1.5V Drive Pch MOSFET

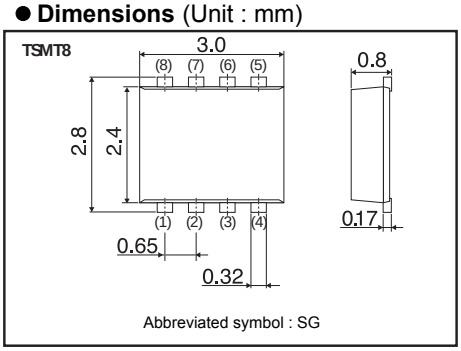
RQ1A070AP

● Structure
Silicon P-channel MOSFET

● Features
1) Low on-resistance.
2) Low voltage drive (1.5V drive).
3) Small surface mount package (TSMT8).

● Application
Switching

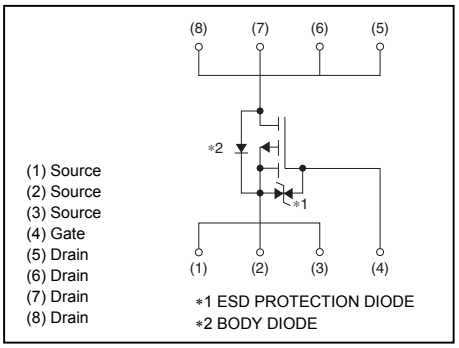
● Dimensions (Unit : mm)



● Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RQ1A070AP		O

● Inner circuit



● Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	−12	V
Gate-source voltage		V_{GSS}	0 to −8	V
Drain current	Continuous	I_D	±7	A
	Pulsed	I_{DP} *1	±28	A
Source current (Body Diode)	Continuous	I_S	−1	A
	Pulsed	I_{SP} *1	−28	A
Power dissipation		P_D *2	1.5	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)*	83.3	°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}=−8V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)DSS}$	−12	-	-	V	I_D=−1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	-	-	−10	μA	V_{DS}=−12V, V_{GS}=0V
Gate threshold voltage	$V_{GS\ (th)}$	−0.3	-	−1.0	V	V_{DS}=−6V, I_D=−1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$ *	-	10	14	mΩ	I_D=−7A, V_{GS}=−4.5V
		-	13	19		I_D=−3.5A, V_{GS}=−2.5V
		-	18	27		I_D=−3.5A, V_{GS}=−1.8V
		-	24	48		I_D=−1.4A, V_{GS}=−1.5V
Forward transfer admittance	$\lvert Y_{fs} \rvert$*	11	-	-	S	V_{DS}=−6V, I_D=−7A
Input capacitance	C_{iss}	-	7800	-	pF	V_{DS}=−6V
Output capacitance	C_{oss}	-	900	-	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	-	850	-	pF	f=1MHz
Turn-on delay time	$t_{d(on)}$*	-	25	-	ns	V_{DD}≒−6V, I_D=−3.5A,
Rise time	t_r *	-	135	-	ns	V_{GS}=−4.5V
Turn-off delay time	$t_{d(off)}$*	-	550	-	ns	R_L=1.7Ω
Fall time	t_f *	-	260	-	ns	R_G=10Ω
Total gate charge	Q_g *	-	80	-	nC	V_{DD}≒−6V, I_D=−7A,
Gate-source charge	Q_{gs} *	-	12	-	nC	V_{GS}=−4.5V
Gate-drain charge	Q_{gd}*	-	13	-	nC	

*Pulsed

●**Body diode characteristics** (Source-Drain)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD} *	-	-	−1.2	V	I_s=−7A, V_{GS}=0V

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (Ⅰ)

