1.5V Drive Nch MOSFET

RUQ050N02

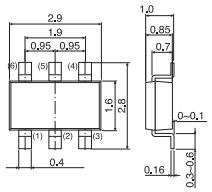
●Structure
Silicon N-channel MOSFET

●Features
1) Low On-resistance.
2) Space saving, small surface mount package (TSMT6).
3) 1.5V drive

●Applications
Switching

●Dimensions (Unit : mm)

TSMT6
SOT-457T



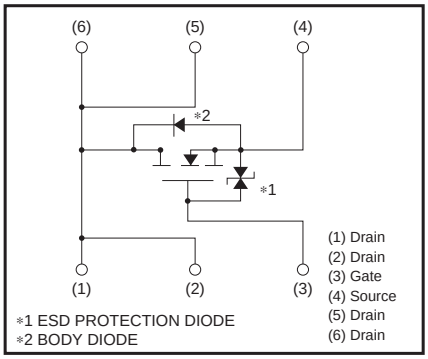
Each lead has same dimensions

Abbreviated symbol : XG

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RUQ050N02		○

●Inner circuit



●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	±5.0	A
	Pulsed	I_{DP} *1	±10	A
Source current (Body diode)	Continuous	I_S	1.0	A
	Pulsed	I_{SP} *1	10	A
Total power dissipation		P_D *2	1.25	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) *	100	°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	$R_{DS\ (on)}$ *	–	22	30	mΩ	I_D= 5.0A, V_{GS}= 4.5V
		–	27	38	mΩ	I_D= 5.0A, V_{GS}= 2.5V
		–	32	45	mΩ	I_D= 2.5A, V_{GS}= 1.8V
		–	40	80	mΩ	I_D= 1.0A, V_{GS}= 1.5V
Forward transfer admittance	$\|Y_{fs}\|$ *	6.5	–	–	S	V_{DS}= 10V, I_D= 5.0A
Input capacitance	C_{iss}	–	900	–	pF	V_{DS}= 10V
Output capacitance	C_{oss}	–	190	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	120	–	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	–	15	–	ns	V_{DD}≒ 10V
Rise time	t_r *	–	25	–	ns	I_D= 2.5A
Turn-off delay time	$t_{d\ (off)}$ *	–	70	–	ns	V_{GS}= 4.5V R_L≒ 4Ω
Fall time	t_f *	–	100	–	ns	R_G=10Ω
Total gate charge	Q_g *	–	12	–	nC	V_{DD}≒ 10V, I_D= 5.0A
Gate-source charge	Q_{gs} *	–	2.5	–	nC	V_{GS}= 4.5V
Gate-drain charge	Q_{gd} *	–	1.7	–	nC	R_L≒ 2Ω, 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= 1.0A, V_{GS}=0V

