

4V Drive Pch MOSFET

RSD140P06

● Structure

Silicon P-channel MOSFET

● Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Drive circuits can be simple.
- 4) Parallel use is easy.

● Application

Switching

● Packaging specifications

| Type | Package | Taping |
|-----------|------------------------------|--------|
| | Code | TL |
| | Basic ordering unit (pieces) | 2500 |
| RSD140P06 | | ○ |

● Absolute maximum ratings (T_a = 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 | ±14 | A |
| | Pulsed | I _{DP} *1 | ±28 | A |
| Source current (Body Diode) | Continuous | I _S | -14 | A |
| | Pulsed | I _{SP} *1 | -28 | A |
| Power dissipation | P _D *2 | 20 | W | |
| Channel temperature | T _{ch} | 150 | °C | |
| Range of storage temperature | T _{stg} | -55 to +150 | °C | |

*1 Pw ≤ 10μs, Duty cycle ≤ 1%

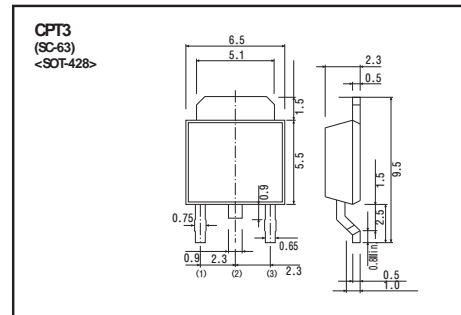
*2 T_c = 25°C

● Thermal resistance

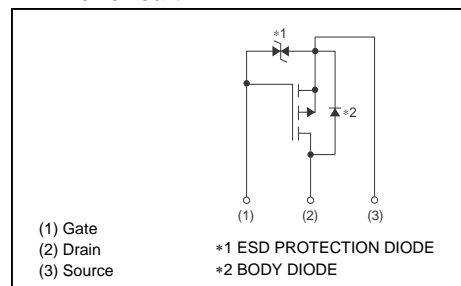
| Parameter | Symbol | Limits | Unit |
|-----------------|-------------------------|--------|--------|
| Channel to Case | R _{th(ch-c)} * | 6.25 | °C / W |

* T_c = 25°C

● Dimensions (Unit : mm)



● Inner circuit



●Electrical characteristics ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|----------------|------|------|----------|---------------|--|
| Gate-source leakage | I_{GSS} | - | - | ± 10 | μA | $V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$ |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | -60 | - | - | V | $I_D=-1\text{mA}$, $V_{GS}=0\text{V}$ |
| Zero gate voltage drain current | I_{DSS} | - | - | -1 | μA | $V_{DS}=-60\text{V}$, $V_{GS}=0\text{V}$ |
| Gate threshold voltage | $V_{GS(th)}$ | -1.0 | - | -3.0 | V | $V_{DS}=-10\text{V}$, $I_D=-1\text{mA}$ |
| Static drain-source on-state resistance | $R_{DS(on)}^*$ | - | 60 | 84 | m Ω | $I_D=-14\text{A}$, $V_{GS}=-10\text{V}$ |
| | | - | 73 | 103 | | $I_D=-14\text{A}$, $V_{GS}=-4.5\text{V}$ |
| | | - | 77 | 108 | | $I_D=-14\text{A}$, $V_{GS}=-4.0\text{V}$ |
| Forward transfer admittance | $ Y_{fs} ^*$ | 10 | - | - | S | $I_D=-14\text{A}$, $V_{DS}=-10\text{V}$ |
| Input capacitance | C_{iss} | - | 1900 | - | pF | $V_{DS}=-10\text{V}$ |
| Output capacitance | C_{oss} | - | 200 | - | pF | $V_{GS}=0\text{V}$ |
| Reverse transfer capacitance | C_{rss} | - | 100 | - | pF | $f=1\text{MHz}$ |
| Turn-on delay time | $t_{d(on)}^*$ | - | 20 | - | ns | $I_D=-7.0\text{A}$, $V_{DD}=-30\text{V}$ |
| Rise time | t_r^* | - | 45 | - | ns | $V_{GS}=-10\text{V}$ |
| Turn-off delay time | $t_{d(off)}^*$ | - | 240 | - | ns | $R_L=4.3\Omega$ |
| Fall time | t_f^* | - | 110 | - | ns | $R_G=10\Omega$ |
| Total gate charge | Q_g^* | - | 27 | - | nC | $V_{DD}=-30\text{V}$ |
| Gate-source charge | Q_{gs}^* | - | 4.5 | - | nC | $I_D=-14\text{A}$, |
| Gate-drain charge | Q_{gd}^* | - | 5.0 | - | nC | $V_{GS}=-10\text{V}$ |

