# 10V Drive Nch MOSFET

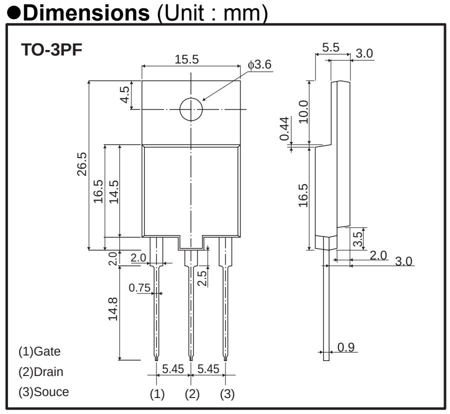
## R6025ANZ

### ●Structure
Silicon N-channel MOSFET

### ●Features
1) Low on-resistance.
2) Fast switching speed.
3) Gate-source voltage ($V_{GSS}$) guaranteed to be ±30V.
4) Drive circuits can be simple.
5) Parallel use is easy.

### ●Applications
Switching

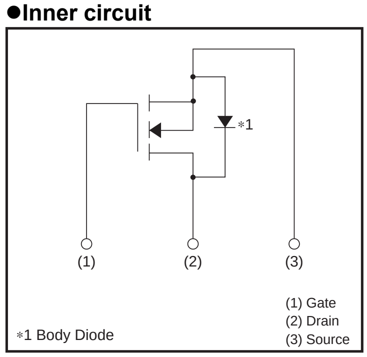
### ●Dimensions (Unit : mm)




### ●Packaging specifications

| | | |
|---|---|---|
| Type | Package | Tube |
| | Basic ordering unit (pieces) | 360 |
| R6025ANZ | | ○ |

### ●Inner circuit




### ●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 | ±25 | A |
| | Pulsed | $I_{DP}$ ∗1 | ±100 | A |
| Source current (Body Diode) | Continuous | $I_S$ ∗3 | 25 | A |
| | Pulsed | $I_{SP}$ ∗1 | 100 | A |
| Avalanche current | | $I_{AS}$ ∗2 | 12.5 | A |
| Avalanche energy | | $E_{AS}$ ∗2 | 39.0 | mJ |
| Total power dissipation (Tc=25°C) | | $P_D$ | 150 | W |
| Channel temperature | | Tch | 150 | °C |
| Range of storage temperature | | Tstg | −55 to +150 | °C |

∗1 Pw≤10µs, Duty cycle≤1%
∗2 L≒500µH, $V_{DD}$=50V, $R_G$=25Ω, Starting, Tch=25°C
∗3 Limited only by maximum temperature allowed.

### ●Thermal resistance

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Channel to case | Rth(ch-c) | 0.83 | °C/W |

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Gate-source leakage | $I_{GSS}$ | – | – | ±100 | nA | $V_{GS}$=±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 | – | 4.5 | V | $V_{DS}$=10V, $I_D$=1mA |
| Static drain-source on-state resistance | $R_{DS(on)}$ * | – | 0.12 | 0.15 | Ω | $I_D$=12.5A, $V_{GS}$=10V |
| Forward transfer admittance | $\mid Y_{fs} \mid$ * | 14 | 20 | – | S | $V_{DS}$=10V, $I_D$=12.5A |
| Input capacitance | $C_{iss}$ | – | 3250 | – | pF | $V_{DS}$=25V |
| Output capacitance | $C_{oss}$ | – | 2400 | – | pF | $V_{GS}$=0V |
| Reverse transfer capacitance | $C_{rss}$ | – | 85 | – | pF | f=1MHz |
| Turn-on delay time | $t_{d(on)}$ * | – | 50 | – | ns | $V_{DD}$≒300V, $I_D$=12.5A |
| Rise time | $t_r$ * | – | 135 | – | ns | $V_{GS}$=10V |
| Turn-off delay time | $t_{d(off)}$ * | – | 185 | – | ns | $R_L$=24Ω |
| Fall time | $t_f$ * | – | 110 | – | ns | $R_G$=10Ω |
| Total gate charge | $Q_g$ * | – | 88 | – | nC | $V_{DD}$≒300V<br>$I_D$=25A<br>$V_{GS}$=10V<br>$R_L$=12Ω / $R_G$=10Ω |
| Gate-source charge | $Q_{gs}$ * | – | 25 | – | nC | |
| Gate-drain charge | $Q_{gd}$ * | – | 30 | – | nC | |

