

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

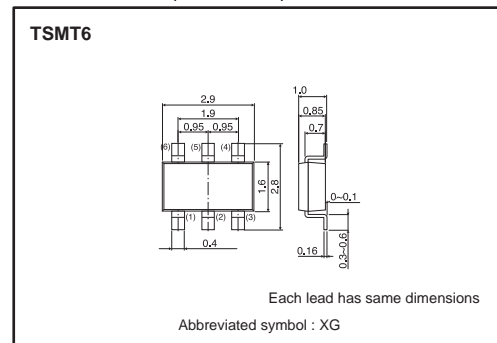
●Applications

Switching

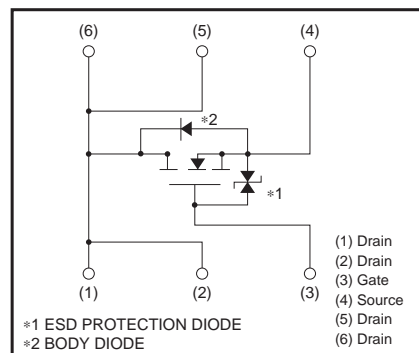
●Packaging specifications

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

●Dimensions (Unit : mm)



●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	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 Mounted on a ceramic board

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th(ch-a)}$ *	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 _{DSS (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
Fall time	t _f *	–	100	–	ns	R _L ≐ 4Ω
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

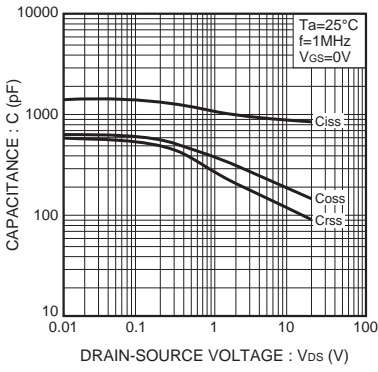


Fig.1 Typical Capacitance vs. Drain-Source Voltage

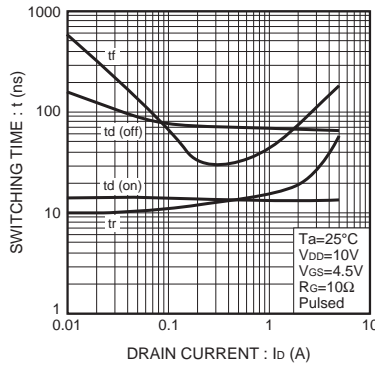


Fig.2 Switching Characteristics

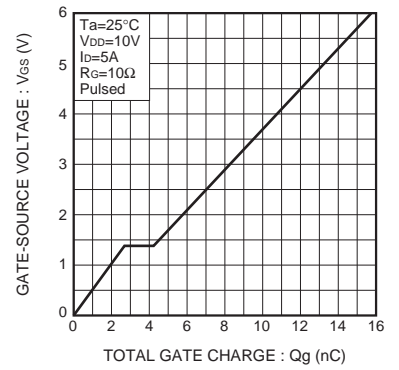


Fig.3 Dynamic Input Characteristics

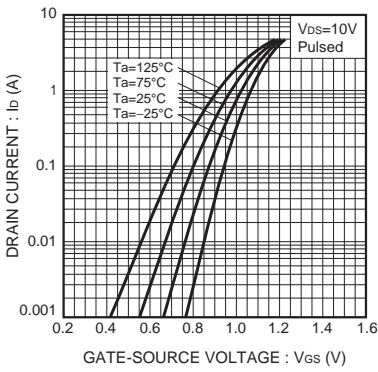


Fig.4 Typical Transfer Characteristics

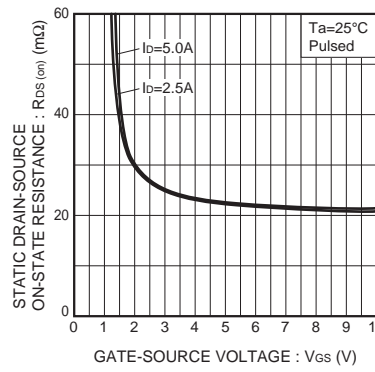


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

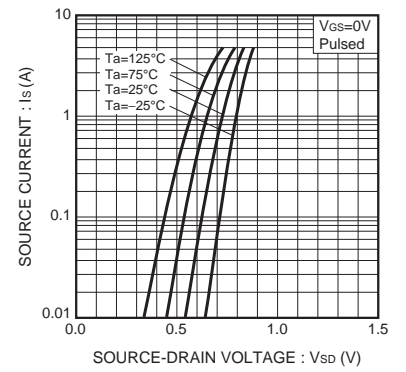


Fig.6 Source Current vs. Source-Drain Voltage

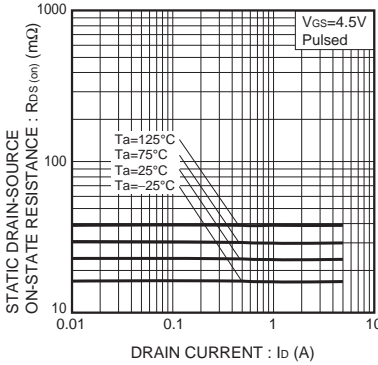


Fig.7 Static Drain-Source On-State Resistance vs. Drain current (I)

