



SPECIFICATION

Item no.: T60404-N4646-X763

K-no.: 26077

6 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: 05.02.2014

Customer: Standard type

Customers Part no.:

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Description	Characteristics	Applications
<ul style="list-style-type: none"> Closed loop (compensation) Current Sensor with magnetic field probe Printed circuit board mounting Casing and materials UL-listed 	<ul style="list-style-type: none"> 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 	<p>Mainly used for stationary operation in industrial applications:</p> <ul style="list-style-type: none"> 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	6	A
V _{out}	Output voltage @ I _P	V _{Ref} ± (0.625*I _P /I _{PN})	V
V _{out}	Output voltage @ I _P =0, T _A =25°C	V _{Ref} ± 0.0056	V
V _{Ref}	External Reference voltage range	0...4	V
	Internal Reference voltage	2.5 ±0.005	V
K _N	Turns ratio	1...4 : 2000	

Accuracy – Dynamic performance data

		min.	typ.	max.	Unit
I _{P,max}	Max. measuring range	±20			
X	Accuracy @ I _{PN} , T _A = 25°C		0.7		%
ε _L	Linearity		0.1		%
V _{out} - V _{Ref}	Offset voltage @ I _P =0, T _A = 25°C		±5.3		mV
ΔV _o / V _{Ref} / ΔT	Temperature drift of V _{out} @ I _P =0, V _{Ref} =2,5V, T _A = -40...85°C	6	30		ppm/°C
t _r	Response time @ 90% von I _{PN}		300		ns
Δt (I _{P,max})	Delay time at di/dt = 100 A/μs		200		ns
f	Frequency bandwidth	DC...200			kHz

General data

		min.	typ.	max.	Unit
T _A	Ambient operating temperature	-40		+85	°C
T _s	Ambient storage temperature	-40		+105	°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 – 4 to Pin 5 – 12)
 Reinforced insulation, Insulation material group 1, Pollution degree 2

S _{clear}	Clearance (component without solder pad)	9.6	mm	
S _{creep}	Creepage (component without solder pad)	10.6	mm	
V _{sys}	System voltage overvoltage category 3	RMS	600	V
V _{work}	Working voltage	RMS	1060	V
U _{PD}	Rated discharge voltage	peak value	1320	V

Note: "According UL 508: Max. potential difference = 600 V_{AC}

Date	Name	Issue	Amendment
05.02.14	Ga.	83	Marking changed acc to UL-specification. 4646X763-82 → 4646-X763-83. CN-924
08.07.13	Ga.	82	Typo: page 2, primary current RMS changed from 2A to 1.5A. Lapidary change.
Hrsg.: KB-E editor	Bearb.: Le designer	KB-PM: Ga. check	freig.: HS released

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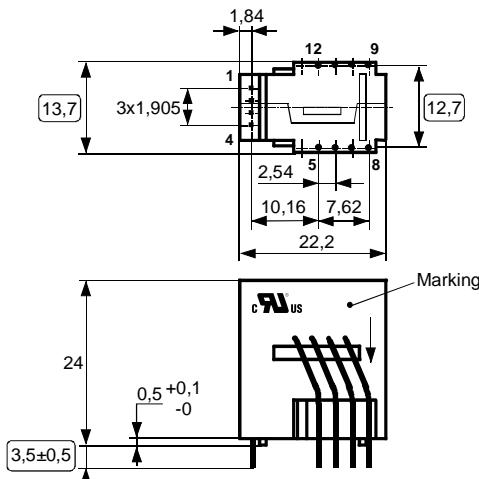
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Mechanical outline (mm):

