

10V Drive Nch MOSFET

R5205CND

● Structure

Silicon N-channel MOSFET

● Features

- 1) Low resistance.
- 2) High speed switching.

● Application

Switching

● Packaging specifications

| Type | Package | Taping |
|----------|------------------------------|--------|
| | Code | TL |
| | Basic ordering unit (pieces) | 2500 |
| R5205CND | | ○ |

● Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits | Unit | |
|-----------------------------------|-------------|-------------|----------|---|
| Drain-source voltage | V_{DSS} | 525 | V | |
| Gate-source voltage | V_{GSS} | ± 30 | V | |
| Drain current | Continuous | I_D *1 | ± 5 | A |
| | Pulsed | I_{DP} *2 | ± 20 | A |
| Source current (Body Diode) | Continuous | I_S *1 | 5 | A |
| | Pulsed | I_{SP} *2 | 20 | A |
| Avalanche current | I_{AS} *3 | 2.5 | A | |
| Avalanche energy | E_{AS} *3 | 1.6 | mJ | |
| Total power dissipation (Tc=25°C) | P_D | 40 | W | |
| Channel temperature | Tch | 150 | °C | |
| Range of storage temperature | Tstg | -55 to +150 | °C | |

*1 Limited only by maximum temperature allowed.

*2 $P_w \leq 10 \mu s$ Duty Cycle $\leq 1\%$

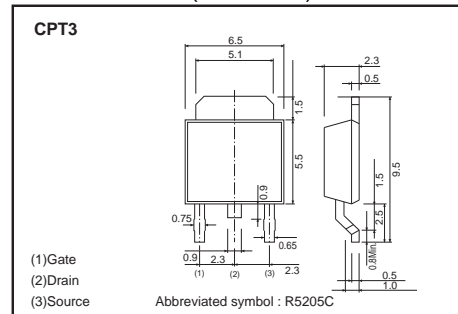
*3 $L = 500 \mu H$, $V_{DD} = 50V$, $R_g = 25 \Omega$ STARTING Tch=25°C

● Thermal resistance

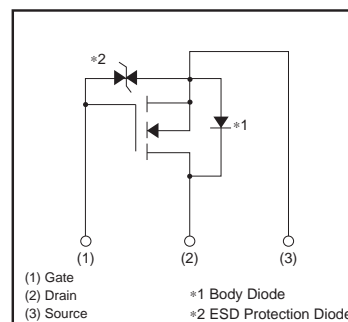
| Parameter | Symbol | Limits | Unit |
|-----------------|------------------|--------|--------|
| Channel to case | $R_{th}(ch-c)^*$ | 3.13 | °C / W |

* Limited only by maximum temperature allowed.

● Dimensions (Unit : mm)



● Inner circuit



● Electrical characteristics (Ta = 25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|----------------|------|------|------|------|-----------------------------|
| Gate-source leakage | I_{GSS} | - | - | ±10 | μA | $V_{GS}=\pm 25V, V_{DS}=0V$ |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 525 | - | - | V | $I_D=1mA, V_{GS}=0V$ |
| Zero gate voltage drain current | I_{DSS} | - | - | 100 | μA | $V_{DS}=525V, V_{GS}=0V$ |
| Gate threshold voltage | $V_{GS(th)}$ | 2.5 | - | 4.5 | V | $V_{DS}=10V, I_D=1mA$ |
| Static drain-source on-state resistance | $R_{DS(on)}$ * | - | 1.3 | 1.6 | Ω | $I_D=2.5A, V_{GS}=10V$ |
| Forward transfer admittance | $ Y_{fs} $ * | 1.5 | 2.5 | - | S | $V_{DS}=10V, I_D=2.5A$ |
| Input capacitance | C_{iss} | - | 320 | - | pF | $V_{DS}=25V$ |
| Output capacitance | C_{oss} | - | 180 | - | pF | $V_{GS}=0V$ |
| Reverse transfer capacitance | C_{rss} | - | 15 | - | pF | $f=1MHz$ |
| Turn-on delay time | $t_{d(on)}$ * | - | 20 | - | ns | $V_{DD}=250V, I_D=2.5A$ |
| Rise time | t_r * | - | 25 | - | ns | $V_{GS}=10V$ |
| Turn-off delay time | $t_{d(off)}$ * | - | 40 | - | ns | $R_L=100\Omega$ |
| Fall time | t_f * | - | 20 | - | ns | $R_G=10\Omega$ |
| Total gate charge | Q_g * | - | 10.8 | - | nC | $V_{DD}=250V, I_D=5A$ |
| Gate-source charge | Q_{gs} * | - | 3.2 | - | nC | $V_{GS}=10V, R_L=50\Omega$ |
| Gate-drain charge | Q_{gd} * | - | 4.4 | - | nC | $R_G=10\Omega$ |

