

MTD2033G

DMOS Dual Full-bridge PWM Stepper Motor Driver

Features

- Dual full-bridge for a bipolar stepper motor
- Output current 1.5A , Output voltage 40V
- Constant current control(Fixed frequency PWM control)
- 2-bit digital current selection
- Stand-by functuon
- Thermal shutdown with hysteresis
- Under voltage lock out function
- Surface mount package with heat sink(HSOP24)

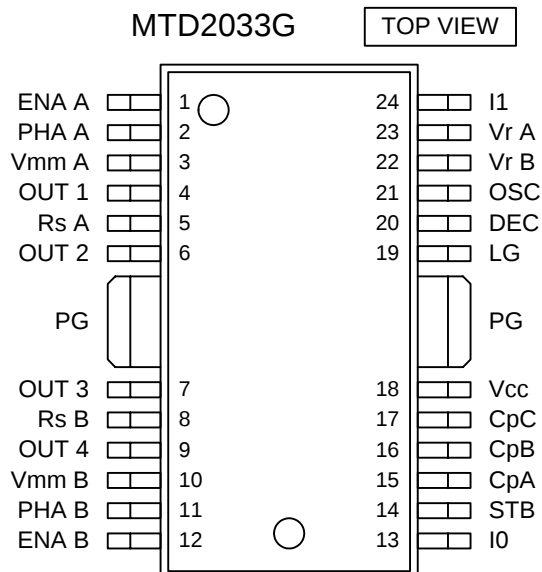


■ Absolute maximum ratings / Ta=25

Parameter	Symbol	Rating	Unit
Load supply	V _{mm}	40	V
Output current	I _{OUT}	1.5	A
Logic supply	V _{cc}	0 ~ 7	V
Logic input	V _{LOGIC}	0 ~ V _{cc}	V
Power dissipation *1	P _D	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



■ Electrical Characteristics

Ta=25 , Vcc=5V , Vmm=24V unless otherwise specified

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
● Output stage						
Load supply current (All circuit OFF)	I _{mm} (OFF)	V _{ENA} =all 5V or V _{I0} =V _{I1} =5V	-	11	20	mA
Load supply current (Stand-by)	I _{mm} (STB)	V _{mm} =35V, V _{STB} =0V	-	-	100	μA
Source driver ON resistance	R _{ON} H	I _{out} =-0.8A	-	0.5	0.7	Ω
Sink driver ON resistance	R _{ON} L	I _{out} =0.8A	-	0.5	0.7	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	-	1.2	1.4	V
Lower MOSFET reverse voltage	V _F L	I _F =0.8A	-	1.2	1.4	V
VcpA under voltage lock out threshold	VcpAUVLO	-	V _{mm} +3	V _{mm} +4	V _{mm} +6	V
● Logic stage						
Logic supply current (All circuit ON)	I _{cc} (ON)	-	-	5	10	mA
Logic supply current (All circuit OFF)	I _{cc} (OFF)	V _{ENA} =all 5V or V _{I0} =V _{I1} =5V	-	5	10	mA
Logic supply current (Stand-by)	I _{cc} (STB)	V _{STB} =0V	-	-	6	mA
Vcc under voltage lock out threshold	VccUVLO	-	3.6	3.8	4.0	V
Logic "H" input voltage	V _{LOGIC} H	-	2.0	-	Vcc	V
Logic "L" input voltage	V _{LOGIC} L	-	GND	-	0.7	V
PHA/ENA/I0/I1/STB "H" input current	I _{IN} H	V _{IN} =3.3 or 5V	-	-	10	μA
PHA/ENA/I0/I1/STB "L" input current	I _{IN} L	V _{IN} =0V	-	-20	-50	μA
DEC "H" input voltage	V _{DEC} H	-	2.0	-	Vcc	V
DEC "L" input voltage	V _{DEC} L	-	GND	-	0.7	V
DEC "H" input current	I _{DEC} H	V _{DEC} =3.3 or 5V	-	50	200	μA
DEC "L" input current	I _{DEC} L	V _{DEC} =0V	-	-	-10	μA
OSC "H" input voltage	V _{OSC} H	-	2.0	-	Vcc	V
OSC "L" input voltage	V _{OSC} L	-	GND	-	0.7	V
OSC "H" input current	I _{OSC} H	V _{OSC} =3.3 or 5V	-	-	10	μA
OSC "L" input current	I _{OSC} L	V _{OSC} =0V	-	-20	-50	μA
Vr "H" input current	I _{ref} H	Vr=5V	-	-	10	μA
Vr "L" input current	I _{ref} L	Vr=0V	-	-1	-10	μA
Comparator Threshold (100%)	Vs1	V _{I0} ="L", V _{I1} ="L"	95	100	105	%
Comparator Threshold (70%)	Vs2	V _{I0} ="H", V _{I1} ="L"	64	70	76	%
Comparator Threshold (40%)	Vs3	V _{I0} ="L", V _{I1} ="H"	36	40	44	%
Comparator blanking tim	tb	-	1	2	3	μs
CpA Charging tim *1	Tchg	Cp1=0.47 μF, Cp2=0.022 μF	-	-	2	ms
Thermal shutdown temperature *2	T _{TSD}	-	150	170	-	

*1:When Vcpa is higher than Vmm+6V, outputs can be turned on.

