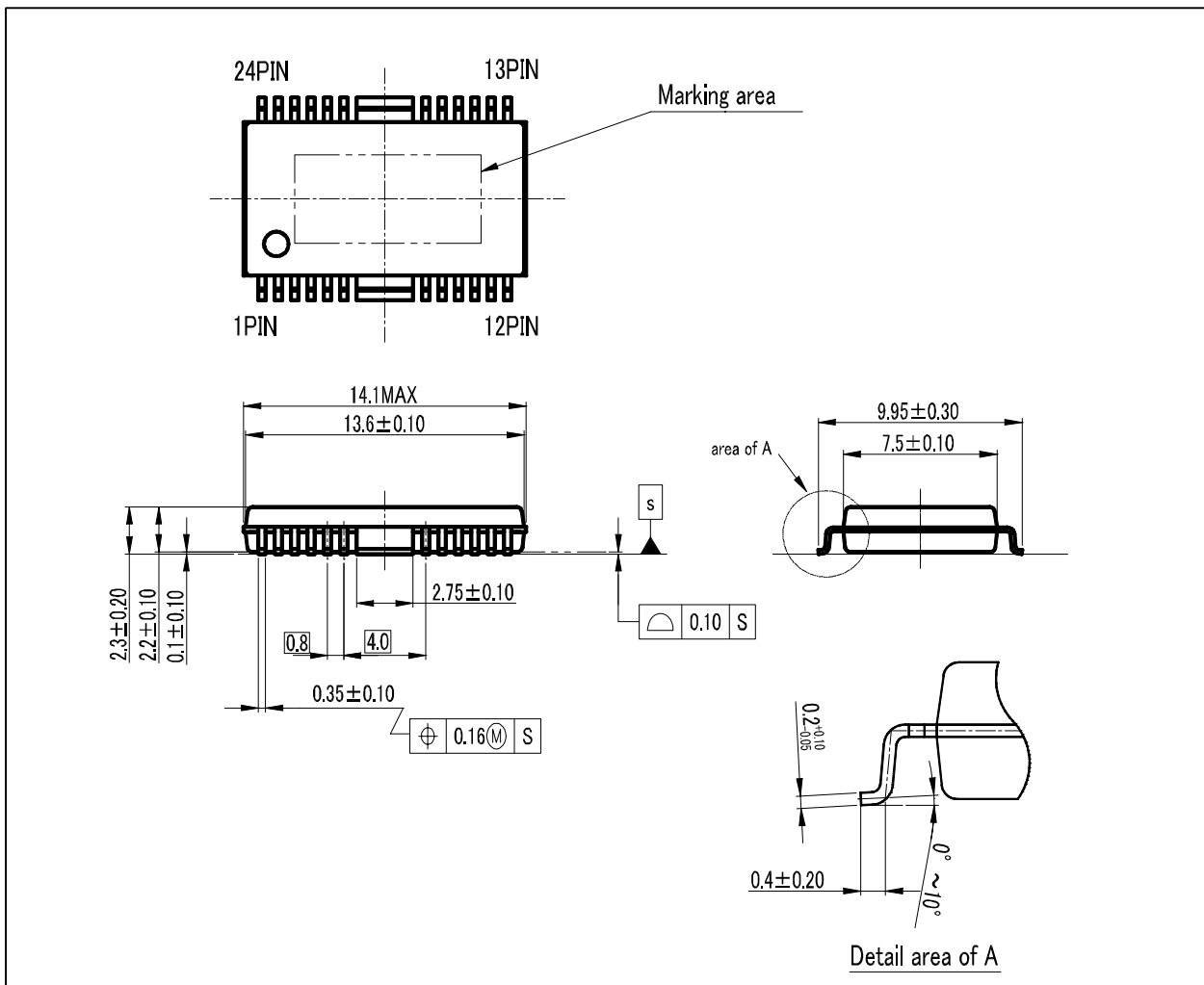
*1: It recommend the electrolytic capacitor for the noise absorption connect near IC to Load supply.

● Constant chopping current level

$$I_{chop} = \frac{V_r}{5 \times R_s}$$



■ Outline Drawing



(Unit : mm)

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