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10V Drive Nch MOSFET

RSJ450N04

● Structure

Silicon N-channel MOSFET

● Features

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

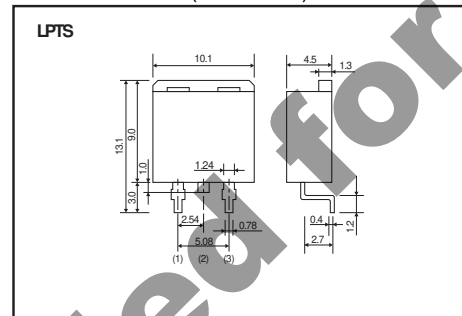
● Application

Switching

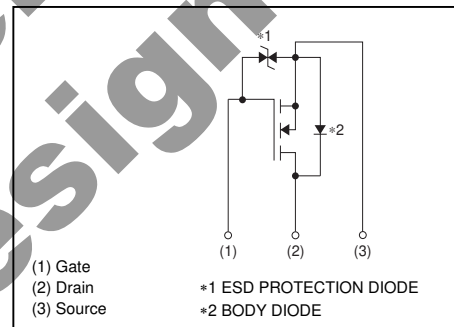
● Packaging specifications

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

● Dimensions (Unit : mm)



● Inner circuit



● Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit	
Drain-source voltage	V_{DSS}	40	V	
Gate-source voltage	V_{GSS}	± 20	V	
Drain current	Continuous	I_D	± 45	A
	Pulsed	I_{DP} *1	± 90	A
Source current (Body Diode)	Continuous	I_S	40	A
	Pulsed	I_{SP} *1	90	A
Power dissipation	P_D *2	50	W	
Channel temperature	T_{ch}	150	$^\circ\text{C}$	
Range of storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$	

*1 $P_w \leq 10\text{W}$, Duty cycle $\leq 1\%$

*2 $T_c = 25^\circ\text{C}$

● Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to Case	$R_{th(ch-c)}$ *	2.5	$^\circ\text{C} / \text{W}$

* $T_c = 25^\circ\text{C}$

●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_{riss}	-	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)

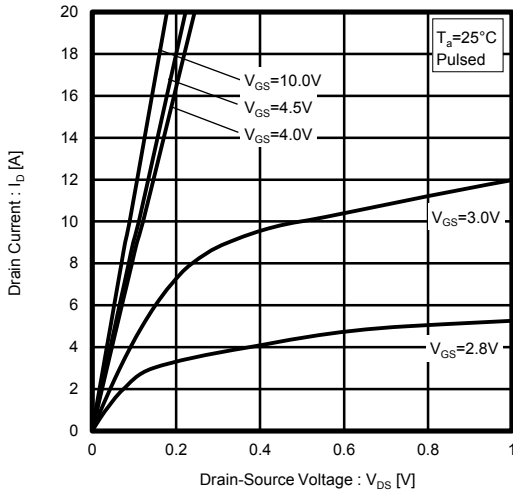


Fig.2 Typical Output Characteristics (II)

