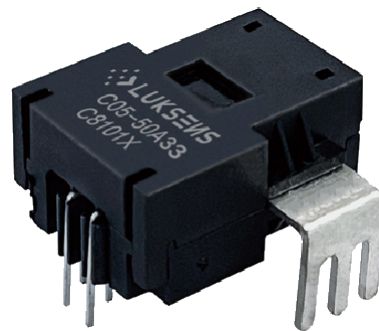


C05-XXA33 Series Current Sensor

The C05-XXA33 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. nominal range $\pm 120\text{A}$ (DC or AC peak)
- High output range up to $\pm 460 \text{ mV}/I_{pn}$
- Single supply +3.3V
- Electrical isolation between the primary conductor and the sensor output
- Superior temperature stability and linearity
- High frequency bandwidth 500kHz
- 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	-300	300	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 ($T_A = 25^\circ\text{C}$, $V_{DD} = 3.3\text{V}$)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_{DD}	Supply voltage		3	3.3	3.6	V
I_C	Current consumption	$I_P=0\text{A}$ without load		6.5	11	mA
I_{PN}	Current nominal measuring range	C05-10A33 X X X X	-25	±10	25	A
		C05-16A33 X X X X	-40	±16	40	
		C05-20A33 X X X X	-50	±20	50	
		C05-32A33 X X X X	-80	±32	80	
		C05-40A33 X X X X	-100	±40	100	
		C05-50A33 X X X X	-125	±50	125	
		C05-80A33 X X X X	-200	±80	200	
		C05-100A33 X X X X	-250	±100	250	
		C05-120A33 X X X X	-300	±120	300	
R_L	Output load resistance	V_{OUT} to GND	5			kΩ
C_L	Output load capacitance	V_{OUT} to GND		1	10	nF

Specifications ($T_A = 25^\circ\text{C}$, $V_{DD} = 3.3\text{V}$)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_{REF}	Internal reference voltage	$I_p = 0\text{A}$	1.63	1.65	1.67	V
G	Nominal sensitivity (customized available)	C05-10A33 X X X X		46		mV/A
		C05-16A33 X X X X		28.75		
		C05-20A33 X X X X		23		
		C05-32A33 X X X X		14.37		
		C05-40A33 X X X X		11.5		
		C05-50A33 X X X X		9.2		
		C05-80A33 X X X X		5.75		
		C05-100A33 X X X X		4.6		
		C05-120A33 X X X X		3.83		
V_{OE}	Offset voltage $V_{OE} = V_0 - V_{REF}$ (customized available)	$I_p = 0\text{A}$	-10		10	mV
ϵ_L	Non-linearity error	$\pm I_{PN}$ without offset	-0.8	0.5	0.8	%/ I_{PN}
T_{CV0}	Temperature coefficient of V_0	$T_A = -40^\circ\text{C} \dots 105^\circ\text{C}$	-0.075	0.05	0.075	mV/K
T_{CVOUT}	Temperature coefficient of V_{OUT}	$T_A = -40^\circ\text{C} \dots 105^\circ\text{C}$ (except T_{CV0E})	-1.5	1	1.5	%
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

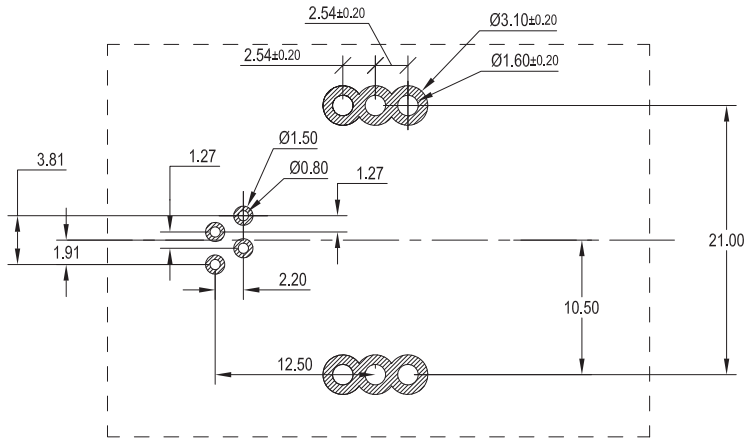
Symbol	Parameter	Value	Unit	Comment
V₀	Insulation voltage for isolation, 50Hz, 1 min	4300	V	
R_{ISO}	Isolation resistance @500VDC	>500	MΩ	
D-CLE	Clearance	>8	mm	Shortest distance through air
D-CRD	Creepage distance	>8	mm	Shortest distance through body

General characteristics

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

Package Outline Drawings

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

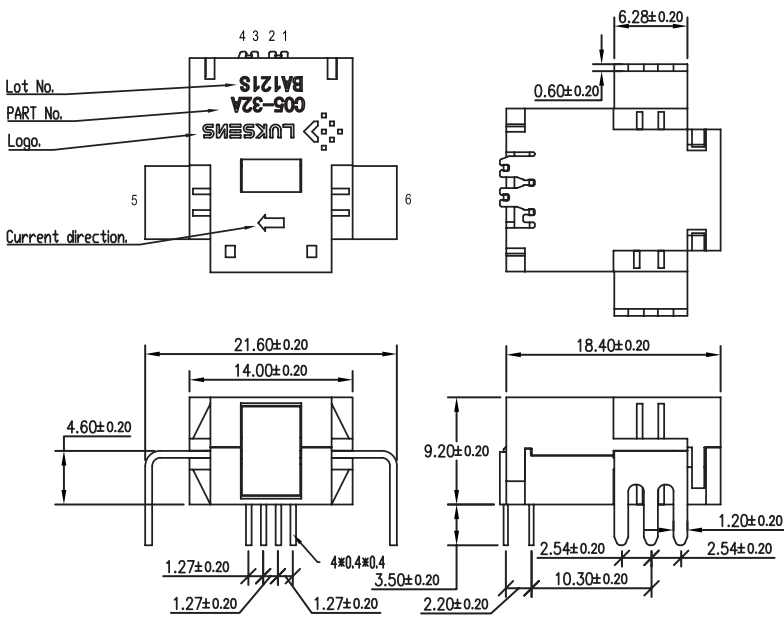


Note:

Maximum soldering temperature 260°C 10s

Maximum PCB thickness 2.4mm

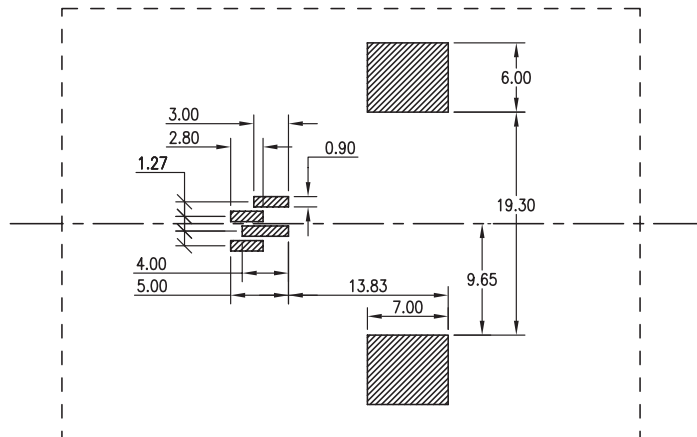
Dimension (mm) : Busbar PCB mounting



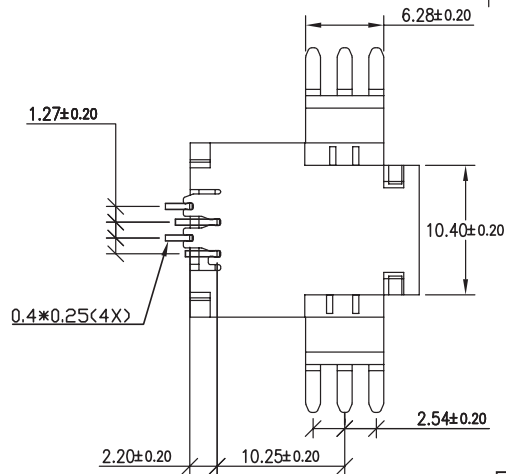
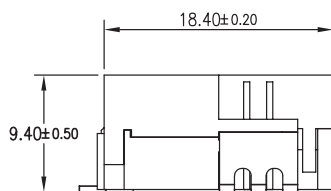
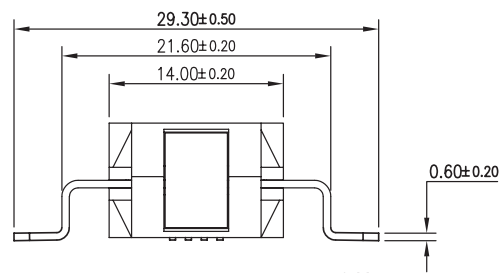
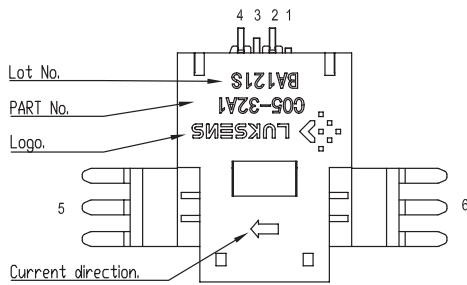
Pin	Symbol
1	V_{REF}^{*1}
2	V_{OUT}
3	GND
4	V_{DD}
5	$-I_P$
6	$+I_P$

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

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



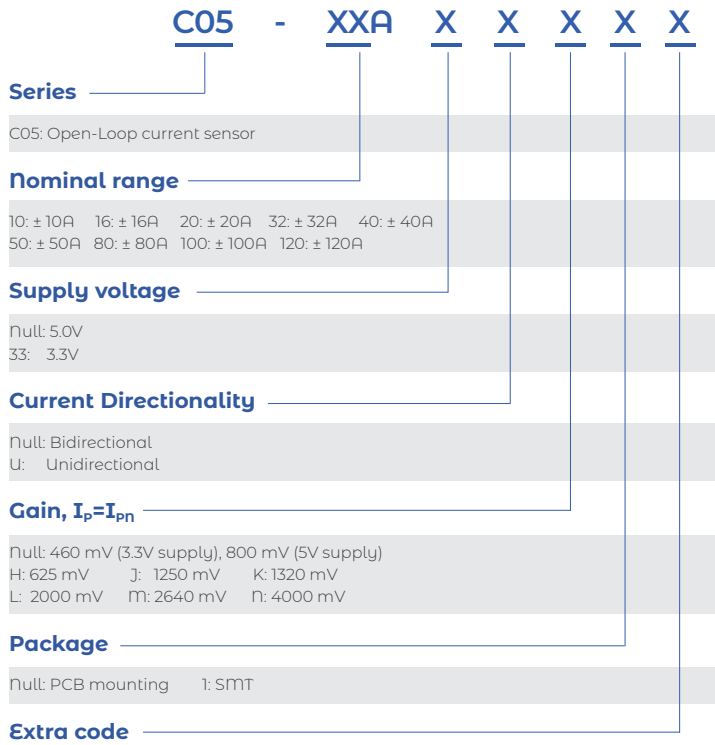
Dimension (mm) : SMT



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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