

2.5V Drive Nch + Nch MOSFET

EM6K31

● Structure

Silicon N-channel MOSFET

● Features

- 1) High speed switing.
- 2) Small package(EMT6).
- 3) Low voltage drive(2.5V drive).

● Application

Switching

● Packaging specifications

| | | |
|--------|------------------------------|--------|
| Type | Package | Taping |
| | Code | T2R |
| | Basic ordering unit (pieces) | 8000 |
| EM6K31 | | ○ |

● Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits | Unit |
|------------------------------|------------|---------------|--------------|
| Drain-source voltage | V_{DSS} | 60 | V |
| Gate-source voltage | V_{GSS} | ± 20 | V |
| Drain current | Continuous | I_D | ± 250 mA |
| | Pulsed | I_{DP}^{*1} | ± 1 A |
| Source current (Body Diode) | Continuous | I_S | 125 mA |
| | Pulsed | I_{SP}^{*1} | 1 A |
| Power dissipation | P_D^{*2} | 150 | mW / TOTAL |
| | | 120 | mW / ELEMENT |
| Channel temperature | T_{ch} | 150 | °C |
| Range of storage temperature | T_{stg} | -55 to +150 | °C |

*1 $P_w \leq 10 \mu s$, Duty cycle $\leq 1\%$

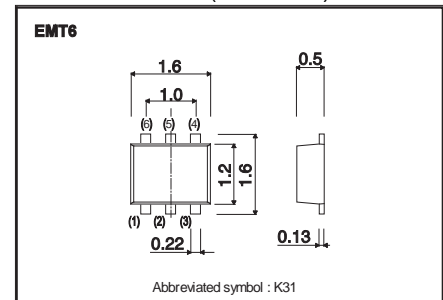
*2 Each terminal mounted on a recommended land.

● Thermal resistance

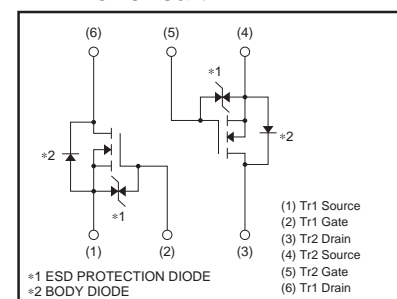
| Parameter | Symbol | Limits | Unit |
|--------------------|------------------|--------|------------------|
| Channel to ambient | $R_{th}(ch-a)^*$ | 833 | °C / W / TOTAL |
| | | 1042 | °C / W / ELEMENT |

* Each terminal mounted on a recommended land.

● Dimensions (Unit : mm)



● Inner circuit



● **Electrical characteristics** (Ta = 25°C)

<It is the same ratings for Tr1 and Tr2.>

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|----------------|------|------|------|------|--------------------------------|
| Gate-source leakage | I_{GSS} | - | - | ±10 | μA | $V_{GS}=\pm 20V, V_{DS}=0V$ |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 60 | - | - | V | $I_D=1mA, V_{GS}=0V$ |
| Zero gate voltage drain current | I_{DSS} | - | - | 1 | μA | $V_{DS}=60V, V_{GS}=0V$ |
| Gate threshold voltage | $V_{GS(th)}$ | 1.0 | - | 2.3 | V | $V_{DS}=10V, I_D=1mA$ |
| Static drain-source on-state resistance | $R_{DS(on)}$ * | - | 1.7 | 2.4 | Ω | $I_D=250mA, V_{GS}=10V$ |
| | | - | 2.1 | 3.0 | | $I_D=250mA, V_{GS}=4.5V$ |
| | | - | 2.3 | 3.2 | | $I_D=250mA, V_{GS}=4.0V$ |
| | | - | 3.0 | 12.0 | | $I_D=10mA, V_{GS}=2.5V$ |
| Forward transfer admittance | $ Y_{fs} $ * | 0.25 | - | - | S | $I_D=250mA, V_{DS}=10V$ |
| Input capacitance | C_{iss} | - | 15 | - | pF | $V_{DS}=25V$ |
| Output capacitance | C_{oss} | - | 4.5 | - | pF | $V_{GS}=0V$ |
| Reverse transfer capacitance | C_{rss} | - | 2.0 | - | pF | $f=1MHz$ |
| Turn-on delay time | $t_{d(on)}$ * | - | 3.5 | - | ns | $I_D=100mA, V_{DD}\approx 30V$ |
| Rise time | t_r * | - | 5 | - | ns | $V_{GS}=10V$ |
| Turn-off delay time | $t_{d(off)}$ * | - | 18 | - | ns | $R_L\approx 300\Omega$ |
| Fall time | t_f * | - | 28 | - | ns | $R_G=10\Omega$ |

