### Features
- Low drain-source On-state Resistance:
  \[ R_{DS(on)} \text{ typ} = 48 \text{ m\Omega} \ (V_{GS} = 4.5 \text{ V}) \]
- High-speed switching: \( Q_g = 2.8 \text{ nC} \)
- Halogen-free / RoHS compliant
  (EU RoHS / UL-94 V-0 / MSL: Level 1 compliant)

### Marking Symbol:
- 7A

### Basic Part Number:
- Dual N-channel MOS 33V (Individual)

### Packaging
- Embossed type (Thermo-compression sealing): 3,000 pcs / reel (standard)

#### Absolute Maximum Ratings \( T_a = 25 \degree C \)  

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain-source Voltage</td>
<td>VDS</td>
<td>33</td>
<td>V</td>
</tr>
<tr>
<td>Gate-source Voltage</td>
<td>VGS</td>
<td>±20</td>
<td>V</td>
</tr>
<tr>
<td>Drain Current (Steady State) (^1)</td>
<td>ID</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>Drain Current (t = 10 s) (^1)</td>
<td>IDp</td>
<td>5.5</td>
<td>A</td>
</tr>
<tr>
<td>Source Current (Pulsed) (^1,2)</td>
<td>ISp(BD)</td>
<td>20</td>
<td>A</td>
</tr>
<tr>
<td>Total Power Dissipation (Steady State) (^1)</td>
<td>PD</td>
<td>1</td>
<td>W</td>
</tr>
<tr>
<td>Total Power Dissipation (t = 10 s) (^1)</td>
<td>PD(t)</td>
<td>1.3</td>
<td>W</td>
</tr>
<tr>
<td>Channel Temperature</td>
<td>Tch</td>
<td>150</td>
<td>\degree C</td>
</tr>
<tr>
<td>Operating Ambient Temperature</td>
<td>Topr</td>
<td>-40 to +85</td>
<td>\degree C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>Tstg</td>
<td>-55 to +150</td>
<td>\degree C</td>
</tr>
</tbody>
</table>

**Note:**
- \(^1\) Device mounted on a glass-epoxy board (See Figure 1)
- \(^2\) Pulse test: Ensure that the channel temperature does not exceed 150\degree C.

---

**Figure 1** FR4 Glass-Epoxy Board
25.4 mm \( \times \) 25.4 mm \( \times \) 0.8 mm
## Electrical Characteristics  \( Ta = 25^\circ C \pm 3^\circ C \)  Tr.1, Tr.2

### Static Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain-source Breakdown Voltage</td>
<td>VDSS</td>
<td>ID = 1 mA, VGS = 0 V</td>
<td>33</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Zero Gate Voltage Drain Current</td>
<td>IDSS</td>
<td>VDS = 33 V, VGS = 0 V</td>
<td>1</td>
<td></td>
<td></td>
<td>( \mu A )</td>
</tr>
<tr>
<td>Gate-source Leakage Current</td>
<td>IGSS</td>
<td>VGS = ( \pm 16 ) V, VDS = 0 V</td>
<td>10</td>
<td></td>
<td></td>
<td>( \mu A )</td>
</tr>
<tr>
<td>Gate-source Threshold Voltage</td>
<td>Vth</td>
<td>ID = 0.26 mA, VDS = 10 V</td>
<td>2.5</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Drain-source On-state Resistance (^*1)</td>
<td>RDS(on)1</td>
<td>ID = 2.5 A, VGS = 10 V</td>
<td>32</td>
<td>38</td>
<td></td>
<td>( m\Omega )</td>
</tr>
<tr>
<td></td>
<td>RDS(on)2</td>
<td>ID = 2.5 A, VGS = 4.5 V</td>
<td>48</td>
<td>68</td>
<td></td>
<td>( m\Omega )</td>
</tr>
</tbody>
</table>