*Pulsed

●Body diode characteristics (Source-Drain) ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|-----------------|------------|------|------|------|------|--|
| Forward Voltage | V_{SD}^* | - | - | -1.2 | V | $I_s=-14\text{A}$, $V_{GS}=0\text{V}$ |

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (I)

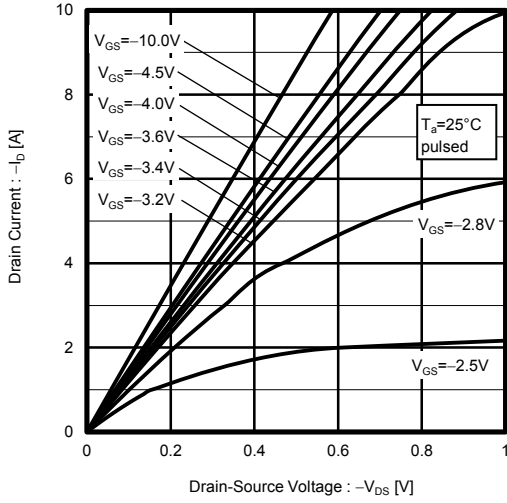


Fig.2 Typical Output Characteristics (II)

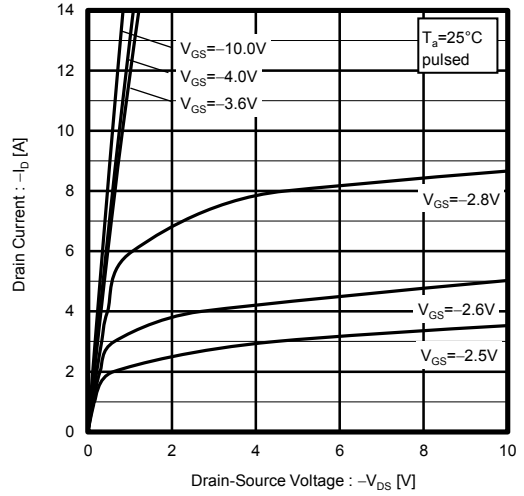


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

