VACUUMSCHMELZE	SPECIFICATION	Item no.: T60404-N4646-X950

K-no.: 25293	**300 mA Differential 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: 04.11.2009
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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 rated current, r.m.s	50	A
$I_{\Delta N}$	Differential rated current, r.m.s	0.3	A
V_{out}	Output voltage @ $I_{\Delta P}$	V_{Ref} ± (0.74*$I_{\Delta P}$/$I_{\Delta N}$)	V
V_{out}(0)*)	Output voltage @ I_P=0, T_A=25°C	V_{Ref} ± 0.025	V
V_{out} (Error)	in case of error (current sensor) V_{out} < 0,5V is set	<0.5	V
V_{Ref}	Internal Reference voltage	2.5 ± 0.005	V
	External Reference voltage range	2,5 ± 0,100	V
V_{Ref}(test current)**)	Reference voltage (external)	0…1	V
V_{out}(Teststrom)**)	Ausgangsspannung @ V_{Ref} = 0…1V	V_{out}(0) + 0.250± 0.060	V
K_N	Turns ratio	(1) : 1000	

*) With switching on and after "test current" the current sensor is degaussed by an internal AC-current for about 110ms. Meantime the output is set to V_{out} < 0.5V.

**) Due to external V_{Ref} = 0…1V an internal test current is generated.

Accuracy – Dynamic performance data

		min.	typ.	max.	Unit
$I_{P,max}$	Max. measuring range (differencial current)	±0.85			
X	Accuracy @ I_{PN}, T_A= 25°C			1.5	%
ε_L	Linearity			1	%
V_{out} - V_{Ref}	Offset voltage @ I_P=0, T_A= 25°C			±25	mV
Δ V_o/ ΔT	Temperature drift of V_{out} @ I_P=0, T_A= -40…85°C		0.1		mV/°C
t_r	Response time @ 90% von $I_{\Delta N}$		35		µs
f	Frequency bandwidth	DC…10			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		35		g
V_C	Supply voltage	4.75	5	5.25	V
I_C	Current consumption		16		mA

Date	Name	Issue	Amendment
04.11.09	Le	81	Primary rated current and differential rated current changed. ÄA-729
25.06.09	Le	81	VRef: changed. Internal = 2.5 +/- 0.005 V and external = 2.5 +/- 0.100 V.

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

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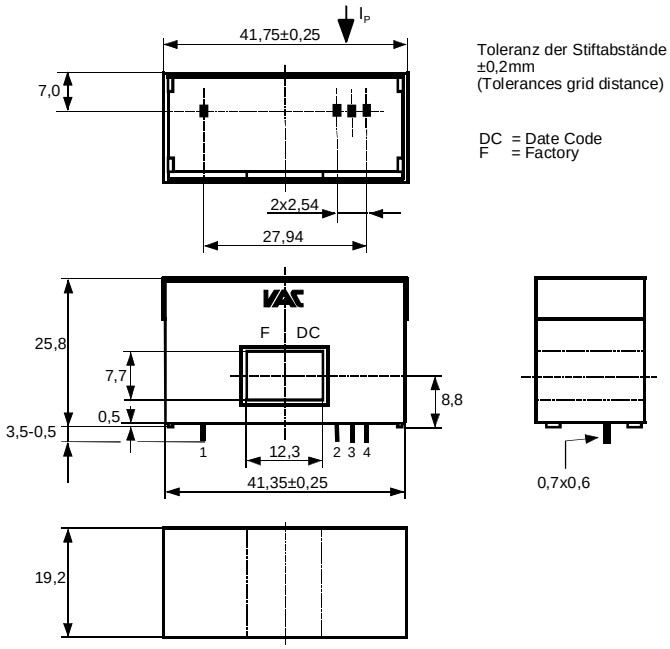
Mechanical outline (mm): General tolerances DIN ISO 2768-c



