



SPECIFICATION

Item no.:

T60404-N4646-X101

K-No.: 24958

100 A 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: 16.06.2009

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 variabel 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 Suppllies (UPS)

Electrical data – Ratings

I _{PN}	Primary nominal r.m.s. current	100	A
R _M	Measuring resistance V _C =± 12V	0 ... 200	Ω
	V _C =± 15V	5 ... 400	Ω
I _{SN}	Secondary nominal r.m.s. current	50	mA

Accuracy – Dynamic performance data

		min.	typ.	max.	Unit
I _{P,max}	Max. measuring range @ V _C = ±12V, R _M = 5 Ω (t _{max} = 10sec) @ V _C = ±15V, R _M = 5 Ω (t _{max} = 10sec)	±188			A
X	Accuracy @ I _{PN} , T _A = 25°C	±236			A
ε _L	Linearity	0.1	0.5	0.5	%
I ₀	Offset current @ I _P =0, T _A = 25°C	0.02	0.05	0.05	mA
t _r	Response time	1			μs
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	+85	°C
T _S	Ambient storage temperature	-40	+90	+90	°C
m	Mass	15			g
V _C	Supply voltage	±11.4	±12 or ±15	±15.75	V
I _C	Current consumption	18			mA
	Constructed and manufactured and tested in accordance with EN 61800-5-1 (primary vs. secondary) Reinforced insulation, Insulation material group 1, Pollution degree 2				
S _{clear}	Clearance (component without solder pad)	12			mm
S _{creep}	Creepage (component without solder pad)	12			mm
V _{sys}	System voltage overvoltage category 3	RMS	600	600	V
V _{work}	Working voltage (table 7 acc. to EN61800-5-1) over voltage category 2	RMS	1000	1000	V
U _{PD}	Rated discharge voltage	peak value	1225	1225	V

Maximale Dauer- und Spitzenströme bei bestimmten Temperaturen

Supply voltage ±12 V:

T _A	85 °C	85 °C	70 °C	55 °C
I _P	100 A	125 A	150 A	150 A
I _{P,max}	188 A	183 A	185 A	194 A
R _M	5 Ω	5 Ω	5 Ω	5 Ω

Supply voltage ±15V:

T _A	85 °C	85 °C	70 °C	55 °C
I _P	100 A	125 A	150 A	150 A
I _{P,max}	236 A	204 A	232 A	244 A
R _M	5 Ω	20 Ω	5 Ω	5 Ω

Date Name Issue Amendment

16.06.09 Le 81 Write error: Accuracy – Dynamic performance data, I_{P,max} changed.Hrsg.: KB-E
editorBearb: Le
designerKB-PM IA: KRe.
checkfreig.: prs.
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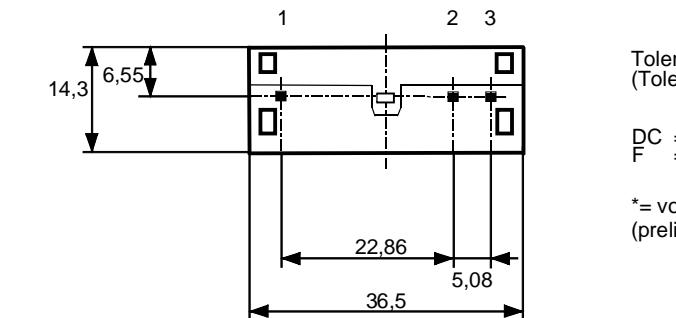
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Mechanical outline (mm):

