

K-No.: 27059

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: 25.09.2020

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		65		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)	8			mm
¹⁾ S_{creep}	Creepage (component without solder pad)	8			mm
¹⁾ $U_{sys, re}$	System voltage (reinforced insulation)			600	V_{RMS}
¹⁾ $U_{work, re}$	Working voltage (reinforced insulation)			800	V_{RMS}
¹⁾ U_{PD}	Rated discharge voltage			1131	V_{PEAK}
¹⁾ $U_{sys, basic}$	System voltage (basic insulation)			1000	V_{RMS}
¹⁾ $U_{work, basic}$	Working voltage (basic insulation)			1600	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
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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Mechanical outline (mm):

General tolerances DIN ISO 2768-c

Connections:

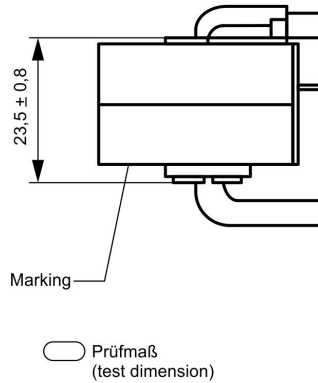
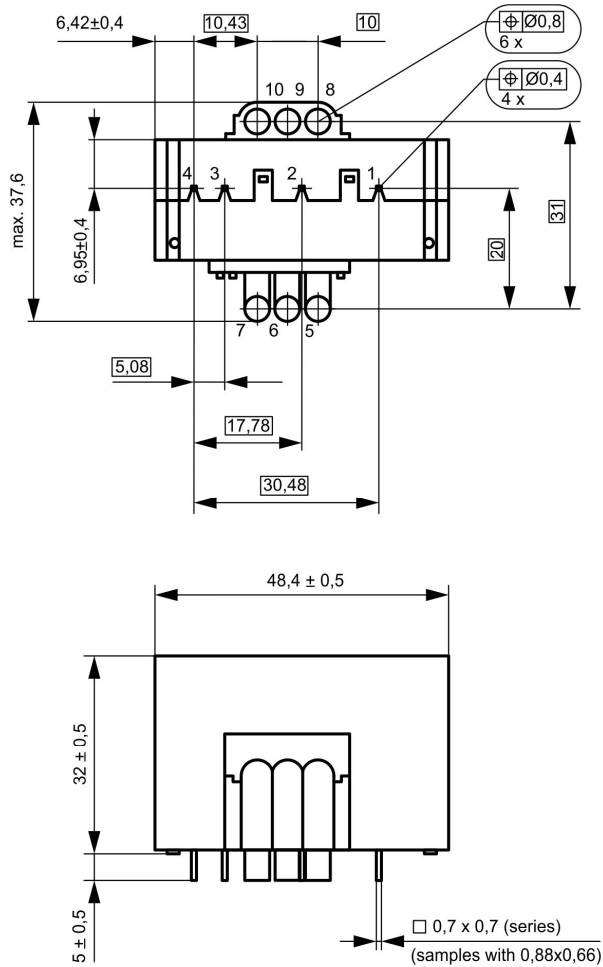
1-4: 0.7 x 0.7mm
5-10: Ø 4.5mm

Marking:

UL-sign 4647-X263
F DC

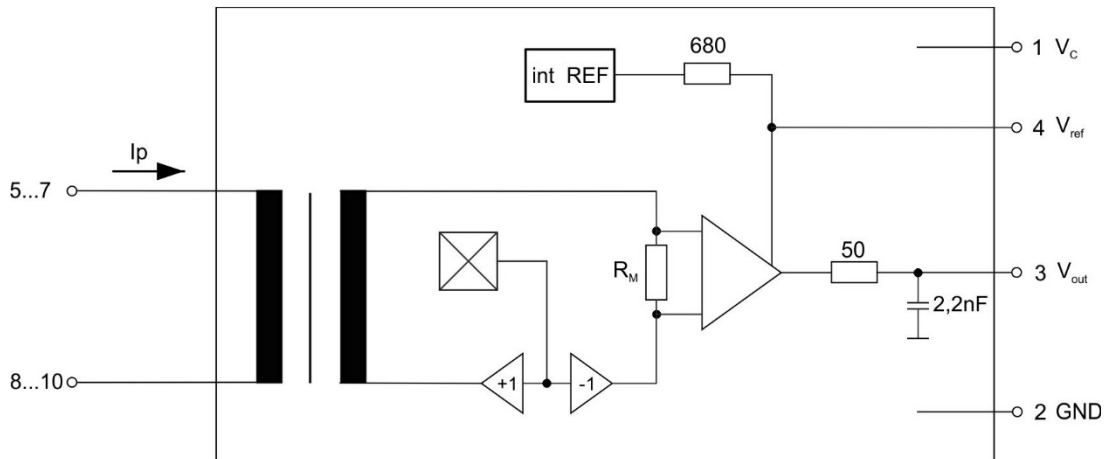
F: Factory
DC: Datecode

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



Prüfmaß
(test dimension)

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 @ $\vartheta_A = 85^\circ C$			35	Ω
R_P	Primary wire resistance @ $\vartheta_A = 25^\circ C$		0.03		m 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 @ $\vartheta_A = -40^\circ C \dots 85^\circ C$			40	ppm/ $^\circ C$
$\Delta V_O = \Delta(V_{OUT} - V_{REF})$	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 @ $\vartheta_A = -40^\circ C \dots 85^\circ C$		0.1		mV
V_{OH}	Hysteresis of V_{OUT} @ $I_P = 0A$ (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)	1.5	kV _{RMS}
U_{PD}			1.875	

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) acc. to M3024	1.5	kV _{RMS}
U_{PD}		1.875	

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 $^\circ C$.
- Housing and bobbin material UL-listed: Flammability class 94V-0.
- Further standards: UL 508 file E317483, category NMTR2 / NMTR8

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