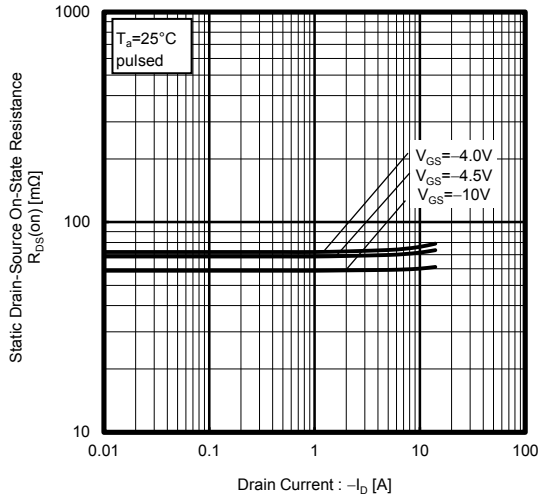


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

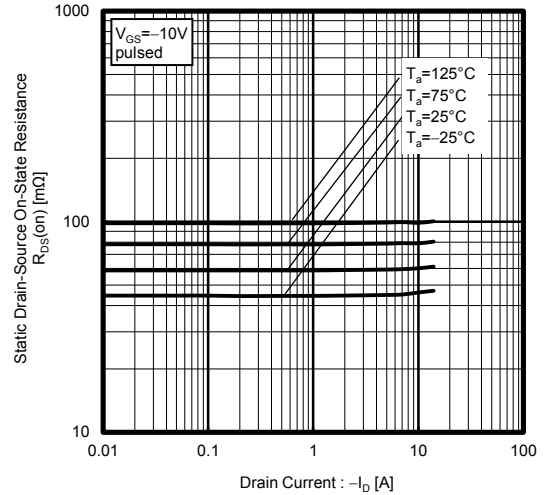


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

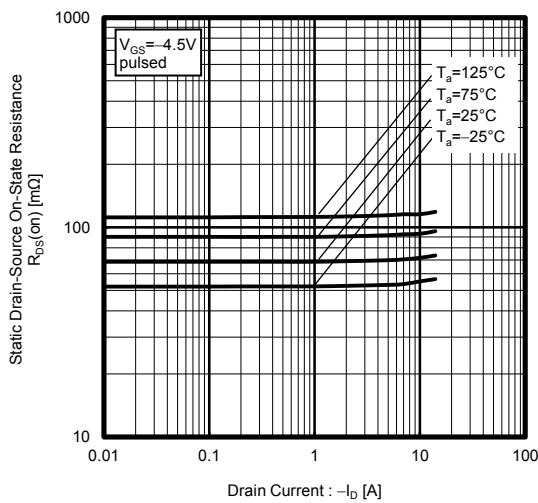


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

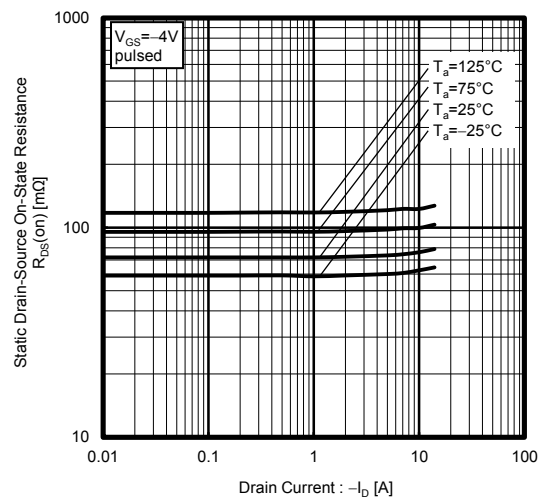


Fig.7 Forward Transfer Admittance vs. Drain Current

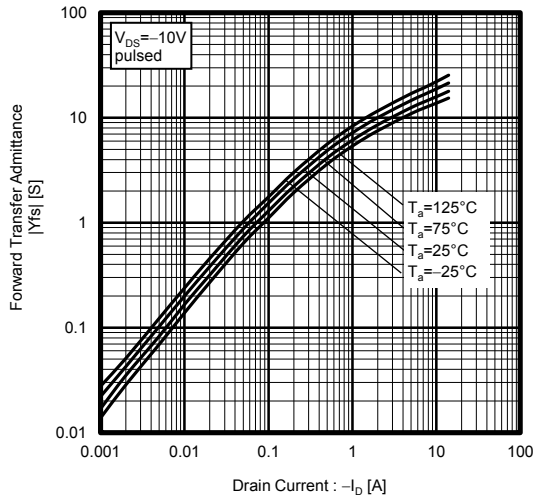


Fig.8 Typical Transfer Characteristics

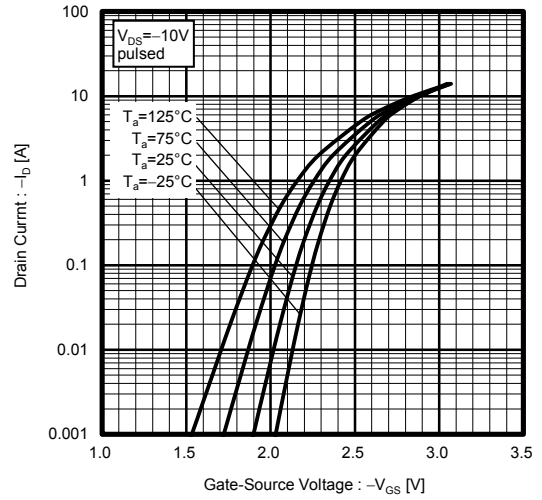


