

# 1.5V Drive Pch MOSFET

## RZF013P01

### ●Structure

Silicon P-channel MOSFET

### ●Features

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

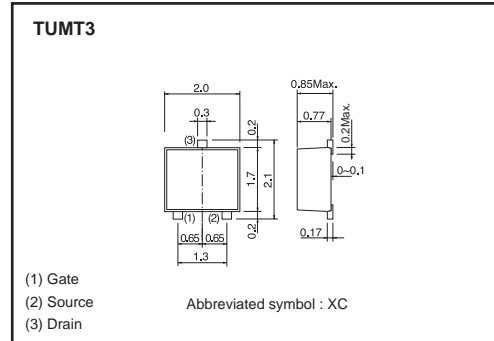
### ●Applications

Switching

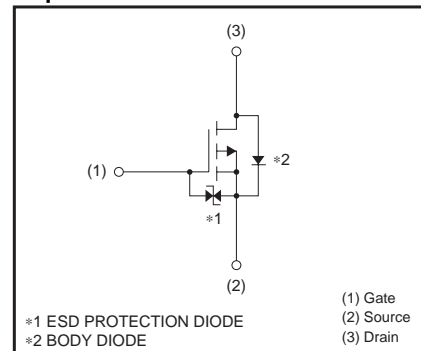
### ●Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	3000
RZF013P01		○

### ●Dimensions (Unit : mm)



### ●Equivalent circuit



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

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DS}$	-12	V	
Gate-source voltage	$V_{GS}$	±10	V	
Drain current	Continuous	$I_D$	±1.3	A
	Pulsed	$I_{DP}$ *1	±5.2	A
Source current (Body diode)	Continuous	$I_S$ *1	-0.6	A
	Pulsed	$I_{SP}$	-5.2	A
Total power dissipation	$P_D$ *2	0.8	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	$R_{th(ch-a)}$ *	156	°C / W

\* When mounted on a ceramic board

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	-	-	$\pm 10$	$\mu A$	$V_{GS}=\pm 10V, V_{DS}=0V$
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	$R_{DS(on)}$ *	-	190	260	m $\Omega$	$I_D=-1.3A, V_{GS}=-4.5V$
		-	280	390	m $\Omega$	$I_D=-0.6A, V_{GS}=-2.5V$
		-	400	600	m $\Omega$	$I_D=-0.6A, V_{GS}=-1.8V$
		-	530	1060	m $\Omega$	$I_D=-0.2A, V_{GS}=-1.5V$
Forward transfer admittance	$ Y_{fs} $ *	1.4	-	-	S	$V_{DS}=-6V, I_D=-1.3A$
Input capacitance	$C_{iss}$	-	290	-	pF	$V_{DS}=-6V$
Output capacitance	$C_{oss}$	-	28	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	$C_{rss}$	-	21	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	-	8	-	ns	$V_{DD}\hat{=} -6V$
Rise time	$t_r$ *	-	10	-	ns	$I_D=-0.6A$
Turn-off delay time	$t_{d(off)}$ *	-	30	-	ns	$V_{GS}=-4.5V$
Fall time	$t_f$ *	-	9	-	ns	$R_L\hat{=} 10\Omega$
Total gate charge	$Q_g$ *	-	2.4	-	nC	$V_{DD}\hat{=} -6V, R_L\hat{=} 4.6\Omega$
Gate-source charge	$Q_{gs}$ *	-	0.6	-	nC	$I_D=-1.3A, R_G=10\Omega$
Gate-drain charge	$Q_{gd}$ *	-	0.4	-	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	$I_S=-1.3A, V_{GS}=0V$

\*Pulsed

●Electrical characteristic curves

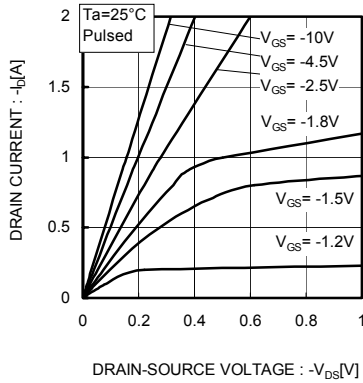


Fig.1 Typical Output Characteristics ( I )

