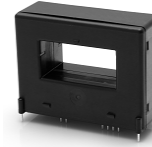


K-No.: 27109

3A Differential Current Sensor for 5V Supply Voltage

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



Date: 28.06.2021

Customer: Standard type

Customers Part no:

Page 1 of 3

Description

- Closed loop (compensation) Current Sensor with magnetic probe
- Printed circuit board mounting
- Casing and materials UL-listed

Characteristics

- excellent accuracy
- very low offset current
- very low temperature dependency and offset drift
- very low hysteresis of offset current
- short response time
- wide frequency bandwidth
- compact design
- reduced offset ripple

Applications

Mainly used for stationary operation in industrial applications:

- Solar inverter

Electrical data - Ratings

I_{PN}	Primary nominal RMS current	200	A
$I_{\Delta N}$	Differential rated RMS current	3	A
V_{OUT}	Output voltage @ $I_{\Delta P}$	$V_{REF} \pm (1.2 * I_{\Delta P} / I_{\Delta N})$	V
$V_{OUT(0)}^1$	Output voltage @ $I_P=0A, \vartheta_A=25^\circ C$	$V_{REF} \pm 0.01$	V
$V_{OUT(Error)}$	in case of error (current sensor) $V_{OUT} < 0.5V$ is set	< 0.5	V
V_{REF}	internal reference voltage	2.5 ± 0.005	V
	external reference voltage range	1.4...3.5	V
$V_{REF(test\ current)}^2$	Reference voltage (external)	0 ... 0.1	V
$V_{OUT(test\ current)}^2$	Output voltage @ $V_{REF} = 0...0.1V$	$V_{OUT(0)} + 0.17 \pm 0.06$	V
K_N	Transformation ratio	(1) : 1000	
	Turns count for test winding	20	

¹ with switching on and after "test current" the sensor is degaussed by an internal AC-current for about 110ms. In this time the output is set to $V_{OUT} < 0.5V$.

² If V_{REF} is set external to 0...0.1V an internal test current is generated.

Accuracy – Dynamic performance data

		min.	typ.	max.	Unit
$I_{\Delta P,max}$	Max. measuring range (differential current)	± 5			A
X	Accuracy @ $I_{PN}, \vartheta_A = 25^\circ C$			1.5	%
ϵ_L	Linearity			1	%
$V_O (V_{OUT}-V_{REF})$	Offset voltage @ $I_P = 0A, \vartheta_A = 25^\circ C$	-10		10	mV
$\Delta V_O / \Delta \vartheta$	Temperature drift of V_{OUT} @ $I_P=0A, \vartheta_A$		0.06		mV/K
t_r	Response time @ 90% of $I_{\Delta N}$		30		μs
f	Frequency bandwidth	DC...10			kHz

General data

ϑ_A	Ambient operation temperature	-40		85	$^\circ C$
ϑ_S	Ambient storage temperature (acc. to M3101)	-40		85	$^\circ C$
m	Mass		93		g
V_C	Supply voltage	4.75	5	5.25	V
I_C	Supply current at $I_P = 0A$ and RT		14		mA

¹ S_{clear} Clearance (component without solder pad) 8 mm

¹ S_{creep} Creepage (component without solder pad) 10 mm

¹ $U_{sys, re}$ System voltage (reinforced insulation) 600 V_{RMS}

¹ $U_{work, re}$ Working voltage (reinforced insulation) 1000 V_{RMS}

¹ U_{PD} Rated discharge voltage 1414 V_{PEAK}

¹ $U_{sys, basic}$ System voltage (basic insulation) 1000 V_{RMS}

¹ $U_{work, basic}$ Working voltage (basic insulation) 2000 V_{RMS}

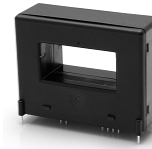
¹Constructed, manufactured and tested in accordance with IEC 61800-5-1:2007
Insulation material group 1, Pollution degree 2, Overvoltage category III

Date	Name	Issue	Amendment
28.06.2021	DJ	81	Further standards: UL 508, file E317483, category NMTR2 / NMTR8. And add UL sign to mechanical dimension and marking info box in datasheet. CN-21-218
Hrg.: R&D-PD NPI D editor	Bearb.: DJ designer		MC-PM: NSch. check freig.: SB released

