

Current Transducer LTSR 25-NP

$I_{PN} = 25 \text{ At}$

For the electronic measurement of currents : DC, AC, pulsed, mixed, with a galvanic isolation between the primary circuit (high power) and the secondary circuit (electronic circuit).



16171

Electrical data

| | | | |
|-------------|---|--|------------|
| I_{PN} | Primary nominal current rms | 25 | At |
| I_{PM} | Primary current, measuring range | $0 \dots \pm 80$ ¹⁾ | At |
| V_{OUT} | Output voltage (Analog) @ I_p | $2.5 \pm (0.625 \cdot I_p / I_{PN})$ | V |
| | $I_p = 0$ | 2.5 ²⁾ | V |
| V_{REF} | Reference voltage (internal reference), refout mode | 2.5 ³⁾ | V |
| | Reference voltage (external reference), refin mode | $1.9 \dots 2.7$ ⁴⁾ | V |
| G | Sensitivity | 25 | mV/A |
| N_S | Number of secondary turns ($\pm 0.1 \%$) | 2000 | |
| R_L | Load resistance | ≥ 2 | k Ω |
| C_{Lmaxi} | Maximum capacitive loading | 500 | pF |
| R_{IM} | Internal measuring resistance ($\pm 0.5 \%$) | 50 | Ω |
| TCR_{IM} | Temperature coefficient of R_{IM} | < 50 | ppm/K |
| V_C | Supply voltage ($\pm 5 \%$) | 5 | V |
| I_C | Current consumption @ $V_C = 5 \text{ V}$ | Typ $28 + I_S^{(5)} + (V_{OUT} / R_L)$ | mA |

Accuracy - Dynamic performance data

| | | | |
|-----------------|--|---|--------------------------|
| X | Accuracy @ $I_{PN}, T_A = 25^\circ\text{C}$ | ± 0.2 | % |
| | Accuracy with R_{IM} @ $I_{PN}, T_A = 25^\circ\text{C}$ | ± 0.7 | % |
| \mathcal{E}_L | Linearity error | < 0.1 | % |
| | | Maxi | |
| TCV_{OUT} | Temperature coefficient of V_{OUT} / V_{REF} @ $I_p = 0$ | | |
| | - $40^\circ\text{C} \dots + 85^\circ\text{C}$ | 37.5 | ppm/K |
| TCG | Temperature coefficient of G | - $40^\circ\text{C} \dots + 85^\circ\text{C}$ | 50 ⁶⁾ ppm/K |
| V_{OM} | Magnetic offset voltage @ $I_p =$ | | |
| | 0, after an overload of $3 \times I_{PN}$ | ± 0.5 | mV |
| | $5 \times I_{PN}$ | ± 2.0 | mV |
| | $10 \times I_{PN}$ | ± 2.0 | mV |
| TCV_{REF} | Temperature coefficient V_{REF} @ $I_p = 0$ | | |
| | - $10^\circ\text{C} \dots + 85^\circ\text{C}$ | 50 | ppm/K |
| | - $40^\circ\text{C} \dots - 10^\circ\text{C}$ | 100 | ppm/K |
| t_{ra} | Reaction time @ 10 % of I_{PN} | < 100 | ns |
| t_r | Response time to 90 % of I_{PN} step | < 400 | ns |
| di/dt | di/dt accurately followed | > 60 | A/ μs |
| BW | Frequency bandwidth (0 .. - 0.5 dB) | DC .. 100 | kHz |
| | (- 0.5 .. 1 dB) | DC .. 200 | kHz |

Notes:

¹⁾ Only in refout mode or with external REF less than 2.525 V and greater than 2.475 V. For external REF out of these limits see leaflet. ²⁾ V_{OUT} is linked to V_{REF} , by conception the difference between these two nodes for $I_p = 0$ is maximum $\pm 25 \text{ mV}$, $2.475 < V_{OUT} < 2.525 \text{ V}$. ³⁾ In Refout mode at $T_A = 25^\circ\text{C}$, $2.475 \text{ V} < V_{REF} < 2.525 \text{ V}$. The minimal impedance loading the ref pin should be $> 220 \text{ k}\Omega$. Internal impedance = 600Ω . For most applications you need to buffer this output to feed it into an ADC for example