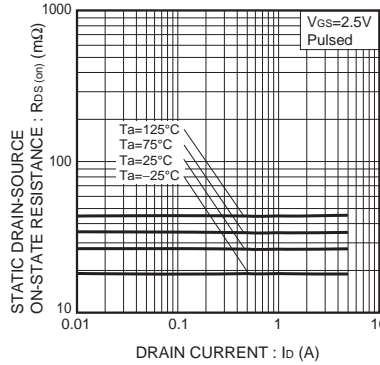


Fig.8 Static Drain-Source On-State Resistance vs. Drain current (II)

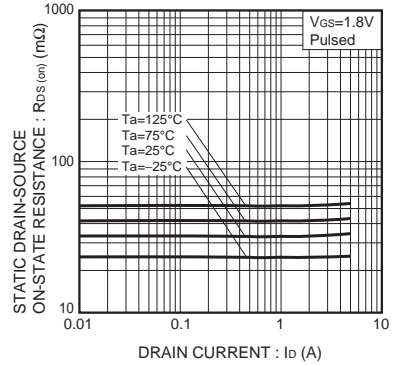


Fig.9 Static Drain-Source On-State Resistance vs. Drain current (III)

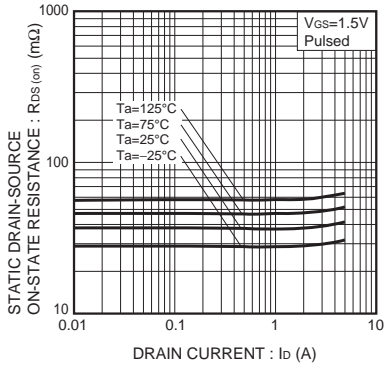


Fig.10 Static Drain-Source On-State Resistance vs. Drain current (IV)

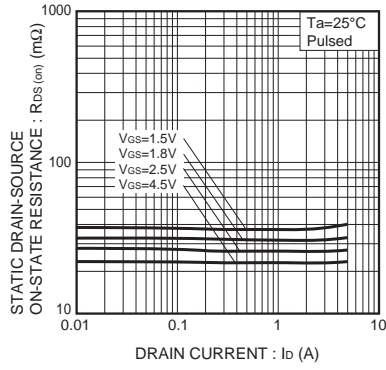


Fig.11 Static Drain-Source On-State Resistance vs. Drain current (IV)

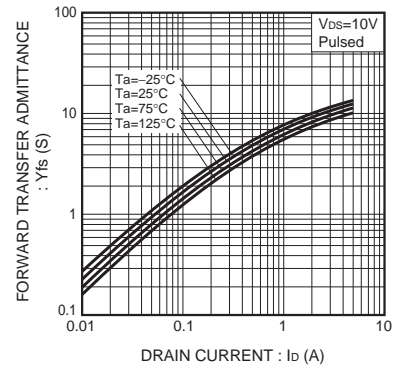


Fig.12 Forward Transfer Admittance vs. Drain current

●Measurement circuit

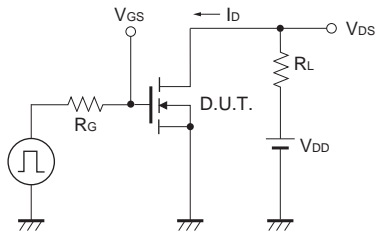


Fig.13 Switching Time Measurement Circuit

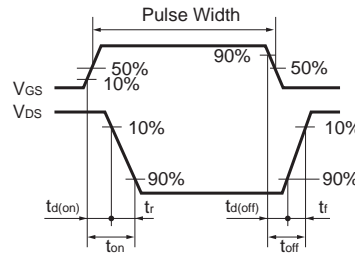


Fig.14 Switching Waveforms

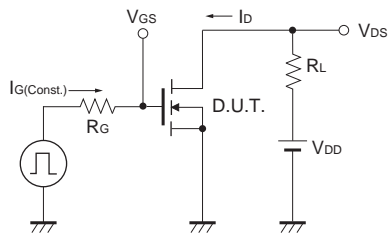


Fig.15 Gate Charge Measurement Circuit

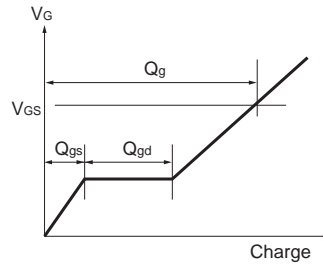


Fig.16 Gate Charge Waveform

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