



SPECIFICATION

Item no.:

T60404-N4646-X662

K-no.: 24512

15 A Current Sensor for 5V- Supply Voltage

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

Date: 30.01.2012

Customer: Standard type

Customers Part no.:

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Description

- Closed loop (compensation)
- Current Sensor with magnetic field 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
 - Uninterruptible Power Supplies (UPS)

Electrical data – Ratings

I_{PN}	Primary nominal r.m.s. current	15	A
V_{out}	Output voltage @ I_P	$V_{Ref} \pm (0.625 * I_P / I_{PN})$	V
V_{out}	Output voltage @ $I_P=0$, $T_A=25^\circ\text{C}$	$V_{Ref} \pm 0.008$	V
V_{Ref}	External Reference voltage range	0...4	V
	Internal Reference voltage	2.5 ± 0.005	V
K_N	Turns ratio	1...3 : 2000	

Accuracy – Dynamic performance data

		min.	typ.	max.	Unit
$I_{P,max}$	Max. measuring range	± 51			
X	Accuracy @ I_{PN} , $T_A= 25^\circ\text{C}$		0.7		%
ϵ_L	Linearity		0.1		%
$V_{out} - V_{Ref}$	Offset voltage @ $I_P=0$, $T_A= 25^\circ\text{C}$		± 8		mV
$\Delta V_o / V_{Ref} / \Delta T$	Temperature drift of V_{out} @ $I_P=0$, $V_{Ref}=2,5\text{V}$, $T_A= -40...85^\circ\text{C}$	6	20		ppm/ $^\circ\text{C}$
t_r	Response time @ 90% von I_{PN}	300			ns
$\Delta t (I_{P,max})$	Delay time at $dI/dt = 100 \text{ A}/\mu\text{s}$	200			ns
f	Frequency bandwidth	DC...100			kHz

General data

		min.	typ.	max.	Unit
T_A	Ambient operating temperature	-40		+85	$^\circ\text{C}$
T_S	Ambient storage temperature	-40		+85	$^\circ\text{C}$
m	Mass		12		g
V_C	Supply voltage	4.75	5	5.25	V
I_C	Current consumption		15		mA

Constructed and manufactured and tested in accordance with EN 61800-5-1 (Pin 1 - 6 to Pin 7 – 10)
 Reinforced insulation, Insulation material group 1, Pollution degree 2

S_{clear}	Clearance (component without solder pad)	7,4	mm	
S_{creep}	Creepage (component without solder pad)	8,0	mm	
V_{sys}	System voltage overvoltage category 3	RMS	300	V
V_{work}	Working voltage (tabel 7 acc. to EN61800-5-1) overvoltage category 2	RMS	650	V
U_{PD}	Rated discharge voltage	peak value	1320	V

According UL 840: $V_{sys} = 600 \text{ V}$

Date	Name	Issue	Amendment
30.01.12	Le	82	Values for clearance and creepage accordance UL 840 added. AA-444
28.01.11	Le	82	Date changed.
Hrsg.: KB-E editor	Bearb: Le designer	KB-PM: Ga. check	freig.: HS released

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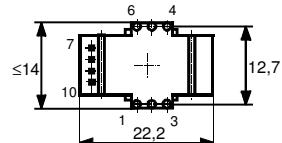
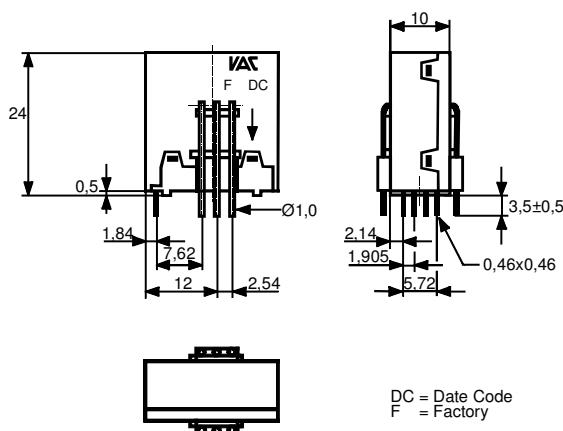
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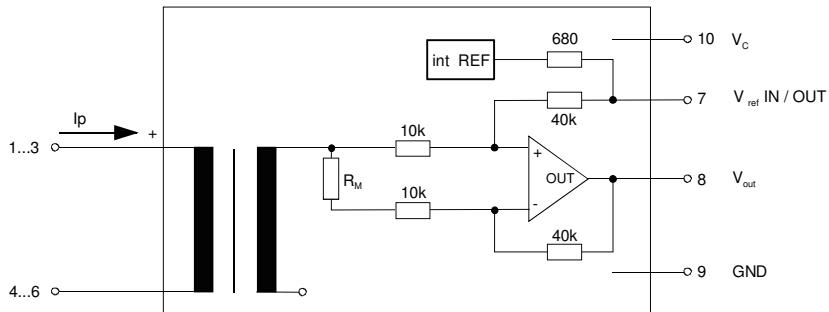
Mechanical outline (mm):

