

K-No.: 27106

150A Current Sensor

For the electronic measurement of currents:
DC, AC, pulsed, mixed with a galvanic isolation
between the primary circuit (high power) and the
secondary circuit (electronic circuit)



Date: 06.07.2023

Customer: Standard Type

Customers Part no:

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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 current 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:

- AC variable speed drives and servo motor drives
- static converters for DC motor drives
- Battery supplied applications
- Switched Mode Power Supplies (SMPS)
- Power supplies for welding applications
- Uninterruptable Power Supplies (UPS)

Electrical data - Ratings

I_{PN}	Primary nominal RMS current	150	A
V_{OUT}	Output voltage	$V_{REF} \pm (0.625 \cdot I_P / I_{PN})$	V
V_{OUT}	Output voltage @ $I_P=0A, \vartheta_A=25^\circ C$	$V_{REF} \pm 0.001$	V
V_{REF}	External Reference voltage range	0 ... 4	V
	Internal Reference voltage	2.5 ± 0.005	V
K_N	Transformation ratio	(1) : 1550	

Accuracy – Dynamic performance data

		min.	typ.	max.	Unit
$I_{P,max}$	Max. measuring range	±450			A
X	Accuracy @ $I_{PN}, \vartheta_A=25^\circ C$			0.7	%
ϵ_L	Linearity			0.1	%
$V_{OUT}-V_{REF}$	Offset voltage @ $I_P=0A, \vartheta_A=25^\circ C$			±1	mV
$\Delta V_O / V_{REF} / \Delta \vartheta$	Temperature drift of V_{OUT} @ $I_P=0A, V_{REF}=2.5V, \vartheta_A$		1	3	ppm/°C
t_{ra}	Reaction time		1.5	2	µs
f_{BW}	Frequency bandwidth (small signal)	DC ... 100			kHz

General data

ϑ_A	Ambient operation temperature	-40		85	°C
ϑ_S	Ambient storage temperature (acc. to M3101)	-40		85	°C
m	Mass		37		g
V_C	Supply voltage	11.4	12	12.6	V
I_C	Supply current @ $I_P = 0A$ and RT		22		mA

$^1)S_{clear}$	Clearance (component without solder pad)	10			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)			1500	V_{RMS}
$^1)U_{work, basic}$	Working voltage (basic insulation)			2400	V_{RMS}
	According to UL 508: max. potential difference			600	V_{RMS}

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

Date	Name	Issue	Amendment
06.07.2023	DJ	81	Applicable documents changed on sheet 3. „The color of the plastic material... added. Minor change
25.09.2020	DJ	81	Approval received. Marking with UL-sign and other standards changed. Minor change

Editor: R&D-PD NPI D

Designer: DJ

MC-PM: NSch.

Released: SB

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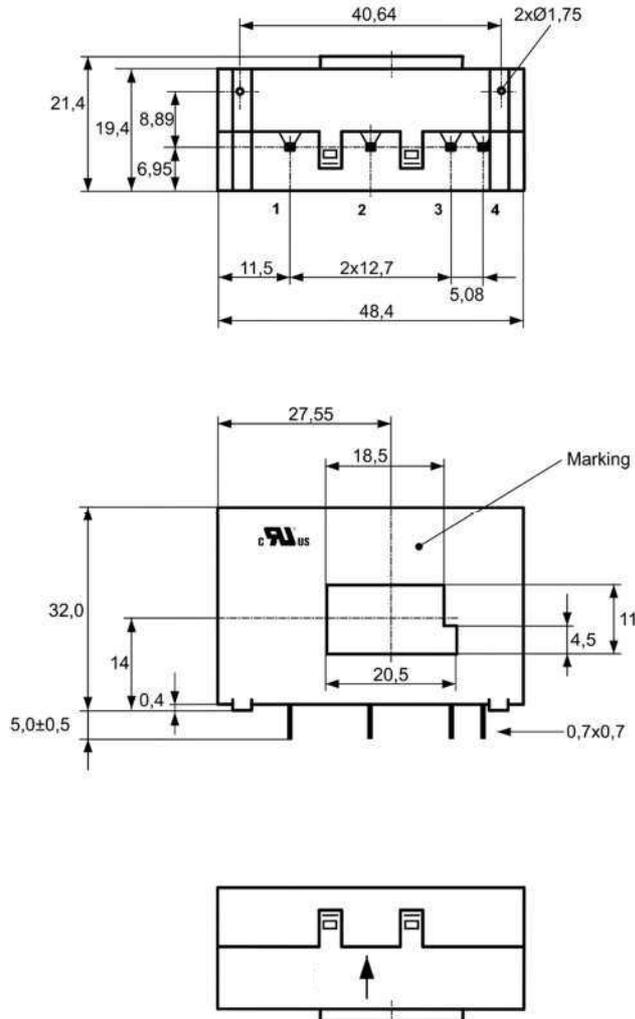
Customer: Standard Type

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Mechanical outline (mm):

