# Switching (250V, 8A)

## RDN080N25

### ●Features

1) Low on-resistance.
2) Low input capacitance.
3) Exellent resistance to damage from static electricity.

### ●Application

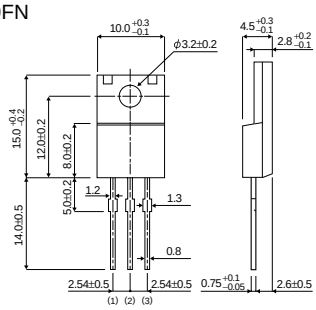
Switching

### ●Structure

Silicon N-channel
MOS FET

### ●External dimensions (Units : mm)

TO-220FN



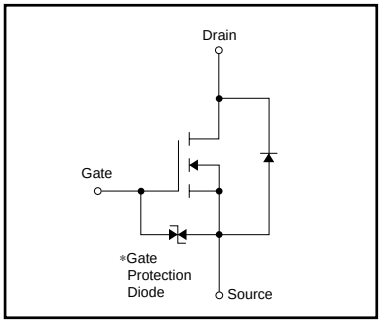

(1) Gate
(2) Drain
(3) Source

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

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 250 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±30 | V |
| Drain Current | Continuous | $I_D$ | 8 | A |
| | Pulsed | $I_{DP}$ *1 | 32 | A |
| Reverse Drain Current | Continuous | $I_{DR}$ | 8 | A |
| | Pulsed | $I_{DRP}$ *1 | 32 | A |
| Avalanche Current | | $I_{AS}$ *2 | 8 | A |
| Avalanche Energy | | $E_{AS}$ *2 | 136 | mJ |
| Total Power Dissipation ($T_C$=25°C) | | $P_D$ | 35 | W |
| Channel Temperature | | $T_{ch}$ | 150 | °C |
| Storage Temperature | | $T_{stg}$ | −55 to +150 | °C |

*1 Pw ≤ 10μs, Duty cycle ≤ 1%
*2 L≒ 4.5mH, $V_{DD}$=50V, $R_G$=25Ω, 1Pulse, Tch=25°C

### ●Equivalent Circuit




*A protection diode is included between the gate and the source terminals to protect the diode against static electricity when the product is in use. Use the protection circuit when the fixed voltages are exceeded.

## ●Electrical characteristics (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±10 | μA | $V_{GS}$=±30V, $V_{GS}$=0V |
| Drain-Source Breakdown Voltage | $V_{(BR)\ DSS}$ | 250 | — | — | V | $I_D$=250μA, $V_{GS}$=0V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | 25 | μA | $V_{DS}$=250V, $V_{GS}$=0V |
| Gate Threshold Voltage | $V_{GS\ (th)}$ | 2.0 | — | 4.0 | V | $V_{DS}$=10V, $I_D$=1mA |
| Static Drain-Source On-State Resistance | $R_{DS\ (on)}$ | — | 0.38 | 0.5 | Ω | $I_D$=4A, $V_{GS}$=10V |
| Forward Transfer Admittance | $\|Y_{fs}\|$ | 1.9 | 3.1 | — | S | $V_{DS}$=10V, $I_D$=4.0A |
| Input Capacitance | $C_{iss}$ | — | 543 | — | pF | $V_{DS}$=10V |
| Output Capacitance | $C_{oss}$ | — | 193 | — | pF | $V_{GS}$=0V |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 64 | — | pF | f=1MHz |
| Turn-On Delay Time | $t_{d\ (on)}$ | — | 13 | — | ns | $I_D$=4.0A, $V_{DD}$ ≒100V |
| Rise Time | $t_r$ | — | 25 | — | ns | $V_{GS}$=10V |
| Turn-Off Delay Time | $t_{d\ (off)}$ | — | 38 | — | ns | $R_L$=25Ω |
| Fall Time | $t_f$ | — | 26 | — | ns | $R_{GS}$=10Ω |
| Reverse Recovery Time | $t_{rr}$ | — | 151 | — | ns | $I_{DR}$=8A, $V_{GS}$=0V |
| Reverse Recovery Charge | $Q_{rr}$ | — | 0.63 | — | μC | di / dt=100A / μs |
| Total Gate Charge | $Q_g$ | — | 15 | — | nC | $V_{DD}$=125V, $V_{GS}$=10V, $I_D$=8A |

