ZMPT101B(ZMPT107) voltage transformer operating guide

1. Wiring diagram

![Wiring Diagram](image)

Figure I  Figure II

2. Determination of maximum output rms voltage \( U_{\text{max}} \):

\( U_{\text{max}} \) is decided by the AD peak voltage in the sampling loop in principle.

As for Bipolar AD, \( U_{\text{max}} = \frac{\text{Peak voltage}}{\sqrt{2}} \)

As for unipolar AD, \( U_{\text{max}} = \frac{\text{Peak voltage}}{2\sqrt{2}} \)

for example:

As for \( \pm 5V \) AD, the maximum rms voltage of the transformer: \( U_{\text{max}} = \frac{5V}{\sqrt{2}} = 3.53V \)

As for 0~3.3V AD, the maximum rms voltage of
the transformer: \( V_{\text{max}} = \frac{3.3V}{2\sqrt{2}} = 1.16V \)

3. Determination of input current-limiting resistor \( R' \)

Current-limiting resistor \( R' = \frac{V}{I} \)

- \( V \): Rated input voltage
- \( I \): Rated operating current (when Coil resistance is compared with current-limiting resistor \( R' \), it can be ignored.)

ZMPT101B/ZMPT107 usually working at rated current: 1~2mA. When Rated input voltage \( \leq 100V \), Usually choosing the operating current \( I = 2mA \); When Rated input voltage \( \geq 220V \), To reducing the resistor power, Usually choosing the operating current \( 1 \text{ mA} \leq I \leq 2 \text{ mA} \).

For example: \( V = 100V \), \( I = 2 \text{ mA} \),

\[
R' = \frac{V}{I} = 50K\Omega
\]

For example: \( V = 220V \), \( I = 1.1 \text{ mA} \),

\[
R' = \frac{V}{I} = 200K\Omega
\]

To improve reliability, the current-limiting resistor selected usually is greater than its 4times the rated power, and generally use a high
temperature coefficient metal film resistor.

4. Determination of the sampling resistor R

\[ R = \frac{V_{output\max}}{I} = \frac{V_{output\max}}{V_{input\max}} \times R \]

for example: \( V_{output\max} = 3.53V, \ V_{input\max} = 120V, \ R = 50k\Omega \)

\[ R = \frac{3.53 \times 50k\Omega}{120} = 1.471k\Omega \]

Directions:

(1) Above formula is also suitable for the two ways of active and passive output.

(2) When selecting the sampling resistor, Resistor should not exceed:

\[ V_{output\max} \times R' / V_{input\max} \]

5. The advantages and disadvantages of the two wiring

(1) Active output

Advantage: high precise, small phase error, high output voltage, strong load capacity.

As for unipolar AD, the positive input terminal of the op amp can plus a fixed benchmark reference voltage to solve. Meanwhile, in order to simplify the line, Generally do not access the c and r which are for the phase compensation. If you need to compensate, Usually
use the software way.

Disadvantage: Line is a little more complicated.

(2) Passive output

Advantage: Simple circuit, High precision.

Disadvantage: The output voltage has certain limitations. The greater the load resistance, the greater the phase difference

Typical testing data are as follows: