

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_{DS}	45	V
Gate-source voltage	V_{GS}	± 12	V
Drain current	Continuous	I_D	± 2.5 A
	Pulsed	I_{DP} *1	± 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 $\leq 1\%$

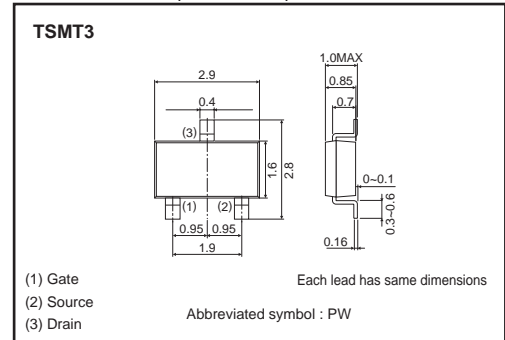
*2 When mounted on a ceramic board

●Thermal resistance

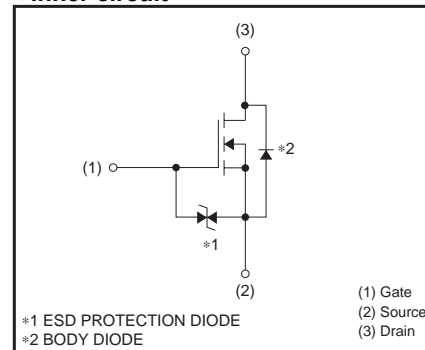
Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th}(ch-a)$ *	125	°C / W

* 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	m Ω	$I_D = 2.5A, V_{GS} = 4.5V$
		–	100	140	m Ω	$I_D = 2.5A, V_{GS} = 4V$
		–	125	175	m Ω	$I_D = 2.5A, V_{GS} = 2.5V$
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	$V_{DD} \doteq 25V$
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	$R_L \doteq 20.8\Omega$
Total gate charge	Q_g *	–	3.2	–	nC	$V_{DD} \doteq 25V$
Gate-source charge	Q_{gs} *	–	0.9	–	nC	$I_D = 2.5A$
Gate-drain charge	Q_{gd} *	–	0.7	–	nC	$V_{GS} = 4.5V$
						$R_L \doteq 10\Omega$
						$R_G = 10\Omega$

*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

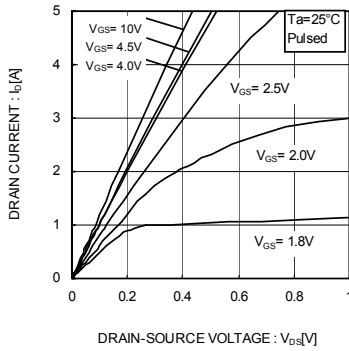


Fig.1 Typical Output Characteristics(I)

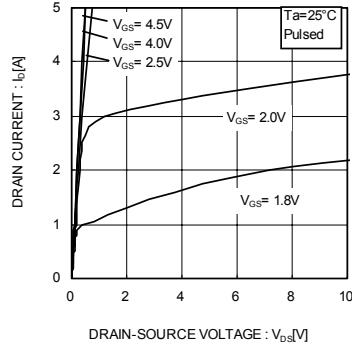


Fig.2 Typical Output Characteristics(II)

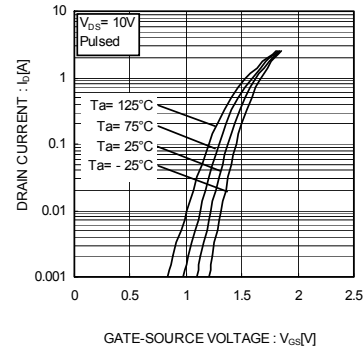


Fig.3 Typical Transfer Characteristics

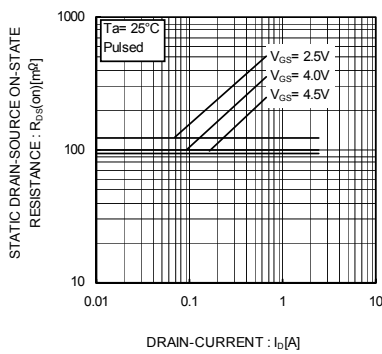


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(I)

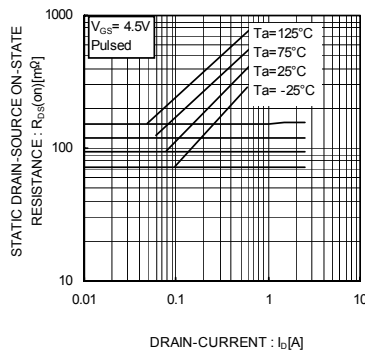


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(II)

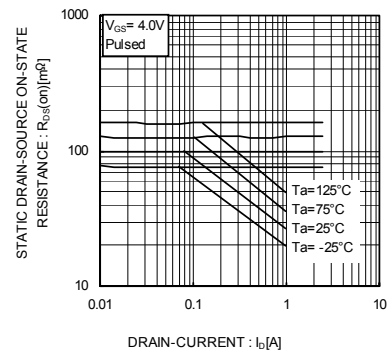


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(III)

