

# 2.5V Drive Nch MOSFET

## RTR025N05

### ●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
RTR025N05		○

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

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DSS}$	45	V	
Gate-source voltage	$V_{GSS}$	$\pm 12$	V	
Drain current	Continuous	$I_D$	$\pm 2.5$	A
	Pulsed	$I_{DP}$ *1	$\pm 10$	A
Source current (Body diode)	Continuous	$I_S$	0.8	A
	Pulsed	$I_{SP}$ *1	10	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  $\leq 1\%$

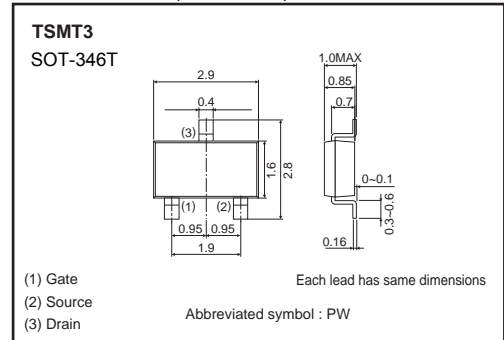
\*2 When mounted on a ceramic board

### ●Thermal resistance

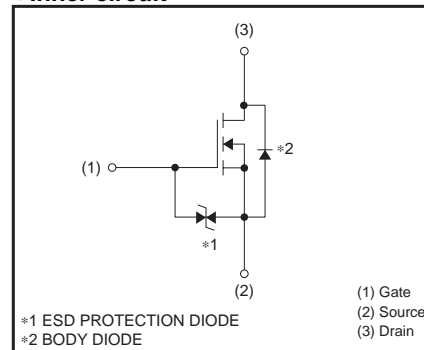
Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th}(ch-a)$ *	125	°C / W

\* When mounted on a ceramic board

### ●Dimensions (Unit : mm)



### ●Inner circuit



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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	–	–	±10	μA	$V_{GS} = \pm 12V, V_{DS} = 0V$
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	$R_{DS(on)}$ *	–	95	130	mΩ	$I_D = 2.5A, V_{GS} = 4.5V$
		–	100	140	mΩ	$I_D = 2.5A, V_{GS} = 4V$
		–	125	175	mΩ	$I_D = 2.5A, V_{GS} = 2.5V$
Forward transfer admittance	$ Y_{fs} $ *	2.0	–	–	S	$V_{DS} = 10V, I_D = 2.5A$
Input capacitance	$C_{iss}$	–	250	–	pF	$V_{DS} = 10V$
Output capacitance	$C_{oss}$	–	60	–	pF	$V_{GS} = 0V$
Reverse transfer capacitance	$C_{rss}$	–	30	–	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$ *	–	9	–	ns	$V_{DD} = 25V$
Rise time	$t_r$ *	–	15	–	ns	$I_D = 1.2A$
Turn-off delay time	$t_{d(off)}$ *	–	20	–	ns	$V_{GS} = 4.5V$
Fall time	$t_f$ *	–	14	–	ns	$R_L = 20.8\Omega$
Total gate charge	$Q_g$ *	–	3.2	–	nC	$V_{DD} = 25V$
Gate-source charge	$Q_{gs}$ *	–	0.9	–	nC	$I_D = 2.5A$
Gate-drain charge	$Q_{gd}$ *	–	0.7	–	nC	$V_{GS} = 4.5V$
						$R_L = 10\Omega$
						$R_G = 10\Omega$

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	$V_{SD}$ *	–	–	1.2	V	$I_S = 2.5A, V_{GS} = 0V$

\*Pulsed

●Body diode characteristics curves

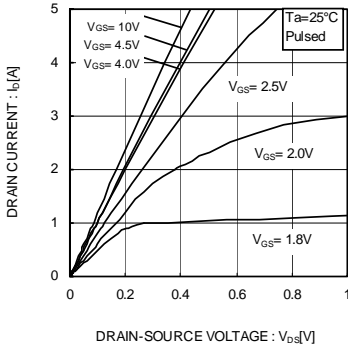


Fig.1 Typical Output Characteristics( I )