General tolerances DIN ISO 2768-c



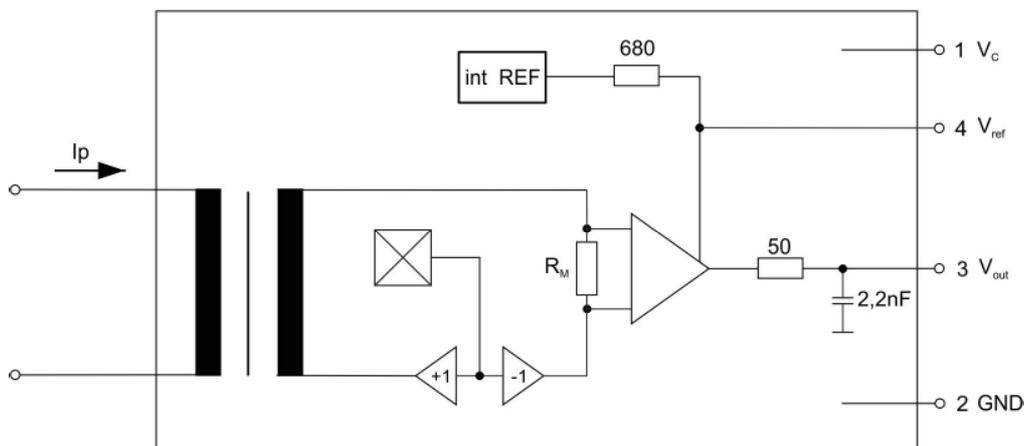
Marking:

UL-sign 4647-X264
F DC

F: Factory
DC: Datecode

Datecode Format: [YYWW]
Example: 1904 -> 2019, Week 4

Schematic diagram:



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Electrical data: (investigate by a type checking)

		min.	typ.	max.	Unit
$V_{C,tot}$	maximum supply voltage (without function)			15	V
I_c	Supply Current with primary current	22mA+ $I_P \cdot K_N + V_{OUT}/R_L$			mA
$I_{OUT,SC}$	Short circuit output current		4		mA
R_s	Secondary coil resistance @ $\vartheta_A = 85^\circ\text{C}$			35	Ω
$R_{i,REF}$	Internal resistance of Reference output		680		Ω
$R_{i,Vout}$	Output resistance of V_{OUT}		50		Ω
R_L	External recommended resistance of V_{OUT}	1			k Ω
C_L	External recommended capacitance of V_{OUT}		no limit		pF
$X_{Ti} / \Delta\vartheta$	Temperature drift of X @ $\vartheta_A = -40^\circ\text{C} \dots 85^\circ\text{C}$			40	ppm/ $^\circ\text{C}$
$\Delta V_O = \Delta(V_{OUT} - V_{REF})$	Sum of any offset drift including:		1	1.5	mV
V_{Ot}	Long term drift of V_O		0.3		mV
V_{OT}	Temperature drift of V_O @ $\vartheta_A = -40^\circ\text{C} \dots 85^\circ\text{C}$		0.1		mV
V_{OH}	Hysteresis of V_{OUT} @ $I_P = 0\text{A}$ (caused by $I_P = 10 \times I_{PN}$)		0.2	0.4	mV
$\Delta V_O / \Delta V_C$	Supply voltage rejection ratio		0.03		mV/V
V_{OSS}	Offsetripple (with 1 MHz-Filter, first order)		7	15	mV _{PP}
V_{OSS}	Offsetripple (with 100 kHz-Filter, first order)		3	6	mV _{PP}
V_{OSS}	Offsetripple (with 20 kHz-Filter, first order)		1.5	2.5	mV _{PP}
C_k	Coupling capacity (primary - secondary)		6		pF
	Mechanical stress according to M3209/3 Settings: 10-2000Hz, 1min/oct, 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	620.625 ... 629.375	mV
$V_{OUT} - V_{REF}$	(100%) M3226:	Offset voltage	± 1	mV
U_d	(100%) M3014:	Test voltage, 1s	1.8	kV _{RMS}
U_{PDE}	(AQL 1/S4) M3024:	Partial discharge voltage (extinction)	1.0	kV _{RMS}
U_{PD}			1.5	

Type-Tests: (Precondition acc. to M3236)

\hat{U}_W	HV transient test acc. to M3064 (1.2 μs / 50 μs) 5 pulses -> polarity +, 5 pulses -> polarity -	8	kV _{PEAK}
U_d	Test voltage acc. to M3014, 60s	3.6	kV _{RMS}
U_{PDE}	Partial discharge voltage (extinction)	1.0	kV _{RMS}
U_{PD}	acc. to M3024	1.5	

Other instructions:

- Current direction: A positive output voltage vs. V_{REF} appears at point V_{OUT} , if primary current flows in direction of the arrow sign on Sensor package.
- Temperature of the primary conductor should not exceed 105 $^\circ\text{C}$.
- Housing and bobbin material UL-listed: Flammability class 94V-0.
- 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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