

10V Drive Nch MOSFET

RCJ330N25

● Structure

Silicon N-channel MOSFET

● Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Gate-source voltage
 V_{GS} guaranteed to be $\pm 30V$.
- 4) High package power.

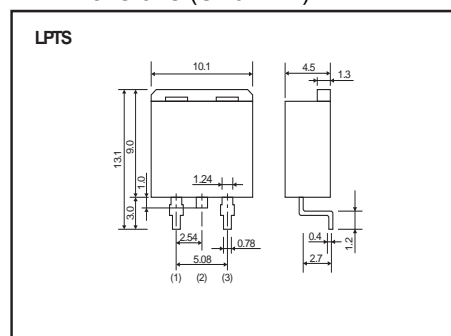
● Application

Switching

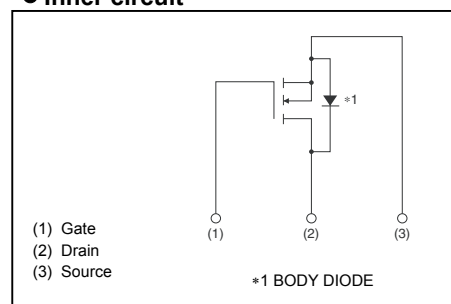
● Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	1000
RCJ330N25		O

● Dimensions (Unit : mm)



● Inner circuit



● Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DS}	250	V
Gate-source voltage		V_{GS}	± 30	V
Drain current	Continuous	I_D *3	± 33	A
	Pulsed	I_{DP} *1	± 132	A
Source current (Body Diode)	Continuous	I_S *3	26	A
	Pulsed	I_{SP} *1	104	A
Avalanche current		I_{AS} *2	16.5	A
Avalanche energy		E_{AS} *2	74.8	mJ
Power dissipation (Tc=25°C)		P_D	211	W
Channel temperature		Tch	150	°C
Range of storage temperature		Tstg	-55 to +150	°C

*1 $P_w \leq 10\mu s$, Duty cycle $\leq 1\%$

*2 $L \leq 500\mu H$, $V_{DS} = 50V$, $R_g = 25\Omega$, starting Tch=25°C

*3 Limited only by maximum temperature allowed.

● Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to Case	$R_{th(j-c)}$ *	0.59	°C / W

* Tc=25°C

● Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	± 100	nA	$V_{GS} = \pm 30V, V_{DS} = 0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	250	-	-	V	$I_D = 1mA, V_{GS} = 0V$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS} = 250V, V_{GS} = 0V$
Gate threshold voltage	$V_{GS(th)}$	3	-	5	V	$V_{DS} = 10V, I_D = 1mA$
Static drain-source on-state resistance	$R_{DS(on)}$	-	77	105	m Ω	$I_D = 16.5A, V_{GS} = 10V$
Forward transfer admittance	$ Y_{fs} $	10	20	-	S	$I_D = 16.5A, V_{DS} = 10V$
Input capacitance	C_{iss}	-	4500	-	pF	$V_{DS} = 25V$
Output capacitance	C_{oss}	-	220	-	pF	$V_{GS} = 0V$
Reverse transfer capacitance	C_{rss}	-	130	-	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$	-	50	-	ns	$I_D = 16.5A, V_{DD} \approx 125V$
Rise time	t_r	-	200	-	ns	$V_{GS} = 10V$
Turn-off delay time	$t_{d(off)}$	-	120	-	ns	$R_L = 7.6\Omega$
Fall time	t_f	-	140	-	ns	$R_G = 10\Omega$
Total gate charge	Q_g	-	80	-	nC	$I_D = 33A,$
Gate-source charge	Q_{gs}	-	25	-	nC	$V_{DD} \approx 125V$
Gate-drain charge	Q_{gd}	-	27	-	nC	$V_{GS} = 10V$

*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD}	-	-	1.5	V	$I_s = 33A, V_{GS} = 0V$

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (I)

