



THE DATASHEET OF MP6K12TCR



4V Drive Nch + Nch MOSFET

MP6K12

● Structure

Silicon N-channel MOSFET

● Features

- 1) Low on-resistance.
- 2) High power package(MPT6).
- 3) Low voltage drive(4V drive).

● Application

Switching

● Packaging specifications

| Type | Package | Taping |
|--------|------------------------------|--------|
| | Code | TCR |
| | Basic ordering unit (pieces) | 1000 |
| MP6K12 | | ○ |

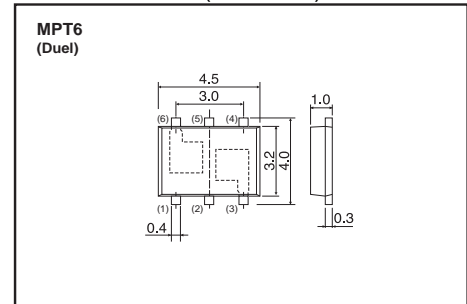
● Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits | Unit |
|--------------------------------|------------|-------------|-------------|
| Drain-source voltage | V_{DSS} | 30 | V |
| Gate-source voltage | V_{GSS} | ± 20 | V |
| Drain current | Continuous | I_D | ± 5 A |
| | Pulsed | I_{DP} *1 | ± 12 A |
| Source current (Body Diode) | Continuous | I_s | 1.6 A |
| | Pulsed | I_{sp} *1 | 12 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 |

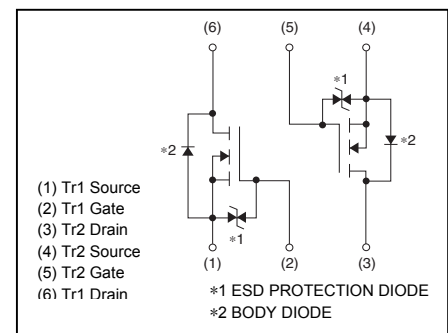
*1 $P_w \leq 10\mu s$, Duty cycle $\leq 1\%$

*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 | $V_{GS}=\pm 20V, V_{DS}=0V$ |
| 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 | $R_{DS(on)}^*$ | – | 30 | 42 | mΩ | $I_D=5.0A, V_{GS}=10V$ |
| | | – | 40 | 56 | | $I_D=5.0A, V_{GS}=4.5V$ |
| | | – | 45 | 63 | | $I_D=5.0A, V_{GS}=4.0V$ |
| Forward transfer admittance | $ Y_{fs} ^*$ | 2.5 | – | – | S | $I_D=5.0A, V_{DS}=10V$ |
| Input capacitance | C_{iss} | – | 250 | – | pF | $V_{DS}=10V$ |
| Output capacitance | C_{oss} | – | 90 | – | pF | $V_{GS}=0V$ |
| Reverse transfer capacitance | C_{rss} | – | 45 | – | pF | $f=1MHz$ |
| Turnon delay time | $t_{d(on)}^*$ | – | 6 | – | ns | $I_D=2.5A, V_{DD}=15V$ |
| Rise time | t_r^* | – | 27 | – | ns | $V_{GS}=10V$ |
| Turnoff delay time | $t_{d(off)}^*$ | – | 26 | – | ns | $R_L=6.0\Omega$ |
| Fall time | t_f^* | – | 5 | – | ns | $R_G=10\Omega$ |
| Total gate charge | Q_g^* | – | 4.0 | – | nC | $I_D=5.0A, V_{DD}=15V$ |
| Gate-source charge | Q_{gs}^* | – | 1.2 | – | nC | $V_{GS}=5V$ |
| Gate-drain charge | Q_{gd}^* | – | 1.2 | – | nC | |

*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 | $I_S=5.0A, V_{GS}=0V$ |

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (I)

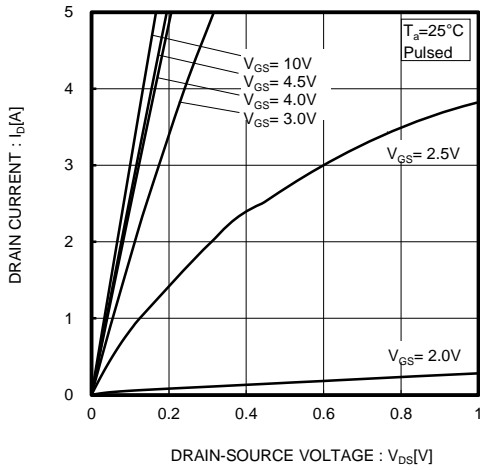


Fig.2 Typical Output Characteristics (II)

