

SHINDENGEN

Stepping Motor Driver ICs

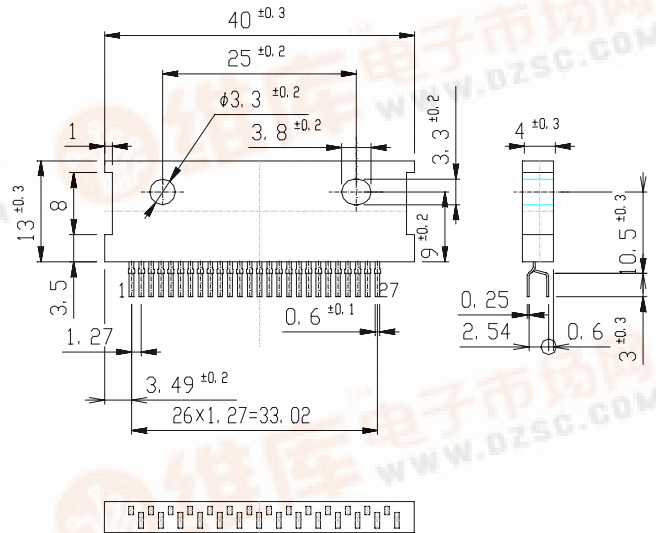
MTD Series

MTD1110

OUTLINE DIMENSIONS

Case : ZIP-27

(Unit : mm)



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

RATINGS

● Absolute Maximum Ratings Ta=25°C

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	T_j	150	°C
Storage Temperature	T_{stg}	-40~150	°C

● Electrical Characteristics (Ta=25°C)

Item	Symbol	Test Conditions	min.	typ.	max.	Unit
Output Saturation Voltage	$V_{CE(sat)}$	$I_o=1.5A$		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		V_{CC}	V
	V_{ENAH}	$V_{CC} = 5V$	2.7		V_{CC}	
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	I_{ref}	$V_{CC}=5V, V_{ref}=0V$		-1	-50	μA
Input Current(Current Sensor)	I_{sense}	$V_{CC}=5V, V_s=0V$		-1	-50	μA
Maximum Sensing Voltage	$V_s(max.)$	$V_{CC}=5V$			1.0	V
Thermal Alarm Cutoff Current	I_{alm}	$V_{CC}=5V, V_{alm}=5V$			10	μA
Thermal Alarm Output Current	I_{alm}	$V_{CC}=5V, V_{alm}=0.5V$			2	mA
Thermal Alarm Temperature	T_{alm}			125		°C
Thermal Shutdown Temperature	T_{TSD}			150		°C

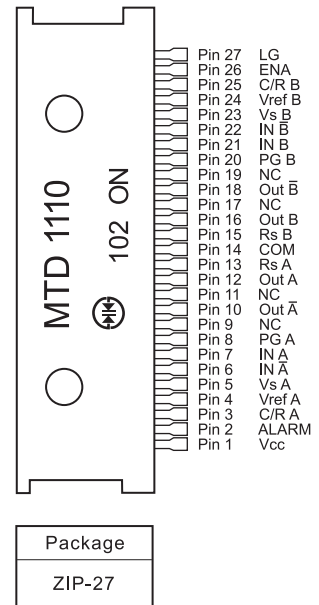
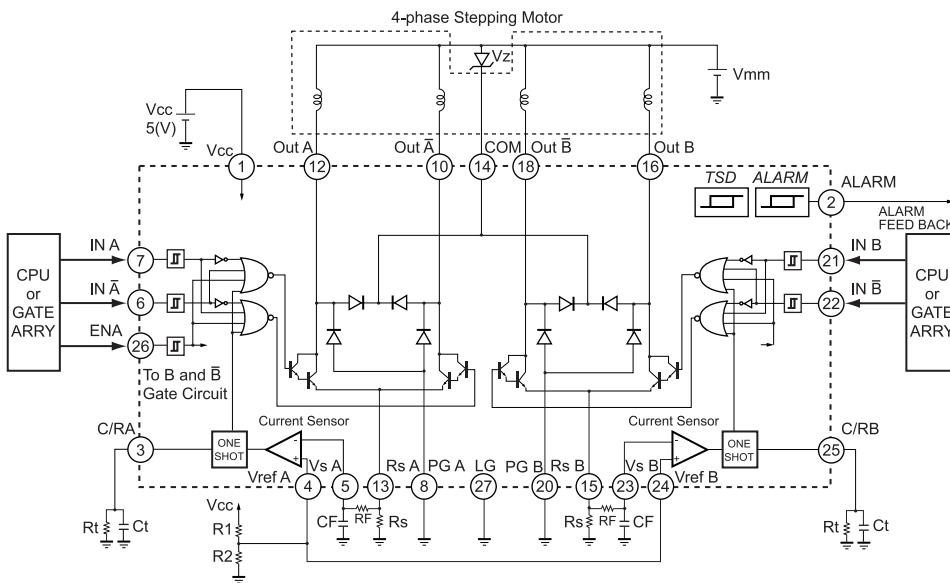


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● Equivalent Circuit · Basic Application Circuit

● Pin Assignment



● True Table

ENA	IN A or B	IN A-bar or B-bar	Out A or B	Out A-bar or B-bar
L	L	L	OFF	OFF
L	L	H	OFF	ON
L	H	L	ON	OFF
L	H	H	OFF	OFF
H	x	x	OFF	OFF

x : don't care

● Recommended Parts Value

Symbol	Recommended Value	Unit
Rs	0.68	Ω
RF	1	k Ω
CF	3300	pF
Rt	8.2	k Ω
Ct	3300	pF
Vz	V _{mm} × 1.2 ~ 1.5	V
R1+R2	<10	k Ω

● Setting of Output Current and Fixed Off Time

Fig.1 shows constant current chopping wave form.

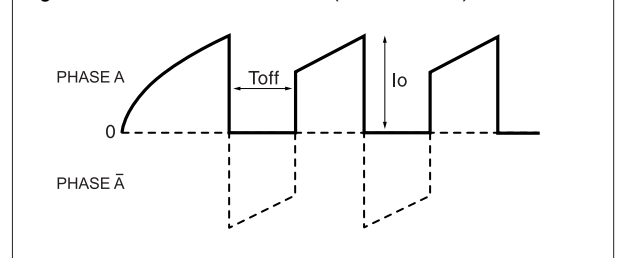
○ Output Current setting

$$I_o = \frac{R_2}{R_1 + R_2} \cdot \frac{V_{cc}}{R_s}$$

○ Fixed Off Time Setting

$$T_{off} = 0.69 \cdot C_t \cdot R_t$$

Fig.1 Constant current wave form (Motor current)



● Recommended Operating Conditions (Ta=25°C)

Item	Symbol	min.	typ.	max.	Unit
Motor Supply Voltage	V _{mm}			32	V
Output Voltage	V _{OUT}			70	V
Output Current	I _o			1.5	A
Output Emitter Voltage	V _E			1.0	V
Logic Supply Voltage	V _{CC}	4.75		5.25	V
Chopping Frequency	f _{chop}		20	27	kHz
Operating Temperature	T _{op}	-25		120	°C