

Drivers

IMT-901 - Microstep Constant Current Driver "IC"

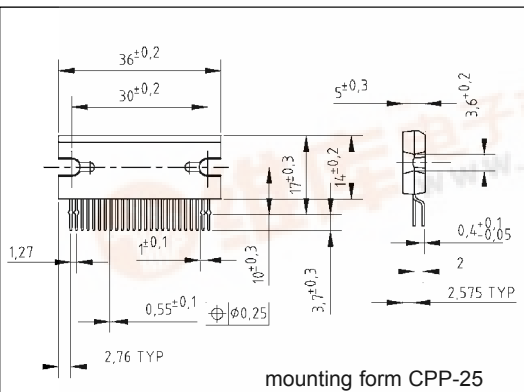


The IMT 901 is a PWM chopper type sinusoidal micro step bipolar stepping motor driver. Sinusoidal micro step operation is generated by means of built-in hardware and is outputted for operation by clock signal inputting.

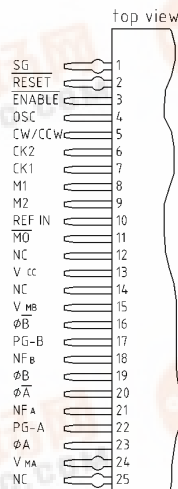
Advantages:

- only one IC for power and logic (up to 2,5 A/phase) reduces considerably space, assembly time and cost of a microstep driver with a max. functions yet with a min. of ext. components.
- selectable from: 1/1-, 1/2-, 1/4-, 1/8-Step enables individual application-related microstep switching, smooth and constant running and reduces considerably system resonance.
- Current down system or current zeroing reduces or eliminates motor power losses and heating during stand-still

Dimensions (mm)



PIN-Assignment



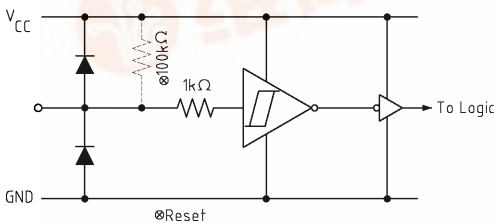
max. Nominal Values (at 25 °C)

Supply voltage V_{CC} :	5,5 V
V_M :	40 V
Output current Iout:	1,5 A (AVE) 2,5 A (peak)
Power dissipation P_d	4 W/40 W without/with heat sink $T_C=85^\circ C$
Operation temp.:	-40°C to 85°C
Storage temp.:	-55°C to 150°C

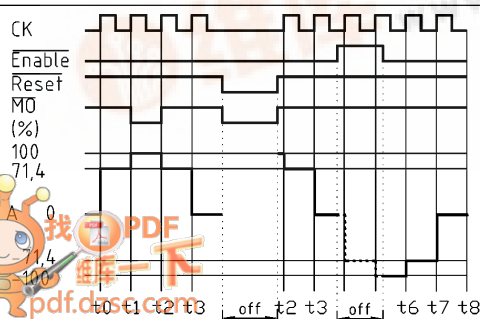
Input	Mode	
M1	M2	
L	L	1/1 Step
H	L	1/2 Step
L	H	1/4 Step
H	H	1/8 Step

Signal Circuit times
 t1: pulse width >10µs
 t2: pulse width >10µs
 t3: > 5µs
 t4: >10µs

Inputs

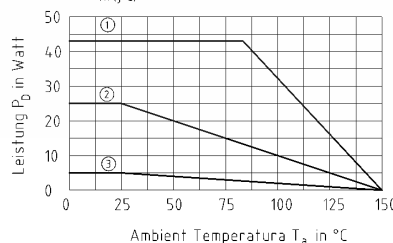


Input-/Output-Signals



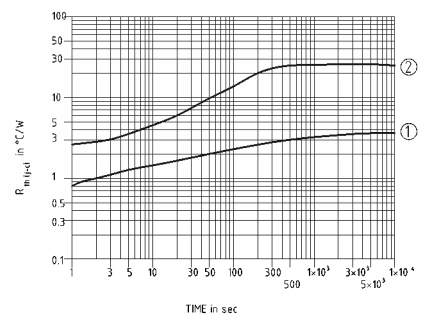
Thermal Behavior

- ① INFINITE HEAT SINK
 $R_{th(j-c)} = 1,5^\circ C/W$
- ② HEAT SINK
(with $3,5^\circ C/W$ Heat Pin and $1,5^\circ C$ contact thermal Resistance; Total $5^\circ C/W$)
- ③ NO HEAT SINK
 $R_{th(j-a)} = 25^\circ C/W$



