FG6K42060L
Silicon N-channel MOSFET (FET1)
Silicon P-channel MOSFET (FET2)

For Switching

**Features**
- Low drain-source ON resistance: RDS(on) typ.
  
  N-ch = 2 Ω (VGS = 4.0 V) P-ch: 95 mΩ (VGS = -4.0 V)
- Halogen-free / RoHS compliant
  (EU RoHS / UL-94 V-0 / MSL: Level 1 compliant)

**Marking Symbol:** Y7

**Packaging**
FG6K42060L Embossed type (Thermo-compression sealing):
3 000 pcs / reel (standard)

**Absolute Maximum Ratings**  \( Ta = 25 \, ^\circ C \)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FET1 (Nch.) Drain-source Voltage</td>
<td>VDS</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>FET1 Gate-source Voltage</td>
<td>VGS</td>
<td>±12</td>
<td>V</td>
</tr>
<tr>
<td>FET1 Drain Current</td>
<td>ID</td>
<td>100</td>
<td>mA</td>
</tr>
<tr>
<td>FET1 Drain Current (Pulsed)</td>
<td>IDp</td>
<td>200</td>
<td>mA</td>
</tr>
<tr>
<td>FET2 (Pch.) Drain-source Voltage</td>
<td>VDS</td>
<td>-20</td>
<td>V</td>
</tr>
<tr>
<td>FET2 Gate-source Voltage</td>
<td>VGS</td>
<td>±10</td>
<td>V</td>
</tr>
<tr>
<td>FET2 Drain Current</td>
<td>ID</td>
<td>-2</td>
<td>A</td>
</tr>
<tr>
<td>FET2 Drain Current (Pulsed)</td>
<td>IDp</td>
<td>-8</td>
<td>A</td>
</tr>
<tr>
<td>Overall Total Power Dissipation</td>
<td>PD</td>
<td>700</td>
<td>mW</td>
</tr>
<tr>
<td>Overall Channel Temperature</td>
<td>Tch</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Overall Storage Temperature</td>
<td>Tstg</td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Note: *1 Measuring on ceramic substrate at 40 mm × 38 mm × 0.1 mm.

PD absolute maximum rating Non-heat sink: 150 mW.
### Electrical Characteristics  \( Ta = 25 \, ^\circ C \pm 3 \, ^\circ C \)

**FET1 (Nch.)**

<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>30</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Zero Gate Voltage Drain Current</td>
<td>IDSS</td>
<td>VDS = 30 V, VGS = 0 V</td>
<td></td>
<td>1.0</td>
<td></td>
<td>( \mu A )</td>
</tr>
<tr>
<td>Gate-source Leakage Current</td>
<td>IGSS</td>
<td>VGS = ( \pm 10 , V ), VDS = 0 V</td>
<td></td>
<td>( \pm 10 )</td>
<td></td>
<td>( \mu A )</td>
</tr>
<tr>
<td>Drain-source On-state Resistance (^*1)</td>
<td>RDS(on)1</td>
<td>ID = 10 mA, VGS = 2.5 V</td>
<td>3</td>
<td>6</td>
<td></td>
<td>( \Omega )</td>
</tr>
<tr>
<td></td>
<td>RDS(on)2</td>
<td>ID = 10 mA, VGS = 4.0 V</td>
<td>2</td>
<td>3</td>
<td></td>
<td>( \Omega )</td>
</tr>
<tr>
<td>Forward transfer admittance (^*1)</td>
<td>[Yfs]</td>
<td>ID = 10 mA, VDS = 3.0 V</td>
<td></td>
<td>20</td>
<td>55</td>
<td>mS</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>Ciss</td>
<td>VDS = 3.0 V, VGS = 0 V, f = 1 MHz</td>
<td></td>
<td>7</td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>Coss</td>
<td>VDS = 3.0 V, VGS = 0 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse Transfer Capacitance</td>
<td>Crss</td>
<td>VGS = 0 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn-on Time (^*2)</td>
<td>ton</td>
<td>VDD = 3.0 V, VGS = 0 to 3.0 V</td>
<td></td>
<td>100</td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Turn-off Time (^*2)</td>
<td>toff</td>
<td>VDD = 3.0 V, VGS = 3.0 to 0 V</td>
<td></td>
<td>100</td>
<td></td>
<td>ns</td>
</tr>
</tbody>
</table>

Note: Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.

\(^*1\) Pulse measurement

\(^*2\) See Test circuit.