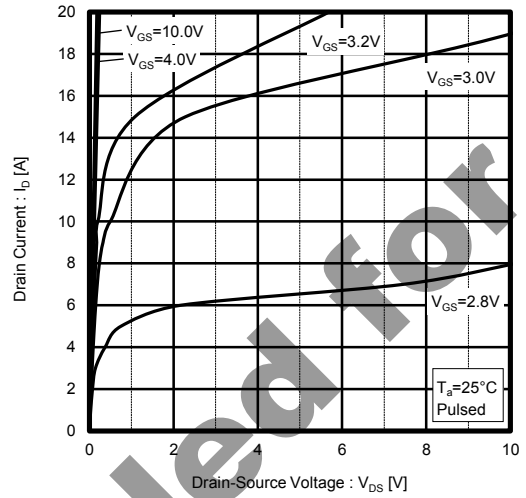


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

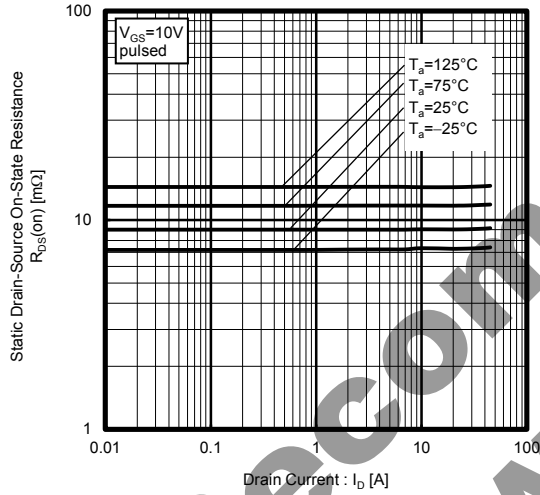


Fig.4 Forward Transfer Admittance vs. Drain Current

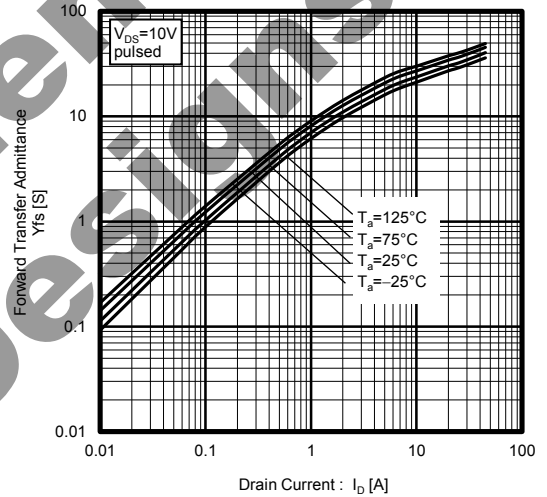


Fig.5 Typical Transfer Characteristics

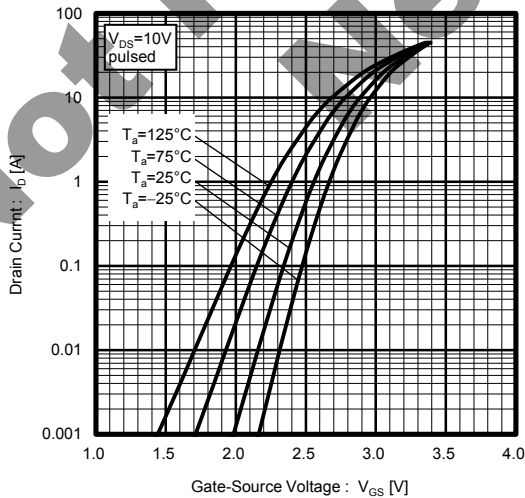


Fig.6 Source Current vs. Source-Drain Voltage

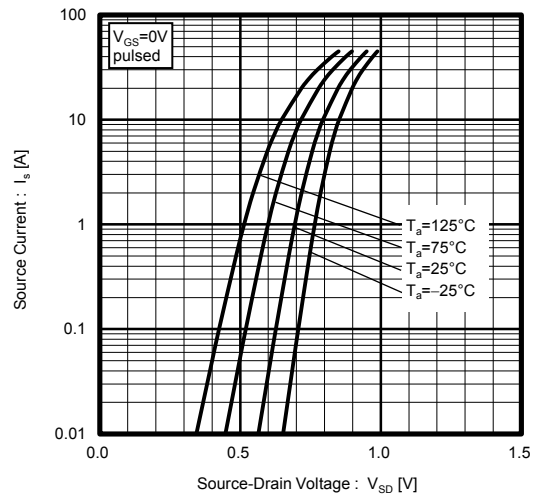


Fig.7 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

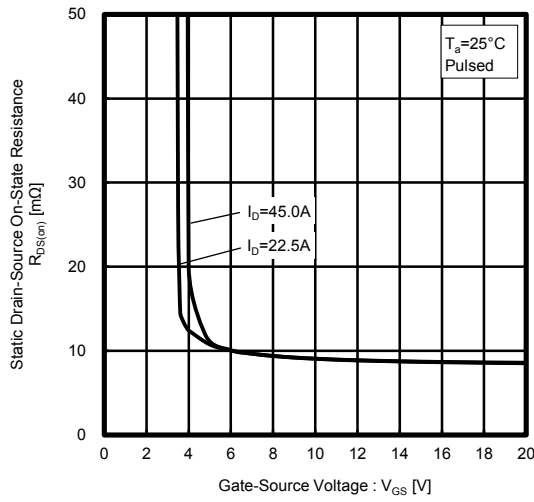


Fig.8 Switching Characteristics

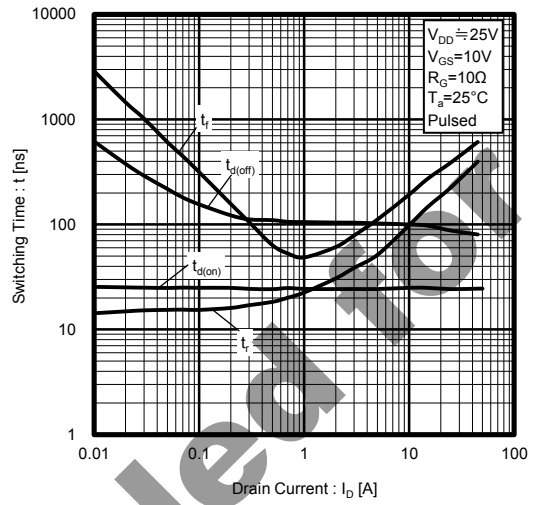


Fig.9 Dynamic Input Characteristics

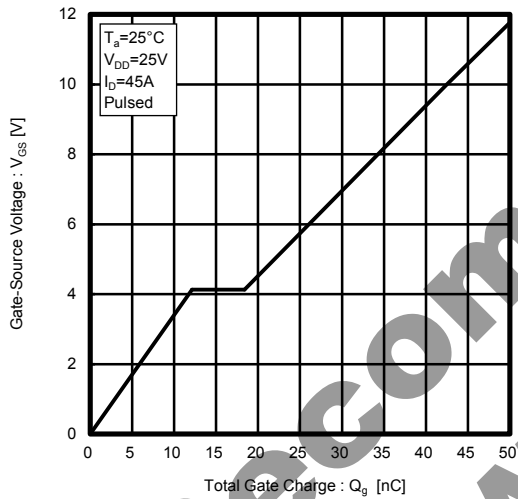


