MTD2525J

DMOS Microstepping Dual PWM Motor Driver

Features

HSOP40

- ●Dual stepper motor driver
- ●For a bipolar stepper motor
- ●Built in constant current chopping (fixed frequency)
- ●DMOS output ; Vout = 40V, Iout = 1.0A
- ●2bit digital current selection
- ●Selectable current decay mode (Slow/Fast/Mix Decay Mode)
- ●Built in UVLO function , thermal shutdown function
- ●Built in system reset circuitry
- ●Built in voltage regulator (VREG=3.3V , Iout=250mA)
  (VREG=2.5V , Iout=250mA)
- ●Surface mount type package with heat dissipation tab (HSOP40)

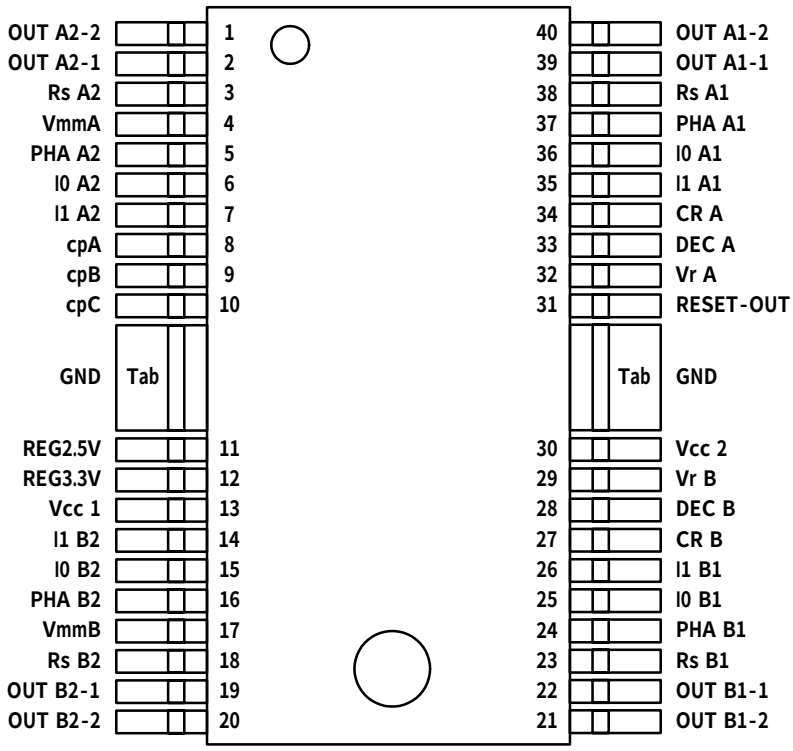
■Absolute maxmum ratings / Ta=25°C

Parameter	Symbol	Value	Unit
Motor supply voltage	Vmm	40	V
Motor driver output current	I_{OUT}	1.0	A
Logic supply voltage	Vcc1, Vcc2	0 ～ 7	V
Logic input voltage	V IN	0 ～ Vcc	V
3.3V-Regulator output current	I REG	250	mA
2.5V-Regulator output current	I REG	250	mA
Reset-IC output current	I RST	7	mA
Reset-IC output voltage	V RST	8	V
Power dissipation *	P_D	2.9	W
Storage temperature range	Tstg	-40 ～ 150	°C
Maximum iunction temperature	Tj	150	°C

*50.8×50.8×1mm³ Glass Epoxy Board(FR4),250mm² Cupper Pattern

■Pin Assignment

<TOP VIEW>



■Recommended operation conditions

Parameter	Symbol	Recommendation	Unit
Motor supply voltage	Vmm	15～35	V
Vcc1 logic supply voltage	Vcc1	4.75～5.50	V
Vcc2 logic supply voltage	Vcc2	4.20～5.50	V
Vr input voltage	Vr	0～5	V
Junction temperature	Tj	-25～120	℃

