

# 1.5V Drive Nch MOSFET

## RQ1C075UN

● **Structure**

Silicon N-channel MOSFET

● **Features**

- 1) Low on-resistance.
- 2) High power package(TSMT8).
- 3) Low voltage drive(1.5V drive).

● **Application**

Switching

● **Packaging specifications**

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RQ1C075UN		○

● **Absolute maximum ratings (Ta = 25°C)**

Parameter	Symbol	Limits	Unit
Drain-source voltage	$V_{DSS}$	20	V
Gate-source voltage	$V_{GSS}$	$\pm 10$	V
Drain current	Continuous	$I_D$	$\pm 7.5$ A
	Pulsed	$I_{DP}^{*1}$	$\pm 30$ A
Source current (Body Diode)	Continuous	$I_S$	1 A
	Pulsed	$I_{SP}^{*1}$	30 A
Power dissipation	$P_D^{*2}$	1.5	W
Channel temperature	Tch	150	°C
Range of storage temperature	Tstg	-55 to +150	°C

\*1  $P_w \leq 10\mu s$ , Duty cycle  $\leq 1\%$

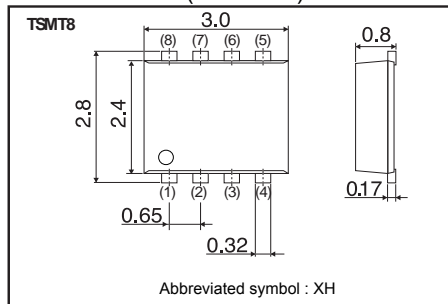
\*2 Each terminal mounted on a ceramic board.

● **Thermal resistance**

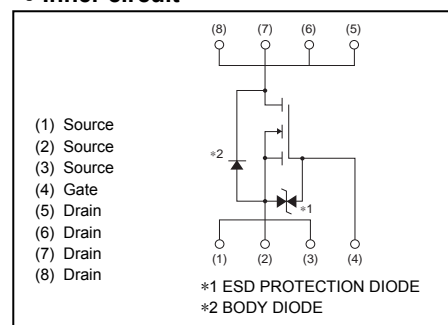
Parameter	Symbol	Limits	Unit
Channel to Ambient	$R_{th}(ch-a)^*$	83.3	°C / W

\* Each terminal mounted on a ceramic board.

● **Dimensions (Unit : mm)**



● **Inner circuit**



**● Electrical characteristics (Ta = 25°C)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	-	-	$\pm 10$	$\mu A$	$V_{GS}=\pm 10V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	20	-	-	V	$I_D=1mA, V_{GS}=0V$
Zero gate voltage drain current	$I_{DSS}$	-	-	1	$\mu A$	$V_{DS}=20V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	0.3	-	1.0	V	$V_{DS}=10V, I_D=1mA$
Static drain-source on-state resistance	$R_{DS(on)}^*$	-	11	16	m $\Omega$	$I_D=7.5A, V_{GS}=4.5V$
		-	14	20		$I_D=7.5A, V_{GS}=2.5V$
		-	17	24		$I_D=3.7A, V_{GS}=1.8V$
		-	20	40		$I_D=1.5A, V_{GS}=1.5V$
Forward transfer admittance	$ Y_{fs} ^*$	7	-	-	S	$I_D=7.5A, V_{DS}=10V$
Input capacitance	$C_{iss}$	-	1400	-	pF	$V_{DS}=10V$
Output capacitance	$C_{oss}$	-	310	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	$C_{rss}$	-	210	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	-	15	-	ns	$I_D=3.7A, V_{DD}=10V$
Rise time	$t_r^*$	-	50	-	ns	$V_{GS}=4.5V$
Turn-off delay time	$t_{d(off)}^*$	-	100	-	ns	$R_L=2.7\Omega$
Fall time	$t_f^*$	-	85	-	ns	$R_G=10\Omega$
Total gate charge	$Q_g^*$	-	18	-	nC	$I_D=7.5A, R_L=1.3\Omega$
Gate-source charge	$Q_{gs}^*$	-	3.2	-	nC	$V_{DD}=10V, R_G=10\Omega$
Gate-drain charge	$Q_{gd}^*$	-	2.9	-	nC	$V_{GS}=4.5V$

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	$V_{SD}^*$	-	-	1.2	V	$I_S=7.5A, V_{GS}=0V$