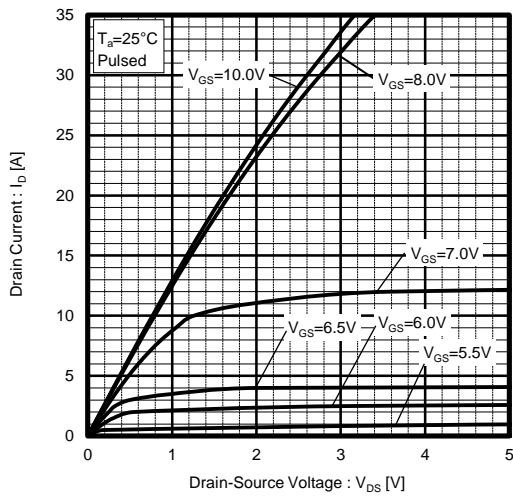


Fig.2 Typical Output Characteristics (II)

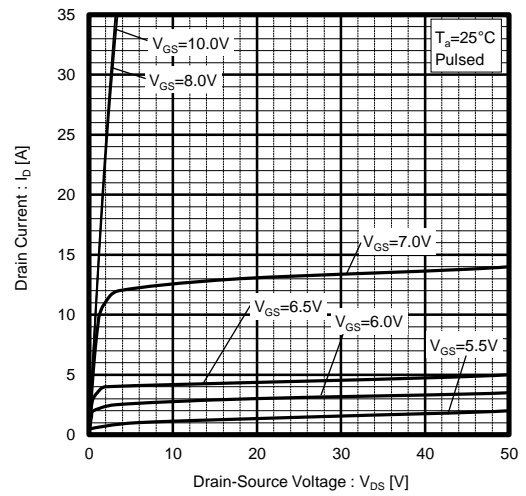


Fig.3 Typical Transfer Characteristics

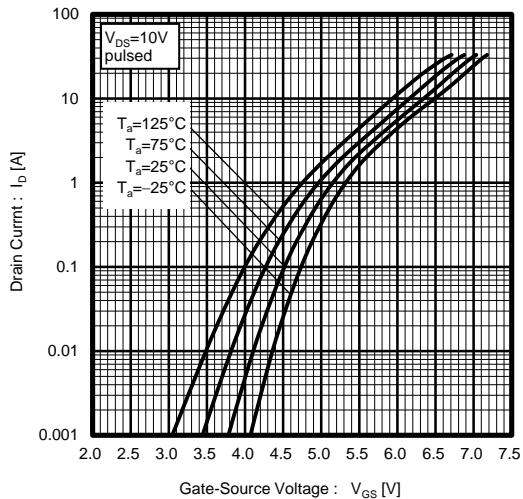


Fig.4 Gate Threshold Voltage vs. Channel Temperature

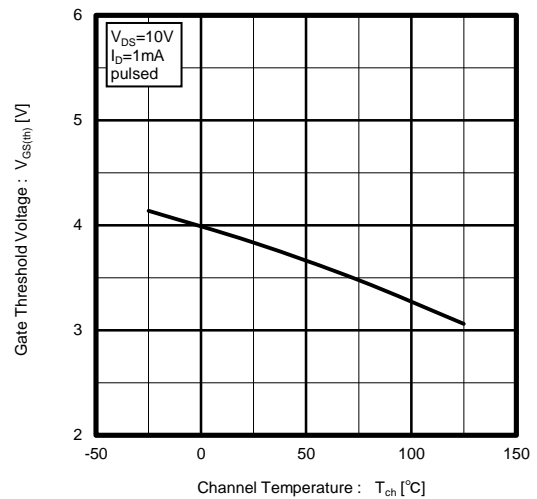


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

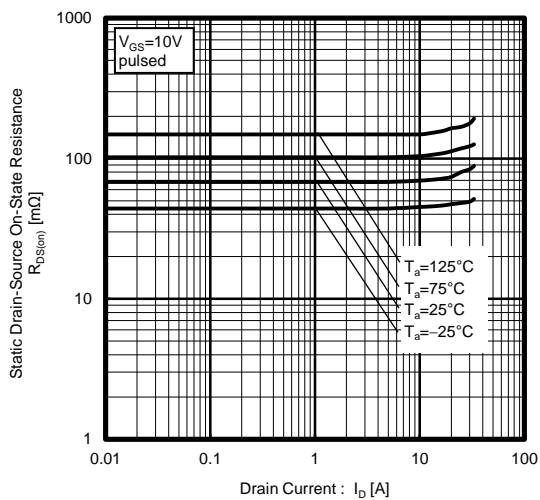


Fig.6 Static Drain-Source On-State Resistance vs. Channel Temperature

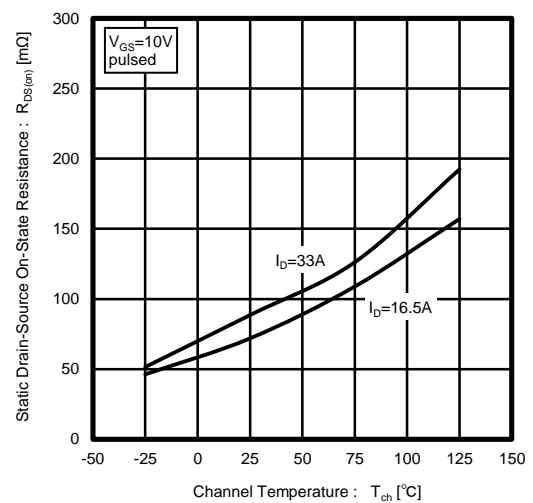


Fig.7 Forward Transfer Admittance vs. Drain Current

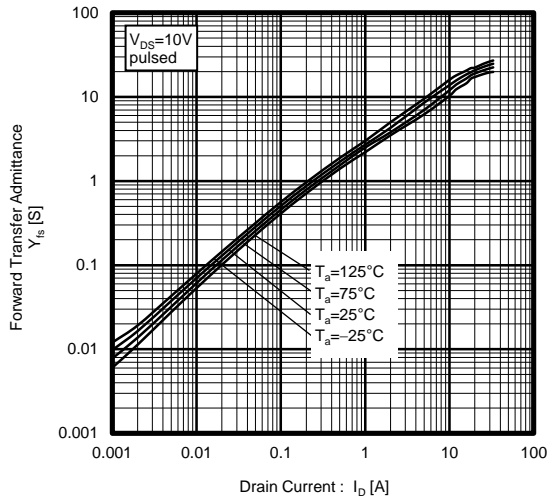


Fig.8 Source Current vs. Source-Drain Voltage

