

Insulation coordination

| Parameter | Symbol | Unit | Value | Comment |
|---|-------------|------|--------------------|---|
| Rms voltage for AC insulation test 50/60 Hz/1 min | U_d | kV | 4.3 | |
| Impulse withstand voltage 1.2/50 μ s | \hat{U}_w | kV | 8 | |
| Clearance (pri. - sec.) | d_{Cl} | mm | > 8 | Shortest distance through air |
| Creepage distance (pri. - sec.) | d_{Cp} | mm | > 8 | Shortest path along device body |
| Clearance (pri. - sec.) | - | mm | 8 | When mounted on PCB with recommended layout |
| Case material | - | - | V0 | According to UL 94 |
| Comparative tracking index | <i>CTI</i> | | 600 | |
| Application example | - | - | 600 V CAT III PD2 | Reinforced insulation, non uniform field according to EN 50178, IEC 61010 |
| Application example | - | - | 1000 V CAT III PD2 | Simple insulation, non uniform field according to EN 50178, IEC 61010 |
| Application example | - | - | 600 V CAT III PD2 | According to UL 508 |

Environmental and mechanical characteristics

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|-------------------------------|--------|--------------|-----|-----|-----|---------|
| Ambient operating temperature | T_A | $^{\circ}$ C | -40 | | 105 | |
| Ambient storage temperature | T_S | $^{\circ}$ C | -40 | | 105 | |
| Mass | m | g | | | 5 | |

Electrical data HLSR 10-SM/SP33

At $T_A = 25\text{ °C}$, $U_C = +3.3\text{ V}$, $R_L = 10\text{ k}\Omega$ unless otherwise noted (see Min, Max, typ. definition paragraph in page 9).

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---------------------|-----------------------------|--------|---------------|-------|----------------------------------|
| Primary nominal rms current | I_{PN} | A | | 10 | | |
| Primary current, measuring range | I_{PM} | A | -25 | | 25 | For $U_C = 3.3\text{ V} \pm 5\%$ |
| Number of primary turns | N_P | - | | 1 | | |
| Resistance of primary jumper @ $T_A = 25\text{ °C}$ | R_P | m Ω | | 0.21 | | |
| Resistance of primary jumper @ $T_A = 105\text{ °C}$ | R_P | m Ω | | 0.29 | | T jumper = 120 °C |
| Supply voltage | U_C | V | 3.135 | 3.3 | 3.465 | |
| Current consumption | I_C | mA | | 19 | 25 | |
| Reference voltage (output) | V_{ref} | V | 1.63 | 1.65 | 1.67 | Internal reference |
| Reference voltage (input) | V_{ref} | V | 0.5 | | 1.7 | External reference |
| Output voltage range @ I_{PM} | $V_{out} - V_{ref}$ | V | -1.15 | | 1.15 | Over operating temperature range |
| V_{ref} output resistance | R_{ref} | Ω | 130 | 200 | 300 | series |
| V_{out} output resistance | R_{out} | Ω | | 2 | 5 | series |
| Capacitive loading | C_L | nF | 0 | | 6 | |
| Electrical offset voltage @ $I_P = 0$ | V_{OE} | mV | -5 | | 5 | $V_{out} - V_{ref}$ |
| Electrical offset current referred to primary | I_{OE} | mA | -109 | | 109 | |
| Temperature coefficient of V_{ref} | TCV_{ref} | ppm/K | -150 | | 150 | -40 °C ... 105 °C |
| Temperature coefficient of V_{OE} | TCV_{OE} | mV/K | -0.075 | | 0.075 | |
| Temperature coefficient of I_{OE} | TCI_{OE} | mA/K | -1.63 | | 1.63 | |
| Theoretical sensitivity | G_{th} | mV/A | | 46 | | 460 mV @ I_{PN} |
| Sensitivity error | ϵ_G | % | -0.5 | | 0.5 | Factory adjustment |
| Temperature coefficient of G | TCG | ppm/K | -200 | | 200 | |
| Linearity error 0 ... I_{PN} | ϵ_L | % of I_{PN} | -0.5 | | 0.5 | |
| Linearity error 0 ... I_{PM} | ϵ_L | % of I_{PM} | -0.8 | | 0.8 | |
| Magnetic offset current (@ $10 \times I_{PN}$) referred to primary | I_{OM} | A | -0.25 | | 0.25 | |
| Reaction time @ 10 % of I_{PN} | t_{ra} | μ s | | | 2 | @ 50 A/ μ s |
| Response time @ 90 % of I_{PN} | t_r | μ s | | | 2.5 | @ 50 A/ μ s |
| Frequency bandwidth (-3 dB) | BW | kHz | | 450 | | |
| Output rms voltage noise spectral density 100 Hz ... 100 kHz | e_{no} | μ V/ $\sqrt{\text{Hz}}$ | | | 16 | |
| Output voltage noise DC ... 10 kHz DC ... 100 kHz DC ... 1 MHz | V_{no} | mVpp | | 9 22 40 | | |
| Accuracy @ I_{PN} | X | % of I_{PN} | -1 | | 1 | |
| Accuracy @ I_{PN} @ $T_A = +85\text{ °C}$ | $X_{85\text{ °C}}$ | % of I_{PN} | -3.2 | | 3.2 | See formula note ¹⁾ |
| Accuracy @ I_{PN} @ $T_A = +105\text{ °C}$ | $X_{105\text{ °C}}$ | % of I_{PN} | -3.9 | | 3.9 | See formula note ¹⁾ |

Note: ¹⁾ Accuracy @ T_A (% of I_{PN}) = $X + \left(\frac{TCG}{10000} \times (T_A - 25)\right) + \left(\frac{TCI_{OE}}{1000 \times I_{PN}} \times 100 \times (T_A - 25)\right)$.