

MTD2525J

DMOS Microstepping Dual PWM Motor Driver

Features

- Dual stepper motor driver
- For a bipolar stepper motor
- Built in constant current chopping (fixed frequency)
- DMOS output ; $V_{out} = 40V$, $I_{out} = 1.0A$
- 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 ($V_{REG}=3.3V$, $I_{out}=250mA$)
($V_{REG}=2.5V$, $I_{out}=250mA$)
- Surface mount type package with heat dissipation tab(HSOP40)

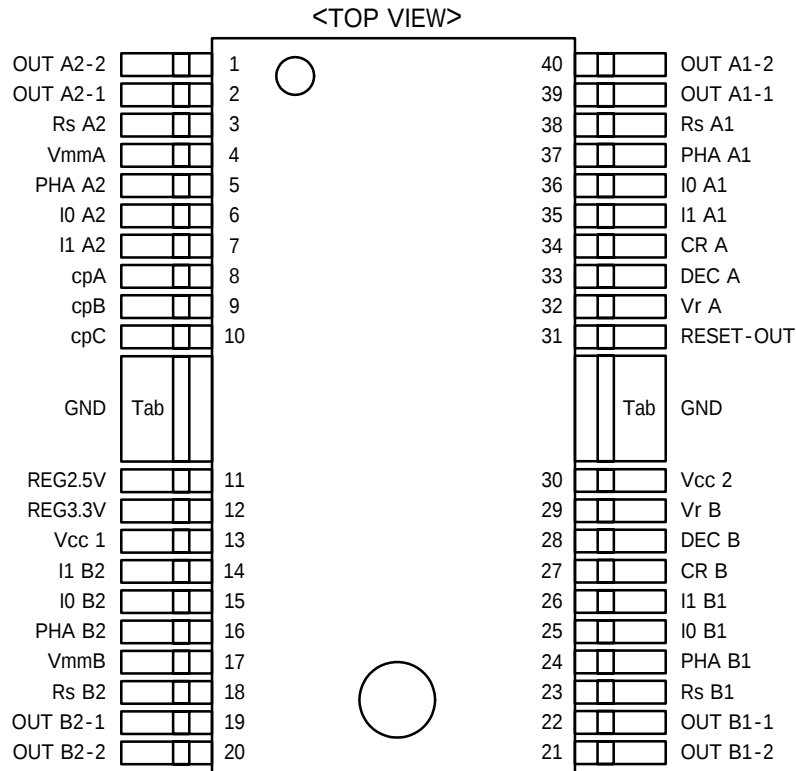


■ Absolute maximum ratings / $T_a=25$

Parameter	Symbol	Value	Unit
Motor supply voltage	V_{mm}	40	V
Motor driver output current	I_{OUT}	1.0	A
Logic supply voltage	V_{cc1}, V_{cc2}	0 ~ 7	V
Logic input voltage	V_{IN}	0 ~ V_{cc}	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	T_{stg}	-40 ~ 150	
Maximum junction temperature	T_j	150	

* $50.8 \times 50.8 \times 1mm^3$ Glass Epoxy Board(FR4),250mm² Copper Pattern

■ Pin Assignment



■ 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
θ_{ja}	43	/W

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

Stepper Motor Driver IC

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■ Electrical Characteristics 1

Ta=25℃, 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 temperature	Tsd	(Notes 1)	(150)	170	-	
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
Motor supply current(all circuit operation)	IimmON	The completion of charge	-	20	30	mA
Motor supply current(stand-by)	Iimm(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 leakage 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=0.22 μF, Cp2=0.01 μF Vmm=27V, Vcc2=0V → 5V	-	-	1.5	ms