## ●Electrical characteristic curves

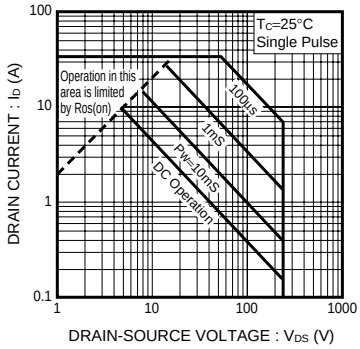



Fig.1 Maximun Safe Operating Area

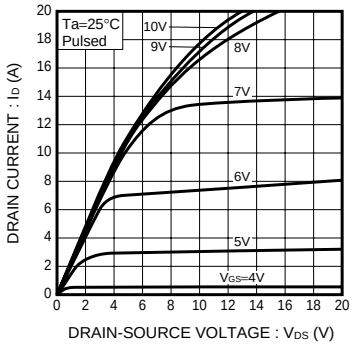



Fig.2 Typical Output Characteristics

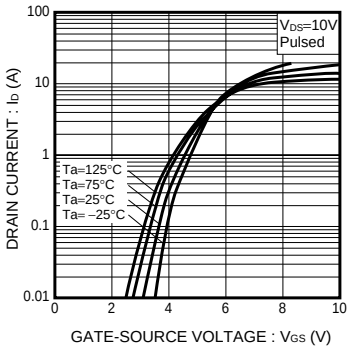



Fig.3 Typical Transfer Characteristics

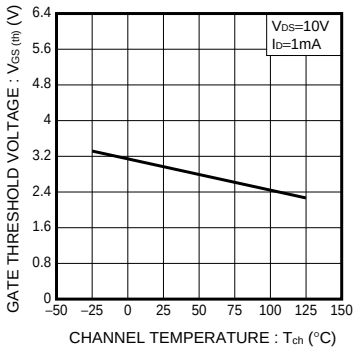



Fig.4 Gate Threshold Voltage vs. Channel Temperature

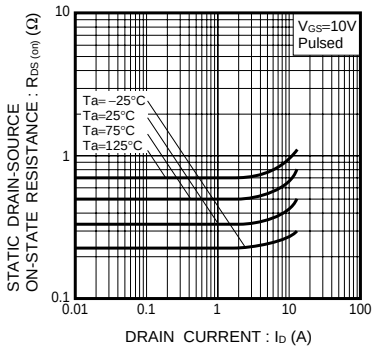



Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

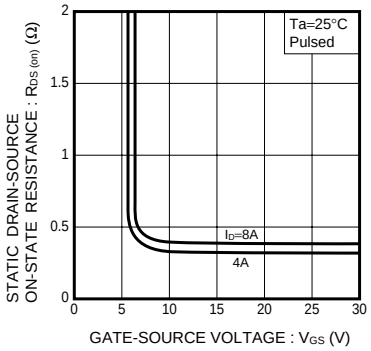



Fig.6 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

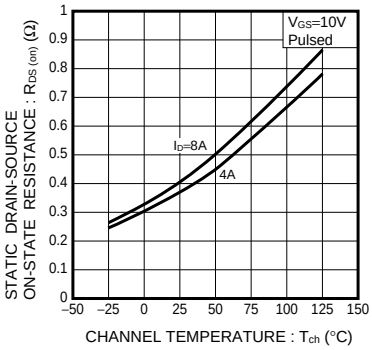



Fig.7 Static Drain-Source On-State Resistance vs. Channel Temperature

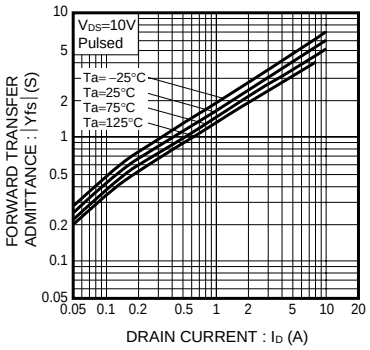



Fig.8 Forward Transfer Admittance vs. Drain Current

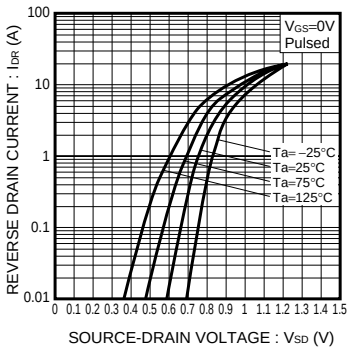



Fig.9 Reverse Drain Current vs. Source-Drain Voltage

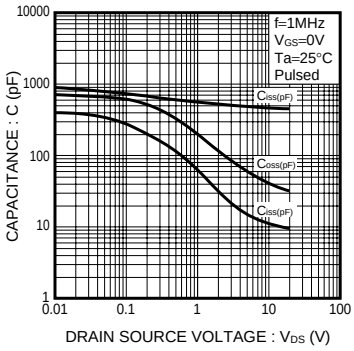



Fig.10 Typical Capacitance vs. Drain-Source Voltage

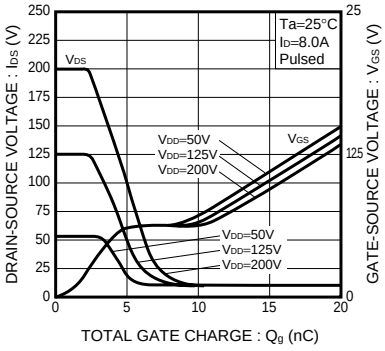



Fig.11 Dynamic Input Characteristics

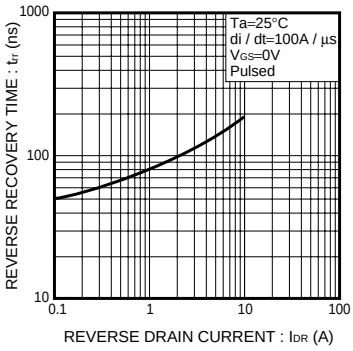



Fig.12 Reverse Recovery Time vs. Reverse Drain Current

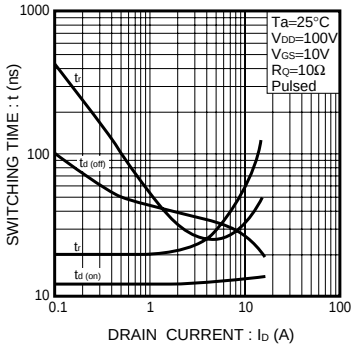



Fig.13 Switching Characteristcs

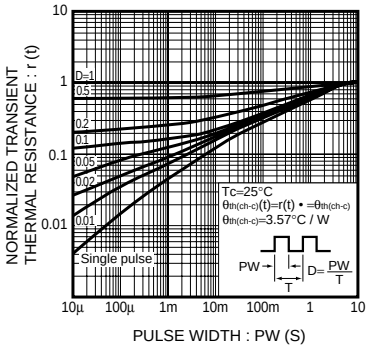



Fig.14 Normalized Transient Thermal Resistance vs. Pulse Width