

2.5V Drive Nch MOSFET

RTR030N05

●Structure

Silicon N-channel MOSFET

●Features

- 1) Low On-resistance.
- 2) Built-in G-S Protection Diode.
- 3) Small Surface Mount Package (TSMT3).

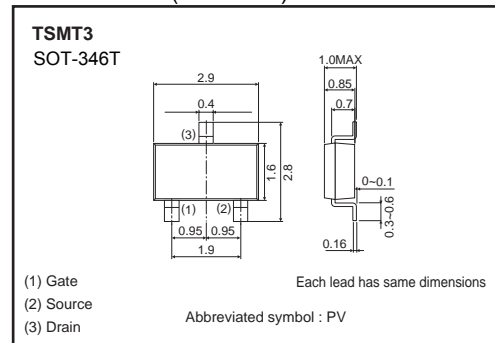
●Application

Switching

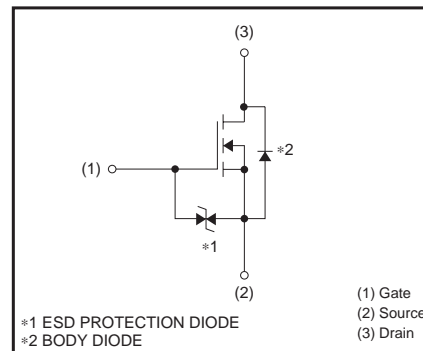
●Packaging specifications

| Type | Package | Taping |
|-----------|------------------------------|--------|
| | Code | TL |
| | Basic ordering unit (pieces) | 3000 |
| RTR030N05 | | ○ |

●Dimensions (Unit : mm)



●Inner circuit



●Absolute maximum ratings (Ta=25°C)

| Parameter | Symbol | Limits | Unit | |
|--------------------------------|------------|-------------|----------|---|
| Drain-source voltage | V_{DSS} | 45 | V | |
| Gate-source voltage | V_{GSS} | ± 12 | V | |
| Drain current | Continuous | I_D | ± 3 | A |
| | Pulsed | I_{DP} *1 | ± 12 | A |
| Source current (Body diode) | Continuous | I_S | 0.8 | A |
| | Pulsed | I_{SP} *1 | 12 | A |
| Total power dissipation | P_D *2 | 1.0 | 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 When mounted on a ceramic board

●Thermal resistance

| Parameter | Symbol | Limits | Unit |
|--------------------|------------------|--------|--------|
| Channel to ambient | $R_{th}(ch-a)$ * | 125 | °C / W |

* When mounted on a ceramic board

●Electrical characteristics (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|----------------|------|------|------|------|---------------------------------|
| Gate-source leakage | I_{GSS} | – | – | ±10 | μA | $V_{GS} = \pm 12V, V_{DS} = 0V$ |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 45 | – | – | V | $I_D = 1mA, V_{GS} = 0V$ |
| Zero gate voltage drain current | I_{DSS} | – | – | 1 | μA | $V_{DS} = 45V, V_{GS} = 0V$ |
| Gate threshold voltage | $V_{GS(th)}$ | 0.5 | – | 1.5 | V | $V_{DS} = 10V, I_D = 1mA$ |
| Static drain-source on-state resistance | $R_{DS(on)}$ * | – | 48 | 67 | mΩ | $I_D = 3A, V_{GS} = 4.5V$ |
| | | – | 53 | 74 | mΩ | $I_D = 3A, V_{GS} = 4V$ |
| | | – | 68 | 95 | mΩ | $I_D = 3A, V_{GS} = 2.5V$ |
| Forward transfer admittance | $ Y_{fs} $ * | 2.8 | – | – | S | $V_{DS} = 10V, I_D = 3A$ |
| Input capacitance | C_{iss} | – | 510 | – | pF | $V_{DS} = 10V$ |
| Output capacitance | C_{oss} | – | 110 | – | pF | $V_{GS} = 0V$ |
| Reverse transfer capacitance | C_{rss} | – | 55 | – | pF | $f = 1MHz$ |
| Turn-on delay time | $t_{d(on)}$ * | – | 12 | – | ns | $V_{DD} = 25V$ |
| Rise time | t_r * | – | 19 | – | ns | $I_D = 1.5A$ |
| Turn-off delay time | $t_{d(off)}$ * | – | 34 | – | ns | $V_{GS} = 4.5V$ |
| Fall time | t_f * | – | 26 | – | ns | $R_L = 16.6\Omega$ |
| Total gate charge | Q_g * | – | 6.2 | – | nC | $V_{DD} = 25V$ |
| Gate-source charge | Q_{gs} * | – | 1.6 | – | nC | $I_D = 3A$ |
| Gate-drain charge | Q_{gd} * | – | 1.4 | – | nC | $V_{GS} = 4.5V$ |
| | | | | | | $R_L = 8.3\Omega$ |
| | | | | | | $R_G = 10\Omega$ |

