SHINDENGEN

Stepping Motor Driver ICs — **MTD Series**

MTD2001

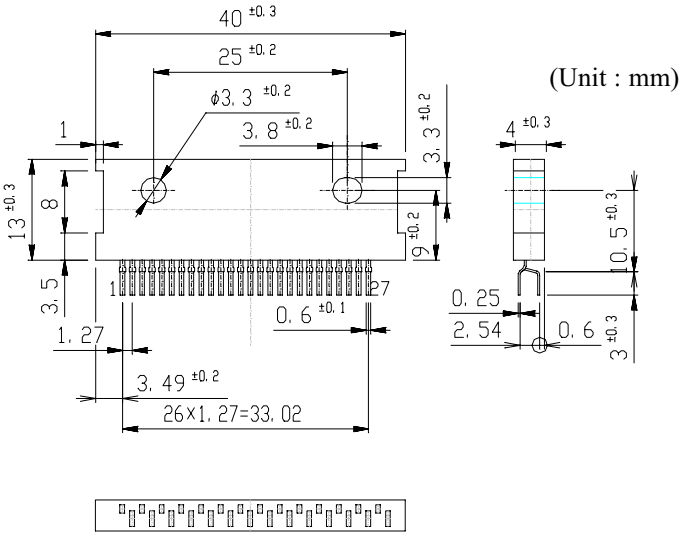
FEATURES

- ●Constant-current chopping function (Off time fixed, self-oscillation)
- ●4-phase input (with inhibit for simultaneously turn ON)
- ●An ENABLE function is provided
- ●Protection for penetration current
- ●Built-in overheating protection (Alarm + shutdown)

OUTLINE DIMENSIONS

Case : ZIP-27

(Unit : mm)



RATINGS

●Absolute Maximum Ratings (Ta=25℃)

Item	Symbol	Ratings	Unit
Output Voltage	$V_{CEO(SUS)}$	60	V
Output Current	I_O	1.5	A
Logic Supply Voltage	V_{CC}	0 to 7	V
Logic Input Voltage	V_{IN}	0 to V_{CC}	V
Total Power Dissipation	P_T	5	W
Junction Temperature	Tj	150	℃
Storage Temperature	Tstg	-40 to 150	℃

●Electrical Characteristics (Ta=25℃)

Item	Symbol	Test Conditions	min.	typ.	max.	Unit
Output Saturation Voltage(Upper side)	V_{CE}(sat)H	Io=1.0A		1.0	1.4	V
Output Saturation Voltage(Lower side)	V_{CE}(sat)L	Io=1.0A		1.0	1.3	V
Output Leakage Current(Upper side)	Ir_H	Vmm=60V,Vout=0V			10	μA
Output Leakage Current(Lower side)	I_{rL}	Vout=60V,V_{RS}=0V			10	μA
Logic Supply Current(Standby)	I_{CC}(OFF)	V_{CC}=5V,V_{ENA}="H"		25	35	mA
Logic Supply Current(All Circuit ON)	I_{CC}(ON)	V_{CC}=5V,V_{ENA}="L"		55	75	mA
Input High Voltage	V_{INH}	V_{CC} = 5V	2.7		Vcc	V
	V_{ENAH}	V_{CC} = 5V	2.7		Vcc	
Input Low Voltage	V_{INL}	V_{CC} = 5V	GND		1.0	V
	V_{ENAL}	V_{CC} = 5V	GND		1.0	
Logic High Input Current	I_{INH}	V_{CC} = 5V,V_{IN}=5V			10	μA
	I_{ENAH}	V_{CC} = 5V,V_{ENA}=5V			10	
Logic Low Input Current	I_{INL}	V_{CC} = 5V,V_{IN}=0V		-10	-50	μA
	I_{ENAL}	V_{CC} = 5V,V_{ENA}=0V		-10	-50	
Reference Input Current	Iref	V_{CC}=5V,Vref=0V		-1	-10	μA
Input Current(Current Sensor)	Isense	V_{CC}=5V,V_S=0V		-1	-10	μA
Maximum Sensing Voltage	V_S(max.)	V_{CC}=5V			1.5	V
Thermal Alarm Cutoff Current	Iralm	V_{CC}=5V,Valm=5V			10	μA
Thermal Alarm Output Current	Ialm	V_{CC}=5V,Valm=0.5V			2	mA
Thermal Alarm Temperature	Talm			125		℃
Thermal Shutdown Temperature	T_{TSD}			150		℃

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●Setting of Output Current and Fixed Off Time

Fig.1 shows constant current chopping wave form.