* Pulsed

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Forward voltage | $V_{SD}$ * | – | – | 1.5 | V | $I_S$= 12.5A, $V_{GS}$=0V |

* Pulsed

## ●Electrical characteristic curves

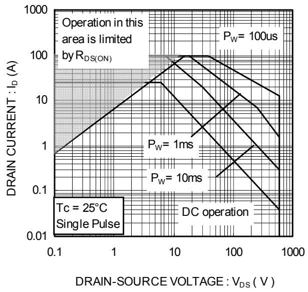



Fig.1 Maximum Safe Operating Aera

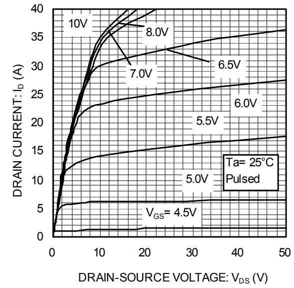



Fig.2: Typical output characteristics( Ⅰ )

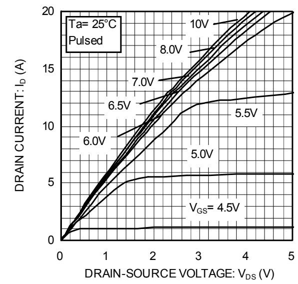



Fig.3: Typical output characteristics( Ⅱ )

