1.5V Drive Nch MOSFET

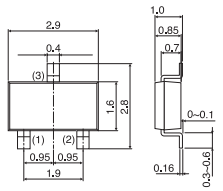
RUR020N02

●Structure
Silicon N-channel MOSFET

●Features
1) 1.5V drive
2) Low On-resistance.
3) Built-in G-S Protection Diode.
Small Surface Mount Package (TSMT3).

●Dimensions (Unit : mm)

TSMT3



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

Each lead has same dimensions

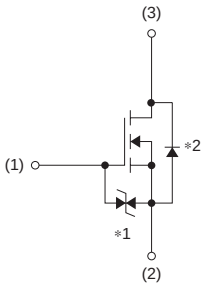
Abbreviated symbol : XK

●Applications
Switching

●Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	3000
RUR020N02		◯

●Inner circuit



*1 ESD PROTECTION DIODE
*2 BODY DIODE

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

●Absolute maximum ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	20	V
Gate-source voltage		V_{GSS}	±10	V
Drain current	Continuous	I_D	±2	A
	Pulsed	I_{DP} *1	±6	A
Source current (Body diode)	Continuous	I_S	0.8	A
	Pulsed	I_{SP} *1	6	A
Total power dissipation		P_D *2	1.0	W
Channel temperature		Tch	150	°C
Range of storage temperature		Tstg	−55 to +150	°C

*1 Pw≤10μs, Duty cycle≤1%
*2 Mounted on a ceramic board

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	Rth (ch-a) *	125	°C / W

* 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}=±10V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	20	–	–	V	I_D= 1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	–	–	1	μA	V_{DS}= 20V, V_{GS}=0V
Gate threshold voltage	$V_{GS\ (th)}$	0.3	–	1.0	V	V_{DS}= 10V, I_D= 1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$*	–	75	105	mΩ	I_D= 2A, V_{GS}= 4.5V
		–	95	135	mΩ	I_D= 2A, V_{GS}= 2.5V
		–	130	185	mΩ	I_D= 1A, V_{GS}= 1.8V
		–	170	240	mΩ	I_D= 0.4A, V_{GS}= 1.5V
Forward transfer admittance	$\|Y_{fs}\|$ *	1.8	–	–	S	V_{DS}= 10V, I_D= 2A
Input capacitance	C_{iss}	–	180	–	pF	V_{DS}= 10V
Output capacitance	C_{oss}	–	45	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	25	–	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	–	6	–	ns	V_{DD} ≒ 10V, I_D= 1A, V_{GS}= 4.5V R_L ≒ 10Ω, R_G=10Ω
Rise time	t_r *	–	17	–	ns	
Turn-off delay time	$t_{d\ (off)}$ *	–	30	–	ns	
Fall time	t_f *	–	30	–	ns	
Total gate charge	Q_g *	–	2.0	–	nC	V_{DD} ≒ 10V, I_D= 2A V_{GS}= 4.5V R_L ≒ 5Ω, R_G=10Ω
Gate-source charge	Q_{gs} *	–	0.6	–	nC	
Gate-drain charge	Q_{gd} *	–	0.4	–	nC	

*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= 2A, V_{GS}=0V

*Pulsed

●Electrical characteristics curves

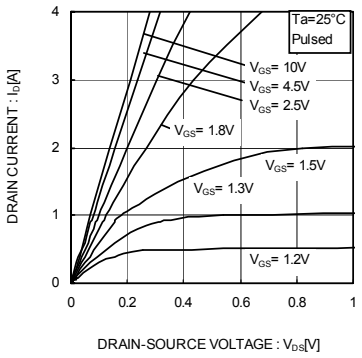


Fig.1 Typical Output Characteristics(Ⅰ)