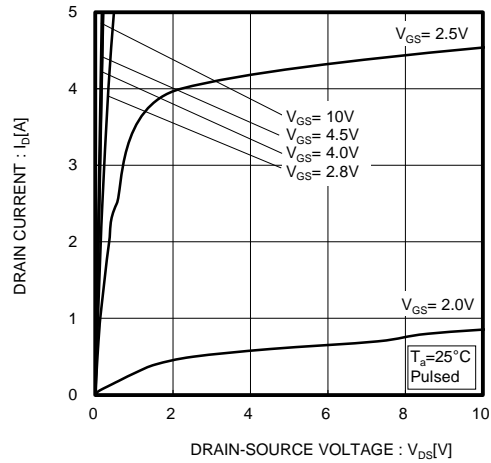


Fig.3 Typical Transfer Characteristics

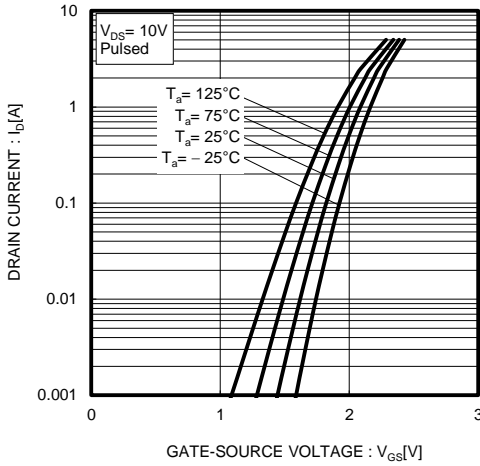


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current (I)

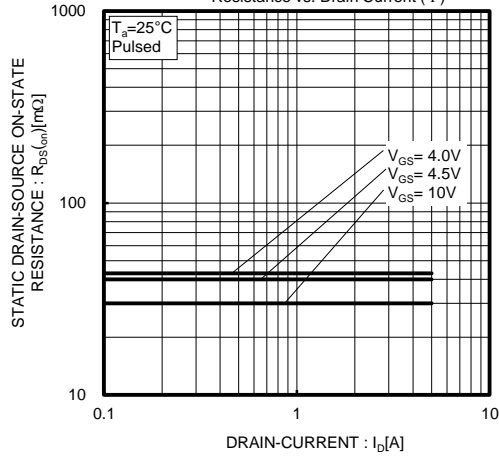


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current (II)

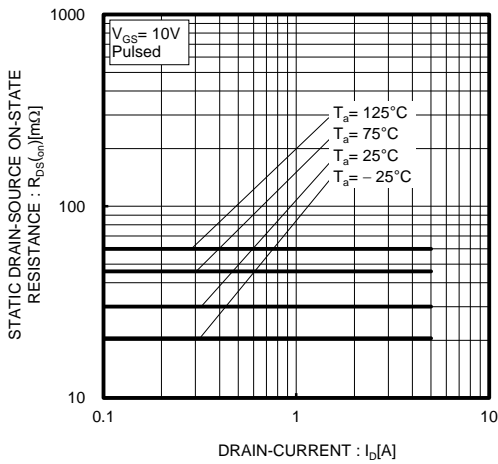


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current (III)

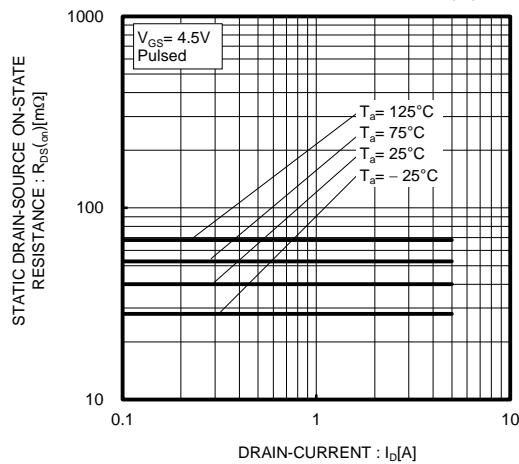


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (IV)