Fig.9 Source Current vs. Source-Drain Voltage

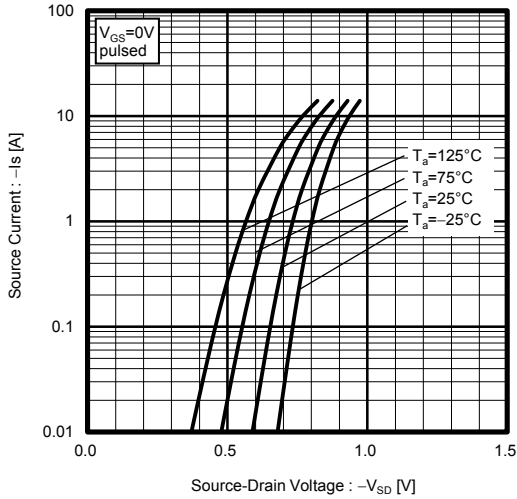


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

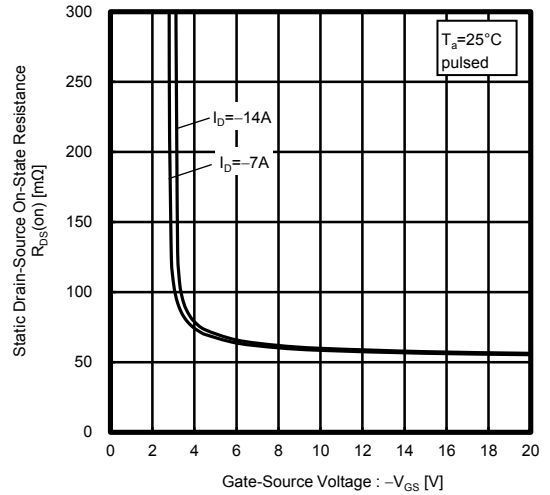


Fig.11 Switching Characteristics

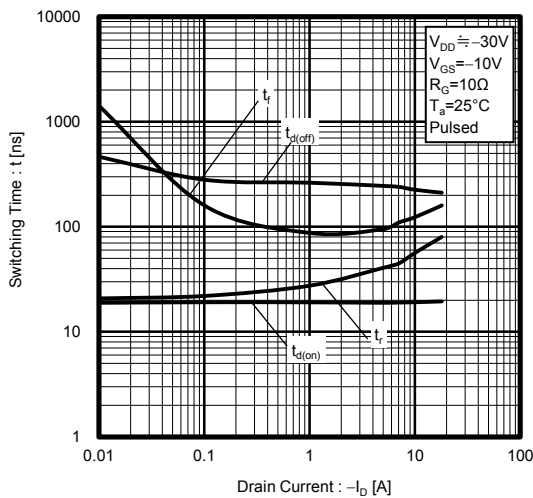


Fig.12 Dynamic Input Characteristics

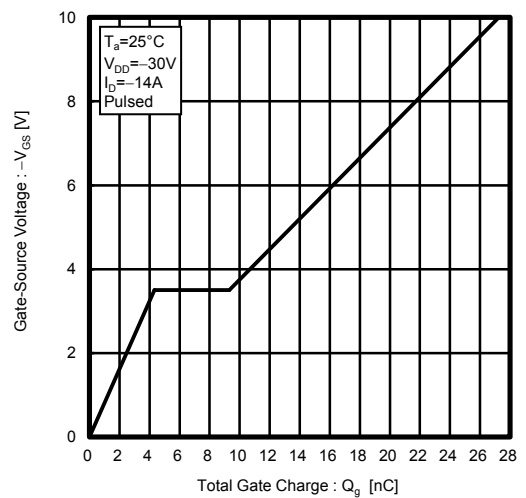


Fig.13 Typical Capacitance vs. Drain-Source Voltage

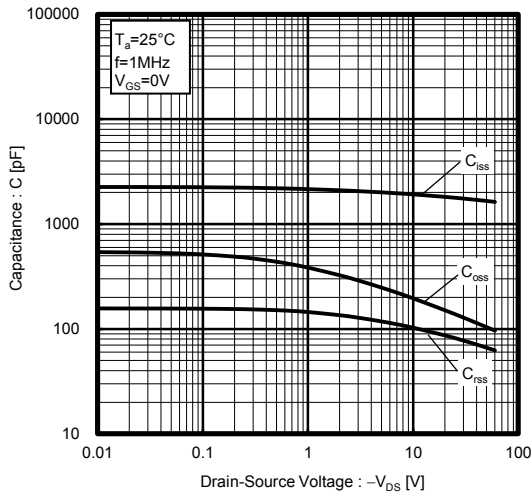


Fig.14 Maximum Safe Operating Area

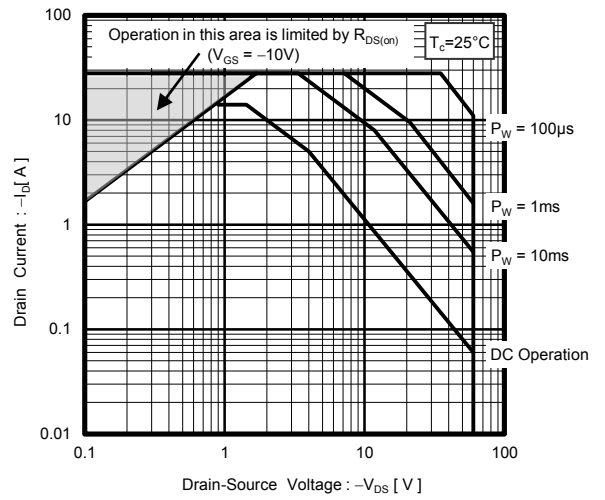