⁴⁾ To override the REF ($1.9 \text{ V} \dots 2.7 \text{ V}$) maxi $\pm 1 \text{ mA}$ is needed

⁵⁾ $I_S = I_p / N_S$

⁶⁾ Only due to TCR_{IM}

Features

- Closed loop (compensated) multi-range current transducer using the Hall effect
- Unipolar voltage supply
- Isolated plastic case recognized according to UL 94-V0
- Compact design for PCB mounting
- Incorporated measuring resistance
- Extended measuring range
- Access to the internal voltage reference
- Possibility to feed the transducer reference from external supply.

Advantages

- Excellent accuracy
- Very good linearity
- Very low temperature drift
- Optimized response time
- Wide frequency bandwidth
- No insertion losses
- High immunity to external interference
- Current overload capability.

Applications

- AC variable speed drives and servo motor drives
- Static converters for DC motor drives
- Battery supplied applications
- Uninterruptible Power Supplies (UPS)
- Switched Mode Power Supplies (SMPS)
- Power supplies for welding applications.

Application Domain

- Industrial.

Copyright protected

Current Transducer LTSR 25-NP

General data

| | | | |
|-------|-------------------------------|-------------------|----|
| T_A | Ambient operating temperature | - 40 .. + 85 | °C |
| T_S | Ambient storage temperature | - 40 .. + 100 | °C |
| m | Mass | 10 | g |
| | Standards | EN 50178: 1997 | |
| | | IEC 60950-1: 2001 | |

Isolation characteristics

| | | | |
|-------------|---|-------|----|
| V_d | Rms voltage for AC isolation test, 50 Hz, 1 min | 3 | kV |
| \hat{V}_w | Impulse withstand voltage 1.2/50 μ s | > 8 | kV |
| V_e | Rms voltage for partial discharge extinction @ 10pC | > 1.5 | kV |
| | | Mini | |
| dCp | Creepage distance ⁷⁾ | 15.35 | mm |
| dCl | Clearance distance ⁸⁾ | 6.2 | mm |
| CTI | Comparative Tracking Index (Group III a) | 175 | |

Application examples

According to EN 50178 and IEC 61010-1 standards and following conditions:

- Over voltage category OV 3
- Pollution degree PD2
- Non-uniform field

| | EN 50178 | IEC 61010-1 |
|-----------------------|-------------------------|-----------------|
| dCp, dCl, \hat{V}_w | Rated isolation voltage | Nominal voltage |
| Single isolation | 600 V | 600 V |
| Reinforced isolation | 300 V | 300 V |

Notes:

⁷⁾ On housing

⁸⁾ On PCB with soldering pattern UTEC93-703.

Safety



This transducer must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the manufacturer's operating instructions.

Caution, risk of electrical shock



When operating the transducer, certain parts of the module can carry hazardous voltage (eg. primary busbar, power supply).

