1.2V Drive Nch MOSFET
RUE002N02

● Structure
Silicon N-channel MOSFET

● Applications
Switching

● Features
1) Fast switching speed.
2) Low voltage drive (1.2V) makes this device ideal for portable equipment.
3) Drive circuits can be simple.

● Packaging specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Package Code</th>
<th>Basic ordering unit (pieces)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TL3000</td>
<td>3000</td>
</tr>
</tbody>
</table>

RUE002N02

● Absolute maximum ratings (Ta=25°C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Limits</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain-source voltage</td>
<td>Voss</td>
<td>-20</td>
<td>V</td>
</tr>
<tr>
<td>Gate-source voltage</td>
<td>Vgst</td>
<td>-38</td>
<td>V</td>
</tr>
<tr>
<td>Drain current</td>
<td>I(DS)</td>
<td>±200</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>I(DP)</td>
<td>±400</td>
<td>mA</td>
</tr>
<tr>
<td>Total power dissipation</td>
<td>P(T)</td>
<td>150</td>
<td>mW</td>
</tr>
<tr>
<td>Channel temperature</td>
<td>Tch</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Range of storage temperature</td>
<td>Tstg</td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

● Thermal resistance

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Limits</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel to ambient</td>
<td>Rth(ch-a)</td>
<td>833</td>
<td>°C / W</td>
</tr>
</tbody>
</table>

*1 Pw ≤ 10 µs, Duty cycle ≤ 1%
*2 Each terminal mounted on a recommended land
### Electrical characteristics (Ta=25°C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gate-source leakage</td>
<td>IGSS</td>
<td>–</td>
<td>–</td>
<td>±10</td>
<td>µA</td>
<td>Vgs=±8V, Vds=0V</td>
</tr>
<tr>
<td>Drain-source breakdown voltage</td>
<td>VBR(oss)</td>
<td>20</td>
<td>–</td>
<td>–</td>
<td>V</td>
<td>Io=1mA, Vgs=0V</td>
</tr>
<tr>
<td>Zero gate voltage drain current</td>
<td>IDSS</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>µA</td>
<td>Vgs=20V, Vds=0V</td>
</tr>
<tr>
<td>Gate threshold voltage</td>
<td>VGS(th)</td>
<td>0.3</td>
<td>–</td>
<td>1</td>
<td>V</td>
<td>Vgs=10V, Io=1mA</td>
</tr>
<tr>
<td>Static drain-source on-state resistance</td>
<td>RDS(on)</td>
<td>–</td>
<td>0.8</td>
<td>1.2</td>
<td>Ω</td>
<td>Io=200mA, Vgs=2.5V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>–</td>
<td>1.0</td>
<td>1.4</td>
<td>Ω</td>
<td>Io=200mA, Vgs=1.8V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>–</td>
<td>1.2</td>
<td>2.4</td>
<td>Ω</td>
<td>Io=40mA, Vgs=1.5V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>–</td>
<td>1.6</td>
<td>4.8</td>
<td>Ω</td>
<td>Io=20mA, Vgs=1.2V</td>
</tr>
<tr>
<td>Forward transfer admittance</td>
<td>[Yfs]</td>
<td>200</td>
<td>–</td>
<td>–</td>
<td>mS</td>
<td>Vgs=10V, Io=200mA</td>
</tr>
<tr>
<td>Input capacitance</td>
<td>Cin</td>
<td>–</td>
<td>25</td>
<td>–</td>
<td>pF</td>
<td>Vgs=10V</td>
</tr>
<tr>
<td>Output capacitance</td>
<td>Coss</td>
<td>–</td>
<td>10</td>
<td>–</td>
<td>pF</td>
<td>Vgs=0V</td>
</tr>
<tr>
<td>Reverse transfer capacitance</td>
<td>Crss</td>
<td>–</td>
<td>10</td>
<td>–</td>
<td>pF</td>
<td>f=1MHz</td>
</tr>
<tr>
<td>Turn-on delay time</td>
<td>tD(on)</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>ns</td>
<td>Vgs=10V, Io=150mA</td>
</tr>
<tr>
<td>Rise time</td>
<td>tr</td>
<td>–</td>
<td>10</td>
<td>–</td>
<td>ns</td>
<td>Vgs=4.0V</td>
</tr>
<tr>
<td>Turn-off delay time</td>
<td>tD(off)</td>
<td>–</td>
<td>15</td>
<td>–</td>
<td>ns</td>
<td>RL=67Ω</td>
</tr>
<tr>
<td>Fall time</td>
<td>tf</td>
<td>–</td>
<td>10</td>
<td>–</td>
<td>ns</td>
<td>Ro=10Ω</td>
</tr>
</tbody>
</table>

