

10V Drive Nch MOSFET

RSJ450N04

● **Structure**

Silicon N-channel MOSFET

● **Features**

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

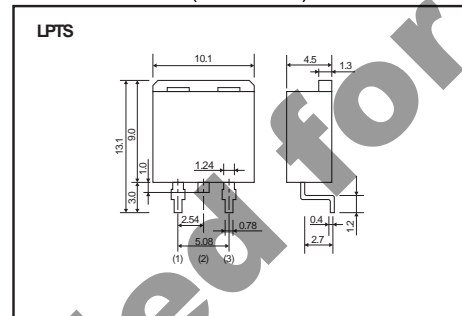
● **Application**

Switching

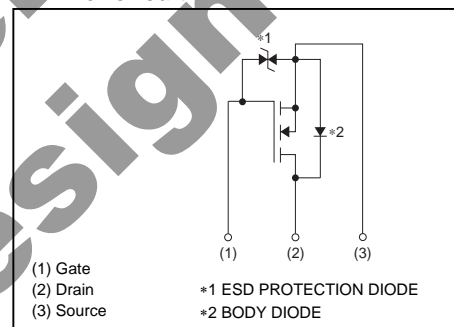
● **Packaging specifications**

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	1000
RSJ450N04		○

● **Dimensions (Unit : mm)**



● **Inner circuit**



● **Absolute maximum ratings (T_a = 25°C)**

Parameter	Symbol	Limits	Unit
Drain-source voltage	V _{DSS}	40	V
Gate-source voltage	V _{GSS}	±20	V
Drain current	Continuous	I _D	±45
	Pulsed	I _{DP} *1	±90
Source current (Body Diode)	Continuous	I _S	40
	Pulsed	I _{SP} *1	90
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 ≤ 10W, 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

●Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	± 10	μA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	40	-	-	V	$I_D=1mA, V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=40V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	1.2	-	3.0	V	$V_{DS}=10V, I_D=1mA$
Static drain-source on-state resistance	$R_{DS(on)}^*$	-	9.5	13.5	m Ω	$I_D=25A, V_{GS}=10V$
Forward transfer admittance	$ Y_{fs} ^*$	10	-	-	S	$I_D=25A, V_{DS}=10V$
Input capacitance	C_{iss}	-	2400	-	pF	$V_{DS}=25V$
Output capacitance	C_{oss}	-	380	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	-	170	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	-	25	-	ns	$I_D=25A, V_{DD}\approx 25V$
Rise time	t_r^*	-	225	-	ns	$V_{GS}=10V$
Turn-off delay time	$t_{d(off)}^*$	-	90	-	ns	$R_L=1.0\Omega$
Fall time	t_f^*	-	390	-	ns	$R_G=10\Omega$
Total gate charge	Q_g^*	-	43	-	nC	$V_{DD}\approx 25V$
Gate-source charge	Q_{gs}^*	-	12	-	nC	$I_D=45A,$
Gate-drain charge	Q_{gd}^*	-	6	-	nC	$V_{GS}=10V$

*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD}^*	-	-	1.2	V	$I_s=25A, V_{GS}=0V$

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (I)

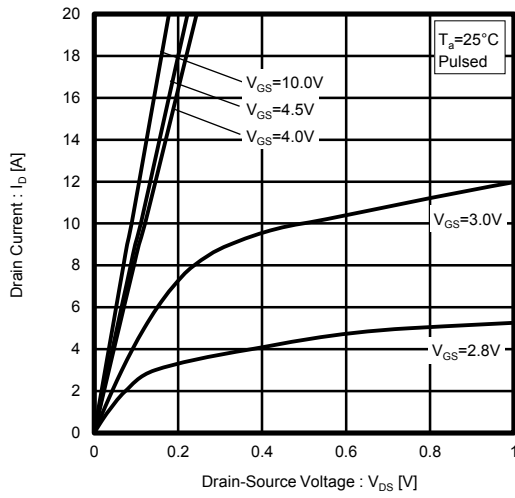


Fig.2 Typical Output Characteristics (II)

