

MTD2005

FEATURES

- Constant-current chopping function (Frequency fixed, separate-oscillation)
- 2-phase input (ENA input is useful for half step drive)
- Selectable slow/fast current decay for improved micro stepping
- A noise cancel function is provided (No externally attached filter needed)
- Protection for penetration current
- Built-in thermal alarm
- Built-in flywheel diodes

RATINGS

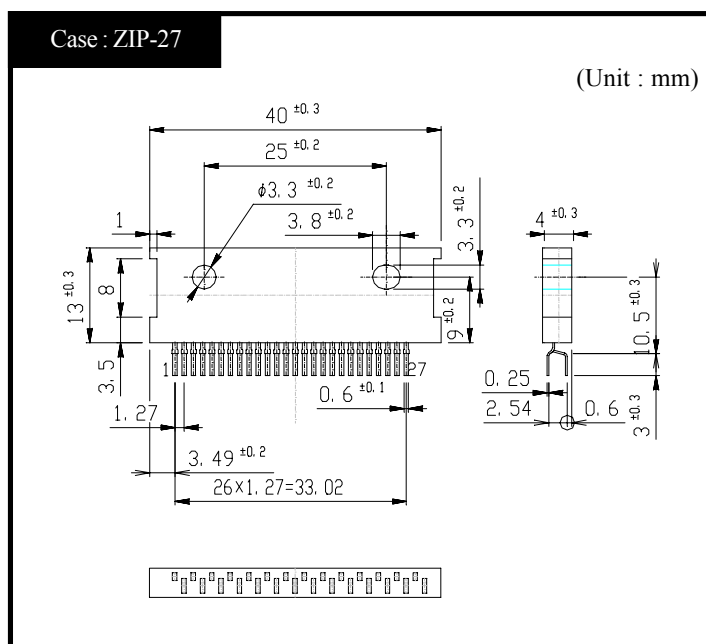
● Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Ratings	Unit
Output Voltage	$V_{CEO(SUS)}$	60	V
Output Current	I_O	1.3	A
Logic Supply Voltage	V_{CC}	0~6	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

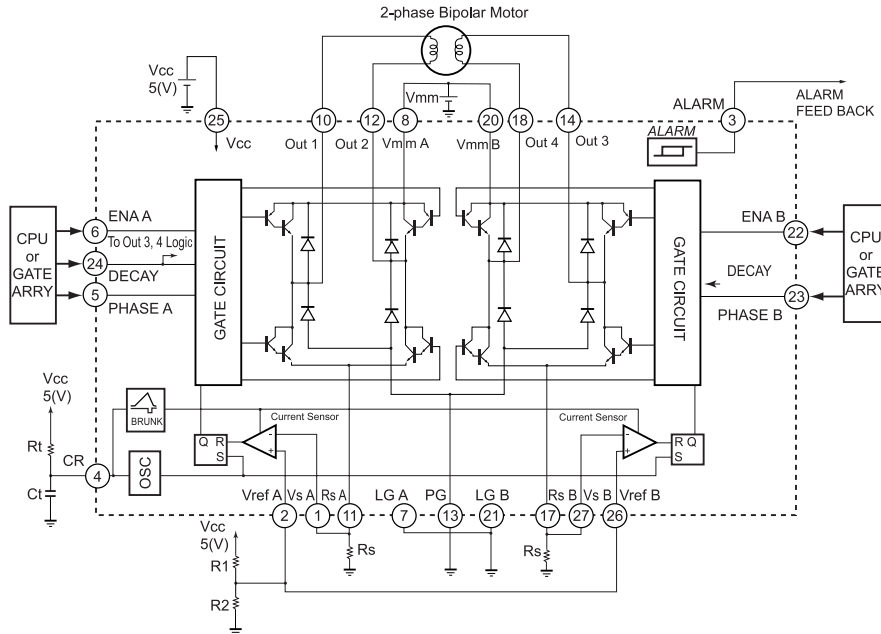
● Electrical Characteristics (Ta=25°C)

