

# MTD2003G

## Dual Full-bridge PWM Stepper Motor Driver

### Features

- Dual full bridge for a bipolar stepper motor driver
- Output current 1.2A , Output voltage 35V
- Constant current control(fixed frequency PWM control)
- 2-bit digital current selection
- Noise cancellation function
- Built-in flywheel and flyback diodes
- Cross conduction protection
- Thermal shutdown with hysteresis
- Surface mount package with heat sink(HSOP24)

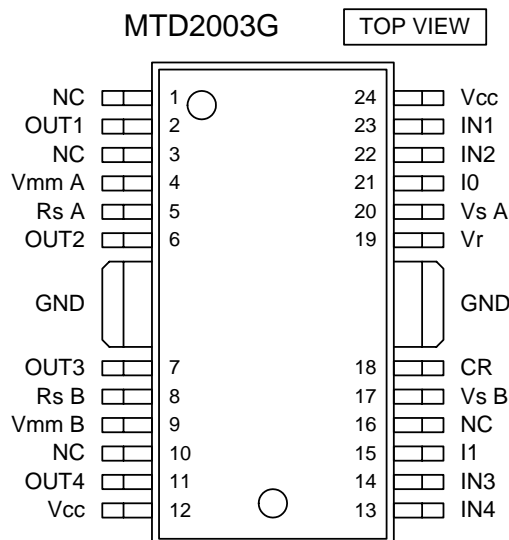


### Absolute maximum ratings / Ta=25

Parameter	Symbol	Rating	Unit
Output voltage	V <sub>mm</sub>	35	V
Output current	I <sub>OUT</sub>	1.2	A
Logic supply	V <sub>CC</sub>	0 ~ 6	V
Logic input	V <sub>LOGIC</sub>	0 ~ V <sub>CC</sub>	V
Allowable power dissipation *	P <sub>D</sub>	2.1	W
Storage temperature range	T <sub>stg</sub>	-40 ~ 150	
Maximum Junction temperature	T <sub>J</sub>	150	

\*50.8 × 50.8 × 1mm<sup>3</sup> Glass Epoxy Board(FR4),200mm<sup>2</sup> Copper Pattern

### Pin Assignment



### Truth table

IN 1 or 4	IN 2 or 3	OUT 1 or 4	OUT 2 or 3
L	L	OFF	OFF
L	H	L	H
H	L	H	L
H	H	OFF	OFF

I <sub>0</sub>	I <sub>1</sub>	Output current ratio[%]	V <sub>ref</sub> [V] (at V <sub>r</sub> =5V)
L	L	100	0.50 ± 5%
H	L	70	0.35 ± 8%
L	H	33	0.17 ± 10%
H	H	0	-

### Electrical Characteristics

V<sub>CC</sub>=5V, T<sub>a</sub>=25 unless otherwise specified

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Output stage						
Upper transistor saturation voltage	V <sub>CE(sat)</sub> H	I <sub>C</sub> =1.0A	-	1.2	1.4	V
Lower transistor saturation voltage	V <sub>CE(sat)</sub> L	I <sub>C</sub> =1.0A	-	0.7	1.0	V
Upper transistor leak current	I <sub>rH</sub>	V <sub>mm</sub> =30V, V <sub>OUT</sub> =0V	-	-	10	μA
Lower transistor leak current	I <sub>rL</sub>	V <sub>OUT</sub> =30V, V <sub>RS</sub> =0V	-	-	10	μA
Upper diode forward drop	V <sub>F</sub> H	I <sub>F</sub> =1.0A	-	1.4	1.6	V
Lower diode forward drop	V <sub>F</sub> L	I <sub>F</sub> =1.0A	-	1.3	1.5	V
Logic stage						
Logic supply current (2circuit ON)	I <sub>CC(ON)</sub>		-	50	65	mA
Logic supply current (2circuit OFF)	I <sub>CC(OFF)</sub>	V <sub>IN</sub> =all 0V or all 5V	-	15	25	mA
IN "H" input voltage	V <sub>IN</sub> H		2.3	-	V <sub>CC</sub>	V
IN "L" input voltage	V <sub>IN</sub> L		GND	-	0.6	V
IN "H" input current	I <sub>IN</sub> H	V <sub>IN</sub> =3.3 or 5V	-	-	10	μA
IN "L" input current	I <sub>IN</sub> L	V <sub>IN</sub> =0V	-	-3	-20	μA
I0,I1 "H"input voltage	V <sub>I0/I1</sub> H		2.3	-	V <sub>CC</sub>	V
I0,I1 "L"input voltage	V <sub>I0/I1</sub> L		GND	-	0.6	V
I0,I1 "H"input current	I <sub>I0/I1</sub> H	V <sub>I0/I1</sub> =3.3 or 5V	-	-	10	μA
I0,I1 "L"input current	I <sub>I0/I1</sub> L	V <sub>I0/I1</sub> =0V	-	-75	-100	μA
Vr input current	I <sub>ref</sub>	Vr=5V	-	500	650	μA
Vs input current	I <sub>s</sub>	Vs=0V	-	-1	-10	μA
Comparator threshold (100%)	Vs1	Vr=5V, V <sub>I0</sub> =0V, V <sub>I1</sub> =0V	0.475	0.5	0.525	V
Comparator threshold (70%)	Vs2	Vr=5V, V <sub>I0</sub> =5V, V <sub>I1</sub> =0V	0.322	0.35	0.378	V
Comparator threshold (33%)	Vs3	Vr=5V, V <sub>I0</sub> =0V, V <sub>I1</sub> =5V	0.153	0.17	0.187	V
Chopping frequency	f <sub>CHOP</sub>		-	20	-	kHz
Blanking time	t <sub>b</sub>	Ct=3300pF	-	1.55	-	μs
Thermal shutdown temperature	T <sub>TSD</sub>		-	150	-	

