

10V Drive Nch MOSFET

RDD020N60

● Structure

Silicon N-channel MOSFET

● Features

- 1) Low on-resistance.
- 2) High-speed switching.
- 3) Wide range of SOA.
- 4) Drive circuits can be simple.
- 5) Parallel use is easy.

● Application

Switching

● Packaging specifications

| Type | Package | Taping |
|-----------|------------------------------|--------|
| | Code | TL |
| | Basic ordering unit (pieces) | 2500 |
| RDD020N60 | | ○ |

● Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits | Unit | |
|--------------------------------|-------------|-------------|------|---|
| Drain-source voltage | V_{DSS} | 600 | V | |
| Gate-source voltage | V_{GSS} | ±30 | V | |
| Drain current | Continuous | I_D *3 | ±2 | A |
| | Pulsed | I_{DP} *1 | ±6 | A |
| Source current (Body Diode) | Continuous | I_S *3 | 2 | A |
| | Pulsed | I_{SP} *1 | 6 | A |
| Avalanche current | I_{AS} *2 | 2 | A | |
| Avalanche energy | E_{AS} *2 | 1 | mJ | |
| Power dissipation | P_D *4 | 20 | W | |
| 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 $L = 500 \mu H$, $V_{DD} = 50V$, $R_G = 25 \Omega$, $T_{ch} = 25^\circ C$

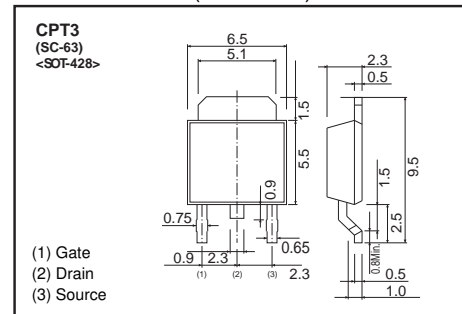
*3 Limited only by maximum temperature allowed

*4 $T_C = 25^\circ C$

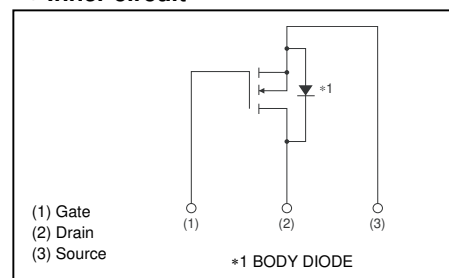
● Thermal resistance

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

● Dimensions (Unit : mm)



● Inner circuit



●Electrical characteristics (Ta = 25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|----------------|------|------|------|------|------------------------------|
| Gate-source leakage | I_{GSS} | - | - | ±100 | nA | $V_{GS}=\pm 30V, V_{DS}=0V$ |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 600 | - | - | V | $I_D=1mA, V_{GS}=0V$ |
| Zero gate voltage drain current | I_{DSS} | - | - | 100 | μA | $V_{DS}=600V, V_{GS}=0V$ |
| Gate threshold voltage | $V_{GS(th)}$ | 2.5 | - | 4.7 | V | $V_{DS}=10V, I_D=1mA$ |
| Static drain-source on-state resistance | $R_{DS(on)}^*$ | - | 5.1 | 6.5 | Ω | $I_D=1A, V_{GS}=10V$ |
| Forward transfer admittance | $ Y_{fs} ^*$ | 0.5 | - | - | S | $V_{DS}=10V, I_D=1A$ |
| Input capacitance | C_{iss} | - | 175 | - | pF | $V_{DS}=25V$ |
| Output capacitance | C_{oss} | - | 25 | - | pF | $V_{GS}=0V$ |
| Reverse transfer capacitance | C_{rss} | - | 3 | - | pF | $f=1MHz$ |
| Turn-on delay time | $t_{d(on)}^*$ | - | 17 | - | ns | $V_{DD}\approx 300V, I_D=1A$ |
| Rise time | t_r^* | - | 14 | - | ns | $V_{GS}=10V$ |
| Turn-off delay time | $t_{d(off)}^*$ | - | 25 | - | ns | $R_L=300\Omega$ |
| Fall time | t_f^* | - | 53 | - | ns | $R_G=10\Omega$ |
| Total gate charge | Q_g^* | - | 7.0 | - | nC | $V_{DD}\approx 300V$ |
| Gate-source charge | Q_{gs}^* | - | 2.1 | - | nC | $I_D=2A$ |
| Gate-drain charge | Q_{gd}^* | - | 3.2 | - | nC | $V_{GS}=10V$ |