#### FET2 (Pch.)

<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>-20</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Zero Gate Voltage Drain Current</td>
<td>IDSS</td>
<td>VDS = - 20 V, VGS = 0 V</td>
<td></td>
<td>-1.0</td>
<td></td>
<td>( \mu A )</td>
</tr>
<tr>
<td>Gate-source Leakage Current</td>
<td>IGSS</td>
<td>VGS = 8 V, VDS = 0 V</td>
<td></td>
<td>( \pm 10 )</td>
<td></td>
<td>( \mu A )</td>
</tr>
<tr>
<td>Drain-source Threshold Voltage</td>
<td>Vth</td>
<td>ID = 1.0 mA, VDS = 3.0 V</td>
<td></td>
<td>-1.0</td>
<td>-1.1</td>
<td>V</td>
</tr>
<tr>
<td>Drain-source On-state Resistance (^*3)</td>
<td>RDS(on)1</td>
<td>ID = - 0.5 A, VGS = - 1.8 V</td>
<td>155</td>
<td>245</td>
<td></td>
<td>m( \Omega )</td>
</tr>
<tr>
<td></td>
<td>RDS(on)2</td>
<td>ID = - 1 A, VGS = - 2.5 V</td>
<td>115</td>
<td>185</td>
<td></td>
<td>m( \Omega )</td>
</tr>
<tr>
<td></td>
<td>RDS(on)3</td>
<td>ID = - 1 A, VGS = - 4.0 V</td>
<td>95</td>
<td>135</td>
<td></td>
<td>m( \Omega )</td>
</tr>
<tr>
<td>Forward transfer admittance (^*3)</td>
<td>[Yfs]</td>
<td>ID = - 1.0 A, VDS = - 10 V</td>
<td></td>
<td>3.0</td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>Ciss</td>
<td>VDS = - 10 V, VGS = 0 V, f = 1 MHz</td>
<td></td>
<td>300</td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>Coss</td>
<td>VDS = - 10 V, VGS = 0 V</td>
<td></td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse Transfer Capacitance</td>
<td>Crss</td>
<td>VGS = 0 V</td>
<td></td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn-on Delay Time (^*4)</td>
<td>ton</td>
<td>VDD = - 10 V, VGS = 0 to - 4.0 V</td>
<td></td>
<td>14</td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Turn-off Delay Time (^*4)</td>
<td>toff</td>
<td>VDD = - 10 V, VGS = - 4.0 to 0 V</td>
<td></td>
<td>112</td>
<td></td>
<td>ns</td>
</tr>
</tbody>
</table>

Note: Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.

\(^*3\) Pulse measurement

\(^*4\) See Test circuit.
**2 Test circuit**

Vin

PW = 10 μs
D.C. ≤ 1 %

VDD = 3 V

ID = 10 mA
RL = 300 Ω

Vout

Vin

50 Ω

G

D

S

VDD

90 %

10 %

90 %

10 %

ton
toff
*4 Test circuit

VDD = -10 V

ID = -1 A
RL = 10 Ω

PW = 10 μs
D.C. ≤ 1 %

Vin

Vout

50 Ω

10 %

90 %

10 %

90 %

ton
toff
Dynamic Input/Output Characteristics

- **ID - VDS**
  - Drain Current ID (A) vs. Drain-source Voltage VDS (V)
  - Various VGS values shown:
    - VGS = -4.0 V
    - VGS = -2.5 V
    - VGS = -2.0 V
    - VGS = -1.5 V
    - VGS = -1.0 V
  - ID values:
    - 2.0 mA
    - 1.0 mA
    - 0.5 mA

- **ID - VGS**
  - Drain Current ID (A) vs. Gate-source Voltage VGS (V)
  - Various VDS values shown:
    - VDS = -10 V
    - VDS = -5 V
    - VDS = -2 V
    - VDS = -0.5 V
    - VDS = 0 V
  - Drain-source On-state Resistance RDS(on) (mΩ) vs. Drain Current ID (A)

- **VDS - VGS**
  - Capacitance C (pF) vs. Drain-source Voltage VDS (V)
  - Various Ciss, Coss, Crss values shown:
    - Ciss:
      - VDD = -10 V
    - Coss:
      - VDD = -10 V
    - Crss:
      - VDD = -10 V

- **RDS(on) - ID**
  - Gate-source Voltage VGS (V) vs. Total Gate Charge Qg (nC)
  - VDD = -10 V

![Graphs showing dynamic input/output characteristics](image-url)
**Gate-source Threshold voltage (Vth)**

- **Temperature (°C)**
  - Vth vs. Temperature graph

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

- **Temperature (°C)**
  - RDS(on) vs. Temperature graph

**Total Power Dissipation (PD)**

- **Temperature (°C)**
  - PD vs. Temperature graph

**Thermal Resistance (Rth)**

- **Pulse Width (tsw)**
  - Rth vs. Pulse Width graph

**Safe Operating Area**

- **Drain-source Voltage (VDS)**
  - Operation area

**Drain Current (ID)**

- **Drain-source Voltage (VDS)**
  - Operation area
WSMini6-F1-B (Unit: mm)

- Land Pattern (Reference) (Unit: mm)
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