

1.2V Drive Nch + Nch MOSFET

UM6K33N

●Structure

Silicon N-channel MOSFET

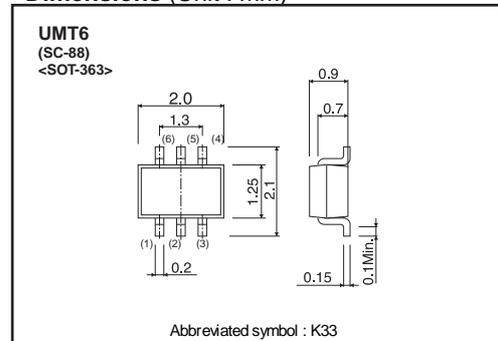
●Features

- 1) High speed switing.
- 2) Small package(UMT6).
- 3) Ultra low voltage drive(1.2V drive).

●Application

Switching

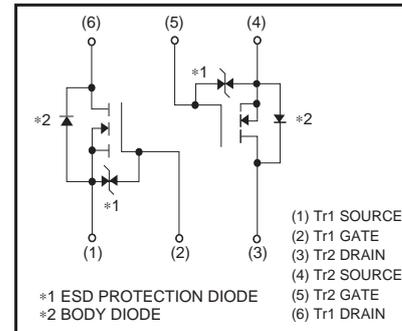
●Dimensions (Unit : mm)



●Packaging specifications

| Type | Package | Taping |
|---------|------------------------------|--------|
| | Code | TN |
| | Basic ordering unit (pieces) | 3000 |
| UM6K33N | | ○ |

●Inner circuit



●Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits | Unit |
|------------------------------|------------|---------------|--------------|
| Drain-source voltage | V_{DSS} | 50 | V |
| Gate-source voltage | V_{GSS} | ± 8 | V |
| Drain current | Continuous | I_D | ± 200 mA |
| | Pulsed | I_{DP}^{*1} | ± 800 mA |
| Source current (Body Diode) | Continuous | I_s | 125 mA |
| | Pulsed | I_{sp}^{*1} | 800 mA |
| 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.

●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 | $V_{GS}=\pm 8V, V_{DS}=0V$ |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 50 | - | - | V | $I_D=1mA, V_{GS}=0V$ |
| Zero gate voltage drain current | I_{DSS} | - | - | 1 | μA | $V_{DS}=50V, V_{GS}=0V$ |
| Gate threshold voltage | $V_{GS(th)}$ | 0.3 | - | 1.0 | V | $V_{DS}=10V, I_D=1mA$ |
| Static drain-source on-state resistance | $R_{DS(on)}$ * | - | 1.6 | 2.2 | Ω | $I_D=200mA, V_{GS}=4.5V$ |
| | | - | 1.7 | 2.4 | | $I_D=200mA, V_{GS}=2.5V$ |
| | | - | 1.9 | 2.7 | | $I_D=100mA, V_{GS}=1.8V$ |
| | | - | 2.0 | 4.0 | | $I_D=40mA, V_{GS}=1.5V$ |
| | | - | 2.4 | 7.2 | | $I_D=20mA, V_{GS}=1.2V$ |
| Forward transfer admittance | $ Y_{fs} ^*$ | 0.4 | - | - | S | $I_D=200mA, V_{DS}=10V$ |
| Input capacitance | C_{iss} | - | 25 | - | pF | $V_{DS}=10V$ |
| Output capacitance | C_{oss} | - | 6 | - | pF | $V_{GS}=0V$ |
| Reverse transfer capacitance | C_{rss} | - | 3 | - | pF | $f=1MHz$ |
| Turn-on delay time | $t_{d(on)}$ * | - | 4 | - | ns | $I_D=100mA, V_{DD} \approx 30V$ |
| Rise time | t_r * | - | 6 | - | ns | $V_{GS}=4.5V$ |
| Turn-off delay time | $t_{d(off)}$ * | - | 15 | - | ns | $R_L=300\Omega$ |
| Fall time | t_f * | - | 55 | - | 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 | $I_s=200mA, V_{GS}=0V$ |