*Pulsed

●Body diode characteristics (Source-Drain)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|-----------------|------------|------|------|------|------|-----------------------|
| Forward Voltage | V_{SD}^* | - | - | 1.5 | V | $I_S=2.0A, V_{GS}=0V$ |

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (I)

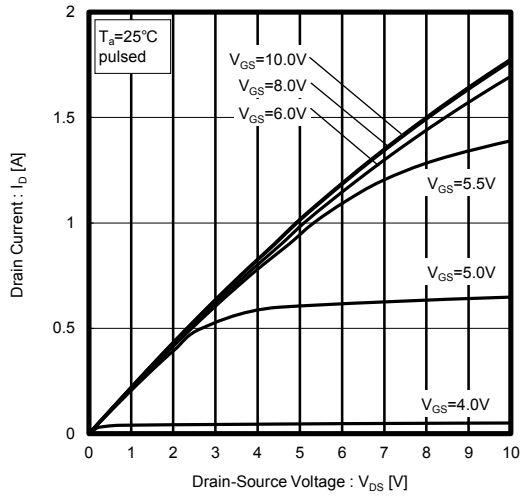


Fig.2 Typical Output Characteristics (II)

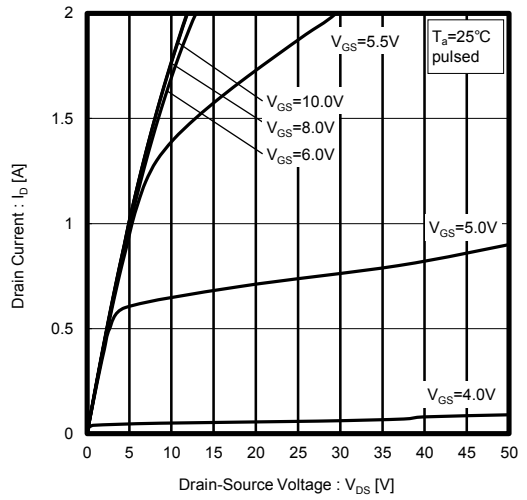


Fig.3 Typical Transfer Characteristics

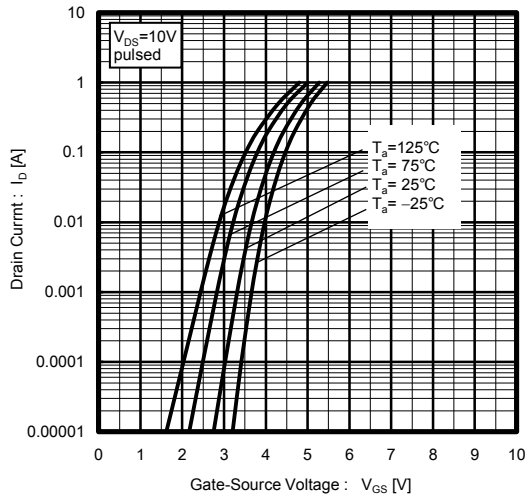


