| VACUUMSCHMELZE | Datasheet | Item no.: T60404-N4647-X263 |
|---|---|---|

| K-No.: 27059 | **150A Current Sensor**<br>For the electronic measurement of currents:<br>DC, AC, pulsed, mixed with a galvanic Isolation between the primary circuit (high power) and the secondary circuit (electronic circuit) |  | Date: 06.07.2023 |
|---|---|---|---|
| Customer: Standard Type | Customers Part no: | | Page 1 of 3 |

## Description

- Closed loop (compensation) Current Sensor with magnetic 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
- Uninterruptable Power Supplies (UPS)

## Electrical data - Ratings

| | | | | | |
|---|---|---|---|---|---|
| $I_{PN}$ | Primary nominal RMS current | | 150 | | A |
| $V_{OUT}$ | Output voltage | | $V_{REF}$ ± (0.625*$I_P$/$I_{PN}$) | | V |
| $V_{OUT}$ | Output voltage @ $I_P$=0A, $\vartheta_A$=25°C | | $V_{REF}$ ± 0.001 | | V |
| $V_{REF}$ | External Reference voltage range | | 0 … 4 | | V |
| | Internal Reference voltage | | 2.5 ± 0.005 | | V |
| $K_N$ | Transformation ratio | | 1 : 1550 | | |

## Accuracy – Dynamic performance data

| | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|
| $I_{P,max}$ | Max. measuring range | ±450 | | | A |
| X | Accuracy @ $I_{PN}$, $\vartheta_A$=25°C | | | 0.7 | % |
| $\varepsilon_L$ | Linearity | | | 0.1 | % |
| $V_{OUT}$-$V_{REF}$ | Offset voltage @ $I_P$=0A, $\vartheta_A$=25°C | | | ±1 | mV |
| $\Delta V_O/V_{REF}/\Delta\vartheta$ | Temperature drift of $V_{OUT}$ @ $I_P$=0A, $V_{REF}$=2.5V, $\vartheta_A$ | | 1 | 3 | ppm/°C |
| $t_{ra}$ | Reaction time | | 1.5 | 2 | µs |
| $f_{BW}$ | Frequency bandwidth (small signal) | DC ... 100 | | | kHz |

## General data

| | | | | | |
|---|---|---|---|---|---|
| $\vartheta_A$ | Ambient operation temperature | -40 | | 85 | °C |
| $\vartheta_S$ | Ambient storage temperature (acc. to M3101) | -40 | | 85 | °C |
| m | Mass | | 65 | | g |
| $V_C$ | Supply voltage | 11.4 | 12 | 12.6 | V |
| $I_C$ | Supply current @ $I_P$ = 0A and RT | | 22 | | mA |

| | | | | | |
|---|---|---|---|---|---|
| [1)]$s_{clear}$ | Clearance (component without solder pad) | 8 | | | mm |
| [1)]$s_{creep}$ | Creepage (component without solder pad) | 8 | | | mm |
| [1)]$U_{sys, re}$ | System voltage (reinforced insulation) | | | 600 | $V_{RMS}$ |
| [1)]$U_{work, re}$ | Working voltage (reinforced insulation) | | | 800 | $V_{RMS}$ |
| [1)]$U_{PD}$ | Rated discharge voltage | | | 1131 | $V_{PEAK}$ |
| [1)]$U_{sys, basic}$ | System voltage (basic insulation) | | | 1000 | $V_{RMS}$ |
| [1)]$U_{work, basic}$ | Working voltage (basic insulation) | | | 1600 | $V_{RMS}$ |
| | According to UL 508: max. potential difference | | | 600 | $V_{RMS}$ |

[1)]Constructed, manufactured and tested in accordance with IEC 61800-5-1:2007 (primary to secondary)
Insulation material group 1, Overvoltage category III, Pollution degree 2

| Date | Name | Issue | Amendment |
|---|---|---|---|
| 06.07.2023 | DJ | 81 | Applicable documents changed on sheet 3. „The color of the plastic material… added. Minor change |
| 25.09.2020 | DJ | 81 | Approval received. Marking with UL-sign and other standards changed. Minor change |

| Editor: R&D-PD NPI D | Designer: DJ | | MC-PM: NSch. | | | Released: SB |
|---|---|---|---|---|---|---|

