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10V Drive Nch MOSFET

RSJ400N06

● Structure

Silicon N-channel MOSFET

● Features

- 1) Low on-resistance.
- 2) High current
- 3) High power Package

● Application

Switching

● Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	1000
RSJ400N06		○

● Absolute maximum ratings (T_a = 25°C)

Parameter	Symbol	Limits	Unit	
Drain-source voltage	V _{DSS}	60	V	
Gate-source voltage	V _{GSS}	±20	V	
Drain current	Continuous	I _D	±40	A
	Pulsed	I _{DP} *1	±80	A
Source current (Body Diode)	Continuous	I _S	40	A
	Pulsed	I _{SP} *1	80	A
Power dissipation	P _D *2	50	W	
Channel temperature	T _{ch}	150	°C	
Range of storage temperature	T _{stg}	-55 to +150	°C	

*1 P_w≤10μs, Duty cycle≤1%

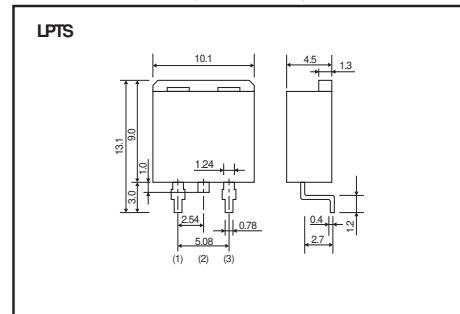
*2 T_c=25°C

● Thermal resistance

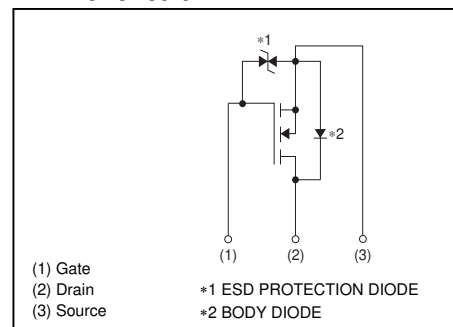
Parameter	Symbol	Limits	Unit
Channel to Case	R _{th(ch-c)} *	2.5	°C / W

* T_c=25°C

● Dimensions (Unit : mm)



● Inner circuit



●Electrical characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	± 10	μA	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$
Drain-source breakdown voltage	$V_{(BR)DSS}$	60	-	-	V	$I_D=1\text{mA}$, $V_{GS}=0\text{V}$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=60\text{V}$, $V_{GS}=0\text{V}$
Gate threshold voltage	$V_{GS(th)}$	1.0	-	3.0	V	$V_{DS}=10\text{V}$, $I_D=1\text{mA}$
Static drain-source on-state resistance	$R_{DS(on)}^*$	-	11	16	$\text{m}\Omega$	$I_D=40\text{A}$, $V_{GS}=10\text{V}$
Forward transfer admittance	$ Y_{fs} ^*$	14	-	-	S	$I_D=20\text{A}$, $V_{DS}=10\text{V}$
Input capacitance	C_{iss}	-	2400	-	pF	$V_{DS}=10\text{V}$
Output capacitance	C_{oss}	-	490	-	pF	$V_{GS}=0\text{V}$
Reverse transfer capacitance	C_{rss}	-	250	-	pF	$f=1\text{MHz}$
Turn-on delay time	$t_{d(on)}^*$	-	20	-	ns	$I_D=20\text{A}$, $V_{DD}\approx 30\text{V}$
Rise time	t_r^*	-	60	-	ns	$V_{GS}=10\text{V}$
Turn-off delay time	$t_{d(off)}^*$	-	90	-	ns	$R_L=1.5\Omega$
Fall time	t_f^*	-	140	-	ns	$R_G=10\Omega$
Total gate charge	Q_g^*	-	52	-	nC	$V_{DD}\approx 30\text{V}$
Gate-source charge	Q_{gs}^*	-	8	-	nC	$I_D=40\text{A}$,
Gate-drain charge	Q_{gd}^*	-	15	-	nC	$V_{GS}=10\text{V}$

*Pulsed

●Body diode characteristics (Source-Drain) ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD}^*	-	-	1.2	V	$I_s=40\text{A}$, $V_{GS}=0\text{V}$

