

## Insulation coordination

| Parameter                                        | Symbol      | Unit | Value                 | Comment                                                               |
|--------------------------------------------------|-------------|------|-----------------------|-----------------------------------------------------------------------|
| Rms voltage for AC isolation test 50/60 Hz/1 min | $U_d$       | kV   | 4.3                   |                                                                       |
| Impulse withstand voltage 1.2/50 $\mu$ s         | $\hat{U}_w$ | kV   | 8                     |                                                                       |
| Partial discharge extinction rms voltage @ 10 pC | $U_e$       | V    | 1650                  |                                                                       |
| Clearance (pri. - sec.)                          | $d_{cl}$    | mm   | 8                     | Shortest distance through air                                         |
| Creepage distance (pri. - sec.)                  | $d_{cp}$    | mm   | 8                     | Shortest path along device body                                       |
| Case material                                    |             |      | V0 according to UL 94 |                                                                       |
| Comparative tracking index                       | $CTI$       |      | 600                   |                                                                       |
| Application example                              | -           | -    | 600 V<br>CAT III PD2  | Reinforced insulation, non uniform field according to EN 50178        |
| Application example                              | -           | -    | 300 V<br>CAT III PD2  | Reinforced insulation, non uniform field according to IEC 61010       |
| Application example                              | -           | -    | 1000 V<br>CAT III PD2 | Simple insulation, non uniform field according to EN 50178, IEC 61010 |

## Environmental and mechanical characteristics

| Parameter                                   | Symbol | Unit | Min | Typ | Max | Comment |
|---------------------------------------------|--------|------|-----|-----|-----|---------|
| Ambient operating temperature               | $T_A$  | °C   | -40 |     | 105 |         |
| Ambient storage temperature                 | $T_s$  | °C   | -40 |     | 105 |         |
| Surrounding temperature according to UL 508 |        | °C   |     |     | 105 |         |
| Mass                                        | $m$    | g    |     | 5   |     |         |

**Electrical data HO 8-NSM-0000**

At  $T_A = 25\text{ °C}$ ,  $U_C = +5\text{ V}$ ,  $N_P = 3$  turns,  $R_L = 10\text{ K}\Omega$  unless otherwise noted (see Min, Max, typ. definition paragraph in page 12).