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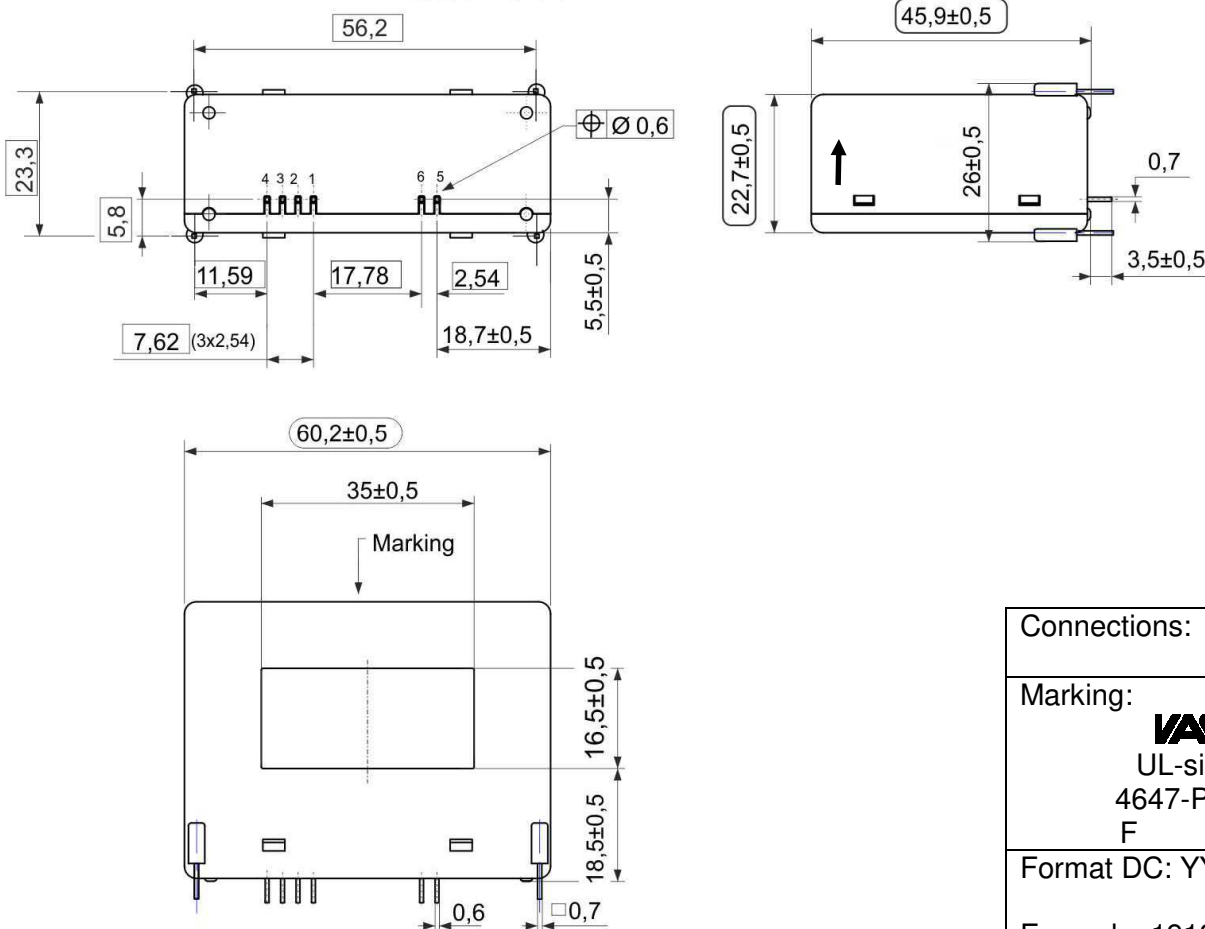
Page 2 of 3

Mechanical outline (mm):

General tolerances DIN ISO 2768-c

DC = Date Code
F = Factory

test dimension



Connections:

Marking:



UL-sign

4647-P982

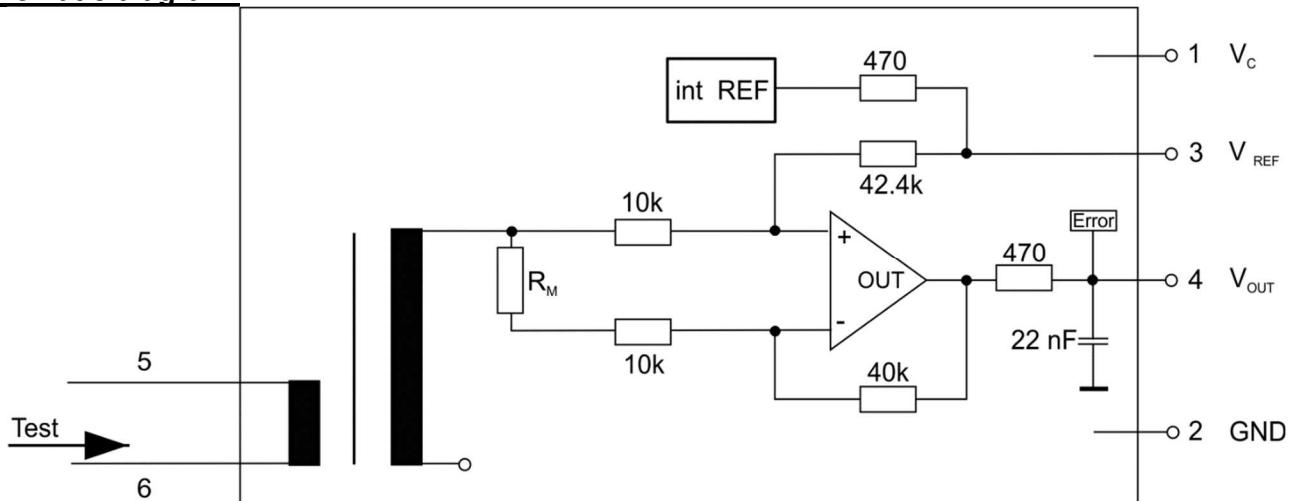
F DC

Format DC: YYWW

Example: 1912:

Year 2019, Week 12

Schematic diagram:



Hrg.: R&D-PD NPI D
editor

Bearb.: DJ
designer

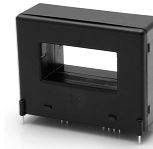
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Page 3 of 3

Electrical data: (investigate by a type checking)

		min.	typ.	max.	Unit
$V_{C,max}$	maximum supply voltage (without function)			6	V
I_c	Supply current with primary current	$16mA + I_{\Delta P} * K_N + V_{OUT}/R_L$			mA
$I_{OUT,SC}$	Short circuit output current		± 20		mA
R_s	Secondary coil resistance @ $\vartheta_A = 85^\circ C$		55		Ω
$R_{i,REF}$	Internal resistance of reference input		470		Ω
$R_{i,OUT}$	Output resistance of V_{OUT}		470		Ω
$\Delta X_{\vartheta}/\Delta \vartheta$	Temperature drift of X @ $\vartheta_A = -40^\circ C \dots 85^\circ C$			400	ppm/K
$\Delta V_{REF}/\Delta \vartheta$	Temperature drift of V_{REF} @ $\vartheta_A = -40^\circ C \dots 85^\circ C$		5	50	ppm/K
$\Delta V_{O=}$ $\Delta(V_{OUT}-V_{REF})$	Sum of any offset drift included:		10		mV
V_{Ot}	Long term drift of V_O		5		mV
$V_{O\vartheta}$	Temperature drift of V_O @ $\vartheta_A = -40^\circ C \dots 85^\circ C$		5		mV
$\Delta V_O/\Delta V_C$	Supply voltage rejection ratio		4		mV/V
V_{OH}	Hysteresis of V_{OUT} @ $I_P = 0$ (after an overload of $100x I_{\Delta N}$)		25	40	mV
$V_{OH, Demag}$	Hysteresis after Degaussing		5	15	mV
V_{OSS}	Offsetripple (without external filter)		32		mV _{PP}
V_{OSS}	Offsetripple (with 20 kHz-Filter, first order)		5		mV _{PP}
V_{OSS}	Offsetripple (with 1 kHz-Filter, first order)		0.6		mV _{PP}
	Mechanical stress according to M3209/3 Settings: 10-2000Hz, 1min/Octave, 2 hours		2		g

Routine Tests: (Measurement after temperature balance of the samples at room temperature, SC=significant characteristic)

V_{OUT} (SC)	(100%) M3011/6:	Output voltage	1182 ... 1218	mV
V_O	(100%) M3226:	Offset voltage	± 10	mV
U_d	(100%) M3014:	Test voltage, 1s	1.8	kV _{RMS}
U_{PDE}	(AQL 1/S4)	Partial discharge voltage (extinction)	1.5	kV _{RMS}
$U_{PD} * 1.875$	M3024:		1.875	

Type Tests: (Precondition acc. M3236)

\hat{U}_W	M3064:	HV Impulse test (1.2 μ s/50 μ s wave form) 5 pulses -> polarity +, 5 pulses -> polarity -	8	kV
U_d	M3014:	Test voltage, 60s	3.6	kV _{RMS}
U_{PDE}	M3024:	Partial discharge voltage (extinction)	1.5	kV _{RMS}
$U_{PD} * 1.875$			1.875	

Other instructions

- A positive output voltage appears at point V_{OUT} vs. V_{REF} , if primary current flows in direction of the arrow.
- Temperature of the primary conductor should not exceed $105^\circ C$.
- Housing and bobbin material UL-listed: Flammability class 94V-0.
- Housing without red phosphorous.
- Further standards: UL 508, file E317483, category NMTR2 / NMTR8

Hrg.: R&D-PD NPI D
editor

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designer

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released