10V Drive Nch MOSFET

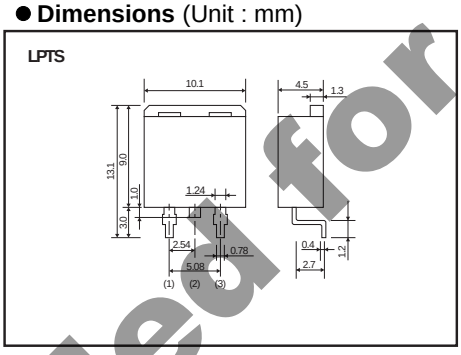
RCJ450N20

● Structure
Silicon N-channel MOSFET

● Features
1) Low on-resistance.
2) High-speed switching.
3) Wide range of SOA.
4) Drive circuits can be simple.
5) Parallel use is easy.

● Application
Switching

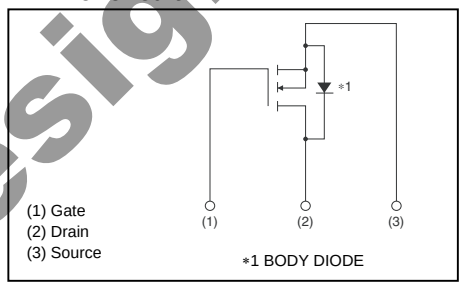
● Dimensions (Unit : mm)



● Packaging specifications

Type	Package	Taping
	Code	TL
	Quantity (pcs)	1000
RCJ450N20		○

● Inner circuit



● Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	200	V
Gate-source voltage		V_{GSS}	±30	V
Drain current	Continuous	I_D *3	±45	A
	Pulsed	I_{DP} *1	±180	A
Source current (Body Diode)	Continuous	I_S *3	45	A
	Pulsed	I_{SP} *1	180	A
Avalanche current		I_{AS} *2	22.5	A
Avalanche energy		E_{AS} *2	160	mJ
Power dissipation		P_D *4	211	W
Channel temperature		Tch	150	°C
Range of storage temperature		Tstg	−55 to +150	°C

*1 Pw≤10μs, Duty cycle≤1%

*2 L ≒ 500μH, V_{DD}=50V, R_G=25Ω, T_{ch}=25°C

*3 Limited only by maximum temperature allowed.

*4 T_C=25°C

● Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to Case	Rth (j-c) *	0.59	°C / W

* T_C=25°C

* Limited only by maximum temperature allowed.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	±100	nA	V_{GS}=±30V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)DSS}$	200	-	-	V	I_D=1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=200V, V_{GS}=0V
Gate threshold voltage	$V_{GS\ (th)}$	3.0	-	5.0	V	V_{DS}=10V, I_D=1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$*	-	42	55	mΩ	I_D=22.5A, V_{GS}=10V
Forward transfer admittance	$\|Y_{fs}\|$*	17.0	-	-	S	V_{DS}=10V, I_D=22.5A
Input capacitance	C_{iss}	-	4200	-	pF	V_{DS}=25V
Output capacitance	C_{oss}	-	270	-	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	-	160	-	pF	f=1MHz
Turn-on delay time	$t_{d(on)}$ *	-	52	-	ns	V_{DD}≒100V, I_D=22.5A
Rise time	t_r *	-	210	-	ns	V_{GS}=10V
Turn-off delay time	$t_{d(off)}$ *	-	90	-	ns	R_L=4.4Ω
Fall time	t_f *	-	70	-	ns	R_G=10Ω
Total gate charge	Q_g *	-	80	-	nC	V_{DD}≒100V, I_D=45A
Gate-source charge	Q_{gs} *	-	28	-	nC	V_{GS}=10V
Gate-drain charge	Q_{gd} *	-	28	-	nC	

*Pulsed

● **Body diode characteristics** (Source-Drain)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD} *	-	-	1.5	V	I_s=45A, V_{GS}=0V

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (Ⅰ)