*Pulsed

●Electrical characteristics curves

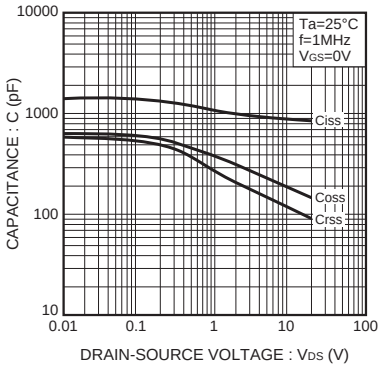


Fig.1 Typical Capacitance vs. Drain-Source Voltage

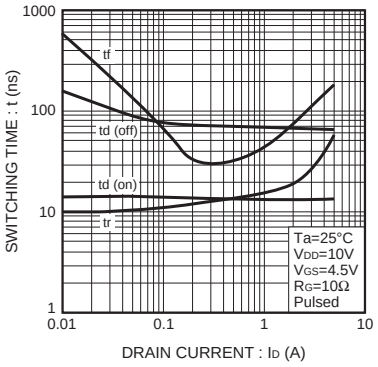


Fig.2 Switching Characteristics

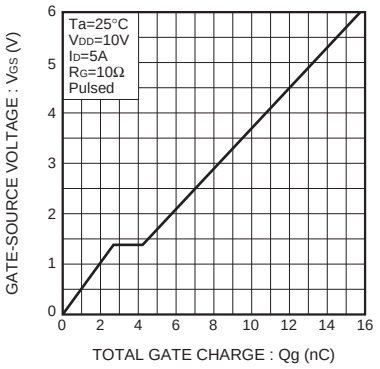


Fig.3 Dynamic Input Characteristics

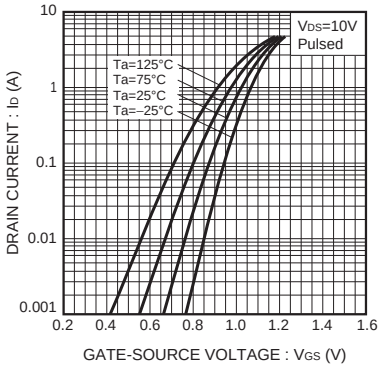


Fig.4 Typical Transfer Characteristics

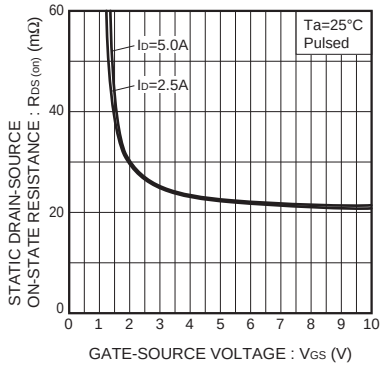


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

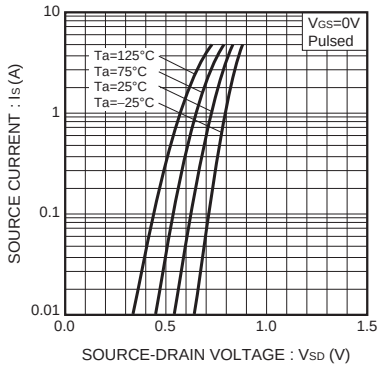


Fig.6 Source Current vs. Source-Drain Voltage

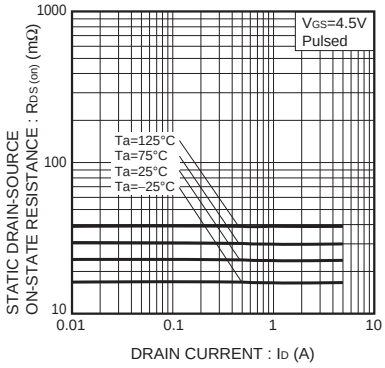


Fig.7 Static Drain-Source On-State Resistance vs. Drain current (I)

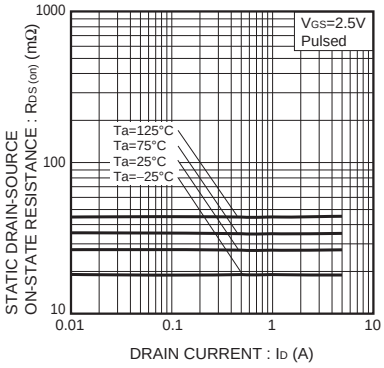


Fig.8 Static Drain-Source On-State Resistance vs. Drain current (II)

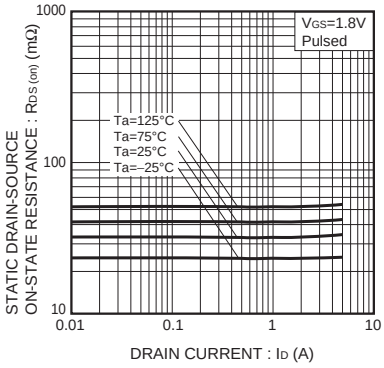


Fig.9 Static Drain-Source On-State Resistance vs. Drain current (III)

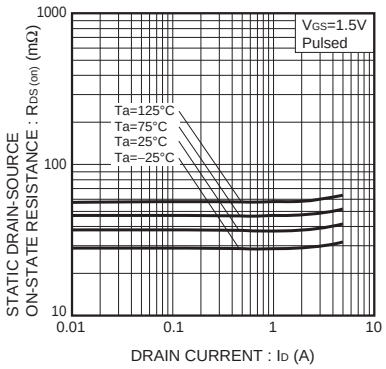


Fig.10 Static Drain-Source On-State Resistance vs. Drain current (Ⅳ)

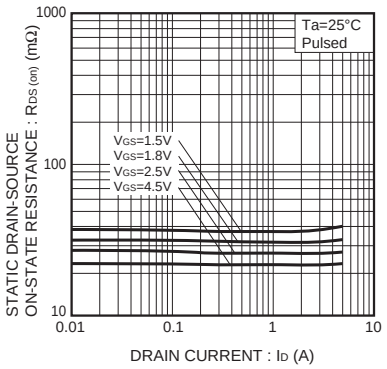


Fig.11 Static Drain-Source On-State Resistance vs. Drain current (Ⅴ)

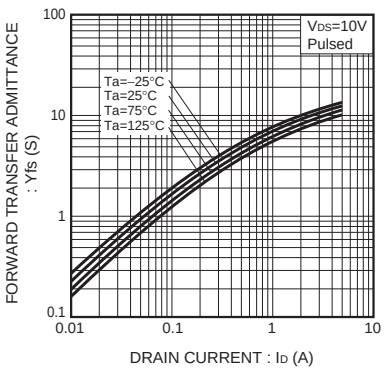


Fig.12 Forward Transfer Admittance vs. Drain current

●Measurement circuit

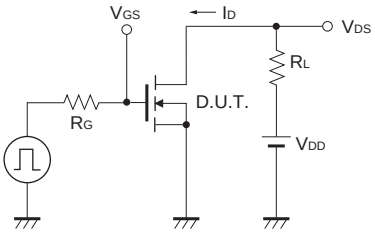


Fig.13 Switching Time Measurement Circuit

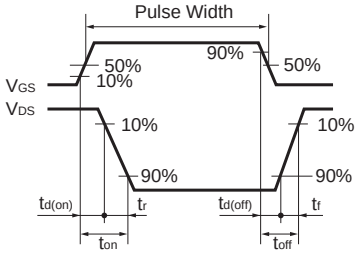


Fig.14 Switching Waveforms

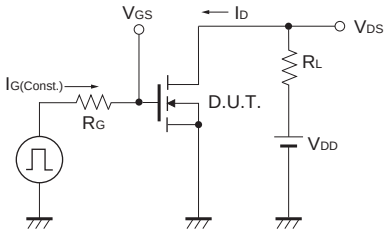


Fig.15 Gate Charge Measurement Circuit

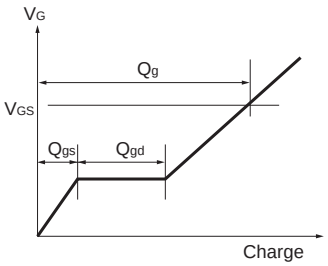


Fig.16 Gate Charge Waveform

Notes

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