*Pulsed

● **Body diode characteristics** (Source-Drain) (Ta = 25°C)

<It is the same ratings for Tr1 and Tr2.>

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|-----------------|------------|------|------|------|------|------------------------|
| Forward voltage | V_{SD} * | - | - | 1.2 | V | $I_s=250mA, V_{GS}=0V$ |

*Pulsed

●Electrical characteristic curves

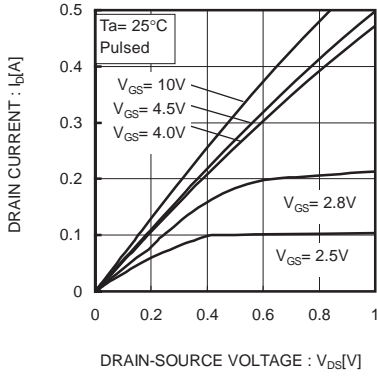


Fig.1 Typical Output Characteristics (I)

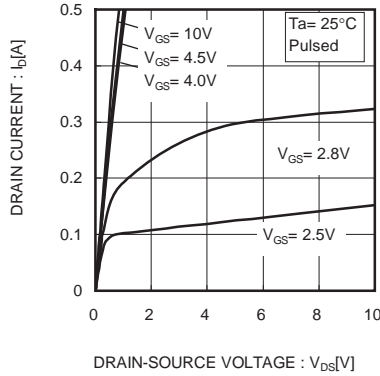


Fig.2 Typical Output Characteristics(II)

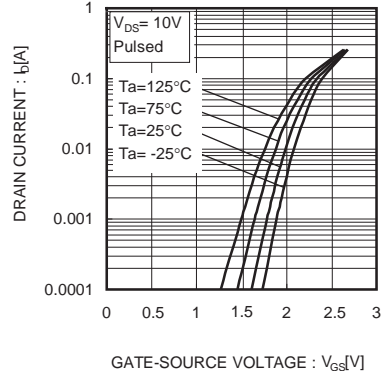


Fig.3 Typical Transfer Characteristics

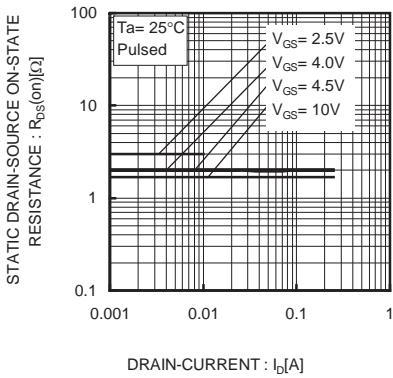


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(I)

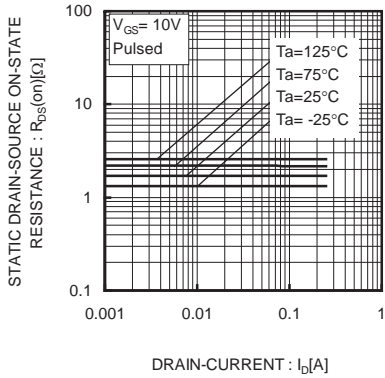


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(II)

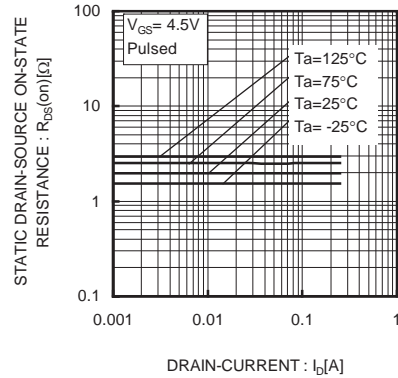


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(III)

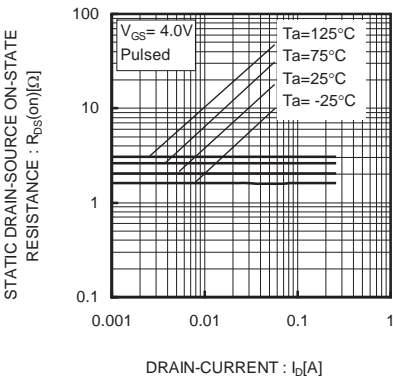


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(IV)