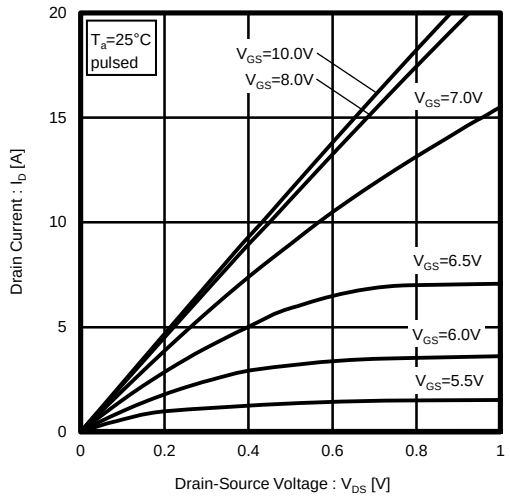


Fig.2 Typical Output Characteristics (Ⅱ)

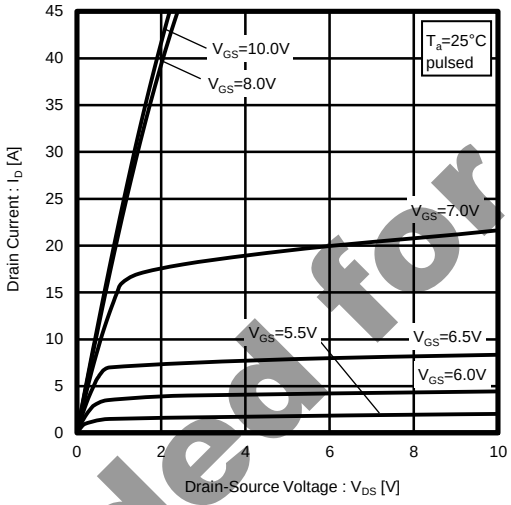


Fig.3 Typical Transfer Characteristics

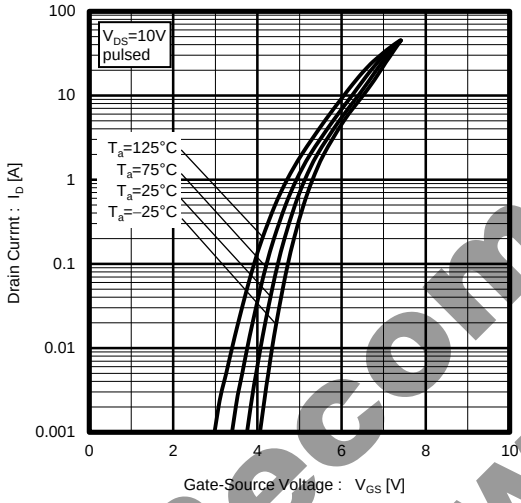


Fig.4 Gate Threshold Voltage vs. Channel Temperature

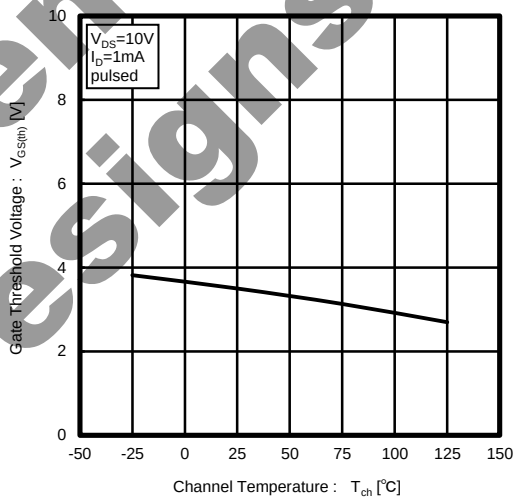


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

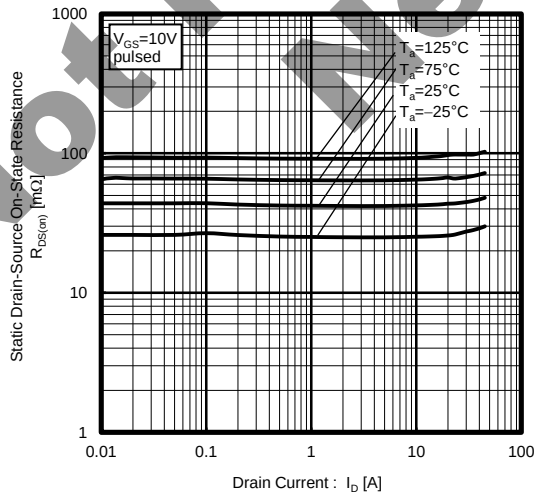


Fig.6 Static Drain-Source On-State Resistance vs. Channel Temperature

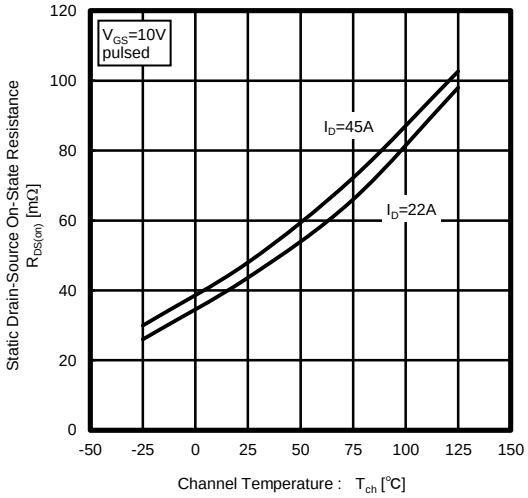


Fig.7 Forward Transfer Admittance vs. Drain Current

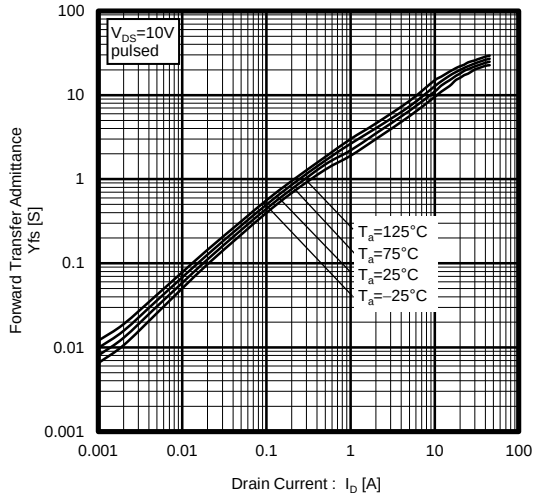


Fig.8 Source Current vs. Source-Drain Voltage

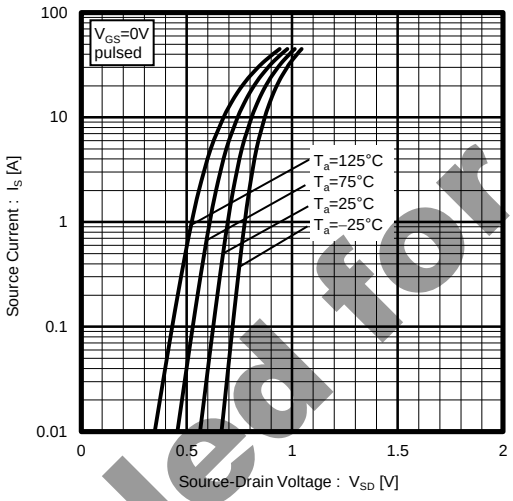


Fig.9 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