*Pulsed

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|-----------------|------------|------|------|------|------|-------------------------|
| Forward voltage | V_{SD} * | – | – | 1.2 | V | $I_S = 3A, V_{GS} = 0V$ |

*Pulsed

●Electrical characteristics curves

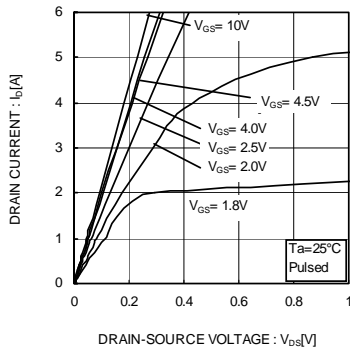


Fig.1 Typical Output Characteristics (I)

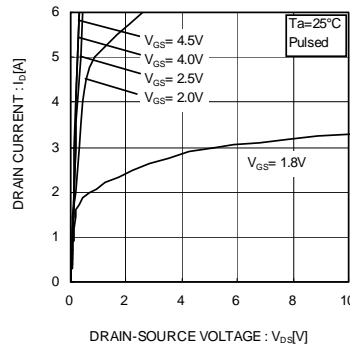


Fig.2 Typical Output Characteristics (II)

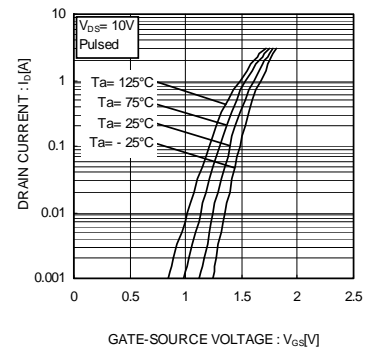


Fig.3 Typical Transfer Characteristics

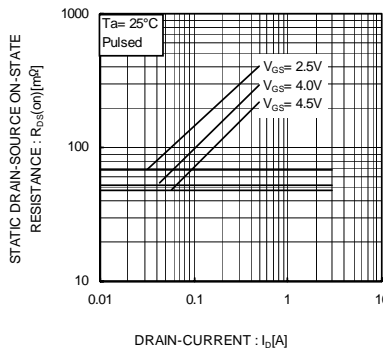


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(I)

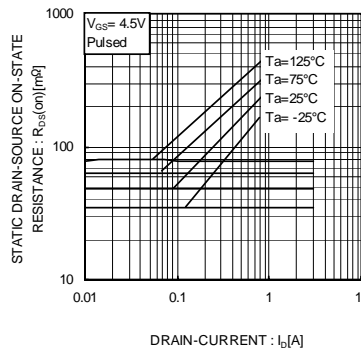


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(II)

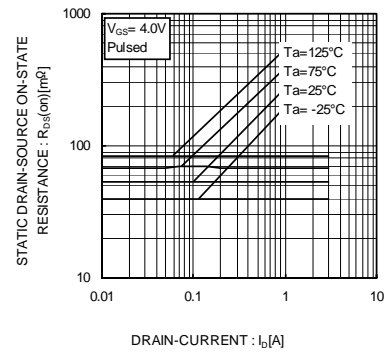


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(III)

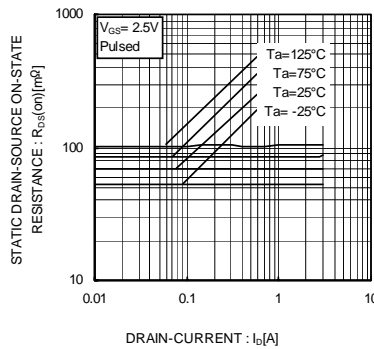


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(IV)