### Recommended operation conditions

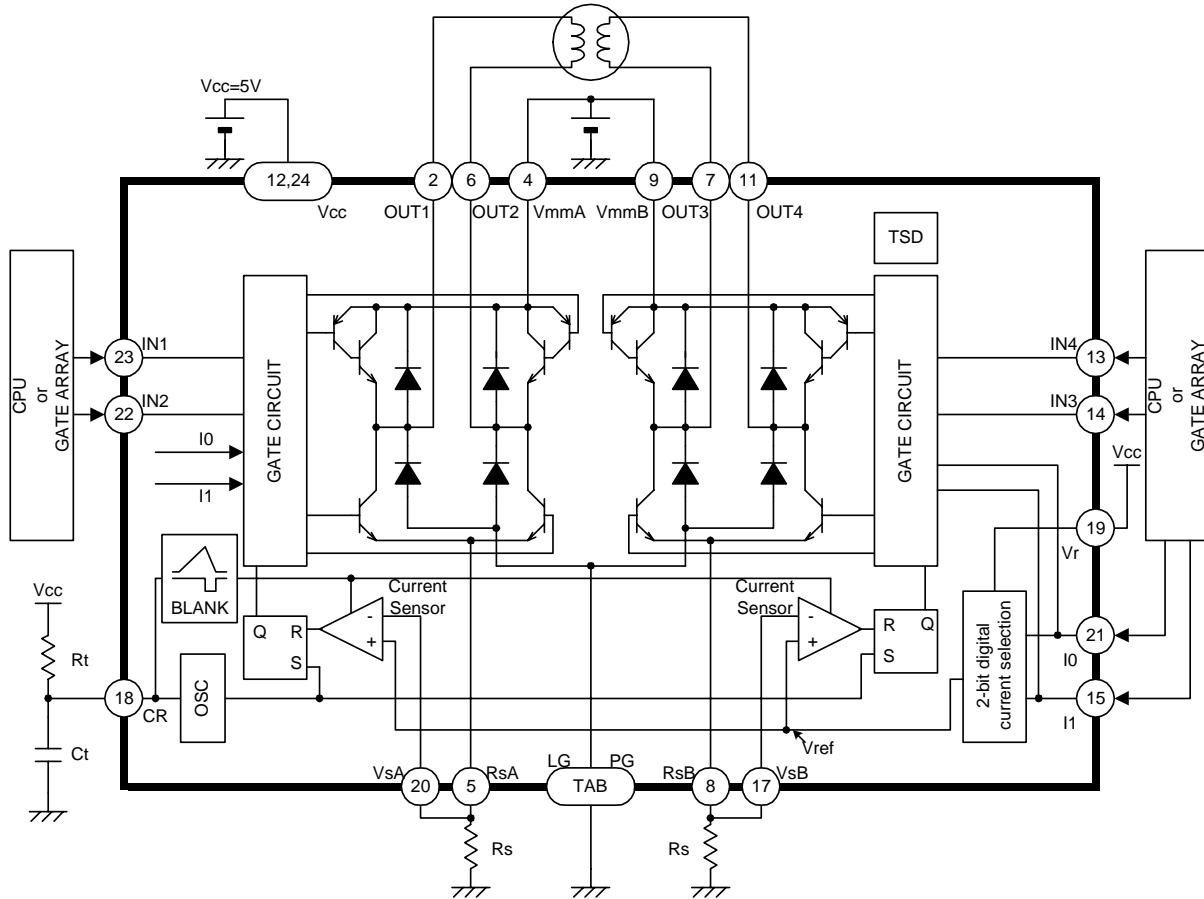
Parameter	Symbol	Recommendation	Unit
Junction temperature	T <sub>j</sub>	-25 ~ 120	
Logic supply	V <sub>CC</sub>	4.75 ~ 5.25	V
Load supply	V <sub>mm</sub>	~ 31	V

