4V Drive Pch MOSFET

RRR040P03

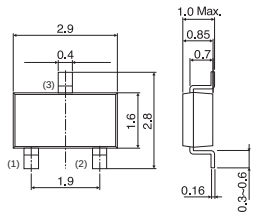
● Structure
Silicon P-channel MOSFET

● Features
1) Low On-resistance.
2) Space saving small surface mount package (TSMT3).
3) 4V drive.

● Application
Switching

● Dimensions (Unit : mm)

TSMT3

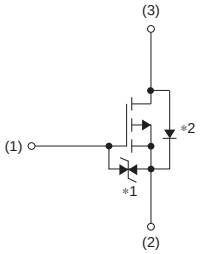


Abbreviated symbol : UG

● Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	3000
RRR040P03		○

● Inner circuit



(1) Gate
(2) Source
(3) Drain

∗1 ESD PROTECTION DIODE
∗2 BODY DIODE

● Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	−30	V
Gate-source voltage		V_{GSS}	±20	V
Drain current	Continuous	I_D	±4	A
	Pulsed	I_{DP} *1	±16	A
Source current (Body Diode)	Continuous	I_S	−0.8	A
	Pulsed	I_{SP} *1	−16	A
Power dissipation		P_D *2	1.0	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)*	125	°C / W

*Mounted on a ceramic board.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	±10	μA	V_{GS}=±20V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)DSS}$	−30	-	-	V	I_D=−1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	-	-	−1	μA	V_{DS}=−30V, V_{GS}=0V
Gate threshold voltage	$V_{GS\ (th)}$	−1.0	-	−2.5	V	V_{DS}=−10V, I_D=−1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$*	-	32	45	mΩ	I_D=−4A, V_{GS}=−10V
		-	45	63		I_D=−2A, V_{GS}=−4.5V
		-	52	72		I_D=−2A, V_{GS}=−4.0V
Forward transfer admittance	$\|Y_{fs}\|$*	2.7	-	-	S	I_D=−4A, V_{DS}=−10V
Input capacitance	C_{iss}	-	1000	-	pF	V_{DS}=−10V
Output capacitance	C_{oss}	-	150	-	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	-	130	-	pF	f=1MHz
Turn-on delay time	$t_{d(on)}$*	-	15	-	ns	I_D=−2A, V_{DD}≒−15V
Rise time	t_r *	-	30	-	ns	V_{GS}=−10V
Turn-off delay time	$t_{d(off)}$*	-	85	-	ns	R_L=7.5Ω
Fall time	t_f *	-	45	-	ns	R_G=10Ω
Total gate charge	Q_g *	-	10.5	-	nC	I_D=−4A, V_{DD}≒−15V
Gate-source charge	Q_{gs} *	-	3.0	-	nC	V_{GS}=−5V R_L=3.8Ω
Gate-drain charge	Q_{gd} *	-	3.3	-	nC	R_G=10Ω

*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=−4A, V_{GS}=0V

*Pulsed

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● Electrical characteristics curves

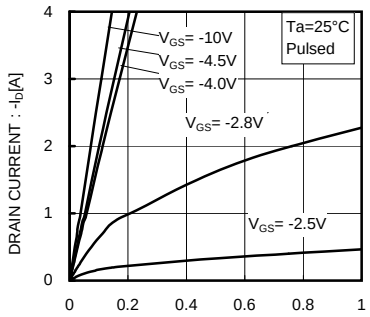


Fig.1 Typical Output Characteristics(Ⅰ)

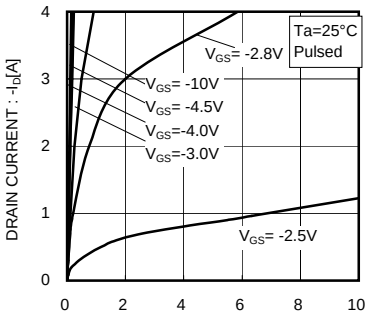


Fig.2 Typical Output Characteristics(Ⅱ)

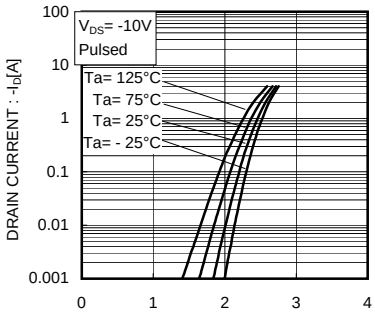


Fig.3 Typical Transfer Characteristics

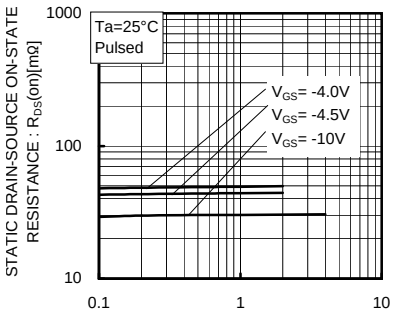


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(Ⅰ)

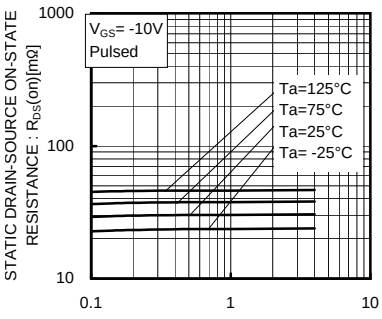


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(Ⅱ)