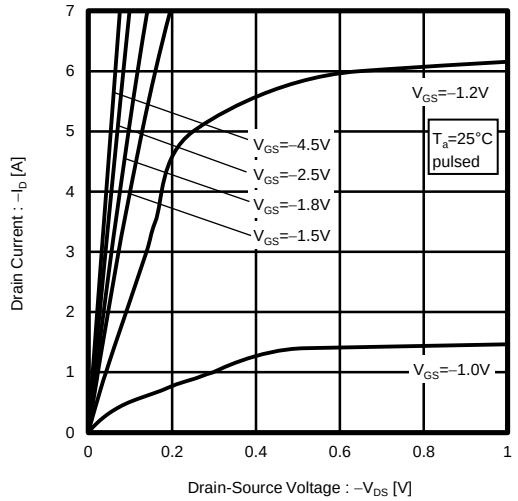


Fig.2 Typical Output Characteristics (Ⅱ)

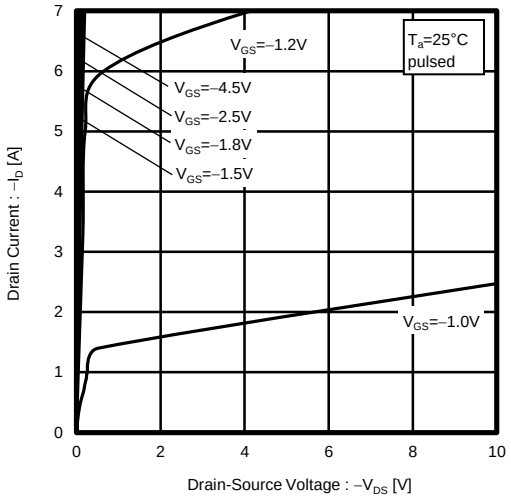


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

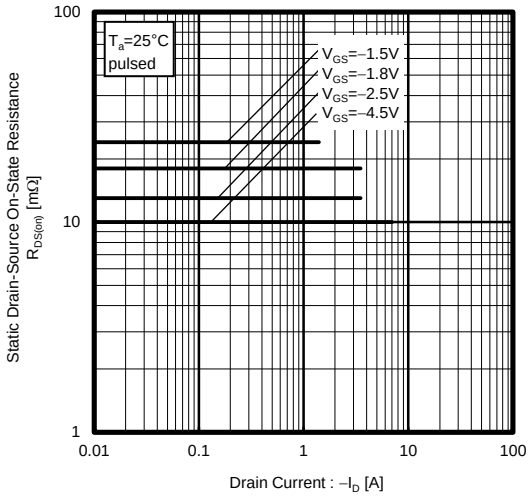


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

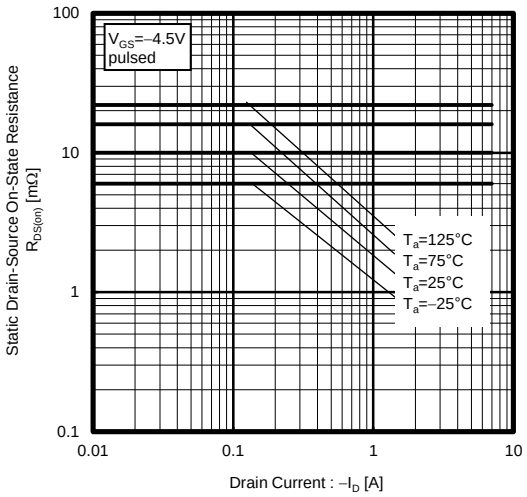


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

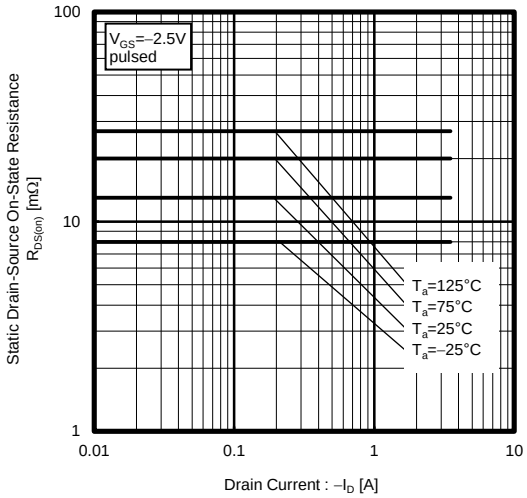


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

