

## Current Sensor

Model Number:

CM4A 1000 H06



For the electronic measurement of current: DC, AC, pulsed..., with galvanic insulation between the primary and the secondary circuit.

### Features

- ✦ Closed loop (compensated) current sensor using the Hall effect
- ✦ Galvanic insulation between primary and secondary
- ✦ Insulating plastic case recognized according to UL 94-V0
- ✦ Very good linearity
- ✦ High accuracy
- ✦ Very low offset drift over temperature
- ✦ No insertion loss
- ✦ Standards:
  - IEC 60664-1:2020
  - IEC 61800-5-1:2022
  - IEC 62109-1:2010

### Applications

- ✦ AC variable speed and servo motor drives
- ✦ Uninterruptible Power Supplies (UPS)
- ✦ Static converters for DC motor drives
- ✦ Switch Mode Power Supplies (SMPS)
- ✦ Power supplies for welding applications
- ✦ Battery management
- ✦ Wind energy inverter
- ✦ Test and detection devices

## Safety

This sensor must be used according to IEC 61800-5-1.

This sensor must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the manufacturer's operating instructions.

**Caution, risk of electrical shock!**



When operating the sensor, certain parts of the module can carry hazardous voltage (e.g., Primary busbar, power supply). Ignore this warning can lead to injury and/or cause serious damage. This sensor is a built-in device, whose conducting parts must be inaccessible after installation. A protective housing or additional shield could be used. Main supply must be able to be disconnected.

## Absolute maximum ratings(not operating)

Parameter	Symbol	Unit	Value
Supply voltage	$V_C$	V	$\pm 25.2$
Primary conductor temperature	$T_B$	$^{\circ}\text{C}$	100
ESD rating, Human Body Model (HBM)	$V_{\text{ESD}}$	kV	4

✘ Stresses above these ratings may cause permanent damage.

## Environmental and mechanical characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Ambient operating temperature	$T_A$	$^{\circ}\text{C}$	-40		85	
Ambient storage temperature	$T_S$	$^{\circ}\text{C}$	-45		105	
Mass	$m$	g		530		

✘ Exposure to absolute maximum ratings for extended periods may degrade reliability.

## Insulation coordination

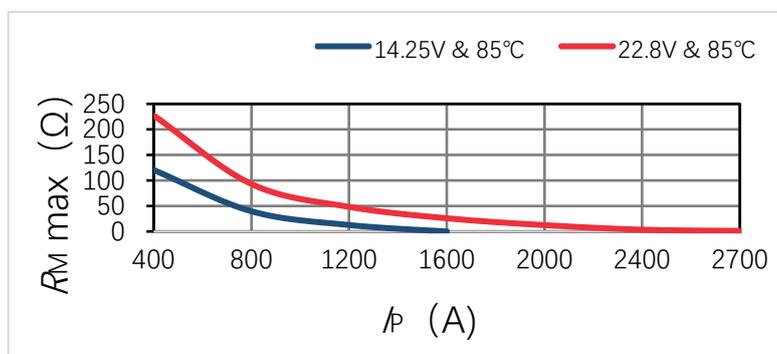
Parameter	Symbol	Unit	Value	Comment
Rms voltage for AC insulation test @ 50Hz, 1min	$V_d$	kV	5.2	
Impulse withstand voltage 1.2/50 $\mu\text{s}$	$V_w$	kV	9.7	
Clearance (pri.- sec.)	$d_{cl}$	mm	19.6	
Creepage distance (pri.- sec.)	$d_{cp}$	mm	20.6	
Comparative tracking index	$CTI$	PLC	Group I	
Application example	-	-	1000V	Reinforced insulation, according to IEC 61800-5, IEC 62109-1CAT III, PD2
Application example	-	-	1500V	Basic insulation, according to IEC 61800-5, IEC 62109-1CAT III, PD2