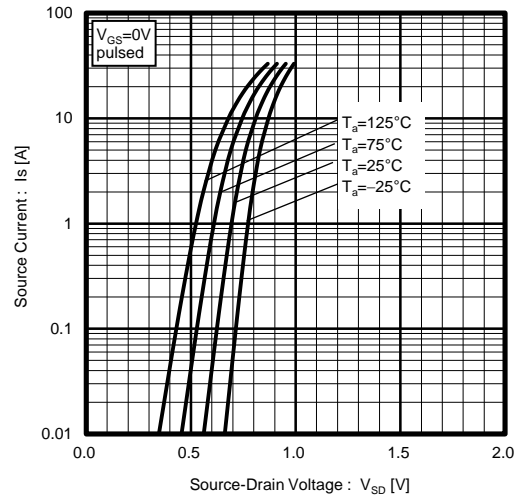


Fig.9 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

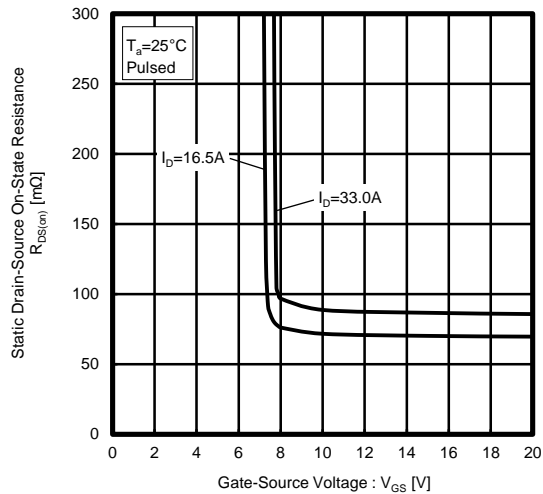


Fig.10 Switching Characteristics

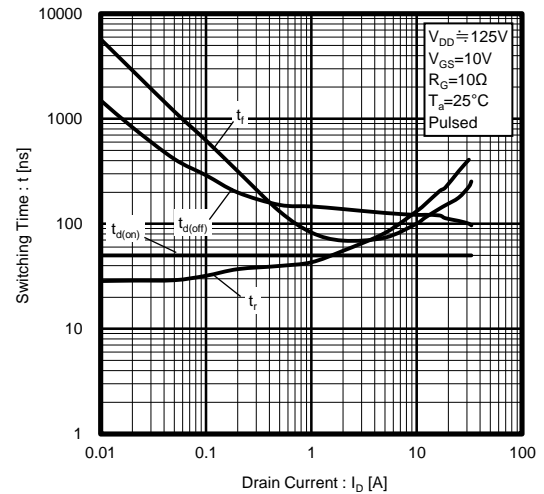


Fig.11 Dynamic Input Characteristics

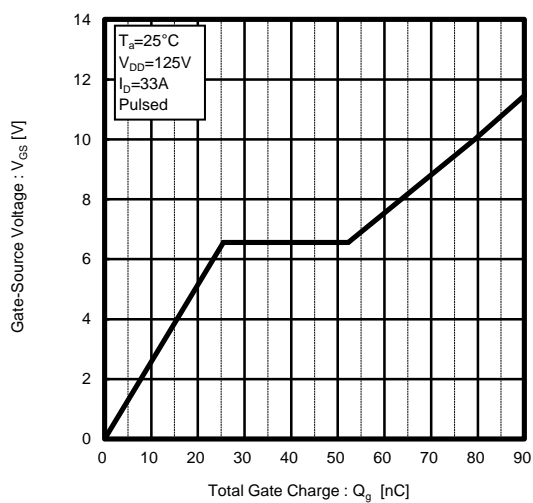


Fig.12 Typical Capacitance vs. Drain-Source Voltage

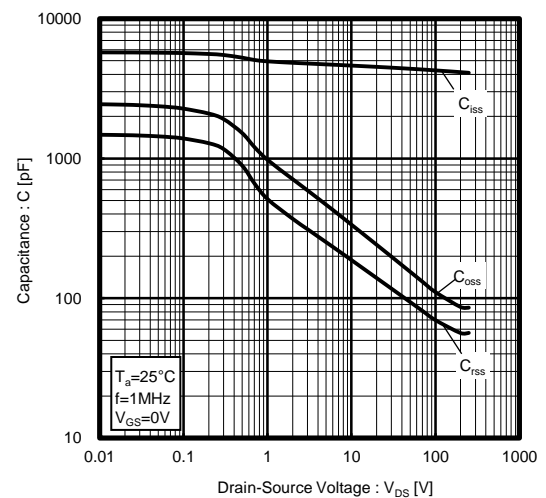


Fig.13 Maximum Safe Operating Area

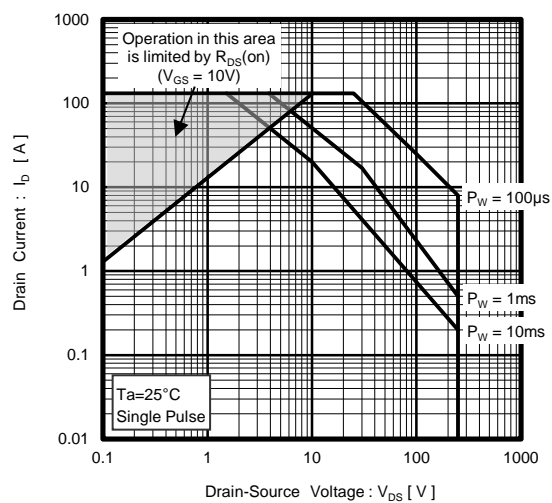
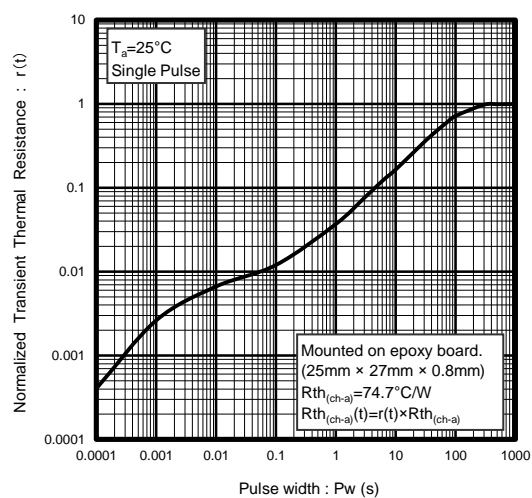


Fig.14 Normalized Transient Thermal Resistance v.s. Pulse Width



● Measurement circuits

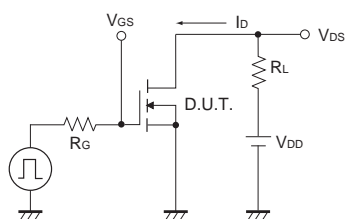


