

2.5V Drive Nch MOSFET

RTQ020N05

●Structure

Silicon N-channel MOSFET

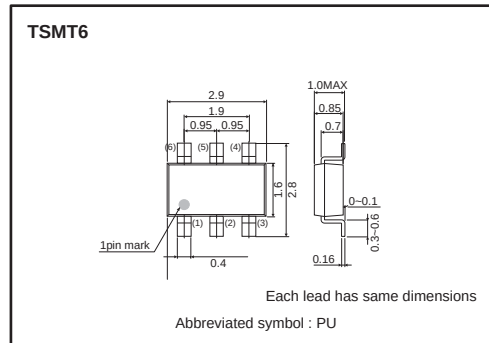
●Features

- 1) Low On-resistance.
- 2) Space savings small surface mount package (TSMT6).
- 3) Low voltage drive (2.5V drive).

●Applications

Switching

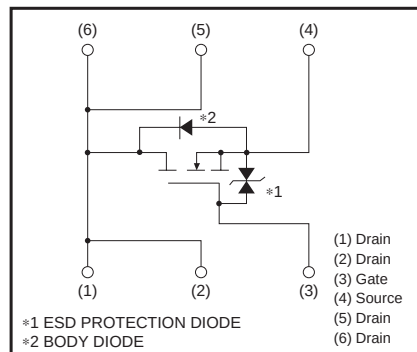
●Dimensions (Unit : mm)



●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RTQ020N05		○

●Inner circuit



●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	A
	Pulsed	I_{DP} *1	± 8	A
Source current (Body diode)	Continuous	I_S	1	A
	Pulsed	I_{SP} *1	8	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 When mounted on a ceramic board

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th(ch-a)}$ *	100	°C/W

* When mounted on a ceramic board

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	–	–	± 10	μA	$V_{GS}=\pm 12V, V_{DS}=0V$
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	$R_{DS(on)}^*$	–	140	190	m Ω	$I_D=2A, V_{GS}=4.5V$
		–	150	210	m Ω	$I_D=2A, V_{GS}=4V$
		–	200	280	m Ω	$I_D=2A, V_{GS}=2.5V$
Forward transfer admittance	$ Y_{fs} ^*$	1.6	–	–	S	$V_{DS}=10V, I_D=2A$
Input capacitance	C_{iss}	–	150	–	pF	$V_{DS}=10V$
Output capacitance	C_{oss}	–	40	–	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	–	15	–	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	–	8	–	ns	$V_{DD}\doteq 25V$
Rise time	t_r^*	–	14	–	ns	$I_D=1A$
Turn-off delay time	$t_{d(off)}^*$	–	16	–	ns	$V_{GS}=4.5V$
Fall time	t_f^*	–	10	–	ns	$R_L\doteq 25\Omega$
Total gate charge	Q_g^*	–	2.3	–	nC	$V_{DD}\doteq 25V, I_D=2A$
Gate-source charge	Q_{gs}^*	–	0.8	–	nC	$V_{GS}=4.5V$
Gate-drain charge	Q_{gd}^*	–	0.5	–	nC	$R_L\doteq 12.5\Omega, R_G=10\Omega$

*Pulsed

●Body diode characteristics (Source-drain) (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD}^*	–	–	1.2	V	$I_S=2A, V_{GS}=0V$

*Pulsed

Electrical characteristics curves

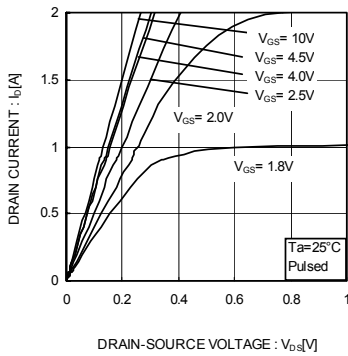


Fig.1 Typical Output Characteristics(I)

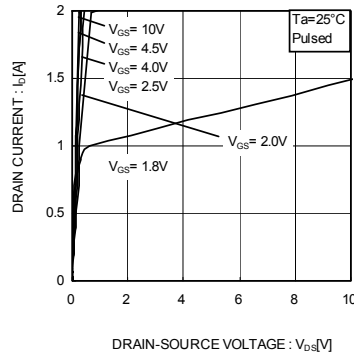


Fig.2 Typical Output Characteristics(II)

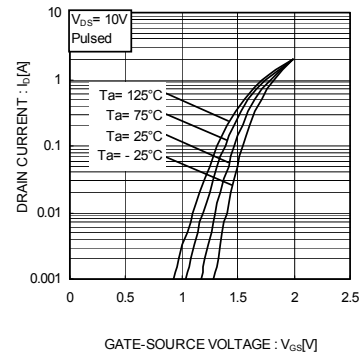


Fig.3 Typical Transfer Characteristics

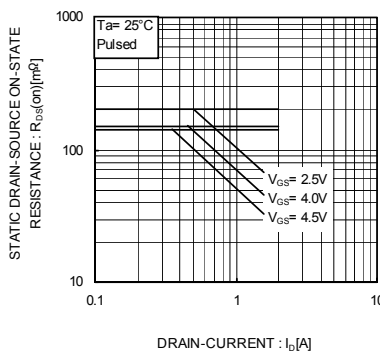


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(I)

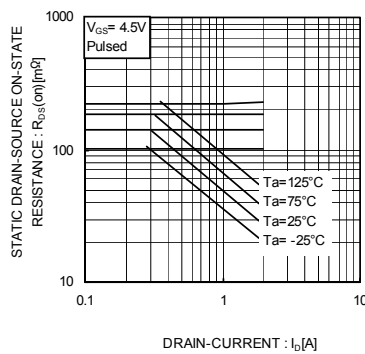


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(II)

