

# 1.5V Drive Nch MOSFET

## TT8K1

### ● Structure

Silicon N-channel MOSFET

### ● Features

- 1) Low On-resistance.
- 2) High power package.
- 3) 1.5V drive.

### ● Application

Switching

### ● Packaging specifications

| Type  | Package                      | Taping |
|-------|------------------------------|--------|
|       | Code                         | TR     |
|       | Basic ordering unit (pieces) | 3000   |
| TT8K1 |                              | ○      |

### ● Absolute maximum ratings (Ta = 25°C)

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

| Parameter                    | Symbol     | Limits        | Unit        |
|------------------------------|------------|---------------|-------------|
| Drain-source voltage         | $V_{DSS}$  | 20            | V           |
| Gate-source voltage          | $V_{GSS}$  | $\pm 10$      | V           |
| Drain current                | Continuous | $I_D$         | $\pm 2.5$ A |
|                              | Pulsed     | $I_{DP}^{*1}$ | $\pm 10$ A  |
| Source current (Body Diode)  | Continuous | $I_s$         | 0.8 A       |
|                              | Pulsed     | $I_{sp}^{*1}$ | 10 A        |
| Power dissipation            | $P_D^{*2}$ | 1.25          | W / TOTAL   |
|                              |            | 1.0           | W / 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  $\leq 1\%$

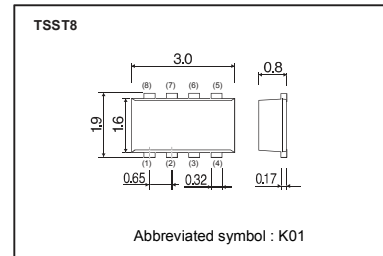
\*2 Mounted on a ceramic board.

### ● Thermal resistance

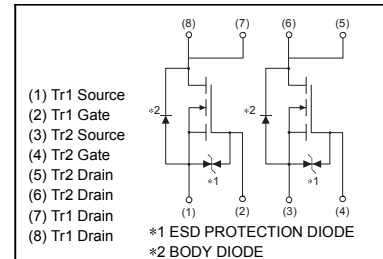
| Parameter          | Symbol           | Limits | Unit             |
|--------------------|------------------|--------|------------------|
| Channel to Ambient | $R_{th}(ch-a)^*$ | 100    | °C / W / TOTAL   |
|                    |                  | 125    | °C / W / ELEMENT |

\*Mounted on a ceramic board.

### ● Dimensions (Unit : mm)



### ● Inner circuit



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

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

| Parameter                               | Symbol         | Min. | Typ. | Max.     | Unit       | Conditions                        |
|---|----------------|------|------|----------|------------|-----------------------------------|
| Gate-source leakage                     | $I_{GSS}$      | -    | -    | $\pm 10$ | $\mu A$    | $V_{GS}=\pm 10V, V_{DS}=0V$       |
| Drain-source breakdown voltage          | $V_{(BR)DSS}$  | 20   | -    | -        | V          | $I_D=1mA, V_{GS}=0V$              |
| Zero gate voltage drain current         | $I_{DSS}$      | -    | -    | 1        | $\mu A$    | $V_{DS}=20V, V_{GS}=0V$           |
| Gate threshold voltage                  | $V_{GS(th)}$   | 0.3  | -    | 1        | V          | $V_{DS}=10V, I_D=1mA$             |
| Static drain-source on-state resistance | $R_{DS(on)}^*$ | -    | 52   | 72       | m $\Omega$ | $I_D=2.5A, V_{GS}=4.5V$           |
|   |                | -    | 65   | 90       |            | $I_D=2.5A, V_{GS}=2.5V$           |
|   |                | -    | 85   | 120      |            | $I_D=1.2A, V_{GS}=1.8V$           |
|   |                | -    | 100  | 140      |            | $I_D=0.5A, V_{GS}=1.5V$           |
| Forward transfer admittance             | $ Y_{fs} ^*$   | 2.7  | -    | -        | S          | $I_D=2.5A, V_{DS}=10V$            |
| Input capacitance                       | $C_{iss}$      | -    | 260  | -        | pF         | $V_{DS}=10V$                      |
| Output capacitance                      | $C_{oss}$      | -    | 65   | -        | pF         | $V_{GS}=0V$                       |
| Reverse transfer capacitance            | $C_{rss}^*$    | -    | 35   | -        | pF         | $f=1MHz$                          |
| Turn-on delay time                      | $t_{d(on)}^*$  | -    | 9    | -        | ns         | $I_D=1.2A, V_{DD}\approx 10V$     |
| Rise time                               | $t_r^*$        | -    | 17   | -        | ns         | $V_{GS}=4.5V$                     |
| Turn-off delay time                     | $t_{d(off)}^*$ | -    | 28   | -        | ns         | $R_L\approx 8.3\Omega$            |
| Fall time                               | $t_f^*$        | -    | 17   | -        | ns         | $R_G=10\Omega$                    |
| Total gate charge                       | $Q_g^*$        | -    | 3.6  | -        | nC         | $I_D=2.5A, V_{DD}\approx 10V$     |
| Gate-source charge                      | $Q_{gs}^*$     | -    | 0.7  | -        | nC         | $V_{GS}=4.5V, R_L\approx 4\Omega$ |
| Gate-drain charge                       | $Q_{gd}^*$     | -    | 0.6  | -        | nC         | $R_G=10\Omega$                    |

