# 4V Drive Nch + Nch MOSFET

## SH8K15

### ● Structure
Silicon N-channel MOSFET

### ● Features
1) Low on-resistance.
2) Built-in G-S Protection Diode.
3) Small Surface Mount Package (SOP8).

### ● Application
Switching

### ● Packaging specifications

| | | |
|---|---|---|
| Type | Package | Taping |
| | Code | TB |
| | Basic ordering unit (pieces) | 2500 |
| SH8K15 | | O |

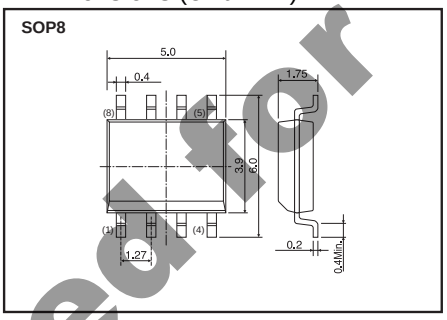
### ● Absolute maximum ratings (Ta = 25°C)

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DSS}$ | 30 | V |
| Gate-source voltage | | $V_{GSS}$ | ±20 | V |
| Drain current | Continuous | $I_D$ | ±9.0 | A |
| | Pulsed | $I_{DP}$ *1 | ±36 | A |
| Source current (Body Diode) | Continuous | $I_S$ | 1.6 | A |
| | Pulsed | $I_{SP}$ *1 | 36 | A |
| Power dissipation | | $P_D$ *2 | 2.0 | W / TOTAL |
| | | | 1.4 | W / ELEMENT |
| Channel temperature | | Tch | 150 | °C |
| Range of storage temperature | | Tstg | −55 to +150 | °C |

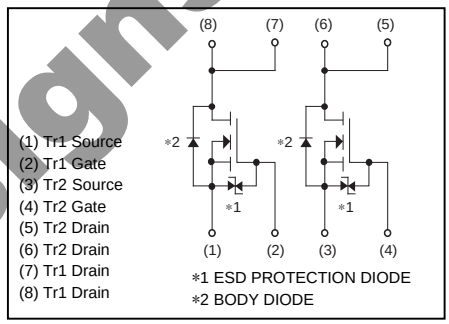
*1 Pw≤10μs, Duty cycle≤1%

*2 Mounted on a ceramic board.

### ● 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 | $V_{GS}$=±20V, $V_{DS}$=0V |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 30 | - | - | V | $I_D$=1mA, $V_{GS}$=0V |
| Zero gate voltage drain current | $I_{DSS}$ | - | - | 1 | μA | $V_{DS}$=30V, $V_{GS}$=0V |
| Gate threshold voltage | $V_{GS\ (th)}$ | 1.0 | - | 2.5 | V | $V_{DS}$=10V, $I_D$=1mA |
| Static drain-source on-state resistance | $R_{DS\ (on)}$ * | - | 15 | 21 | mΩ | $I_D$=9.0A, $V_{GS}$=10V |
| | | - | 18 | 25 | | $I_D$=9.0A, $V_{GS}$=4.5V |
| | | - | 20 | 28 | | $I_D$=9.0A, $V_{GS}$=4.0V |
| Forward transfer admittance | $\|Y_{fs}\|$* | 5.0 | - | - | S | $I_D$=9.0A, $V_{DS}$=10V |
| Input capacitance | $C_{iss}$ | - | 630 | - | pF | $V_{DS}$=10V |
| Output capacitance | $C_{oss}$ | - | 230 | - | pF | $V_{GS}$=0V |
| Reverse transfer capacitance | $C_{rss}$ | - | 110 | - | pF | f=1MHz |
| Turn-on delay time | $t_{d(on)}$* | - | 10 | - | ns | $I_D$=4.5A, $V_{DD}$≒15V |
| Rise time | $t_r$ * | - | 33 | - | ns | $V_{GS}$=10V |
| Turn-off delay time | $t_{d(off)}$* | - | 42 | - | ns | $R_L$=3.3Ω |
| Fall time | $t_f$ * | - | 10 | - | ns | $R_G$=10Ω |
| Total gate charge | $Q_g$ * | - | 8.5 | - | nC | $I_D$=9A |
| Gate-source charge | $Q_{gs}$ * | - | 2.3 | - | nC | $V_{DD}$≒15V |
| Gate-drain charge | $Q_{gd}$ * | - | 4.0 | - | nC | $V_{GS}$=5V |