■Thermal resistance

Symbol	Value	Unit
θja	43	℃/W

*50.8×50.8×1mm³ Glass Epoxy Board(FR4),250mm² Cupper Pattern

■Electrical Characteristics 1

Ta=25°C,Vcc1=5V,Vcc2=5V,Vmm=24V unless otherwise specified

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Common to all function						
Vcc1 Logic supply current	Icc1	3.3-REG and 2.5-REG no load. RESET-OUT="High"	-	5	10	mA
Thermal shutdown operation temperture	Tsd	(Notes 1)	(150)	170	-	°C
Stepper motor drivers						
Vcc2 UVLO Enable threshold	Vcc2UVLO	-	3.6	3.8	4.0	V
Vcc2 Logic supply current(when all circuit stop)	Icc2(OFF)	-	-	10	15	mA
Vcc2 Logic supply current(all circuit operation)	Icc2(ON)	-	-	15	20	mA
Moter supply current(all circuit operation)	ImmON	The completion of charge	-	20	30	mA
Moter supply current(stand-by)	Imm(STB)	Vcc=OPEN or 0V, Vmm=35V	-	-	100	mA
Pha/I0/I1"High" input voltage	V IN H	-	2.0	—	Vcc2	V
Pha/I0/I1 "Low" input voltage	V IN L	-	GND	—	0.7	V
Pha/I0/I1 input current	I IN H I IN L	V IN = 5V V IN = 0V	—	—	10	μA
DEC "High" input current	I DEC H	V DEC = 5V	—	333	500	μA
DEC "Low" input current	I DEC L	V DEC = 0V	—	—	-15	μA
Reference input current	I ref	Vref = 3V	—	50	100	μA
Comparator threshold(100%)	Vs1	I0 = Low , I1 = Low	95	100	105	%
Comparator threshold(70%)	Vs2	I0 = High , I1 = Low	64	70	76	%
Comparator threshold(40%)	Vs3	I0 = Low , I1 = High	36	40	44	%
Source driver ON resistance	R ON H	Iout = -0.8A	—	0.6	0.8	Ω
Sink driver ON resistance	R ON L	Iout = 0.8A	—	0.6	0.8	Ω
Output leakagr current	I leak	Vmm = 35V , Vout = 0V Vout = 35V , Vtab = 0v	—	—	100	μA
Blanking time	tb	Ct=3300pF , Rt=18kΩ	—	1.55	—	μs
CpA Charge setting time	Tchg	Cp1=0.22μF,Cp2=0.01μF Vmm=27V,Vcc2=0V→5V	—	—	1.5	m s

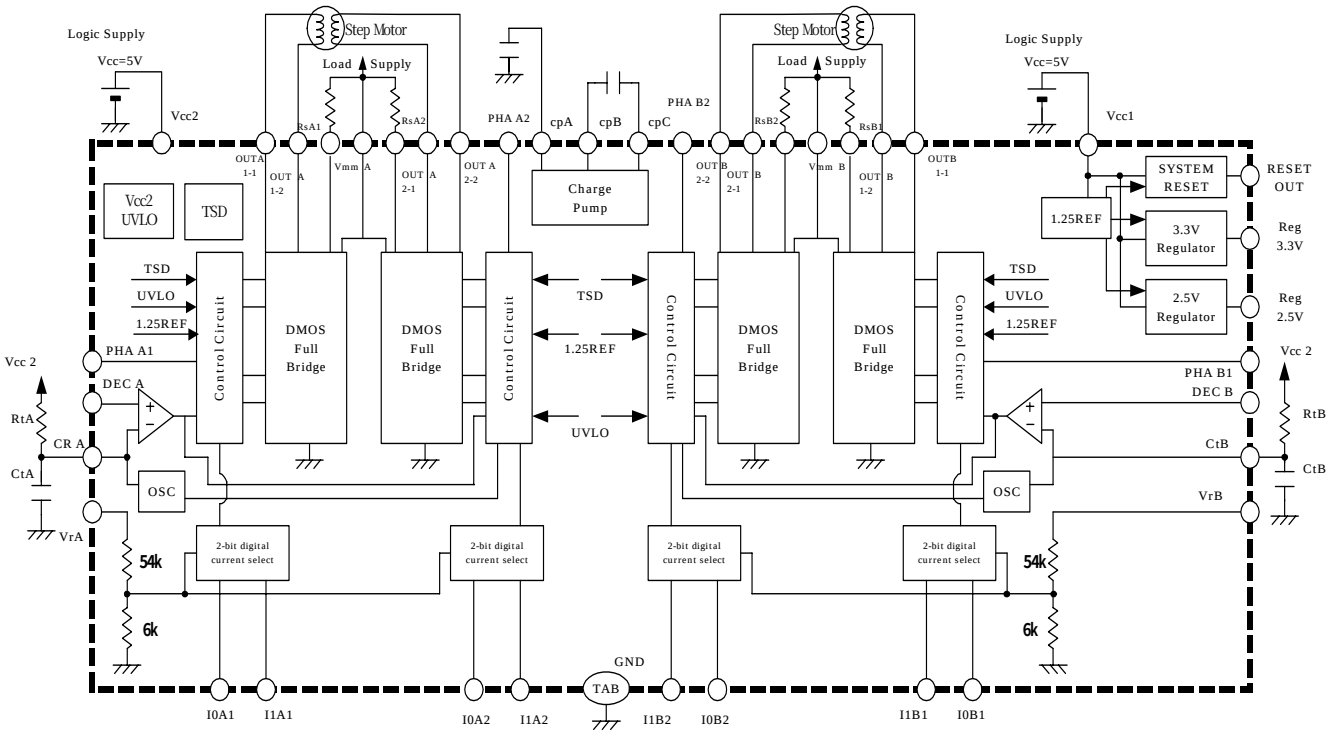
(Notes 1) shutdown temperature is assured by design