\*Pulsed

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

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

| Parameter       | Symbol   | Min. | Typ. | Max. | Unit | Conditions            |
|-----------------|----------|------|------|------|------|-----------------------|
| Forward Voltage | $V_{SD}$ | -    | -    | 1.2  | V    | $I_S=2.5A, V_{GS}=0V$ |

\*Pulsed

● Electrical characteristic curves

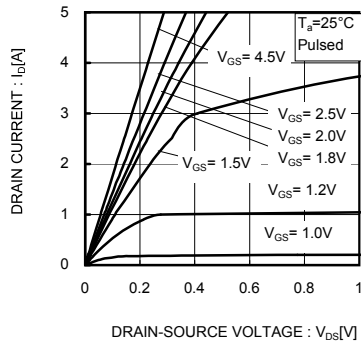


Fig.1 Typical Output Characteristics( I )

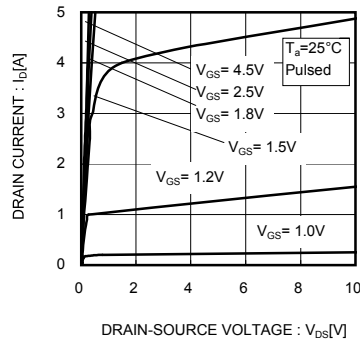


Fig.2 Typical Output Characteristics( II )

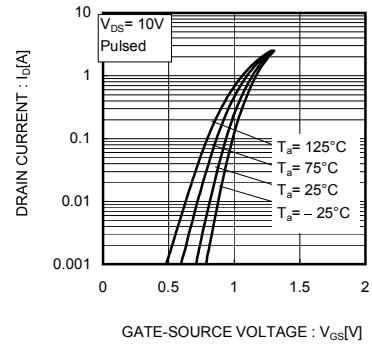


Fig.3 Typical Transfer Characteristics

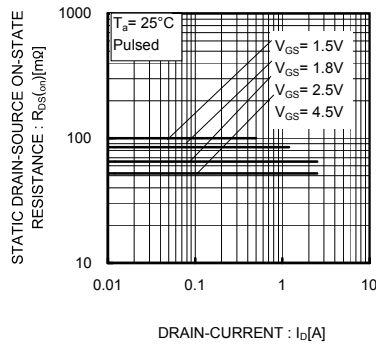


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( I )

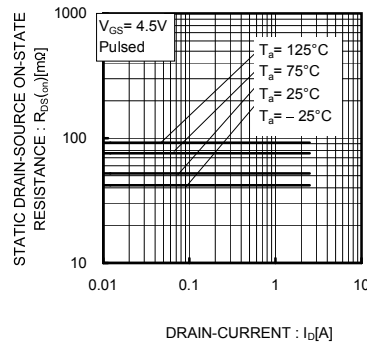


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current( II )

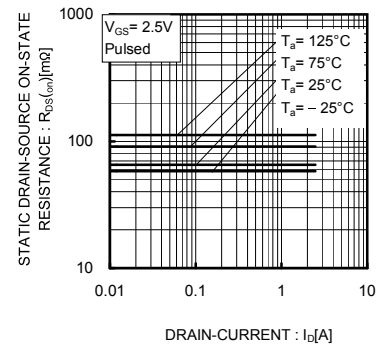


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current( III )

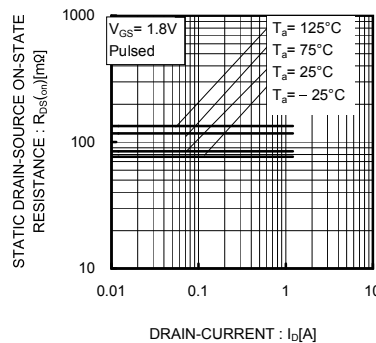


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current( IV )