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Static Drain-Source On-State Resistance vs. Drain Current

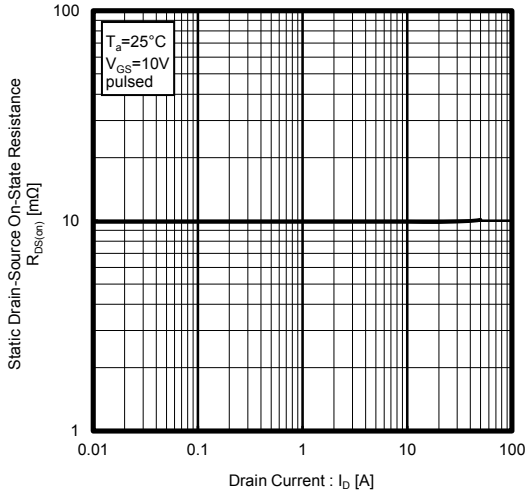


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

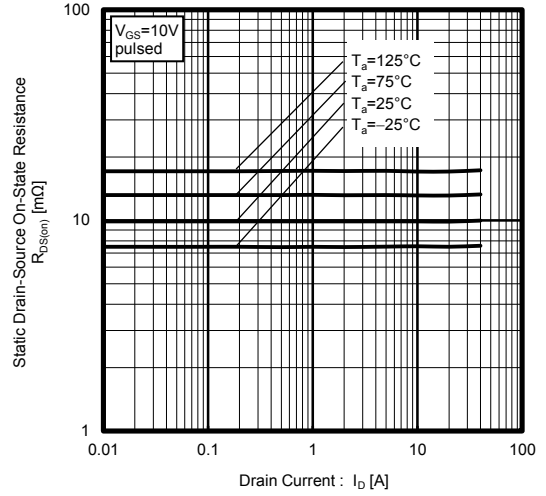


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

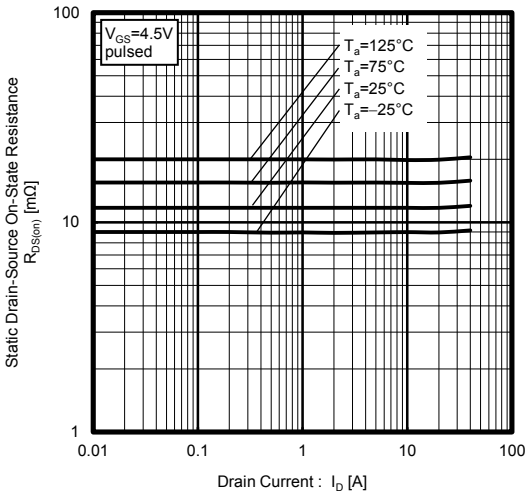


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

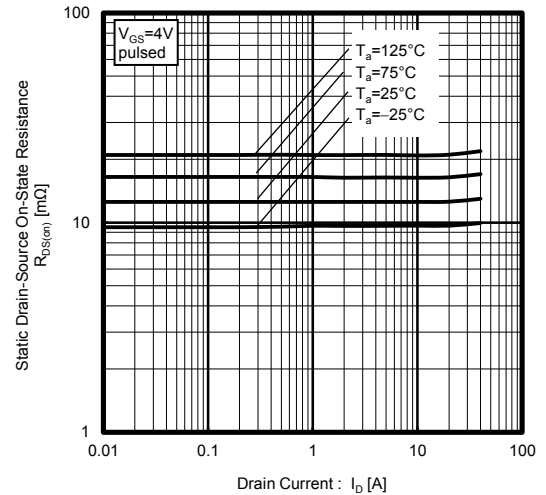


Fig.5 Forward Transfer Admittance vs. Drain Current

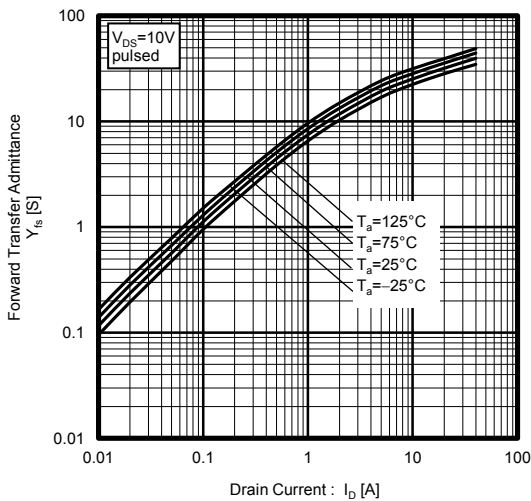