*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 | $I_s$=9.0A, $V_{GS}$=0V |

*Pulsed

## ●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (Ⅰ)

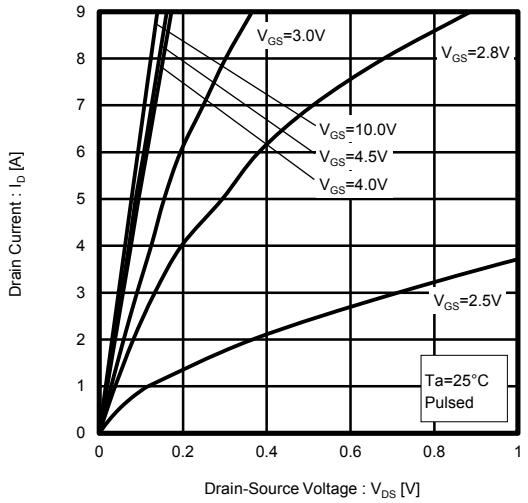



Fig.2 Typical Output Characteristics (Ⅱ)

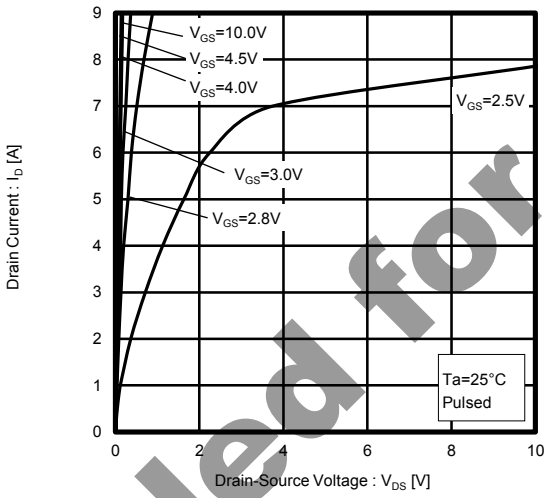



Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

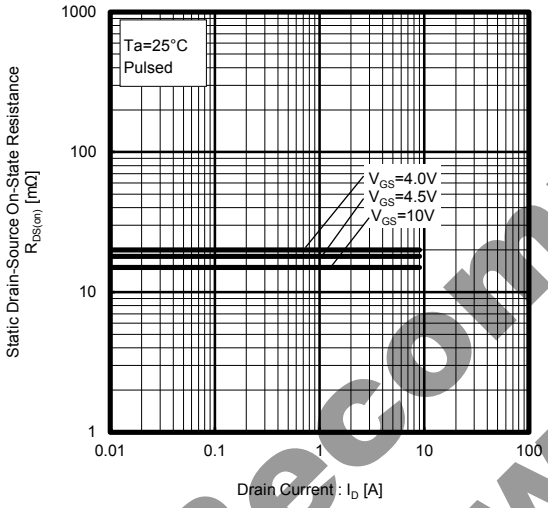



Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

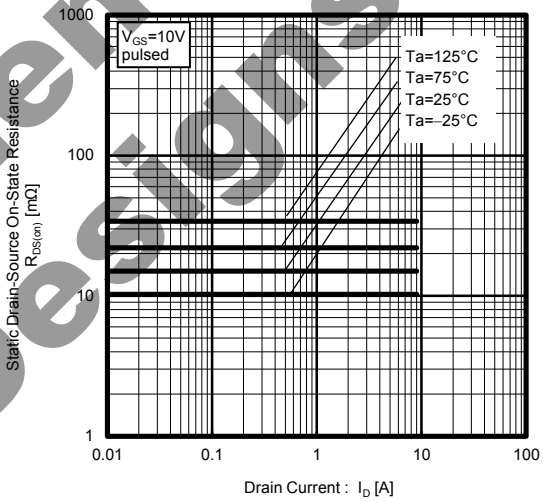



Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

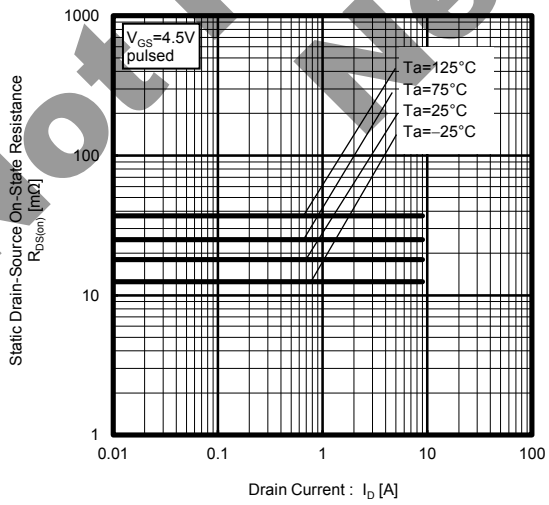



Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

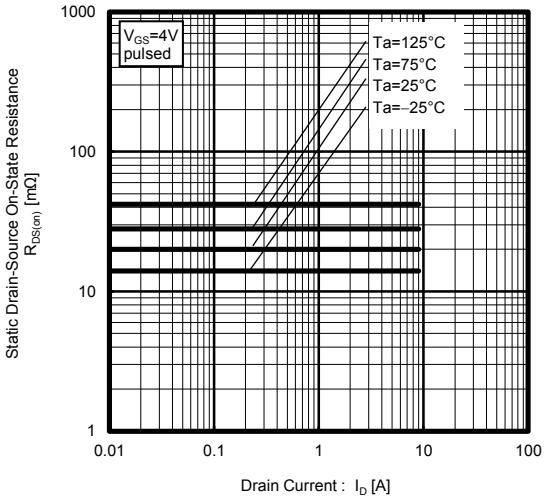


Fig.7 Forward Transfer Admittance vs. Drain Current

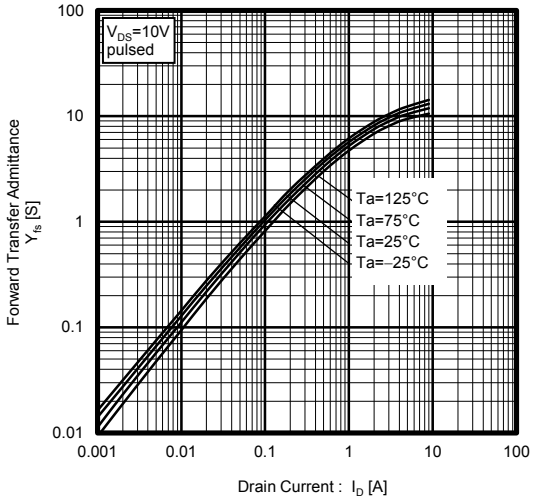



Fig.8 Typical Transfer Characteristics

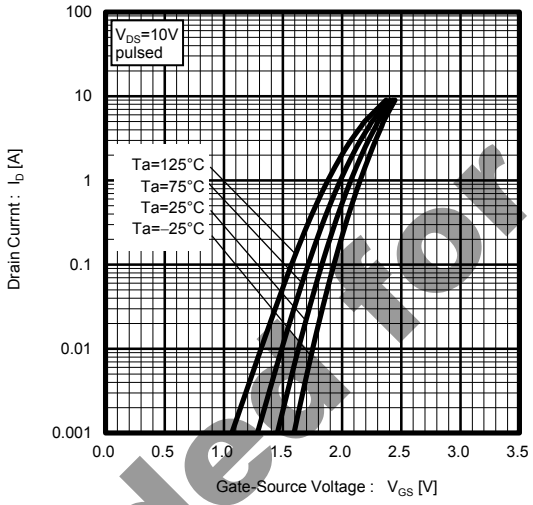



Fig.9 Source Current vs. Source-Drain Voltage

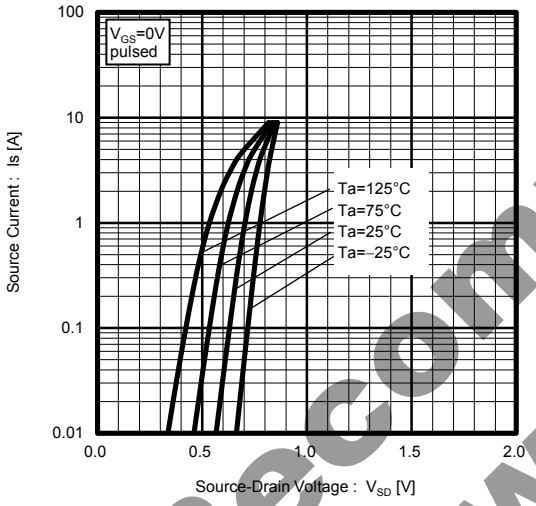



Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

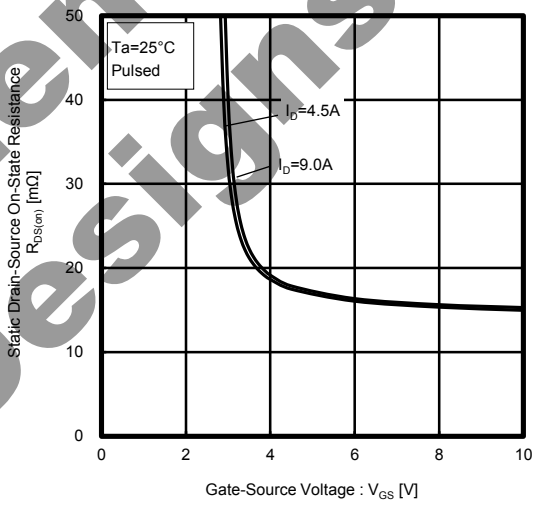



Fig.11 Switching Characteristics

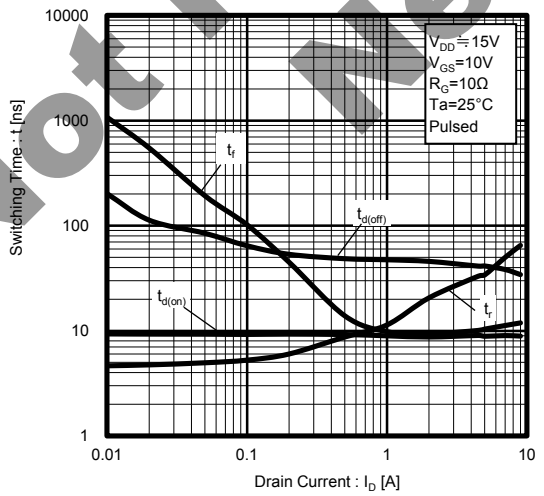



Fig.12 Dynamic Input Characteristics

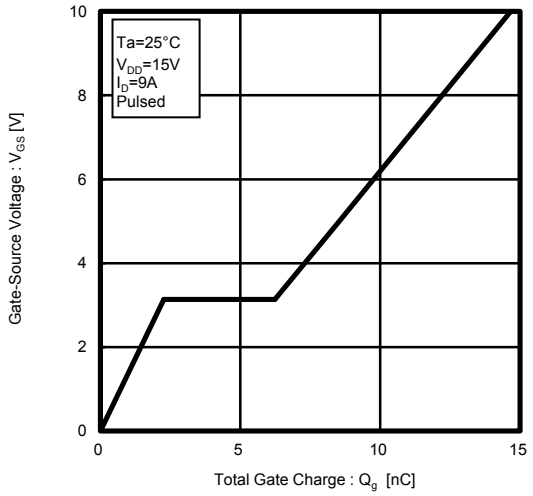


FIg.13 Typical Capacitance vs. Drain-Source Voltage

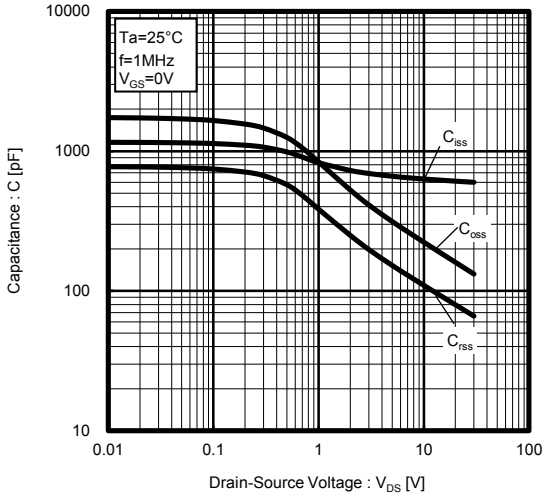



Fig.14 Maximum Safe Operating Area

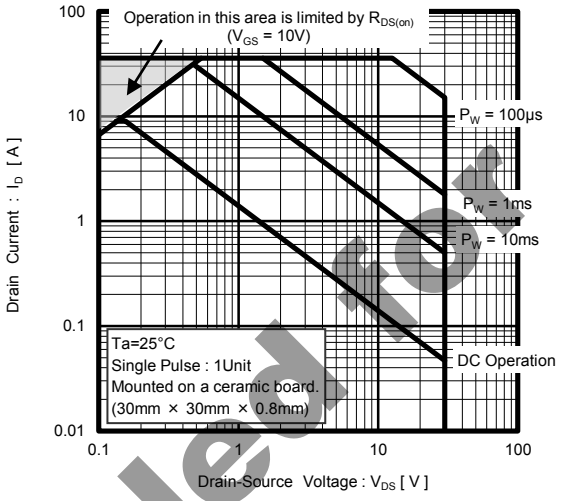
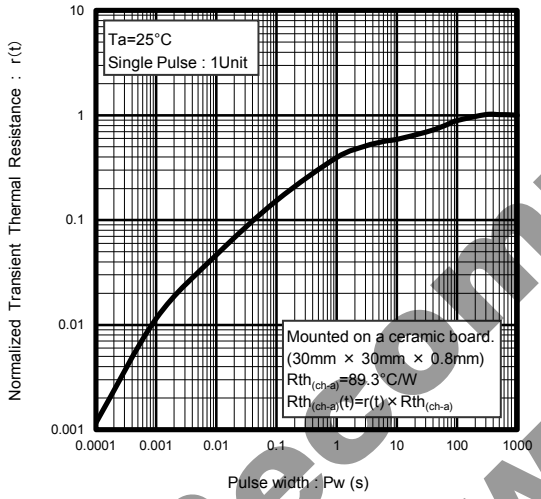



FIg.15 Normalized Transient Thermal Resistance v.s. Pulse Width



