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|--------------|---|------------------|
| K-no.: 24509 | 6 A Current Sensor modul 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: 08.04.2008 |
|--------------|---|------------------|

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| Customer: Standard type | Customers Part no.: | Page 1 of 2 |
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| <u>Description</u> | <u>Characteristics</u> | <u>Applications</u> |
|---|--|--|
| <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 | Mainly used for stationary operation in industrial applications: <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 | $2.5 \pm (0.625 \cdot I_P / I_{PN})$ | V |
| V_{out} | Output voltage @ $I_P=0, T_A=25^\circ C$ | 2.5 ± 0.025 | V |
| V_{Ref} | 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 | ± 20 | | | |
| X | Accuracy @ $I_{PN}, T_A=25^\circ C$ | | | 0.7 | % |
| ϵ_L | Linearity | | | 0.1 | % |
| $V_{out} -2,5V$ | Offset voltage @ $I_P=0, T_A=25^\circ C$ | | | ± 25 | mV |
| $\Delta V_{out} / 2,5V / \Delta T$ | Temperature drift of V_{out} @ $I_P=0, T_A= -40...85^\circ C$ | | 26 | 51 | ppm/K |
| 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...100 | | | kHz |

General data

| | | min. | typ. | max. | Unit |
|-------|-------------------------------|------|------|------|------------|
| T_A | Ambient operating temperature | -40 | | +85 | $^\circ C$ |
| T_S | Ambient storage temperature | -40 | | +85 | $^\circ C$ |
| 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 – 9)
Reinforced insulation, Insulation material group 1, Pollution degree 2

| | | | | | |
|-------------|--|---|-----|------|----|
| S_{clear} | Clearance (component without solder pad) | 7 | | | mm |
| S_{creep} | Creepage (component without solder pad) | 7 | | | 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 |

| Date | Name | Issue | Amendment |
|----------|------|-------|-----------------------|
| 08.04.08 | Le | 82 | "preliminary" delete. |

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| Hrsg.: KB-E editor | Bearb.: Le. designer | KB-PM: KRe check | freig.: Heu. released |
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 isolation between primary circuit
 (high power) and secondary circuit
 (electronic circuit)

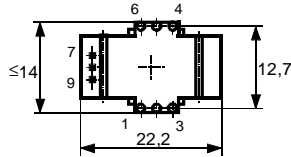
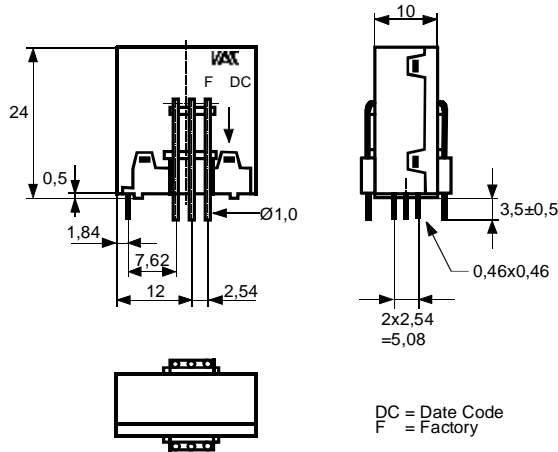
Customer: Standard type

Customers Part no.:
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Mechanical outline (mm):

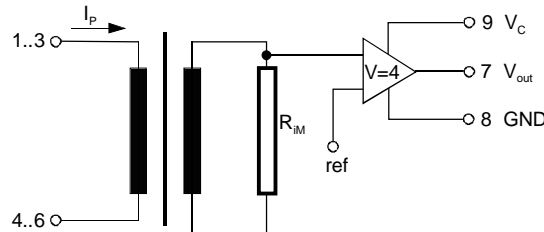
General tolerances DIN ISO 2768-c

Connections:

 1...6: \varnothing 1 mm
 7...9: 0,46*0,46 mm

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

Marking:

 4646X653
 F DC

 DC = Date Code
 F = Factory

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 [mW] | |
| 1 | 6 | ± 20 | 2.5 ± 0.625 | 1:2000 | 0.33 | |
| 2 | 3 | ± 10 | 2.5 ± 0.625 | 2:2000 | 1.5 | |
| 3 | 2 | ± 6.7 | 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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 Isolation between the primary circuit
 (high power) and the secondary circuit

Customer:

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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 | | ± 20 | | mA |
| R_P | Resistance / primary winding @ $T_A=25^\circ C$ | | 1 | | m Ω |
| R_S | Secondary coil resistance @ $T_A=85^\circ C$ | | | 67 | Ω |
| $R_i(V_{out})$ | Output resistance of V_{out} | | | 1 | Ω |
| R_L | External recommended resistance of V_{out} | 1 | | | k Ω |
| C_L | External recommended capacitance of V_{out} | | | 500 | pF |
| $\Delta X_T/\Delta T$ | Temperature drift of X @ $T_A = -40 \dots +85^\circ C$ | | | 40 | ppm/K |
| $\Delta V_0 = \Delta(V_{out} - 2.5V)$ | Sum of any offset drift including: | | 9 | 20 | mV |
| V_{0t} | Long term drift of V_0 | | 3 | | mV |
| V_{0T} | Temperature drift von V_0 @ $T_A = -40 \dots +85^\circ C$ | | 8 | | 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) | | | 100 | mV |
| V_{OSS} | Offsetripple (with 100 kHz- filter first order) | | 10 | 20 | mV |
| V_{OSS} | Offsetripple (with 20 kHz- filter first order) | | 2.5 | 5 | 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 | |

Inspection¹⁾ (Measurement after temperature balance of the samples at room temperature)

| | | | | | |
|-----------------------|--------------|---|--|-----------------|--------|
| $V_{out}(I_P=I_{PN})$ | (V) M3011/6: | Output voltage vs. internal reference ($I_P=6A, 40-80Hz$) | | $625 \pm 0.7\%$ | mV |
| $V_{out}-2.5V(I_P=0)$ | (V) M3226: | Offset voltage | | ± 0.025 | V |
| V_d | (V) M3014: | Test voltage, rms, 1 s pin 1 – 6 vs. pin 7 – 9 | | 1.5 | kV |
| V_e | (AQL 1/S4) | Partial discharge voltage acc.M3024 (RMS) with V_{vor} (RMS) | | 1400 1750 | V V |

Type Testing¹⁾ (Pin 1 - 6 to Pin 7 - 9)

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 V |

¹⁾ preliminary data

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 | Index | Änderung |
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