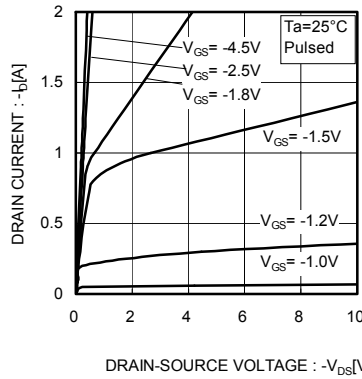


Fig.2 Typical Output Characteristics( II )

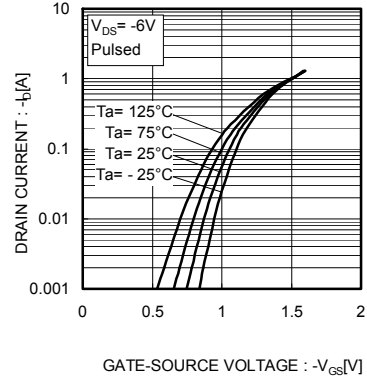


Fig.3 Typical Transfer Characteristics

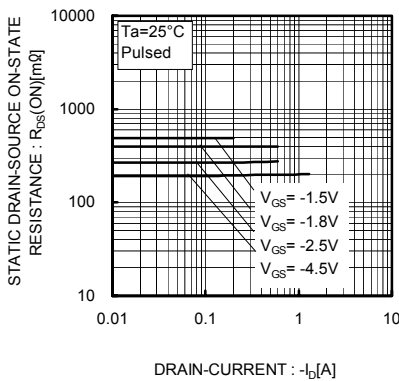


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( I )

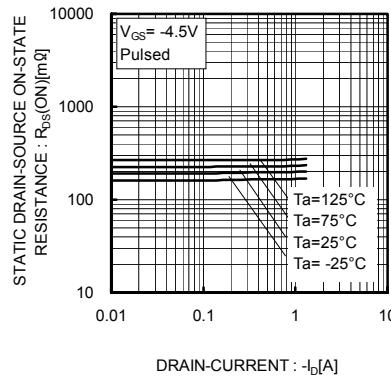


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current( II )

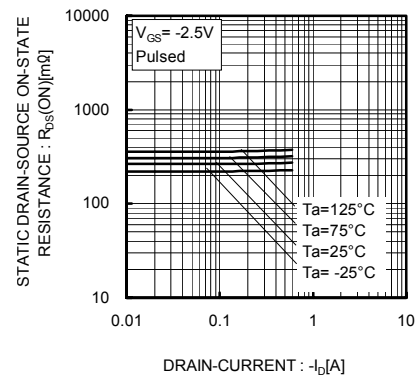


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(III)

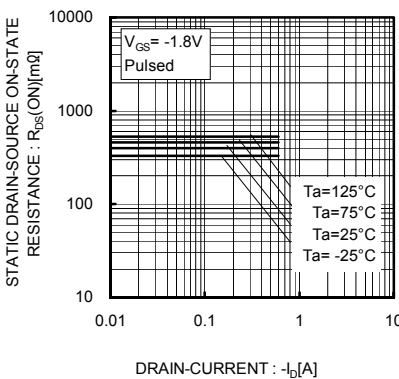


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(IV)

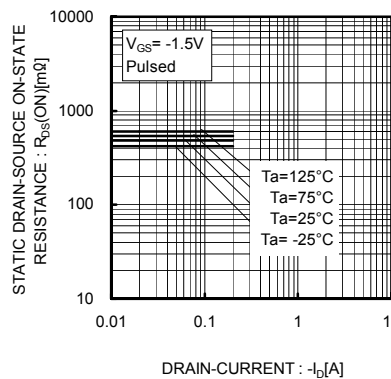


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current(V)

