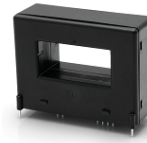


K-No.:30107

### 2A 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: 18.02.2022

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	150	A
$I_{\Delta N}$	Differential rated RMS current	2	A
$V_{OUT}$	Output voltage @ $I_{\Delta P}$	$V_{REF} \pm (1.32 * I_{\Delta P} / I_{\Delta N})$	V
$V_{OUT(0)}^1$	Output voltage @ $I_P=0A, \vartheta_A=25^\circ C$	$V_{REF} \pm 0.015$	V
$V_{OUT(Error)}$	in case of error (current sensor) $V_{OUT}$ is set	< 0.5	V
$V_{REF}$	internal reference voltage	$2.5 \pm 0.005$	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 @ $V_{REF} = 0...0.1V$	$V_{OUT(0)} + 0.2 \pm 0.06$	V
$K_N$	Transformation ratio	(1) : 1000	
	Turns count for test winding	20	

<sup>1</sup> 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  $V_{OUT} < 0.5V$ .

<sup>2</sup> 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	$\pm 3$			A
	Max. measuring range ( $V_{C,min}=4.98V, R_{LOAD}>100k\Omega$ )	$\pm 3.6$			A
X	Accuracy @ $I_{PN}, \vartheta_A = 25^\circ C$			1.5	%
$\epsilon_L$	Linearity			1	%
$V_O$	Offset voltage @ $I_P = 0A, \vartheta_A = 25^\circ C$	-15		15	mV
$\Delta V_O/\Delta \vartheta$	Temperature drift of $V_{OUT}$ @ $I_P=0A, \vartheta_A$		0.07		mV/°C
$t_r$	Response time @ 90% of $I_{\Delta N}$		30		$\mu s$
f	Frequency bandwidth	DC...10			kHz

#### General data

$\vartheta_A$	Ambient operation temperature	-40		85	°C
$\vartheta_S$	Ambient storage temperature (acc. to M3101)	-40		85	°C
m	Mass		94		g
$V_C$	Supply voltage	4.75	5	5.25	V
$I_C$	Supply current at $I_P = 0A$ and RT		15		mA
<sup>1)</sup> $s_{clear}$	Clearance (component without solder pad)	8			mm
<sup>1)</sup> $s_{creep}$	Creepage (component without solder pad)	10			mm
<sup>1)</sup> $U_{sys, re}$	System voltage (reinforced insulation)			600	$V_{RMS}$
<sup>1)</sup> $U_{work, re}$	Working voltage (reinforced insulation)			1000	$V_{RMS}$
<sup>1)</sup> $U_{PD}$	Rated discharge voltage			1414	$V_{PEAK}$
<sup>1)</sup> $U_{sys, basic}$	System voltage (basic insulation)			1000	$V_{RMS}$
<sup>1)</sup> $U_{work, basic}$	Working voltage (basic insulation)			2000	$V_{RMS}$

<sup>1)</sup>Constructed and 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
18.02.2022	NSch.	81	Other instructions on sheet 3 changed. " The color of the plastic material... added. Minor change

Hrg.: R&D-PD NPI D  
editor

Bearb.: DJ  
designer

MC-PM: NSch.  
check

freig.: SB  
released

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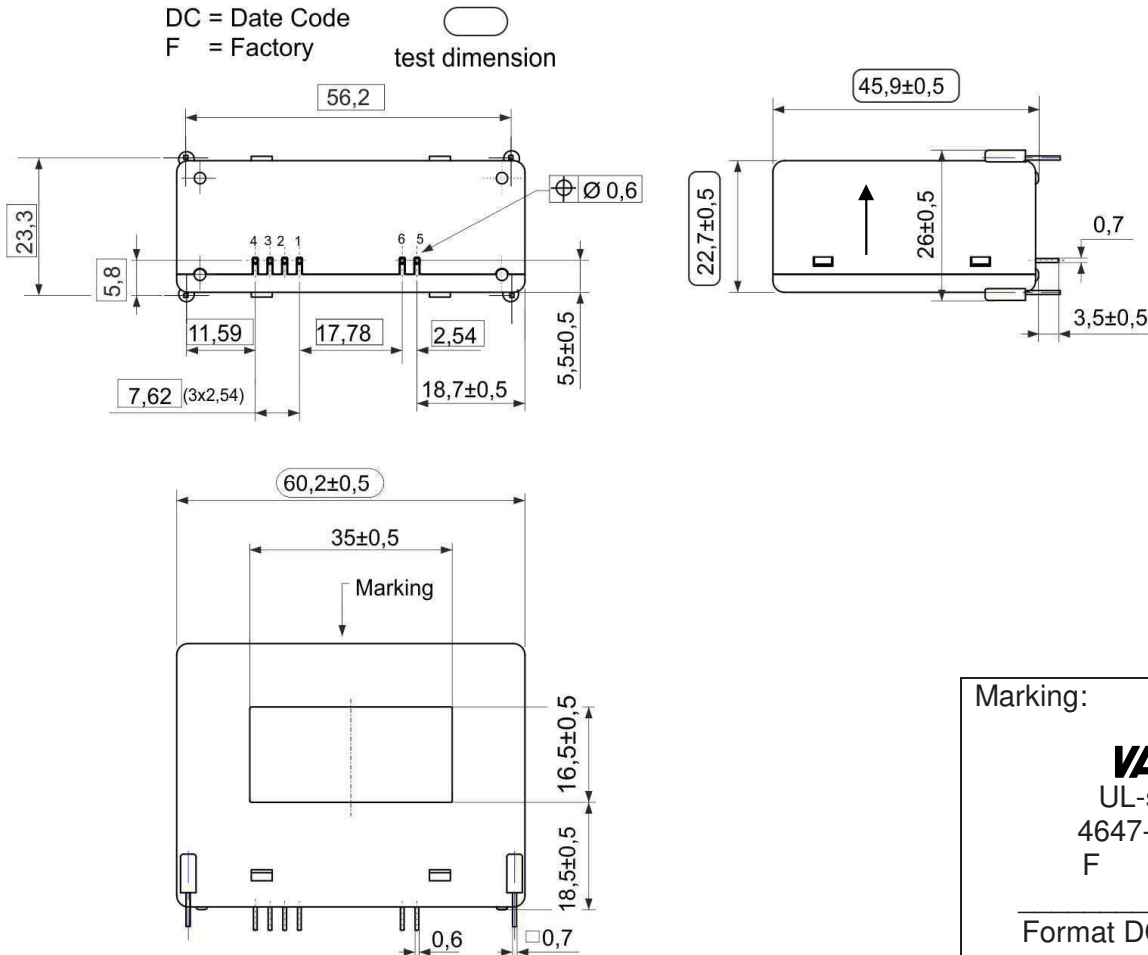
Customer: Standard Type