TRANSIENT THERMAL RESISTANCE

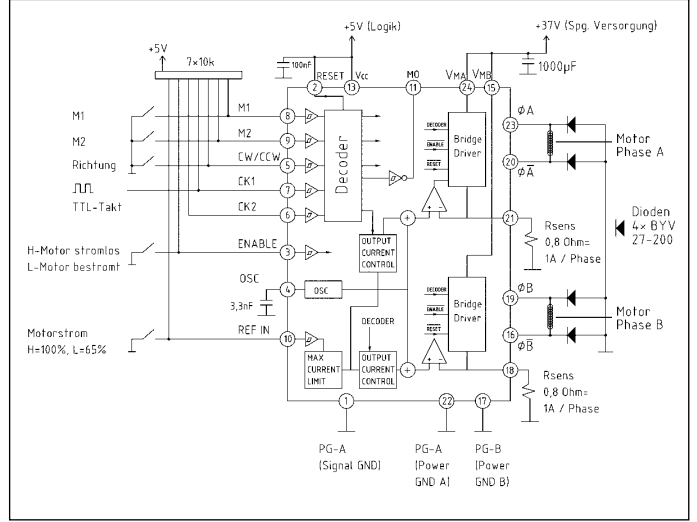
- ① 2C/W HEAT SINK
- ② NO HEAT SINK



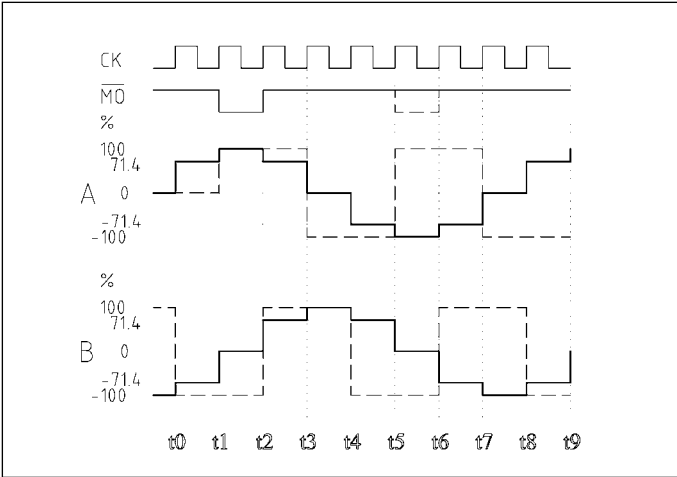
Function Table

INPUT					MODE
CK1	CK2	CW/CCW	Enable	Reset	
	H	L	L	H	CW
	L	L	L	H	INHIBIT
H		L	L	H	CCW
L		L	L	L	INHIBIT
	H	H	L	H	CCW
	L	H	L	H	INHIBIT
H		H	L	H	CW
L		H	L	H	INHIBIT
X	X	X	H	H	Z
X	X	X	X	L	Z

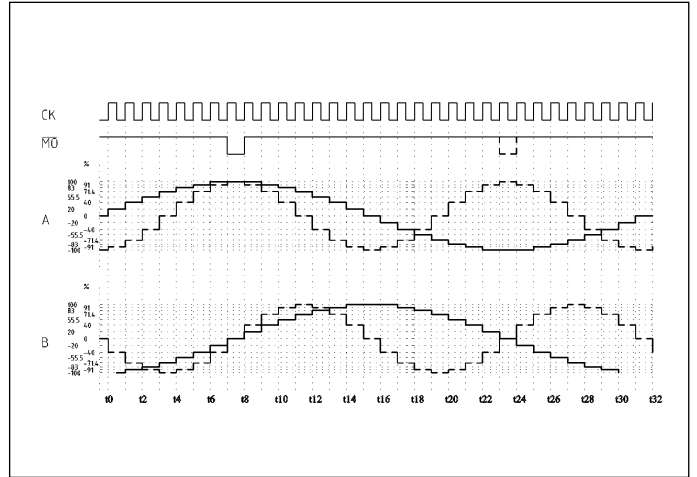
Block diagramm (+ external Circuit)



Full-/Half-Step Mode



Quarter-/Eighth-Step Mode



Electrical Characteristics 1 (Ta=25°, V_{CC}=5V, V_M=24V)