Output Current setting

$$Io = \frac{R2}{R1+R2} \cdot \frac{Vcc}{Rs}$$

Fixed Off Time Setting

Toff=0.69・Ct・Rt

●True Table

ENA A or B	IN 1 or 4	IN 2 or 3	Out 1 or 4	Out 2 or 3
L	L	L	OFF	OFF
L	L	H	L	H
L	H	L	H	L
L	H	H	OFF	OFF
H	×	×	OFF	OFF

× : don't care

●Recommended Parts Value

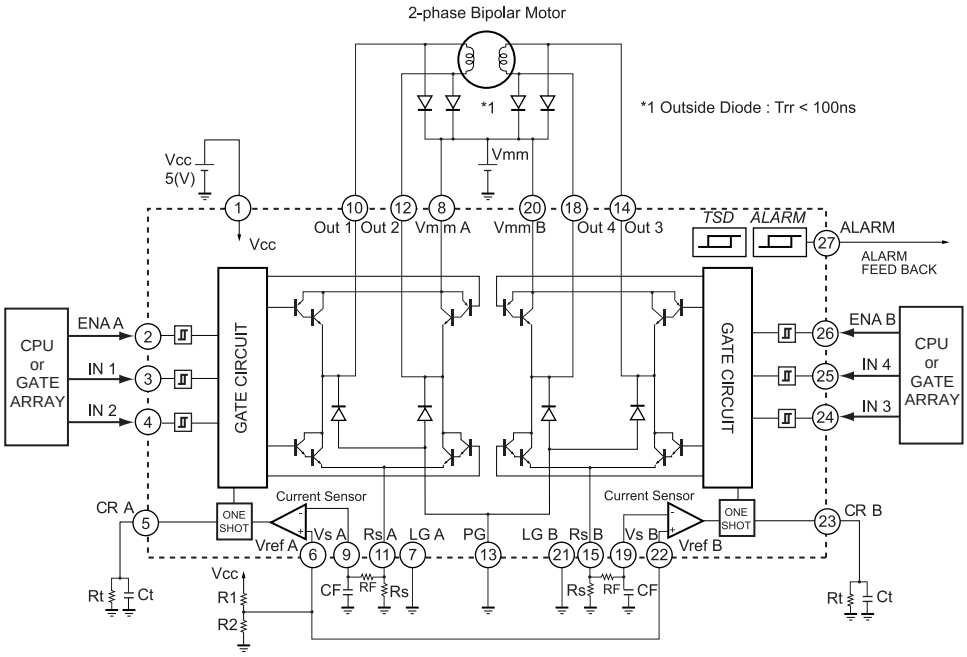
Symbol	Recommended Value	Unit
Rs	0.68	Ω
RF	2	kΩ
CF	1000	pF
Rt	15	kΩ
Ct	3300	pF
R1+R2	<10	kΩ

●Recommended Operating Conditions（Ta=25℃）

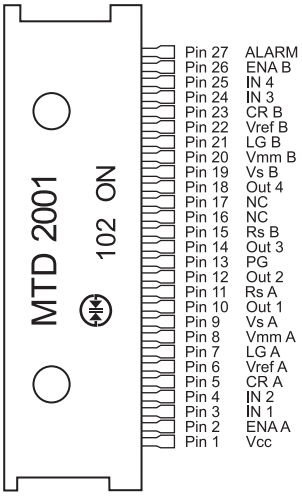
Item	Symbol	min.	typ.	max.	Unit
Motor Supply Voltage	Vmm	10		50	V
Output Current	Io			1.2	A
Output Emitter Voltage	V_E			1.5	V
Logic Supply Voltage	V_{CC}	4.75		5.25	V
Chopping Frequency	fchop		20	27	kHz
Operating Temperature	Top	-25		120	℃

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Equivalent Circuit / Basic Application Circuit

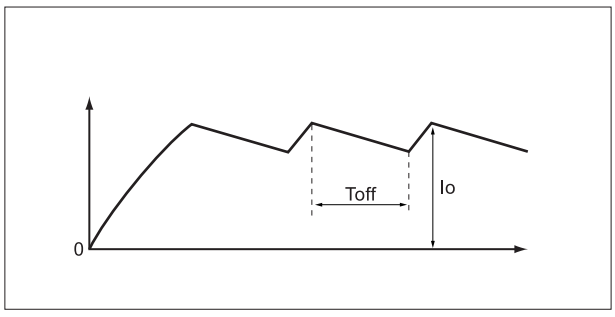


Pin Assignment



Package
ZIP-27

Fig.1 Constant current wave form (Motor current)



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