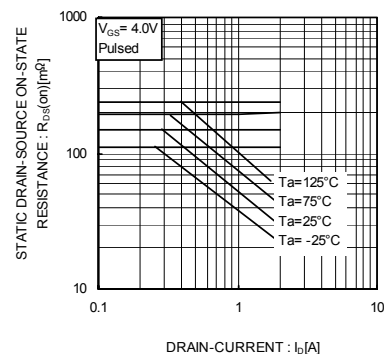


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(III)

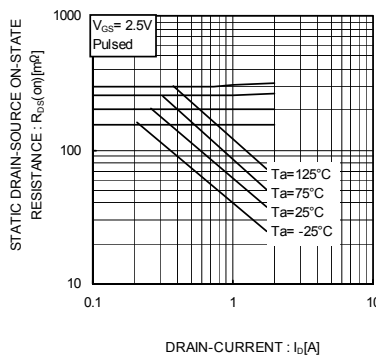


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(IV)

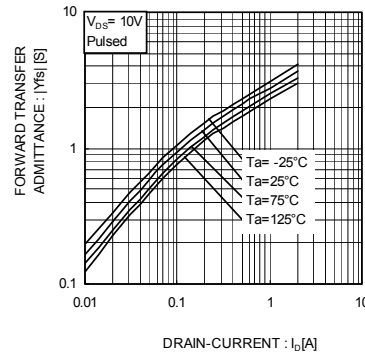


Fig.8 Forward Transfer Admittance vs. Drain Current

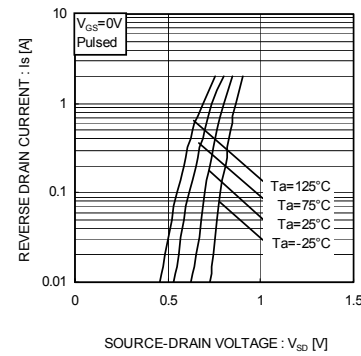


Fig.9 Reverse Drain Current vs. Source-Drain Voltage

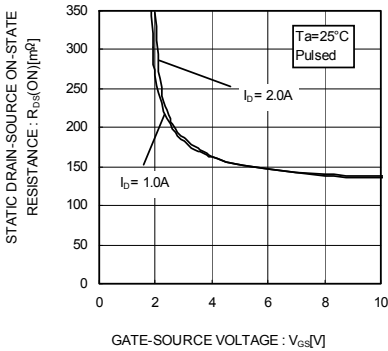


Fig.10 Static Drain-Source On-State Resistance vs. Gate Source Voltage

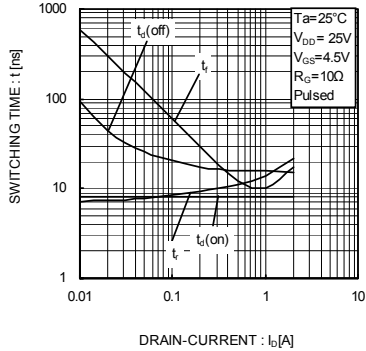


Fig.11 Switching Characteristics

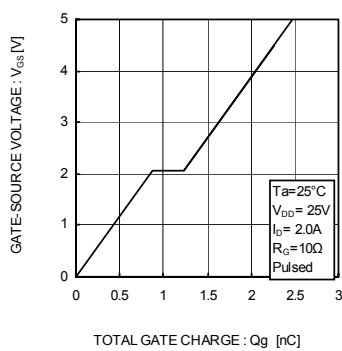


Fig.12 Dynamic Input Characteristics

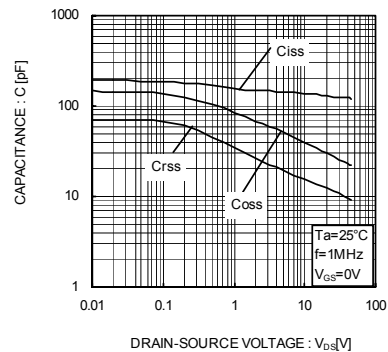


Fig.13 Typical Capacitance vs. Drain-Source Voltage

●Measurement circuit

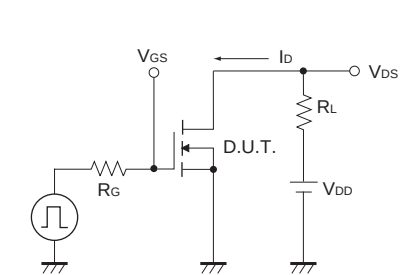


Fig.1-1 Switching time measurement circuit

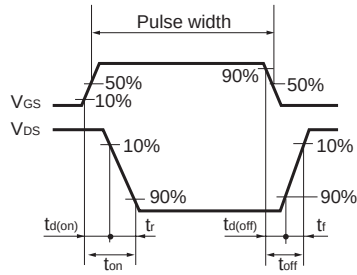


Fig.1-2 Switching waveforms

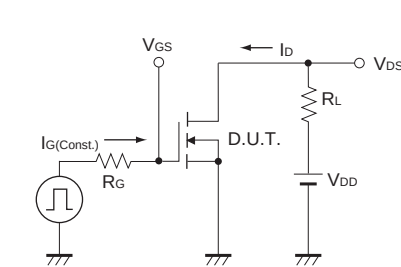


Fig.2-1 Gate charge measurement circuit

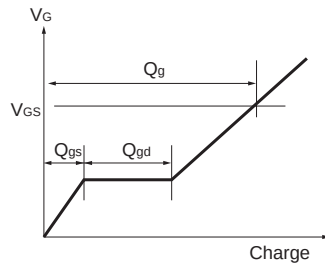


Fig.2-2 Gate charge waveform

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