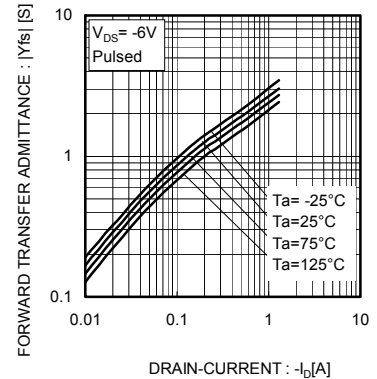


Fig.9 Forward Transfer Admittance vs. Drain Current

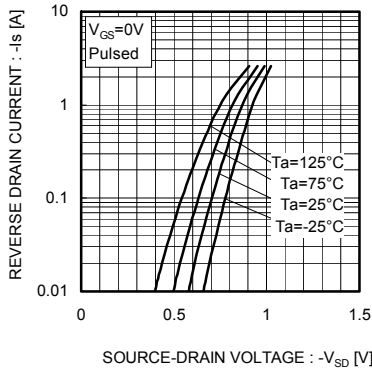


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

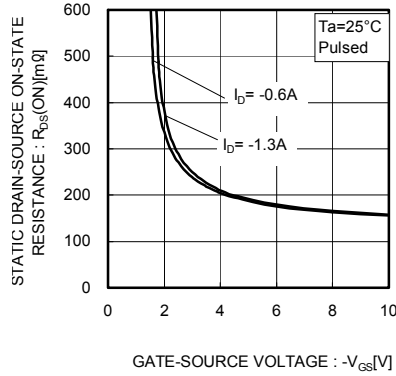


Fig.11 Static Drain-Source On-State Resistance vs. Gate Source Voltage

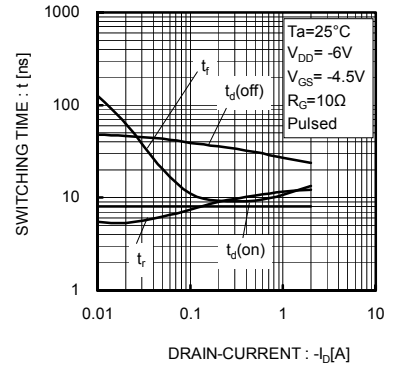


Fig.12 Switching Characteristics

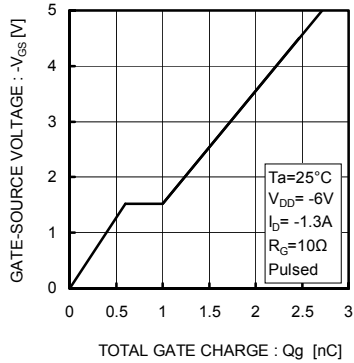


Fig.13 Dynamic Input Characteristics

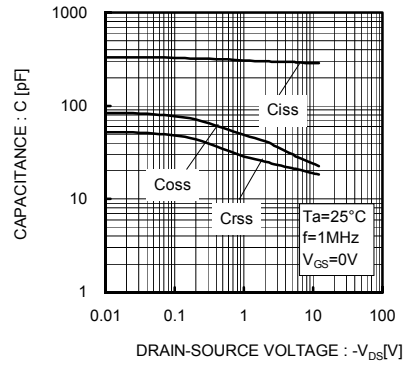


Fig.14 Typical Capacitance vs. Drain-Source Voltage

●Measurement circuits

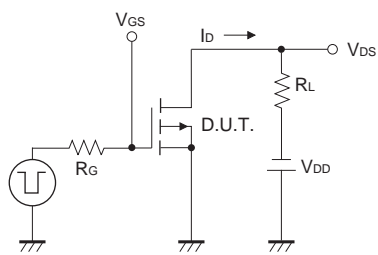


Fig.1-1 Switching Time Measurement Circuit

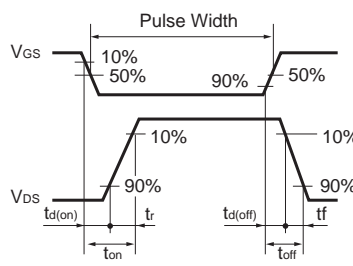


Fig.1-2 Switching Waveforms

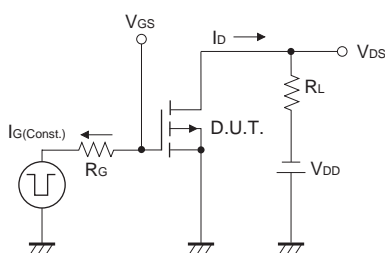


Fig.2-1 Gate Charge Measurement Circuit

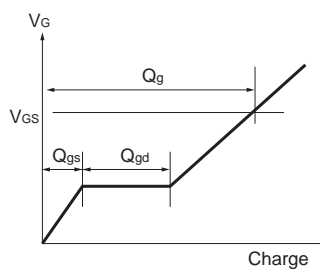


Fig.2-2 Gate Charge Waveform

●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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