

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)

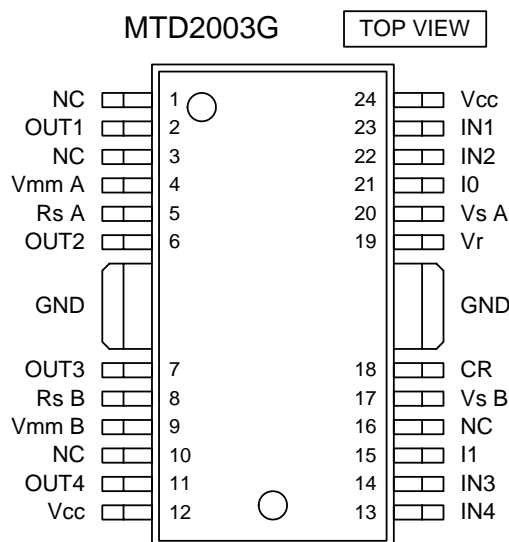


Absolute maximum ratings / Ta=25

Parameter	Symbol	Rating	Unit
Output voltage	V _{mm}	35	V
Output current	I _{OUT}	1.2	A
Logic supply	V _{CC}	0 ~ 6	V
Logic input	V _{LOGIC}	0 ~ V _{CC}	V
Allowable power dissipation *	P _D	2.1	W
Storage temperature range	T _{stg}	-40 ~ 150	
Maximum Junction temperature	T _J	150	

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

I0	I1	Output current ratio[%]	Vref[V] (at Vr=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_{CC}=5V, T_a=25 unless otherwise specified

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

Recommended operation conditions

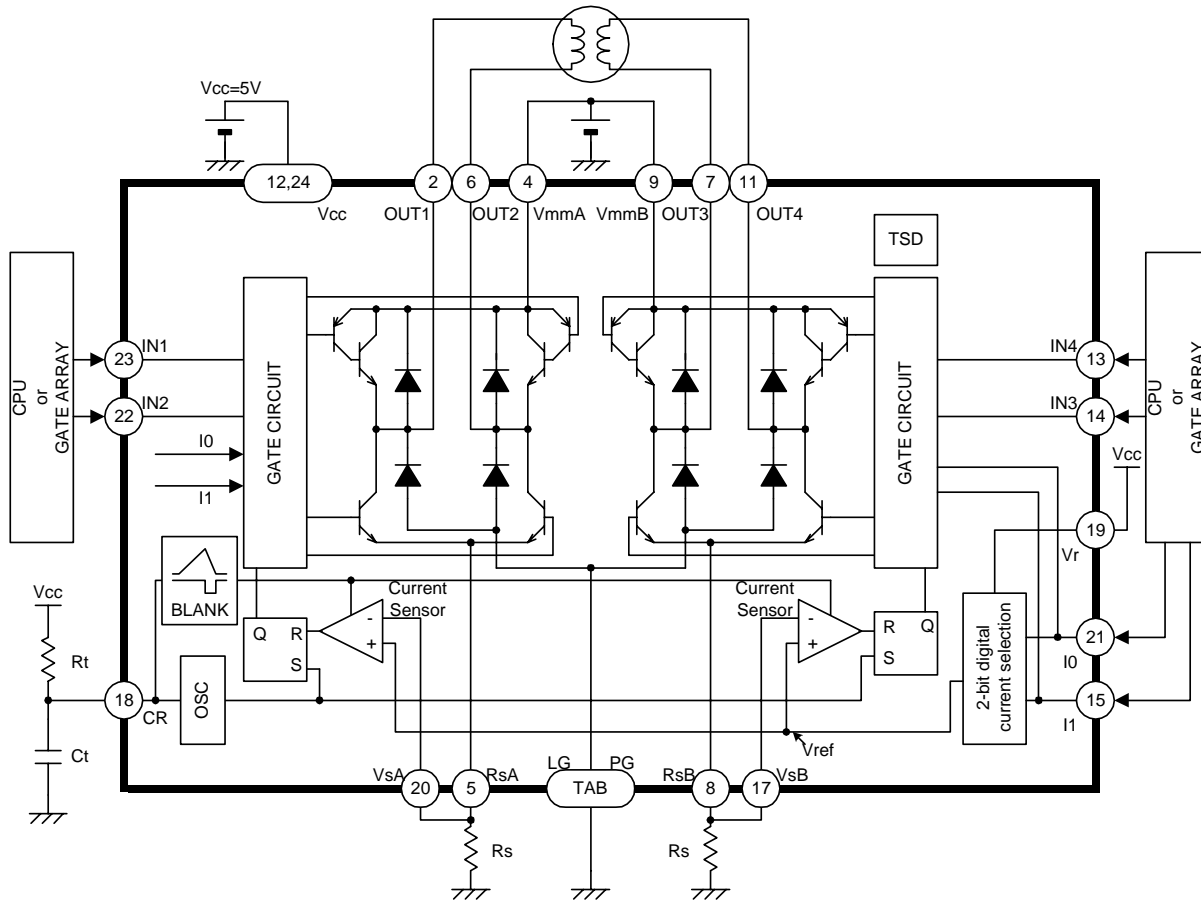
Parameter	Symbol	Recommendation	Unit
Junction temperature	T _j	-25 ~ 120	
Logic supply	V _{CC}	4.75 ~ 5.25	V
Load supply	V _{mm}	~ 31	V

