

# SHINDENGEN

## Stepping Motor Driver ICs

MTD Series

### MTD1120F

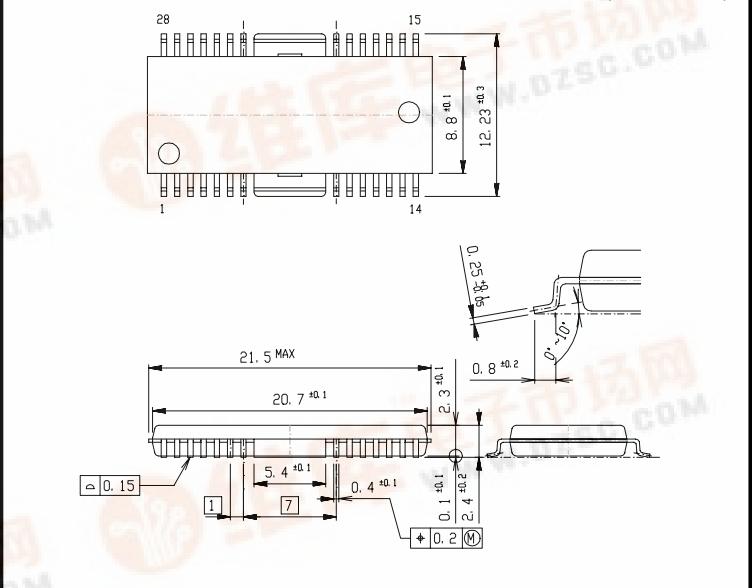
#### FEATURES

- Constant-current chopping function  
(Off time fixed, self-oscillation)
- 4-phase input  
(with inhibit for simultaneously turn ON)
- Built-in flywheel diodes

#### OUTLINE DIMENSIONS

Case : HSOP-28

(Unit : mm)



#### RATINGS

##### Absolute Maximum Ratings ( $T_a=25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Output Voltage	$V_{CEO(SUS)}$	80	V
Output Current	$I_O$	1.2	A
Logic Supply Voltage	$V_{CC}$	0~7	V
Logic Input Voltage	$V_{IN}$	$0 \sim V_{CC}$	V
Total Power Dissipation	$P_T$	3	W
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~150	$^\circ\text{C}$

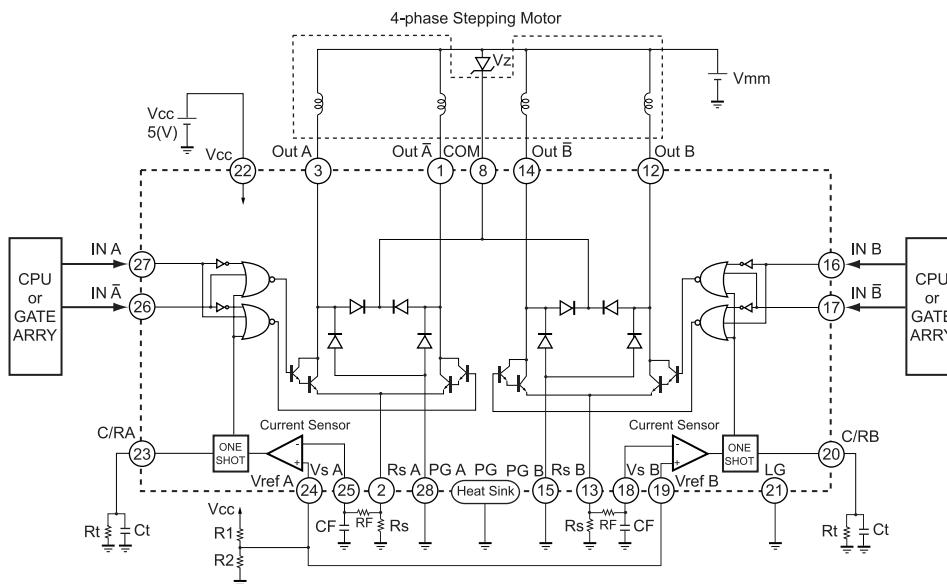
##### Electrical Characteristics ( $T_a=25^\circ\text{C}$ )

Item	Symbol	Test Conditions	min.	typ.	max.	Unit	
Output Saturation Voltage	$V_{CE}(\text{sat})$	$I_O=0.9\text{A}$		1.1	1.4	V	
Output Leakage Current	$I_{CER}$	$V_{CER}=80\text{V}$			10	$\mu\text{A}$	
Logic Supply Current	$I_{CC}$	$V_{CC} = 5\text{V}$		30	70	mA	
Input High Voltage	$V_{INH}$	$V_{CC} = 5\text{V}$	2.7		$V_{CC}$	V	
Input Low Voltage	$V_{INL}$	$V_{CC} = 5\text{V}$	GND		1.0	V	
Logic High Input Current	$I_{INH}$	$V_{CC} = 5\text{V}, V_{IN}=5\text{V}$			10	$\mu\text{A}$	
Logic Low Input Current	$I_{INL}$	$V_{CC} = 5\text{V}, V_{IN}=0\text{V}$			-10	-50	$\mu\text{A}$
Reference Input Current	$I_{ref}$	$V_{CC} = 5\text{V}, V_{ref}=0\text{V}$			-1	-50	$\mu\text{A}$
Input Current(Current Sensor)	$I_{sense}$	$V_{CC}=5\text{V}, V_s=0\text{V}$			-1	-50	$\mu\text{A}$
Maximum Sensing Voltage	$V_s(\text{max.})$	$V_{CC}=5\text{V}$				1.0	V

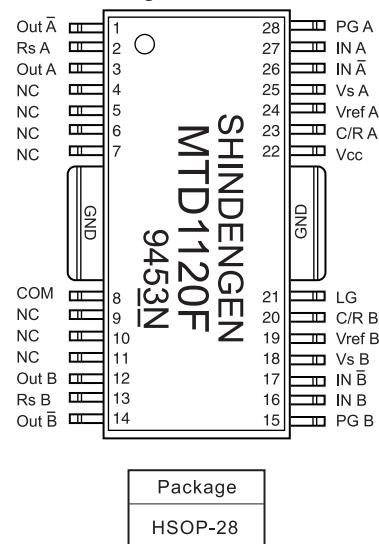
# Stepping Motor Driver ICs

**MTD1120F**

## ● Equivalent Circuit • Basic Application Circuit



## ● Pin Assignment



## ● True Table

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

## ● 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.

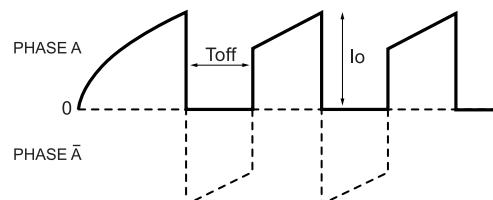
Output Current setting

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

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	Vmm			32	V
Output Voltage	Vout			70	V
Output Current	Io			0.5	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	°C