Fig.6 Typical Transfer Characteristics

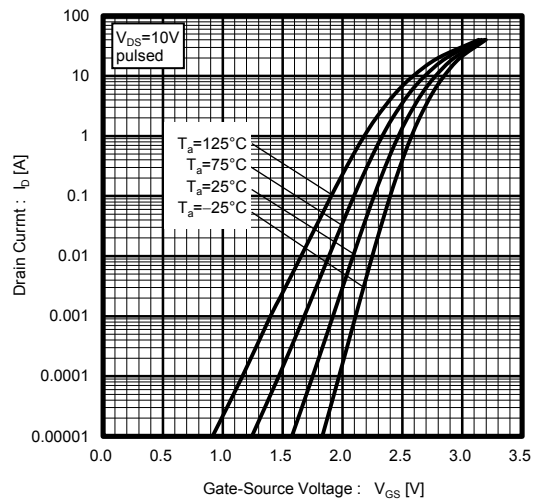


Fig.7 Source Current vs. Source-Drain Voltage

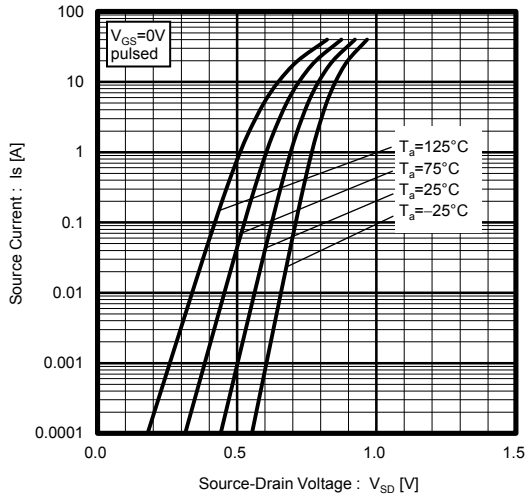


Fig.8 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

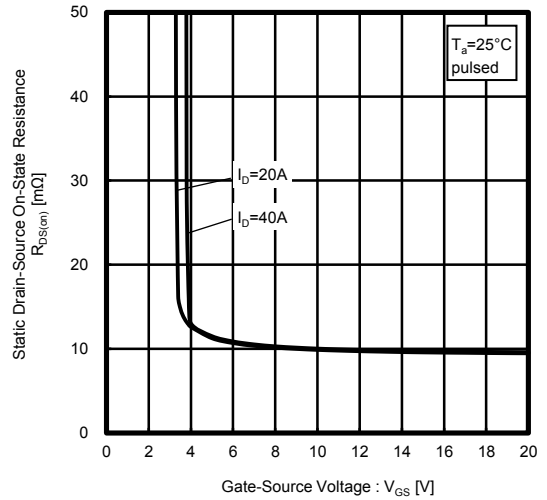


Fig.9 Switching Characteristics

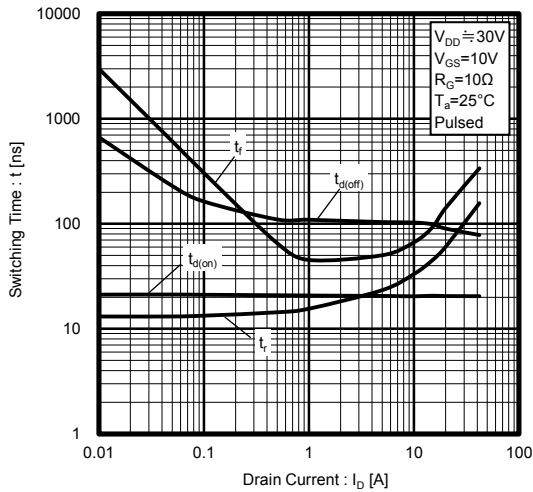


Fig.10 Dynamic Input Characteristics

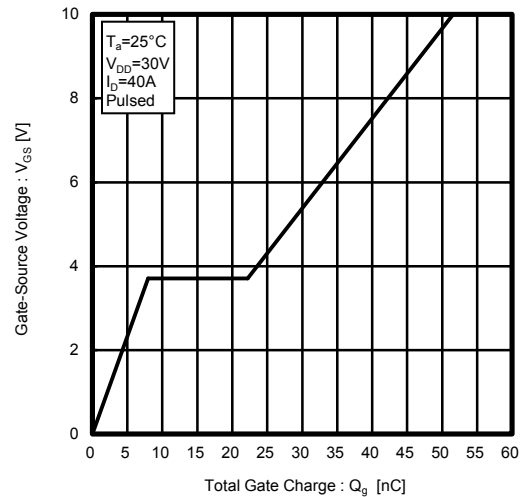


Fig.11 Typical Capacitance vs. Drain-Source Voltage

