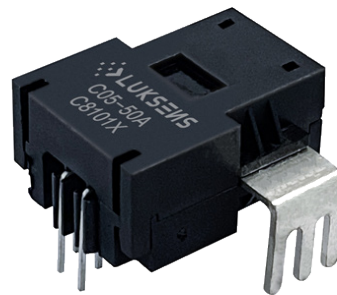


C05 Series Current Sensor

The C05 series current sensor provides efficient and precise sensor solutions for AC, DC and pulse currents in industrial, commercial and communications systems. It consists of three main components: an accurate low-temperature drift linear hall sensor, a flux collector and a current transformer. It offers markedly low resistance, reducing power loss and temperature drift to deliver exceptional performance.



Features

- Non-contact measurement of high current
- Output voltage proportional to carried current
- Max. measuring range $\pm 125\text{A}$ (DC or AC peak)
- High output range up to $\pm 800 \text{ mV}/I_{\text{pn}}$
- Ratio metric output from supply voltage
- Electrical isolation between the primary conductor and the sensor output
- Superior temperature stability and linearity
- High frequency bandwidth 120kHz
- Compact size for applications with limited space
- RoHs compliance (Lead-Free)

Applications

- Home appliances
- Load detections and managements
- Intelligent power/battery management systems
- Welding applications
- Variable speed drives
- Combiner box

Advantages

- Accurately measures AC, DC and pulse currents
- Fast response $3\mu\text{s}$, minimal noise output
- No insertion losses
- High immunity from external interference
- Excellent current overload capacity
- High ESD sensitivity (Human Body Model) 4kV

Standards

- EN 50178:1997
- IEC 61010-1:2010
- IEC 62109-1: 2010

Absolute maximum ratings

Symbol	Parameter	Min.	Max.	Unit
$V_{DD\ max.}$	Maximum supply voltage (not destructive)	-0.3	6.5	V
I_{PM}	Maximum measuring current	-125	125	A
T_{PC}	Primary conductor temperature		120	°C
T_A	Ambient operating temperature	-40	105	°C
T_S	Storage temperature range	-40	105	°C
$V_{ESD-HBM}$	ESD sensitivity HBM (Human Body Model)		4	kV

Stresses above these ratings may cause permanent damage. Exposure to absolute maximum ratings for extended periods may degrade reliability.

Specifications ($T_A = 25^\circ\text{C}$, $V_{DD} = 5.0\text{V}$)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_{DD}	Supply voltage		4.5	5	5.5	V
I_C	Current consumption	$I_P=0\text{A}$ without load		14	20	mA
I_{PN}	Current nominal measuring range	C05-10A	-25	± 10	25	A
		C05-16A	-40	± 16	40	
		C05-20A	-50	± 20	50	
		C05-32A	-80	± 32	80	
		C05-40A	-100	± 40	100	
		C05-50A	-125	± 50	125	
R_L	Output load resistance	V_{OUT} to GND	5			k Ω
C_L	Output load capacitance	V_{OUT} to GND		1	10	nF
G	Nominal sensitivity (customized available)	C05-10A	78.4	80	81.6	mV/A
		C05-16A	49	50	51	
		C05-20A	39.2	40	40.8	
		C05-32A	24.5	25	25.5	
		C05-40A	19.6	20	20.4	
		C05-50A	15.6	16	16.4	

Specifications ($T_A = 25^\circ\text{C}$, $V_{DD} = 5.0\text{V}$)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_{REF1}	Internal reference voltage	$I_p = 0\text{A}$	2.48	2.5	2.52	V
V_{OE}	Offset voltage $V_{OE} = V_0 - V_{REF1}$ (customized available)	$I_p = 0\text{A}$	-10		10	mV
$T_{CV_{OE}}$	Temperature coefficient of V_{OE}	$T_A = -40^\circ\text{C} \dots 105^\circ\text{C}$	-0.075	0.05	0.075	mV/K
T_{CG}	Temperature coefficient of G	$T_A = -40^\circ\text{C} \dots 105^\circ\text{C}$ (except $T_{CV_{OE}}$)	-1.5	1	1.5	%
E_L	Non-linearity error	$\pm I_{PN}$ without offset	-0.8	0.5	0.8	%/ I_{PN}
BW	Frequency bandwidth (-3dB)			120	250	kHz
T_R	Step response to 90% I_{PN}	(Design target)		3	5	μs
$R_{PRIMARY}$	Primary conductor resistance	$T_A = 25^\circ\text{C}$		1		m Ω