(Notes 1) shutdown temperature is assured by design

Stepper Motor Driver IC

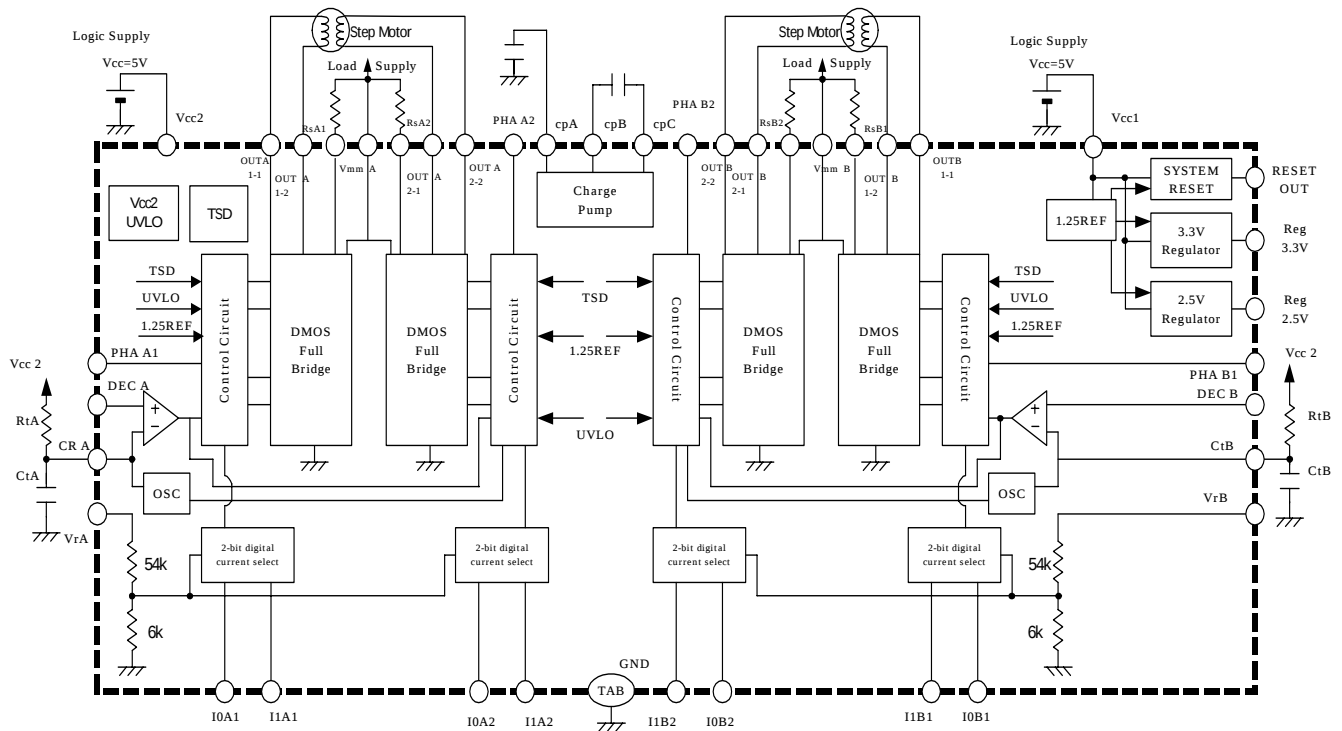
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■ Electrical Characteristics 2

Ta=25 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	I REG3.3_1	Vcc1=4.75V, V REG3.3 = 3.21V	-	-	250	mA
Output max load current 2	I REG3.3_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 μF	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	I REG2.5_1	Vcc1=4.75V, V REG2.5 = 2.425V	-	-	250	mA
Output max load current 2	I REG2.5_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 μF	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	μA
Output saturation voltage	VRST(sat)	Vcc1 = 2.5V , I RST = 3mA	-	0.2	0.4	V
Operating logic supply voltage	VopL	RL = 1KΩ VRST(sat) 0.4V	-	0.9	1.0	V
"H" Transport delay time	tD		60	100	140	ms

