

# 4V Drive Nch MOS FET

## RSR020N06

### ●Structure

Silicon N-channel  
MOSFET

### ●Features

- 1) Low on-resistance.
- 2) Built-in G-S Protection Diode.
- 3) Small Surface Mount Package (TSMT3) .

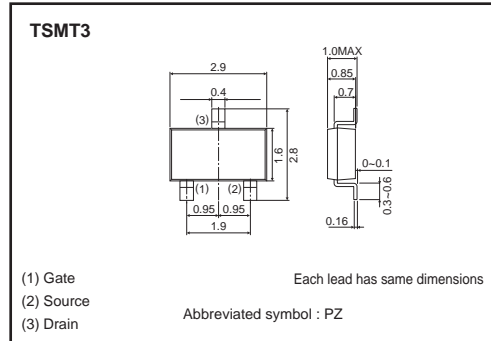
### ●Application

Switching

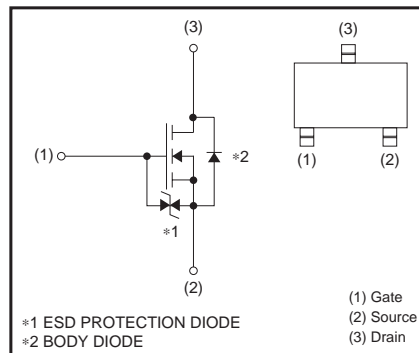
### ●Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	3000
RSR020N06		○

### ●Dimensions (Unit : mm)



### ●Inner circuit



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

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DSS}$	60	V	
Gate-source voltage	$V_{GSS}$	$\pm 20$	V	
Drain current	Continuous	$I_D$	$\pm 2$	A
	Pulsed	$I_{DP}^{*1}$	$\pm 8$	A
Source current (Body diode)	Continuous	$I_S$	0.8	A
	Pulsed	$I_{SP}^{*1}$	8	A
Total power dissipation	$P_D^{*2}$	1.0	W	
Range of channel temperature	$T_{ch}$	150	°C	
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	$R_{th}(ch-a)^*$	125	°C / W

\*2 When mounted on a ceramic board.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	–	–	$\pm 10$	$\mu A$	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	60	–	–	V	$I_D=1mA, V_{GS}=0V$
Zero gate voltage drain current	$I_{DSS}$	–	–	1	$\mu A$	$V_{DS}=60V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	1.0	–	2.5	V	$V_{DS}=10V, I_D=1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	–	120	170	m $\Omega$	$I_D=2A, V_{GS}=10V$
		–	140	195		$I_D=2A, V_{GS}=4.5V$
		–	150	210		$I_D=2A, V_{GS}=4V$
Forward transfer admittance	$ Y_{fs} $ *	1.3	–	–	S	$V_{DS}=10V, I_D=2A$
Input capacitance	$C_{iss}$	–	180	–	pF	$V_{DS}=10V$
Output capacitance	$C_{oss}$	–	50	–	pF	$V_{GS}=0V$
Reverse transfer capacitance	$C_{rss}$	–	22	–	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	–	6	–	ns	$V_{DD}=30V, I_D=1A$
Rise time	$t_r$ *	–	10	–	ns	$V_{GS}=10V$
Turn-off delay time	$t_{d(off)}$ *	–	20	–	ns	$R_L=30\Omega$
Fall time	$t_f$ *	–	6	–	ns	$R_G=10\Omega$
Total gate charge	$Q_g$ *	–	2.7	–	nC	$V_{DD}=30V$
Gate-source charge	$Q_{gs}$ *	–	1.0	–	nC	$I_D=2A, V_{GS}=5V$
Gate-drain charge	$Q_{gd}$ *	–	0.6	–	nC	$R_L=15\Omega, R_G=10\Omega$

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	$V_{SD}$ *	–	–	1.2	V	$I_S=2A, V_{GS}=0V$