General tolerances DIN ISO 2768-c

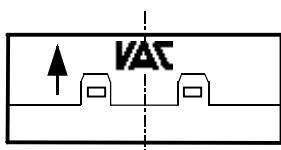
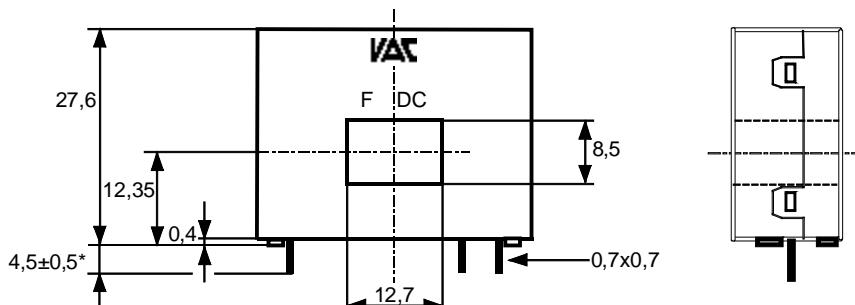
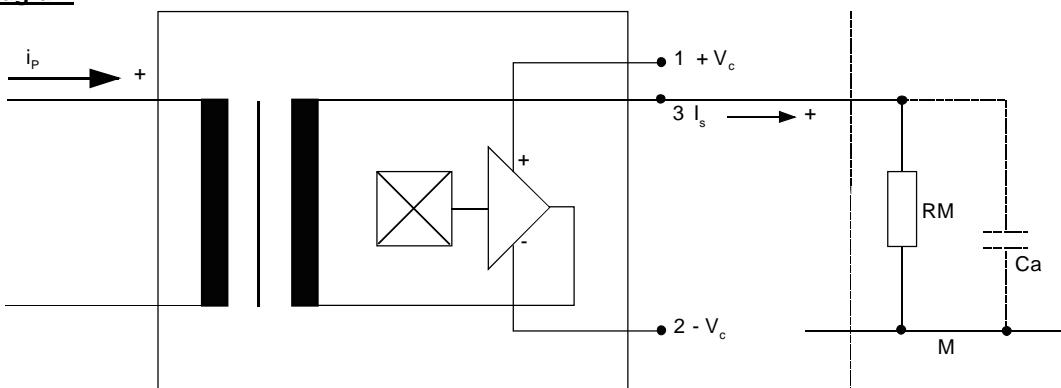

 Toleranz der Stiftabstände $\pm 0,2\text{mm}$
 (Tolerances grid distance)

 DC = Date Code
 F = Factory

 $*$ = vorläufig
 (preliminary)

 Connections:
 1...3: $0,7 \times 0,7 \text{ mm}$

Marking:

 4646X101
 F DC

Schematic diagram


Temperature of the primary conductor should not exceed 110°C

Additional indications are obtainable on request.

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

Hrsg.: KB-E
editorBearb: Le
designerKB-PM IA: KRe.
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Additional Information

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Electrical Data (investigate by a type checking)

		min.	typ.	max.	Unit
V _{Ctot}	Maximum supply voltage (without function) ±15.75 to ±18 V: for 1s per hour			±18	V
R _S	Secondary coil resistance @ T _A =85°C			114	Ω
X _{Ti}	Temperature drift of X @ T _A = -40 ... +85 °C			0.1	%
I _{0ges}	Offset current (including I ₀ , I _{0t} , I _{0T})			0.07	mA
I _{0t}	Long term drift Offset current I ₀		0.025		mA
I _{0T}	Offset current temperature drift I ₀ @ T _A = -40 ...+85°C		0.025		mA
I _{0H}	Hyteresis current @ I _P =0 (caused by primary current 10 x I _{PN})		0.025	0.05	mA
ΔI ₀ /ΔV _C	Supply voltage rejection ratio			0.01	mA/V
i _{loss}	Offset ripple (with 1 MHz- filter first order)			0,17	mA
i _{loss}	Offset ripple (with 100 kHz- filter first order)		0.025	0.05	mA
i _{loss}	Offset ripple (with 20 kHz- filter first order)		0.008	0.013	mA
C _k	Maximum possible coupling capacity (primary – secondary)	6			pF

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

K _N (N ₁ /N ₂)	(V)	M3011/6	Transformation ratio (I _P =100A, 40-80 Hz)	1 : 2000 ± 0,5	%
I ₀	(V)	M3226	Offset current	< 0.05	mA
V _d	(V)	M3014:	Test voltage, rms, 1 s pin 1 – 3 vs. hole	1.8	kV
V _e	(AQL 1/S4)		Partial discharge voltage acc.M3024 (RMS) with V _{vor} (RMS)	1300 1625	V V

Type Testing (Pin 1 - 3 to hole)

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)	1300 1625	V V	

Datum	Name	Index	Änderung
16.06.09	Le	81	Date changed.
Hrsg.: KB-E editor	Bearb: Le designer	KB-PM IA: KRe. check	freig.: prs. released

