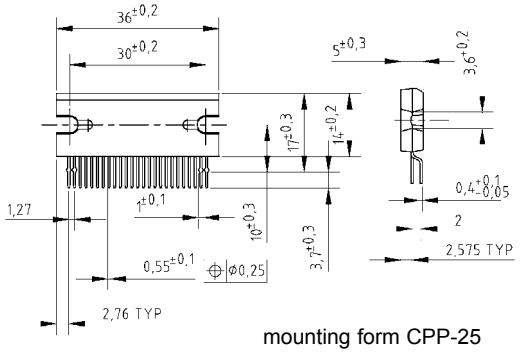
IMT-901 - Microstep Constant Current Driver "IC"

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:

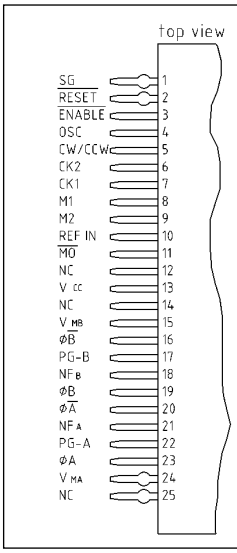
- only one IC for power and logic (up to 2,5 A/phase)
  reduces considerably space, assembly time and cost of a microstep driver with a max. functions yet with a min. of ext. components.
- selectable from: 1/1-, 1/2-, 1/4-, 1/8-Step
  enables individual application-related microstep switching, smooth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

Dimensions (mm)



mounting form CPP-25

PIN-Assignment



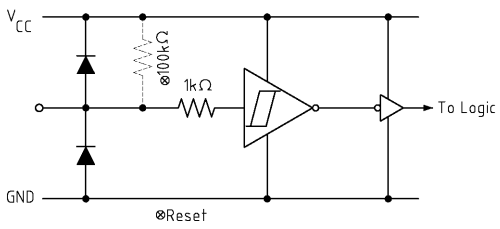
max. Nominal Values (at 25 °C)

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 °C
Operation temp.:		-40°C to 85°C
Storage temp.:		-55°C to 150°C

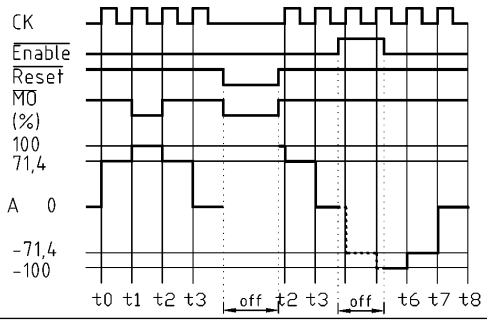
Input M1	Input M2	Mode
L	L	1/1 Step
H	L	1/2 Step
L	H	1/4 Step
H	H	1/8 Step

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

Inputs



Input-/Output-Signals

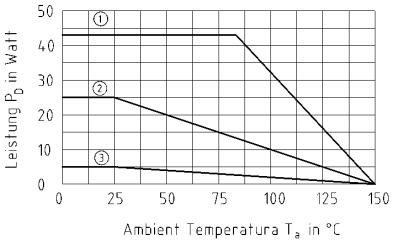


Thermal Behavior

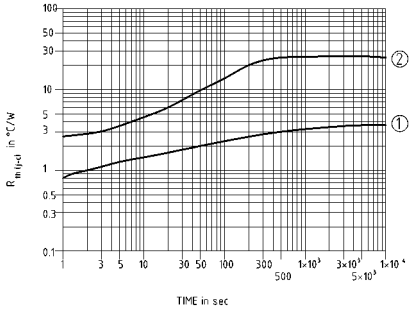
① INFINITE HEAT SINK
$R_{th\,(j-c)}$ =1,5°C/W

② HEAT SINK
(with 3,5°C/W Heat Pin and 1,5°C contact thermal Resistance; Total 5°C/W)

③ NO HEAT SINK
$R_{th\,(j-a)}$ =25°C/W



TRANSIENT THERMAL RESISTANCE
① 2C/W HEAT SINK
② NO HEAT SINK

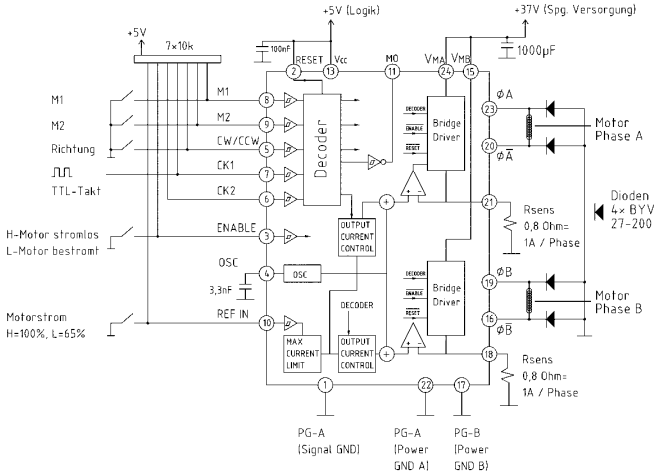


IMT-901

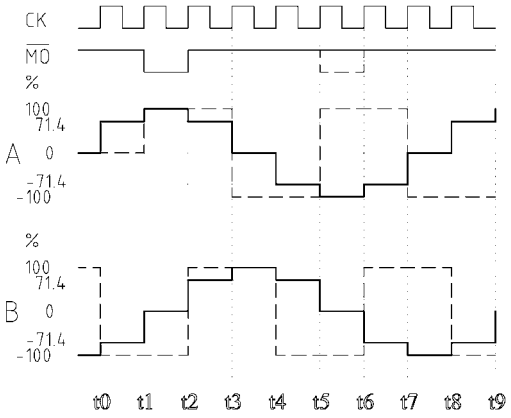
Function Table

INPUT					MODE
CK1	CK2	CW/CCW	$\overline{\text{Enable}}$	$\overline{\text{Reset}}$	
↓	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

