# CS3A P21 SERIES

芯森
CHIPSENSE

Current Sensor

Model Number：

CS3A 50 P21
CS3A 100 P21
CS3A 150 P21
CS3A 200 P21

RoHS compliant

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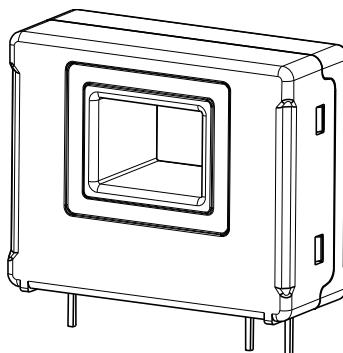
For the electronic measurement of current:DC,AC, pulsed..., with insulation insulation between the primary and the secondary circuits.

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 following manufacture'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.

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Absolute maximum ratings(not operating)

Parameter	Symbol	Unit	Value
Supply voltage	V_C	V	± 18
Primary conductor temperature	T_B	℃	100

※ Stresses above these ratings may cause permanent damage.

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

Environmental and mechanical characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Ambient operating temperature	T_A	℃	-40		85	
Ambient storge temperature	T_S	℃	-40		90	
Mass	m	g		25		
Standards	IEC 60664-1,IEC 61800-5-1,IEC 62109-1					

Insulation coordination

Parameter	Symbol	Unit	Value	Comment
Rms voltage for AC insulation test @ 50Hz,1min	V_d	kV	3	
Impulse withstand voltage 1.2/50μs	V_W	kV	7	
Clearance (pri.- sec.)	d_{Cl}	mm	6.7	
Creepage distance (pri.- sec.)	d_{Cp}	mm	6.7	
Plastic case	-	-	UL94-V0	
Comparative traking index	CTI	PLC	3	
Application example	-	-	300V	Reinforced insulation,according to IEC 61800-5-1, IEC 62109-1CATⅢ, PD2
Application example	-	-	600V	Basic insulation,according to IEC 61800-5-1, IEC 62109-1CATⅢ, PD2

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Electrical data

CS3A 50 P21

※ With T_A=25℃,V_C=±15V,R_M=30Ω,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	A		±50		
Primary current, measuring range	I_{PM}	A	-100		100	
Measuring resistance	R_M	Ω	0		280	@±12V, 85℃, ±50A
			0		170	@±12V, 85℃, ±100A
			0		380	@±15V, 85℃, ±50A
			0		220	@±15V, 85℃, ±100A
Secondary nominal rms current	I_{SN}	mA		±25		
Secondary current, measuring range	I_{SP}	mA	-50		50	
Secondary coil resistance	R_S	Ω		75		@ 70℃
Number of secondary turns	N_S	-		2000		
Theoretical sensitivity	G_{th}	mA/A		0.5		
Supply voltage	V_C	V	±12		±15	@ ±5%
Current consumption	I_C	mA		20+I_S		
Zero offset current	I_O	mA	-0.2	±0.1	0.2	
Thermal drift of offset current	I_{OT}	mA	-0.5		0.5	@ -40℃~85℃
Residual current@ I_P=0 after 1xI_{PN}	I_{OM}	mA	-0.15		0.15	
Sensitivity error	$\mathcal{E}_G$	%	-0.1		0.1	Exclusive of I_0
Linearity error 0…I_{PN}	$\mathcal{E}_L$	% of I_{PN}	-0.1	±0.05	0.1	Exclusive of I_0
Accuracy @ I_{PN}	X	% of I_{PN}	-0.5	±0.3	0.5	Exclusive of I_0
Response time@ 90% of I_{PN}	t_r	µs			1	
Frequency bandwidth (-1dB)	BW	kHz		150		