## Electrical data

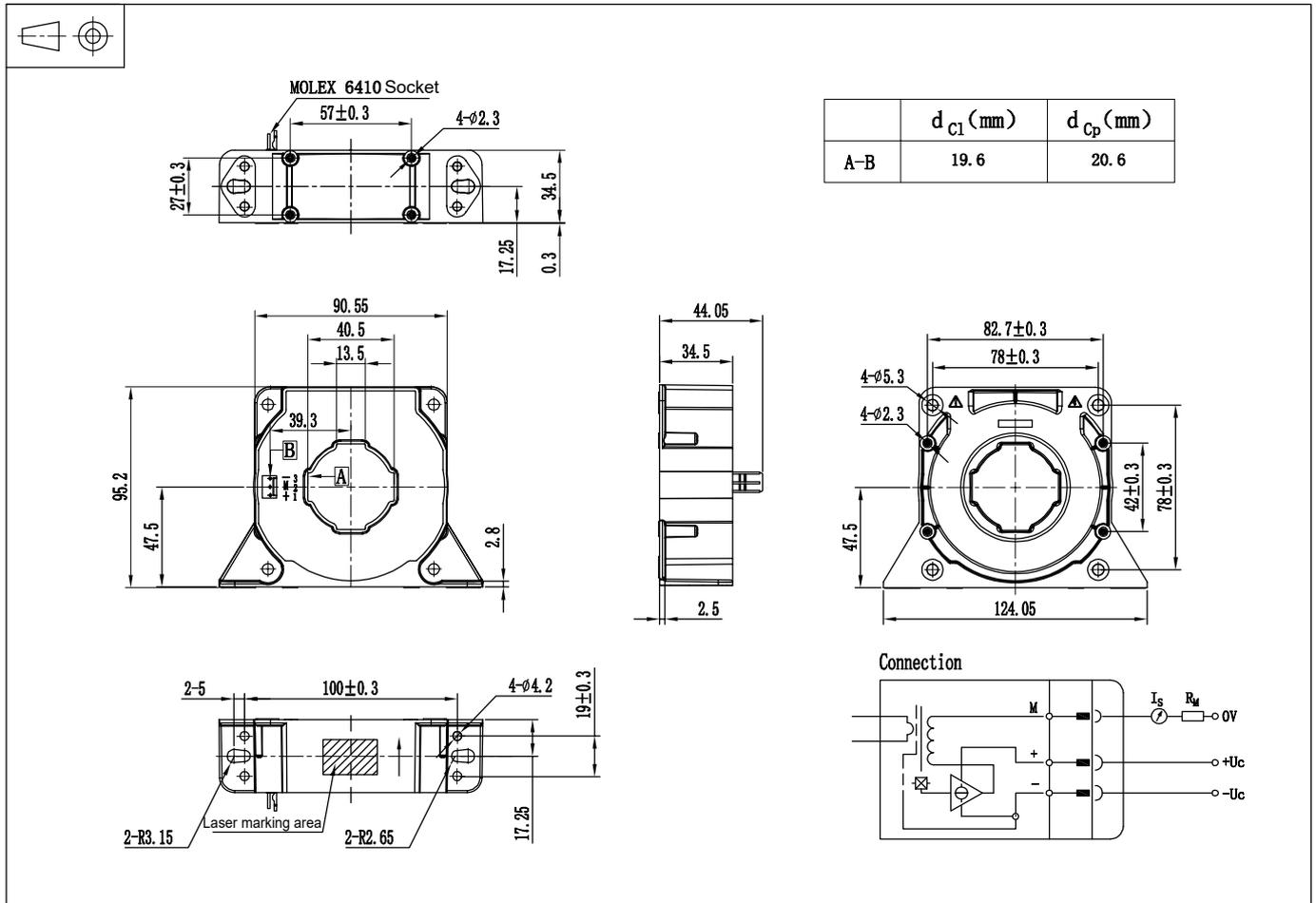
✘ With  $T_A = 25^\circ\text{C}$ ,  $V_C = \pm 24\text{V}$ ,  $R_M = 20\Omega$ , unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	$I_{PN}$	A	-1000		1000	
Primary current, measuring range	$I_{PM}$	A	-2700		2700	
Measuring resistance	$R_M$	$\Omega$	-	-	-	$V_C = \pm 24\text{V}; T_A = +85^\circ\text{C};$ $R_M = 1\Omega$ For other details, please check Figure 1.
Secondary nominal rms current	$I_{SN}$	mA	-200		200	
Secondary coil resistance	$R_S$	$\Omega$			31.8	$R_S(T_A) = R_S \times (1 + 0.004 \times (T_A + \Delta\text{temp} - 25))$ Estimated temperature rise@ $I_{PN}$ is $\Delta\text{temp} = 15^\circ\text{C}$
Secondary current, measuring range	$I_S$	mA	-540		540	
Number of secondary turns	$N_S$	-		5000		
Theoretical sensitivity	$G_{th}$	mA/A		0.2		
Supply voltage	$V_C$	V	$\pm 15$	$\pm 24$		@ $\pm 5\%$
Current consumption	$I_C$	mA		$40 + I_S$		
Offset current	$I_O$	mA	-0.2		0.2	
Thermal drift of offset current	$I_{OT}$	mA	-0.5		0.5	@ $-40^\circ\text{C} \sim 85^\circ\text{C}$
Residual current@ $I_P=0$ after $I_{PN}$	$I_{OM}$	mA	-0.1		0.1	
Sensitivity error	$\mathcal{E}_G$	%	-0.2		0.2	Exclusive of $I_{OE}$
Linearity error 0... $I_{PN}$	$\mathcal{E}_L$	% of $I_{PN}$	-0.1		0.1	Exclusive of $I_{OE}$
Accuracy@ $I_{PN}$	$X$	% of $I_{PN}$	-0.3		0.3	Exclusive of $I_{OE}$
Response time@ 90% of $I_{PN}$	$t_r$	$\mu\text{s}$			1	
Frequency bandwidth(-1dB)	$BW$	kHz			150	

Figure 1:



Dimensions (in mm. 1 mm = 0.0394 inch)



## Mechanical characteristics

- ◇ General tolerance  $\pm 0.5\text{mm}$
- ◇ Primary hole  $\Phi 38\text{ mm}$
- or
- ◇ Sensor vertical fastening  $40\text{ mm} \times 13\text{ mm}$   
2pc  $\Phi 5.3\text{ mm}$  through hole  
2pc M5 metal screw
  
- Recommended fastening torque  $1.2\text{ N}\cdot\text{m} (\pm 10\%)$
- or
- Recommended fastening torque  $4\text{pc } \Phi 4.2\text{ mm}$  through hole  
 $4\text{pc M4}$  metal screw  
 $1.2\text{ N}\cdot\text{m} (\pm 10\%)$
  
- ◇ Connection of secondary Molex 6410 Socket
- ◇ Sensor horizontal fastening  $4\text{pc } \Phi 5.3\text{ mm}$  through hole  
 $4\text{pc M5}$  metal screw
  
- Recommended fastening torque  $1.2\text{ N}\cdot\text{m} (\pm 10\%)$

## Remarks

- ◇ When  $I_p$  flows in the direction of arrow, the current output is positive.
- ◇ Temperature of primary conductor should not exceed  $100^\circ\text{C}$ .
- ◇ Dynamic performances ( $di/dt$  and response time) are best with a single bar completely filling the primary hole.

This is a standard model. For different applications (measurement, secondary connections...), please contact CHIPSENSE.