

# 1.5V Drive Pch MOSFET

## RQ1A070ZP

### ●Structure

Silicon P-channel MOSFET

### ●Features

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

### ●Applications

Switching

### ●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RQ1A070ZP		○

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

<It is the same ratings for Tr1 and Tr2.>

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DSS}$	-12	V	
Gate-source voltage	$V_{GSS}$	±10	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
Total power dissipation	$P_D$ *2	1.5	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  $\leq 1\%$

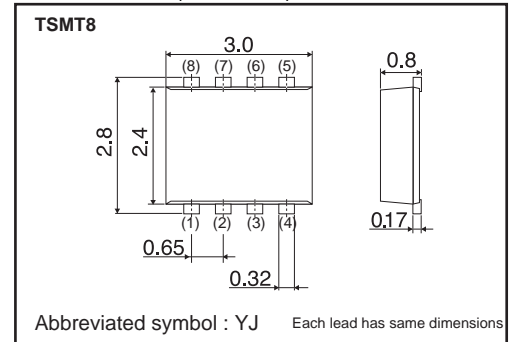
\*2 When mounted on a ceramic board

### ●Thermal resistance

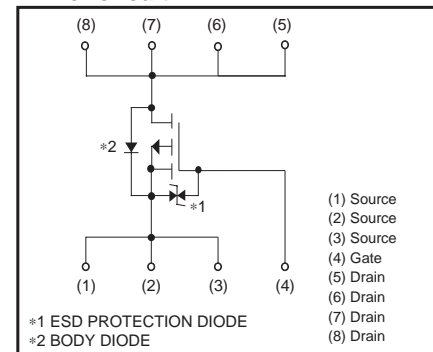
Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th(ch-a)}$ *	83.3	°C/W

\* 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	$V_{(BR)DSS}$	-12	-	-	V	$I_D = -1mA, V_{GS}=0V$
Zero gate voltage drain current	$I_{DSS}$	-	-	-1	$\mu A$	$V_{DS} = -12V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	-0.3	-	-1.0	V	$V_{DS} = -6V, I_D = -1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	-	8	12	$m\Omega$	$I_D = -7A, V_{GS} = -4.5V$
		-	11	16	$m\Omega$	$I_D = -3.5A, V_{GS} = -2.5V$
		-	15	23	$m\Omega$	$I_D = -3.5A, V_{GS} = -1.8V$
		-	19	38	$m\Omega$	$I_D = -1.4A, V_{GS} = -1.5V$
Forward transfer admittance	$ Y_{fs} $ *	12	-	-	S	$V_{DS} = -6V, I_D = -7A$
Input capacitance	$C_{iss}$	-	7400	-	pF	$V_{DS} = -6V$
Output capacitance	$C_{oss}$	-	800	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	$C_{rss}$	-	750	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	-	35	-	ns	$V_{DD} = -6V$
Rise time	$t_r$ *	-	95	-	ns	$I_D = -3.5A$
Turn-off delay time	$t_{d(off)}$ *	-	310	-	ns	$V_{GS} = -4.5V$ $R_L = 1.7\Omega$
Fall time	$t_f$ *	-	190	-	ns	$R_G=10\Omega$
Total gate charge	$Q_g$ *	-	58	-	nC	$V_{DD} = -6V$ $I_D = -7A$
Gate-source charge	$Q_{gs}$ *	-	11	-	nC	$V_{GS} = -4.5V$
Gate-drain charge	$Q_{gd}$ *	-	10	-	nC	$R_L = 0.86\Omega / R_G=10\Omega$

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	$V_{SD}$ *	-	-	-1.2	V	$I_S = -7A, V_{GS}=0V$

\* Pulsed

●Electrical characteristics curves

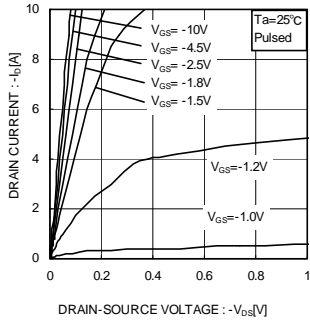


Fig.1 Typical output characteristics(I)

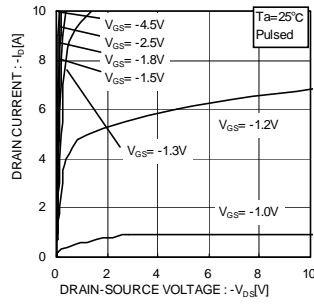


Fig.2 Typical output characteristics(II)

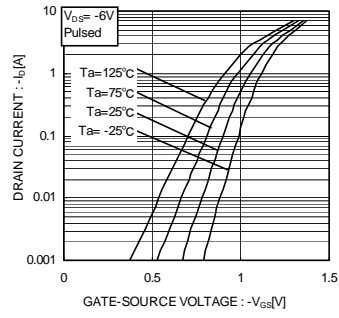


Fig.3 Typical Transfer Characteristics

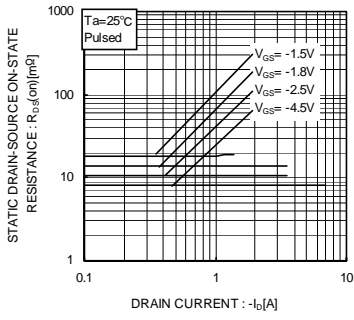


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(I)

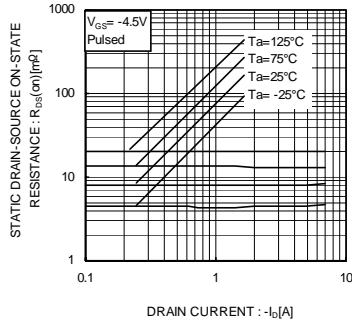


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(II)