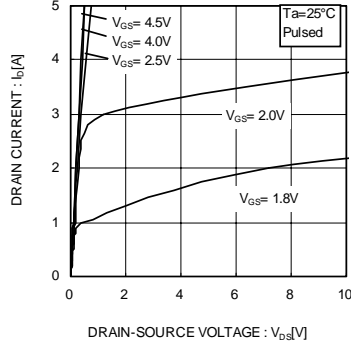


Fig.2 Typical Output Characteristics( II )

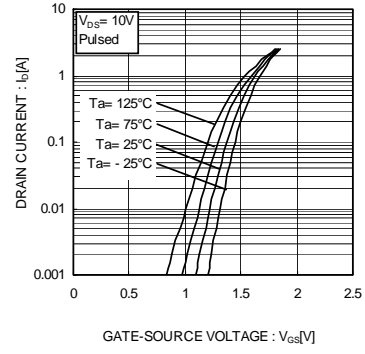


Fig.3 Typical Transfer Characteristics

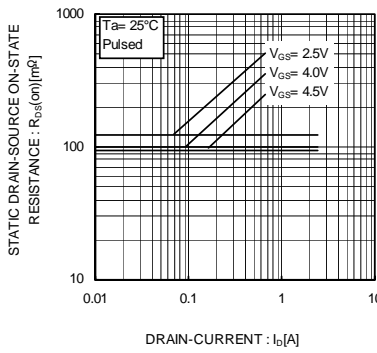


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( I )

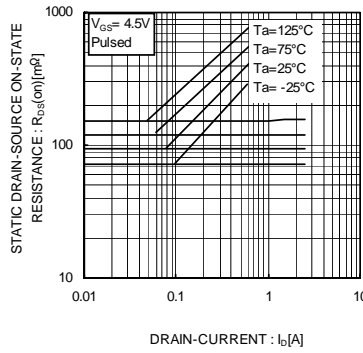


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current( II )

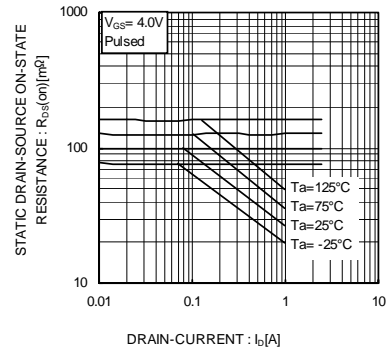


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current( III )

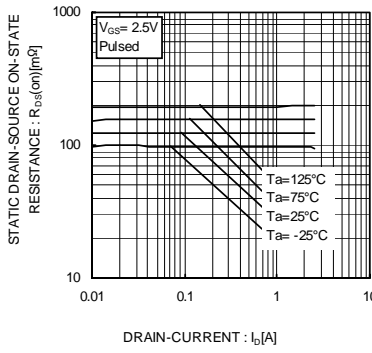


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current( IV )