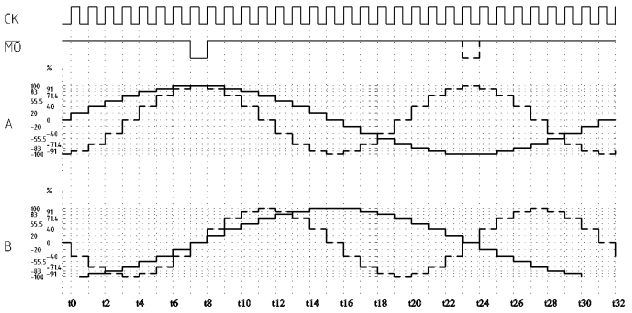
Block diagramm (+ external Circuit)



Full-/Half-Step Mode



Quarter-/Eighth-Step Mode



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

CHARACTERISTICS				SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.
NF Terminal Current				I_{NF}	-	SOURCE TYPE		-	170	-
OSC Frequency				f_{OSC}	-	C_{OSC}=0.0033µF		25	44	62
Output Saturation Voltage	Upper Side			$V_{SAT\ U2}$	-	I_{OUT}=0.8 A		-	1.8	2.2
	Lower Side			$V_{SAT\ L2}$				-	1.1	1.5
A-B CHOPPING CURRENT (Note 1)	2W1-2ø	W1-2ø	1-2ø	VECTOR	-	Θ=0/8	REF IN : L R_{NF}=0.8 Ω C_{OSC}=0.0033µF	-	100	-
	2W1-2ø	-	-			Θ=1/8		-	100	-
	2W1-2ø	W1-2ø	-			Θ=2/8		86	91	96
	2W1-2ø	-	-			Θ=3/8		78	83	88
	2W1-2ø	W1-2ø	1-2ø			Θ=4/8		66.4	71.4	76.4
	2W1-2ø	-	-			Θ=5/8		50.5	55.5	60.5
	2W1-2ø	W1-2ø	-			Θ=6/8		35	40	45
	2W1-2ø	-	-			Θ=7/8		15	20	25
2 Phase excitation mode VECTOR								-	141	-
Feed Back Voltage Step				ΔV_{NF}	-	ΔΘ=0/8-1/8	REF IN : H R_{NF}=0.8 Ω C_{OSC}= 0.0033µF	-	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
						ΔΘ=6/8-7/8		120	160	200
Output T, Switching Characteristics				t_r	-	R_L=2Ω, V_{NF}=0V		-	0.3	-
				t_f		C_L=15pF		-	2.2	-
				t_{pLH}	-	CK-Output		-	1.5	-
				t_{pHL}				-	2.7	-
				t_{pLH}	-	OSC-Output		-	5.4	-
				t_{pHL}				-	6.3	-
				t_{pLH}	-	$\overline{\text{RESET}}$-Output		-	2.0	-
				t_{pHL}				-	2.5	-
				t_{pLH}	-	$\overline{\text{ENABLE}}$-Output		-	5.0	-
				t_{pHL}				-	6.0	-
Output Leakage Current	Upper Side			I_{OH}	-	V_M=30V		-	-	50
	Lower Side			I_{OL}				-	-	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%
2W1-2ø: 2W1, 2 phase excitation mode
W1-2ø: W1, 2 phase excitation mode
1-2ø: 1, 2 phase excitation mode

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

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Voltage	High	$V_{IN\ H}$	-	M1, M2, CW/CCW, REF IN $\overline{\text{ENABLE}}$, CK1, CK2 $\overline{\text{RESET}}$	3.5	-	V_{CC} +0.4	V
	Low	$V_{IN\ L}$	-		GND -0.4	-	1.5	
Input Hysteresis Voltage		V_H	-		-	600	-	mV
Input Current		$I_{IN-1(H)}$	-	M1, M2, REF IN, $\overline{\text{ENABLE}}$ V_{IN} = 5.0 V	-	-	100	nA
		$I_{IN-1(L)}$	-	$\overline{\text{RESET}}$, 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 $\overline{\text{RESET}}$: H $\overline{\text{ENABLE}}$: L (2,1 - 2 Phase excitation)	-	10	18	mA
	V_{CC}	I_{CC2}	-	Output Open (W1-2, 2W1-2 Phase Excitation) $\overline{\text{RESET}}$: H $\overline{\text{ENABLE}}$: L	-	10	18	
	V_{CC}	I_{CC3}	-	$\overline{\text{RESET}}$: L, $\overline{\text{ENABLE}}$: L	-	5	-	
	V_{CC}	I_{CC4}	-	$\overline{\text{RESET}}$: H, $\overline{\text{ENABLE}}$: L	-	5	-	
Comparator Reference Voltage		$V_{NF(H)}$	-	REF IN H Output Open; 2 Phase excitation, R_{NF} = 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 Differencial		ΔV_0	-	B/A C_{OSC}= 0.0033 µF, R_{NF} = 0.8 Ω,	-10	-	10	%
$V_{NF(H)}$ - $V_{NF(H)}$		ΔV_{NF}	-	$V_{NF(L)}/V_{NF(H)}$ C_{OSC} = 0.0033µF, R_{NF} = 0.8 Ω,	56	63	70	%
Output Voltage		$V_{OH(MO)}$	-	I_{OH} = -40µA	4.5	4.9	V_{CC}	mV
		$V_{OH(MO)}$	-	I_{OH} = -40µA	GND	0.1	0.5	mV