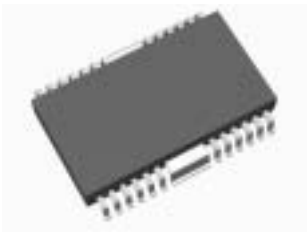
MTD2033G

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)



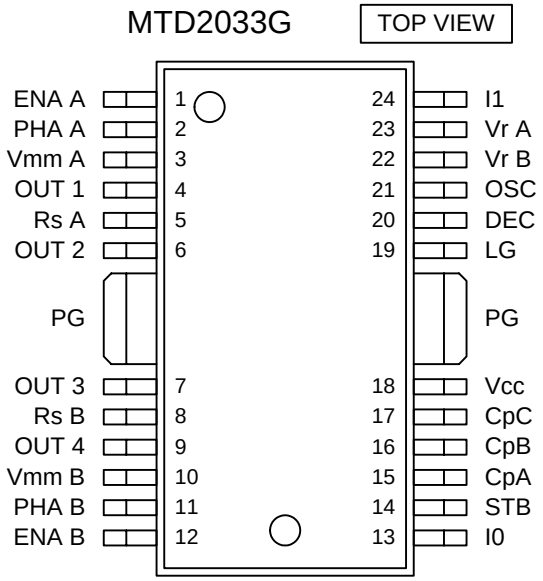
HSOP24

■Absolute maximum ratings / Ta=25°C

Parameter	Symbol	Rating	Unit
Load supply	Vmm	40	V
Output current	I_{OUT}	1.5	A
Logic supply	Vcc	0～7	V
Logic input	V_{LOGIC}	0～Vcc	V
Power dissipation *1	P_D	2.1	W
Storage temperature range	Tstg	-40～150	°C
Maximum Junction temperature	Tj	150	°C

*1 : 50.8×50.8×1mm^3 Glass Epoxy Board(FR4),200mm^2 Cupper Pattern

■Pin Assignment



■Electrical Characteristics

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

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
●Output stage						
Load supply current (All circuit OFF)	Imm(OFF)	V_{ENA}=all 5V or V_{I0}=V_{I1}=5V	-	11	20	mA
Load supply current (Stand-by)	Imm(STB)	Vmm=35V, V_{STB}=0V	-	-	100	μA
Source driver ON resistance	R_{ON}H	Iout=-0.8A	-	0.5	0.7	Ω
Sink driver ON resistance	R_{ON}L	Iout=0.8A	-	0.5	0.7	Ω
Upper MOSFET leakage current	IrH	Vmm=35V, V_{OUT}=0V	-	-	100	μA
Lower MOSFET leakage current	IrL	V_{OUT}=35V, V_{RS}=0V	-	-	100	μA
Upper MOSFET reverse voltage	V_FH	I_F=0.8A	-	1.2	1.4	V
Lower MOSFET reverse voltage	V_FL	I_F=0.8A	-	1.2	1.4	V
VcpA under voltage lock out threshold	VcpAUVLO	-	Vmm+3	Vmm+4	Vmm+6	V
●LOgic stage						
Logic supply current (All circuit ON)	Icc(ON)	-	-	5	10	mA
Logic supply current (All circuit OFF)	Icc(OFF)	V_{ENA}=all 5V or V_{I0}=V_{I1}=5V	-	5	10	mA
Logic supply current (Stand-by)	Icc(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	IrefH	Vr=5V	-	-	10	μA
Vr "L" input current	IrefL	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=0.47μF、Cp2=0.022μF	-	-	2	ms
Thermal shutdown temperature *2	T_{TSD}	-	150	170	-	°C

*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
θja *3	58	°C/W

*3 : 50.8×50.8×1mm^3 Glass Epoxy Board(FR4),200mm^2 Cupper Pattern

■Recommended operation conditions

Parameter	Symbol	Recommendation	Unit
Junction temperature	Tj	-25～120	℃
Logic supply	Vcc	4.75～5.50	V
Load supply	Vmm	15～35	V
Reference voltage	Vr	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