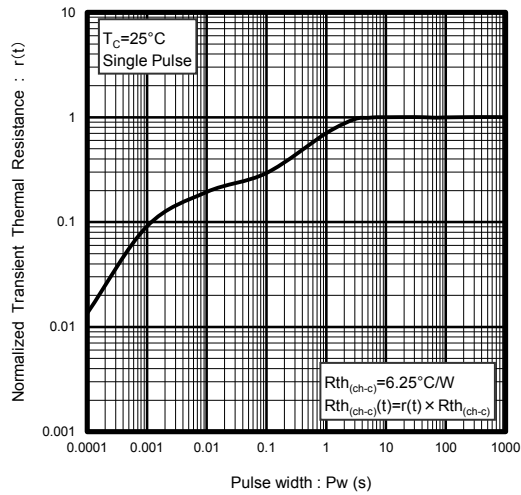


Fig.15 Normalized Transient Thermal Resistance v.s. Pulse Width



● Measurement circuits

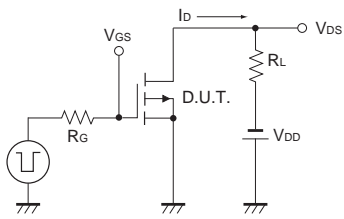


Fig.1-1 Switching Time Measurement Circuit

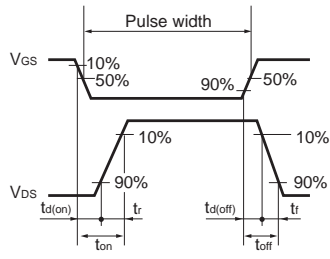


Fig.1-2 Switching Waveforms

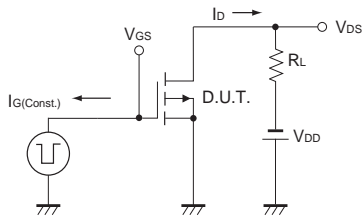


Fig.2-1 Gate Charge Measurement Circuit

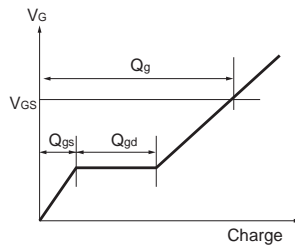


Fig.2-2 Gate Charge Waveform

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