■Electrical Characteristics 2

Ta=25°C unless otherwise specified

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
3.3V - Voltage regulator						
Output voltage 1	VREG3.3_1	Vcc1=5.0V,I REG3.3 = 40mA	3.21	3.30	3.39	V
Output voltage 2	VREG3.3_2	Vcc1=3.60V,I REG3.3 = 100mA	3.10	3.30	3.39	V
Output max load current 1	IREG3.3_1	Vcc1=4.75V,V REG3.3 = 3.21V	-	-	250	mA
Output max load current 2	IREG3.3_2	Vcc1=3.60V,V REG3.3 = 3.10V	-	-	100	mA
Line regulation	△V LINE3.3	Vcc1=4.5～5.0V , I REG3.3= 40mA	—	10	20	mV
Load regulation	△V LOAD3.3	Vcc1 = 5V , I REG3.3 = 0～ 50mA	—	30	60	mV
Ripple rejection	RR3.3	Vcc1=5V , V RIPPLE=1Vp-p I REG3.3=40mA,f=120Hz, C3.3=4.7 μ F	50	70	—	dB
2.5V - Voltage regulator						
Output voltage 1	VREG2.5_1	Vcc1=5.0V,I REG2.5 = 40mA	2.425	2.500	2.575	V
Output voltage 2	VREG2.5_2	Vcc1=3.6V,I REG2.5 =100mA	2.300	2.500	2.575	V
Output max load current 1	IREG2.5_1	Vcc1=4.75V,V REG2.5 = 2.425V	-	-	250	mA
Output max load current 2	IREG2.5_2	Vcc1=3.60V,V REG2.5 = 2.300V	-	-	100	mA
Line regulation	△V LINE2.5	Vcc1=4.5～5.0V , I REG2.5= 40mA	—	10	20	mV
Load regulation	△V LOAD2.5	Vcc1 = 5V , I REG2.5 = 0～ 50mA	—	30	60	mV
Ripple rejection	RR2.5	Vcc1=5V , V RIPPLE=1Vp-p I REG2.5=40mA,f=120Hz, C2.5=4.7 μ F	50	70	—	dB
System reset circuitry						
Detection voltage	VsRST	RL = 1KΩ VRST(sat)≦0.4V Vcc1=High → Low	4.15	4.35	4.55	V
Output leakage current	I RSTH	V RST = 8V	—	—	3	μ A
Output saturation voltage	VRST(sat)	Vcc1 = 2.5V , IRST = 3mA	—	0.2	0.4	V
Operating logic supply vltage	VopL	RL = 1KΩ VRST(sat)≦0.4V	—	0.9	1.0	V
"H" Transport delay time	tD		60	100	140	m s

■Block diagram / Typical application



■DEC truth table

条件	DECAY Mode
V DEC ＜ 0.7V	Slow Decay
1V＜ V DEC ＜ 3V	Mix decay
V DEC ＞ 3V	Fast decay