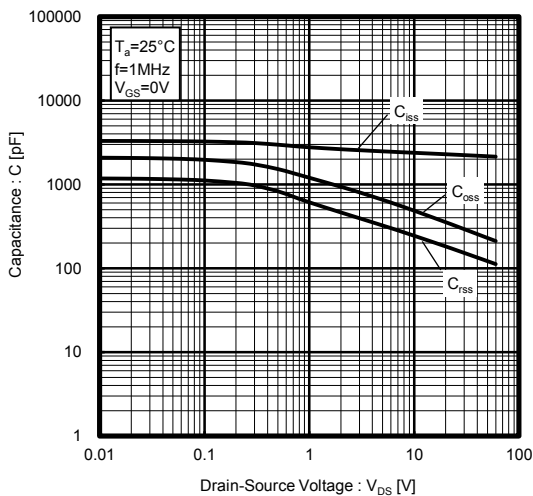
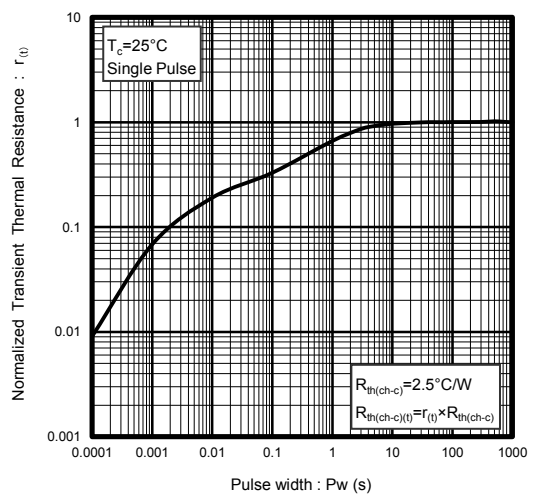


Fig.12 Normalized Transient Thermal Resistance v.s. Pulse Width



● Measurement circuits

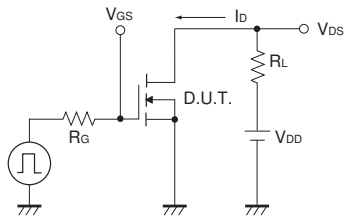


Fig.1-1 Switching Time Measurement Circuit

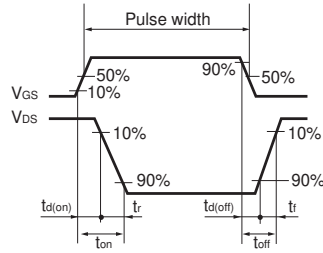


Fig.1-2 Switching Waveforms

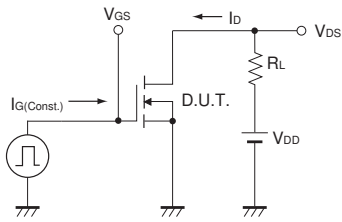


Fig.2-1 Gate Charge Measurement Circuit

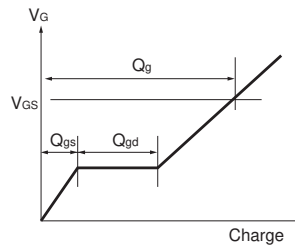


Fig.2-2 Gate Charge Waveform

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