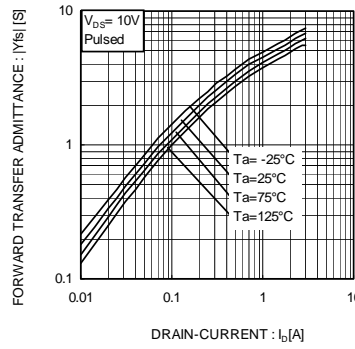


Fig.8 Forward Transfer Admittance vs. Drain Current

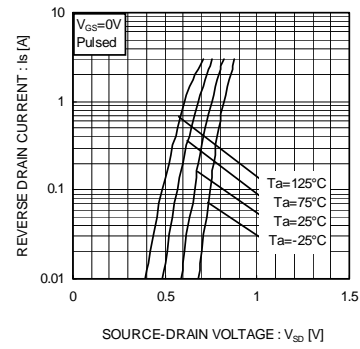


Fig.9 Reverse Drain Current vs. Source-Drain Voltage

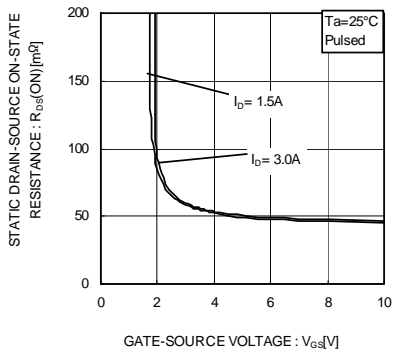


Fig.10 Static Drain-Source On-State Resistance vs. Gate Source Voltage

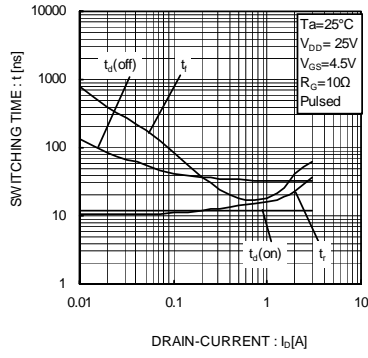


Fig.11 Switching Characteristics

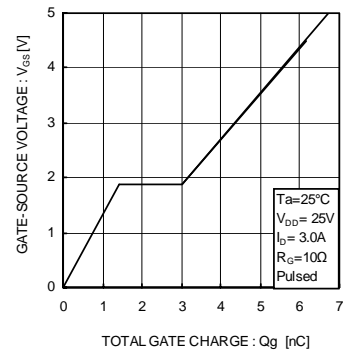


Fig.12 Dynamic Input Characteristics

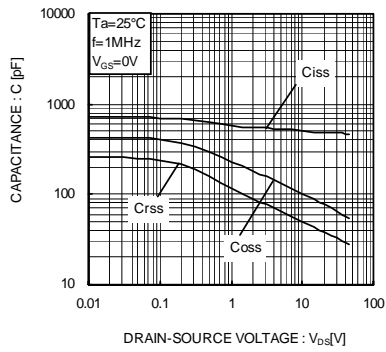


Fig.13 Typical Capacitance vs. Drain-Source Voltage

●Measurement circuits

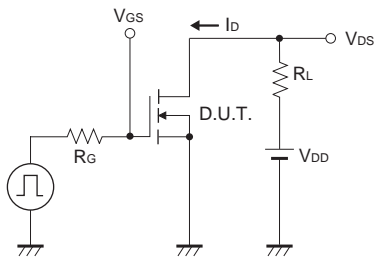


Fig.1-1 Switching Time Measurement Circuit

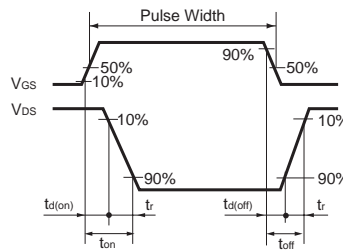


Fig.1-2 Switching Time Waveforms

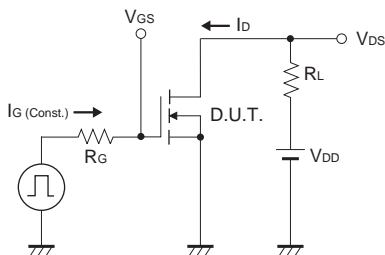


Fig.2-1 Gate Charge Measurement Circuit

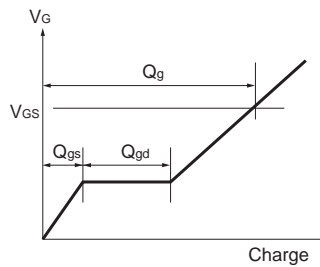


Fig.2-2 Gate Charge Waveform

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