| Parameter                                                        | Symbol              | Unit          | Min                 | Typ                 | Max                 | Comment                                |
|------------------------------------------------------------------|---------------------|---------------|---------------------|---------------------|---------------------|----------------------------------------|
| Primary nominal rms current                                      | $I_{PN}$            | At            |                     | 8                   |                     |                                        |
| Primary current, measuring range                                 | $I_{PM}$            | At            | -20                 |                     | 20                  |                                        |
| Number of primary turns                                          | $N_P$               |               |                     | 1,2,3               |                     |                                        |
| Supply voltage                                                   | $U_C$               | V             | 4.5                 | 5                   | 5.5                 |                                        |
| Current consumption                                              | $I_C$               | mA            |                     | 19                  | 25                  |                                        |
| Reference voltage                                                | $V_{ref}$           | V             | 2.475               | 2.5                 | 2.525               | Internal reference                     |
| External reference voltage                                       | $V_{ref}$           | V             | 0.5                 |                     | 2.65                |                                        |
| Output voltage range @ $I_{PM}$                                  | $V_{out} - V_{ref}$ | V             | -2                  |                     | 2                   |                                        |
| Output voltage @ $I_P = 0\text{ A}$                              | $V_{out}$           | V             |                     | $V_{ref} + V_{OE}$  |                     |                                        |
| Electrical offset voltage                                        | $V_{OE}$            | mV            | -7                  |                     | 7                   |                                        |
| Temperature coefficient of $V_{ref}$                             | $TCV_{ref}$         | ppm/K         |                     |                     | ±160                | -20 °C .. 85 °C<br>Internal reference  |
|                                                                  |                     |               |                     |                     | ±190                | -40 °C .. 105 °C<br>Internal reference |
| Temperature coefficient of $V_{OE}$                              | $TCV_{OE}$          | mV/K          |                     |                     | ±0.088              | -20 °C .. 85 °C                        |
|                                                                  |                     |               |                     |                     | ±0.095              | -40 °C .. 105 °C                       |
| Theoretical sensitivity                                          | $G_{th}$            | mV/A          |                     | 100                 |                     | 800 mV/ $I_{PN}$ @ $U_C = 5\text{ V}$  |
| Sensitivity error                                                | $\varepsilon_G$     | %             |                     |                     | ±0.5                | Factory adjustment                     |
| Temperature coefficient of $G$                                   | $TCG$               | ppm/K         |                     |                     | ±200                | -40 °C .. 85 °C                        |
|                                                                  |                     |               |                     |                     | ±220                | -40 °C .. 105 °C                       |
| Linearity error 0 .. $I_{PN}$                                    | $\varepsilon_L$     | % of $I_{PN}$ |                     |                     | ±0.5                | @ $U_C = 5\text{ V}$                   |
| Linearity error 0 .. $I_{PM}$                                    | $\varepsilon_L$     | % of $I_{PM}$ |                     |                     | ±0.8                | @ $U_C = 5\text{ V}$                   |
| Gain error with respect to $U_C \pm 10\%$                        |                     | %/%           |                     |                     | ±0.05               | Gain error per $U_C$ drift             |
| Magnetic offset voltage<br>@ $I_P = 0$ after $2.5 \times I_{PN}$ | $V_{OM}$            | mV            |                     |                     | ±6                  |                                        |
| Reaction time @ 10 % of $I_{PN}$                                 | $t_{ra}$            | µs            |                     |                     | 2                   | $di/dt = I_{PN}/\mu s$                 |
| Response time @ 90 % of $I_{PN}$                                 | $t_r$               | µs            |                     |                     | 3.5                 | $di/dt = I_{PN}/\mu s$                 |
| Frequency bandwidth (-3 dB)                                      | $BW$                | kHz           |                     | 250                 |                     |                                        |
| Output rms voltage noise (spectral density)<br>(DC .. 100 kHz)   | $e_{no}$            | µV/√Hz        |                     |                     | 32.9                | @ $U_C = 5\text{ V}$                   |
| Output voltage noise<br>(DC .. 20 MHz)                           | $V_{no}$            | mVpp          |                     | 80                  |                     |                                        |
| Standby pin "0" level                                            |                     | V             |                     |                     | 0.3                 |                                        |
| Standby pin "1" level                                            |                     | V             | $U_C - 0.3$         |                     |                     |                                        |
| Time to switch from standby to normal mode                       |                     | µs            |                     |                     | 20                  |                                        |
| Over-current detect                                              |                     | At            | $2.6 \times I_{PN}$ | $2.9 \times I_{PN}$ | $3.2 \times I_{PN}$ | peak value                             |
| Accuracy @ $I_{PN}$                                              | $X$                 | % of $I_{PN}$ |                     |                     | ±1                  | $= \varepsilon_G + \varepsilon_L$      |
| Accuracy @ $I_{PN}$ @ $T_A = +85\text{ °C}$                      | $X$                 | % of $I_{PN}$ |                     |                     | ±2.9                | See formula note <sup>1)</sup>         |
| Accuracy @ $I_{PN}$ @ $T_A = +105\text{ °C}$                     | $X$                 | % of $I_{PN}$ |                     |                     | ±3.8                | See formula note <sup>1)</sup>         |

**Note:** <sup>1)</sup> Accuracy @  $I_P$  and  $X_{TA} = \pm [X + (TCG/10000) \cdot (T_A - 25) + TCV_{OE} \cdot 100 \cdot (T_A - 25) / (G_{th} \cdot I_P)]$ .