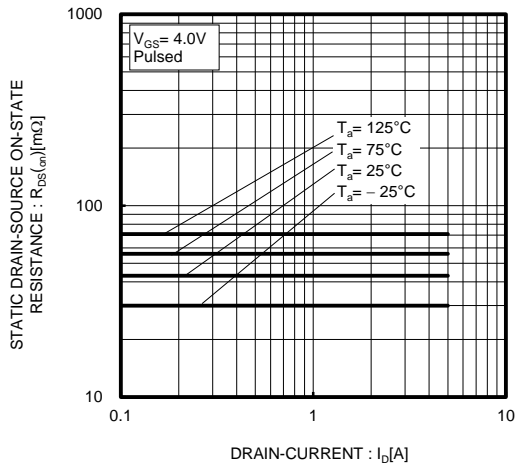


Fig.8 Forward Transfer Admittance vs. Drain Current

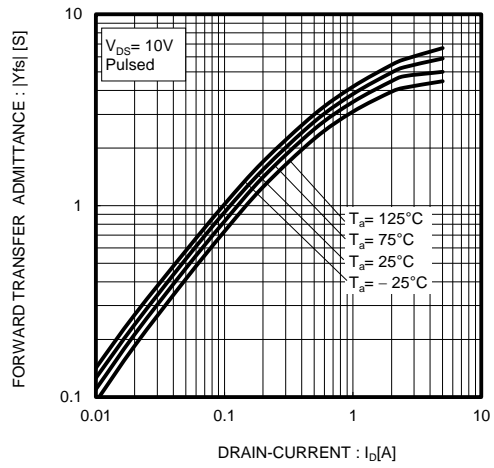


Fig.9 Reverse Drain Current vs. Source-Drain Voltage

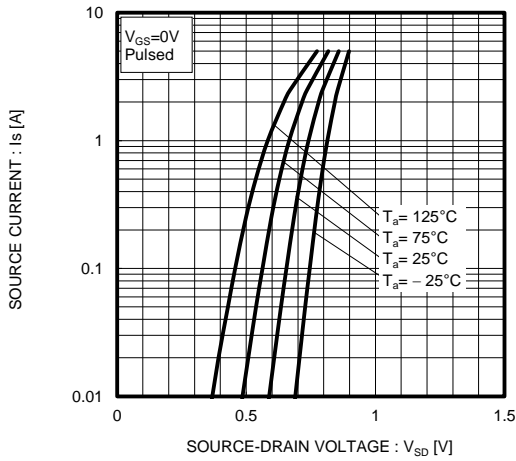


Fig.10 Static Drain-Source On-State Resistance vs. Gate Source Voltage

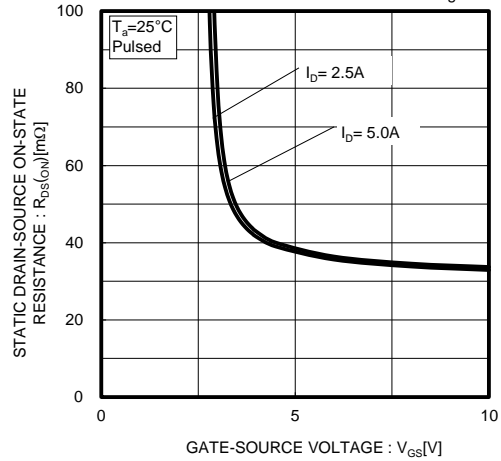


Fig.11 Switching Characteristics

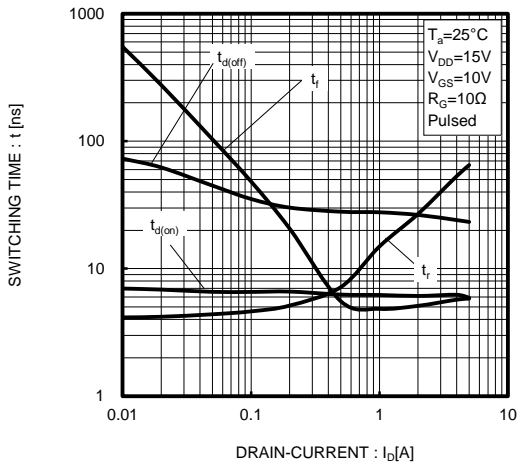


Fig.12 Dynamic Input Characteristics

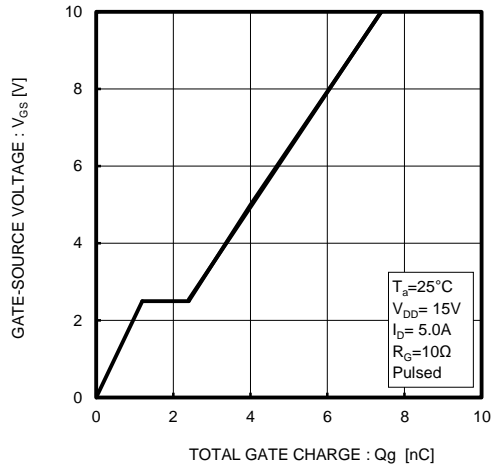


Fig.13 Typical Capacitance vs. Drain-Source Voltage

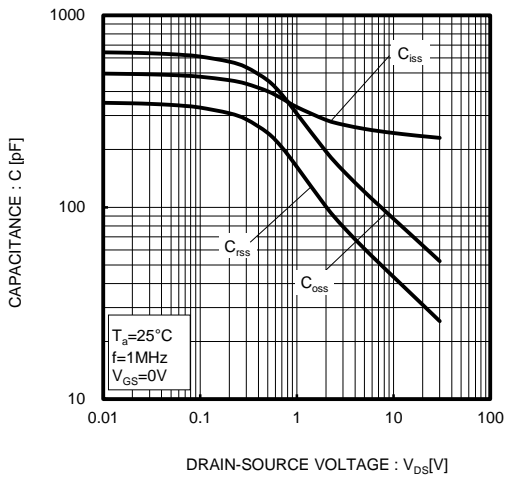


Fig.14 Maximum Safe Operating Area