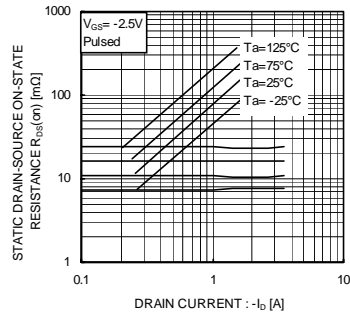


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(III)

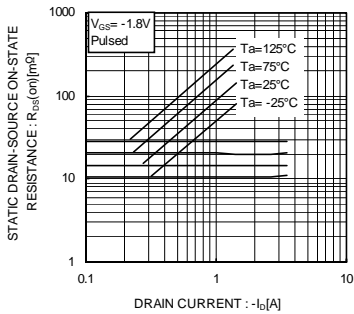


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(IV)

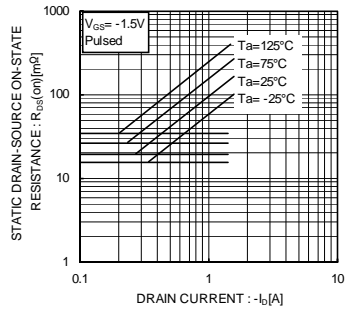


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current(V)

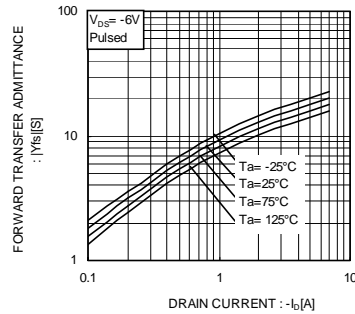


Fig.9 Forward Transfer Admittance vs. Drain Current

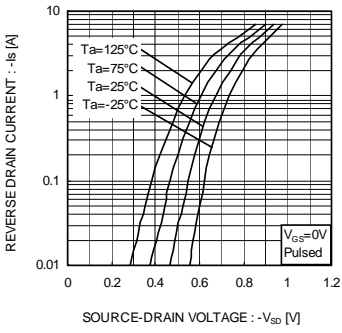


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

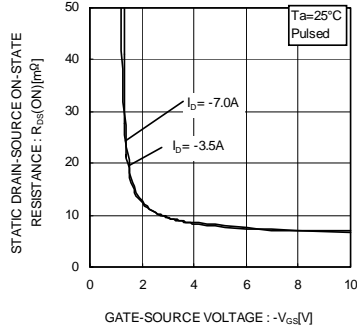


Fig.11 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

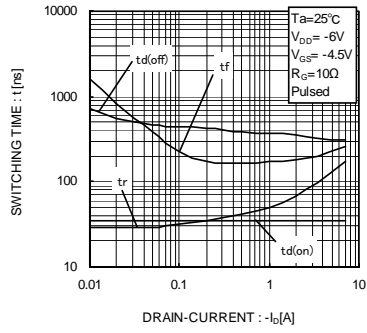


Fig.12 Switching Characteristics

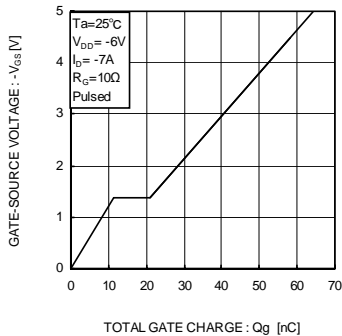


Fig.13 Dynamic Input Characteristics

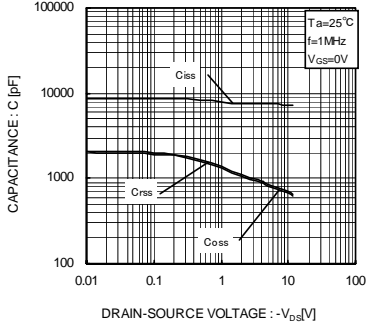


Fig.14 Typical Capacitance vs. Drain-Source Voltage

●Measurement circuits

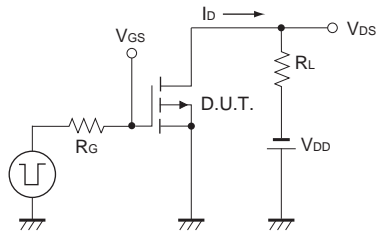


Fig.1-1 Switching Time Measurement Circuit

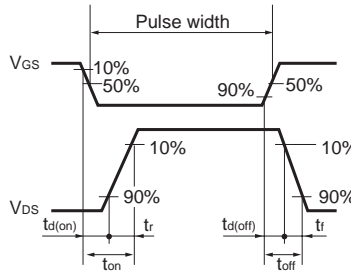


Fig.1-2 Switching Waveforms

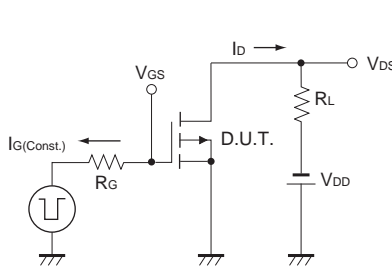


Fig.2-1 Gate Charge Measurement Circuit

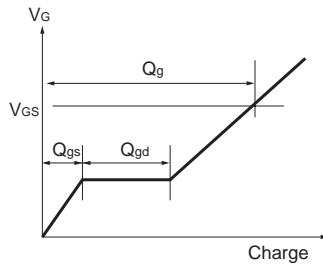


Fig.2-2 Gate Charge Waveform

●Notice

This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit.

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