Be sure to wait before moter drive so long than Tchg, when logic power supply powered on or Stand-By release.

*2:Shutdown tempereture is assured by design.

■ Thermal resistance

Symbol	Rating	Unit
θ _{ja} *3	58	/W

*3 : 50.8 × 50.8 × 1mm³ Glass Epoxy Board(FR4),200mm² Copper Pattern

■ Recommended operation conditions

Parameter	Symbol	Recommendation	Unit
Junction temperature	T _j	-25 ~ 120	
Logic supply	V _{cc}	4.75 ~ 5.50	V
Load supply	V _{mm}	15 ~ 35	V
Reference voltage	V _r	0 ~ 6	V
OSC frequency	f _{OSC}	16 ~ 150	kHz

■ Truth table

I0 and I1	ENA A or B	PHA A or B	OUT 1 or 4	OUT 2 or 3
L	L	H	H	L
L	L	L	L	H
×	H	×	OFF	OFF
H	×	×	OFF	OFF

× : don't care

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

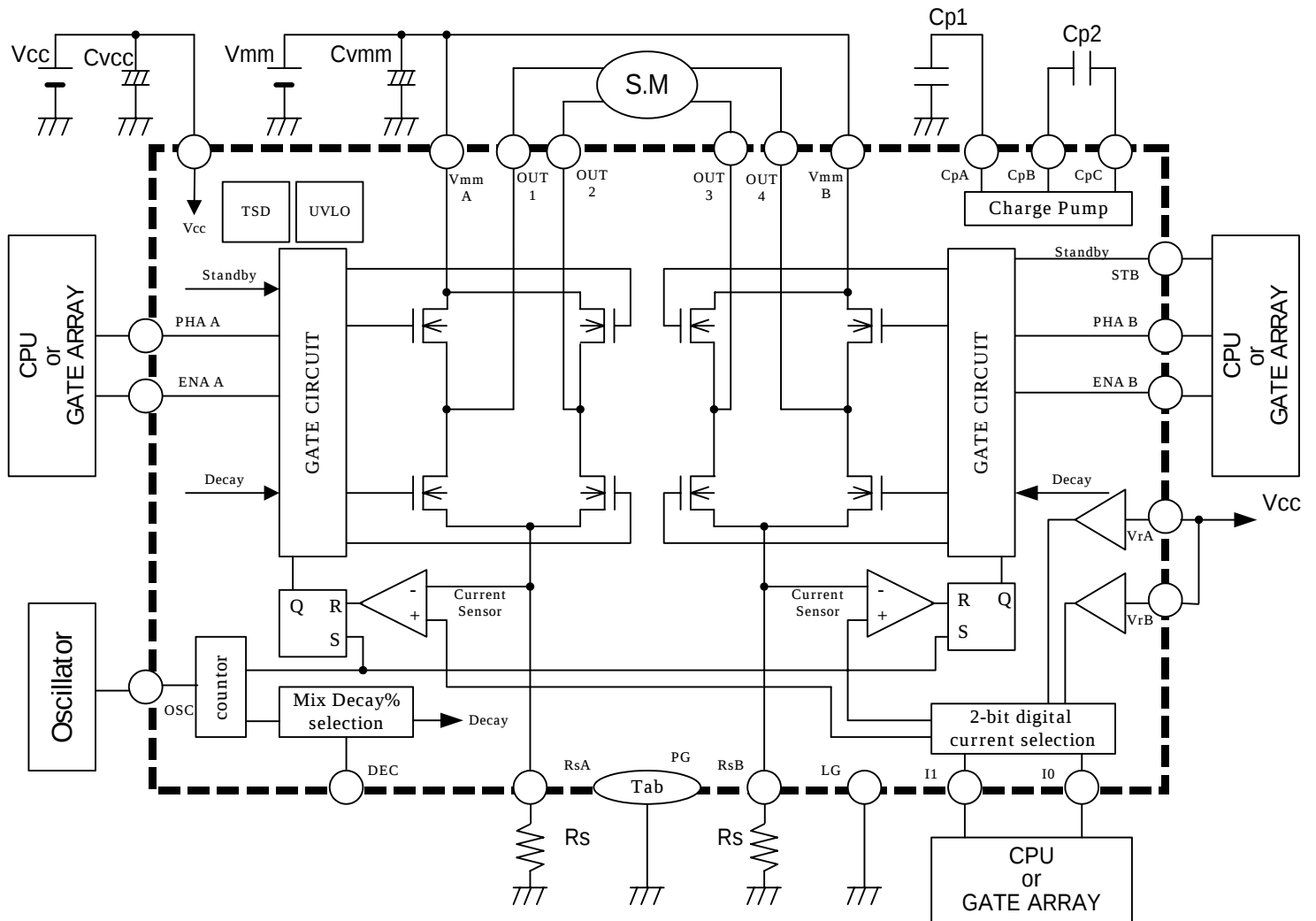
STB	Mode
H or OPEN	ACTIVE
L	Stand-By

DEC	Current Decay Mode
H	Mix Decay
L or OPEN	Slow Decay

Stepper Motor Driver IC

MTD2033G

■ Typical Application



- Constant chopping current level

$$I_{chop} = \frac{V_{ref}}{10R_s}$$

- Chopping frequency

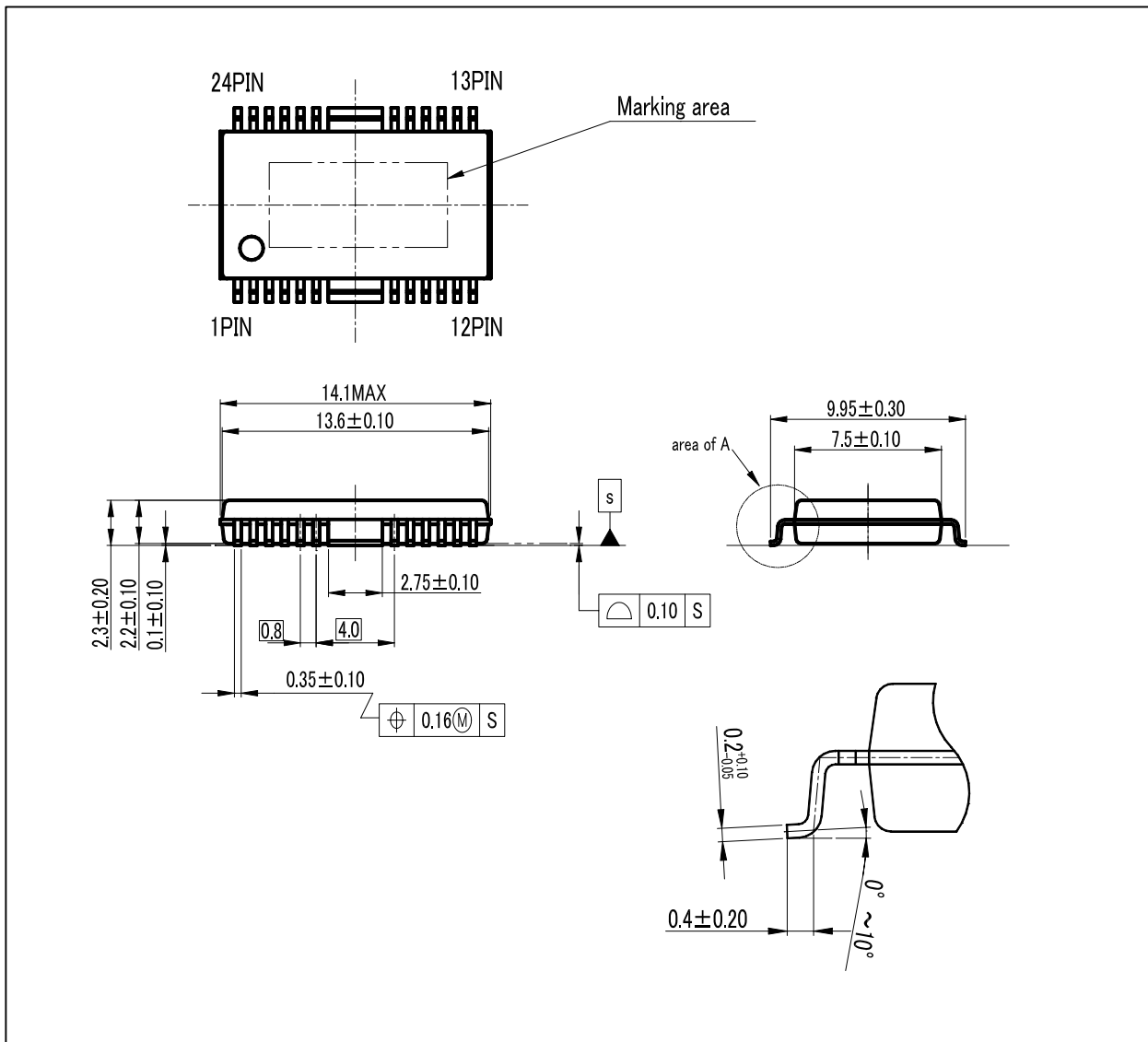
$$f_{chop} = f_{osc}$$

- Recommended component values

Symbol	Recommended value	Unit
Cp1	0.47	μ F
Cp2	0.022	μ F
Cvmm *1	47	μ F
Cvcc	1	μ F

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

■ Outline Drawing



(Unit : mm)

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