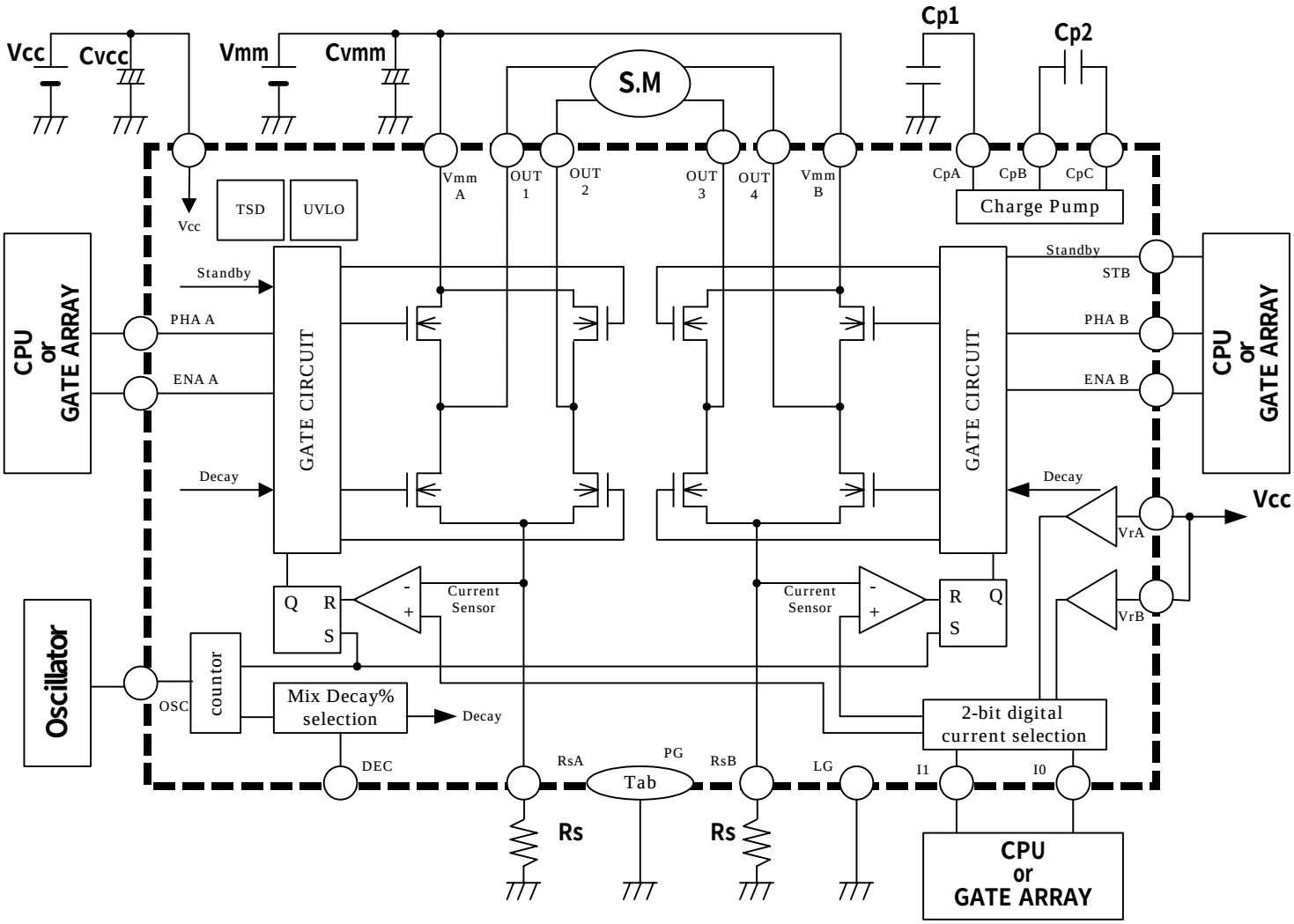
×：don't care

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

■Typical Application



●Constant chopping current level

$$Ichop = \frac{Vref}{10Rs}$$

●Chopping frequency

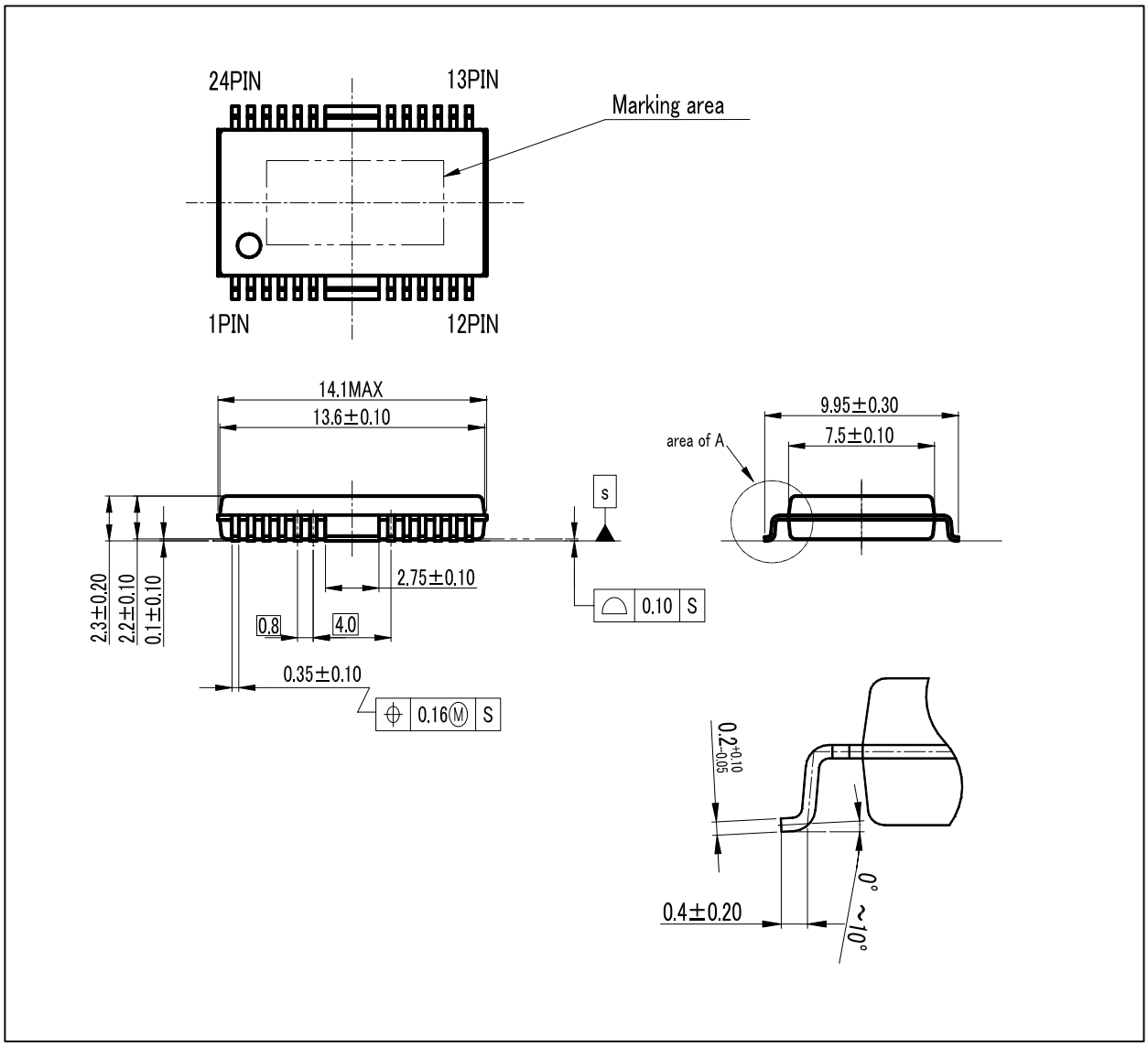
fchop = fosc

●Recommended component values

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

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

■Outline Drawing



(Unit : mm)

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