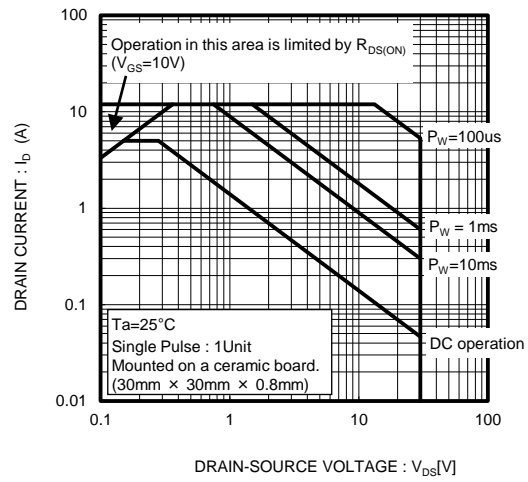
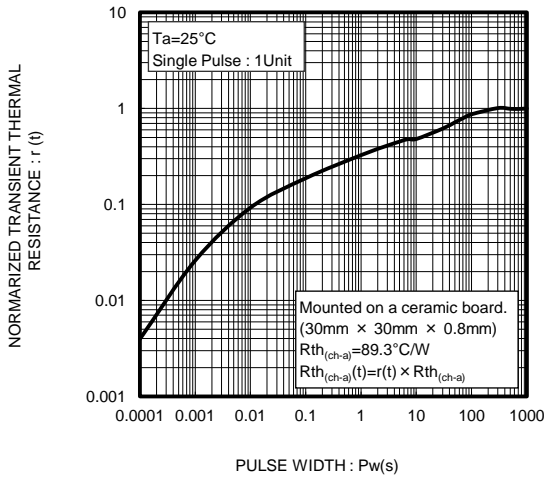


Fig.15 Normalized Transient Thermal Resistance vs. Pulse Width



● Measurement circuits

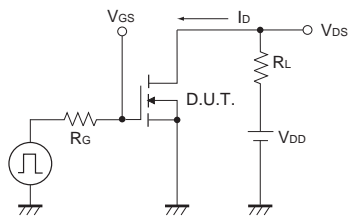


Fig.1-1 Switching Time Measurement Circuit

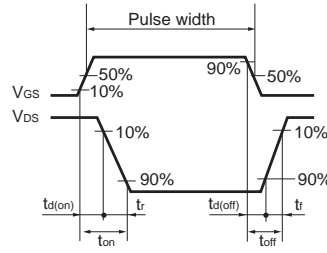


Fig.1-2 Switching Waveforms

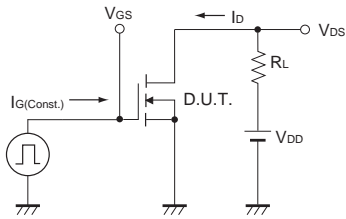


Fig.2-1 Gate Charge Measurement Circuit

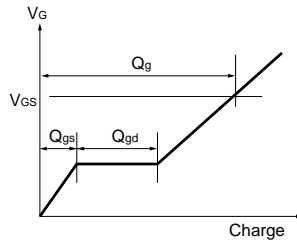


Fig.2-2 Gate Charge Waveform

● Notice

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

Notes

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