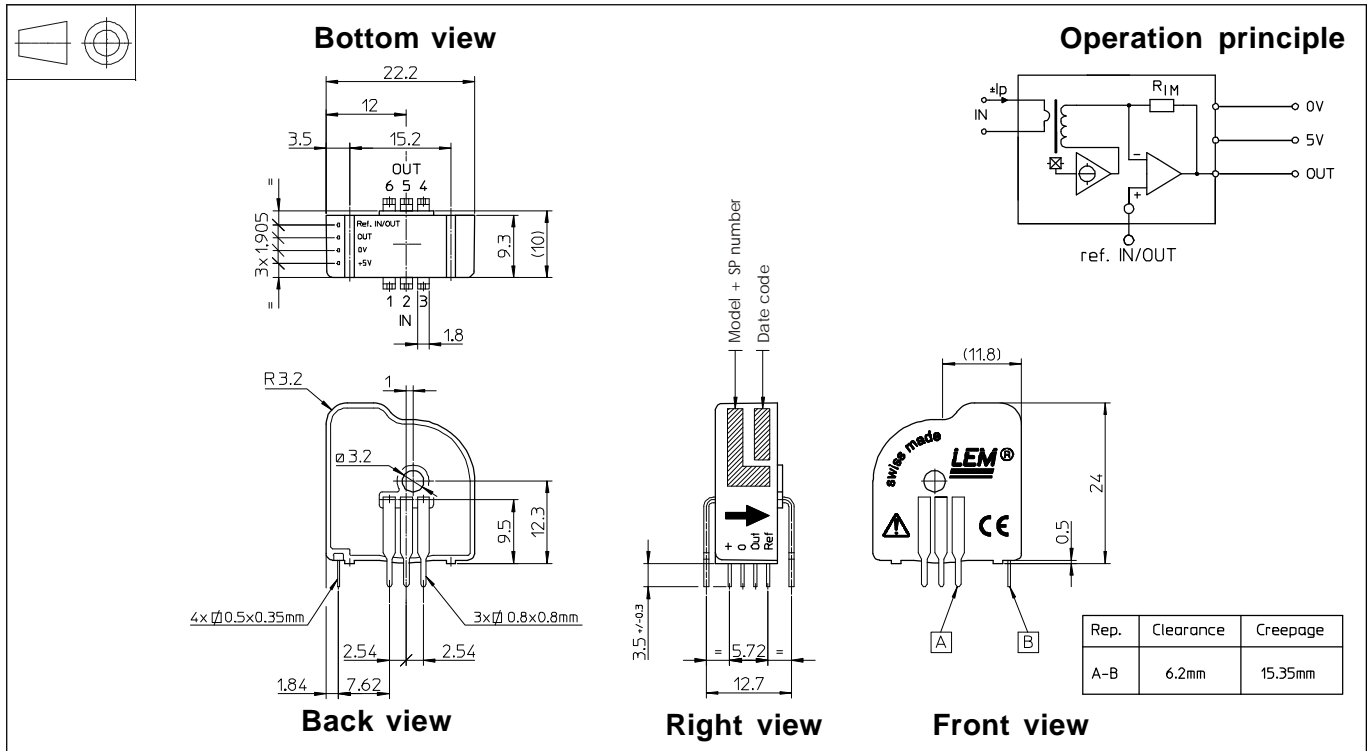
Ignoring this warning can lead to injury and/or cause serious damage.

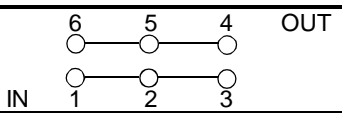
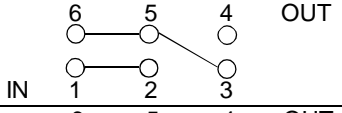
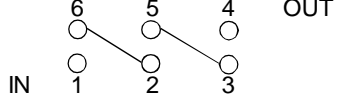
This transducer is a built-in device, whose conducting parts must be inaccessible after installation.

A protective housing or additional shield could be used.

Main supply must be able to be disconnected.

Dimensions LTSR 25-NP (in mm. 1 mm = 0.0394 inch)



| Number of primary turns | Primary nominal current rms I_{PN} [A] | Nominal ⁹⁾ output voltage V_{OUT} [V] | Primary resistance R_P [mΩ] | Primary insertion inductance L_P [μH] | Recommended connections |
|-------------------------|--|--|-------------------------------|---|---|
| 1 | ± 25 | 2.5 ± 0.625 | 0.18 | 0.013 |  |
| 2 | ± 12 | 2.5 ± 0.600 | 0.81 | 0.05 |  |
| 3 | ± 8 | 2.5 ± 0.600 | 1.62 | 0.12 |  |

Mechanical characteristics

- General tolerance ±0.2mm
- Fastening & connection of primary
Recommended PCB hole 1.3mm
- Fastening & connection of secondary
Recommended PCB hole 0.8mm
- Additional primary through-hole ∅3.2mm

Remarks

- V_{OUT} is positive when I_P flows from terminals 1, 2, 3 to terminals 6, 5, 4
- For the EMC, the acceptance criteria are available on request.
- Temperature of the primary jumper should not exceed 100 [°C].

Note: ⁹⁾ Output voltage when LTSR 25-NP is used with internal reference.

Output Voltage - Primary Current