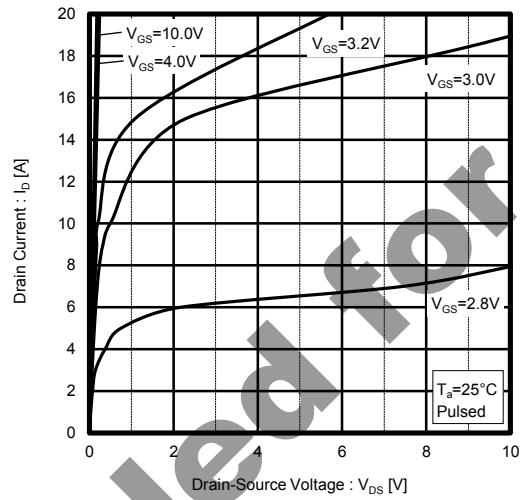


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

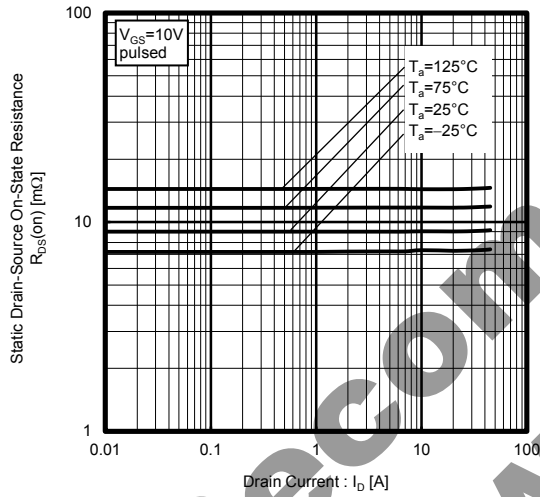


Fig.4 Forward Transfer Admittance vs. Drain Current

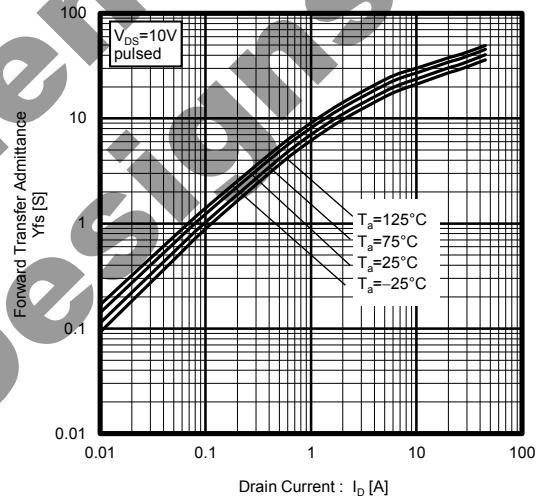


Fig.5 Typical Transfer Characteristics

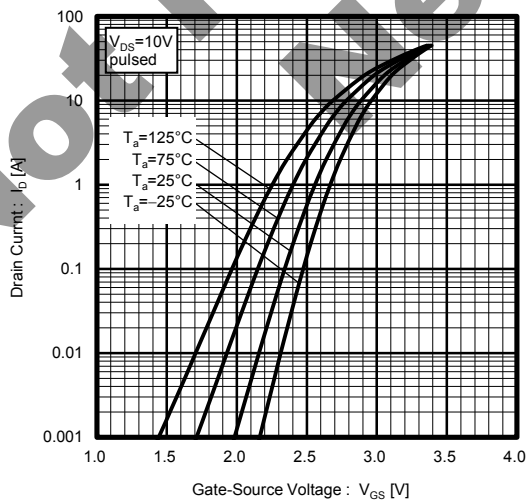


Fig.6 Source Current vs. Source-Drain Voltage

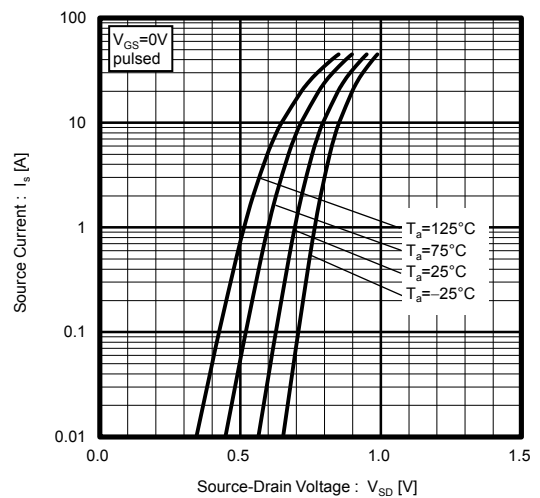


Fig.7 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