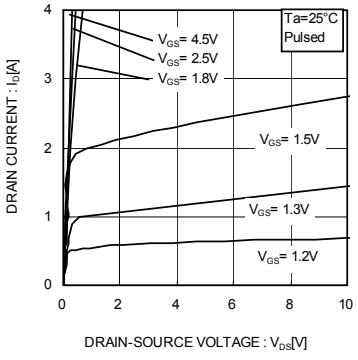


Fig.2 Typical Output Characteristics(Ⅱ)

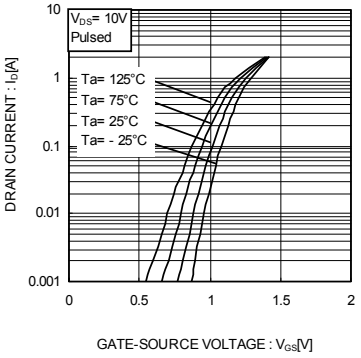


Fig.3 Typical Transfer Characteristics

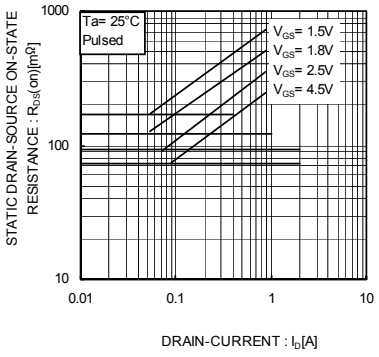


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(Ⅰ)

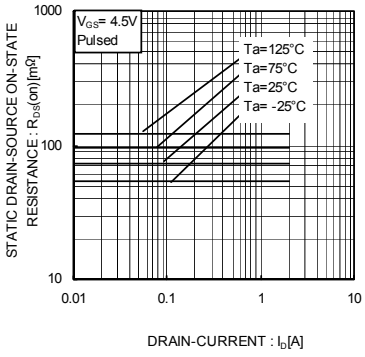


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(Ⅱ)

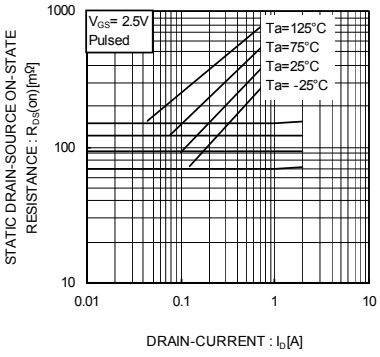


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(Ⅲ)

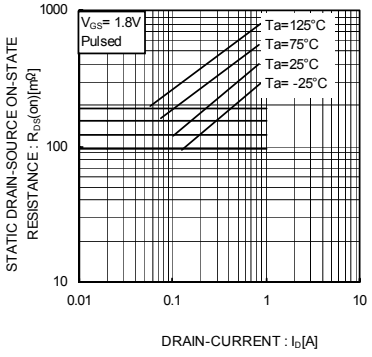


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(Ⅳ)

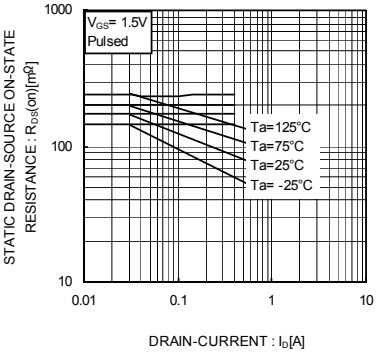


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current(Ⅴ)