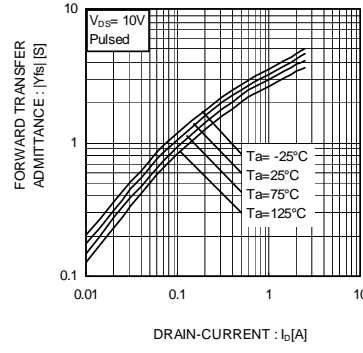


Fig.8 Forward Transfer Admittance vs. Drain Current

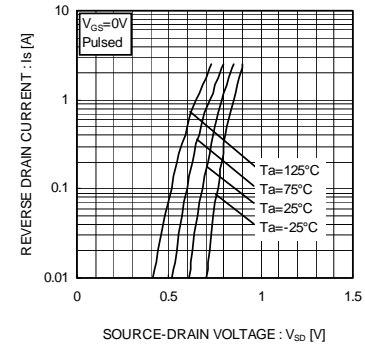


Fig.9 Reverse Drain Current vs. Source-Drain Voltage

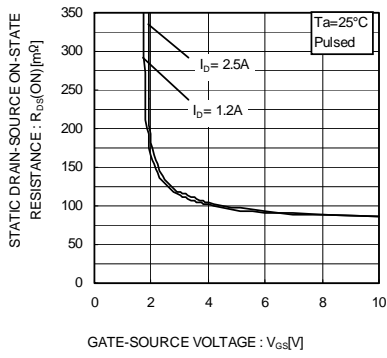


Fig.10 Static Drain-Source On-State Resistance vs. Gate Source Voltage

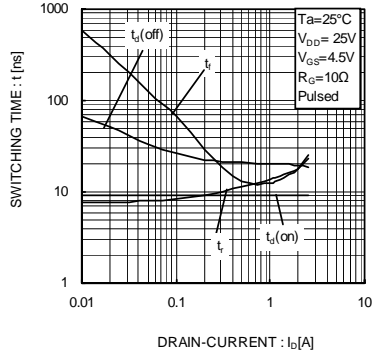


Fig.11 Switching Characteristics

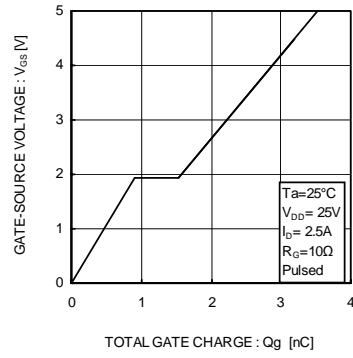


Fig.12 Dynamic Input Characteristics

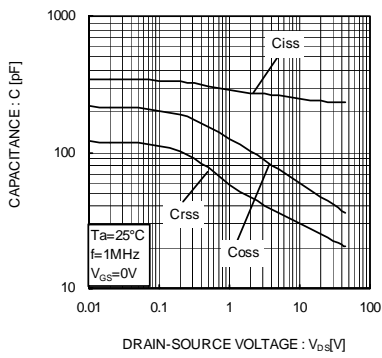


Fig.13 Typical Capacitance vs. Drain-Source Voltage

●Measurement circuits

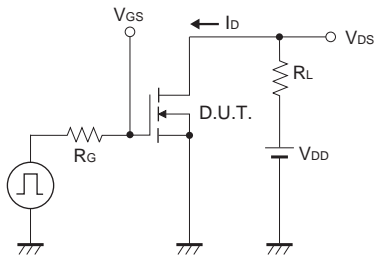


Fig.1-1 Switching Time Measurement Circuit

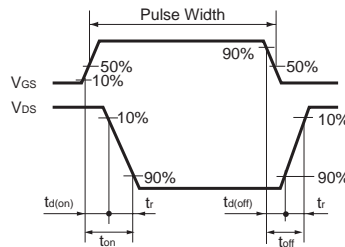


Fig.1-2 Switching Waveforms

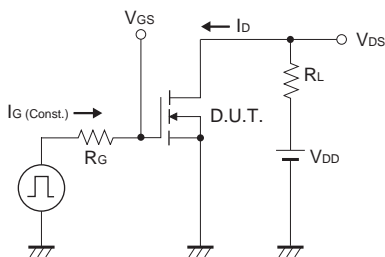


Fig.2-1 Gate Charge Measurement Circuit

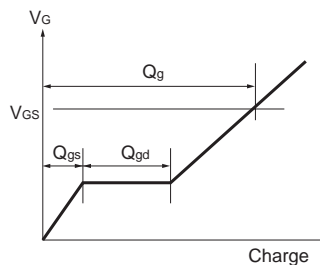


Fig.2-2 Gate Charge Waveform

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