DC/DC Converter

TSHT Series

TSHT5.8-01 Transformer

FEATURES
- Compact SMD package
- I/O isolation test voltage 3k VDC
- Operating ambient temperature range -40°C ~ +125°C
- Meets EN62368 standards

TSHT5.8-01 Transformer is specially designed for applications where an isolated voltage is required in a distributed power supply system, compatible with integrated IC used as a 1W DC/DC converter with 5V input, 5V output. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

Selection Guide

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Input voltage (VDC)</th>
<th>Output voltage (VDC)</th>
<th>Input Current (Max.)</th>
<th>Power (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nominal (Range)</td>
<td></td>
<td>mA (AC)</td>
<td>mA (DC)</td>
</tr>
<tr>
<td>TSH5.8-01</td>
<td>5 (4.5-5.5)</td>
<td>5</td>
<td>177</td>
<td>250</td>
</tr>
</tbody>
</table>

Note: Pins and phase points of the transformers refer to Phase Diagram.

General Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Operating Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inductance°</td>
<td>pin 2 to pin 1; pin 2 to pin 3</td>
<td>--</td>
<td>146</td>
<td>--</td>
<td>μH</td>
</tr>
<tr>
<td></td>
<td>pin 5 to pin 4; pin 5 to pin 6</td>
<td>--</td>
<td>185</td>
<td>--</td>
<td>μH</td>
</tr>
<tr>
<td>DCR</td>
<td>pin 2 to pin 1; pin 2 to pin 3</td>
<td>--</td>
<td>0.34</td>
<td>--</td>
<td>Ω</td>
</tr>
<tr>
<td></td>
<td>pin 5 to pin 4; pin 5 to pin 6</td>
<td>--</td>
<td>0.41</td>
<td>--</td>
<td>Ω</td>
</tr>
<tr>
<td>Isolation</td>
<td>Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.</td>
<td>3000</td>
<td>--</td>
<td>--</td>
<td>VDC</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>Input-output resistance at 500VDC</td>
<td>1000</td>
<td>--</td>
<td>--</td>
<td>MΩ</td>
</tr>
<tr>
<td>Isolation Capacitance</td>
<td>Input-output capacitance at 100kHz/0.1V</td>
<td>--</td>
<td>20</td>
<td>--</td>
<td>pF</td>
</tr>
<tr>
<td>Storage Humidity</td>
<td>--</td>
<td>--</td>
<td>95</td>
<td>%RH</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature°</td>
<td>Including temperature rise</td>
<td>-40</td>
<td>--</td>
<td>+125</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature°</td>
<td>-55</td>
<td>--</td>
<td>+125</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

Reflow Soldering Temperature°

Peak temp. ≤245°C; maximum duration time ≤60s over 217°C.

Notes:
1. Test conditions: 100kHz/0.1V;
2. The temperature of the transformer (ambient plus temperature rise) should be within the operating temperature range;
3. The storage temperature of the transformer only;
4. We suggest that times of reflow soldering should not exceed twice, For actual application, please refer to IPC/JEDEC J-STD-020D.

Mechanical Specifications

<table>
<thead>
<tr>
<th>Case Material</th>
<th>Black plastic; flame-retardant and heat-resistant (UL94 V-0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>12.50 x 8.70 x 5.90mm</td>
</tr>
<tr>
<td>Weight</td>
<td>0.6g (Typ.)</td>
</tr>
<tr>
<td>Cooling Method</td>
<td>Free air convection</td>
</tr>
</tbody>
</table>

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Material certification

<table>
<thead>
<tr>
<th>Material</th>
<th>UL No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire</td>
<td>E234867</td>
</tr>
<tr>
<td>Case</td>
<td>E150608</td>
</tr>
<tr>
<td>Varnish</td>
<td>E317427</td>
</tr>
</tbody>
</table>

Phase Diagram

![Phase Diagram](image)

<table>
<thead>
<tr>
<th>Turns Ratio (Np: Ns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage (VDC)</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

Application Circuit

![Application Circuit](image)

Table 1: Recommended parameters

<table>
<thead>
<tr>
<th>IC</th>
<th>MORNSUN SCM1201</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>1µF/16V</td>
</tr>
<tr>
<td>C2</td>
<td>1µF/16V</td>
</tr>
<tr>
<td>D1</td>
<td>30V/400mA</td>
</tr>
<tr>
<td>D2</td>
<td>30V/400mA</td>
</tr>
</tbody>
</table>

Notes:

1. If it is required to further reduce input and output ripple, the capacitance of C1 and C2 can be increased properly if required, and should be connected close to the pin terminal of the module.

2. In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 1% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side (The sum of the efficient power and resistor consumption power is not less than 1%).
## Dimensions and Recommended Layout

**Top View**

- Dimensions: 6.00±0.20 [0.024±0.008]
- Note:
  - Unit: mm [inch]
  - Pin section tolerances: ±0.10 [±0.004]
  - General tolerances: ±0.50 [±0.020]

**Front View**

- Dimensions: 0.25 [0.010]

**Right View**

- Dimensions: 0.75 [0.029]

**Note:**
- Grid: 2.54*2.54 mm

### Tape and Reel Info

**Reel Information**

- ØReel Diameter: 13.00

**Quadrant assignments for PIN 1 orientation in tape**

- Sprocket holes
- Pocket Quadrants

<table>
<thead>
<tr>
<th>Device</th>
<th>Package Type</th>
<th>Pin</th>
<th>SPQ</th>
<th>Reel Diameter (mm)</th>
<th>Reel Width W1 (mm)</th>
<th>A0 (mm)</th>
<th>B0 (mm)</th>
<th>K0 (mm)</th>
<th>P1 (mm)</th>
<th>W (mm)</th>
<th>Pin1 Quadrant</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSHT3.8-01</td>
<td>SMD</td>
<td>6</td>
<td>500</td>
<td>330.0</td>
<td>16.4</td>
<td>13.00</td>
<td>8.90</td>
<td>6.40</td>
<td>20.00</td>
<td>16</td>
<td>Q1</td>
</tr>
</tbody>
</table>
Notes:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210037, Roll packaging bag number: 58210038;
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide other analog transformer customization service, please contact our technicians directly for specific information;
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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