Fig.4 Gate Threshold Voltage vs. Channel Temperature

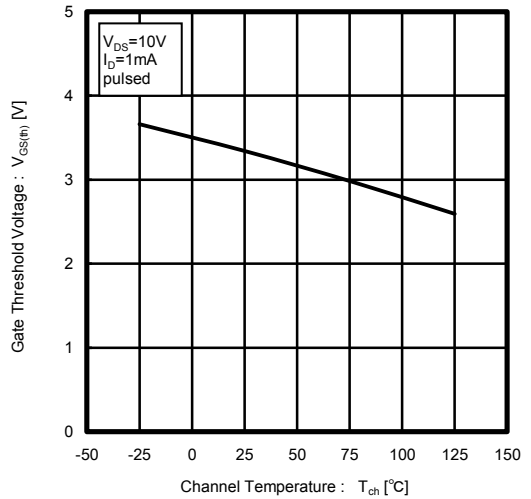


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

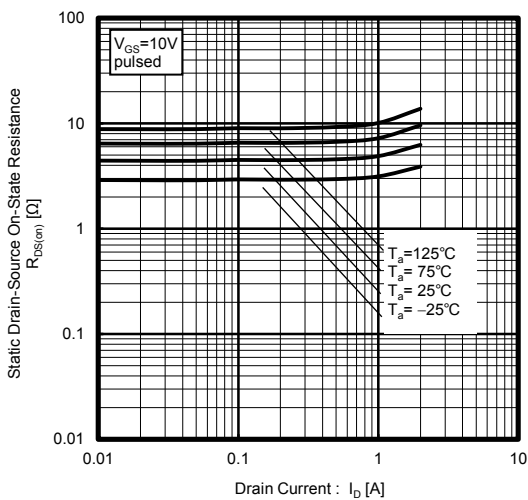


Fig.6 Static Drain-Source On-State Resistance vs. Channel Temperature

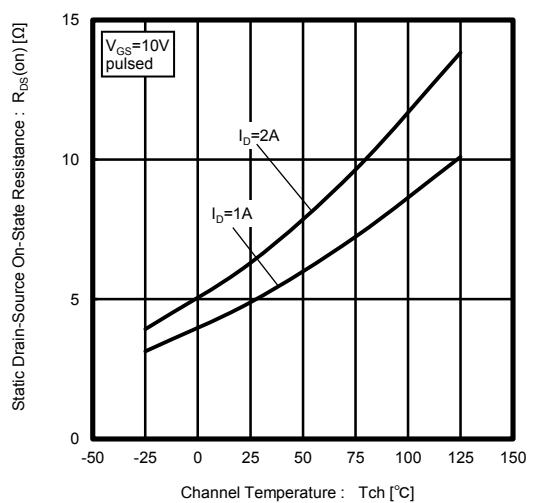


Fig.7 Forward Transfer Admittance vs. Drain Current

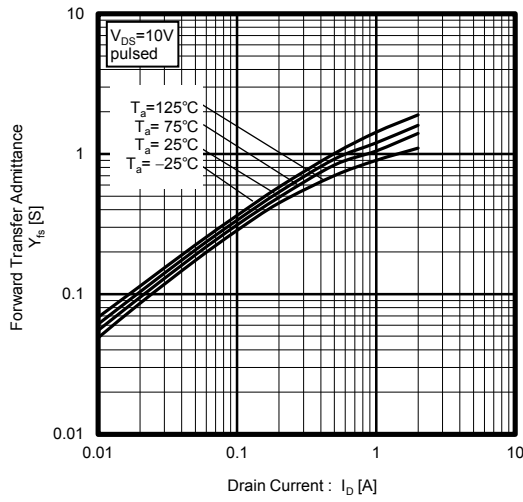


Fig.8 Source Current vs. Source-Drain Voltage

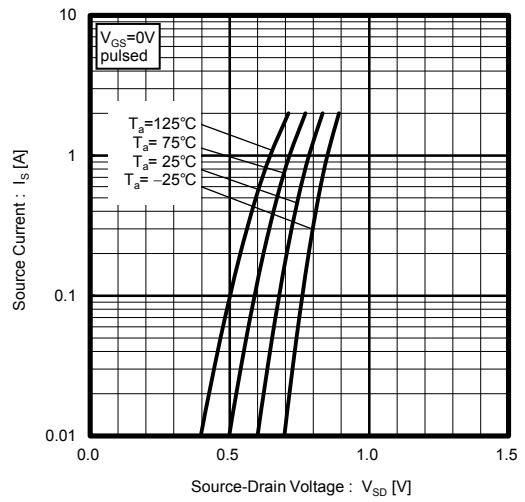


Fig.9 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