\*Pulsed

●Electrical characteristic curves

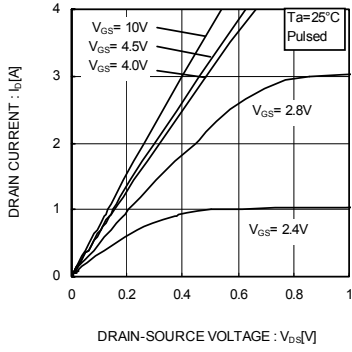


Fig.1 Typical Output Characteristics( I )

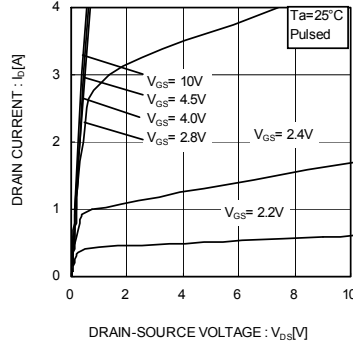


Fig.2 Typical Output Characteristics( II )

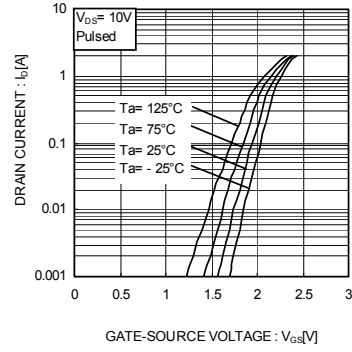


Fig.3 Typical Transfer Characteristics

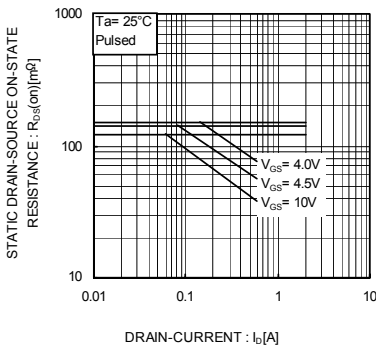


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( I )

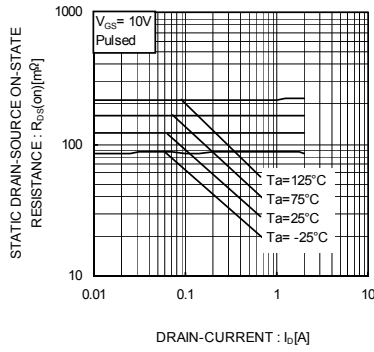


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current( II )

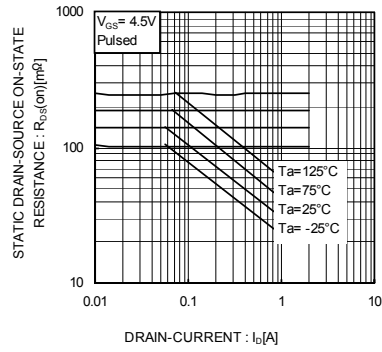


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current( III )

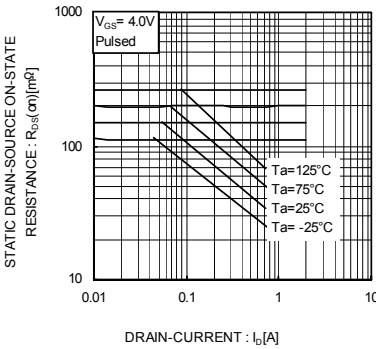


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current( IV )