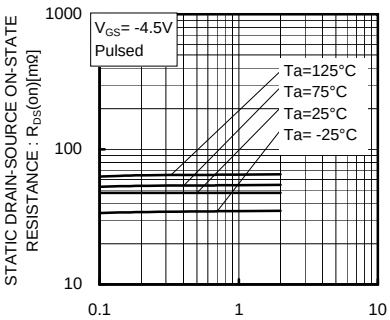


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(Ⅲ)

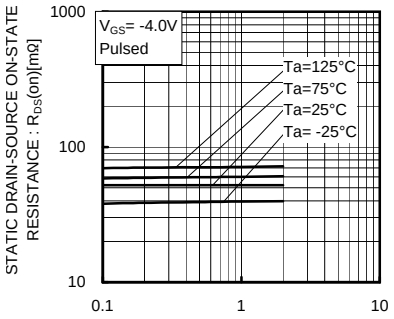


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(Ⅳ)

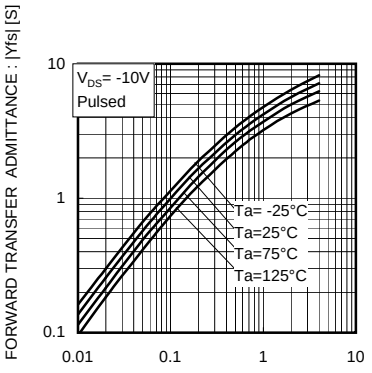


Fig.8 Forward Transfer Admittance vs. Drain Current

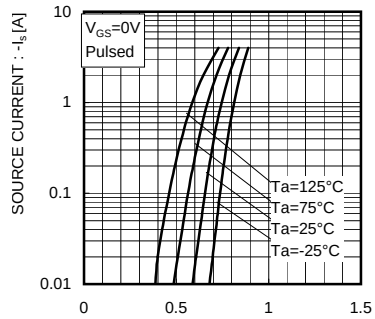


Fig.9 Reverse Drain Current vs. Sourse-Drain Voltage

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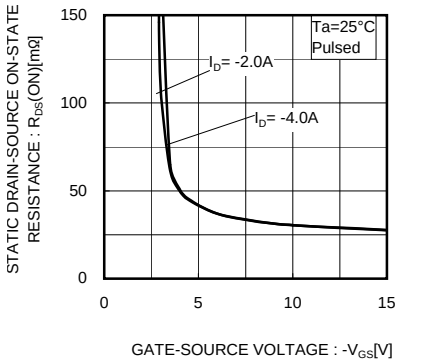


Fig.10 Static Drain-Source On-State Resistance vs. Gate Source Voltage

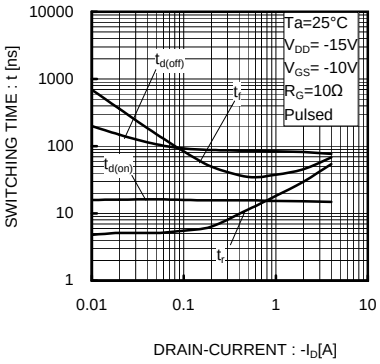


Fig.11 Switching Characteristics

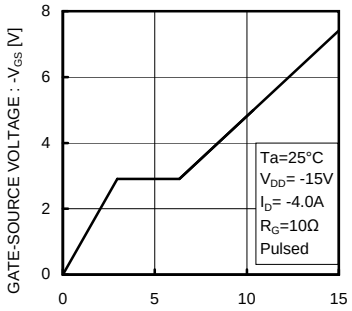


Fig.12 Dynamic Input Characteristics

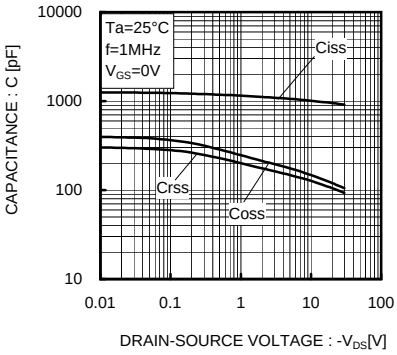


Fig.13 Typical Capacitance vs. Drain-Source Voltage

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● Measurement circuits

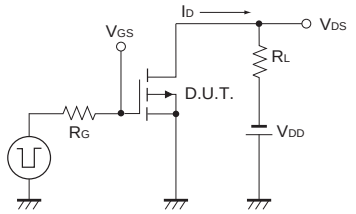


Fig.1-1 Switching time measurement circuit

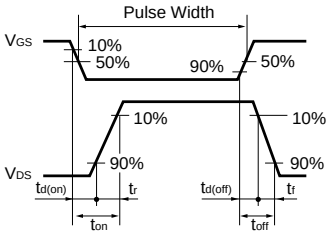


Fig.1-2 Switching Waveforms

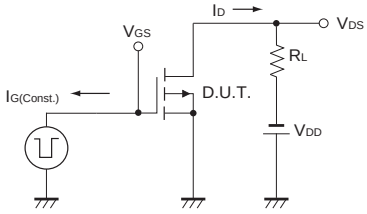


Fig.2-1 Gate charge measurement circuit

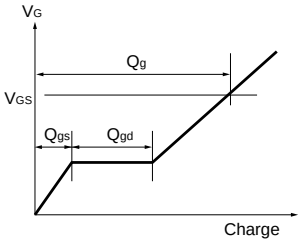


Fig.2-2 Gate Charge Waveform

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