Fig.10 Typical Capacitance vs. Drain-Source Voltage

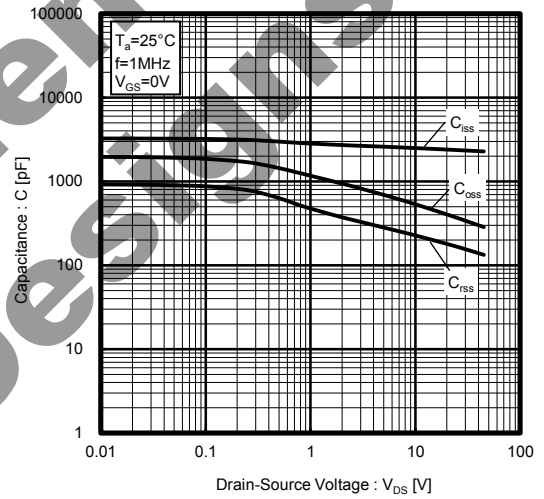


Fig.11 Maximum Safe Operating Area

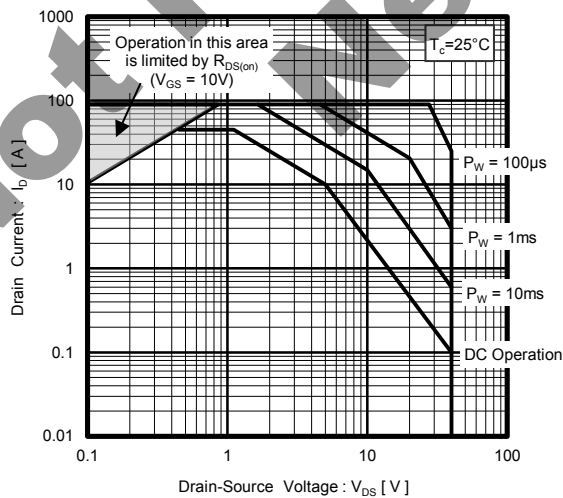
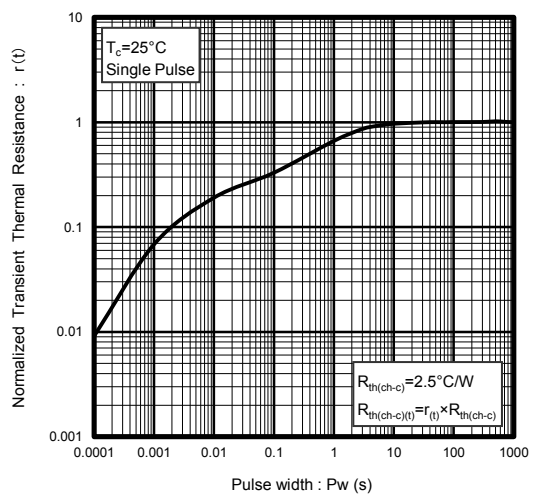


Fig.12 Normalized Transient Thermal Resistance v.s. Pulse Width



● Measurement circuits

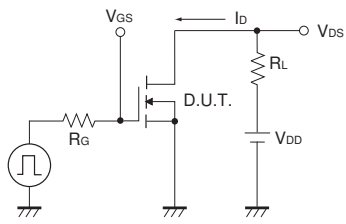


Fig.1-1 Switching Time Measurement Circuit

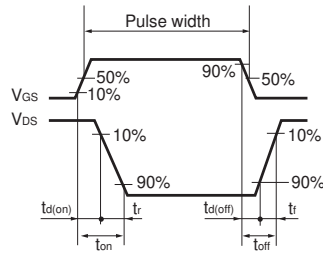


Fig.1-2 Switching Waveforms

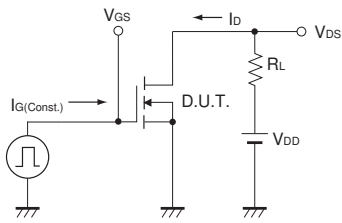


Fig.2-1 Gate Charge Measurement Circuit

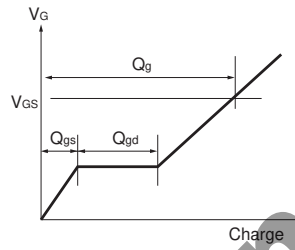


Fig.2-2 Gate Charge Waveform

Not Recommended for New Designs

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