Customers Part no:

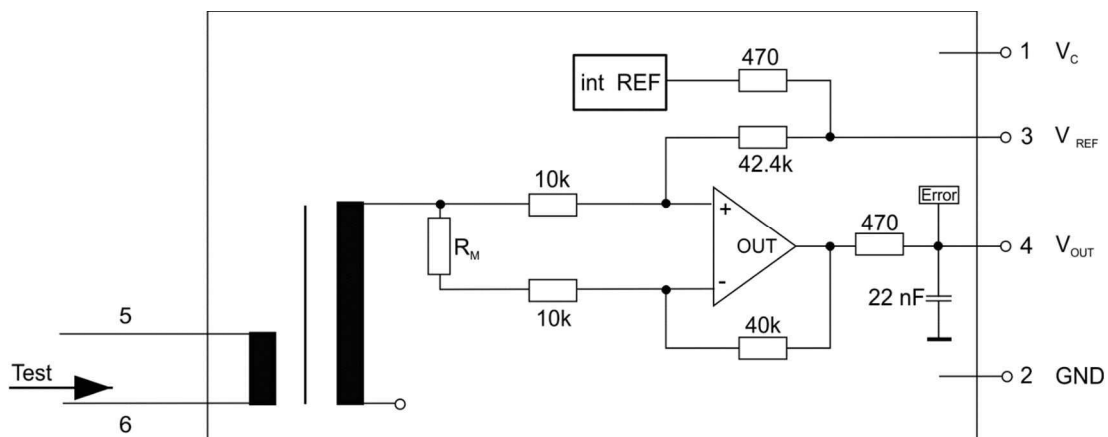
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#### Mechanical outline (mm):

General tolerances DIN ISO 2768-c



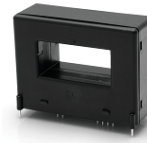
#### Schematic diagram:



K-No.:30107

### 2A Differential Current Sensor for 5V Supply Voltage

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#### 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			$\pm 15$	mA
$R_S$	Secondary coil resistance @ $\vartheta_A = 85^\circ C$		80		$\Omega$
$R_{i,REF}$	Internal resistance of reference input		470		$\Omega$
$R_{i,OUT}$	Output resistance of $V_{OUT}$		470		$\Omega$
$\Delta X_{\vartheta}/\Delta \vartheta$	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
$V_{Ot}$	Long term drift of $V_O$		7		mV
$V_{O\vartheta}$	Temperature drift of $V_O$ @ $\vartheta_A = -40^\circ C \dots 85^\circ C$		8		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 $800x I_{\Delta N}$ )			70	mV
$V_{OH, Demag}$	Hysteresis after Degaussing			20	mV
$V_{OSS}$	Offsetripple (without external filter)		40	60	mV <sub>PP</sub>
$V_{OSS}$	Offsetripple (with 20 kHz-Filter, first order)		10		mV <sub>PP</sub>
$V_{OSS}$	Offsetripple (with 1.6 kHz-Filter, first order)		1		mV <sub>PP</sub>
	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		1301 ... 1339	mV
$V_O$	(100%) M3226	Offset voltage		$\pm 15$	mV
$U_d$	(100%) M3014	Test voltage, 1s		1.8	kV <sub>RMS</sub>
$U_{PDE}$ $U_{PD} * 1.875$	(AQL 1/S4) M3024	Partial discharge voltage (extinction)		1.5 1.875	kV <sub>RMS</sub>

#### Type Tests: (Precondition acc. M3236)

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

#### 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
- The color of the plastic material is not specified and the current sensor can be supplied in different colors (e.g. brown, black, white, natural). This has no effect on the specifications or UL approval

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