### Thermal resistance

Symbol	Rating	Unit
ja	58	/W

\*50.8 × 50.8 × 1mm<sup>3</sup> Glass Epoxy Board(FR4),200mm<sup>2</sup> Copper Pattern

Block diagram / Typical application



Constant chopping current level

$$I_{chop} = \frac{V_r}{10 \times R_s} - 0.015$$

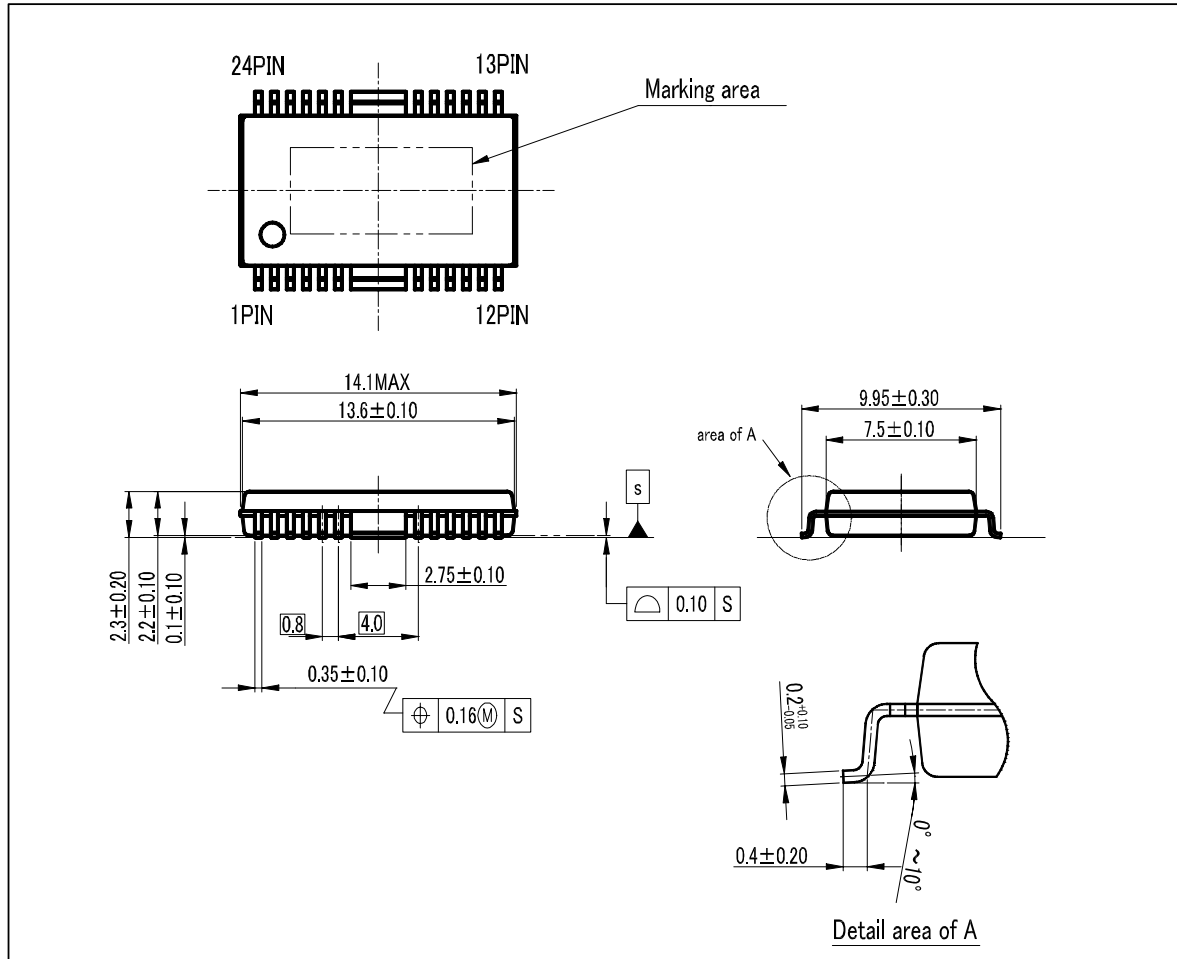
Recommended component values

Symbol	Recommended component values	Unit
Rt	18	k
Ct	3300	pF
Vr	Vcc	V

ONE SHOT OFF TIME

$$f = \frac{1}{0.72 \times C_t \times R_t}$$

Outline Drawing



(Unit : mm)

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