1.5V Drive Nch MOSFET

RUL035N02

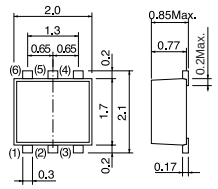
●Structure
Silicon N-channel MOSFET

●Features
1) Low On-resistance.
2) Space saving, small surface mount package (TUMT6).
3) Low voltage drive (1.5V drive).

●Applications
Switching

●Dimensions (Unit : mm)

TUMT6

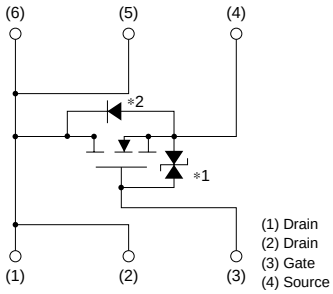


Abbreviated symbol : XD

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RUL035N02		○

●Inner circuit



∗1 ESD PROTECTION DIODE
∗2 BODY DIODE

●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	±3.5	A
	Pulsed	I_{DP} ∗1	±7	A
Source current (Body diode)	Continuous	I_S	0.8	A
	Pulsed	I_{SP} ∗1	7	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	$R_{DS\ (on)}$*	–	31	43	mΩ	I_D= 3.5A, V_{GS}= 4.5V
		–	38	53	mΩ	I_D= 3.5A, V_{GS}= 2.5V
		–	50	70	mΩ	I_D= 1.8A, V_{GS}= 1.8V
		–	66	93	mΩ	I_D= 0.7A, V_{GS}= 1.5V
Forward transfer admittance	$\|Y_{fs}\|$ *	3.2	–	–	S	V_{DS}= 10V, I_D= 3.5A
Input capacitance	C_{iss}	–	460	–	pF	V_{DS}= 10V
Output capacitance	C_{oss}	–	110	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	60	–	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	–	10	–	ns	V_{DD} ≒ 10V
Rise time	t_r *	–	20	–	ns	I_D= 1.8A
Turn-off delay time	$t_{d\ (off)}$ *	–	40	–	ns	V_{GS}= 4.5V
Fall time	t_f *	–	50	–	ns	R_L ≒ 5.6Ω
						R_G=10Ω
Total gate charge	Q_g *	–	5.7	–	nC	V_{DD} ≒ 10V, I_D= 3.5A
Gate-source charge	Q_{gs} *	–	1.1	–	nC	V_{GS}= 4.5V
Gate-drain charge	Q_{gd} *	–	0.9	–	nC	R_L=2.9Ω, R_G=10Ω