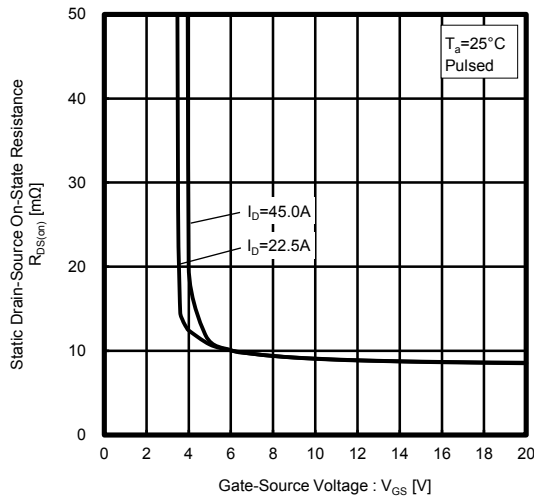


Fig.8 Switching Characteristics

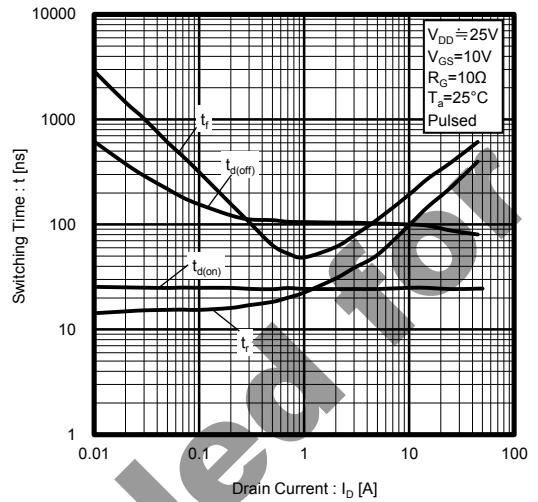


Fig.9 Dynamic Input Characteristics

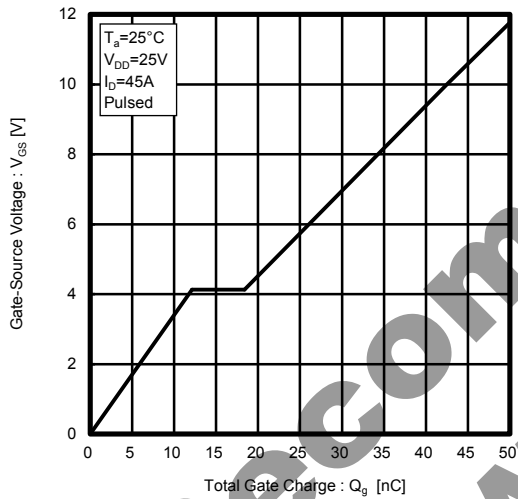


Fig.10 Typical Capacitance vs. Drain-Source Voltage

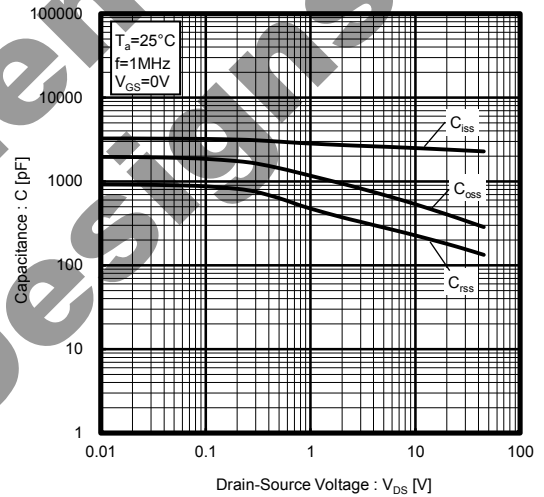


Fig.11 Maximum Safe Operating Area

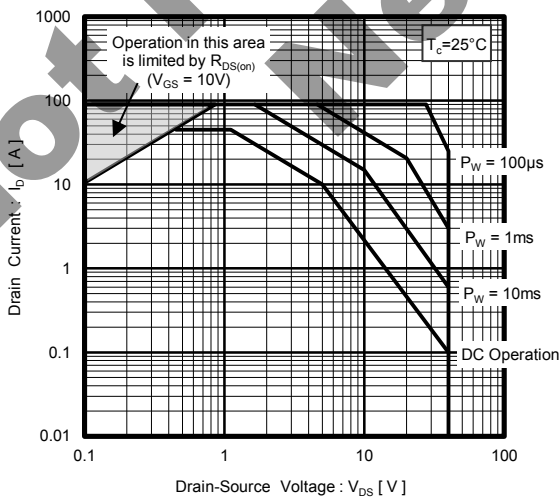
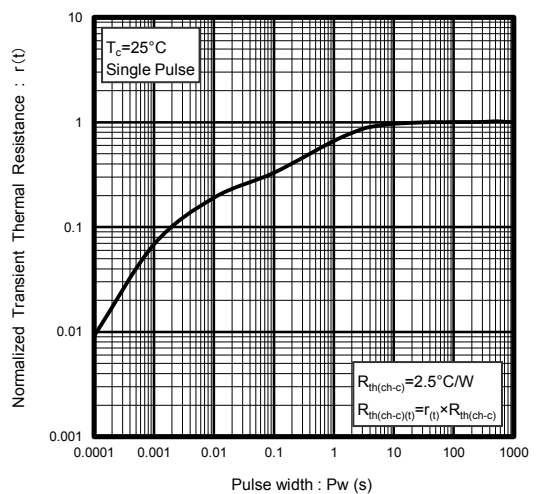