● **Measurement circuits**

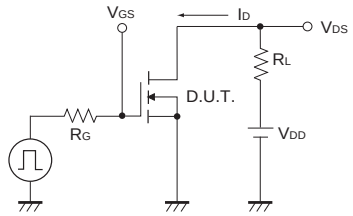



Fig.1-1 Switching Time Measurement Circuit

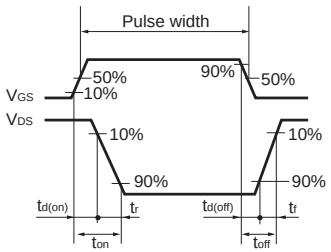



Fig.1-2 Switching Waveforms

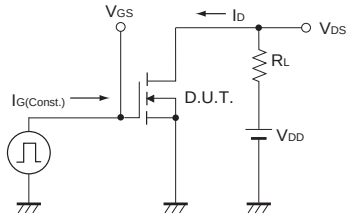



Fig.2-1 Gate Charge Measurement Circuit

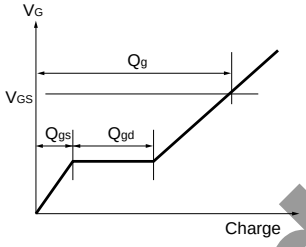



Fig.2-2 Gate Charge Waveform

● **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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