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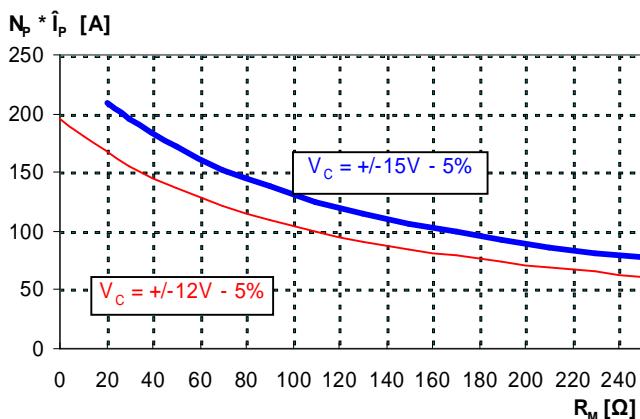
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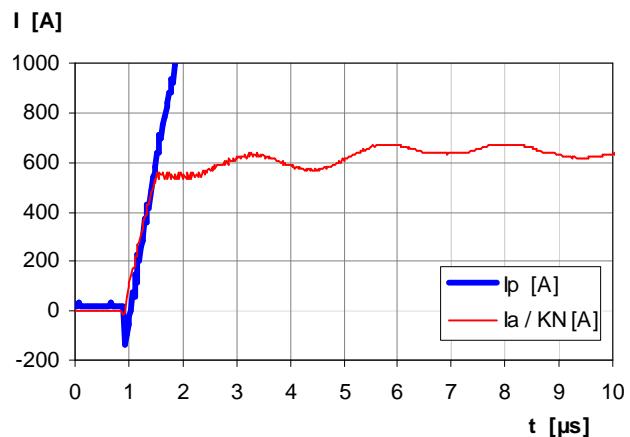
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Limit curve of measurable current $\hat{I}_P(R_M)$ @ ambient temperature $\leq 85^\circ\text{C}$ **Maximum measuring range ($\mu\text{s-range}$)**

Output current behaviour of a 3kA current pulse
@ $V_C = \pm 15V$ und $R_M = 100\Omega$



Fast increasing currents (higher than the specified $I_{p,\max}$), e.g. in case of a short circuit, can be transmitted because the currents are transformed directly and be limited by diodes only.

The offset ripple can be reduced by an external low pass. Simplest solution is a passive low pass filter of 1st order with

$$f_g = \frac{1}{2p \cdot R_M \cdot C_a}$$

In this case the response time is enlarged.

It is calculated from:

$$t'_r \leq t_r + 2,5R_M C_a$$

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.

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Additional Information

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

I_{OH} :	Zero variation after overloading with a DC of tenfold the rated value ($R_M = R_{MN}$)
I_{OT} :	Long term drift of I_o after 100 temperature cycles in the range -40 bis 85 °C.
t_r :	Response time, measured as delay time at $I_P = 0,8 \cdot I_{Pmax}$ between a rectangular current and the output current.
$\Delta t (I_{Pmax})$:	Delay time between I_{Pmax} and the output current i_a with a primary current rise of $di_1/dt = 100 \text{ A}/\mu\text{s}$.
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
$X_{ges}(I_{PN})$:	The sum of all possible errors over the temperature range by measuring a current I_{PN} : $X_{ges} = 100 \cdot \left \frac{I_S(I_{PN})}{K_N \cdot I_{SN}} - 1 \right $
X :	Permissible measurement error in the final inspection at RT, defined by $X = 100 \cdot \left \frac{I_{SB}}{I_{SN}} - 1 \right $ where I_{SB} is the output DC value of an input DC current of the same magnitude as the (positive) rated current ($I_o = 0$)
X_{Ti} :	Temperature drift of the rated value orientated output term. I_{SN} (cf. Notes on F_i) in a specified temperature range, obtained by: $X_{Ti} = 100 \cdot \left \frac{I_{SB}(T_{A2}) - I_{SB}(T_{A1})}{I_{SN}} \right $
e_L :	Linearity fault defined by $e_L = 100 \cdot \left \frac{I_P}{I_{PN}} - \frac{I_{Sx}}{I_{SN}} \right $ Where I_P is any input DC and I_{Sx} the corresponding output term. I_{SN} : see notes of F_i ($I_o = 0$).

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

Hrsg.: KB-E	Bearb: Le		KB-PM IA: KRe.		freig.: prs. released
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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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