*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= 0.8A, V_{GS}=0V

●**Electrical characteristics curves**

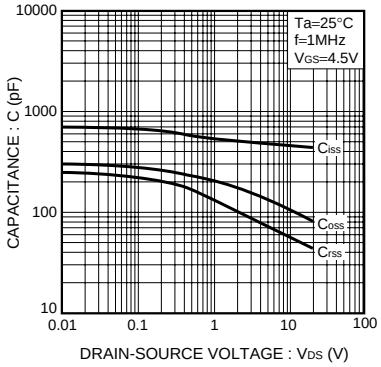


Fig.1 Typical Capacitance vs. Drain-Source Voltage

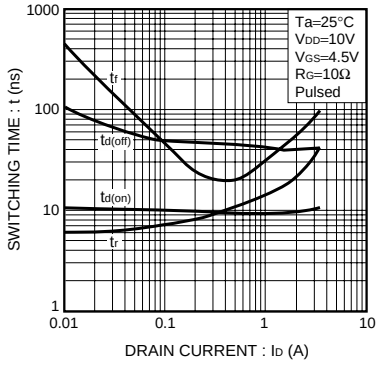


Fig.2 Switching Characteristics

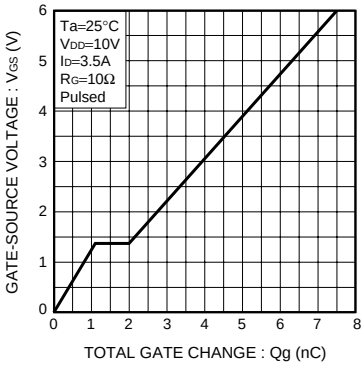


Fig.3 Dynamic Input Characteristics

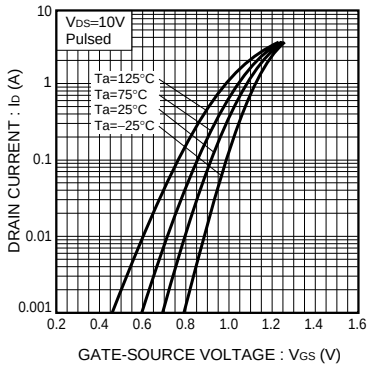


Fig.4 Typical Transfer Characteristics

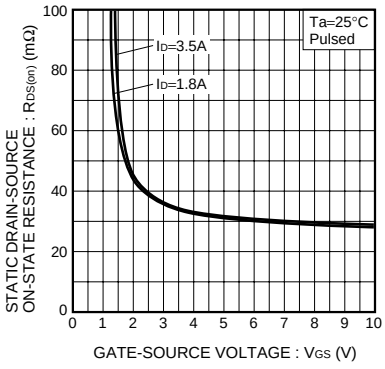


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

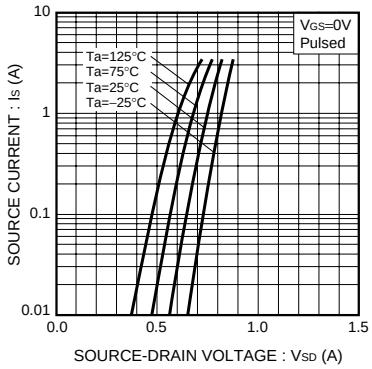


Fig.6 Source-Current vs. Source-Drain Voltage

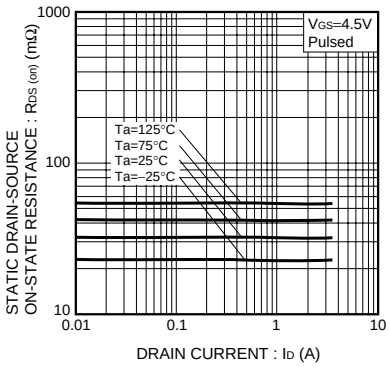


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

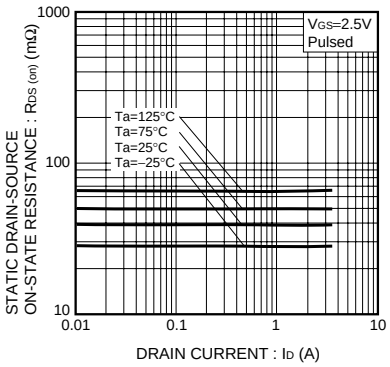


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

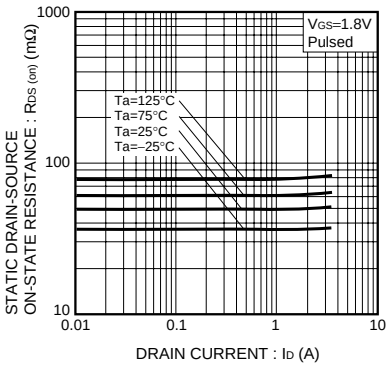


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

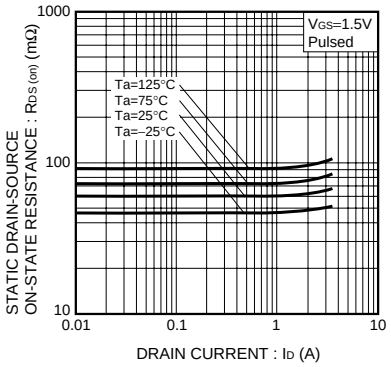


Fig.10 Static Drain-Source On-State Resistance vs. Drain Current (Ⅳ)

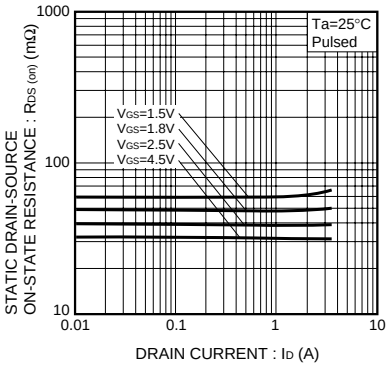


Fig.11 Static Drain-Source On-State Resistance vs. Drain Current (Ⅴ)

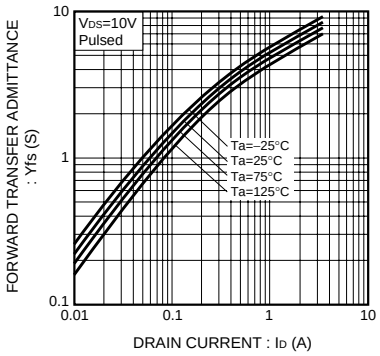


Fig.12 Forward Transfer Admittance vs. Drain Current

●Measurement circuit

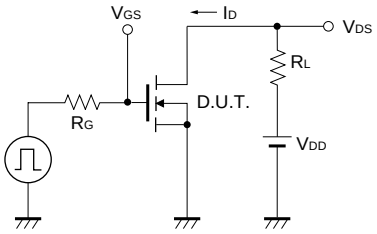


Fig.13 Switching Time Measurement Circuit

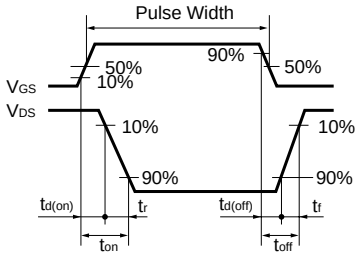


Fig.14 Switching Waveforms

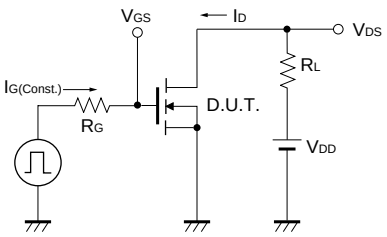


Fig.15 Gate Charge Measurement Circuit

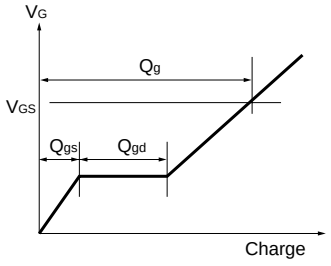


Fig.16 Gate Charge Waveform

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