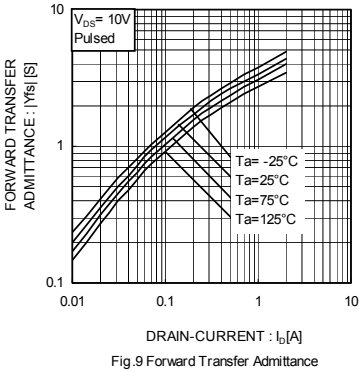


Fig.9 Forward Transfer Admittance vs. Drain Current

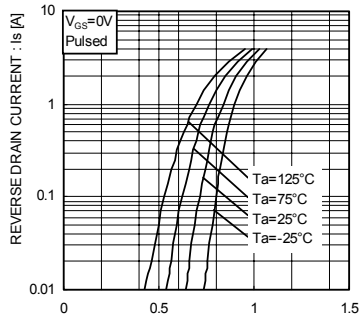


Fig.10 Reverse Drain Current vs. Sourse-Drain Voltage

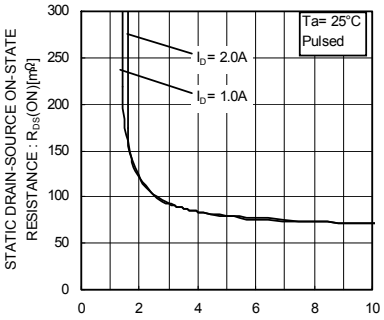


Fig.11 Static Drain-Source On-State Resistance vs. Gate Source Voltage

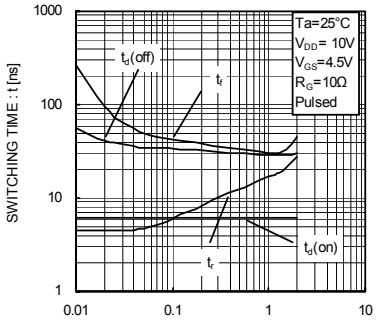


Fig.12 Switching Characteristics

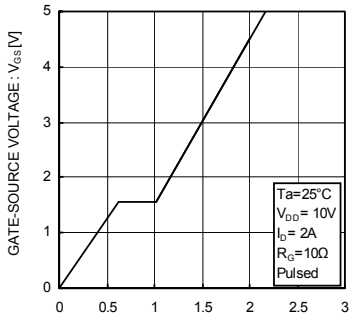


Fig.13 Dynamic Input Characteristics

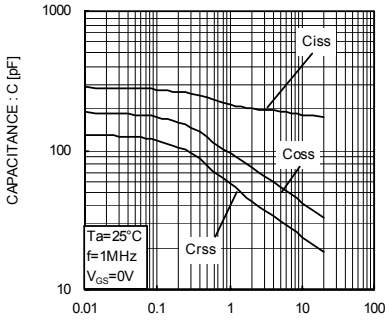


Fig.14 Typical Capacitance vs. Drain-Source Voltage

●Measurement circuit

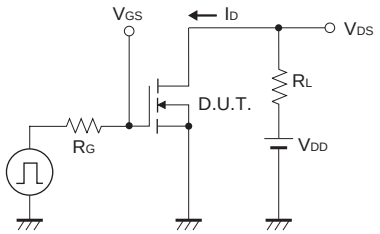


Fig.1-1 Switching Time Measurement Circuit

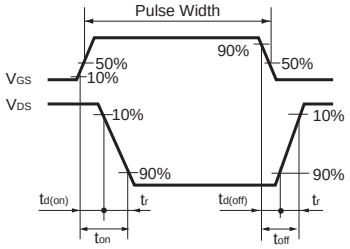


Fig.1-2 Switching Waveforms

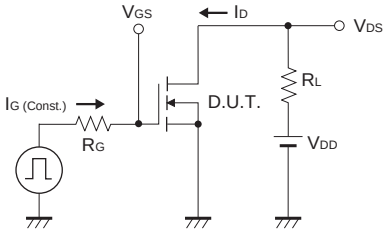


Fig.2-1 Gate Charge Measurement Circuit

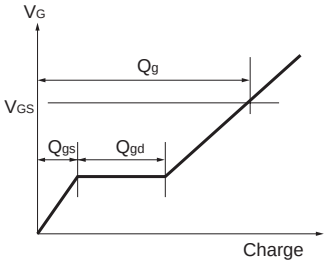


Fig.2-2 Gate Charge Waveform

●Notice

This product might cause chip aging and breakdown under the large electrified environment.
Please consider to design ESD protection circuit.

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