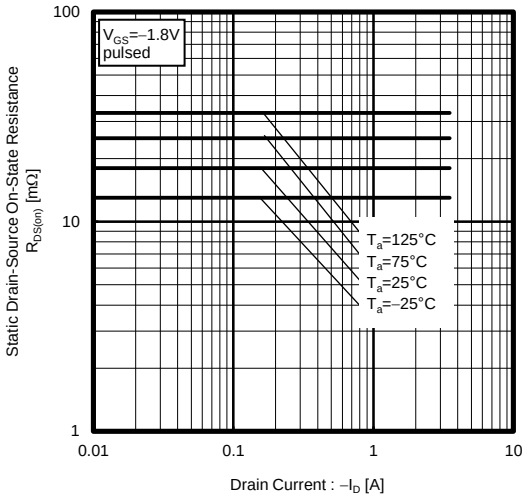


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current

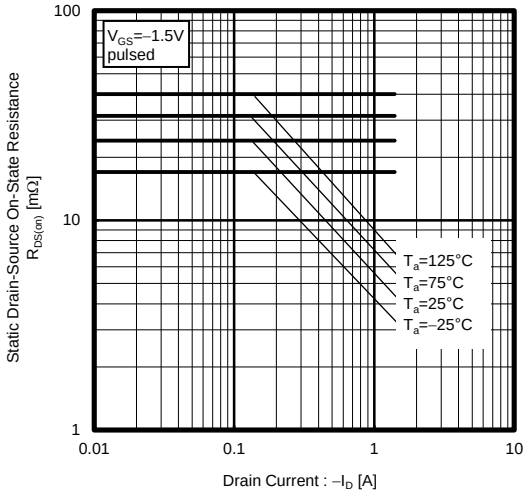


Fig.8 Forward Transfer Admittance vs. Drain Current

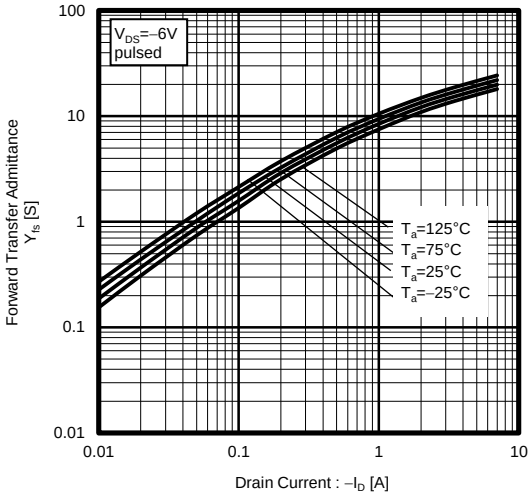


Fig.9 Typical Transfer Characteristics

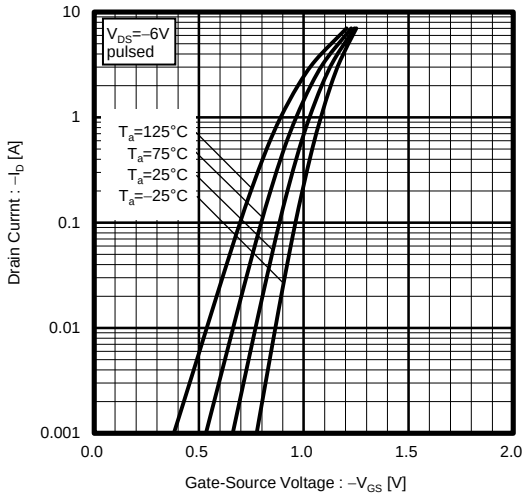


Fig.10 Source Current vs. Source-Drain Voltage

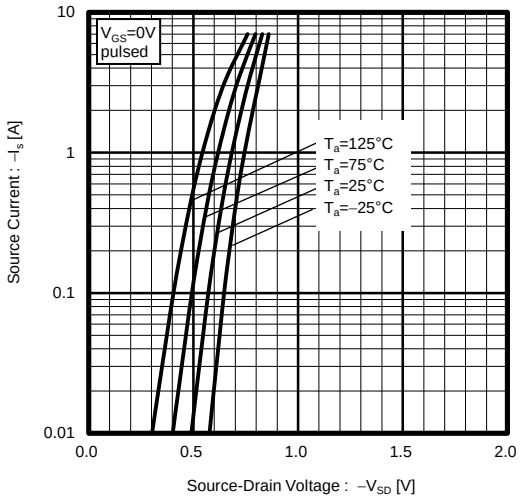