*Pulsed

●Electrical characteristic curves

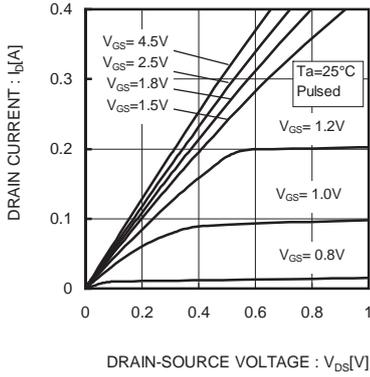


Fig.1 Typical Output Characteristics(I)

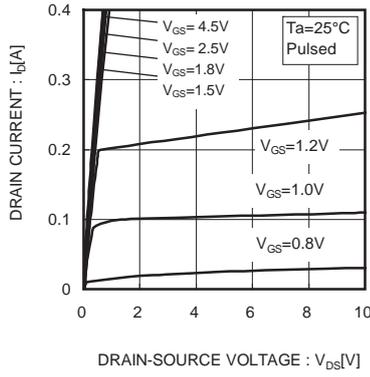


Fig.2 Typical Output Characteristics(II)

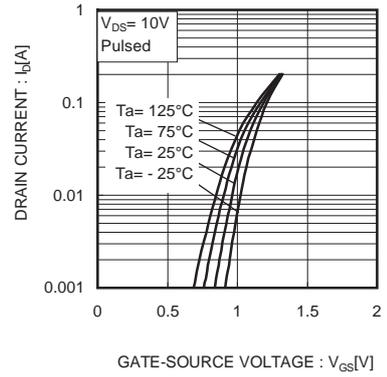


Fig.3 Typical Transfer Characteristics

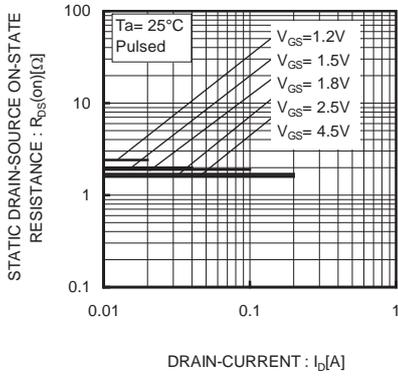


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(I)

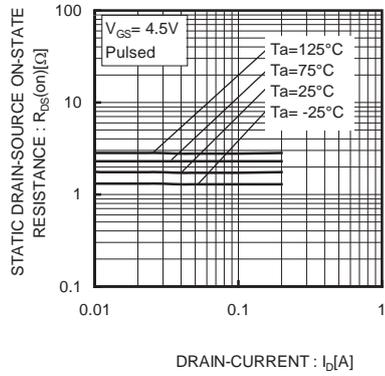


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(II)

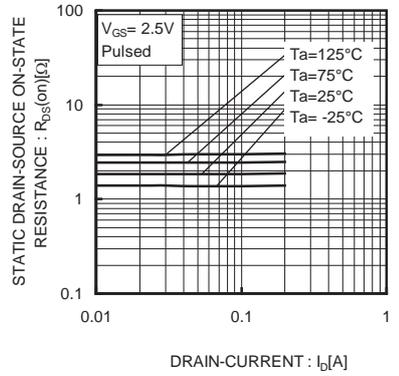


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(III)

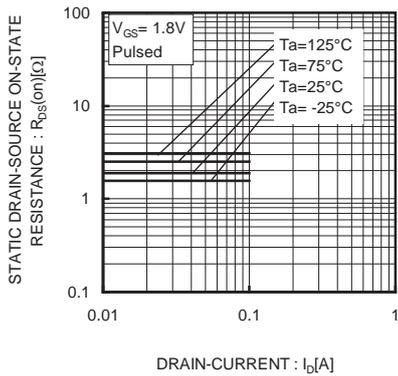


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(IV)

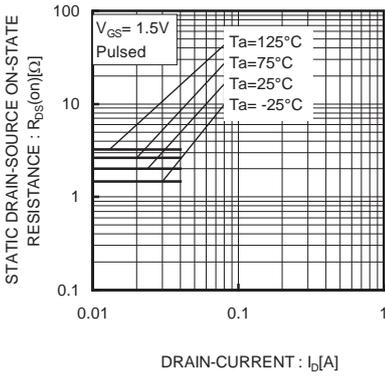


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current(V)