General tolerances DIN ISO 2768-c

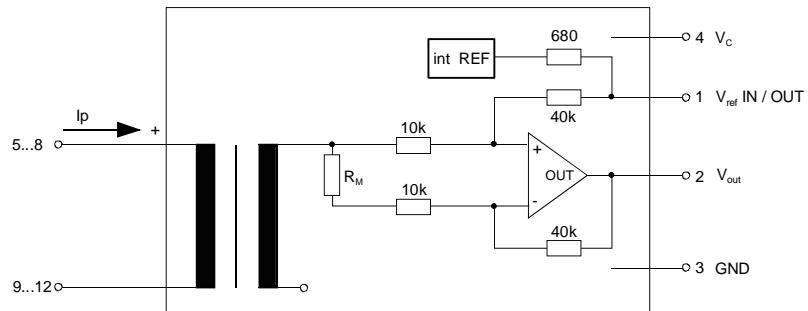


test dimension

Tolerances grid distance ±0,25mm

DC= Date Code

F = Factory

Connections:
 1...4: 0,46*0,46 mm
 5..12: Ø 1 mm
Marking:
VAC UL-sign
 4646-X763-83
 F DC
Schematic diagram**Possibilities of wiring** (@ T_A = 85°C)

primary windings	primary RMS current maximal	output voltage RMS	turns ratio	primary resistance	wiring
N _P	I _P [A]	I _{P,max} [A]	V _{out} (I _{PN}) [V]	K _N	R _P [mΩ]
1	6	±20	2.5±0.625	1:2000	0.25
2	3	±10	2.5±0.625	2:2000	1.0
4	1.5	±6,7	2.5±0.625	4:2000	4

Operating temperature of the current sensor and the primary conductor must not exceed 105°C.
 Additional information is obtainable on request.

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

Hrsg.: KB-E	Bearb: Le		KB-PM: Ga.		freig.: HS
editor	designer		check		released

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Additional Information

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Electrical Data

		min.	typ.	max.	Unit
V_{Ctot}	Maximum supply voltage (without function)			7	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:	5	15		mV
V_{0t}	Longtermdrift of V_0	3			mV
V_{0T}	Temperature drift von V_0 @ $T_A = -40 \dots +85^\circ\text{C}$	3			mV
V_{0H}	Hysteresis of V_{out} @ $I_p=0$ (after an overload of $10 \times I_{PN}$)		7.5		mV
$\Delta V_0/\Delta V_c$	Supply voltage rejection ratio	1			mV/V
V_{oss}	Offsetripple (with 1 MHz- filter first order)		55		mV
V_{oss}	Offsetripple (with 100 kHz- filter firtd order)	9	15		mV
V_{oss}	Offsetripple (with 20 kHz- filter first order)	2.5	4		mV
C_k	Maximum possible coupling capacity (primary – secondary)	5	10		pF
	Mechanical stress according to M3209/3		30g		
	Settings: 10 – 2000 Hz, 1 min/Oktave, 2 hours				

Inspection (Measurement after temperature balance of the samples at room temperature; SC = significant characteristic)

$V_{out}(I_p=I_{PN})$ (V)	M3011/6:	Output voltage vs. external reference ($I_p=6\text{A}, 40\text{-}80\text{Hz}$)	$625 \pm 0.7\%$	mV (SC)
$V_{out}-V_{Ref}(I_p=0)$ (V)	M3226:	Offset voltage	± 5.3	mV
V_d (V)	M3014:	Test voltage, rms, 1 s pin 1 – 4 vs. pin 5 – 12	1.8	kV
V_e (AQL 1/S4)		Partial discharge voltage acc.M3024 (RMS) with V_{vor} (RMS)	1400 1750	V V

Type Testing (Pin 1 - 4 to Pin 5 - 12)

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)	3.6	kV
V_e	Partial discharge voltage acc.M3024 (RMS) with V_{vor} (RMS)	1400 1750	V V	

Applicable documents

Current direction: A positive output current appears at point I_s , by primary current in direction of the arrow.
Enclosures according to IEC529: IP50.

Further standards UL 508 file E317483, category NMTR2 / NMTR8

Datum	Name	Index	Amendment
05.02.14	Ga.	83	Date updated.
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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_{0L} : 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 $\varepsilon_L = 100 \cdot \left| \frac{I_p}{I_{PN}} - \frac{V_{out}(I_p) - V_{out}(0)}{V_{out}(I_{PN}) - V_{out}(0)} \right| \%$

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