Fig.1-1 Switching Time Measurement Circuit

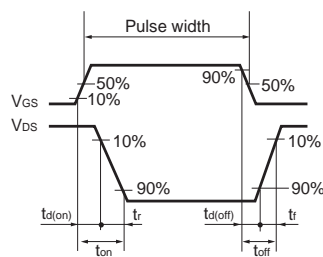


Fig.1-2 Switching Waveforms

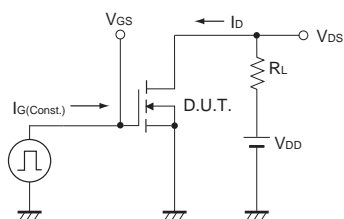


Fig.2-1 Gate Charge Measurement Circuit

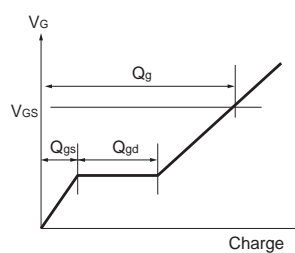


Fig.2-2 Gate Charge Waveform

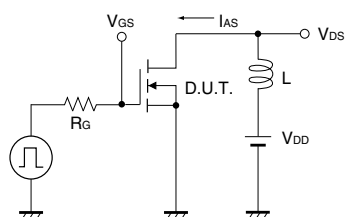


Fig.3-1 Avalanche Measurement Circuit

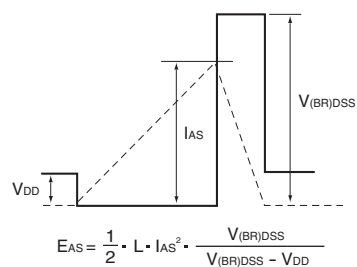


Fig.3-2 Avalanche Waveform

$$E_{AS} = \frac{1}{2} \cdot L \cdot I_{AS}^2 \cdot \frac{V_{(BR)DSS}}{V_{(BR)DSS} - V_{DD}}$$

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JAPAN	USA	EU	CHINA
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CLASS IV		CLASS III	

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- Please verify and confirm characteristics of the final or mounted products in using the Products.
- In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
- De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.
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This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of ionizer, friction prevention and temperature / humidity control).

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 - [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.
3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
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