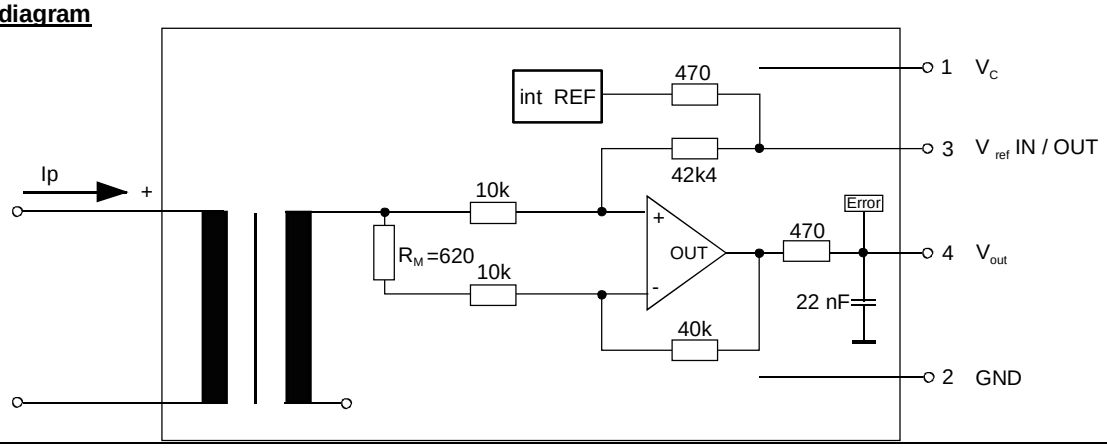
Connections:

1...4: 0,7*0,6 mm

Marking:

4646X950
F DC

Schematic diagram



Short clearance and creepage distances due to metallic shielding.

Temperature of the primary conductor should not exceed 100°C.
Additional information is obtainable on request.
This specification is no declaration of warranty acc. BGB §443 dar.

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VACUUMSCHMELZE	Additional Information	Item No.: T60404-N4646-X950

K-No.: 25293	**300mA Differential Current Sensor for 5V- Supply Voltage** For the electronic measurement of currents: DC, AC, pulsed, mixed ..., with a galvanic Isolation between the primary circuit and the secondary circuit	Date: 04.11.2009

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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		16mA +$I_{\Delta p}$*K_N+V_{out}/R_L		mA
$I_{out,SC}$	Short circuit output current		±20		mA
$\Delta X_{Ti} / \Delta V$	Temperature drift of X @ T_A = -40 ... +85 °C			400	ppm/K
R_S	Secondary coil resistance @ T_A=85°C			80	Ω
$R_{i,Ref}$	Internal resistance of Reference input		470		Ω
R_i,(V_{out})	Output resistance of V_{out}		470		Ω
R_L	External recommended resistance of V_{out}		100		kΩ
C_L	External recommended capacitance of V_{out}		no limit		pF
$\Delta V_{Ref} / \Delta T$	Temperature drift of V_{Ref} @ T_A = -40 ... +85 °C			400	ppm/K
$\Delta V_0 = \Delta(V_{out} - V_{Ref})$	Sum of any offset drift including:		16	25	mV
V_{0t}	Longtermdrift of V_0		12		mV
V_{0T}	Temperature drift von V_0 @ T_A = -40 ...+85°C		10		mV
$\Delta V_0/\Delta V_C$	Supply voltage rejection ratio		7.5		mV/V
V_{0H}	Hystereses of V_{out} @ I_P=0 (after an overload of 1000 x $I_{\Delta N}$)		75	175	mV
$V_{0H, Demag}$	Hystereses after Degaussing			12	mV
v_{oss}	Offsetripple (without external filter)			120	mV
v_{oss}	Offsetripple (with 20 kHz- filter firdt order)		35	50	mV
v_{oss}	Offsetripple (with 1.6 kHz- filter first order)		10	15	mV
	Mechanical stress according to M3209/3 Settings: 10 – 2000 Hz, 1 min/Decade, 2 hours			1.5g	

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

V_{out} (I_P=$I_{\Delta N}$) (V)	M3011/6:	Output voltage vs. reference ($I_{\Delta P}$=0.4A, 40-80Hz)	0.972 … 1.002	V
V_{out}–V_{Ref} (I_P=0) (V)	M3226:	Offset voltage	± 0.025	V
V_{out}(test current) (V)		Output voltage @ V_{Ref} = 0V	0.250± 0.060	V

Applicable documents

Current direction: A positive output current appears at point V_{out}, 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	Ämendment
04.11.09	Le	81	Date updated. ÄA-729
25.06.09	Le	81	Date updated.

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Explanation of sever al 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 $I_{\Delta P} = 0{,}9 \cdot I_{\Delta N}$ between a rectangular current and the output voltage V_{OUt} ($I_{\Delta p}$)

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

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

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

V_{0t}: 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

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

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

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

ε_L: Linearity fault defined by

$$e_L = 100 \cdot \left| \frac{I_{\Delta P}}{I_{\Delta N}} - \frac{V_{out}(I_{\Delta P}) - V_{out}(0)}{V_{out}(I_{\Delta N}) - V_{out}(0)} \right| \%$$

This “Additional information“ is no declaration of warranty according BGB $443.