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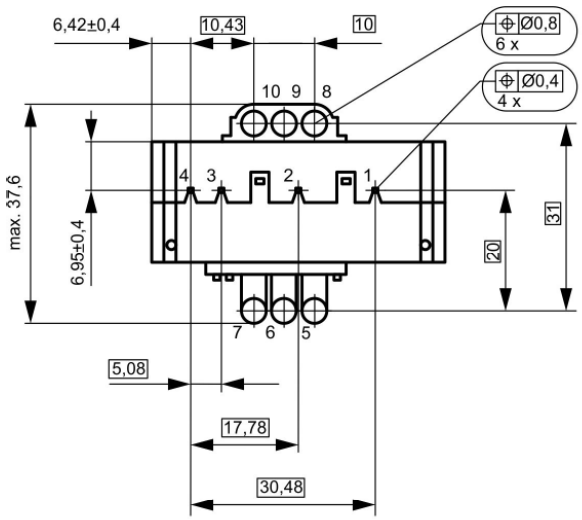
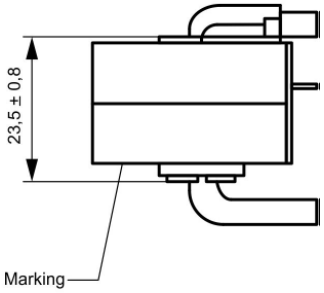
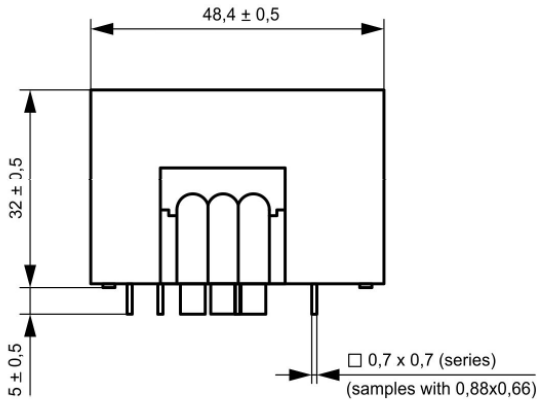
|---|---|---|

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




Connections:

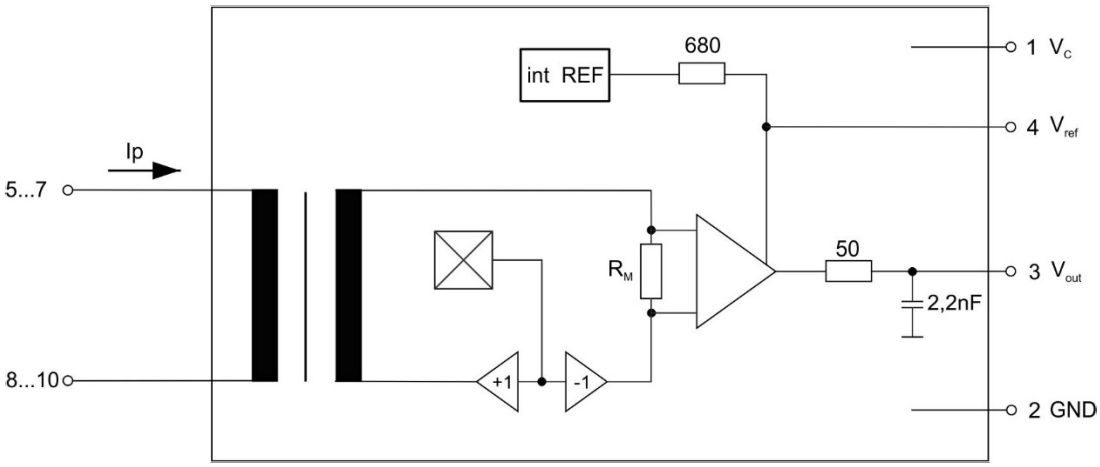
1-4: 0.7 x 0.7mm
5-10: Ø 4.5mm

Marking:
UL-sign 4647-X263
F DC

F: Factory
DC: Datecode

Datecode Format: [YYWW]
Example: 1904 -> 2019, Week 4

**Schematic diagram:**

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**Electrical data:** (investigate by a type checking)

| | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|
| $V_{C,tot}$ | maximum supply voltage (without function) | | | 15 | V |
| $I_C$ | Supply Current with primary current | | $22mA+I_P*K_N+V_{OUT}/R_L$ | | mA |
| $I_{OUT,SC}$ | Short circuit output current | | 4 | | mA |
| $R_S$ | Secondary coil resistance @ $\vartheta_A$ = 85°C | | | 35 | Ω |
| $R_P$ | Primary wire resistance @ $\vartheta_A$ = 25°C | | 0.03 | | mΩ |
| $R_{i,REF}$ | Internal resistance of Reference output | | 680 | | Ω |
| $R_{i,Vout}$ | Output resistance of $V_{OUT}$ | | 50 | | Ω |
| $R_L$ | External recommended resistance of $V_{OUT}$ | 1 | | | kΩ |
| $C_L$ | External recommended capacitance of $V_{OUT}$ | | no limit | | pF |
| $X_{Ti}$ / $\Delta\vartheta$ | Temperature drift of X @ $\vartheta_A$ = -40°C ... 85°C | | | 40 | ppm/°C |
| $\Delta V_O=\Delta(V_{OUT}-V_{REF})$ | Sum of any offset drift including: | | 1 | 1.5 | mV |
| $V_{Ot}$ | Long term drift of $V_O$ | | 0.3 | | mV |
| $V_{OT}$ | Temperature drift of $V_O$ @ $\vartheta_A$ = -40°C … 85°C | | 0.1 | | mV |
| $V_{OH}$ | Hysteresis of $V_{OUT}$ @ $I_P$=0A (caused by $I_P$ = 10 x $I_{PN}$) | | 0.2 | 0.4 | mV |
| $\Delta V_O/\Delta V_C$ | Supply voltage rejection ratio | | 0.03 | | mV/V |
| $v_{OSS}$ | Offsetripple (with 1 MHz-Filter, first order) | | 7 | 15 | $mV_{PP}$ |
| $v_{OSS}$ | Offsetripple (with 100 kHz-Filter, first order) | | 3 | 6 | $mV_{PP}$ |
| $v_{OSS}$ | Offsetripple (with 20 kHz-Filter, first order) | | 1.5 | 2.5 | $mV_{PP}$ |
| $C_k$ | Coupling capacity (primary - secondary) | | 6 | | pF |
| | Mechanical stress according to M3209/3<br>Settings: 10-2000Hz, 1min/oct, 2 hours | | 2 | | g |

**Routine-Tests:** (Measurement after temperature balance of the samples at room temperature, SC=significant characteristic)

| | | | | |
|---|---|---|---|---|
| $V_{OUT}$ (SC) | (100%) M3011/6: | Output voltage | 620.625 ... 629.375 | mV |
| $V_{OUT}$-$V_{REF}$ | (100%) M3226: | Offset voltage | ±1 | mV |
| $U_d$ | (100%) M3014: | Test voltage, 1s | 1.8 | $kV_{RMS}$ |
| $U_{PDE}$<br>$U_{PD}$ | (AQL 1/S4) M3024: | Partial discharge voltage (extinction) | 1.5<br>1.875 | $kV_{RMS}$ |

**Type-Tests:** (Precondition acc. to M3236)

| | | | |
|---|---|---|---|
| $\hat{U}_W$ | HV transient test acc. to M3064 (1.2µs / 50µs)<br>5 pulses -> polarity +, 5 pulses -> polarity - | 8 | $kV_{PEAK}$ |
| $U_d$ | Test voltage acc. to M3014, 60s | 3.6 | $kV_{RMS}$ |
| $U_{PDE}$<br>$U_{PD}$ | Partial discharge voltage (extinction)<br>acc. to M3024 | 1.5<br>1.875 | $kV_{RMS}$ |

**Other instructions:**

- Current direction: A positive output voltage vs. $V_{REF}$ appears at point $V_{OUT}$, if primary current flows in direction of the arrow sign on Sensor package.
- Temperature of the primary conductor should not exceed 105°C.
- Housing and bobbin material UL-listed: Flammability class 94V-0.
- Further standards: UL 508 file E317483, category NMTR2 / NMTR8
- The color of the plastic material is not specified and the current sensor can be supplied in different colors (e.g. brown, black, white, natural). This has no effect on the specifications or UL approval

| Editor: R&D-PD NPI D | Designer: DJ | | MC-PM: NSch. | | | Released: SB |
|---|---|---|---|---|---|---|