General tolerances DIN ISO 2768-c


 Toleranz der Stiftabstände
 $\pm 0,2$ mm
 (Tolerances grid distance)

 DC = Date Code
 F = Factory

Connections:

 1...6: Ø 1 mm
 7..10: 0,46*0,46 mm

Marking:
VAC
4646X662
F DC
Schematic diagram

Possibilities of wiring (@ T_A = 85°C)

primary windings	primary current RMS	primary current maximal	output current RMS	turns ratio	primary resistance	wiring
N _P	I _P [A]	I _{P,max} [A]	I _S (I _P) [mA]	K _N	R _P [mΩ]	
1	15	±51	2.5±0.625	1:2000	0.33	
2	7.5	±25	2.5±0.625	2:2000	1.5	
3	5	±17	2.5±0.625	3:2000	3	

Temperature of the primary conductor should not exceed 110°C.

Additional information is obtainable on request.

This specification is no declaration of warranty acc. BGB §443 dar.

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Additional Information

Item No.: T60404-N4646-X662

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Electrical Data

		min.	typ.	max.	Unit
V_{Ctot}	Maximum supply voltage (without function)			6	V
I_C	Supply Current with primary current		$15\text{mA} + I_p \cdot K_N + V_{out}/R_L$		mA
$I_{out,SC}$	Short circuit output current		± 20		mA
R_P	Resistance / primary winding @ $T_A=25^\circ\text{C}$		1		$\text{m}\Omega$
R_S	Secondary coil resistance @ $T_A=85^\circ\text{C}$			67	Ω
$R_{i,Ref}$	Internal resistance of Reference input			670	Ω
$R_i(V_{out})$	Output resistance of V_{out}			1	Ω
R_L	External recommended resistance of V_{out}	1			$\text{k}\Omega$
C_L	External recommended capacitance of V_{out}			500	pF
$\Delta X_{Ti} / \Delta T$	Temperature drift of X @ $T_A = -40 \dots +85^\circ\text{C}$			40	ppm/K
$\Delta V_0 = \Delta(V_{out} - V_{Ref})$	Sum of any offset drift including:		3.5	10	mV
V_{ot}	Longtermdrift of V_0	2			mV
V_{0T}	Temperature drift von V_0 @ $T_A = -40 \dots +85^\circ\text{C}$	2			mV
V_{0H}	Hysteresis of V_{out} @ $I_p=0$ (after an overload of $10 \times I_{PN}$)	3			mV
$\Delta V_0/\Delta V_c$	Supply voltage rejection ratio			1	mV/V
V_{oss}	Offsettripple (with 1 MHz- filter first order)			30	mV
V_{oss}	Offsettripple (with 100 kHz- filter firrdt order)	4	8		mV
V_{oss}	Offsettripple (with 20 kHz- filter first order)		1.2	2	mV
C_k	Maximum possible coupling capacity (primary – secondary)	5	10		pF
	Mechanical stress according to M3209/3				
	Settings: 10 – 2000 Hz, 1 min/Decade, 2 hours			30g	

Inspection (Measurement after temperature balance of the samples at room temperature)