*Pulsed

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|-----------------|------------|------|------|------|------|---------------------|
| Forward voltage | V_{SD} * | - | - | 1.5 | V | $I_s=5A, V_{GS}=0V$ |

*Pulsed

●Electrical characteristic curves

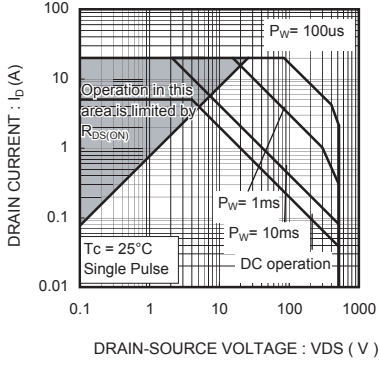


Fig.1 Maximum Safe Operating Area

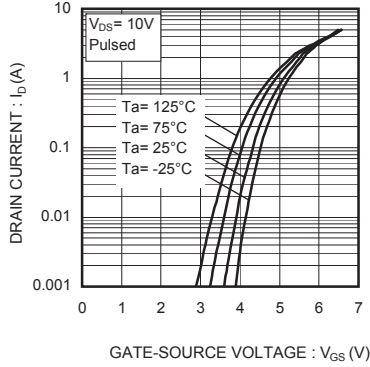


Fig.2 Typical Transfer Characteristics

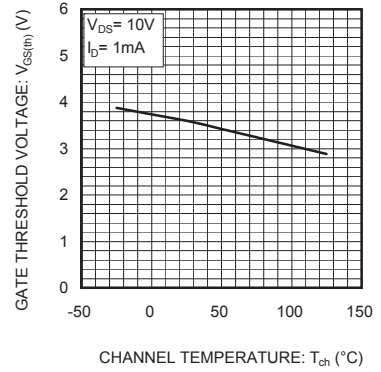


Fig.3 Gate Threshold Voltage vs. Channel Temperature

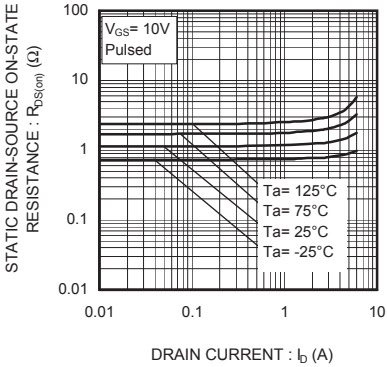


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

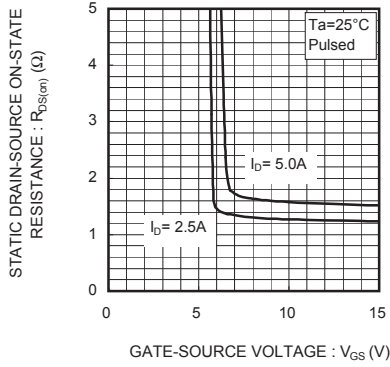


Fig.5 Static Drain-Source On-State Resistance vs. Gate Source

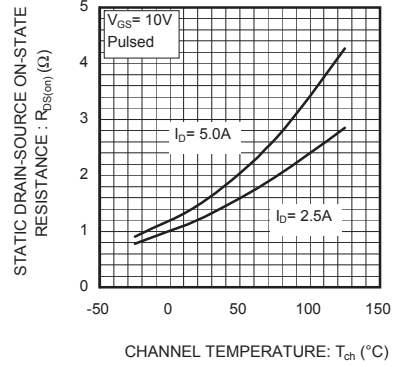


Fig.6 Static Drain-Source On-State Resistance vs. Channel

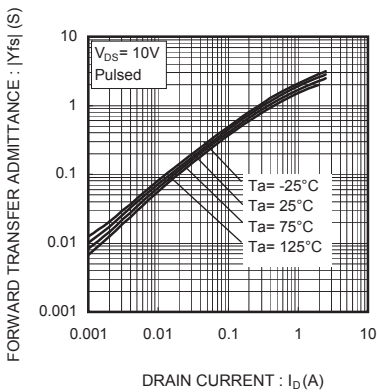


Fig.7 Forward Transfer Admittance vs. Drain Current

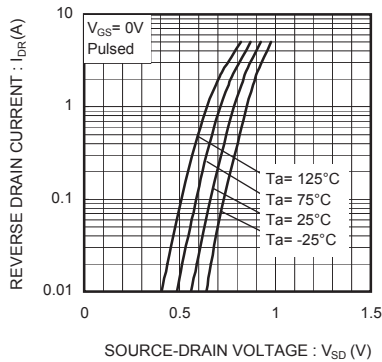


Fig.8 Reverse Drain Current vs. Source-Drain Voltage