\*Pulsed

● Electrical characteristic curves

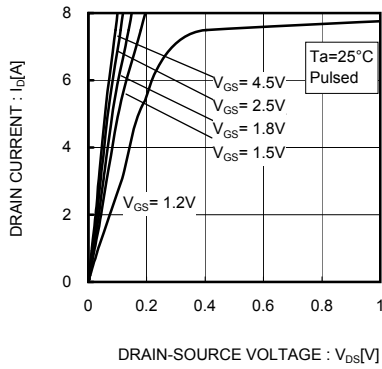


Fig.1 Typical Output Characteristics( I )

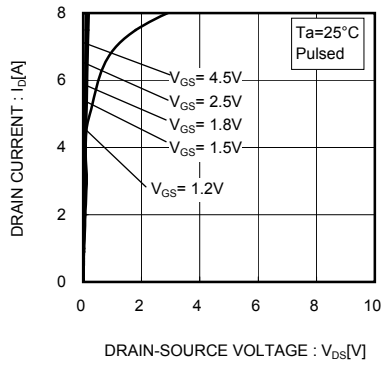


Fig.2 Typical Output Characteristics( II )

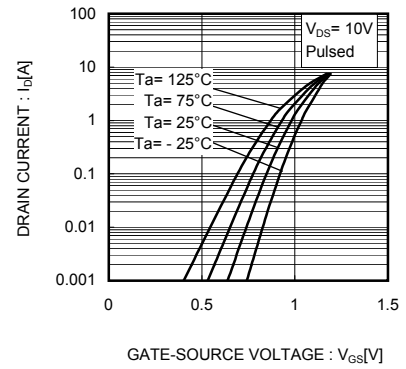


Fig.3 Typical Transfer Characteristics

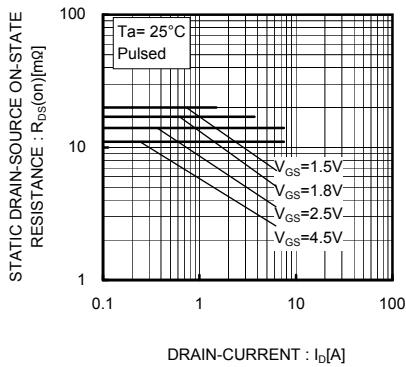


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( I )

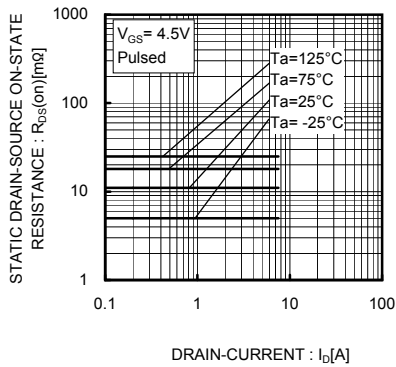


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current( II )

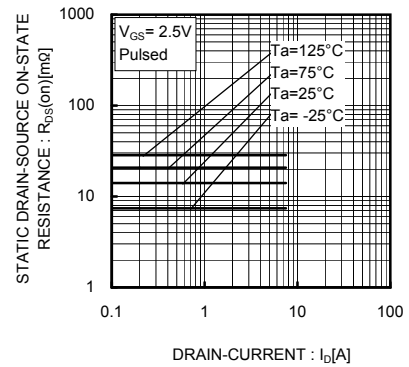


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current( III )

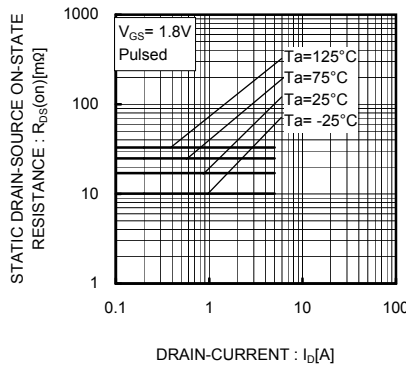


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current( IV )

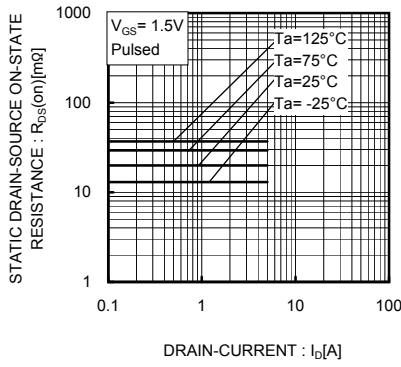


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current( V )

