MTM232270LBF
Silicon N-channel MOS FET

For switching
MTM13227 in SMini3 type package

■ Features
• Low drain-source On-state resistance : RDS(on) typ = 85 mΩ (VGS = 4.0 V)
• Low drive voltage: 2.5 V drive
  Halogen-free / RoHS compliant
  (EU RoHS / UL-94 V-0 / MSL : Level 1 compliant)

■ Marking Symbol : ET

■ Packaging
Embosed type (Thermo-compression sealing) : 3 000 pcs / reel (standard)

■ Absolute Maximum Ratings Ta = 25 °C

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<th>項目</th>
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<tr>
<td>Drain-source Voltage</td>
<td>VDS</td>
<td>20 V</td>
<td></td>
</tr>
<tr>
<td>Gate-source Voltage</td>
<td>VGS</td>
<td>±10 V</td>
<td></td>
</tr>
<tr>
<td>Drain current</td>
<td>ID</td>
<td>2.0 A</td>
<td></td>
</tr>
<tr>
<td>Peak drain current 1</td>
<td>IDp</td>
<td>8 A</td>
<td></td>
</tr>
<tr>
<td>Power dissipation 2</td>
<td>PD</td>
<td>500 mW</td>
<td></td>
</tr>
<tr>
<td>Channel temperature</td>
<td>Tch</td>
<td>150 °C</td>
<td></td>
</tr>
<tr>
<td>Operating ambient temperature</td>
<td>Topr</td>
<td>-40 to +85 °C</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>Tstg</td>
<td>-55 to +150 °C</td>
<td></td>
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</tbody>
</table>

Note)
*1 Pulse width ≤10 μs, Duty cycle ≤1 %
*2 Measuring on ceramic board at 40 × 38 × 0.1 mm
  Absolute maximum rating PD without heat sink shall be made 150 mW.
### Electrical Characteristics $T_a = 25 \, ^\circ C \pm 3 \, ^\circ C$

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<th>標準</th>
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<tr>
<td>Drain-source surrender voltage</td>
<td>VDSS</td>
<td>ID = 1 mA, VGS = 0 V</td>
<td>20</td>
<td></td>
<td></td>
<td>V</td>
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<tr>
<td>Drain-source cutoff current</td>
<td>IDSS</td>
<td>VDS = 20 V, VGS = 0 V</td>
<td></td>
<td></td>
<td>10</td>
<td>μA</td>
</tr>
<tr>
<td>Gate-source cutoff current</td>
<td>IGSS</td>
<td>VGS = ±8 V, VDS = 0 V</td>
<td></td>
<td></td>
<td>±10</td>
<td>μA</td>
</tr>
<tr>
<td>Gate threshold voltage</td>
<td>Vth</td>
<td>ID = 1.0 mA, VDS = 10 V</td>
<td>0.4</td>
<td></td>
<td>0.85</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Drain-source ON resistance $^1$

| RDS(ON1) | ID = 1 A, VGS = 4 V | 85 | 110 | | | mΩ |
| RDS(ON2) | ID = 0.5 A, VGS = 2.5 V | 100 | 150 | | | |

Forward transfer admittance $^1$

| | Yfs | ID = 1 A, VDS = 10 V, f = 1 kHz | 3.0 | | | S |

Short-circuit input capacitance (Common source)

| Ciss | ID = 1 A, VDS = 10 V, f = 1 kHz | 290 | | | | pF |

Short-circuit output capacitance (Common source)

| Coss | VDS = 10 V, VGS = 0, f = 1 MHz | 26 | | | | pF |

Reverse transfer capacitance (Common source)

| Crss | | 20 | | | | |

Turn-on Time $^2$

| ton | VDD = 10 V, VGS = 0 to 4 V ID = 1 A | 12 | | | | ns |

Turn-off Time $^2$

| toff | VDD = 10 V, VGS = -4 to 0 V ID = 1 A | 60 | | | | ns |

Note)
1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.
2. *1 Pulse test: Pulse width $\leq$ 10 μs, Duty cycle $\leq$ 1 %
   *2 Turn-on and Turn-off test circuit
*2 Turn-on and Turn-off test circuit

Vin

PW = 10 μs
D.C. ≤ 1 %

VCC = 10 V

ID = 1 A
RL = 10 Ω

Vout

50 Ω

10 %

90 %

10 %

90 %

Vout

Vin

t(on)

t(off)
**Technical Data (reference)**

**VDS - VGS**

![Graph showing VDS vs VGS with different IDS](image1)

**RDS(on) - ID**

![Graph showing RDS(on) vs ID](image2)

**Capacitance - VDS**

![Graph showing Capacitance vs VDS](image3)

**Dynamic Input/Output Characteristics**

![Graph showing Input/Output Characteristics](image4)
MOS FET
MTM232270LBF

Technical Data (reference)

- **Gate-source Threshold Voltage Vth (V)**
  - Temperature (°C)
  - Plot: Linear decrease with temperature.

- **Total Power Dissipation PD (W)**
  - Temperature Ta (°C)
  - Plot: Decrease with temperature.

- **Drain-source On-resistance RDS(on) (mΩ)**
  - VGS = 2.5 V
  - VGS = 4.0 V
  - Temperature (°C)
  - Plot: Linear increase with temperature.

- **Thermal Resistance Rth (°C/W)**
  - Pulse Width tsw (s)
  - Plot: Increase with pulse width.

- **Safe Operating Area**
  - Drain-source Voltage VDS (V)
  - Drain current ID (A)
  - Pulse Width tsw (s)
  - Current limit by RDS(on)
  - Operation limits:
    - Ta = 25 °C
    - Glass epoxy board (26.4x25.4x0.8mm)
    - Coated with copper foil
    - More than 300mm²
  - DC: 100 ms

Established: 2011-03-09
Revised: 2013-09-02
Land Pattern (Reference) (Unit: mm)

- 2.0 ± 0.2
- 0.3 ± 0.1
- 0.15 ± 0.1
- 0.2 ± 0.1
- 1.3 ± 0.1
- 1.25 ± 0.1
- 0.15 ± 0.1
- 0.9 ± 0.1
- 0.9 ± 0.1
- 0.8
- 1.9
- 1.3
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