SHINDENGEN

Stepping Motor Driver ICs

MTD Series

MTD1110

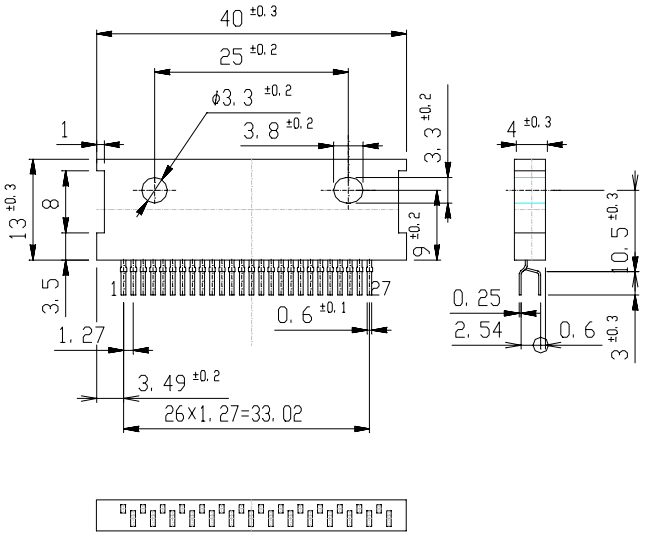
FEATURES

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

OUTLINE DIMENSIONS

Case : ZIP-27

(Unit : mm)



RATINGS

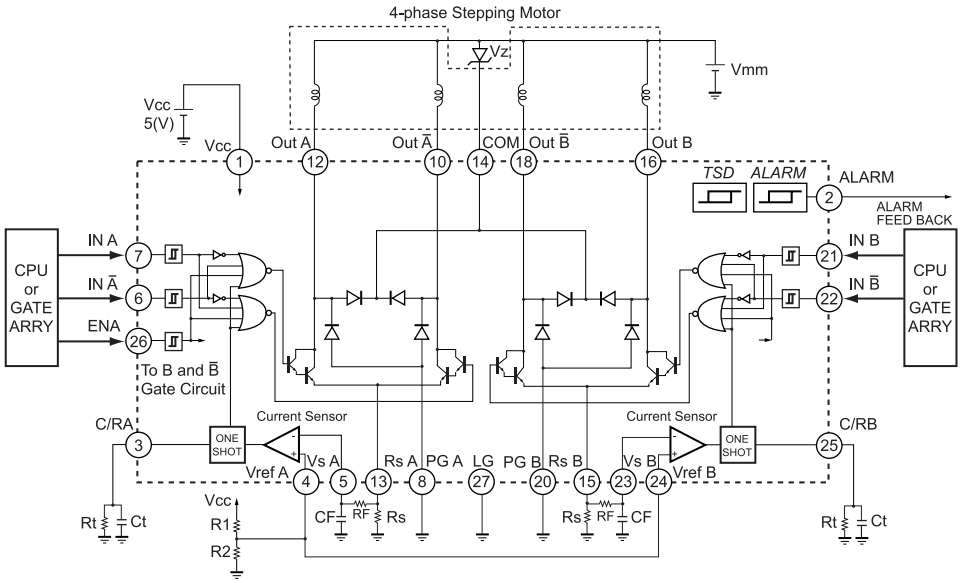
●Absolute Maximum Ratings Ta=25℃

Item	Symbol	Ratings	Unit
Output Voltage	$V_{CEO(SUS)}$	80	V
Output Current	I_O	2	A
Logic Supply Voltage	V_{CC}	0～7	V
Logic Input Voltage	V_{IN}	0～V_{CC}	V
Total Power Dissipation	P_T	5	W
Junction Temperature	Tj	150	℃
Storage Temperature	Tstg	−40～150	℃

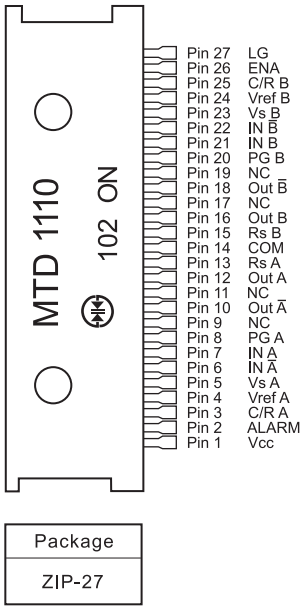
●Electrical Characteristics (Ta=25℃)

Item	Symbol	Test Conditions	min.	typ.	max.	Unit
Output Saturation Voltage	V_{CE}(sat)	Io=1.5A		1.1	1.4	V
Output Leakage Current	I_{CER}	V_{CER}=80V			10	μA
Logic Supply Current(Standby)	I_{CC}(OFF)	V_{CC}=5V,V_{ENA}="H"		20	40	mA
Logic Supply Current(All Circuit ON)	I_{CC}(ON)	V_{CC}=5V,V_{ENA}="L"		40	60	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	−100	
Reference Input Current	Iref	V_{CC}=5V,Vref=0V		−1	−50	μA
Input Current(Current Sensor)	Isense	V_{CC}=5V,V_S=0V		−1	−50	
Maximum Sensing Voltage	V_S(max.)	V_{CC}=5V			1.0	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		℃

● Equivalent Circuit・Basic Application Circuit



●Pin Assignment



Package
ZIP-27

●True Table

ENA	IN A or B	IN Ā or B̄	Out A or B	Out Ā or B̄
L	L	L	OFF	OFF
L	L	H	OFF	ON
L	H	L	ON	OFF
L	H	H	OFF	OFF
H	×	×	OFF	OFF

× : don't care

●Recommended Parts Value

Symbol	Recommended Value	Unit
Rs	0.68	Ω
RF	1	kΩ
CF	3300	pF
Rt	8.2	kΩ
Ct	3300	pF
Vz	Vmm×1.2～1.5	V
R1+R2	<10	kΩ

●Setting of Output Current and Fixed Off Time

Fig.1 shows constant current chopping wave form.

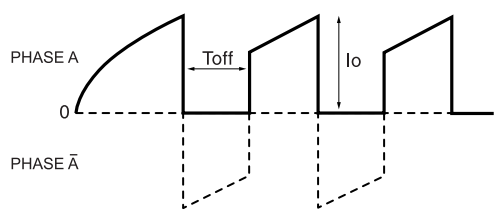
○Output Current setting

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

○Fixed Off Time Setting

Toff=0.69・Ct・Rt

Fig.1 Constant current wave form (Motor current)



●Recommended Operating Conditions （Ta=25℃）

Item	Symbol	min.	typ.	max.	Unit
Motor Supply Voltage	Vmm			32	V
Output Voltage	VOUT			70	V
Output Current	Io			1.5	A
Output Emitter Voltage	VE			1.0	V
Logic Supply Voltage	Vcc	4.75		5.25	V
Chopping Frequency	fchop		20	27	kHz
Operating Temperature	Top	−25		120	℃