$V_{out}(I_p=I_{PN})$ (V)	M3011/6:	Output voltage vs. external reference ($I_p=15\text{A}$, 40-80Hz)	$625 \pm 0.7\%$	mV
$V_{out}-V_{Ref}(I_p=0)$ (V)	M3226:	Offset voltage	± 0.008	V
V_d (V)	M3014:	Test voltage, rms, 1 s pin 1 – 6 vs. pin 7 – 10	1.5	kV
V_e (AQL 1/S4)		Partial discharge voltage acc.M3024 (RMS) with V_{vor} (RMS)	1400 1750	V

Type Testing (Pin 1 - 6 to Pin 7 - 10)

Designed according standard EN 50178 with insulation material group 1

V_W	HV transient test according to M3064 (1,2 μs / 50 μs -wave form)	8	kV	
V_d	Testing voltage to M3014	(5 s)	3	kV
V_e	Partial discharge voltage acc.M3024 (RMS) with V_{vor} (RMS)		1400 1750	V

Applicable documents

Current direction: A positive output current appears at point I_s , by primary current in direction of the arrow.
Housing and bobbin material UL-listed: Flammability class 94V-0.
Enclosures according to IEC529: IP50.

Datum	Name	Index	Amendment			
30.01.12	Le	82	Date adapted.			
28.01.11	Le	82	Inspection M3011/6: 15A instead of 25A, typo. Lapidary change.			
Hrsg.: KB-E editor	Bearb: Le. designer		KB-PM: KRe check			freig.: HS released

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Explanation of several of the terms used in the tablets (in alphabetical order)

t_r : Response time (describe the dynamic performance for the specified measurement range), measured as delay time at $I_p = 0,9 \cdot I_{PN}$ between a rectangular current and the output voltage $V_{out}(I_p)$

$\Delta t(I_{Pmax})$: Delay time (describe the dynamic performance for the rapid current pulse rate e.g short circuit current) measured between I_{Pmax} and the output voltage $V_{out}(I_{Pmax})$ with a primary current rise of $dI_p/dt \geq 100 \text{ A}/\mu\text{s}$.

V_0 : Offset voltage between V_{out} and the rated reference voltage of $V_{ref} = 2,5\text{V}$.
 $V_0 = V_{out}(0) - 2,5\text{V}$

U_{PD} Rated discharge voltage (recurring peak voltage separated by the insulation) proved with a sinusoidal voltage V_e
 $U_{PD} = \sqrt{2} * V_e / 1,5$

V_{vor} Defined voltage is the RMS value of a sinusoidal voltage with peak value of $1,875 * U_{PD}$ required for partial discharge test in IEC 61800-5-1
 $V_{vor} = 1,875 * U_{PD} / \sqrt{2}$

V_{sys} System voltage RMS value of rated voltage according to IEC 61800-5-1

V_{work} Working voltage voltage according to IEC 61800-5-1 which occurs by design in a circuit or across insulation

V_{0H} : Zero variation of V_o after overloading with a DC of tenfold the rated value

V_{ot} : Long term drift of V_o after 100 temperature cycles in the range -40 bis 85 °C.

X: Permissible measurement error in the final inspection at RT, defined by

$$X = 100 \cdot \left| \frac{V_{out}(I_{PN}) - V_{out}(0)}{0,625\text{V}} - 1 \right| \%$$

$X_{ges}(I_{PN})$: Permissible measurement error including any drifts over the temperature range by the current measurement I_{PN}

$$X_{ges} = 100 \cdot \left| \frac{V_{out}(I_{PN}) - 2,5\text{V}}{0,625\text{V}} - 1 \right| \% \quad \text{or} \quad X_{ges} = 100 \cdot \left| \frac{V_{out}(I_{PN}) - V_{ref}}{0,625\text{V}} - 1 \right| \%$$

ε_L : Linearity fault defined by $\varepsilon_L = 100 \cdot \left| \frac{I_p}{I_{PN}} - \frac{V_{out}(I_p) - V_{out}(0)}{V_{out}(I_{PN}) - V_{out}(0)} \right| \%$

This "Additional information" is no declaration of warranty according BGB §443.

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ООО "ЛайфЭлектроникс"

"LifeElectronics" LLC

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

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