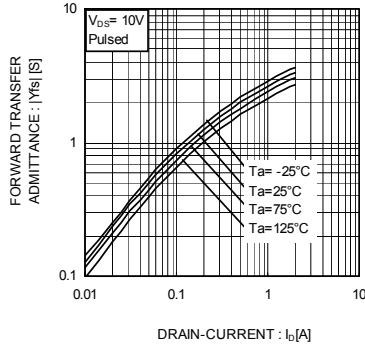


Fig.8 Forward Transfer Admittance vs. Drain Current

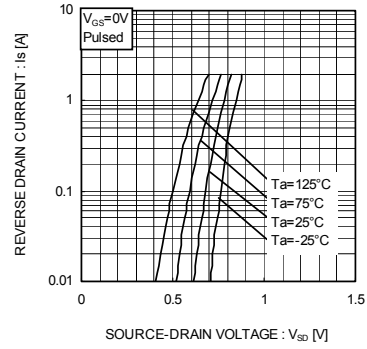


Fig.9 Reverse Drain Current vs. Source-Drain Voltage

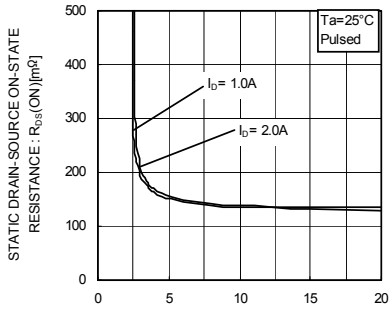


Fig.10. Static Drain-Source On-State Resistance vs. Gate Source Voltage

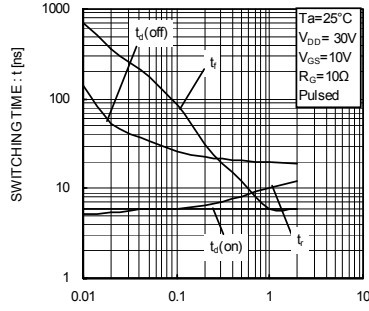


Fig.11 Switching Characteristics

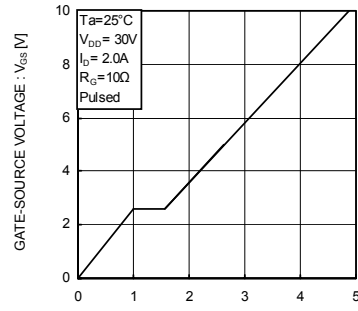


Fig.12 Dynamic Input Characteristics

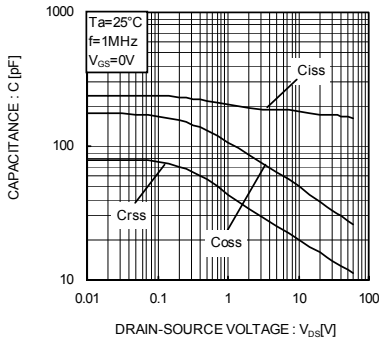


Fig.13 Typical Capacitance vs. Drain-Source Voltage

● Measurement circuit

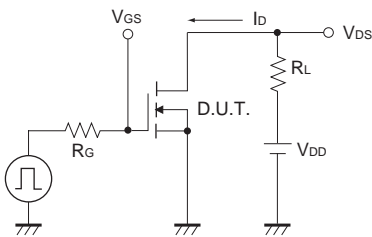


Fig.1-1 Switching time measurement circuit

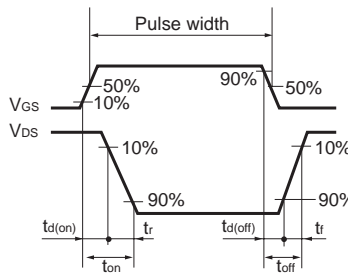


Fig.1-2 Switching waveforms

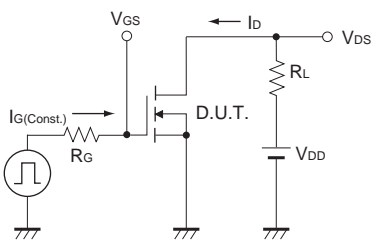


Fig.2-1 Gate charge measurement circuit

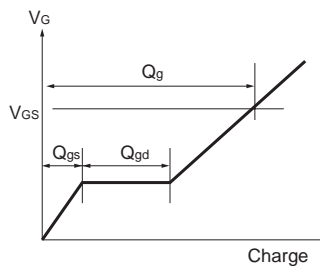


Fig.2-2 Gate charge waveform