Fig.11 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

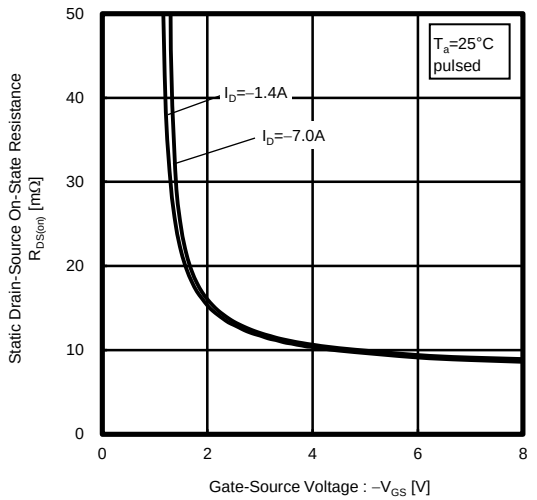


Fig.12 Switching Characteristics

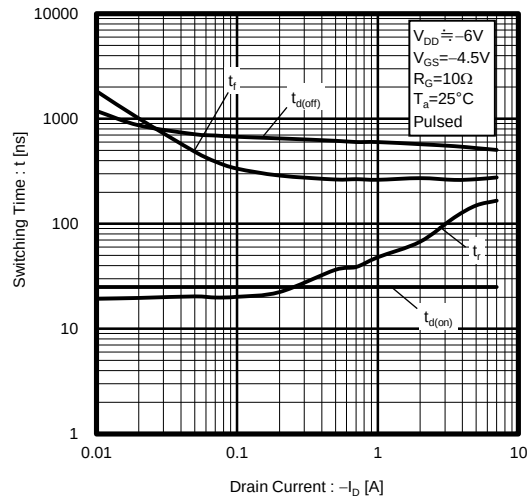


Fig.13 Dynamic Input Characteristics

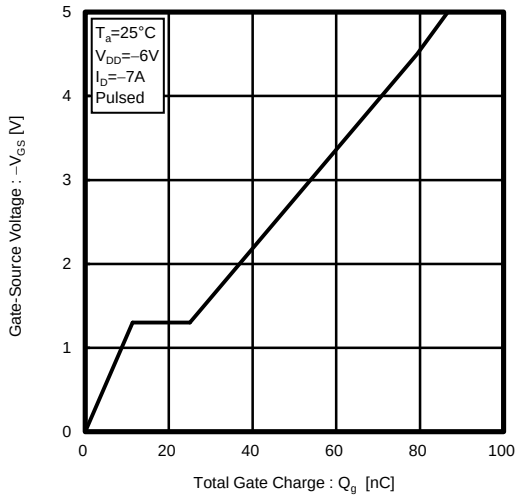


Fig.14 Typical Capacitance vs. Drain-Source Voltage

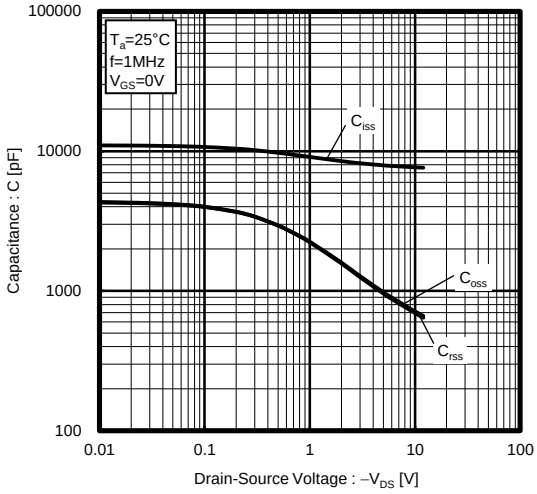


Fig.15 Maximum Safe Operating Area

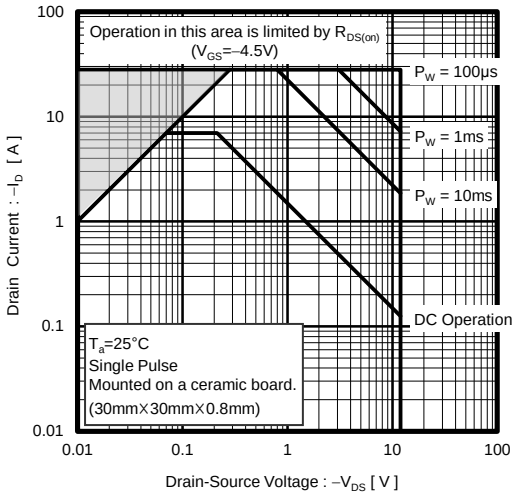
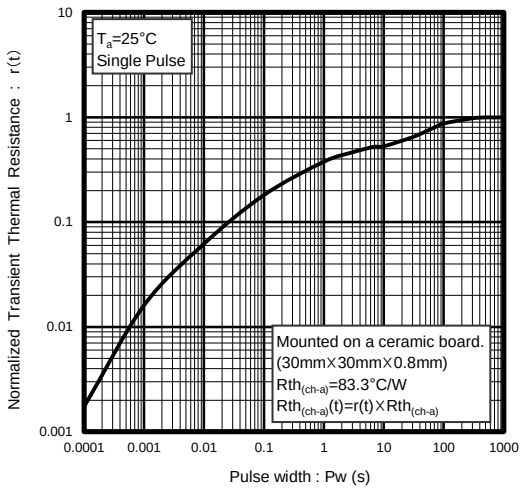