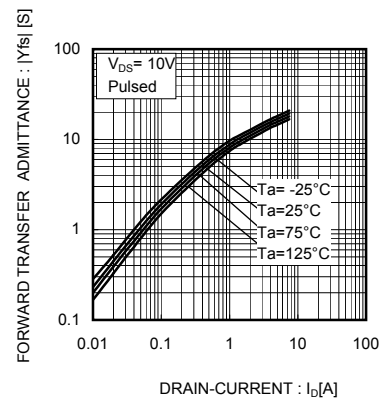


Fig.9 Forward Transfer Admittance vs. Drain Current

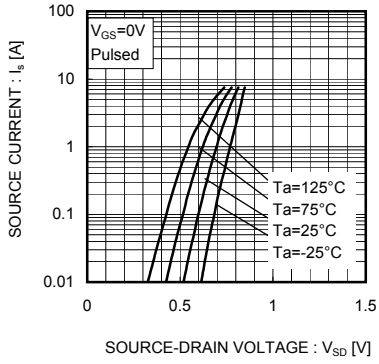


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

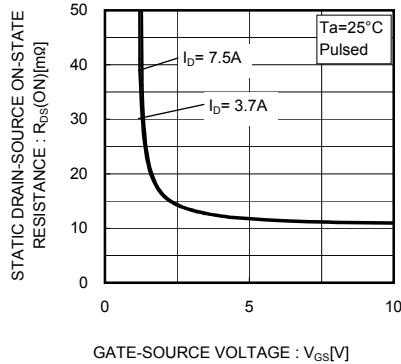


Fig.11 Static Drain-Source On-State Resistance vs. Gate Source Voltage

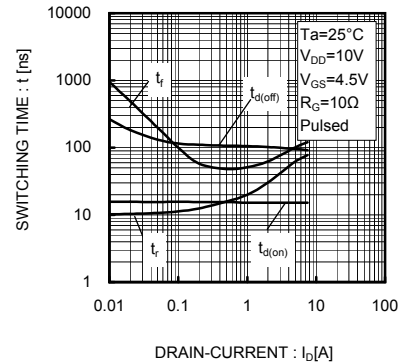


Fig.12 Switching Characteristics

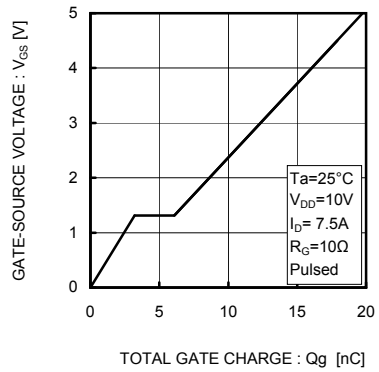


Fig.13 Dynamic Input Characteristics

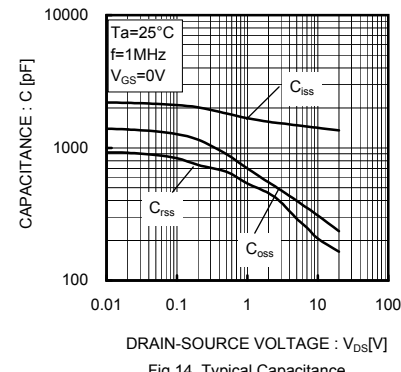


Fig.14 Typical Capacitance vs. Drain-Source Voltage

● Measurement circuits

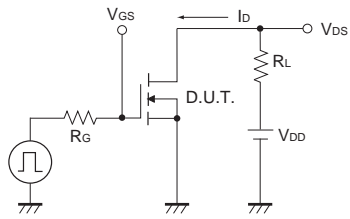


Fig.1-1 Switching time measurement circuit

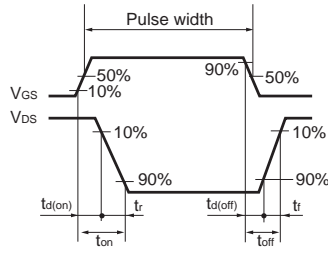


Fig.1-2 Switching waveforms

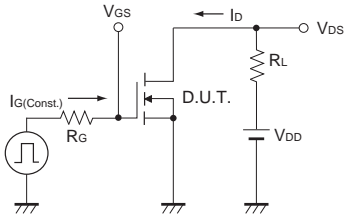


Fig.2-1 Gate charge measurement circuit

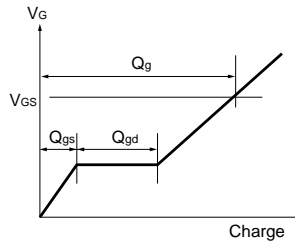


Fig.2-2 Gate Charge Waveform

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