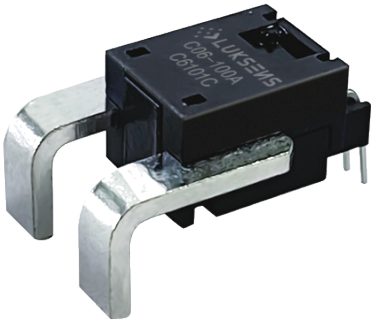
C06 Series Current Sensor

The C06 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 ±300A (DC or AC peak)
- 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)

Advantages

- Accurately measures AC, DC and pulse currents
- Fast response 3.5μs, minimal noise output
- No insertion losses
- High immunity from external interference
- Excellent current overload capacity
- High ESD sensitivity (Human Body Model) min. 4kV

Applications

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

Standards

- EN 55014-1: 2017
- EN 55014-2: 2015
- EN 50178: 1998
- EN 61000-4 Series
- IEC 60068-2 Series

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°C, V_{DD}= 5.0V)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_{DD}	Supply voltage		4.5	5	5.5	V
I_C	Current consumption	I_P=0A without load		14	20	mA
I_{Pn}	Current nominal measuring range	C06-50A	-50		50	A
		C06-50AU	0		50	
		C06-100A	-100		100	
		C06-100AU	0		100	
		C06-150A	-150		150	
		C06-150AU	0		150	
		C06-200A	-200		200	
		C06-200AU	0		200	
		C06-250A	-250		250	
		C06-250AU	0		250	
		C06-300A	-300		300	
		C06-300AU	0		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°C, V_{DD}= 5.0V)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
G	Nominal sensitivity (customized available)	C06-50...300A @I_{PN}		2000		mV
ε_G	Sensitivity error	Full scale of I_{PN} @T_A=25°C	-1	±0.5	1	%
		Full scale of I_{PN} @T_A=25°C ...105°C	-1.25	±0.7	1.25	%
		Full scale of I_{PN} @T_A=-40°C ...25°C	-3.5	±1.5	3.5	%
G	Nominal sensitivity (customized available)	C06-50...300AU @I_{PN}		4000		mV
ε_G	Sensitivity error	Full scale of I_{PN} @T_A=25°C	-1	±0.5	1	%
		Full scale of I_{PN} @T_A=25°C ...105°C	-1.25	±0.7	1.25	%
		Full scale of I_{PN} @T_A=-40°C ...25°C	-3.5	±1.5	3.5	%
V_0	V_{OUT}(@I_P=0A)	C06-50...300A	2.48	2.5	2.52	V
		C06-50...300AU	0.48	0.5	0.52	V
V_{OE}	Offset voltage	I_P=0A	-20		20	mV
T_{CVOE}	Temperature coefficient of V_{OE}	T_A=-40°C ...105°C	-0.075		0.075	mV/°C
T_{CG}	Temperature coefficient of G	T_A=-40°C ...105°C (except T_{CVOE})	-1.5		1.5	%
ε_L	Non-linearity error	±I_{PN} without offset	-0.8		0.8	%/I_{PN}
BW	Frequency bandwidth (-3dB)			120		kHz
T_R	Step response to 90% I_{PN}	(Design target)		3.5		μs

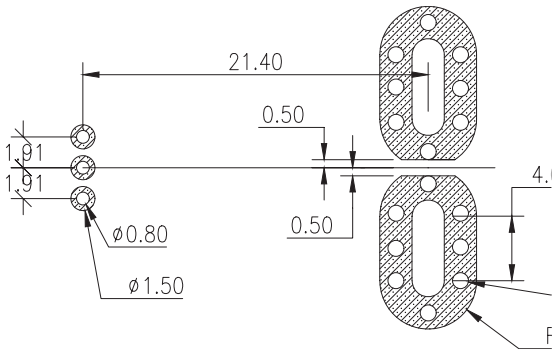
Insulation characteristics

Symbol	Parameter	Value	Unit	Comment
V_D	Insulation voltage for isolation, 50Hz, 1 min	3600	V	
R_{ISO}	Isolation resistance @500VDC	>500	MΩ	
D-CLE	Clearance	7	mm	Shortest distance through air
D-CRD	Creepage distance	7	mm	Shortest distance through body

General characteristics

Symbol	Parameter	Value	Unit	Comment
m-HSE	Housing material	V0		Flame retardant UL 94
m-CDT	Conductor material	H62		0.3mΩ before welding on PCB
m-FC	Flux collector material	Mn-Zn ferrite		C06-50A...150A, C06-50AU...150AU
m-FC	Flux collector material	Oriented silicon steel		C06-200A...300A, C06-200AU...300AU
m	Mass	6	grams	

PCB footprint (mm, general tolerance ±0.05mm)

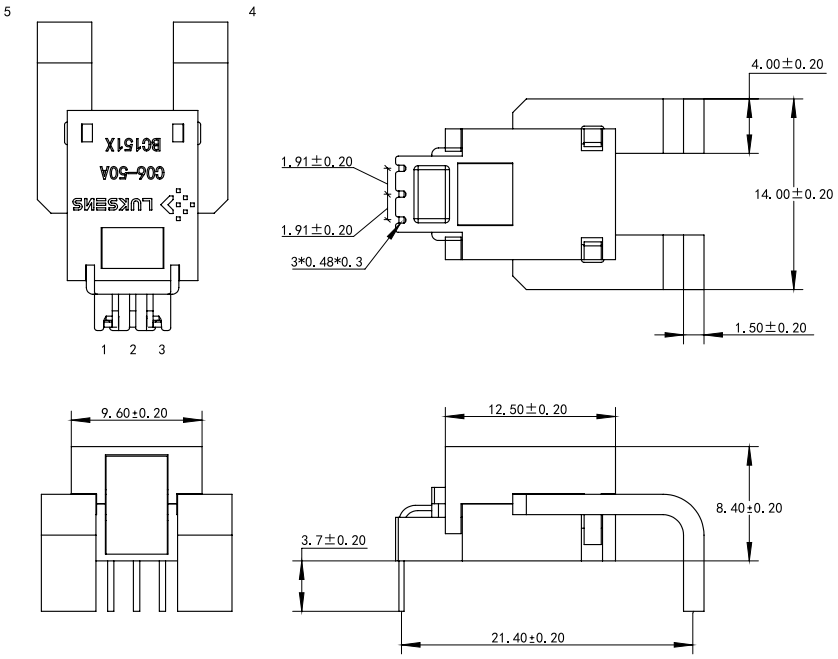


Note:

Maximum soldering temperature 260°C 10s

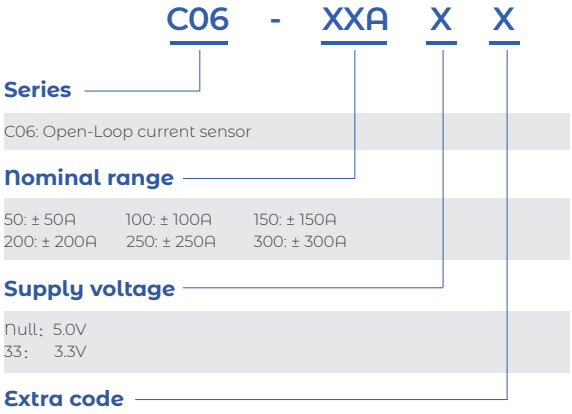
Maximum PCB thickness 2.4mm

Dimension (mm)



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

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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