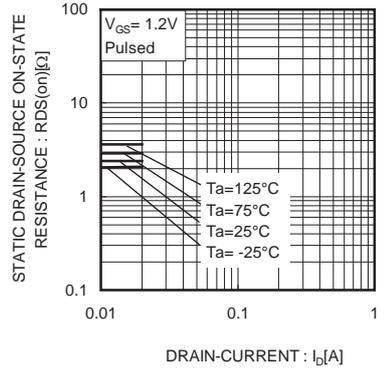


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current(VI)

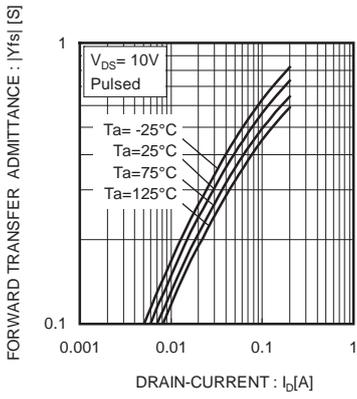


Fig.10 Forward Transfer Admittance vs. Drain Current

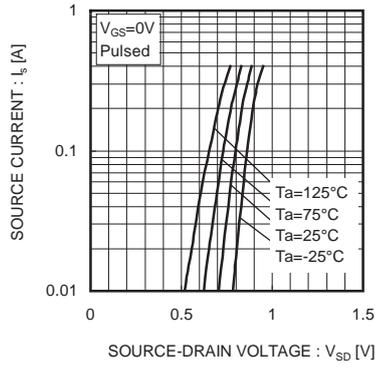


Fig.11 Reverse Drain Current vs. Source-Drain Voltage

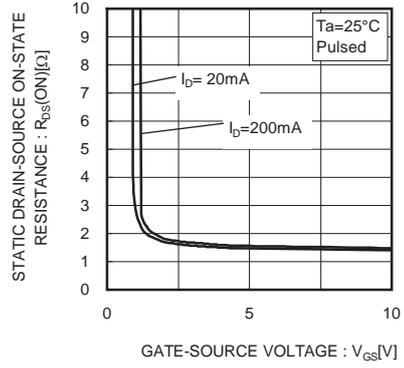


Fig.12 Static Drain-Source On-State Resistance vs. Gate Source Voltage

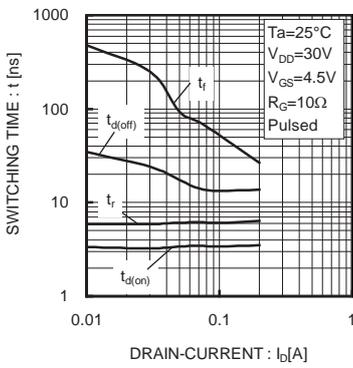


Fig.13 Switching Characteristics

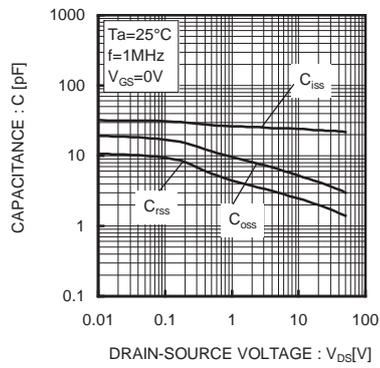


Fig.14 Typical Capacitance vs. Drain-Source Voltage

●Measurement circuits

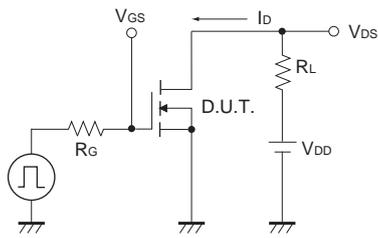


Fig.1-1 Switching time measurement circuit

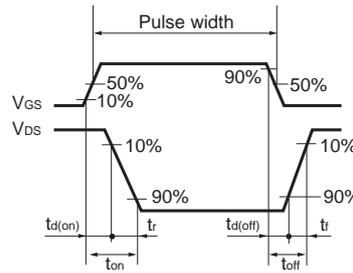


Fig.1-2 Switching waveforms

●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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