■PHASE truth table

PHA A1	OUT A1-1	OUT A1-2
H	H	L
L	L	H

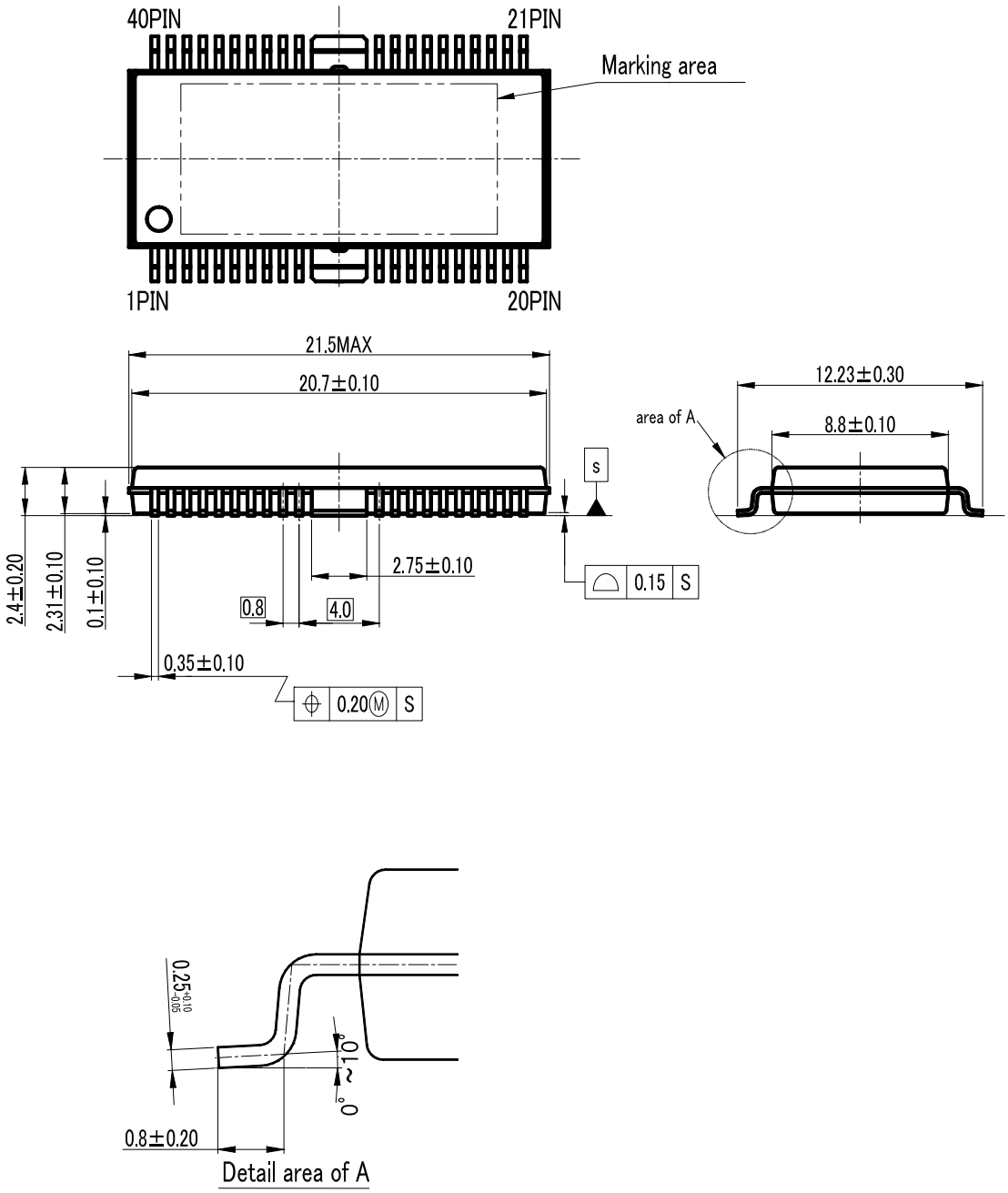
PHA A2	OUT A2-1	OUT A2-2
H	H	L
L	L	H

B side truth table is the same to A side

■Current control truth table

I0	I1	Output current (%)
L	L	100
H	L	70
L	H	40
H	H	0

■Outline Drawing



(Unit : mm)

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