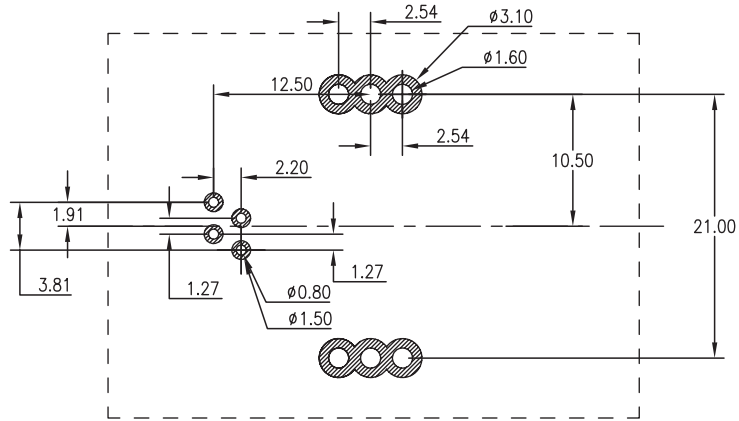
Insulation characteristics

Symbol	Parameter	Value	Unit	Comment
V_0	Insulation voltage for isolation, 50Hz, 1 min	4300	V	
R_{ISO}	Isolation resistance @500VDC	>500	m Ω	
D-CLE	Clearance	>8	mm	Shortest distance through air
D-CRD	Creepage distance	>8	mm	Shortest distance through body

General characteristics

Symbol	Parameter	Value	Unit	Comment
m-HSE	Housing material	V0		Flame retardant UL 94
m-FC	Flux collector material	Mn-Zn ferrite		Superior magnetic permeability
m	Mass	6	grams	

PCB footprint (mm, general tolerance $\pm 0.05\text{mm}$)

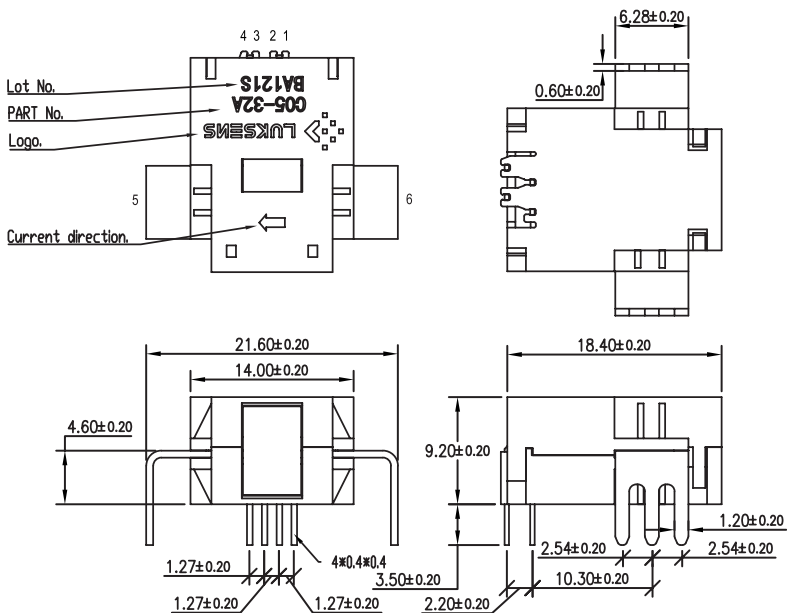


Note:

Maximum soldering temperature 260°C 10s

Maximum PCB thickness 2.4mm

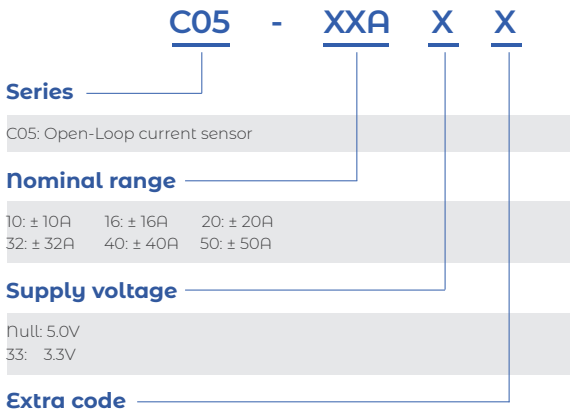
Dimension (mm)



Pin	Symbol
1	V_{REF}^{*1}
2	V_{OUT}
3	GND
4	V_{DD}
5	$-I_P$
6	$+I_P$

*1 V_{REF} can work in internal reference voltage mode.

Name Guide Description



Notes

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Safety and Environment



The product is to be installed by manufacturer trained personnel or competent person trained in accordance with manufacturer installation instructions.

With respect to applicable standards IEC 61010-1/ EN 61010-1 *safety requirements for electrical equipment for measurement, control and laboratory use part 1 general requirements*, the product should be used in limited energy secondary circuits.



Risk of electrical shock

Certain parts of the module can carry hazardous voltage during the operation process of the product because hazardous live voltage of primary conductor, power supply occurs, injury and/or serious damage will be caused if this warning is ignored.

Conducting parts must be inaccessible after installation of the product. Additional protection including shield or protective housing could be used according to IEC 60664 Insulation coordination for equipment within low-voltage supply systems.

Disconnection of the main supply will protect against possible injury and serious damage.



ESD protection

Damage from an ESD event will occur if the personnel is not well grounded when handling.

Important notice

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