Item	Symbol	Test Conditions	min.	typ.	max.	Unit
Output Saturation Voltage(Upper side)	$V_{CE(sat)H}$	$I_o=0.8A$		1.0	1.4	V
Output Saturation Voltage(Lower side)	$V_{CE(sat)L}$	$I_o=0.8A$		1.0	1.4	V
Output Leakage Current(Upper side)	I_{rH}	$V_{mm}=60V, V_{out}=0V$			10	μA
Output Leakage Current(Lower side)	I_{rL}	$V_{out}=60V, V_{rs}=0V$			10	μA
Logic Supply Current(Standby)	$I_{CC(OFF)}$	$V_{cc}=5V, V_{ENA}="H"$		19	26	mA
Logic Supply Current(All Circuit ON)	$I_{CC(ON)}$	$V_{cc}=5V, V_{ENA}="L"$		25	33	mA
Phase "H" Input Voltage	V_{phaH}	$V_{CC} = 5V$	2.7		V_{cc}	V
Phase "L" Input Voltage	V_{phaL}	$V_{CC} = 5V$	GND		0.8	V
Phase "H" Input Current	I_{phaH}	$V_{CC} = 5V, V_{pha}=5V$			10	μA
Phase "L" Input Current	I_{phaL}	$V_{CC} = 5V, V_{pha}=0V$		-100	-150	μA
Enable "H" Input Voltage	V_{ENAH}	$V_{CC}=5V$	2.7		V_{cc}	V
Enable "L" Input Voltage	V_{ENAL}	$V_{CC}=5V$	GND		0.8	V
Enable "H" Input Current	I_{ENAH}	$V_{CC}=5V, V_{ENA}=5V$			10	μA
Enable "L" Input Current	I_{ENAL}	$V_{CC}=5V, V_{ENA}=0V$		-100	-150	μA
DECAY "H" Input Voltage	V_{DECH}	$V_{CC}=5V$	2.7		V_{cc}	V
DECAY "L" Input Voltage	V_{DECL}	$V_{CC}=5V$	GND		0.8	V
DECAY "H" Input Current	I_{DECH}	$V_{CC}=5V, V_{DEC}=5V$			10	μA
DECAY "L" Input Current	I_{DECL}	$V_{CC}=5V, V_{DEC}=0V$		-200	-300	μA
Reference Input Current	I_{ref}	$V_{CC}=5V, V_{ref}=0V$		-1	-10	μA
Input Current(Current Sensor)	I_{sense}	$V_{CC}=5V, V_s=0V$		-1	-10	μA
Maximum Sensing Voltage	$V_s(max.)$	$V_{CC}=5V$			1.0	V
Pulse Blanking Time	t_b	$V_{CC}=5V, C_t=3300pF$		1.35		μs
Thermal Alarm Cutoff Current	I_{ralm}	$V_{CC}=5V, V_{alm}=5V$			10	μA
Thermal Alarm Output Current	I_{alm}	$V_{CC}=5V, V_{alm}=0.5V$			2	mA
Thermal Alarm Temperature	T_{alm}			140		°C

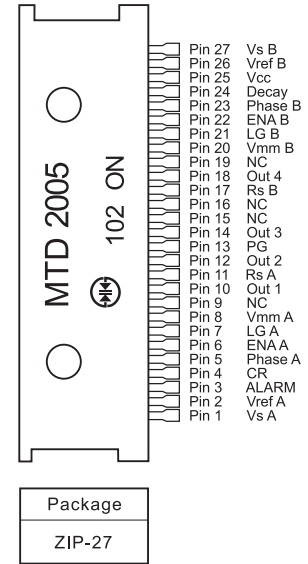
OUTLINE DIMENSIONS



● Equivalent Circuit · Basic Application Circuit



● Pin Assignment



● True Table

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

x : don't care

● Recommended Parts Value

Symbol	Recommended Value	Unit
Rs	0.68	Ω
Rt	13	kΩ
Ct	4700	pF
R1+R2	<10	kΩ

● True Table for Current Decay

DECAY	Current Decay Mode
L	FAST (Sink+Source Chopping)
H	SLOW (Source Chopping)

● Setting of Output Current and Chopping Frequency

Fig.1 shows constant current chopping wave form.

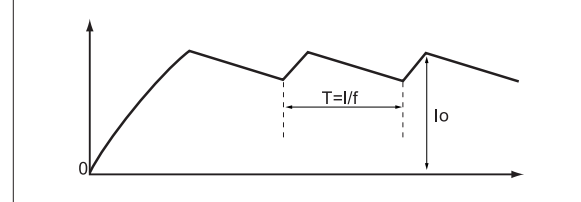
○ Output Current setting

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

○ Chopping Frequency Setting

$$f = \frac{1}{0.72 \cdot C_t \cdot R_t}$$

Fig.1 Constant current wave form (Motor current / phase)



● Recommended Operating Conditions (Ta=25°C)

Item	Symbol	min.	typ.	max.	Unit
Motor Supply Voltage	Vmm			50	V
Output Current	I _o			1	A
Output Emitter Voltage	V _E			1	V
Logic Supply Voltage	V _{CC}	4.75		5.25	V
Chopping Frequency	f _{chop}		20		kHz
Operating Temperature	T _{op}	-25		120	°C