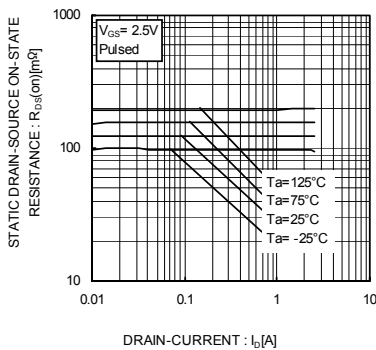


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(IV)

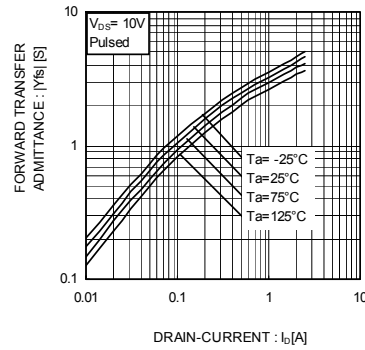


Fig.8 Forward Transfer Admittance vs. Drain Current

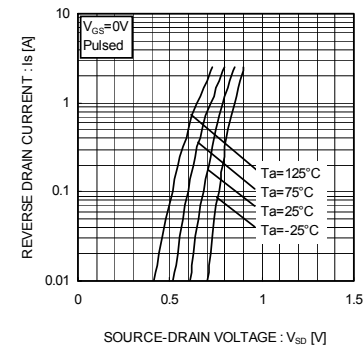
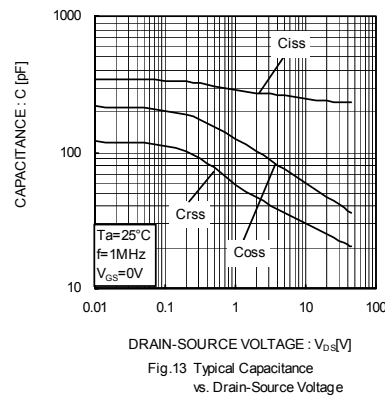
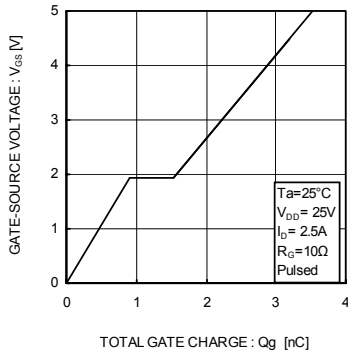
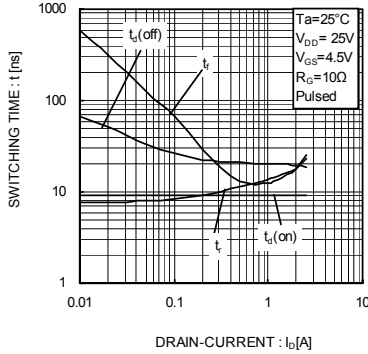
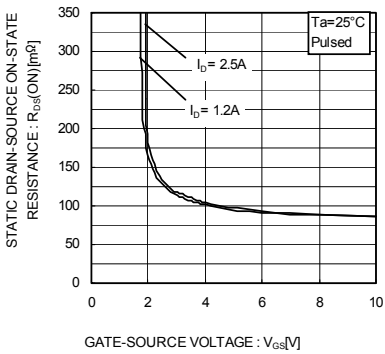


Fig.9 Reverse Drain Current vs. Source-Drain Voltage



●Measurement circuits

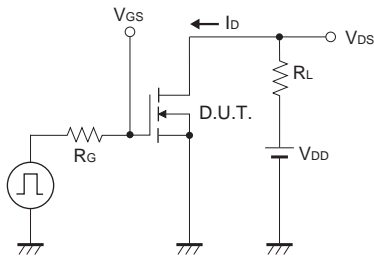


Fig.1-1 Switching Time Measurement Circuit

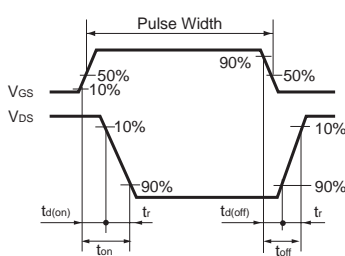


Fig.1-2 Switching Waveforms

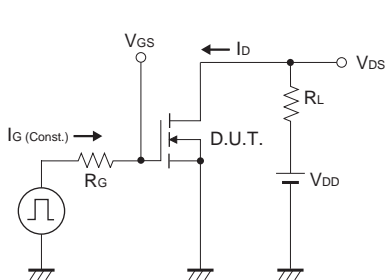


Fig.2-1 Gate Charge Measurement Circuit

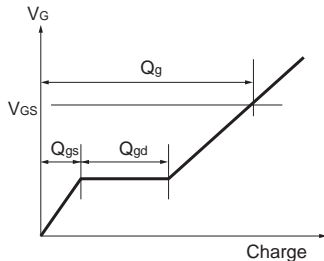


Fig.2-2 Gate Charge Waveform

Notes

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