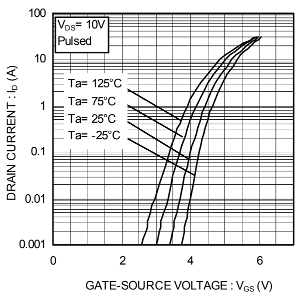



Fig.4 Typical Transfer Characteristics

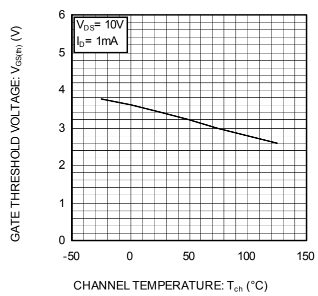



Fig.5 Gate Threshold Voltage vs. Channel Temperature

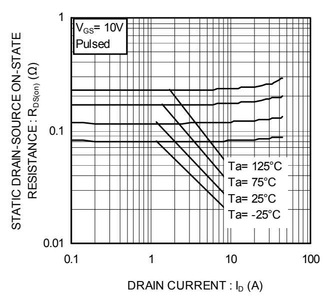



Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

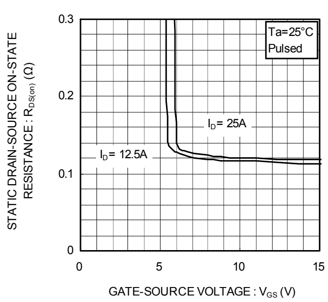



Fig.7 Static Drain-Source On-State Resistance vs. Gate Source Voltage

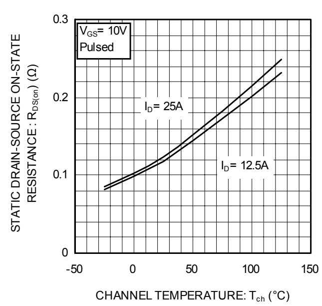



Fig.8 Static Drain-Source On-State Resistance vs. Channel Temperature

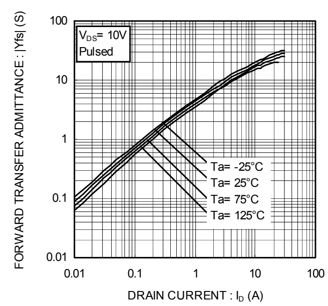



Fig.9 Forward Transfer Admittance vs. Drain Current

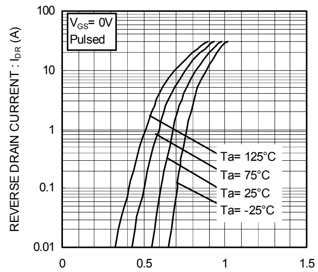



Fig.10 Reverse Drain Current vs. Sourse-Drain Voltage

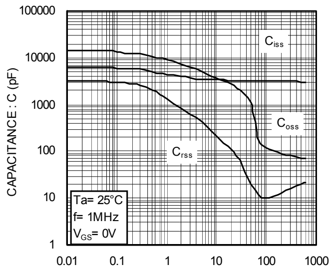



Fig.11 Typical Capacitance vs. Drain-Source Voltage

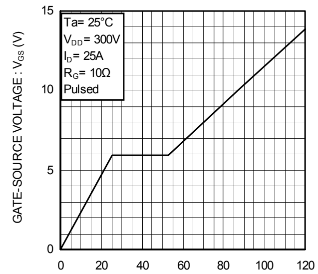



Fig.12 Dynamic Input Characteristics

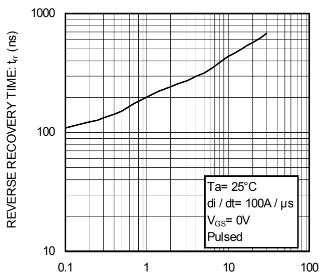



Fig.13 Reverse Recovery Time vs.Reverse Drain Current

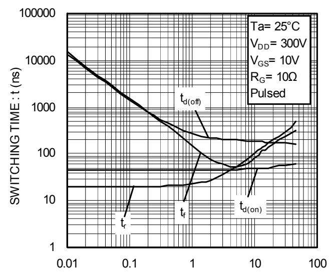



Fig.14 Switching Characteristics

## ●Switching characteristics measurement circuit

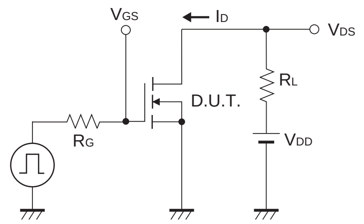



Fig.1-1 Switching Time Measurement Circuit

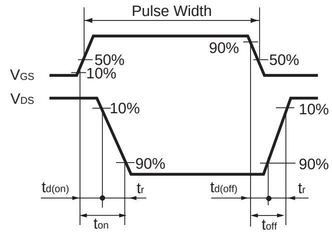



Fig.1-2 Switching Waveforms

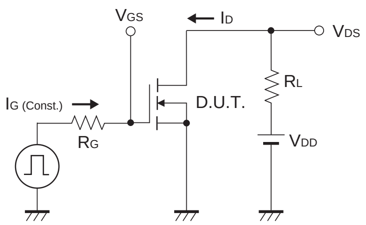



Fig.2-1 Gate Charge Measurement Circuit

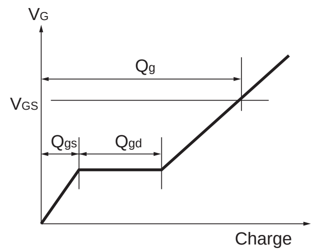



Fig.2-2 Gate Charge Waveform

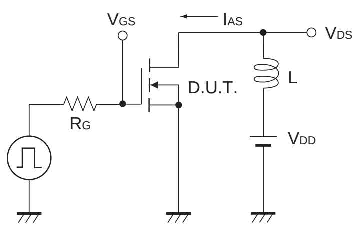
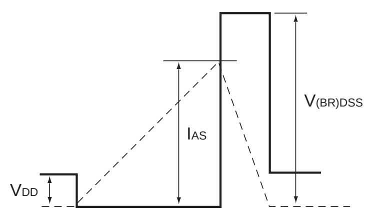



Fig.3-1 Avalanche Measurement circuit




$$E_{AS} = \frac{1}{2} \cdot L \cdot I_{AS}{}^{2} \cdot \frac{V_{(BR)DSS}}{V_{(BR)DSS} - V_{DD}}$$

Fig.3-2 Avalanche waveform

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