

**K-no.:** 24845

**25 A Current Sensor for 5V- Supply Voltage**
**Date:** 28.01.2013

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

**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	25	A
$V_{out}$	Output voltage @ $I_P$	$V_{Ref} \pm (0.625 \cdot I_P / I_{PN})$	V
$V_{out}$	Output voltage @ $I_P=0, T_A=25^\circ C$	$V_{Ref} \pm 5$	mV
$V_{Ref}$	External Reference voltage range	0...4	V
	Internal Reference voltage	$2.5 \pm 0.005$	V
$K_N$	Turns ratio	1...3 : 2000	

**Accuracy – Dynamic performance data**

		min.	typ.	max.	Unit
$I_{P,max}$	Max. measuring range	±85			
X	Accuracy @ $I_{PN}, T_A=25^\circ C$			0.7	%
$\epsilon_L$	Linearity			0.1	%
$V_{out} - V_{Ref}$	Offset voltage @ $I_P=0, T_A=25^\circ C$			±1.35	mV
$\Delta V_o / V_{Ref} / \Delta T$	Temperature drift of $V_{out}$ @ $I_P=0, V_{Ref}=2.5V, T_A=-40...85^\circ C$	1.4		10	ppm/°C
$t_r$	Response time @ 90% von $I_{PN}$		300		ns
$\Delta t (I_{P,max})$	Delay time at $di/dt = 100 A/\mu s$		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		+85	°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 3 b, 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
$V_{work}$	Working voltage	(tabel 7 acc. to EN61800-5-1) overvoltage category 2		RMS	350
$U_{PD}$	Rated discharge voltage	peak value			1037

Date	Name	Issue	Amendment
28.01.13	Le	82	Values for clearance and creepage changed from 7 → 7.4 and 7 → 8.0. Offset voltage from ±5 to ±1.35
			Frequency bandwidth f. 100 to 200 kHz. Temperature drift from 3 to 1.4. Marking: Issue (increased) added. CN-572

Hrsg.: KB-E editor	Bearb.: Le. designer	KB-PM: KRe. check	freig.: HS released
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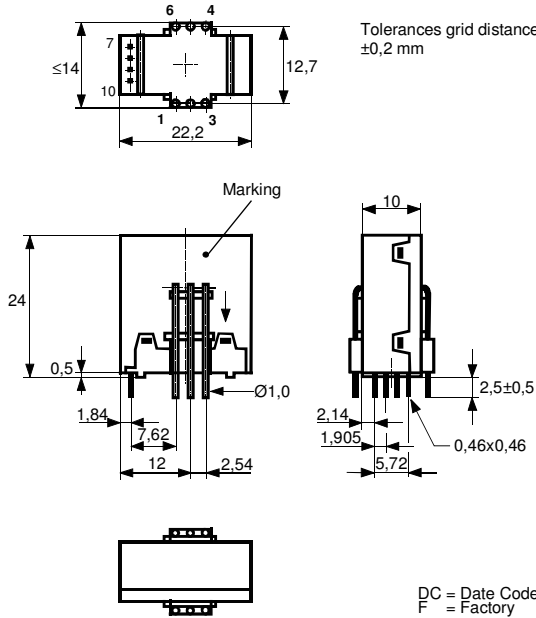
Customer: Standard type

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**Mechanical outline (mm):**

General tolerances DIN ISO 2768-c



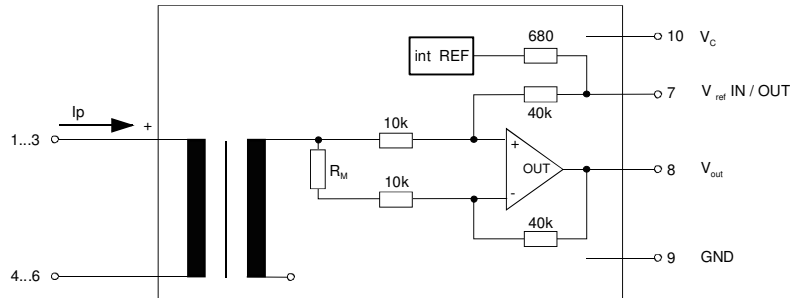
Connections:

1...6:  $\varnothing$  1 mm  
7...10: 0,46x0,46 mm

Marking:

**VAC**  
4646X681-82  
F DC

**Schematic diagram**



**Possibilities of wiring**

(@  $T_A = 85^\circ\text{C}$ )

primary windings	primary current RMS	primary current maximal	output voltage RMS	turns ratio	primary resistance	wiring
$N_P$	$I_P$ [A]	$\hat{I}_{P,max}$ [A]	$V_{out}(I_{PN})$ [V]	$K_N$	$R_P$ [m $\Omega$ ]	
1	25	$\pm 85$	$2.5 \pm 0.625$	1:2000	0.33	
2	12	$\pm 42$	$2.5 \pm 0.600$	2:2000	1.5	
3	8	$\pm 28$	$2.5 \pm 0.600$	3:2000	3	

Temperature of the primary conductor should not exceed  $110^\circ\text{C}$ .  
Additional information is obtainable on request.  
This specification is no declaration of warranty acc. BGB §443 dar.

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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	$15mA + I_p \cdot K_N + V_{out}/R_L$			mA
$I_{out,SC}$	Short circuit output current	$\pm 20$			mA
$R_P$	Resistance / primary winding @ $T_A=25^\circ C$	1			m $\Omega$
$R_S$	Secondary coil resistance @ $T_A=85^\circ C$	67			$\Omega$
$R_{i,Ref}$	Internal resistance of Reference input	670			$\Omega$
$R_{i,(V_{out})}$	Output resistance of $V_{out}$	1			$\Omega$
$R_L$	External recommended resistance of $V_{out}$	1			k $\Omega$
$C_L$	External recommended capacitance of $V_{out}$	500			pF
$\Delta X_{Ti} / \Delta T$	Temperature drift of X @ $T_A = -40 \dots +85^\circ C$	40			ppm/K
$\Delta V_0 = \Delta(V_{out} - V_{Ref})$	Sum of any offset drift including:	2			mV
$V_{0t}$	Longtermdrift of $V_0$	1			mV
$V_{0T}$	Temperature drift von $V_0$ @ $T_A = -40 \dots +85^\circ C$	1			mV
$V_{0H}$	Hysteresis of $V_{out}$ @ $I_p=0$ (after an overload of $10 \times I_{PN}$ )	2			mV
$\Delta V_0 / \Delta V_C$	Supply voltage rejection ratio	1			mV/V
$V_{oss}$	Offsetripple (with 1 MHz- filter first order)	30			mV
$V_{oss}$	Offsetripple (with 100 kHz- filter first order)	3			mV
$V_{oss}$	Offsetripple (with 20 kHz- filter first order)	0.8			mV
$C_k$	Maximum possible coupling capacity (primary – secondary)	5			pF
	Mechanical stress according to M3209/3	30g			
	Settings: 10 – 2000 Hz, 1 min/Decade, 2 hours				

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

Symbol	Unit	Code	Description	Value	Unit
$V_{out} (I_p=I_{PN})$	(V)	M3011/6:	Output voltage vs. external reference ( $I_p=25A, 40-80Hz$ )	$625 \pm 0,7\%$	mV
$V_{out} - V_{Ref} (I_p=0)$	(V)	M3226:	Offset voltage	$\pm 5$	mV
$V_d$	(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)	1100 1375	V V

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

Symbol	Description	Value	Unit
$V_W$	HV transient test according to M3064 (1,2 $\mu s$ / 50 $\mu s$ -wave form)	6	kV
$V_d$	Testing voltage to M3014	(5 s)	kV
$V_e$	Partial discharge voltage acc.M3024 (RMS) with $V_{vor}$ (RMS)	1100 1375	V 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
28.01.13	Le	82	Date updated..
08.04.08	Le.	81	"preliminary" and EN 60721 5K3 delete. AA-427

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