CHARACTERISTICS	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.
IN Terminal Current	I _{IN}	-	SOURCE TYPE	-	170	-
OSC Frequency	f _{OSC}	-	C _{OSC} =0.0033µF	25	44	62
Output Saturation Voltage	V _{SAT(U2)}	Upper Side	I _{OUT} =0.8 A	-	1.8	2.2
		Lower Side	I _{OUT} =0.8 A	-	1.1	1.5
A-B CHOPPING CURRENT (Note 1)	VECTOR	REF IN : L R _{REF} =0.8 Ω C _{OSC} =0.0033µF	θ=0/8	-	100	-
			θ=1/8	-	100	-
			θ=2/8	86	91	96
			θ=3/8	78	83	88
			θ=4/8	66.4	71.4	76.4
			θ=5/8	50.5	55.5	60.5
			θ=6/8	35	40	45
			θ=7/8	15	20	25
2 Phase excitation mode VECTOR	-	-	-	-	141	-
Feed Back Voltage Step	ΔV _{FB}	REF IN : H R _{REF} =0.8 Ω C _{OSC} =0.0033µF	Δθ=0/8-1/8	-	0	-
			Δθ=1/8-2/8	32	72	112
			Δθ=2/8-3/8	24	64	104
			Δθ=3/8-4/8	53	93	133
			Δθ=4/8-5/8	87	127	167
			Δθ=5/8-6/8	84	124	164
Output T, Switching Characteristics	t _L	R _L =2Ω, V _{IN} =0V C _L =15pF	t _{L1}	-	0.3	-
			t _{L2}	-	2.2	-
	t _{CH}	CK-Output	t _{CH1}	-	1.5	-
			t _{CH2}	-	2.7	-
	t _{SH}	OSC-Output	t _{SH1}	-	5.4	-
			t _{SH2}	-	6.3	-
	t _{EH}	RESET-Output	t _{EH1}	-	2.0	-
			t _{EH2}	-	2.5	-
	t _{EH}	ENABLE-Output	t _{EH1}	-	5.0	-
			t _{EH2}	-	6.0	-
Output Leakage Current	Upper Side	I _{CH}	-	-	50	
	Lower Side	I _{CL}	-	-	50	
Output Voltage	V _{OH(MO)}	-	I _{OH} =-40µA	4.5	4.9	V _{CC}
	V _{OL(MO)}	-	I _{OL} =40µA	GND	4.1	0.5

Note : Maximum Current (θ=0) : 100%
 2W1-2θ: 2W1, 2 phase excitation mode
 W1-2θ: W1, 2 phase excitation mode
 1-2θ: 1, 2 phase excitation mode

Electrical Characteristics 2 (Ta=25°, V_{CC}=5V, V_M=24V)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Voltage	High	V _{IN(H)}	M1, M2, CW/CCW, REF IN	3.5	-	V _{CC} +0.4	V
	Low	V _{IN(L)}	ENABLE, CK1, CK2 RESET	GND-0.4	-	1.5	
Input Hysteresis Voltage	V _H	-	-	-	600	-	mV
Input Current	I _{IN-1(H)}	-	M1, M2, REF IN, ENABLE V _{IN} = 5.0 V	-	-	100	nA
	I _{IN-1(L)}	-	RESET, V _{IN} =0 V INTERNAL PULL-UP-RESISTOR	10	50	100	µA
	I _{IN-2(L)}	-	SOURCE TYPE, V _{IN} = 0 V	-	-	100	nA
Quiescent Current	V _{CC}	I _{CC1}	Output Open RESET : H ENABLE : L (2,1 - 2 Phase excitation)	-	10	18	mA
		I _{CC2}	Output Open (W1-2, 2W1-2 Phase Excitation) RESET : H ENABLE : L	-	10	18	
	V _{CC}	I _{CC3}	RESET : L, ENABLE : L	-	5	-	
		I _{CC4}	RESET : H, ENABLE : L	-	5	-	
Comparator Reference Voltage	V _{NF(H)}	-	REF IN H Output Open 2 Phase excitation, R _{NP} = 0.7 Ω, C _{OSC} = 0.0033µF	0.72	0.8	0.88	V
	V _{NF(L)}	-	REF IN H Output Open	0.45	0.5	0.55	
Output Differential	ΔV _O	-	B/A C _{OSC} = 0.0033 µF, R _{NP} = 0.8 Ω	-10	-	10	%
Output Voltage	V _{NF(H)} - V _{NF(H)}	ΔV _{NF}	V _{NF(L)/V_{NF(H)} C_{OSC} = 0.0033µF, R_{NP} = 0.8 Ω}	56	63	70	%
	V _{OH(MO)}	-	I _{OH} = -40µA	4.5	4.9	V _{CC}	mV
Output Voltage	V _{OH(MO)}	-	I _{OH} = -40µA	GND	0.1	0.5	mV