Thermal resistance

Symbol	Rating	Unit
ja	58	/W

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Block diagram / Typical application



Constant chopping current level

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

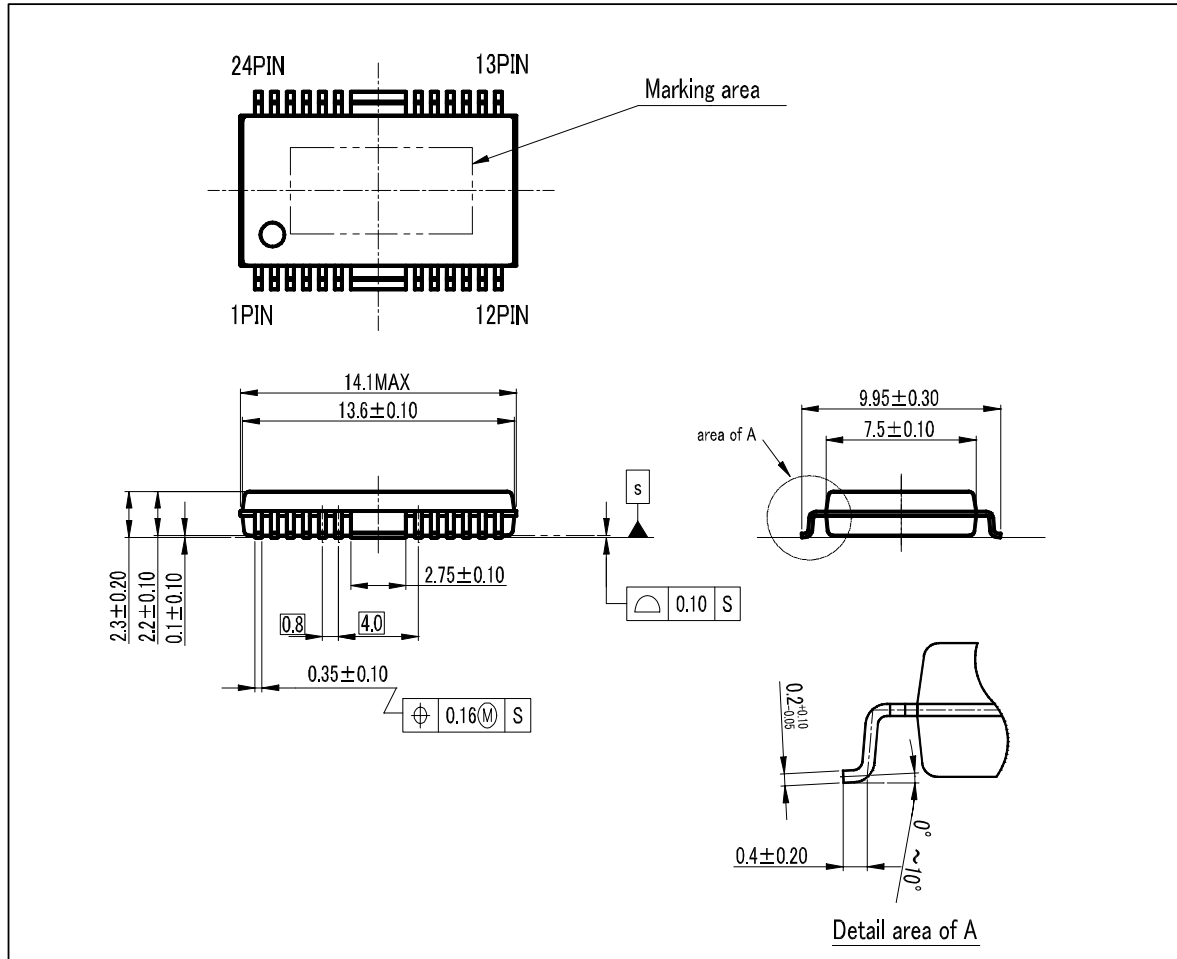
Recommended component values

Symbol	Recommended component values	Unit
R _t	18	k
C _t	3300	pF
V _r	V _{cc}	V


ONE SHOT OFF TIME


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

Outline Drawing



(Unit : mm)

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