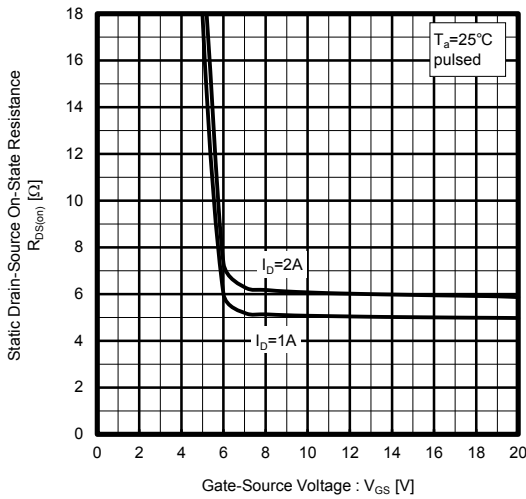


Fig.10 Switching Characteristics

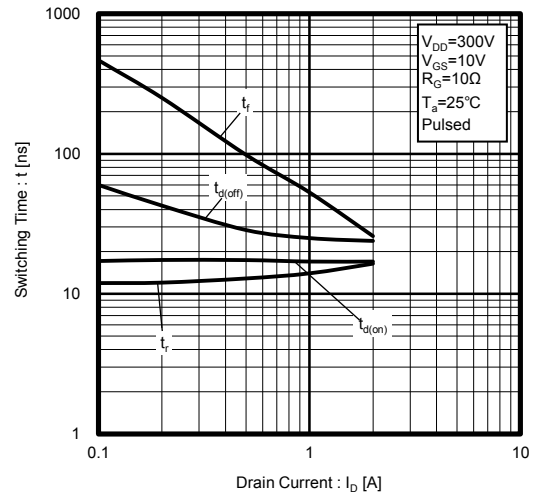


Fig.11 Dynamic Input Characteristics

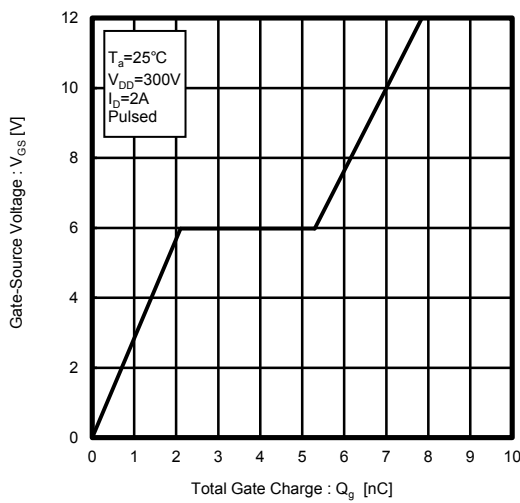


Fig.12 Typical Capacitance vs. Drain-Source Voltage

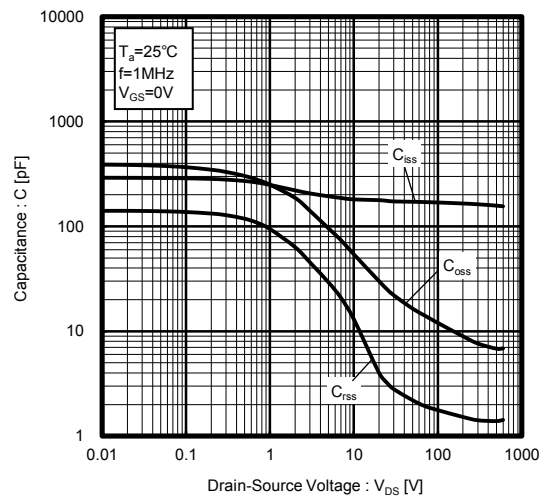


Fig.13 Reverse Recovery Time vs. Source Current

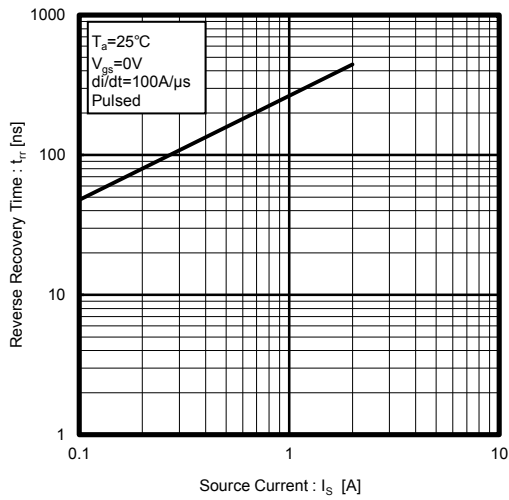


Fig.14 Normalized Transient Thermal Resistance v.s. Pulse Width

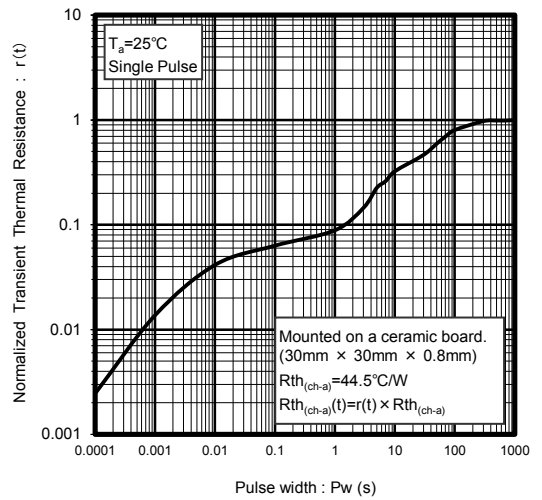
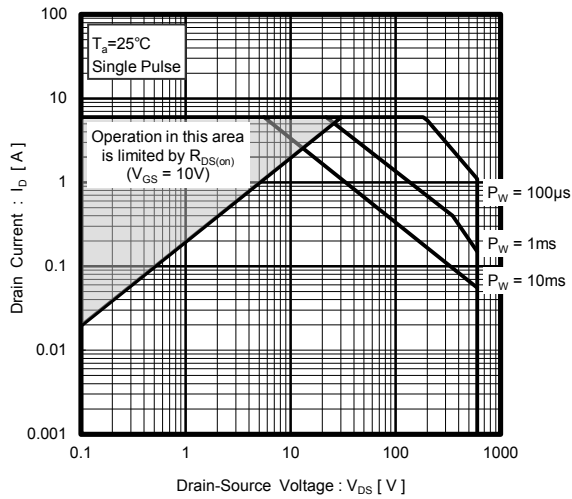


Fig.15 Maximum Safe Operating Area