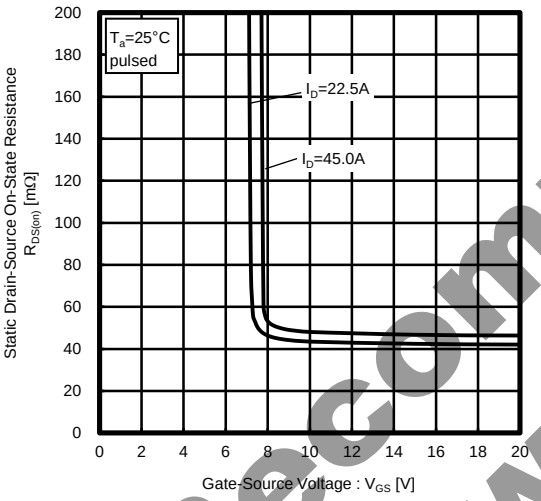


Fig.10 Switching Characteristics

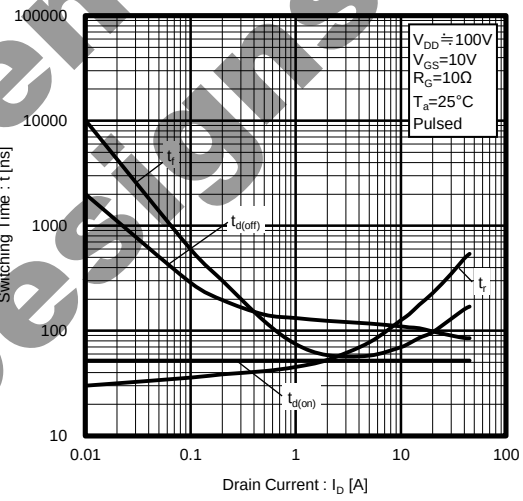


Fig.11 Dynamic Input Characteristics

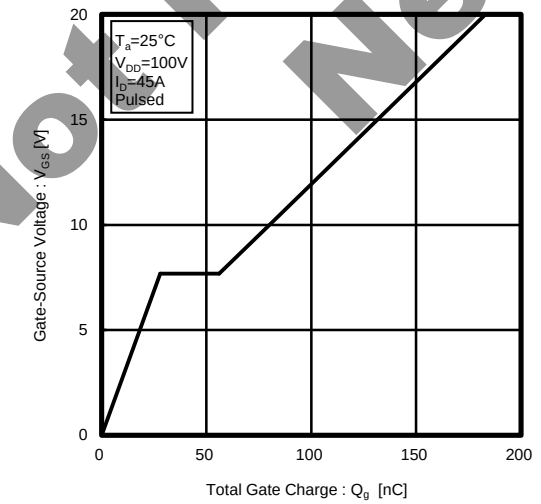


Fig.12 Typical Capacitance vs. Drain-Source Voltage

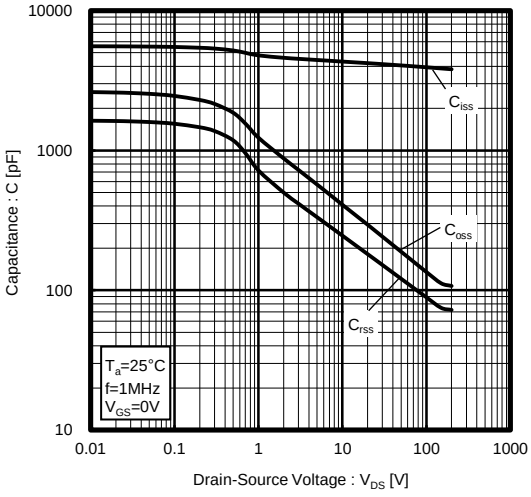


Fig.13 Reverse Recovery Time vs. Source Current

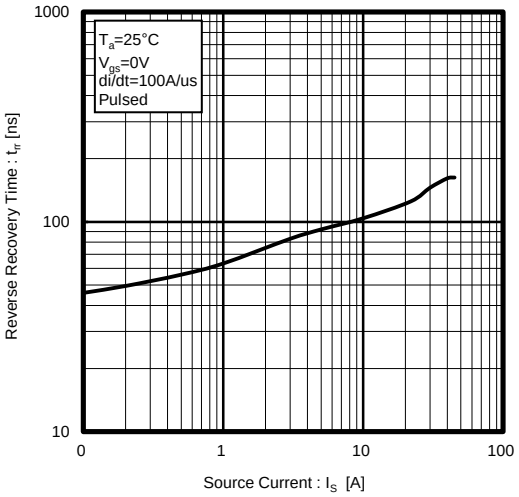


Fig.14 Maximum Safe Operating Area

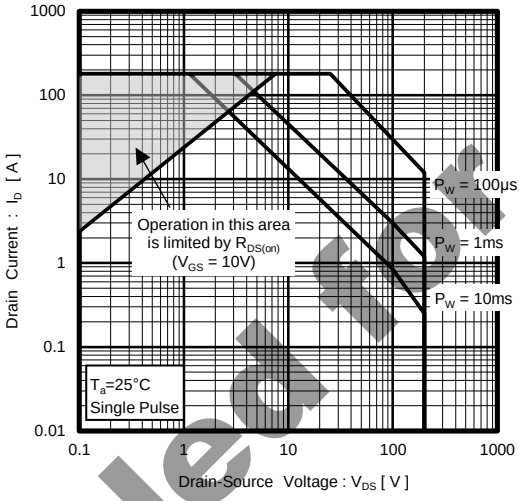
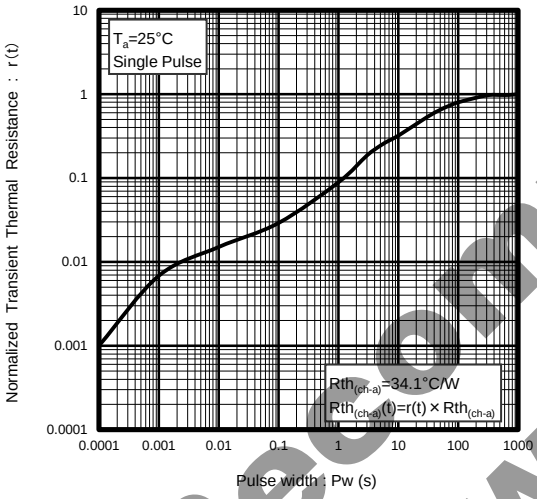


Fig.15 Normalized Transient Thermal Resistance v.s. Pulse Width



● **Measurement circuits**

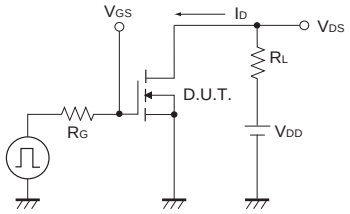


Fig.1-1 Switching Time Measurement Circuit

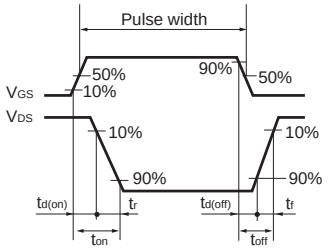