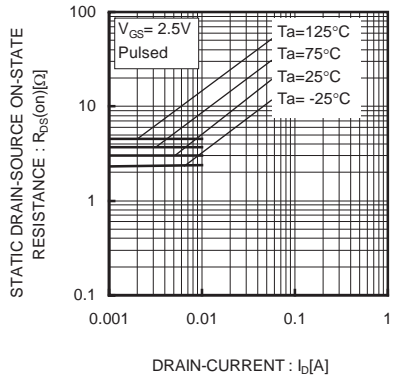


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current(IV)

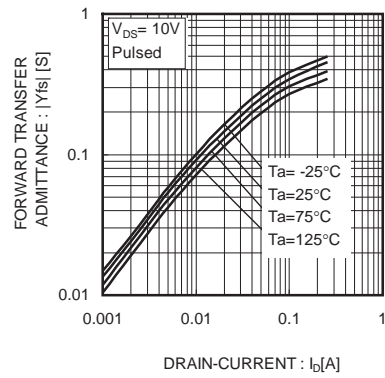


Fig.9 Forward Transfer Admittance vs. Drain Current

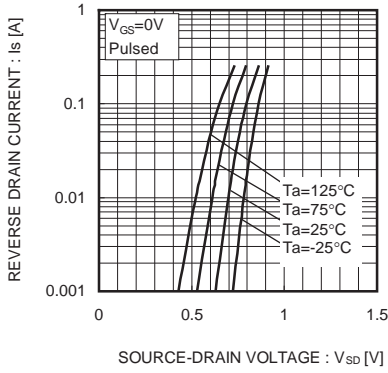


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

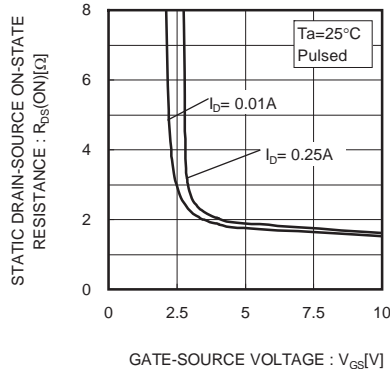


Fig.11 Static Drain-Source On-State Resistance vs. Gate Source Voltage

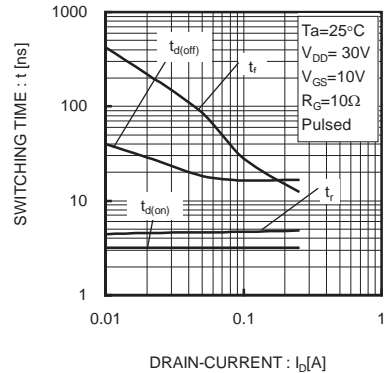


Fig.12 Switching Characteristics

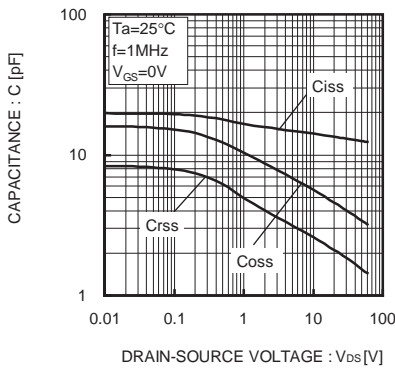


Fig.13 Typical Capacitance vs. Drain-Source Voltage

●Measurement circuits

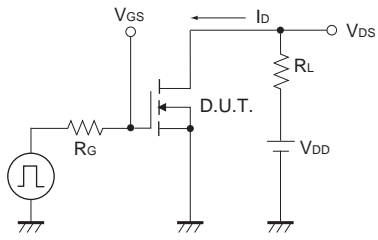


Fig.1-1 Switching time measurement circuit

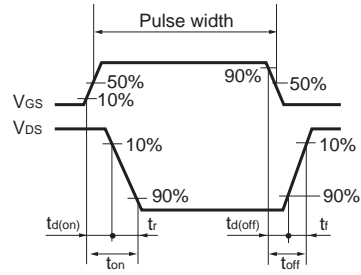


Fig.1-2 Switching waveforms

●Notice

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

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