* Pulsed

### Body diode characteristics (Source-drain) (Ta=25°C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward voltage</td>
<td>VSD</td>
<td>–</td>
<td>1.2</td>
<td>–</td>
<td>V</td>
<td>Io=100mA, Vgs=0V</td>
</tr>
</tbody>
</table>

* Pulsed
### Electrical characteristics curves

#### Fig. 1 Typical Output Characteristics (I)

![Graph showing output characteristics](image1)

**DRAIN-SOURCE VOLTAGE : V_{DS}[V]**

**DRAIN-CURRENT : I_D[A]**

**Ta=25°C**

- V_{DS}=1.2V
- V_{DS}=1.5V
- V_{DS}=1.8V
- V_{DS}=2.5V
- V_{DS}=4.0V

**Pulsed**

#### Fig. 2 Typical Output Characteristics (II)

![Graph showing output characteristics](image2)

**GATE-SOURCE VOLTAGE : V_{GS}[V]**

**DRAIN-SOURCE VOLTAGE : V_{DS}[V]**

**DRAIN-CURRENT : I_D[A]**

**Ta=25°C**

- V_{GS}=1.2V
- V_{GS}=1.5V
- V_{GS}=1.8V
- V_{GS}=2.5V
- V_{GS}=4.0V

**Pulsed**

#### Fig. 3 Typical transfer characteristics

![Graph showing transfer characteristics](image3)

**DRAIN-SOURCE VOLTAGE : V_{DS}[V]**

**DRAIN-CURRENT : I_D[A]**

**Ta=25°C**

- V_{DS}=1.2V
- V_{DS}=1.5V
- V_{DS}=1.8V
- V_{DS}=2.5V
- V_{DS}=4.0V

**Pulsed**

#### Fig. 4 Static Drain-Source On-State Resistance vs. Drain Current (I)

![Graph showing static on-state resistance](image4)

**STATIC DRAIN-SOURCE ON-STATE RESISTANCE : R_{DS(on)}[mΩ]**

**DRAIN-CURRENT : I_D[A]**

**Ta=25°C**

- V_{GS}=1.2V
- V_{GS}=1.5V
- V_{GS}=1.8V
- V_{GS}=2.5V
- V_{GS}=4.0V

**Pulsed**

#### Fig. 5 Static Drain-Source On-State Resistance vs. Drain Current (II)

![Graph showing static on-state resistance](image5)

**STATIC DRAIN-SOURCE ON-STATE RESISTANCE : R_{DS(on)}[mΩ]**

**DRAIN-CURRENT : I_D[A]**

**Ta=25°C**

- V_{GS}=1.2V
- V_{GS}=1.5V
- V_{GS}=1.8V
- V_{GS}=2.5V
- V_{GS}=4.0V

**Pulsed**

#### Fig. 6 Static Drain-Source On-State Resistance vs. Drain Current (III)

![Graph showing static on-state resistance](image6)

**STATIC DRAIN-SOURCE ON-STATE RESISTANCE : R_{DS(on)}[mΩ]**

**DRAIN-CURRENT : I_D[A]**

**Ta=25°C**

- V_{GS}=1.2V
- V_{GS}=1.5V
- V_{GS}=1.8V
- V_{GS}=2.5V
- V_{GS}=4.0V

**Pulsed**

#### Fig. 7 Static Drain-Source On-State Resistance vs. Drain Current (IV)

![Graph showing static on-state resistance](image7)

**STATIC DRAIN-SOURCE ON-STATE RESISTANCE : R_{DS(on)}[mΩ]**

**DRAIN-CURRENT : I_D[A]**

**Ta=25°C**

- V_{GS}=1.2V
- V_{GS}=1.5V
- V_{GS}=1.8V
- V_{GS}=2.5V
- V_{GS}=4.0V

**Pulsed**

#### Fig. 8 Static Drain-Source On-State Resistance vs. Drain Current (V)

![Graph showing static on-state resistance](image8)

**STATIC DRAIN-SOURCE ON-STATE RESISTANCE : R_{DS(on)}[mΩ]**

**DRAIN-CURRENT : I_D[A]**

**Ta=25°C**

- V_{GS}=1.2V
- V_{GS}=1.5V
- V_{GS}=1.8V
- V_{GS}=2.5V
- V_{GS}=4.0V

**Pulsed**

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**Not Recommended for New Designs**
Measurement circuit

Notice
This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit
**Notice**

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