■ 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

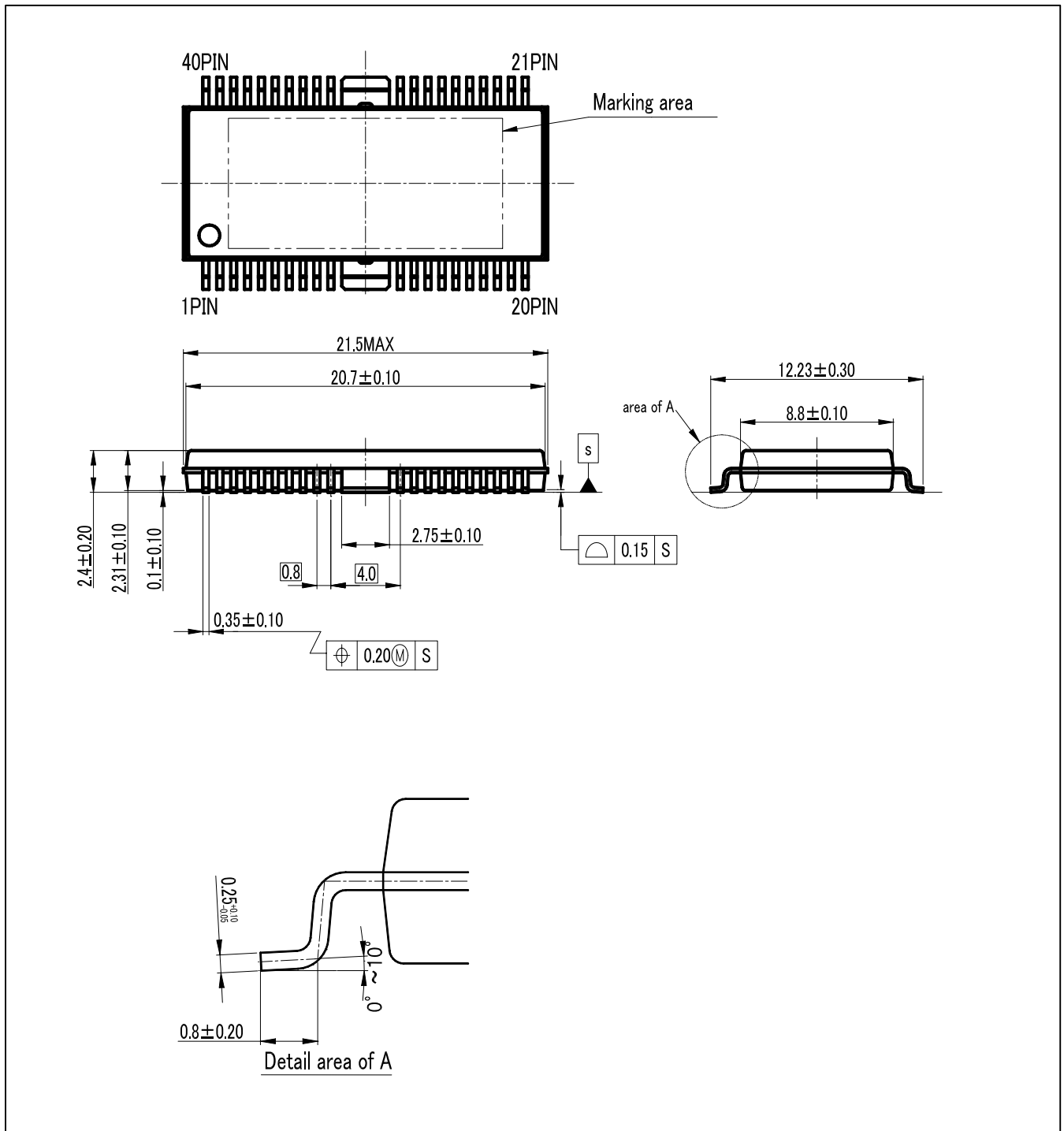
PHA A1	OUT A1-1	OUT A1-2	PHA A2	OUT A2-1	OUT A2-2
H	H	L	H	H	L
L	L	H	L	L	H

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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