### Dynamic Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Capacitance</td>
<td>Ciss</td>
<td>VDS = 10 V, VGS = 0 V</td>
<td></td>
<td>220</td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>Coss</td>
<td>f = 1 MHz</td>
<td></td>
<td>40</td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Reverse Transfer Capacitance</td>
<td>Crss</td>
<td></td>
<td></td>
<td>35</td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Turn-on Delay Time (^*2)</td>
<td>td(on)</td>
<td>VDD = 15 V, VGS = 0 to 10 V</td>
<td>7</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Rise Time (^*2)</td>
<td>tr</td>
<td>ID = 2.5 A</td>
<td>3</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Turn-off Delay Time (^*2)</td>
<td>td(off)</td>
<td>VDD = 15 V, VGS = 10 to 0 V</td>
<td>15</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Fall Time (^*2)</td>
<td>tf</td>
<td>ID = 2.5 A</td>
<td>9</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Total Gate Charge</td>
<td>Qg</td>
<td>VDD = 15 V, VGS = 0 to 4.5 V</td>
<td>2.8</td>
<td></td>
<td></td>
<td>nC</td>
</tr>
<tr>
<td>Gate-source Charge</td>
<td>Qgs</td>
<td></td>
<td>1.1</td>
<td></td>
<td></td>
<td>nC</td>
</tr>
<tr>
<td>Gate-drain Charge</td>
<td>Qgd</td>
<td></td>
<td>1.2</td>
<td></td>
<td></td>
<td>nC</td>
</tr>
</tbody>
</table>

### Body Diode Characteristic

| Diode Forward Voltage \(^*1\) | VSD | IS = 2.5 A, VGS = 0 V | 0.8 | 1.2 | V |

**Note:**
1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.
2. \(^*1\) Pulse test: Ensure that the channel temperature does not exceed 150°C.
3. \(^*2\) Measurement circuit for Turn-on Delay Time/Rise Time/Turn-off Delay Time/Fall Time
*2 Measurement circuit for Turn-on Delay Time/Rise Time/Turn-off Delay Time/Fall Time

VDD = 15 V
ID = 2.5 A
PW = 10μs
D.C. ≦ 1 %
MOS FET
FC8J33040L

**Product Standards**

**RDS(on) - ID**

- **ID - VGS**
  - **VGS = 10.0 V**
  - **4.5 V**
  - **4.0 V**
  - **3.5 V**
  - **3.0 V**

**ID - VDS**

- **VDS - VGS**
  - **0**
  - **0.1**
  - **0.2**
  - **0.3**

**Gate-source Voltage VGS (V)**

- **Drain current ID (A)**
  - **0**
  - **0.2**
  - **0.4**
  - **0.6**
  - **0.8**
  - **1**

**Gate-source Voltage VGS (V)**

- **Drain-source Voltage VDS (V)**
  - **0**
  - **0.1**
  - **0.2**
  - **0.3**
  - **0.4**
  - **0.5**
  - **0.6**
  - **0.7**
  - **0.8**
  - **0.9**
  - **1**

**Drain-source On-state Resistance RDS(on) (mΩ)**

- **VGS = 4.5 V**
  - **10.0 V**

**Capacitance - VDS**

- **Ciss**
- **Coss**
- **Crss**

**Dynamic Input/Output Characteristics**

- **VDD = 15 V**

---

**Established**: 2011-01-13
**Revised**: 2013-07-31
WMini8-F1

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**Land Pattern (Reference) (Unit: mm)**

- 0.65
- 0.65
- 0.65
- 0.4
- 2.4

---

**MOS FET**

FC8J33040L

---

**Product Standards**

- Mini8-F1

---

**Technical Details**

- 2.9 ± 0.1
- 0.30 ± 0.05
- 0.16 ± 0.10
- 0.65
- 2.4 ± 0.1
- 0.80 ± 0.05
- 0.80 ± 0.05
- 0.15

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**Established:** 2011-01-13

**Revised:** 2013-07-31
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