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Electrical data

CS3A 100 P21

※ With T_A=25℃, V_C=±15V, R_M=30Ω, unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	A		±100		
Primary current, measuring range	I_{PM}	A	-150		150	
Measuring resistance	R_M	Ω	0		100	@±12V, 85℃, ±100A
			0		50	@±12V, 85℃, ±150A
			0		170	@±15V, 85℃, ±100A
			0		90	@±15V, 85℃, ±150A
Secondary nominal rms current	I_{SN}	mA		±50		
Secondary current, measuring range	I_{SP}	mA	-75		75	
Secondary coil resistance	R_S	Ω		75		@ 70℃
Number of secondary turns	N_S	-		2000		
Theoretical sensitivity	G_{th}	mA/A		0.5		
Supply voltage	V_C	V	±12		±15	@ ±5%
Current consumption	I_C	mA		20+I_S		
Zero offset current	I_O	mA	-0.2	±0.1	0.2	
Thermal drift of offset current	I_{OT}	mA	-0.5		0.5	@ -40℃~85℃
Residual current@ I_P=0 after 1xI_{PN}	I_{OM}	mA	-0.15		0.15	
Sensitivity error	ε_G	%	-0.1		0.1	Exclusive of I_0
Linearity error 0…I_{PN}	ε_L	% of I_{PN}	-0.1	±0.05	0.1	Exclusive of I_0
Accuracy @ I_{PN}	X	% of I_{PN}	-0.5	±0.3	0.5	Exclusive of I_0
Response time@ 90% of I_{PN}	t_r	µs			1	
Frequency bandwidth (-1dB)	BW	kHz		150		

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Electrical data

CS3A 150 P21

※ With T_A=25℃,V_C=±15V,R_M=30Ω,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	A		±150		
Primary current, measuring range	I_{PM}	A	-300		300	
Measuring resistance	R_M	Ω	0		26	@±12V, 85℃, ±200A
			0		4	@±12V, 85℃, ±250A
			0		56	@±15V, 85℃, ±200A
			0		8	@±15V, 85℃, ±300A
Secondary nominal rms current	I_{SN}	mA		±75		
Secondary current, measuring range	I_{SP}	mA	-150		150	
Secondary coil resistance	R_S	Ω		75		@ 70℃
Number of secondary turns	N_S	-		2000		
Theoretical sensitivity	G_{th}	mA/A		0.5		
Supply voltage	V_C	V	±12		±15	@ ±5%
Current consumption	I_C	mA		20+I_S		
Zero offset current	I_O	mA	-0.2	±0.1	0.2	
Thermal drift of offset current	I_{OT}	mA	-0.5		0.5	@ -40℃~85℃
Residual current@ I_P=0 after 1xI_{PN}	I_{OM}	mA	-0.15		0.15	
Sensitivity error	ε_G	%	-0.1		0.1	Exclusive of I_0
Linearity error 0…I_{PN}	ε_L	% of I_{PN}	-0.1	±0.05	0.1	Exclusive of I_0
Accuracy @ I_{PN}	X	% of I_{PN}	-0.5	±0.3	0.5	Exclusive of I_0
Response time@ 90% of I_{PN}	t_r	μs			1	
Frequency bandwidth (-1dB)	BW	kHz		150		

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Electrical data

CS3A 200 P21

※ With T_A=25℃,V_C=±15V,R_M=30Ω,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	A		±200		
Primary current, measuring range	I_{PM}	A	-300		300	
Measuring resistance	R_M	Ω	0		26	@±12V, 85℃, ±200A
			0		4	@±12V, 85℃, ±250A
			0		56	@±15V, 85℃, ±200A
			0		8	@±15V, 85℃, ±300A
Secondary nominal rms current	I_{SN}	mA		±100		
Secondary current, measuring range	I_{SP}	mA	-150		150	
Secondary coil resistance	R_S	Ω		75		@ 70℃
Number of secondary turns	N_S	-		2000		
Theoretical sensitivity	G_{th}	mA/A		0.5		
Supply voltage	V_C	V	±12		±15	@ ±5%
Current consumption	I_C	mA		20+I_S		
Zero offset current	I_O	mA	-0.2	±0.1	0.2	
Thermal drift of offset current	I_{OT}	mA	-0.5		0.5	@ -40℃~85℃
Residual current@ I_P=0 after 1xI_{PN}	I_{OM}	mA	-0.15		0.15	
Sensitivity error	ε_G	%	-0.1		0.1	Exclusive of I_0
Linearity error 0…I_{PN}	ε_L	% of I_{PN}	-0.1	±0.05	0.1	Exclusive of I_0
Accuracy @ I_{PN}	X	% of I_{PN}	-0.5	±0.3	0.5	Exclusive of I_0
Response time@ 90% of I_{PN}	t_r	μs			1	
Frequency bandwidth (-1dB)	BW	kHz		150		

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Dimensions（in mm. 1 mm = 0.0394 inch）
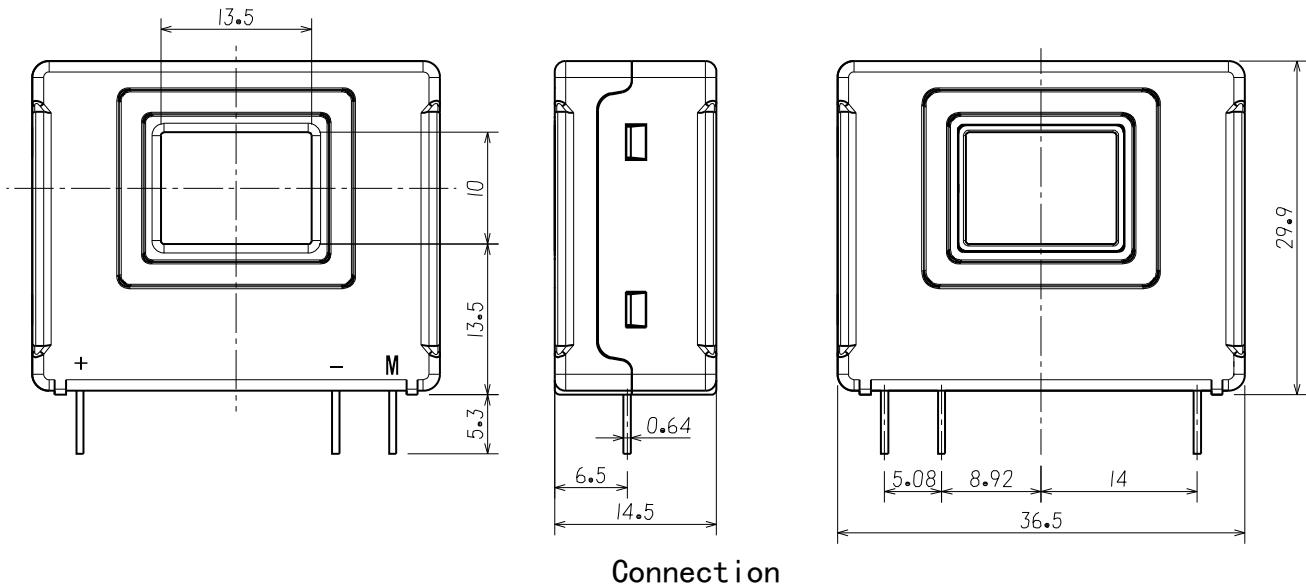
Connection
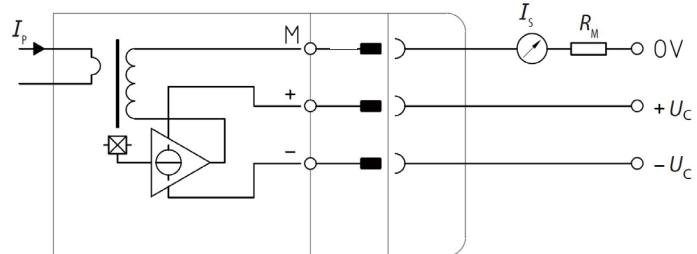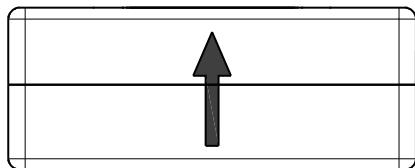
Mechanical characteristics

◇ General tolerance   ±0.3 mm

◇ Primary busbar   13.5x10.0mm

◇ Connection of secondary   3pins

     0.64x0.64mm

◇ Recommended PCB hole   Φ1.0mm

Remarks

◇ V_{OUT} and I_P are in the same direction, when I_P flows in the direction of arrow.

◇ Temperature of primary conductor should not exceed 100℃.

◇ Dynamic performances (di/dt and response time)are best with a single bar completely filling the primary hole.

This is a series of standard models, for different versions (supply voltages,connectors...), please contact CHIPSENSE.

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