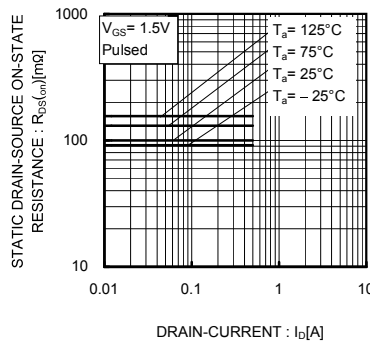


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current( V )

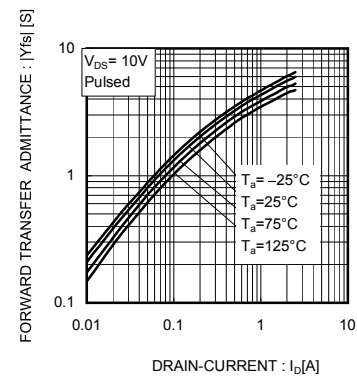


Fig.9 Forward Transfer Admittance vs. Drain Current

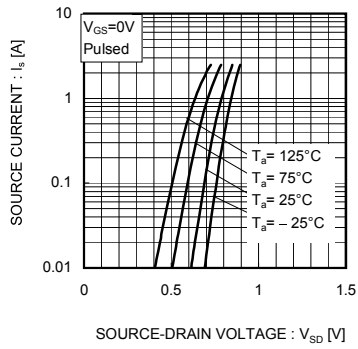


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

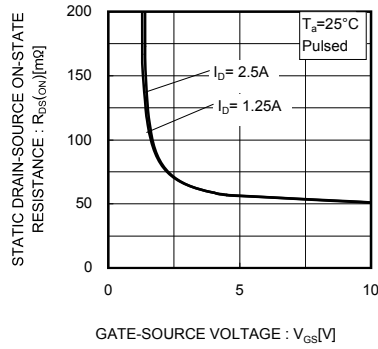


Fig.11 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

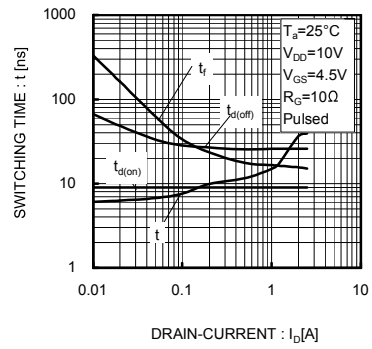


Fig.12 Switching Characteristics

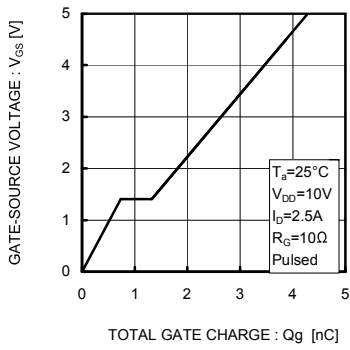


Fig.13 Dynamic Input Characteristics

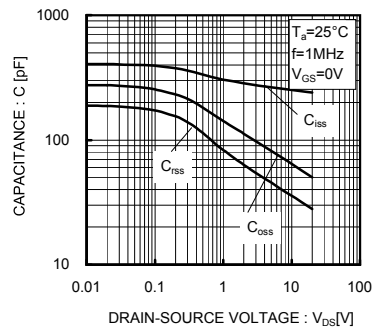


Fig.14 Typical Capacitance vs. Drain-Source Voltage

● Measurement circuits

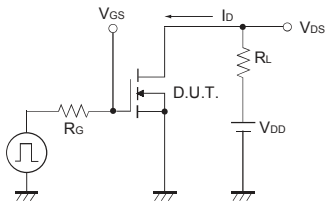


Fig.1-1 Switching time measurement circuit

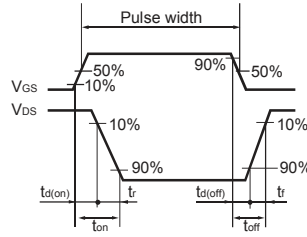


Fig.1-2 Switching waveforms

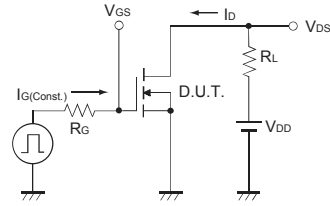


Fig.2-1 Gate charge measurement circuit

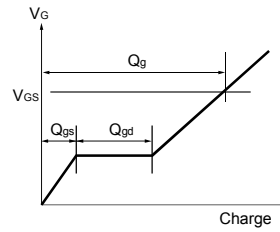


Fig.2-2 Gate Charge Waveform

● 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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