Fig.16 Normalized Transient Thermal Resistance v.s. Pulse Width



● Measurement circuits

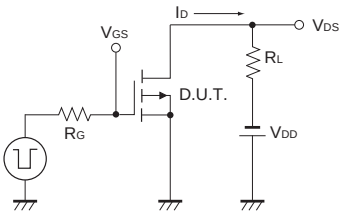


Fig.1-1 Switching Time Measurement Circuit

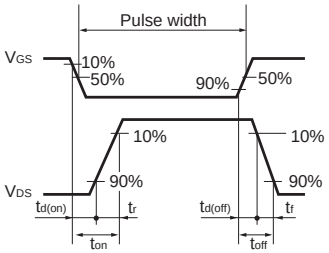


Fig.1-2 Switching Waveforms

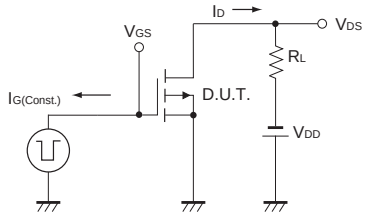


Fig.2-1 Gate Charge Measurement Circuit

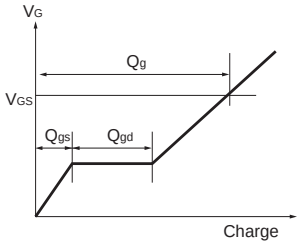


Fig.2-2 Gate Charge Waveform

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