● Measurement circuits

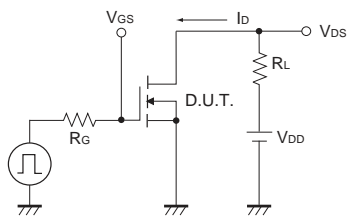


Fig.1-1 Switching Time Measurement Circuit

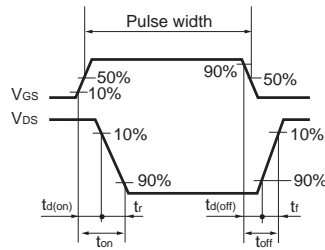


Fig.1-2 Switching Waveforms

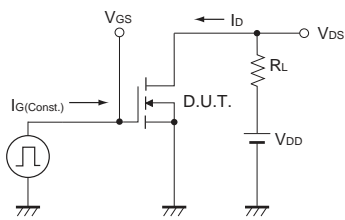


Fig.2-1 Gate Charge Measurement Circuit

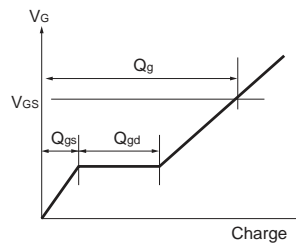


Fig.2-2 Gate Charge Waveform

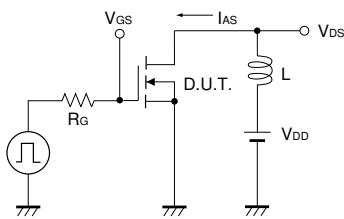


Fig.3-1 Avalanche Measurement Circuit

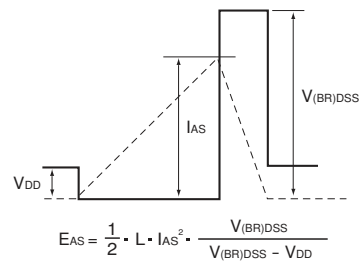


Fig.3-2 Avalanche Waveform

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