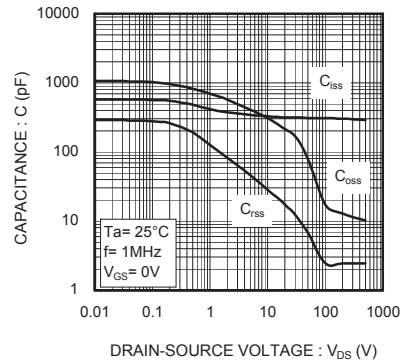


Fig.9 Typical Capacitance vs. Drain-Source Voltage

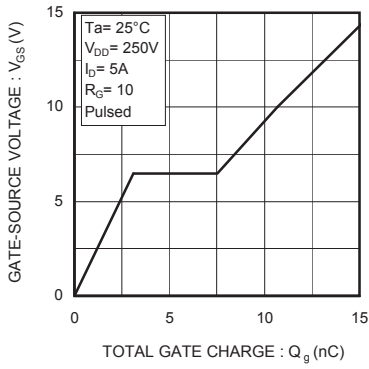


Fig.10 Dynamic Input Characteristics

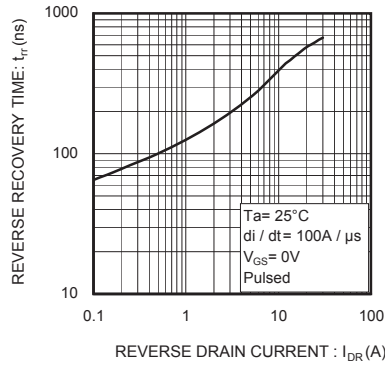


Fig.11 Reverse Recovery Time vs. Reverse Drain Current

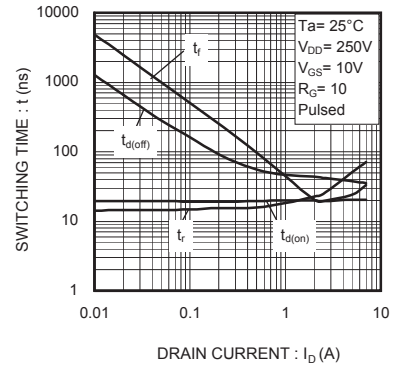


Fig.12 Switching Characteristics

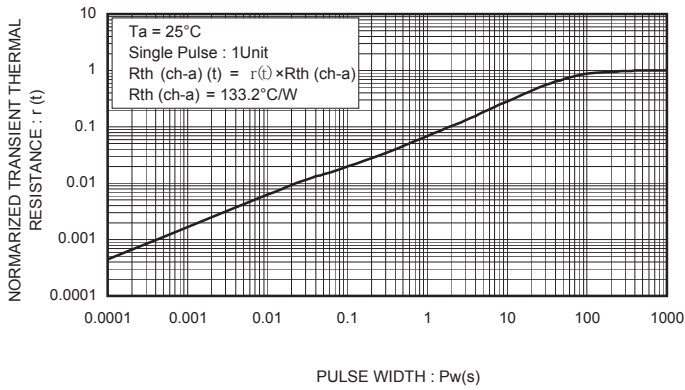


Fig.13 Normalized Transient Thermal Resistance vs. Pulse Width

● Measurement circuits

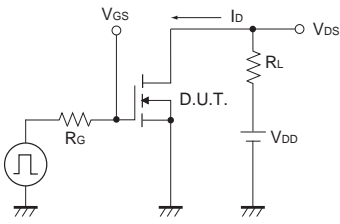


Fig.1-1 Switching time measurement circuit

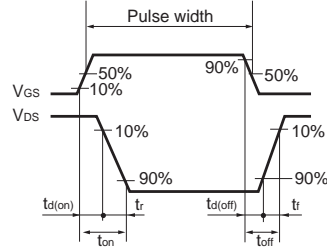


Fig.1-2 Switching waveforms

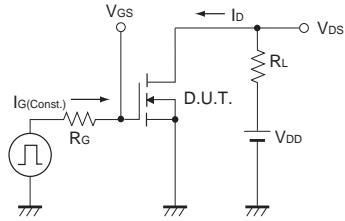


Fig.2-1 Gate charge measurement circuit

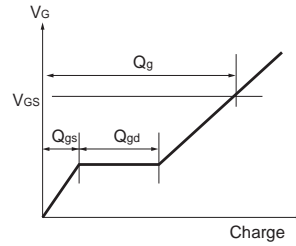


Fig.2-2 Gate charge waveform

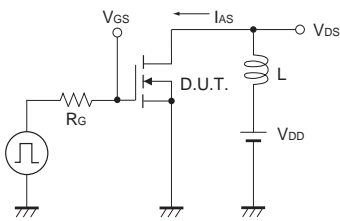


Fig.3-1 Avalanche Measurement circuit

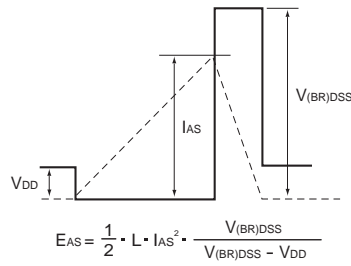


Fig.3-2 Avalanche waveform

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