Fig.1-2 Switching Waveforms

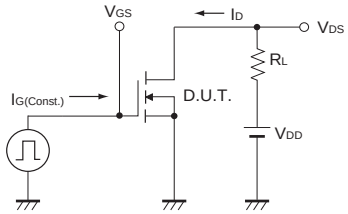


Fig.2-1 Gate Charge Measurement Circuit

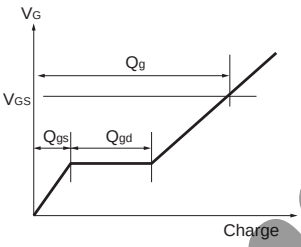


Fig.2-2 Gate Charge Waveform

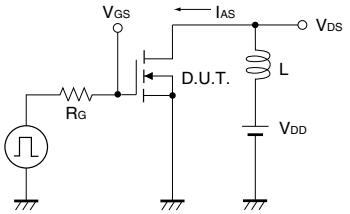


Fig.3-1 Avalanche Measurement Circuit

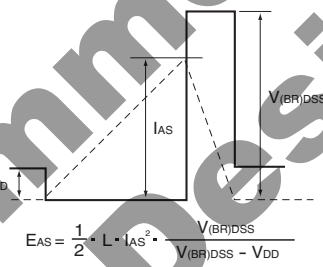


Fig.3-2 Avalanche Waveform

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CLASSⅢ	CLASSⅢ	CLASSⅡb	CLASSⅢ
CLASSⅣ		CLASSⅢ	

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5. Please verify and confirm characteristics of the final or mounted products in using the Products.

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7. De-rate Power Dissipation depending on ambient temperature. When used in sealed area, confirm that it is the use in the range that does not exceed the maximum junction temperature.

8. Confirm that operation temperature is within the specified range described in the product specification.

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2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

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   [b] the temperature or humidity exceeds those recommended by ROHM
   [c] the Products are exposed to direct sunshine or condensation
   [d] the Products are exposed to high Electrostatic

2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.

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4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

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