Fig.12 Normalized Transient Thermal Resistance v.s. Pulse Width



● Measurement circuits

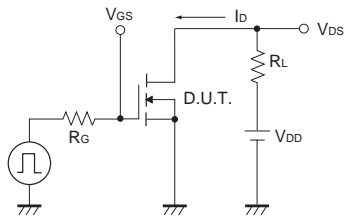


Fig.1-1 Switching Time Measurement Circuit

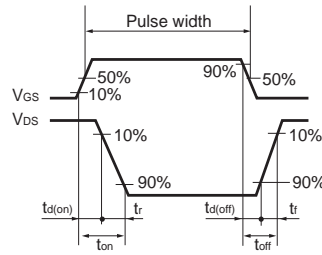


Fig.1-2 Switching Waveforms

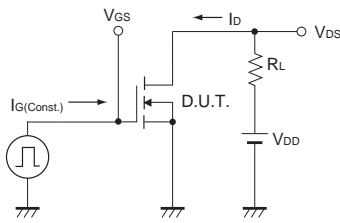


Fig.2-1 Gate Charge Measurement Circuit

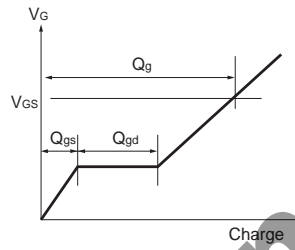


Fig.2-2 Gate Charge Waveform

Not Recommended for New Designs

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